ESPHM 2025

16th EUROPEAN SYMPOSIUM OF PORCINE HEALTH MANAGEMENT

BERN/SWITZERLAND
May 21st - 23rd, 2025

ECPHM EUROPEAN COLLEGE OF PORCINE HEALTH MANAGEMENT

Universität Bern | Universität Zürich
vetsuisse-fakultät

CONGRESS VENUE Kursaal Bern, Switzerland

PROCEEDINGS





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Proceedings

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Welcome MESSAGE

Dear Esteemed Members of the Porcine Health Management Community,

It is my great pleasure and honor to extend to you a warm welcome to the European Symposium of Porcine Health Management (ESPHM) 2025, which will be held in the picturesque city of Bern, Switzerland.

As we gather together for this momentous event, we reflect on the journey that has brought us here. Originally announced in 2019 and planned for 2020, our congress faced unprecedented challenges due to the global pandemic. However, through resilience and adaptation, we transformed the obstacles into opportunities, convening virtually in 2021 to continue our vital discussions and collaborations in porcine health management.

Now, in May 2025, we are delighted to invite you to join us in person in Bern, Switzerland. Nestled amidst the breathtaking landscapes of the Swiss Alps, Bern offers a captivating backdrop for our congress. Its rich history, vibrant culture, and renowned hospitality promise to enhance our experience as we come together to advance the field of porcine health management.

Our congress is organized jointly with the European College of Porcine Health Management (ECPHM) and the Veterinary Practitioner Council (VPC), exemplifying our commitment to excellence in education, research, and practice. With a diverse program featuring keynote lectures, round table discussions, parallel scientific sessions, and endless networking opportunities, the ESPHM 2025 promises to be a stimulating and enriching event for all attendees.

We extend our invitation to all pig veterinarians, researchers, industry professionals, policymakers, and other stakeholders who share our passion for promoting the health and well-being of pigs. Your expertise, insights, and contributions are invaluable as we work together to address the evolving challenges and opportunities in porcine health management.

On behalf of the organizing committee, I invite you to join us in Bern for a congress that promises not only professional growth and collaboration but also unforgettable experiences and connections. Together, let us forge new pathways, share knowledge, and inspire innovation in porcine health management.

We look forward to welcoming you to Bern, Switzerland, for the ESPHM 2025.

Warm regards,

Heiko Nathues
Chair of the Local Organizing Committee of the ESPHM 2025



Scientific COMMETTEE

LOCAL ORGANISING COMMITTEE



Heiko Nathues
Head of LOC and Chair of ESPHM 2025



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The ECPHM is a non-profit organization under the umbrella of the European Board of Veterinary Specialization (EBVS).
EBVS recognises and monitors veterinary speciality Colleges in Europe. It defines guidelines for the recognition and registration of specialists in areas of veterinary medicine in Europe, and maintains an updated register of European Veterinary Specialists. EBVS encourages and promotes the enhanced utilization and availability of veterinary specialist services to the public and the veterinary profession.

The ECPHM works for the advancement of health and welfare oriented porcine production management in the herd context in Europe, and the increase of the competency of those who practice in this field.

The major objectives of the ECPHM include:

• Establishing guidelines and standards of training for postgraduate education and experience prerequisite to become a veterinary specialist in the specialty of porcine health management.
• Examining and authenticating veterinarians as specialists in porcine herd health management to serve health and welfare of the animals, the economic outcome of the herd, and the production of safe quality product for consumers in a sustainable animal production by providing expert care for pigs.
• Encouraging research and other contributions to the science and practice of porcine herd health management including husbandry, reproduction, epidemiology, pathogenesis, diagnosis, therapy, prevention, and control of diseases directly or indirectly affecting pigs and the maintenance of healthy and productive pig herds.
• Porcine health management also includes the impact on quality and safety of pork and gives special consideration to herd health and production, production systems and targets, and the management of pig populations.
• Promoting communication and dissemination of knowledge.

The ECPHM is organized through different bodies that take care of the different activities performed:

• the Board represents the College and is its main government body;
• the Education Committee organizes educational events for the ECPHM residents, including the e-learning sessions, the pre-symposium workshop and the summer school. The Education Committee also approves Resident training programs;
• the Examination Committee prepares the annual exam and arranges the examination of residents;
• the Credentials Committee reviews and approves the applications for admittance to the residency program, as well as the applications to sit the exam, and review applications for recertification of the Diplomates;• the Nominations Committee manages and reviews the proposals for nominations in the different committees and board;
• the ECPHM activities are supported by a permanent Administrative Secretariat in Parma, Italy.

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The first ESPHM was organized by the ECPHM in 2009 in Copenhagen (Denmark). Subsequent meetings were organized in Hannover (Germany) and Helsinki (Finland). After the creation of the European Association of Porcine Health Management (EAPHM) in 2010, the following symposia were organized in a three-party fashion, involving the EAPHM, the ECPHM and the local organizers until ESPHM 2021.

ESPHM 2009 Copenhagen (Denmark)
ESPHM 2010 Hannover (Germany)
ESPHM 2011 Helsinki (Finland)
ESPHM 2012 Bruges (Belgium)
ESPHM 2013 Edinburgh (United Kingdom)
ESPHM 2014 Sorrento (Italy)
ESPHM 2015 Nantes (France)
ESPHM 2016 Dublin (Ireland) co-organized with IPVS
ESPHM 2017 Prague (Czech Republic)
ESPHM 2018 Barcelona (Spain)
ESPHM 2019 Utrecht (The Netherlands)
ESPHM 2021 Virtual Symposium
ESPHM 2022 Budapest (Hungary)
ESPHM 2023 Thessaloniki (Greece)
ESPHM 2024 Leipzig (Germany) co-organized with IPVS

By means of this organizational formula, the ESPHM has been held so far in various European Countries.

The 16th edition will be held in 2025 in Bern (Switzerland) and is jointly organized by the European College of Porcine Health Management (ECPHM), a renewed council of European pig practitioners (Veterinary Practitioner Council, VPC) and the Local Organizing Committee (LOC).
The symposium philosophy consists of mounting a sound program, with cutting-edge scientific-technical knowledge, practically oriented, which is able to catch the attention of swine veterinarians all over Europe, but with full international vocation.

The symposium's content includes invited lectures, initiating always with the state-of-art swine production in the organizing country, as well as oral communications, posters and flash talks. Importantly, the ESPHM is an excellent platform for introducing the ECPHM Residents into the scientific world, by presenting their studies (Resident oral communication sessions) and participating in the College activities organized around the symposium (e.g., Resident workshop, farm visits).
In addition, the ESPHM must serve as a vehicle for potentiating networking among pig veterinary professionals all around Europe, and emphasize the global character of a borderless profession. Also, Annual General Meetings of the ECPHM are organized within the program of the symposium, and facilitate that the critical mass of the college can join together once a year.

Porcine Health Management (PHM) is an open access peer-reviewed journal that aims to publish relevant, novel and revised information regarding all aspects of pig health medicine and production. The journal provides a venue for global research on pig health and production, including infectious and non-infectious diseases, reproduction, epidemiology, management, economics, genetics, housing, nutrition, animal welfare and ethics, legislation, food safety, drugs and surgery. This journal is aiming at readers, and attracting authors, with different levels of experience; Diplomates and Residents of the ECPHM and other colleges as well as PhD students and experienced researchers from outside! Anticipated articles include: original research, reviews, short communications, case reports, case studies and commentaries.

The Editors-in-Chief are **Paolo Martelli** (University of Parma, Italy) and **Heiko Nathues** (University of Bern, Switzerland).

Journal of Porcine Health Management – 2024 Highlights
Advancing Excellence in Swine Health and Welfare

- Impact Factor 2024: 3.2
- CiteScore 2024: 4.1
- Average Time to First Decision: 21 days
- Acceptance Rate: 42%
- Open Access – Global Reach: 100+ countries
- Editorial Board: International experts in swine medicine, virology, epidemiology, and welfare
- Submissions from 25+ Countries in 2024
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A research-driven global animal health company, we have been helping veterinary professionals and those who look after animals all around the world to reach far beyond animal health and welfare. We're truly global, based in 47 countries and working across more than 110. We have 21 R&D centers, 33 production sites and more than 7000 employees worldwide. Ceva's innovative health solutions include products, equipment, training, technical support, data analysis and specialized services to ensure their optimal use.
Ceva is a key partner for the swine sector, thanks to a broad range of veterinary products providing the right responses to the sanitary and zootechnical objectives of modern swine farming. The Group has invested heavily, especially in R&D, to offer the right products to meet the needs of professionals, notably in vaccines, reproduction and anti-infectives.
Ceva, as a gold Sponsor at ESPHM 2025 is taking the opportunity to communicate the strength in SW vaccines in Europe, being 3rd in the SW biologicals ranking. Also we will present our recently launched vaccine, Cirbloc M Hyo, and services as Ceva Lung Program, our exclusive tool to monitor Respiratory problems.
For more information, please come and visit us on our booth #16

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As the world's population continues to grow, the demand for protein soars. Kemin is dedicated to developing ingredients that help producers raise healthy livestock and poultry. We offer the most comprehensive portfolio of high-quality and science-based-services and solutions. Our nutritional ingredients and vaccines proactively address bacterial, viral, parasitic, as well as toxic challenges for a profitable preventive strategy while committing to responsible use of medicines. Our solutions are backed by a team of experts, as well as rigorous quality and safety standards, to ensure our customers get the most out of every product. In this way, we strengthen animals and foster a healthy and sustainable business for you – our customers.

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At MSD Animal Health, we are committed to preserving and improving the health, wellbeing, and performance of animals. Central to our mission is the transformation of pig farming through innovative health solutions and advanced on-farm technologies that promote the health and well-being of pigs. By integrating these state-of-the-art solutions, we empower veterinarians and farmers to embrace the future of pig farming, ultimately delivering greater value to consumers.

Our comprehensive portfolio includes one of the broadest ranges of veterinary pharmaceuticals, vaccines, health management solutions and services available. We also offer an extensive suite of connected technologies, including identification, traceability, and monitoring products that further enhance our commitment to animal health and well-being.

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Zoetis provides numerous health and wellness products and services for pigs. Our experts work with swine producers and veterinarians to help them make informed decisions to produce safe, high-quality pork. Some of our major products for pigs include the vaccines CircoMax® Myco, CircoMax®, and Suvaxyn® PRRS MLV; premium anti-infectives as Draxxin® and Naxcel® for Swine, and the immunological alternative to physical castration Improvac®. We also offer comprehensive education and training to those who work directly with pigs or supervise pig caregivers. Learn more: https://www.zoetis.com/products-and-science/livestock

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Anitox is a global leader specializing in pathogen control and feed milling efficiency solutions for the swine industry. Anitox supports swine producers and feed manufacturers by ensuring animal health and performance. Anitox supports producers by ensuring regulatory compliance and reducing contamination risks. Operating worldwide, Anitox maintains strong commitments to sustainability, animal welfare, and food safety, continuously driving advancements through research and technological innovation to deliver safer, healthier, and more profitable livestock production.

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Since 1997, BioChek has been supporting the poultry and swine industries to help improve livestock productivity and promote animal health. BioChek's extensive portfolio of veterinary diagnostics is used worldwide to detect a wide range of poultry and swine diseases. Our head office is based in the Netherlands, and we have an R&D department and production facility in the UK, a USDA-licensed facility in the USA, a regional office in South Africa, regional and local sales teams, and numerous distributors across the globe.

EXOPOL

EXOPOL is a veterinary biotechnology company specializing in diagnostic services, autogenous vaccines, and qPCR kits. Founded in 1993, we are based in Zaragoza, Spain, a key livestock-producing region in Europe. With a team of over 60 professionals, we dedicate 25% of our resources to R&D to develop innovative solutions for swine and other livestock species.
As one of Spain's leading diagnostic laboratories, we offer a Real-Time PCR portfolio of over 300 assays, ensuring precision and reliability in disease detection. We believe that accurate diagnostics are key to producing the best autovaccines. Innovation is in our DNA, and we are committed to shaping the future of animal health.

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As a professional supplier of Veterinary equipment, Meddit B.V is a Dutch company dedicated in providing efficient, high-quality products, especially for vaccination or liquid medicine delivery systems. With more than total 50 years of team's experience in these specifical areas, Meddit develops a lot of success products to help our customers.
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For over 20 years, Medi Nova, based in Italy, has been a trusted partner in the livestock sector, driving research, innovation, and progress.
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The patented technology of FORMULA semen extenders stems from the R&D partnership between Medi Nova and the University of Parma, culminating in the latest formulation of the antibiotic-free MEDI BIO ACTIVE.
Beyond extenders, Medi Nova provides cutting-edge equipment, products, and technologies designed to enhance farm efficiency and animal welfare, offering innovative solutions to meet the evolving needs of the industry.

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At Pharmacosmos, we are specialists in iron therapy. We develop, manufacture and market medicines for the treatment of iron deficiency anaemia in humans and animals. We are furthermore specialists in developing and producing advanced carbohydrates for pharmaceutical and technical uses. We are a family owned company during three generations and have our headquarters in Holbæk, Denmark and affiliates in the US, China, UK, Ireland, Germany, Sweden and Norway. We have grown considerably over the past several years and are at present more than 650 people working with all aspects of a fully integrated pharmaceutical company.

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Poulpharm: Your Trusted Partner in Animal Health & Science
Poulpharm is an independent, global leader in animal health and research, providing high-quality services from diagnostics to (pre-)clinical trials under GCP and safety studies in GLP-accredited facilities. Founded in 2006 and headquartered in Belgium, Poulpharm operates worldwide, including Hungary, France, Italy, Vietnam, the Philippines, Myanmar, and Jordan. Our expertise covers diagnostics, autogenous vaccines, and contract research, assisting veterinarians, farmers, and businesses in delivering innovative animal health solutions. Committed to compliance, efficiency, and animal welfare, Poulpharm advances disease prevention, treatment effectiveness, and sustainable farming practices.





Keynote lectures

KEYNOTE SESSION

FREEDOM FROM DISCOMFORT



DR. DAVID RENAUDEAU

"The impact of global warming on pig production/husbandry"

Wednesday May 21, 13.30-15.00

Biosketch

Dr David Renaudeau, is a senior researcher at the PEGASE (Physiology, Environment and Genetics for Animal and Livestock Systems, F 3590 St Gilles) joint research unit between INRA and the AGRO Institute. D. Renaudeau has 25 years of experience in pig nutrition and adaptation to heat stress. Part of his current research focuses on assessing the vulnerability of the pig sector to climate change and evaluating adaptation strategies.

Abstract

1/ Introduction

Pig production plays a significant social and economic role in many European Union (EU) member states, particularly in Spain, Germany, France, Denmark, and the Netherlands. The EU is the world's second-largest producer of pork, after China, and the largest exporter of pork and pork products. In the future, the EU's pig production sector will face a range of challenges, including the gradual decline in pork consumption, limited interest from the new generation of farmers in the pig sector, and uncertainties related to the potential uncontrolled spread of African Swine Fever (ASF) or other swine diseases, the evolution of EU legislation regarding pig farming and its associated costs, the volatility of feed prices, and the broader global context—economic, political, and climatic—in which the pork industry has to continue to evolve. Like other livestock sectors, pig production will also need to contribute to global efforts to reduce its impact on climate change while simultaneously adopting effective strategies to cope with the consequences of global warming. Provision of realistic projections of climate change impacts on the EU pig sector is a prerequisite to evaluate its vulnerability and propose effective adaptation strategies.

This brief review aims to summarize the current knowledge on the potential impacts of climate change on pig production in the EU.

2/ Past and future climate evolution in the EU

Anthropogenic influence on the climate is unequivocal and leads to a global Earth energy imbalance, as evidenced by rises in global average atmospheric temperature (IPCC, 2023). In the EU, while the average land temperature increased by 0.44°C between the pre-industrial period (1900-1950) and the reference period 1960-1990, it increased four times more in the following 40 years, reaching +1.90°C[1]. The corresponding global temperature rise was +1.54°C, meaning Europe has warmed faster than any other continent in recent decades. In winter, this warming is most noticeable at northern latitudes, while in summer, it is more pronounced in central and southeastern Europe, as well as around the Mediterranean. Projections from the EURO-CORDEX initiative[2] based on the different climatic scenario confirm that temperatures across the EU land will continue to rise throughout this century at a higher rate than the global world

[1] https://climate.copernicus.eu/climate-indicators/temperature

[2] https://cordex.org

average. In addition, anthropogenic global warming is impacting climate variability, resulting in an increase in both the intensity and frequency of extreme events such as summer heat waves. In France, the frequency and the intensity of summer heat waves have dramatically increased in the period 1947 – 2019, with more than half of heat waves occurring since 2000. This trend seems set to continue in the near future, with all climate scenarios showing a doubling of the number of heat waves from 2021 to 2050. This probability would be more than six times higher from 2071 to 2100 under the RCP8.5 scenario (Ouzeau et al., 2016).

3/ Vulnerability of pig sector to climate change.
The vulnerability of a production system is classically determined by a combination of three components - exposure to stressors, sensitivity to those stressors, and the ability to withstand, recover from, and adapt to their effects.

In the warming global context, the first component is related to its direct effects on the climatic environment of pig farming (high temperature, more frequent and severe climatic events such as summer heat waves) and other uncertainties due its indirect effects on the emergence or re-emergence of diseases and/or on the availability and the quality of feed resources (see below). The sensitivity of the pig industry is related to global external factors (socio-economic or sanitary context) and factors specific to the pig production system. For example, as feeding costs account for 60 to 70% of the total production costs, pig sector is very sensitive to fluctuations in the global commodity price. In addition, the production potential of domestic pigs has increased considerably since the 1960s, and this intensification is also likely to increase pigs' sensitivity to climate change-related hazards. In highly productive pig genotypes, the adaptive capacity to cope with environmental perturbations may be compromised, assuming that genetic selection in a highly controlled environment has resulted in a prioritization of the resource allocation to production-related processes at the expense of traits related to adaptation (Knap, 2005). However, it is also expected that meeting the nutritional requirements of modern pig genotypes will become more challenging when resource availability is limited (due to inadequate nutrition or heat stress) or when maintenance needs are increased (due to cold or immune stress). Finally, selection for leaner pigs also results in animals with a higher susceptibility to heat stress, probably due to the high metabolic cost of muscle deposition (Renaudeau et al., 2011). In connection with intensification of pork production, more than 75% of EU pigs are currently reared in industrialized, large scale, intensive indoor production systems (Mateos et al., 2024). Although the situation varies greatly from one country to another, there is still a high proportion of pig buildings that were designed more than 15-20 years ago and only a few of them are equipped with specific cooling systems, which is a factor of sensitivity to climate change. In fact, when a summer heatwave strikes, traditional ventilation systems are often inadequate for removing the excessive sensible heat and moisture produced by animals, leading to heat stress, reduced performance, and an increased risk of mortality. Finally, the adaptability of a production system is linked to the internal characteristics of the farm (pig farming model, its geographic location, structure and age of its buildings, degree of self-sufficiency in feed production...) and also to the economic environment (feed costs, energy costs, evolution of meat prices…), which determine the margins available to implement cost-effective adaptation strategies and/or to finance the transition of the farms to a more robust model.

4/ Several potential effects of climate change
Direct effects of elevated temperature

Like other livestock species, pigs are homeothermic animals that have to maintain body core temperature over a wide range of climatic conditions. Thermal stress is the result of a misbalance between heat produced or gained from the environment and the amount of heat lost to the environment. In thermoneutral growing pigs, most (60%) of heat production (HP) is related to the basal metabolic rate approximated by the measurement of fasting HP. The remaining HP is divided into two components, HP related to feed intake and its digestive and metabolic utilization (25%) and the one related to physical activity (15%) (Labussière et al., 2013). Heat can be lost from the body by two physical processes: sensible and latent heat loss. Sensible heat can be gained or lost by conduction, convection and radiation depending on the temperature gradient between the body surface of the animal and its surroundings. In pigs, latent heat is lost mainly through the evaporation of moisture from the respiratory tract that occurs while panting as pigs have few active sweat glands (Renaudeau et al., 2006). Temperature threshold at which performance starts to decrease depends on the animal's related factors (genotype, body weight, physiological stage) but also by the rearing conditions (feed management, housing conditions and climatic factors other than ambient temperature) (Renaudeau et al., 2012). In addition, in most conventional EU housing systems pigs cannot express their natural behavior of wallowing in mud to prevent hyperthermia. This limited ability to lose heat by evaporation explains why pigs are vulnerable to high temperatures.

Global warming might mean that physiological limits related to heat tolerance will be reached regularly and more often in coming decades. In particular, climate change will result in an increase in both the intensity and frequency of extreme event such as summer heat waves. Based on a recent study, it is projected that the proportion of pigs affected by extreme

conditions worldwide will increase to 25% in 2050 (compared to 9% in 2000) regardless of the SSP scenario (Thornton et al., 2021). In 2090, it will reach 39 and 70% under SSP1-2.6 and SSP5-8.5 respectively. The number of days per year of extreme HS would increase from 6 to 77 days between 2000 and 2090 (SSP5-8.5). In Europe, eastern Spain (Catalonia, Aragon and Murcia) and northern Italy (Lombardy) would be the most affected pork producing regions.

In contrast to the impact of chronic heat challenge, the pig's responses to discrete, sudden heat extreme events like a summer heat waves and their consequences for the rest of the productive life of the animal have not been extensively studied (Renaudeau and Dourmad, 2022). During the first 24-48 hours after the onset of a simulated summer heatwave, the primary response observed in pigs includes a drop in voluntary feed intake in an attempt to reduce HP, resulting in an immediate reduction in animal performance due to feed restriction (Renaudeau, 2020). In addition, a sharp rise in heat losses is also observed and related to cardiovascular adjustments that are made to increase peripheral vasodilation to improve heat transfer from inner compartments to skin at the expense of blood flow through the splanchnic bed (Collin et al., 2001). The associated reduced nutrient and oxygen supply alters intestinal barrier function, leading to potential impaired nutrient absorption and inflammatory stress for at least the 3-6 d following acute HS (Abuajamieh et al., 2018). The absence of an immediate compensatory feed intake observed during the recovery period could thus be linked to the above-mentioned gastrointestinal tract perturbations and could lead to retarded growth with possible economic consequences. Since the 2000s, the occurrence of multiple heat waves between June and August has become increasingly frequent. As a consequence, the likelihood of an animal being exposed to several consecutive heat waves during its productive life would increase in the future. One can be assumed that physiological adaptations triggered during the first thermal challenge could enhance the animals' capacity to tolerate subsequent heat waves. This hypothesis was validated in a recent study showing that prior HS experience to help growing pigs to cope with a summer heatwave occurring at the end of the growing period (Renaudeau, 2020). In addition, it has now been clearly established that HS during the gestation period may change the behavior and growth performances of the offspring (Johnson and Baumgard, 2018). In particular, prenatal heat stress alters the social behavior of piglet ((Merlot et al., 2018) and their ability to deposit lean tissue, resulting in fatter carcasses at slaughter (Johnson et al., 2015; Zhao et al., 2021).

Significant heat events since the early 2000s have resulted in sizable animal mortality. During the heat waves which occurred in Europe during summer 2003, thousands of pigs, poultry and cattle died in French region of Brittany and Pays de Loire. On the basis of the activity of the rendering companies in France, the increased mortality rate during the heat wave in 2019 was estimated to be around 40% in the poultry and pig sectors. Because of their elevated metabolic rate and their limited ability to lose heat, the risk of an increased mortality rate is particularly high for lactating sows and heavy finishing. A higher incidence of sow mortality during the summer months has been reported, especially in the 2-4 days after farrowing (Chagnon et al., 1991). In addition, when the temperature in the farrowing unit rises above 22°C at parturition, the risk of stillbirth increases due to the prolonged duration of farrowing and the associated risk of hypoxia for piglets (Vanderhaeghe et al., 2010). Finally, a higher risk of pig death has also been reported during transport and lairage at the slaughter house in the hot season (Vitali et al., 2014). The causes of this excess in mortality are not very well known. Under conditions of extreme heat stress, the thermoregulatory capacity of the body can be exceeded, resulting in illness due to overheating that can progress to a fatal heat stroke. An increased internal body temperature, combined with ischaemia and increased oxidative stress after blood redistribution, can cause cell, tissue, or organ damage especially in the brain, heart, kidneys, intestines, liver, and lungs resulting in a multiorgan system failure (Leon and Helwig, 2010).

Indirect effects due to uncertainties in the availability and the quality of feed resources.

As mentioned before, feed is the most important cost in pig production. In Europe, pig feeds are based primarily on cereals (up to 70-80% of a total compound feed mostly wheat, corn and barley), protein-rich raw materials (mostly soybean meal, rapeseed meal, sunflower meal and peas), coproducts (from the food and bioethanol industry) and oils and fat. While cereals, pulses, and co-products from the food and bioethanol industries form the primary sources of feed materials within the EU, protein-rich row materials are mainly imported from third countries (USA, Brazil, Argentina) due to insufficient domestic production. Although a significant proportion of the raw materials used in feed formulation are produced in Europe, feed material prices are highly dependent on the volatility of global ingredient prices, which in turn depend on global stocks, but also on the quality of harvests in the main production areas. There is common agreement in literature that climate change in recent decades has negatively affected major crop yield trends in many regions of the world, with average yield losses of 5.3% for major crops between 1961 and 2017 (5.9% for maize, 4.9% for wheat) (More, 2020). At a global scale, the various predictive models infer that climate change will continue to reduce the production of major crops. Based on a database summarizing data from 8000 simulations in 202 papers published between 1984 and 2020, Hasegawa et al (2022) conclude that climate change will reduce global yields of major crops (-7.1%/°C, -3.7%/°C and -4.0%/°C for maize, wheat and soya, respectively) with wide variation according to the geographical area. In Europe, there is a consensus that wheat yields are expected to increase, especially in the central and northern regions, while corn

yields are expected to decrease significantly, especially in the southern regions (Webber et al., 2018). However, most of the simulation studies don't account for uncertainties still to be documented, such as water availability for irrigation, changes in phenology and cropping calendars, along with the potential cumulative impacts of pests, diseases and weeds and the increased frequency of extreme events. Extreme weather, especially, may increase the risks of multiple simultaneous crop failures within regions or globally. Thus, beyond changing average yield trends, climate change could lead to more pronounced inter-annual climate variability with more extreme events, leading to increased yield variability and global crop prices volatility. According to Tigchelaar et al (2018), the probability of a simultaneous 10% drop in maize yield in the world's 4 biggest corn producers is currently zero, but would rise to 67% with 2°C global warming. In this case, this overall reduction in maize production would have a dramatic impact on its price and on the production costs in livestock sectors. It is assumed that world crop price levels will increase twofold and world crop price volatility will increase fivefold between 2000 and 2080 (Tran et al., 2012). This increased crop prices would be driven by the combined effects of the direct and indirect impacts of climate change on production yields but also by population and income growth and demand for biofuels.

Mycotoxins are fungal secondary metabolites detected in many agricultural commodities, especially cereals. Like poultry, pigs are particularly susceptible to the risk posed by mycotoxins. This is due to the high proportion of cereals in their diet and their limited ability to convert mycotoxins into less toxic products. In addition, the stability of mycotoxins makes it difficult to reduce their concentration and toxicity once a feed has been contaminated. In Europe, regulation and/or recommendations exist for 6 mycotoxins that may be present in pig feed: aflatoxins (AF), ochratoxin A, fumonisins (FUM), zearalenone (ZEN) and trichothecenes (principally deoxynivalenol [DON], T-2 and HT-2 toxins). ZEN and DON are the most frequent mycotoxins detected in pig feedstuffs. Mycotoxin contamination in feedstuffs can occur in farms, post-harvest, or during storage. In 2024, around 87% of complete feed samples collected worldwide showed mycotoxin contamination (mainly ZEN, DON, AF and FUM)[3]. In commercial conditions, as risk ingredients are diluted in complete feeds, mycotoxins contamination levels in pig feedstuffs are usually not high enough to cause morbidity and mortality but may result in economical loss through changes in voluntary feed intake, growth, reproduction efficiency, and immunosuppression (Pierron et al., 2016). Studies have been carried out to predict the impact of climate change on mycotoxins contamination in cereals produced in the EU. Increasing rainfall and higher temperature may favor the production DON by Fusarium spp. in wheat whereas more frequent and severe drought periods may stimulate the production of AF by Aspergillus spp in maize (Van der Fels-Klerx et al., 2013). Under a +2°C temperature-increase scenario, Battilani et al. (2016) showed that AF contamination in maize will increase, particularly in southern Europe (Spain, Italy and the Balkans). The potential impacts of climate change in the prevalence of mycotoxin contamination in feed crops have to be taken into consideration in order to assess the impact of climate change on the pig sector.

Indirect effects due to uncertainties in emerging or re-emerging diseases

In the future, the consequences of a warming climate may lead to increased mortality (as noted above) and morbidity in pigs. In theory, an animal's disease burden is generally defined by two fundamental host-mediated components: its exposure to infectious agents, and its susceptibility to infection after exposure.

Climate change can affect animal health by increasing the frequency of exposure to existing or emerging diseases by creating conditions conducive to the development vectors and their host reservoirs, and to the survival or the development of pathogenic agents. Although the contribution of climate change on the spread of diseases in ruminant species (e.g. insect-born viral diseases such as catharral fever or Epizootic haemorragic disease) is now becoming widely recognized, corresponding observation for specific swine diseases remains highly uncertain. The African Swine Fever (ASF) is a devastating hemorrhagic viral disease which causes major economic losses in affected countries. ASF can be easily transmitted via mainly direct contact with between domestic and wild pigs or via dissemination of contaminated meat or infected material (Dixon et al., 2020). Up to now, there is no convincing evidence that the circulation of the ASF virus is directly affected by warming climate (Tiwari et al., 2022). However, climate change would indirectly impact the expansion, the geographical distribution and/or the biology of ASF vectors (soft ticks and wild pigs) and increase the risk of the development of ASF outbreaks. As indicated above, as the risk of mycotoxin contamination of cereals increases, the impact of these toxins on pig health could increase in the future. In fact, mycotoxins have complex immunostimulatory or immunosuppressive effects depending on the toxin, the concentration and the parameter investigated (Pierron et al., 2016). Ingestion with mycotoxin-contaminated feed may reduce host resistance to infectious diseases. High levels of DON (>2.5 mg/kg) in naturally contaminated feed have been shown to reduce the immune response to PRRSV and affect the course of PRRSV infection in pigs. (Savard et al., 2014). In addition, feeding pigs a DON-contaminated diet was shown

[3] DSM-FIRMENICH World Mycotoxin Survey, The Global Threat, January – December 2024, 11 pp.

to inhibit the vaccination efficiency of PRRSV modified live vaccine (Savard et al., 2015). Some other studies suggest that reduction in vaccine efficacy in response to mycotoxin intake occurs at lower concentrations than those required to impair the global immune response (Pierron et al., 2016). As vaccination is one of the most effective strategies for disease prevention, this interaction between mycotoxin intoxication and vaccine immune responses would have considerable economic consequences in the pig sector.

Acclimation responses to elevated temperature results from coordinated changes in metabolism and modulates numerous physical functions including those related to immunity. As a consequence, it is assumed that heat stress may predispose animals to diseases. For instance, in connection with the reduced feed intake generally observed in hot condition, macro- and micronutrient deficiency can impair immune function and lead to ineffective immune responses. For pigs, the data on the interactions between heat stress and the immune function are conflicting. Morrow-Tesch et al. (1994) showed that immunosuppression under heat stress conditions (28 d at 33°C) depends on social status in group-housed growing pigs. This immune suppression was also observed in pigs that endured chronic HS lasting 21 days (Xiang-hong et al., 2011). In contrast, it has also been reported that pigs previously exposed to a 7-d HS displayed improved capacity to fight against by repeated administrations of LPS (Campos et al., 2019). In fact, regardless of the nature of the stressors, both specific and non-specific physiological and cellular adaptation responses were triggered in the animals. In other words, it was suggested that non-specific mechanisms designed to counteract the effects of acute HS also played a role in helping the animals manage the inflammatory response

5/ Conclusions

The potential impacts of global warming on the pig industry are likely to be driven primarily by cumulative uncertainties associated with climatic factors, particularly the frequency and intensity of extreme heat events, as well as by the volatility of feed raw materials and their safety, and the emergence or re-emergence of infectious diseases. To assess the vulnerability of the EU pig sector and design effective, cost-efficient adaptation strategies, it is essential to develop reliable projections of climate change impacts. Enhancing our capacity to predict and mitigate the adverse effects of climate change on pork production must be prioritized moving forward. Achieving this goal requires the development of advanced modeling tools that integrate both direct and indirect climate change effects, future changes in production systems (including genetic improvements), and the broader global context—comprising socio-economic, regulatory, and political factors—in which the pork industry will evolve.

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KEYNOTE SESSION

FREEDOM FROM DISCOMFORT



PROF. IRENE CAMERLINK

"Pigs' perception of ambient temperatures:
a sustainable approach to thermoregulation"

Wednesday May 21, 13.30-15.00

Biosketch

Dr. Irene Camerlink is a researcher in animal behaviour and welfare, with a focus on the social behaviour of pigs. She conducted her PhD at Wageningen University (Netherlands) and thereafter worked as postdoctoral researcher at SRUC (Edinburgh, UK) and the Vetmeduni, Vienna (Austria) before taking a position as Associate Professor (Hab.) at the Institute of Genetics and Animal Biotechnology of the Polish Academy of Sciences, Poland. She is Editor-in-chief of the journal Applied Animal Behaviour Science, and editor of the books 'Animal Welfare in Practice: Pigs' and 'Bridging Research Disciplines to Advance Animal Welfare Science'. She was awarded the ISAE New Investigator Award in 2017 and the UFAW Young Animal Welfare Scientist of the Year Award in 2020. Throughout her career she has studied pig behaviour and welfare by combining multiple disciplines such as genetics, ethology, behavioural ecology and social sciences.

Abstract

Introduction

Pigs are kept commercially in nearly all climatic zones, and in the wild can be found in every continent apart from Antarctica (Ruf et al., 2023). While young piglets can easily become hypothermic, and adult pigs quickly suffer from heat stress (both situations having considerable lethal risk), pigs do survive and reproduce prolifically in extreme climates even when outdoors. This shows the adaptability of pigs to a wide range of temperatures. Despite this, both heat stress and cold stress are considered important welfare threats in commercial pig farming. Consequently, pigs are kept in temperature-regulated buildings to maintain a relatively constant temperature per age category. This presents a paradox, whereby pigs as a species can cope successfully with extreme temperatures when given the opportunity for behavioural thermoregulation, but whereby commercial pig farms are struggling to negate the negative consequences of thermal stress. This raises the question whether attempts to keep commercial pigs at a set 'optimum' in a predetermined thermoneutral zone to achieve maximum productivity is actually most beneficial in terms of animal welfare and farm economics.

Adaptation occurs when animals are exposed to environmental challenges (such as high or low temperatures) but have the opportunity to adjust their behaviour and/or physiology in response, thereby increasing their chances of survival and reproduction for such challenges in future. In nature, pigs adapt to extreme temperatures by making use of a range of micro-climates to thermoregulate, thereby avoiding constant exposure. For example, they seek shade and wallow during the heat and huddle when cold. Moreover, temperature (and light) fluctuations within and between days and seasons are important indicators for pigs to maintain their biological rhythms, which contributes to health and reproduction. Allowing the ambient temperature in indoor housing to reflect a more natural situation by introducing temperature fluctuations and micro-climates may offer animals choice to self-regulate their needs for optimum health (Huntingford et al., 2020). While such approaches do exist, they have only been sparsely researched. In fact, housing elements which create micro-

climates, such as covered creep areas, kennels, and straw, have largely disappeared in modern farms in favour of housing systems that are easy to manage and disinfect.

Heating or cooling entire pig facilities rather than micro-climates is financially and environmentally costly. With the unpredictability in climate events, as well as high energy prices and water scarcity, the pig sector will need to consider more sustainable alternatives for temperature management. It is therefore worthwhile to explore methods that more closely align with pigs' individual needs, as well as with overall farm sustainability. The aim of this review is to provide an overview of the current research on pigs' behavioural response to thermal conditions (i.e. behavioural thermoregulation), and to explore climate management techniques for indoor housing that could aid in the sustainability of the pig sector.

Methods

A systematic literature search was conducted in Web of Science and Scopus by using the following search string: pig OR piglet OR sow OR swine OR 'sus scrofa', AND temperature OR climate OR thermoregulation OR hypothermia OR hyperthermia OR 'heat stress' OR 'cold stress' OR 'thermal neutral zone' OR 'thermal stress' AND behavio*. With this search string, Scopus retrieved only one publication and therefore the search in Scopus was conducted without behavio* and with the search string based on the title, abstract and keywords. In Web of Science, the search was limited to the title only (as it otherwise resulted in more than 3000 articles), except for behavio* which was searched in the title, abstract and keywords. The search was further narrowed down by including only peer-reviewed literature (articles and review papers), published in English, and within the research areas Agriculture, Veterinary Sciences, Behavioural sciences, Zoology, and Developmental biology. No restriction was made on the year of publication. The search was conducted on 28th of February 2025.

Retrieved articles were first screened based on the title, followed by selection on the abstract. Articles that did not report on pig behaviour were excluded as well as studies on body temperature instead of ambient temperature. The selected titles were entered into a word cloud to assess the 50 most prominent topics. In the word cloud generator, similar words and those only differing in spelling were combined. Data were collected on the climate, sample size, breed, age category (piglets, growing pigs (pigs between weaning and slaughter), sows, and prenatal treatments), age/weight, temperature range, study method, and behavioural responses.

Results and discussion

From the 209 retrieved articles, 24 were excluded based on the title and 52 were excluded based on the abstract. The 133 articles for full text analysis included five review papers and three meta-analyses. Most studies were on growing pigs (pigs between weaning and slaughter; n = 68), followed by sows (n=32) and piglets (n=19) and 3 studies focused on piglets exposed prenatally to temperature challenges. Figure 1 shows the word cloud of the 50 most prominent topics from the titles. Most studies were on heat stress rather than cold stress (hypothermia), although this depended on the age category of the pigs.



Figure 1. Word cloud of the titles of the selected publications arising from the review, with the exclusion of the words 'pigs', 'pig' and 'swine' which together appeared 84 times across the 134 selected titles. The size of the word indicates the frequency of occurrence, whereby the word 'temperature' occurred 72 times and 'behaviour' (including behavior and behavioral) 62 times. Feed intake, food intake and feeding were combined into 'feed-intake'. The word 'high' relates to high temperature.

Behavioural thermoregulation in response to ambient temperatures

The main behavioural response studied in relation to high temperatures or heat stress was a change in feed intake. Studies focussing on the effect of temperature on physiological responses or changes in performance often included feed intake as only behavioural measure, which consistently showed a reduced feed intake at high ambient temperatures. Renaudeau et al. (2011) conducted a meta-analysis on the effect of high ambient temperature on feed intake and indeed confirmed that feed intake reduces as temperature increases, especially in heavier pigs. A reduced feed intake can therefore be an indicator for when pigs perceive their environment as too warm. Given these clear outcomes, the articles reporting only feed intake as behavioural component were removed from the further review process (n=25 articles removed). Ambient temperature also affected lying behaviour and posture, whereby pigs space more away from each other at higher temperatures (Andersen et al., 2000; Spoolder et al., 2012). They also lie more on the slatted floor, resulting in increased fouling of the solid part of the floor, which is a concern for animal welfare as well as environmental pollution (Aarnink et al., 2006).

Pigs' perception and preference

Perception of ambient temperature is subjective and will party depend on how the animal is (genetically) adapted to the environmental conditions. The effect of genetics on thermoregulation was reviewed by Gourdine et al. (2021), who confirmed that pig breeds show genetic variation for thermoregulation, which is reflected in differences in feed intake behaviour. They conclude that genetic selection is possible for genotypes that are more tolerant to heat stress. This suggests that breeds varying in their genetic adaptation to a certain climate may perceive temperatures differently.

Across various studies, pigs' preference for temperatures was assessed in preference tests where pigs had access to differentially heated compartments (Vasdal et al., 2010) or were trained to press a panel or lever to obtain additional heat. This showed, amongst others, that young pigs' preference does not remain constant but that the need for high temperatures reduces in piglets between 3 and 5 weeks old (Bench and Gonyou, 2007). This further shows that pigs can be trained to indicate for themselves when they prefer a certain temperature, which could be used to let pigs partially self-regulate their thermal needs. For example, pigs could learn to push a lever for access to a shower to cool down or access to a heat source to gain more warmth. This could be an additional form of environmental enrichment for pigs, but unfortunately also a risk of water spillage.

Increasing the sustainability of the sector in terms of climate management

Heating and cooling indoor housing systems requires a substantial amount of energy, and water in the case of water-based cooling systems. This has a negative impact on the sector's sustainability in terms of economic losses and its environmental burden. Applying micro-environments and temperature fluctuations can create thermal variation for pigs and reduce energy costs. The need for energy- and water saving heating- and cooling systems has been recognized (Godyń et al., 2020) but will require technical developments and housing adjustments that are not necessarily applicable to each building type.

Only six articles specifically mentioned micro-climates in the title or abstract. Micro-climates were studied, for example, by manipulating floor temperature to direct pigs' lying behaviour (Geers et al., 1990) or assessing the effects of micro-climates that occur in trailers during transport (Romero et al., 2024). Using the passive energy of kennels to create micro-climates showed that kennels kept up to 12°C warmer than the surrounding room temperature (Andersen et al., 2000). Local cooling systems can positively influence pig behaviour during high temperatures, for example through sprinkling, fogging, floor cooling, or cool-pads for lactating sows (Godyń et al., 2020). Given the potential of micro-climates to contribute to more sustainable climate control, it is surprising that relatively little research has been conducted in relation to pigs' thermoregulatory behaviour. However, installation of micro-climates at pen level can be costly and conventional space allowance in pig pens may not provide sufficient floor space to enable different climatic zones. Consequently, low ranking pigs may suffer more when being displaced from preferential resting places such as kennels (Andersen et al., 2000), which may reduce the welfare of weak or subordinate pigs when insufficient resources (such as lying spaces) are provided.

Conclusion

The paradox between the strong climate adaptability of pigs, at the same time as their vulnerability to extreme temperatures in commercial settings, suggests that there is scope for improvement in the way that commercial pig climates are managed. The need for change is evident, from an animal welfare, economic and environmental perspective. Sector evaluation, using for example Life Cycle Sustainability Assessment, on national or even regional level are needed to indicate per climatic zone the optimum between inputs in terms of energy, water and labour costs and outputs in terms of pig productivity. Breeding for more robust pigs, with vitality at birth to avoid hypothermia and adaptability to heat stress in later life, may move away from the current focus on hyper-prolificacy and rapid growth, but may on balance result in a better and more sustainable farm performance.

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KEYNOTE SESSION

FREEDOM FROM HUNGER AND THIRST, FREEDOM FROM PAIN, INJURY AND DISEASE



DR. VIVI AARESTRUP MOUSTSEN

"Ensuring proper feed and water in loose-housing of pigs"

Thursday May 22, 08.30-10.00

Biosketch

Vivi received her M.Sc. in Animal Science from The Royal Veterinary and Agricultural University in Frederiksberg, Denmark, in 1995, and her PhD in Animal Science at the same University in 2002. Vivi has been focusing on research and development production conditions for farrowing and lactating sows. From 2002 and onwards the emphasis has been on development of systems for loose housed farrowing and lactating sows. The research includes determination of sow and piglets dimensions, space needed for important behaviours and criteria for pen design as well as water accessibility, sows' nursing capabilities and large litters. The aim of SEGES is to develop, test and recommend the best technologies for production of pigs in Denmark.
As chief scientist, she is involved in assimilation of results to end users and ongoing encouragement to get results to work in practice. In addition, Aarestrup Moustsen has been the author/coauthor of a number of peer review scientific papers, abstracts for international conferences, and is also reviewer for a couple of scientific journals. In addition to her work at SEGES, Aarestrup Moustsen has been honorary associate professor in animal husbandry, pigs, at the Department of Large Animal Sciences, Faculty of Health and Medical Sciences, University of Copenhagen (UCPH), Denmark, a position she has had since 2012.

Read more on www.esphm2025.org/dr-vivi-moustsen/

Abstract

Water consumption of lactating sows was monitored. The observed water consumption was higher than reported in previously, which can be related to sows being more lean, have greater feed intake and a higher milk production.

Sows that had the highest water consumption on day 2 after farrowing had a higher water consumption than other sows in the herd for the rest of the lactation period.

There was an indication that sows that were subsequently treated with antibiotics drank fewer times a day and smaller amounts in the last two days before farrowing than sows that were not treated. Sows that subsequently need antibiotic treatment may thus be identified based on their drinking pattern.

There was a clear increase in water consumption during the lactation period, and an increase with outdoor temperature ≥10°C.

Information about water consumption of lactating sows can help to strengthen and improve the care and productivity of sows, especially since registration of water consumption allows for real-time monitoring at individual sow level.

Introduction
A pig can survive losing almost all fat and over half of the protein, whereas a body loss of 10% water can be fatal.

The sow consists of about 50% water. In addition, water plays an essential role in the passage of feed through the intestine, digestion of the feed, absorption of nutrients, excretion of nutrients and waste products, as a medium for chemical reactions, for maintaining the electrolyte balance, as a lubricant in joints and organs, for metabolism, in the regulation of the body's temperature, and as the main share in the sow's milk, as milk consists of app. 80% water. The potential milk yield can be 25 kg daily (Krogh et al., 2021). A higher milk production contributes to sows producing more heat (Theil et al., 2004). Yet, few farmers and advisors are aware of the potential of water consumption as an online tool for surveillance.

The purpose of this study was to determine the level of water consumption for individual sows before, during and after farrowing. In addition, the data collection helped to uncover possible explanatory parameters for fluctuations and variation in the observed water consumption.

Materials and methods
Data were collected in a herd (dry feed) with approx. 500 sows annually. Average littersize was 18 liveborn and 1 stillborn piglet/litter. A flowmeter (Badger Meter Flowmeter Vision 2006 4F44 1-10 LPM) was installed at each farrowing pen. Data was retrieved automatically.

Definitions and breakdowns of data
Water consumption: The amount of water the sow consumes and the amount of water that is wasted. In the study, it was the water consumption that was recorded. The sows' daily water consumption is composed of the number of daily drinking periods and the amount (consumption) per drinking period.

Criteria for splitting data
The farrowing day was set starting at 00:00 on the day when farrowing was registered on the sow-chart.
The dataset was divided into levels. The following level divisions were applied:
• Sow parity: 1st+ 2nd and 3rd+4th
• Stillbirths (piglets/litter): 0; 1; 2-3; 4 or more
• Weaned (piglets/litter): < 10; 10-11; >11
• Treatment: Treated: Treatment with antibiotics only and treatments with both antibiotics and pain relievers; Not treated: No treatment or only treated with pain relief).

Water consumption on day 2 after farrowing:
The sows in the dataset were divided into three groups according to their water consumption on day 2 after farrowing. Day 2 was chosen to be after farrowing, but at the same time at the beginning of the lactation period
• High: The third of the sows in a herd that drank the most on day 2 after farrowing
• Medium: The third of the sows in a herd that drank neither the most nor the least on day 2 after farrowing
• Low: The third of the sows in a herd that drank the least on day 2 after farrowing

Outdoor temperature:
Since it is primarily temperatures that can affect the sows' water consumption, it was chosen to divide 'season' based on outdoor temperature instead of 'month'.
• Summer/hot: Daily temperatures constantly above 10°C
• Spring and autumn / changeable: Daily temperatures changing around 10°C
• Winter/cold: Daily temperatures constantly below 10°C

Water consumption per day of lactation:
• Farrowing day was set as day 0; the day before farrowing was day -1; two days before farrowing was day -2 etc. and correspondingly, the first day of lactation after farrowing was day 1; second day after farrowing day 2 etc.

Results and discussion
Water consumption
Several studies have shown that sows' water intake increases towards the end of the gestation period (Fraser & Phillips, 1989; Malmkvist et al, 2012). During farrowing, the sows' water consumption decreases and post farrowing, the sow's water consumption increases again. This was also the case in this study.

The median water consumption was
• Dag 1: 17 L/so (25 %: 14 L/so; 75 %: 24 L/so; min: 1 L/so; max: 59 L/so)
• Dag 18: 28 L/so (25 %: 21 L/so; 75 %: 35 L/so; min: 5 L/so; max: 70 L/so).

The sows in this study drank 17 L of water per day for the last 3 days before farrowing. This is significantly more than in a study by Fraser & Phillips (1989), where sows fed pelleted feed drank an average of 9 L of water daily for the last 3-5 days before farrowing. This difference may be due to the fact that the sows today have a higher need for water, as a result of higher feed intake and higher milk production (Pedersen & Moustsen, 2023).

Water consumption and the sow's lactation day
The water consumption (median) on days 4, 11 and 18 was 20 L, 25 L and 28 L respectively, whereas it has been found in the literature that the sows' needs are 18 L, 24 L and 26 L on the corresponding days for dry feeding (Pedersen & Moustsen, 2023).

Drinking pause and farrowing - individual
Previous studies have shown that in the last 2-4 hours leading up to and during farrowing, the sows are often very little active (Baxter et al., 2011; Hansen et al., 2017). Thus, the sows do not drink during this period. When analyzing the data, this was also very clear, as the majority of the sows had a drinking pause in connection with farrowing.

Water consumption, stillbirths and deaths in the first four days after farrowing
There was an indication that sows with no stillbirths had shorter drinking pause than sows with more stillbirths. There was no immediate correlation between the length (duration) of the drinking pause on the farrowing day and the number of dead piglets in the first four days after farrowing.

Water consumption and treatment
As treatments with antibiotics were primarily carried out at/close to the farrowing day, the analyses of the correlation between treatment with antibiotics and water consumption. There was an indication that sows that were subsequently treated with antibiotics drank fewer times a day and less in the last two days before farrowing than sows that were not treated. This can be explained by the fact that treated sows have been sick, which can reduce their water consumption (Brumm (2006). However, it is important to be aware that there was limited data and only one herd in the dataset.

Water consumption on day 2 after farrowing as an indicator of the sow's water consumption during the rest of the lactation period
The water consumption on day 2 after farrowing for the third of the sows with the lowest consumption was less than 13 L/sow. The water consumption for the third of the sows with average water consumption was approx. 19 L/sow, while the water consumption for the third of the sows with the highest water consumption on day 2 after farrowing was more than approx. 30 L/sow.

Analysis of data confirmed that sows with lower water consumption on day 2 after farrowing continued to have low water consumption for the rest of the lactation period, sows with intermediate consumption on day 2 continued with intermediate consumption, and similarly sows with high water consumption on day 2 after farrowing had a higher water consumption than other sows in the herd for the remainder of the lactation period. This is consistent with Kruse et al. (2011), who found a large variation between sows' water consumption, but less variation for the individual sow.

Water consumption and the age of the sow
The data showed that 3rd-4th parity sows had a higher water consumption (L/sow/day) than 1st-2nd litter sows and ≥ 5 parity sows. The difference may be related to increased milk production and feed intake. Since weaning weight was not recorded and milk production is not known, it cannot be concluded whether sows older than the fourth litter had reduced feed intake and milk production or whether their lower water consumption is explained by the fact that fifth litter and older sows are fully grown (Nielsen et al., 2018).

Water consumption and outdoor temperature
There was a higher water consumption (L/sow/day) on days with > 10°C compared to other days. This may be due to both a higher water demand and a greater water loss (Pedersen & Moustsen, 2023). It has previously been found that water consumption increased by 0.16 L/s/day if room temperature increased by 1□C (Quiniou et al., 2000).

Perspectives

The study indicated promising results that can improve the care and productivity of hyper-prolific sows. Water consumption in farrowing units can be registered at sow level and in real-time. This makes it suitable as an indicator of farrowing time, the sow's milk production and feed intake. Monitoring can be done 'centrally' by, for example, farrowing unit managers. Fluctuations in water consumption can, if future research supports, make it possible to take action quickly, e.g. before the sow shows clinical signs of disease. Monitoring can also be used to identify sows have not drunk 30 minutes after feeding; or been in farrowing for a long time.

In 2024-2025, SEGES in collaboration with Aarhus University registers and analyze water consumption, farrowing and sow-condition.

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KEYNOTE SESSION

FREEDOM FROM HUNGER AND THIRST, FREEDOM FROM PAIN, INJURY AND DISEASE



PROF. ELISABETH GROSSE BEILAGE

"Detection and treatment of pain in diseased pigs"

Thursday May 22, 08.30-10.00

Biosketch

Prof. Elisabeth grosse Beilage, DVM, PhD, Dipl. ECPHM

Is a veterinarian at the University for Veterinary Medicine Hannover, Germany, since 1989; at first in the Clinic for Swine and Small Ruminants and later as a senior scientist at the Field Station for Epidemiology. Area of current research is focussed on animal welfare, clinic and epidemiology of infectious pig diseases and control/eradication of these infections. Other areas of expertise are pig herd health management, zoonosis control, vaccination and gross pathology.

KEYNOTE SESSION

FREEDOM FROM HUNGER AND THIRST, FREEDOM FROM PAIN, INJURY AND DISEASE



DR. LYDIA KUHNERT

"Detection and treatment of pain in diseased pigs"

Thursday May 22, 08.30-10.00

Biosketch

Education and Employments

After studying veterinary medicine at Leipzig University (2008-2014), Dr. Kuhnert started her doctoral thesis at the group of Prof. Dr. Walther Honscha at the Institute for Pharmacology, Pharmacy and Toxicology (Faculty of Veterinary Medicine, Leipzig University) supported by a PhD scholarship of H. Wilhelm Schaumann Foundation (2014-2016). Since 2016, she is employed as scientist in the group of Prof. Honscha and finished her doctoral thesis in 2019. Since 2016, she gives lectures in veterinary pharmacology and pharmacy courses. Dr. Kuhnert is specialist for veterinary pharmacology and toxicology and since 2022, started to habilitate in pharmacology at Leipzig University. Additionally, she is head of laboratory at the Institute for Pharmacology, Pharmacy and Toxicology and since 2024, project leader of the biosafety laboratory S2 at the Institute for veterinary anatomy (Leipzig University).

Read more on www.esphm2025.org/dr-med-vet-lydia-kuhnert/

Abstract

Introduction

Untreated pain in animals is associated with suffering, distress and detrimental effects on physical and mental health and thus represents a welfare-related concern (Hellebrekers, 2000). However, in pigs pain recognition, assessment and treatment is often neglected (Contiero et al., 2019; Hellebrekers, 2000; Herskin and Di Giminiani, 2018; Hewson et al., 2007; Ison et al., 2016; Luna et al., 2020). This applies in particular to pain caused by spontaneously occurring diseases and injuries (Kschonek et al., 2025a, b), while pain caused by damaging management procedures, such as castration or tail docking, is more intensively investigated (Contiero et al., 2019; Miller et al., 2023; Prunier et al., 2021; Sutherland, 2015). Pain also leads to a decrease in performance, such as lower average daily gains, and is therefore of economic interest to the livestock owner (Steagall et al., 2021). Concerning animal welfare and ethics, veterinarians have a responsibility to provide appropriate pain relief to the pigs they treat (Vinuela-Fernandez et al., 2007). The selection of an appropriate analgesic necessitates the reliable recognition of pain in a clinical examination under on-farm conditions and assessed in terms of severity.

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with or resembling actual or potential tissue damage” (Raja et al., 2020). The IASP provides the most frequently cited definition of pain in human and veterinary medicine, which has also been adapted several times over the years to reflect current research findings. Pain is caused by a tissue damage (noxious agent), which is recognised by nociceptors, transmitted and processed in the central nervous system. This leads to local reflexes, systemic vegetative reactions and changes of the behaviour (Breves et al., 2022).

Pain recognition and assessment

In pigs, pain is not easy to detect and manifests itself clinically in a change in behaviour (Flecknell, 2008; Vinuela-Fernandez et al., 2007; Wilson et al., 2014). The term behaviour covers all sensorimotor expressions of an animal (grosse Beilage and Wendt, 2013) that deviate in frequency or performance from the behaviour exhibited by most animals of the respective species (Broom, 1991). Pain recognition and assessment in pigs is based in particular on the animal’s reactions to its environment, interaction with other pigs in the group, vocalisations, muscle activity, deviations from physiological posture and movement disorders (Table 1). It is generally advisable to use obviously non affected pigs from the same groups or neighbouring pens as a reference for the clinical examination of the individual. Significantly deviating findings are easily recognisable, while minor deviations are often overlooked. Furthermore, in a clinical examination pain is usually not recognised by a single parameter, but rather by a combination of various deviating findings. This process usually takes place unconsciously and is therefore prone to error. So-called pain scales have been developed for the standardised examination and assessment of pain for certain animal species and defined injuries or diseases. This means that the use of a pain scale is limited to the animal species and the purpose for which it was developed.

Currently, there is an absence of pain scales that can be used to assess pain in pigs for spontaneously occurring diseases or injuries. Consequently, the behavioural changes enumerated in Table 1 serve as the basis for the clinical identification and assessment of pain in pigs. The parameter “attention” summarises how a pig reacts to its environment, e.g. people or ambient noise. Unaffected pigs will turn to actions in the environment with interest, while reduced interest can be described as listless (low degree) to lethargic (high degree) (Wilson et al., 2014). Social interaction” describes how pigs react to conspecifics. Pigs that separate themselves from other pigs (Prunier et al., 2021; Wilson et al., 2014) and prefer to stay against the wall and in corners of the pen are conspicuous; affected pigs avoid hierarchical or territorial fights. Sucking behaviour may also be an indicator of pain. Cancellation of suckling by the sow and less frequent suckling by the piglets are indications of pain due to mastitis. Reduced feed intake or even refusal to feed can be caused by pain, but also by discomfort. Insufficient feed intake must therefore be assessed in the context of other findings. However, it is difficult to determine acutely reduced feed intake in an individual animal for all pigs that are kept in groups and fed ad *libidum* (Wilson et al., 2014). A prolonged reduction or loss of feed intake can be recognised by sunken flanks and later by loss of weight. Sounds such as squeaking, crying and moaning can indicate pain. However, “crying” is also a vocalisation that can be triggered by a defensive reaction, e.g. against other pigs, during herding or restraint, and must therefore be interpreted in the context of the situation. “Screaming”, which is shown in connection with a movement disorder and without the intervention of other pigs or a human, indicates pain. Teeth grinding indicates severe pain (Wilson et al., 2014), but the typical sound is often ignored because it is easily masked by the surrounding noise (feeding, ventilation, other pigs). Muscle tremors that are limited to individual muscles or body parts are also indicative of pain, while “whole body tremors” are more likely to be triggered by shivering (Kluivers-Poodt et al., 2013; Wilson et al., 2014). The position of the tail can also indicate pain, but there are strict limits to the assessment of tail position in pigs with short docked tails. In pigs with undocked or only slightly docked tails, the tucked or even pinched tail between the hind legs indicates

pain. High-frequency lateral tail movements (tail wagging) is another sign that may indicate pain. The posture of affected pigs often changes in response to pain. Tripping, i.e. the rapid shifting of weight between the limbs, weight bearing on the carpal joints or prostration indicate considerable pain. Furthermore, an arched back is a typical sign of pain. In pigs in a sitting position, increased weight bearing on one ischial tuberosity and relief of the other, as well as a "twisted" back line, indicate a relief reaction that is indicative of pain. Stiffness of movement or lameness is the typical reaction with which animals try to avoid or at least reduce pain by relieving the strain. Pain that is localised in one limb leads to a more pronounced and therefore more easily recognisable lameness than pain that is localised in two or more limbs. A pig with pain in more than one limb will only try to put weight on the affected limb for a short time at a time; the gait pattern is less "spectacularly" disturbed than when one painful limb is relieved.

In cases of doubt, a "diagnostic pain treatment" can help to identify and assess pain in an animal. A successful reduction in pain after the application of an analgesic and the deterioration at the end of the duration of action is clearly indicating pain, while stress, suffering or fear as the cause of a behavioural deviation could not be influenced with a painkiller. However, if pain treatment has no effect, a "treatment failure" must also be considered in the differential diagnosis.

Table 1: Behavioural changes as indicators of pain in pigs

Indicator		Characterisation
Attention		Unimpaired: Pig reacts to environment by moving head, eyes, neck; movement in the direction of the trigger of the action Impaired: Listless to lethargic; head lowered
Social interaction		Unimpaired: Nose-to-nose contact, grunting, lying down with contact to other pigs in the group (temperature-dependent), maintaining position in the hierarchy, playing (piglets) Impaired: Separation, lying without contact, preferential lying against the wall or in corners, reduced defence in rank order fights, slipping down the rank order
Suckling		Unimpaired: Suckling ends with saturation of the piglets or "empty" teats Impaired: Sow interrupts suckling and/or suckles less frequently
Feed intake		Unimpaired: age-specific normal feed intake (quantity/duration) Impaired: Feed intake restricted (inappetence to anorexia)
Vocalisation		Unimpaired: Grunting Impaired: Squeaking, screaming, moaning
Chewing muscles/teeth		Unimpaired: Physiological chewing movements to grind the food Impaired: Teeth grinding
Muscles		Unimpaired: Physiological tone Impaired: Tremor
Tail position, tail movement		Unimpaired: Low or relaxed hanging with slight swinging Impaired: Tail tucked to "tucked between one"; tail wagging
Posture	Standing	Unimpaired: Body weight physiologically distributed over all limbs Impaired: Carping, tripping, prostration
	Sitting	Unimpaired: Body weight largely evenly distributed on both ischial tuberosities, hind limbs positioned to the right and left of the body, straight back line Impaired: Body weight rests increasingly on one ischial tuberosity, back line "twisted"; relief of painful parts of the body; movement with trailing hindquarters (hindquarters weakness)
	Lying	Unimpaired: Chest/abdominal or lateral position with physiological weight bearing and relief of body parts, change of position possible without restriction Impaired: Relief of body parts, inability to stand up
	Back line	Unimpaired: Physiologically Impaired: Bent up when standing, twisted when lying down
Movement		Unimpaired: Regular and even loading of all limbs Impaired: Lameness; stiffness
Reaction to pain treatment		No reaction: Illness/injury not painful or no pain relief achieved Visible improvement (behaviour, relief): Pain is likely to be the cause of the changed behaviour if the treatment is successful and very likely if the signs of pain reappear after the end of the duration of action if treated once

Availability of analgesics in the EU
In the EU and its Member States, there are several analgesics approved for the treatment of pain in pigs. The availability of veterinary medicinal products depends on which drugs are authorised in each Member State. Therefore, it is important to know, that veterinary medicinal products get approved by centralised, decentralised or national authorization procedure (Chapter III Reg. (EU) 2019/6). Therefore, not all of the listed active compounds may be available in each European Member State.

The availability of veterinary medicinal products authorised in the EU are listed in the UPD database (https://medicines.health.europa.eu/veterinary/en, provided by European Union). Some decentralised and national authorized veterinary medicines are only listed in national database. Therefore, national databases were developed to provide an overview about the market authorization, the availability on the Member State market and sometimes the product characteristics. For example, there is the VETIDATA (Veterinary Information Service for Drug Application, Toxicology and Drug Law, https://vetidata.de/ provided by the Institute of Pharmacology, Pharmacy and Toxicology, Faculty of Veterinary Medicine, Leipzig University) available in Germany.

Various analgesics are approved for pain management in pigs in the EU. From the group of non-steroidal anti-inflammatory drugs (NSAIDs) these contain: diclofenac, acetylsalicyclic acid and its derivative sodium salicylate, flunixin, tolfenamic acid, meloxicam and ketoprofen. Paracetamol (syn. Acetaminophen) and metamizole are NSAID-like substances and are also authorised for use in pigs in the EU. Strong opioids are not authorized for use in pigs according to the current state of knowledge (EMA 2015).

Pain treatment

Classification and mechanism of action of analgesics
NSAIDs inhibit cyclooxygenase locally in the inflamed tissue and systemically, which reduces the release of inflammatory mediators such as prostaglandins. Depending on their selectivity, they have analgesic, antiphlogistic and antipyretic effects (Burian et al., 2005; Vane et al., 1998; Löscher et al., 2014). As prostaglandins play a central role in the pathophysiology of enterotoxaemia, in particular meloxicam can also be used successfully in the treatment of septicaemia (Schoos et al. 2019). In the EU approved drugs are classified according to their selectivity towards the different cyclooxygenase isoforms: COX-1 selective (acetylsalicylic acid and sodium salicylate), COX1/COX-2 non-specific (diclofenac, flunixin, tolfenamic acid, ketofprofen) and COX-2 preferential (meloxicam) (EMA 2025; Löscher et al., 2014).

The active compound paracetamol is the only approved for pigs and has mainly a central antipyretic effect by inhibiting the COX-3 isoform (Löscher et al., 2014). Metamizole has a very potent central analgesic and antipyretic effect which is mediated by an inhibition of COX-3, cannabinoid and opioid systems (Jasiecka et al., 2014). Metamizole also has a spasmolytic effect on the smooth muscles of the gastrointestinal tract (Löscher et al., 2014).

Pharmacotherapy
The selection of the best analgesic drug depends on the mode of action, the cause of pain and the regulatory framework. According to Article 106 Reg. (EU) 2019/6, the use of the selected veterinary medicinal products shall be in line with the terms of the market authorisation, which may differ between the veterinary medicinal product.

Diseases of the respiratory tract with fever
It is a well-documented, that respiratory diseases are frequently associated by fever. Therefore, a combination of analgesic and antipyretic effect with a suitable antibiotic is indicated. The release of inflammatory mediators causes a shift of the body temperature in the brain, which resents as fever (Balli et al., 2023). Thus, an accumulation of the active compound in the brain is essential for an antipyretic effect. Paracetamol and salicylic acid derivatives have been shown to possess central antipyretic and analgesic properties (Schoos et al., 2019). Ketoprofen has demonstrated a significant antipyretic and antiphlogistic effect, particularly combined with antibiotics to treat infections caused by *Actinobacillus pleuropneumoniae* and *Glaesserella parasuis*. In contrast, flunixin exhibit antiphlogistic effects, but did not reduce fever reduction in infections with *Actinobacillus pleuropneumoniae, Pasteurella multocida* and PRRSV (Schoos et al., 2019).

Postpartal dysgalactia syndrome (PDS, MMA)
The post-partum dysgalactia syndrome (PDS) is associated with significant losses of suckling piglets. A comprehensive review article summarised that all analgesics authorised for pigs (flunixin, meloxicam, ketoprofen and tolfenamic acid) exhibited excellent anti-inflammatory and antipyretic properties for myometritis therapy by adding to an antibiotic drug (Schoos et al., 2019; Jeeraphokhakul et al., 2023).

Surgery (e.g. castration)
It is crucial to administrate narcotic and analgetic drugs to avoid surgery pain such as caused by castration. To achieve an appropriate analgetic effect, the analgesics need to be applied prior to the surgery procedure. The best post-operative analgetic effect for Meloxicam and Ketoprofen was obtained when these were applied 30 minutes before the operation (Schoos et al., 2019). A further comparative study showed an enhanced post-operative analgesic effect of flunixin and ketoprofen compared to meloxicam (EMA 2025).

Musculoskeletal system
There are limited studies on the analgesic treatment of musculoskeletal diseases available. Ketoprofen has been shown to have the strongest analgesic effect for pigs and also suppresses pain in the musculoskeletal system (Schoos et al., 2019). In lameness sows a pronounced analgesic effect of flunixin and meloxicam was observed (Pairis et al., 2015), but a less accumulation of meloxicam in inflamed tissue was determined in comparison to flunixin (Steagall et al. 2021).

Most important side effects
All NSAIDs can inhibit the COX-1 isoform. COX-1 is ubiquitously expressed overall in the body and is necessary to maintain physiological functions, such as gastroprotection. Inhibition of COX-1 typically leads to gastrointestinal bleeding and ulcerations (Löscher et al., 2014). Due to the antithrombotic effect (inhibition of thromboxane formation in platelets) of salicylic acid derivatives (acetylsalicylic acid, sodium salicylate), there is an increased tendency to bleed for up to 7 days after the end of treatment. As prostaglandins are also necessary for renal perfusion, NSAIDs may cause side effects with long-term use and in combination with dehydration, hypertension and nephrotoxic agents.
Similar to classical NSAIDs, metamizole can cause gastrointestinal and renal side effects. Metamizole may also induce bronchospasm (Löscher et al., 2014)

Contraindications
It is important that use in pregnant and lactating sows is limited. In particular, the use up to 48 hours before parturition may lead to birth complications. Salicylic acid derivatives are also not suitable for use in pregnant and lactating sows and piglets under 4 weeks of age, as cartilage and bone maturation may be impaired. A carefully use is suggested for patients with liver damage due to the liver metabolism of NSAIDs. Furthermore, the risk of kidney failure increases by using in hypovolemic pigs (Löscher et al., 2014; Schoos et al 2019).

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KEYNOTE SESSION

FREEDOM TO EXPRESS NORMAL BEHAVIOUR



DR. ALEXANDER GRAHOFER

"Reproductive behaviour and managment of parturition in free farrowing systems"

Thursday May 22, 13.30-15.00

Biosketch

Alexander Grahofer is a senior scientist at the Clinic for Swine, Department of Clinical Veterinary Science, Vetsuisse Faculty, University of Bern, where he teaches swine medicine and reproduction. He studied veterinary medicine at the University of Veterinary Medicine Vienna, Austria and received his DVM from the University of Bern, Switzerland.

He is a Diplomate of the European College of Porcine Health Management (ECPHM) and the European College of Animal Reproduction (ECAR). His current research focuses on porcine reproduction, in particular parturition and the peripartal period of sows in a free farrowing system. He is also developing innovative and new learning tools for veterinary medicine.

Abstract

Introduction

The pig industry is increasingly shifting from traditional farrowing crates to free farrowing systems. This change is driven by growing concerns about animal welfare and regulatory demands to improve sow well-being by allowing greater freedom of movement and expression of natural behaviour. In addition, the prevalence of farrowing disorders are increasing in our hyperprolific sows.

Sow behaviour in a free farrowing system

The free farrowing system enables sows to express their natural behaviour and enhances their locomotion in the peri- and postpartal periods, which has a positive effect on sow health and welfare. One significant advantage of this system is that it allows sows to express their nest-building behaviour, with higher activity levels observed compared to crated sows [1].

Nest-building is an intrinsic behaviour regulated by hormonal changes, initiated by increased prolactin levels following a decline in progesterone and a rise in prostaglandin F2α [2].

The sow initiates nest-building approximately 24 hours before farrowing, with peak activity occurring 4 to 12 hours before the birth of the first piglet. This behaviour ceases as oxytocin levels rise and udder comfort improves, due to piling of nestbuilding material [3]. Prolonged nest-building behaviour, maintained during parturition, may be considered abnormal, and it appears indicative of problems in the hormonal process of parturition [3]. It is well-established that insufficient or unsuitable nesting materials during the periparturient period can cause stress in sows, leading to increased opioid release. This, in turn, suppresses oxytocin secretion, reducing uterine contractility [4]. Hence, encouraging natural nesting behaviour can help shorten farrowing duration and thereby improve piglet vitality, and enhance colostrum intake by

reducing the time between farrowing and the first suckling [3].
Although various types and amounts of nest-building materials influence the farrowing process in confined systems, there is limited research on their effects in free farrowing systems. One study found that sows in free farrowing systems primarily used newspaper for nest-building, rather than straw or jute fabric [5]. In addition, a recent study indicated that larger litters (≥17 piglets) delayed the peak of nest-building activity in free farrowing systems [6].

Management of parturition in a free farrowing system
Several studies have demonstrated that farrowing duration is shorter in free-farrowing sows compared to crated sows [4,7,8]. This difference may be attributed to the inhibitory effects of elevated opioid levels and a higher density of opioid receptors in crated sows, which are thought to suppress endogenous oxytocin activity during parturition [4].
Additionally, a recent study found that housing conditions influence hormonal regulation during farrowing [8]. Free farrowing sows exhibited significantly lower intrapartum progesterone levels compared to crated sows. This difference may be associated with the significantly lower concentrations of prostaglandin F2α metabolite observed in crated sows, suggesting a potential impact of confinement on the hormonal regulation of parturition [8].
The incidence of dystocia has significantly increased in recent years. Although free farrowing systems enable sows to express natural behaviours and influence hormonal changes during the peripartal period, the incidence of dystocia of the last five years remains comparable to that observed in crated systems (free farrowing sows: 48.9 % vs. crated sows: 48.8%). An overview of the prevalence of dystocia in free farrowing systems over the past five years is presented in Table 1. Hence, adequate management procedures are needed to reduce and/ or immediately recognize birth disorders in free farrowing sows.

Table 1: Overview of the incidence of dystocia in free farrowing sows of the last five years

Authors	Year	Definition for dystocia (Piglet-piglet interval)	Incidence (%)
Bill et al., [9]	**2021**	**> 60 min**	**29**
Grahofer et al., [10]	**2021**	**> 60 min**	**39**
Blim et al., [7]	**2022**	**> 60 min**	**40**
Egli et al., [11]	**2022**	**> 60 min**	**56**
Jahn et al., [12]	**2022**	**> 60 min**	**58**
Lehn et al. [8]	**2025**	**> 60 min**	**60**
Adam et al. [13]	**2025**	**> 60 min**	**60**

Uterotonic agents
The routine use of uterotonic agents in crated sows has been reported to positively influence the farrowing process and associated parameters. However, limited information is available regarding their use during parturition in free farrowing sows [9,14]. In these studies, the administration of oxytocin after the first or fourth piglet had no significant effect on farrowing duration. A significant increase in intrapartum deaths, particularly cases involving ruptured umbilical cords and severe meconium staining, was observed in oxytocin-treated sows. Additionally, a case report described adverse effects following the routine intramuscular administration of 35 µg carbetocin during farrowing [15]. This treatment was associated with prolonged piglet-to-piglet intervals (>60 min), excessive colostrum loss, and an increased incidence of weak and stillborn piglets.
Collectively, these findings suggest that the routine administration of oxytocin or its analogs is not recommended for free farrowing sows due to their potential negative effects. A possible explanation for these adverse outcomes is the significantly higher endogenous oxytocin levels observed in free farrowing sows during the post-expulsion phase of parturition compared to crated sows [1,7,8]. An additional exogenous administration of uterotonic agents may cause prolonged and intense uterine contractions or uterine spasms, potentially compromising fetal blood supply through the umbilical cord. This can lead to hypoxia and increased piglet mortality, similar to the effects observed with oxytocin overdoses in crated sows.

Indicators for the farrowing process in a free farrowing system

Blood glucose level

Farrowing is a demanding process for sows, with glucose serving as the primary energy source for the uterus. In crated sows, blood glucose levels can predict farrowing duration. However, a recent study found no significant correlation between blood glucose levels and farrowing duration in a free farrowing system [16]. This suggests that blood glucose levels at the onset of farrowing are not reliable predictors of prolonged farrowing (>300 min) or dystocia (>1-hour piglet-to-piglet interval). Farrowing is an energy-intensive process for sows, with glucose serving as the primary energy source for the uterus.

Interestingly, sows in a free farrowing system, particularly those that began farrowing after their morning meal, exhibited lower blood glucose levels than crated sows. One possible explanation is that nest-building behavior before farrowing demands glucose for uterine function, and since sows are generally more active during the day in a free farrowing system [17], their increased glucose metabolism may further contribute to lower blood glucose levels at the onset of farrowing.

Piglet traits

A meta-analysis found no significant differences in the number of stillborn piglets per litter between free farrowing and crated systems. However, in the absence of enrichment material in both housing systems, crated sows experienced a significantly higher number of stillbirths. [18]. Similar to crated sows, the occurrence of stillborn piglets in free farrowing systems can serve as an indicator of prolonged farrowing [19]. An increase in stillborn piglets is positively associated with a longer farrowing duration [19]. Therefore, sows that expel a stillborn piglet during farrowing should be closely monitored for signs of dystocia.

Placenta traits

To date, placental characteristics in sows have been largely overlooked. Several studies on free farrowing sows indicate that placental expulsion duration is longer in this housing system compared to crated systems. While the reasons for these differences remain unclear, it is hypothesized that the housing system allows the third stage of labor to proceed more naturally, as myometrial contractions decrease in amplitude after the last piglet is expelled and may even reverse direction from the cervix to the uterine tube.

A possible key indicator for monitoring parturition in free farrowing sows is the onset of placental expulsion. Sows that expelled the placenta before the birth of the last piglet experienced significantly longer piglet expulsion durations compared to those that expelled the placenta simultaneously with or after the last piglets [20]. Additionally, the number of placental parts may serve as a predictor for farrowing and placental expulsion durations in free farrowing sows [20]. Notably, farrowing and placental expulsion durations were significantly prolonged when five or more placental parts were expelled. This suggests that during prolonged farrowing, the placenta is subjected to increased mechanical stress, making it more likely to be expelled in multiple fragments.

Conclusions

The shift towards free farrowing systems represents a significant advancement in improving sow welfare by allowing greater freedom of movement and expression of natural behaviours, particularly nest-building. While these systems provide numerous benefits, including reduced stress and potential improvements in farrowing duration and piglet vitality, challenges remain, such as high incidence of dystocia and the need for effective management practices. Hormonal regulation, the nesting materials, and monitoring for farrowing disorders are key factors that influence the success of farrowing in these systems. Further research is needed to optimize management strategies, minimize risks, and fully harness the benefits of free farrowing systems in promoting sow and piglet health.

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KEYNOTE SESSION

FREEDOM TO EXPRESS NORMAL BEHAVIOUR



PROF. INGER-LISE ANDERSEN

"Behaviour of sows and their piglets in different crated and free farrowing systems"

Thursday May 22, 13.30-15.00

Biosketch

I am a professor of ethology and animal welfare at the Norwegian Univ. of Life Sciences, Dep. of Animal and Aquacultural Sciences, Faculty of Bioscience. I am currently teaching several courses in ethology and animal welfare for graduate and undergraduate students, and supervising bachelor students, master students and PhDs. My main research focus has been behaviour and welfare in pigs in all phases of production including pregnant sows, sows and piglets, weaned and finishing pigs. The topics on pigs include social dynamics, loose-housing systems, maternal behaviour and piglet survival, farrowing environment, environmental enrichment and positive emotions, and welfare of weaned pigs, finishing pigs and sows with their piglets. I also have experience in research and teaching in other farm animal species, such as sheep, goats and horses. In these species I have focused on social dynamics, and more recently on horse signals and communication and how this information can be used to enhance welfare in sport horses. Finally, I am involved in a larger project on stress biology/resilience and pigmentation in juvenile rainbow trout and salmon.

Abstract

Maternal investment, sow behavioural needs and criteria for housing design

Domestic sows follow a reproductive strategy of producing large litters than what the mother can take care with some offspring being substantially smaller and less fit to survive than others (Drake et al., 2008; Andersen et al., 2011). Litter sizes in some countries have risen to around 15 piglets on average, with some sows exceeding 20 piglets—despite sows typically having only 14–16 functional teats. This is driven by selection for increased liveborn piglets but comes at a substantial biological cost for the sow and piglets. An increased maternal investment at a young age may reduce residual reproductive success and longevity of the sow. Neonatal competition for teats is intense, even when teat numbers match litter size, as some piglets monopolize multiple teats (e.g. Ocepek et al., 2017a). Larger litters cause higher mortality due to crushing and starvation, and despite increased litter sizes and slightly lower percentage of liveborn piglets being lost, the number of piglets successfully weaned remains around 12–13. Larger litters lead to more unsuccessful nursings, longer intervals between nursing, greater variation in piglet weight at weaning (Ocepek et al., 2017a), and increased labor demands for farmer during farrowing. Nest-building in domestic pigs evolved to protect piglets from predators, prevent heat loss, and strengthen the mother-offspring bond, as pigs do not lick or groom their young. Even when provided with straw, crated sows display frustration behaviors like bar biting and restlessness (Andersen et al., 2014), emphasizing the need for space to express maternal instincts. While nest-building materials help, they cannot fully compensate for confinement stress. Long-stemmed straw in loose pens enhances nest-building, increases resting time, and reduces oral stereotypies more effectively than peat or plane sawdust as litter on the solid floor(Rosvold et al., 2018). During farrowing, sows with straw show less negative communication toward piglets, initiate more successful nursing bouts, experience shorter farrowing durations, and have fewer stillbirths compared to those with sawdust, peat, or no material (Rosvold & Andersen, 2019). Loose housing during lactation places higher demands on maternal traits than crated or

semi-crated systems. Key behaviors include nest-building, sow-initiated communication, and careful movement within the pen (Ocepek & Andersen, 2018; Ocepek & Andersen, 2017b).

Farrowing crates, introduced in the 1950s as a cost-effective way to save space and labour (Ko et al., 2022), and with the aim of restricting sow movements to prevent piglet crushing. Despite its global dominance, the crate system inhibits maternal care and compromise sow welfare by preventing essential maternal behaviours such as nest-building, exploration, locomotion, and physical activity—key for facilitating birth, orienting within the environment, and interacting with piglets. Moreover, crated sows have more locomotion problems and udder lesions, and the piglets have more skin lesions on their face and carpus than in farrowing pens (Lohmeier et al., 2019). Suckling duration per suckling bout is also longer in the pen system than in crates. Temporary crating allows more sow-piglet interactions and exploration than permanent crates (Ko et al., 2022) but does not significantly reduce stress biomarkers. While opening the crate affects immediate sow and piglet behaviour (Illmann et al., 2021), studies suggest it may also increase piglet mortality (King et al., 2019). Thus, temporary crating appears to be another inadequate attempt to create a well-functioning system that ensures good welfare for both sows and piglets.

Many farrowing pens have been developed with the aim of meeting sows' behavioral needs. The Australian Werribee pen (e.g. Cronin et al., 2000) and Switzerland's FAT2 pen (Weber et al., 2007) achieved similar or lower piglet mortality rates than crates in commercial and experimental farms. Outdoor hut systems offer the most stimulating environment but are impractical in many regions due to climate and highly variable mortality rates. Despite promising production results in some countries, they also require robust sow genetics and skilled management. Newer pen designs, as for instance the PigSafe pen, emphasize smaller nest areas to reduce preweaning mortality (Baxter et al., 2015). Notably, piglets from the PigSafe pen exhibited more pre-weaning play and less post-weaning aggression than those from crates (Baxter et al., 2015), highlighting the developmental benefits of a more stimulating birth environment. Cronin et al. (1998) recommended a minimum nest width of 2.2 m for better sow orientation and nursing. As sows have become larger, they require spacious pens, particularly wide enough to turn around and orient themselves while nest-building and nursing. Larger pens with ample bedding, solid walls in the resting area, and deep-slatted dunging areas improve hygiene by encouraging proper dunging behavior (Bøe et al., 2019). Nest areas should be enclosed on three sides for privacy while allowing the sow to see her surroundings (Andersen & Ocepek, 2022). Sloped solid walls help sows safely transition from standing to resting. Floor heating aids piglet survival by reducing heat loss and encouraging faster suckling. Many pen designs assume piglets will leave their mother's udder for a warm creep area, but naturally, newborns prefer to stay close for warm udder for comfort, protection and milk. In fact, increased time near the sow does not raise mortality in individually loose-housed sows; rather, it enhances survival (Melisova et al., 2011).

Example of a farrowing pen designed to meet behavioural needs of the sow - the SowComfort pen

The SowComfort farrowing pen was designed to meet the sow's needs and encourage good maternal behavior (Andersen & Ocepek, 2022). Key features include a separate nest area with protective walls, a comfortable mattress, floor heating, and a hay rack providing straw and hay (Figure 1). Sloped walls support the sow while lying down and protect piglets from crushing. The pen has distinct nest and activity areas, offering the sow a good overview and providing a predictable, safe environment for the farmer. The pen includes 7.7 m² for the sow to move before farrowing, with space for piglets up to 30 kg after the sow is moved, if needed. The nest area has a 30 mm thick rubber mat, with insulation underneath to enhance floor heating efficiency. The activity area contains the feeder, drinker, and plastic slatted floor. The nest area was designed to promote piglet survival through stimulating good maternal behavior, offering a hay/straw rack for nest-building material. Sows have free access to hay from one week before birth and throughout lactation. Straw replaced hay 24 hours before birth for nest building. After birth, a thin layer of dry sawdust on the rubber mat ensures optimal hygienic conditions for neonates. Sloping panels and independently controlled heated-floor zones allow temperature control, influencing where the sow lies relative to her litter. To test the SowComfort pen in a commercial setting, we selected two commercial herds that wanted to build a new farrowing section. We collected production data from 343 healthy sows with different parities in the new pen, distributed over 7 consecutive batches.

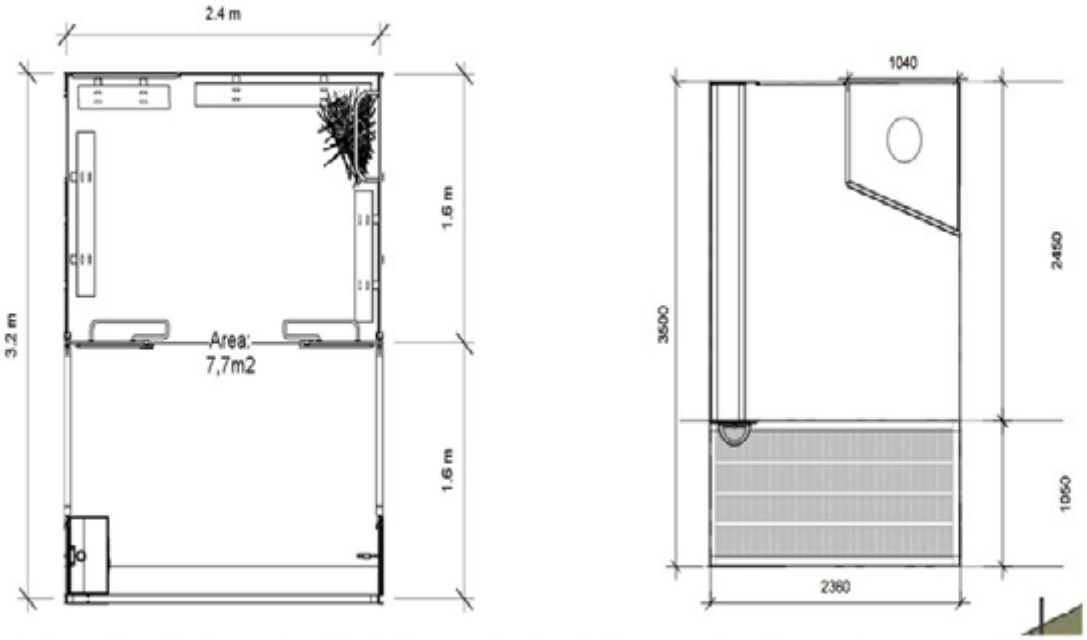


Figure 1. SowComfort pen to the left vs a typical, Norwegian farrowing pen with creep area to the right. The latter had a long through for feeding sows and piglets.

The SowComfort pen reduced piglet mortality due to starvation (1.7 ± 0.5%) but had a slightly higher crushing rate than the old system (11.8 ± 1.4% vs. 9.6 ± 1.2% of liveborn piglets; Figure 2). However, piglets without knee lesions were significantly higher in the SowComfort pen (28.8 ± 3.1%) compared to the old system (11.0 ± 2.4%), indicating better protection from the rubber mattress over concrete with sawdust. Over seven consecutive batches, total piglet mortality declined significantly from 15.4 ± 1.6% in batch 1 to 11.7 ± 1.6% in batch 7, with daytime farrowing attendance at 80%, but no night supervision. Liveborn mortality was significantly lower in the SowComfort pen, particularly for primiparous and second-parity sows. Starvation was rare, with crushing as the primary cause of death. Sows with smooth farrowings and early nursing were left undisturbed. Currently, piglet mortality in one of these farms using the SowComfort pen is around 10%, with the farmer reporting minimal additional workload at farrowing.

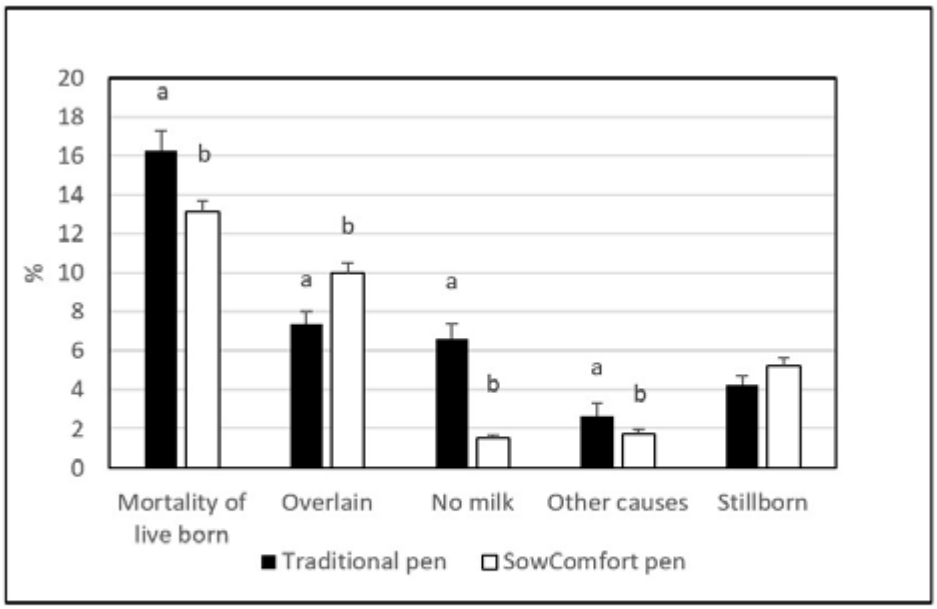


Figure 2. Causes of preweaning mortality in a traditional, individual loose-housed sow pen with a separate piglet creep area compared to the SowComfort pen with a nest area for sows and piglets together and no separate creep area.

Human impact and management

Loose-housing systems rely on a positive human-animal relationship, where sows feel confident and secure around stockpersons. Achieving this requires consistent, predictable behaviour, patience, and positive reinforcement through gentle handling, friendly talking, and even treats. A Norwegian survey of loose-housed sow herds found that farmers who attended at least 80% of farrowings, maintained frequent positive contact with sows, dried newborn piglets when needed, and practiced split suckling in large litters had the lowest pre-weaning mortality rates (Rosvold et al., 2017). Ultimately, good management practices can help mitigate the negative effects of suboptimal pen design.

Conclusions

We have sufficient scientific knowledge and practical experience to transition to loose-housing systems that prioritize animal welfare. Behavioral needs of sows and piglets must guide system design, with technology serving as a support rather than the primary focus, as has been the case for decades. While well-designed pens contribute as a good basis for producing high-quality litters, sow maternal traits and management practices have the greatest influence on productivity and piglet survival in loose-housing systems. To ensure a sustainable pig production, breeding programs must account for both productivity and sow well-being. Maternal investment costs—such as shoulder lesions, body condition loss, and reduced longevity—must be balanced against the number of piglets born and weaned. In addition to prioritizing the sow and piglet behavioural needs, achieving optimal system design requires integrating both effective management practices and strategic genetic selection.

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KEYNOTE SESSION

FREEDOM FROM FEAR AND DISTRESS



PROF. XAVIER MANTECA VILANOVA

"Behaviour of pigs in a comparative light"

Friday May 23, 08.30-10.00

Biosketch

Xavier Manteca Vilanova received his BVSc and PhD from the Autonomous University of Barcelona and an MSc in Applied Animal Behaviour and Animal Welfare from the University of Edinburgh. Currently, he is professor of animal behaviour and animal welfare at the School of Veterinary Science in Barcelona. He has published extensively and is a diplomate of the European College of Animal Welfare and Behavioural Medicine. Xavier has been member of the Animal Health and Welfare Panel of EFSA and has participated in several EU-funded research projects.

Abstract

Introduction and objectives

The objectives and methods of ethology -the study of animal behaviour- were formally established by Nikolaas Tinbergen in the second half of the last century (Tinbergen, 1963). In his seminal paper, Tinbergen suggested that the objectives of ethology are describing and explaining the behaviour of animals, and that the explanation of behaviour must address four questions that have ever since been known as the "four whys" of Tinbergen: (1) causation, i.e. the physiological mechanisms which trigger behaviour and draw it to an end, (2) ontogeny, i.e. how and why behaviour changes through age, (3) function, i.e. how a given behaviour increases the fitness of the individual that performs it, and (4) evolution of behaviour.

Understanding the behaviour of pigs is important for at least two reasons. First, behavioural changes are often the first sign of health or welfare problems, and behavioural observations can facilitate early diagnosis and intervention. Second, several behavioral patterns of pigs -including foraging, nest-building and aggression- have a direct impact on their welfare and production.

Behavioural research has benefited from long-term observational studies that provide detailed descriptions of behaviour. One of such studies was the "Pig park project", which started in 1978 in Edinburgh (Scotland) and lasted for over 3,5 years. During the project, several groups of pigs kept in an enclosure with different types of habitat were studied, yielding a wealth of data on the foraging, social and reproductive behaviour of pigs in semi-natural conditions (Stolba and Wood-Gush, 1989). A full explanation of behaviour, however, also requires experimental and comparative studies and our understanding of pig behaviour has advanced significantly when information from other species has been used.

This paper is not meant to be a comprehensive review of pig behaviour. Rather, it will focus on two aspects of pig behaviour-foraging behaviour and the prevention of tail biting and how early experiences modify behaviour later on in life-that (1) have practical applications, (2) their study has benefited from a comparative approach, and (3) are not covered by other speakers.

Foraging behaviour and prevention of tail-biting

Foraging behaviour

The feeding behaviour of animals can be divided into two phases: appetitive and consummatory. Appetitive feeding behaviour (from now on, foraging behaviour) includes the behavioural patterns involved in the searching for and the acquisition of food, whereas consummatory feeding behaviour refers to the actual eating of food. It might be thought that foraging behaviour is simply a means to acquire food and that it becomes irrelevant when pigs have high-quality food freely available in the feeder. However, the results of many studies done in a wide variety of species clearly indicate that foraging behaviour is self-rewarding, and that restriction of foraging behaviour leads to welfare problems.

The self-rewarding properties of foraging behaviour are demonstrated by the phenomenon of contrafreeloading, which means that animals prefer to "work" (for instance by pressing a lever) to receive food even though identical "free" food can easily be obtained in a nearby dish. Contrafreeloading has been demonstrated in many species, including pigs when they are given the choice to "work" for food using natural foraging behaviour (de Jonge et al., 2008).

Prevention of foraging behaviour increases the risk of abnormal behaviours, including repetitive abnormal behaviour or stereotypies and behaviours that are potentially damaging for other animals, such as tail-biting in pigs. Indeed, although tail-biting has been classified in several types, it seems that its most common form develops as pigs that are prevented from showing their normal foraging behaviour "redirect" their motivation to root towards the tail of other pigs (Taylor et al., 2010). Interestingly enough, feather pecking in laying hens and wool-pulling in sheep appears to have a similar origin. For example, wool-pulling appears only when sheep are kept out of pasture for several weeks and the movements of sheep that engage in wool-pulling closely resemble those shown when grazing (Parés et al., 2023).

Prevention of tail-biting

Tail-biting has serious economic and welfare consequences. Although its cost varies widely, it has been suggested that the costs of tail biting lesions across Europe are around 2.0 euros per finished pig, which is equivalent to the 1–3% of the sale value of a pig (Niemi et al., 2021). From an animal welfare standpoint, tail biting not only causes pain and distress in the affected animals, but it should also be seen as an indicator of sub-optimal housing and husbandry conditions. Furthermore, tail-docking -which has been and, in many countries, is still widely used to reduce tail biting lesions- causes its own welfare problems and is subjected to legal restrictions in the European Union.

As the most common form of tail-biting is likely to start as redirected foraging and exploratory behaviour, the provision of manipulable material that allows pigs to show their normal rooting behaviour is considered to be one of the key interventions to prevent tail-biting. However, not all manipulable materials are equally effective, and this is largely due to the time pigs spent manipulating them (i.e. the so-called "optimal" manipulable materials are those that attract pigs' interest for the longest periods of time, which agrees with the fact that pigs have the "drive" to forage for long periods of time).

From a practical perspective, however, optimal manipulable materials -such as straw bedding- are not always easy to use, particularly on fully slated floors, and at least in some circumstances using other materials which in principle are not optimal can be more cost-effective (Niemi et al., 2021). If this is the case, using different types of material sequentially, so that the "novelty effect" is not lost, is extremely important. Also, regardless of the manipulable material that is used, it is essential to keep in mind that tail-biting is a multifactorial problem and that risk factors other than lack of rooting material -such as crowding, poor ventilation, health problems, etc.- must be addressed.

How does early experience modify behaviour later on in life?

Animals of the same species show pronounced Individual differences in behaviour which are consistent over time and across situations and are not accounted for by age or sex. In farm animals, such individual differences can have a significant impact on their welfare and production. The term temperament is commonly used to describe these consistent individual differences in behaviour (Manteca and Deag, 1994). Research in a wide variety of species has shown that temperament results from both genetics and environmental effects during the early stages of development. Studies of pig behaviour have identified several environmental influences on temperament and some of them are briefly described below.

Prenatal stress

Research in many species has shown that prenatal stress has long-lasting effects on the physiology and behaviour of offspring. In pigs, female offspring of sows that were stressed during pregnancy showed a more pronounced stress response than control animals, and their maternal behaviour was also affected, as they were more restless and tended to bite at their piglets more than control daughters (Jarvis et al., 2006).

Environmental enrichment before weaning
Research in laboratory animals has shown that the effects of environmental enrichment go well beyond the reduction of abnormal behaviour and can include positive effects on health, for example. Similarly, recent work with pigs suggests that environmental enrichment particularly before weaning can reduce the effects of some pathogens (de Bruijn et al., 2024).

Human-piglet interaction
It has been known for a long time that a good human-animal relationship has beneficial effects on both welfare and production, and positive handling of piglets during lactation reduces fear behaviour and physiological stress responses to humans, novelty and routine husbandry practices (Hemsworth et al., 2023).

Socialization and aggressive behaviour at weaning
Aggressive behaviour is a significant welfare problem when pigs are mixed with unacquainted individuals -as happens for example at weaning- and when they compete for resources. Social interaction with piglets from other litters before weaning has been shown to reduce the negative effects of aggression at weaning (Verdon et al., 2024) and this can be due to the positive effects that such early interactions have on piglets' social skills.

Concluding remarks
The examples given in this paper illustrate two important principles of animal welfare: the close link between behaviour and welfare and the importance of temperament. The importance of natural behaviour for animal welfare has been extensively discussed (see for example Bracke and Hopster, 2006) and it is widely accepted that the possibility to perform some highly motivated, rewarding behaviours is a requisite for good welfare. Individual differences in how each animal reacts to its environment are also fundamentally important for welfare. The welfare of an individual has been defined as its state as regards its attempts to cope with its environment (Broom, 1986) and therefore animals exposed to the same environment will experience different welfare states if they differ in their physiological, behavioural and emotional response to it, i.e. if they differ in their temperament.

Finally, this paper has dealt with the study of the causation and ontogeny of behaviour. However, the other two "whys of Tinbergen" -i.e. function and evolution- are also relevant to understand the behaviour of pigs and its practical implications (see for example Weary et al., 1996).

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KEYNOTE SESSION

FREEDOM FROM FEAR AND DISTRESS



PROF. PETER KUNZMANN

"Ethical challenges towards good stockmanship"

Friday May 23, 08.30-10.00

Biosketch

Academic professional activity

Since June 2015	W2- Professor "Applied Ethics in Veterinary Medicine: Humans- Animals- Nature" at the Foundation of the University of Veterinary Medicine Hanover
Since 9 May 2008	Senior Lecturer at the University of Jena
Since the Summer semester 2004	Adjunct Professor of Philosophy at the University of Würzburg
June 2002 until December 2005	Research associate at the Institute of Technology-Theology-Natural Sciences, Munich
June 2000 until May 2002	Feodor Lynen Fellow of the Alexander von Humboldt Foundation at the University of Zielona Góra in Poland
1992 until 1999	Staff member at the Institute of Philosophy at the University of Würzburg Habilitation in Philosophy, doctorate in philosophy, theological diploma

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Abstract

The thesis can be summarised: the challenge for good animal husbandry in the present is that we have gone beyond the concept of the five freedoms in many respects. This is the case because we are experiencing a significant change in our imaginary of animals, which is also supported by science. At the same time, the approaches in animal ethics in the vast majority of cases go beyond the pathocentric view, which gives the five freedoms such a central role.

Five freedoms and basic pathocentric concept

The five freedoms remain correct, of course, when it comes to keeping animals free from suffering. Some of them directly address the kind of suffering, such as fear and distress, others name basic needs of animals that will lead to suffering if not sufficiently cared for; hunger, thirst and malnutrition maybe called evil for animals, both when it comes to their bodily functions and possible sources and to forms of suffering that can be subjectively experienced.

So the first note on five freedoms is that they describe good stockmanship starting from a negative perspective.

The corresponding ethical position, called pathocentrism, focuses on the avoidance of suffering. The yardstick for improvements in animal husbandry, in turn, is the degree of burden that the respective conditions impose on the animals.

This is where especially sceptical considerations lead us: as humans, we can hardly empathise with animals and imagine their happiness, but we can make an interpretative estimate of when animals are not feeling well. The least that humans owe animals is the avoidance of (unnecessary) suffering or pain. We don't know what goes on inside happy animals. But with effort and attention, we can recognise the ways in which we disturb their well-being.

That sounds much more relaxed than it can be justified philosophically and ethically and presented scientifically. The question of our ability to grasp animal well-being or animal suffering in its various facets, is still hotly debated even after decades. Even for a biologically rather fundamental entity such as pain, there are very different interpretations of what this concept actually denotes in animals. For example, for pigs, this is developed in the paper by Ison et al (Ison et al 2016).

Even if it is not that easy to say what it is actually about, especially from a scientific and methodological point of view: it is the moral minimum consensus in our society and at the same time shapes animal protection legislation. The German animal protection law takes such an approach ex negativo, not requiring the facilitation or realisation of well-being, but instead prohibiting the infliction of pain, suffering or harm (unless justified by a reasonable cause). In his much-cited footnote in his "Introduction to the Principles of Morals and Legislation", 1789 Jeremy Bentham has elevated the principle of pathocentrism to the key principle of all moral relationships with animals: "Is it the faculty of reason, or perhaps, the faculty for discourse?...the question is not, Can they reason? nor, Can they talk? but, Can they suffer?"

The thrust of Bentham's argument is obviously egalitarian: it does not matter who is suffering. The capacity to suffer is the only criterion. However, there is most likely to be a significant difference in the perception of pain and suffering between humans and animals.

In classical pathocentrism, suffering is treated as a common, interchangeable coin that can be easily converted between humans and animals, but also between albatrosses and sea urchins. In the treatment of animals, however, the differences in sentience are morally relevant. A jellyfish presumably suffers differently and under different conditions than a dog. Taking this into account allows for a more differentiated consideration of the morally decisive factor, namely whether animals are harmed at all by the treatment by humans.

Possible animal suffering is not only the ethical criterion for evaluating our actions towards animals – it is what makes an ethical relationship necessary in the first place. It is the capacity for suffering or, more generally, the sentience of animals that brings them into the spotlight of ethical considerations in the first place. Because we can cause animals to suffer and suffering, as an evil, is to be avoided, the well-being of animals cannot leave us indifferent.

In the assertion of the sentience of animals, two things become ethically significant: the reason for our responsibility towards animals and, at the same time, the extent of that responsibility. The reason, because the sentience of animals compels us to take special care of them; and the extent, because the avoidance of animal suffering represents an unavoidable task of ethically legitimate action.

In precisely this setting, the five freedoms have had an enormous impact and retained their relevance to this day.

It is likely to be extremely difficult to enforce positive duties, especially if they are linked to penal provisions. This raises the question of when we have fulfilled our duty to make animals happy. If we assume a normal state free of suffering (in the broadest sense), we have set an achievable goal.
As long as the standards of good animal husbandry in morals and legislation are based on this form of pathocentrism, there is no need for major steps beyond the five freedoms. Whereby the (fourth) freedom, which, formulated positively, is a freedom to live out natural behavioural patterns, implicitly points beyond it: "Freedom to express (most) normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind".

However, in several perspectives, we go further.

Flourishing and permanent holidays
In ethics, a modern view of animals attributes positive emotions to animals. Accordingly, the question arises as to how we can grant this to animals in husbandry; this is a real challenge, especially with cognitively rich animals such as pigs. Such features are difficult to implement in the reality of husbandry, difficult to scientifically establish and difficult to monitor legally. Today, the numerous ethical approaches demand what could be called flourishing: the animal should be able to realize all its capabilities according to its nature. In contrast to the pathocentric view, however, it is extremely difficult to draw a line here.

In this context, F. A. Brom spread the question of whether an animal protection law could have the task of guaranteeing animals in human keeping a permanent holiday: "In a discussion on the practical implications of the [Dutch] Animal Health and Welfare Act (AHWA) ... someone claimed that the goal of the AHWA could not be to give animals a permanent holiday." (Brom 1997). Or whether it should be geared more to damage prevention „[…]to prevent suffering (pool welfare), not to promote happiness. From this point of view, the animal's welfare is injured if it drops below a certain level. […] The choice between a point of departure in the life with happiness or in a life without suffering is important" (Brom 1997).

In the context of this article the basic divide lies in the question whether the avoidance of suffering should suffice in the context of the five freedoms, or whether we have to fulfil quite different requirements for animals, in this case more precisely for pigs.

There is an almost bewildering variety of approaches, which go far beyond the claim that we owe animals the avoidance of (avoidable) suffering. To pick out just one very prominent one: Martha Nussbaum speaks of the fact that in our dealings with animals, we must ensure that they realise their respective, specific, species-inherent *capabilities.* Nussbaum has elaborated this approach mainly in her book "Frontiers of justice" (2006). Momand sums it up precisely: "Within each creature rests innate capability wishing to thrive. And, importantly, the Aristotelian argument insists that 'there are waste and tragedy when a living creature with the innate or 'basic' capability for some functions that are evaluated as important and good never gets the opportunity to perform those functions' … Thus, the approach holds that 'an ethical concern that the functions of life not be impeded, that the dignity of living organisms not be violated' .This is exactly what Nussbaum's capabilities approach is intended to accomplish. 'It wants to see each thing flourish as the sort of thing it is'" (Momand 2016, 222).

To evaluate the approach, justification and scope of even just Nussbaum's theory would be beyond the scope of this paper. And it is only one of many approaches that, for various reasons, go far beyond pathocentricity. I will just point out that the very different moral claims very much lead to highly divergent perspectives in ethics and in the public consciousness of what we use to measure good animal husbandry.

Better animal husbandry

Most of our interested contemporaries in modern societies demand better *animal husbandry*, which is more closely oriented towards the complete satisfaction of all the animals' needs. This differs from the logic of the five freedoms in that it also takes into account needs does not immediately turn into suffering when frustrated. For the discourse, it is crucial that we can no longer realistically set a definable goal here: for pathocentrism, a goal is achieved when animals live free from suffering. Other approaches demand much more; above all, however, it is impossible to say when we will have fulfilled the claim of giving animals a good life.

Three different perspectives are conceivable here (Kunzmann 2019) although they can usually get mixed up in the discussion about farm animals:

1. All people want the animals not to live a bad life. Therein lies the moral consensus. This is also pathocentric basic law of animal protection: avoiding suffering. However, parts of agriculture still undercut these minimum standards again and again, with the consequence for the reputation and credibility of all animal owners.

2. People want animals to have a better life. What exactly this means, of course, ranges as widely as the space between the ideal fulfilment of all capabilities on the one hand and the frustration of all needs on the other. In Germany, the SocialLab Consortium has evaluated corresponding surveys: "Ideas about ideal animal husbandry are characterised by terms such as 'free-range', 'species-appropriate husbandry', 'hygiene compliance in the stable', 'no antibiotics', 'more controls' or 'feed without genetic engineering'. Overall, the participants would like to see the most species-appropriate husbandry possible for farm animals, characterised by, for example, 'sufficient space', 'daylight', healthy and not too rapid growth, and species-appropriate feeding. In pig farming, keeping the animals on straw and providing them with the opportunity to wallow are of great importance in the ideal images.' (SocialLab 2019, 4, translated by the author).

3. Finally, there are those who want animals to be simply super. This involves a mixture of utopian images of animal husbandry, which real agriculture fails to meet. Not the only, but perhaps the most important motive here is the farm idyll, known in English literature as 'Old Mac Donald's Farm'.

Without going through all the variants now: the demand for consistent compliance with animal welfare represents a minimum level that cannot, of course, be undercut. What goes beyond that, the demand for better conditions for the animals, has been driving the discussion for decades.

Theoretically and practically, it is difficult to take such interests of animals seriously without turning the ideals of good animal husbandry into utopian ideals. The five freedoms, to prevent animals from suffering, are, from an internal point of view, however, also far too little to be able to justify the demands on the keeping of animals as sentient beings.

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Oral Presentations

BBD-OP-01

SCREENING ACTINOBACILLUS PLEUROPNEUMONIAE SEROTYPES USING QPCR ANALYSIS OF ORAL FLUID SAMPLES

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Background and Objectives

Actinobacillus pleuropneumoniae, the causative agent of porcine pleuropneumonia, exhibits considerable genetic and phenotypic diversity, which is typically characterized through serotype identification. As the immunological response is serotype-specific, primary control strategies rely on the surveillance of circulating serotypes. However, current serological methods face notable limitations. This study investigates the application of real-time polymerase chain reaction (qPCR) to detect circulating serotypes of A. pleuropneumoniae in clinically healthy swine herds through oral fluid testing.

Material and Methods

The study analyzed samples from three A. pleuropneumoniae-positive and three A. pleuropneumoniae-negative farms. From each farm, 30 tonsil brushing samples and their respective microbiological cultures, as well as 5 to 10 oral fluid samples, were evaluated using qPCR to detect A. pleuropneumoniae and its serotypes (1-19). Additionally, 30 serum samples from each positive farm were tested with an LPS ELISA to detect circulating antibodies corresponding to specific serotypes or serogroups: 1 (9/11); 5a, 5b; 2; 3 (6, 8, 15, 17); 7 (4); 10; 12; 13; and 14.

Results

Negative farms consistently tested qPCR-negative for A. pleuropneumoniae and its serotypes, confirming the specificity of the method. In positive farms, qPCR demonstrated high sensitivity, as oral fluid samples reliably detected the same serotypes identified by ELISA. Moreover, serotypes identified in oral fluid samples correlated with those detected in individual tonsil brushing samples, further validating the oral fluid sampling approach.

Discussion and Conclusion

Serological techniques have been routinely employed for monitoring A. pleuropneumoniae serotypes. However, these methods face limitations, including the requirement to test a substantial number of animals, cross-reactivity between serotypes (e.g., 3 [6, 8, 15, 17]), and the challenges posed by emerging serotypes (e.g., 18 and 19). The qPCR analysis of oral fluids represents a noninvasive, cost-effective alternative for monitoring. It complements traditional serological methods by providing qualitative information on serotype distribution, thereby enhancing proactive surveillance and improving control strategies for A. pleuropneumoniae.

BBD-OP-02

PREVALENCE OF VIRULENT S. SUIS SEROTYPE 9 AND ANTIBIOTIC USAGE AGAINST S. SUIS IN DUTCH WEANER PIGS

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Background and Objectives

Streptococcus suis (S. suis) can cause severe disease in pigs. Different serotypes are known, with varying virulence within and between serotypes. Serotype 9 is the most prevalent cause of S. suis infections in the Netherlands. A public-private-partnership investigated 1) presence of virulent S. suis serotype 9 in weaner pigs on sow farms and 2) level of antibiotic usage against S. suis in the Netherlands.

Material and Methods

1) A cross-sectional fieldstudy, including 20 farms, was carried out in Feb-May 2022. Tonsil samples were taken from weaner pigs (n=100/farm, age 5-8 weeks) to determine prevalence of total and virulent S. suis serotype 9, using a new developed qPCR. Information was collected on farm-, pen- and pig level, e.g. farm management factors, pen-size, age, sex, and historical S. suis problems on the farm. 2) Antibiotic usage against S. suis in weaned pigs was quantified by combining information on total antibiotic usage (SDa) and interviews with pig veterinarians (n=16) on their relative antibiotic usage.

Results

1) S. suis serotype 9 was present at all farms at high prevalence (range 61-100%, median 96%). Virulent S. suis serotype 9 was found in 18/20 farms and the on-farm prevalence ranged between 0 and 79% (median 27%). Factors influencing carriership of virulent serotype 9 could not be identified in this study. 2) S. suis represents one third of the antibiotic usage in weaner pigs, with amoxicillin having the highest contribution: 85% of the total oral antibiotic usage against S. suis.

Discussion and Conclusion

The high variation in virulent S. suis serotype 9 prevalence between farms suggests there is room for on-farm interventions. However, factors possibly affecting carriership of virulent S. suis need further evaluation. S. suis is a hotspot in antibiotic usage in Dutch weaner pigs which reflects the severity of the S. suis disease burden and the need for other control measures.

BBD-OP-03

THE GENETIC BASIS OF CARRIAGE OF VIRULENT STREPTOCOCCUS SUIS TYPE 9 IN WEANER PIGS

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Background and Objectives

The role of host genetics in response to Streptococcus suis (S. suis) infection has not yet been investigated. Therefore, this study aimed to investigate the genetic background of S. suis serotype 9 (SS9) bacterial carriage on the tonsil. We analyzed total SS9 and a virulent subtype that has been associated with disease. Results will help to evaluate selective breeding as a potential control strategy for S. suis disease.

Material and Methods

Two tonsil swabs were collected from each of 910 Topigs Norsvin commercial pigs, from ten SS9 positive farms, at ~6-8 weeks of age; one swab was used to genotype host DNA and the other to quantify total and virulent SS9 bacterial load, using a qPCR assay which discriminates virulent from non-virulent SS9 strains. Genetic parameter estimation and genome-wide association studies (GWAS) were conducted to evaluate the genetic basis of bacterial load, measured by Ct value and quantity (the bacterial genome copy number). Pigs with a Ct value above threshold were either: 1) considered not exposed and excluded, or 2) deemed completely resistant and included in analyses.

Results

Heritability of total SS9 was estimated at 0.20 ± 0.07 (Ct) and 0.18 ± 0.07 (quantity) based on Scenario 1, and 0.20 ± 0.06 (Ct) and 0.19 ± 0.07 (quantity), based on Scenario 2. Heritability of virulent SS9 was estimated at 0.09 ± 0.09 (Ct) and 0.00 ± 0.11 (quantity) based on Scenario 1, and 0.34 ± 0.07 (Ct) and 0.29 ± 0.07 (quantity), based on Scenario 2. No genomic regions were associated with the bacterial load.

Discussion and Conclusion

Results show that SS9 bacterial load is heritable and polygenic. Breeding for reduced bacterial load may be a potential control strategy for S. suis disease, assuming that a higher bacterial load is associated with increased risk of developing disease.

BBD-OP-04

COMPARISON OF LUNG TISSUE CYTOKINE LEVELS IN FINISHING PIGS POST-MYCOPLASMA HYOPNEUMONIAE CHALLENGE AND TREATMENT WITH DIFFERENT ANTIBIOTIC TREATMENTS

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Background and Objectives

Mycoplasma hyopneumoniae (Mhp) causes important economic loses to producers and treatment with antibiotics is often necessary. Mhp induction of proinflammatory cytokines is key for its pathogenesis. Antimicrobials with both antibacterial and immunomodulatory effects would be beneficial to producers. The effects of two commonly used antibiotics on lung cytokines were investigated.

Material and Methods

400 feeder pigs, negative for Mhp. were allocated to finishing pens (13 pens). Pens were randomised to either Control (3 pens; 80 pigs), Tylvalosin (5 pens; 160 pigs) or Lincomycin groups (5 pens; 160 pigs). All pigs were endo-tracheally inoculated with a virulent Mhp strain. Treatment started 10 days post-exposure. Control pigs were left untreated, Tylvalosin pigs received Aivlosin® (50ppm tylvalosin in water for 5 days) and Lincomycin group received Lincomix® SP (220ppm lincomycin in water for 7 days). Challenge was successful based on development of dry coughing and Mhp PCR detection on laryngeal swabs and lung tissue. 5 days after treatment initiation, lung samples were collected from 6 pigs/pen (n=30 for treated groups and n=18 for Control group). Samples were analysed for cytokine levels using a commercial cytokine array (Quantibody® Multiplex ELISA, Porcine Cytokine Array Q1&Q2, RayBiotech Inc.). Cytokines were compared using non-parametric tests.

Results

Wilcoxon Scores for Tylvalosin, Lincomycin and Control were 32.1, 46.5 and 40.0 respectively for IL_8; 31.5, 45.8 and 42.28 for IL_10 and 48.2, 32.0, 37.5 for IFN-α. Tylvalosin significantly reduced IL_8 and IL_10 and increased IFN-α in lung tissue compared to Lincomycin ($p<0.05$).

Discussion and Conclusion

Literature indicates that Mhp infections upregulate IL-8 and IL-10, while IFN-α is strongly downregulated. This study indicates that, at label doses, Aivlosin has a measurable effect on reducing inflammation by decreasing interleukin levels. Results suggests that tylvalosin contributes to a more efficient immunomodulation, potentially leading to an improved respiratory healing process in treated animals.

BBD-OP-05

FREQUENCY OF DETECTION OF MYCOPLASMA HYOPNEUMONIAE AND INFLUENZA A VIRUS IN THE RESPIRATORY MUCUS OF GILTS, SOWS AND GROWING PIGS IN FRENCH CONVENTIONAL FARMS

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Background and Objectives

Mycoplasma hyopneumoniae (Mhyo) and Influenza A virus (swIAV) are two major pathogens commonly responsible of respiratory disorders in pigs. The detection of the genome of these pathogens can be performed by PCR on mucus collected by tracheobronchial swabbing (TBS). Aim of this investigation is to evaluate the frequency of detection of these two pathogens in the mucus of different ages animals showing respiratory signs.

Material and Methods

From 2020 to mid-2024, in the frame of respiratory diagnostic, 324 individual or groups of pigs have been sampled by TBS in conventional French farms. Per investigated group (IG), up to 18 animals showing respiratory signs like sneezing, coughing or dyspnoea were sampled. Presence of Mhyo and IAV were assessed in individual sample or in pools of 2 to 5 samples by RT-qPCR (Real Time quantitative Polymerase Chain Reaction).

Results

In suckling (n=26 IG) and nursery piglets (n=143 IG), Mhyo was detected in 31% and 35% of the cases respectively. Regarding fattening pigs (n=82 IG), almost 90% of the IG were positive for Mhyo. In gilts (n=42 IG) and sows (n=31 IG) Mhyo was found in 76% and 81% of the cases respectively. Focusing on influenza, among the groups on which the swIAV PCR was performed, the frequency of detection was 32% on suckling piglets (n=22 IG), 42% on nursery piglets (n=115 IG) and below 15% in fatteners (n=37 IG), gilts (n=29 IG) and sows (n=25 IG). In 10% of the IG, Mhyo and swIAV coinfection was detected.

Discussion and Conclusion

These PCR results contributed to understand the potentially involved pathogens. This investigation shows, that Mhyo and swIAV genomes can be detected early in the piglets live in conventional farms in France. Maternal transmission might play a key role in early contact to these pathogens, underlining the importance to reduce Mhyo and swIAV maternal shedding, by management and vaccination.

BBD-OP-06

CORRELATION BETWEEN LAWSONIA INTRACELLULARIS SHEDDING AND AVERAGE DAILY GAIN IN FINISHERS IN DANISH FIELD TRIAL.

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Background and Objectives

Lawsonia intracellularis (LI) is a dose-dependent bacterial infection in pigs associated with intestinal histologic lesions at levels exceeding 4.8 log10 bacteria/gram feces, and increasing bacterial loads negatively impacting Average Daily Gain (ADG). The objective of this study was to evaluate the correlation between LI shedding and ADG in LI-intramuscularly-vaccinated (V) and LI-non-vaccinated (C) finisher pigs.

Material and Methods

In a Danish case farm from 228 pigs (parallel groups of 112 V and 116 C finishers) in six consecutive batches, individual fecal samples were collected every two weeks, starting 3 weeks prior to transfer to finisher barn (30kg), ending 7 weeks post transfer (approx. 85kg). Additionally, pigs were individually weighed at time of transfer and eight weeks later. Fecal samples were tested for LI in qPCR at Centre for Diagnostic Solutions, The Netherlands. Shedding of LI was evaluated as Area-Under-the-Curve (AUC) in a multilevel linear regression, taking clustering of pen and batch into account and including “LI-vaccination” and “antimicrobial treatment against diarrhoea” as explanatory variables. Correlation between AUC and ADG was evaluated in Pearson’s correlation test including only pigs with at least one sample exceeding 4.8.log10 bacteria/gram feces (‘high-level-shedders’).

Results

In total 101 pigs (32 V and 69 C) were identified as ‘high-level-shedders’. Shedding, described as AUC, was significantly affected by LI-vaccination and treatment against diarrhoea (both $p<0.001$). The AUC of V-pigs was reduced by 39% compared to C-pigs. The correlation between AUC and ADG was only significant in the C-group ($R=-0.362$, $p=0.002$), not in the V-group ($R=-0,162$, $p=0.376$), indicating that the negative impact of increasing bacterial loads only existed for non-vaccinated pigs.

Discussion and Conclusion

Intramuscular LI vaccination reduced the total LI shedding. However, in this study of co-mingled pigs, infection was not eliminated. Data indicates that LI-intramuscularly-vaccinated pigs are more robust and ADG is less affected at increasing bacterial levels.

BBD-OP-07

EFFICACY OF A ZINC SILLEN CORE-LINKED POLYMER IN SUPPRESSING E. COLI AND SALMONELLA PATHOGENICITY

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Background and Objectives

Zinc oxide (ZnO) is widely used in the swine industry to treat post-weaning diarrhoea (PWD) in piglets due to its antibacterial effects at therapeutic levels (2,000 ppm). However, environmental worries about zinc accumulation in soil and the rise of antimicrobial resistance prompted the European Union to prohibit zinc use at therapeutic levels. As a result, the pig industry faces an urgent need for alternatives. Our zinc sillen core-linked polymer (ZSCLP) is a viable alternative to ZnO due to its high bioavailability and efficacy at lower doses. The purpose of this study was to assess the efficiency of ZSCLP in inhibiting Escherichia coli 1057 and Salmonella Typhimurium growth and adhesion to intestinal cells.

Material and Methods

MIC experiments were performed to determine the ZSCLP concentration necessary to suppress the growth of E. coli 1057 and Salmonella Typhimurium. Adhesion experiments using IPEC-J2 cells were utilised to evaluate bacterial adhesion in the presence of ZSCLP at concentrations of 80 and 40 ppm.

Results

ZSCLP exhibited potent antimicrobial activity, with a MIC of 4 ppm ($p < 0.001$) for Salmonella Typhimurium and 35 ppm for E. coli 1057. Adhesion assays demonstrated an 82.17% reduction in Salmonella Typhimurium attachment at 80 ppm ($p < 0.001$), and 75.80% at 40 ppm ($p < 0.001$). For E. coli 1057, adhesion rates were lower by 49.03% at 80 ppm ($p < 0.05$) and 40.66% at 40 ppm ($p < 0.05$). These findings demonstrate a concentration-dependent antibacterial action of the ZSCLP, particularly against Salmonella Typhimurium.

Discussion and Conclusion

ZSCLP demonstrates significant antimicrobial activity at concentrations substantially lower than the 150 ppm permitted level of zinc in feed by the EU. The study highlights ZSCLP's potential to mitigate bacterial infections and environmental impact, offering a promising solution in the post-ZnO era.

HHM-OP-01

EFFECT OF SAMPLING INTERVAL ON THE TIME-TO-DETECTION OF TRANSBOUNDARY PATHOGENS

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Background and Objectives

Previously, we showed that active regional surveillance based on testing a few samples from many herds achieved detection at low prevalence and a reasonable cost, i.e., < € 0.032 per pig in the region (Trevisan et al., 2024). Herein, we address sampling interval, i.e., how often should sampling be performed to achieve early detection of a transboundary pathogen in an "active participatory surveillance" program?

Material and Methods

Using the 2017 USDA Census of Agriculture, we created a dataset of 66,637 farms in the contiguous 48 U.S. states (8,080,470 km^2). Each farm was identified by geolocation, production type, and inventory. The spread of a "generic" pathogen within this region was simulated for 180 days over a range of spread parameter values (6,075 scenarios) using the Animal Disease Spread Model (ADSM) software (v3.5.10.0). The output dataset for each scenario reported the infection status of each farm by day post-outbreak (DPO).

An R function was used to calculate the probability (P) of detecting ≥ 1 positive farm by DPO as a function of the percentage (%) of herds participating in the surveillance program, herd-level sensitivity, and disease prevalence. The effect of sampling interval was evaluated by comparing P for a specific DPO vs the aggregate P (Pa) based on sampling every 14 days (Equation 1).

(Equation 1) $Pa = [1 - (1 - P_{14}) \times (1 - P_{28}) \times \ldots (1 - P_{DPO})]$

Results

For example, given 80% producer participation and 10% herd-level sensitivity, a single sampling on DPO 28 (0.03% prevalence/17 infected herds) provided a 77% probability of detection. In contrast, aggregate sampling (DPO 14 and 28) provided a 90% probability of detection.

Discussion and Conclusion

Simplicity (testing a few targeted samples from many herds) should guide surveillance programs. This regional design is globally adaptable and provides low-cost, highly sensitive detection of a transboundary agent.

HHM-OP-02

CONTRIBUTION OF AN EPIDEMIOLOGICAL AND POPULATION DYNAMICS MODEL IN UNDERSTANDING THE PERSISTENCE OF INFLUENZA A VIRUSES IN THREE PIG FARMS IN FRANCE

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Background and Objectives

Swine Influenza A Viruses (swIAV) can lead to enzootic infections characterized by repeated herd-wide outbreaks that systematically affect all batches of growing pigs, with recurrent infections. Using a multi-level agent-based approach, the conditions for persistence of swIAVs were analyzed in endemically affected farms, coupling the herd structure and population dynamics with a specific and realistic swIAV epidemiological model.

Material and Methods

Three farrow-to-finish farms with endemical swIAV infections and distinct spatial organizations were selected to capture their structural specificities. Air inlets and outlets and animal movement patterns between each sector were incorporated in the population model. The associated swIAV epidemiological model accounts for the partial protection conferred by maternally derived antibodies and subsequent IAV infections following immunity waning. The primary mode of transmission considered was within-batch transmission, combined with airborne transmission between sectors. Two scenarios were explored through model simulations: continuous airborne transmission between sectors and occasional airborne transmission during animal movements considering the exposure of sectors via air inlets close to transfer paths.

Results

Herd structure and underlying animal movements were identified as critical, exposing sectors to external forces of infections, particularly when all sectors were in the same building. Early infections, before three weeks of age, were frequent. Maternal antibodies favored the within-herd persistence due to longer batch-level infectious periods. Under the occasional transmission hypothesis, the infectious process was less consistent, affecting sporadically piglets in nursery. Fattening pigs were identified as a potential weak point as a source of reinfection, with a relatively low prevalence, but potential underdetection because of limited clinical expressions.

Discussion and Conclusion

This study highlights the variability in swIAV infection dynamics, strongly influenced by farm spatial structuring. Animal population dynamics, airflows and epidemiological connections are critical factors that require particular attention. Structural modifications based on animal movements and airflows could inflect the within-herd persistence.

HHM-OP-03

PRRS ERADICATION OF DANISH SOW HERDS IN THE PERIOD 2020-2024

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Background and Objectives

The Danish national reduction strategy for Porcine Reproductive and Respiratory Syndrome (PRRS), launched in May 2022, has increased the focus on eradication strategies. The aim of this study was to describe the number and success rate of PRRS eradications of Danish sow herds carried out during the period from January 2020 to March 2024, to determine the proportion of reinfected herds, and to examine the antibiotic usage before and after PRRS eradication from the sow herds.

Material and Methods

The study was conducted as a register-based study using data from the Central Husbandry Register (CHR), the SPF Register, and VetStat. The study population included sow herds with >10 sows and historical PRRS status changes, indicating an eradication program. The eradication program had to start after January 1, 2020, and end before March 13, 2024. For herds with a successful PRRS eradication, the study compared antibiotic usage one year before with one year after PRRS eradication.

Results

A total of 207 sow herds completed an eradication program, with 159 (76.8%) being partial eradications and 48 (23.2%) total de-pop/re-pop eradications. The success rate for partial eradications was 81.8%, with 130 out of 159 herds achieving a negative status. Among the herds that achieved a PRRS negative status, 9% were reinfected within the study period, with a median time to reinfection of 344 days. The analysis showed a significant reduction in antibiotic usage for piglets and sows in the period after eradication compared to the year before initiation of the eradication program.

Discussion and Conclusion

The study concludes that PRRS eradications in Danish sow herds significantly reduces antibiotic usage and has a high success rate for partial eradications. However, the risk of reinfection remains, highlighting the need for continued vigilance, effective biosecurity measures and area eradication programs.

HHM-OP-04

EFFECT OF POLYMORPHISMS IN SGK1, CD163 AND TAP1 GENES ON HOST RESPONSES TO PRRSV INFECTION IN PIGS

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) is the most economically significant swine disease. Previously, we observed varying infection outcomes among pigs challenged with a high-virulence PRRSV strain, likely attributable to their genetic background. Markers like SGK1 and CD163 have been linked to reproductive performance and immune responses during PRRSV outbreaks in sows. However, the effects of these genetic markers and others remain unknown in growing pigs exposed to high-virulence PRRSV strains.

Material and Methods

Eight-week-old pigs were intranasally challenged with the high-virulence PRRSV Lleida 029_22 Rosalia strain (10^5 $TCID_{50}$/ml) across two independent studies. Pigs (n=20) were genotyped for 18 markers using high-resolution melting analysis. Clinical scores were monitored over a 28-day period, and viral loads in serum and saliva, along with PRRSV-specific antibody levels, were assessed. Associations between genetic markers and host response indicators were analyzed using the non-parametric Wilcoxon test. Additional metrics, including infectious virus titers and neutralizing antibody responses, are being evaluated.

Results

Eight of the tested markers—including GBP1, GBP5, and MX1—did not segregate within the population, but significant associations were found for others. The SGK1_rs338508371 AA genotype was associated with lower saliva viral loads at 3 dpi ($p<0.05$), while the CD163_rs1107556229 GG pigs showed reduced viremia at 14 dpi ($p<0.05$) and 28 dpi ($p=0.06$). The TAP1_rs80928141 TT genotype was associated with lower clinical scores ($p=0.05$) and reduced viral loads in serum at 14 dpi and saliva at 3 dpi ($p<0.05$). Lastly, pigs with the TAP1_rs80928141 CT genotype exhibited higher antibody levels at 7 dpi ($p=0.05$) and 21 dpi ($p=0.07$). The effects of seven additional markers are currently being evaluated.

Discussion and Conclusion

SGK1, CD163 and TAP1 were identified as potential genetic markers that could enhance herd resilience and mitigate the economic impact of PRRSV on swine production when incorporated into breeding programs.

HHM-PP-05

SURVIVAL ANALYSIS OF FATTENING PIGS WITH MOVEMENT DISORDERS

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Background and Objectives

To increase evidence and knowledge about the typical course of diseases of pigs is essential for farmers and veterinarians. While the prevalence and type of typical diseases and injuries depending on age is well researched, knowledge about the typical course of diseases over time is scarce. In particular, whether and which type of symptoms of a compromised pigs indicate a healing process, or - accordingly - a development towards euthanasia, is hardly assessed.

Material and Methods

CARE-PIG is a project that elaborates on the critical time-point for euthanasia of diseased or injured fattening pigs. Based on a data collection in five farms, a dataset of more than 550 pigs and more than 3000 corresponding clinical examinations was generated. Following a plausibility check, descriptive analysis and evaluation, the goal was to perform a survival analysis to increase understanding of symptoms shaping the typical course of diseases to either healing or death of fattening pigs with movement disorders.

Results

First results show that variables describing behavioral appearance as well as disease-specific variables classifying the movement disorder can be used to indicate the course of diseased or injured pigs. The quality and impact of included variables on the endpoint of trajectories (healing/euthanasia) will be subject to the presentation of the conference. Furthermore, considerations about the modelling of time and additional relevant influences on the course of diseases with the help of an empirical dataset will be addressed.

Discussion and Conclusion

Knowledge about the typical course of diseases of pigs is scarce. From a statistical point of view, the survival analysis provides an initial answer to what type of symptoms indicate a process towards healing or euthanasia.

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HHM-OP-06

DO ALL DIARRHEIC PIGS NEED TREATMENT? OCCURRENCE OF SELF-RESOLVING DIARRHEA IN PIGS FOLLOWED FROM BIRTH TO 10 WEEKS OF AGE

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Background and Objectives

Diarrhea in pigs is a major indication for antimicrobial treatments in pig production. Due to the risk of antimicrobial resistance, it is necessary to evaluate the need for diarrhea treatment in each case and consider to what extent diarrhea may be self-resolving in robust individuals.

Material and Methods

A total of 2700 pigs from 180 litters from a Danish herd were included between March 2023 and July 2024. From each litter, 15 randomly selected newborn piglets remained with their own mother until weaning. The pigs were observed daily from birth until 10 weeks of age and sampled weekly. No batch medication was allowed, but pigs that were clinically affected by diarrhea were treated individually. Pigs with diarrhea without clinical affection (depression, unthriftiness) were not treated.

Results

Of the 2700 pigs, a complete dataset from birth to 10 weeks was available for 1861 pigs. 73% of these pigs experienced one or more episodes of self-resolving diarrhea without needing antimicrobial treatment. Additionally, 25% of the pigs experienced diarrhea with clinical affection and therefore received antimicrobial treatment at some point during the study. Only 2% of the pigs completed the entire study without any episodes of diarrhea or diarrhea treatment. Pre-weaning, 37% had one or more episodes of self-resolving diarrhea, and only 7% received diarrhea treatment while 56% did not experience diarrhea or received diarrhea treatments. Post-weaning, 76% experienced self-resolving diarrhea, and 21% received diarrhea treatment while only 3% did not experience diarrhea or received diarrhea treatments.

Discussion and Conclusion

This study shows that not all diarrheic pigs need antimicrobial treatment to recover. Most diarrhea cases in the herd were self-resolving. Post-weaning, 97% of the pigs experienced one or more episodes of diarrhea. Following careful clinical examination, only 25% of the pigs observed from birth until 10 weeks required treatment, thereby reducing antimicrobial use to approximately one fourth.

IMM-OP-01

ORAL VACCINATION WITH A NOVEL SUBUNIT VACCINE PROTECTS PIGLETS AGAINST F18-FIMBRIATED E. COLI CHALLENGE INFECTION

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Background and Objectives

F18-fimbriated E. coli cause postweaning diarrhoea or oedema disease in piglets, leading to substantial losses for farmers. Current vaccines do not prevent transmission or have a risk of reversion to virulence. Hence, novel vaccines to prevent these bacterial infections are needed. This study aimed to investigate the protective efficacy of an aminopeptidase N (APN)-targeted oral vaccine candidate containing the FedF tipadhesin of F18 fimbriae against challenge infection with an F18-fimbriated shiga toxin-producing E. coli (STEC) strain.

Material and Methods

APN-specific porcine monoclonal IgA antibodies fused to FedF (aAPN-pIgA-FedF) were produced by CHO cells. Piglets (5 weeks old, F18 seronegative, F18R positive, n=8/group) were orally immunized for 3 consecutive days with either PBS or the vaccine candidate (3 mg aAPN-pIgA-FedF + 50 μg cholera toxin) and received a booster dose at day 14 post primary immunisation (ppi). At day 28 ppi, piglets were infected with an F18+ STEC strain. FedF-specific serum antibody responses were evaluated by ELISA, while fecal excretion of the STEC strain was monitored daily for 12 days by colony counting on selective agar plates.

Results

Oral immunisation increased FedF-specific serum IgG responses at day 28 ppi, which increased further upon challenge infection. Moreover, in the immunised piglets a 200-fold reduction in bacterial excretion was observed from day 7 post challenge onwards as compared to the control group. At day 12 post challenge, excretion of the challenge strain was undetectable in 88% of the immunised piglets as compared to 14% of the control animals.

Discussion and Conclusion

Our results show that oral immunisation of piglets with APN-targeted antigens provide protection against infection. Although the immunogenicity of this vaccine candidate needs improvement, APN targeting is a promising technology to deliver vaccines to the gut immune system. It will contribute to the development of novel oral vaccines providing protection against enteric pathogens.

IMM-OP-02

TARGETING SWINE DYSENTERY: HETEROLOGOUS PROTECTION BY A NOVEL VACCINE

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Background and Objectives

Clinical studies under GCP standards have been carried out to demonstrate the efficacy of a novel Swine Dysentery (SD) vaccine under field natural SD outbreaks. This vaccine is aimed to cover an important gap within the porcine industry, thus, although SD is a highly relevant and widespread disease there is not an authorized vaccine available in this moment and it has been historically controlled by antibiotherapy. However, the increase of antimicrobial resistance is regularly reported for Brachyspira hyodysenteriae.

Material and Methods

480 vaccinated and 480 control pigs in four commercial porcine farms with previous regular SD outbreaks within Spain and Portugal (120 pigs/group in each farm) were monitored from vaccine/placebo administration until the end of the fattening period to test the efficacy of the vaccine. This vaccine is based on the inactivated AqDysH57 strain of B. hyodysenteriae and was intramuscularly inoculated at the 5th and 7th week of life of the piglets. Primary criterium for efficacy evaluation was established as incidence of SD, considering number of pigs with dysenteric diarrhoea in each group and faecal shedding of B. hyodysenteriae detected by qPCR. Other criteria included were severity and duration of the disease, rescue antibiotic treatments and weight gain. B. hyodysenteriae isolates were recovered and characterized for each facility.

Results

A global decrease in the incidence of SD in vaccinated pigs was observed (vaccine efficacy of 83.3%). Significant differences in incidence were reported in each studied farm and a reduction of rescue individual antibiotic treatments was also recorded in vaccinated pigs ($p<0.001$). Besides, characterization of B. hyodysenteriae isolates recovered from each farm showed relevant divergences with the vaccine strain.

Discussion and Conclusion

In conclusion, the Swine Dysentery Vaccine developed by Aquilón CyL would be a very useful tool for control and eradication programs of this economically significant disease in swine production.

IMM-OP-03

OEDEMA VACCINATION AS A MEANS TO IMPROVE GROWTH PERFORMANCE WHEN THE SUBCLINICAL FORM OCCURS

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Background and Objectives

In its subclinical form, oedema disease (OD) caused by Verotoxin-producing strains of Escherichia coli (VTEC) can have an insidious effect on growth. The aim of the study was to evaluate the efficacy of a recombinant VT2e vaccine, VEPURED®, in a case of subclinical oedema disease.

Material and Methods

On a French farrow-to-finish farm without clinical signs of OD, the mortality rate was <2% in the post-weaning unit but growth performance was reduced ($ADWG_{8\text{-}30kg}$ = 449g). Vtx2e was identified by PCR on oral fluids collected at 48 days of age (DOA). At 5 days of age, a randomized selection of 304 piglets (V) was vaccinated with 1ml intramuscular injection of VEPURED® and 292 piglets remained non-vaccinated as the control group (NV).Weighing was performed at 5, 28 and 61 DOA. After the trial, vaccination was implemented. A data analysis was performed to compare nursery results from 4 batches before (n=2,253) and after implementation of vaccination (n=2,130).

Results

In this Rev. study, both groups started at 2.09 kg but at the end of nursery (61 DOA) the vaccinated piglets were 1.32 kg heavier than the non-vaccinated piglets (p = 0.07). In the NV group, the mortality rate increased to 3.75% and remained at 1.06% in the vaccinated piglets. In the retrospective analysis, the vaccinated piglets were 1.25 kg heavier than the non-vaccinated piglets (p=0.04) at the end of nursery. The 0.7% mortality rate in the V group was significantly lower than the 1.7% in the NV group (p=0.02).

Discussion and Conclusion

Under these farm conditions, the use of an OD vaccine in pigs led to an increase in growth performance and a decrease in mortality in the nursery period. The estimated return on investment of vaccination in this study was 1.15€/pig.

IMM-OP-04

DNA PRIMING AND MLV BOOSTING AGAINST PRRSV IMPROVES THE IMMUNOGENICITY OVER A SINGLE DOSE OF MLV IN THE PRESENCE OF MATERNAL ANTIBODIES

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) is one of the most economically devastating diseases for the pig industry worldwide. Modified live vaccines (MLVs) are one of the main tools used to control the impact of PRRS, both in sows (to control reproductive problems) and in growing pigs (to reduce respiratory disease and restore growth performances). However, we have previously shown that piglets born to PRRS-immune sows (MDA+) have inhibited anti-PRRSV responses following MLV immunization, with reduced vaccine efficacy. Therefore, an alternative vaccination strategy that could bypass the MDA-mediated interference is needed.

Material and Methods

In this study, plasmids encoding PRRSV antigens GP5, M, N and NSP5 non-targeted (DNA-UT) or fused to molecules targeting XCR1 (DNA-XCL1) or MHC-II (DNA-MHCII) were administrated intradermally in MDA+ piglets, followed by a boost using MLV. The resulting immune response and vaccine efficacy were compared to a conventional PRRS MLV (MLV 1×) and a PRRS MLV prime-boost (MLV 2×) immunization.

Results

MLV 2×, DNA-UT and DNA-MHCII enhanced humoral responses in MDA^+ piglets, compared to MLV 1×. DNA-UT and DNA-XCL1 improved PRRSV-specifc IFN-γ cellular responses, although transiently, compared to MLV 1×. Antigen targeting did not further increase humoral or cellular responses. Surprisingly, despite the presence of sufficient maternally-derived neutralizing antibodies (MDNA), the induction of both PRRSV-specific humoral and cellular responses in MDA^+ piglets (MLV 2×) were not inhibited following MLV immunization. DNA-UT and MLV 2× were superior at reducing both PRRSV viraemia and weight loss. Correlation analyses revealed that parameters moderately associated with reduced viraemia were total PRRSV specific IgG before challenge and neutralizing antibody titers two weeks post-challenge.

Discussion and Conclusion

We demonstrated that prime-boost vaccine strategy using DNA encoding conserved PRRSV antigens and MLV effectively enhances immunogenicity over conventional MLV immunization, with similar ability to reduce the viral replication in MDA^+ animals.

IMM-OP-05

RELATIONSHIP BETWEEN AUDIO-BASED RESPIRATORY HEALTH MONITORING SYSTEM AND PIG PRRS VACCINATION STATUS: A 1-YEAR OBSERVATIONAL RETROSPECTIVE DATA BASE STUDY

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Background and Objectives

Respiratory disease outbreaks continue to be a major challenge for pig producers, being Porcine Reproductive and Respiratory Syndrome virus (PRRSV), the main pathogen impacting antibiotic use, welfare, productivity, and profitability. In China, a diversity of swine production companies, in different regions and following different strategies for PRRS control have been remotely monitoring their growing population with sound-technologies. Therefore, the objectives of this study were to describe the respiratory health status of all these farms and to measure the impact in ReHS of the different vaccine interventions used for PRRS control.

Material and Methods

In this study, all Chinese growing farms sound-monitored from 1st Sep of 2022 to 30th Sep of 2023 were considered as a candidate for the study. Inclusion criteria included a minimum of 3 monitors per farm, a known PRRS status and vaccine use by the farm, as well as a minimum of 60 days of continue data. Farms were categorized into 3 groups: (1. PRRS-negative; 2. PRRS-positive-vaccinated; 3. PRRS-positive-non-vaccinated) and differences in daily ReHS values were calculated and analyzed for the study.

Results

A total of 88 farms fulfilled the inclusion criteria averaging a ReHS of 70.06 during the timing of the study. The average ReHS score of the group 1 was the highest followed by group 2 and 3 (72.72, 70.85 and 67.45 respectively) being significantly lower in group 3 (positive non-vacciantед) compared to the other groups (2 vs 3 α=0.1; p=0.039; 1 vs 3 α=0.1; p=0.089).

Discussion and Conclusion

Respiratory health management is a comprehensive challenge for producers. The above findings demostarted that pig vaccination for PRRS significantly improves respiratory health, and in this case, this improvement can be objectively monitored and at a large scale. Sound monitoring metric, ReHS, provides to pig farmers a quantifiable and measurable method to manage pig's respiratory health from individual farms to entire systems.

IMM-OP-06

MICROBIOTA AND IMMUNE SHIFTS IN WEANED PIGLETS SUPPLEMENTED WITH PROBIOTICS

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Background and Objectives

The post-weaning period is critical for piglet health, with significant physiological and immunological changes. We hypothesized that probiotic supplementation impacts piglet health, microbiota, and immune function from weaning to 9 weeks (W).

Material and Methods

A total of 80 weaned 4-week-old Piétrain x TN70 hybrid piglets were divided into 2 groups (probiotic vs. control), with 5 animals per pen and 8 pens per group. Both groups received a standard pre-starter diet until 6 weeks and a starter diet until 9 weeks, with probiotic groups receiving a Bacillus-based probiotic (3 x 10^8 CFU/kg feed). Colon tissue and content were collected at weeks 4, 6, and 9 from 8 animals per group. Key parameters analyzed included growth performance, tissue gene expression (96 genes via qPCR), and microbiota composition (V1-V9 16S rRNA sequencing).

Results

No growth performance differences were observed between treatments. Control pigs showed higher expression of gut epithelial integrity genes, including Occludin and Zona-occludin 2 at W6, and Claudin2 at W9, indicating a compensatory response to compromised gut barrier function. Probiotics reduced pro-inflammatory gene expression including Interleukin 4, Nuclear factor NF-kappa-B1, and Toll-like receptor 2 at W6, indicating improved intestinal health. Control pigs also showed higher nutrient transporter gene expression Glucose transporter 1 and Zinc transporter 1 at W6 and L-type amino acid transporter 1 at W9, possibly reflecting a higher nutrient absorption capacity, which however did not result in increased growth. The probiotic group tended to have increased alpha diversity (Shannon index) at W6 ($p = 0.071$), while beta diversity showed differences over time (W4 vs. W6 and 9) but no differences between treatments.

Discussion and Conclusion

In conclusion, probiotic supplementation in pigs reduced pro-inflammatory gene expression and increased microbiota diversity in the large intestine, indicative of a more balanced microbial profile.

REPRODUCTION

REP-OP-01

RADAR SIGNAL ANALYSIS FOR MONITORING NEST-BUILDING BEHAVIOUR OF SOWS IN A FREE FARROWING SYSTEM

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Background and Objectives

Monitoring sows during the pre-farrowing and farrowing periods is critical for optimizing reproductive outcomes for both sows and piglets. Radar technology provides several advantages over traditional cameras, such as resistance to low light, obstructions, and adverse environmental conditions, all while preserving privacy. This study aimed to develop and assess a radar-based algorithm for the early detection of nest-building behavior, which can serve as a reliable predictor of the onset of farrowing.

Material and Methods

Data was collected using a radar sensor installed above a free farrowing pen. In total, five farrowing processes from three sows were monitored, generating 3D point clouds of sow movements. Velocity data were filtered to exclude external interference and noise, smoothed using a 1-second moving average, and analyzed with a rolling window approach. The algorithm identified elevated activity indicative of nest-building using a dynamic threshold derived from a secondary rolling window. Parameters were optimized per farrowing and tested across others to evaluate generalizability.

Results

The algorithm successfully predicted nest-building behavior with a mean time difference of 09:38:12 ±05:44:16 to the first piglet's birth. Individual variability in nesting behavior was observed. Sow A displayed consistent timing across three farrowings, while sow B showed a longer nesting period. Sow C, although represented by a single farrowing, exhibited a timing pattern similar to sow A. The algorithm demonstrated robust performance in detecting activity changes despite environmental variability.

Discussion and Conclusion

The radar-based algorithm shows promise as a reliable tool for early farrowing detection, enabling timely interventions. Its non-invasive nature and resilience to barn conditions make it highly suitable for commercial farming, while also maintaining privacy. However, the small dataset limits generalizability. Expanding the dataset could enable the development of group models, improving prediction accuracy. Integrating radar technology has the potential to enhance operational efficiency and animal welfare in farrowing management.

REP-OP-02

FACTORS INFLUENCING REPRODUCTIVE PERFORMANCE IN AUSTRIAN SOW FARMS WITH REPRODUCTIVE DISORDERS

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Background and Objectives

Poor reproductive performance is a challenge for piglet-producing farms. Until now, the characteristics of these farms remain poorly understood. This study aimed to identify factors contributing to reproductive disorders in Austrian piglet producing farms.

Material and Methods

40 Austrian piglet-producing farms with at least one defined reproductive problem - farrowing rate <85 %, return to estrus rate >10 %, abortion rate >10 % - were examined. A questionnaire addressing management, treatment and prophylaxis was conducted on farm visits. Five key performance indicators (KPIs) were established to assess farm productivity: farrowing-rate, return-to-estrus rate, abortion rate, total number of piglets born per litter and number of piglets weaned per litter.

Results

Farm size ranged from 35 to 2000 sows. Farrowing rate was significantly higher, in larger farms (>80 sows) (p=0.019), farms unsuspicious for PRRS (p=0.008), and farms where no cleaning of vulva before artificial insemination was performed (p=0.029). Return-to-estrus rate was higher in smaller farms (p=0.006), in farms with a higher prevalence of vaginal discharge after farrowing (p=0.011) and in farms with older (>3 years) teaser boars (p=0.039). Larger farms had higher numbers of total piglets born per litter (p=0.031) and weaned piglets per litter (p=0.02). Average number of weaned piglets per litter was higher in farms with all-in/all-out implementation in farrowing pens (p=0.026) and lower in farms with access of other farm animals or pets to the pig barn (p=0.078).Rectal evaluation of body temperature after farrowing did not correlate with KPIs, neither did usage of hormones antimicrobial therapy/metaphylaxis.

Discussion and Conclusion

Overall, larger farms exhibited higher reproductive performance. Interestingly, several well-established strategies for improving fertility performance were found to have limited relevance. Further studies are needed to validate these findings and to identify additional factors influencing reproductive performance.

REP-OP-03

ESTIMATING THE INDIVIDUAL STILLBORN RATE OF SOWS USING FARROWIN® APP: A TOOL TO REDUCE STILLBORN RATE IN SWINE BREEDING HERDS

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Background and Objectives

The objective of this study was to build a predictive model of the stillborn rate based on technical results at previous farrowing and backfat measurement.

Material and Methods

This study was performed on two farrow-to-finish and one farrow-to-wean farms located in Brittany, France. At each farm, the number of total born (TB), born alive (BA), stillborn piglets (S), the same data at the previous farrowing (TB_{n-1}, BA_{n-1} and S_{n-1}), backfat thickness (BT) just before farrowing and at previous weaning and parity rank were recorded in our dataset of 3686 farrowings. Bayesian networks were used as an integrated modelling approach to investigate risk factors associated with stillbirth using BayesiaLab® software.

Results

Our results suggest the validity of a hybrid model to predict the percentage of stillborn piglets. Three significant risk factors were identified by the model: parity (percentage of total mutual information: MI=64%), S_{n-1} (MI=25%) and TB_{n-1} (MI=11%). Additionally, BT before farrowing was also identified for sows of parity five or more (MI=0.4%). In practice, under optimal conditions (i.e., low parity rank, less than 8% of stillborn piglets, and a prolificacy lower than 14 piglets at the previous farrowing), our model predicted a stillborn rate almost halved, from 6.5% (mean risk of our dataset) to 3.5% for a sow at the next farrowing. In contrast, in older sows with a BT less than 15 mm, more than 15% of stillborn and a prolificacy greater than 18 piglets at the previous farrowing, the risk is multiplied by 2.5 from 6.5% to 15.7%.

Discussion and Conclusion

Our results highlight the impact of parity, previous prolificacy and stillborn rate and BT at farrowing on the probability of stillborn. It can help farmers manage sows according to their risk of having stillborn piglets. For this, the FarroWin® application (for Android and iOS) is currently developed.

REP-OP-04

INFLUENCE OF THE INTRAUTERINE APPLICATION OF A PHYTOTHERAPEUTIC AGENT AND OTHER PARAMETERS ON THE UTERINE INVOLUTION OF SOWS IN A FREE FARROWING SYSTEM

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Background and Objectives

Endometritis is among the most common postpartum problem in sows requiring antimicrobial treatment. For this reason, alternative methods of treatment and risk factors for uterine disorders need to be evaluated. The aim of this study was to evaluate the influence of the intrauterine application of a phytotherapeutic agent after farrowing. Furthermore, other parameters on the uterine involution were evaluated.

Material and Methods

In total, 150 sows were included in the study and the sows were divided randomly into three groups (300 ml of phytotherapeutic agent in 20% dilution (Treatment), 300ml sodium chloride (Placebo) and no intervention (Control). On days 2, 3, 5, 7 and 21 postpartum, the uterine involution was assessed by measuring the diameter on three locations of the uterine horns using ultrasound.

Results

The mean uterine diameter changed from 36.4 ±6.5 mm on day 2 to 20.4 ±5.9 mm on day 7 (reduction of 43.81%) and ultimately 14.0 ±3.2 mm on day 21 (reduction of 61.15%). No significant differences between the groups and the regression of uterine involution were detected (Treatment:61.1 ±8.4%; Placebo: 62.0 ±9.4%, Control: 60.4 ±10.2%). However, birth induction had a positive effect on uterine involution, increasing the relative uterine involution by 8, whereas lack of appetite during the first week postpartum, lead to a decrease of 7% until day 7.Furthermore, anabnormal BCS of 2 or 3.5 and a parity of 2 or higher and a lack lead to a reduction of uterine involution regression on day 21.

Discussion and Conclusion

In conclusion, a single intrauterine application of a phytotherapeutic agent after farrowing does not significantly affect uterine involution in free farrowing sows. Nevertheless, sow-related and management factors play a crucial role in uterine involution, highlighting the need for further research to better understand these influences and improve reproductive health in the postpartum period.

REP-OP-05

ULTRASOUND ASSESSMENT OF UTERINE DIAMETER AND VESSEL SIZE IN TEMPORARILY CONFINED POSTPARTUM SOWS UNDER TROPICAL CONDITIONS

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Background and Objectives

Prolonged farrowing is a significant challenge in swine production, often resulting in postpartum complications, such as delayed uterine recovery and inflammation. This study investigated the relationship between uterine involution and uterine vessel size with farrowing duration in temporarily confined sows (confined for 3 days post-farrowing) under tropical conditions.

Material and Methods

Fourteen Landrace × Yorkshire sows were examined. Uterine diameter and vessel size were measured via transabdominal ultrasound from 2 to 15 days postpartum. Sows were grouped based on farrowing duration: normal (≤ 300 min) and prolonged (> 300 min).

Results

The average farrowing duration was 200 ± 128 min, with 28.6% of sows classified as prolonged. Uterine diameter in the prolonged group decreased from 43.5 ± 9.4 mm to 12.4 ± 0.5 mm, while the normal group showed a decrease from 30.7 ± 1.4 mm to 13.6 ± 0.4 mm. On day 2 postpartum, sows with prolonged farrowing had a significantly larger uterine diameter than the normal group ($P = 0.042$).Uterine vessel size decreased similarly in both groups (prolonged: 7.3 ± 1.3 mm to 2.5 ± 0.1 mm; normal: 6.1 ± 0.7 mm to 2.7 ± 0.1 mm; $P = 0.397$). Uterine diameter was strongly correlated with vessel size in both normal ($r = 0.705$, $P < 0.001$) and prolonged ($r = 0.749$, $P < 0.001$) groups.

Discussion and Conclusion

In conclusion,this is the first study to evaluate and provide initial data on uterine vessel size and its correlation with the uterine diameter in postpartum sows. Although no significant differences between uterine vessel size and farrowing duration were detected, a notable increase in uterine size during the initial 2 days postpartum in temporarily confined sows under tropical climates with prolonged farrowing duration was identified. Further studies are needed to explore the effects of uterine vessel dynamics in sows.

REP-OP-06

INFLUENCE OF BLOOD GLUCOSE LEVEL ON SOW TRAITS, FARROWING CHARACTERISTICS AND PIGLET VITALITY IN FREE FARROWING SOWS

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Background and Objectives

Farrowing demands significant energy from sows. This study aimed to assess the effect of blood glucose on farrowing kinetics in free farrowing conditions.

Material and Methods

In 147 sows, feeding time, peripheral glycemia of sows (collected from the ear vein) at the onset and the farrowing process was evaluated including farrowing duration (first piglet-last placenta) and obstetrical intervention (piglet-piglet interval > 60min; manual extraction of piglets and administration of oxytocin (20 IU)).

Results

A mean farrowing duration of 422 ±130min with 16.1 ±3.6 total born piglets was observed. Glycemia at the begin of farrowing was 4.44 ±0.63 mmol/l and increased to the end to 4.72 ± 0.79 mmol/l. In the general linear model, the time between the last meal and onset of farrowing significantly affected the farrowing duration (p=0.007). Sows that consumed their last meal before farrowing in the morning exhibited significantly lower glycemia levels (4.33 mmol/l) compared to those fed in the evening (4.51 mmol/l; p = 0.009). However, they tended to have a shorter farrowing duration (397 minutes vs. 439 minutes; p = 0.053).Obstetrical interventions were applied in 50% of the sows. The farrowing process with birth help lasted 59 minutes longer than without (p<0.001) and tended to have 0.5 more stillborn piglets (p=0.054). However, there was no difference in blood glucose levels between sows. Older sows (>4 litters) had lower blood glucose levels at the start of farrowing and received significantly more farrowing assistance (62% vs. 37%). In addition, they also had more stillborn piglets (1.42 vs. 0.78) in comparison to younger sows.

Discussion and Conclusion

Glycemia had no significant effect on farrowing duration and therefore this parameter cannot be used to predict sows with dystocia. However, glycemia was influenced by the parity of the sows and the time point of the last meal before farrowing.

RES-OP-01

RISK ASSESSMENT OF PRRSV-1 MLV VACCINE STRAINS TRANSMISSION VIA RESIDUAL PRESENCE IN INTRAMUSCULAR SYRINGES OR NEEDLE-FREE INJECTION DEVICES.

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Background and Objectives

The purpose of this study was to evaluate the risk of persistence of PRRSV-1 MLV (MLV1) vaccine strains in automatic intramuscular syringes with needle (AIMS) or in needle-free injection devices (NFID) after implementation of different cleaning and disinfection procedures.

Material and Methods

Three different MLV1 vaccines licensed in France, used with AIMS or their associated NFID, were evaluated in three different farms. Injection devices were sampled (internal injection mechanism and external surface) unwashed (UW), after washing (W) or after washing and disinfection (WD) procedures, just after the vaccination of 50 piglets (D0) or after seven days of quarantine (D7). The samples were tested by PRRSV PCR in order to detect the presence of virus genome and by virus isolation on MARC-145 cells to evaluate the presence of PRRSV infectious viral particles.

Results

Regardless of the maintenance procedure (UW, W, WD) and the MLV1 vaccine used, PRRSV genome was detectable inside the injection devices and on the external surface of NFID at each sampling point. The same was observed for the AIMS injection barrel, except on D7 when genomic viral loads were undetectable in syringes used for both DV and 94881 MLV1 vaccine strains, but remained detectable for the VP-046 bis strain. No PRRSV RNA was detected on the external surface of the WD AIMS. Infectious PRRSV-1 MLV virus was detected only immediately after vaccination and before any washing or disinfection, confirming the effectiveness of the disinfection protocols implemented. One viable MLV1 isolate (VP 046 bis strain) was detected on D7 in one UW NFID.

Discussion and Conclusion

Transmission of PRRSV-1 MLV vaccine strains via injection device is possible, particularly with a high risk when injection equipment is used without cleaning and within a quarantine period of less than 7 days.

RES-OP-02

SALMONELLA DERBY ISOLATED FROM THE INTESTINE OF POST-WEANING PIGLETS WITH NECROTIC COLITIS

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Background and Objectives

Salmonella Derby (S.Derby) is one of the most frequently reported serotypes in pigs .Pigs can be carriers without any aparent clinical signs and excrete salmonella to the environment over a long period of time .Generally S.Derby is not known to cause severe intestinal disease in pigs . Here , we report a case of necrotic colitis in weaned piglets in which S.Derby was isolated from the intestine .

Material and Methods

An outbreak of hemorrhagic diarrhea occured in a weaning unit of a farm (1000 sows) in central Cyprus in May 2024. Almost all the groups of weaned piglets involved exhibited hemorrhagic and watery diarrhea starting 4 days after weaning. Three pigs with characteristic symptoms were euthanized and necropsy was performed . Fecal samples , lymph nodes , serosal swabs and spleen samples were collected and submitted to a laboratory for diagnostic investigation .

Results

Moderate to severe colitis with thickened and hyperemic mucosa and adherent fibrino-necrotic exudate was observed in all 3 animals . Mesenteric lymph nodes were also congested and enlarged and there was peritoneal and pericardial fluid evident with no other gross lesions observed. Bacterial cultivation of fecal samples resulted in the growth of Salmonella spp and Salmonella enterica subsp.enterica serotype Derby was confirmed. The same samples were negative for Brachyspira spp in microbiological investigation and Lawsonia intracellularis through PCR. Microbiological examination of the spleen was negative .

Discussion and Conclusion

This case indicates that S.Derby could potentially cause necrotic colitis in weaned piglets similarly to S.Typhimurium and should be included in the list of differential diagnoses . However further histopathological investigations are needed for the role of S.Derby in this incident to be confirmed .

RES-OP-03

ASSESSMENT OF DIFFERENT ABATTOIR-BASED SAMPLING MATERIALS FOR INFLUENZA A VIRUS SURVEILLANCE IN PIGS

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Background and Objectives

Substantial economic losses and public health concerns due to swine influenza A virus (swIAV) emphasize the need for establishing active surveillance programs with reliable, cost-efficient, animal welfare- and user-friendly sampling strategies. To date, large-scale monitoring systems are hampered by technical and economic constraints. The abattoir as a point of confluence of pigs from several sources might create a convenient and cost-effective environment for sample collection. Therefore, the study aimed to assess the suitability of different sampling materials collected at the slaughterhouse to detect swIAV.

Material and Methods

Twenty-one farms in Germany were selected based on the occurrence of frequent lung lesions at the slaughterhouse. Oral fluids were collected in the lairage and subsequently thirty randomly selected fattening pigs from each farm were sampled by nasal swabs prior to and after scalding; blood, bronchial swabs and lung tissue were sampled along the further slaughtering process. Antibodies in blood against swIAV were analyzed by indirect ELISA. Viral RNA was first investigated by influenza A RT-qPCR and positive samples with a Ct-value ≤33 were further subtyped using multiplex RT-qPCR.

Results

swIAV antibodies were present in 85.7% of the farms and 79,2% of the samples. swIAV-RNA was detected in 33.3% of the farms and 21.6% of the samples, respectively. The detection of swIAV in lung samples and bronchial swabs by RT-qPCR was significantly higher than in nasal swabs ($p<0.001$). Bronchial swabs had significantly lower Ct-values ($p<0.001$) than other sampling materials. Multiplex RT-qPCR revealed the subtypes H1avN1, H1huN2, H1avN2 and H1pdmN2.

Discussion and Conclusion

Samples taken at slaughterhouse are suitable to monitor the swIAV status of fattening farms. Hereby, the indirect ELISA provided the highest probability to detect prior exposure. However, to overcome the limitations of serological surveillance further characterization of swIAV strains by virologic methods is crucial. Interestingly, bronchial swabs were the preferable material for identification of subtypes.

RES-OP-04

LOCOMOTOR DISORDERS - HOW TO DECIDE BETWEEN ONGOING THERAPY OR EUTHANASIA?

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Background and Objectives

Locomotor disorders are one of the most common health issues in pigs across all production phases. As treatment is not successful for all pigs, sometimes individuals need to be euthanised. Keeping the balance between giving a diseased pig a chance to recover but avoiding unnecessary pain and suffering by 'in time' euthanasia is often a challenge. This study is aimed on criteria defining the point in the course of lameness when healing cannot longer be expected and euthanasia is required.

Material and Methods

In the project CARE PIG, pigs (n=422) of different age groups affected by locomotor disorders were monitored (under treatment) during the course of the disease in order to document appearing symptoms until either recovery or euthanasia. The monitoring comprised clinical examinations, supplemented by photo and video documentation. To validate the timing of the decision for euthanasia, a subgroup of 60 lame pigs was selected and evaluated by a group of more than 55 experts. Based on the evaluation of the decisions marking 'in time' euthanasia , the clinical symptoms shown during the course of disease were comparatively analysed in order to understand differences between euthanised and recovered pigs and generate criteria for decisions ensuring 'in time' euthanasia.

Results

Preliminary results indicate that general behavioural patterns, disease-specific symptoms and their combinations are important indicators for characterizing porcine locomotor disorders. The results of the project have a sound empirical basis and allow making judgements for all age groups of pigs. The parameters presented during the conference help to describe the disease progression more accurately and to gain knowledge about the most appropriate time for euthanasia in cases of lameness.

Discussion and Conclusion

The disease progression in lame pigs is still incompletely characterised. The data presented at the congress aims on the determination of disease specific criteria that help to decide whether an ongoing treatment or euthanasia does protect the pig at its best.

VPH-OP-01

DISTRIBUTION AND POTENTIAL GENETIC DETERMINANTS OF ANTIMICROBIAL RESISTANCE OF STREPTOCOCCUS SUIS IN NORTH AMERICA, LATIN AMERICA, AND EUROPE FROM 2014 TO 2024

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Background and Objectives

The increasing prevalence of antimicrobial resistance (AMR) and multidrug resistance (MDR) in Streptococcus suis significantly challenges control strategies that heavily rely on antibiotics. This study evaluated AMR and MDR distributions and genetic determinants in 1349 S. suis genomes collected from North America, Latin America, and Spain (2014–2024), with phenotypic susceptibility testing conducted on 458 isolates against 19 antimicrobials.

Material and Methods

We analyzed 1349 draft genomes, including 458 isolates tested for phenotypic susceptibility to 19 antimicrobial drugs (AMDs). Pairwise probabilistic co-occurrence analysis explored patterns among 45 antimicrobial resistance genes (ARGs), six biocide and heavy metal resistance genes (BMRGs), and 58 virulence-associated genes (VAGs). Genome-wide association studies linked genotypes to resistance phenotypes. Specific amino acid substitutions in GyrA and ParC associated with enrofloxacin resistance and mutations in PBPs linked to beta-lactam resistance were examined.

Results

Non-pathogenic isolates contained more ARGs than highly-pathogenic isolates, but ermB (81.6%) and tet(O) (88.7%) were present in most isolates. Co-occurrence analysis revealed 25, 281, and 1330 positive co-occurrences for BMRGs, ARGs, and VAGs, respectively. tet(O) and ermB frequently co-existed with other ARGs such as tet(L) and optrA. Novel associations were observed between cadmium-zinc resistance gene cadX and ARGs, BMRGs, and VAGs (e.g., murM, murN, srtB). sly, epf, and mrp also co-occurred with tet(O). In total, 17 ARGs, 14 VAGs, and cadX were associated with resistance phenotypes. ParC S79Y (sensitivity:100%, specificity:100%) and GyrA S81F/R/V (sensitivity:83.3%, specificity:100%) were strongly linked to enrofloxacin resistance. Multiple PBP mutations were linked to beta-lactam resistance.

Discussion and Conclusion

The genetic co-occurrence patterns suggest potential co-selection between metals and antibiotics, underscoring the complexity of AMR development. These findings highlight critical pathways in AMR dissemination, supporting targeted efforts to mitigate resistance spread. Further research is essential to confirm these associations and guide effective control strategies.

VPH-OP-02

ANALYSIS OF ANTIMICROBIAL USE IN SWISS FINISHER PIGS DEPENDING ON THE HOUSED ANIMAL SPECIES ON THE FARM

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Background and Objectives

Imprudent antimicrobial use (AMU) is a major cause for the development of antimicrobial resistance worldwide. The national surveillance system IS ABV was established in Switzerland to monitor AMU in veterinary medicine. The uniform data collection enables comprehensive AMU estimations in livestock. The objectives of this study were to calculate AMU of Swiss finisher pigs using IS ABV data. Additionally, we analyzed differences in AMU between farms housing finisher pigs exclusively and mixed farms housing dairy cattle alongside.

Material and Methods

AMU was calculated at the population level of the respective farm type and for all single farms at the farm level. We calculated a treatment incidence based on Defined Daily Doses (DDD) by the European Medicines Agency, 2016. Statistical comparisons between the farm types were performed using the Mann-Whitney-U-Test.

Results

From January to December 2023, 3'403 prescriptions for finishers were recorded on 500 finisher farms, compared to 1'444 recorded prescriptions on 500 mixed farms. At the population level, we calculated 1.00 DDD/finisher/year for finisher farms and 0.40 DDD/finisher/year for mixed farms. At the farm level, the median AMU was 0.11 DDD/finisher/year (1st quartile: 0.00; 3rd quartile: 1.05) for finisher farms and 0.00 DDD/finisher/year (1st quartile: 0.00; 3rd quartile: 0.24) for mixed farms. Finisher farms had a significant higher total AMU for finishers than mixed farms ($p<0.01$).

Discussion and Conclusion

These results indicate that farm types may have an important influence on total AMU. Mixed farms might benefit from differing management practices resulting in reduced AMU. Furthermore, differences in farmers' attitude towards AMU, depending on the species they house, may also be influential factors. Considering different farm systems could be crucial for developing effective AMU reduction strategies and promote prudent AMU patterns in Swiss pig production.

VPH-OP-03

INTEGRATING BEHAVIOURAL SCIENCE AND EPIDEMIOLOGY TO OPTIMIZE EARLY DETECTION OF ZOONOTIC SWINE INFLUENZA IN THE NETHERLANDS

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Background and Objectives

The Netherlands faces zoonotic disease risks due to its dense human and livestock populations. The 2009 H1N1 outbreak highlighted the pandemic potential of influenza virus reassortment. Effective preparedness requires integrating behavioural and epidemiological models. Human behaviour, shaped by personal, social, and institutional factors, is critical in detecting, intervening, and treating diseases. Using the Theory of Planned Behaviour (TPB), a framework was developed integrating knowledge from the TPB to improve early detection and response, using (zoonotic) swine influenza as a case study.

Material and Methods

Within the framework we defined the desired outcome: timely detection and notification of symptomatic (and hypothetical zoonotic) swine influenza to prevent its spread. Actions, such as symptom recognition and disease reporting, were linked to key drivers extracted from the TPB and disease transmission modelling. Expert elicitation estimated the likelihood of action for different farmer profiles, while disease transmission modelling assessed farm-to-farm spread probabilities. Simulations integrated these probabilities to evaluate intervention effectiveness across different scenarios.

Results

The framework successfully combined behavioural science and epidemiology, offering nuanced estimates of intervention effectiveness. For early detection, 95% of farmers were estimated to notify their veterinarian within 13 days post-infection. Key factors influencing action included symptom recognition and disease spread extent. The farmer profiles influenced response likelihood, while human infections linked to outbreaks had minimal impact. Farm density and assumptions about transmission probabilities significantly affected the likelihood of spread before notification.

Discussion and Conclusion

The framework provides a systematic approach for integrating social and epidemiological insights to support evidence-based policies. The work can be further enhanced by complementing expert judgement with more extensive stakeholder surveys, randomized scenario presentations, and immersive methods. This pragmatic tool aids policymakers in designing targeted interventions for (zoonotic) disease preparedness.

VPH-OP-04

PRRSV ERADICATION IN THE NETHERLANDS; RESULTS OF THE NATIONAL FORERUNNER PROJECT 2022-2024

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Background and Objectives

PRRSv infections impact pig health, welfare, and indirectly antibiotic use. In the Netherlands, ~90% of pig farms are infected. In 2021, a plan was initiated to aim for PRRS eradication. A forerunner project was set up to increase awareness and motivation, and to explore feasibility of eliminating PRRSv on infected farms in the Dutch context.

Material and Methods

Forty-nine farms were recruited to get started with PRRS reduction between 2022 and 2024. Farm specific biosecurity risk assessments were conducted and improvement plans were made to achieve a PRRS-free flow of pigs. A PRRSv monitoring scheme was developed including thrice annually PCR testing of serum combined with serology. Based on these results, a 'gold', 'silver' or 'bronze' farm status for PRRSv was assigned. ORF5 sequencing was conducted in case of PCR-positive results to compare strains to different MLV strains

Results

One 'gold' farm remained, presumably, free from PRRS. All other farms remained PRRS positive ('bronze' or 'silver'). On ~30% of the PCR-positive farms evidence of field virus was never found. The number of farms with evidence of field virus in the preceding year reduced from 25 in 2023 to 20 in 2024. Most farms indicated clinical benefit of PRRS control efforts, evidenced by the 28% reduction of average antibiotic use from 15.3 in 2022 to 11.1 DDD in 2023 in weaned piglets.
Fylogenetic analysis showed that on 8/23 farms, with multiple retrieved sequences, similarity between sequences was low, suggesting new introductions.

Discussion and Conclusion

Participating farmers were successful in reducing the impact of PRRS. Robust improvements in formal PRRS status was not achieved. Partly because the use of piglet MLV vaccination, either on request of piglet buyers or to improve the clinical situation, interferes with the monitoring scheme. For national PRRSv eradication, sturdy motivators and policy regulations appear needed. Industry/sectoral regulations are anticipated to stimulate progress in PRRS control in the Netherlands

VPH-OP-05

IMPACT OF MYCOPLASMA HYOPNEUMONIAE INFECTION ON KEY PERFORMANCE METRICS OF SWINE PRODUCTION SUSTAINABILITY

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Background and Objectives

Infectious diseases decrease production efficiency and can compromise the sustainability of pork production. The objective of this study was to assess production performance metrics in M. hyopneumoniae infected pigs under commercial conditions to inform estimates of sustainability in pork production.

Material and Methods

Eight years of data were evaluated for three swine production flows (A-C). Flow A was positive for M. hyopneumoniae at the sow farm. Flows B and C were negative for M. hyopneumoniae infection and were used as controls. All flows were sourced from PRRSV positive sow farms. A retrospective comparison using exploratory data and time series analyses was conducted to identify differences in flows based on M. hyopneumoniae infection and co-infection with PRRSV.

Results

Mortality, average medication cost per pig, and substandard sales were >1.5 times higher on average in flow A compared to flows B and C. Gain to feed ratio and carcass weight in flow A were on average 1.04 and 1.03 times lower than in flows B and C, respectively. The time series analysis showed the peak mortality was 2.3 times higher in flow A compared to flows B and C. The lowest ADG in flow A was 1.5 times lower than that in the control flows.

Discussion and Conclusion

In this dataset, infection with M. hyopneumoniae resulted in increased medication cost, decreased growth rate and carcass weight, leading to reduced production efficiency, which can ultimately compromise pork production sustainability. A synergistic effect of co-infection of M. hyopneumoniae and PRRSV was observed. The timing of peak disruption in production performance parameters was evidenced several months post the initial M. hyopneumoniae outbreak. Results from this study suggest that the impact of swine diseases on sustainability of pork production requires analysis of commercial farm data as production dynamics are not usually captured in the scientific literature.

VPH-OP-06

MOLECULAR DETECTION AND CHARACTERIZATION OF THE CILIATED PROTOZOAN BALANTIOIDES COLI AND THE MICROSPORIDIAN SPECIES ENTEROCYTOZOON BIENEUSI IN PIGS RAISED IN ITALY

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Background and Objectives

Balantioides coli is a ciliated protozoan of both human and veterinary interest; Enterocytozoon bieneusi is the most common species of microsporidia fungi in humans, with high prevalences also reported in pigs. The lack of good sanitary and biosecurity measures favours their emergence and spread in pig farming. Given the scarcity of available data on B. coli and E. bieneusi in pigs reared in Italy, a study was planned to determine both their prevalence and their genetic variants.

Material and Methods

440 faecal samples were collected from pigs reared in 22 farms in northern Italy. For the detection of B. coli, the samples were analyzed by two copromicroscopic methods: the sedimentation and the FLOTAC® dual technique. Then, a conventional PCR targeting the ITS1–5.8S-rRNA–ITS2 region was performed. For E. bieneusi a nested PCR was performed amplifying the ITS region. For both parasites, PCR amplicons showing the expected size were purified, sequenced and the sequences obtained were compared with those available in the GenBank database using the BLASTn algorithm. In addition, farm management data were assessed as risk factors for parasite occurrence using generalized linear models.

Results

For B. coli, 422 samples were positive by sedimentation technique (95.9%), while 377 samples were positive by FLOTAC® with zinc sulphate solution (85.7%) and 39 with sodium chloride solution (8.9%). Most of the sequenced samples showed genotype B. Considering E. bieneusi, 279 samples were positive (63.4%); the multivariate model evidenced age (OR=14.8, p=0.00) and fecal body soiling (OR=0.4, p=0.01) as significant risk factors. ITS sequences belonged mainly to group 1, which includes the main genotypes with zoonotic potential.

Discussion and Conclusion

This study showed a high prevalence of both B. coli and E. bieneusi in pigs in Italy. Further insights are needed to determine their distribution and genetic polymorphism and to define their public health significance.

VVD-OP-01

EXPERIMENTAL AEROSOL INFECTION WITH PRRSV AND ASSESSMENT OF THE IMPACT OF FAR-UVC LIGHT ON INFECTION RISK

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Background and Objectives

A common hypothesis is that PRRSV may be transmitted via airborne routes over longer distances (>5.8 km) and therefore poses challenges for the health of pigs in herds. One way of reducing the risk of airborne PRRSV herd introduction is to expose inlet air to ultraviolet (UV) light to inactivate the virus. To evaluate the influence of far-UVC light in preventing airborne PRRSV infection in pigs, we conducted a range of proof-of-concept experiments that aimed at establishing an experimental model to infect pigs with aerosolized PRRSV, and to assess the impact of far-UVC on the infection risk.

Material and Methods

Infection of two pigs with airborne PRRSV-1 (2.5 ml of 1.27×10^6 TCID50/mL) released from nebulizers at 273 cm was attempted in case (far-UVC, 222 nm irradiation) and control stables (no UV irradiation) and repeated three times. Air and surface samples were collected from the pen before, 10, 30, and 60 minutes after virus dispersal to confirm the presence of PRRSV-1 in the air and investigate potential environmental contamination, respectively. Monitoring of PRRSV-1 infection in the pigs was done by testing serum samples daily until 48 hours after dispersal. All samples were tested PRRSV-1 nucleic acids by in-house RT-qPCR test.

Results

We established an experimental infection model of aerosolized PRRSV-1. Far-UVC exposure prevented infection of airborne PRRSV-1 in two piglets in each of three independent experiments, whereas two, one, and zero piglets became infected in the rooms without far-UV exposure.

Discussion and Conclusion

These studies indicate a possible protective effect of far-UVC in preventing PRRSV-1 infection by airborne PRRSV-1. The inoculation model must be optimized to infect the piglets consistently. The results need to be reproduced in larger studies, and possibly also with other viruses for concluding any influence of far-UVC on airborne viruses.

VVD-OP-02

PRRSV-1 OUTBREAK IN A FARROWING FARM CAUSED BY A VACCINE DERIVED STRAIN: A CASE REPORT

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Background and Objectives

The benefits of PRRS modified live virus vaccines (MLV) have been largely proved, however, the safety of these vaccines is questioned since vaccine strains can revert to virulence due to random mutations or recombination events. Reversion to virulence has been previously described for PRRSV-2 MLV but also recently for PRRSV-1 MLV after recombination. This case report described the introduction of a virulent PRRSV-1 strain derived from a MLV in a 1000-sow farrow-to-wean farm in France.

Material and Methods

In January 2023, unusual fever and lethargy in sows, and premature farrowings were reported in a farm that was regularly controlled as PRRS stable, using mass vaccination of sows. PRRSV-1 was detected by RT-PCR in sows and suckling piglet samples. Sequencing of ORF5, ORF7, and whole genome (WGS) were performed. Time-to-baseline production and total production losses were calculated using statistical process control methods.

Results

ORF5 and ORF7 nucleotide sequences indicated that the strain isolated from the clinical samples was differentiable from the DV MLV vaccine strain used in the farm (95.9% and 94.2% respectively) but close to the VP-046 Bis MLV strain which was never used (99.0% for both). WGS confirmed the high nucleotide identity percentage with the VP-046 Bis MLV strain (98.6%). The genomic similarity percentages of the farm PRRSV strain with the VP-046 Bis vaccine strain were homogenous over the entire genome and no recombination events were detected. A closely related strain was also detected in a wean-to-finish farm located 300 meters further. It took 17 batches (34 weeks) to recover the baseline production of piglets after implementation of a PRRSV stabilization protocol, which represented a total loss of 812 weaned piglets.

Discussion and Conclusion

This is the first case report of a PRRSV-1 MLV which reverted to virulence in France and caused substantial economic losses.

VVD-OP-03

CHARACTERIZATION OF THE HIGHLY VIRULENT PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS ROSALIA STRAIN IN PREGNANT SOWS UNDER EXPERIMENTAL CONDITIONS

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Background and Objectives

Porcine reproductive and respiratory syndrome virus (PRRSV) remains one of the most important pathogens hampering the swine industry. Highly virulent PRRSV strains have been associated with severe reproductive clinical signs under field conditions. This study aimed to characterize the highly pathogenic PRRSV Rosalia strain in pregnant sows under experimental conditions.

Material and Methods

Eight PRRSV-naïve pregnant sows (90±2 days of gestation) were intranasally challenged with the highly virulent PRRSV Lleida 029_22 Rosalia strain ($1x10^5$ $TCID_{50}$/ml), while three sows served as non-infected controls. Sows were allowed to farrow naturally unless gestation exceeded 117 days, in which case farrowing was induced. Clinical monitoring was carried out in both sows and their litters until weaning. Offspring were classified at delivery as either born-alive or non-viable (mummified, stillborn, decomposed or autolytic). Blood and saliva samples were collected to assess viral loads and immune responses in both sows and piglets.

Results

Most sows showed no major clinical signs, although three out of the eight challenged animals exhibited fever and mild lethargy. One sow was euthanized for humane reasons at 14 days post-infection (DPI). Regarding piglet outcomes, 93.2% of piglets from challenged sows were lost at delivery and 98.1% were lost by weaning, compared to 13.3% and 15.6% in the control group, respectively. The virus was detected in serum from all challenged sows by 14 DPI, with one sow remaining viremic until 46 DPI. Consistent antibody responses were detected in challenged sows, with highest levels at 14 DPI. Additional parameters are currently being evaluated.

Discussion and Conclusion

Experimental inoculation of the PRRSV Rosalia strain in late-gestation sows resulted in severe reproductive disorder, with offspring mortality rates exceeding 98% by weaning. These findings underscore the devastating impact of highly virulent PRRSV strains and highlight the critical need for improved control measures.

VVD-OP-04

EVALUATION OF TONSIL-ORAL SCRUBBING SAMPLING METHOD TO SERUM, DEEP TRAQUEAL SWAB TO DETECT PRRSV IN FINISHERS.

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Background and Objectives

Effective surveillance of PRRSV plays a role in comercial herds for understanding transmission patterns, control and disease management strategies. The PRRSv detection rate varies among different sample types over time. PRRSV can persist in tonsils up to 150 days after infection. This study aimed to compare fattening pig PRRSv detection rate by RT-PCR betwen serum, tonsil-oral scrubbing and deep traqueal swabs in positive prrs herds.

Material and Methods

Four different sample types were collected from 73 finishers across 5 different finishing units included in this study. Three different sampling methods were selected: serum, tonsil-oral scrubbings and deep traqueal swabs. All samples were individually tested using the same extraction kit and tested using VetMAX PRRSV EU NA 2.0 Kit (Termofisher). Ct values and detection capacity were analyzed using Minitab Statistical Software Version 22.0.

Results

Tonsil-oral scrubbing (37%) showed a significantly higher detection capacity compared to serum samples (7.9%) and deep traqueal swabs (17.2%). Regardind Ct values no statistically significant differences were observed among the sample types.

Discussion and Conclusion

Tonsil-oral scrubbing proves to be a useful tool for monitoring PRRSV in commercial farms, particularly toward the end of the shedding period. This technique can be routinely implemented in PRRSV Control Programs, especially in the Gilt Devolpment Unit (GDU) prior to moving animals to the breeding herd to improve PRRSV detection.

VVD-OP-05

SWINE ORTHOPNEUMOVIRUS DETECTED FOR THE FIRST TIME IN A PIG HERD IN SWEDEN

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Background and Objectives

Respiratory diseases are common in pig production. Complex aetiology makes managing the disease challenging since, in addition to environmental factors, multiple different pathogens can contribute to the disease. Also, new porcine viruses have emerged, while their clinical importance is unknown. In 2016, a novel respiratory virus, swine orthopneumovirus (SOV) of the genus Orthopneumovirus, was discovered and sequenced in the USA. Since then, SOV has also been detected in a few European countries and South Korea. This report presents the first detection of SOV in the pig population in Sweden.

Material and Methods

In total, 682 clinical samples from 112 Swedish pig farms submitted to the Swedish Veterinary Agency for diagnostic purposes between September 2023 and June 2024, were screened for the presence of SOV with qPCR. The first qPCR round targeted the N gene, and positive samples were confirmed by an additional run targeting the G gene, followed by metagenomic next-generation sequencing. SOV-positive samples were analysed for swine influenza, Actinobacillus pleuropneumonia (APP), Pasteurella multocida (Pm), Mesomycoplasma hyorhinis (Mhr) and Mesomycoplasma hyopneumoniae.

Results

Out of 682 samples, six samples from a single farm were SOV-positive. The presence of SOV was confirmed by blast analysis of 11 ORF nucleotides of SOV obtained by whole genome sequencing. The positive samples were nasal swabs taken during a respiratory disease outbreak. Cough and nasal discharge were noted in the nursing unit, starting in piglets aged three weeks. SOV-positive samples were collected from three- and four-week-old pigs, whereas samples from pigs at the age of five weeks were negative. The farm was PCR-positive also for APP, Pm, and Mhr, indicating a multimicrobial respiratory infection.

Discussion and Conclusion

This study suggests the presence of SOV in the pig population in Sweden. Further investigations are required to estimate the prevalence and clinical importance of SOV, as well as understanding the dynamics of multimicrobial respiratory infections.

VVD-OP-06

HISTOLOGICAL LESIONS AND MOLECULAR EVIDENCE OF PORCINE CIRCOVIRUS TYPE 3 IN SKELETAL ABNORMALITIES AND HUMPY-BACK POSTURE

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Background and Objectives

Porcine circovirus 3 (PCV-3) is associated with systemic disease and reproductive disorder in pigs. While its link to lesions such as (peri-)arteritis, myocarditis, and CNS changes is well-established, its role in skeletal abnormalities has never been elucidated. This study was prompted by an outbreak of spinal deformities ("humpy-back syndrome") in a Swiss breeding farm to investigate the pathogenicity of PCV-3 in bone.

Material and Methods

Between March 2023 and August 2024, 36 pigs were examined, based on clinical signs or farm origin. Clinical signs included spinal malformation, rib swelling, head oedema, CNS symptoms, and abortion. Tissues from bone, brain, spinal cord, kidney, lymph nodes, and heart were analysed by histopathology, qPCR, and RNA-ISH to detect PCV-3 and associated lesions.

Results

Histopathology identified PCV-3 lesions in 23 pigs (64%), including (peri-)arteritis and rib fractures. CNS lesions included meningoencephalitis and gliosis, respectively. Thirteen pigs (36%) did not show any histological lesions. qPCR detected PCV-3 in 25 pigs (69%), with high viral loads in bone and CNS. Three abortion cases tested positive despite the absence of macroscopic and histological lesions. ISH revealed PCV-3 RNA in arteries, heart, CNS, and bone, including osteoblasts and within callus formation.

Discussion and Conclusion

This study strengthens the link between PCV-3 and systemic inflammatory disease, expanding its role in skeletal lesions and spinal deformities. For the first time, active viral replication was detected in bone lesions, notably in pigs displaying "humpy-back" posture. While previous studies identified similar vascular lesions in affected pigs, involvement of PCV-3 in musculoskeletal abnormalities had not been confirmed until now. The findings emphasise the importance of pathomorphological investigations and recommend diagnostic tools such as ISH to confirm the role of PCV-3 in skeletal lesions. Further research is needed to clarify the impact of PCV-3 on posture and musculoskeletal health in pigs.

WEL-OP-01

MANDATORY VETERINARY AUDITS IMPROVES WELFARE FOR NORWEGIAN PIGS

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Background and Objectives

A united Norwegian livestock industry introduced the animal welfare program (AWP) for pigs in 2019. The aim of AWP is improved welfare for all Norwegian pigs. Farmers face economic consequences if requirements of AWP are not met.

Material and Methods

Each farm is required to have one to three annual veterinary audits. The farmer and veterinarian complete a report on the digital platform called “Helsegrissystemet” (“The health pig system”) where animal welfare conditions are assessed. Action must be taken if welfare parameters fail. Health status, biosecurity and management are also recorded in “Helsegrissystemet”.
At date (29.11.2024), 93.4% of all Norwegian farms with breeding sows or an annual pig slaughter exceeding 10 carcasses are enrolled in the AWP. Farms had 2967 audits in 2024 and in total 18557 audits since 2019. In 2024, 580 welfare deviations were reported in 359 farms.
Every five years, farmers and veterinarians must complete an e-learning course. Otherwise, the farmer risks financial sanctions and veterinarians cannot conduct AWP-audits. 332 veterinarians are currently approved to perform AWP-audits.

Results

At the time of slaughter, 4.68% of the deliveries were not in compliance with the AWP.
Most common deviations were insufficient water supply, poor rooting materials and inadequate conditions in the resting area.
The single most improved welfare indicator is the increase in farms with loose sows in the farrowing pens, from 71.7% in 2021 to 82.6% in 2024.
Veterinarians exceeding 10 visits had an individual average deviation per visit ranging from 0 to 2.5.

Discussion and Conclusion

Variations of recorded deviations per audit indicates different veterinary approaches. Systematic and regular calibrations are needed to improve the quality of AWP-audits.
AWP facilitates documenting how welfare is managed on Norwegian pig farms. Although AWP has limitations in measuring animal-based welfare, the introduction of mandatory veterinary audits has improved the welfare of Norwegian pigs.

WEL-OP-02

THE WELFARE AND HAIR CORTISOL CONCENTRATION OF PIGS IN MIXED ORGANIC FARMS

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Background and Objectives

Mixed organic systems may provide a welfare-friendly alternative to intensive pig farming by reducing stress and promoting natural behaviors of the pigs. This study investigated the effects of seasonality, housing system (indoor or outdoor), and sex on hair cortisol concentration (HCC) in pigs from organic farms. We also assessed whether the housing system and environmental conditions affected pigs' welfare levels.

Material and Methods

Fifty-three pigs of the Slovenian indigenous Krškopolje breed were divided into three groups based on breeding system: group Out-1 (n = 18; reared outdoor year-round), Out-2 (n = 20; reared indoor in winter and outdoor in other months), and Ind (n = 15; reared indoor year-round). Hair samples were collected from the withers area on four occasions (winter, spring, summer, autumn). Before sampling, the pigs' welfare was assessed using the Piglow app.

Results

Seasonality significantly affected HCC and was more pronounced in pigs reared outdoor. HCC peaked in winter across all groups and was lowest in summer and autumn. Similarly, the welfare was lowest in winter across all groups, with group Out-1 scoring the lowest, but no differences were observed between groups in other seasons. The highest HCC was measured in group Out-1 in winter, as it was the only group housed outdoor at that time. In contrast, group Ind had significantly higher HCC in summer compared to the groups Out-1 and Out-2. Sex had no effect on HCC and HCC decreased with time. The welfare of pigs improved in spring and stayed high throughout the study.

Discussion and Conclusion

Seasonality and housing systems substantially influenced HCC and the welfare levels, highlighting the impact of environmental conditions on pigs. The findings indicate that combined indoor-outdoor systems, where pigs are housed indoor in winter and outdoor in warmer months, may enhance welfare levels of pigs, reared in organic farms.

WEL-OP-03

DESCRIPTIVE ANALYSIS OF HAIR CORTISOL CONCENTRATION FROM BIRTH TO SLAUGHTER IN ORGANIC PIG FARMS

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Background and Objectives

Hair cortisol is a stress indicator and could be used to assess the pigs' exposure to stressors in the weeks/months prior to sampling. We previously showed that the hair cortisol concentration (HCC) at the end of fattening period was highly variable between farms and between individuals within a farm (Levallois et al., 2023). The aim of this study was to further describe the HCC in organic pigs from birth to slaughter in order to identify factors associated HCC variability during pigs' life.

Material and Methods

Fifteen farrow-to-finish organic farms were selected and 35 piglets born from 5 sows were ear-tagged. The necks of these pigs were clipped four times during their life : at birth, at weaning, at the end of the post-weaning period and at the end of the finishing period. Cortisol was extracted and quantified using an ELISA method. Management practices and herd health data were described. To describe the variability in HCC, an analysis of the variance model was run.

Results

HCC ranged from 18.81 to 564.2 pg/mg at birth, from 6.08 to 280.13 pg/mg at weaning, from 2.25 to 267.15 pg/mg at the end of the post-weaning period and from 1.4 to 197.18 pg/mg at the end of the finishing period. The factors influencing HCC were the age of pigs, their weight, the type of farrowing pens (indoor vs outdoor) and the implementation of pre-weaning socialization. Both the type of farrowing pens and the pre-weaning socialization had an effect on HCC decrease over time.

Discussion and Conclusion

As previously observed in conventional farms, HCC exhibited a great variability in pigs in organic farms. HCC decreased during pig's life and factors associated with lower HCC levels (outdoor farrowing or socialization) offer opportunities to manage pig stress.

WEL-OP-04

PIG DIETS WITH FORMER FOOD PRODUCTS: PREFERENCE, WELFARE, BEHAVIOUR, (INTESTINAL) HEALTH AND PERFORMANCE

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Background and Objectives

Using former food products (FFPs) to replace cereals in pig diets can reduce the negative impact of pig production on the environment. This study aimed to partially substitute cereals with FFPs in sow and weaned piglet diets (44.9% and 33.5-36.0%, respectively) and determine piglet diet preference and effects on welfare, behaviour, clinical health and performance.

Material and Methods

Therefore, a preference test, where piglets could choose between a circular (PC) or standard (PS) diet, and a comparison test, in which piglets received either PC or PS, were conducted. Piglets were born from sows with a standard (SS) or circular (SC) diet and already received PC or PS in the farrowing pen (FPC or FPS).

Results

Piglets consumed more PC than PS in the first three weeks after weaning, regardless of sow or farrowing pen diet. Hardly any effects of sow or piglet diet on welfare indicators were found. Effects of sow and piglet diet were found on performed agonistic behaviour with piglets from SS sows and PS piglets performing more agonistic behaviour than piglets from SC sows and PC piglets. No clinical health abnormalities were found. Effects on gut development, intestinal health, and microbiome composition and diversity (full 16S long-read sequencing on jejunum and colon + metagenomic sequencing on colon) were studied in a follow-up trial and are currently being analysed. Average daily gain and average daily feed intake were higher for PC piglets but feed conversion ratio did not differ between treatments.

Discussion and Conclusion

To conclude, based on the first study, replacing cereals in pig diets with large amounts of FFPs may be used as viable strategy to enhance early feed intake without negative effects on welfare, behaviour, health and production performance which offers a sustainable way to utilize food industry by-products. It needs to be determined to what extent FFPs affect intestinal health indicators.

WEL-OP-05

INFLUENCE OF 25-HYDROXIVITAMIN D3 SUPPLEMENTATION ON THE PERFORMANCE AND NUTRIENTS DIGESTIBILITY OF GROWING-FINISHING PIGS FED WITH DIFFERENT CALCIUM-PHOSPHORUS RATIO AND PHYTASE

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Background and Objectives

Ca and P requirements are important for bone mineralization and muscle deposition. Moreover, phytase and vitamin D plays an important role on the mineral metabolism regulation. This study aimed to evaluate the effects of 25(OH)D_3 supplementation on perfomance and nutrients digestibility of growing/finishing pigs fed with different dietary calcium (Ca) to phosphorus (P) ratios.

Material and Methods

A total of 192 gilts (28.34 BW) were allocated in an 91-d study. The experimental design was randomized blocks in a 2x2 factorial arrangement including high = 2:1 Ca:P ratio (H) or low =1.4:1 Ca:P ratio (L) and 0 or 50 mcg/kg 25(OH)D_3. Four feeding phases (G1; G2; F1, and F2) were applied and all diets included phytase and vitamin D3. Growth performance parameters (BW, ADG, ADFI, and FCR) were determined by phase and overall. The apparent total tract digestibility (ATTD) of nutrients and minerals was performed at the end of G1 phase. All data were analyzed by ANOVA using the MIXED procedure in SAS, with significant differences at $P < 0.05$. Significant interactions were further analyzed by T test.

Results

An interaction between the Ca:P ratio and 25(OH)D_3 inclusion was observed across all phases. During the G1 and G2 phases, the H group without supplementation demonstrated superior performance. In the F1 and F2 phases, the L group exhibited reduced growth performance, which was improved with 25(OH)D3 supplementation. ATTD at 21d was not affected by the Ca: P ratio but 25(OH)D3 increased ATTD of all the minerals independently on the Ca: P ratio.

Discussion and Conclusion

Reduction of the Ca: P ratio decreased growth and feed efficiency in pigs but this effect was compensated by 25(OH)D_3 inclusion probably due to a more efficient absorption of the nutrients.

WEL-OP-06

BEHAVIOUR OF LACTATING PIGLETS AND SOWS LEADING TO CRUSHING EVENTS IN OPEN CRATES

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Background and Objectives

As public opinion demands better animal welfare, intensive pig farming should reduce sow confinement and thus tackle piglet crushing. Indeed, there is still a lack of in-depth knowledge of the dynamics associated with crushing events in systems without permanent confinement, especially with hyper-prolific sows, which are now widely used in pig farming, but poorly selected for their maternal behaviour and for good piglet viability. The aim of this study was to describe the behaviour and the health status of the crushed piglets and their mother leading to the crushing events.

Material and Methods

Hyper-prolific sows and lactating piglets under intensive rearing conditions were observed during the 2 minutes before the fatal crushing events in temporary crates opened 7 days post-partum (total area 7,2 m^2) through individual pen's video cameras. The ethogram used for the data collection included piglets' activity (sleeping, suckling, active) and sows' posture change (rolling, sternal or lateral lying down, sitting). In case of evident poor health condition of the piglet (undersized, lame or starved), it was classified as unwell. A descriptive analysis was showed from 66 crushing events observed in 56 litters.

Results

In 19% of the cases, the crushed piglet was classified as unwell. The results emphasised that the main fatal posture change for healthy piglets was the rolling of the sows from sternal to lateral lying (76%). Furthermore, in 81% of the cases the healthy piglets were sleeping before dying, suggesting poor utilisation of the nest area.

Discussion and Conclusion

To reduce crushing events, results suggest to investigate different types of pen structures to reduce the mother' rolling behaviour and to attract piglets away from the sow area, enhancing the nest utilization. Importance of an individual care of weak or diseased animals seems to be also crucial in case of open crates.



Flash Talks

FTP-OP-01

Bacteriology and Bacterial Diseases

PATHOGENICITY OF SHIGA TOXIN TYPE 2E (STX2E) IN PIGLETS: A DOSE-RESPONSE CHALLENGE MODEL

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Background and Objectives

Oedema disease (OD) is a significant condition in nursery piglets. Variability in the secretion of Shiga toxin subtype 2e (Stx2e) by porcine Shiga toxin-producing Escherichia coli (STEC) strains has been observed in vitro. This study aimed to assess the effects of different Stx2e doses on piglets and to evaluate dose-related histopathological changes in predilection sites.

Material and Methods

A total of 39 piglets (28 days of age) from OD-free farms were randomized by weight, litter, and sex into three groups: Group A (n=15) received a high dose of rStx2e (250 x 10^3 CD_{50}), Group B (n=15) a low dose (100 x 10^3 CD_{50}), and Group C (n=9) served as controls with saline, all applied intravenously under inhalation anaesthesia (study day- SD 0). Clinical observations were recorded daily. Surviving piglets were euthanized on SD 10 for histopathological examination of nine tissues—inguinal, mesenteric and tracheobronchial lymph nodes (LN), lungs, kidney, stomach, brain, cerebellum, and spinal cord. Statistical analysis was performed using GraphPad Software, version 5.04. Study was approved by Commission for Animal Welfare, Ministry of Agriculture, Czech Republic (reference number: MZE-53847/2022-13143).

Results

Clinical symptoms manifested within 24 hours, predominantly in Group A, where nearly all piglets succumbed or required euthanasia within 48 hours (A vs. B, $p=0.008$). Group B exhibited reduced severity, with five piglets showing mild or no signs. A significant dose-response relationship was observed between toxin concentration and lymph node lesion severity (sinus size), the extent of stomach and lung oedema, and vascular changes—karyorrhexis in inguinal LN ($p<0.001$), mesenteric LN ($p<0.05$), the brain ($p<0.05$), and vascular wall oedema in all tissues except kidney and cerebellum.

Discussion and Conclusion

This pilot study confirms a dose-dependent progression OD symptoms and histopathological damage on predilection sites in piglets. Findings support field observations, where subclinical OD cases may contribute to impaired piglet performance.

FTP-OP-02

MIS – Miscellaneous and Clinical cases

CASE REPORT OF AN UNUSUAL FINDING: ACTINOBACILLUS PLEUROPNEUMONIAE SEROTYPE 2, BIOVAR 2 IN A GERMAN PIG FARM

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Background and Objectives

Actinobacillus pleuropneumoniae (APP) is a causative agent of pleuropneumonia, resulting in considerable economic losses in the pig industry. Currently, 19 serotypes and 2 biovars of APP have been described, with geographical variations in their distribution and pathogenic relevance. In Germany, NAD-dependent Biovar 1 is by far the predominantly biovar described.The objective of this contribution is a respiratory case with fatal outcomes in the fattening unit of a German sow farm with 250 sows.

Material and Methods

To investigate the underlying cause, lung samples were collected for further analysis and transferred to a lab. Bacteriological culture was carried out and the grown isolate was identified by MALDI-TOF mass spectrometry and 16S rRNA gene sequencing. Serotype and biovar determination, along with toxin profiling, were conducted using PCR assays. Additionally, screening PCRs for Influenza A virus, Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), and Actinobacillus suis were conducted on the lung tissue samples.

Results

APP-specific PCR on lung tissue revealed a CT value of 19.1. PCR testing for Influenza A, PRRSV, and A. suis were negative. The only pathogen isolated exhibited NAD-independent growth on blood agar. Subsequent MALDI-TOF analysis confirmed the species as Actinobacillus pleuropneumoniae. 16S rRNA gene sequencing of the isolate resulted in a 99.9% identity to A. pleuropneumoniae. Serotyping and biotyping via gel-based and real-time PCR confirmed the presence of serotype 2, biovar 2. Further toxin profiling revealed positive results for ApxI and ApxII toxins, with an unusual base pair length of 1100 bp for the apx gene.

Discussion and Conclusion

To the best of our knowledge, this represents the first reported case of a respiratory disease caused by APP serotype 2, biovar 2 in a German pig farm. Further research (including whole genome sequencing) is essential to understand the implications of this atypical strain on disease management and control strategies.

FTP-OP-03

VVD – Virology and Viral Diseases

USING TONGUE TIP EXUDATES TO MONITOR PORCINE CIRCOVIRUS 2 (PCV2) AND TO ASSESS VACCINE EFFICACY IN SOWS

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Background and Objectives

Tongue tip exudates are frequently used for detecting vertical transmission of porcine reproductive and respiratory syndrome (PRRS) virus in breeding farms. However, whether this sample is well-suited for monitoring porcine circovirus (PCV2) remains poorly evaluated. Therefore, this study aimed to evaluate the impact of sow vaccination against PCV2 on detection of this virus by qPCR in aggregated tongue tip exudates from the offspring.

Material and Methods

Tongue tips exudates from several breeding farms from Spain with no previous gilt or sow PCV2 vaccination were tested for PCV2 qPCR. Tongue tips were collected by farrowing batch; number of tongues per plastic bag comprised those of stillborn and piglets dying during the first lactation week. Five farms showing consistent detection of the virus were eligible for vaccination, and gilts and sows were correspondingly vaccinated with two doses of Ingelvac Circoflex® administered three weeks apart. Thereafter, tongue tip exudates continued to be collected, and the effect of sow vaccination on PCV2 detection in this sample was assessed by comparing detection patterns before and after vaccination.

Results

A total of 183 tongue tip exudate samples from 5 farms were tested. Before vaccination, detection of PCV2 was sometimes intermittent but consistent over time, with Ct values ranging widely between farrowing batches (from Ct values nearly 40 to 18.8 [$>10^4$ to 1.44 x 10^8 copies/mL]). After sow vaccine application, PCV2 was detected for a period (variable from farm to farm) until several batch tongue tip exudates became negative to PCV2.

Discussion and Conclusion

Results indicated that vaccination of breeding stock most likely prevented vertical transmission of PCV2, which resulted in the reduction of detecting the virus in tongue tip exudates. Testing this aggregated sample may be a practical and cost-effective alternative for monitoring PCV2 in breeding herds, with the potential application of assessing vaccine efficacy in sows.

FTP-OP-04

IMM – Immunology and Vaccinology

CYTOKINE PROFILING AND IMMUNE MODULATION IN PIGS VACCINATED WITH A SYNTHETIC RNA VACCINE AGAINST SWINE INFLUENZA

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Background and Objectives

Swine influenza, or swine flu, significantly impacts pig health and economic productivity. Swine also act as mixing vessels for various influenza viruses, making vaccination and biosecurity crucial for public health.Recently, synthetic RNA vaccine (SRV) technology has shown promising results against highly pathogenic avian influenza. To study immunological responses, we analyzed cytokine profiles (either by Luminex or mRNA quantitation) in pigs vaccinated with an SRV construct expressing the HA of H1avN1 SIV (Bad Griesbach/IDT5604/2006).

Material and Methods

Pigs were vaccinated at 8 weeks, boostered at 11 weeks, and challenged three weeks later with the afore-mentioned SIV strain. Blood samples were taken post-booster, one day after challenge, and 5 days post-challenge for cytokine testing. At 5 days post-challenge, pigs were slaughtered, and lungs evaluated for viral load.

Results

Post-booster vaccination, the unvaccinated control group exhibited higher serum IL-6 levels than the vaccinates. One day after challenge, vaccinated animals showed higher ex vivo elicited virus specific IL2/IL4 ratio indicating a recall/memory effect, which correlated inversely with lower lung virus loads at slaughter. The unprotected animals however showed lower IL2/IL4 ratios at 1 day post-challenge (dpch) which correlated inversely with higher lung virus loads. In vaccinates, the initial Th1 dominated immune response shifted towards a Th2 dominated response 5 dpch, indicating resolution of infection and activation the humoral based immune defense.

Discussion and Conclusion

These findings highlight SRV's potential to protect against swine influenza by mediating a tailored immune response and suggest that understanding cytokine dynamics can help design vaccines and improve vaccine strategies.

FTP-OP-05

MIS – Miscellaneous and Clinical cases

ROTAVIRUS AND CYSTOISOSPORA SUIS DETECTION IN PIGLETS DURING THE SUCKLING PERIOD: A DESCRIPTIVE STUDY IN 18 FARMS IN FRANCE

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Background and Objectives

Piglet diarrhea (PD) during the suckling period is frequent problem on many farms nowadays, with control based on hygiene, biosecurity and medical prophylaxis. Rotavirus and Cystoisospora suis (C.suis) are both important pathogens frequently involved in PD cases. The goal of the study was to investigate these pathogens based on the assessment of environmental samples collected from farrowing crates by species specific qPCR methods.

Material and Methods

Fecal samples from the environment of 9 litters (3 farrowing crates wiped/sponge) were collected in 18 farms: 9 facing diarrhoea between 2 and 4 weeks of age (group A) and 9 without clinical signs described (group B). On each pooled sample: 3 qPCR were performed to detect rotavirus type A and C and Cystoisospora suis. Management of prophylaxis, practices regarding hygiene and care provided to piglets were also examined thanks to a questionnaire.

Results

A farm was considered positive when at least one sample was positive by qPCR.
• Only 3 farms were negative for the three pathogens (1 in group A, 2 in group B).
• The overall positivity for Rotavirus was 78%: for the 4 negative farms, 3 of them also negative for C.suis. Rotavirus type A was detected in 61% of farms, 28% for type C.
• 44 % of farms were positive for C.suis. All the farms were using injectable toltrazuril to prevent clinical coccidiosis. In group A, all the C. suis positive farms (6/9), were also positive for rotavirus. In group B, one was also positive for rotavirus, out of 2 farms positive for C.suis.

Discussion and Conclusion

This study confirmed the frequent presence of multiple pathogens, with environmental sampling on suckling piglets. When clinical signs of diarrhoea are reported, co-detection of C.suis and rotavirus are observed. Detection of C. suis in environment suggests impossible eradication of parasite and need for continuous control programs together with biosecurity measures.

FTP-OP-06

MIS – Miscellaneous and Clinical cases

HEPATIC RUPTURE IN PIGS WITH NEUROLOGICAL SIGNS: A CASE REPORT

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Background and Objectives

Lacerated liver with haemorrhagic peritoneal effusion or clotted blood in the cranial abdominal cavity was observed as one of the few imposing gross necropsy findings in 7-, 8-, and 13-week-old pigs that showed neurological signs prior to death. This case report probed into the pathological mechanisms of ante mortem hepatic rupture and evaluated as to whether the resulting post-mortem lesion described above could be directly associated with a pathogen.

Material and Methods

These cases of hepatic tear, situated mostly on the edge of the dorsal border of the left and right medial lobes, were recorded in three multi-sourced, pig rearing units of unrelated three-site production flows in the East of England, UK.

The history, epidemiology, necropsy findings and response to treatment of these herds indicated that the 12 dead pigs examined had highly likely suffered from Streptococcal meningitis, five (42%) of which had ruptured liver. Three of these 12 casualties were necropsied in the laboratory, two of which had inflammed heart valves where a non-typable Streptococcus suis was cultured; and out of these two, one had split liver whose sections were submitted for histopathology.

Recently, another case of ruptured liver with haemoabdomen was found during necropsy of a 7-week-old pig with severe valvular endocarditis. Heart valves, brain, and joint swabs, including formalin-fixed liver and heart tissues were submitted to the laboratory.

Results

Initially, these ruptured livers were thought to have been a consequence of severe hepatic congestion resulting from acute cardiac failure due to bacterial septicaemia-induced valvular endocarditis. Histology of ruptured livers from two different pigs, however, revealed hepatic sinusoidal congestion in only one and an acute hepatocellular degeneration and necrosis common to both.

Discussion and Conclusion

This clinical case, thus, highlights the importance of considering hepatocyte and endothelial integrity, e.g. vitamin-mineral deficiencies, in the diagnosis and management of Streptococcal infection comorbidities in pigs.

FTP-OP-07

MIS – Miscellaneous and Clinical cases

ACUTE, TRANSIENT MORTALITY WITH SKIN SCALD OF UNKNOWN CAUSE IN PIGS – A CASE SERIES

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Background and Objectives

Since 2010, eight cases of acute, transient mortality with skin scalding have occurred in growing pigs. APHA is raising awareness amongst UK veterinarians by providing guidance on investigating cases resembling this presentation and welcomes input from those who have seen or diagnosed similar cases.

Material and Methods

Investigations involved clinical history taking, farm visits and post-mortem examinations with bacteriology and histopathology. In some cases, also completed was biochemistry on serum and/or urine; feed analysis for mycotoxins and nutritional imbalances; and whole genome sequencing (WGS) of Escherichia coli from the small intestine.

Results

Cases occurred between August and October on solid-floored indoor straw units. Three had a very recent feed outage and/or a new delivery and a further four had a very recent history of whole-group, oral antibiotic use. Deaths involved three to >100 pigs over 24 hours. The surviving pigs in each case recovered fully. Deaths were restricted to a proportion of pens in five cases. Gross pathology involved severe, mainly ventral, skin lesions resembling scald in all cases, with visceral congestion and haemorrhages in seven cases, at sites not typically associated with swine fevers. Histopathology of skin revealed aetiologically non-specific changes suggestive of severe, acute, irritant, contact dermatitis. No bacterial pathogens were isolated from a range of systemic sites. Biochemistry was unremarkable, in particular, magnesium was not raised. No feed imbalances were detected. WGS of E. coli did not detect genes for urease production. In one case, deoxynivalenol was detected in feed but not at a clinically significant concentration. Recent tiamulin treatment was not described.

Discussion and Conclusion

The cases share similar seasonality, clinical presentation, course of disease and pathology, however, no diagnosis was established. Differentials include septicaemia, water deprivation, magnesium toxicity and tiamulin reaction. An interrupted feed supply preceded some cases; mycotoxicosis due to mouldy feed dislodged from feed bins is under investigation.

FTP-OP-08

WEL - Animal Welfare and Ethology

CLASSIFICATION OF PIG VOCALIZATIONS IN A CONVENTIONAL HOUSING SYSTEM FOR FATTENING PIGS

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Background and Objectives

The vocal repertoire of pigs is diverse and classifying vocalizations into discrete categories is challenging. Aim of our study was to record and categorize the vocal repertoire of fattening pigs in a conventional housing system, to characterize the vocalizations based on acoustic parameters and to evaluate the possibility of automated separation of vocalizations using machine learning techniques.

Material and Methods

Data collection was carried out in a conventional farm on six observation days. Behavior associated with vocalizations was recorded by direct observation and positive or negative valence was assigned to each behavior-associated vocalization. Characterization of the behavior-associated vocalizations was carried out using selected frequency- (25%-, 50%- and 75%-quartile) and amplitude-based features (amplitude modulation rate, average amplitude modulation extent, cumulative amplitude modulation extent). Additionally, machine learning methods (random forest) were applied with the aim of developing an automated procedure to distinguish negative pig vocalizations from other pig sounds.

Results

The category “vocalizations” was divided into “positive/neutral” and “negative”. A total of 1705 vocalization-behavior combinations were recorded. The majority were “grunting/contact calls” with 59.7% (n=1018), followed by “physical contact” with 14.1% (n=240), “conflict over resources” with 9.9% (n= 169), “alert call” with 5.5% (n=93), “oral manipulation” with 4.3% (n=73), “fight” with 4.0% (n=68) and “play behavior in the group” with 2.6% (n=44). Acoustic characterization of 618 vocalizations suggested a good separability of positively/neutrally and negatively rated vocalizations. Five machine learning models were tested based on these features using stratified cross-validation to divide 1936 vocalizations into “negative” and “other vocalizations” categories. Mean precision and mean sensitivity of 91% was achieved.

Discussion and Conclusion

It is possible to separate pig vocalizations rated as “negative” from vocalizations rated as “positive/neutral” based on acoustic parameters. Automation of separation using a machine learning method was successful and could be an important tool for on-farm real-time monitoring in the future.

FTP-OP-09

VPH – One Health: Veterinary Public Health and Sustainable Pig Production

HYGIENE PROCEDURES OF TRUCKS TRANSPORTING PIGS: SEARCHING FOR THE OPTIMAL PROTOCOL

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Background and Objectives

Importance of hygiene management of trucks transporting live animals has increased, being also a legal requirement for African Swine Fever control, since transportation of live pigs is an important route of pathogens transmission among farms. The aim of the study was to develop the best cleaning and disinfection (C&D) procedure for trucks transporting live pigs, to fill the gap of an effective and standardized hygiene procedure.

Material and Methods

The instructions for C&D of barns (Italian Decree June 28th 2022) were further detailed based on literature to develop the best truck hygiene protocol. To assess its efficacy, 15 trucks were microbiologically investigated (Methicillin-resistant Staphylococci - MRS, Escherichia coli, Enterobacteriaceae, total mesophilic count) by three double samples/truck (driver's cab; boot cabinet; cargo area) before (dirty) and after (clean surfaces) the protocol application. Moreover, rapid ATP-bioluminescence tests (three samples/truck) were performed. C&D procedures were performed in an appropriate station equipped with water hoses working at low pressure, high-pressure washer, foam lance, and disinfectant arch. Procedures focused on six main areas: exterior part, inside cargo compartment, ramp, tractor, boot cabinet and driver's cab.

Results

All the dirty trucks were positive to MRS, with the cargo area and boot cabinet showing the highest prevalence (100 and 60%, respectively). No other pathogens were detected. After C&D, prevalence of MRS was zeroed (0%; $p=0.0079$); ATP values were highly greater ($p<0.001$) for the cargo area (638.5±487.4 RLUs) and the boot cabinet (610.2±1120.4 RLUs) compared to the driver's cab (25.9±43.9 RLUs).

Discussion and Conclusion

By applying the proposed C&D procedures, it was possible to promisingly eliminate MRS from pig trucks, unlike with procedures commonly performed at farm level. The ATP level might be a useful biomarker, as it can easily and in real-time check the efficacy of C&D.

FTP-OP-10

MIS – Miscellaneous and Clinical cases

HOUSING AND HEALTH MANAGEMENT OF HOBBY PIGS

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Background and Objectives

Proper knowledge of pigs kept as pets is necessary. This study investigated the housing and management of hobby pigs in Belgium (Be) and The Netherlands (Ne).

Material and Methods

A questionnaire was designed and pre-tested. The questions were related to nutrition (n = 11), housing (n = 10), health problems (n = 6), legislation (n = 5), and general information (n = 10). The questionnaire was made available digitally in Google Forms, and distributed via social media, the veterinary faculty, and veterinary practices. The data were analyzed in Excel.

Results

In total 121 owners had collaborated: Be 29%, Ne 71%. The number of hobby pigs per owner was: one (25%), two (63%), three (8%) or four (4%). There were 128 males and 101 females. In 26% of the cases, only females were kept, in 35% only males and in 39% males and females. 92% of the males were castrated, 16% of the females sterilized. The average age was 5 years. The animals were fed once (14%), twice (66%), thrice (13%), or four times per day (6%). Vegetables and fruit were extra fed by 31% of the owners, and kitchen waste by 57%. In 55% of the cases, the pigs were housed with other companion animals, and in 82%, pigs had access to an outdoor pasture. Less than half of the respondents (41%) indicated having a double fencing. Enrichment material consisted of straw (74%), grass (65%), and toys (59%).The main health problems were obesity 36%, claw problems (30%), long teeth 23%, sunburst 11%, and snoring 10%.Anthelmintic treatment was applied once (26%) or twice (17%) per year, or never (34%). 64% did not vaccinate against erysipelas.

Discussion and Conclusion

Housing, daily animal care, and health problems differ significantly from commercial farms. Many owners were unaware of the EU legislation related to biosecurity and fences for outdoor pigs.

FTP-OP-11

MIS – Miscellaneous and Clinical cases

REGULATION OF PERIWEANING BODY TEMPERATURE IS IMPROVED IN PIGLETS GIVEN HIGHER DOSES OF INJECTABLE IRON DEXTRAN DURING THE SUCKLING PERIOD

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Background and Objectives

Recent research has shown that two doses of iron dextran given to piglets within the first 10 days of life has resulted in improved birth-market growth compared to a single dose. One study reported a >4.0-fold increase in TRPV1 gene expression, which encodes for a sensory receptor involved in thermoregulation, in piglets that received a higher iron dose. The primary objective of this project was to evaluate the relationship between injectable iron dosage and piglet body temperature during and after weaning.

Material and Methods

Sixteen crossbred gilts from a commercial sow farm were allotted to either a control (200mg iron) or treatment (400mg iron) group within 24 hours of birth. All piglets received 200mg of Uniferon® iron dextran at three days of age, with treatment pigs receiving an additional 200mg three days later. To monitor body temperature without repeated handling, Thermochron® DS1921G data loggers were attached to the axillary skin of piglets, recording temperatures every five minutes from 12 hours pre-weaning to five days post-weaning. Piglets were anesthetized for data logger placement, and data collection began once all pigs had been recovered.

Results

The treatment group maintained an average body temperature 0.5°F higher than controls during the study (p=0.12). Control pigs exhibited greater variability in body temperature with higher maximums, lower minimums, and more frequent drops below normal (101.5°F) compared to the treatment group even in a warm, summer environment. Altogether, the additional 200mg dose of iron resulted in improved thermoregulation, bringing their average temperature closer to normal during the evaluation period (Control=100.7°F, Treatment=101.2°F).

Discussion and Conclusion

Piglets that received 400mg of iron demonstrated improved thermoregulation, potentially reducing thermal stress and increasing energy efficiency during the post-weaning period. Enhanced thermoregulation may contribute to better energy allocation, ultimately benefiting pig health and wean-market performance.

FTP-OP-12

REP - Reproduction

SINGLE FIXED-TIME ARTIFICIAL INSEMINATION USING VAGINAL TRIPTORELIN GEL IN SOWS POST-WEANING

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Background and Objectives

Fixed-time artificial insemination (FTAI) enhances reproductive efficiency and meat production by optimizing the genetic potential of breeding males and reducing costs associated with multiple inseminations. This study aimed to evaluate the large-scale application of FTAI under commercial conditions using a GnRH agonist (triptorelin) followed by a single insemination, compared to standard estrus-based insemination protocols.

Material and Methods

Sows after weaning were divided into two groups: **Triptorelin group (n = 418):** Treated vaginally with triptorelin 96 h post-weaning and inseminated once at 120 h. **Control group (n = 390): Received** no treatment and were inseminated at 0 and 24 h after estrus onset. All the sows showed estrus onset before 120 hours after weaning. Parity and lactation length were comparable between groups (Control: 5.21 ± 0.10 and 25.96 ± 0.33 days; Triptorelin: 5.11 ± 0.10 and 26.11 ± 0.25 days; $p > 0.05$). Data were analyzed using the Mann-Whitney U test and expressed as mean ± SEM.

Results

There were no differences in pregnancy (control 92.04 vs 93.16%, $p>0.05$) and farrowing rates (85.83 vs. 86.40 %, $p>0.05$). Gestation length was shorter in the triptorelin than in control group (117.60±0.09 vs 116.97±0.08 days, $p<0.001$). There were no differences in total (17.19 ± 0.20 vs. 15.42 ± 0.21>0.05) and live piglets born (15.42 ± 0.21 vs 15.60 ± 0.22>0.05).

Discussion and Conclusion

FTAI with triptorelin successfully induced estrus and synchronized ovulation, reducing the number of inseminations while achieving comparable reproductive outcomes. This demonstrates its technical feasibility and potential to enhance reproductive efficiency and economic viability in commercial pig production.**Funding:** Universidad de Murcia and CEFU S.A., RETOS de Transferencia Ref: 34071.

FTP-OP-13

HHM – Herd Health Management

EFFECT OF ORAL MELOXICAM ADMINISTRATION TO SOWS ON PIGLET COLOSTRUM INTAKE BASED ON IMMUNOCRIT, BIRTH WEIGHTS, AND INFRARED THERMOGRAPHY

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Background and Objectives

Colostrum intake is essential for the early growth and survivability of piglets. Meloxicam, a nonsteroidal anti-inflammatory drug, can be used to alleviate pain and inflammation in postpartum sows. However, minimal information exists on the effect of Meloxicam on piglet colostrum intake. This study investigated the effect of oral Meloxicam administration to sows on piglet colostrum intake based on immunocrit, birth weights, and infrared thermography.

Material and Methods

Sixty dams and their corresponding litters (n=30 per treatment) were randomly allotted to two treatments: 1) Meloxicam and 2) Control. Treated dams received compounded Meloxicam 1.5% suspension (6mL; 90mg; orally) at the time of induction and 24-hours after. Piglets were selected within each litter based on a pre-determined birth order. Body weights and thermal infrared surface body temperatures of enrolled piglets were taken before and after (161.5 ± 7.9 minutes) colostrum consumption. Blood was collected from the fourth piglet in each litter after colostrum consumption for immunocrit testing. Colostrum intake (g) was calculated as described by Devillers et al., 2007. Data was analyzed using linear mixed regression models and Pearson's correlation.

Results

Piglets born from sows that received Meloxicam had increased colostrum intake (186 g; $p=0.037$) and final body weights ($p=0.039$) compared to pigs born from control sows. Colostrum intake and immunocrit levels were positively correlated with post-colostrum body weight ($r=0.29$-0.34, $p<0.05$). No correlation was shown between body temperature and body weight, colostrum intake, or immunocrit levels ($p>0.10$).

Discussion and Conclusion

Piglets born from sows that received Meloxicam had increased colostrum intake and heavier final body weights. Additional research should be conducted to evaluate different timing and dosage strategies for Meloxicam and its effect on pig performance. Studies have shown that environmental factors may impact infrared temperature readings, resulting in variation. Further research on the application of thermal infrared technology in field conditions is warranted.

FTP-OP-14

MIS – Miscellaneous and Clinical cases

SUITABILITY OF WATER SOLUBLE FLORFENICOL CONTAINING PRODUCTS FOR USE IN PROPORTIONERS

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Background and Objectives

Florfenicol typically demonstrates poor solubility in water, resulting in precipitation and crystallisation when used at therapeutic dose in highly concentrated stock solutions (proportioners). The solubility and suitability for use in proportioners of eight liquid florfenicol containing veterinary products were evaluated: Amphen® 200 mg/ml florfenicol Oral Suspension, based on an advanced nanonisation formulation technique, and seven standard liquid products.

Material and Methods

Visual appearance of the eight mixtures with a florfenicol inclusion level of 100 g per 10 l stock solution was evaluated immediately after product administration, and 12 and 24 hours later. Analyses were performed in hard (pH 8.04) and soft water (pH 6.12). Based on the outcome of this test, the suitability of the nanonised formulation for use in proportioners was further evaluated during a 24-hour study. Therefore, 200 g nanonised florfenicol was added to 20 litres of water in a stock container. The proportioner was set at a 1:100 injection rate, resulting in an expected concentration of 100 mg florfenicol per litre of drinking water at the nipple. Samples of medicated drinking water were taken at the nipples at four time points to determine florfenicol concentration. Mixtures in both tests were stirred manually for 10 seconds after product administration.

Results

The nanonised formulation demonstrated excellent homogeneity at all three time points. In contrast, sedimentation of insoluble florfenicol crystals immediately after administration and further precipitation over time was observed when using standard florfenicol formulations. The visual appearance was independent of the use in hard or soft water. In case of nanonisation, florfenicol recovery expressed as percentage of the expected concentration at 0, 6, 12 and 24h was 98, 100, 100 and 101%, respectively.

Discussion and Conclusion

Nanonisation of florfenicol (Amphen® Oral Suspension) resulted in a homogeneous suspension for 24h, enabling its use in proportioners, even at a setting of 1%.



Chaired Poster Presentations

BBD-CP-01

BBD – Bacteriology and Bacterial Diseases

INFLUENCE OF ANTIBIOTICS ON THE SECRETION OF STX2E BY SHIGA-TOXIN-PRODUCING ESCHERICHIA COLI FIELD STRAINS FROM SWINE

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Background and Objectives

Shiga toxin-producing Escherichia coli (STEC) cause oedema disease in pigs, resulting in significant losses for farmers. Bacterial infections are often treated with antibiotics, however, their use is contraindicated for STEC infections since antibiotic treatment increases the likelihood of developing more severe symptoms. The latter was shown for a limited number of human STEC strains but not for porcine STEC strains and antibiotics frequently used in swine husbandry. Therefore, this study aimed to map the variation in Stx2e secretion in response to antibiotics by a large number of STEC isolates recently collected on farms with oedema disease.

Material and Methods

An in-house developed multiplex PCR was used to evaluate the presence of virulence genes associated with the 58 STEC strains. An E-test strip was used to determine the minimum inhibitory concentration (MIC) of these STEC strains to amoxicillin, tetracyclin, erythromycin, enrofloxacin and ciprofloxacin. The STEC strains were then cultured in presence of these antibiotics at 25% of the MIC. Stx2e secretion was quantified by ELISA. Bacterial genomes were sequenced using long-read nanopore sequencing.

Results

The STEC strains did not alter their Stx2e secretion in the presence of amoxicillin, while a significant decrease in Stx2e secretion was observed for tetracycline and erythromycin treatment. Remarkably, both ciprofloxacin and enrofloxacin triggered a 7- to 41-fold increase in Stx2e secretion in the same 17 STEC strains. These strains shared identical genetic elements flanking the Stx2e operon. Deleting these genetic elements inhibited the antibiotic-induced increase in Stx2e secretion.

Discussion and Conclusion

STEC strains vary in their Stx2e secretion in response to different antibiotics. A subset of strains responded to enrofloxacin and ciprofloxacin by upregulating Stx2e secretion. This response is associated with genetic elements flanking the Stx2e operon. Together, our findings advocate the use of vaccines or genetic screening prior to administering antibiotics to optimise treatment of STEC infections.

BBD-CP-02

BBD – Bacteriology and Bacterial Diseases

PRODUCTION AND CLINICAL OUTCOMES OF THE APPLICATION OF AN AUTOGENOUS VACCINE AGAINST MYCOPLASMA HYOSYNOVIAE

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Background and Objectives

Mycoplasma hyosynoviae is a commensal bacterium that can induce lameness in growing pigs, which contributes to welfare issues in swine. There are limited preventative and treatment options to control M. hyosynoviae-associated lameness. Autogenous vaccines can be used in an attempt to reduce lameness in downstream pigs. The objective of this study was to investigate production and clinical outcomes following vaccination against M. hyosynoviae in commercial settings.

Material and Methods

A 9,000-dam sow farm with a history of M. hyosynoviae lameness in growing pigs, and 11 downstream sites were included in the study. Dams (n=1,208) were randomly allocated into two treatment groups, vaccinated or non-vaccinated (intramuscularly inoculated at ~5 and ~3 weeks prior to farrowing). Piglets born to enrolled dams were followed from birth until finishing age (n=12,377) and were randomized into unvaccinated or vaccinated twice varying in application time. Weights were collected at birth and weaning, and subsets of pigs were conveniently weighed at growing (n=2,911) and finishing age (n=2,182). The proportion of lame pigs were analyzed through a mixed-effect logistic regression model based on final live animals at the end of the trial. Individual weights were evaluated through linear mixed models. All statistical analyses were conducted in R.

Results

Results suggest a lower risk of developing lameness in vaccinated piglets when compared to unvaccinated piglets regardless of sow vaccination status. Finishing weights, average daily gain at weaning, growing, and finishing did not differ between treatment groups.

Discussion and Conclusion

Piglet vaccination regardless of application time, resulted in significantly fewer lame pigs when compared to unvaccinated piglets born to unvaccinated sows. Moreover, vaccination either of the sow or the piglet, did not appear to affect weights close to market age. Regarding clinical presentation of lameness, similar results have been reported after the application of a one-dose autogenous vaccine in commercial settings.

BBD-CP-03

BBD – Bacteriology and Bacterial Diseases

VACCINATION WITH A LIVE NON-PATHOGENIC E. COLI VACCINE RESULTED IN IMPROVED PRODUCTION PERFORMANCE COMBINED WITH A SIGNIFICANT REDUCTION IN ANTIMICROBIAL USE

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Background and Objectives

In swine production, the post-weaning period has been identified as one of the most challenging and stressful periods in the life of a piglet. Piglets might undergo infectious challenges with enterotoxigenic Escherichia coli (ETEC) resulting in post-weaning diarrhea (PWD). Metaphylactic and curative antimicrobial therapy is frequently applied, leading to increased treatment incidence per 100 days at risk (TI_{100}). Here, we report the results of an antimicrobial coaching trajectory in a 1000-sow farm with high antimicrobial use during the post-weaning period. We evaluated the effect of a commercial E. coli vaccine (Coliprotec F4F18) on the reduction of antimicrobial use during the post-weaning period.

Material and Methods

A 1000-sow farm was rated as an 'attention farm' for the post-weaning period according to AMCRA benchmark reporting. A farm visit including a biosecurity check was carried out together with all associated stakeholders. Subsequently, an antimicrobial coaching trajectory was enrolled to follow-up on the improvement of the reduction of antimicrobial use after implementation of the various advice. For analytical purposes, we compared the results obtained in period 1 (1-6 weeks of vaccination) to period 2 (7-21 weeks of vaccination), since practical experience has shown that a 'stabilisation period' of about 6 weeks is necessary for maximal vaccination effect.

Results

There was a clear improvement in mortality (-64.9%) and ADWG (+7.1%) following vaccination with a simultaneous reduction in number of days in nursery (-7d). Meanwhile, the weight at the end of nursery remained similar. There was a clear decrease in the TI_{100} (-37.2%). Overall, the implementation of all measures resulted in a positive ROI of 2.72 per piglet.

Discussion and Conclusion

In conclusion, implementation of several biosecurity measures in combination with the use of a commercial E. coli vaccine could improve performance parameters and mortality, and reduce antimicrobial use, resulting in a positive ROI of 2.72 per piglet.

HHM-CP-01

HHM – Herd Health Management

RELATIONSHIP BETWEEN PRODUCTIVITY AND PRRS HEALTH STATUS IN SOW AND GROWING PIG HERDS

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Background and Objectives

The ongoing national strategy to reduce PRRS (Porcine Reproductive and Respiratory Syndrome) in Denmark aims at improving the economic outcomes for pig producers. PRRS is known to negatively impact productivity, with estimated annual losses of 112 million DKK in 2013. However, there are few studies on effects in chronically infected herds. This study investigates the relationship between PRRS health status and productivity in Danish pig herds.

Material and Methods

Data from the national productivity average for Danish pig production in 2023 were combined with PRRS health status data. The dataset included 98 sow herds, 57 weaner herds, and 195 finisher herds with known and unchanged PRRS health status throughout 2023. Statistical analyses were conducted using linear models adjusted for herd size, with data processing and statistics performed in R.

Results

The study found a statistically significant reduction in daily weight gain of 39 g/day (3.7%) in finisher pigs (from 30 kg to 115 kg body weight) from herds with positive PRRS health status compared to negative herds. No significant differences in productivity were observed for sow herds. For weaner herds, a similar trend of reduced productivity was noted, though not statistically significant due to sample size and data variation.

Discussion and Conclusion

The findings indicate that pig herds being chronically infected with PRRS virus have a reduced productivity in growing pigs, particularly in finisher pigs. The reduction in daily weight gain highlights the economic impact of PRRS on pig production. Further research is needed to explore the underlying mechanisms and potential mitigation strategies, but the results underscore the importance of controlling PRRS to improve productivity and economic sustainability of pig herds.

HHM-CP-02

HHM – Herd Health Management

DIFFERENT PRRS-STRAINS OVER TIME ON DUTCH PIG FARMS: NEW INTRODUCTIONS OR CIRCULATION OF THE SAME STRAIN?

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Background and Objectives

The porcine reproductive and respiratory syndrome virus (PRRSV) is a highly genetically diverse RNA virus which causes reproductive failure in sows and a complex respiratory syndrome in pigs of all ages. The Dutch swine industry aims to eradicate PRRSV by 2050. Most of the time, farmers and veterinarians struggle to eradicate a strain from the farm. The main argument, especially in swine-dense areas, for farmers not to start with eradication is the risk for a new PRRSV strain introduction for instance by air. The aim of this study was to get more insights in the incidence of a new lateral PRRSV introduction on Dutch pig farms. Therefore, we looked retrospectively to monitoring data from the Netherlands in the years 2022-2024.

Material and Methods

In total, 18 farms were selected where two or more field strains were present with a minimum period of 5 months between the sampling points. A PRRSV-strain was classified as a field-strain when there was less than 98% with the four modified live vaccines available in the Netherlands (DV, VP-046, 94881 & 96V198). The nucleotide sequence identity between the two strains found on a farm was used to classify the farms into “internal recirculation” (≥ 98%) or “external introduction” (< 98%).

Results

From the 18 farms, 13 were classified as “internal recirculation” and 5 as “external introduction”.

Discussion and Conclusion

The presented data suggest that introduction events of new PRRSV-strains are less common than expected. In fact, most of the times, there is a recirculating strain of PRRS on that farm and introductions of new strains are rare. The argument that new introductions play a major role does not seem to be valid. This study supports that the focus on 72% of these farms should be more on internal biosecurity.

HHM-CP-03

HHM – Herd Health Management

CORRELATION BETWEEN IMMUNOCRIT AND E.COLI ANTIBODIES LEVELS OF SUCKLING PIGLETS: A CASE REPORT

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Background and Objectives

Immunocrit has been described as a tool to evaluate colostrum intake. The objective of this study was to investigate the correlation between immunocrit levels and E. coli antibodies in sucklers and its correlation with their condition.

Material and Methods

The study took place in a Spanish commercial farm with sporadic reports of neonatal diarrhea. Sows were regularly vaccinated 4w pre-farrowing against E. coli and C.perfringens (Porcilis® Coliclos, MSD Animal Health). A total of 36 piglets born from 6 sows were bled between 5min45sec and 1h15min0sec post-farrowing. Piglets were divided in two groups, weak (W) and strong (S), towards their physical aspect and size. Blood samples were analyzed for: immunocrit and antibody titers of 987p, k88AB, k88ac, k99 and LT toxin of E. coli. Results were compared between W and S groups (ANOVA two-ways). A correlation and regression analyses between immunocrit and E. coli Ab levels were performed.

Results

No differences were found for immunocrit levels between groups. S-piglets showed statistically higher levels of antibodies against K99 and LT than the W-piglets (k99: W 9,93 2log vs S 10,41 2log; LT: W 9,35 2log vs S 9,91 2log; $p<0,03$). Titers of 987p, k88ab and k88ac showed higher numerical values in S group. All parameters showed statistical differences regarding their dams ($p<0,01$), showing that piglets born from some sows always had higher values of immunocrit and E. coli antibodies titration, independently of their physical condition.There was a significant positive correlation between immunocrit and E. coli titers, with a medium-high intensity of the correlation (0,6) for all parameters except for LT (0,3).

Discussion and Conclusion

Under the conditions of this study, there was found a positive correlation between immunocrit and E. coli antibody tires, as well as between K99 and LT levels and piglet's physical condition, suggesting that immunocrit can be an easy and valid tool to evaluate colostrum intake.

IMM-CP-01

IMM – Immunology and Vaccinology

EXPLORATORY USE OF SALIVARY BIOMARKERS IN PCV2 VACCINATED AND NON-VACCINATED AND SUBSEQUENTLY CHALLENGED PIGLETS

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Background and Objectives

Saliva biomarkers reflect systemic immune and oxidative responses, offering insights into host-pathogen interactions. This study aimed to assess saliva biomarkers to evaluate immune responses in vaccinated (V) and non-vaccinated (NV) piglets with a ready-to-use combined PCV2d and Mycoplasma hyopneumoniae vaccine following PCV2b experimental inoculation.

Material and Methods

Twelve animals were vaccinated with 2 mL of CIRBLOC® M Hyo at 3 weeks of age, and 12 received the same volume of PBS. Five weeks post-vaccination pigs were PCV2 inoculated. Saliva was collected at 4 days before challenge (dbc) and 3, 10, 17 and 21 days post-challenge (dpc). Biomarkers assessed included total protein, calprotectin, S100A12, α-amylase, adenosine deaminase (ADA), haptoglobin (Hp), ferric reducing ability of saliva (FRAS) and advanced oxidation protein products (AOPP). Statistical analyses were done with Graphpad and statistical significance was set as $p<0.05$.

Results

Pigs showed no clinical signs during the whole experimental period. V animals showed significantly lower levels of α-amylase (at 4 dbc and 3 dpc), ADA (at 3 dpc), FRAS (at 10 dpc) and Hp (at 21 dpc) when compared to NV counterparts ($p<0.05$). No further statistically significant differences were found between groups with the rest of the studied biomarkers.

Discussion and Conclusion

Lower levels of Hp, ADA and FRAS in V animals could suggest that vaccination may attenuate the inflammatory and oxidative responses associated with PCV2 infection. The decrease of α-amylase in V animals could indicate a state of less stress, and it also is associated with a decrease of inflammation. These findings highlight the usefulness of saliva biomarkers in evaluating the immune response and redox states in V and NV PCV2 infected pigs.

IMM-CP-02

IMM – Immunology and Vaccinology

CONTROLLED, BLINDED AND RANDOMISED FIELD EFFICACY, AND RETURN-ON-INVESTMENT STUDY OF A NEXT-GENERATION PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS TYPE 2 (PRRSV2) MODIFIED LIVE VIRUS (MLV) VACCINE

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Background and Objectives

PRRSV is one of the economically most important pathogens in the swine industry worldwide. A next-generation PRRSV2 MLV vaccine has been developed by Synthetic Attenuated Virus Engineering, indicated to have very high efficacy, cross-protective capacity and safety.The aim of this field study was to demonstrate the PRRSV2 protective efficacy including, reduction of mortality, morbidity and antimicrobial use (AMU), and estimated return-on-investment of this new next-generation PRRSV2 MLV-vaccine.

Material and Methods

A South-Korean 1800-sow two-site farm was selected on being a "PRRSV2-only endemic, stable sow herd not vaccinating pig(let)s". Sows already vaccinated with another PRRSV2-MLV. Pigs weaned at 25-29 days-of-age (T1) from site1 followed till slaughter (~115kg) at site-two, were enrolled. Five-hundred newly weaned piglets were ear tagged, weighed, randomly distributed by 250 into one of two groups, and injected with either 2ml of saline, "Ctrl", or 2ml of Persoporc™ (Ceva, France), "Vac". They were monitored on mortality and individual treatment for respiratory disease until slaughter. All pigs were weighed-out before first slaughter (T2). On all parameters, group averages were calculated, and with the use of Gompertz standardisation, feed consumption and days till slaughter were calculated, for return-on-investment estimation based on local prices. Levels of significance was set $p<0.05$. Statistics by: Wilcoxon Mann-Whitney U-test* or paired t-test**, all with ANOVA two-tailed.

Results

Live weight: T1 7.188kg vs 7.194kg and T2 95.39kg vs 94.06kg (p=0.0343*), mortality wean-slaughter: 14/250=5.6% vs 24/250=9.6% (p=0.0212**), and animals receiving individual treatment: 56/250=22.4% vs 106/250=42.4% (p=0.0001706**) in "Vac" and "Ctrl", respectively. Return-on-investment: 7.4€/€, excluding vaccine costs.

Discussion and Conclusion

The next-generation PRRSV2-MLV vaccine provided a substantial, highly significant reduction of PRRSV2-induced respiratory disease, and AMU, a significant reduction of mortality, and increase of slaughter weight, and a return-on-investment of 7.4:1. This indicates a strong PRRSV2-protective efficacy, improving health, welfare, profitability, and OneHealth perspectives.

IMM-CP-03

IMM – Immunology and Vaccinology

IS PRRSV VACCINATION IN LACTATING SOWS AFFECTING PRODUCTIVITY?

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Background and Objectives

It is a common practice to administer PRRSV MLV vaccines 3-4 times per year to the breeding herd either during gestation or lactation. The safety of a PRRSV-1 MLV vaccine in lactating sows was assessed under field conditions.

Material and Methods

In two commercial farms (The Netherlands and Portugal), 24 lactating sows were administered 2-5 days after farrowing either with 2 mL of saline (12 sows, T01) or 2 mL of Suvaxyn PRRS MLV (12 sows, T02) by IM route. Rectal temperatures and potential systemic/injection site reactions were monitored. Milk samples taken after vaccination (days -1, 7 and 14) were tested by PRRSV-1 RT-qPCR. Offspring body weight after vaccination (days -1, 14 and 21) were recorded as indirect measure of milk production.

Results

No systemic nor unacceptable injection site reactions were observed after vaccination. Rectal temperature in one vaccinated sow reached 41.0°C at 4 days post vaccination, returning to normal the following day.Mean piglet's body weights (kg) in each farm for T01 were 1.70 and 1.69 (day -1), 4.99 and 5.24 (day 14), and 6.28 and 7.08 (day 21). In T02 were 1.67 and 1.62 (day -1), 4.75 and 4.98 (day 14), and 6.08 and 6.70 (day 21). Average daily weight gains (ADWG) (kg) from day -1 to day 21 were 0.21 and 0.24 in T01, and 0.20 and 0.23 in T02.PRRSV-1 was not detected in any milk sample by RT-qPCR.

Discussion and Conclusion

PRRSV vaccination during lactation did not cause unacceptable local or systemic reactions other than transient fever, reduced appetite, and injection site swelling.Milk production was not affected by vaccination since the ADWG was not biologically different in piglets born to vaccinated and control sows. Furthermore, PRRSV genome was not detected confirming that the vaccine virus is not shed via milk.

MIS-CP-01

MIS – Miscellaneous and Clinical cases

RETURN ON INVESTMENT (ROI) OF INTRADERMAL LAWSONIA VACCINATION IN A COLOMBIAN FINISHING FARM

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Background and Objectives

Ileitis, also known as Porcine Proliferative Enteropathy (PPE), is a disease caused by the obligate intracellular bacterium Lawsonia intracellularis (1). It occurs in various forms, while the most often occurring subclinical form is associated with low productive performance (2). The aim of the study is to evaluate the impact of intradermal vaccination against Lawsonia intracellularis, analyzing zootechnical and economic data during fattening, without modifying existing control strategies.

Material and Methods

The trial was carried out on a farm with 950 sows located in Colombia, with a history of ileitis. Performance of 11 batches of pigs (n=10881) vaccinated with Porcilis® Lawsonia ID at 21 days of age (V), was compared with performance of 11 batches of not-vaccinated pigs (n=10580; NV) in historical comparison. Data on performance parameters (weight, mortality, feed consumption, days to slaughter) were recorded in both groups, whilst medication and management strategies stayed the same. Additionally, inspection of intestines from both groups (V n=336; NV n=312) at slaughter according to Christensen-Jansen methodology was performed. Economic impact of Lawsonia vaccination was calculated in U.S. dollar. Data was analyzed using R software (4

Results

Weight and age at placement were similar in both groups (V: 10.01kg, age 42.8d; N: 10.55 kg, age 43d).During fattening Lawsonia-vaccinated pigs obtained less mortality (V: 3.44% vs. N: 4.6%; -1.43%; $p \leq 0.05$) and an improved feed conversion than non-vaccinated pigs (V: 2.05 vs. N: 2.12; -0.06 points; p=0.001). Less severe intestinal lesions were found in vaccinated pigs at slaughter. Overall, the improved performance resulted in a calculated return on invest of 5.37 USD per pig.

Discussion and Conclusion

The study shows the significant positive impact of intradermal Lawsonia vaccination on mortality and feed efficiency in the finishing unit, leading to a positive financial Return on Investment of this measure.

MIS-CP-02

MIS – Miscellaneous and Clinical cases

AN OUTBREAK OF DIARRHEA IN PIGLETS IN GERMANY ASSOCIATED WITH ROTAVIRUS B - DETECTED BY UNBIASED NEXT-GENERATION SEQUENCING

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Background and Objectives

A piglet production farm in Germany, with a herd size of 450 sows, experienced recurring diarrhea outbreaks among piglets in their first days of life. Despite achieving an average of 32 weaned piglets per sow per year, the farm faces a pre-weaning mortality of 11.6 %. Diarrhea often begins in litters from gilts and spreads to offspring of older sows, with affected piglets displaying severe symptoms, including yellowish-white watery diarrhea and vomiting, leading to dehydration and nutrient deficiencies. The clinical symptoms did not improve with vaccination and antibiotic treatment.

Material and Methods

For diagnostics, fecal samples from untreated piglets were collected and subjected to bacteriological analysis in aerobic culture. Additionally, a Clostridium enrichment procedure was performed, and the samples were tested for Rotavirus A and C, Transmissible Gastroenteritis Virus, and Porcine Epidemic Diarrhea Virus using PCR. In a second step, unbiased next-generation sequencing was conducted using the Illumina MiSeq platform, followed by Rotavirus B PCR testing.

Results

Bacteriological analysis identified the presence of Escherichia coli, Clostridioides difficile, and Clostridium perfringens. Unbiased next-generation sequencing revealed a substantial presence of Rotavirus B, with de novo sequencing indicating a relative abundance of 85% (293,442 specific counts). Rotavirus B PCR testing yielded a Ct-value of 22. Targeted management interventions significantly improved clinical outcomes within the herd.

Discussion and Conclusion

In this case, unbiased sequencing facilitated the identification of a previously unrecognized etiological agent of piglet diarrhea within the herd. Currently, documented cases of Rotavirus B-associated diarrhea in pigs remain limited, suggesting that the virus may be underdiagnosed due to a lack of targeted diagnostics. Rotavirus B PCR is not routinely performed, which may contribute to underreporting.
Integrating unbiased next-generation sequencing into routine diagnostic protocols can significantly enhance the breadth of diagnostic capabilities for swine herds.

MIS-CP-03

MIS – Miscellaneous and Clinical cases

DIFFERENT FEEDING CURVES DURING GESTATION AFFECT SOWS' BODY COMPOSITION IN THE LONG TERM

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Background and Objectives

In pig farms, overfeeding leads to obesity, peripartal issues and reduced lactation feed intake, while underfeeding may cause muscle breakdown. Both over- and underfeeding negatively impact sows' longevity and maternal body condition, fetal and piglet development. Farmers try to cope with the sow's nutritional needs by either feeding a constant amount of feed (flat) or feeding a higher amount in early and late gestation, and a lower amount in mid gestation(high-low-high, HLH). The aim of this cross-sectional study is to check if feeding strategy influences sow's body compostion throughout gestation.

Material and Methods

In total, 1371 sows from 36 farms were enrolled in a cross-sectional study, with 244 sows from 11 farms being fed a flat curve and 1073 sows from 25 farms being fed a HLH curve. Sows of different genetics and parity were represented in both groups. At one time point, sows of different batches were measured. The bathces were in different stage of gestation: 0, 30, 70, 90 and 110 days of gestation. Backfat thickness (BF) and loin depth (LD) were measured with an ultrasound. Data was analyzed by ANOVA.

Results

The average LD, regardless of the period of gestation, was higher in sows fed HLH ($P<0.05$) than sows fed a flat curve (57.4±0.28 vs 50.7±0.61 mm), the same was observed when analyzing LD at different periods of gestation. The BF was similar for both groups at all time points as well as the average BF regardless of the period of gestation.

Discussion and Conclusion

Farms implementing HLH had sows with overall greater LD, though it remains uncertain whether this outcome is a direct result of the feeding scheme or influenced by other coinciding factors. Further research will need to clarify how LD interacts with sows' metabolism at different moments of gestation and what is the ideal range of LD and BF to optimize sows' health and reproductive performance.

REP-CP-01

REP - Reproduction

VAGINAL MICROBIOME IN POSTPARTUM AND WEANED SOWS UNDER TROPICAL CONDITIONS

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Background and Objectives

The postpartum period is a critical phase for sows, as it significantly impacts their uterine health and subsequent reproductive performance. Vaginal discharge can occur in sows with or without health issues; however, purulent discharge caused by bacterial endometritis poses a major threat to reproductive performance. This study aimed to compare the vaginal bacterial abundance of sows after farrowing and weaning.

Material and Methods

A total of 52 vaginal samples were collected from 26 sows at 2 days postpartum (n=26) and 21 days postpartum (n=26). The vaginal microbiome data were obtained through 16S rRNA-targeted metagenomic sequencing to identify variations between the two timepoints. The data were processed by filtering, denoising, and removing chimeric sequences for statistical analysis. Total bacterial counts and relative bacterial abundances were analyzed and visualized using heat maps.

Results

Community structure metrics (alpha diversity) differed between the two timepoints, as indicated by the Chao1 (173.2 ± 73.2 vs. 105.4 ± 61.8, P=0.004), Shannon (4.2 ± 0.6 vs. 3.3 ± 0.8, P<0.001), and PD whole tree (28.2 ± 9.1 vs. 16.9 ± 8.6, P<0.001) indices for days 2 and 21 postpartum, respectively. The genera Fusobacterium (17.9%), Staphylococcus (13.8%), and Streptococcus (10.4%) were the three dominant bacteria in the vaginal microbiome of sows at 2 days postpartum, while Porphyromonas (19.7%), Fusobacterium (12.8%), and Anaerococcus (7.0%) were dominant at weaning.

Discussion and Conclusion

The most notable changes included a decrease in Staphylococcus (P < 0.001) and Streptococcus (P < 0.001) and an increase in Porphyromonas (P < 0.001) and Anaerococcus (P < 0.001) between the two timepoints, indicating a shift in the microbiota of postpartum and weaned sows. In conclusion, this study highlights the divergence of the vaginal microbiome in sows between postpartum and weaning under tropical conditions, suggesting its potential as a biomarker for reproductive health and a tool for improving sow management and outcomes.

REP-CP-02

REP - Reproduction

EVALUATION OF COLOSTRUM INTAKE MEASURING PIGLET RECTAL TEMPERATURE WITHIN 20 TO 28 HOURS AFTER BIRTH

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Background and Objectives

A precise assessment of colostrum intake in the initial hours following piglet birth is essential, as insufficient colostrum intake can negatively impact survival and growth. Based on literature recommendations (Solignac et al., 2022), if at least 70% of piglets reach homeothermy (i.e., a rectal temperature above 38.5°C) at 24 hours postpartum, this is related to an adequate colostrum intake. The aim of our study was to test this threshold over an extend period, measuring piglet rectal temperature at 20, 22, 24, 26, and 28 hours After Farrow Ending (AFE).

Material and Methods

The rectal temperature of 1330 piglets from 83 different litters on 11 farms was measured at different times : 20-22-24-26-28 hours AFE. Piglets were considered as homeotherm when they reach rectal temperature above 38.5°C. At each time we compared the proportion of homeotherm piglets.
Statistical analysis were performed using R software, including tests of proportion conformity (parametric tests).

Results

There was no significant difference between the 24- and 26-hour thresholds ($p>0.01$) in terms of the proportion of homeotherm piglets. There were significant differences between the 24 hour thresholds and the other time points, 20,22 and 28 hours ($p<0.01$). This leads us to establish new thresholds. Between 20 and 24 hours AFE, the proportion of homeotherm piglets has to be at least 60%. Between 24 and 26 AFE the proportion should be 70% and between 26-28 AFE 80%.

Discussion and Conclusion

The development of this tool aims to improve decision-making in piglet care, providing means to better manage colostrum intake and ultimately support improved survival in newborn piglets within the swine industry. Further analysis are ongoing on piglets rectal temperature between 20 and 28 hours after birth regarding piglet survival rate at weaning.

REP-CP-03

REP - Reproduction

INFLUENCE OF COLOSTRUM TRAITS ON THE FARROWING PROCESS AND REPRODUCTIVE PERFORMANCE OF SOWS IN A FREE FARROWING SYSTEM

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Background and Objectives

Colostrum is vital for newborn piglets, with its quantity and quality profoundly influencing their survival and the overall production system. The objective of this study was to characterise the influence of immunoglobulin concentration and progesterone on the farrowing process and reproductive performance in free farrowing sows.

Material and Methods

In total, 151 sows were included in the study and continuously farrowing monitoring was conducted. The colostrum samples were collected after the first piglet and concentration of immunoglobulins was quantified using a Brix refractometer (digital handheld pocket refractometer, MA871, Milwaukee Instruments, USA) and ELISA (Bethyl Pig IgG-ELISA-Kit E-101-104, Montgomery, Texas). The concentration of progesterone was measured in the diluted serum samples with a Progesterone-ELISA-Kit (ADI-900-011, Enzo Life Sciences AG).

Results

The mean number of live-born piglets was 14.54 ± 3.10, and the average farrowing duration (first piglet-last piglet) was 237.41 ± 112.83 minutes. Farrowing was induced in 17.22% of the sows, and the mean stillborn rate was 8.78%. The mean immunoglobulin concentration in colostrum measuring with ELISA was 66.56 ± 24.78 mg/ml and Brix was 27.2 ± 2.95%. A significant correlation between each test was recorded ($r(151) = 0.66$; $p < 0.01$). The mean progesterone concentration was 25.08 ± 10.28 ng/ml. Unexpectedly, progesterone and immunoglobulin concentrations were positively correlated ($r(151) = 0.21$; $p < 0.01$). In addition, sows had significantly higher immunoglobulin content than gilts (27.43 ± 2.97% vs. 26.10 ± 2.65%; $p < 0.05$), and birth induction reduced the immunoglobulin content (25.95 ± 2.53% vs 27.45 ± 2.97%; $p < 0.05$).

Discussion and Conclusion

The findings revealed a significant correlation between immunoglobulin levels measured by ELISA and the Brix-refractometer, confirming their reliability. Sows had higher immunoglobulin content than gilts, and birth induction lowered immunoglobulin levels. These results highlight how management practices, like birth induction, can affect colostrum quality and piglet welfare.

VPH-CP-01

VPH – One Health: Veterinary Public Health and Sustainable Pig Production

CHLORHEXIDINE NANOPARTICLE AS A HEALTH PROMOTER DOES NOT CAUSE TOXICITY IN PIGLETS

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Background and Objectives

Nanotechnology applied to animal nutrition has shown enormous potential in promoting health, as an alternative to the use of antibiotics. Chlorhexidine nanoparticles can present desired effects against pathogens that attack the health and well-being of young piglets, and this is the first study to investigate the effects of the molecule post-weaning. The objective of this study was to validate the serum biochemistry of piglets treated with chlorhexidine nanoparticles in the immediate post-weaning period.

Material and Methods

A total of 96 piglets (48 barrows and 48 gilts), 21 days old and weighing 7,358 kg, were distributed in a complete randomized block design. The readings are divided into four experimental groups, with eight repetition per treatment and three animals per experimental unit (pen): CON (negative control), C25 (25 mg/kg of nanochlorhexidine), C50 (50 mg/kg of nanochlorhexidine) and C75 (75 mg/kg nanochlorhexidine). Blood samples collected four times (days 0, 7, 21 and 42). The piglet with the closest weight to the average weight of the pen was selected and used in all blood collections throughout the experiment. The biochemical parameters were analyzed by automated methods. The data obtained were submitted to regression analysis through the SAS software (version 9.4).

Results

No quadratic or linear regression effects were observed in the serum biochemical parameters of urea, creatinine, alanine aminotransferase, aspartate aminotransferase, gammaglutamyl transferase, alkaline phosphatase and albumin, and all values were found within the reference range for the species.

Discussion and Conclusion

Likewise, it is possible that the doses of chlorhexidine nanoparticles used do not present toxic effects, allowing their use as a alternative to antibiotics. More studies are necessary to evaluate other effects of the molecule in piglets during nursery phase.

VPH-CP-02

VPH – One Health: Veterinary Public Health and Sustainable Pig Production

DEVELOPMENT AND EVALUATION OF AN INTERACTIVE DASHBOARD FOR MONITORING ANTIMICROBIAL RESISTANCE IN AUSTRIAN PIG HERDS

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Background and Objectives

Antimicrobial resistance (AMR) in livestock poses a critical challenge to both animal and public health. Addressing this issue requires efficient data visualization and analysis tools to support veterinary decision-making. This study presents the development of an interactive dashboard at the University of Veterinary Medicine Vienna, designed to visualize microbiology data from Austrian pig farms, with a focus on bacterial isolates and their antibiotic susceptibility. The main objective is to support the early identification of resistance patterns and facilitate the development of targeted treatment strategies.

Material and Methods

The dashboard, built using the Shiny framework, integrates a comprehensive dataset of bacterial isolates from swine farms in Austria collected during routine diagnostics. The platform allows users to explore various parameters, such as sample materials, farm characteristics, and temporal trends in antimicrobial resistance. Usability was assessed using the System Usability Scale (SUS), supplemented by structured interviews with veterinarians and microbiology experts. The feedback was used to iteratively improve the tool's design.

Results

The dashboard visualizes complex microbiological data, facilitating the early detection of AMR trends. Data analysis tools, such as interactive visualizations, enable users to identify patterns and derive insights from the data. While the usability test received positive feedback, further evaluation is required to confirm its impact on supporting data-driven decisions in herd management and reducing antibiotic use.

Discussion and Conclusion

The interactive dashboard enhances antimicrobial resistance monitoring, offering a practical tool for veterinarians in swine farming. It enables targeted therapeutic interventions, reducing the overuse of antibiotics, improving animal welfare, and supporting One Health initiatives. Future developments will focus on expanding the dashboard's features, incorporating additional datasets, and exploring risk assessment and predictive analytics to further optimize decision-making in animal health management.

VPH-CP-03

VPH – One Health: Veterinary Public Health and Sustainable Pig Production

IMPACT OF CHLORHEXIDINE NANOPARTICLES ON DIARRHEA INCIDENCE DURING THE POST-WEANING PHASE

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Background and Objectives

Antimicrobial resistance represents a growing challenge in animal production, requiring the development of alternative strategies to reduce its use. Chlorhexidine nanoparticles stand out as a promising approach due to their antimicrobial properties, which can contribute to the mitigation of infections. The post-weaning phase is a period of vulnerability for piglets, often associated with an increase in the incidence of diarrhea. The present study aimed to evaluate the efficacy of chlorhexidine nanoparticles in incidence of diarrhea in weaned piglets.

Material and Methods

A total of 120 piglets (60 barrows and 60 gilts), weaned at an average of 21 days, were used during 42 days of experiment. Piglets were divided into five experimental groups using a randomized block design (initial weight and sex), with eight replicates per treatment: CON (negative control), HALQ (positive control with 120 mg/kg of halquinol), C25 (25 mg/kg of nanochlorhexidine), C50 (50 mg/kg of nanochlorhexidine) and C75 (75 mg/kg of nanochlorhexidine). Once a day, throughout the experiment, a fecal score analysis was performed by classifying the feces in the pen and calculating the occurrence of diarrhea as a percentage related to the study days. The absence of diarrhea was determined by the observation of normal feces (scores one and two) and the presence of diarrhea was determined by the observation of pasty and liquid feces (scores three and four). Data were analyzed at SAS Software (version 9.4) by Tukey's test with a significant difference when $p < 0.05$.

Results

No effects of treatment were observed throughout the experiment ($P > 0.05$).

Discussion and Conclusion

The results demonstrate that chlorhexidine nanoparticles did not significantly affect the incidence of diarrhea in weaned piglets. Although these nanoparticles possess antimicrobial effects, the findings suggest limited efficacy as an alternative strategy for managing post-weaning diarrhea, highlighting the need for further research to explore their potential applications in swine production.

VVD-CP-01

VVD – Virology and Viral Diseases

PROGRESSION OF INTERSTITIAL PNEUMONIA INDUCED BY HIGHLY VIRULENT PRRSV-1 STRAINS

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Background and Objectives

In 2020, a highly virulent strain of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) strain, named Rosalía, caused severe disease outbreaks with a high impact on Spanish pig production. The aim of this study was to characterize and evaluate the impact of the highly virulent Rosalía strain on the development of lung lesions in experimentally infected piglets.

Material and Methods

Piglets were inoculated intranasally with the virulent Rosalía PRRSV-1 strain or mock-inoculated and euthanized at 10- and 35-days post-infection (dpi). Lung samples were collected to conduct histopathological, immunohistochemical, and in situ hybridization studies.

Results

Rosalía infected-piglets initially developed interstitial pneumonia, which in some cases was complicated by bronchitis or catarrhal-purulent bronchopneumonia. Additionally, perivascular, peribronchial, and peribronchiolar infiltrates were observed, mainly consisting of $CD163^+$ and $CD3^+$ cells, as well as fibroblast proliferation and $CD163^+$ macrophages infiltrating the interlobular septa. This lung lesion progressed to proliferative necrotizing pneumonia, primarily observed in peribronchial areas, and characterized by severe alveolar damage and necrosis. In those cases of persistent lung damage, proliferation of type II pneumocytes was observed together with interstitial inflammatory infiltrates mainly composed of $CD20^+$ cells, fibroblast/myofibroblast proliferation, and angiogenesis growing from the interstitium. Furthermore, tertiary lymphoid organs were found, mainly composed of $CD20^+$ cells. Typically, a higher frequency of $PRRSV^+$ cells was detected in areas showing severe inflammatory lesion, but also, positive cells were observed in regions exhibiting lung fibrosis.

Discussion and Conclusion

Virulent PRRSV-1 strains typically cause severe interstitial pneumonia. However, for the Rosalía strain, this lesion progresses to proliferative necrotizing pneumonia, then further evolving into pulmonary fibrosis accompanied by angiogenesis, which results in persistent and severe lung damage. The progression of lesions induced by this virulent strain could represent a model for the study of post-viral pulmonary fibrosis, like that observed in severe SARS-CoV-2 cases.

VVD-CP-02

VVD – Virology and Viral Diseases

PHYLOGEOGRAPHIC ANALYSIS OF PRRS ORF5 SEQUENCES FROM INTEGRATED AND NON-INTEGRATED PIG FARMS IN ITALY

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Background and Objectives

Porcine reproductive and respiratory syndrome virus (PRRSV) represents one of the main challenges for the pig industry. The Italian pig farming system includes a limited number of major companies characterized by strong hierarchical integration and separated pig flows, and several independent farms—ranging from small rural operations to big-sized farms.Previous studies, using biostatistical models, have suggested that these independent farms play a significant role in the persistence and spread of PRRSV, potentially impacting integrated companies. However, the absence of detailed molecular epidemiology data has prevented definitive conclusions.

Material and Methods

In this study, over 500 ORF5 sequences, obtained from Italian PRRSV strains collected from both independent and integrated pig facilities, were analyzed using a phylodynamic and phylogeographic approach. Several geographical, productive, and environmental factors (e.g., pig population density, proximity to roads, altitude, wind, etc.) were incorporated into the phylogeographic framework to assess their impact on viral persistence and spread.

Results

The results demonstrated the circulation of two main clades in Italy, each characterized by different population dynamics. Sequence analysis confirmed the pivotal role of independent farms in sustaining a significant viral population and facilitating its introduction into the integrated pig production system. Additionally, the phylogeographic analysis revealed a progressive centrifugal viral dispersal originating from the central-northern regions and highlighted the influence of several environmental variables on local viral distribution, persistence, and dispersal speed. Interestingly, many of these factors differed between the integrated production system and the independent one.

Discussion and Conclusion

Overall, this study confirms the evolving variability of the PRRSV scenario in Italy. Particularly, the analysis of real field data supports previous hypotheses regarding the role of independent farms in PRRSV epidemiology and their potential threat to the integrated production system, having peculiar determinants of persistence and spread. These findings underscore the need for regional collaborative efforts and systematic information sharing to enhance infection control.

VVD-CP-03

VVD – Virology and Viral Diseases

GENERATION OF CD163 AND TMPRSS2 DOUBLE-KNOCKOUT PIGS FOR ENHANCED RESILIENCE TO PRRS AND SWINE INFLUENZA USING CRISPR/CAS9 TECHNOLOGY

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) and swine influenza are major viral diseases affecting global swine production. Gene editing offers a novel strategy to improve disease resistance by targeting host factors essential for viral infection. The aim of this study was to generate double knockout (KO) pigs for CD163 and TMPRSS2, two genes involved in PRRS and influenza virus entry and replication, to evaluate their potential for improved disease resistance.

Material and Methods

Double KO embryos were generated by microinjection of CRISPR/Cas9 components (Navarro-Serna et al., Theriogenology 2024) into in vivo derived zygotes, followed by transfer to synchronized recipient sows. From two pregnancies, 6 fetuses and 4 piglets were obtained and genotyped for mutations in CD163 and TMPRSS2. PRRS resistance was preliminarily assessed in one surviving piglet vaccinated with attenuated PRRS virus. Immune response was assessed by ELISA and viral replication was measured by qPCR.

Results

The genotype of 6 fetuses and 4 piglets was double KO mutations in 9 (90%) and single mutation in the CD163 gene in one (10%). All mutations were biallelic except 2 for CD163 and 1 for TMPRSS2 genes. Among the resulting offspring, a single surviving piglet had mutations in both target genes. Preliminary vaccination studies with attenuated PRRS virus suggested a marked resistance to PRRS infection in this piglet, with no detection of viral replication by qPCR or seroconversion, whereas it was relevant in control piglets.

Discussion and Conclusion

This preliminary study demonstrates the feasibility of generating double KO pigs using CRISPR/Cas9, achieving a high rate of precise genetic modification. Preliminary data suggest that simultaneous gene editing of CD163 and TMPRSS2 offers a promising strategy to improve swine health and reduce the economic impact of viral diseases, representing a significant step toward revolutionizing livestock disease management. Funding: Fundación Seneca 22065/PI/22

WEL-CP-01

WEL - Animal Welfare and Ethology

DIETARY PRECISION BIOTIC, A PROMISING APPROACH TO MANIPULATE UNDOCKED TAIL PIGS' BEHAVIOR VIA GUT-BRAIN AXIS

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Background and Objectives

Microbiome-gut-brain axis and its influence on pigs' behavior has been recently explored suggesting that there may be a link between specific microbiota functions and the development of manipulative behaviors. A novel precision biotic (PB) has been selected in vitro to modulate function of the microbiome promoting stress resilient pigs. The aim of this study was to test the effect of dietary PB in grower-finisher pigs under a social stress challenge on lesions severity, cortisol levels, blood metabolome and growth performance

Material and Methods

A total of 140 undocked tails pigs (25 kg BW) were housed in 36 pens (4 pigs/pen, pens by gender: entire males + females) and distributed to 2 diets: control (NC) or NC + 250 ppm PB for 90 days. The social stress challenge consisted of mixing pigs from different pens (same diet) at 48d and 49d. Body, tail and ear lesion scores were evaluated before, during and after mixing challenge and at the end of the trial. As well as plasma metabolome and cortisol levels from saliva and hair. Growth performance (BWG) and feed efficiency (FCR) was also measured. Data were analyzed with JMP Pro 16.0, with statistical significance set at $P<0.05$.

Results

Social stress challenge showed higher body and ear lesions in the animals, higher saliva cortisol level and a reduction of BGW and FCR ($p<0.05$). PB showed significantly lower saliva cortisol after the social challenge and lower hair cortisol and enriched gamma-aminobutyric acid (GABA) metabolic pathways at plasma. PB improved BWG and FCR ($p<0.05$) compared to NC specially during the social stress period.

Discussion and Conclusion

PB supplementation reduced cortisol after a social challenge and cumulative cortisol until the market weight by modulating the GABA production potentially generated by the gut microbiota, which consequently had a positive effect on growth performance. In conclusion, PB supplementation promoted pig resilience to social stress.

WEL-CP-02

WEL - Animal Welfare and Ethology

PNEUMONIA – HOW TO DECIDE BETWEEN ONGOING THERAPY OR EUTHANASIA?

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Background and Objectives

Respiratory diseases are a widespread problem in modern pig production across all production phases. As treatment is not successful in all pigs, sometimes individuals need to be euthanised. Keeping the balance between giving a diseased pig a chance to recover but to avoid unnecessary pain and suffer by euthanasia is often a challenge.

Material and Methods

Pigs (n=43) of different age groups affected respiratory tract diseases were monitored during the course of the disease until recovery or euthanasia. The monitoring comprised clinical examinations, supplemented by photo and video documentation. A subgroup of pigs (n= 12) was selected and clinical findings, photos and videos from different time points (n=33) were evaluated by a group of more than 55 experts to determine whether the pig should receive an ongoing treatment or needs to be euthanised. Based on these evaluations, the symptoms and their combinations were analysed to compare the finding of pigs at the day the evaluators determined to be “in time” that were euthanised with those recovered.

Results

Preliminary results suggest that general behavioural patterns, disease-specific symptoms and their combinations are important indicators for characterising respiratory disorders in pigs. These parameters help to describe the disease progression more accurate and to gain knowledge about the most appropriate time for euthanasia.

Discussion and Conclusion

The decision to euthanise is difficult for farmers and veterinarians. The data presented are a part of the CARE PIG project which is aimed on the determination of disease specific criteria that help to decide whether an ongoing treatment or euthanasia does protect the pig at its best.
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WEL-CP-03

WEL - Animal Welfare and Ethology

INFLUENCE OF LAWSONIA INTRACELLULARIS VACCINATION ON THE FREQUENCY AND SEVERITY OF TAIL LESIONS IN FATTENING PIGS

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Background and Objectives

The pathogen Lawsonia intracellularis (LI) is the causative agent of an important intestinal disease in pigs. LI and it´s prevention by vaccination have been anecdotally described with a reduction in cannibalism. The aim of this study was to describe the impact of a LI infection and vaccination on frequency and severity of tail lesions in a subclinically LI-infected farm by a systematic observation.

Material and Methods

A farrow-to-finish German farm with subclinical LI infection (determined by serology, PCR) and history of tail biting was selected for this side-by-side, controlled study. In total, 854 piglets were included and divided in 2 groups (separate pens): vaccinated (Porcilis® Lawsonia at 6-7 weeks) and unvaccinated control piglets. A score system described by Abriel 2017 was used to score tail lesions in each individual pig during fattening period. Tail lesions were recorded at beginning, half-way, and end of fattening period. The Mantel-Haenszel test was used for the statistical analysis.

Results

Tail scoring showed significantly fewer injuries, swellings, bleedings, and partial losses during the entire fattening process in vaccinated pigs compared to controls. From the beginning of fattening, injuries were observed in the control and vaccination group. Towards the end of fattening, the frequency of injuries in the control group increased, whereas in the vaccinated groups it decreased. At the end of fattening, the proportion of injured tails was 49,5 % in the non-vaccinated group and 7,5 % in the vaccinated group ($P<0.0001$).

Discussion and Conclusion

Tail lesions may be the consequence of many stressor factors, including those related to management, environment, feeding, health, etc. Under the conditions of this study, the reduced frequency of injured tails after Lawsonia intracellularis vaccination compared to non-vaccinated pigs highlights that subclinical infection with LI plays a role in the context of tail lesions and shows that vaccination may be an alternative to confer partial protection.



Posters

BBD-PP-01

DEVELOPMENT OF A PRECLINICAL HELICOBACTER PYLORI INFECTION MODEL IN PIGS USING STRAINS SS1 AND J99

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Background and Objectives

Gastric cancer is the fourth most common cause of cancer-related mortality in humans, often linked to infections by Helicobacter (H.) pylori. The eventual development of an effective vaccine against this pathogen requires demonstration of efficacy in animal models. This study focused on developing an experimental model of H. pylori in pigs using two strains.

Material and Methods

A total of 26 H. pylori-free pigs were selected and divided into three groups: control (n=6), inoculated with H. pylori SS1 (n=10) or with the J99 (n=10) strains. Animals were endogastrically inoculated (study day 0 [SD0] and SD2) and clinically monitored from SD0 to SD63. Rectal and oral swabs were taken on a weekly basis. Half of pigs were necropsied at SD28; remaining ones at SD63. H. pylori presence in swabs and stomach was tested by PCR. Histopathology was performed on several stomach sections. Stomach intraepithelial lymphocytes were characterized by flow cytometry.

Results

No clinical signs or gross/histopathological lesions were recorded in any animal during the study. H. pylori was detected in higher frequency in oral (3/5 in J99 and 1/5 in SS1 group) than in rectal swabs (1/5 for both groups) from SD28 onwards. One animal from the SS1 group yielded positive PCR results in oral swabs from SD28 to SD63. H. pylori was detected in stomach samples, especially in the fundus, in 4/5 pigs from J99 and only in one from SS1 groups. At SD63, a numerically higher percentage of CD3+, CD4+, CD4+CD8+, CD21b+ cells were detected in both inoculated groups when compared to the controls.

Discussion and Conclusion

This exploratory study allowed establishing a preclinical H. pylori infection model in pigs to be further used for vaccine testing. Based on current results, the strain J99 should be preferred to achieve at least 80% of infected animals.

BBD-PP-02

STREPTOCOCCUS SUIS INTRANASAL CHALLENGE MODEL FOR HIGHLY PREVALENT SEROTYPES

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Background and Objectives

Streptococcus suis is a major swine pathogen with variable pathogenicity across and within serotypes, causing inconsistent challenge model results. Robust study designs, strain screening, and natural infection routes are essential. We assessed the pathogenicity of various strains in weaned pigs via intranasal inoculation.

Material and Methods

This study was approved by the Poulpharm Ethical Committee (2024/097). Specific humane endpoints were based on demeanor, feeding behavior, handling response, and clinical parameters. Pigs were monitored daily, and those with highly altered parameters or temperature >41°C for two consecutive days were euthanized with barbiturate overdose.Thirty-six 4-week-old piglets were assigned to six groups, each receiving a distinct S. suis strain. Two strains from serotypes 2, 7, and 9 (S2a, S2b, S9a, S9b, S7a, S7b) were selected from the Poulpharm biobank. On day 0 (D0), piglets were intranasally challenged with 1×10^{9} CFU after acetic acid priming. Animals were housed separately in a BSL-2 facility. Animals were monitored twice daily from D0 to D7. Behavior, respiratory pattern, cough, locomotion, and neurological signs were scored from 0 (normal) to 3 (highly altered). The sum of these variables determined the disease index (mean ± SEM). Data were analyzed by ANOVA.

Results

Before inoculation and on D0, all piglets were clinically normal (disease index = 0). No differences were observed on D1, D2, D3, D6, and D7. Most clinical signs appeared on D4 and D5. On D4, S2a and S7b had the lowest disease index, while S9b had the highest (1.5, 1.0, 4.2; SEM = 0.6; $p < 0.05$). On D5, S9b remained highest and S7b lowest (3.7 and 0.2; SEM = 0.5; $p < 0.05$).

Discussion and Conclusion

The pathogenicity of Streptococcus suis varies by strain, with S9b showing the highest clinical severity. This highlights the need for careful strain selection in challenge models and vaccine development, especially with the emerging threat of serotype 9 in Europe.

BBD-PP-03

PREVALENCE OF INFECTIOUS AGENTS DETECTED IN NEONATAL DIARRHOEA CASES IN SPAIN

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Background and Objectives

Neonatal diarrhoea is one of the most frequent clinical presentations observed in swine farms. It is a multifactorial process in which several infectious or non-infectious agents may participate. The objective of this study was to evaluate the presence of viruses or bacteria with pathogenic potential in neonatal diarrhoea cases in Spain.

Material and Methods

From 2019 to 2023, 365 cases of neonatal diarrhoea distributed throughout Spain were sampled. Individual rectal swabs or faeces collected in a container were taken from diarrheic piglets. Swabs were processed in pools, while collective samples (containers with faeces) were analysed individually. All samples were tested using the following PCRs: Rotavirus A, Rotavirus C, Porcine epidemic diarrhoea virus (PEDV), E. coli, E. coli virulence factors, Clostridium perfringens, Clostridium perfringens toxins and Clostridioides difficile.

Results

Rotavirus A was detected in 136 of 365 cases (37%). Rotavirus C was detected in 122 of 365 cases (33%). PEDV was detected in 6 of 365 cases (2%). Enterotoxigenic E. coli (ETEC) was detected in 127 of 365 cases (35%). Enteropathogenic E. coli (EPEC) was detected in 269 of 365 cases (74%). Clostridium perfringens type A was detected in 312 of 365 cases (85%). Clostridium perfringens type C was detected in 2 of 365 cases (1%). Clostridioides difficile was detected in 240 of 365 cases (66%).In 92% of cases, more than one agent was detected.

Discussion and Conclusion

Clostridium perfringens type A, EPEC, and Clostridioides difficile were the most frequently detected agents in neonatal diarrhoea processes. Usually more than one agent was found. Therefore, in addition to an appropriate anamnesis, it is necessary to perform histopathological examinations to determine location of lesions (small x large intestine) and its association with pathogens presence, for each clinical case.

BBD-PP-04

AGE-RELATED PATTERNS IN NEONATAL DIARRHOEA PATHOGEN PREVALENCE

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Background and Objectives

The prevalence of pathogens causing neonatal diarrhoea varies across different stages of the neonatal period, influenced by factors such as intestinal maturation, immune development, management practices, and environmental conditions. The aim of this study was to evaluate the presence of different pathogens at different ages throughout the lactation period.

Material and Methods

A total of 712 farms with neonatal diarrhoea problems were included in this study. Three litters per farm were sampled between 2022 and 2023. Faecal material samples collected from rectum were fixed onto FTA cards and analysed by qPCR to detect key pathogens.

Results

64% of samples were from litters aged within the first 6 days of life. Only 25% of the samples received were from 8 days to 28. The most prevalent bacterial agents in the first week were Clostridium perfringens type A (75%) and Clostridioides difficile (67%). The prevalence of these agents declined over time, dropping to 11% and 7%, respectively, by day 14. At the same time, the most common viral agent detected was Rotavirus type C, with a 42% positivity rate, followed by Rotavirus type A, which showed a 31% positivity rate. Escherichia coli virulence factors were present in fewer than 23% of samples throughout the lactation period. In total, 21% of the samples showed single-agent infections, 29% indicated coinfections, and 27% revealed triple infections. Coinfections were more frequently detected in the early stages of life.

Discussion and Conclusion

These findings demonstrate a dynamic shift in pathogen prevalence during the first week of life. Clostridium perfringens type A and Clostridioides difficile were the most prevalent bacterial agents in young piglets, while Rotavirus type C was the most detected viral pathogen. These results highlight the need for continued surveillance and immunisation against the most prevalent agents to minimise their economic impact.

BBD-PP-05

IMPACT OF SEROVARS AND VIRULENCE FACTORS ON BIOFILM FORMATION IN STREPTOCOCCUS SUIS

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Background and Objectives

Streptococcus suis is a worldwide pathogen that impacts swine production, causing severe clinical signs in post-weaning piglets, including meningitis and arthritis. Biofilm formation is a major virulence mechanism in S. suis, enhancing its persistence and resistance. This study aims to evaluate the in vitro biofilm formation of S. suis isolates from Spanish swine farms and to assess the effects of serovars (SVs) and virulence factors (VFs).

Material and Methods

A total of 240 S. suis isolates representing 16 different SVs were included. The presence of five virulence-associated genes (epf, gapdh, luxS, mrp, and sly) was determined using PCR. In vitro biofilm formation was assessed using the crystal violet staining protocol, with absorbance measured at 595 nm and expressed as the difference from the negative control (DC). Statistical analyses were conducted using R v4.3.2.

Results

The most prevalent VF gene was luxS (90%), followed by gapdh (80%), epf (64.6%), mrp (64.2%), and sly (62.5%). There was a positive association of epf, sly, and mrp with SVs 1, 2 and 9 ($p < 0.001$), and a negative association of epf and sly with SV7 ($p < 0.05$). Significant heterogeneity in biofilm formation was observed among S. suis SVs. Notably, SV2 exhibited the lowest biofilm formation (DC = 1.77 ± 0.46), contrasting with the high biofilm-forming capacities of SV1 (DC = 3.54 ± 1.32), SV7 (DC = 6.98 ± 2.33), and SV9 (DC = 5.77 ± 1.56). Additionally, epf, mrp, and sly VF genes were associated ($p < 0.05$) with reduced biofilm formation.

Discussion and Conclusion

This study highlights the importance of serovar-specific differences in biofilm formation among S. suis isolates, with significant implications for pathogenicity and persistence. These findings provide a foundation for further research into biofilm-related mechanisms to mitigate the impact of S. suis in the swine industry.

BBD-PP-06

IN-DEPTH & FUNCTIONAL CHARACTERIZATION OF THE LOWER AIRWAYS' MICROBIAL COMMUNITY IN SICK FINISHER PIGS USING A NOVEL SHOTGUN METAGENOMICS APPROACH

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Background and Objectives

Respiratory infections are a major concern for pigs' health and economic productivity, yet the role of the lower respiratory tract (LRT) microbiome in respiratory diseases remains poorly elucidated. This study aimed at providing an in-depth characterization of the respiratory microbiome of finisher pigs with respiratory problems, and to identify the virulence factors through novel shotgun metagenomics sequencing approaches.

Material and Methods

Thirty tracheobronchial swabs (TBS) were obtained from finisher pigs (3-5 months old) with deep respiratory problems across 15 different German farms. Viral infections were diagnosed using the PathoSense metagenomic diagnostic assay. Bacterial composition was analyzed using full-length 16S rRNA gene sequencing. Functional characterization was carried out using metagenomic shotgun sequencing. All data were generated on a GridION or PromethION sequencing device (Oxford Nanopore Technologies).

Results

Mesomycoplasma hyopneumoniae, Glaesserella parasuis, and Pasteurella multocida were the three most abundant bacterial pathogens, while commensal bacterial taxa consisted mainly of Streptococcus, Clostridium, and Rothia species. Interestingly, M. hyopneumoniae was more present in TBS samples that were positive for Porcine Reproductive and respiratory Syndrome Virus (PRRSV) and negative for swine Influenza A Virus (swIAV). In contrast, G. parasuis was more abundant in swIAV-positive samples. Shotgun metagenomic sequencing revealed virulence factors belonging mainly to Mesomycoplasma hyopneumoniae (e.g., p102, p97, p146, mhp108, mhp107, hlya) and Pasteurella multocida (e.g., ptfA, lpxC).

Discussion and Conclusion

The obtained results advance the current knowledge on the composition of the deep swine respiratory tract microbiome, opening new perspectives on its correlation with viral infections and overall health conditions. Moreover, the present study provides technical advancement on the possibility of sequencing bacterial DNA from low-biomass respiratory samples without requiring prior cultivation. This will pave the way for future untargeted diagnostic tools that can detect bacteria and their virulence factor genes directly from clinical samples.

BBD-PP-07

ACTINOBACILLUS PLEUROPNEUMONIAE IN SWEDISH PIG HERDS

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Background and Objectives

The bacterium Actinobacillus pleuropneumoniae (APP) causes respiratory infection in pigs. There are currently 19 known serotypes. Routine diagnostics for APP are cultivation and subsequent species identification by matrix-assisted laser desorption/ionization, time-of-flight (MALDI-TOF) technology with agglutination for serotyping. In this study, we wanted to gain increased knowledge about APP in Swedish pigs and investigate whether routine diagnostics need adaptation.

Material and Methods

Isolates from 21 Swedish herds (n=34) were analyzed using SVA's routine diagnostics. The results were compared with whole genome sequencing (WGS) of the isolates. In addition to the 34 collected samples, three APP2 and one APP8 from domestic pigs and one APP7 from a wild boar that had been sampled and sequenced between 2021 and 2023, were included in the comparison.

Results

Results from the WGS agree well with results from MALDI-TOF/agglutination. No genes for antibiotic resistance could be detected in the sequenced isolates. In terms of virulence genes, sequencing showed a largely identical pattern in all APP2 and in the APP7 isolate, while serotype 8 had a slightly different set of virulence genes. The Swedish APP2 isolates are closely related.

Discussion and Conclusion

The routine diagnostic methods are adequate for identification of APP.The absence of genes for antibiotic resistance in the sequenced isolates indicates a favourable situation where antibiotics are still effective for treatment of pigs suffering from pleuropneumonia. This agrees well with results from susceptibility testing and field experience.All APP2 and APP7 showed a largely identical pattern regarding virulence genes, while serotype 8 had a slightly different setup. Since the bacteria can have several different genes that have approximately the same function, the clinical significance of this is unclear. Serotype 2 is the dominant serotype in Swedish pigs affected by APP. In the future we would like to further study the clinical relevance of the two virulence profiles.

BBD-PP-08

FREQUENCY OF DETECTION OF HELICOBACTER SUIS AND HELICOBACTER PYLORI IN HEALTHY PIGS OF DIFFERENT AGES IN SPAIN

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Background and Objectives

Helicobacter (H.) suis infection has been widely documented in pigs, but this species is also susceptible to H. pylori. Therefore, both pathogens may represent a potential risk for zoonotic transmission. The present study aimed to investigate the frequency of detection of H. suis and H. pylori in healthy pigs from Spanish commercial farms at different ages.

Material and Methods

Rectal and oral swabs (n=314 for each sample) as well as tissue samples (fundus, pyloric and esophageal gastric regions as well as gastrohepatic lymph node (GHLN), n=134) from a total of 324 healthy pigs (comprising ages of 3 and 10-24 weeks of age) from 7 Spanish herds were analyzed by H. pylori and H. suis PCRs.

Results

suis was detected, in at least one sample, in 254 out of 324 tested pigs, all of them fattening pigs. At stomach level, H. suis was detected in 132/134 fundus, 131/134 pylorus, 123/134 esophageal pars samples but only in 1/134 GHLN. Moreover, H. suis was detected in 128/314 and 106/314 rectal and oral swabs, respectively. In contrast, H. pylori was detected only in 2/314 and 4/314 rectal and oral swab samples, respectively, being all of them from 3-week-old piglets. Among the tested animals, no gastric ulcers of pars esophagea were reported.

Discussion and Conclusion

The high prevalence of H. suis detection in pigs, particularly at fattening ages, confirms its widespread presence in pigs in Spain. In contrast, H. pylori was minimally detected in 3-week-old piglets. Notably, the lack of gastric ulcers in H. suis infected pigs suggests that its colonization does not necessarily lead to lesions and that the infection is apparently subclinical. These findings highlight the need for continuous monitoring to assess the relevance of these pathogens to porcine health and food safety.

BBD-PP-09

EFFECT OF NASAL MICROBIOTA AT WEANING ON MYCOPLASMA HYOPNEUMONIAE LUNG LESION OUTCOME IN EXPERIMENTALLY CHALLENGED PIGS

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Background and Objectives

This study examined how the nasal microbiota of weaned piglets influenced the extension of lung lesions and immune response after challenged with Mycoplasma hyopneumoniae, highlighting its role in respiratory health.

Material and Methods

At 24 days of age (D0), 12 piglets from a Mycoplasma hyopneumoniae-free farm (seronegative and qPCR-negative) were transported to experimental facilities. On D21, they were intratracheally challenged with M. hyopneumoniae (5 mL, 10^6 CCU/ml). Nasal swabs and serum samples were collected at D0 (weaning), D21 (challenge) and D35 (post-challenge) for ELISA and 16S rRNA gene sequencing by Illumina. Lung lesions were evaluated at necropsy (D56). Based on IgG levels (median S/P=0.157) or lung lesion extent (median=9.5%), piglets were classified as good or bad responders. Nasal microbiota was analyzed using Qiime2 (v2023.9). Spearmann correlation analyses explored nasal microbiota and respiratory outcome associations (GraphPad-Prism 10).

Results

Bad responders (n=5, median lung lesion=19.1% [range 14.2–35.1%]) had significantly lower alpha diversity (Chao1, $p<0.05$) at D0 compared to the good ones (n=6, median lung lesions=6.6% [range 3–9.5%]), with significant negative correlations between diversity index and lesions (Chao1:r=-0.727; Shannon:r=-0.645). Similarly, when considering IgG levels at D35, bad responders (n=6, median IgG values=0.012) presented lower nasal microbiota alpha diversity (Shannon and Evenness, $p<0.05$) compared to good responders (n=5, median IgG=0.132). Qualitative taxonomic analysis revealed: higher relative abundance of Moraxella (32.1% vs. 2.3%) and Glaesserella (24.1% vs. 11%) in bad responders, while good responders showed higher Prevotella (12.3% vs. 4.8%) and lower Glaesserella (11% vs. 24.1%) at weaning (D0).

Discussion and Conclusion

Altogether, these results suggest that nasal microbiota composition may correlate with the respiratory outcome of M. hyopneumoniae challenge later in life, emphasizing the need of a better understanding on the role of the nasal microbiome in early life of piglets. Grant#2021/11914-0 and Grant#2023/15067-5, São Paulo Research Foundation (FAPESP).

BBD-PP-10

ABORTION AND LETHAL SEPTICAEMIA IN SOWS CAUSED BY A NON-ST194 STREPTOCOCCUS EQUI SUBSP. ZOOEPIDEMICUS – A CASE REPORT FROM HUNGARY, 2023

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Background and Objectives

Outbreaks of zoonotic Streptococcus equi subsp. zooepidemicus (SEZ) have led to severe epidemics in the pig industry since the 1970s in Southeastern Asia, China, and more recently, North America. High mortality cases resulting from peracute septicaemia have been linked to strains from a particularly virulent clonal lineage, identified as sequence type (ST) 194. This highly virulent ST194 variant has not yet been identified in Europe, and both strains of the two previously published European outbreak cases belonged to distinct, distantly related sequence types. For these reasons, we considered it important to investigate in more detail a small outbreak of sow abortion and sudden death caused by a SEZ strain and by this contributing to the understanding of an emerging swine pathogen.

Material and Methods

In August 2023, a febrile disease followed by abortion (2.7%) and subsequent death (4.3%) occurred in sows on a small-scale organic pig farm in West Hungary. We investigated the case using classical pathological, microbiological, epidemiological, and molecular methods.

Results

The observed symptoms, pathological lesions, and microbiological findings were consistent with bacterial septicaemia caused by SEZ. Routine laboratory tests revealed no other significant infectious agents. Whole-genome analysis classified the strains as ST138, which was unrelated to both any known European isolates and the hypervirulent ST194 clone. Also, some of the putative virulence genes previously linked to the hypervirulent nature of ST194 strains were absent in our isolates or were present as different variants. A sudden change in weather, coupled with an unusually high daily average temperature before the outbreak, was identified as the sole predisposing factor. The swift application of antibiotic treatment and biosecurity measures likely helped contain and resolve the outbreak.

Discussion and Conclusion

This third report of abortion and lethal septicaemia in sows underscores the potential for non-ST194 SEZ strains to cause outbreaks on pig farms in Europe.

BBD-PP-11

EVALUATING THE EFFECTS OF ORAL LAWSONIA INTRACELLULARIS VACCINATION ON SWINE MICROBIOME AND GROWTH PERFORMANCE

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Background and Objectives

Lawsonia intracellularis causes ileitis in pigs and disrupts the gut microbiota, leading to reduced growth rates and poor feed conversion. This study investigates the impact of the oral live vaccine on pig performance and microbiome composition in a Swiss herd endemically infected with Lawsonia intracellularis.

Material and Methods

Sixty piglets 2 weeks of age were assigned to experimental or control group, matched by litter, weight, and gender. The experimental group was individually vaccinated with the oral live attenuated vaccine Enterisol® Ileitis (off-label use), the control group received a mock vaccination. Pigs were weighed, and fecal samples were collected at various time points. Fecal samples underwent targeted full-length 16S rRNA gene amplicon sequencing using a PromethION device. This process identified the bacterial composition, diversity, and relative abundances within the samples. Richness was estimated for each sample, and alpha diversity was calculated using the Shannon diversity index. Beta diversity analysis evaluated the dissimilarity in bacterial communities between samples, with the Bray-Curtis dissimilarity index measuring the degree of community differentiation between experimental groups.

Results

There was a statistically significant difference in richness between experimental groups at 11 weeks of age (p-value = 0.02). Furthermore, community dissimilarity between groups observed at week 11 was higher than at any other age (p-value = 0.06).Pigs in the control group had 91.19 Kg average sale weight with an average daily weight gain of 655.5 grams. Vaccinated pigs had 98.83 Kg of sales weight and average daily weight gain of 715.2 grams (p-value <0.05)

Discussion and Conclusion

The differences observed in the microbiome between experimental groups coincide with the timing of infection with Lawsonia intracellularis. These findings indicate the impact of vaccination on the microbiome during infection and highlight the production benefits, as vaccinated pigs had a 7.64 kg higher sale weight than control pigs.

BBD-PP-12

EVALUATION OF TYLVALOSIN CONCENTRATIONS IN LUNG TISSUE IN MYCOPLASMA HYOPNEUMONIAE (MHP) CHALLENGED PIGS.

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Background and Objectives

Mycoplasma hyopneumoniae (Mhp) causes important economic loses to producers due to reduced growth rate and increased mortality, especially when co-infections with other pathogens exist. Understanding the pharmacokinetic/pharmacodynamic relationship is relevant for Veterinarians to select the most appropriate antimicrobial treatment and align with the current requirements for reduced and judicious use. To exert its effect, an antimicrobial drug should attain therapeutic concentrations at the target site of action. The aim of this study was to evaluate tylvalosin lung concentrations when Aivlosinis® was administered in drinking water at 50ppm tylvalosin.

Material and Methods

Data was obtained from a comparative Mhp challenge study involving 400 feeder pigs, that included a group of 160 pigs treated with tylvalosin at 50 ppm in drinking water. All pigs were endo-tracheally inoculated with a virulent Mhp strain. Treatment started 10 days post-exposure. 5 days after treatment initiation, lung samples were collected from 6 pigs/pen (n=30) and analysed for tylvalosin content using a validated HPLC method.To evaluate tylvalosin exposure vs. strain susceptibility, an MIC90 of 16ng per gram tissue from a recently published MIC survey (Leal Zimmer et al USA, 2021 AASV Meeting) was used as reference.

Results

The mean tylvalosin concentration was 25.8 ng/g ranging from 7.2 ng/g to 83.7 ng/g. The lower bound of the 95% confidence interval of the concentrations was 20.3 ng/g and the upper bound was 31.3 ng/g.

Discussion and Conclusion

This study ratifies that at the label dose used in Canada and the US, Aivlosin® reached therapeutic concentrations of tylvalosin in lung tissue that exceed those of published MICs for local strains in North America.

BBD-PP-13

EVALUATION OF SAMPLE MATERIALS FOR THE DETECTION OF MYCOPLASMA SUIS IN SWINE

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Background and Objectives

Mycoplasma suis (M. suis) is a hemotrophic bacterium causing anemia in swine, especially in young pigs. While infections are often subclinical, clinical signs may appear under stressful conditions. Although M. suis is known to adhere to erythrocytes, data on the diagnostic performance of sample types other than EDTA blood is limited. This investigation evaluates various sample types for PCR detection of M. suis to determine the most suitable diagnostic materials for accurate diagnostic testing.

Material and Methods

A cohort of 21 M. suis-positive sows was selected from a confirmed positive herd. From each sow, one sample of EDTA blood, serum, oral fluids, and a used needle from injections was collected, yielding 21 samples per type. All samples were analyzed via real-time PCR. The primary goal was to identify which sample types provided the most reliable and sensitive detection of M. suis, as indicated by Ct values.

Results

Preliminary results indicate that all 21 EDTA blood samples tested positive for Mycoplasma suis, yielding the lowest average Ct value of 27.8. Serum samples showed a slightly lower detection rate, with 20 out of 21 testing positive and an average Ct value of 32.3. Oral fluid samples were consistently negative. Notably, one needle sample tested positive, with a Ct value of 35.1.

Discussion and Conclusion

The results highlight the importance of selecting appropriate sample materials for accurate M. suis diagnosis in swine. EDTA blood remains the preferred sample type due to consistently positive results and lower Ct values, making it suitable for detecting clinical and subclinical infections. The reliable detection of M. suis in serum samples suggests more flexible diagnostic options. In contrast, oral fluids proved unsuitable for M. suis identification. The detection of M. suis in a used needle underscores the potential transmission risk. As the trial is ongoing, future results will be incorporated into the final outcome.

BBD-PP-14

TRUEPERELLA ABORTISUIS

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Background and Objectives

Trueperella abortisuis (formerly known as Arcanobacterium abortisuis) was described as an emerging pathogen isolated from pigs in 2013 (Metzner et al.). Since then, only a few scientific papers have been published. Nevertheless, T. abortisuis is still an underdiagnosed pathogen causing abortion, fertility problems and vaginal discharge. Aim of the study was to develop better diagnostic tools and to get more information about the importance of T. abortisuis.

Material and Methods

Routine samples and samples from selected swine farms have been examined for T. abortisuis by using non-selective and in-house developed selective blood agar plates. Species identification was carried out by MALDI-TOF-MS. Currently a specific qPCR is in development. Autogenous vaccines have been produced by using inactivated antigens in combination with aluminium hydroxide or oil-based adjuvants.

Results

T. abortisuis has been isolated from more than 20 swine farms in Germany and abroad. Comparative examinations of clinically normal and diseased sows with vaginal discharge or fertility disorders revealed that T. abortisuis is associated with the diseases. Those results have been supported by using selective agar plates that have been developed after evaluation of susceptibility test results. Autogenous vaccines have been produced after optimizing antigen production and by choosing the optimal adjuvant. The use of autogenous vaccines in affected sow herds showed not only good tolerability but also effective control of this infectious disease.

Discussion and Conclusion

Because of the slow growth and missing selective agars T. abortisuis supposed to be underdiagnosed. Using selective agar plates in combination with MALDI-TOF-MS and PCR based detection will support a full range diagnostic in case of unclear infections. This knowledge will help to control this emerging disease by targeted hygiene management measures and the use of autogenous vaccines.

BBD-PP-15

INFECTION DYNAMICS IN PRRSV AND MYCOPLASMA HYORHINIS CO-INFECTED PIGS AND CLINICAL DEVELOPMENT IN THE AFTERMATH OF AN ACUTE OUTBREAK OF PLEURITIS AND PNEUMONIA IN AN AUSTRIAN PIGLET PRODUCING FARM

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Background and Objectives

This field study aimed to investigate the infection dynamics and clinical development in piglets naturally co-infected with PRRSV and M. hyorhinis (Mhr). The study farm had been PRRSV positive and vaccinated (sows and piglets) for several years but recently experienced a severe outbreak (morbidity >25%; mortality >5%) of pleuritis and pneumonia in the nursery and the fattening farm the piglets are sold to.

Material and Methods

A group of twenty piglets was screened for PRRSV (serum pools) and Mhr (nasal swabs) bi-weekly from birth until the 12th week of life to determine the onset of Mhr colonization and PRRSV circulation. After the nursing period, all remaining piglets were euthanized, examined for gross and histological lesions and sampled for pathogen detection.

Results

PRRS field virus circulation and Mhr colonization (n=18) was first detected in the 6th week of life. Three study piglets and five further animals of the same age group showing respiratory symptoms were necropsied in the 7th (n=3) and 9th (n=5) week. On the respective necropsy dates, all piglets (n=25) were PRRSV-positive and nasally colonized by Mhr.
Mhr was cultivated from one pleuritic animal, one arthritic animal and multiple lungs (n=8) showing rubbery-firm cranioventral pulmonary consolidation (CVPC) associated with Mycoplasma infection. Additionally, swollen tracheobronchial lymph nodes were observed in 15 piglets.
Histologic lung lesions included mild (n=23) lung lesions usually associated with Mycoplasma infection and mild (n=13), moderate (n=9) or severe (n=1) lung lesions compatible with PRRS. Neither M. hyopneumoniae (all lungs negative by PCR), nor bacterial secondary pathogens could be detected in the lungs of any piglet.

Discussion and Conclusion

These results affirm the potential of Mhr to induce CVPC and mycoplasma-associated lung lesions in the absence of M. hyopneumoniae, which was probably facilitated and enhanced by the concomitant circulation of PRRSV. Even though clinical symptoms were only visible in few animals, almost all piglets showed some degree of PRRSV and/or Mhr associated lesions.

BBD-PP-16

MULTIPLEX SEROLOGICAL DETECTION OF ANTIBODIES TO DIFFERENT SEROGROUPS OF ACTINOBACILLUS PLEUROPNEUMONIAE IN NORWEGIAN SWINE HERDS

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Background and Objectives

In Norway, Actinobacillus pleuropneumoniae (APP) is present in most conventional herds, while SPF herds must be seronegative based on indiscriminate ELISA-tests. Nationally, serotype 8 is the most frequently detected during clinical outbreaks. Due to variation in the severity of disease from different serovars, a better understanding of serovar diversity is needed. An advantage of bead-based multiplex immunoassays is that they allow the measurement of antibodies to multiple serotypes in a single sample run. The objective of the study was to investigate the occurrence of different APP serotypes in a high density swine production area. Subgoals were to examine if the APP occurrence and serotype profile differed between herds depending on remarks for pleuritis/pericarditis on post-mortem inspections at abattoirs, and to compare the multiplex immunoassay and ELISA results.

Material and Methods

Serum samples (n=263) from 32 sow herds were analysed with a bead-based multiplex immunoassay detecting antibodies against APP1-9-11, APP 2, APP 3-6-8-15, APP 4-7, APP 5, APP 10, and APP 12. Results from herds with the least and the most remarks for pleuritis/pericarditis were compared and tested further with three different ELISA kits.

Results

At least one serogroup was detected in all except one herd with the multiplex immunoassay, and sera could be positive for up to six different serogroups. APP 3-6-8-15 and APP 4-7 were the most frequently detected serogroups, while APP 5 was not found. In herds with the most abattoir remarks, a higher number of serogroups were detected. With some exceptions, there was an acceptable level of agreement between the multiplex immunoassay and the ELISA kits.

Discussion and Conclusion

This is the first study investigating seropositivity to multiple serogroups of APP in Norway. Preliminary results indicate that a higher number of different serogroups increases the herd prevalence of pleuritis/pericarditis. Between-test agreement will be further investigated.

BBD-PP-17

ACUTE PANNICULITIS ASSOCIATED WITH GLAESSERELLA PARASUIS IN WEANED PIGLETS

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Background and Objectives

Glaesserella parasuis (G. parasuis) is the causative agent of Glasser's disease. Final diagnosis is achieved with bacterium isolation from body fluids in case of polyserositis and/or cerebrospinal fluid in case of meningitis. This case report describes an atypical clinical picture of the disease in weaned piglets.

Material and Methods

The case farm is a farrow-to-wean farm regularly controlled as PRRS stable with vaccination. Between April and June 2024, the farmer reported sudden deaths in weaned piglets (in total around 50 losses out of 3500). Pigs were necropsied and bacterial cultures performed after swabbing meninge, heart blood, pericardium, peritoneum, pleura and subcutaneous tissue on 4 piglets. Two sections of the skin of each pig were fixed with 10% buffered formalin. Two bacterial strains obtained were whole genome sequenced (WGS). Multilocus sequence types (MLST), serotype and putative virulence gene information were extracted.

Results

At necropsy, external aspect presented an intense and diffuse swelling of the abdominal skin and a reddish and diffuse discoloration. After removing the skin, we observed a moderate amount of clear, fluid to gelatinous material in the subcutaneous tissue and the hypodermis. Internally, we observed fibrin on liver's surface and a serofibrinous exudate in different joints. Histopathological lesions were consistent with acute panniculitis, multifocal dermatitis or even myositis.Only G. parasuis was cultured from the abdominal subcutaneous tissue of the 4 pigs and in the heart blood of one. WGS analyses identified the serotype 4 and MLST identified two novel sequence types. 150 potential virulence factors were annotated but some differences concerning the wza, lppA and bmaA6 genes were noted between the two strains. We also note the absence of all vtaA genes except vtaA6.

Discussion and Conclusion

They are very few descriptions of G. parasuis associated panniculitis and myositis in the literature and this case describes such atypical clinical picture on weaned piglets.

BBD-PP-18

WHOLE GENOME SEQUENCING FOR STREPTOCOCCUS SUIS SUPPORTS THE EPIDEMIOLOGICAL LINK BETWEEN MULTIPLICATION AND PRODUCTION SOW FARMS

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Background and Objectives

Streptococcus suis causes significant economic losses in swine production. This study analyzes 154 S. suis isolates from clinically ill pigs in Spain (2018–2022), assessing genetic traits and the vertical transmission within integrated production systems. Our aim is to demonstrate the epidemiological relationship of these isolates (grandmother-GM or selection sow farms and mother-M or multiplication sow farms).

Material and Methods

Isolates were extracted and sequenced using Illumina NovaSeq6000 (2x250bp). Characterization was performed via multilocus sequence typing (MLST) and in silico serotyping using Blastn and a customized database. A phylogenetic tree was generated for isolates with known grandmother (GM) farms using NASP for variant calling, Gubbins to identify recombination regions in the core alignment, and IQ-TREE. A Chi-square test was used to evaluate the association between GM farm and M farm versus the phylogenetic group, the sequence types, and the serotypes.

Results

The statistical analysis revealed a significant association between the GM farm and the phylogenetic group ($p<0.0001$), serotype ($p<0.0002$), and sequence type ($p<0.0001$). Similarly, a significant association was observed between M farm and the phylogenetic group ($p=0.0018$), serotype ($p=0.0019$), and ST ($p=0.0356$). Briefly, these findings demonstrate that phylogenetically related isolates are highly likely to belong to the same production pyramid, providing evidence of vertical transmission and the persistence of specific clones within the same pyramid over several years.

Discussion and Conclusion

Our study emphasizes the significance of dam-to-pig transmission and highlights the importance of knowing the origin of the clinical case (GM farm and M farm) to understand the epidemiology of the Streptococccus suis serotypes that may be present in a production pyramid.

BBD-PP-19

ASSESSING THE FINANCIAL IMPACT OF ORAL LAWSONIA INTRACELLULARIS VACCINATION IN A HUNGARIAN PIG FARM

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Background and Objectives

Ileitis, caused by Lawsonia intracellularis, leads to lower growth rates, increased feed conversion, and, in severe cases, death in pigs. Although Lawsonia intracellularis is ubiquitous in pigs, disease expression is not always evident. This study aimed to evaluate the economic benefits of implementing a vaccination protocol using an oral attenuated live vaccine.

Material and Methods

A Hungarian farm operating on weekly batches was selected for the study. Nine consecutive batches, totaling 10,216 pigs, were vaccinated with Enterisol® Ileitis. The previous six weekly batches, totaling 6,790 pigs, were used for comparison of production parameters. Financial benefit and return on investment were estimated using feed conversion (F.C), average daily weight gain (ADWG), days on feed (DOF), and mortality differences between vaccinated and unvaccinated batches. Statistical differences were evaluated using Minitab statistical software.

Results

Vaccinated pigs had a F.C of 2.76, compared to 2.91 in control pigs, difference of 0.15 (95% CI 0.0575-0.2426). Additionally, vaccinated pigs had 68,9 higher ADWG (95% CI 41.8-96.0), with 982 grams in versus 908 grams in control pigs. The average sale weight was 109.9 kg with 76.64 DOF for vaccinated pigs, while control pigs had an average sale weight of 110.7 kg with 83.96 DOF. Lastly, vaccinated pigs had a mortality rate of 2.43%, compared to 4.99% in control pigs. All observed differences were statistically significant (p-value < 0.05)

Discussion and Conclusion

The results obtained support the benefits observed globally with oral vaccination against Lawsonia intracellularis. Additionally it shows that vaccinated pigs, if grown for the same period as control pigs, will reach 5.69 Kg more per pig and require 10,68 Kg less of feed. Considering 2024 prices for feed, meat and vaccine in Hungary, the return of investment was estimated to 15:1.

BBD-PP-20

ECONOMIC LOSS DUE TO ACTINOBACILLUS PLEUROPNEUMONIA DEMONSTRATED BY CEVA LUNG PROGRAM

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Background and Objectives

Post-mortem lung scoring is an appropriate tool to assess the farm respiratory health status. Clear correlation between lung lesions, the economic impact of the disease and the efficiency of vaccination has been reported. Ceva Lung Program (CLP) was confirmed as a valuable tool to establish the prevalence and severity of pleuropneumonia, the manifestation of Actinobacillus pleuropneumonia (App). The aim of this study is to evaluate the impact of App-like lesions on productivity, in a random survey on Danish pig farms in 2023.

Material and Methods

In the 2023 Danish "Lungvember" best-respiratory-health monitoring campaign, was run for the second time. Herds had lungs scored following slaughter at the Veterinary laboratory, Kjellerup using the CLP method. App-like lesions were recorded, scored, and calculated into a farm severity APP-index (APPI). A production value/pen-place was calculated for each herd and compared to of the herd APPI by a multiple linear regression model.

Results

In 2023, 69 herds participated in Lungvember. From 48 of these, production data was obtained. Only 40 herds had an APPI>0 and were included in the analysis. The average APPI was 0,61 for the included herds. A high APPI, adjusted for PRRSV and Mycoplasma hyopneumoniae, was correlated to low production value/pen-place, with an average loss of 12,73€/pen-place for included herds, giving an average loss of 3,11€/pig. This correlates to an average loss of 20.90€ (95% confidence interval -9.39€; -32.42€) per finishing-pen-place/1.0 APPI.

Discussion and Conclusion

Postmorten lung scoring is a valuable tool and here we demonstrated that included herds with a positive APPI (average 0.61) on average had a loss of 3,11€/pig, correlating to an average loss of 20.90€ finishing-pen-place/1.0 APPI.

BBD-PP-21

ANTIMICROBIAL RESISTANCE OF THE MAIN PIG PATHOGENS: A TWO-YEAR SURVEY IN EMILIA ROMAGNA AND LOMBARDY REGION (ITALY)

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Background and Objectives

Antimicrobial resistance (AMR) poses a threat to human and animal health and causes a progressive reduction in therapeutic availability. The AMR of the main pathogens isolated from pigs in Northern Italy was evaluated.

Material and Methods

The study included 2.441 strains collected from symptomatic pigs during 2022–2023 at IZSLER laboratories: Actinobacillus pleuropneumoniae (APP) (n=352), Streptococcus suis (n=494), Pasteurella multocida (n=362), enterotoxigenic E. coli (ETEC) (n=994), Salmonella Choleraesuis (n=192) and monophasic S. Typhimurium (MST) (n=47). Antimicrobial susceptibility to a panel of antibiotics was assessed using the MIC micro-method following CLSI procedures. Strains were classified as susceptible, resistant or intermediate and collected on ClassyFarm system (Italian-Ministry-of-Health).

Results

APP isolates were highly susceptible to ceftiofur, gamithromycin, tiamulin, tildipirosin, tilmicosin, trimethoprim+sulphonamides, tulathromycin (>90%) and showed resistance to ampicillin (28%) and tetracycline (49%). Biovar-2 exhibited higher resistance rates to ampicillin, flumequine and tetracycline than biovar-1. S.suis showed susceptibility to penicillin (69%) and ampicillin (94%) and the highest resistance to tetracycline and erythromycin (95% and 83%). Compared to the other main serotypes, S.suis ST9 showed reduced susceptibility to penicillin (43% vs >80%), amoxicillin+clavulanic acid (84% vs >90%) and trimethoprim+sulphonamides (43% vs >70%). P. multocida was resistant to tetracycline (36%) and tiamulin (60%). ETEC exhibited high resistance rates to ampicillin (95%), sulfisoxazole (88%) and tetracycline (88%). S.Choleraesuis was resistant to ampicillin (84%), enrofloxacin (85%), sulfisoxazole (90%), tetracycline (79%); susceptible to colistin (99%) and more susceptible to amoxicillin+clavulanic acid than the monophasic variant (88% vs 62%). MST was resistant to ampicillin (98%), sulfisoxazole (98%), tetracycline (96%), and more susceptible to flumequine (79% vs 51%) and enrofloxacin (53% vs 15%) than S. Choleraesuis.

Discussion and Conclusion

Most of the antibiotics evaluated have been widely used in swine production, which may explain the high resistance rates observed for some isolates. Continuous evaluation of resistance trends is crucial to monitor AMR and choose the most appropriate treatments.

BBD-PP-22

DETECTION OF CLOSTRIDIUM NOVYI BY PCR IN SOWS SUFFERING FROM SUDDEN DEATH IN EUROPEAN COUNTRIES

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Background and Objectives

Sow mortality is a concern in the swine sector. It has many contributing causes, such as lameness, prolapses, and sudden deaths (SD), amongst others. Specifically, the SD can be caused by infectious or non-infectious. Concerning the infectious ones, one of which is bacteria of the genera Clostridium spp. In particular, the α-toxin produced by C. novyi Type B has been detected in the liver of sows suffering from SD. This study aimed to present the first European data on C. novyi's implication in sows suffering from SD.

Material and Methods

A total of 495 sows from 377 farms distributed across NL, DK, BE, FR, ES, IT, and DE were included in the study carried out between 2020 and 2024. The samples were taken from the liver of sows suffering from SD using a swab, transferred to an FTA card, and then sent to HIPRA Diagnos HQ. This method provides a safe way to diagnose, as the genetic material is inactivated upon contact with the FTA card, avoiding the spread of any infectious diseases. A previously validated qPCR was used to detect the presence of the gene encoding C. novyi α-toxin.

Results

Of the samples analysed, 68% were positive, and 69% of the farms presented at least one positive animal. In these countries, the positivity rates per sample were: 67%, 70%, 77%, 61%, 68%, 65%, and 36% respectively.

Discussion and Conclusion

The results of this study demonstrate that C. novyi has been highly implicated in sows suffering from SD. Previous studies have validated the lack of presence of the α-toxin in the liver of healthy animals. The use of diagnostic methods like a qPCR can be a useful tool to evaluate the role of C. novyi in sows suffering from SD.

BBD-PP-23

ASSOCIATION OF INTESTINAL LESION SCORES WITH HISTOPATHOLOGY AND QPCR RESULTS FOR LAWSONIA INTRACELLULARIS IN COLOMBIA

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Background and Objectives

Porcine proliferative enteropathy (PPE) occurs asymptomatically in some populations, causing losses in productivity, increases the costs associated with its control and masked by treatments with antibiotics via food or water.The macroscopic assessment of ileum-lesions allows us to associate the severity of the structural damage caused by Lawsonia intracellularis to standard laboratory test results.This study seeks to correlate the intensity of macroscopic damage by measuring intestinal scores at slaughter, in addition to molecular biology and histopathology, to assess the most common cellular damages.

Material and Methods

The study was carried out in 160 commercial pigs not vaccinated against Lawsonia intracellularis, sent to different slaughter plants in Colombia. The qualification of gross lesions was carried out following the scoring system by Szabo et al., the qualification of histopathological lesions according to a severity scale. and the qPCR was performed using a commercial kit.

Results

The severity of macroscopic tissue lesion (intestinal score) correlates with the severity of cell damage as well with higher bacterial load of Lawsonia intracellularis (CT value).The association between the score, histopathology, and qPCR, in this case we found that the grade 0 lesion score has a severity level of 15% with CT values of 31.1, while the grade 3 lesion score was associated with a severity of 75% and CT values of 26.5.

Discussion and Conclusion

Assessing intestinal macroscopic lesions at slaughter is a diagnostic tool that correlates with the degree of pressure that the production system faces from Lawsonia intracellularis, thus providing a tool also in situation where other (laboratory) approaches are not available. It allows the implementation of measures to mitigate the impact of the pathogen.This opens an important discussion as control alternatives with a greater impact such as vaccination since traditional alternatives do not control this bacterium as effectively.

BBD-PP-24

SUSCEPTIBILITY PROFILES (2009-2020) OF RESPIRATORY PATHOGENS TO TILMICOSIN - EU MIC DATA AND PK/PD RELATIONSHIPS

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Background and Objectives

Susceptibility profiles of respiratory pathogens to tilmicosin were compared to observe trends over time to evaluate long-term efficacy. Results were put into relationship to pharmacokinetics (PK) of tilmicosin (Tilmovet®- Huvepharma NV).

Material and Methods

Tilmicosin MIC data were generated based on susceptibility testing of A.pleuropneumoniae (APP), G.parasuis (GP), P.multocida (PM), B.bronchiseptica (BB) and M.hyopneumoniae (MH) isolates during three time periods (2009-2012; 2015-2016; 2019-2020) in Europe. MIC_{50}, MIC_{90} and MIC ranges were determined. CLSI interpretive criteria were used to calculate % of susceptible and resistant isolates. Tilmicosin lung tissue and macrophage concentrations were determined in PK studies.

Results

Minor tilmicosin MIC_{90} changes were determined for APP isolates from 16.0µg/ml (2009-2012) to 32.0µg/ml (2015-2016; 2019-2020), for PM isolates from 16.0µg/ml (2009-2012) to 8.0µg/ml (2015-2016; 2019-2020), for BB isolates from 32µg/ml (2009-2012) to 64.0µg/ml (2015-2016; 2019-2020). Changes of tilmicosin MIC_{90} values were determined for GP isolates from 2.0µg/ml (2009-2012) to 4.0µg/ml (2015-2016) and 8.0µg/ml (2019-2020). MH isolates (2015-2016) show low MIC_{90} values (0.5µg/ml). Based on CLSI breakpoints high % of susceptibility were determined for APP isolates (99.4%-2009-2012; 80.5%-2015-2016; 88.7%-2019-2020) and PM isolates (98%-2009-2012; 100%-2015-2016; 99.3%-2019-2020).
Pharmacokinetic studies verify accumulation and long persistance of tilmicosin in lung tissues and immune cells. Intracellular accumulation is considered as the key factor for tilmicosin's high therapeuitic effect in respiratory disease treatment. Lung (2.71µg/g), macrophage (6-11µg/ml) concentrations and results of treatment studies were used to define CLSI veterinary breakpoints (susceptible $\leq$16µg/ml; resistant $\geq$32µg/ml) for APP and PM.

Discussion and Conclusion

Susceptibility data generated over a time period of 12 years show minor changes in susceptibility patterns of respiratory pathogens to tilmicosin. An excellent therapeutic effect of tilmicosin can be expected based on the available PK/PD data and CLSI clinical breakpoints.

BBD-PP-25

SURVEILLANCE OF HAEMOTROPHIC MYCOPLASMAS IN PIGS FROM FARMS LOCATED IN THE CENTRAL AREA OF ARGENTINA

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Background and Objectives

Haemotrophic Mycoplasmas (HM) infect several mammalian species, including domestic and wild pigs. To date, three different HM species are known in pigs: Mycoplasma suis, Mycoplasma parvum and Candidatus Mycoplasma haemosuis. In Argentina, there are no studies on the circulation of MH among pig farms, so the aim of this study was to detect Mycoplasma spp. from pig blood specimens by PCR.

Material and Methods

The study was conducted in 22 farms (from 15 to 1900 sows) in the area of influence of the Universidad Nacional de Rio Cuarto (Córdoba and San Luis provinces, Argentina). Eight blood specimens with anticoagulant (3.2% sodium citrate) were collected in each farm, 4 from growing pigs and 4 from sows. The blood specimens were processed in pools of 4 (2 pools by farm: 1 from growing pigs and 1 from sows) and processed by a genus-specific nested-PCR targeting the 16S-23S rRNA intergenic spacer (ITS). Some PCR product was observed in all the sampled farms with amplicons ranging from 600 to 200 bp.

Results

In some farms, up to 4 different sized amplicons were observed. By the PCR target used, none of the amplicons would correspond to M. suis, since in this species, 16S rRNA is located 166 kb downstream of the 23SrRNA gene. It might be the other HM species described (M. parvum, Candidatus M. haemosuis), some other mycoplasma species that may be causing bacteremia or some other HM species of which the pig is not the definitive host. For unambiguous identification of the Mycoplasma species observed, PCR products should be sequenced or species-specific PCR should be used

Discussion and Conclusion

From this scenario showing a high circulation of Mycoplasmas in pig blood, we are aware of the importance of identifying these species. Further studies are needed not only for the identification of Mycoplasma, but also for the determination of prevalence and to apply control measures.

BBD-PP-26

COINFECTIONS BETWEEN BACTERIAL NEONATAL DIARRHOEA AGENTS ON SWEDISH FARMS

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Background and Objectives

Neonatal diarrhoea (ND) in piglets is a multifactorial disease, therefore, a differential diagnosis of the multiple agents involved should be considered. One of the most common tools is the qPCR. Differentiating the bacterial load of a sample has been described as a valuable indicator for distinguishing between a mere positivity, a commensal bacterium, or a presumptive diagnosis due to intestinal dysbiosis. This study shows the prevalence of high and low concentrations of bacterial pathogens in piglets suffering from ND.

Material and Methods

A total of 66 Swedish farms and 234 diarrhoea samples were included. Samples were obtained between June 2021 and October 2024 and sent to the DIAGNOS Laboratory using FTA® ELUTE cards. A multiplex qPCR test adapted from previous studies was performed to detect genes-encoding F4, F5, and F6 adhesion factors, the heat-labile toxin (LT) of ETEC, C.difficile A-B toxins and C.perfringens α-β-ε-toxins. Regarding the interpretation of the results, samples were considered as 'high-load' when the Ct values were <30 for C.difficile and E. coli and <26 for C.perfringens α, β, or ε toxins.

Results

Of the total samples, 97.4% were positive for C.perfringens α-toxin, with 54.3% showing Ct values <26. β-toxin was only positive on 0.4% of the cards. C.difficile A-toxin was detected on 82% of the cards (68.2% with Ct <30), and C.difficile B-toxin was also detected on 52.5% of the samples (18% Ct <30). Notably, 48.3% of the samples were positive for ETEC adhesion factor F4, and 49.1% for LT-toxin. ETEC F5 and F6 were only detected on 33.6% and 3% of samples, respectively.

Discussion and Conclusion

Pathogenic bacterial agents are commonly identified in piglet diarrhoea. The bacterial load detected by qPCR supports the clinical interpretation of a positive result. The present study shows the percentage of Swedish samples in which different bacterial agents might be considered etiological agents of ND.

BBD-PP-27

SEVERE ACTINOMYCOSIS IN ORGANIC FREE-RANGE SOWS: A CASE REPORT FROM GERMANY

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Background and Objectives

Actinomycosis, a rare but persistent disease in pig farming, particularly affects free-range sows. Historically linked primarily to Actinomyces suis, recent findings indicate that other species, such as A. denticolens and A. suimastitidis, also contribute to granulomatous mastitis. This care report case involves sows from an organic free-range farm in Germany, where some animals developed severe mastitis after weaning, attributed to warm, humid conditions and the use of straw bedding.

Material and Methods

The case involved three sows from a free-range organic farm with 192 sows and extensive piglet-rearing facilities. The farm adheres in accordance with Regulation (EU) 2018/848 on organic production, using straw bedding and practicing vaccination protocols but without routine antibiotics. Necropsies were performed on affected sows, revealing extensive mastitis. The examinations were conducted in the laboratory of SAN Group Biotech Germany GmbH, Hoeltinghausen, Germany. Tissue samples underwent histopathological and bacteriological analysis.

Results

Necropsy findings indicated severe mastitis characterized by ulcerated pyogranulomatous dermatitis and extensive connective tissue proliferation. Histological analysis revealed pyogranulomas, Splendore-Hoeppli material, and bacterial colonies. Bacteriological cultures identified various Actinomyces species and related bacteria, including Schaalia hyovaginalis and Trueperella pyogenes. These results confirmed actinomycosis as the primary cause of lesions, consistent with previous reports on this condition.

Discussion and Conclusion

Actinomycosis remains a significant challenge in free-range pig farming, exacerbated by factors like straw bedding and outdoor housing. Treatment options are limited, with surgical intervention being labor-intensive and economically burdensome. Preventive measures, such as piglet tooth grinding and herd-specific vaccines, may help reduce infection rates. In cases of actinomycosis, it is essential to culturally screen for Actinomyces denticolens, in addition to other present actinomycetes such as Trueperella pyogenes and Schaalia hyovaginalis. Enhanced research efforts are crucial to developing effective treatments and prevention strategies, ensuring better animal welfare and minimizing antibiotic use.

BBD-PP-28

GROWTH COMPARISON OF MULTIPLE STRAINS OF ACTINOBACILLUS PLEUROPNEUMONIAE WITH AND WITHOUT ADDITION OF EPINEPHRINE

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Background and Objectives

Most swine farms are endemically infected with Actinobacillus pleuropneumoniae (App). Disease outbreaks of colonized animals are related to various trigger factors, as climate stressors or coinfecting agents. We hypothesized that stress hormone supplements in bacterial growth medium facilitate the isolation of colonizing App strains from healthy individuals.

Material and Methods

Growth behavior of App field strains of frequent serotype (ST) 2, pathogenic ST5 and rarely isolated ST12 with and without the stress hormone epinephrine were compared. Multiple growth assays were performed starting from App cryo stocks applied to chocolate blood agar plates and incubated at 37 °C and 5% CO_2either for 24 hours or for 7 days. Culture material of different age was used in growth assays in liquid medium containing different concentrations of epinephrine ranging from 0-100 µM in triplicate. Optical densities (OD) were measured in 30-minute intervals for eight hours. Colony forming units (CFU)/ml were determined for each growth assay by ten-fold dilution series.

Results

There were significant differences with respect to plateau, slope and intercept of growth curves between 24-hours- and 7-days-old cultures. OD-values reflected slower growth for 7-days-old cultures, but finally the same plateau as with 24-hours-old cultures was reached for some cases. Different strains of the same serotype differed in growth. Epinephrine supplemented media did not enhance App growth at all.

Discussion and Conclusion

Stress reflected by an increase in stress hormones is considered as a trigger factor for disease outbreaks of App. The pathomechanism of this activation process is not known but might be due to the composition of the tonsillar microbiome, resilience of the pig and also characteristics of the respective App strain involved. A general impact of epinephrine on growth of App could not be shown in these in vitro assays.

BBD-PP-29

GENETIC DIVERSITY AND DISTRIBUTION OF VIRULOMES OF STREPTOCOCCUS SUIS CIRCULATING IN NORTH AMERICA, LATIN AMERICA, AND EUROPE FROM 2014 TO 2024

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Background and Objectives

S. suis displays significant genetic diversity and a broad spectrum of virulence, from nonpathogenic to highly virulent. We evaluated the population structure and virulome profiles of 1,349 isolates collected from 600 farms across North America, Latin America, and Spain between 2014 and 2024.

Material and Methods

Genetic diversity was assessed using three typing methods: in-silico serotyping, Multilocus sequence typing, and whole-genome clustering. Multiple correspondence analysis and hierarchical clustering of principal components were performed to explore the virulome profiles based on 58 virulence-associated genes (VAGs).

Results

A total of 242 sequence types, 50 clonal complexes, 29 serotypes, and 167 lineages (PLs) were identified. Common molecular types included serotypes 1 (16.5%), 9 (11.3%), 1/2 (10.5%), and 2 (10.0%); ST1 (20.8%) and ST28(16.2%); and PL1(22.1%), PL2 (20.2%), and PL4 (3.7%), each of which was significantly different in their VAGs profiles ($p \leq 0.05$). However, serotypes 1 and 2 shared VAGs profiles with serotype 14 ($p > 0.05$). We detected regional and temporal variations in the distribution of common strains and their virulome profiles. The marked decline in CC1(ST1), PL1, and serotype 1, along with an increase in CC28(ST28), PL2, and serotype 1/2 since 2020, due to targeted control programs. However, the rise of singletons and emerging strains (e.g., novel STs and PLs), implies an increasing diversity over time. HCPC classified isolates into five clusters: G1 (12.8%); G2 (25.3%); G3 (24.8%); G4 (18.8%); and G5 (18.3%). Cluster G1 exhibited non-pathogenic profile, while G3 and G5 represented highly-pathogenic profiles and were associated with serotypes 1, 1/2, 2, and 14, CC1 (ST1), and CC28 (ST28). The presence of mrp in highly-pathogenic isolates, and its absence in non-pathogenic isolates, suggests that it is a valuable virulence-associated marker.

Discussion and Conclusion

The detection of emerging variants, pathogenic strains, and distinct virulome profiles in heterologous groups enhances our understanding of disease dynamics and virulence mechanisms, which can inform the development of effective control strategies.

BBD-PP-30

ORAL VACCINATION AGAINST E. COLI F4/F18: COMPARISON OF PERFORMANCE, ANIMAL EXPOSURE TO ANTIBIOTICS AND BEHAVIOR OF PIGLETS AFTER WEANING

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Background and Objectives

A farrow-to-finish farm with 450 sows had clinical colibacillosis during post-weaning with the presence of E. coli F4-LT1-STb and Streptococcus suis infections. The objective of this contemporary study was on 3 consecutive batches to compare growth performance, animal exposure to antibiotics and behavior of piglets orally vaccinated against E. coli F4/F18 and those not vaccinated.

Material and Methods

At 19 days of age, for the 3 batches, 657 piglets in the control group were ear-tagged and weighed individually and 656 piglets in the vaccinated group were vaccinated orally with ColiprotecTM F4/F18 (Elanco) in addition. At 21 days, piglets were split per treatment into 64 post-weaning (PW) pens. Loss and antibiotic use were recorded during PW and at the end pigs were weighed individually. For each batch, two video monitoring devices (Peek Analytics, Tell Elevage) filmed 2 pens per group during PW. The statistical unit was the pen (JMP 18.1).

Results

Vaccinated group had a significantly lower number of piglets per pen that died in post-weaning than controls (0.4 vs 1.1 piglets/pen, $p<0.05$). In contrast, weights and ADG8-30 of the two groups did not differ at the end of PW. The number of collective treatments decreased during the study for both groups, with a faster decrease for the vaccinated group. Analysis of images from the first 22 days of post-weaning showed that vaccinated piglets were significantly more active than controls on enrichment (3.4 vs 2.9%, $p<0.01$) and at the dunging area (3.4 vs 2.6 %, $p<0.05$). On the videos of the first 7 days of post-weaning, vaccinated piglets showed significantly higher activity than controls at feeders (8.5 vs 6.3%, $p<0.01$) and at the dunging area (0.8 vs 0.5%, $p<0.01$).

Discussion and Conclusion

Oral vaccination against E. coli F4/F18 led to a significant reduction in mortality per PW pen. Vaccinated piglet behavior is matching the bibliography description for piglets without digestive disorders.

BBD-PP-31

BACTERIOLOGICAL INVESTIGATIONS OF SUSPECTED NNPD CASES IN SWEDEN

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Background and Objectives

New neonatal porcine diarrhoea (NNPD) is a serious disease of newborn piglets, in Sweden most often associated with enteroadherent Enterococcus hirae. This study aimed to investigate the presence of E. hirae and enterotoxigenic Escherichia coli (ETEC), respectively, in piglets with suspected NNPD.

Material and Methods

Rectal swabs were collected from untreated, diarrhoeic piglets under one week of age and displaying disease for less than one day, in Swedish herds experiencing diarrhoea outbreaks. Culture, MALDI-TOF MS, enterotoxin (STa, STb and LT) and adhesion-factor PCR were used to identify E. hirae and ETEC. Additionally, piglets from affected farms were necropsied and histologically examined and any enteroadherent coccoid bacteria indicative of E. hirae infection were recorded.

Results

Swab samples from 67 piglets from 14 herds were analysed. E. hirae was present in all herds and isolated from 53 out of 67 piglets, while ETEC was present in 8 herds and isolated from 9 out of 67 piglets. In 7 piglets, both E. hirae and ETEC were isolated, while E. hirae alone was isolated from 46 piglets, and ETEC alone from 2 piglets. The most common histological findings among the 17 necropsied piglets were enteritis and/or colitis, and in the small intestine of 4 out of 17 piglets enteroadherent coccoid bacteria were found in combination with osmotic enteropathy or acute enteritis. In one piglet enteroadherent coccoid bacteria were present without other lesions. Acute necrotising enteritis was diagnosed in one piglet, and C. perfringens was cultured.

Discussion and Conclusion

Enterococcus hirae was the most common bacterial species isolated from suspected NNPD cases. However, enteroadherence could only be demonstrated in a few of the necropsied individuals, indicating that a conclusive diagnosis of E. hirae infection is difficult to achieve. Additionally, ETEC was occasionally found together with E. hirae, further complicating diagnosis. Other factors contributing to diarrhoea must also be ruled out.

BBD-PP-32

BENEFITS OF PIGLET VACCINATION WITH ENTERISOL® ILEITIS ON PRODUCTION PERFORMANCE IN FATTENING PIGS ON COMMERCIAL FARM IN SERBIA

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Background and Objectives

Lawsonia intracellularis is a bacterium responsible for ileitis in pigs. Ileitis leads to significant economic losses due to reduced growth rates and poor feed conversion. Vaccination is the main strategy for controlling infections. This study evaluates the production performance benefits of an oral live attenuated vaccine against Lawsonia intracellularis under field conditions in Serbia.

Material and Methods

The study was conducted on a commercial farrow-to-finish farm in Serbia. The herd had confirmed Lawsonia intracellularis circulation based on diagnostic results. Piglets from five weekly batches (totaling 2,601 pigs) were vaccinated at 3 weeks of age using an oral drench application of Enterisol® Ileitis. Five weekly batches (2,652 pigs) were left unvaccinated and served as the control group for comparison in production performance.Average daily weight gain (ADWG), feed conversion (F.C), days on feed (DOF), and mortality were estimated per batch and per experimental group. These metrics were compared using statistical methods in Minitab® statistical software.

Results

Vaccinated pigs had an ADWG of 718 grams, compared to 713 grams in the control group. The F.C was 2.67 in the vaccinated group versus 2.79 in the control group, resulting in a reduction of 5.5 kg of feed required per fattener pig to reach market weight. Mortality rates were 7.46% in the vaccinated group, while the control group had a mortality rate of 8.60%. The average sale weight was 101.09 kg for vaccinated pigs, compared to 97.58 kg for control pigs. Lastly, pigs on the vaccinated group had 0.8 days less on feed than control pigs.

Discussion and Conclusion

The experimental unit of the study was the batches, which led to a limited sample size and no statistical differences were detected. However, the observed differences in production parameters led to 3.51 kg more per pig requiring 5.5Kg less and a return on investment of 6 euros.

BBD-PP-33

EFFECT OF TYLOSIN ADMINISTRATION ON INTESTINAL MICROBIOTA DEVELOPMENT OF PIGS DURING THE FIRST 6 WEEKS POST-WEANING

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Background and Objectives

Prevotellaceae, Lachnospiraceae, Ruminococcaceae and Lactobacillaceae are part of the core microbiota of healthy piglets post-weaning. The effect of tylosin (Pharmasin®) administration in post-weaning pigs on gut microbial composition and abundance was investigated.

Material and Methods

Ten healthy weaned pigs were assigned to a control (unmedicated) and treatment group (5 pigs per group). One week after weaning tylosin (5mg/kg bodyweight) was administered for 7 days (D0-D6) via drinking water.
Rectum faecal samples were collected prior to antibiotic treatment (D0) and after initiation of treatment (D3, D7, D14, D21, D28, D35, D42). Faecal samples were processed for DNA isolation and full-length 16S rRNA gene amplicon sequencing (Oxford Nanopore Technologies) to identify the bacterial composition and diversity.

Results

Higher abundances of Prevotellaceae and Prevotella copri were determined in tylosin-treated pigs compared to the control group. Higher abundances of Lachnospiraceae were measured at all time points (D3-D42) in the tylosin group. Abundance levels of Ruminococcaceae spp and Ruminococcus were consistenly higher in tylosin-medicated pigs vs. the control group. Adundance differences were identified between tylosin-medicated and control group for Lactobacillaceae/L.amylococcus/L.reuteri.
A higher decrease in abundances for Bacteroidaceae, Peptostreptococcaceae and Clostridiaceae was determined at all time points (D0-D42) in the tylosin group vs. control group.

Discussion and Conclusion

Bacterial profiles of tylosin-treated pigs differ from non-medicated pigs. Higher abundances of Prevotellaceae, Lachnospiraceae and Ruminococcaceae spp in tylosin group are in line with the shift of the microbial composition observed post-weaning and linked to a carbohydrate fermenting microbiome. Results verify that the physiological microbiota transition and mutaration post-weaning can be supported by the use of tylosin (Pharmasin®). Decrease in Bacteroidaceae, Peptostreptococcaceae and Clostridiaceae abundances confirm this medication effect. Tylosin can contribute to gut microbiota homeostasis and stabilization of the intestinal microbial community.

BBD-PP-34

SAFETY ASSESSMENT IN GESTATING SOWS OF A VACCINE COMBINING TOXINS APXI, APXII AND APXIII AND BACTERINS BASED ON ACTINOBACILLUS PLEUROPNEUMONIAE SEROTYPE 2, AND 9-11

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Background and Objectives

In France control of pleuropneumonia requires reduction of Actinobacillus pleuropneumoniae (APP) carriage, via implementation of sow vaccination, using bacterin-based vaccines. This study aims to prove safety of a vaccine combining bacterins of APP biovar1 serotypes2 and 9-11 (B1S2 and B1S9-11) and toxins ApxI, ApxII, and ApxIII, including oil-based adjuvant.

Material and Methods

In a farrow-to-finish farm negative for APP B1S2 and B1S9-11, a batch of 24 sows was divided in 2 groups. GroupA (12 sows) was vaccinated twice with Suigen® APP 2-9-11, 6 (V1) and 3 (V2) weeks before farrowing. At the same time, sows in GroupB (12 sows), were injected with physiological serum. Following parameters were monitored: rectal temperature (RT) and other systemic signs, and redness, swelling, pain, nodules at injection site. Monitoring was done at the time of vaccination, 6 and 24h after vaccination (H0, H6 and H24 respectively). Technical performances at farrowing were also compared using ANOVA (number of total born –TB, number of born alive – BA) or Poisson distribution (number of stillborn - NS, and number of mummies – NM).

Results

Mean RT was statistically higher in group A only at V1H6 (38.2°C vs 37.5°C in GroupB). At V1H6, 1 sow showed anorexia, 5 sows showed a slight ear-shaking. Situation got back to normal at V1H24. Local adverse events were observed only in groupA in 1 to 3 sows at V1, in 5 to 6 sows at V2 depending on the effect. Those effects lasted 48 up to 240h. There was no statistical impact on birth performances.

Discussion and Conclusion

Vaccination of sows with a combined vaccine induced reversible local adverse events, probably due to the oil adjuvant. Rectal temperature rised transiently only after V1. This is consistent with adverse events described in the SPC for growing pigs. Other systemic events only appeared at V1H6 and disappeared after 24h.

BBD-PP-36

MINIMUM INHIBITORY CONCENTRATION (MIC) PROFILE OF MYCOPLASMA HYOPNEUMONIAE (MHP) STRAINS ISOLATED IN SPAIN: ANTIBIOTIC SUSCEPTIBILITY AND RESISTANCE PATTERNS

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Background and Objectives

Mycoplasma hyopneumoniae (Mhp) is one of the most relevant pathogens in finishing swine. The ongoing use of antibiotics to mitigate the impact of this disease requires close monitoring to prevent the development of antibiotic resistance.

Material and Methods

A total of 20 strains were evaluated. The strains used in this study were isolated from pigs showing clinical signs between 2018 and 2023 in Spain by Exopol Laboratories. (Exopol, SL., Spain). The Minimum Inhibitory Concentration (MIC) test was conducted in liquid medium using 96-well plates with antibiotics (Sensititre™ by Thermo Fisher Scientific, USA), following the protocol outlined by Hannan et al. 2000.The concentration range (µg/mL) of the antibiotic used was: doxycycline from 0.03 to 8, chlortetracycline 0.125 to 8, lincomycin from 0.06 to 16, erythromycin from 0.06 to 32, tilmicosin from 0.03 to 64, tylosin from 0.03 to 32, tiamulin from 0.0075 to 16, enrofloxacin 0.015 to 16 and tylvalosin from 0.0075 to 64.

Results

MIC50 and MIC90 (µg/mL) for the Mhp isolates were 2 and 8 for doxycycline, >8 and >8 for chlortetracycline, 0.25 and >16 for lincomycin, >32 and >32 for erythromycin, 1 and >64 for tilmicosin, 0.125 and 32 for tylosin, 0.125 and 0.25 for tiamulin, 0.375 and 3 for enrofloxacin and 0.0225 and 4 for tylvalosin.

Discussion and Conclusion

Tylvalosin had the lowest MIC50 among all tested antibiotics. Although MIC90 results were lower for tiamulin and enrofloxacin, this could be attributed to atypical MIC values in two strains for tylvalosin. These strains fall outside the typical distribution for the wild-type population, as indicated by GMean results: tylvalosin (0.065), tiamulin (0.121), and enrofloxacin (0.448). Based on these susceptibility results, we can consider that Aivlosin® is an effective option for treating Mycoplasma hyopneumoniae infections in Spain.

BBD-PP-37

INFLUENCE OF SOW VACCINATION AGAINST ATROPHIC RHINITIS ON NASAL TURBINATE MORPHOLOGY AND GROWTH PERFORMANCE ON A POLISH FATTENING FARM

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Background and Objectives

Progressive atrophic rhinitis (PAR) is caused by toxinogenic strains of Bordetella bronchiseptica and Pasteurella multocida type D. The infection is usually accompanied by excessive lacrimation, deformation of the snout, and growth retardation. Since there is no successful treatment for affected tissues, our investigation aimed to evaluate the influence of passive immunity to PAR, elicited by the sow vaccination, on growth performance and nasal turbinate morphology in finishers reared on a Polish farm.

Material and Methods

This study was conducted on modern farm belonging to a fully integrated pork producer. All the animals were born on a 8,000-head sow farm diagnosed as PAR-positive (post-slaughter testing). For the scope of this investigation 1,524 pregnant sows were allocated into two equal batches: VAC and NON-VAC. Group VAC was immunised prior to farrowing using RHINISENG®. All the animals born in both groups were reared at the same location in separate batches until slaughter. Data regarding the average daily weight gain (ADWG) of the finishers (10,138 in Group VAC and 10,047 in Group NON-VAC) were tracked. Post-slaughter evaluation of nasal turbinate lesions in 120 randomly selected individuals (60 from each group) was carried out according to the guidelines of European Pharmacopoeia.

Results

The incidence of severe PAR lesions in VAC and NON-VAC finishers was 31.67% and 71.67%, respectively. The percentage of animals with moderate lesions was higher in Group VAC (18.33%) compared to NON-VAC (13.33%). The percentage of animals with no or mild lesions was 50.00% in VAC group compared to 15.00% in the NON-VAC group. All the differences were statistically significant ($p<0.05$; chi-squared test). ADWG was numerically higher in Group VAC (932 g/day) compared to Group NON-VAC (741 g/day).

Discussion and Conclusion

Active immunisation of pregnant sows using RHINISENG® reduced the incidence of the turbinate lesions in finishers, which contributed to a higher ADWG.

BBD-PP-38

COMPARISON OF DIFFERENT MYCOPLASMA HYOPNEUMONIAE VACCINATION PROTOCOLS BY LUNG LESION SCORE IN PANAMA, COSTA RICA AND GUATEMALA'S PRODUCTION

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Background and Objectives

Mycoplasma hyopneumoniae (Mhyo) is an important pathogen involved in Porcine Respiratory Disease Complex and continues to be present in all swine producing regions in the world. Vaccination of piglets against Mhyo has become an effective way to reduce lungs lesions induced by Mhyo infection. This study aims to compare different Mhyo control protocols through Lung Lesion scores.

Material and Methods

The evaluation was carried out in 3 of the main swine producing countries in Central America: Panama, Costa Rica and Guatemala. Between January and November 2024, a total of 27729 lungs from 433 herds were scored at the slaughterhouse for enzootic pneumonia (EP)-like lesions using the Ceva Lung Program (CLP) scoring methodology. The animals involved in this study were vaccinated with five different vaccination protocols: Group 1: Hyogen®, N = 4088; Group 2: DUO®, N = 1193; Group 3 – Combo Vaccine (PCV2+Mhyo) RTU 1 shot (N=16209); Group 4 – Combo Vaccine (PCV2+Mhyo) RTM 1 shot (N = 3235), Group 5 – Mhyo Vaccine 2 shots (N = 3004). Comparative effects of lung lesions between treatments were calculated using ANOVA.

Results

Animals vaccinated with the G1 and G2 protocols showed a statistically lower EP Index when compared to the other groups ($G1=1.04^{a}$; $G2=1.22^{a}$; $G3=3.09^{b}$; $G4=3.62^{c}$; $G5=4.12^{c}$) $p<0.0001$. The percentage of lungs with bronchopneumonia lesions showed a significant difference between the vaccinated groups: (($G1=23\%^{a}$; $G2=27\%^{a}$; $G3=60\%^{b}$; $G4=60\%^{b}$; $G5=77\%^{b}$) $p<0.0001$.

Discussion and Conclusion

Vaccination of piglets against Mhyo with Hyogen reduced the severity of Ep-like lesions. Lung scoring at slaughterhouse is a valuable tool for the assessment of the respiratory health status.

BBD-PP-39

DEVELOPMENT OF ACTINOBACILLUS PLEUROPNEUMONIAE SEROTYPE INDEPENDENT ANTIBODY ELISA TEST SYSTEM TO TIME AND EVALUATE APP VACCINATIONS

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Background and Objectives

Since Actinobacillus pleuropneumonia (App) ApxIV antibodies are not protective and LPS antibodies are serotype-specific, there is a need for a serotype independent ELISA to assess the presence of protective maternal derived antibodies and the take of all App vaccinations

Material and Methods

Since the App outer-membrane-protein (OMP) is serotype-independent and antibodies against this protein reduce or prevent attachment of A.pleuropneumoniae, this antigen was chosen for the Biochek App-OMPA antibody ELISA. A separate App-ApxIV-ELISA was developed to assess if the OMPantibody response after vaccination is a pure vaccine response.For evaluation serum samples of pigs of two commercial farms were investigated via the OMP- and ApxIV App antibody ELISA. Farm 1: SPF gilts were vaccinated with an App subunit vaccine containing OMP. Gilts were tested before vaccination and 5 weeks post vaccination. Farm 2: Endemic (previous App SPF) farrow-finish herd. Incoming SPF gilts and sows are App vaccinated with serotype 2,9,11 bacterin-vaccine. Cross-sectional samples of mature gilts, sows and finishers are tested. The average S/P-ratio and % positivity of both ELISA's is measured.

Results

Farm1:App-OMPA ELISA: pre-vaccination: S/P:0.25;10%pos / post-vaccination: S/P:0.93;90% pos. App-ApxIV ELISA:pre-vaccination: S/P:0.05 / post-vaccination: S/P:0.2.(5% positive) Farm2:App-OMP-ELISA: Gilts S/P:0.41;40 %pos / Sows S/P:1.26;100% pos / pigs 80kg S/P:0.45;30% pos.App-ApxIV-ELISA:Gilts S/P:0.07;0%pos / Sows S/P:1.11;87%pos / pigs 80kg S/P:0.65;50% pos.

Discussion and Conclusion

The BioChek App-OMPA-ELISA is able to measure the response of different App vaccinations on the investigated endemic- and SPF farms. Combined with the App-ApxIV-ELISA it's possible to measure the vaccination response in SPF pigs and still monitor the SPF status taking in account the specificity of the ApxIV ELISA. On the infected farm the vaccination triggered a uniform protective OMP antibody response in the sows but didn't prevent the infection measured by the ApxIV ELISA.

BBD-PP-40

BACTERIAL INVESTIGATIONS ON THE AETIOLOGY OF PIG NEONATAL DIARRHOEA CASES IN GERMANY IN 2023

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Background and Objectives

Neonatal diarrhoea (ND) can cause high economic losses (suckling piglet mortality, reduced ADG). The aim of the presented work is to give an update on the most common pathogens in fecal samples of suckling piglets with ND in German farms in 2023.

Material and Methods

From 94 farms 427 samples (pooled samples- up to five clinically affected piglets/litter) were sent in. All samples were subjected to bacteriological isolation on specific medias. Furthermore, 107 samples from 90 farms were tested by real-time multiplex PCR (mPCR) for the detection of rotavirus A/C and 39 samples of 21 farms were examined for presence of Cystoisospora suis (C. suis) by PCR. E. coli and C. perfringens isolates were further typed by mPCR for presence of virulence genes.

Results

52.8% (n = 299) isolates were E. coli (59.2% highly, 39.8% moderately positive; 28.8% (n = 69) haemolytic). ETEC was most frequently isolated (12.5% (n = 32)), followed by EPEC (5.1% (n = 11)) and NTEC (8.2% (n = 21)). 32.3% (n = 183) isolates were C. perfringens (35.0% highly, 59.6% moderately positive) and 14.8% (n = 84) C. difficile. 346 testings (144 isolates; 202 feces, instestine or swabs) for presence of C. perfringens specific toxins by mPCR were performed. Typing revealed 95.4% (n = 300) CPA with ß2-toxin, 4.4% (n = 14) CPA and 0.3% (n = 1) CPC. 70.0 % of the samples were positive for rotavirus A and 24.4 % for group C. Of 21 examined farms 33.3% (n = 7) were tested C. suis positive.

Discussion and Conclusion

This study demonstrates E. coli is mainly involved in ND, followed by rotavirus A and C. perfringens, in particular CPA with ß2-toxin. Also, the data indicates, that the involvement of C. suis still plays an important role in suckling piglet diarrhoea.

BBD-PP-41

EFFECT OF SEASONALITY ON THE INCIDENCE OF SLAUGHTERHOUSE-ASSESSED APP-LIKE LESIONS IN BRAZIL

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Background and Objectives

Actinobacillus pleuropneumoniae (App) remains a significant challenge for swine production worldwide. The prevalence of pleuropneumonia can vary across seasons. In Brazil, some regions experience well-defined seasonal changes. This study aimed to evaluate the prevalence of App-like lesions in Brazil by comparing different seasons from 2014 to 2024.

Material and Methods

From April 2014 until October 2024 a total of 4.901 batches and 502,509 lungs from different farms in Brazil, were scored for App-like lesions at different slaughterhouses using the Ceva Lung Program (CLP) methodology. Two periods were considered according to slaughtering season (autumn-summer and spring-winter). Additionally, two regions of Brazil were analyzed separately and compared. At batch level: cranial pleuritis (CP) (%), dorso-caudal pleurisy (DCP) (%), and App-index were calculated. Statistical comparisons performed by using the student's t-test. Significance level set at $p < 0.05$.

Results

The results of CP (5.70% vs 5.20%; p=0.02), DCP (8.72% vs 8.05%; p=0.02) and App-index (0.29 vs 0.26; p=0.01) were worse during the spring-winter compared to autumn-summer. In southern Brazil, where the seasons are more distinct, the results aligned with the previous findings, showing higher rates of DCP (8.47% vs 7.78%; p = 0.02) and App-index (0.29 vs 0.27; p =0.01) in spring-winter. In contrast, no significant seasonal differences were observed in the central and northeastern regions.

Discussion and Conclusion

The prevalence of App-like lesions, including CP, DCP and the App-index, was higher in batches fattened during the spring-winter. This was expected, especially in colder southern states, where the finishing phase's cold weather is linked to increased respiratory diseases. These findings highlight the seasonal impact on pleuropneumonia prevalence, particularly in regions with well-defined seasons.

BBD-PP-42

IMPACT OF PRRSV AND STREPTOCOCCUS SUIS CO-INFECTION ON THE RESPIRATORY MICROBIOME AND MORTALITY IN PIGLETS

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Background and Objectives

Severe respiratory and systemic diseases still occur in pig husbandry, posing ongoing challenges for veterinarians and farmers. Porcine reproductive and respiratory syndrome virus (PRRSV) and Streptococcus suis (S. suis) are critical pathogens in swine, and their co-infection can result in severe respiratory and systemic disease. The objective of this study was to explore the changes of the respiratory tract microbiome of piglets with or without a co-infection by PRRSV and S. suis.

Material and Methods

The study involved infecting either conventional piglets or Cesarean-Derived Colostrum-Deprived (CDCD) piglets. Within each Three groups were made: Control, S. suis infection, and PRRSV with S. suis co-infection. The respiratory tract microbiota was characterized using a metagenomic approach, including four tissues: nasal, tracheal, tonsillar, and pulmonary.

Results

The comparison of conventional to CDCD background revealed differences in the 'baseline' microbiomes. In addition, the S. suis exposure group compared to control, showed a dysbiosis and decreased resilience, leading to overgrowth of S. suis. Moreover, the presence of PRRSV worsened these effects on the microbiome. Co-infected piglets with CDCD background showed increased mortality rates, compared to conventional background piglets in the co-infected group.

Discussion and Conclusion

These findings were corroborated by data on presence of pneumonia. This study underscores the intricate relationship between microbial dysbiosis, viral co-infections, and host immunity.

BBD-PP-43

EVALUATION OF POST-WEANING DIARRHOEA PREVENTIVE MEASURES IN AN EXPERIMENTAL TRIAL

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Background and Objectives

The increased prescription of antibiotics for the treatment of post-weaning diarrhoea (PWD) since the ban on high-dose zinc oxide in pig production highlights the need for well-evaluated preventative measures. This experimental trial investigated three preventative measures for newly weaned piglets exposed to disease-associated E. coli strains.

Material and Methods

Thirty 28-day-old piglets were weighed upon arrival at the Swedish Veterinary Agency's animal facility and allocated to five groups. Groups 2-5 were exposed to E. coli on days three (serotype O149) and six (serotypes O147 and O141) after weaning; group 1 was the unexposed control. Group 2 was given one litre of prebiotic-supplemented peat twice daily, group 3 received water with organic acids (pH approx. 4.5), and group 4 received a low-protein feed (crude protein 14.9%). Group 5 served as the exposed control. Clinical-, faecal- and cleanliness scoring was performed at least daily. Weighing was performed weekly. After 21 days all pigs were euthanized and necropsied. A linear regression model was used for the statistical analysis (R version 4.2.2).

Results

The average daily weight gain (ADWG) of the groups in grams: group 1: 360±111, group 2: 330±89, group 3: 370±83, group 4: 330±65, and group 5: 260±56. Group 3 and the unexposed control group had a significantly higher ADWG than the exposed control group ($p<0.05$). Group 5 had the highest average faecal score: 4.5±3.3. However, group 1 had the highest average cleanliness score: 11.7±8.

Discussion and Conclusion

The differences in ADWG indicated that piglets in the groups with a preventive measure exposed to disease-associated E. coli strains grew better than exposed piglets not receiving any preventive measure. Organic acids in water seemed the most effective measure for reducing the negative effects of exposure to disease-associated E.coli strains. All the measures tested are available commercially, and can easily be implemented in pig herds where PWD is present.

BBD-PP-44

SURVEY ON THE IMPACT OF A NEONATAL DIARRHOEA VACCINE IMPLEMENTATION ON SPANISH FARMS

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Background and Objectives

Neonatal diarrhoea (ND) is an ongoing issue on farms. It affects piglet performance, impairing their weight at weaning and compromising litter homogeneity. Furthermore, it increases antibiotic usage and the time invested in the farrowing area. ND has a multifactorial nature, comprising management and a variety of infectious agents. All these factors make ND a recurring problem. The objective of this project was to parameters related to ND on Spanish farms, before and after implementing SUISENG® Diff/A, which includes Clostridiodes difficile toxins A and B and Clostridium perfringens type A α toxin.

Material and Methods

A survey of 16 closed-type questions was conducted on 30 Spanish farms from different regions. The survey was completed by the farm's manager. Questions were structured into two sections, focussing on ND and its impact on the farm's performance before (9 questions) and after (7 questions) vaccine implementation. All the farms used Escherichia coli and C. perfringens type C vaccine.13 of them also a Rotavirus A vaccine.

Results

Recurrent ND in all batches was experienced on 60% of farms, while 37% reporting it only in some batches. On 67% of farms the morbidity rate was >25% of litters. In terms of onset, ND appeared within the first 5 days of life in 80% of cases, and 83% of farms used antibiotics to control ND. After the inclusion of the new vaccine: The percentage of farms with morbidity rates >25% decreased to 10%, 80% of farms reduced antibiotics, and 85% of farms reduced the time invested in the farrowing area due to ND problems. The piglet weight at weaning was improved on 59% of farms.

Discussion and Conclusion

The inclusion of SUISENG® Diff/A in the vaccination plan led to a reduction in ND, an improvement in piglet performance, and a reduction in antibiotic use, and workload in the nursery.

BBD-PP-45

SERPIN B12 IN THE SALIVA OF PIGS BEHAVES DIFFERENTLY IN BACTERIAL AND VIRAL DISEASES

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Background and Objectives

The serpin superfamily is integrated by a group of serine and cysteine inhibitory proteins (1). One of the proteins of this group, the Serpin B12, showed increases in a proteomic study in pigs with sepsis (2). Our study aimed to develop and validate an in-house assay for Serpin B12 in the saliva of pigs and to study its possible changes in a bacterial, Streptococcus suis (S. suis) and viral disease, Porcine Reproductive and Respiratory Syndrome (PRRS) .

Material and Methods

Serpin B12 was measured using the amplified luminescent proximity homogeneous assay (AlphaLisa) technology. A complete analytical validation was performed, including precision, and accuracy.Once validated, the concentration in B12 was measured in a total of 61 pigs from commercial farms in Southeast of Spain : 16 pigs naturally infected by S.suis, 29 pigs with PRRS, and 16 healthy pigs as a control group.

Results

Analytical validation indicated an adequate precision and accuracy of the assay for the quantification of salivary Serpin B12 in pigs.Median Serpin B12 levels were significantly higher in pigs with meningitis due to S. suis (median= 4198 ng/mL, 25-75% percentile= 2446-6926) (p=0.0235) compared to healthy pigs (median= 1690 ng/mL, 25-75% percentile= 1100-2217). However, there were no significant differences between PRRS (median= 1817 ng/mL, 25-75% percentile= 1064-2939) and the other groups

Discussion and Conclusion

This study showed that salivary Serpin B12 can be measured in saliva of pigs. In addition this protein increases in piglets with S. suis infection compared to healthy pigs, indicating its possible role in bacterial diseases . In addition, it does not show significant changes between pigs with PRRS and healthy pigs. The fact that serpin B12 concentrations are more affected by S. suis than PRRS infection opens the potential an application of protein as a new biomarker for differentiating between bacterial and virus infections.

BBD-PP-46

MODELLING THE BURDEN OF MYCOPLASMA HYOPNEUMONIAE INFECTION FOR ENHANCED DECISION SUPPORT ON FATTENING FARMS

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Background and Objectives

Mycoplasma hyopneumoniae poses significant financial, welfare, and antibiotic use challenges for pig producers globally. This study modelled M. hyopneumoniae infection in growing pigs on a Dutch fattening farm, focusing on three critical burdens: the occurrence of clinical signs and lung lesions, antimicrobial usage, and financial performance.

Material and Methods

A stochastic, individual-based model was developed using EMULSION software to simulate infection dynamics, production performance, clinical signs and pneumonia development. Antibiotic treatment based on the detection of coughing in the compartment was also modelled. The model incorporates multiple organizational levels, allowing for distinguishing between within-pen, between-pen, and indirect transmission. Model outputs are used to calculate feed and treatment costs, penalties for deviations in slaughter weights, and revenues per carcass. All parameters were sourced from scientific literature, representative surveys, or expert elicitation, with sensitivity analysis conducted as appropriate.

Results

As an example of model outputs, we describe the impact of a severe M. hyopneumoniae infection within one pen of 12 pigs. Antibiotic treatment was administered in 93% of simulations, with an average initiation on day 24 (SD = 15 days) and a mean total dosage of 54.6 grams (SD = 14.7 grams). Compared to a non-infected cycle, the outbreak led to a decrease in margin over feed costs of €5.21 per fattening pig. Various scenarios exploring different infection severities can be simulated, with the progression of M. hyopneumoniae infection and development of clinical signs and pneumonia visualized at both pen and compartment levels.

Discussion and Conclusion

The developed model could, for example, help evaluate the effectiveness of preventive and control measures on various burdens, as well as assess the impact of co-infections with other respiratory pathogens. These advancements are essential for shaping more effective management strategies for M. hyopneumoniae infections.

BBD-PP-47

BACTERIAL PATHOGENS FOUND IN POSTWEANING PIGS IN SEVEN DANISH HERDS ON CONSECUTIVE SAMPLING DATES

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Background and Objectives

Postweaning diarrhea is quite common in Danish pigherds. The diarrhea may affect a few pigs in a pen to almost all pigs. Infection with E.coli F4 and/or F18 are often seen, less often Brachspira hyodysenteriae and Lawsonia intracellularis. Outbreake of diarrhea are often treated with antimicrobial therapy.

Material and Methods

Outbreake of diarrhea was investigated in seven Danish pig herds. The herds were visited twice on days when diarrhea occurred in newly weaned piglets. At each visit pooled feces samples were collected from five pigs in each pen. A total of 14 to 15 pens were sampled in each herd. The samples were shipped to analysis at the Veterinary Laboratory using Real-time PCR for E.coli F4, E.coli F18, B. hyodysenteriae and L. intracellularis.

Results

E.coli F18 was found in all herds and to a lesser extent E.coli F4. There were a few samples positive for B. hyodysenteriae, and no findings of L. intercellularis.In each herd the results on the two samling days showed similar finding in four of the herds with respect to E.coli. However, two herds had massive presence of E.coli F4 at the first visit, but no or low/moderate presence at the second visit. Brachyspira hyodysenteriae was fund in three of the seven herds, in all cases only at one sampling day and in low or moderate numbers.

Discussion and Conclusion

Repeated sampling for the diagnosis of diarrhea is often neglected due to the cost of analysis. This study showed variation in results between sampling days in five of the seven herds. Repeated sampling may be necessary to do a proper diagnostic to recommend the optimal treatment. In these seven herds the primary pathogens explaining diarrhea were E.coli, mostly E.coli F18. The diagnostic procedures should be completed using an antimicrobial sensitivity test, to determine the correct antimicrobial therapy.

BBD-PP-48

BRUCELLA SEROPREVALENCE IN FINNISH WILD BOAR

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Background and Objectives

Wild boar population in Finland is about 2,100 animals. The densest populations are in Southeastern and Southern Finland. Wild boar may carry infectious diseases such as African swine fever, classical swine fever, Aujeszky's disease, and brucellosis. These diseases are monitored through a surveillance program involving hunted wild boar in Finland. Brucella suis infects primarily swines but can occassionally infect also other species such as hares, dogs, and humans.

Material and Methods

Brucella infections in wild boar were first detected in Finland in 2015. Subsequent surveillance was conducted in 2016, 2019, 2021, and 2024. Surveillance was primarily performed using serological methods, with some organ samples cultivated for Brucella bacteria in 2015, 2016 and 2019. The surveillance covered the entire country, except in 2019, only samples from outside Southeastern Finland were examined. This selection was based on previous findings of seropositive animals primarily in Southeastern Finland. Serosurveillance was made by Rose Bengal test in 2015, 2016, and 2019, and iELISA test (IDVet Brucellosis indirect multispecies) in 2021 and 2024. The samples positive in Rose Bengal test were further tested with iELISA.

Results

Seroprevalence was found to be 4.7% (5/107), 6.8% (6/88), 8.2% (12/146), 2.7% (16/ 598), and 1.0% (5/503) in 2015, 2016, 2019, 2021, and 2024, respectively. Additionally, Brucella suis biovar 2 was detected in organ samples from three, five, and one animals in 2015, 2016, and 2019, respectively. The highest number of seropositive samples was detected in Southeastern and Southern Finland, where the population is also the largest. Individual seropositive samples were also obtained from the central and western parts of the country.

Discussion and Conclusion

Brucella infections in wild boar are concerning due to the potential spread of the disease to domestic pigs. Moreover, Brucella bacteria have zoonotic potential and have occasionally been found in dogs consuming raw meat. Public awareness of the risk of Brucella infections to domestic pigs, farmers, hunters, and dogs is important.

BBD-PP-49

APRAMYCIN SUSCEPTIBILITY DATA: COMPARISON DISK DIFFUSION VS. BROTH MICRODILUTION TESTING OF ESCHERICHIA COLI AND SALMONELLA SPP. STRAINS (ISOLATES FROM 2019-2020)

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Background and Objectives

Susceptibility of Escherichia coli and Salmonella spp. isolates to apramycin was determined by disk diffusion and results compared with broth microdilution MIC data.

Material and Methods

Disk diffusion assay (Zone Diameter) was used to determine apramycin susceptibility of 10 Escherichia coli and 10 Salmonella spp. isolates.

Apramycin broth microdilution MICs for 10 E.coli and 10 Salmonella spp. strains were generated in advance and compared with disk diffusion susceptibility results.

For data interpretation, suggested zone diameter breakpoints (susceptible>12mm, resistant<12mm) and MIC breakpoints (resistant≥64µg/ml according to pharmacokinetic and clinical studies) were used.

Results

For five Escherichia coli strains inhibition zone of 17mm, 18.5mm, 16mm, 16mm and 15.5mm were determined. Low MICs (MIC 4.0µg/ml, 2.0µg/ml, 4.0µg/ml, 16.0µg/ml, 8.0µg/ml) were measured for these E.coli strains.
Zero mm inhibition zones were determined for five Escherichia coli strains. These E.coli strains show high MIC values (MICs 1024µg/ml, 1024µg/ml, 512µg/ml, 512µg/ml, 256µg/ml). Results indicate that the zone diameter results are in line with the MIC results.
For nine Salmonella strains inhibition zones of 17mm, 16mm, 15mm, 17mm, 17mm, 16mm, 15.5mm, 15mm, 15.5mm were measured. Low MICs were determined for these Salmonella strains (MIC 2.0µg/ml, 4.0µg/ml, 4.0µg/ml, 4.0µg/ml, 4.0µg/ml, 8.0µg/ml, 4.0µg/ml, 4.0µg/ml, 4.0µg/ml). For one Salmonella isolate a zero mm inhibition zone was determined which was in line with a high MIC (512µg/ml).
Due to suggested zone diameter and MIC breakpoints, five E.coli strains can be categorized as susceptible. The other five E.coli isolates are categorized resistant. Nine Salmonella spp. strains are categorized as susceptible and one strain resistant.

Discussion and Conclusion

Apramycin (Apravet®) susceptibility results determined by disk diffusion for E.coli and Salmonella spp. are in line with broth microdilution MIC results. Disc diffusion assay is a reliable method for susceptibility testing.

BBD-PP-50

PREVALENCE OF ENZOOTIC PNEUMONIA IN THE LUNGS OF PIGS IN SLAUGHTERHOUSES AND ITS CORRELATION WITH THE COMMERCIAL MYCOPLASMA HYOPNEUMONIAE VACCINES AVAILABLE IN PORTUGAL

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Background and Objectives

Enzootic pneumonia (EP) is a chronic respiratory disease whose main agent is Mycoplasma hyopneumoniae. The assessment carried out at the slaughterhouse makes it possible to measure the lesions associated with EP and correlate them with production parameters. Vaccination is the main method of control, but it does not prevent infection. The objective was to assess the lesions of EP in lungs of pigs slaughtered between November 2023 and October 2024 in one of Portugal's largest pig farming groups (VALPOR) and correlate them with the vaccines used to control Mycoplasma hyopneumoniae.

Material and Methods

In the Valpor group, 99 batches were inspected at the slaughterhouse, with a sample of 100 pigs per batch, having a total of 9,900 lung assessments. Lungs were classified according to the lesions observed, using the Mesones 0-5 system, a "Pneumonia Index" (IPP) was generated for each batch, where a value greater than 1.0 is suspicious of disease. The "EP Prevalence" was also recorded as a percentage (%), which results from the absence or presence of a lesion in each lung, giving the % of lungs affected in each batch. Four different vaccines for Mycoplasma hyopneumoniae were used at more 18 days age during the lactation period.

Results

A significant lower difference in IPP (0.54 vs average 0.93) was found in batches vaccinated with Suvaxyn MH-One - Zoetis (vaccine A) compared to the other vaccines. The Prevalence of EP was also lower with vaccine A (30.85% vs. average 39.68%). In these group, the average Prevalence EP was 39.68% and the average IPP was 0.93.

Discussion and Conclusion

The vaccine A stood out positively from the group average in all the parameters evaluated (IPP and EP prevalence). The strategy of vaccines used to prevent EP needs to consider better effectiveness and in addition, improve management practices and biosecurity in farms. Lung lesions evaluation at slaughter plants is another tool in the toolbox to evaluate EP.

BBD-PP-51

IMPACT OF THE IMPLEMENTATION OF NEONATAL DIARRHOEA PREVENTIVE MEASURES IN DANISH FARMS EVALUATED VIA A SURVEY

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Background and Objectives

Neonatal diarrhoea (ND) is an ongoing issue on farms impairing piglets' performance. The multifactorial nature of ND makes it a recurring problem despite preventive measures such as vaccines. The objective of this project was to evaluate the parameters related to Danish farms before and after implementing SUISENG® Diff/A a vaccine that includes Clostridiodes difficile (toxins A-B) and Clostridium perfringens type A α-toxin. Both agents have been commonly detected in ND coinfections in Denmark.

Material and Methods

A survey of 16 closed-type questions was conducted on 39 Danish farms. Most of the farms had a previous PCR-positive diagnosis of C. difficile and/or CpA. The farm's veterinarian completed the survey based on the answers from the farmers. The questions were structured into two sections: ND incidence and impact before implementing the vaccine (Time1–T1; n=9 questions) and after including it (Time2–T2; n=7). All the farms were already vaccinating with an E.coli and C.perfringens type C vaccine, 7 of which, with an inactivated Rotavirus type A vaccine.

Results

In T1, 18% of surveyed farms were not suffering ND. They were excluded from the overall analysis. Recurrent ND in all batches was experienced on 31% of farms, while 51% experienced ND in some. On 56% of farms morbidity rate was >25% of litters. ND appeared within the first 5 days of life in 96% of cases and 97% of farms had used antibiotics to control ND. After vaccination, 19% of farms had morbidity exceeding 15% litters, 61% reduced antibiotics and 65% reduced the workload in the farrowing area. The weight at weaning was improved on 48% of farms, 16% were uncertain of any improvement.

Discussion and Conclusion

The inclusion of SUISENG® Diff/A in the vaccination plan led to a reduction in ND, an improvement in piglet performance, and a decrease in antibiotic use and workload.

BBD-PP-52

IMPROVED BIOSECURITY AND AUTOGENOUS VACCINATION OF SOWS AS EFFECTIVE MEASURES FOR CONTROLLING STREPTOCOCCUS SUIS IMPACT ON A CONVENTIONAL LARGE SCALE PIG FARM IN HUNGARY

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Background and Objectives

Streptococcus suis has global relevance, affecting industrial pig farming. The disease can reduce performance and increase mortality, posing a significant economic burden on swine production. Due to new regulations reducing the use of antimicrobials in livestock and the lack of effective vaccines, controlling S. suis infections has become increasingly challenging. Antibiotics have been the primary tool for S. Suis prevention and treatment, rising antimicrobial resistance has underscored the urgent need to reduce their use. This investigation follows up the impact of the combination of autogenous sow vaccination and improved biosecurity measures on S. suis control on a large scale farm in Hungary.

Material and Methods

A 1.000 sows farrow-to-finish farm was followed up closely from 2020 to June 2023.A total of 126.000 piglets were born throughout this period. In 2020, the primary animal health challenges were Actinobacillus pleuropneumoniae and Lawsonia intracellularis , postweaning diarrhea, and S. Suis. S. suis-related clinical signs (i.e. neurological signs, arthritis), and 2% mortality each batch were a critical concern among weaners. In 2020, a comprehensive protection strategy against S. Suis was started.In May 2021 sow were vaccinated using a farm-specific autogenous vaccine (AV) (SUIBAC S. suis serotype 1/2 and 2, Ceva-Biovac, France) to enhance passive immunity in piglets. Beside vaccination improved hygiene protocols were implemented (product and concentration revision, regular staff and tool/device/environment protocol controll and supervision, needle change/litter policy, disposal rubber glove, etc) .

Results

The measurements lead to 98% reduction of antimicrobial use, and complete elimination of critival important antimicrobials The mortality and clinical signs linked to S. Suis could be reduced by 90%. In total the mediaction costs could be reduced by 91% (from $83 to $8 per sow)

Discussion and Conclusion

Using homologous AV along with a comprehensive advanced hygine policy can effectively reduce mortality and use of antimicrobials linked to Str. suis infection

BBD-PP-53

EVOLUTION OF THE PREVALENCE AND SEVERITY OF LUNG LESIONS ASSESSED IN SLAUGHTERHOUSES IN SPAIN FROM 2016 TO 2024.

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Background and Objectives

Assessment of lung lesions in slaughterhouses is a useful tool to estimate the incidence of respiratory disease. The most frequently observed lesions in slaughterhouses are cranioventral bronchopneumonia, associated with Mycoplasma hyopneumoniae, the main agent of Enzootic Pneumonia (Ep); and dorso-caudal pleuritis, strongly associated with subacute and/or chronic Actinobacillus pleuropneumoniae (Ap). The aim of this study was to analyse the evolution of prevalence and severity of Ep-like lesions and Ap-like lesions over the years 2016-2024 in Spain.

Material and Methods

A total of 1.131.296 lungs from 6.536 batches from different farms located around Spain were evaluated between 2016 and September 2024 using the Ceva Lung Program (CLP) score methodology, which assists lung scoring for Ep-like lesions using modified Madec grid, and dorso-caudal pleurisy (DCP) to evaluate Ap-like lesions. The following parameters were calculated at batch level: EP index Broncho-pneumonic lungs (%) (BPL) Affected surface out of all lungs (%) (ASAL) Dorso-caudal pleuritis (%) (DCP) APP index Results were compared through Kruskal-Wallis test with pairwise comparisons and p-value was set at 0.05.

Results

Ep-like lesions indexes over time decrease from 2016 to 2024 ($p<0.01$), except for an increase during 2021 and 2022, both in terms of prevalence and severity (ASAL= 2016_3.82; 2017_3.16; 2018_2.79; 2019_2.52; 2020_2.12; 2021_2.37; 2022_2.28; 2023_1.96; 2024_1.39).DCP prevalence and APP index increased over time from 2016 to 2021 ($p<0.01$), improving significantly in 2022 and increasing again thereafter.

Discussion and Conclusion

There has been a positive evolution in the control of EP, possibly due to the improved effectiveness of the prevention plans implemented. The rebound of EP-like lesions in 2021-2022 may be associated with the severe cases of hypervirulent PRRS strains. In relation to DCP, no clear trend is observed. One of the reasons may be due to the large number of Ap serotypes present with high virulence diversity.

BBD-PP-54

EVALUATION OF ANTIMICROBIAL ACTIVITY OF POLYPHENOL GRAPE EXTRACTS AGAINST PATHOGENIC STREPTOCOCCUS SUIS, STAPHYLOCOCCUS HYICUS, AND PASTEURELLA MULTOCIDA FROM SPANISH SWINE FARMS

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Background and Objectives

The rise of antimicrobial resistance poses a global public health challenge, necessitating alternatives such as plant extracts rich in bioactive compounds like polyphenols. These compounds have demonstrated potent antibacterial activity against pathogenic microorganisms. This study evaluates the in vitro inhibitory capacity of four grape extracts, i.e., alcohols A (non-volatilized) and B (volatilized), glycol, and cetone, with varying polyphenol concentrations against a selection of pathogens recovered from clinical cases in Spanish swine farms. Due to their proprietary nature, the composition of the extracts is undisclosed.

Material and Methods

Cellular viability of Streptococcus suis (n = 20), Staphylococcus hyicus (n = 20), and Pasteurella multocida (n = 20) was assessed against different extracts at double concentrations (expressed as percentage). Bacterial metabolic activity was measured using resazurin reduction to determine survival percentages in response to extracts. The inhibitory concentration for 50% bacterial inhibition (IC50) and the minimum inhibitory concentration (MIC) were determined for each pathogen and grape extract using R v4.3.2.

Results

All four grape extracts exhibited antimicrobial activity against the three pathogens, with variations depending on the extract and species. S. hyicus was the most susceptible to all extracts, particularly to cetone (MIC = 1.55%; IC50 = 0.5%). P. multocida and S. suis showed showed similar IC50 values around 1% across polyphenol extracts. Notably, P. multocida had the lowest MIC values for all evaluated extracts, revealing their effectiveness, especially to cetone and glycol extract (MIC < 3.13%). Alcohol A (non-volatilized) grape extract was observed to be the least effective.

Discussion and Conclusion

This study demonstrates the in vitro efficacy of polyphenol grape extracts in controlling bacterial pathogens recovered from Spanish swine farms at low concentrations, highlighting their antimicrobial potential as alternatives for managing infectious diseases. Further investigations need to be performed to elucidate the underlying mechanisms and assess their in vivo effect in swine production.

BBD-PP-55

EFFICACY OF TRIMETHOPRIM/SULFACHLOROPYRIDAZINE COMBINATION AGAINST PORCINE RESPIRATORY BACTERIA FROM EUROPE

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Background and Objectives

Minimum inhibitory concentration (MIC) to trimethoprim (TMP), sulfachloropyridazine (SCP) and their combination efficacies against P.multocida (PM), S.suis (SS), A.pleuropneumoniae (APP), G.parasuis (GP) were investigated.

Material and Methods

49 pathogenic bacteria (12 PM, 14 SS, 13 APP, 10 GP) from Europe (2019-2020) were used. MIC determination: broth microdilution method. Susceptibility testing of trimethoprim, sulfachloropyridazine and combination (ratio 1:5) was performed. Fractional inhibitory concentration index (FICI) was determined and classified: S=synergistic, $FICI \leq 0.5$; P=partial synergistic, $0.5<FICI<1$; I=indifferent, $1<FICI<4$; AN=antagonistic, $FICI \geq 4$.

Results

For PM isolates a reduction of MIC_{90} values from 256µg/ml (TMP), 1280µg/ml (SCP) to 64µg/ml (TMP/SCP) and MIC ranges from 128-256µg/ml (TMP), 80-1280µg/ml (SCP) to 32-128µg/ml (TMP/SCP) were determined. For SS isolates MIC_{90} values from 256µg/ml, 1280µg/ml (SCP) to 256µg/ml (TMP/SCP) and MIC ranges from 64-256µg/ml (TMP), <10-2560µg/ml (SCP) to 4-256µg/ml (TMP/SCP) were determined. Combined administration in APP isolates caused MIC reductions: MIC_{90} values from 16µg/ml (TMP), 80µg/ml (SCP) to 4µg/ml (TMP/SCP); MIC ranges 0.5-128µg/ml (TMP), 20-160µg/ml (SCP) to 0.5-8µg/ml (TMP/SCP). For GP isolates reductions of MIC_{90} values from 16µg/ml (TMP), 320µg/ml (SCP) to 4µg/ml (TMP/SCP) and MIC ranges 0.5-128µg/ml (TMP), 20-160µg/ml (SPC) to 0.5-8µg/ml (TMP/SCP) were determined.
TMP/SCP synergistic effects - found for all pathogens: 41.7% (PM), 35.7% (SS), 61.5% (APP) and 50% (GP). Indifferent effects of TMP/SCP were determined in 25% of PM, 42.9% of SS, 23.1% of APP, 50% of GP isolates. Antagonistic effects: not found in GP isolates; found in 16.7% of PM, 21.4% of SS, 15.4% of APP isolates.

Discussion and Conclusion

Results verify reductions of MIC_{90} values and MIC ranges due to TMP/SCP combined use. TMP/SCP provides synergistic effect to PM, SS, APP and GP isolates

BBD-PP-56

EFFICACY OF TRIMETHOPRIM/SULFADIAZINE COMBINATION AGAINST RESPIRATORY BACTERIA FROM EUROPE

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Background and Objectives

Minimum inhibitory concentration (MIC) to trimethoprim (TMP), sulfadiazine (SD) and their combination efficacies against P.multocida (PM), S.suis (SS), A.pleuropneumoniae (APP), G.parasuis (GP) were investigated.

Material and Methods

49 European bacteria (12 PM, 14 SS, 13 APP, 10 GP) were used. MIC determination: broth microdilution method. Susceptibility testing of trimethoprim, sulfadiazine and combination (ratio 1:5) was performed. Fractional inhibitory concentration index (FICI) was determined and classified: S=synergistic, FICI≤0.5; P=partial synergistic, 0.5<FICI<1, I=indifferent, 1<FICI<4; AN=antagonistic, FICI≥4.

Results

For PM isolates modifications of MIC_{90} values from 256µg/ml (TMP), >5120µg/ml (SD) to 256µg/ml (TMP/SD) and MIC ranges from 128-256µg/ml (TMP), 2560->5120µg/ml (SD) to 256µg/ml (TMP/SD) were determined. For SS isolates changes of MIC_{90} values from 256µg/ml (TMP), >5120µg/ml (SD) to 256µg/ml (TMP/SD) and MIC ranges 64-256µg/ml (TMP), 160->5120µg/ml (SD), to 4-256µg/ml (TMP/SD) were determined.
Combined administration in APP isolates caused MIC reductions: MIC_{90} values from 16µg/ml (TMP), 5120µg/ml (SD) to 4µg/ml (TMP/SD); MIC ranges 0.5-128µg/ml (TMP), 80-5120µg/ml (SD) to 0.5-8µg/ml (TMP/SD).
For GP isolates reductions of MIC_{90} values from 128µg/ml (TMP), 2560µg/ml (SD) to 32µg/ml (TMP/SD) and MIC ranges 2-128µg/ml (TMP), 10-5120µg/ml (SD) to 2-64µg/ml (TMP/SD) were measured.
TMP/SD synergistic effects - found for three tested pathogens: 71.4% (SS), 61.5% (APP) and 60% (GP). Indifferent effects of TMP/SD combination were determined in 100% of PM, 21.4% of SS, 23.1% of APP and 40% of GP isolates. Antagonistic effects: not found in PM, GP isolates; found in 7.1% of SS, 15.4% of APP isolates.

Discussion and Conclusion

Results verify modifications/reductions of MIC_{90} values and MIC ranges due to TMP/SD combined use. TMP/SD (HydroTrim®) provides synergistic effect to SS, APP and GP isolates.

BBD-PP-57

EVALUATION OF THE PRESENCE OF EDEMA DISEASE IN SAMPLES OF ORAL FLUID OF GROWERS AND FATTENERS

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Background and Objectives

Edema disease is a multifactorial infectious disease associated with substantial losses in mostly post-weaning period. It is caused by E. coli virotype possessing fimbriae F18 and toxin Stx2e. The aim of this study was to assess the presence of edema disease-causing E. coli strains in Slovenian commercial pig farms depending on biosecurity and technological measures performed by the owners.

Material and Methods

Growers and fatteners in age groups of 5–6-weeks, 7–8 weeks, 12 weeks and 14 weeks on 37 commercial pig farms were sampled for oral fluid with non-invasive method by Verocheck ® diagnostic kit. Real-time PCR detection of toxin Stx2e was performed by TaqMan® Universal Master Mix 2x by Applied Biosystems in Hipra's laboratory in Girona, Spain. Farmers were surveyed on the size of the farm, type of husbandry, the origin of the feed, presence of quarantine and past outbreaks of edema disease. Results of RT-PCR and questionnaire were compared by sign test, Fisher's exact test, test of equal or given proportions and Mann-Whitney test.

Results

According to the results of RT-PCR there was 64.9% presence of E. coli strains producing Stx2e. Statistical analysis showed statistically significant relation between the type of husbandry and the origin of the feed with the presence of edema disease-causing E. coli strains, while no statistically significant relation could be proven between the presence of those E. coli strains and the size of the farm, presence of quarantine or past outbreaks of edema disease.

Discussion and Conclusion

None of the sampled age groups showed statistically significant dominance in the prevalence when compared with other age groups, thus contradicting the theoretical data claiming higher prevalence in younger age groups of pigs. To properly address this problematic in the future, further studies will be needed to estimate the proportion of Stx2e produced by patotype EDEC versus other Stx2e producing E. coli strains.

BBD-PP-58

EVALUATION OF 3 VACCINATION PROGRAMS FOR THE CONTROL OF ACTINOBACILLUS PLEUROPNEUMONIAE THROUGH LUNG LESIONS SCORE AT SLAUGHTER IN CENTRAL AMERICA PRODUCTION

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Background and Objectives

Actinobacillus pleuropneumoniae (App) is a swine respiratory agent that causes great economic losses to production. Vaccination is an integral part of its control. The aim of this study was to evaluate different vaccination protocols by measuring lung lesions suggestive of App.

Material and Methods

The evaluation was carried out in 3 of the main swine producing countries in Central America: Panama, Costa Rica and Guatemala. Between January and November 2024, a total of 30506 lungs from 486 herds were scored at the slaughterhouse for pleuropneumonia App-like lesions using the Ceva Lung Program (CLP) scoring methodology. The animals involved in this study were vaccinated with three different vaccination protocols: V1: Coglapix®, Ceva Santé Animale, 2 mL at 7 and 10 weeks of age (WOA) N = 13661; V2: Bacterin vaccine, serotypes 2, 4, 5; 2 mL at 7 and 10 WOA, (N = 5604); V3: Multivalent toxoid vaccine; 2 mL at 7 and 10 WOA (N=11231). Each farm with at least two different vaccination protocol groups, evaluated over time (before and after). Comparative effects of lung lesions between treatments were calculated using ANOVA.

Results

V1 had lower rates of App-like lesions (dorsocaudal pleurisy), with 1.4% when compared to V2=4.9% and V3=5.0% respectively ($p < 0.001$). In addition, V1 showed a significantly lower ($p<0.05$) App-index (0.03) when compared to V2 (0.13) and v3 (0.14). No significant differences between V2 and V3 in either lesion rate or index.

Discussion and Conclusion

Lung scoring has been a useful and complementary tool to monitor lung health and evaluate respiratory challenge management programs. In this study, animals vaccinated with the V1 vaccine showed significantly lower rate and severity of App-like lesions than the groups vaccinated with V2 and V3.

BBD-PP-59

EVALUATION OF THE EFFECTIVENESS OF VACCINATION PROTOCOLS FOR ACTINOBACILLUS PLEUROPNEUMONIAE AND MYCOPLASMA HYOPNEUMONIAE IN TERMS OF LUNG LESIONS

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Background and Objectives

The interaction of different respiratory pathogens such as Mycoplasma hyopneumoniae (Mhyo) and Actinobacillus pleuropneumoniae (App) is well documented and present in swine farms. The aim of this study was to evaluate vaccination protocols for App and Mhyo throughout the year 2024, based on lung lesion scores at slaughterhouse.

Material and Methods

The study was conducted on 10 farms of the same swine company, divided into 7 production lines and totaling 4000 sows in Panama. The company implemented the vaccination protocol for App with Bacterin vaccine serotypes 2, 4, 5, vaccinating pigs at seven and ten weeks of age (WOA) and the vaccination protocol for Mhyo with inactivated subunit vaccine, containing ORF2 and vaccinating pigs at three and six WOA (Period 1). Four months later, the farms switched from the vaccination protocol of App to Coglapix®, Ceva Santé Animale at seven and ten WOA (Period 2). One month later, the farms also switched from the vaccination protocol of Mhyo to Hyogen®, Ceva Santé Animale, once at three WOA (Period 3). The Ceva Lung Program (CLP) was used to assess Ap and EP-like lesions. A total of 60 batches and 3380 lungs were evaluated. Kruskal-Wallis one-way analysis of variance used for statistical evaluation amongst groups.

Results

In period 1 (April to June 2024), the EP Index was higher, with statistical difference, in relation to period 2 (July 2024) and period 3 (August to October 2024). EP Index Period 1 = 5.1^{a}; EP Index Period 2 = 3.2^{b}; EP Index Period 3 = 2.8^{b}. $P<0.05$. The same occurred for the App Index: App Index Period 1 = 0.09^{a}; App Index Period 2 = 0.02^{b}; App Index Period 3 = 0.02^{b}.

Discussion and Conclusion

There has been a positive evolution in the control of App, possibly due to the improved effectiveness of the prevention plans implemented.

BBD-PP-60

SUCCESSFUL ELIMINATION OF TET(C) POSITIVE CHLAMYDIA SUIS IN PIGS AFTER TREATMENT WITH ANTIMICROBIALS

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Background and Objectives

Chlamydia (C.) suis is highly prevalent in pigs and most field isolates carry Tet(c) resistance genes. Hence, it is assumed that C.suis hides in cells during tetracycline treatment and is reactivated after treatment termination. To perform chlamydial infection trials in pigs, chlamydia-free animals are required, which are not available if not SPF raised. The aim of this study was to evaluate the success of elimination of Tet(c) positive C.suis in conventional gilts using doxycycline and tylosin treatment.

Material and Methods

Thirty 15-weeks old gilts were kept in a BSL-2 facility and were treated in-feed with doxycycline (5%, 12.5 mg/kg bodyweight) for eight days and got additional intramuscular tylosin (5-10 mg/kg bodyweight) application on days 6 to 8 of doxycycline treatment.

Results

Pre-treatment, cervical swabs were qPCR negative but rectal swabs were qPCR positive (mean ct = 29.2). C.suis isolates were highly viable as demonstrated by the rapid isolation on LLC-MK2 cells within 2-3 days. Additionally, all isolates carried the Tet(c) resistance gene. During treatment, C.suis prevalence decreased over time with mean ct´s raising to 30.7 (d1), 31.5 (d2), 35.3 (d3), and 36.5 (d4). At day 5, none of the animals was excreting C.suis neither rectally nor cervically. Shedding was further excluded via qPCR weekly until week 25. Furthermore, ileum mucosa was tested negative by PCR and IHC staining.

Discussion and Conclusion

Provided there are no new chlamydia entries, C.suis – even if Tet(c) positive - can be eliminated from the intestinal tract of pigs by doxycycline and tylosin therapy, although the role of tylosin might not be important since shedding stopped prior to usage. In the field, reinfections are likely and success of oral intake of the recommended doses using in-feed medication cannot be guaranteed on an individual level, which might explain the continuous rectal shedding after treatment.

BBD-PP-61

PREVALENCE OF PROGRESSIVE ATROPHIC RHINITIS IN FATTENING PIGS IN SPAIN

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Background and Objectives

Atrophic Rhinitis (AR) is a significant infectious disease mainly caused by toxigenic strains of Bordetella Bronchiseptica (Bb) and Pasteurella multocida Type D (PMD). Infection with Bb in early stages of life causes a Non-Progressive AR (NPAR) and coinfection with PMD leads to a Progressive AR (PAR) during the fattening period. Mild or moderate lesions of NPAR and PAR may not be apparent without the evaluation of nasal lesions. The objective of this study was to evaluate the status of PAR in animals originating from non-vaccinated farms at the slaughterhouse.

Material and Methods

Thirty-two different fattening farms (from 32 different origins) representing 12 provinces from northern, central and southern Spain were evaluated during the first half of 2024. From each half-empty load from each fattening farm, 20-25 animals were randomly selected at the slaughterhouse. Lesion nasal scores compatible with PAR were evaluated based on European Pharmacopeia. Animals were grouped based on the score of lesions: 0=no lesion; 1-4=mild; 5-8=moderate; 8-18=severe. The evaluation was performed using the AI-DIAGNOS App, an automated and objective Artificial Intelligence tool developed by HIPRA.

Results

Only 10.9% of nasal snouts presented no lesions, 46.4% were scored as having mild lesions, 33.1% moderate lesions and 9.6% severe lesions. When considering the average results of the farms: 1 showed no lesions, 19 had a mild score and 12 a moderate score.

Discussion and Conclusion

The results of this study showed a relevant and unexpected prevalence of PAR on Spanish farms. A total of 42.7% of fattening pigs exhibited moderate to severe lesions compatible with PAR and potentially caused by the coinfection of Bb and PMD. Within the preventive and control tools for a healthy nasal respiratory structure, proper environmental conditions and the inclusion of vaccines for controlling both Bb and PMD have been demonstrated to be efficient tools.

HHM-PP-01

EFFECT OF DIETARY SUPPLEMENT CONSISTING OF PHYTOGENICS, YEAST COMPONENTS AND FUNCTIONAL CLAYS ON FEED INTAKE AND PROGENY PERFORMANCE IN SOWS DURING HEAT STRESS

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Background and Objectives

The modern lactating sow is particularly at risk of heat stress. In sows, temperatures above 25 °C are associated with reduced feed intake (FI), resulting in reduced milk production with the knock-on effect on piglet growth. The aim of the study was to evaluate the effect of dietary supplement consisting of phytogenics, yeast components and functional clays (PYC) on FI and progeny performance in lactating sows during heat stress.

Material and Methods

The trial was carried out on a farrow-to-finish commercial farm. Total 100 PIC multiparous sows were allocated into two groups based on expected farrowing date and parity (on average 3.6) to completely randomized design. Control (CTR) group (n = 50) received standard feed based on corn and soybean meal without supplementation of PYC and treatment group (n = 50) received standard feed with the supplementation of PYC at 1 kg/t of feed. Ambient temperatures ranged between 26 and 29°C, with a humidity of around 75% (temperature humidity index 79-81) exposing sows to mild or severe heat stress. The trial started two weeks before farrowing and ended with the weaning of pigs at 21 days of lactation. The average daily FI of the sows during lactation, litter weight at weaning (kg), litter weight gain (kg), mortality of piglets (%) were recorded.

Results

Under heat stress conditions sow FI in lactation was significantly increased in PYC group vs CTR sows by 21% (P=0.001). The litter weight at weaning as well as litter weight gain significantly increased vs the CTR by 11% (P=0.01) and 16% (P=0.003), respectively. Piglet mortality was reduced in sows fed PYC (9.13% vs. CTR 15.37%, P=0.009) improving survivability rates by 7%.

Discussion and Conclusion

Supplementation with PYC increased sow FI and progeny performance under summer heat stress in commercial sow farm conditions.

HHM-PP-02

BIOSECURITY CHALLENGES AND OPPORTUNITIES IN HERDS ENZOOTICALLY INFECTED WITH SWINE INFLUENZA VIRUS

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Background and Objectives

Swine influenza A viruses (swIAVs) are known to become enzootic in confined herds exceeding certain size thresholds. This study investigated primary biosecurity measures and husbandry practices used in such enzootically infected herds across six European countries.

Material and Methods

The study was carried out in 15 sow herds with enzootic circulation swIAV in France, Germany, Denmark, Italy, Spain and the United Kingdom. During an on-farm visit, a questionnaire was completed to collect data on the farm's main characteristics, management, and factors related to biosecurity, husbandry, and airflow between sections that could influence the introduction and spread of swIAV.

Results

The herds were either breeding to nursery or farrow-to-finish operations (7 and 8 herds, respectively) with an average of 889 sows per herd. Most herds used one- or two-week farrowing batch intervals (73.3%). In 6 out of 15 herds, workers did not change overalls and boots across farm activities (animal and crop production). In all but one herd, at least one worker wore the same overalls and boots to visit several sectors. Cross-fostering and mixing pigs from different litters at weaning were common practices (15 and 14 herds, respectively), as well as changing stocking density during nursery rearing (9 herds). Some herds also mixed and/or housed pigs from different batches together. In over half of the rooms observed across all sections (20/37 rooms; 8/9 herds), the exhaust air could mix with the intake of another room. Such airflow failure could affect all areas in some farms. Holes in the walls were observed in 17/41 rooms (9/11 herds).

Discussion and Conclusion

Assessment of the biosecurity measures in the 15 swIAV-enzootically infected herds, revealed several common flaws in biosecurity practices regarding personnel behavior, management and housing. Correcting these critical points could help reduce the probability of swIAV persistence at the herd level.

HHM-PP-03

AUTOMATIC WEIGHT ESTIMATION OF INDIVIDUAL WEANER PIGS VIA 3D-IMAGE-PROCESSING

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Background and Objectives

Measuring pigs´ individual body weight is valuable for analysing the weight distribution within a pen or batch and for assessing daily weight gain. However, individual weighing is a stressful procedure for pigs and time-consuming for the farm staff. This study investigated whether the weight of individual weaner pigs could be estimated automatically via 3D-image-processing.

Material and Methods

Seven batches of weaner pigs (n=1446) with RFID-ear tags housed in one compartment with six pens were included in this study. Modified drinking stations with RFID-antennas and 3D-cameras (OptiTrack, Hölscher + Leuschner) automatically assigned the RFID to the estimated optical weight (EOW). In addition, a mechanically determined reference weight (RW) was taken individually at weaning, day 18 after weaning and the end of rearing period (day 39). EOW were summarized daily and weekly by using the mean weight (mEOW) for the specific period. Implausible weights (<5 and >40 kg) were excluded. A pearson correlation (r) between daily or weekly mEOW and RW was calculated and the mean difference (md), minimum (min) and maximum (max) deviation and standard deviation (sd) were determined.

Results

A high correlation ($p<0.001$) between daily mEOW and RW (r=0.954, md=1.542, min=-20.8 kg, max=13.8 kg, sd=2.459) and weekly mEOW and RW (r=0.962, md= 1.195, min=-15.4 kg, max=8.9 kg sd=2.129) was detected.

Discussion and Conclusion

The mEOW reflected the RW well, with the weekly mEOW showing the better agreement. The system is suitable for an automatic continuous monitoring of individual weights of rearing piglets to improve health and management strategies.

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HHM-PP-04

COPROLOGY OR SEROLOGY: WHICH IS THE MOST APPROPRIATE DIAGNOSTIC TEST FOR DEFINING THE STATUS OF A FARM REGARDING ASCARIS SUUM ?

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Background and Objectives

Ascaris suum is the most widespread nematode in pigs. Performances of coprological and serological diagnostic tests were compared to define the status of a pig farm regarding Ascaris suum.

Material and Methods

In 100 alternative pig farms in France (either on litter or with outdoor access), 10 blood samples were taken from finishing pigs (at least 22 weeks old) and 20 to 30 fecal samples were collected, depending on the category of animals present on the farm (10 sows, 10 piglets aged 10 to 12 weeks, and 10 finishing pigs aged at least 22 weeks). A SERASCA® ELISA test (Parasitology Laboratory, Ghent University) was performed on blood samples (cut-off 0.5) and a coprological analysis (Anses, Ploufragan Laboratory) on fecal samples. A farm was considered positive if at least one A. suum egg was observed in the fecal samples. For the serological test, different hypotheses were evaluated to define the number of seropositive animals required for a farm to be considered positive for A. suum. A Bayesian approach was used to estimate the herd sensitivity and specificity of both diagnostic tests without gold standard.

Results

The coprological test exhibited a high specificity for detecting A. suum (> 95%), whether 20 or 30 samples per farm were taken. However, the sensitivity of coprology remained very low (< 30%), even when adding samples from breeding animals to those from growing animals. In contrast, the serological test showed a high sensitivity (≈ 95%) with specificity estimated at 85% when considering a farm infected from a single seropositive sample, and 93% from two positive samples.

Discussion and Conclusion

The serological diagnostic test evaluated appears more suitable for defining a farm's status regarding A. suum than coprology, considering the farm infected if at least two out of 10 blood samples from finishing pigs are positive.

HHM-PP-06

NETWORK ANALYSIS OF THE PIG TRANSPORT DATA IN THE NETHERLANDS: TOWARDS A DASHBOARD FOR TRACING DURING THE HIGH-RISK PERIOD

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Background and Objectives

Animal movement is a key factor in spreading infectious diseases. After the detection of a notifiable disease, a contingency plan should be activated to mitigate the risk of spread from the index case. Also, animal movements during the critical timespan between the disease introduction and detection, the so-called “high-risk period” (HRP), should be inventoried. We describe the conceptualization and first steps towards implementing a dashboard using network analysis which can be used for forward and backward tracing of animal movements during the HRP of an outbreak.

Material and Methods

We used data of pig transports in the Netherlands, between 2019-2022. The network was set up as a dashboard application in Shiny in R. The user selects the date range (HRP), index premises, and depth of the network (shortest number of steps out/in-going concerning the focal node), and filters for incoming or outgoing movements. The resulting network shows only the more intuitive and relevant parameters for the dashboard’s goal including the attributes: indegree, outdegree, betweenness, depth, geographic location, and farm type. The Dutch authorities were asked to test the dashboard using an African swine fever outbreak simulation.

Results

The dashboard was received as an intuitive dashboard with a clear visualization, although some of the network attributes were not known before. The authorities indicated that the main added values of the dashboard were the quick and easy access to deeper levels of the animal movements, rather than only focusing on the direct contacts during the current tracing, and the map showing the geographical location of all connected premises.

Discussion and Conclusion

The dashboard is an intuitive tool with added value for tracing and prioritizing capacity during the HRP of an outbreak. Further improvements such as including data on farm visitors and feed trucks, and the implementation in ASF and CSF contingency plans are under discussion.

HHM-PP-07

IDENTIFICATION OF BACTERIAL AND VIRAL CONTAMINATION BIOMARKERS IN PIG TRANSPORT LORRIES

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Background and Objectives

Transporting pigs is a major risk for the introduction or spread of diseases such as African Swine Fever. In terms of food safety, animal transport is also likely to influence the transmission of food-borne zoonotic agents such as the hepatitis E virus or Salmonella. The aim of this study was to identify bacterial and viral biomarkers of contamination in pig transport lorries. The decrease in, or disappearance of these biomarkers would verify the effectiveness of lorry cleaning and disinfection (C/D).

Material and Methods

First, swab samples were taken from the loading ramps of 100 lorries in two slaughterhouses in Brittany (France) before C/D. The samples were analysed by Next Generation Sequencing (NGS) to identify the bacterial and viral agents present. PCRs were performed to confirm the NGS results and those from the literature. New samples were taken in three places from eight lorries before and after C/D to assess the relevance of the biomarkers identified.

Results

The NGS results revealed that bacteria were detected the most, while viral agents were detected rarely. According to the PCR, however, the genomes of circovirus, porcine adenovirus (PAdV) and teschovirus were detected in 100% of the samples, as were four bacterial agents (Clostridium, Escherichia coli, Lawsonia intracellularis and Mycoplasma). In a second series of analyses, PAdV, Lawsonia intracellularis, Mycoplasma, Clostridium and E. coli were always detected before C/D and in 30-95% of samples after C/D.

Discussion and Conclusion

The systematic detection of PAdV, Lawsonia intracellularis, Mycoplasma, Clostridium and E. coli in all pig transport lorries and the clear effect of C/D on their further detection make these pathogens potential biomarkers for validating the C/D of lorries after pig transport. In the context of the risk of ASF spread via pig lorries, use of viral biomarker for assessing C/D seems particularly relevant.

HHM-PP-08

INTRODUCING THE PIG BAROMETER: A COMPREHENSIVE PILOT TOOL FOR MAPPING DIAGNOSTIC TEST RESULTS AND GEOLOCATION OF SWINE ENDEMIC PATHOGENS IN SPAIN

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Background and Objectives

Disease surveillance systems are key to understanding disease dynamics, and they hold the potential for early warning and to support decision-making in the control of infectious diseases. This ongoing project has the goal to aggregate swine diagnostic data from Spain and report them in web dashboards, describing the dynamics of pathogen detection by PCR-based assays over time, specimen, age group, and geographical area.

Material and Methods

The pig barometer was designed to visualize pathogen-specific laboratory test results from veterinary diagnostic laboratories (VDLs) in Spain. The pilot dashboard shows results of three endemic pathogens: Mycoplasma (M.) hyopneumoniae, swine influenza virus (SIV) and Lawsonia (L.) intracellularis. Anonymized diagnostic test results from the VDLs were cleaned using Python, then converted into RDF format and structured with ontologies to ensure data interoperability. The cleaned data, including PCR assay results, sample type, productive stage, and a proxy for province geolocation, was aggregated by case. Queries were processed in Python, and the results were integrated into Tableau for visualization.

Results

Six VDLs provided data from 23,249 anonymized diagnostic cases submitted between 02/01/2020 and 29/12/2023. Out of the samples tested for each pathogen, 24.1% (3,306/13,748) tested positive for SIV, 27% (2,014/7,448) for M. hyopneumoniae and 41.8% (859/2,053) for L. intracellularis. Results were mainly obtained from tissues (12,127), fluids (6,646), swabs (2,660), and faeces (1,311), and the productive stage with more reported cases was finishing (10,477). A good representation of the Spanish territory was achieved, as data from 49 provinces has been represented. The pig barometer is found in the DECIDE project's species case studies on GitHub: https://decide-project-eu.github.io/case-studies-website/case-studies/pig-barometer.html.

Discussion and Conclusion

The pig barometer holds the potential of showing historical trends, dynamics and current presence of specific pathogens per area, aiding in the control infectious swine diseases. We aim to expand the tool by including data from additional pathogens (and countries) with the long-term objective of helping the industry towards generating better swine health information.

HHM-PP-10

CAUSES OF SPONTANEOUS SOW DEATHS AND PREDICTIVE FACTORS IN 5 DANISH SOW HERDS

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Background and Objectives

A high rate of spontaneously dead sows causes production losses and likely indicates underlying welfare problems. Establishing the cause for spontaneous deaths is a prerequisite for lowering mortality. The aim of this study is to determine causes of spontaneous sow deaths in farrowing, pregnancy and service units and relate these to predictive factors.

Material and Methods

Five conventional herds were included. Inclusion criteria: 6-8% spontaneous deaths on an annual basis; location close to the diagnostic laboratory; herd size min. 1000 sows, PRRS-negative. The day a sow was found dead, it was transported to the laboratory for necropsy. Farmers provided information on sows, including parity, date and time of day, temperature in the unit and clinical observations prior to death. Further registrations, like dates of farrowing, service, weaning and litter size were drawn from management software (Agrovision, Cloudfarms).

Results

Preliminary results include 45 sows, of which the majority belonged to parity 1 (36%) and 2 (21%). Housing units at the time of death were farrowing (56%), gestation (29%) and service (7%). The main causes of spontaneous death were complications at/after farrowing (27%), organ torsion (liver 22%, spleen 17%) and gastric ulcers (12%). All sows were found dead early in the morning, at barn temperatures ranging from 17 to 23 °C. For 13 sows, clinical recordings showed that the sows were sick the day before death, of which 5 had a reduced appetite. Body condition score was below normal for 9% of sows.

Discussion and Conclusion

Organ torsions were the most prevalent cause of death occurring in all units and parities at similar levels, followed by complications at farrowing. Neither body condition score nor appetite could be used to predict spontaneous death. Increased focus during and after farrowing is recommended. Necropsies are ongoing and more sows will be included in the final presentation.

HHM-PP-12

ECONOMIC MODEL FOR COST OF MYCOPLASMA HYOPNEUOMIAE INCLUDING SOW AND WEAN TO FINISH PERFORMANCE

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Background and Objectives

More farms are evaluating the cost of the Mycoplasma hyopneumoniae (M. hyopneumoniae) and considering elimination. One of the questions is the economic benefit for elimination? Previous work demonstrated a low lateral M. hyopneumoniae break rate at 6% in high pressure pig dense areas (Yeske, 2018). In addition, studies have shown M. hyopneumoniae infection to negatively impact reproductive (Britton, 2024) and grow-finish (Silva, 2019) performance. However, current economic models have only considered the cost of wean-to-finish performance.

Material and Methods

An economic model was created to compare performance data for M. hyopneumoniae positive herds versus with negative herds and to calculate the cost of the disease. For this model, data from one production system was incorporated, with similar genetics and management as reference for the model. The model can be used to compare different scenarios to allow for sensitivity analysis as control and elimination options are explored.

Results

Cost difference between negative and positive farms was $2.13 per pig for farrow-to-wean and $3.57 per pig for wean-to-finish, for a total of $5.7 per pig. Comparing traditional closure and medication elimination protocols, the ROI for elimination procedures would be 1.3 months' time.

Discussion and Conclusion

The addition of sow herd performance in past models has not been considered. The model presented in this work provides a more accurate calculation for the cost of the disease. These models can help producers evaluate the cost of M. hyopneumoniae in their herds and then choose the best control or elimination plan.

HHM-PP-13

SURVEILLANCE AND DIAGNOSTIC DATA ASSOCIATED WITH DIAGNOSES OF SWINE INFLUENZA A 2019-2024

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Background and Objectives

Exploring characteristics of swine influenza A virus (SwIAV) diagnoses made through the Great Britain scanning surveillance network provides insight into clinical signs, ages and concurrent diagnoses prompting diagnostic submissions.

Material and Methods

Five years of surveillance data were provided by veterinarians submitting samples and carcasses for Government-subsidised testing. Data for submissions from which SwIAV was confirmed included geographic origin, pig age, clinical signs and concurrent diagnoses. Influenza A M-gene-positive samples were subtyped by additional PCRs or whole genome sequencing.

Results

SwIAV was diagnosed in 18% of submissions with respiratory signs. The most frequent signs for SwIAV were respiratory, then wasting, then 'found dead'. Wasting or 'found dead' was more common in carcass submissions than in sample submissions. Most diagnoses were from pig dense areas, including East Scotland and North-East and Eastern England. Diagnoses were made from every age category but were most commonly made in four- to eight-week-old pigs, with another small peak at 14- to 17-weeks-old. Several diagnoses were in replacement breeding pigs and adult sows. Forty-six percent of diagnoses were from carcass submissions. Concurrent diagnoses were made in 88% of these carcass submissions; porcine reproductive and respiratory syndrome, Streptococcus suis and salmonellosis were most frequent. A severe SwIAV outbreak was recorded in vaccinated adult sows associated with secondary streptococcal infection. The predominant SwIAV subtypes were pandemic 2009 H1N1 (clade 1A.3.3.2) and H1huN2 (clade 1B.1.1) with occasional H1N1 (clade 1C.2.2, Eurasian avian-like) viruses.

Discussion and Conclusion

SwIAV remains an important endemic disease in Great British pigs, with diagnoses most common early postweaning. Respiratory signs are, unsurprisingly, prominent. Data suggest that pig carcass submissions for post-mortem examination are prompted by additional clinical signs and/or mortality. Concurrent infectious diseases are common, some likely secondary to or exacerbating the SwIAV. Diagnostic investigation and provision of SwIAV subtype enables implementation of targeted treatment, vaccine decisions and control measures.

HHM-PP-14

INFLUENZA A VIRUSES CIRCULATING IN PIGS AND PIG FARMERS OF SWITZERLAND

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Background and Objectives

Influenza A viruses (IAV)s are widely distributed in pig farms worldwide and are major candidates for the next human pandemic. Effective IAV control and prevention requires surveillance at the swine - human interface including whole genome sequencing (WGS). However, knowledge of swine IAVs in Switzerland remains limited. This study aims to profile IAVs circulating in Swiss pig farms and their caretakers.

Material and Methods

Between May 2023 and October 2024, 45 asymptomatic pig herds and 17 herds with respiratory symptoms were sampled across eight Swiss cantons. Data was collected using an epidemiological questionnaire. Nasal swabs were taken from pigs, whereas caretakers sampled their nose themselves during a single farm examination. Swabs were tested by a pan-IAV qPCR and positive cases underwent WGS.

Results

In total, qPCR was positive in 33 herds (53.2%) and in 103 of 988 sampled pigs (10,4%). This included 24 asymptomatic herds (53.3% of all asymptomatic herds) and nine herds with symptoms (52.9 % of all symptomatic herds). One zoonotic transmission event was observed. Sequenced viruses belonged to the H1N1 Eurasian avian-like swine lineage, clade 1C.2.2, clustering close to viruses in Switzerland and neighbouring countries.

Discussion and Conclusion

The detection frequency suggests a similar IAV prevalence in Swiss pig farms as in farms of neighbouring countries. However, Switzerland's low respiratory disease burden in pig farms, potentially due to the absence of other primary respiratory pathogens, may result in lower viral loads and fewer clinical outbreaks. The frequent detection of IAVs in asymptomatic herds and the increased number of IAV sequences through this study enable important updates on the epidemiology of swine IAVs in Switzerland. Additional data are required to fully understand IAV circulation within Switzerland. Taken together, active surveillance and WGS are essential to detect and contain IAV strains with pandemic potential timely.

HHM-PP-15

ASSESSMENT OF INTESTINAL PERMEABILITY IN PIGS TREATED WITH PHYTOBIOTIC-PREBIOTIC FEED ADDITIVE

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Background and Objectives

Phytobiotics, including plant extracts and compounds, have been studied as alternatives to antibiotic growth promoters due to their antimicrobial, antioxidant, and anti-inflammatory activities and their beneficial effects on gut function and animal performance in swine. This study aimed to evaluate the intestinal permeability of pigs treated with a phytobiotic-prebiotic feed additive.

Material and Methods

A total of 480 pigs (70 days old) were divided into four treatments: T1: Negative control; T2: Natural feed additive “A” - a combination of carob pulp, chicory, and fenugreek (0.5 kg/ton); T3: Natural feed additive “A” (1.0 kg/ton); and T4: Natural feed additive “B” - a combination of chicory, thyme, and carob pulp (0.5 kg/ton). All pigs received a three-phase diet: Phase I: Days 0–22; Phase II: Days 23–38; and Phase III: Days 39–55. At the end of the trial, intestinal quality was assessed in eight animals per group through the oral administration of fluorescein isothiocyanate dextran (FITCd, 3–5 kDa). Its presence in blood was used as a marker for tight junction permeability. Data were analyzed using one-way ANOVA (SAS 9.3, SAS Institute Inc., Cary, NC) with a significance level of $P \leq 0.05$.

Results

Pigs treated with the natural feed additive “A” at 1.0 kg/ton (T3) showed statistically significant ($p = 0.0297$) improvement in intestinal permeability compared to the treatment with 0.5 kg/ton inclusion (T2). Additionally, higher average weight gains were observed for treatments T2 and T3, 0.912 kg and 0.902 kg, respectively ($P \leq 0.05$) than the treatments T1 (0,785kg) and T4 (0,854kg).

Discussion and Conclusion

Our results demonstrated that the natural feed additive combining carob pulp, chicory, and fenugreek at an inclusion level of 1.0 kg/ton improved intestinal permeability in pigs.

HHM-PP-16

EFFECT OF A PROTEIN DRINK ADMINISTERED BETWEEN 2 TO 8 DAYS OF LIFE AND 3 DAYS BEFORE AND AFTER WEANING ON PIGLET PERFORMANCE

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Background and Objectives

A protein drink was formulated to promote piglet's intestinal health. The objective of the study was to compare performance of piglets receiving a protein drink between 2 to 8 days of age and 3 days before and after weaning with control piglets receiving water.

Material and Methods

The study was performed in 2024 on a farrow-to-finish farm of 460 sows on 3 consecutive batches. After randomization, 462 piglets in the 'test' group received 3% Tonisity Px™ (Tonisity International Ltd) reconstituted with mineral water in bowls between day 2 to day 8 of life and 3 days before and after weaning. During the same period, 430 piglets in the Control group received mineral water in bowls in the same quantities. Piglets were weighed individually at day 2 (D2), day of weaning (D25) and at the end of post-weaning (D60). Loss rate was recorded from D2 to D60.

Results

At weaning, 'test' group weighed 0.74kg more than control group (6.50 vs. 5.76kg, p=0.01) and had an ADGD2-D25 of +30 g/d (211 vs. 181 g/d, p=0.01). Analysis of the data by weight class at D2 showed a significant difference of +620g ($p<0.05$) for medium piglets and +1.15kg ($p<0.001$) for heavy piglets from the 'test' group. The number of fall-behinds at weaning was significantly reduced of 13.1% in the 'test' group (9.1 vs. 22.2%, $p<0.01$). At the end of post-weaning, heavy piglets from the 'test' group weighed 1.7kg ($p<0.05$) more. Loss rate between D2 to D25 decreased by -3.1% for the 'test' group (9.2 vs. 12.3%, non-significant) and by -1.4% between D25 to D60 (2.3 vs. 3.7%, non-significant). The profit was estimated at €49,423 for the farm over one year.

Discussion and Conclusion

Administration of Tonisity Px showed a significant improvement in piglets' performance. Weight improvement occurred across the entire population and was particularly evident in medium and heavy piglets.

HHM-PP-17

BIOSECURITY AND ANIMAL HEALTH MONITORING - DO WE NEED BOTH?

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Background and Objectives

Both animal health monitoring and the assessment of biosecurity provide important insights into potential weaknesses of pig farms. For Switzerland, comprehensive protocols and questionnaires available for both aspects are established in the field and tailored to local production conditions. In this study, a biosecurity questionnaire was compared with a health monitoring tool to determine their similarities, differences and relationships.

Material and Methods

25 breeding and 15 fattening farms were visited and animal health was analysed using a wide range of parameters. The parameters belong to the Smart Animal Health method, which aims to assess animal health in a comprehensive, valid and practical manner. At the same time, a detailed biosecurity questionnaire of 83 questions on internal and external biosecurity was collected on these farms. The results of both methods were compared at farm level by Pearson correlation.

Results

For the fattening farms, the animal contact rates within the farm and lack of cleaning and disinfection on the internal biosecurity side and the location, animal purchase and non-living disease transmission vectors on the external biosecurity side were rated the worst by the questionnaire. On the breeding farms, high internal and external biosecurity showed a weak positive correlation with good animal health on the farms ($r=0.12$ and $r=0.11$ respectively). On the fattening farms, both high internal and high external biosecurity showed a weak negative correlation with a good health monitoring result ($r=-0.23$ and $r=-0.02$ respectively). None of the correlation analyses were statically significant ($p>0.05$).

Discussion and Conclusion

This study highlights two aspects of biosecurity and animal health in pigs. Firstly, both require their own appropriate recording methods and, although biosecurity can be an important risk factor, it does not fully explain animal health. Secondly, farm-specific biosecurity is the sum of various factors, some farmers can influence easily (animal contact) and others only with difficulty (location).

HHM-PP-18

SPLENIC TORSION AND REPRODUCTIVE DISORDERS ARE PREVALENT CAUSES OF DEATH IN SOWS

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Background and Objectives

High sow mortality is a major problem in intensive pig farming and reached 14.2% in Denmark in 2023. The causes of spontaneous death in sows are poorly understood. The objective of this study was to uncover pathological conditions and investigate the causes of spontaneous death in sows.

Material and Methods

The study was conducted in 2024 at a rendering plant that receives all pigs that die in Danish herds. Full body necropsies were performed in all four seasons – two times two days within two consecutive weeks in each. In total, 108 sows were examined. The cause of death of each animal was concluded based on the gross pathology.

Results

The median weight of the sows was 241 kg (min.: 126 kg, max.: 383 kg). Forty-four sows were pregnant and 64 were non-pregnant. The following causes of death were identified (pregnant vs. non-pregnant sows): Reproductive disorders (25 vs. 35%), splenic torsion (5 vs. 14%), intestinal disorders (9 vs. 9%), inflammatory disorders (14 vs. 6%), suspected trauma (14 vs. 3%), liver lobe torsion (0 vs. 9%) and haemorrhagic gastric ulcer (7 vs. 3%). In the remaining sows (n=26), the cause of death was inconclusive, but 23 of them had serious pathological conditions including e.g. gastric ulcers, pneumonia and pleuritis.

Discussion and Conclusion

The study found relatively few hepatic torsions compared to 42% found in another recent Danish study (Kongsted et al., 2021). Interestingly, we only saw liver lobe torsions in non-pregnant sows. Splenic torsion as cause of death was on the other hand more prevalent than in previous studies. The aetiology of splenic and hepatic torsions in sows is poorly understood and needs further investigation. The high prevalence of reproductive disorders as cause of death is in line with other studies and calls for increased focus on breeding and farrowing management.

HHM-PP-19

DIFFERENT LEVELS OF ADVERSE REACTION OF TWO FREQUENTLY USED CIRCO-MYCO VACCINES, UNDER FIELD CONDITIONS

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Background and Objectives

Fever following piglet vaccination is often unnoticed. Fever causes discomfort and serves as a welfare indicator. This study aimed to compare adverse reactions of different adjuvants under field conditions by monitoring rectal temperatures in two often used PCV2-Mycoplasma hyopneumoniae (Circo-Myco) vaccine combinations for intramuscular application by needle.

Material and Methods

At a farrow-to-finish farm in the Netherlands, three piglets per litter were randomly selected before weaning and assigned to one of two groups. After weaning, the piglets were housed in two rooms, grouped by pen. One week after weaning the piglets were vaccinated intramuscularly with 2 ml of Circo-Myco vaccine. One group received a carbomer (C) adjuvanted vaccine, while the other group received a mineral oil + aluminium hydroxide (MO) adjuvanted vaccine, as per product labels. Rectal temperatures were measured at 3, 6, and 24 hours post-vaccination. Temperatures were analyzed and compared using the Mann-Whitney U test. The percentage of animals with fever (temperature >40°C) was compared using a Chi-square test.

Results

Body temperature (hours), average and standard deviation: MO (n=46) vs C (n=42):+3h: 39.75 (±0.56) vs 39.58 (±0.33); +6h: 39.97 (±0.73) vs 39.46 (±0.40) ($p<.05$); +24h: 39.72 (±0.28) vs 39.72 (±0.29).Percentage of piglets with fever (T>40°C): MO (n=46) vs C (n=42):+3h: 33% vs 12% ($p=.06$); +6h: 57% vs 5% ($p<.05$); +24h: 11% vs 10%.

Discussion and Conclusion

Compared to the C group, the MO group had higher average rectal temperatures at 6 hours post-vaccination ($p<.05$). The percentage of piglets with fever was higher in the MO group at 3 ($p=.06$) and 6 ($p<.05$) hours post-vaccination, indicating a difference in adverse reactions. These reactions may go unnoticed in the field due to the absence of staff in the specific rooms at 3 to 6 hours post-vaccination.

HHM-PP-20

EFFECT OF TOLTRAZURIL/GLEPTOFERRON TREATMENT ON PIGLETS WEANING WHEIGHT IN A LARGE-SCALE FARM IN VIETNAM

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Background and Objectives

The clinical signs associated with the Cystoisospora suis infection include pasty to watery non-hemorrhagic feces and reduced weight gain. Piglets with Iron Deficiency Anemaia (IDA) frequently suffer from weakness and reduced growth rate with impairment of the performance. The aim of this study was to evaluate the benefit of toltrazuril (TZL) and gleptoferron via intramuscular administration on weaning weight comparing to standard protocol in a coccidia-positive farm under the conditions of industrial farm in Vietnam.

Material and Methods

In a farrow-to-finish farm with history of C. suis infection, 90 litters were randomly selected: half of the piglets of each litter were injected with 1,5mL toltrazuril (Forceris®) until the 3rd day of life (treatment group) and the other half received standard treatment applied on farm (oral TZL + iron dextran) (control group). All litters were weighed at the start of the study and at weaning (28 days of life- DOL). Hemoglobin levels were measured at birth and weaning. Statistical analysis was performed by GraphPad Prism 10.2.3.

Results

Despite the fact that piglets in control group were 109 g heavier on average at inclusion (p= 0.0005), average weaning weight and weight gain were significantly better in treatment group (p= 0.0007, p= 0.0398 respectively), with numerical difference of 690g and 470 g, expressed as median. Hb levels did not differ at birth (p= 0.7372), but were significantly higher in the treatment group (p= 0.0387) with less anemic piglets at weaning (Hb< 90g/L), 8,9% vs. 15,6%.

Discussion and Conclusion

Early application of injectable combination of gleptoferron and toltrazuril improved the performance of piglets compared to standard protocol applied on farm under the conditions of intensive farm in North part of Vietnam. Gleptoferron based product improved Hb levels and decreased frequency of IDA at weaning, compared to standardly used local dextran based product.

HHM-PP-21

EFFECT OF CARBOTHECINE ADMINISTRATION IN SOWS IN PIGLET COLOSTRUM INTAKE AND MORTALITY DURING LACTATION PERIOD

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Background and Objectives

Colostrum intake is directly correlated with mortality rate. 250g is the minimum amount of colostrum needed for piglet survival. Serum concentration lower than 20mg/ml is correlated with low growth and high mortality rate. Actual pig production conditions require sow farrowing interventions to ensure piglet survival. The aim of this study was to evaluate the effect of carbothecine administration in sows and its impact on piglet colostrum intake and mortality in farrowing piglets.

Material and Methods

The study was conducted in a 780-sow. 573 piglets were followed during lactation. All sows received a prostaglandin at 113 days of gestation. In the Test group sows also received a carbothecine dose 20h after the prostaglandin injection, whereas the control group only received the prostaglandin. 327 piglets from the test group, and 246 piglets from the control group were included in the study. At 24h of birth, piglets were bleed and weight was recorded. At 21 days of age weight was recorded again. IgG serum concentration was evaluated with a refractometer. By using the formula $y=7,1823x-33,9453^4$, %brix was transformed to IgG concentration. IgG serum values up to 20mg/ml were considered adequate. Colostrum intake and % of mortality were evaluated. Statistical analysis was run using Jamovi software.

Results

In the control group 68,27% of the piglets received a correct amount of colostrum (>20mg/mL) vs 38,85% in the Test group. Regarding mortality rate, 4,5% was recorded in the Control group vs 15% in the Test group ($p<0,001$)

Discussion and Conclusion

The results show that the level of colostrum intake and the % of survival was higher in the offspring that came from the Control group. The administration of carothecine did not have a positive effect in the parameters analyzed in the conditions of this trial.Also, animals that received >250g of colostrum, showed a lower mortality during the lactation period.

HHM-PP-22

REDUCING SOW MORTALITY: THE INTERPLAY OF GENETICS, NUTRITION, AND CONSISTENT MANAGEMENT PRACTICES

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Background and Objectives

Sow mortality in intensive pig farming is a growing concern, affecting health, welfare, and farm profitability. Historical data from Flemish pig farms show an increase in sow mortality from 3.1% in 1995 to 4.8% in 2001, with recent Danish studies reporting rates as high as 14%.

Material and Methods

A study involving 15 Flemish farms, all with annual sow mortality exceeding 5%, sought to investigate causes. Necropsies of maximum 8 sows per farm were performed at Animal Health Care Flanders. Farm-specific advice to reduce sow mortality was given during herd visits.

Results

These farms had a median size of 350 sows, ranging from 180 to 950. At the start, the average mortality rate was 11.4%, with 27% of farms experiencing rates above 15%. Danish genetics were present on 73% of farms. Necropsies on 100 sows revealed that **positional changes** (e.g., liver lobe, splenic mesenteric, and splenic torsions) were the most common cause (32%), primarily in the farrowing unit. **(Poly)arthritis and osteomyelitis** (19%) were frequently observed in the gestation unit. Farm-specific advice focused on improving feed composition, feeding management, and housing. Recommendations included increasing crude fiber in feed to reduce aggression and arthritis, installing escape partitions and additional feed troughs, and tailoring diets to sow conditions through back fat measurements. Adjustments to genetics were also suggested for some farms. Following these interventions, the average mortality rate decreased by 3.3%.

Discussion and Conclusion

The study highlights that optimizing management in genetics, nutrition, and housing can significantly reduce sow mortality. Increased fiber improves sow behavior, reducing aggression and associated health risks in gestation. Proper feed management around farrowing minimizes organ positional changes, further lowering mortality. These findings emphasize the importance of targeted, evidence-based measures to enhance sow welfare and farm productivity.

HHM-PP-23

PILOT SCREENING OF THE LEVEL OF ANTIBODIES AGAINST ASCARIS SUUM IN 19 DANISH FINISHER FARMS

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Background and Objectives

Ascaris suum infection is known to compromise weight gain and feed conversion. In Denmark there is no penalty for white spots in the liver and anthelmintics are used less frequently in finishers compared to other countries.
The diagnosis of Ascaris can be performed by detecting eggs or worms in the faeces. This approach is not very sensitive. An ELISA test is more sensitive and can estimate the intensity of infestation in a group of finishers.
We investigated the level of antibodies against Ascaris suum in 19 Danish farms with different kinds of housing.

Material and Methods

19 farms that did not use anthelmintics participated in the pilot screening. 4 farms were organic, 5 farms had big pens (>25 pigs/pen) and 10 farms had small pens (<25 pigs/pen).
10 blood samples from each farm were collected from pigs at the end of fattening and analyzed in an ELISA test (Monoscreen AbELISA). Also a questionnaire for each farm was completed.

Results

We found a heavy load (average S/P ratio >45%) of Ascaris suum in 6 of the 19 farms.
Compared to negative farms positive farms were smaller, more outdoor, had more solid concrete flooring and larger compartments, used less antibiotics and did less cleaning and disinfection. They didn't report more respiratory diseases.

Discussion and Conclusion

Serology is a convenient method to monitor prevalence of Ascaris suum at farm level. Although the sample size is small, the results of this study suggest that Ascaris suum infections in Denmark might be underestimated. Treatment is indicated in some farms and the questionnaire has identified potential areas for improvement of farm management practices. Further screening and longitudinal monitoring after interventions is recommended

HHM-PP-24

OVERVIEW OF PATHOGENS FOUND IN TRACHEOBRONCHIAL SWABS OF PIGS ON 95 BELGIAN FARMS FACING RESPIRATORY PROBLEMS

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Background and Objectives

Coughing affects pigs at different stages and is caused by the porcine respiratory disease complex (PRDC). Tracheobronchial swab (TBS) sampling allows to detect several of these pathogens in live animals. Until recently, veterinarians were limited in their diagnostic options but new sequencing-based diagnostic approaches (PathoSense, Oxford Nanopore Technologies) became available so vets no longer have to make a selection of which pathogens to test for. The goal of this sampling was to identify which pathogens can be found in PRDC using TBS in diseased pigs from different age groups.

Material and Methods

As part of Ceva Santé Animale's diagnostic service, TBS were collected from November 2020 to February 2024 on 95 farms facing respiratory signs. Sampling included sows (S), suckling piglets (SP), nursery piglets (NP) and fattening pigs (FP). Third-generation viral and bacterial metagenomic nanopore sequencing (Oxford Nanopore Technologies) was performed on the pooled sample using the PathoSense technology.

Results

In total, 127 pooled samples were analysed (n=13 SP, n=51 NP, n=31 FP, n=32 S). The most frequently found pathogens per age category were: SP: Glaesserella parasuis (GPS) (92,3%), Streptococcus sp. (69,2%), Mycoplasma hyorrhinis (61,5%), swIAV (53,8%) and Neisseria spp. (46,2%). NP: GPS (72,5%), Streptococcus spp. (51,0%), Mycoplasma Hyorrhinis (51,0%), swIAV (45,1%) and PRRSv (31,4%). FP: M.hyo (61,3%), GPS (41,9%), PRRSv (41,9%), Parvovirus (41,9%), Mycoplasma hyorrhinis (29,0%). S: M.hyo (75,0%), Pasteurella spp. (31,3%), Streptococcus spp. (21,9%), atypical porcine pestivirus (21,9%), GPS (15,6%).

Discussion and Conclusion

The pathogens found in TBS and the detection frequency differed by age category. Some pathogens are seen as primary pathogens and others are considered opportunistic pathogens. The most frequently detected primary pathogen in suckling and nursery piglets was swIAV. In fattening pigs and sows M.hyo appeared to be most common. It is important to know which pathogens are involved in the respiratory disease on farm to establish an adequate prophylaxis and treatment.

HHM-PP-25

ASSESSMENT OF SOW FOOT LESIONS AND ASSOCIATED RISK FACTORS ON-FARM WITH THE AIM OF IMPROVING SOW LONGEVITY

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Background and Objectives

Insufficient longevity in sow herds is a challenge faced by many farms. Over the years, sow lameness has emerged as one of the major causes of involuntary culling. Sow foot lesions are a significantly contributing cause of such lameness.

Material and Methods

To assess theses lesions on farm, a screening was performed on 40 French swine farms involving the observation of 8 types of foot lesions on a total of 3 125 hind feet of sows. Besides foot observations, 45 farm parameters were collected on each farm, such as pen density in gestation units, floor humidity scores, interval between cleaning and sow arrival, culling rate before parity 3, among others. These farm-level factors were analysed in relation to associated sow foot lesion scores. Statistical analysis was performed using chi-square tests of independence for qualitative parameters, and Kruskal-Wallis tests for numerical parameters.

Results

The lesions called white line lesion (WL), heel-sole crack (HSC) and toe overgrowth (TO) were identified as the main lesions impacting sow longevity, as they have a significant association with sow mortality rate and/or culling before parity 3 ($p < 0.05$). Risk thresholds for these key lesions were determined based on these data. Risk factors for these lesions were identified, such as high gestation pen floor humidity for WL and TO ($p < 0.01$), small pen size for TO and HSC ($p < 0.01$), and high stocking density in pens during quarantine for WL ($p < 0.01$) for instance.

Discussion and Conclusion

These results allow on-farm assessment of whether longevity issues are caused by foot lesions. If so, the analysis of risk factors provides clues on potential ways to improve sow foot health and quality.

HHM-PP-26

INVESTIGATING THE IMPACT OF STANDARD AND NON-COMMERCIAL DIETS ON THE PORCINE MICROBIOTA

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Background and Objectives

The porcine gut microbiota serves an important function as a dynamic interface between the host and its external environment. Crucially, the microbiota conveys numerous benefits to its host, while remaining defined by its substrates and environment. This study sought to evaluate the effect of different settings and diets on the composition and function of the microbiota.

Material and Methods

We analysed the faecal microbiota of 344 pigs and other members of the Suidae family from 36 locations spanning 8 countries from a range of varied lifestyles and ages with different diets. Dietary information comprised crude protein and fibre, alongside ingredient composition. To our knowledge, this was the most diverse cohort of pigs in a single study to date. 16S V1-V9 rRNA gene sequencing was performed, and the resultant data were analysed using QIIME2, while short-chain fatty acids (SCFAs) were quantified via gas chromatography.

Results

Of all lifestyle variables analysed via PERMANOVA and calculating the ω^2 effect size, dietary fibre content was found to be the most influential in shaping the microbiota's composition. Alongside this, the presence of bedding material such as straw, and feeding of a non-commercial diet (such as self-grown crop formulations, or supplementation with fresh vegetables) were found to significantly increase α-diversity (Wilcoxon $P<0.05$). LEfSe analysis revealed non-commercial diets to be associated with Treponema, Turicibacter, Cellulosilyticum and Cryptobacteroides while commercial diets were characterised by Lactobacillus, Limosilactobacillus, Streptococcus and Clostridium (LDA >3). PICRUSt2 predicted several amino acid-degrading and SCFA-producing pathways to be significantly increased among the non-commercially-fed pigs (Wilcoxon $P<0.05$). Subsequently, SCFA quantification revealed that bacteria associated with both dietary groups were significantly correlated with different SCFAs (Kendall's τ $P<0.05$).

Discussion and Conclusion

This work sheds light on the manifold interactions between the diet, microbiota and host across a spectrum of lifestyles, and highlights the knowledge still to be gained from studying real-world scenarios.

HHM-PP-27

INVESTIGATING PIG HERD HEALTH IN SWITZERLAND USING SMART ANIMAL HEALTH PARAMETERS

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Background and Objectives

Monitoring and documentation of pig herd's health is an important part of veterinary service but also crucial for the pig farmers and interested parties. Monitored parameters must be both reliable and meaningful and recorded consistently. For Switzerland, such parameters and their threshold values have been specified recently (Smart Animal Health, https://doi.org/10.3389/fvets.2023.1125806). In this work a selection of these parameters was applied in order to describe health of pig herds in Switzerland in 2023.

Material and Methods

Data from 1456 pig herds (29% of total herds) were descriptively analysed using the thresholds (target and alarm values) of selected parameters.

Results

In 10% of the herds no alarm values were observed; 60% had 1-2 and 30% of the herds had >2 alarm values. The two most frequently achieved alarm values were management related ("AI/ AO", "Cleaning and disinfection").In the herds, 3-28 target values/ herd were achieved. Overall, the two most frequently achieved target values were health related ("Lameness suckling piglets" and "Treatment index fatteners").

Discussion and Conclusion

Assuming that the analysed herds and the indicators provide a proxy to pig's health, the pig herd health in Switzerland was decent. Most of the herds had <3 alarm values which was considered as biologically acceptable. Furthermore, the most frequently achieved target values were related to health and (low) antimicrobial use. However, there is room for improvement which could e.g. be achieved by veterinary support of herds with alarm values. A weakness of the analysis was the lack of data so that not all relevant parameters could be described in all herds.The analysis provides a first insight in the frequency of specific aspects of pig herd health in Switzerland. The continuous collection and analysis of the data is a valuable tool to describe herd health, observe trends and to compare health among herds.

HHM-PP-28

MONITORING RESPIRATORY HEALTH AND TEMPERATURE IN GROWING PIGS

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Background and Objectives

Respiratory pathology significantly impacts swine industry productivity. SoundTalks® (ST) is a monitoring tool that uses sound analysis to provide the Respiratory Health Status (ReHS) metric, a gold standard for evaluating respiratory symptoms in swine. This study aimed to correlate ReHS and environmental conditions with diagnosed pathologies.

Material and Methods

Approximately 85,000 pigs from 3 production companies in Spain were monitored using 55 ST devices. The study included 65,000 piglets in 86 nursery batches (S2) and 20,000 pigs in 17 fattening batches (S3). Each batch was characterized by an average ReHS, ranging from 0 to 100, with a color scale: green (100-61), yellow (60-41), and red (40-0) indicating respiratory health status. ReHS below 60 indicated respiratory problems, prompting sampling for PRRSV, Influenza A, and Mycoplasma hyopneumoniae. Temperature alarms were triggered by changes exceeding 6ºC within six hours.

Results

Respiratory problems were more severe during colder seasons (60% in autumn and winter). Environmental issues, indicated by temperature alarms, were more frequent in summer, with 45% of alarms occurring during this period. Temperature increases were most common between 12-16h (70%), while significant drops occurred between 20-24h (55%). Nursery batches (S2) had an average ReHS of 45, while fattening batches (S3) averaged 69. Significant differences in ReHS were found based on diagnosed pathologies: In nursery batches without pathogens had an average ReHS of 72, those with only PRRSV had 57, and those with SIV + PRRSV had 28. In fatteners, only SIV + PRRSV + Mhyo co-infection (ReHS 43) showed significant differences compared to other groups.

Discussion and Conclusion

Summer had the most temperature alarms, while respiratory health was worse in autumn and winter. Pathogen detection had the greatest impact on ReHS. Weaners (S2) were more sensitive to respiratory problems than fattening pigs (S3), showing worse ReHS values even with fewer pathologies detected.

HHM-PP-29

ANTIMICROBIAL USE IN FINNISH SOWS AND ASSOCIATED HERD CHARACTERISTICS

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Background and Objectives

The use of antimicrobials (AMU) in food-producing animals significantly impacts animal health, productivity and antimicrobial resistance. In Finland, the use of medicines for pigs is recorded in the national web-based herd health and welfare register Sikava. We aimed to qualitatively and quantitatively describe AMU in Finnish sows using anonymous herd health data and to identify indications for antimicrobial treatment, antimicrobial agents used for each indication and farm-level risk factors associated with AMU.

Material and Methods

Forty-eight randomly selected herds with more than 100 sows were selected from the herd register of 906 herds. The register data included AMU in sows, biosecurity scores and assessments of veterinary health care visits for 2022. Visiting veterinarians collect information on husbandry, animal health and welfare using a Sikava protocol, and record their findings electronically in the herd health register. AMU data included the product name and antimicrobial group (active substance), indication, duration of therapy (in days), the number of sows treated and dosage. Sow medications were quantified as treatment incidence (TI). The Generalized Linear Mixed Models package in SPSS was used to identify farm-level risk factors associated with AMU in sows.

Results

The median TI for sows was 5.0 (range: 0.06 - 37.6). The most used antimicrobial for sows was penicillin and sows were most commonly treated individually with injections for locomotor, udder and reproductive disorders. The main risk factor was herd size ($p<0.001$). Large farms (>400 sows) (predicted TI 11.5 ±1.7) used more antimicrobials than both small (<150 sows), (5.2 ±1.8; $p=0.005$) and medium-sized farms (>150 ≤400 sows), (2.7 ±1.7; $p<0.001$).

Discussion and Conclusion

Compared to other European countries, AMU in Finnish sows was moderate. No group treatments were administered. AMU was highly variable between herds, but generally the antimicrobial selection followed guidelines for prudent use of AMU for different indications.

HHM-PP-30

MONITORING OF PRRSV BY PCR IN ORAL FLUIDS AND AIR SAMPLES DURING COUGH EPISODES REGISTERED BY AUTOMATED REAL TIME RESPIRATORY HEALTH STATUS (REHS)

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Background and Objectives

Continuous surveillance and monitoring of PRRSV in a practical, non-invasive and welfare friendly manner, being as cost effective has high relevance for veterinary practice. This study aimed at determining the agreement between respiratory health status (ReHS) indicated by sound (SoundTalks®) that transforms pig respiratory sounds into a 0-100 metric, and the positive detection rate of PRRSV in Oral Fluids (OF) and air samples (AS) to choose the most practical and reliable, less costly sampling method.

Material and Methods

Ten weekly batches of 1100 weaned pigs (4-week-old) were split into 2 rooms of 550 pigs, each equipped with sound-monitors. Every week 8 OF were collected from 16 pens pooled into one. Simultaneously AS were collected (AirPREP™ cub, 200LPM) for one hour. All samples were cooled and PCR-tested for PRRSV. The agreement between ReHS status and the two different samplings methods was calculated using Cohen's Kappa. Diagnostic sensitivity and specificity were calculated for AS and ReHS status in parallel testing (Se_{par}, Sp_{par}) with OF as reference standard.

Results

A total of 144 PCR's, 72 pooled-OF and AS respectively, were evaluated during the study. For OF and AS samples the agreement was 0.51 [0.3;0.71]. The agreement between ReHS alarm (ReHS <60) and OF and AS was 0.1 [-0.12;0.32] and 0,2 [-0.073;0.48] respectively. The diagnostic performance of AS and ReHS alarms combined was Se_{par} = 0.52 [0.31;0.72] and Sp_{par} = 0.85 [0.72;0.94].

Discussion and Conclusion

The moderate agreement between the sampling methods allows practitioners more opportunities to choose the cheapest and most practical sampling method. Earlier studies have revieled other options like manure sampling as a alternativeto e.g. OF and blood samples. This study, and others, show that soundbased alarms can not be used as a stand-alone surveillance method for PRRSV. However, the combination of different sampling methods could increase the likehood of early detection.

HHM-PP-31

EXPLORING COMBINED LABORATORY TEST AND SLAUGHTER DATA FOR BETTER DECISION MAKING REGARDING RESPIRATORY HEALTH OF FINISHING PIGS

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Background and Objectives

From finishing pig farms extensive data is generated in diagnostic labs and at slaughter, reflecting disease and pig production. Combining longitudinal data from various sources could improve decision making about respiratory health of pigs. This study, part of the DECIDE project, aimed to explore the association between slaughterhouse data and diagnostic test results from finishing pig farms.

Material and Methods

Data from 37 farms were collected, validated, combined, and analysed anonymously. Farms were selected for frequent slaughtering at specific plants and availability of lab results (2020-2024).
Data were aggregated into a record per sex per slaughter batch, including the date, slaughter plant, and average and variation per batch (Inter Quartile Range (IQR)) values for continuous data and condemnations regarding pleuritis, pneumonia, livers, and carcasses.
Potential associations were evaluated using linear regression models continuous data and multilevel mixed-effects negative binomial regression models for condemnation data. Explanatory variables included test results for PRRSv, Mycoplasma hyopneumoniae (Mhyo), Actinobacillus pleuropneumoniae (App), and Influenza virus (IAVsw) within two months before slaughter. Fixed variables included e.g. season, trend over time and slaughterhouse.

Results

Positive IAVsw results were associated with lower average and IQR of backfat thickness.
Positive PRRSv results were associated with higher slaughter weights and muscle thickness, and lower average backfat thickness.
Positive Mhyo results were associated with higher average and IQR of net weight and backfat thickness.-
Positive App results were associated with IQR in body weight, backfat and muscle thickness.
No significant associations were found between PRRSv or IAVsw results and condemnations. For Mhyo and App results, models did not converge

Discussion and Conclusion

Although no significant associations were found between diagnostic test results and condemnations, a positive lab test before slaughter was associated with production parameters. Linking data of different sources seems promising to enable improved decision making, but more research is needed. The limitations of the study and recommendations for future studies will be discussed.

HHM-PP-32

EFFECT OF DOUBLE INJECTION WITH 200MG IRON (UNIFERRON) ON THE MARKETWEIGHT OF SLAUGHTERPIGS

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Background and Objectives

The industry standard for parenteral iron in piglets has been 200 mg given intramuscularly (IM). Recently published research has shown that an iron dosage higher than 200 mg has a better outcome on body weight and average daily gain (ADG). Studies performed to date have largely focused on herds in the United States and genetics popular there. The goal of this study was to investigate increased iron dosing impacts on weight gain in a Danish sow herd.

Material and Methods

Roughly 300 piglets were enrolled on day 6 of life. Prior to enrollment, all piglets received 200 mg iron on day 2 of life. Enrollment consisted of pairing equally sized gilts and barrows within litter. One piglet per pair was randomly assigned to the treatment group and given a 2nd, 200 mg dose of iron. Hemoglobin (Hb) and weight were measured for all pigs at enrollment. Weight again at weaning, end of nursery, and market. Wean age was the covariate for weaning weight and Hb. Days on feed were used as the covariate for the wean to finish growth data.

Results

At weaning, Hb was numerically increased in the treatment group ($p=0.15$). Weaning weight was significantly better in the treatment group (6368g vs. 5963 g, $p<0.02$). At the end of nursery, pigs in the treatment group weighed more than the control (31.46 kg vs. 29.94, $p=0.069$). At marketing, pigs in the treatment group were 3.5 kg heavier compared to the control ($p=0.05$). Additionally, pigs that received two doses of iron had an improved ADG (0.71 vs. 0.68, $p=0.058$).

Discussion and Conclusion

Similar to previously published studies, pigs in the Danish sow herd performed similarly. These studies underscore the importance of optimal iron dosing in pigs, especially with older wean ages. Even with iron-rich creep feed provided, producers and veterinarians should consider increasing iron dosing to supplement modern pig growth.

HHM-PP-33

PRECISE DIGITAL CONTROL OF VISITS TO THE DEAD STOCK CONTAINER REDUCES THE RISK OF PATHOGEN DISSEMINATION WITHIN THE FARM.

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Background and Objectives

The role of people in pathogen transmission is well documented. Farm personnel can contribute to the internal recirculation of pathogens, especially when interacting with areas of high infection pressure, such as carcass containers. This study examines staff interactions with the carcass area to assess compliance with biosecurity standards and their potential impact on the internal recirculation of pathogens.

Material and Methods

The study was conducted between June and August 2024 on a 2.500-sow commercial farm with production sites I and II. Biorisk Internal® software (Animal Data Analytics SL, Segovia, Spain) was used to monitor personnel movements, segment production areas and place receivers in each zone. Workers and visitors wore a beacon, which was read by the receivers at the entrances and exits of each building. In this way, staff routes were tracked, allowing the number of movements and the associated risk between areas with animals of different ages and health statuses to be identified.

Results

During the study, 1,592 visits to the carcass area were recorded, with an average of 17 visits per day. Of the visits, 41.17% (7 out of 17) were made by a single worker in charge of managing the carcasses. After interacting with the carcass area, the workers visited the following areas: 81 times the maternity area, 36 times the gestation area, 32 times the transition area and 6 times the quarantine area. In the remaining cases, they went to the changing rooms for further decontamination.

Discussion and Conclusion

Farm staff can play a key role in the recirculation of pathogens, with the risk accumulating in specific individuals. Biorisk Internal® helps to train and raise staff awareness of their movements, improving biosecurity and reducing the risk of internal recirculation.

HHM-PP-34

NOVEL GEL-BASED ADMINISTRATION OF TOLTRAZURIL AND PONAZURIL FOR NEONATAL COCCIDIOSIS CONTROL

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Background and Objectives

Neonatal coccidiosis, caused by Cystoisospora suis, presents as diarrhea in the first three weeks of life, resulting in economic losses via reduced gain. Toltrazuril is used to manage C. suis by individual administration to piglets orally or via injection. Use of gel at the litter level provides the opportunity to apply passive group treatment requiring minimal interaction with piglets, reducing stress and decreasing labour.

Material and Methods

Sows from a 400-sow organic site with historical clinical coccidiosis were allocated to four treatment groups with even parity distribution, ~20 litters/group. Treatment groups included: control, toltrazuril gel (TG), ponazuril gel (PG), and toltrazuril/iron (TI) injection. At 4-days of age (doa) processed litters received iron or TI injection. Gel was administered to creep areas twice (6/7 doa). Piglets were individually weighed within 24hrs of birth and preweaning (~28 doa). Pooled fecal samples were collected at 10, 17, and 24 doa, and crate-level scour and diarrhea-related sick pigs were assessed.

Results

When comparing the average proportion of sick pigs, TI and TG groups had significantly fewer sick pigs compared to the PG and control groups regardless of day ($p<0.004$). ADG was not significantly different across treatments (0.26kg/d, $p=0.97$). When evaluating the presence of C.suis, TI litters had significantly fewer positive samples at all time points compared to other groups ($p<0.001$). Mean crate scour scores were significantly different across all groups at all time points ($p<0.01$); however, TI and TG groups had the lowest proportion of scouring litters.

Discussion and Conclusion

Although TI and TG groups saw reductions in C. suis positive samples and lower magnitudes of detection, TG and PG groups showed similar clinical presentation compared to TI, in the form of crate scour score and percentage of diarrhea-related sick pigs, demonstrating the feasibility of gel administration methods as alternatives for coccidiosis control.

HHM-PP-35

HISTORICAL OVERVIEW OF SWINE INFLUENZA VIRUS SUBTYPES IN THE NETHERLANDS 2018-2024

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Background and Objectives

Swine influenza A virus (swIAV) is an important pathogen, causing respiratory disease and reproductive disorders. Zoonotic risk is ongoing. In this report an overview of the occurence of different swIAV subtypes isolated on Dutch farms from January 2018 through September 2024 is presented.

Material and Methods

Samples for swIAV detection collected by veterinarians included nasal swabs, lungs, oral fluids, BALF, tracheo-bronchal swabs and udder wipes. Samples originate from animal categories with and without respiratory clinical signs. PCR (VetMAX-Gold Influenza SWIAV-PCR swine) was performed for presence of swIAV. Subtyping was performed by PCR (swIAV Influenza Subtyping Multiplex-PCR) on samples with a Ct-value £ 30. In the period January 2018 to September 2024, 511 swIAV strains were subtyped.

Results

From January 2018 to September 2024, the classical subtype H1avN1 was the most prevalent (41.5%), followed by the pandemic subtype H1pdmN2 (26.8%) and further followed by the subtypes H1huN2 (14.9%), H1avN2 (8.6%), H1pdmN1pdm (4.79%), H1huN1 (2.3%) and H3N2 (1.2%). The pandemic subtypes H1pdmN2 and H1pdmN1pdm account together for 31.5%. Comparing subtypes found in the period 2018-2019 (n=58), 2020 (n=116), 2021 (n=108), 2022 (n=120), 2023 (n=66) and Jan.-Sept. 2024 (n=43), in these respective periods, the H1avN1 subtype accounted for 43.1%, 46.6%, 38.0%, 37.5%, 39.4% and 48.8%, H1pdmN2: 19.0%, 32.8%, 26.9%, 32.5%, 22.76% and 11.6%; H1huN2: 25.9%, 12.1%, 20.4%, 10.8%, 15.2%, 4.7%; H1avN2: 8.6%, 5.2%, 2.8%, 10.8%, 10.6%, 23.3%; H1pdmN1pdm: 0.0%, 0.9%, 6.5%, 5.8%, 6.1%, 11.6%.

Discussion and Conclusion

The classical swIAV subtype H1avN1 is still most often detected in the Dutch swine population, although its proportion has gone up and down over the years. The pandemic subtype H1pdmN2 is the second most prevalent and together with the other pandemic subtype H1pdmN1pdm, they account for 1 out of the 3 subtypes found in Dutch farms. H1avN2 has been found more in 2024 compared to the past.

HHM-PP-36

POSTPARTUM DYSGALACTIA SYNDROME SELF-DIAGNOSIS AND PREVALENCE IN FRENCH HERDS

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Background and Objectives

Postpartum Dysgalactia Syndrome (PDS) is still present in sow herds and requires prudent use of antibiotic treatments and prevention. However, because of various non-specific symptoms, diagnosis may be difficult. The aim of this study was to investigate prevalence of PDS, diagnosing criteria, treatments, and risk factors according to farms.

Material and Methods

A survey was conducted through telephone interviews of French pig farms, with or without regular occurrence of PDS. We collected characteristics of herds and their technical results. Farmers self-declared PDS clinical signs (nature, severity, prevalence) and treatments implemented. Survey included questions about management, focusing on known published risk factors associated with PDS. Descriptive, univariate and multivariate statistical analysis were performed.

Results

Fifty-five farms were recruited. Average size and performance (16.8 total born and 13 weaned piglets) were representative of French results. In 20% of herds, temperature of sows is never controlled, while systematic monitoring of all sows occurs in 18% of the herds. Fever thresholds vary between 39°C (23% farms) and 40°C (7% farms), with only 23% herds using 2 thresholds. Fever and purulent discharge are the main reasons for systematic antibiotic treatments. Self-declarations of PDS vary according to clinical signs and farms. Severe PDS (2 signs) is declared by 45% herds, with estimated average sow prevalence of 4.3% (0 to 20%). Some management strategies differ according to PDS prevalence.

Discussion and Conclusion

Estimated average prevalence of PDS may seem low in this sample of herds selected based on PDS-related issues. We confirm significant variability between herds with possible inadequate fever monitoring. Establishing a clear definition of PDS is essential both for management of diseased sows, analysis of risk factors and implementation of prevention strategies. This study suggests that severity of PDS could be assessed in farms using various thresholds of prevalence for different clinical signs (3 to 10%).

HHM-PP-37

DIAGNOSTIC SCREENING FOR RESPIRATORY PATHOGENS IN PIGLETS IN 32 DANISH SOW HERDS

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Background and Objectives

An efficient and early diagnosis of pathogens spreading in the farrowing unit is critical to ensure the correct treatment of the piglets through antibiotics, adjusted management and/or vaccination procedure.In this study we present the findings from pooled nasal swabs collected routinely from piglets at 32 randomly selected Danish sow herds. These samples were analyzed for a broad spectrum of respiratory relevant pathogens.

Material and Methods

Pooled nasal swabs were collected from piglets at week 1, week 2 and just before weaning at approximately 4 weeks of age. If present in the age group, samples were collected from piglets showing clinical signs of respiratory disease. The samples were analyzed using a high-throughput real-time qPCR procedure, for the presence of Pasteurella multocida, Mycoplasma hyorhinis, Streptococcus suis type 2, Glaesserella parasuis, Bordetella bronchiseptica, Influenza A, Porcine Cirvovirus type 2 and Porcine Cytomegalovirus[1].

Results

A few of the pathogens were positive all the samples such as Streptococus and Glaesserella whereas the prevalence for the other bacterial pathogens showed a clear tendency to increase with age of the piglets ranging from 19 % to 47 % in week 1 and increasing from 33% to 80% just before weaning. This was also evident for influenza A and Porcine Cytomegalovirus with an increase in prevalence from 9 % and 28 % at week 1 to 57 % and 77 % just before weaning respectively. The prevalence for PCV2 remained below 13% in all age groups.

Discussion and Conclusion

A systematic diagnostic approach in several farms will create a database of diagnostic data that will allow us to compare farms on their use of antibiotics, vaccines and management.And the use of a broad diagnostic platform will provide us with knowledge regarding interactions of the various pathogens within the herd and the possibility of evidence-based interventions and optimized use of vaccines and antibiotics

HHM-PP-38

LUNG LESION EVALUATION AT SLAUGHTER: 2015-24 OVERVIEW OF CEVA LUNG PROGRAM RESULTS IN PORTUGAL.

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Background and Objectives

CEVA Lung Program (CLP) has been collecting data from slaughtered Portuguese pigs since December 2015. This data allowed to measure the incidence of bronchopneumonic and pleuritic lesions, and to infer the prevalence of enzootic pneumonia and swine pleuropneumonia in slaughter pigs. The aim of the present study is to synthesize and compare the average yearly results during the period 2015-2024.

Material and Methods

Between December 2015 and November 2024, were scored 1514 batches of pigs from Portuguese farms (167.117 pigs from 393 farms) at slaughter using the CLP methodology (Modified Madec System and Modified SPES as described by Cvjetković et al, 2018). The data were analysed with Microsoft Excel®.

Results

The incidence of bronchopneumonic lungs decreased from 2015 (45.43%) to 2020 (20.27%) with 33.92%, 26.08%, 27.55, 23.61% between 2016 and 2019, increasing again since 2021 (22.27% in 2021, 23.21% in 2022, 23.22% in 2023 and 36.15% in 2024). The severity of the lesions (Madec Index) followed a similar pattern. The incidence of dorsocaudal pleurisy showed a similar pattern with the point of inflex in 2021 (41.00%, 18.88%, 24.47%, 14.57%, 13.18%, 14.00%, 11.58%) between 2015 and 2021, increasing from 2022 to 2024 (12.79%, 17.76% and 20.75%). The severity of the lesions (APPI Index) followed a similar pattern.

Discussion and Conclusion

Enzootic pneumonia and swine pleuropneumonia remain uncontrolled at farm level. It was observable an increment in the bronchopneumonic lesions severity and incidence since 2020, and in dorsocaudal pleurisy lesions severity and incidence had the same pattern since 2021. Is this a consequence of a reduction in CLP audits in during the COVID-19 pandemic? Or a consequence of the reduction of usage of antimicrobials? It seems crucial to evaluate how effective these diseases control programs are today and continue to monitor lung heath and animal welfare.

HHM-PP-39

EVALUATION OF DEPLOYABLE FAN COVERINGS FOR BIOCONTAINMENT OF AIRBORNE SWINE PATHOGENS

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Background and Objectives

Pathogens such as PRRSV and IAV are spread by respiratory secretions and other particles. While air filtration reduces pathogen introduction, biocontainment remains underexplored. This study aimed to evaluate the efficacy of rapidly deployable exhaust fan coverings for aerosol biocontainment by measuring total air particle quantity reductions.

Material and Methods

One wean-to-finish site was selected featuring various fan sizes (24" to 50"). Three materials were compared to a fan with no covering: PolyKlean™ synthetic media (Blue Poly), Nylon, tear-resistant fan sock (Fan Sock) staked to the ground to redirect airflow, and Polyethylene privacy screen (Black Screen). Airborne particle counts were collected using an optical particle counter. Measurements were collected 1 meter from the fan interior and 1, 2, and 3 meters from the fan exterior. Three consecutive air particle measurements were performed per distance and location to calculate an average particle count, with three replicates completed for each treatment and fan. Data was analyzed using a two-way repeated measures ANOVA to evaluate the effects of fan cover treatment and fan size on air particle quantity measurements.

Results

At 1 meter outside the fan, the fan sock treatment had a lower average 5.0 µm particle count compared to no cover or the blue poly treatments ($p=0.046$). Differences in air particle counts based on fan size were not observed ($p>0.10$).

Discussion and Conclusion

The fan sock treatment had the greatest impact of reducing air particles at 1 meter outside of a fan compared to other treatments. However, as the distance from the fan increased, there was no difference in air particle quantity across the fan cover treatments. This pilot study suggests that rapidly deployable fan coverings may reduce air particle quantity at short distances from the barn, thus questioning its role in improving biocontainment of aerosolized pathogens.

HHM-PP-40

CONCENTRATION OF ACUTE PHASE PROTEINS IN SOWS PERIPARTUM

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Background and Objectives

Determining the health status of parturient sows or sows shortly after parturition is still a challenge in the field. Measuring levels of acute-phase proteins (APPs) pig-MAP and haptoglobin could create a practical tool for diagnostics in the field. The aim of this study was to investigate the influence of physiological parturition on the concentration of APPs in serum, milk and saliva of periparturient sows.

Material and Methods

Nineteen clinically healthy periparturient sows were enrolled in this study. Samples were taken at seven time points: T0 (112th day of gestation), T1 (peripartal), T2 (12h post partum (p.p.)), T3 (24h p.p.), T4 (48h p.p.), T5 (72h p.p.) and T6 (14 d p.p.). Clinical examination was performed and serum, milk and saliva samples were collected and analysed by ELISA.

Results

In serum samples, pig-MAP-concentrations at time points T3-T5 (2.42-3.64 mg/ml) were significantly increased compared to T0 (1.16 mg/ml) and at T4-T5 (3.29-3.64 mg/ml) compared to T6 (1.68 mg/ml). Haptoglobin-concentrations were significantly increased at time points T2-T5 (2.88-3.87 mg/ ml) compared to T0 (2.03 mg/ml) and at T3-T5 (3.26-3.87 mg/ml) compared to T6 (2.35 mg/ml). In milk both, pig-MAP and haptoglobin-concentrations were significantly increased at T1-T5 (pig-MAP: 0.06 mg/ml; haptoglobin: 0.99-0.60 mg/ml) compared to T6 (pig-MAP: 0.02mg/ml; haptoglobin: 0.11mg/ml). In saliva haptoglobin-concentrations were significantly increased at the time point T2 (4.18 mg/ml) compared to T6 (0.92 mg/ml).

Discussion and Conclusion

The significant increase in pig-MAP and haptoglobin-concentration in serum, milk and saliva peripartal and up to 72h p.p. demonstrates that these APPs may be useful as early indicators of impaired sow health during parturition. Comparing the baseline value T0 in this study with literature, it is striking that an increase in APPs-concentrations can already be measured in sows in late gestation.

HHM-PP-41

HE GOLDILOCKS PROBLEM OF SELECTING JUST THE ONE HEALTH ADDITIVE FOR PIGLETS COMPARED TO ALTERNATIVES.

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Background and Objectives

Without routine antibiotics, health-promoting feed components are common in pig production. This study compared several alternatives in one trial to identify the best for herd health and performance. Economics typically allow only one product in the weaned-to-finish period. Three alternatives (butyrate, immunomodulator, probiotic) were compared to a control. Conducted outside the EU under challenging conditions, a negative control was deemed too risky, so an antibiotic-positive control was used to assess each alternative's relative benefits.

Material and Methods

25 day-olds piglets sorted by genetic line and sex and randomly grouped into four treatments: T0 (Positive control) 529 pigs/23 pens, T 1-3 (butyrate, immunomodulator, probiotic) each respectively 552 pigs/24 pens. Pigs were fed a standard commercial diet with in feed addition of the respective treatements. Trial concluded at 137 days of age, all commercial production parameters (BW, FI, FCR, ADG) were recorded and subsequently statistically analysed on a per pen basis. Data were analyzed, and the main and interactive effects of gender and feeding program were tested using the statistical model. Faeces consistency and mortality were recorded for the entire trial period.

Results

Numerically BW at 137 days was highest for the positive control group (T0) with 91.98, however this was not statistically significant ($p>0.05$). All treatments T1-T3 significantly outperformed the control in survival ($p<0.05$). Treatments T1 and T3 showed equal diarrhoea scores to Positive control (T0), with only T2 showing a slight but significant increase; 6-10% in the nursery phase ($p<0.05$).

Discussion and Conclusion

This unique opportunity to test three alternatives on a commercial farm with a large number of animals confirmed that viable options exist to replace routine antibiotics in terms of performance. However, to identify differences between these alternatives, well-designed challenge trials or field studies are needed, as even the large animal numbers in the present study were insufficient to show statistically significant differences between T1-T3

HHM-PP-42

EXPLORING CARBONIC ANHYDRASE VI AS A HEALTH STATUS INDICATOR IN PORCINE SALIVA SAMPLES.

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Background and Objectives

Carbonic anhydrase VI (CA VI) is an enzymatic protein with the presence of Zinc in its active centre which is mainly synthetized in the salivary glands. It is speculated that it has a mucosa-protective role in the gastrointestinal and respiratory tract, and an increased secretion under disease conditions could be hypothesized. We have studied, for the first time, the levels of salivary CA VI in healthy and diseased growing pigs to check its possible use as health status indicator.

Material and Methods

A total of 111 diseased pigs and 55 apparently healthy pigs from commercial growing farms in the southeast of Spain. Individual saliva samples were collected during routine veterinary examination and the concentrations of CA VI and Zn were measured by ELISA and atomic absorption spectrometry respectively. The possible differences in the levels of both parameters between healthy and diseased animals were statistically analyzed using unpaired t test with Welch's correction since data neither follow normal distribution nor homoscedasticity criteria. Moreover, a statistical analysis was also performed after subdividing the diseased pigs into 5 groups: lameness (n = 16), diarrhea (n = 11), dyspnea (n = 30), tail biting (n = 40) and local inflammation (n = 14).

Results

The concentrations of CA VI appeared statistically increased in diseased pigs in comparison to healthy animals while the opposite was observed for Zn levels. The highest concentrations of CA VI were observed in the groups of local inflammation and dyspnea. For the Zn concentrations, the lowest levels were reported in animals with local inflammation and lameness followed by dyspneic pigs.

Discussion and Conclusion

The concentrations of CA VI increase in diseased pigs next to a decrease in Zn levels. Further studies would be needed to elucidate the specific role of salivary CA VI under different pathological conditions.

HHM-PP-43

HHM-PP-43

MONITORING OF PRDC ASSOCIATED PATHOGENS IN FATTENING PIGS

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Background and Objectives

Influenza A Virus (IAV), Porcine Respiratory and Reproductive Syndrome Virus (PRRSV), Porcine Circo Virus Type 2 (PCV2), Mesomycoplasma hyopneumoniae (M.hyo) and Actinobacillus pleuropneumoniae (App) are considered as primary pathogens of the porcine respiratory disease complex (PRDC). They compromise the immune system, facilitating secondary pathogens. Therefore, early identification of circulating pathogens is crucial to minimize their impact. Thus, we investigated whether longitudinal monitoring of primary pathogens by PCR combined with Nanopore sequencing (NS) in cases of acute respiratory distress further enhances effective diagnosis and tailored interventions.

Material and Methods

Twenty-one fattening farms in Germany were selected based on the occurrence of lung lesions at slaughterhouse. A cohort of animals was sampled longitudinal—beginning, mid, end of fattening and slaughterhouse—using Oral Fluids (OFs). OFs were tested by PCR for PRRSV, PCV2, IAV, M.hyo and APP. In case of acute respiratory signs, tracheobronchial swabs (TBS) were obtained and analyzed by NS. In addition, lung lesions were assessed using the Ceva Lung Program (CLP) scoring methodology.

Results

PCRs were positive for APP and PCV2 in 95.5%, PRRSV in 61.9%, IAV in 38.1% and M.hyo in 33.3% of the farms. In acute cases (15 farms) investigation of TBS by NS revealed M.hyo in 86.7%, PRRSV in 33.3% and IAV in 26.7% of the farms. PCV2 and APP were not found in TBS samples of fattening pigs by NS. Further potential coinfections detected by NS were predominantly Pasteurella sp. and Glaesserella parasuis. The CLP score did not significantly differ between farms with and without acute respiratory signs ($p<0.05$).

Discussion and Conclusion

OFs are suitable to early identify pathogens contributing to PRDC. In addition, TBS samples are a valuable tool for the detection of M.hyo in case of acute respiratory distress. Interestingly, a reduced diversity of microbials was detected by nanopore sequencing in fattening pigs compared to a previous study using younger pigs.

HHM-PP-44

INNOVATIVE TOOLS FOR MYCOPLASMA HYOPNEUMONIAE CONTROL AND MONITORING IN THE FIELD

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Background and Objectives

Effective surveillance, specially for Mycoplasma hyopneumoniae (Mhyo), is key for understanding transmission patterns and disease management strategies. Sound-based technologies have demonstrated to improve early detection and disease surveillance. The objective of this study was to evaluate the impact of 2 different vaccine strategies on the patterns of Mhyo clinical signs in a commercial grow-finish population using a sound-monitoring technology.

Material and Methods

4018 PRRS&Mhyo pigs from a single sow-flow housed in 3 finishing-barn were sound-monitored (3 monitors/ room, 2 rooms/barn, adjacent/parallel buildings). Pigs were vaccinated at 21 days of age (DOA) with a Mhyo single-dose vaccine. Upon arrival on the finishing barns (56DOA), and following a “checkered pattern”, pigs from alternative pens (50% of the total) in barns A&B received a booster vaccination with the same single dose vaccine while those from barn C remained as a negative control. Respiratory health status (30deep tracheal swabs-PCR-116daysDOA/barn, %respiratory_alarms-green, yellow, red) as well as production performance and treatment data were monitored by room and analysed for the study.

Results

Despite starting with a similar ReHS pattern due to PRRS, overall %_days without respiratory alarms (%green_days) as well as consequent pattern developed due to Mhyo infection significantly differed between barns (58%, 32% and 2% in barns A, B, and C respectively, Chi^2=337, $p<0.0001$; avgCT$\geq$38 (neg) and avgCT=23 (pos) in barns A&B (boostered) vs C (1dosis) at 116DOA). Production analysis demonstrated a 0.08 feed_coversion rate decrease difference between strategies (barns A&B vs C).

Discussion and Conclusion

Innovative monitoring technologies can effectively measure the impact of Mhyo control strategies in unstable flows. Overall Mhyo pattern decreased with distance from barn C to barn B and A respectively translated into a relative benefit of a Mhyo booster vaccination with economic benefits. However, proximity to the outbreak (barn C) and 50% of booster-vaccine coverage, could explain the differences observed in the study.

HHM-PP-45

HANDLING PIGLETS BY ONE HINDLEG: A POTENTIAL RISK FACTOR FOR UMBILICAL OUTPOUCHINGS IN PIGS

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Background and Objectives

Umbilical outpouchings (UO) in pigs are a challenge due to reduced welfare and early euthanasia. Risk factors for UO development include umbilical infections, trauma and genetics. In conventional pig production piglets are handled several times during the first days of life, and it has been speculated whether lifting and handling of piglets by one hindlimb may harm the healing of the umbilicus, weakening the abdominal wall and increasing the risk of UO. The aim of the study was to evaluate whether handling techniques of piglets has an impact on the development of UO.

Material and Methods

In a Danish indoor sow herd, litters of piglets were allocated into two groups at the day of birth. Piglets in Group A were handled with support under the abdomen for the first 2 weeks of life in order to minimize physical stress on the umbilical area. Piglets in Group B were handled by one hind leg for the first two weeks of life. Pigs were clinically examined for presence of UO at 2 and 9-10 weeks of age. Pigs that died were necropsied.

Results

A total of 1,901 pigs were included at birth and 1,626 pigs were examined at week 2, 9-10 or at necropsy. Umbilical outpouchings were present in 5.9 % (46/780) and 7.4 % (63/846) of the pigs in Group A and B during the study period respectively. A generalized linear model with UO development as outcome and handling strategy, sex and mother sow as explanatory variables showed an OR 0.7 for UO in group A compared to group B (CI: 0.5-1.1, p=0.12).

Discussion and Conclusion

Piglets handled with support under the abdomen had a statistical tendency (p=0.12) for a decreased odds of for UO development compared to piglets handled by one hind leg.

HHM-PP-46

IMPACT OF MATERNAL ANTIMICROBIAL TREATMENT ON THE DEVELOPMENT OF PIGLET FECAL MICROBIOTA AND GROWTH

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Background and Objectives

Antimicrobials are frequently used in swine industry to treat bacterial infections. Growing concerns have emerged around the impact of antimicrobial use in pregnant animals, especially on the gut microbiota of their offspring. Studies show that maternal antimicrobial administration disrupts neonatal gut microbial composition, reduces diversity, and has lasting implications on gut health. We aimed to examine the potential impact of antimicrobial exposure during pregnancy, when the piglet immune system is developing, and focusing on potential long-term influences on neonatal gut health.

Material and Methods

Sows at 80 days of gestation in a Finnish commercial farm were treated with penicillin, tetracycline or saline (control), 10 sows per group. Fecal and vaginal samples were collected from sows before treatment and in late pregnancy and colostrum during farrowing to assess changes in microbiota. Fecal samples from 82 healthy piglets were further collected at 3 days from birth, before weaning (age 23-27 days), and post-weaning (age 70-74 days). Microbial profiling was performed using 16S rRNA gene amplicon sequencing. Maaslin3 and coda4microbiome were used to perform differential abundance analysis.

Results

The α-diversity in feces was significantly higher in post-weaning piglets of antimicrobial treated sows compared to those born to control sows. Differentially abundant taxa were found most prominently in 3-day-old and post-weaning piglets. At 3 days, Enterococcus, Escherichia and Faecalicoccus were differentially abundant. In post-weaning piglets, the fibre-degrading genera Blautia, Faecalibacterium, Agathobacter and Mitsuokella were differentially abundant, and significantly associated with average daily growth. Sow feces, vaginal and colostrum microbiotas were similar between experimental groups at farrowing.

Discussion and Conclusion

Antimicrobials given to pregnant sows influenced early life intestinal microbiota development and growth of piglets. Differences in piglet microbiotas were observed despite that the sow microbiotas were no longer different at farrowing. We are currently studying the systemic and intestinal immunity in the piglets.

HHM-PP-47

DANISH PRRS REDUCTION STRATEGY IS DELIVERING PROMISING RESULTS

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Background and Objectives

In May 2022, a joint strategy developed by veterinary authorities, slaughter companies, veterinarians, and pig producers, to reduce PRRS in Danish pig production was initiated. The goal of the strategy is that 75% of all finishers will be PRRSV seronegative at slaughter and 85% of all sow herds will be PRRSV seronegative. The objective of the paper is to give a status on the progression of the reduction strategy.

Material and Methods

A range of measures have been implemented with the purpose of paving the road for a national reduction of PRRS. The most important measure is mandatory public declaration of serological PRRSV status of all herds, tracking of trade patterns and area maps that provide real-time visualization of the geographical distribution of pig herds by PRRS status, accessible by all pig producers, veterinarians, and advisors. Furthermore, regional eradication programs with local veterinary leadership have been established to systematically tackle the virus in areas with high density of PRRS positive herds.

Results

By November 2024, regional eradication programs have been established throughout Denmark covering 87% of all Danish pig herds. Significant variation in PRRS prevalence has been observed among the PRRS regional eradication programs, with a higher prevalence of PRRSV seropositive herds identified in the western region of Denmark. The eastern part of Denmark is close to be free of PRRS positive herds.The proportion of PRRSV seronegative finishers delivered for slaughter has improved since the reduction strategy was published from 25% to 66%. The proportion of PRRSV seronegative sow herds have improved from 58% to 72%.

Discussion and Conclusion

The Danish PRRS reduction strategy which was initiated in May 2022 is beginning to deliver promising results. Next step is to develop a follow-up monitoring system in regions which have been declared free of PRRS to ensure full control of the virus among Danish pig herds.

HHM-PP-48

BIOSECURITY EVALUATED BY COMBAT: RESULTS FROM 13 SWINE FARMS IN DENMARK

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Background and Objectives

COMBAT is a free online tool for evaluating and improving biosecurity on swine farms, focusing on internal and external biosecurity, transport and management. The objective of this study was to evaluate the biosecurity level in swine farms during the Danish national PRRS-eradication program and assist on biosecurity decisions to ensure PRRS-eradication or prevent PRRS re-infection.

Material and Methods

COMBAT was performed at the farm by the veterinarian or one of the authors with farm owner or staff. The COMBAT benchmarking tool was used for data analyses and all farms were anonymized. The COMBAT program provides an overall biosecurity level (biosecurity risk index), shows specific areas needing improvement and suggestions on how to act.

Results

From November 2023 to October 2024 13 farms were included. 11 farms scored “low” or “very low” (biosecurity risk index below 40/100). These have a high probability to successfully eliminate PRRS and stay negative. Two farms scored “moderate”. Four low-risk farms are PRRS-free and located in a PRRS-high risk area. The most frequent COMBAT recommendations were to enhance hygiene and procedures for disposal/transport of dead animals, to build fences around farms and keep longer downtime for visitors.

Discussion and Conclusion

The good biosecurity level in Danish farms was confirmed in this study. If the Danish farms keep this level the national PRRS eradication program should succeed. This was confirmed with the four low risk farms kept free only few kilometers from PRRS-positive farms. Recommendations are to ensure optimal procedures around dead animal disposal. Fences are irrelevant in Denmark as one fence at the German border prevents entrance of wild boars.

HHM-PP-49

2021-2023 REVIEW OF LUNG SCORINGS ON 2500 FRENCH PIG FARMS. ANALYSIS OF ANNUAL (2018-2023) AND SEASONAL VARIATIONS

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Background and Objectives

The Ceva Lung Program (CLP) evaluates Enzootic Pneumonia like lesions (EP) by scoring lungs at slaughter. The objective of this work is to synthetize results of French CLP from 2021 to 2023, and to describe the seasonal and annual evolution of EP since 2018 (previous study).

Material and Methods

Scorings were performed using original Madec grid on 6 lobes (0 to 4 per lobe; score out of 24) by skilled operators in mainly 5 major slaughterhouses.
Average of scorings per farm and per year was calculated leading to an annual average EP score.
Farms were located in the western part of France and recruited following specifications or veterinary requests.

Results

From 2021 to 2023, 2494 farms were evaluated (9193 scorings, 727109 lungs; 1689 farms on average per year).
The 2021-23 assessment per farm shows a historically low level of EP (1.29/24; 10.6% of farms with EP≥3).
Annual evolution of EP score since 2018 decreased from 1.84 to 1.23 whereas the score for the farms inspected every year remained stable (1.37-1.28).
A seasonal effect was observed, summer scorings being lower (-0.23 maximum). When considering a potential farm effect by comparing summer scorings to those of other seasons of the same farm, summer EP score was significantly lower than winter one (-0.18; Wilcoxon paired test).

Discussion and Conclusion

Motivation for scoring was not recorded but we can hypothesize that farms scored every year probably adhere to specifications which implies good health management and could explain the difference with the global population.
A seasonal effect is confirmed. However its amplitude remains very limited, perhaps due to temperate oceanic climate of the area and indoor pig breeding.
Although this assessment is not based on a randomized sample, its scope (30% of French farms included) makes it a formidable observatory of lung lesions in the French pig production.

HHM-PP-50

HEALTH ASSESSMENT IN PIGS: IS IT INFLUENCED BY THE ASSESSOR?

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Background and Objectives

The valid, objective and repeatable assessment of animal health is essential to compare farms' health statuses over time and to evaluate the effect of management measures within a farm. For comparisons between different farms, it is also important that different assessors have high agreement, and that their assessments do not include major differences. In this study, we investigated these differences between different assessors.

Material and Methods

With the Smart Animal Health method, a pig health assessment was established based on animal-based parameters (e.g. lameness, tail lesions, runts) and resource-based parameters (e.g. cleaning and disinfection, water supply). Overall, 57 parameters were allocated to five age categories (piglets, weaners, fattening pigs and gestating and lactating sows). This method was carried out on 94 farms by either one researcher or one out of 9 specialized pig veterinarians. The continuous and categorical results of the two assessor groups for different parameters were compared using the Mann-Whitney U test and chi-square tests, respectively.

Results

Significant differences between assessor groups were found for the assessment of calluses (joints and shoulder) in weaners, fattening pigs, gestating and lactating sows (all $p<0.001$). Also, the observed proportions of lame fattening pigs and lactating sows show significant differences, as the researcher assessed more lame animals in these categories ($p<0.001$). For the categorical parameters, the cleanliness of the drinking stations in fattening pigs, gestating, and lactating sows was assessed differently in a way that the researcher counted more stations as dirty as the group of specialized veterinarians did ($p<0.001$).

Discussion and Conclusion

Most of the analysed parameters showed no significant difference between the two groups of assessors and the Smart Animal Health method could be carried out in practice independently of the assessor. For some parameters that either had a broader definition (callus) or were more subjective (cleanliness) a higher agreement might be reached by training.

HHM-PP-51

INCREASED ANTIMICROBIAL USAGE IN PRRS SEROPOSITIVE PIG HERDS

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Background and Objectives

Acute outbreak of Porcine Reproductive and Respiratory Syndrome (PRRS) in sow herds have been linked to increased antimicrobial usage. As the virus infection is associated with immunosuppression, chronic infections could also be associated with increased antimicrobial usage. The objective of this study was to determine if chronic PRRS seropositive health status correlates with increased antimicrobial usage on herd level.

Material and Methods

As part of Denmark's PRRS reduction plan, all pig herds are tested for PRRS antibodies at least once yearly. This study included herds with unchanged PRRS health status (either seropositive or seronegative) throughout 2023. Antimicrobial prescription data and the number of pigs per age group are publicly available for all Danish herds. Antimicrobial prescriptions were converted to Animal Daily Doses (ADD) per 100 animal days for each age group, sows/piglets, growers, and fattening pigs. The antimicrobial consumption in herds with positive and negative PRRS health status was compared using the Wilcoxon Rank Sum Test and Students T-test.

Results

Antimicrobial usage was significantly higher in seropositive sow herds and grower herds compared to seronegative herds. For sow herds, the median use was 6.1 % higher (p=0.003) in seropositive herds (2.42 ADD/100 animal days) compared to seronegative sow herds (2.28 ADD/100 animal days). For grower herds, the median use was 8.1 % higher (p=0.001) in seropositive herds (9.93 ADD/100 animal days) compared to seronegative herds (9.19 ADD/100 animal days). For fattening pigs, an observed numerical difference of 5% in median use was not statistically significant.

Discussion and Conclusion

The results suggest that reducing the prevalence of PRRS infected herds will lead to a reduction in the consumption of antibiotics at national level, both from a decrease in acute outbreaks and chronically infected herds. However, at the individual herd level, the reduction of antibiotic consumption through PRRS elimination will depend on many other factors.

HHM-PP-52

EVALUATION OF COLOSTRUM INTAKE

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Background and Objectives

Colostrum is crucial for newborn piglets' survival due to its energy and passive immunity. Piglet needs at least 250g of colostrum, the average production per sow per litter is 3.67 kg. Homogeneous distribution of colostrum among piglets is essential, but increasing litter size and weight dispersion make this challenging. This study evaluates colostrum intake by estimating IgG levels in piglets' serum at 24-36 hours of life.

Material and Methods

The study included 4,104 piglets from 114 farms. Six litters per farm were randomly selected at 24-36 hours of life. Six piglets per litter were chosen based on visible weight differences (2 heavy, 2 middle, 2 light). Blood samples were taken, and 1,547 piglets were followed until weaning. IgG levels in serum were determined using refractometers, converting the refractive index into %Brix to estimate IgG concentration. Adequate colostrum intake was defined as serum IgG levels above 20 mg/ml.

Results

The average IgG concentration was 27.12 mg/ml with a coefficient of variation of 40.69%. 27.13% of piglets had serum IgG levels below 20 mg/ml. Among piglets, 69.5% of light, 73.5% of middle, and 76.4% of heavy piglets ingested enough colostrum, with average IgG levels of 26.16 mg/ml, 27.22 mg/ml, and 27.43 mg/ml, respectively. Piglets under 1 kg had an average IgG of 22.88 mg/ml, with only 45.7% above 20 mg/ml. Offspring from gilts had the lowest results (68.3%), improving until the fourth birth (81.8%) and decreasing after the fifth. Piglets from litters with over 17 born alive had an average IgG of 27.17 mg/ml, with 30% below 20 mg/ml.

Discussion and Conclusion

IgG concentration varies significantly between and within farms. 22.36% of piglets had less than 20 mg/ml, correlating with lower growth and higher mortality. Smaller piglets, offspring of gilts, and piglets from large litters ingest less colostrum.

HHM-PP-53

CASE REPORT: FOCUS ON CLEANING AND DISINFECTION TO TACKLE SEVERE POST-WEANING DIARRHOEA OF VIRAL AETIOLOGY

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Background and Objectives

A 1000-sow farm had a history of post-weaning diarrhoea (PWD) due to F4-ETEC. The isolated F4-ETEC strain had a highly resistant antimicrobial profile, limiting available options for antimicrobial therapy. Therefore, the piglets were orally vaccinated against PWD with a commercial E. coli vaccine (Coliprotec F4F18) at the age of at least 18 days with good results during several consecutive months. The case report covers the overall approach of an acute clinical case of severe watery diarrhea in a farm, previously in a stable clinical situation.

Material and Methods

Several consecutive steps were implemented to identify the specific cause of the clinical problem, including a vaccination audit, a broad diagnostic approach using 3rd generation nanopore sequencing (PathoSense) and an evaluation of cleaning and disinfection (C&D) procedures through hygiene scores using Rodac plates.

Results

The vaccination audit did not reveal any abnormalities that could explain the occurring clinical problem. The 3rd generation nanopore sequencing diagnostics revealed the presence of 19 different bacterial and viral pathogens, of which several viral pathogens have an impact on intestinal integrity. Evaluation of C&D procedures revealed a major gap in the standard C&D procedure. This might induce potential survival of several intestinal pathogens, such as Rotavirus A-B-C-H. Therefore, an optimal C&D procedure was implemented in all post-weaning compartments, including a supplementary cleaning step with NaOH 2% followed by application of glutaraldehyde disinfection. This resulted in optimized hygiene scores and clear improvement of the clinical condition and performance of the post-weaned piglets.

Discussion and Conclusion

In conclusion, the occurrence of clinical episodes of PWD in a previously stable situation applying a commercial E. coli vaccination should be examined more broadly to identify other potential interfering intestinal pathogens and impaired management strategies that could have an impact on the overall infectious pressure in the environment of the post-weaned piglets.

HHM-PP-54

IMPLEMENTATION OF DIGITAL TOOLS IN REGIONAL PRRS CONTROL PROGRAMS

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Background and Objectives

Monitoring is a key component for PRRS control programs. This study aims to demostrate the efficacy of digital tools for disease monitoring, such as those based on sound, in growing populations as early indicators of PRRS status during regional PRRS control programs.

Material and Methods

A total of 215 sound-monitoring devices were installed in 13 nurseries and 26 finisher facilities covering 10 sow flows from an integrator located in southeastern Spain. These devices registered and indicated, in real-time, the respiratory clinical signs (respiratory health status or ReHS, green-yellow-red alarms) of these populations as part of their monitoring step for a regional PRRS control program. Viral PRRS status was determined weekly based on tongue tips fluids at farrowing, and from oral fluids at pig-placements in nurseries and finishers facilities. Patterns and trends, as well as correlations between the ReHS and "%days_in_green" (ReHS>60) against CT_PCRs results from sow farms and grow-finish population were analysed.

Results

A total of 11 months-farm data (07/23, 06/24) were analysed in the study. PCR results and clinical signs recorded in the nurseries during the study demonstrated seasonal patterns of the disease (worse in winter vs summer-fall). A significant association was demonstrated between PRRS status at the sow farms and the nurseries (R^2=0.15; p=0.0026) as well as between "%_days_green" or "average_ReHS" and the PRRS status in nurseries (R^2=0.16; p=0.04). Associations between ReHS and other secondary pathogens were also observed at the finishing facilities and linked with specific flows and PRRS status.

Discussion and Conclusion

Digital tools, such as those sound-based, covering the growing-finishing phase could play an important role in PRRS control programs for respiratory health monitoring as demonstrated in this study. Real-time but aggregated data by flow on respiratory health, supported by specific PRRS diagnostics when needed, enhances, and ensures a better and earlier response by veterinarians and supervisors during periods of disease instability when facing PRRS outbreaks.

HHM-PP-55

BACILLUS SP. PB6 ENHANCES SOW REPRODUCTIVE PERFORMANCE UNDER FIELD CONDITIONS: A CASE STUDY

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Background and Objectives

Late gestation and lactation are physiologically demanding periods for sows. Emerging evidence suggests that these stages are associated with changes in the structure and function of the sow's intestinal microbiota. Additionally, clinically significant pathogens, such as Clostridium perfringens, can be transmitted to piglets from the sow. As a result, effective microbiota management strategies could be crucial in enhancing the health of both sows and their suckling piglets. This field trial aimed to assess the impact of a Bacillus probiotic on sow reproductive performance under practical conditions.

Material and Methods

This field trial was carried out in a 500-sow farrow-to-finish farm managed in a 10-batch system in Brittany, France. Cases of diarrhea were observed in piglets. Testing was done on 10 litters 2 to 3 days after birth, selecting 3 piglets per litter, with a Rainbow piglet Scours BIO K 402 (BioX diagnostics, Belgium) and revealed the presence of C. perfringens in 25 piglets out of 30. Sow microbiota management consisted in adding Bacillus sp. PB6 (CLOSTAT®, Kemin Europa NV) at 4 x 10^8 CFU/kg of feed to the diets fed to 10 batches of 44 sows during gestation and lactation. Reproductive performance and piglet growth were measured until 21 days of age and compared to historical data.

Results

Compared to batches from the past 12 months, PB6 resulted in a reduction in the number of litters experiencing diarrhea per batch (3 versus 10) and decreased the percentage of piglets treated with antibiotics (6% versus 23%). Additionally, PB6 led to an increase litter weight at weaning (78.7 kg versus 71.3 kg).

Discussion and Conclusion

This case study demonstrates that PB6 enhances sow performance during lactation as well as growth in suckling piglets. Additionally, the findings suggest that microbiota management with PB6 has the potential to mitigate neonatal diarrhea associated with C. perfringens.

HHM-PP-56

REDUCTION OF ANTIMICROBIAL USE AFTER LAWSONIA INTRACELLULARIS VACCINATION SUGGESTS A POTENTIAL IMPROVEMENT ON BIODIGESTER PERFORMANCE

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Background and Objectives

Composting in biodigesters is a renewable energy source that allows recycling of nutrients, leading to environmental, quality of life and economic improvements. The aims of this study were to evaluate the impact of Lawsonia intracellularis (LI) vaccination on antimicrobial consumption and its impact on the efficiency and performance of the farm biodigester.

Material and Methods

A farm (6300 sows) with a history of Ileitis and operating a biodigester for manure processing was followed up from August 2020 to March 2023. Intramuscular LI vaccination (Porcilis Ileitis) was implemented in November 2021 to control clinical disease. An historical comparison was done comparing a period before (Aug20-Nov21) and after (Dec21-Mar23) implementation of vaccination. Antibiotic consumption and energy production of the biodigesters were measured in mg/kg and Megawatts produced (MW) per biodigester, respectively. The relationship between both variables was investigated by a linear model (Statgraphics Centurion XVI).

Results

Antimicrobial consumption was reduced after vaccine implementation (before: 146,61mg/kg; after: 64,57mg/kg). Similar findings were described for antimicrobials used against enteric disorders (before: 80,8mg/kg; after: 36,6mg/kg) Energy production was increased after vaccination (before: 322 MW; after: 8793 MW).
The equation of the Linear model, fitted to describe the relationship between antimicrobial consumption and energy production was: Energy production (MW) = 14493 - 117.575*antimicrobial consumption (mg/kg). A significant strong correlation (R2=-0.964186; P<0.05) was determined.

Discussion and Conclusion

Under the conditions of this case report, LI vaccination reduced antimicrobial consumption, having a potential impact on the performance of the biodigester. It is hypothesized that this antimicrobial reduction led to an optimal bacterial growth needed for manure bio-digestion, and therefore, improving the efficiency in the generation of biogas and energy through the effluents. Vaccination does not only support animal health but also may improve sustainability in pig production under the One Health umbrella, promoting circular economy, less antimicrobial usage and optimizing this renewable energy source.

HHM-PP-57

AN OVERVIEW OF THE MOST FREQUENTLY FOUND PATHOGENS IN ALTERED SLAUGHTER LUNGS FROM FOUR EUROPEAN COUNTRIES

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Background and Objectives

Tackling the Porcine Respiratory Disease Complex (PRDC) relies on ameliorating farm management and implementing correct treatment and prophylactic measures. These can only be successfully conducted if the pathogens leading to PRDC are diagnosed properly, and a part of this strategy can rely on examining slaughter lungs. The goal of this study is to identify main pathogens present in PRDC-affected lungs from herds located in Germany (DE), the Netherlands (NL), Belgium (BE) and Austria (AT).

Material and Methods

In total, 61 farms with low to high respiratory problems were included. Lungs were scored according to Ceva Lung Program methodology. Within each batch, the investigator selected up to five lungs and sampled the transition area between healthy and affected parenchyma. Pooled samples were then analyzed by a screening-PCR for following pathogens: Actinobacillus pleuropneumoniae (App), Mesomycoplasma hyopneumoniae (Mhyo), Betaarterivirus suid 1 + 2 (PRRSV), Swine influenza A virus (swIAV) and Porcine circovirus type 2 (PCV2).

Results

Mhyo was found on average in 90.2% of all farms, followed by PRRSV1 (47.5%), PCV2 (45.9%), App, PRRSV2 and swIAV respectively (3.3%). There were low differences in the presence of Mhyo between the regions, with high values ranging from 85.7% (NL) – 100% (BE). PCV2 was found in most Belgian herds (80%), followed by NL (42.9%), AT (66.7%) and Germany (35.3%). Most prominent genotype was PCV2d (69.2%), followed by PCV2a and PCV2b respectively (15.4%).

Discussion and Conclusion

We can conclude that the present method of sampling and analysis was practical and efficient for finding latter mentioned pathogens. Most importantly, we demonstrated that PCV2 was detected in PRDC lungs from almost every second herd, with a higher rate for PCV2d. The impact of PCV2 and especially PCV2d in PRDC as an immune-suppressive and co-infective agent should be evaluated in future studies.

HHM-PP-58

ASSESSMENT OF CLEANING AND DISINFECTION PRACTICES ON CONVENTIONAL INDOOR PIG FARMS ACROSS 19 COUNTRIES WORLDWIDE

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Background and Objectives

Biosecurity measures play a pivotal role in minimizing the risk of introducing and spreading infectious agents. Within biosecurity, cleaning and disinfection (C&D) procedures play an important role. The current study aimed to assess the implementation of C&D procedures on conventional pig farms during 2019–2023, with a focus on identifying areas that warrant improvement.

Material and Methods

Biocheck.UGent (https://biocheckgent.com) data from 22285 pig farms in 19 countries worldwide collected between 2019–2023 were considered, and parameters that are of interest to C&D measures were selected.

Results

In terms of protecting the farm from external threats (external biosecurity), 70% of the respondents reported the presence of a hygiene lock and its use by visitors. This practice was especially high in Germany (94%), the Netherlands (94%), and South Africa (95%). Disinfection baths/boot washers were present at the entrance of 57% of farms, with regular changing of fluid in the baths on 67% of farms. However, the application of specific measures for the proper introduction of material was reported only on 35% of the farms. Regarding internal biosecurity, 43% of farms reported the presence of disinfection baths and/or boot washers between compartments/units, and even fewer farms (24%) had hand washing stations and/or hand disinfection equipment between compartments/units. The protocol for C&D of equipment after use was present in almost half of the farms (49%). More than half of farms (64%) reported following proper cleaning and disinfection procedures. In terms of implementing C&D procedures after each production cycle, 84% of farms revealed a well implemented practice in all countries. However, the effectiveness of these practices (e.g. by taking samples) was only validated on 9% of the farms.

Discussion and Conclusion

The assessment of C&D measures revealed both areas of high implementation and scope for improvement. Improving the knowledge exchange on biosecurity among pig farming actors might be the way forward.

HHM-PP-59

GOOD VACCINATION PROCEDURES AND HIPRALINK® VACCINATION AS TOOLS TO OPTIMIZE PRRS VACCINATION MANAGEMENT

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Background and Objectives

Vaccines bring health benefits to pig herds, but their full potential cannot be achieved if they are not used lege artis. The aim of the study was to demonstrate that Good Vaccination Procedures (GVP) screening programme and HIPRALINK® are useful tools to assess the compliance of vaccination practices and identify critical failures of vaccine administration.

Material and Methods

A positive-stable farm experienced a PRRSv outbreak, despite the vaccination programme established: piglet vaccination at 12 days of age against Mycoplasma hyopneumoniae and 2 days preweaning against PRRSv and PCV2; sows blanket-vaccinated against PRRSv every 4 months. Consequently, vaccination practices were assessed: HIPRA's GVP screening and HIPRALINK® vaccination analysis for intramuscular (IM) vaccinations, HIPRADERMIC® screening for intradermal (ID) vaccinations.

Results

Storage: fridge temperature exceeded 8°C and one expired bottle was used. Hygiene: syringes and needles for PRRSV-vaccine reconstitution were discarded only when no longer functional, bacterial and yeast/mould count for one of the piglet IM-syringes was 250,000 and 300,000 CFU/ml (respectively) and the HIPRADERMIC® devices were not always cleaned immediately after the end of a vaccination session. Vaccination: blanket-vaccination in sows exceeded 4 months, sows were IM-injected to close to the neck's ventral portion, the needles for piglet vaccination were too short and the ID vaccination sessions were prolonged beyond the recommended time in 17/34 sessions, including 11/39 sessions exceeding 4 hours after reconstitution of the PRRS vaccine (2 sessions were finished the following day). Furthermore, the vaccination (for sows and piglets) was spread over several days, instead of finishing in one day.

Discussion and Conclusion

Several failures were identified that can compromise vaccine effectiveness on the farm. The programmes presented were shown to have an additional value in investigating clinical problems in the herd, highlighting the importance of recording accurate data from vaccination procedures and the potential of technology use.

HHM-PP-60

EFFECT OF INTRADERMAL VACCINATION AGAINST LAWSONIA INTRACELLULARIS ON FINISHERS PERFORMANCE IN A CHRONICALLY INFECTED FARM

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Background and Objectives

The objective of this trial was to evaluate the effect of an intradermal vaccination against Lawsonia intracellularis on productive and economic performance in finishing pigs.

Material and Methods

The trial was conducted in a commercial 2000-sow farm located in the South of Spain. Recurrently, from 70-80kg onwards, pigs were showing growth retardation, affecting negatively the farm performance. Sporadically, some cases of soft feces were observed. Chronic infection was confirmed by the detection of L. intracellularis by qPCR testing in feces.It was decided to vaccinate intradermally 30000 piglets with Porcilis® Lawsonia ID, using the IDAL device. Vaccine was administered simultaneously with PCV2 vaccination (mixed with Porcilis® PCV ID), at 21 days of age. To determine vaccine efficacy, a historical comparison was performed, comparing animals before (n=23081; non-vaccinated; NV) and after (n=23192; vaccinated; V) implementation of vaccination. Clinical signs and performance data were recorded during fattening in the same 10 finishing barns (statistical unit) during both periods. Performance data was analyzed by ANOVA test, including starting weight as covariance. An economic analysis was performed.

Results

Growth retardation was observed only in control pigs. No diarrhoea was described in the study groups.There were statistical differences in fattening entry weight between groups, with +1,55kg in the NV group (V 21,02kg vs NV 22,57kg; $p<0,005$). Weight at slaughter was similar between groups,but vaccinated reached slaughter weight earlier (NV: 119,85d; V: 114,42d; $p<0,05$). ADG was numerically higher in vaccinated animals (NV: 791,7g/d; V: 837,6g/d). Vaccinated batches showed less mortality, although not significant. FCR and carcass performance did not show differences between groups. In terms of profitability, vaccinated animals showed an estimated extra benefit of 1,62€, including the cost of the vaccine.

Discussion and Conclusion

Under the conditions of this study, piglet's intradermal vaccination against L. intracellularis was an efficacious tool to improve productive and economic performance in finishing pigs

HHM-PP-61

ANALYSIS OF PRODUCTION PERFORMANCES IN FATTENING AND PRODUCTION FARMS ACCORDING TO THE TYPE OF BATCH MANAGEMENT AND OTHER ASSOCIATED VARIABLES.

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Background and Objectives

The pig sector faces multiple challenges, making it essential to study management strategies to promote efficient production.
The objective is to evaluate the reproductive and productive performance of production and fattening farms to identify factors influencing efficiency throughout the animals' productive lives.

Material and Methods

The study analyzes productive and reproductive parameters based on variables such as batch management type (1W, 2W, 3W, and 5W), lactation duration, finishing male, seasonality, and production model ("single-origin" and "multi-origin"). Data were collected from six production farms that implemented management changes between 2021 and 2024, as well as their associated fattening farms. A generalized linear model (GLM) was applied to determine associations between quantitative and qualitative variables, and Duncan's post hoc test was used for non-dichotomous independent variables.

Results

Multiple associations with statistical differences were found between the parameters studied and the variables analyzed. The most important ones were: a) an increase in the percentage of stillbirths with higher batch interval ($P<0.001$; 1W=9.22%^{a}; 2W= 9.95%^{b}; 3W=10.89%^{c}; 5W= 15.11%^{d}). b) higher ADG (g/day) with higher batch interval ($P<0.001$; 1W= 648.8^{a}; 2W=701.6^{b}; 3W=719.1^{c}; 5W=729.9^{c}). c) higher mortality in "multi-origin" fattening farms ($P=0.013$; "multi-origin"=9.2%; "single-origin"=7.6%). d) higher prolificacy in 28-day lactations ($P<0.001$; 21-days lactations=13.83 TN/parturition; 28-day lactations=17.02 TN/parturition). e) worse ADG (g/day) in the last quarters of the year ($P<0.001$; first=714.9^{a}; second=703.3^{b}; third=670.8^{c}; fourth=683.2^{c}).

Discussion and Conclusion

Each system has advantages and disadvantages, so strategies must be tailored to the specific characteristics of each farm to maximize production efficiency.

HHM-PP-62

MONITORING PRRS BY STATISTICAL PROCESS CONTROL CHARTS

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Background and Objectives

A transition of the pig sector towards a sustainable production is inevitable and challenging, but facilitated by the concept of a next-generation farm (NGF), a brand-new farm using modern technologies to improve welfare and biosecurity, including air filtration.
The aim was to describe and compare productive dynamics of a NGF versus a conventional farm throughout a cohort-study, both experiencing a Porcine Reproductive and Respiratory Syndrome (PRRS) outbreak during a 20-month observation period.

Material and Methods

The NGF and conventional farms selected were two farrowing sites with same feed, genetics, size, management, owner and location, but a completely different facility. At the beginning the conventional farm was classified as a positive stable with vaccination herd (category II-vx), whereas the NGF was negative. In both systems, a routinary monitoring PRRS program was performed by a RT-PCR testing of processing fluids for each batch and blood samples from weaning-age piglets by batch only in the conventional farm. Per each farm, two productive items were analyzed with the Statistical Process Control (SPC) approach.

Results

The time-to-stability (TTS) was 91 weeks for the conventional farm compared to 49 for the NGF. Before the PRRS outbreak, the pre-weaning mortality rate was 16.7% in the conventional farm versus 22.4% of the NGF, while the abortions rate was 3.1% versus 1.4%. In the SPC chart of the pre-weaning mortality rate, five (100%) out-of-control (OC) signals were detected during the short TTS in the NGF, compared to the conventional farm where OC signals were doubled. In the abortion rate SPC charts, a similar scenario was observed.

Discussion and Conclusion

The conventional farm SPC charts displayed a greater number of “alarms” during the entire observation period, reflecting the instability of the herd’s health status, the opposite of NGF, where the facility allowed a quick return to PRRSV negativity and subsequent preservation, as confirmed by TTS.

HHM-PP-63

LUNG SCORING SURVEY IN EUROPEAN COUNTRIES IN 2024

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Background and Objectives

Scoring of lung lesions in the slaughter pigs provides an important information about the respiratory health in the pig population. Lesions suggestive for previous M.hyo or A.p. infections and their scoring were described before. Scoring of those lesions allows quantifying the problems with enzootic pneumonia end pleuropneumonia. The aim of this survey was to collect the results of lung scoring performed in most of swine producing European countries in 2024.

Material and Methods

Ceva Lung Program scoring methodology was implemented to score the lesions at the slaughterhouse. The results were collected EU countries in the 12 months period from December 2023 till the end of November 2024. The median values were calculated for % of lungs with bronchopneumonia (%BP), % of affected lung parenchyma out of sick lungs (% parenchyma), % of dorso-caudal pleurisy (%DP) and APP index (APPI).

Results

The total number of scored lungs was 405934 from 3537 reports. There are differences among countries in number of farms, however most of audits come from Spain, France, Germany and Netherlands, countries slaughtering >55% of pigs in EU. The median value of %BP was 27%. The median for % of affected parenchyma was 4.2%. For % DP the median was 9.09% vs and APPI index 0.24.

Discussion and Conclusion

The data set from EU countries in 2024 shows similar prevalence of Enzootic pneumonia and pleuropneumonia in swine herds, as in previous years as shown in surveys using the same methodology.

HHM-PP-65

VALUE OF LONG-TERM DATA RECORDINGS FOR EVALUATION OF VACCINATION EFFICACY IN HERDS SUBCLINICALLY INFECTED WITH LAWSONIA INTRACELLULARIS

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Background and Objectives

Lawsonia intracellularis (LI) has besides its relevance as intestinal clinical pathogen a well described subclinical facete. The LI vaccination showed in numerous clinical cases improved performance data like average daily weight gain (ADWG), reduced animal losses, etc.. Following these observations farmers and vets often use simple performance checks on the vaccination efficacy. The aim of this study was to illustrate variations on performance data of unvaccinated and LI vaccinated batches in a subclinical LI infected farm.

Material and Methods

A controlled, side-by-side study was performed in a fattening farm with a history of subclinical LI infection. In total, 6 consecutive fattening batches (141-142 pigs/batch) were included, in which half of the piglets were left unvaccinated (controls) and half LI vaccinated (Porcilis® Lawsonia) at 6-7 weeks. Individual weight was recorded at beginning and at the end of fattening period. The Wilcoxon-Mann-Whitney-U test, two-sided, was used to statistically examine the results.

Results

Average starting weight (controls: 34.6; vaccinated: 34.6 kg) and animal losses were (controls: 2.57%; vaccinated: 2.82%) similar. Over all 6 batches, vaccinated groups had a statistically higher ADWG than unvaccinated groups (943 vs 921 g/d; p 0,011). The ADWG was also higher in 4 out of 6 single batches (15 - 57 g/day). But in 2 batches ADWG was very similar with a difference of only 1 to 5g/day.

Discussion and Conclusion

Farmers and vets are generally aware of variability and limitations of performance data in pig farms especially when only group weights are available. But often due to practical reasons, this low-quality data is used to make conclusions about the efficacy of interventions such as vaccinations. In this farm, evaluation of vaccine efficacy at a single batch level would have led to wrong conclusions in one third of the batches investigated. Therefore, systematic long-term data recordings are recommended especially in subclinical situations to make differences visible.

HHM-PP-66

EVALUATION OF BIOSECURITY ON SOUTHERN GERMAN FATTENING PIG FARMS

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Background and Objectives

The aim of the study was to evaluate the level of biosecurity in pig fattening farms in Southern Germany. It is well known that biosecurity is the foundation of keeping pigs healthy, reduces the use of antibiotics and improves farm productivity. However, the successful implementation of biosecurity measures into daily operations is not always straightforward and requires a high level of discipline from farmers.

Material and Methods

The study included 26 randomly selected farms from Bavaria and Baden-Wuerttemberg, where biosecurity measures were assessed by the same veterinarian during on-site visits. The questionnaire was based on Biocheck.UGent™, a risk-based online evaluation tool, which also offers the possibility to compare farms on a national and global level. To gain a more complete overview of the farms' biosecurity, additional questions were included. After the farm visit, the farmers received feedback and recommendations for improvement.

Results

Although external biosecurity was better implemented on the farms than internal biosecurity, there were still shortcomings, such as those related to vehicle traffic or the supply of feed, water and equipment. Regarding internal biosecurity, weaknesses were for example identified in the handling of different age groups and the measures related to the use of equipment.

Discussion and Conclusion

The study demonstrated that there is considerable room for improvement in the biosecurity status of many fattening pig farms in Southern Germany. The deficiencies in external biosecurity pose a risk for the introduction of pathogens into the farms, particularly considering the ongoing African Swine Fever outbreaks. On the other hand, the lacks in internal biosecurity enhance the spread of pathogens within the herds.

HHM-PP-67

ESTIMATION OF LAWSONIA INTRACELLULARIS INFECTIOUS PRESSURE IN PIG FARMS SUSPECTED OF SUBCLINICAL ILEITIS IN FRANCE

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Background and Objectives

Lawsonia intracellularis (L.i.) is a worldwide important enteric pathogen causing ileitis in pigs. Several publications reported a negative correlation between L.i. fecal load, serology and growth performance in pigs even in the absence of clinical signs. This study aims to describe the current infection dynamics in French pig farms suspicious for subclinical ileitis in a practical and time-saving manner.

Material and Methods

Practitioners were asked to identify commercial swine farms with poor growth performance in the finishing unit, without clinical expression of disease, management failure, antibiotic group treatment, nor L.i. vaccination. In these farms (n=23) cross-sectional sampling in three different age groups (median 12,15,20 weeks of age (woa)) was performed. In total 22 blood samples and 5 saliva samples per farm were investigated by semi-quantitative L.i.ELISA (SVANOVIR® L. intracellularis/Ileitis-Ab, Cut-off=30Inh%) resp. by L.i.qPCR (BactoReal®Kit,Ingenetix, Cut-off=50Cq).

Results

All farms had at least 1 positive sample for L.i., median earliest positive age being 12 woa for both sample types (mean Cq: youngest group 40; intermediate group 35; eldest group 35 resp. mean %Inh: 26; 45; 67). Ten farms showed simultaneously 1 positive sample in the youngest groups (either PCR or ELISA), minimum 2 age groups with at least 1 PCR<34Cq and minimum 2 age groups with at least 1 Elisa>60Inh%.

Discussion and Conclusion

Under the conditions of this study, L.i. was detected in all investigated pig farms suspicious for subclinical ileitis. The results indicate an early, intense and prolonged infection dynamic in 43% of them. In a recent study, obtained in herds without performance reduction as inclusion criterium, results were 77% and 23% respectively. This data reveals the frequent presence of L.i. in sub-optimal performing swine farms and underlines among other possibilities the impact of inclusion parameters, the practitioner's role in health management and the need for time-saving and efficient approaches in diagnostics and prophylaxis.

HHM-PP-68

THE LIMITATIONS OF IL-6 MEASUREMENT IN SALIVA SAMPLES OF PIGS.

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Background and Objectives

Interleukins could be considered as the first alarm tool during immune response. IL6 seems to be a general marker for bacterial infections and their levels appeared indetectable in a great percentage of healthy animals. However, the increase of IL6 levels produced by infections lasted from eight hours to three-four days and could limits its use as health biomarker. We have evaluated the correlation between the levels of salivary IL6 and acute phase proteins in a small field trial.

Material and Methods

A commercial immunoassay was analytically validated for the proper quantification of IL-6 in porcine saliva samples. Afterwards, a total of 11 healthy pigs and 39 pigs suffering from tail biting from a commercial growing farm in the southeast of Spain were selected. Individual saliva samples were collected during routine veterinary examination, the concentrations of IL-6 were measured by ELISA and the levels of acute phase protein, C reactive protein (CRP), haptoglobin (Hp) and PigMAP were quantified by TRIFMA. The possible differences in the levels of all parameters between healthy and diseased animals were statistically analyzed using a Mann Whitney t test since the data do not follow normal distribution criteria. The correlation between parameters was analyzed by Spearman correlation test.

Results

The assay for salivary IL6 concentrations showed precision below 10%, an accuracy of 93% with a limit of detection of 0,023pg/mL. The levels of IL6 in diseased animals were like those observed in healthy animals. Contrary, the levels of CRP, Hp and Pig-MAP were elevated in diseased animals with high associations. No correlation was observed for IL6 and any acute phase protein.

Discussion and Conclusion

The concentrations of IL6 could be properly quantified in saliva samples of pigs using commercial assay with high analytical confidence. However, the measurement of salivary IL6 in field condition for health status assessment is of limited use.

HHM-PP-69

POTENTIAL OF AN INTEGRATED PROFILE OF SALIVA BIOMARKERS AS A TOOL FOR DISEASE DETECTION

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Background and Objectives

Saliva has shown diagnostic potential in pigs for assessing health and welfare through the measurement of different biomarkers. The aims of this work were: 1) to assess how a panel of salivary analytes change in different porcine infectious diseases; and 2) whether a different profile could be useful as an aid for raise the suspicion of a specific infection.

Material and Methods

Saliva samples were obtained from healthy pigs and pigs with three infectious diseases: meningitis due to Streptococcus suis, diarrhea due to enterotoxigenic Escherichia coli (ETEC) and porcine reproductive and respiratory syndrome (PRRS). The following biomarkers were analyzed: adenosine deaminase (ADA), haptoglobin (Hp), calprotectin (Calp), aldolase, alpha-amylase (sAA), lactate dehydrogenase (LDH), total protein (TP) and advanced oxidation protein products (AOPP). Receiver operating characteristic (ROC) curves and binary logistic regression analyses were performed to assess the discriminating value of the analytical profile.

Results

Pigs with S. suis and ETEC infections showed higher values of ADA, Hp, Calp, aldolase, sAA, LDH and TP than healthy pigs. The highest values of Hp and aldolase were found in animals with ETEC. Animals with PRRS showed higher values of Hp, Calp, sAA and LDH than healthy animals. The constructed regressions combined increased ADA and Hp as significant variables for ETEC detection with >80% overall accuracy. In the case of PRRS, the regression model included non-increased ADA together with increased LDH as significant variables with >88% overall accuracy. For S. suis, the regression model did not significantly discriminate the disease from the rest of animals.

Discussion and Conclusion

Salivary analytes show different changes in pigs depending on the disease. Combination of some of the analytes that differentially changed according to the disease could be an additional tool for the detection of the diseases.

HHM-PP-70

ORCINE SIALOCHEMISTRY: THE USE OF SALIVA ANALYSIS FOR HEALTH AND WELFARE ASSESSMENT

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Background and Objectives

Saliva has emerged as a valuable biological fluid for non-invasive monitoring of physiological states in pigs, offering a stress-free alternative to blood sampling. Traditionally used for pathogen detection, recent research highlights its potential for assessing a diverse panel of health-related biomarkers categorized by stress, inflammation, immune response, redox homeostasis, and sepsis. This has led in human medicine to the concept of Sialochemistry, and its use in diagnosing and monitoring health and disease states. The objective of this work is to present this concept and provide an overview of its current applications in pigs.

Material and Methods

The concept of sialochemistry is described, based on the existing literature, as the main biomarkers that can be measured in saliva to evaluate health and welfare.

Results

Sialochemistry can be defined as the analysis of analytes in saliva. There are six groups of biomarkers measurable in saliva that can be used for evaluation:

(1) Stress: Cortisol, cortisone, alpha-amylase, and chromogranin A (CgA) for poor welfare detection, alongside oxytocin as a potential marker of positive emotions and well-being.

(2)Inflammation: Acute-phase proteins, including haptoglobin, C-reactive protein, Pig-MAP, and ferritin.

(3) Immune Response: Immunoglobulins involved in humoral immunity; adenosine deaminase for cell-mediated immunity; S100 proteins (calprotectin, calgranulin C); and myeloperoxidase for innate immune responses.

(4) Redox Status: Oxidants and antioxidants to measure oxidative balance.

(5) Sepsis: Procalcitonin and aldolase for detecting severe bacterial infections and guiding antibiotic use.

(6) Metabolism and Trace Elements: Urea, creatinine, AST, ALT, zinc, copper, and iron for assessing general health.

Discussion and Conclusion

This study updates the current knowledge on sialochemistry and reinforces its potential as a non-invasive tool for the early and accurate detection of health and welfare issues in swine. The diverse biomarker panels demonstrate the potential of the analysis of saliva for health monitoring in animal welfare research and practice.

HHM-PP-71

USE OF SENTINEL GILTS IN GROUP HOUSED PRRS MLV VACCINATED SOW HERDS TO DETECT POSSIBLE LOW CIRCULATION OF FIELD VIRUS

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Background and Objectives

Dutch pig industry is striving for PRRSv eradication by 2050. First step is wild type virus negative pig outflow in farrow to wean farms, followed by stopping vaccination. In this study we describe experiences with longitudinal testing of non-vaccinated sentinel gilts introduced in group housed sow herds with an ongoing MLV vaccination program.

Material and Methods

Two farrow to wean farms with around 550 sows, with PRRS PCR negative piglets at 10 weeks of age for more than 2 years, 6-60 MLV vaccination scheme, dynamic sow groups with feed stations.Farm A: own replacement, 2 MLV vaccinations before entering sow herd, one group of 8 sentinel gilts not vaccinated.Farm B: arrival of SPF (Mhyo, APP, PRRS) gilts every 12 weeks, 2 or 3 MLV vaccinations before entering sow herd (depending of age upon arrival). 2 groups of 5 sentinel gilts in 2 subsequent groups.Serology was performed at entrance of the sow herd and after farrowing.

Results

On farm A 2 of 8 animals tested serological positive at entry of sow herd. At second sampling 7/8 were tested again, with lower S/P ratios than first sampling (1,16 and 1,64 resp).On farm B 3/10 animals tested positive at entry of sow herd. On farm B there was an outbreak of PRRSv wildtype virus after the introduction of sentinel gilts, which caused seroconversion in these gilts.

Discussion and Conclusion

Use of sentinel gilts is described as a step towards PRRS-negative sow herds. But, serological results of sentinel gilts with an ongoing MLV vaccination scheme, should be interpreted with care. The use of sentinel animals in monitoring can be supportive to other monitoring strategies, i.e. processing fluids or tong tip fluids.

HHM-PP-72

COMPARISON AT FARM LEVEL OF LUNG LESION SCORINGS DEPENDING ON MYCOPLASMA HYOPNEUMONIAE VACCINE USED : A FOUR-YEAR STUDY

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Background and Objectives

Many vaccines against Mycoplasma hyopneumoniae (Mh) are available. The goal of this study is to compare at farm level, slaughter lung lesions of pigs according to the Mh vaccine used.

Material and Methods

The same study design (Spindler 2022) was used and repeated four times with a one-year shift. It involved farms from a French cooperative using a same Mh vaccine over 3 consecutive semesters and considered lung scoring (LS) on second and third semesters. This work synthetized data from study 1 (LS from 01/07/2020 to 30/06/2021) to 4 (LS from 01/07/2023 to 30/06/2024).

LS were performed using original Madec grid on 6 lobes (0 to 4 per lobe; total score out of 24; Ceva Lung Program).
The unit was the farm evaluation per study (average of LS per farm).
Localization of farms in Brittany (high Pig density area) was taken into account.

Results

555 different farms have been included in the four studies (212 625 lungs scored). 37% participated in only one study whereas 20% participated in all four.

Results of four studies will be presented. Aggregated data and results (medians) per vaccine were as followed:

1289 farm evaluations : vaccine A (n=161), B (n=107), C (n=602), D (n=143), E (n=29) and H (Hyogen®, n=247).

% of Breton farms varied from 53%^{a} (A) to 77%^{b} (H).

Average Enzootic Pneumonia like Score (EPS): 1.2^{b} (A), 0.6^{a} (B), 1.1^{b} (C), 1.9^{c} (D), 1.8^{bc} (E), 0.6^{a} (H)

Prevalence of severely affected farms (EPS ≥ 3/24): 8.1%^{a} (A), 3.7%^{a} (B), 10.1%^{b} (C), 20.3%^{c} (D), 27.6%^{c} (E), 5.7%^{a} (H)

(Superscript letters = statistical differences; Wilcoxon or Chi Square test)

Discussion and Conclusion

Group H shows significant good results despite high usage in Brittany. Those H results confirm initial results (Spindler 2022) and fit with studies from other countries (Lasierra 2024; Cvjetkovic 2021).

HHM-PP-73

PRODUCTIVITY AND LONGEVITY OF SOWS BASED ON WAIST GIRTH AT FIRST MATING

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Background and Objectives

The influence of weight at first service on sow lifetime productivity and longevity is well-known. Various studies suggest an ideal weight range of 135-160kg. Weighing all gilts entering a farm incurs significant costs in equipment and labor. The aim was to measure sow girth at the waist, just in front of the hind legs, as a simpler and faster method to estimate animal weight indirectly and assess whether it correlates with productivity parameters, as weight does.

Material and Methods

The study was conducted on a Spanish multi-site sow farm with 2200 sows of the Large White breed. The waist girth of 1448 sows were measured at first service from January 2020 to February 2022, and they were grouped into five categories: less than 120cm, 121-125cm, 126-130cm, 131-135cm, and more than 136cm. The parameters used to evaluate productivity and longevity were farrowing rate (FR), total born (TB), weaned piglets (WP), wean-to-service interval (WTSI) and retention rate at third parity (P3), differentiating the results at first-parity from those obtained throughout the sow's lifetime. Data were analyzed using Jamovi software, and ANOVA was performed.

Results

No differences were found between parameters when analyzing the sow's lifetime. FR ranged between 83,59%-85,74%, TB 13,94-14,36, WP 11,53-11,82, WTSI 7,31-7,96 days, and P3 46,45%-52,47%. Significant differences in FR 82,80%-89,59% and TB 13,27-14,43, were observed in first-parity sows, but no differences in WP 11,18-11,91.

Discussion and Conclusion

There are studies that correlate heart girth and flank-to-flank measurements with weight achieving a similar precision (66,4% and 72,2%), but none measure waist girth. Also do not directly correlate the measurements with productivity parameters, but rather with weight. Although waist girth is simpler than weighing, it seems to have less direct influence on productivity and longevity throughout the sow's productive life, but it has a significant impact on key productivity parameters at first parity.

HHM-PP-74

EVIDENCE-BASED VETERINARY MEDICINE PERCEPTION BY SWINE VETERINARIANS: A EUROPEAN SURVEY ACROSS DIVERSE PRACTITIONER PROFILES

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Background and Objectives

EBVM enhances the quality of care by guiding clinical decisions with robust scientific data, leading to more effective disease management. Evaluating the levels of knowledge and use is crucial for identifying gaps and training needs, ultimately promoting the adoption of evidence-based practices and optimizing herd health and productivity. This study aimed to give an overview of EBVM perception, with the goal of raising awareness of this concept and highlighting reservations veterinarians face in applying it to decision making process in swine veterinary practice.

Material and Methods

An online survey was developed to investigate swine veterinarians' level of knowledge and reservations concerning EBVM. The questionnaire was sent to approximatively 650 swine veterinarians in 24 European countries. It consisted of a first section about EBVM, along with two additional sections focusing on the sociological profile and veterinary practices of the respondents (vaccination and diagnostic approaches, interactions with peers, continuous training). A Chi-square test was performed to investigate any association between veterinarians' features and their EBVM perception.

Results

A total of 108 veterinarians from 22 countries answered (response rate: 16.6%). Among them, 32% had never heard of EBVM. Most learned about it through veterinary schools (31), training and congresses (12), professional associations (10), literature (14), or colleagues (6). Of the 108 respondents, 89 veterinarians (82%) found the approach useful in practice, and 53% (57 practitioners) wanted it to be further developed. However, 22% (24) expressed reservations citing, for example, lack of time or a difficult access to data.

Discussion and Conclusion

Our study evidenced large gaps and still some reservations in the use of EBVM in the field of swine veterinary practice but a significant benefit when used by swine practitioners. Further work needs to be carried out to identify the determinants of its effective application and added value in the decision-making process.

HHM-PP-75

PRACTICAL APPROACH TO MANAGE NEONATAL DIARRHEA: OVERVIEW OF 3 CLINICAL CASES IN FRANCE

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Background and Objectives

Neonatal diarrhea (ND) is a common issue on pig farms, leading to economic losses due to mortality, growth impacts and antibiotics use. Both bacterial and viral pathogens are often involved, but non-infectious factors also play an important role. This case report aims to assess the effectiveness of a practical approach to managing ND by evaluating risk factors and vaccination across three farms.

Material and Methods

Three farrow-to-finish farms, from 240 to 480 sows, facing recurrent ND were selected. Between 2022 and 2023, a complete diagnostic (bacteriology, virology, histopathology) was performed on 3 litters per farm. An audit assessing risk factors (Brilland et al., 2024) was conducted, then corrective measures were implemented. A second audit was performed one year later. Audit scores, farrowing unit performance, and the percentage of treated litters (%TL) to control ND were compared.

Results

• Diagnostics revealed that Clostridium Perfringens type A was the main pathogen involved. The main risk factor was insufficient comfort for piglets.
• Accordingly, Enteroporc Coli AC® vaccination was implemented along with recommendations for nursing and comfort improvements.
• In all farms, the number of affected litters decreased.
• In farm 1, the audit score improved from 64% to 75%, while farms 2 and 3 remained stable (70% - 65% and 53% - 50%, respectively).
• In farm 1, %TL lowered from around 40% to 15% and percentage of mortality (%M) decreased (-0.6), despite an increase in live born piglets (+1.3). In farms 2 and 3, %M also reduced (-1 and -2,2 respectively) and %TL decreased significantly (Chi Square test; p Chi Square test; $p<0.001$) from 22% (N=236) to 11% (N=236) and 23% (N=91) to 3%(N=221), respectively.

Discussion and Conclusion

This case report demonstrates the effectiveness of a complete and global approach to managing ND on farms. Improvements in key ND-related parameters were observed across all farms.

HHM-PP-76

THE IMPACT OF WATER TEMPERATURE, PRE-SOAKING AND CHOICE OF SAMPLING LOCATION WHEN CLEANING THE PIG STY

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Background and Objectives

To decrease the bacterial load and reduce the use of antibiotics in animal husbandry, thorough cleaning of the pig sty in-between batches of animals is routinely performed. This study investigated the effect of washing by quantification of the total aerobic bacteria (TAB) and adenosine triphosphate (ATP) before and after cleaning in four different washing protocols.

Material and Methods

Sampling was performed before and after washing, using a pre-moistened non-woven cloth (TAB analyses) and a cotton swab (ATP). Four protocols were compared; washing with cold ($\bar{x}$ 15.5°C) or hot ($\bar{x}$ 45.3°C) water, and with or without previous soaking overnight. Sampling was performed within 90 minutes after washing, at three predetermined locations per pen, (a) the front corner on the slatted floor beneath the water nipple, (b) in the middle of the solid floor and (c) the diagonally corresponding back corner on solid floor. The effect of disinfection was not included in the present study.
The analyses of TAB was performed by surface plating on blood agar and counting colony forming units (CFU), and ATP by swabs inserted into a luminometer to measure bioluminescence.

Results

The reduction of TAB varied significantly between sampling locations, but water temperature and soaking did not influence the results. ATP was increased by soaking and washing with cold water, and decreased by soaking and washing with warm water.

Discussion and Conclusion

In several sampling locations, the number of TAB and ATP levels were higher after washing than before, potentially due to aerosols generated by a high-pressure washing. However, a high variability in TAB precluded the interpretation of the variation found between different sampling locations. Soaking and washing with warm water seems as the most effective washing method since the number of ATP-containing particles declined. Nevertheless, this method provides limited information regarding the bacterial load in the pen.

HHM-PP-77

HEALTH MONITORING IN PIGS: WHICH PARAMETERS AND DATA SOURCES ARE RELEVANT?

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Background and Objectives

An up-to-date, valid and smart monitoring system is essential for assessing animal health at the herd- and population level. For this purpose, various data sources and the parameters measured therein must be analysed and displayed in a combined approach. The Smart Animal Health project aimed to identify significant parameters and the benefits of public, private and on-farm data sources for pig farming to draw conclusions about animal health.

Material and Methods

Public (e.g. transport data, number of origins), private (e.g. mortality rate, antimicrobial usage) and on-farm collected (e.g. percentage of lameness and tail lesions) data from 94 farms were assessed in a standardized way by ten different pig specialized veterinarians. Correlations between each of the assessed parameters were analysed (Pearson correlation). In addition, the results of the monitoring per farm based on different, individual data sources and the results of a combination of public, private and on-farm data sources were correlated (Pearson correlation).

Results

For suckling piglets, fattening pigs and lactating sows, the number of origins and antimicrobial usage were positively correlated ($r=0.33$; $p=0.01$, $r=0.77$; $p<0.001$ and $r=0.45$; $p<0.001$ respectively). For weaned piglets, calluses were found to be moderately to strongly positively correlated with lameness ($r=0.43$; $p<0.01$). In gestating and lactating sows, respectively, there were only weak positive correlations between the parameter's calluses and lameness or injuries ($r=0.26$; $p<0.01$ and $r=0.24$; $p<0.01$ respectively) and between lameness and mortality ($r=0.31$; $p<0.01$). Health monitoring based on public and private data sources correlated with the additional parameters of the on-farm assessment ($r=0.53$; $p<0.0001$).

Discussion and Conclusion

This study presents a valid health monitoring system based on meaningful parameters that could be used in practice for pig holdings. The combination of public and private data-based sources together with on-farm data, which takes more time and effort to assess, showed the most profound results for the individual farms.

HHM-PP-79

PREVALENCE AND SEVERITY OF ENZOOTIC PNEUMONIA AND PLEUROPNEUMONIA ON CZECH PIG FARMS BASED ON LUNG LESION SCORING IN 2024.

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Background and Objectives

Monitoring of respiratory disease by lung scoring is beneficial to assess the farm health status. Clear correlation between lung lesions, the economic impact of the disease and the efficiency of vaccination has been reported. Ceva Lung Program (CLP) was confirmed as a valuable tool to establish the prevalence and severity of Enzootic Pneumonia (EP) and pleuropneumonia. The aim of this study is to evaluate the level of EP and A.p- like lesions on Czech pig farms in 2024 compared to the previous period.

Material and Methods

The survey was conducted on conventional pig farms excluding those with the M.hyo and A.p. SPF status. A total of 5442 lungs (4728 in 2023) in 70 batches of slaughtered pigs were scored using the CLP method. Bronchopneumonia lesions (BP), were recorded and scored. Dorso-caudal pleurisy (DP) suggestive for previous pleuropneumonia was scored to describe A.p-like lesions. Data were compared to the previous year.

Results

The prevalence of 11% of BP was found, compared to 30% previously. The area of affected surface of lung parenchyma in pneumonic lungs reached 3.3% vs 4.6% in 2023. As for pleuropneumonia – 9.6% (vs 9.7% previously) of lungs were affected by dorso-caudal pleurisy lesions with the APPI index 0.21 compared to 0.2 in 2023. All values are expressed as median.

Discussion and Conclusion

EP-like lesions have lower prevalence in lungs from Czech farms than in 2023, with a decreasing tendency even compared to previous years. That indicates efficient preventive measures are being implemented in the farms. Lesions characteristic for A.p infections were at very similar level in terms or prevalence and severity. These data demonstrate that management of respiratory health in Czech swine herds is efficient.

HHM-PP-80

STANDARDIZED NATURAL CITRUS EXTRACT AS FEED ADDITIVE TO THE MICROBIOTA OF PERIPARTUM SOWS' WITH BENEFICIAL EFFECT ON PIGLET PERFORMANCES

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Background and Objectives

Farrowing is a critical period for sows, which is suitable for digestive disorders. Most of the time, these troubles are closely linked to dysbiosis of the gut microbiota and can have negative consequences on animals. To manage these situations, intestinal microbiota modulation could be an effective solution. This study aims to assess the effect of a Standardized Natural Citrus Extract (SNCE) supplementation on sows' health and performance around farrowing.

Material and Methods

50 sows on peripartum were divided into 2 groups:
A control (CTL) group (23 sows) without supplementation;
A SNCE group (27 sows) supplemented with 2500 ppm of SNCE, 10 days before and 5 days after farrowing.
Sows' performances (feed intake, litter weight gain, and intestinal transit resumption) and microbiota were monitored.

Results

Results showed an increase in feed intake in sows from SNCE group (8,540 g/d) compared to CTL group (7,937 g/d, $P < 0.01$, Wilcoxon). The interval between farrowing and first droppings was also reduced in the SNCE group (1.35 d Vs 1.88), which indicates a better and faster transit resumption after farrowing ($P < 0.05$, t-test). These effects were correlated to sow's microbiota modulation. Indeed, the discriminant analysis was able to separate the two microbial communities using 21 OTUs (area under the ROC curve = 96%). Moreover, piglets' litter weight gain between 24h and 7 days after farrowing was higher in the SNCE group (1.35) compared to the CTL group (0.93, $P < 0.01$, t-test).

Discussion and Conclusion

SNCE supplementation showed beneficial effects on peripartum sows' performance and welfare. These effects were correlated to the sow's microbiota modulation and piglets' performances were enhanced as a result. The earlier establishment of a beneficial microbiota in piglets might partly explain this observation. Better weight gain of the piglets from SNCE sows may also be explained by the quality and quantity of milk produced by SNCE sows.

HHM-PP-81

AN ENHANCED CLEANING AND DISINFECTION PROTOCOL IN LACTATION SWINE FACILITIES IMPROVED HEALTH STATUS OF SUCKLING PIGLETS

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Background and Objectives

Cleaning and disinfection (C&D) are key for eradicating endemic diseases, and to reduce the risk of introducing new pathogens. Both selection of active and efficient products and the training and awareness of farm workers are essential to achieve an effective C&D of facilities. In this study, a specific C&D program was tested in the lactation barn of four different commercial pig farms.

Material and Methods

The current C&D program used in all four farms (CN group) was compared with the new program group (KV). This included an alkaline detergent, and a concentrated disinfectant based on quaternary ammonium, glutaraldehyde and isopropanol. It was a before-after study, and two batches of suckling piglets were followed up in the CN group. After the training of the farm workers on the new program, 6 batches were assessed in the KV group. During the suckling period, all clinical incidences (mortality and antibiotic interventions) were daily recorded in each litter. In total, 542 and 1621 litters in the CN and KV group, respectively, were followed up during the study.

Results

Pre-weaning mortality was reduced after the KV program (13.2% vs 15.8%; $P<0.01$). This reduction was mainly associated with lower digestive disease (especially in one of the farms, which had high incidence of diarrhea) and lameness. Consequently, the number of weaned piglets per litter was higher in the KV group (12.0 vs 11.8; $P<0.05$). The percentage of piglets requiring any antibiotic intervention was also lower in KV litters in all farms, especially to treat diarrhoea, and was reduced 4.7 times (3.8% vs 18.0% in KV and CN piglets; $P<0.0001$).

Discussion and Conclusion

Formulated detergents and effective disinfectants, together with a proper training of farm workers on product application and protocols, were efficient to improve health status of suckling piglets in commercial farms.

HHM-PP-82

PIG RESPIRATORY HEALTH IN RELATION TO FARM CLIMATE – COUGH MONITORING BY SOUNDTALKS AND CONTINUOUS CLIMATE MEASUREMENT BY HEALTHY CLIMATE SOLUTIONS

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Background and Objectives

Background and objectives
Respiratory problems in pigs are the cause of high antibiotic use and veterinarians need more tools for recurrent respiratory problems. Previous studies revealed correlations between CO2 levels and respiratory outbreaks in pig farms and between CO2 and ammonia levels.In this observational study, we wanted to relate respiratory health of finishing pigs to inside air quality parameters and weather data.

Material and Methods

Materials and methods
In September 2023 one coughing monitor and one climate monitor were installed in 4 similar units of finishing pigs. SoundTalks® is a cloud-based sensor technology that monitors 24/7 the sound emitted from pigs. Based on artificial intelligence, it produces the animals' respiratory health status (ReHS). When the ReHS value falls below 60, the system emits early warnings (yellow / red alerts). Healthy Climate Monitors are used for real time continuous monitoring of temperature, CO2, relative humidity, ammonia, fine dust particles and air pressure. They also import outside temperature, - relative humidity and - air pressure from a nearby official weather station.
A Pearson Correlation Test Matrix was used to find linear correlations between variables.

Results

Results
During the study 35 out of 278 days were ReHS alert days.During the study mean ammonia levels were above the maximum level of 20 ppm in 3 of the 4 units. Outside temperature was negatively correlated with CO2 levels: -0,72. ReHS was positively correlated with ammonia: +0,53. Despite ReHS alerts, no interventions were implemented. Despite the high ammonia levels, ReHS was restored within 2 to 12 days.

Discussion and Conclusion

Discussion and conclusion
We conclude that the results indicate that coughing may be the result of an interplay of many variables, of which only a few important ones were tested in this study.
Continuous measurement sensor devices are useful tools, now and in the future. Problems can be detected earlier, and sensor data can be analyzed to find root causes.

HHM-PP-83

DEVELOPMENT IN LUNG LESIONS IN DANISH HERDS- A LONGITUDINAL STUDY 2022-2023

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Background and Objectives

Enzootic Pneumonia (EP) and Actinobacillus pleuropneumoniae (AP) are important contributors to porcine respiratory disease complex, which causes economic losses in the pig industry worldwide. Post-mortem scoring of EP- and AP-like lung lesions is a tool to monitor the level of respiratory health and estimate the prevalence and severity of EP and AP at farm level. With annual screenings, it is possible to discover fluctuations in within and between herd prevalence and severity of lung lesions over time. LUNGVEMBER is an annual screening of Danish herds performed each year in November using the Ceva Lung Program (CLP). The aim of this study was to report the results of CLP´s performed during LUNGVEMBER in 2022-2023.

Material and Methods

Herds included in LUNGVEMBER are designated by the herd veterinarian. Lungs are collected at slaughter and evaluated at the Veterinary laboratory, Kjellerup, using CLP. A herd level EP- and an AP-index is calculated and reported to the herd, and national average for EP- and AP-indexes is calculated for each year and compared with a one side t-test.

Results

In 2022 and 2023, 2.946 lungs were scored, representing 39 and 65 herds. There was s significant decrease in average EP-index from 1,69 to 1,04 (p=0,01) and average AP-index from 0,93 to 0,61 (p=0,02) from 2022 to 2023. In 2023 25% of the lungs had broncho pneumonic lesions, compared to 34% the year before. Dorso caudal pleuritis prevalence was 33% in 2022 and 22% in 2023.

Discussion and Conclusion

Although herds are not randomly chosen, the sample size is large enough to compare the results from different years. From 2022 to 2023 the prevalence and severity of EP- and AP-related lung lesions has decreased significantly, maybe due to the ongoing national reduction program for PRRS in Denmark. It will be interesting to see if the decrease continues in 2024.

HHM-PP-84

A SPATIAL ANALYSIS OF PRRS TRANSMISSION RISK LINKED TO SLURRY FERTILIZATION IN TAUSTE, SPAIN

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Background and Objectives

This study investigates the risk of PRRS virus transmission between pig farms in the Tauste region of Spain, focusing on the role of pig slurry as fertilizer. PRRS significantly impacts pork production, and while slurry is a known potential transmission route, the extent of its contribution to between-farm spread is poorly understood.

Material and Methods

The study covered 163 farms in Tauste, encompassing various production stages (sow farms, nurseries, and finishing units). The research uses a combination of epidemiological and environmental approaches. First, it tracks the movement of slurry tankers using the Biorisk® External system (Animal Data Analytics SL, Segovia, Spain) to identify farm-to-farm contacts (defined as a tanker spreading slurry within 1km of a farm for at least 10 minutes). Second, it assesses airborne PRRS transmission by collecting air samples at different distances (50m, 150m, 300m) from slurry application sites before and after application, analyzing for viral RNA using quantitative PCR.

Results

The number of epidemiological relationships varied from 1 to 7 per farm and day, being multiple in 83 % of the cases involving more than one farm in the same slurry spreading trip. In up to 76 % of the cases, the slurry was spread from higher to lower health status farms (site I>site II>site III), which spots a good margin of improvement of 24 % of the cases that, properly planned, can avoid the associated risks. Only in one case was the PRRS virus isolated from the slurry.

Discussion and Conclusion

This research will generate valuable data on PRRS transmission related to slurry use. The findings will help quantify the risk of between-farm spread associated with this practice. The results will contribute to improved biosecurity measures in the pork industry, potentially leading to safer slurry handling practices and reduced PRRS transmission.

HHM-PP-85

PREVALENCE OF MYCOTOXINS IN CROPS AND FEED FOR SWINE AND POULTRY IN BRAZIL

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Background and Objectives

Mycotoxins are toxic compounds produced by certain fungi that can contaminate animal feed, posing significant risks to animal health and productivity. These contaminants often occur in crops such as grains, cereals, and hay, commonly used in feed formulations. This study aimed to describe the prevalence of mycotoxins in grains and feed used in Brazilian swine and poultry production.

Material and Methods

A total of 456 samples of crops (corn, soybean, sorghum, soybean meal, sorghum meal, and wheat bran) and feed used in swine and poultry production were analyzed. The samples were tested using the AgraStrip® Pro WATEX® kit (Romer Labs), based on competitive immunochromatographic lateral flow strips, for total aflatoxins (B1, B2, G1, G2), deoxynivalenol, ochratoxin A, zearalenone, total fumonisins (B1, B2, B3), and T-2 toxins.

Results

Among the 456 samples, 175 were corn, 144 feed, 74 soybean meal, 30 sorghum, 15 wheat bran, and 7 soybean samples. Six samples (1.31%) tested negative for all mycotoxins, while 88.84% (406) showed more than one mycotoxin. Aflatoxins were detected in 359 samples (78.72%) with an average concentration of 4 ppb and a maximum of 120 ppb, fumonisins were found in 400 samples (87.71%) with an average of 120 ppb and a maximum of 1237 ppb, zearalenone was present in 341 samples (74.78%) with an average of 86 ppb and a maximum of 147 ppb, deoxynivalenol was detected in 289 samples (63.38%) with an average of 214 ppb and a maximum of 957 ppb, while T-2 toxins were found in 224 samples (49.12%) with an average of 19 ppb and a maximum of 74 ppb.

Discussion and Conclusion

Mycotoxins can cause reduced weight gain, lower feeding efficiency, reproductive issues, immunosuppression, and increased mortality in livestock production. This survey revealed a high prevalence of mycotoxins in grains and feed used in swine and poultry production.

HHM-PP-86

ESTABLISHING A BIOSECURITY CONCEPT IN LOWER SAXONY (GERMANY)

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Background and Objectives

With the introduction of the EU animal health law at the 21th April 2021 farmers bear more responsibilities regarding internal and external biosecurity of their livestock. There are additional requirements for pig farmers in preparation for possible disease outbreaks. Its main goal is to better prevent, detect and respond to animal diseases, many of which can also affect human zoonoses. Lower Saxony is one of Germany´s most important livestock regions. A working group has been formed in Lower Saxony to assist livestock farmers since authorities and trade associations have a vested interest in safeguarding animal health and minimizing economical damage from outbreaks.

Material and Methods

Results

A comprehensive concept has been put together with checklists and a management plan to identify weak points and raise awareness for biosecurity in all areas of the farm. Veterinarians are obliged by the new law to advise farmers. Therefore, special training was carried out in Lower Saxony for agricultural advisors and veterinarians. Right now around 12,000 livestock owners in Lower Saxony were contacted and around 400 vets were specially trained to provide adequate advice. Key points are the implantation of farm enclosure and hygiene (e.g. animal transportation, black and white separation, cleaning and disinfection, employee training regarding hunting activities and importing pork meat from ASF-positive EU member states and carcass storage).

Discussion and Conclusion

The aim is to identify opportunities for improvement so that the farmer can reduce the risk of animal disease outbreaks.

HHM-PP-87

ASSESSING TEMPERATURE CHANGE OF NEWBORN PIGLETS VARYING IN SIZE USING INFRARED THERMOGRAPHY

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Background and Objectives

Establishing thermostability is key in piglet early life survival. The present study aimed to evaluate the use of infrared thermography (IRT) and various thermal windows as a tool to assess thermostability in newborn piglets.

Material and Methods

108 piglets (Duroc Danish x Landrace x Large white) were used. Piglets were divided into four groups according to their body weight (BW) at birth; Q1: 0.60–0.98 kg, Q2: 0.99–1.37 kg, Q3: 1.38–1.76 kg and Q4: 1.77–2.15 kg. Individual BW, RT and surface temperature of two thermal windows (Eye and Ear) assessed by IRT (FLIR® model T650sc, FLIR Systems, USA) were obtained at five time points; 0h, immediately after birth (AB), 1h, 2h, 12h, and 24h AB. Average surface temperature values were obtained from IRT images using FLIR Tools software 6.0 (FLIR Systems, Wilsonville, OR, USA). A linear mixed model was used to analyse the effect of the four groups (Q1, Q2, Q3, and Q4) on RT and the IRT thermal windows during five evaluation times (0h, 1h, 2h, 12h, and 24h).

Results

The 0h RT (37.4± 0.25◦C, P<0.01), Eye (34.5 ± 0.50◦C, P<0.01) and Ear (35.20± 0.68◦C, P<0.01) temperature in Q4 piglets was significantly greater than piglets in other groups. No significant differences were observed in RT, Eye or Ear surface temperature after 1h between groups. However, RT, Eye and Ear temperature at 0h AB was significantly lower than temperatures recorded at 1h, 2h,12h and 24h within Q1 (P<0.01), Q2 (P<0.01) and Q3 (P<0.01) piglets but not for Q4 piglets (P=0.95, P=0.99 and P= 0.99, respectively).

Discussion and Conclusion

Piglet BW at birth influenced the rectal and surface temperature. Larger piglets achieved thermostability more rapidly than smaller piglets. IRT is a potential tool to monitor changes in newborn piglet temperature.

HHM-PP-88

USING INFRARED THERMOGRAPHY AS A TOOL TO ASSESS SURFACE TEMPERATURE CHANGE IN NEWBORN PIGLETS

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Background and Objectives

Hypothermia is a common cause of mortality in newborn piglets. The present study aimed to assess the ability to detect surface temperature changes of two thermal windows using infrared thermography of newborn piglets over a 24-hour period.

Material and Methods

108 piglets (Duroc Danish x Landrace x Large white) were used. Piglets were divided into four groups according to their body weight (BW) at birth; Q1: 0.60–0.98 kg, Q2: 0.99–1.37 kg, Q3: 1.38–1.76 kg and Q4: 1.77–2.15 kg. Individual BW, surface temperature of two thermal windows (Nose, and Brachial biceps (Braq)) assessed by IRT (FLIR® model T650sc, FLIR Systems, Wilsonville, OR, USA) and obtained at five time points; 0h, immediately after birth (AB), 1h, 2h, 12h, and 24h AB. Average surface temperature values were obtained from IRT images of both thermal windows using FLIR Tools software 6.0 (FLIR Systems, Wilsonville, OR, USA). A linear mixed model was used to analyse the effect of the four piglet groups on the IRT thermal windows during five evaluation times (0h, 1h, 2h, 12h, and 24h).

Results

Surface temperature of Nose ($P<0.01$) and Braq ($P<0.001$) at 0h AB was significantly lower than any other evaluation time for piglets in Q1 (26.0±0.58◦C and 32.9±0.49◦C, respectively), Q2 (27.1±0.38◦C and 33.1±0.24◦C, respectively) and Q3 (27.7±0.53◦C and 32.7±0.40◦C, respectively). No significant difference in surface temperature at the different evaluation times was detected for Q4 piglets in Nose (0.99) or Braq ($P=0.56$). No significant differences in surface temperature were detected between piglets in the different groups at any evaluation time ($P>0.05$).

Discussion and Conclusion

This work shows that changes in surface temperature can be detected on small thermal windows of newborn piglets using IRT as a remote sensing technology.

IMM-PP-01

LATERAL INTRODUCTION OF NEW INFLUENZA A STRAINS LIMITS THE EFFICACY OF SWINE INFLUENZA VACCINATION IN SOWS TO REDUCE VIRAL CIRCULATION IN NURSERIES

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Background and Objectives

Influenza A virus (IAV) causes recurrent respiratory disease in nurseries on endemically infected pig farms. Vaccination is one of the tools to control the disease. This study evaluated the on-field efficacy of a combined vaccination program for sows using a commercial trivalent vaccine (H1N1/H1N2/H3N2).

Material and Methods

The trial was conducted on a 900-sow operation with biweekly farrowing batches, where H1N2 1.B.1.2.1 was circulating endemically. The vaccination protocol included blanket vaccinations, and a pre-farrowing booster dose using a trivalent vaccine containing H1 clades 1B.1.2.1 and 1C.2.2, along with H3N2 (clade 3.1970.1). Three cohorts of 40 piglets (totalling 10 litters) were monitored from birth to 9 weeks of age (nasal swabs, RT-qPCR) to assess IAV circulation. One cohort was sampled prior to vaccination, while the other two followed the offspring of vaccinated sows. Influenza A antibodies in piglets were detected using ELISA.

Results

Prior to vaccination, the H1N2 virus was circulating at 5 weeks of age (39.5% positive by RT-qPCR). After sow vaccination, no IAV was detected in the first post-vaccination cohort. However, in the second post-vaccination group (three months later), 71.1% of 5-week-old piglets tested positive. Sequencing identified the virus as a human seasonal H3N2 from a different clade (A/Malaysia/29930/2004). Before vaccination, all 1-week-old piglets were seropositive by ELISA, but post-infection, antibody levels dropped, resulting in seronegativity.

Discussion and Conclusion

While vaccination of sows initially reduced virus circulation in nurseries, the introduction of a new H3N2 strain created a new scenario. These findings highlight the necessity for ongoing monitoring and the development of flexible vaccine production platforms to adapt to evolving epidemiological conditions on farms.

IMM-PP-02

PRELIMINARY ASSESSMENT OF THE FEASIBILITY OF USING COMBINED E.COLI, CLOSTRIDIUM PERFRINGENS AND ROTAVIRUS A VACCINES TOGETHER

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Background and Objectives

Neonatal diarrhea is a common condition affecting many farms and is frequently caused by E. coli, Clostridium perfringens, and Rotavirus A. Vaccination of gilts and sows is a key tool for controlling this condition. Administering a combined vaccine for E. coli, Clostridium perfringens, and Rotavirus A in a single shot would be convenient. The aim of the present study was to test whether mixing a commercial vaccine containing Rotavirus A (Porcilis Rota) with an E. coli/Clostridium perfringens vaccine (Porcilis ColiClos) would affect the viability of the vaccine virus.

Material and Methods

The test was conducted using MA-104 cells, which were previously tested to ensure they supported the efficient replication of the rotavirus A vaccine viruses (G4 and G5 strains). To determine whether the two vaccines could be mixed, the Rotavirus A vaccine was reconstituted with PBS and mixed with the ready-to-use E. coli/Cl. perfringens vaccine. The mixtures were incubated at room temperature for up to 1 hour. Then, serial decimal dilutions of the mixtures were prepared and titrated in MA-104 cells to assess whether the mixing and incubation time affected the viability of Rotavirus A. The viral titer was evaluated using immunofluorescence staining with an anti-VP6 monoclonal antibody. The toxicity of the E. coli/Cl. perfringens vaccine for the MA-104 cells was also assessed.

Results

The vaccine viruses replicated efficiently in the MA-104 cell cultures. Incubating the rotavirus A vaccine with the E. coli/Clostridium perfringens vaccine did not result in any significant decrease inrRotavirus A titers after 0, 30, or 60 minutes of incubation at room temperature, nor did it affect MA-104 cell viability.

Discussion and Conclusion

Based on the results, mixing Porcilis Rota and Porcilis ColiClos appears to be suitable for the immunization of sows, as the immunogenicity of both vaccines is maintained after mixing.

IMM-PP-03

EFFICACY OF A PCV2D AND MYCOPLASMA HYOPNEUMONIAE COMBINED VACCINE IN EXPERIMENTALLY PCV2B CHALLENGED PIGLETS

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Background and Objectives

The objective of this study was to assess the efficacy of a new ready-to-use combined vaccine containing PCV2d genotype and Mycoplasma hyopneumoniae in piglets experimentally inoculated with PCV2b.

Material and Methods

Forty-eight 2-week-old piglets were divided into two groups (n=24) based on the treatment received: vaccinated (V) or non-vaccinated (NV). At 3 weeks of age, V piglets received 2 mL of CIRBLOC M Hyo® and NV ones 2 mL of PBS. Five weeks post-vaccination (wpv) animals were intranasally challenged with PCV2b and necropsied 3 weeks post-challenge (3 wpc). Blood was collected at vaccination, 3 and 5 wpv, and 1, 2 and 3 wpc for viral load detection, ELISA and cytokine quantification. Tracheobronchial lymph node (TBLN) was taken at necropsy for histopathology and RNAscope in situ hybridization (ISH). Statistical analyses were performed to assess vaccine' efficacy, setting statistical significance at $p<0.05$.

Results

Vaccinated group showed higher antibody levels from challenge onwards, and lower percentage of viraemic pigs, viral load in serum at 2 and 3 wpc and in TBLN tissues when compared to the NV ones ($p<0.05$). Th1 cytokines increased significantly in V animals from vaccination to challenge, while the NV group showed higher Th1 levels at 3 wpc. By ISH, the V group had a statistically higher percentage of animals scored as 0 (no viral genome) (73.9%), compared to the NV group (33.3%) ($p<0.05$). Conversely, the NV group had a statistically higher percentage of animals scored as 3 (high amount of viral genome) (19.0%) compared to the V group (0.0%) ($p<0.05$).

Discussion and Conclusion

The vaccine used in this study showed efficacy against PCV2 in terms of humoral and cellular immune responses, percentage of viremic pigs and viral load in serum and tissues. Vaccination using a PCV2d based product conferred cross-protection to pigs against a PCV2b challenge.

IMM-PP-04

AUTOGENOUS VACCINATION AGAINST MYCOPLASMA HYOSYNOVIAE FAILED TO PREVENT LAMENESS IN A CONTROLLED FIELD TRIAL

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Background and Objectives

Mycoplasma hyosynoviae may cause arthritis and lameness in growing-finishing pigs leading to reduced animal welfare and increased antimicrobial use. No commercial vaccines exist; autogenous vaccines are used in some countries but with sparse documentation of effect. The objective of this study was to evaluate the effect of autogenous vaccination against M. hyosynoviae on lameness occurrence and antibody production in a controlled field trial.

Material and Methods

The vaccine consisted of mineral oil adjuvant and formaldehyde-inactivated M. hyosynoviae isolated from the joints of three lame pigs originating from a Norwegian finisher farm with recurring M. hyosynoviae-associated arthritis. Piglets across three batches were randomly allocated to receive 2-mL intramuscular injections of either vaccine (n=384) or 0.9% saline (n=359) at six and nine weeks of age (w.o.a.). Pigs from both treatment groups were mixed in pens. At 10 w.o.a. pigs were moved to the finisher farm and lameness assessed daily. Serum was collected from 60 pigs from each treatment group at 6, 8, 13 and 19-21 w.o.a. and analyzed for M. hyosynoviae IgG antibodies by ELISA at a commercial laboratory.

Results

No significant difference in lameness occurrence was observed between the control (6.7%) and vaccine (7.8%) groups (p=0.554). A decline in antibody levels was observed from week 6-13, while the highest levels occurred at 19-21 w.o.a. There were no significant differences between treatment groups in no. of pigs positive for M. hyosynoviae antibodies at any time (all p-values>0.05).

Discussion and Conclusion

Reasons for lack of vaccine efficacy may include vaccine-related factors (e.g. choice of adjuvant or bacterial strains), study design, or interference with maternally derived antibodies. M. hyosynoviae is a commensal pathogen and antibody production is expected in non-vaccinated animals. Also, the role of antibodies in disease protection is not clear. In conclusion, no difference in lameness occurrence or antibody production was observed between M. hyosynoviae-vaccinated and control animals.

IMM-PP-05

THE UTILITY OF PIGLET PROCESSING FLUID TO DETECT SPECIFIC ANTIBODIES AGAINST IMPORTANT PORCINE PATHOGENS.

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Background and Objectives

Processing fluid (PF) may improve the monitoring of some porcine pathogens and represents a promising alternative to blood for selected immunological compounds assessment in suckling piglets and their mothers. This study aimed to assess the utility of PF in detecting antibodies against important porcine pathogens via commercial ELISA kits and the effect of sample pooling on the test results. We also checked whether the results obtained from testicular-only PF differ from those obtained from boar and gilt serum.

Material and Methods

Commercial ELISA evaluated PF, male and female serum for the presence of antibodies against Actinobacillus pleuropneumoniae (App), Erysipelothrix rhusiopathiae (Ery), Mycoplasma hyopneumoniae (Mhp), hepatitis E virus (HEV), swine influenza virus (SIV) and porcine epidemic diarrhoea virus (PEDV). The differences in the positive sample number between different sample types were assessed with a chi-square test. ROC analysis was employed to determine the optimal cut-off for PF. Subsequently, the selected test's performance parameters and kappa coefficient were calculated from each test for PF results interpreted according to the test's manufacturers and ROC-calculated cut-offs.

Results

Determining and applying ROC-calculated cut-off improves the selected test's performance parameters, resulting in excellent accuracy and agreement. However, accuracy and agreement remained unsatisfactory for some tests (App, Ery) even when using ROC-calculated cut-off. For all tests, except the one dedicated to detecting antibodies against the App, there were no significant differences in the number of positive samples between particular sets of sample types.

Discussion and Conclusion

Some commercially available ELISA kits can be useful for detecting antibodies against important porcine pathogens in individual PF and pooled samples. However, an optimal cut-off or sample dilution should be determined and applied in every case. In addition, we found that PF obtained from boars can only be useful for assessing the status of whole litter.
The study was financed by NCN project UMO-2020/37/B/NZ7/00021.

IMM-PP-06

EFFECT OF THE CONTROL OF NEONATAL DIARRHOEA AND CYSTOISOSPOROSIS ON PRE-WEANING PERFORMANCE WITH FOCUS ON CLOSTRIDIUM PERFRINGENS TYPE A CONTROL

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Background and Objectives

Neonatal diarrhoea (ND) with Clostridium perfringens type A (CpA) as one of the main pathogens involved and piglet cystoisosporosis due to Cystoisospora suis (C. suis) belong to the most common disease conditions on a pig farm worldwide. They can cause severe diarrhoea, significant economic losses and excessive use of antimicrobials. The aim of the study was to investigate the efficacy of the combination of vaccination of sows with a vaccine containing alpha and beta2 toxoids (CpA) and the control of cystoisosporosis in piglets.

Material and Methods

The study was conducted in a 200-sows herd in southern Germany with a history of repeated diarrhoea in the first weeks of life using no ND sow vaccine before. ND caused by ETEC (enterotoxic E.coli) and CpA together with cystoisosporosis was confirmed before start of the trial. Two groups were parallelly treated, with IVP (Sows: Enteroporc COLI AC®; Piglets: Forceris®) or CP (Sows: Autogenous vaccine (NTEC, ETEC, without alpha and beta2 toxoid of CpA); Piglets: Gleptoferron, oral toltrazuril). All piglets were weighed individually on day of treatment and at 21st day of age (D21). Mortality rate was recorded. Statistical calculations were performed (SAS1 version 9.3).

Results

Typing of isolates from fecal swabs taken from one litter of CP group with ND on 3rd DOA revealed CpA (alpha and beta2 toxin positive). Mean body weight at D21 was statistically significant higher in IVP (13 sows; 159 piglets; 6.43kg) than in CP group (13 sows; 158 piglets; 6.13kg) ($p = 0.0202$; linear mixed-effects model). The mortality rate was numerically lower in IVP group (15.3% vs. 21.2%).

Discussion and Conclusion

This study demonstrates that the use of a vaccine containing the alpha and beta2 toxoid plays a central role in the control of ND. In addition, early treatment with toltrazuril, in sufficiently high quantities, is necessary for successful management of coinfection with C. suis.

IMM-PP-07

COMPARISON OF DIFFERENT NEEDLE-FREE VACCINES AGAINST PCV2-ASSOCIATED DISEASES AND MYCOPLASMAL PNEUMONIA ON PRODUCTION PERFORMANCE EVALUATED PRE- AND POST-SLAUGHTER

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Background and Objectives

Batch uniformity of finishing pigs can be greatly affected by numerous factors, including subclinical PCV2 infection. Therefore, the aim of our investigation was to evaluate the influence of two intradermal vaccines against PCV2-associated diseases and mycoplasmal pneumonia on pre- and post-slaughter production parameters following a side-by-side methodological approach.

Material and Methods

This investigation was carried out in a high-performing PRRSV-negative weaner-to-finisher farm with 11,000 animals. All the animals were born at a 5,000-head sow farm and weaned in weekly batches after four weeks of lactation. For the purpose of this study 2,474 weaners (6.30 kg) in four consecutive batches were randomly allocated into two groups of 1,254 (group H [HIPRA]) and 1,220 (group M [MSD]), ear-tagged and vaccinated using Mhyosphere® PCV ID (Hipra, Spain) or Porcilis® PCV ID, Porcilis® M Hyo ID ONCE (Intervet International, the Netherlands), respectively. Data regarding number of days from vaccination to market (VTM) and average daily weight gain from weaning to slaughter (total ADWG) were tracked. Based on post-slaughter data obtained from 2,170 individuals average carcass weight (ACW) and percentage of underweights (carcass <80 kg) were evaluated. Analysis of variance was utilised to assess statistical significance of differences.

Results

Average number of VTM days was significantly lower ($p<0.001$) in group H (129.2) compared to group M (130.5). Total ADWG was higher in group H (627 g/day) than in group M (612 g/day). The difference (15 g/day) was statistically significant ($p<0.001$). ACW in group H and M was 87.04 kg and 85.91 kg. The difference (1.13 kg) was statistically significant ($p<0.001$). Percentage of carcasses <80 kg was significantly lower ($p<0.01$) in group H (10.13%) compared to group M (14.69%).

Discussion and Conclusion

Our results highlight both challenges to decrease variation in batches of finishing pigs and practical significance of production data obtained during post-slaughter examination.

IMM-PP-08

ADDED VALUE OF BOOSTING GILTS AGAINST PPV1 WITH A GENOTYPE 2 BASED VACCINE AFTER PPV1 BREAK IN DANISH SOW HERDS

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Background and Objectives

Porcine parvovirus 1 (PPV1) causes SMEDI (stillbirth, mummification, embryonic death, and infertility) in sows. A new variant, Genotype 2 (27a-like), is now prevalent in Europe and older vaccines does not offer full protection. The objective of this study was to investigate if boosting of PPV1 immunity with a genotype 2(G2)-based vaccine in herd experiencing a PPV1 G2 break could increase litter size and reduce litter size variation.

Material and Methods

This study included two Danish sow herds, experiencing increased numbers of mummies. In both herds PPV1 G2 were detected by PCR from mummified fetuses. All gilts were boosted twice 3 weeks apart with a G2 PPV1 vaccine (ReproCyc ParvoFLEX®) on top of their regular PPV1-Erysipelas combination (herd 1) or Erysipelas-PPV1-Leptospirosis combination (herd 2).Gilt litter size and gilt litter size variation were compared for a 7-month period before G2 boosting to 7-month after G2 boosting with one month in between. T-tests and F-tests were used to calculate differences in average liveborn piglets and standard deviation (SD) respectively.

Results

725 gilt litters were included. Number of liveborn in herd 1 increased from 16.75 to 17 showing a 0.25 piglet per litter difference between the two groups (p=0.483) and a significant reduction in litter size SD of 0.7 (p=0.009). In herd 2 the study showed a significant improvement of 1.2 piglet per litter in herd 2 (p=0.006) and a litter size SD reduction of 0.3 (p=0.343) piglet per litter.

Discussion and Conclusion

Boost with the PPV G2 vaccine ReproCyc ParvoFLEX ® significantly improved number of liveborn piglets in gilt litters in herd 2 and variation in gilt litter size in herd 1. This is an important improvement of the herd economy as SEGES Innovation sets the added value of one extra liveborn piglet to 70€/sow/year.

IMM-PP-09

SHORT TIME TO STABILITY AND RECOVERY AFTER OUTBREAK IN THREE FARMS USING COMBINED VACCINATION PROTOCOLS AGAINST PRRS

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Background and Objectives

Porcine Reproductive and Respiratory Syndrome (PRRS) causes high economic losses to farms. Vaccination combining modified-live (MLV) and inactivated vaccines (KV) is one of the strategies to control the disease. The aim of this study was to evaluate the effect of sow vaccination against PRRSV with a modified-live and an inactivated vaccine on PRRS outbreak duration and farm productive parameters.

Material and Methods

This trial was conducted in three sow farms, vaccinated with MLV every 4 months. Following a PRRS outbreak complementary KV (Progressis®, Ceva) vaccination was implemented. Two (2)-6 weeks after outbreak, all females ≥6Mth were mass-vaccinated, and gilt basic vaccination commenced. From 4-6 weeks after mass-vaccination, onwards: boosting 3 weeks before each farrowing (3wpf). Tongue tips sampled at birth and tested by RT-qPCR weekly. Three periods compared were, before outbreak=**B**: w22'2023-KV, outbreak=**O**: KV-1st birth mothers KV 3wpf, after outbreak=**P**: 1st birth mothers KV 3wpf -w22'2024. Productive parameters recorded: total-born/litter, born-alive/litter, still-born/litter and weaned/litter. Groups compared using ANOVA with post-hoc comparison test. Significant differences when $p<0.05$.

Results

The time to obtain sow herd stability demonstrated by consistent weekly PRRSV-free tongue tip samples were as low as, 5, 12, and 20 weeks for the three farms, respectively. The group-averages were total-born/litter (15.25, 14.54*, 15.48), born-alive/litter (13.99, 12.96*, 14.18), still-born/litter (8.34%, 10.67%*, 8.35%) and weaned/litter (11.88, 9.93*, 12.14) between B, O and P groups, respectively. O-group (*) is significantly worse than both B and P groups, no significant differences between B and P.

Discussion and Conclusion

In three different farms with different PRRSV instability and outbreaks, the complementary KV vaccination protocol quickly and consistently restored productivity and sow-herd stability without transmission of PRRSV to the off-spring. These data indicate substantial, significant on-farm PRRSV control of the complementary KV program.

IMM-PP-10

FADE OUT OF PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PRRSV) IN AN ENDEMIC DUTCH FARROW- TO FINISH HERD

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Background and Objectives

The Netherlands aims to eradicate PRRSV before 2050. Vaccination with stringent biosecurity was already proved successful in reinfected SPF farms. This study demonstrates how vaccination and well-defined internal biosecurity was successfully combined to eradicate PRRSV in a commercial farrow-to-finish herd for the first time in the Netherlands.

Material and Methods

This case took place in a farrow-to-finish farm (300 sows - 3000 fattening places), situated in a low pig density area, that became endemically infected in the early nineties. Since then, sows and all purchased SPF gilts were vaccinated after arrival (Porcilis PRRS®, MLV vaccine). The farm was monitored for years using ResPig®, a biannual cross-sectional serological program investigating blood (ELISA and PCR) from gilts, sows and pigs (3, 10, 16, 22 weeks of age) and saliva from 4 age groups (gilts, 7, 10, 16 weeks). Since 2018, better hygienic procedures and compartmentalizing were implemented, including strict working lines (from younger to older pigs) using specific clothing, footwear, and equipment for each production site.

Results

After 2014, all 16- and 22-week-old fatteners were PRRSV seronegative (antibodies) and PCR negative in saliva or pooled sera. In March 2019, sows and gilts were vaccinated for the last time, no pigs were vaccinated against PRRSV thereafter. Antibodies were detected in sows until December 2020, whereafter also those became PRRSV seronegative.

Discussion and Conclusion

Most breeding farms in the Netherlands use PRRSV vaccination to reduce clinical symptoms. Until now, most of these were not successful in eradicating PRRSV. Under the conditions presented here, eradication using a MLV vaccine combined with strict biosecurity was possible. It was hypothesized that vaccination reduced vertical transmission of PRRSV and shortened the shedding period of breeders. Herd compartmentalizing and hygienic procedures would have lowered the spread of PRRSV. By the combination the infection faded out, resulting in the production of PRRSV-negative fatteners.

IMM-PP-11

EVALUATION OF COLOSTRUM IMMUNOGLOBULIN G IN A COMMERCIAL SOW HERD: PARITY-BASED DIFFERENCES AND THE ROLE OF BETA-1,3-GLUCAN AS IMMUNOADJUVANTS

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Background and Objectives

With an increased number of piglets born and roughly the same amount of colostrum produced, there has been a surge in interest in colostrum quality. This experiment aimed to evaluate differences in colostrum between parities and explore options to enhance immunoglobulin content.

Material and Methods

Forty-seven gilts and sows from a 1,200-sow commercial farm in the Czech Republic with hyperprolific genetics, PRRS, and M. Hyo negative were used. The group was divided into control (n=25) and treatment (n=22). The treatment group was supplemented with 1g/sow/day of an immunoadjuvant (beta-1,3-glucan) from day 85 of gestation until the end of lactation. Each group had an even distribution of parities. Colostrum was extracted following a standardized procedure. Immunoglobulin content was measured using an ELISA test and calibration curve.

Results

In the control group, parity 6 sows had the lowest level of Immunoglobulin G (IgG) at 51.82 mg/ml, followed closely by gilts at 59.12 mg/ml. Parity 2 sows increased to 94.58 mg/ml, peaking at parity 3 with 101.8 mg/ml, then progressively dropping. The immunoadjuvant positively impacted IgG levels across all parities. Parity 6 sows still had the lowest IgG level (94.2 mg/ml). Treatment gilts more than doubled their IgG levels (136.15 mg/ml), compared to the control group and parity 2 sows increased to 132.55 mg/ml. The treatment group peaked at parity 3 (165.61 mg/ml) before declining.

Discussion and Conclusion

Immunoadjuvants showed a positive numeric increase in IgG across all parities, with the most impactful results in the first three parities, which comprised around 60% of the herd. Additionally, the control group highlighted the importance of maintaining a good parity structure by culling parity 6+ sows. This small-scale study provided numerical differences and serves as proof of concept and should be expanded to a larger trial.

IMM-PP-12

IMPROVEMENT OF TECHNICAL PERFORMANCE AFTER PIGLET VACCINATION ON A SUBCLINICAL PCV2 FARM

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Background and Objectives

The aim of this study was to evaluate the benefits of intradermal PCV-2 vaccination against PCV-2 genotype d on a farm without clinical disease. An expected growth performance (ADWG 8-115kg = 739g) was expressed for the pigs. PCV-2 viraemia in the pigs was medium/low (no more than 10^{6-7}copies of virus detected per ml of sera).

Material and Methods

The trial was performed on a PRRSV-free French farrow-to-finish farm. Neither sows nor piglets were vaccinated against PCV-2 and M.hyopneumoniae.The study compared 2 periods: previous non-vaccinated groups NV1-NV2-NV3 (n=733) were compared with vaccinated groups V1-V2-V3 (n=796). The vaccinated groups were vaccinated intradermally with MHYOSPHERE® PCV ID at 4weeks of age (WOA).Fifteen pigs in each group were identified individually. PCV2 viraemia was monitored by PCR on blood and in oral fluid samples from 3 pig pens from each group at 11, 18 and 22 WOA. Pig mortality records and slaughterhouse data were monitored from each pig group.A logistic regression model was used for the statistical analysis.

Results

PCV2 viraemia decreased in vaccinated pig groups V1 and V2 and was undetectable in group V3. Mortality rates were not significantly different between groups (p>0,05). The vaccinated pigs increased on average by an additional 65g average daily weight gain (8-115Kg live weight) compared to the non-vaccinated groups. The vaccinated groups were significantly heavier (p<0.001) at slaughter and had a 5.5Kg heavier average cold carcass weight than the non-vaccinated ones. The non-vaccinated pig groups had a higher prevalence of classified light carcasses (p<0.01) than the vaccinated groups. The return on investment of the vaccine calculated during this study was 6,5€/pig in vaccinated groups V1-V2-V3 and 9.5€/pig in V3.

Discussion and Conclusion

MHYOSPHERE® PCV ID vaccination was effective in controlling PCV2d viraemia and was cost effective under these farm study conditions.

IMM-PP-13

EFFECT OF ORAL VACCINATION ON PERFORMANCE OF PIGLETS INFECTED WITH SALMONELLA TYPHIMURIUM WITHOUT OBVIOUS CLINICAL SIGNS

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Background and Objectives

Salmonella spp. is widely spread on Spanish pig farms, S. Typhimurium being one of the most frequently detected serovars. It usually leads to enteric disease, with diarrhea, mortality and growth retardation, besides it may also cause septicaemia. This investigation aimed to determine the use of a S. Typhimurium commercial vaccine on the mortality, average daily gain (ADG), diarrhoea control and number of runts in nursery.

Material and Methods

A 3000 sow farm in Spain suffering from recurrent S. Typhimurium clinical cases in nursery vaccinated 1619 piglets with a S. Typhymurium attenuated live vaccine (Salmoporc®, 1ml by drench) at 10-14 days age, comparing it to a group of 835 unvaccinated animals. Piglets from both groups were housed in the same room at approximately 25 piglets per pen. Pens were weighed individually at exit, obtaining 32 replicates for the control and 64 for the vaccinated group. A generalized linear model was used to determine statistical differences in Mortality, ADG and percentage of runt piglets. Statistical differences were set at $p<0.05$.

Results

Average initial weight of both groups was similar (5.07 Kg and 5.08 Kg). The incidence of diarrhea in both groups was low with mild clinical signs. Differences between control and vaccinated groups in weight (13.5 ±0.47Kg Vs 15.1 ±0.34Kg) and ADG (206 Vs 254 grams/day) at the end of the investigated period were statistically significant ($p<0.001$), even with longer growth time for the control group (41 Vs 39 days). Mortality (3.6% Vs 1.8%) and percentage of runts (11.9% Vs 4.7%) were significantly higher in the control group.

Discussion and Conclusion

The vaccination by oral drench of a S. Typhimurium commercial vaccine significantly improved productive results in nursery even in an almost subclinical situation, where almost no diarrhoea was present.

IMM-PP-14

GUT-ASSOCIATED CELL-MEDIATED IMMUNE RESPONSE IN PIGS VACCINATED AGAINST PORCINE PROLIFERATIVE ENTEROPATHY AND CO-INFECTED WITH LAWSONIA INTRACELLULARIS AND BRACHYSPIRA HYODYSENTERIAE

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Background and Objectives

Co-infections may worsen the clinical signs and lesions caused by Lawsonia intracellularis (LI) and potentially affect the effectiveness of LI vaccination. This study aimed to characterize the gut-associated cell-mediated immune response in pigs co-infected with LI and B. hyodysenteriae (Bhyo) and vaccinated with an LI vaccine.

Material and Methods

Eighty pigs were divided into five groups: V-CO (LI vaccinated, co-infected with LI+Bhyo), P-CO (placebo vaccinated, co-infected with LI+Bhyo), V-LI (LI vaccinated, infected with LI), P-LI (placebo vaccinated, infected with LI), and NC (negative control, placebo vaccinated and non-challenged).
Pigs received the LI vaccine (Porcilis Ileitis, MSD Animal Health) on D0, the LI challenge on D22, and the Bhyo challenge on D30. Necropsies were performed on D21, D29, D36, and D43.
Lymphocytes were isolated from mesenteric lymph nodes and submitted to an ELISPOT assay to assess IFN-γ production, indicating a cell-mediated immune response. Each spot in a well represents one IFN-γ-producing lymphocyte. The average spot count was calculated and statistically analyzed using the Kruskal-Wallis test.

Results

Evolution of spot-forming cells (SFCs) average per well:
V-CO: 6.16 (D21), 8.5 (D29), 12.41 (D36), 20.3 (D43)
V-LI: 5.16 (D21), 10.75 (D29), 12.66 (D36), 20.16 (D43)
P-CO: 5.4 (D29), 8.25 (D36), 14.16 (D43)
P-LI: 3.5 (D29), 6.16 (D36), 14.41 (D43)
NC: 5.75 (D21), 6.5 (D29), 4.5 (D36), 5 (D43).
The threshold for nonspecific IFN-γ response was 7 spots per well. No statistically significant difference was found between groups.

Discussion and Conclusion

LI is an intracellular bacterium, and a cell-mediated immune response is expected. IFN-γ from T-cells is crucial for protection against LI and limits lesion development. Although only numerical differences were observed between groups, primary exposure to the LI vaccine antigen allowed a faster and more intense gut-associated cell-mediated immune response after exposure to the live antigen, suggesting cell-mediated immunological memory.

IMM-PP-15

A CASE OF SWINE INFLUENZA A VIRUS INFECTION IN A GERMAN FATTENING FARM LEADING TO RESPIRATORY DISTRESS AND SERVERE EP-LIKE LUNG LESIONS AT SLAUGHTER

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Background and Objectives

Swine influenza A virus (swIAV) is part of the porcine respiratory disease complex (PRDC) and can cause severe respiratory disease and economical losses. This investigation aimed to assess the impact of vaccination of fatteners with RESPIPORC FLUpan H1N1® (VAC1) and RESPIPORC FLU3® (VAC2) on respiratory disease, lung health at slaughter and economic performance on a German fattening farm.

Material and Methods

A farm housing 1250 finishing pigs suffered from severe coughing mid of fattening and increased lung discards at slaughter. Tracheobronchial swabs (TBS) of 15 acute diseased animals at 70 kg were examined using PathoSense® to identify the involved respiratory pathogens. Lungs of these pigs (NVac) were evaluated according to Ceva Lung Program® (CLP®) at slaughter. The TBS was positive for Glaesserella parasuis, Mycoplasma hyopneumponiae, Pasteurella multocida and swIAV H1avN1. Antimicrobial treatment of affected pigs did not show satisfying results, and the next arriving pigs were vaccinated using VAC1 and VAC2 at the beginning of fattening. Clinical signs and daily weight gain of vaccinated pigs were recorded and compared to data of unvaccinated batches at a similar season. Another CLP® of vaccinated animals (Vac) was performed.

Results

The CLP® of NVac revealed100% lungs with broncho-pneumonic lesions, resulting in a high EP index of 5.67. In Vac group, coughing was reduced to a minimum, also reflected in the lung health at slaughter – percentage of lungs with broncho-pneumonic lesions of 76% and EP index of 2.75. Daily weight gain revealed 799g in NVac vs. 824g in Vac.

Discussion and Conclusion

This case report underlines the role of swIAV in respiratory disease of fattening pigs, leading to increased lung lesions at slaughter. Furthermore, it shows that swIAV negatively impacts growth performance. In the circumstances of this farm simultaneous vaccination with RESPIPORC FLUpan H1N1® and RESPIPORC FLU3® had a positive impact on the above-mentioned parameters.

IMM-PP-16

COMPARISON OF INTRADERMAL VERSUS INTRAMUSCULAR VACCINATION EFFICACY AND CARCASS QUALITY IN PIGS INOCULATED AGAINST MYCOPLASMA HYOPNEUMONIAE AND PORCINE CIRCOVIRUS TYPE 2 IN THAILAND

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Background and Objectives

The objective of this study was to assess and compare the influence on carcass quality of intradermal (ID) versus intramuscular (IM) vaccination against Mycoplasma hyopneumoniae and Porcine Circovirus Type 2 on commercial pig farms in Thailand.

Material and Methods

A control group (6 herds, 4,433 pigs) received the conventional intramuscular (IM) vaccine, whereas a test group (6 herds, 4,551 pigs) received the intradermal (ID) vaccine (HIPRADERMIC®). The study examined characteristics such as weaning age, slaughter weight and age, and average daily weight gain (ADWG). The study also examined slaughter-related statistics, including abscess proportions, pork rejections, and pork collar quality downgrades. All parametric variables were compared using the student t-test.

Results

The findings showed no statistically significant variation in the age at which the animals were weaned or the age at which they were slaughtered between groups. Nevertheless, the ID group had a greater slaughter weight (109.01 ± 5.89 kg vs. 108.42 ± 3.82 kg) and ADWG (700 ± 48 g/day vs. 687 ± 44 g/day). Although there is no statistical significance, the shorter rearing period results in cost savings on feed and management expenses. The proportion of live pigs and rates of culling were similar in both groups. Regarding carcass quality, the ID group had no recorded abscesses compared to a 0.03 % occurrence in the control group. Additionally, the total quantity of condemned pork due to abscesses was significantly lower in the HIPRADERMIC® group (1.60 kg vs. 19.33 kg, p=0.01), and there was a reduction in downgrades (313.63 vs. 409.73 kg). The percentage of affected tissues was slightly higher in the ID group (1.17 ± 0.49%) compared to the control group (1.09 ± 0.77%).

Discussion and Conclusion

In conclusion, the ID approach offered significant advantages regarding carcass quality, specifically in minimizing losses and downgrades caused by abscesses. These findings should be further studied.

IMM-PP-17

CASE REPORT: ELIMINATION OF VERTICAL TRANSMISSION OF PCV-2 THROUGH SOW VACCINATION

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Background and Objectives

Porcine Circovirus 2 (PCV-2) is ubiquitous and main responsible for porcine circovirus diseases (PCVDs). PCVD can be diagnosed, despite commercial PCV2 vaccines. If the sow herd immunity against PCV2 is not homogeneous, subpopulations can lead to PCV2 vertical transmission (sow to piglets). The objective of this study was to evaluate the impact of sow PCV2 vaccination on the reduction of vertical transmission to the offspring.

Material and Methods

The study was conducted in a commercial herd. PCVD was diagnosed in finishers (immunohistochemistry) despite vaccination with Ingelvac CircoFLEX at 21 days of age (doa). After detection of PCV2 in newborn piglets, a double mass PCV2 vaccination program was established in sows (4 weeks apart). Tongue tips of the groups, as well as 100 ear tagged piglets at 21, 58 and 98 doa, were sampled and followed before and after sow vaccination (50+50). Samples were analyzed by ELISA PCV2 (Biochek) and qPCR.

Results

Results demonstrated the presence of PCV2 by qPCR only before sow vaccination (tongue tips and piglets at 21, 58 and 98doa with $8x10^2$; $3x10^3$; $1x10^7$ titers respectively).
Piglets had serological changes at 21doa(1,2vs1,5) due to maternal antibody, and at 58(0,8vs1,2) and 98(1,5vs0,8) doa due to piglets' vaccination when comparing before and after strategy.

Discussion and Conclusion

This study demonstrated the impact of a double sow mass vaccination to stop vertical PCV2 transmission to piglets. Results from this study demonstrated a a more optimal PCV2 piglet vaccination response after stopping piglets transmission from the sows. Ingelvac CircoFLEX in sows was able to reduce detection of PCV2 in piglets early in life and establish a solid immune response.

IMM-PP-18

EFFICACY OF AN ORAL LIVE LAWSONIA INTRACELLULARIS VACCINE ON PERFORMANCE OF NURSERY PIGS

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Background and Objectives

On a farm where Lawsonia intracellularis (Li) was diagnosed by the vet (post-mortem lesions confirmed by PCR), the producer wanted to reduce the number of smaller pigs prevented from leaving the nursery to go to the finisher site by implementing Li vaccination. This would help with the pig flow and management on the nursery site. We report the findings of a study performed to evaluate the efficacy of an oral Li vaccine on the nursery performance.

Material and Methods

Seven batches were vaccinated with Enterisol Ileitis® (EI); 6 subsequent batches were not. All pigs were vaccinated at weaning (4 weeks of age) against PCV2, Mycoplasma hyopneumoniae and PRRS; EI was given via the water system using a continuous dosing membrane pump (EMEC) a week after weaning. All deaths were recorded. Weights were recorded at animal or pen level at weaning, at move into and at exit out of stage 2. All medication use was recorded. Outcome measures were ADG, % mortality and % of smaller pigs (< 29 kg) held back. Analysis was performed using Minitab 20.2.

Results

2493 vaccinated (V) pigs and 2116 non-vaccinated (NV) pigs were enrolled. There was no difference in weaning weights or medical treatments between treatment groups. At exit V pigs had a mortality rate of 3.13% vs NV 5.15% ($p<0.001$). The % smaller pigs held back was 5.38% for V pigs vs 10.16% for NV pigs ($p<0.001$). V pigs had an average weight of 42.45 kg (sd 4.2) and ADG of 563 g/d vs 39.15 kg ($p<0.001$; sd 4.7; $p=0.01$)) and 520 g/d for NV pigs ($p<0.001$).

Discussion and Conclusion

These results demonstrate the efficacy of the vaccination schedule including Enterisol Ileitis® by demonstrating a higher growth (+ 43 g/d), less variability, reduced mortality (- 2%) and fewer smaller pigs held back (- 4.8%) from time of vaccination till 15 weeks of age.

IMM-PP-19

COMPARATIVE OF THE EFFICACY OF COMMERCIAL PORCINE VACCINES AGAINST M. HYOPNEUMONIAE

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Background and Objectives

Mycoplasma hyopneumoniae (Mhyo), the etiological agent of porcine enzootic pneumonia, is highly contagious and primarily affects the respiratory tract, leading to chronic respiratory lesions and decreased pulmonary function. This study compares the efficacy of commercial porcine vaccines against Mhyo, including intramuscular and intradermal ones.

Material and Methods

This study included 3-week-old piglets divided in 5 groups (15 piglets/group) vaccinated with Vaccine A (MHYOSPHERE® PCV ID using Hipradermic®); Vaccine B (Porcilis® PCV ID/Porcilis® M Hyo ID ONCE, using IDAL Twin); Vaccine C (Porcilis® PCV M Hyo intramuscular), Vaccine D (HYOGEN®/CIRCOVAC® intramuscular) and Vaccine E (PBS) as control. All groups were challenged intranasally at nine weeks of age with a highly virulent strain of Mhyo on three consecutive days. Three weeks after the infection, the affected lung surface was assessed by a human expert. The benefits of each vaccination strategy in terms of efficacy, route of administration, vaccination process and animal welfare were compared in a radar chart.

Results

Lung lesions related to Mhyo infection was significantly reduced compared to the control group (E [14.2% of lung affected surface]) only in two vaccines (Group [% of affected lung surface, % of reduction]: A [8.5, 40.2] and D [9.2, 35.4]) out of the four tested (B [14.2, 0.0], C [11.8, 16.9]). Pigs from Vaccine A presented the largest reduction of affected lung surface compared to the control group. The radar chart showed that Vaccine A offers the best global benefit in terms of efficacy, animal welfare, and optimization of the vaccination process.

Discussion and Conclusion

The present study showed that only two vaccines were able to reduce the lung lesions caused by Mhyo, being Vaccine A the one with the strongest reduction of the affected lung surface. The radar chart demonstrated that MHYOSPHERE® PCV ID vaccination offers the most comprehensive benefits, optimizing efficacy, animal welfare, and the vaccination process.

IMM-PP-20

A CASE REPORT OF A CLINICAL APP OUTBREAK WITH SEVERE ECONOMIC IMPACTS AND SUBSEQUENT STABILISATION THROUGH VACCINATION

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Background and Objectives

Actinobacillus pleuropneumoniae (App) is responsible for porcine pleuropneumonia. Depending on the circulating strains and environmental conditions, varying severity of the disease can be observed. High mortality is visible in the peracute and acute forms, with additional significant respiratory symptoms in acute App cases, in contrast to the milder symptoms in subacute, and subclinical forms. The aim of this study was to evaluate the benefits of App vaccination in a farm suffering from severe App outbreaks.

Material and Methods

Early December-2023 a few 80kg-pigs died after showing mild respiratory distress in a run-out, straw compartment of a 4000-finishing farm. Oral fluids were sampled, and postmortems were performed. Postmortem lung samples were examined by PCR and histology. Pigs of this compartment were Tetracycline-treated. Two weeks later, in two further compartments, approximately 100 metres away from the first compartment for which the farmer used separate boots and clothes, finishing mortality increased severely from 1.5% to >10%. Clinical affected pigs were treated with Dexamethasone and Tulathromycin. To prevent another App outbreak, a vaccination with Coglapix® (Ceva, France) was implemented. Lung scoring of randomly selected (every second lung at slaughter) according to Ceva Lung Program® (CLP®) methodology was conducted of unvaccinated and vaccinated.

Results

Oral fluids were App positive by PCR. Lung samples were tested App positive by PCR, typing revealed serotypes 5 and 9. Pleuropneumonia was visible during histological examination. CLP® revealed dorsocaudal pleurisy (App-like lesions) in 46.67% vs. 0.00% ($p<0.0001$; Chi square; Yates continuity correction) and App indexes of 1.47 vs. 0 ($p<0.0001$; Mann-Whitney test) in unvaccinated (n=30) vs. vaccinated (n=31), respectively. Vaccination successfully substituted antimicrobial use (AMU) and normalised respiratory health and mortality.

Discussion and Conclusion

This case report shows that App can have huge health, welfare, OneHealth, and economic impacts on pig production. Vaccination had a positive effect on animal welfare, lung health, AMU and productive performance.

IMM-PP-21

COMPARATIVE EFFICACY OF TWO FRESHLY MIXED MYCOPLASMA HYOPNEUMONIAE PLUS PCV2 VACCINES ADMINISTERED AT WEANING IN NURSERY PIGS.

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Background and Objectives

PCV2 and Mycoplasma hyopneumoniae (Mhp) remain among the biggest challenges to swine health and performance with Mhp mainly being an issue in finisher pigs. We report the findings of a field study performed to compare the efficacy of two different PCV2 and Mhp vaccine combinations in nursery pigs.

Material and Methods

The study farm was positive for PRRS, Mhp and Influenza A virus. Four consecutive batches of pigs were included; the first 2 batches received treatment 1(T1; n=1103): 2ml of FLEXcombo®: Ingelvac CircoFLEX® (1ml) mixed with Ingelvac MycoFLEX® (1ml), the next 2 batches received treatment 2 (T2; n=1097): 0.5ml of Circovac® mixed with 2ml Hyogen®. At weaning (5 weeks of age or woa) pigs were vaccinated, tagged and weighed before being allocated to a pen. At 13 woa pen weights were recorded before pigs were moved to the finishing barns. All deaths were recorded (date, tag number, weight and reason) but no postmortems were performed. Primary outcome measurements were weights and average daily gain (ADG). Analysis was performed using Minitab® 20.2.

Results

There were no significant differences in weaning weights, medical treatments, feeding days, feed and water intakes or mortality between the treatment groups. At 13 woa, average weight was 44.49 kg and ADG 0.64 kg/d for T1 vs 41.98 kg ($p<0.0001$) and 0.58 kg/d for T2 ($p<0.0001$) with lower variability of weights in T1: sd 1.71 vs 2.87 for T2 ($p<0.001$).

Discussion and Conclusion

These results demonstrate the efficacy of FLEXcombo® with a higher ADG (+47g/d) and higher and less variable weights from time of vaccination till 13 woa, resulting in an extra 2.51 kg at exit of the nursery. Less variable weights at 13 weeks will makes precision management in finishing easier[1] and is likely to result in less variability in slaughter weights, which plays a major role in profitability[2].

IMM-PP-22

FIELD STUDY ON THE IMPACT OF PIGLET VACCINATION AGAINST A HIGHLY VIRULENT PRRSV STRAIN: PRODUCTIVE FATTENING RESULTS

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Background and Objectives

The study focuses on the impact of vaccination against the porcine reproductive and respiratory syndrome virus (PRRSv) on pig production in Spain, especially after the emergence of highly virulent strains like Rosalía. This virus has caused significant losses in pig production, particularly affecting companies that produce negative piglets in high-density areas

Material and Methods

The study was conducted in a fattening farm in Teruel, where the animals were divided into two groups housed in identical barns. One group was vaccinated with Ingelvac PRRSFLEX® and the other was not. Serum samples were taken from 30 animals in each group for PCR and Elisa tests before vaccination, at the onset of clinical symptoms, and 15 and 30 days after symptom onset. The production data of the animals were recorded individually throughout the fattening period.

Results

The results showed that vaccinated animals had lower mortality (13% less), a shorter stay (8 days less), higher average daily gain (40g more), and better feed conversion ratio (298g less). Additionally, vaccinated pigs remained negative for the virus longer and had a lower viral load compared to unvaccinated pigs, which showed clinical symptoms at six weeks.

Discussion and Conclusion

In conclusion, vaccination with Ingelvac PRRSFLEX® proved to be an effective tool to mitigate the effects of virulent strains like Rosalía, significantly improving production results. The vaccination resulted in an estimated return on investment of 30:1, highlighting its usefulness in preventing the negative consequences of PRRSv in high-density pig areas. Moreover, vaccinated pigs were sent to the slaughterhouse 8 days earlier, despite entering the fattening phase a week later.

IMM-PP-23

INTRADERMAL VACCINATION AGAINST PRRSV AT WEANING LEADS TO BETTER GROWTH PERFORMANCE AND LESS CARCASS CONDEMNATIONS AT SLAUGHTER

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Background and Objectives

Intradermal vaccination of piglets against PRRSV brings several benefits to swine farms, improving productive performance and reducing losses by carcass trimming and condemnation due to arthritis and abscesses. This case-report describes the improvement on growth and carcass condemnation after the implementation of an intradermal vaccination program against PRRSV, PCV2 and Mh at weaning.

Material and Methods

In a PRRS-stable farrow-to-finish farm, clinical signs and suboptimal performance in the fattening phase were associated with high titers of PRRS antibodies at 24 weeks of age. Originally, the piglets were only vaccinated with a PCV2 and Mh combined vaccine (intramuscular). That was changed to an intradermal vaccination protocol at weaning with Mhyosphere® PCV ID and Unistrain® PRRS ID with Hipradermic®. The comparison of slaughterhouse data was conducted using data before (intramuscular vaccination, IM-V) and after (intradermal vaccination, ID-V) the protocol change. Tuckey test was used to assess statistical significance.

Results

Carcass cold weight increased ($p<0.001$) and slaughter age decreased ($p<0.001$) from IM-V to ID-V: intradermally vaccinated pigs were 3,1 kg heavier than IM-V pigs with a slaughter age lower by 5 days in average. This led to an ADWG raising up to 49g more for vaccinated pigs ($p<0.001$). Improvement was also visible on carcass classification: the percentage of light carcasses (73-82,9 kg) was reduced from 6% in IM-V group to 1% in ID-V group. The percentage of condemnation due to arthritis diminish significatively ($p<0.05$) from 3,37% in IM-V to 2,39% in vaccinated group (ID-V). The 0,15% of total condemnation in group ID-V is also significantly under the 0,33% of IM-V group ($p<0.05$).

Discussion and Conclusion

In this farm the implementation of an intradermal vaccination program in pigs led to an increase of growth performance and helped to significantly diminish carcass condemnation. The estimated return of investment is 3,28€/pig for the animals vaccinated with UNISTRAIN® ID and MHYOSPHERE® PCV ID.

IMM-PP-24

EVALUATION OF POLYMER AND EMULSION ADJUVANTS FOR STREPTOCOCCUS SUIS VACCINATION

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Background and Objectives

Streptococcus suis is a major swine pathogen causing considerable economic losses in the porcine industry. Developing a safe and effective vaccine is the key to preventing and treating S. suis. Inactivated vaccines remain the best strategy today to fight against the disease and potent adjuvants are needed. In this study, MONTANIDE™Gel02 and ISA201VG adjuvants formulated with a trivalent (serotype-1 strain-Z1, serotype-2 strain-Z2, serotype-7 strain-S7) inactivated S. suis antigens were assessed in pig trials.

Material and Methods

The inactivated vaccine is formulated with Gel02 (polymer) or ISA201VG (water-in-oil-in-water (W/O/W) emulsion) and compared to AlOH and homemade water-in-oil (W/O) adjuvants. The safety is first evaluated by vaccinating pigs intramuscularly with double dose (4 ml) of the vaccines, 5 pigs per group. The body temperature and local reactions at slaughter 14 days after vaccination were collected and scored. In order to assess efficacy, pigs were vaccinated with 2 ml twice 3 weeks apart. Antibody titers from blood samples were monitored by ELISA. Two weeks after the boost, a challenge was performed by injecting one lethal dose of S. suis (serotype-1 Z1 or serotype-2 Z2). Clinical signs, mortality rate and specific organ lesions after necropsy are observed.

Results

Regarding safety, a weak increase of the body temperature was observed in all groups except the AlOH group. The local reactions score showed that W/O/W emulsion provided an improved safety profile compared to W/O emulsion and that polymer adjuvant demonstrated an excellent safety profile comparable to AlOH. In terms of efficacy, Polymer provided highest efficacy among all adjuvants tested, with 100% protection against both challenged S. suis serotypes, all pigs of the group survived.

Discussion and Conclusion

Polymer adjuvant is suited for formulating highly efficient S.suis inactivated vaccines, providing balanced efficacy/safety profile and a good alternative to AlOH.

IMM-PP-25

EVALUATION OF THE SEROLOGICAL RESPONSE AGAINST ACTINOBACILLUS PLEUROPNEUMONIAE OMPA AFTER THE VACCINATION WITH COGLAPIX®

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Background and Objectives

Currently, there are no commercial serological techniques available to assess the humoral response after vaccination against Actinobacillus pleuropneumoniae (APP). The objective of this study was to evaluate the antibody dynamics after APP vaccination using a new ELISA kit in two farms.

Material and Methods

The same trial was conducted in two different farms. Pigs were vaccinated with an APP vaccine (Coglapix®, Ceva) at 7 and 10 weeks of age. At 7 weeks of age, 42 animals from each farm were selected and identified. Blood was sampled longitudinally from these 84 animals at 7, 10, 13 and 16 weeks of age. Antibody levels against the outer membrane protein A (OmpA) of APP were determined using the App OmpA ELISA Antibody test Kit (BioChek). Percentage of ELISA positive samples and mean S/P values were calculated following manufacturer´s instructions. Additionally, blood samples from piglets at 18 weeks of age were also taken. These samples were processed by the APP-ApxIV ELISA Test Kit (IDEXX) to determine whether the animals had been infected.

Results

In both farms, all piglets were seronegative at 7 weeks of age.A significant increase ($p<0.05$) in OmpA-ELISA antibody levels (mean S/P ratio) after vaccination was observed at 13 weeks of age in both farms (0.73 and 0.68) compared to the initial point (0.11 and 0.14, respectively). If adjusted for the predicted sensitivity of 90%, up to 88% of the vaccinated pigs showed a positive serological response. In both farms, pigs were negative to the ApxIV-ELISA test performed at 18 weeks of age.

Discussion and Conclusion

The serological results indicated same lack of APP infection in both farms. Under these study conditions, obtained results showed that immunization with this APP vaccine induced significant amounts of antibodies against APP OmpA.

IMM-PP-26

IMPACT OF SOW VACCINATION AGAINST INFLUENZA A VIRUS ON PIGLET MORTALITY DURING LACTATION AND NURSERY PERIOD

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Background and Objectives

Swine influenza A virus (swIAV) is one of the most important respiratory pathogens in pig farms. Sow vaccination is the main strategy to control swIAV infection in sows and clinically protect piglets. The objective of this investigation was to evaluate the effect of sow vaccination on piglet mortality.

Material and Methods

On a 700-sow farm in Spain piglets showed respiratory clinical signs associated to swIAV in weaning and post-weaning period. Nasal swabs were collected to confirm swIAV infection and subtype characterization was performed (H1pdmN2). Initially, a whole herd vaccination protocol was implemented by applying two vaccines against swIAV, Respiporc Flu3® (RPF3) [H1N1, H1N2, H3N2 strains] and Respiporc FLUpan®H1N1 (RPFpan) [(H1N1)pdm09 strain] simultaneously, with a boost after 3 weeks. Afterwards, gilts were vaccinated with two doses of each vaccine in quarantine and gestating sows 3 weeks before farrowing. Piglet mortality was registered during the same period in two consecutive years, before (CONTROL) and after vaccination (RPF3+RPFpan). Mortality was analyzed between groups, CONTROL: W39´2022-W37´2023 vs RPF3+RPFpan: W38´2023-W38´2024 for farrowing period and since December´2022 to September´2023 vs December´2023 to September´2024 for nursery period. Significant differences were considered when $p<0.05$.

Results

Piglet mortality in farrowing period was significantly lower in RPF3+RPFpan group [5.13%(SD=2.20, CI95% 4.52-5.74)] compared to CONTROL group [10.08%(SD=9.25, CI95% 7.47-12.68)].In nursery, significant differences in mortality were found for RPF3+RPFpan scenario [4.97%(SD=2.86, CI95% 2.92-7.02)] compared to CONTROL group [11.95%(SD=7.21, CI95% 6.79-17.11).

Discussion and Conclusion

On the conditions of this investigation, using a suitable protocol and right vaccines against swIAV improved piglet mortality during lactation and nursery period. It is important to pay attention to the rise for pandemic lineage infection to establish a broad protection in sow herds against classical and pandemic strains.

IMM-PP-27

COMPARATIVE EFFICACY IN WEAN TO FINISH FEMALE PIGS OF TWO FRESHLY MIXED MYCOPLASMA HYOPNEUMONIAE PLUS PCV2 VACCINES GIVEN AT WEANING.

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Background and Objectives

PCV2 and Mycoplasma hyopneumoniae (Mhp) still represent challenges to swine health and performance, with Mhp mainly an issue in finishing. We report the findings of a study performed to compare the efficacy of two PCV2 and Mhp vaccine combinations in wean-finish female pigs.

Material and Methods

The farm was positive for PRRS, Mhp and Influenza A. Four consecutive weekly batches were included; the first 2 batches received treatment 1 (T1; n=486): 2ml FLEXcombo®: Ingelvac CircoFLEX® (1ml) mixed with Ingelvac MycoFLEX® (1ml), the next 2 batches received treatment 2 (T2; n=488): 0.5ml Circovac® mixed with 2ml Hyogen®. At weaning pigs were vaccinated, tagged and weighed. At 13 woa, pen weights were collected and same treatment pigs were combined to fill a single sex finishing room. Before slaughter or end of the trial, individual weights were collected. Outcome measurements were weight, average daily gain (ADG) and Enzootic Pneumonia-like lesions (EPLL). Slaughter blood samples were analysed (ELISA) to confirm exposure to Mhp, IAV ans PRRS. Analysis was performed using Minitab® 20.2 and JMP 18.0.1.

Results

There were no significant differences in weaning weights, treatments, EPLL or mortality between treatment groups. ELISA demonstrated exposure to Mhp and PRRS only to all batches. At 13 woa, T1 average weight was 45.57 kg vs 41.98 kg for T2 ($p<0.0001$). Finishing weight for T1 was 117.70 kg and ADG (wean-finish) was 0.833 kg/d vs 114.20 kg and 0.804 kg/d for T2 ($p<0.0001$). Comparison of correlation between 13 woa and finishing weights demonstrated that heavier entry weights were more likely to result in heavier exit weights ($p=0.002$) which was more pronounced in the T1 pigs ($p\leq0.05$).

Discussion and Conclusion

These results demonstrate the efficacy of FLEXcombo® with higher ADG (+29g/d) resulting in an extra 3.52 kg at finishing. The results also demonstrate that entry weights into finishing might be used to predict finishing weights.

IMM-PP-28

COMPARISON OF RESPIRATORY HEALTH SCORES OF WEAN TO FINISH PIGS GIVEN DIFFERENT FRESHLY MIXED MYCOPLASMA HYOPNEUMONIAE PLUS PCV2 VACCINES AT WEANING.

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Background and Objectives

PCV2 and Mycoplasma hyopneumoniae (Mhp) are still amongst the biggest challenges to swine health and performance. We report the findings of a field study performed to compare the Respiratory Health Scores (ReHS) of pigs receiving 2 different PCV2 and Mhp vaccine combinations.

Material and Methods

The farm was positive for PRRS, Mhp and Influenza A virus. Four consecutive weekly batches were included; the first 2 batches received treatment 1 (T1; n=1103): 2ml of FLEXcombo®: 1 ml Ingelvac CircoFLEX® mixed with 1 ml Ingelvac MycoFLEX®, the next 2 batches received treatment 2 (T2; n=1097): 0.5ml of Circovac® mixed with 2ml Hyogen®. At weaning pigs were vaccinated and tagged. At the end of nursery, pigs of the same treatment group were combined to fill a single sex finishing room. Respiratory clinical sounds in all rooms were monitored by SoundTalks®; oral fluids samples were taken when ReHS dropped below 60. After slaughter lungs were scored (Goodwin method) and blood was collected for Mhp, PRRS and IAV ELISA. Outcome measurements were Enzootic Pneumonia-like lesions (EPLL) and ReHS. Analysis was performed using Minitab® 20.2.

Results

All batches were ELISA positive for Mhp and PRRS but negative for IAV; alarm samples were negative (PCR) for all 3 pathogens. There was no significant difference in EPLL. ReHS values did not differ between treatment groups, however, a statistically significant number of ReHS alarms (ReHS<60) in T2 compared to T1 were observed in finishing period ($p<0.001$).

Discussion and Conclusion

Higher respiratory health of the T1 pigs was demonstrated by the ReHS which remained above 70 compared to T2 pigs that experienced reduction in ReHS after placement into finishing. This demonstrates the added value of SoundTalks® to EPLL evaluation alone; the monitors indicated a decrease in respiratory health that was not detected at slaughter assessments of the lungs, likely because lesions had already healed at the time of slaughter.

IMM-PP-29

EVOLUTION OVER TIME OF THE PRRS VIRAL LOAD AFTER VACCINATION IN A FATTENING UNIT INFECTED WITH A HIGHLY VIRULENT STRAIN

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Background and Objectives

The "Rosalía" strain and its variants have exacerbated the impact of the virus in Spain. The aim of the study was to evaluate whether vaccination in infected animals with high viral loads helps to return to normality quicker.

Material and Methods

Two groups of 650 future breeding sows (G1 and G2), were placed in a fattening unit. These animals were confirmed to be viraemic in the Isowean after PCR in sera at 7 weeks of age with a high virulence strain (97% rosalia-like) and low Cts (<28) in all pools (18 pools of 4 sera). Only G2 was vaccinated with UNISTRAIN ® PRRS at 9 weeks of age in the fattening. Viral load in oral fluids of both groups was analyzed at the time of vaccination and at 7 and 12 weeks post-vaccination (wpv), and viral load of sera (36 sows from each group) at 1, 3, 7 (9 pools of 4 sera) and 12 wpv (individual sera). Ct values were used for statistical comparison. The productive difference of both scenarios was evaluated on the basis of mean number of days of stay, ADG (g/day), FCR and % mortality in the fattening phase.

Results

Differences appear from 7 wpv: 44% of the pools from G1 showed high Cts (<28), whilst no pool had Cts of <30 in G2. At 12 wpv the OFs showed a significantly lower viral load (p=0.009) in G2; 8% VS 25% in G1. Positive sera at 12 wpv were 3% in G2 compared to 9% in G1, with Cts<28 (p=0.27). There was a difference of 14.5 days' stay between groups in favour of the vaccinated group, with an improvement of 7gr daily, -0.130 FCR points and a 1.70% reduction in mortality.

Discussion and Conclusion

UNISTRAIN® PRRS reduced viral load earlier than the unvaccinated group which helps to return to normality quicker.

IMM-PP-30

IMPACT OF VT2E VACCINATION ON SUBCLINICAL OEDEMA DISEASE ON A SPANISH SWINE FARM

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Background and Objectives

Swine oedema disease (OD) is caused by verotoxin 2e (Vt2e) and is known to induce degenerative angiopathy in pigs. Depending on the characteristics of the clinical signs, OD can be categorized into three types: clinical, chronic and subclinical (1, 2). However, in the case of subclinical oedema disease (SOD), themanifestation is non-specific, and so it is not easy to demonstrate the efficacy of the vaccine. The aim of this study was to assess the efficacy of VT2E vaccination on a farm with SOD, located in Spain.

Material and Methods

The farm is located in the northeast of Spain with approximately 175 productive sows. During the second half of 2023, there was a significant increase in mortality in the nursery, without any clear clinical signs related to OD, apart from some neurological symptoms. In the necropsies, neither colonic oedema nor eyelid oedema was detected. The farm was confirmed VT2e-positive through VEROCHECK analysis (PCR on oral fluids targeting the VT2E gene).Vaccination began at the end of 2023 with the administration of a recombinant Vt2e vaccine (VEPURED®, HIPRA Spain). Two distinct groups were sequentially established: the non-vaccinated (NON-VAC) group, comprising 14,497 piglets during 2022-23, and the vaccinated (VAC) group from the end of 2023 until October 2024 with 7,197 piglets.Comprehensive productivity data for both groups were systematically recorded and subjected to comparative analysis using the logistic regression test.

Results

A statistically significant reduction in mortality rate was observed, 7.4% (1028 animals) in the NON-VAC group, compared to 4.24% (303 animals) in the VAC group ($p < 0.001$).

Discussion and Conclusion

In line with previous studies (3), VT2E vaccination yielded substantial enhancements in key production parameters, particularly a significant reduction in mortality rates during the nursery period even on a farm with SOD with non-specific symptoms.

IMM-PP-31

FIELD EFFICACY OF AN INTRADERMAL ALL-IN-ONE VACCINE ON A MEXICAN FARM WITH PCV2- ASSOCIATED DISEASE

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Background and Objectives

Porcine circovirus type 2 (PCV2) has been a major issue in the swine industry, causing a whole range of clinical signs (1) that generate an increase in mortality rates and a reduction in ADWG. Vaccination against PCV2 is an efficient tool to control and reduce productivity losses associated with porcine PCV2-SD. The aim of this study was to evaluate the efficacy of two vaccination protocols to reduce mortality in grower pigs on a farm with PCV2-associated disease.

Material and Methods

The field trial was carried out on a three-sites weekly production system farm with 1,100 sows in Mexico. The PRRSV status of the sow farm was Positive Stable (II-A). The pigs born from September 2023 to February 2024 (n= 16,641, group A) were vaccinated against PCV2 with 2.0 ml of an intramuscular vaccine at 14 days of age. The pigs born from March to June 2024 (N=7,448, group ID) were vaccinated intradermally at 21 days of age with Mhyosphere® PCV ID (all-in-one intradermal vaccine based on an inactivated recombinant Mycoplasma hyopneumoniae^{cpPCV2} strain expressing the porcine circovirus type 2 capsid protein thereof). Productivity parameters such as mortality, ADWG, and FCR were evaluated during the fattening period. The statistical analysis and the test used was the Wilcoxon test.

Results

The global mortality rate was significantly higher in group A (17.42%) compared to group ID (4.4%) ($p < 0.001$). Regarding ADWG, the ID group showed significantly better results than group A in the grower-finisher unit (744 g/d vs 686 g/d, $p< 0.001$). Consequently, age-to-slaughter was reduced by 21.9 days (34 weeks in the ID group vs 30.87 weeks in group A) ($p < 0.001$).

Discussion and Conclusion

In this study, the use of the Mhyosphere® PCV ID vaccine demonstrated significantly better productive results than the intramuscular vaccine, becoming an effective tool for the control of PCV2.

IMM-PP-32

FIELD STUDY OF THREE DIFFERENT MHYO-PCV2 VACCINES ON A PCV2D HIGH CHALLENGE FARM

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Background and Objectives

The objective of this study was to assess the efficacy of three different Mycoplasma hyopneumoniae (Mhyo)-PCV2 vaccines on a PCV2d high challenge farrow-to-finish farm in Spain.

Material and Methods

A randomized, blinded and controlled study was performed on a commercial farm. The farm was PRRSV-positive and presented high pressure from PCV2d in the nursery ($2.2 \cdot 10^{12}$ in tissue). A total of 911 piglets from 3 weeks of age were randomly distributed between four groups. Animals in each litter were randomized according to initial body weight to ensure balanced groups. At vaccination day, the piglets were vaccinated with MHYOSPHERE ® PCV ID (Group A, n= 292) intradermally using Hipradermic®, or with either one of two concurrent intramuscular vaccination protocols against PCV2 and Mhyo (Group B, n= 285 and Group C, n= 284). A total of 50 piglets were kept as non-vaccinated controls to monitor PCV2 circulation by analytical confirmation. The animals were followed up until the end of fattening. During this period, zootechnical parameters (average daily weight gain, cullings and mortality) and laboratory variables (PCV2 viraemia and nasal shedding) were recorded.

Results

In terms of zootechnical variables, no statistically significant differences were observed between groups at entry and at the end of the fattening periods, nor in the percentage of cullings. Mortality results were similar between all vaccinated groups without significant differences.In terms of PCV2 viraemia, no statistically significant differences were observed between vaccinated groups, however, significant differences were found compared to the control group. Nasal shedding was statistically significantly lower in Group A in comparison to Groups B and C and the control group ($p<0.05$).

Discussion and Conclusion

According to the results, it is concluded that MHYOSPHERE® PCV ID is efficacious on a high PCV2d challenge farm, as demonstrated by the control of PCV2 viraemia and significantly lower nasal shedding compared to the rest of the treatments.

IMM-PP-33

COMPARISON OF THE EFFICACY OF DIFFERENT MYCOPLASMA HYOPNEUMONIAE VACCINES ON THE INCIDENCE OF LUNG LESIONS ASSESSED AT SLAUGHTERHOUSE IN SPAIN

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Background and Objectives

Vaccination against Mycoplasma hyopneumoniae (Mh) reduces the prevalence and extent of bronchopneumonia-like lung lesions caused by Mh, as well as reducing the negative impact of enzootic pneumonia on average daily gain and feed conversion rate. The evaluation of bronchopneumonia-like lung lesions at slaughterhouse is a good method to assess the effectiveness of Mh vaccines. This study aims to compare the prevalence of lesions between pigs vaccinated with different commercial vaccines.

Material and Methods

This study includes 520.043 lungs from 3.188 batches of pigs from random farms with more than 300 companies represented, evaluated between January-2016 and September-2024 (8 years) in different Spanish slaughterhouses, using the Ceva Lung Program methodology. The assessed batches could be vaccinated with different commercial vaccines (named from 0 to 11). The evaluations were performed randomly and blindly, by trained independent veterinary evaluators. For each batch the following parameters were calculated: Enzootic pneumonia index (Ep index) Broncho-pneumonic lungs (BPL) (%) Affected surface out of all lungs (ASAL) (%) The results were compared with the Kruskall-Wallis test, using pairwise comparisons.

Results

Batches vaccinated with Vaccine 0 (1.13 (SD=1.12 CI95% 1.08 to 1.18)) showed statistically lower Ep index than vaccines 1, 3, 4, 6, 7, 9, 10, 12. Regarding BPL, Vaccine 0 (32.11 (SD=20,77 CI95% 31.19 to 33.04)) was statistically lower than vaccines 1, 3, 4, 6, 7, 9, 10, 12. In relation to ASAL, Vaccine 0 (1.91 (SD=2.09 CI95% 1.82 to 2.01)) showed statistically lower percentage than vaccines 1, 3, 4, 6, 7, 9, 10, 12.

Discussion and Conclusion

In the conditions of this study, lungs from pigs vaccinated with Vaccine 0 showed fewer bronchopneumonia-like lung lesions than lungs from pigs vaccinated with any other vaccine. Vaccine 0 (Hyogen®) has been shown to be effective in reducing the prevalence and severity of bronchopneumonia-like lung lesions.

IMM-PP-34

EVALUATION OF THE CELLULAR IMMUNE RESPONSE INDUCED BY A GLAESSERELLA PARASUIS TBPBY167A-BASED VACCINE IN NON-CHALLENGED COLOSTRUM-DEPRIVED PIGLETS.

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Background and Objectives

Glaesserella parasuis (G. parasuis) is a major pathogen in swine, causing Glässer's disease, which leads to significant economic losses. The high genetic variability of G. parasuis strains limits the efficacy of conventional vaccines, making subunit vaccines a promising alternative. This study aims to evaluate the cellular immune response in colostrum-deprived piglets immunized with a subunit vaccine based on the Y167A mutant of transferrin-binding protein B (TbpB), without exposure to G. parasuis.

Material and Methods

Peripheral blood mononuclear cells (PBMCs) were isolated from five immunized and five non-immunized piglets. Cellular responses were evaluated 15 days after the first and second oral mucosal vaccine doses. Monocytes, natural killer (NK) cells, and B and T lymphocytes, expressed as cell numbers, were analysed. PBMCs (5×10^5cells/well) were distributed in 96-well microplates and labelled using hybridoma supernatants (sIgM, CD8α, CD172a, and CD3). Flow cytometric analysis was performed, and data were processed using statistical software. Isotype-matched monoclonal antibodies served as negative controls. A p value <0.05 was considered statistically significant, using Shapiro-Wilk normality tests and independent-samples t-tests.

Results

Fifteen days after the first vaccine dose, immunized piglets showed a trend toward increased NK cell counts compared to non-immunized piglets (p=0.062). However, after the second dose, immunized piglets had significantly higher B cells (p=0.022) and T cells (p<0.001) counts compared to non-immunized piglets.

Discussion and Conclusion

This study demonstrates that this vaccine enhances the adaptive immune response in non-infected piglets, as evidenced by increased B and T cells counts after the second dose. While a trend toward increased NK cells after the first dose suggests an innate immune response, the adaptive immune response became prominent after the second dose, highlighting the importance of two doses for a robust immune response. These findings emphasize the potential of this vaccine in improving swine health and the need for further research to analyse specific cellular subpopulations.

IMM-PP-35

PREVALENCE AND SCORING OF LUNG LESIONS IN SWINES VACCINATED WITH DIFFERENT COMMERCIAL MYCOPLASMA HYOPNEUMONIAE & PCV2 VACCINES COMBOS IN BRAZIL

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Background and Objectives

Mycoplasma hyopneumoniae (M. hyo) and Porcine Circovirus type 2 (PCV2) are important pathogens of PRDC. Vaccination has been one of the main tools to control these agents. And its effectiveness can be measured with the slaughterhouse scoring methods. This study aimed to examine the possible association of lung injuries at slaughter with two different commercial combos against M. hyo and PCV2

Material and Methods

From 2020 to 2024, 24408 lungs from 39 pyramids were evaluated at slaughterhouses, in 7 different States of Brazil. The animals underwent two different protocols at weaning. Animals in Group 1: were vaccinated with a single dose of Hyogen (2 mL) & Circovac 0.5 mL IM, with 65 batches of a total of 6940 lungs, and the Group 2: two-dose vaccination of Mhyo + PCV2 2 mL IM (Porcillis PCV M hyo), with 178 batches a total of 17498 lungs. Lung injury scores were analyzed at the batch level, using the CEVA Lung Program methodology with an average of 100.56 lungs per batch inspected. Average values were calculated for Ep and App like lesions.

Results

The evaluated lungs of animals from Group 1 showed a bronchopneumonia (BP) frequency of 30.4% while that of Group 2 was 53.3%. Considering the severity of bronchopneumonic injuries, the percentage of the affected area was 1.6% and 4.5% for Groups 1 and 2, respectively. The incidence of dorsal-caudal pleurisy was 5.4% for Group 1 and 10.7% for Group 2. When comparing the impact of scar lesions Group 2 had a 3.8% score compared with 7.9% with the other group.

Discussion and Conclusion

The results showed that the vaccination strategy in Group 1, a single dose of Hyogen (2 mL) and Circovac (0.5 mL), was more efficient, reducing the prevalence and severity of bronchopneumonia lesions compared to the protocol of Group 2.

MIS-PP-01

WHEN DROUGHT AFFECTS YOUR PIGS: PYRROLIZIDINE ALKALOID INTOXICATION OUTBREAKS IN SPAIN

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Background and Objectives

Pyrrolizidine alkaloid (PA) intoxication is a well-documented condition associated with the ingestion of contaminated feed in livestock. Pigs are highly susceptible to these toxins which primarily target the liver. The aim of this work was to describe the clinicopathological features of fattening pigs fed with PA contaminated barley.

Material and Methods

During autumn 2023, swine veterinarians of central regions of Spain reported multiple farms with 80% of fattening pigs showing prostration, apathy, and dark-coloured urine, and a mortality of 20-40% in late fattening stages. On-farm necropsies were performed, and formalin-fixed liver samples (n= 23) were submitted to the Veterinary Pathology Diagnostic Service (UAB, Spain) for their histopathological evaluation. Both feed and tissue samples (liver and kidney) were analysed for mycotoxins, heavy metals, and pesticides. Additionally, different PA were investigated in barley and compound feed.

Results

Necropsied pigs showed diffuse paleness or icterus, and gastroesophageal ulcers. Livers were orange-coloured with a marked lobular pattern. Microscopically, hepatocyte cords were replaced by severe fibrosis and there was marked ductal proliferation and cholestasis. Remaining hepatocytes showed megalocytosis, karyomegaly, and/or nuclear pseudoinclusions. Feed contained average of 4,285 ppb of several PA, whereas the concentration of other analysed toxic products was unremarkable. Interestingly, barley harboured most of the alkaloid load.

Discussion and Conclusion

The present work describes multiple outbreaks of PA toxicosis in pigs fed with national barley, with Heliotropium europaeum as the probable source of PA. A prolonged drought period followed by a late heavy rainy season caused a poor annual harvest that was not treated with pesticides, increasing the risk of PA containing plants in livestock feed. Since these climate conditions may become more frequent in the future, similar events are likely to occur, urging the need to characterize and prevent these feed-related conditions.

MIS-PP-02

CONFIRMED TOLTRAZURIL RESISTANCE IN A DUTCH FIELD ISOLATE OF CYSTOISOSPORA SUIS

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Background and Objectives

Despite routine use of toltrazuril, diarrhea due to Cystoisospora suis is frequently observed. In most cases, however, the problem is effectively controlled by thorough cleaning and disinfection and strict adherence to instructions on the SPC. If, nevertheless, clinical symptoms continue to occur, it is advisable to consider resistance to toltrazuril. In this study, we present a second case of toltrazuril resistance in the Netherlands on a 3800 sow farm with piglets up to 25 kg.

Material and Methods

Pooled fresh faecal samples were taken from thirteen toltrazuril treated, clinically affected litters of two weeks of age and were sent to the Institute of Parasitology of the University of Veterinary Medicine in Vienna. Autofluorescence was used to detect oocysts of C. suis. Infectious oocysts were isolated and sporulated. Susceptibility for toltrazuril and diclazuril was tested in vitro using a merozoite development assay. A toltrazuril-susceptible and a toltrazuril-resistant strain of C. suis were used as controls.

Results

Oocysts were detected by autofluorescence in 12 out of 13 samples. Toltrazuril (20 µM) showed an efficacy of <20% in contrast to the susceptible reference strain that showed an efficacy of >95%. Efficacy of diclazuril was only 15% for the isolate from the Dutch farm compared to >98% in the reference strain.

Discussion and Conclusion

Toltrazuril resistance of Cystoisospora suis originating from the Dutch sow farm was confirmed in-vitro. As there is no alternative on the market, this has a large impact for the farm. The farm now has entirely focussed on hygiene and started to use a disinfectant that is effective against oocysts of C. suis. Further studies to evaluate the extent of toltrazuril resistance of C. suis on Dutch farms will be evaluated.

MIS-PP-03

FIBRINOUS-HAEMORRHAGIC PERICARDITIS WITH HEMOPERICARDIUM: A NOVEL CAUSE OF ACUTE DEATH IN FATTENING PIGS?

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Background and Objectives

Fibrinous pericarditis (FP) is a typical lesion as part of bacterial systemic infections causing polyserositis; in few cases, pericardium is the only affected serosa. Here we describe an apparent novel pathological condition characterized by FP with hemopericardium associated with acute death in fattening pigs.

Material and Methods

Since late-2022, the Veterinary Pathology Diagnostic Service (SDPV, UAB, Spain) has received cases of pigs with a clinical history of sudden death or death preceded by severe acute respiratory signs. In all cases, outbreaks of porcine reproductive and respiratory syndrome (PRRS) occurred 3-5 weeks before animal death. Previous on-farm necropsies indicated the existence of FP and hemopericardium. The SDPV analyzed 12 whole carcasses, fresh tissues from 5 pigs and 22 pericardium bloods (PB). Besides gross and histopathological assessment in carcasses and tissues, detection of bacteria and PRRS virus (PRRSV) was attempted in all cases.

Results

All necropsied pigs showed fibrous-fibrinous pericarditis, with formation of granulation tissue, marked dilation of the parietal pericardium, hemopericardium, hepatomegaly with centrilobular hepatic necrosis, and variable degrees of interstitial pneumonia. Assessment of bacterial infections yielded Glaesserella parasuis Streptococcus suis or Mycoplasma hyorhinis, although in an inconstant manner. All PB samples but three were RT-qPCR positive for PRRSV.

Discussion and Conclusion

The present case compilation describes an apparent novel condition characterized by fattening pigs suffering from acute death associated to congestive heart failure caused by a chronic-active fibrinous pericarditis with severe hemopericardium. Evidence so far suggests a viral infection (PRRSV) that facilitates subsequent bacterial infection (not always detected, probably due to the chronic nature of the condition) of the pericardium. At this stage, there are more questions than answers, since it is unknown why one single serosa is affected and why a severe hemopericardium is generated (the usual outcome of chronic serosal inflammation is fibrosis).

MIS-PP-04

ACCURACY OF PORTABLE HUMAN HEMOGLOBIN METER (HEMOCUE® HB 201+ SYSTEM) FOR HEMOGLOBIN MEASUREMENT IN NEWBORN PIGLETS AND SOWS

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Background and Objectives

Hemoglobin concentration is an essential health indicator for both neonatal piglets and sows. Traditional laboratory methods for hemoglobin evaluation may be impractical in outdoor settings due to their complexity and time requirements. Portable hemoglobin meters, such as the HemoCue® Hb 201+ System, deliver rapid results with minimal sample volume requirements. This study aimed to assess the accuracy of the HemoCue® Hb 201+ System relative to the traditional cyanmethemoglobin method for measuring hemoglobin concentrations in piglets and sows.

Material and Methods

Two hundred blood samples were collected: one hundred from the umbilical cords of neonatal piglets and one hundred from sows shortly after parturition. Hemoglobin concentrations were evaluated using both the portable meter and the traditional method.

Results

The mean hemoglobin concentrations for piglets were 11.8 ± 1.9 g/dL via the portable meter and 11.9 ± 1.8 g/dL using the traditional method, with 95% confidence intervals of 11.5–12.1 g/dL and 11.6–12.2 g/dL, respectively. The mean hemoglobin levels for sows were 13.2 ± 2.0 g/dL as measured by the portable meter and 13.3 ± 1.9 g/dL by the usual method, with 95% confidence intervals of 12.9–13.5 g/dL and 13.0–13.6 g/dL, respectively. Substantial correlations were seen between the two methodologies for both piglets ($r = 0.872$, $P < 0.001$) and sows ($r = 0.910$, $P < 0.001$). Bland-Altman analysis indicated that 95.6% of the discrepancies in piglet measurements and 96.2% of the discrepancies in sow measurements were within the limits of agreement (mean ± 2×standard deviation), demonstrating a substantial degree of concordance between the techniques.

Discussion and Conclusion

The findings demonstrate that the HemoCue® Hb 201+ System is a dependable and efficient tool for evaluating hemoglobin concentrations in both piglets and sows in field conditions.

MIS-PP-05

BENEFITS AND CONVENIENCE OF DIFFERENT VACCINES IN STANDARD VACCINATION PROGRAMS IN GERMANY

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Background and Objectives

With trends of increasing farms size and labor shortage on farms, it is important to focus on an easy way of vaccination for both farmworkers and animals. Vaccines are available as mono-, ready-to-use (RTU) or combination vaccines. Comparative data on commonly used products from different companies is hardly available. This field experience compares the benefits and convenience of different vaccine combinations to get on-farm knowledge as basis for decision.

Material and Methods

In a farrow-to-finish farm 10 batches of finishing pigs (7,150 pigs in total) were vaccinated with 4 vaccine combinations. All pigs got a M.hyo-, PCV2- and PRRS-vaccination. The PRRS-vaccine did not change throughout the field observation. The first 3 batches were not vaccinated against ileitis whereas the last 7 were. The M. hyo-, PCV2- and Ileitis-vaccines changed within the groups (A: PCV2-Mono-A, M.hyo-Mono-A, no ileitis; B: PCV2-M.hyo RTU-B mixed with ileitis-KV (killed vaccine); C: PCV2-Mono-A, M.hyo-Mono-A and ileitis-OL (oral live); D: M.hyo-PCV2-D freshly mixed combination plus ileitis-OL). ADG, mortality and the labor time required for the vaccination were compared batchwise.

Results

Adding an ileitis vaccine led to a reduction in mortality in all ileitis vaccinated groups (3.3% no ileitis vaccine; 2.6% ileitis-KV; 2.2% and 2.3% ileitis-OL). Mortality was lowest and ADG was highest in those groups receiving ileitis-OL (927g/d, 2.2% and 943 g/d, 2.3%) compared to ileitis-KV (901 g/d, 2.6%). In general, the vaccination time needed for oral application (1 person 0.6 h per batch) was shorter than for i.m.-application (3 people 3 h each per batch). Considering the entire vaccination program, the possibility of combining antigens reduced working time.

Discussion and Conclusion

Combining antigens saves time in vaccine administration. In individual cases, however, the benefit of administering another antigen in an extra vaccination procedure can outweigh the disadvantage of additional workload. Controlled trials to confirm the current results are needed.

MIS-PP-06

RECOVERY AT NIPPLE LEVEL OF TWO TRIMETHOPRIM CONTAINING VETERINARY PRODUCTS

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Background and Objectives

Trimethoprim is an antibiotic typically used in combination with sulfonamides. Its low solubility in drinking water leads to sedimentation of trimethoprim when used in highly concentrated stock solutions. In such case, the active is lost and never reaches the animals. Furthermore, sedimentation in the water delivery systems results in additional work and increases the risk of blocked pipelines. A field trial was carried out to evaluate the visual appearance of the stock solutions and recovery of both active compounds using two different formulations, both containing 500 mg sulfadiazine and 100 mg trimethoprim/g.

Material and Methods

Product 1: HydroTrim®: formulation containing nanonised trimethoprim. Product 2: standard powder mixture. Both products were administered at the registered dose of 25 mg sulfadiazine and 5 mg trimethoprim/kg bodyweight/day. A highly concentrated stock solution with a proportioner set at 1% (dilution 1:100) was used. Medicated water was manually stirred and consumed within 12h after administration start. Water samples were taken 2, 6 and 10 hours after medication start at the drinking nipples in 10 pens of each group to determine the concentrations of both active compounds.

Results

Substantial and increasing sedimentation of trimethoprim, starting within 30 minutes after administration start, was observed in case of the standard powder mixture. The nanonised formulation demonstrated excellent homogeneity throughout the whole administration period, resulting in seven times higher trimethoprim concentrations at the nipples at the three time points. Sulfadiazine concentrations were similar.

Discussion and Conclusion

Different studies have shown the synergistic effect between trimethoprim and sulfonamides for several bacteria. The importance of both molecules reaching the tissues, should not be underestimated. It seems that today sulfonamide-trimethoprim mixtures are not suitable for use with proportioners. HydoTrim® 500 mg sulfadiazine and 100 mg nanonised trimethoprim/g demonstrates excellent homogeneity in stock containers and provides substantially higher trimethoprim concentrations at nipple level.

MIS-PP-07

CLINICAL EVALUATION OF SARCOPTIC MANGE LESIONS ON SOWS WITH SCABIES BEFORE AND AFTER DIFFERENT TREATMENTS.

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Background and Objectives

Sarcoptes scabiei var. suis is responsible for pig sarcoptic mange. It leads to reduction of growth, fertility and feed efficiency leading to economic loss. The objective of this study was to evaluate scabies lesions on sows before and after different treatments.

Material and Methods

A clinical assessment grid was developed based on clinical signs of chronic scabies: hyperkeratosis. The rating scale was determined by mutual agreement among veterinary practitioners (score 1 : no hyperkeratosis ; score 5 : Significant hyperkeratosis). 143 sows from 5 batches with different litter rank were included in the study. The control group received no treatment for sarcoptic mange, IVM group received a subcutaneous injection of ivermectin following the Summary of Product Characteristic (SPC) and SEB group received a dorsal application of phoxim (Sebacil 7,5% pour-on, Elanco) repeated 14 days later (day 14) following SPC. Each sow was assessed, at the beginning of the study (day 0), at day 21 and day 42, with the clinical grid and hemoglobin measures (Hb) were performed. Statistical analysis was performed with Student t-test (Hb values) and Wilcoxon test each pair (hyperkeratosis score) on JMP 18.1.

Results

On day 0, day 21 and day 42, no statistical differences were observed between groups for hemoglobin values. On day 0 and day 21 no statistical differences were observed between groups for hyperkeratosis score. On day 42, a statistical difference was observed between control group and SEB group (respectively, 3.54±0.93 vs 3.00±1.02, $p<0.05$) and between IVM group and SEB group (respectively, 3.63±0.89 vs 3.00±1.02, $p<0.01$).

Discussion and Conclusion

The hyperkeratosis score was reliable with the observation of the farmer and the vet practitioner that sows with a topical treatment seem to have less scabies lesions on their body. Hemoglobin values were not affected by the presence or absence of scabies lesions as reported in other studies.

MIS-PP-08

IMPACT OF A BIOACTIVE MINERAL-BASED FEED ADDITIVE ON GROWTH EFFICIENCY IN FINISHING PIGS UNDER FIELD CONDITIONS.

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Background and Objectives

A bioactive mineral-based feed additive (Proteck, Elanco) is a consistent and unique natural mineral which impacts the composition of the microbiome in pigs (Song et al, 2021). A meta-analysis in finishing pigs improved ADG by 2.5% (P=0.01) and FCR by 2.24% (P=0.003) (Elanco data on file). The objective of this study was to determine the impact in finishing pigs under field conditions in Spain.

Material and Methods

11,702 Pietrain pigs across 15 barns (12 male only, 2 female only, 1 mixed) were selected across 7 sites with a history of recurring enteric challenges. Pigs were weighed on entry to each barn (approximately 20kg) and at slaughter, not at the start of the treatment period. The additive was mixed in feed at 400g/ tonne for the final 6 weeks of finishing. Two sources of feed were used, each barn kept with the same source throughout the evaluation.

Results

Feeds, sex or breed did not influence the outcome. Initial weights were 21.2kg (control) and 19.98kg (treatment). Finishing weights were 124.97kg (treatment) vs 122.73kg (control). ADG increased 52g/ pig in the treatment pigs (P=0.0042). Pigs on Proteck reached market weight 7 days sooner (P=0.032). FCR tended to be improved at 2.42 (treatment) vs 2.50 (control) (P=0.149). Average daily feed intake was 1.77kg (treatment) vs 1.7kg (control) (P=0.05)).

Discussion and Conclusion

The increase in growth efficiency observed was consistent with the meta-analysis cited in the introduction. Pigs reaching market weight 7 days sooner driven by the 52g of additional average daily weight gain would indicate a more favourable intestinal environment referred to by Song et al (2021) and consequently improved utilisation of nutrients from the diet. This presents a real opportunity to improve the economics of pig production at the finishing stage through feed cost reduction (7 days x 1.7kg daily feed intake = 11.9kg of feed saved/ finished pig).

MIS-PP-09

A NEW SPECIES-SPECIFIC TURBIDIMETRIC AUTOMATED ASSAY TO MEASURE CALPROTECTIN (S100A8/A9) IN SALIVA OF PIGS

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Background and Objectives

Calprotectin or S100A8/A9 is a member of the S100 family protein and belongs to the subgroup of calgranulins. It is involved in the activation of the innate immune system and increases during the inflammatory response. The objective of this work was to develop and validate a porcine-specific automated turbidimetric method to measure calprotectin in porcine saliva.

Material and Methods

An immunoturbidimetric method that uses an in-house polyclonal antibody against porcine Calprotectin was developed for an automated biochemical analyzer (Olympus AU400,). The reproducibility, accuracy, and low limit of quantification (LLOQ) were evaluated. In addition, samples of pigs suffering from meningitis caused by Streptococcus suis (S.suis) (Group A; n=21) and healthy pigs (Group B; n=25) were analysed by this method and by a commercial assay designed for humans that has been previously validated in pigs.

Results

The mean (+SD) imprecision of intra- and inter-assay for assay were 3.00±1.86% and 4.75±1.71% respectively. Linearity under dilution tests resulted in a linear regression equation with a correlation close to 1 (R^2>0.99). The mean (+SD) recovery was 90.59±6.83% and the LLOQ was 0.86 mg/L. The diseased group showed statistically significant higher levels of Calprotectin in saliva (Group A, 45.41 mg/L (34.31-73.27 mg/L)) than the healthy group (Group B, 3.48 mg/L (3.10-4.04 mg/L); P-value <0.001). The validated method for porcine calprotectin demonstrated a 13-fold increase in salivary protein levels between the groups, in comparison to the commercial assay method, which exhibited an 8-fold increase.

Discussion and Conclusion

Calprotectin can be measured in porcine saliva by this new specific automated assay with adequate precision, accuracy and sensitivity along with the advantages of automation, a straightforward procedure and rapid turnaround time. In addition, this assay can detect increases of Calprotectin in saliva in pigs with meningitis caused by S.suis.

MIS-PP-10

EVOLUTION OF SHOULDER ULCERS THROUGHOUT THE SOW REPRODUCTIVE CYCLE

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Background and Objectives

Shoulder ulcers in sows affect the welfare and may lead to premature culling. This study investigated the evolution of shoulder ulcers throughout the sow reproductive cycle.

Material and Methods

Three pig farms participated in the study. Within each farm, one group of sows was monitored (A n=16; B n=45 C n=28 sows). The sows were investigated at the beginning, halfway, and end of the farrowing period, and one and two months of gestation.The shoulders were scored: 0 no lesion; 1 only epidermis; 2 epidermis and dermis, mild fibrosis; 3 subcutis, severe fibrosis; 4 scapula visible, severe fibrosis; 5 scar. The sow's body condition (1-5) was scored (BCS) visually. Data on reproductive performance were recorded. Associations between shoulder ulcers, and parity, BCS, and performance were investigated.

Results

The overall prevalences in farms A, B, and C were 56%, 68%, and 67%, respectively. Score 1 was most prevalent halfway and at the end of the farrowing period; score 5 during gestation and at farrowing. The prevalences of scores 2 and 3 were low (<5%); score 4 was not present. The prevalence in gilts and multiparous sows was 11%, and 79%, respectively. The prevalences at the beginning, halfway, and end of the farrowing period were 45%, 58%, and 62%, and 54% and 51% at one and two months of gestation.The BCS in farms A, B, and C were 3.4, 4.2, and 3.2 at farrowing, and 3.3, 1.3, and 2.1 at weaning, respectively. The lesion score was associated ($P<0.001$) with parity $r=0.46$ and BCS $r=-0.17$. The number of stillborn piglets (2.3 vs. 1.5) was higher in sows with ulcers ($P<0.05$).

Discussion and Conclusion

The prevalence of ulcers increased during lactation and decreased after weaning. The prevalence was higher in older and thin sows, emphasizing proper culling and nutrition. Further research should explore the impact of shoulder ulcers on stillborn piglets.

MIS-PP-11

DIETARY SUPPLEMENTATION OF 25-HYDROXIVITAMIN D3 DURING POST-WEANING PERIOD IMPROVES VITAMIN D STATUS, DUODENUM FUNCTIONALITY AND IMMUNE DEVELOPMENT

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Background and Objectives

Vitamin D plays an important role in mineral regulation and bone health, and its immunomodulatory capacity is gaining recognition. The aim of this study was the evaluation of dietary supplementation of 25-Hydroxyvitamin D_3 a high bioavailable metabolite of Vitamin D3, for 42 days post-weaning period on the vitamin D status and the effect at different tissues.

Material and Methods

Eighteen weaned male 28d old pigs (8.5kg BW) were used in a 42d study, randomized into 2 dietary treatments: Control group (C) including vitamin D3 at 1000 IU/kg, and 25-Hydroxyvitamin D_3 group (Hy•D) replacing vitamin D_3 by 25-Hydroxyvitamin D3 at 50mcg/kg. Vitamin D metabolites were measured in plasma at study days 0, 14, 35 and 42. At d42, tissue from duodenum, ileum and Peyer patches (PP), were collected for transcriptomic profiling using a porcine microarray analyses of gene expression. Data were analyzed using Partek® Genomics Suite® version 7 (ANOVA; $P \leq 0.05$).

Results

At day 14, 35, and 42, Hy•D piglets showed higher ($P<0.001$) plasmatic 25-OH-D3 and 24,25-OH-D3 levels compared to C. At duodenum, higher differential transcriptome response was observed compared to ileum (7341 vs 61 genes) between animals fed Hy•D and C. The pathways impacted by Hy•D at duodenum were related to the proteasome, cell cycle and immunity. At PP, differential transcriptome response was 4082 genes between Hy•D and C piglets, including an upregulation of VDR (vitamin D receptor) gene expression. Pathways impacted at PP showed a specific regulation linked to the differential B lymphocytes response.

Discussion and Conclusion

These findings confirm that the supplementation of 50mcg/kg feed of 25-OH-D_3, improves vitamin D status in post-weaning pigs and reveal alterations of gene expression in improving duodenum functionality (efficient cell turnover) and in reinforcing the innate immune response at the Peyer patches.

MIS-PP-12

PALATABILITY OF SULFONAMIDE/TRIMETHOPRIM CONTAINING VETERINARY PRODUCTS IN DRINKING WATER

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Background and Objectives

Palatibility of veterinary medicines for oral use is often a concern. The daily intake of medication in animals reluctant to drink medicated water is insufficient and leads to health and welfare issues. The impact of two types of sulfonamide/trimethoprim (TMP) containing products on water intake in pigs with mild but increasing cough was investigated in a field study.

Material and Methods

Nursery pigs reared under the same conditions were evenly divided into two groups and treated for 5 days. Group 1 HydroTrim®(n=490): 25 mg sulfadiazine (SDZ), group 2 (n=484): 25 mg sulfamethoxazole (SMX), both groups: 5 mg TMP/kg bodyweight/day. Medicated water was administered via a concentrated stock solution using a proportioner set at 1% (dilution 1:100) and stirred manually. Sulfonamide and trimethoprim concentrations in the stock solutions as well as volumes at start of administration were equal. Water consumption was measured digitally at seven time points on day 1 of treatment and once daily from 2 days before to 2 days after the treatment period.

Results

Mean water intake per pig in the SMX/TMP group was compared to and expressed as a percentage of the SDZ/TMP group. Day 1: Cumulative intake at 2, 4, 6, 8, 10, 12, and 24 h was 24%, 27%, 23%, 19%, 17%, 14%, and 14% lower in the SMX/TMP group, respectively. Daily consumption on d-2, d-1, d1, d2, d3, d4, d5, d+1, and d+2 was 5%, 5%, 14%, 11%, 12%, 16%, 14%, 11%, and 9 % lower in the SMX/TMP group, respectively.

Discussion and Conclusion

Substantial differences in water intake were observed when using different types of sulfonamides/trimethoprim combination products in drinking water. Sulfamethoxazole/trimethoprim can provoke an immediate and continuous decrease in water intake throughout the treatment period, in contrast to sulfadiazine/trimethoprim (HydroTrim®).

MIS-PP-13

EXPLORING OAH: A REVOLUTIONARY ENZYMATIC SOLUTION FOR OTA DETOXIFICATION IN SWINE PRODUCTION

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Background and Objectives

Ochratoxin A (OTA), a potent nephrotoxin produced by Aspergillus and Penicillium species, is considered one of the most harmful mycotoxins globally. Its widespread presence in agricultural crops and processed foods highlights its importance in food and feed safety. OTA presents a significant risk due to its long half-life and the potential for considerable accumulation in the body through dietary intake. Recently, the EFSA set a new reference point for adverse health effects in pigs at 0.01 mg OTA/kg of feed. In pigs, OTA primarily accumulates in the liver and kidneys. This study evaluated the effectiveness of OTA amidohydrolase (OAH; OCHRAzyme®), a feed additive, in converting OTA into non-toxic metabolites, phenylalanine and ochratoxin α (OTα), within the digestive tract of piglets.

Material and Methods

In a 15-day feeding trial, a total of 48 weaned piglets were assigned to one of four dietary groups: (i) control diet, (ii) diet contaminated with 0,05 mg/kg OTA, (iii) diet contaminated with 0,05 mg/kg OTA and supplemented with 1.5 U/kg OAH, or (iv) diet contaminated with 0,05 mg/kg OTA and supplemented with 5 U/kg OAH. Growth performance was monitored throughout the trial, and plasma and kidney samples were collected on days 18 and 19 to assess OTA and OTα concentrations as biomarkers of exposure.

Results

The results showed a significant reduction in OTA concentrations ($p < 0.0001$) in plasma for both OAH concentrations, while only the higher enzyme concentration resulted in a significant reduction in OTA levels in kidney samples. This was accompanied by a significant increase in the non-toxic metabolite OTα ($p < 0.0001$).

Discussion and Conclusion

These findings suggest that OAH supplementation as a feed additive could serve as an effective preventive strategy against OTA-related health and performance issues in swine.

MIS-PP-14

STREPTOCOCCUS AGALACTIAE SEPTICAEMIA IN TWO WEANERS FROM DIFFERENT FARMS

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Background and Objectives

In this report, we acknowledge two cases of septicaemia caused by Streptococcus agalactiae (Sa) in weaners from two different Italian sow farms.

Material and Methods

Animals were found dead and necropsies were performed on frozen (1) and early autolytic (2) pigs. ASF, PRRS and PCV2 were excluded by PCR. The country is officially free from CSF. Samples of brains, livers, and kidney (n.1 only) underwent bacteriological examinations. Plates of conventional media were incubated both in aerobic, anaerobic and microaerophilic (5% CO_2) conditions for 24-48h. Bacterial species were identified using MALDI TOF MS. The antimicrobial susceptibility of the strains was assessed by broth microdilution and interpreted based on CLSI clinical breakpoints. Strains were compared using PFGE.

Results

Congested mucosae and splenomegaly were detected. Liver n.1 was congested with multifocal white lesions with irregular edges and the kidney surface had haemorrhagic petechiae. ASF, PRSS and PCV2 resulted negative. Sa was isolated in purity from all the samples tested, with the exception of liver n.2, in which non-haemolytic Escherichia coli was also isolated. The strains resulted susceptible to betalactams, cephalosporins and phenicols, whereas resistant to erythromycin, tetracycline and kanamycin. PFGE detected 78.3% similarity between brain strains.

Discussion and Conclusion

Based on a presumptive diagnosis of Streptococcus suis, animals were administered amoxicillin via feed and exhibited clinical improvement. The bacteria has already been isolated from tonsils at slaughter and sporadically from pig organs in Russia (2016-2019). In this case, the isolation of Sa in pure culture suggests hematogenous dissemination as the most probable route of entry to the brain. Farm 1 includes whey and dairy by-products in the feed, which is a possible risk factor as Sa is a well-known cause of infective mastitis in cattle. The source of infection in farm 2 remains unclear. In conclusion, in case of sudden death Sa might be included in the differential diagnosis.

MIS-PP-15

EXUDATIVE EPIDERMITIS IN SUCKLING PIGS CAUSED BY STAPHYLOCOCCUS HYICUS: A CASE REPORT

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Background and Objectives

Exudative epidermitis (EE), also known as greasy pig disease, is a widespread skin infection affecting suckling and weaned piglets. It has a worldwide distribution, with sporadic outbreaks associated with high morbidity and mortality rates. We described the diagnosis and control measurements conducted after an outbreak of EE caused by Staphylococcus hyicus.

Material and Methods

The outbreak herein described appeared in a 4,000-crossbred sows (Landrace-Large White) farm located in southern Spain, which operated in a four-week batch production system. Clinical disease was observed in suckling piglets, with a 70 % of morbidity, and an increase of mortality rate of 5 % during this period. A histopathological and microbiological analysis were carried out. The bacteria could be recovered from skin and internal organs of affected animals. Isolates were multirresistant, and the pulsed-field gel electrophoresis (PFGE) analysis showed that all the isolates were genetically indistinguishable, suggesting a common origin. Certain deficiencies in the cleaning and disinfection protocols carried out in the farrowing unit could be responsible for the severity of the outbreak. A formaldehyde-inactivated autogenous bacterin with S. hyicus isolate was produced and was administered intramuscularly to sows and piglets.

Results

The efficacy of autogenous vaccination in sows with an inactivated vaccine based on complete ExhC-positive S. hyicus isolates at five and two weeks before farrowing in combination with the improvement of managements measures and selection of healthy animals for replacement allowed the resolution of the outbreak, completely reducing the morbidity and mortality rates after three months.

Discussion and Conclusion

The importance of an adequate diagnosis, biosecurity evaluation and the use of appropriate immune prophylaxis based on autogenous vaccines, are essential tools for the rapid and effective resolution of disease outbreaks of EE.

MIS-PP-16

A COMPARATIVE ASSESSMENT OF ORAL TOLTRAZURIL AND INJECTABLE IRON ADMINISTRATION VS COMBINED PARENTERAL TOLTRAZURIL+IRON (FORCERIS®)

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Background and Objectives

Background and Objectives
Cystoisosporosis and anaemia control in piglets is based in the administration of toltrazuril and iron. The aim of this study was to compare the effects of a combination of an oral toltrazuril and injectable iron vs a new injectable combination of toltrazuril and iron. Outcomes include score of diarrhea score, average daily weight gain, and mortality in piglets either treated or left untreated with only iron.

Material and Methods

Materials and Methods
In a farm with pre-weaning diarrhea, cystoisosporosis was confirmed in fecal samples via autofluorescence. 35 litters were randomly assigned to one of three treatments: 12 litters (141 piglets): 1,5mL of Forceris® intramuscular at 1-3 day of age (doa) (group F); 11 litters (132 piglets): oral toltrazuril and injectable iron 3-4 doa (group OT/I), and 12 litters (141 piglets) received only Iron 1-3 doa (group C). Piglets in each group were individually tagged and weighed at processing and weaning age (21 doa). Score of diarrhea was recorded at three different times: processing 2-4 doa, 10-12 doa and 21 doa.

Results

Results
ADWG in the group F with the injectable combination was significantly higher (0.228 ± 0.052^{a}) compared to group OT/I (0.199 ± 0.058^{b}) and group C (0.195 ± 0.057^{b}). No differences were found among treatments on mortality. In terms of score of diarrea, there were no differences among treatments at 1st period (1-3 doa) and 3rd period (18-21 doa). During the 2nd period (10-12 doa), no differences were found between treatments F and OT/I but there were significant differences between these two groups and group C.

Discussion and Conclusion

Discussion and conclusions
In this clinically affected farm, results suggested that the use of a combined injectable combination of toltrazuril and iron in piglets at processing improves growth with near to 30 grams more of ADWG vs a combination of an oral toltrazuril and injectable iron.

REP-PP-01

VISUAL INSPECTION AND ULTRASOUND EXAMINATION OF THE REPRODUCTIVE TRACT OF CULLED BREEDING BOARS

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Background and Objectives

Investigating the reproductive tract of culled boars at slaughter may support the culling policy in artificial insemination (AI) centers. This study investigated the reproductive tract of boars culled from an AI center using visual examination and ultrasound testing.

Material and Methods

The testicles and epididymides of 28 boars from one AI center were collected at slaughter and examined by palpation, visually, and by ultrasound (7.5 MHz linear probe). Abnormal testicles were incised, and histopathological analysis was done. Data on semen quality (CASA) before culling was collected.

Results

The mean culling age was 878 days. Culling reasons were decreasing (n=15) or fluctuating (n=3) semen quality, insufficient semen quality (n=4), breeding value (n=5), and blood in semen (n=1). Semen quality parameters (mean; SD) were: ejaculate volume (233; 64 ml), doses per ejaculate (25;9), % motility (85;9), % normal spermatozoa (67;9), % usable doses (59;11).Abnormalities were detected through visual inspection and palpation in 8 of 28 boars (10 of 56 testicles): edematous testicle, enlarged caput epididymis, cyst on testis or epididymis, adhesions between epididymis and testis, hypotonic testicle, absence of corpus epididymis. Normal ultrasound images were found in 37 of 56 testicles. Abnormalities with ultrasound were found in 12 boars (in one or both testicles), namely edema, mediastinum not visible, echo-dense areas, hyperechogenic structures, parenchyma striation, anechogenic structures, cysts, and heterogeneous parenchyma structure. There was no correlation (r) between semen quality and visual or ultrasound abnormalities.Incision of testicles with abnormal gross and ultrasound results showed white zones in the parenchyma, calcifications, caseous areas, or pale parenchyma. Histopathology showed interstitial fibrosis in testicles with echo-dense areas, and mild atrophy, degeneration, and edema in testicles with hyperechogenic scattered areas. Testicles with striation did not show histological abnormalities.

Discussion and Conclusion

Ultrasound allows the detection of abnormalities in visually normal testicles. Histopathology confirmed and specified the tissue abnormalities observed by ultrasound.

REP-PP-02

LARGE SCALE ASSESSMENT OF A BAYESIAN PREDICTIVE MODEL TO IDENTIFY SOWS AT-RISK OF STILLBIRTH

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Background and Objectives

A high number of stillborn piglets negatively impacts both production and animal welfare, and the stillbirth rate (SR) continues to rise with increasing sow prolificacy. The objective of this study was to confirm the accuracy of a predictive Bayesian model by verifying the consistency between the rate predicted using the FarroWin® application and the actual SR.

Material and Methods

The model has been developed with an expected accuracy of 72%. A dataset of 9,814 farrowing results from five farms was used. For each farrowing, the total number of piglets born, the number of stillborn piglets at the previous farrowing, sows backfat thickness just before farrowing and the parity rank were recorded. SR predicted by the model was calculated and compared to the actual SR. The agreement between the predicted and actual SR (application versus real-life) was evaluated using several thresholds. For instance, with a SR threshold set at 8%, agreement was confirmed if both the predicted and actual rates were either less than or equal to 8%, or both were above 8%. Conversely, if one rate exceeded 8% while the other was 8% or below, agreement was not confirmed. SR thresholds of 12% and 15% were also analyzed.

Results

In our dataset, 35%, 22% and 14% of sows had more than 8%, 12% and 16% respectively of stillborn piglets and the distribution was homogeneous between the different herds.The concordance rate between actual SR at farrowing and the application was 68%, 77%, and 86% when the SR threshold was set at 8%, 12%, and 15%, respectively. There was a strong correlation between the model's predictions and the actual SR.

Discussion and Conclusion

These results confirm that our model and its associated application (designed for Android and iOS) can be effective tools for identifying sows at high risk of stillbirth and managing them accordingly.

REP-PP-03

INFLUENCE OF FARROWING SYSTEMS AND BACKFAT THICKNESS ON METABOLIC PROFILES, OXIDATIVE STRESS, AND COLOSTRUM YIELD IN LACTATING SOWS UNDER TROPICAL CONDITIONS

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Background and Objectives

Modern hyperprolific sows expend substantial energy reserves to nurse large litters, leading to significant shifts in metabolic paradigm. This alters serum metabolites and elevated malondialdehyde (MDA) levels, reflecting chronic stress. This study evaluated impacts of farrowing system on serum insulin, insulin-like growth factor-1 (IGF-1), non-esterified fatty acids (NEFAs), plasma MDA, backfat thickness, colostrum, and milk production in sows.

Material and Methods

A total of 76 crossbred sows (parity 2.1±0.5, range 1–3) were housed in either farrowing crates (n=35) or free-farrowing pens (n=41) from 109±2 days of gestation until weaning. Backfat thickness was measured before farrowing and at weaning, with backfat loss during lactation calculated. Based on backfat thickness before farrowing, sows were categorized into low (<18 mm), moderate (18–24 mm), and high (≥24 mm) groups. Colostrum and milk yields were evaluated, while blood samples were collected at one-day-postpartum and weaning, to measure insulin, IGF-1, NEFAs, and MDA using ELISA assays.

Results

On average, backfat thicknesses at 109 days of gestation and weaning were 21.8±3.7 mm and 14.9±3.4 mm, respectively, with a lactational loss of 28.6%. Colostrum yield and milk yields from days 3–10 and 10–17 of lactation were 5.7±1.1 kg, 8.8±1.4 kg/d, and 10.7±2.2 kg/d, respectively. Serum metabolites, plasma MDA levels, backfat loss, colostrum, and milk yields did not differ between farrowing systems ($P>0.05$). At one-day-postpartum, sows with low-backfat had lower serum insulin and IGF-1 levels than those with moderate and high-backfat ($P<0.05$). Low-backfat sows experienced greater backfat loss than moderate ($P=0.021$) and high-backfat ($P=0.006$). In the free-farrowing systems, low-backfat sows lost more backfat than those in the crates system (27.7 vs 12.0%, $P=0.037$), but they tended to produce more colostrum (5.6 vs 4.6 kg, $P=0.084$).

Discussion and Conclusion

Farrowing systems did not influence sow metabolic parameters or oxidative stress; however, low-backfat sows kept in the free-farrowing system produced more colostrum than those in the crate system.

REP-PP-04

SUPPLEMENTATION WITH SYNBIOTICS DURING LATE GESTATION IN SOWS MODULATE COLOSTRUM COMPOSITIONS AND FATTY ACID PROFILES

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Background and Objectives

Synbiotics, a combination of prebiotics and probiotics, provide numerous benefits in pig production, including improved nutrient metabolism, gut health, and metabolic activity in suckling piglets. Nevertheless, its effects on colostrum composition and biomolecular profiles remain unclear. This study aims to evaluate the impact of synbiotics supplementation on sow performance, colostrum composition and fatty acid profiles.

Material and Methods

Forty-three Landrace × Yorkshire sows were randomly assigned to Control (n=22) and Treatment (n=21) groups. Control group received a conventional diet, while Treatment group was supplemented witha 25 mL/sow/day of synbiotics (TPI Synbiotics™, Thailand) from 30 days before farrowing until day 21 of lactation (51.9±2.9 days). The synbiotic product contained 1×10^9 CFU/L of Bacillus subtilis and 1×10^7 CFU/L each of Bacillus thuringiensis, Paenibacillus puldeungensis, Paenibacillus cookii, Brevibacillus panacihumi, along with fermented liquid feed. The colostrum samples were collected within one hour of farrowing. Major composition and fatty acid profiles in colostrum were analyzed using infrared spectroscopy (MilkoScan FT2, Denmark) and gas chromatography coupled with mass spectrometry for fatty acid methyl ester (GC-MS-FAME), respectively. The effect of synbiotics on colostrum composition was analyzed by using the generalized linear models procedure of the SAS. Least-square means were compared using the Tukey-Kramer test, with statistical significance set at $P<0.05$.

Results

No effect of dietary supplementation was found on sow performance ($P>0.05$). However, sows in Treatment group had higher colostrum protein (16.1±0.4 vs.14.9±0.4 kg, $P=0.038$) and casein (12.9±0.4 vs. 11.8±0.3, $P=0.026$) concentrations than sows in Control group, while colostrum fat concentration was lower (6.1±0.3 vs. 5.1±0.3, $P=0.029$). Treatment sows exhibited higher colostrum levels of linoleic acid, linolenic acid, and DPA, and lower colostral palmitic acid, stearic acid oleic acid, and linolelaidic acid ($P<0.05$).

Discussion and Conclusion

In conclusion, synbiotics supplementation during late gestation may serve as an alternative strategy to enhance colostrum quality.

REP-PP-05

THE CHARACTERISTICS OF ANEMIC VERSUS NORMAL NEONATAL PIGLETS

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Background and Objectives

The objective of this study was to examine how anemia affects the physiological characteristics of neonatal piglets compared to their normal counterparts.

Material and Methods

A total of 524 piglets, including 274 anemic and 250 normal piglets, were evaluated. Characteristics analyzed included birth weight, blood hemoglobin concentration, blood oxygen saturation, heart rate, rectal temperature, and vital scores at birth and 72 hours post-birth. Piglets were categorized as anemic based on hemoglobin levels < 90 g/L. The influence of anemia on colostrum intake, survival rate, and early growth performance was also assessed. For continuous variables (birth weight, hemoglobin levels, blood oxygen saturation, heart rate, and colostrum intake), data were presented as means ± standard deviations and analyzed using independent samples t-tests to assess differences between groups.

Results

On average, anemic piglets exhibited significantly lower birth weights (1.2 ± 0.3 kg vs. 1.4 ± 0.3 kg, $P < 0.001$) and hemoglobin levels (78.5 ± 5.8 g/L vs. 120.3 ± 7.4 g/L, $P < 0.001$) compared to normal piglets. Blood oxygen saturation and heart rate were also significantly reduced in anemic piglets (88.6 ± 4.3% vs. 94.2 ± 3.1%, $P < 0.001$; 165 ± 12 bpm vs. 175 ± 10 bpm, $P = 0.002$, respectively). Colostrum intake was lower in anemic piglets (345.7 ± 55.4 g vs. 412.3 ± 48.9 g, $P < 0.001$), and these piglets exhibited reduced vital and delayed standing and suckling times. Survival rates at 72 hours were lower in the anemic group (87.0% vs. 96.0%, $P = 0.018$).

Discussion and Conclusion

In summary, anemia in neonatal piglets negatively impacts critical physiological parameters, colostrum intake, and early survival outcomes. Timely detection and management of anemia could help improve piglet health and reduce mortality risks in pig production systems.

REP-PP-06

RESULTS FROM DIFFERENT DIAGNOSTIC APPROACHES CONCERNING LEPTOSPIRA SPP. IN TERMS OF SMEDI LITTERS

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Background and Objectives

Diagnostic material for PCR in terms of Leptospira ssp. associated abortion or stillbirth may include lung, liver, kidney or stomach content from affected fetuses or the detection of antibodies against Leptospira spp. in stillborn fetuses, if infected after the 70th day of gestation. In the present study we used different specimens for direct Leptospira spp. or antibody detection to evaluate adequate diagnostic approaches for Leptospira diagnostic in SMEDI cases.

Material and Methods

We included 142 fetuses of 36 SMEDI litters from 16 farms in which also serum of the affected sows was available. Serological examinations (MAT) of sow sera, fetal heart blood and PCR examinations of fetal tissue pools (Kidney, Liver), stomach content and meconium from affected fetuses were carried out.

Results

Antibodies against Leptospira spp. were present in 62.5% of the farms and 44.4% of the individual sow sera. Highest titers against serovars Pomona, Bratislava were present in sera of sows from Leptospira spp. PCR positive litters. Due to hemolysis, only 23.5 % heart blood samples of the fetuses could be examined by MAT; all revealed negative results. 14.1 % of the tissue pools were positive for Leptospira spp. by qPCR. Single sample examination revealed a detection rate of 95 % for kidney, 85 % for liver, 70 % for meconium and 65 % for stomach content. In fresh stillborn fetuses the probability to detect Leptospira spp. was reduced (OR: 0.055). Parity of the sow and farm size were associated with an increased chance to detect Leptospira spp. (gilt: OR: 49.57 / farm > 900 sows: OR: 22.98).

Discussion and Conclusion

Parity of sows and phenotype of the fetus affect the Leptospira spp. detection. Kidney displayed the most suitable tissue for Leptospira spp. detection in SMEDI fetuses by qPCR. Heart blood of fetuses was not suitable for Leptospira spp. serological diagnostics.

REP-PP-07

COLOSTRUM INTAKE IN FLEMISH PIG FARMS: ASSESSING THE IMPACT OF PIGLET SIZE AND FARM MANAGEMENT

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Background and Objectives

Colostrum intake is critical for healthy and resilient piglets. This study aimed to evaluate colostrum uptake on Flemish pig farms and determine whether large and medium-sized piglets outcompete smaller piglets.

Material and Methods

Farmers completed a questionnaire, and veterinarians collected blood samples from 5 sows per farm and 6 piglets per sow (small, medium-sized, and large piglets, visually estimated and maximum 7 days old). Colostrum intake was estimated by comparing antibody concentrations (PCV2 ELISA) between sows and piglets. Piglets with ≥100% antibody concentration compared to sow were considered to have absorbed sufficient colostrum (Biebaut et al., 2021; Baratelli et al., 2002; Könighoff et al., 2002).

Results

From May 2022 to April 2024, 84 farms were sampled. The average colostrum uptake was 120.34 ± 53.16%. On average, farms had 8.7 ± 5.6 piglets with insufficient uptake (min 0 and max 25 out of 30 sampled piglets). Mean uptake was 115.91% for small piglets, 120.56% for medium-sized, and 124.56% for large piglets. Large piglets had higher colostrum uptake compared to smaller ones ($p<0.05$, t-test). Insufficient colostrum intake rates were higher in small piglets (32%) compared to medium-sized (28%) and large piglets (23%). Mean differences between the top 10 best and bottom 10 worst farms/results was the mean herd size ($p<0.05$), the use of a radio in the farrowing unit ($p<0.05$) and the percentage of piglets with low birth weight ($p<0.05$). Although no other significant correlations were found, trends emerged. Piglets born from sows with nesting material had higher colostrum uptake (120.56 ± 22.77 versus 114.79 ± 16.29), and farms with sufficient uptake reduced the AMU with 9.8 days in the nursery compared to the other farms.

Discussion and Conclusion

This study highlights the importance of improving colostrum management to ensure sufficient intake for all piglets, particularly smaller ones, to enhance piglet health and reduce antibiotic use.

REP-PP-08

DETECTION OF DIFFERENT VIRUSES IN PORCINE ABORTION MATERIAL

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Background and Objectives

Abortion in sows occurs worldwide. The cause of abortion is often difficult to identify, especially when it comes to infectious diseases.

Material and Methods

We investigated abortion material from 93 different farms over 2 years (2021: 55; 2022: 38) by PCR for the occurrence of porcine viruses known being involved in abortion: porcine reproductive and respiratory syndrome virus (PRRSV), porcine circovirus (PCV) 2, PCV3, PCV4, encephalomyocarditis virus (EMCV), porcine parvovirus (PPV), porcine teschovirus (PTV), porcine sapelovirus (PSV). PPV was only investigated in cases with mummified foetuses (n=25/93).

Results

EMCV, PCV4 and PPV could not be detected. In total, 36.6% (34/93) of investigated samples resulted in at least one positive PCR reaction. Highest detection rate was found for PCV2 (27.7%) with viral loads of 10^4 to 10^{12} genome equivalents (GE) per gram tissue followed by PRRSV (10.8%), PCV3 (5.4%) with viral loads of 10^2 to 10^{11} GE/g tissue, PTV (3.2%) and PSV (1.1%). In three cases double infections were diagnosed with involvement of PRRSV, PCV2, PCV3 and PTV each in different combinations. One sample showed positive PCR results for PRRSV, PSV and PTV and another one for PRRSV, PCV2, PCV3 and PTV.

Discussion and Conclusion

This study shows that viruses can be regularly detected in porcine abortion material. Most prevalent virus species is PCV2 followed by PRRSV possibly also reflecting their active involvement in abortion. However, when looking at the viral load of PCV2 in foetal hearts, only six samples reached the threshold of 10^9 GE/g tissue as value with most probable clinical relevance. For PCV3 no threshold values are available for interpretation, therefore histopathologic investigations are still needed for final diagnosis to confirm clinical relevance. Since PTV and PSV was only detected in 3 or 1 specimen respectively, it seems there is only little relevance in abortion cases in Austrian sows.

REP-PP-09

EFFECT OF A MIXTURE OF HERBS (ESTRAL) ON THE REPRODUCTIVE PERFORMANCE OF SOWS

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Background and Objectives

Optimal sow reproductive performance is important for the farm's profitability. This study investigated the effect of adding an herbal mixture to the sow's feed before weaning on reproductive and litter performance.

Material and Methods

The study was conducted in a sow farm practicing a 5-week batch-farrowing system. Six successive weaning batches of 50 sows each, were included. The animals of each batch were allocated to either treatment (T) or control (C) using stratified randomization. Animals of the T group received 50 grams of the product Estral®, once orally the day before weaning, and gilts the day after the last altrenogest treatment. The animals of the C groups were left untreated. The herb mixture consisted of Vitex Agnus Castus (containing flavonoids), Salvia Officinalis, and Thymus Vulgaris. Parameters of comparison were related to estrus post-weaning (% of sows in estrus, WEI, number of inseminations per estrus), pregnancy rate, gestation length, and litter performance (total born, liveborn, litter weight 24 h post-partum). The data were analyzed using a generalized linear model, with treatment as independent variable, and batch and parity as covariates. Gestation length was analyzed using Kruskal-Wallis ANOVA.

Results

Most parameters were numerically and slightly better in the T group, but only gestation length was significantly shorter -0.3 days ($P<0.05$) in the T group. The pregnancy rate was 4.2% (93.2% vs 97.4%) higher in the T than in the C group ($P=0.072$).

Discussion and Conclusion

The treatment was easily implementable in routine management practices. The fact that the improvements in the T group were only small and not statistically significant might be because reproductive performance was already good on this farm. The slightly shorter gestation length in the T group is economically less important. Further research is needed on more farms and farms with variable reproductive performance.

REP-PP-10

INCREASED STILLBORN RATE ASSOCIATED WITH PORCINE CIRCOVIRUS TYPE 3 (PCV-3) DETECTION IN A FRENCH FARROW-TO-WEAN BREEDING HERD

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Background and Objectives

Recently, several reports pointed out the potential causality association of PCV-3 with reproductive failure.This case report aims to describe the clinical aspects and diagnosis implemented after an increase of stillborn rate observed in a farrow-to-wean French herd following the introduction of gilts of a new origin

Material and Methods

The case farm is a farrow-to-wean farm of 850 sows regularly controlled as PRRS stable with vaccination. Following a farmer's decision, they changed the genetic line of the breeding herd and consequently, the origin of the gilts was modified. Six months later, the first gilts farrowing occurred and an increase of the percentage of stillborn and autolyzed fetuses was observed. Percentage of mummies was not affected.Bacteriology on stomach contents, PCR and histopathology on stillborn tissues were implemented in order to identify the cause of the reproduction disorders on eight stillborn piglets from 4 different litters (2 per litter).

Results

On five batches, the stillborn rate increased by 30% and returned to baseline afterwards.At necropsy, external aspect was normal except for one stillbirth which presented an onset of autolysis. Bacteriology and all PCR for PCV-2, PRRSV, Leptospira and Porcine parvovirus type 1 returned negative. qPCR for PCV-3 on heart tissues were strongly positive on all pools of two fetuses (1 pool per litter). The amount of viral genome detected by quantitative PCR ranges from 10^5 to 10^9 copies/mL.Histopathology showed a moderate to marked lymphoplasmacytic myocarditis on all formalin-fixed samples.

Discussion and Conclusion

The originality of this case rests on the absence of increased mummification rate but only an increase in that of stillbirths and its association with the introduction of a new gilts origin. It highlights the need for studies to investigate the dynamics of PCV-3 infection and its consequences in sow herds

REP-PP-11

DEVELOPMENT OF INNOVATIVE BUFFERS FOR BOAR SPERM WASHING ALTERNATIVES TO STANDARD PHOSPHATE-BUFFERED SALINE

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Background and Objectives

Removing seminal plasma from boar sperm through washing is a key step in many biotechnological applications for in vitro studies. To this end, phosphate-buffered saline (PBS) is commonly used since it prevents osmotic stress and does not interfere with DNA analysis; however, it may exert a negative effect on sperm cells. This study proposes alternative washing buffers to better preserve sperm cell viability upon washing, that was investigated by measuring progressive motility and cell surface roughness.

Material and Methods

Three aliquots of semen were centrifuged at 400g for 5 minutes, the supernatant was removed, and the pellet was resuspended in PBS, buffer A (polysaccharide base) or buffer B (monosaccharide base). Progressive motility (%) and surface roughness (nm) were evaluated after cells washing using SCA® (Microptic, Spain) and atomic force microscopy (IC-AFM mode), respectively. Statistical analysis was performed with RStudio.

Results

Sperm progressive motility, after pellet resuspension, showed statistically significant differences between PBS (51.5%) and buffers A (78.7%) and B (84.3%) ($p < 0.001$). Cells surface roughness in PBS (6.67±0.27 nm) was significantly different compared to roughness observed in buffer A (7.03±0.29 nm) and B (7.53±0.31 nm) ($p < 0.05$). Five days after washing, progressive motility in PBS (8.9%) was significantly lower than in buffers A (77.5%) and B (84.2%) ($p < 0.01$). Surface roughness in PBS (10.20±0.17 nm) showed a significant increase compared to the stable values observed in buffer A (7.76±0.22 nm) and buffer B (8.15±0.22 nm) ($p < 0.001$).

Discussion and Conclusion

This study demonstrates that PBS increases cell surface roughness and reduces progressive motility, whereas buffer A and B can maintain cell viability for up to five days after washing. This provides a significant advantage for biotechnological applications and in vitro studies; therefore, proposed buffers can be considered better alternatives to PBS for sperm cell washing procedures.

REP-PP-12

MANAGEMENT OF REPRODUCTIVE DISORDERS IN SOWS THROUGH LEPTOSPIROSIS VACCINATION AND IMPROVED HYGIENE PRACTICES: A CASE REPORT

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Background and Objectives

Leptospiras are spirochetes that can cause reproductive disorders in sows. The transmissionof the pathogen occurs through mucous membranes and skin wounds when encounter infected urine Leptospiras can be transmitted to humans, underscoring the importance of effective control in animals.This field case follows up reproductive performance in an Leptospira infected sow herd after vaccination andimplementation of hygienic measures.

Material and Methods

In a herd with 350 sows in Germany, increased reproductive disorders occurred since October 2021 (highabortion rate (7.3%), increased stillbirths (2.05 per litter), increased number of return-to-estrus cases (14.9%)).The molecular biological examination of abortion material revealed the presence of pathogenic group Subclade P1Leptospira. Therefore, all sows were vaccinated with Porcilis® EPL twice in Q1/2022. At the farmer's request, noantibiotics were used for therapy. In addition, hygienic measures were implemented, such as daily feces removaland use of dry disinfectant behind the sows during the stalled period in the mating area (8d). After removal, themating center was cleaned and disinfected. To measure the impact, reproductive performance data from Q4/2021 until Q3/2022 was recorded.

Results

Already in the same quarter after vaccination the reproductive parameters improved (abortion rate (5.4%), number of stillborn piglets (1.68%), return-to-estrus-rate (9.9%). Six months later the reproductive parameters stabilized to pre-clinical-level: abortion rate (0.5%), number of stillborn piglets (1.35 per litter), return-to-estrus rate (10.0%). In total thefarrowing rate increased from 80.4% (Q4/21) to 89.7 % (Q3/22). In consequence 30.1 piglets/sow/year were weaned in Q3/22, which means 1.7 piglets more than before the leptospirosis outbreak.

Discussion and Conclusion

The implemented combination of measures brought the herd to a uniform immune status and were sufficient to contain the clinical signs due to Leptospira infection. In case of a natural Leptospira infection improvement of herd performance would not have been expected so quickly.

REP-PP-13

RETROSPECTIVE ANALYSIS OF PCR SAMPLES AND FUTURE PERSPECTIVES OF THIRD GENERATION SEQUENCING AS A DIAGNOSTIC TOOL FOR SMEDI COMPLEXES AND ABORTIONS IN SOWS

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Background and Objectives

Abortion and SMEDI represent a significant challenge in pig farming worldwide, with diagnostic and causative investigations remaining complex and often inconclusive. This work aims to compare classical PCR methods through a retrospective analysis of samples collected over the past two years (2022 and 2023) while also exploring early results from Third Generation Sequencing. The focus is to assess whether sequencing technology could offer valuable insights and provide a potential advantage in future diagnostic approaches for abortion cases in swine production.

Material and Methods

A retrospective analysis was conducted by analyzing 200 samples of fetal tissue and/or placenta, collected from routine diagnostics in 2021 to mid-2023 at SAN Group Biotech Germany GmbH that had been screened with real-time PCR to detect Porcine Parvovirus (PPV1), Porcine Reproductive and Respiratory Syndrome Virus (PRRSV), Porcine Circovirus 2 (PCV2), Chlamydia spp. and Leptospira spp. Another 94 samples collected in 2021 and 2022, mostly SMEDI cases, were analyzed by PathoSense using a novel viral and bacterial metagenomics workflow using nanopore sequencing.

Results

The Real Time PCR testing results showed that PRRSV was the most frequently detected pathogen (9,5%), followed by Chlamydiaceae (6%), PCV2 (3%), PPV1 (2,5%) and Leptospira (1%). Using nanopore sequencing, PPV1 (11.7%), PCV3 (12.8%), PCV2 (3.2%), PRRSV (6.4%) and Acinetobacter sp. (33%) were detected, while 38.3% of the samples tested negative.

Discussion and Conclusion

In conclusion, the comparison of both methods reveals consistent results as well as notable differences. While PCR testing focuses on the “Top 5” known abortive pathogens, sequencing was able to detect additional pathogens such as PCV-3 and Acinetobacter sp. The highly sensitive PCR method, combined with the broad diagnostic potential of NGS, could offer valuable advancements for future investigations. However, for effective utilization of both methods, a thorough interpretation of the results in terms of their clinical relevance is essential.

REP-PP-14

EVALUATION OF MACROSCOPIC PARAMETERS AND THE INFLUENCE ON THE REPRODUCTIVE CYCLE OF THE UROGENITAL TRACT IN SLAUGHTERED SOWS

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Background and Objectives

Evaluation of the urogenital tract in slaughtered sows is a valuable diagnostic tool. Therefore, the aim of the study was to evaluate macroscopic parameters and their relationship to the reproductive cycle of the urogenital tract in slaughtered sows.

Material and Methods

The following parameters were assessed in 105 sows within 40 hours after slaughter: Weight of the empty bladder and the reproductive tract (from the ostium urethrae externum to the ovary, with and without the broad uterine ligament). Furthermore, length of vagina, cervix and the right and left uterine horn were measured. The ovary was evaluated to assess the reproductive cycle. In addition, the mucosa of the uterus and the urinary bladder was assessed for inflammation (Yes/No).

Results

The average weight of the uterus was 1376.0 ± 623.3 g with a range of 355.0 – 3213.0 g. The mean weight of the bladder was 245.3 ± 100.8 g with a range of 87.0 – 847.0 g. Overall, an inflammation in 43.8 % of the uteri and in 30.5 % of the urinary bladder was detected. In the linear multiple regression model, a significant influence of the oestrus ($p = 0.019$), dioestrus ($p = < 0.01$), and the uterine mucosa ($p = < 0.01$) on the uterus weight was detected. Furthermore, a significant influence of the dioestrus ($p = < 0.01$), the uterine mucosa ($p = < 0.01$), and the bladder mucosa ($p = < 0.01$) on the bladder weight was detected.

Discussion and Conclusion

The study presents a structured and systematic evaluation of the urogenital tract in slaughtered sows, offering current data on its condition. Within the context of the reproductive cycle, uterus and urinary bladder weights may serve as valuable indicators of inflammatory processes in the genital tract.

REP-PP-15

DIFFERENTIAL PROTEIN EXPRESSION IN SMALL EXTRACELLULAR VESICLES AS POTENTIAL BIOMARKERS OF BOAR SEMEN QUALITY

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Background and Objectives

Small extracellular vesicles (sEVs) in seminal plasma carry and transport bioactive components that support sperm functions. However, the correlation between the protein content of boar sEVs and sperm motility and morphology remains unclear. This study aimed to identify biomarkers in sEVs associated with sperm motility and morphology.

Material and Methods

Semen was collected from four sexually mature boars using the gloved hand technique. The semen was assessed using CASA systems and categorized into two groups: Good-quality (motility ≥ 70%, morphology ≥ 75%) and Poor-quality (motility < 70%, morphology < 75%). Boar sEVs were isolated through sequential ultracentrifugation and characterized using nanoparticle tracking analysis (NTA), transmission electron microscopy (TEM) and western blotting. Protein composition was analyzed by liquid chromatography-tandem mass spectrometry (LC-MS/MS) and identified using the Uniprot swine protein database. The sEVs diameter and concentration were performed using GLM by SAS Program.

Results

On average, the sEVs diameter and concentration were 95.1 nm and 10.9×10^{11} particles/mL, respectively. The sEVs diameter of Good-quality was significantly greater than Poor-quality semen (99.1 ± 0.5 vs 91.0 ± 0.6, $P < 0.001$). Additionally, the sEVs concentration in Good-quality was higher than in Poor-quality semen (11.2×10^{11} vs 10.6×10^{11} particles/mL, $P<0.001$). The morphology of sEVs was intact, cup-shaped vesicles with membrane integrity. A total of 408 proteins were identified, with 34 differentially expressed proteins (DEPs). Good-quality semen contained 31 DEPs with GBA1 and PGK2 uniquely expressed. Poor-quality semen also had 31 DEPs with EGF and MIF exclusively present.

Discussion and Conclusion

The GBA1 plays a role in spermiogenesis and the PGK2 is associated with the glycolytic pathway. In contrast, the EGF is involved in cell proliferation during spermatogenesis and the MIF is implicated in disrupting sperm maturation. In conclusion, the GBA1, PGK2, EGF and MIF proteins are potential biomarkers associated with sperm motility and morphology.

REP-PP-16

A SMEDI OUTBREAK IN GILTS CAUSED BY SKIPPING VACCINATION – A CASE REPORT

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Background and Objectives

Porcine parvovirus (PPV) is considered a primary causative agent for SMEDI (stillbirth, mummification, embryonic death, infertility) symptoms in pigs. Clinical cases are mostly limited to gilts. In older sows, the infection often remains symptomatic, as they have a well-developed immunity against the virus. In this case report describes the importance of vaccination compliance in all populations within a farm.

Material and Methods

In September 2024, a farrowing batch on a 300-sow farm in Germany exhibited SMEDI-like symptoms, despiteall gilts and sows were routinely vaccinated against Parvovirus, Erysipelas and Leptospiras (Porcilis®EPL).At day 205 of age the gilts were vaccinated the first time. Differential diagnosis targeted SMEDI-associated pathogens. Two mummified litters (1 = 4 mummies, 2 = 6 mummies) were sent for necropsy and four blood samples from noticeable sows were collected for further diagnostics. Available on-farm records and vaccination history were investigated.

Results

Interestingly, only gilts (n = 10) in the problem batch (n = 26) showed reproductive failure. When compared with older sows, gilts had less piglets born alive (8.3 vs 15.75) per litter, and more stillbirths and mummified piglets (3 vs 0) per litter. PPVwas detected by PCR in mummified foetuses, whereas PRRSV, PCV2 and leptospirosis testing yielded negative results.PCV2 and PRRSV were not detected in blood, but PCV3 by PCR (ct-value: 34). Leptospirosis antibody test (MAT) showedno to low titers. On-farm records revealed the lack of a complete basic immunization of gilts from this batch: only asingle dose was administered when label recommends two.

Discussion and Conclusion

This case describes a PPV-associated reproductive failure, limited to gilts, and caused by lack of vaccine compliance.Skipping vaccination in gilts was the most likely cause, as shown by the presence of SMEDI-like signs and the low MATtiters, both restricted to gilts. This was corroborated by on-farm records.

RES-PP-01

ASSESSMENT OF STREPTOCOCCUS SUIS SEROTYPES IN SPANISH PIG FARMS DURING THE PERIOD 2019 TO 2024

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Background and Objectives

Streptococcus suis (S. suis) is a major pathogen in swine production and an emerging zoonotic threat. Although serotype (ST) 2 has historically been considered the most prevalent in Europe, recent studies suggest that other serotypes are more common in certain regions, including Spain. This study aimed to analyze the prevalence and distribution of S. suis serotypes in clinical cases from Spanish swine farms, using advanced molecular techniques to enhance serotype differentiation.

Material and Methods

A total of 216 S. suis isolates were included in this study. They belonged to 107 farms analyzed between 2019 and 2024 and were isolated from cerebrospinal fluid and/or synovial fluid collected from animals exhibiting clinical signs consistent with meningitis and/or arthritis. Each isolate was identified using Matrix-Assisted Laser Desorption/Ionization-Time of Flight (MALDI-TOF) mass spectrometry, and serotyping was performed on S. suis isolates through an in-house multiplex PCR method.

Results

The distribution of ST revealed that ST9 (47/216) was the most prevalent, followed by ST7 and ST1 (37/216 each), ST 1/14 (23/216), ST2 (20/216) and ST 2-1/2 (18/216). The average number of ST isolated per farm was 2, with a maximum of 8 isolates in one farm. In 66 out of 107 farms, the pathogen was isolated from both nervous and joint samples.

Discussion and Conclusion

The present study provides an updated analysis of the serotypes identified in Spanish swine farms, with ST9 being the most frequently detected and ST2 representing only 8% of clinical cases. Notably, diagnostic accuracy before 2022 was limited due to the absence of differentiation between serotypes 2-1/2 and 1-14 by means of PCR, which may have led to an underestimation of these serotypes. The absence of cross-protection among serotypes poses challenges for infection control, making continuous surveillance essential for understanding S. suis epidemiology and establishing effective control measures.

RES-PP-02

TONSIL SCRAPINGS TO ASSESS THE SPREAD OF ACTINOBACILLUS PLEUROPNEUMONIAE IN AN ACUTE OUTBREAK IN A SPF SOW HERD

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Background and Objectives

Actionobacillus pleuropneumoniae (APP) is a gram-negative bacterium that causes pleuropneumonia. APP can colonize the tonsils and evade the host clearance, leading to so called “carriers”. Epidemiological models suggest a horizontal spread in farms even without clinical signs. In this case report from a recent APP-infected sow herd, tonsil scrapings were used to determine the spread of the pathogen on farm to evaluate whether partial culling can be considered as an effective control tool.

Material and Methods

In this case a 1500-sow farm, free of APP, became infected with APP (serotype 7), diagnosed in acute dead first litter sows in the farrowing stable. Presumably the transport of animals and temporary housing changes due to renovation led to the introduction of the bacterium. The farmer wanted to regain the APP-free status of the sow herd as soon as possible. Potentially, compartments without clinical signs were still not infected and culling infected compartments would be an option. To detect possible carriers, tonsil scrapings from sows in different farrowing rooms and gestation stables were collected (n=100). Toothbrushes were used to scrape the tonsils. After scraping, the head of the toothbrush was cut off, suspended in saline (0.9%) and shipped to the laboratory. Samples were pooled by four and a PCR based on the Apx-IV gene was performed.

Results

PCR was positive in 11 pooled samples, 1 pool was suspicious and 12 pools were negative. In all compartments of the gestation stable and in all farrowing rooms APP was detected, indicating that the pathogen has already spread all over the sow herd.

Discussion and Conclusion

The first idea to regain the APP-free status by cull and remove gilts/sows from clinically affected farrowing rooms was no option due to the wide spread of the bacterium on the farm. These findings prove that horizontal spread of APP may occur without clinical signs.

RES-PP-03

INTESTINAL EMPHYSEMA (PNEUMATOSIS CYSTOIDES INTESTINALIS) IN BACKYARD PIGS

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Background and Objectives

Intestinal emphysema is a rare condition, characterized by gas-filled spaces within the intestinal wall. Although its etiology is not fully understood, bacterial gas production, intestinal motility disorders, or dietary factors are considered potential contributors. Reports in pigs are limited, highlighting the need for further investigation into its occurrence and significance. This study aimed to describe intestinal emphysema's pathological and microbiological findings in backyard pigs, focusing on potential pathological features and microbial involvement.

Material and Methods

Three pigs, originating from different backyard farms in Romania, without prior clinical signs, were investigated after they were slaughtered for own consumption. Intestinal samples were submitted for analysis. Macroscopic examination of the received samples revealed gas-filled lesions of variable severity in the intestinal walls. Tissue samples were further processed for histopathology and microbiological analysis, including smear microscopy and cultivation.

Results

Lesions were predominantly observed in the ileum and jejunum. Histologically, the intestinal mucosa showed mild lympho-plasmocytic infiltration, consistent with chronic inflammation, without severe alterations. Air bubbles visible macroscopically corresponded to empty spaces lined sporadically by endothelial cells in the serosa and mesentery. These spaces were surrounded by severe granulomatous and eosinophilic reactions, with marked fibrosis. Microbiological analysis confirmed the presence of Clostridium spp., visualized microscopically as dense bacterial populations. Cultivation and further identification are ongoing.

Discussion and Conclusion

This study highlights intestinal emphysema as a rare, incidental condition in pigs, with lesions localized to the ileum and jejunum. Histology revealed gas-filled spaces in the serosa and mesentery, surrounded by granulomatous and eosinophilic inflammation and fibrosis, suggesting chronic inflammation. Clostridium spp. was identified, supporting bacterial involvement, but additional studies are needed to explore other etiologies, including fungal infections. The absence of clinical signs underscores the likelihood of underdiagnosis, especially in backyard systems with inconsistent feeding and limited oversight. These findings emphasize the need for further research to understand predisposing factors

RES-PP-04

HERD MANAGEMENT FACTORS INFLUENCING AUTOGENOUS VACCINE EFFECTIVENESS AGAINST STREPTOCOCCUS SUIS : STUDY IN 20 FRENCH PIG FARMS.

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Background and Objectives

Streptococcus suis (S. suis), commensal to pathogenic bacteria of the pigs, is a main cause of economical loss and use of antimicrobials in pig farm all around the world. To prevent streptococcosis, autogenous vaccines based on bacterial strains isolated in farm are used in several countries. The effectiveness of autogenous vaccines seems to be impacted by the clinical context of each farm (Rieckman, 2020). The aim of this study was to assess the influence of herd-management factors on the effectiveness of autogenous vaccines through a precise description of 20 farms using S. suis autogenous vaccines.

Material and Methods

Twenty farms using S. suis autogenous vaccine on sows were selected. Effectiveness was assessed by comparing (i) the frequency and severity of clinical signs and (ii) antibiotic treatments against streptococcosis before and after vaccine implementation. Farms were then classified into two categories: “success” and “failure”. Data on farm management, biosecurity, farm sanitary status, vaccination plan and autogenous vaccine composition were collected during a systematic visit of the farm. A bivariate analysis and then a Multiple Component Analysis were conducted to identify herd factors associated with failure or success.

Results

Seven farms were classified as “failure” and thirteen as “success”. Among the different factors associated with “failure”, the high prolificacy of sows (>16,5 total born and >15,5 live born piglets) was identified as a significant criteria (P=0,014). Regarding vaccination practices, a frequent change of needles (<5 sows per needle) tends to be associated with “success” (P=0,057).

Discussion and Conclusion

This study presents key points to improve effectiveness of autogenous vaccines against S. suis. The management of high prolific sows and their offspring is a main issue since colostrum intake, crucial for piglets, can be jeopardised. In addition, vets should support farmers for vaccination implementation as the quality of sows’ immunization is a prerequisite for piglets’ protection.

VPH-PP-01

ASCARIS SUUM MILK SPOT LESIONS IN PIGS SLAUGHTERED IN ITALY: THE ABATTOIR AS A MONITORING TOOL

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Background and Objectives

The monitoring of milk spot lesions provides a useful tool for assessing the prevalence of Ascaris suum. Given the lack of current data on the prevalence of milk spots in pigs, a retrospective observational study was planned in Italy, in an area characterised by a high density of intensive pig farms.

Material and Methods

The study focused on data on milk spot lesions recorded within a year in one of the main national abattoirs. The livers of 754833 pigs from 399 farms were analyzed at post-mortem inspection. For each recruited farm data on rearing region, slaughter season, farm size and type of production were collected. These variables were entered into generalized linear mixed models and the likelihood of finding an animal with milk spots in relation to these factors was estimated.

Results

368 farms were positive (92.2%) and 198964 pig carcasses showed liver lesions (26.4%). The risk of finding animals with milk spots raised in spring and summer, when temperatures are higher and A. suum third-stage larvae hatch in a shorter time, causing an increase in the number of infected pigs and consequent liver lesions. Medium-sized farms were more likely to have milk spots in slaughtered animals, as in large farms the use of all-in/all-out systems and regular cleaning and disinfection protocols could reduce parasite exposure; at the same time, small farms could provide efficient management of pigs. The number of lesions was significantly higher in farrow-to-finish farms, and this could be related inadequate management, which could favour the persistence of A. suum.

Discussion and Conclusion

In view of the high prevalence observed and the economic damage in the pig industry caused by organ discarding, it is necessary to promote a better cooperation between abattoirs, veterinarians and farmers in developing targeted control plans.

VPH-PP-02

DETECTION OF LISTERIA MONOCYTOGENES IN FATTENING PIGS AND SLAUGHTERHOUSES IN AUSTRIA

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Background and Objectives

Pork products play an important role in the transmission of Listeria (L.) monocytogenes to humans, but the role of living pigs in transmission is currently unknown. There is a lack of information about the role of pigs in the L. monocytogenes epidemiology throughout the pork production chain – from stable to table.

Material and Methods

Faecal material from 400 Austrian pigs as well as environmental samples including swab, feed and straw samples from 20 farms and 150 swab samples from the corresponding slaughterhouse were investigated for the presence of Listeria spp. through enrichment, PCR and MALDI-TOF. Additionally, a short questionnaire was assessed to evaluate potential risk factors for the occurrence of Listeria.

Results

Both L. monocytogenes and other Listeria spp. were detected in swab samples of the slaughterhouse, environmental samples in farms and faecal samples. While the slaughterhouse samples mainly tested positive for L. monocytogenes (29.2%), samples associated with farms and pigs showed a higher detection rate of other Listeria (13.9%) in comparison to L. monocytogenes (3.4%). L. monocytogenes were found in 9 /20 farms as well as in the pigs of 4 farms and in slaughterhouse samples of all three different sampling dates. Due to the low prevalence of L. monocytogenes, we could not detect any risk factors.

Discussion and Conclusion

As shown in this study, Listeria spp. including L. monocytogenes can be detected in pigs, the farm environment, and the slaughterhouse environment. Occurence in the slaughterhouse was significantly higher than in the farms, where we observed a large variation in the prevalence. In the next step we will perform whole genome sequencing and analysis to study genetic relationship between those isolates and consequently analyse epidemiology throughout the pork production chain.

VPH-PP-03

ANTIGENIC DIVERSITY OF SWINE INFLUENZA A(H1) VIRUSES CIRCULATING IN THE NETHERLANDS

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Background and Objectives

Swine influenza A virus (swIAV) serological testing to detect antibodies against currently circulating or emerging influenza viruses is challenged by the high diversity and rapid evolution of co-circulating subtypes. The aim of this study was to antigenically characterize current circulating swIAV strains in the Netherlands and to evaluate the performance of our existing hemagglutinin inhibition (HI) assay.

Material and Methods

Thirty six representative swine influenza viruses collected in the Netherlands between 2022-2023 belonging to the three H1 lineages (Classical Swine lineage (clade 1A.3.3.2), Eurasian Avian lineage (clade 1C.2.1 and 1C.2.2) and the Human Seasonal lineage (clade 1B.1.2.1) were cultured and tested in the HI assay. Ferret antisera (n=13) raised against representative viruses isolated from pigs and humans between 2009 and 2023 were used for the HI.

Results

Viruses from clade 1A.3.3.2 and clade 1B.1.2.1 showed no substantial reaction with the available ferret sera in the HI assay. However, viruses from clades 1C.2.1 and 1C.2.2 were recognized by ferret sera raised against both older and recent viruses of 1C clades.

Discussion and Conclusion

These results highlight the high antigenic diversity of swine influenza viruses in The Netherlands, in particular viruses from clades 1A.3.3.2 and 1B.1.2.1. As the lack of reactivity in the HI assay may result in false negative results, regular update of swine reference strains and sera is recommended for swine serology testing, vaccine updates and pandemic preparedness.

VPH-PP-04

THE BURDEN OF DISEASE IN SWISS PORK PRODUCTION

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Background and Objectives

Animal diseases significantly impact economic efficiency and productivity of food systems. Within the Global Burden of Animal Diseases programme the Animal Health Loss Envelope (AHLE) metric was developed to consider economic losses due to all possible causes of disease burden. This study's aim was to estimate the AHLE of Swiss swine production.

Material and Methods

We developed production models for most common farm types using production and economic data from national databases, industry and literature. A simulated disease-free, 'ideal' scenario was created based on AHLE definitions and empirical data from top-performing farms. Input levels required to produce a target number of slaughter pigs in the 'ideal' scenario were calculated. Gross margin analysis was performed, and herd-level gross margin differences were calculated. The AHLE was estimated as the difference in gross margin between baseline production and the 'ideal' scenario, at population level.

Results

The input level estimation showed that the 'ideal' scenario required 38%, 3.5% and 1.5% fewer sows, weaned piglets and reared piglets, respectively, to produce the same number of slaughter pigs as with baseline production. The gross margin difference between baseline production and the 'ideal' scenario was CHF 1616 per breeding sow and CHF 92 per fattening pig. The AHLE was estimated at CHF 290 million annually (CHF 71 million and CHF 219 million for breeding and fattening, respectively).

Discussion and Conclusion

Disease due to all causes places a significant economic burden on Swiss pork production. Due to improved production efficiency in the 'ideal' scenario, lower input levels are required to produce the same number of slaughter pigs compared to baseline production. This has implications for sustainable food production and economic efficiency. Our model is adaptable to other settings and countries to estimate gross margins, input and output levels and AHLE, key indicators for optimal resource allocation and prioritisation.

VPH-PP-05

COMPREHENSIVE ANALYSIS OF AUSTRIAN SWINE-RELATED CLOSTRIDIUM PERFRINGENS: INSIGHTS FROM MULTI-LOCUS SEQUENCE TYPING AND WHOLE GENOME SEQUENCING

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Background and Objectives

Clostridium perfringens (CP) is, among others, a major enteric pathogen in the early life of piglets. Interpretative criteria for susceptibility testing are currently missing, and antibiotic resistance testing is scarce in Austria. Furthermore, little is known about the epidemiology of CP. To reduce antimicrobial usage in farm animals, the EU implemented new legislation and aims for a 50% reduction by 2030, emphasizing the need for targeted treatment. Accurate typing is necessary for epidemiological investigations and tracking potential spillover infections. The aim of this study was to type CP strains isolated from swine and other animals using whole genome sequencing (WGS) and multilocus-sequence-typing (MLST).

Material and Methods

We analyzed 20 WGS of Austrian swine-related CP isolates for antimicrobial resistance (AMR)-genes in silico via a publicly available database (e.g. ResFinder). In addition, we performed an eight-gene MLST of 100 CP strains of swine (n=77) and other species (n=23).

Results

We propose two novel clonal complexes (CC) determined by MLST with up to 4 different loci: CC39, a swine-related CC, with 22 established and 20 novel sequence types (ST), and CC21, a companion animal and poultry related CC with 8 established and 2 novel ST. A total of 32 novel ST were assigned. The WGS in silico analysis revealed the presence of 9 different AMR-genes, with tet-genes beeing the most predominant. Four isolates showed single, and 13 multiple AMR-genes, with one isolate harboring 8 different AMR-genes.

Discussion and Conclusion

Due to advances in WGS and the creation of well-curated gene and MLST databases, comprehensive results on the presence of AMR (and virulence) genes and epidemiology can be obtained within days. To date, little is known about the translation of resistance-genotypes to -phenotypes in CP. For Enterobacteriaceae, it has been shown that ~98% of detected resistance-genotypes translate into corresponding resistance-phenotypes (Feldgarden et al. 2019). In vitro AMR-testing will be performed for CP.

VPH-PP-06

EXPLORATORY STUDY ON CRYPTOSPORIDIUM SPP. PREVALENCE DETECTION AND GENOTYPING IN DIFFERENT SWINE FARMS LOCATED IN ARAGON (SPAIN)

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Background and Objectives

Cryptosporidium spp. is an intracellular protozoan that affects both humans and pigs. Its zoonotic nature highlights the importance of controlling this pathogen. However, information regarding Cryptosporidium spp. prevalence in swine farms is limited. Thus, this exploratory study aimed to determine the prevalence of Cryptosporidium spp. in swine farms and genetically characterize the species involved.

Material and Methods

Ten farms located in Aragón (Spain) with different production systems (2-phases/3-phases) and productive phases (lactation, nursery, fattening and/or wean-to-finish) were included in this study. Faecal samples were collected from 3 pens of each stage (n=72) and analysed for oocyst counts using immunofluorescence. Positive samples were amplified by PCR for sequencing of 18S rDNA. Statistical analyses of oocyst counts and positivity between farms were performed using Kruskal-Wallis test. Statistical significance was set as $p<0.05$.

Results

Cryptosporidium spp. was detected in 5 studied farms (5/10; 50%). Immunofluorescence results revealed a Cryptosporidium spp. prevalence of 16.7% (12/72) in Aragón. The highest detection rate of Cryptosporidium spp. was observed in the 3-phase farms (21.8%), compared to 2-phase farms (12.5%). The lowest prevalence was detected in lactation (8.0%), followed by Wean-to-Finish (17.4%), while the highest prevalence was observed at nursery and fattening phases (25.0% in both). The average number of oocysts/field was low (1.0±3.7), with the highest oocyst counts observed in 3-phase (2.2±5.4) and fattening (3.0±6.4) farms. No significant differences were found between productive systems and phases. Sequencing of positive samples identified two species: Cryptosporidium scrofarum (87.5%) and Cryptosporidium suis (12.5%).

Discussion and Conclusion

The obtained results highlight the importance of controlling Cryptosporidium spp. and its potential transmission to humans, particularly among people who contact with pigs (e.g. farm workers, swine veterinarians) during nursery and fattening phases. Although the zoonotic transmission of Cryptosporidium parvum is well-demonstrated, further investigations are needed to assess the zoonotic potential transmission of Cryptosporidium scrofarum and Cryptosporidium suis detected in this study.

VPH-PP-07

UNVEILING THE ROLE OF DOMESTIC AND WILD SWINE AS RESERVOIRS OF ZOONOTIC BACTERIA

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Background and Objectives

The One Health concept recognizes that human, animal and the environment health are linked. Several pathogens have the ability to breach species barriers, posing a significant threat to global health by prompting the emergence of infectious diseases (ID), which can endanger both humans and animals.This study aimed to characterize the nasal microbiome of domestic pigs (DP) raised in outdoor systems, and wild boars (WB), while detecting the presence of specific zoonotic pathogens—Streptococcus suis, Mycobacterium tuberculosis, Brucella suis, as well as ESKAPE pathogens.

Material and Methods

A total of 51 nasal swab samples (VTM®) were collected from domestic pigs (n=30, from 3 farms) and WB (n=21), in the centre/northern region of Portugal, DNA extraction was perfomed on each swab, followed by Microbiome evaluation was performed using Oxford Nanopore long-read sequencing. High-accuracy taxonomical classification was validated through ZymoBIOMICS, and sequencing runs were conducted on the GridION5 platform.

Results

A total of 4,430 bacterial OTUs were obtained, with 3,634,560 reads in WB and 8,672,399 in DP. Reads for S. suis, Acinetobacter baumannii, Pseudomonas aeruginosa, Klebsiella pneumoniae, and Staphylococcus aureus were detected in all WB and DP farms. Additionally, M. tuberculosis and Enterococcus faecium were detected in all WB samples and in swine samples from two farms, while B. suis was detected in samples from one farm. Most of the pathogens studied represented less than 1% of the total OTUs, except for A. baumannii (9.15%) and S. suis (1.19%) in WB, and P. aeruginosa (12.31%) in DP.

Discussion and Conclusion

These findings enabled the detection of different zoonotic bacteria in healthy DP and WB, underscoring their pivotal role as pathogens' reservoirs. Their potential interaction with other animals may contribute to the dissemination of emerging ID. This demonstrates the relevance of collaboration among institutions focused on animal, human, and environmental health for the timely identification of potential health threats.

VPH-PP-08

TRADE OF LIVE PIGS ASSOCIATED WITH THE SPREAD OF SWINE INFLUENZA VIRUS ACROSS EUROPEAN COUNTRIES – A PHYLOGEOGRAPHIC ANALYSIS

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Background and Objectives

Swine influenza virus (SIV) causes respiratory distress in pigs, leading to economic losses to the swine industry. SIV also poses a significant threat to human health, as the virus is zoonotic, and novel reassortant strains can arise in pigs when they are simultaneously infected with multiple influenza strains of different origins. Long-distance trade of pigs has been suggested as driver of SIV spread across continents. It is unclear whether live pig trade also drives the spread of SIV across European countries and, hence, could facilitate the emergence of new reassortant strains in Europe.

Material and Methods

To assess this, we performed a discrete phylogeographic analysis with a generalized linear model (GLM) in BEAST X, using SIV RNA sequences of ten European countries. Sequences were obtained from GISAID and NCBI and the number of included sequences was proportional to the estimated SIV incidence per country to minimize sampling bias. Separate analyses were conducted for H1, H3, N1, and N2 segments of the virus. Data on live pig and pork trade between countries were collected from the CEPII database, and additional data on pig and farm densities per country were obtained from EUROSTAT.

Results

Trade of breeding pigs and pigs below 50 kg was a strong predictor in the analysis of each gene segment. The number of pigs in the country of export was found as additional, weaker predictor for some segments. The trees show clusters of SIV strains shared between non-adjacent countries.

Discussion and Conclusion

The results of this study suggest that European surveillance of SIV must be enhanced to prevent SIV from spreading across countries. New policies for pigs purchased for other reasons than slaughter may aid the prevention of SIV introduction in new herds. Further work will be conducted to assess the relation between trade and the timing and rate of reassortment of European SIV strains.

VPH-PP-09

PERFORMANCE OF GROWING AND FINISHING PIGS RECEIVING DIETS WITH DIFFERENT LEVELS OF HERBAL METHIONINE INCLUSION

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Background and Objectives

Methionine (MET) is one of the most important essential amino acids in pig nutrition. In addition to its nutritional function, MET is also important for the protein metabolism and intestinal health of animals. The aim was to evaluate the effects of total or partial inclusion of a herbal source of methionine (H-MET) as a substitute for DL-methionine on the productive performance of growing and finishing pigs.

Material and Methods

Total of 144 pigs (72 gilts and 72 barrows), with an average age of 70 days, grouped by sex and initial weight and assigned to one of four experimental treatments in a randomized block design, with initial weight and sex as blocking factors. The treatments were as follows: T1 (Positive control: 100% DL-Methionine), T2 (33.34% replacement of DL-Methionine), T3 (66.67% replacement of DL-Methionine), and T4 (100% replacement of DL-Methionine). Pens containing three pigs each were considered the experimental unit, with a total of twelve replicates per treatment. Individual weights were recorded on days 0, 21, 42, 63, and 90 of the experimental period. To evaluate pig performance, the variables average daily weight gain (ADWG), average daily feed intake (ADFI), and feed conversion ratio (FCR) were measured. Statistical significance was established at $P < 0.05$.

Results

Inclusion of H-MET had no different in the ADWG however the partial inclusion of H-MET improved FCR; Based on quadratic regression, the best inclusion rates were estimated for the FCR variable, resulting in 33.34% (P= 0.013) in the first phase, 29% (P= 0.046) in the adjusted phase (D1-D42) and 34% (P=0.021) in the complete phase (D1-D90).

Discussion and Conclusion

Study demonstrates that the replacement of DL-methionine with H-MET has no adverse effects on swine performance. Furthermore, in the complete phase (Days 1-90) the inclusion of 33.34% H-MET significantly improved feed conversion, highlighting its potential as a viable alternative in swine nutrition.

VPH-PP-10

THYMIC ATROPHY AS PIVOTAL LESION IN PFTS

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Background and Objectives

Porcine Periweaning Failure to Thrive Syndrome (PFTS) is an emerging disease in the swine industry, characterized by growth retardation and progressive debilitation of piglets within two to three weeks post-weaning. Clinical signs are often non-specific and may include repetitive oral behaviors. Although the etiology remains unclear, immune dysfunction, particularly thymic atrophy and impaired lymphocyte development, has been proposed as a key factor.

Material and Methods

In this study, histopathology and immunohistochemistry were performed on PFTS-positive piglets from farms across different regions of Spain (Andalucía, Extremadura, Murcia, and La Rioja), focusing on thymic lesions and CD3+ lymphocyte distribution.

Results

A mild to moderate CD3+ lymphocytic infiltrate was detected in the lamina propria of the gastric fundus, small intestine, and colon. The infiltrate's intensity varied between sections of digestive tract, without a consistent pattern. In the stomach, more pronounced infiltrates caused superficial foveolar cells to appear as a simple cubic epithelium, while in the small intestine, they were associated with villus atrophy and a reduced villi-to-crypt ratio. In the nasal mucosa, a similar mild to moderate lymphocytic infiltrate was observed, with more intense infiltration in cases associated with porcine cytomegalovirus infection. Oppositely, lesions linked to porcine circovirus type 2 were restricted to a single farm and did not correlate with increased lymphocyte infiltration in digestive or respiratory tissues.

However, all animals exhibited severe thymic atrophy, characterized by lymphoid cell depletion and cortical reduction, rendering the cortex indistinguishable from the medulla. This suggests a disruption in T-cell development despite the thymic degeneration.

Discussion and Conclusion

In spite of the severe thymic atrophy, there was no evidence of lymphoid cell sequestration in the organs. The presence of peripheral CD3+ T cells suggests that before the thymic atrophy, this organ remains functional in the first stages of the syndrome, reason why it is very important to study what event provokes this lesion.

VPH-PP-11

ALARMING INCREASE IN THE PREVALENCE OF LIVESTOCK-ASSOCIATED METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS ON HUNGARIAN PIG FARMS: GENOMIC EVIDENCE FOR SPILLOVER TO HUMANS

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Background and Objectives

Livestock-Associated Methicillin-Resistant Staphylococcus aureus (LA-MRSA) strains, particularly those from clonal complex (CC) 398, are prevalent in pigs and are rapidly emerging as significant threats to human health.

Material and Methods

In our 2019 study, dust samples were collected from 40 pig farms, along with nasal swabs from veterinarians and other workers associated with these farms (n = 27), to assess the presence and potential risks of this pathogen in Hungary. The collected MRSA isolates were subjected to whole-genome sequencing and antimicrobial susceptibility testing. We also included the genome sequences of 14 LA-MRSA isolates obtained from diseased humans in the same year.

Results

The results were alarming: 83% of the farms (33/40) tested MRSA-positive, and 70% of the swine professionals (19/27) were found to be carrying the bacteria. Nearly all MRSA strains, including those isolated from humans, were of the CC398 lineage. Genetic analyses, including core genome multilocus sequence typing (cgMLST) and single nucleotide polymorphism (SNP) analysis, identified clusters of closely related bacterial strains from both the environment and humans, suggesting recent transmission events within the farms and beyond. This is particularly concerning because more of the human clinical isolates were closely linked to strains found on farms.Worryingly, half of the MRSA isolates from swine farms showed decreased susceptibility to eight or more antimicrobials. Both human and animal strains carried multidrug-resistance genes, including the cfr gene, which is associated with resistance to critical antibiotics.

Discussion and Conclusion

This significant rise in LA-MRSA prevalence within Hungary's swine industry—from just 2% in 2008 according to the European Food Safety Authority—underscores the growing public health risk posed by this pathogen. As the bacteria continues to spread in both asymptomatic carriers and is isolated from symptomatic human cases, the findings highlight an urgent need to reassess the potential dangers LA-MRSA poses to human health, especially considering its widespread antimicrobial resistance.

VPH-PP-12

A NOVEL BETA-GLUCAN BASED PRODUCT: WHAT'S IN IT FOR THE SOW

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Background and Objectives

AletaTM is a unique beta-glucan product derived from algae (Euglena gracilis) and provides a consistent response in situations of disease and stress and helps to maintain animal performance under intensive farming conditions. Previous in vitro and in vivo mouse studies have demonstrated that when the beta-glucan is unwound, its immunomodulating potency could be increased by up to 10 times. Up till now, data in sows for this novel "unwound" approach were not available. In the current trial, the efficacy of the immune stimulating product "Aleta" (i.e. Euglena gracilis) has been tested against the efficacy of a "novel product" (i.e. unwounded beta-glucan) in a trial in gestating and lactating sows over 6 weeks.

Material and Methods

In total, 32 sows were included in this trial. Briefly, sows were randomly assigned to four treatment groups with 8 replicates per treatment. Sows were fed with the product for 3 weeks before and after farrowing in which: T1=Control; T2=1g/hd/day Aleta; T3=4g/hd/day novel product (aim=same beta-glucan level in T2 and T3); T4=1g/hd/day novel product.

Results

Main take-aways are: 1/ There is a significant increased number of alive and healthy piglets per sow in the highest application dosage of the novel product ($P<0.01$). 2/ There is no effect of the different beta-glucan treatments on the average weight of the piglets per sow ($P>0.05$). 3/ There is higher total weight of the piglets from sows supplemented with the highest dosage of the novel product ($P=0.01$).

Discussion and Conclusion

The fact that the novel product resulted in more healthy piglets per sow and higher total piglet weight is very valuable and can be most probably correlated to enhanced immune function. As such, it seems that animals supplemented with the novel product cope better with stress, disease, and vaccination. Extra microbiome and blood analyses are ongoing to corroborate the latter.

VPH-PP-14

RECENT DATA ON SLAUGHTER LUNG LESIONS FROM FINISHER PIGS IN GERMANY AND AUSTRIA USING THE CEVA LUNG PROGRAM

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Background and Objectives

The evaluation of lungs in pigs at the abattoir offers the possibility to find possible causes of respiratory diseases. Additionally, management practices, housing conditions and climate, varying within or between countries could affect pigs' respiratory health. Present work offers an overview of lung lesion comparison valuable for farmers and practitioners.

Material and Methods

In total, 45,811 lungs were submitted for evaluation using standardized methodology (Ceva Lung Program), all together belonging to 225 different farms and four regions: Austria (A) (n=1,055), Eastern Germany (EG) (n=25,934), North-Western Germany (NWG) (n=17,496) and Southern Germany (SG) (n=1,333). The data were collected from 2022 to 2023 and were analysed on batch level.

Results

Median (range) prevalence of bronchopneumonia (BP) in general was 59% and significantly higher in NWG (62%; 0-100%) compared to EG (59%; 0-100%) and SG (47%; 9-89%) and AT (23%; 8-74%) (Statistics pending). The percentage of affected lung surface in pneumonic lungs was higher in AT (8%; 1-25%) compared to SG (7%; 0.6-11%) and NWG (4%; 1-10%) and EG (3%; 0-12%) (Statistics pending). In total, 30% of the lungs had dorso-caudal pleurisy (DP). EG had higher values (42%; 0-91%) than all other regions: SG (13%; 0-73%), NWG (11%; 0-85%) and AT (9%; 0-50%) (statistics pending).

Discussion and Conclusion

Under the conditions of the present study, NWG presented higher values of bronchopneumonic lesions and EG higher prevalence of DP. The present results are in line with the previous work, however in contrary to data published before in which bronchopneumonic lesions were most present in Austria and DP in NWG. These discrepancies might be explained by general shift in lung lesions due to adopted control measures or the number of farms evaluated per region.

VPH-PP-15

EXTRAORDINARY AVERAGE DAILY GAIN IN HIGH HEALTH, HIGH WELFARE FINISHER PIGS –A FIELD STUDY

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Background and Objectives

Sweden is one of two countries reporting an average daily gain (ADG) from birth to slaughter exceeding 700g/day (Interpig 2023), probably due to a high health and strong animal-welfare legislation. The dominating genetics used are Topigs Norsvin in sows, inseminated with Duroc or domestic Hampshire. This study aimed to investigate the ADG and feed conversion rate (FCR) in a high health, high animal welfare, organic pig herd.

Material and Methods

The farm bred gilts during winter, farrowing occurred in the spring, and after weaning at six weeks of age sows were slaughtered, whereas finishers were raised on pasture with ad lib feeding of commercial organic finisher feed. New gilts were recruited from the finishers, two-three litters for recruitment being alternating cross-breeds between Landrace and Yorkshire, while the rest were sired by Hampshire.
Age, slaughter weights, and total amount of purchased feed were collected for the years 2020-2022. The birth weight was estimated to 2 kg. Feed consumed from 45 days of age until slaughter were calculated and slaughter-to-live weight conversion was standardized to 1.34.

Results

On average 98.6 (87-108) pigs were slaughtered/year with an average slaughter weight of 130.1 (109.4-165.6) kg and an average age of 167.7 (122-244) days.
ADG for 2020, 2021 and 2022 was 1107g, 1036g and 950g, respectively.
FCR for 2020, 2021 and 2022 was 37.3, 35.9 and 42.4 MJ NE/kg BW, respectively.
More results coming.

Discussion and Conclusion

The latest pig genetics, a good health and welfare, combined with ad libitum access to feed and grazing, provide opportunities for optimal growth, thus showing the potential for improvement in the production. Further, no adverse effects such as locomotor disturbances were noted. The lower ADG for 2022 might be explained by a different feed without soy, a warm and dry summer causing heat stress, also reducing the possibilities for rooting and grazing.

VVD-PP-01

ERADICATION OF VIRULENT STRAIN OF PRRSV PROGRAM WITH MODIFIED LIVE VIRUS (MLV) VACCINE IN COMBINATION WITH AN INTEGRAL METHOD

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Background and Objectives

Porcine Reproductive and Respiratory Syndrome virus (PRRSv) causes severe illness and becomes an economically devastating disease of pigs. Highly pathogenic PRRSv (HP-PRRSv) was first described in China in 2006, and new variants continue to emerge. The Spanish pig industry has been affected by a virulent variant named Rosalia since 2020. This strain causes clinical disease and death in all ages, including adult pigs and pregnant sows, leading some producers to launch eradication programs. The objective of this study was to eradicate PRRS on a breeding commercial farm

Material and Methods

Eradication was performed on a new 2800-sow breeding farm (site 1). This farm was first populated (June 2023) with SPF sows (Rhinitis, scabies, Actinobacillus pleuropneumoniae, Mycoplasma hyopneumoniae, PRRSv, Brachyspira hyodysenteriae). PRRSv outbreak occurred in September 2023 (Day 0 virus detected by PCR, cq 24). At Day 1, all animals were intradermally vaccinated and revaccinated at 4 weeks (Porcilis® PRRS) using IDAL. Before herd closure, all replacement gilts needed were introduced. Strict internal biosecurity measures were implemented. Tongues of dead piglets were weekly tested by PCR

Results

During the outbreak, sow mortality, abortion rate and conception rate were 3.9% (111 sows), 8.4% (131 abortions) and 62%, respectively. First negative piglets were born in January 2024. At day 168, all suckling piglets tested negative (February 2024) and no viremic piglets were weaned. PRRS-free sows introduced in July 2024 (Day 300) and remained negative after herd opening

Discussion and Conclusion

Following this protocol, eradication was successful. Implementing herd closure and strict internal biosecurity, together with needle-free intradermal vaccination were main pillars in virus elimination. Avoidance of new virus entries, minimizing virus iatrogenic transmission and persistence, and providing clinical protection against HP-PRRSv and herd immunity by vaccination were key actions that should be present in any eradication program

VVD-PP-02

PRRS QPCR TEST DEVELOPMENT: THE IMPORTANCE OF STRAIN COVERAGE AND LOWER LIMIT OF DETECTION (LLOD)

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Background and Objectives

Due to the high PRRSv-mutation-rate, straincoverage of a qPCR-test is important to avoid false negative results. Secondly, the LLOD of a qPCR-test describes the lowest number of pathogen-copies that can reliably be detected. This is important to confirm the status and assessing the pool-size to still reliably detect a pathogen. The recently developed vetproof®PRRS-qPCR-kit uses an optimized design approach, covering multiple ORFs in the PRRSv-genome to reliably detect all known PRRSv variants and differentiates Type1-,Type2-,and Type2HP-strains, including an MS2 phage extraction control to verify test results.

Material and Methods

1.PRRSv-strain coverage was checked by testing a diverse group of Type1,Type2,Type2-HP strains and proficiency testing panels with hard to detect strains.Additionally,>1400 sequences were checked in silico to further assess the expected diagnostic sensitivity. 2.The LLOD analytical sensitivity study was done via multiple serial dilutions of each target, ranging at 5,10,25,50,100,1000,10^4,10^5and10^6 copies/reaction in various sample-matrixes extracted with the vetproof®MagBead-Extraction-Kit . 3.The possible pool size was determined and tested knowing the LLOD,the minimal load of a serum-sample/ml,the volume used for extraction and the volume used for the test.

Results

1.Full straincoverage for all the tested targets was confirmed.Based on the in silico analysis,a very high straincoverage is likely,which indicate a 100% diagnostic sensitivity. 2.The new PRRSv-qPCR reliably achieves 10 copies/reaction for all the 3 targets in serum,semen,blood and oral fluids. 3.Serum-samples containing a minimal amount of 10^4 copies can theoretically be pooled ≥ 10 samples with this LLOD with a perfect extraction.

Discussion and Conclusion

This new PRRS-qPCR demonstrates full strain-coverage, maintained by robust design and regular checks. The LLOD allows pooling of a high number of serum-samples, but it’s advised to stick to 5-10 samples since extraction methods are not always perfect in the field.

VVD-PP-03

DEVELOPMENT OF AN AUTOMATED PIXEL CLASSIFIER FOR PCV2 GENOME LABELLING IN FORMALIN FIXED TISSUES USING IN SITU HYBRIDIZATION

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Background and Objectives

Porcine circovirus 2 (PCV2) quantification in lymphoid tissues is paramount for diagnostic purposes. Traditionally, PCV2 presence in lymphoid tissues has been assessed semi-quantitatively (0-3 scoring), a subjective method. This study aimed to develop an automated pixel classifier for detecting PCV2 genome detected by in situ hybridisation (ISH) and to correlate findings with qPCR data on the same tissue.

Material and Methods

Tracheobronchial lymph nodes (TBLN) were collected both freshly (for PCV2 qPCR) and in formalin (for ISH analyses) from 44 piglets three weeks post-PCV2-inoculation. TBLN sections underwent ISH using RNAscope technology to detect PCV2 genome. Its presence was scored visually from 0 (no staining) to 3 (widespread genome distribution). Slides were digitalized and PCV2 labelling was quantified with QuPath software using a developed pixel classifier to measure the labelled area percentage. Both classifications were compared with the viral load obtained in TBLN through qPCR. Results were analysed with Graphad and statistical significance was set as $p<0.05$.

Results

The percentage of labelled area showed a very high and statistically significant correlation (0.97) with the visual semi-quantitative score. The following correspondence between percentage of labelled area (quantified digitally) and the visual score was established: ≤0.0025% (score 0), 0.0026-1.0% (score 1), 1.01-5.0% (score 2) and >5.0% (score 3). Both visual and digitally analysed classifications showed a high statistically significant correlation (0.88 and 0.87, respectively) with the PCV2 load quantification in TBLN tissues, being 4.32 ± 0.8 $\log_{10}$ PCV-2 DNA copies (score 0), 7.17 ± 1.6 (score 1), 9.53 ± 1.0 (score 2) and 10.32 ± 1.0 (score 3).

Discussion and Conclusion

This study demonstrated that the new pixel classifier for PCV2 genome labelling provided a highly precise and automated approach to evaluate and quantify PCV2 presence in tissues. Furthermore, it validates the subjective optical microscopy assessment.

VVD-PP-04

EFFICACY OF FATTY ACID ESTERS TO MITIGATE THE INFECTIVITY OF PRRS VIRUS ON PORCINE ALVEOLAR MACROPHAGES

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Background and Objectives

Porcine Reproductive and Respiratory Syndrome (PRRS) is a major viral disease affecting pig farms and causing significant economic losses. The high rate of natural mutation of PRRS virus (PRRSv) limits vaccinal efficiency, thus limiting prophylaxis effectiveness. In order to evaluate the potential effect of specific bioactives on resistance to infection, the impact of a combination of fatty acids esters (FAE) against PRRSv type 1, subtype 3 Lena strain was studied.

Material and Methods

Firstly, cultured Porcine Alveolar Macrophages (PAM) were incubated with gradual doses of FAE (0, 0.03%, 0.06%, 0.12%, 0.24%). MTT method, using a colorimetric indicator to assess the reduction of tetrazolium salt by mitochondrial enzymes, was used to determine the cell viability and thus the cytotoxicity of FAE on PAM. Then, a PRRSv stock of 10^{5}-$10^{6.8}$ 50% Tissue Culture Infectious Dose ($TCID_{50}$/ml) was incubated with FAE at gradual doses for 60 minutes at 37°C. The number of infectious particles remaining in the PRRSv/FAE mixture was later determined using daily microscopic inspection of cytopathic effects on PAM.

Results

FAE showed a dose-dependent behavior concerning cytotoxicity on PAM and their integrity after infection with PRRSv. At a concentration of 0.24%, they affected PAM viability. At lower concentrations however, they significantly reduced the number of infectious PRRSv versus the negative control, from 5.5 to 4.4 $\log_{10}$ $TCID_{50}$/ml for 0.06% FAE ($P<0.05$) and from 5.5 to 0.65 $\log_{10}$ $TCID_{50}$/ml for 0.12% FAE ($P<0.001$), this last viral titer being below the detection limit.

Discussion and Conclusion

Based on these results, FAE seem to have a significant potential to mitigate the infectivity of PRRSv on PAM, reducing the number of infectious particles before infection. Considering the observed cytotoxicity at the highest dosage tested, further research remains to be undertaken prior evaluating potential application on PRRS management via pig nutrition.

VVD-PP-05

EVALUATION OF TESTICULAR-ONLY PROCESSING FLUID FOR DETECTING PRRSV GENETIC MATERIAL AND THE EFFECTS OF SAMPLE POOLING

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Background and Objectives

The goal of this study was to assess the effectiveness of using testicular-only processing fluid (TPF) to detect the porcine reproductive and respiratory syndrome virus (PRRSV) and to evaluate how pooling TPF samples affects the accuracy of a commercial PCR kit in classifying the samples correctly.

Material and Methods

A total of 348 paired serum samples from male piglets and TPF, along with 341 serum samples from gilts, were tested using a real-time PCR kit. The samples were classified as low-positive, moderate-positive, and high-positive based on Ct ranges (≥36, 30.01-35.99, and ≤30, respectively). Three positive samples were selected from each range and diluted to create pools containing 1 positive and 9, 19, 39, 79, 159, and 319 negative samples.

Results

The viral RNA was detected in 21.26% (74/348) of male sera, 15.23% (53/348) of TPF, and 17.00% (58/341) of gilt sera. Using the ROC-calculated cut-off (RC) (<43.96), 14.37% (50/348) of the TPF samples were positive. No significant differences in the percentage of positive samples between male sera, TPF, and gilt sera were found using the manufacturer`s cut-off (MC) and RC. The specificity, positive predictive value, and Kappa for TPF improved after using the RC. The sensitivity stayed the same. In TPF pools, RNA was detected in 11.11% (2/18) of low-positive samples, regardless of the cut-off. In moderate-positive samples, 72.22% (13/18) were positive using the MC, and 12/18 (66.66%) using the RC. All high-positive samples were classified correctly (100%; 18/18), regardless of the cut-off.

Discussion and Conclusion

The use of TPF can be valuable for PRRS diagnosing and monitoring. Pooled sample results may not accurately reflect the true PRRSV status of the herd. Detection of PRRSV in TPF should be interpreted with caution, mainly due to the occurrence of negative results in individuals with high Ct in serum. A study financed by UMO-2020/37/N/NZ7/00084.

VVD-PP-06

VACCINATION AGAINST ROTAVIRUS A IMPACTS THE DETECTION RATES OF ROTAVIRUS B AND C IN CASES OF NEONATAL DIARRHEA

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Background and Objectives

Rotavirus A (RVA) is the most prevalent and important rotavirus species in pig production, causing neonatal diarrhea. Other rotavirus species identified in pigs are rotavirus B, C, and H (RVB, RVC, and RVH). This study examines rotavirus infection rates in piglets on six farms with a history of recurrent neonatal diarrhea.

Material and Methods

The samples were obtained from six sow herds (S1-S6) within the same production system. Sows from S1 and S2 farms have been vaccinated against rotavirus A with an autogenous vaccine for more than three years, while those from S3, S4, S5, and S6 were not. Fecal samples were taken from diarrheic piglets aged up to 7 days, from 1-5 pens per group. Ileum content samples were obtained from deceased piglets, aged up to 3 weeks, showing signs of dehydration. Eight to sixty-one piglets were sampled per herd. The samples were screened for RVA, RVB, RVC, and RVH using real-time RT-PCR assays.

Results

In the vaccinated herds (S1 and S2), the percentage of positive samples for RVA, RVB, and RVC was 2.7%, 1.4%, and 78.1%, respectively. In the unvaccinated herds, a lower percentage of samples (56.8%) tested positive for RVC, while the percentage of positive samples for RVA (8.1%) and RVB (28.4%) was higher. RVH was not found in any of the tested samples.

Discussion and Conclusion

The results showed an increase in the detection rates of RVC, accompanied by a decrease in the detection rates of RVA and RVB, in piglets from farms vaccinated against RVA. This study highlights the importance of other RV species, in addition to RVA, in the etiology of neonatal diarrhea. Further studies are needed to assess the prevalence of rotavirus infections in Poland and comprehend their significance as a factor, or a co-factor, of neonatal diarrhea.

VVD-PP-07

SWINE INFLUENZA A SUBTYPING RESULTS IN 11 EUROPEAN COUNTRIES FROM JANUARY 2020 TO SEPTEMBER 2024

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Background and Objectives

Swine influenza A virus (swIAV) impacts pig health in all stages of production. Influenza viruses circulating on farms can change and subtypes can vary within the regions. The aim of this investigation is to give an overview of passive Influenza surveillance in 11 European countries over the past five years.

Material and Methods

This report summarizes Influenza subtyping results of the years 2020 to 2023 and 2024 (Q1-Q3) on farm level in UK, DE, ES, PT, BE, NL, IT, FR, PL, HU and DK. Nasal swabs, oral fluids, bronchoalveolar lavage or lung tissue were either taken in cases of acute influenza-like symptoms or in cases of unclear, persistent respiratory or reproductive disorders. Samples were analyzed for Influenza A by real-time PCR. Subtyping of samples with a ct-value <30 was done by multiplex real-time PCR.

Results

Overall, it was possible to identify subtypes in 3491 swIAV samplings. In the whole period, most farms were positive for H1avN2 (29.6%) followed by H1avN1 (27.5%). The percentage of farms testing positive for H1pdmN1 increased from 10.9% in 2020 to 13.6% in 2024. H1huN2 could be detected in 11.8% and H1pdmN2 in 10.0% of the cases. The lowest detection rates were H1huN1 (2.8%), H3N2 (2.8%) and H3N1 (0.6%). A huge difference between countries could be seen. In DK no H1hu subtypes could be detected, whereas the two pandemic subtypes and H1avN2 played the dominant role. In contrast, in the UK H1huN2 and H1pdmN1 were most detected. H3N2 was only found in Spain, Portugal and Poland.

Discussion and Conclusion

The frequencies of swIAV subtypes all over Europe have slightly changed from 2020 to 2024. There are huge differences regarding the proportion of subtypes within different European countries. Knowing which strains are circulating on farms and in which stages of production, is important to be able to implement the right vaccination regime.

VVD-PP-08

PRRSV TRANSMISSION BETWEEN FARMS

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Background and Objectives

A national reduction strategy for Porcine Reproductive and Respiratory Syndrome (PRRS) was launched in Denmark in May 2022. This has increased the focus on the transmission of PRRSV between pig farms. The objective of the current study was to use register data to identify causes and risk factors for new PRRSV infections.

Material and Methods

We performed a register-based retrospective case-control study, using data from the SPF- and CHR-registers during 1 January – 31 December 2023. Specifically, data about geographical location, number of sows/weaners/slaughter pigs, movements and PRRSV-serological tests where used. Case-farms were defined as farms which changed their PRRS-status from negative to positive, while control-farms remained PRRS-negative.

Results

A total of 155 cases and 2,001 controls were included in the study. All observations due to direct inward movement of PRRS-positive pigs were excluded (n=66) before a logistic regression analysis was performed to quantify additional risk factors for becoming PRRS-positive. Two significant risk factors were found: PRRS-positive neighbors ($p<0.001$) and purchase from suppliers which became PRRS-positive up to 90 days ($p<0.001$) after the case farm. The latter may indicate purchase of newly infected non-diagnosed pigs. In total, 56 observations (45 cases and 11 controls) received pigs from a supplier becoming positive. This means that among all cases, 40.2% (62/155) could be explained by a deliberate inward movement of PRRS-positive pigs, 29.0% (45/155) were most likely due to inward movement of infected non-diagnosed pigs and the remaining 31.0% (48/155) cases of unknown character.

Discussion and Conclusion

Results from the present study points towards the direct movement of PRRS positive pigs as the main driver of PRRSV transmission between pig farms in Denmark, while local spread seem to impact transmission in a smaller scale. This is likely influenced by the testing frequency, as most farms are tested annually.

VVD-PP-09

PRRS AREA ERADICATION OF THE DANISH ISLAND BORNHOLM

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Background and Objectives

In spring 2022 pig producers, from the island Bornholm located in the Baltic Sea, decided to initiate an eradication program to get rid of PRRS from all pig herds on the island. This report describes measures and methods used to achieve the goal of the PRRS eradication program on Bornholm.

Material and Methods

Bornholm covers an area of 588 km^2 and has approximately 100 pig herds evenly distributed across the island. All pigs are born and slaughtered on the island with a yearly production of half a million heads. An advisor with in-depth knowledge of local conditions was appointed eradication program leader. The island was then divided into four eradication zones with approximately 25 herds per zone. A veterinary coordinator was appointed for each zone. All herds were tested by blood samples for the presence of PRRS antibodies to map the PRRS-positive herds on the island. Quarterly meetings were arranged to ensure good communication between the parties involved.

Results

At the start 42% of all herds were PRRSV seropositive, with 17 of 26 sow herds being seropositive for PRRSV. In the following two years all 17 sow herds completed PRRS virus elimination with seven sow herds doing total de-pop/re-pop and 10 sow herds doing partial eradication. All PRRS positive grower/finisher herds were in the same period emptied and loaded again with PRRSV negative pigs. In fall 2024 all herds on the island were retested for PRRS antibodies by blood samples. The results showed no positive samples meaning a total elimination of PRRSV from the pig herds on Bornholm.

Discussion and Conclusion

This report shows it is possible to eradicate PRRSV from an area with high density of positive pig herds, when the producers stand together and decide to do area eradication in collaboration with skilled veterinarians and advisors.

VVD-PP-10

ASSESSMENT OF SWINE DEEP TRACHEAL SECRETIONS FOR DETECTION AND ISOLATION OF PRRSV

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Background and Objectives

Although there are numerous sensitive sample types for detection and isolation of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) from swine, many require post-mortem collection. Deep tracheal secretions are a sample type that is used to detect other respiratory pathogens, such as Mycoplasma hyopneumoniae. The objective of this study was to evaluate the feasibility of detecting and isolating PRRSV from ante-mortem deep tracheal secretions.

Material and Methods

One hundred sixty PRRSV negative gilts were placed into a continuous flow gilt development unit at 10-weeks of age, where they were naturally exposed to PRRSV. Tracheal secretions were collected from 60 gilts using sixteen-inch red rubber catheters at two collection events, 14 days post-placement (dpp) and 28 dpp. Gilts were selected for sampling based on convenience and evenly distributed among the pens. A species-specific real-time PCR was performed to detect PRRSV, plus virus isolation and genomic sequencing was completed on the tracheal secretion sample with the lowest Ct value at each of the two collection events.

Results

Deep tracheal secretions were 98% (59/60) positive for PRRSV PCR at 14 dpp with a mean Ct value of 22.12 (range: 14.15-35.95), while 100% (60/60) were positive at 28 dpp with a mean Ct value of 24.46 (range: 18.02-30.3). Viral isolation and genomic sequencing were obtained from both deep tracheal secretions in which isolation was attempted.

Discussion and Conclusion

In this proof-of-concept study, PRRSV was detected by PCR and isolated from swine deep tracheal secretions collected ante-mortem. This method provides a sampling option for PRRSV detection and isolation that may be used in conjunction with M. hyopneumoniae diagnostics for application in dual PRRSV and M. hyopneumoniae control and elimination programs. Further evaluation is needed to understand diagnostic sensitivity of the sample type over the course of infection and to compare deep tracheal secretions to other sample types such as serum.

VVD-PP-11

EVALUATION OF A BLEND OF PHYTOCHEMICALS AND CARBOXYLIC ACID ON COMPLETE FEED WHEN INOCULATED WITH PORCINE EPIDEMIC DIARRHEA VIRUS, PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS, AND SENECA VALLEY VIRUS 1

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Background and Objectives

Feed Sanitizers have been found to decrease virus concentrations in swine feed. The objective was to evaluate different inclusion levels of a synergistic blend of phytochemicals and carboxylic acid (Finio, Anitox Corp.) when applied, pre- or post-inoculation at either 1.75 or 2.75 kg/MT, to complete feed contaminated with porcine epidemic diarrhea virus (PEDV), porcine reproductive and respiratory syndrome virus (PRRSV) and Seneca Valley virus 1 (SVV1).

Material and Methods

The sanitizer was applied to the pre-inoculation samples at their respective inclusion levels and 50 µL of each virus were added to the post-inoculation samples. All bottles were incubated at room temperature for 24 hours. Half of the samples were immediately processed (0 h) and the other half were incubated at room temperature for an additional 24 hours. Samples were processed and aliquots were analyzed via a triplex RT-PCR at Kansas State University Veterinary Diagnostic Laboratory. Cycle threshold and proportion of PCR positive were analyzed using SAS GLIMMIX v 9.4 (SAS, Inc., Cary, NC) with each virus analyzed individually.

Results

An application time × inclusion level interaction was observed for PRRSV at 0 h, where less RNA was detected ($P < 0.05$) in the post-inoculation samples at either 1.75 or 2.75 kg/MT as compared to the pre-inoculation or control samples. For other viruses at 0 h, the post-inoculation samples had less detectable PEDV or SVV1 RNA ($P < 0.05$) than the pre-inoculation samples. As time continued (24 h), both pre- and post-inoculation samples had less detectable PEDV RNA ($P < 0.05$) than the controls in feed.

Discussion and Conclusion

Inclusion of Finio at either inclusion level decreased the quantity of detectable PEDV and PRRSV RNA at 24 h ($P < 0.05$), but no differences were observed between the 1.75 and 2.75 kg/MT inclusion samples ($P > 0.05$). The sanitizer reduced viral concentrations in feed.

VVD-PP-12

SWINE INFLUENZA A VIRUS INFECTION DYNAMICS AND EVOLUTION IN INTENSIVE PIG PRODUCTION SYSTEMS

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Background and Objectives

Swine influenza A virus is one of the main viral pathogens responsible for respiratory disease in farmed pigs. Whilst outbreaks are often epidemic in nature, increasing reports suggest that continuous, endemic infection of herds is now common. The move towards larger herd sizes and increased intensification in the commercial pig industry may promote endemic infection, however, the impact that intensification has on swine influenza A virus infection dynamics and evolution is unclear.

Material and Methods

We carried out a longitudinal surveillance study over 18 months on two intensive, indoor, multi-site pig production flows. Frequent sampling of all production stages using individual and group sampling methods was performed, followed by virological and immunological testing and whole genome sequencing.

Results

We identified weaned pigs between 4-12 weeks old as the main reservoir of swine influenza A virus in the production flows, with continuous, year-round infection. A single virus subtype was maintained on each farm for the entire duration of the study.

Discussion and Conclusion

Despite the continuous nature of viral circulation, infection levels were not uniform, with increasing exposure at the herd level associated with reduced viral prevalence followed by subsequent rebound infection. Viral evolution was characterised by long periods of stasis punctuated by periods of rapid change coinciding with increasing exposure within the herd. An accumulation of mutations in the surface glycoproteins consistent with antigenic drift was observed, in addition to amino acid substitutions in the internal gene products as well as reassortment exchange of internal gene segments from newly introduced strains. These data demonstrate that long-term, continuous infection of herds with a single subtype is possible and document the evolutionary mechanisms utilised to achieve this.

VVD-PP-13

INFLUENZA A VIROLOGICAL ACTIVE SURVEILLANCE IN DANISH FREE RANGE ORGANIC PIGS REVEALS DETECTION IN SEVEN OF 25 SOW HERDS

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Background and Objectives

Swine Influenza A virus (IAV) is endemic circulating among pigs in almost all Danish pig herds. Free range organic pigs are held in a different setting than conventional pigs which could influence the circulation of IAV among these pigs. Additionally, exposure to the outdoor environment poses a risk for exposure to Avian Influenza Virus (AIV). A cross-sectional active screening in Danish free-range sow herds was conducted, investigating the presence of IAVs and identifying potential AIV spillovers.

Material and Methods

Twenty-five free range herds in Denmark with >10 sows were offered to have nasal swabs collected by the local veterinarian from ten pigs of each of three different age groups. Samples were tested for IAV in pools of five using a pan-IAV, RT-qPCR test. Samples from positive pools were tested individually and subjected to whole genome sequencing (WGS). Veterinarians were asked to include registrations of clinical signs and vaccination procedure.

Results

Offspring from 8.347 sows were included in the screening. Seven of the 25 herd-submissions had positive IAV-pools. Five IAV-positive herds reported clinical signs, and seven IAV-negative herds reported clinical signs. WGS was performed on sixteen individual IAV-positive samples from seven different herds. In total, twelve full genomes were successfully obtained and in two cases only a few segments were obtained. In the last two cases, IAV subtypes were determined by multiplex RT-qPCR. The subtypes detected included H1avN2sw, H1pdmN1av, H1pdmN2sw, H1avNx and HxN2sw. AIV was not detected in any of the tested samples.

Discussion and Conclusion

Test of offspring from approximately half of the Danish free range organic sows revealed that almost 1/3 of the herds were positive for IAV. The prevalence of IAV in conventional pigs has not been tested in a similar scheme, but unpublished comparable data indicates lower level of IAV circulation in free-range herds compared to conventional herds.

VVD-PP-14

EVALUATION OF ORAL FLUIDS FOR THE DETECTION AND SUBTYPING OF PPV1 IN GERMAN FATTENING FARMS – PREVALENCE DATA FROM A RANDOMIZED FIELD STUDY

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Background and Objectives

Oral fluids display easy gainable material for pathogen detection. Only less information is available concerning the suitability of OFs for nucleic acid detection and further subtyping of porcine parvovirus 1. In the present examination we used OFs to conduct a randomized prevalence study for PPV1 and corresponding subtypes in German fattening pigs.

Material and Methods

619 OFs from 92 fattening farms, randomly selected based on the fattening farm density of each federal state, were collected. For each farm up to two OFs pools were prepared (n total: 164). Subsequently qPCR was conducted. PPV1 positive pools from each farm with a Cq-value <35 were selected for sequencing of the VP2 of PPV1. Assignment to PPV1 subtypes was done as described by Vereecke et al. 2022.

Results

In total 43.5% (40/92) of the farms and 38.4% (63/164) of the pooled OFs were PPV1 DNA positive. For 28 of the 40 PPV1 positive farms (70%) subtypes could be generated. One Farm was PPV1a, 26 farms PPV1b positive. One PPV1 strain of one farm was phylogenetically not definitely assignable and was proposed as PPV1b/d positive.

Discussion and Conclusion

PPV1 DNA detection in OFs was successful and enabled a PPV1 prevalence estimation and subtyping of PPV1 in German fattening farms. PPV1b was the most often detected PPV1 subtype. After its first description in Germany 2006 PPV1b has become the most prevalent subtype at least in the growing pig population.

VVD-PP-15

EVALUATION OF A NEW RT-PCR FOR DETECTION AND DIFFERENTIATION OF PRRSV-1 AND PRRSV-2 USING FIELD SAMPLES SUBMITTED FOR ROUTINE DIAGNOSTIC TESTING IN SPAIN

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) is an economically important disease of pigs. The agents, PRRSV-1 and PRRSV-2, are highly diverse viruses that evolve rapidly in the field as a result of mutation and recombination events. This may result in the emergence of new strains with clinical relevance like Rosalia strain in Spain. In addition, new sample types for PRRSV PCR detection such as tongue tips or tonsil-oral scrubbings have been recently described. This study summarizes the evaluation of a new RT-PCR for detection of PRRSV-1 and PRRSV-2 using field samples from Spanish farms.

Material and Methods

A total of 101 samples received at the diagnostic laboratory (GSP, Lleida, Spain) for routine PRRSV PCR testing were used. A variety of sample types were selected, including serum (n=65), tongue tips (n=18), lung tissue (n=7), tonsil-oral scrubbings (n=6), oral fluids (n=3), fetus (n=1) and processing fluids (n=1). Samples were extracted using the same kit and tested using RealPCR PRRSV-1/PRRSV-2 Multiplex RNA Test (PCR-A, IDEXX) and the RT-PCR test (PCR-B) currently in use for routine diagnostic testing at the laboratory. The same PCR instrument was used, and Ct values obtained were compared.

Results

The comparison of Ct values showed a high correlation (R2=0.981) between PCR tests across sample types. Test results were in agreement for 95 samples tested. Five serum and one tongue tips samples showed PRRSV-1 positive results with PCR-A, but were negative with PCR-B (Ct values ≥ 35). Ct values were compared for both PCR tests, a difference of ± 1 Ct value was shown for most samples.

Discussion and Conclusion

This study showed excellent agreement of a new RT-PCR for detection of PRRSV-1 and PRRSV-2 in comparison to another PCR test, showing that PCR-A can be used for routine testing of PRRSV samples from Spanish pig farms.

VVD-PP-16

EVALUATION OF THE USEFULNESS OF TESTICULAR-ONLY PROCESSING FLUID TO THE DETECTION OF THE GENETIC MATERIAL OF PCV2 AND THE CONSEQUENCES OF SAMPLE POOLING

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Background and Objectives

The study aimed to evaluate the utility of testicular-only processing fluid (TPF) in detecting the genetic material of PCV2 and assessing the impact of pooling PF samples on the ability of a commercial PCR kit to classify the sample correctly.

Material and Methods

A total of 361 paired serum samples from male piglets and TPF, along with 342 gilt sera were tested with a commercial real-time RT-PCR kit. The samples were classified as low-positive, moderate-positive, and high-positive based on Ct ranges (≥36, 30.01-35.99, and ≤30, respectively). Two positive samples were selected from each range and diluted to create pools containing 1 positive and 9, 19, 39, 79, 159, and 319 negative samples.

Results

In 13.02% (47/361) of the male sera, 16.09% (61/361) of the TPF, and 10.32% (32/342) of gilt sera PCV2 was detected. A significant difference was found between gilt sera and TPF ($p<0.05$). Using the ROC-calculated cut-off (RC) (Ct<36.50), 12.47% (45/361) of the TPF were classified as positive for PCV2, and no significant differences in the percentage of positive samples between boar and gilt sera and TPF were found ($p=0.267$). In the TPF pools, PCV2-DNA was not detected in low-positive samples. In moderate-positive samples, 33% (4/12) and 0% (0/12) of diluted samples were correctly classified using the manufacturer`s cut-off (MC) and RC, respectively. The viral DNA was detected in all dilutions (100%; 12/12) when the MC was used in high-positive samples. After applying the RC, 83.33% (10/12) of the dilutions were classified correctly.

Discussion and Conclusion

The use of TPF may serve as a noninvasive, cost-effective tool for monitoring the presence of PCV2 in the herd. Results from pooled samples may not accurately reflect the true PCV2 status of the herd. Interpretation results of PCV2 DNA detection in TPF should be done with caution. A study financed by UMO-2020/37/N/NZ7/00084.

VVD-PP-17

DETECTION RATE FOR SINGLE PRRSV POSITIVE PIGLETS BY PCR TESTING ON PROCESSING FLUIDS

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Background and Objectives

When eradicating PRRSV, it is crucial to monitor the presence of PRRSV. PCR testing of processing fluid (PF) is a simple and frequently used method that allows testing of many animals, but with low prevalence of PRRSV, false-negative results can appear. Studies from the US show that a single PRRS-positive male piglet is detected in PF from 40 aggregated litters, but the Danish procedure for collecting PF is different (freeze-thaw) and testicles from Danish piglets contains remains of injectable analgetics injected in the testicles before castration. Hence, the Danish detection rate might be lower.

Material and Methods

PCR was performed on PF obtained by thawing tail or testicles from one individual PRRS-positive pigs together with testicles and tails from 20 PRRS-negative litters. Tails and testicles from PRRS-negative piglets were collected in a herd with known PRRS-negative status and distributed in bags of 20 litters, frozen, and sent to Livestock Diagnostic Laboratory, Kjellerup, Denmark. PRRS-positive piglets were selected from a panel of individually frozen tails and testicle pairs collected in PRRS-positive herds. The PRRSV positive status of the individual pigs was confirmed by PCR on blood samples.

Results

PCR results on 20 PRRS-negative litters combined with material from one PRRS-positive pig showed that only one out of five PCR tests yielded a positive test result with strongly positive tails. Out of 35 aggregated samples of PF with one set of positive testicles, 10 portions (29%) were PCR-positive for PRRSV.

Discussion and Conclusion

The study confirms that tails are not suitable material for detecting PRRSV, and that the detection rate of single positive male pigs in PF is lower compared to previous studies. Therefore, it is recommended to aggregate fewer than 20 litters for PF towards the end of the eradication process, and PF collection should always be followed by a period of testing weaned pigs.

VVD-PP-18

PRRSV-1 MLV VACCINE STRAINS DETECTION BY QPCR ON PIGLETS' SERUM SAMPLES PRIOR TO WEANING FOLLOWING SOW MASS VACCINATION: A DESCRIPTIVE STUDY.

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Background and Objectives

The purpose of this study was to describe the detection of PRRSV-1 MLV vaccine strains by qPCR in blood samples from piglets prior to weaning, following mass vaccination of sows with one of the three MLV vaccines available on the French market at the time of the study: DV strain, VP-046 Bis strain or 94881 strain.

Material and Methods

For each vaccine, five farms, PRRSV-positive stable with vaccination according to AASV classification, were enrolled (15 farms in total). A questionnaire with mainly semi-closed questions was developed to assess potential risk factors previously mentioned in the literature for the shedding of PRRSV strains on a production site. The questionnaire was filled out during a one hour in-person interview with the farmer. After a sow mass vaccination, blood samples were collected from one due-to-wean piglet per litter with a maximum of 30 piglets per batch on the four consecutive batches weaned. Blood samples were analysed pooled by five by PCR.

Results

All batches but one returned negative results. This farm, which used VP-046 Bis MLV vaccine strain, showed positive results in two out of six pools five weeks after the mass vaccination of sows. ORF5 and ORF7 sequencing indicated that the strain isolated from clinical samples was closely related to the VP-046 Bis strain (99.7% similarity for both ORFs). At this farm, some characteristics that may explain a prolonged circulation of the vaccine strain have been identified: a delay of more than 7 days between the first vaccinated sows and the last ones and late cross-fostering (>14 days of age).

Discussion and Conclusion

This study confirms that circulation of the PRRSV-1 MLV vaccine strains is possible after vaccination. That's why the prudent use of MLV vaccines remains essential, as the recombination between PRRS viruses (wild and/or vaccine strains) has already been reported.

VVD-PP-19

ASSESSING RISKS OF VIRAL CONTAMINATION ASSOCIATED WITH USING RECYCLED WATER IN SLAUGHTERHOUSES TO WASH PIG TRANSPORT LORRIES

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Background and Objectives

Given environmental and financial challenges, slaughterhouses are having to use recycled water to clean animal transport lorries. Although the water is treated, could it be a source of viral contaminants for the pigs transported later? The aim of this study was to assess the presence of certain viral contaminants in recycled water from slaughterhouses, and then to assess the infectivity of any viruses detected in an in vivo assay.

Material and Methods

Recycled water was sampled three times per day on four dates at five slaughterhouses located in Brittany (France). Genome of predefined viral contaminants (HEV, Porcine Circovirus (PCV) and PRRS virus) was detected by PCR. New samples were collected from one of the slaughterhouse with viral PCR positive results. A volume of concentrated or unconcentrated water was then administered oronasally to two groups of three SPF pigs. The animals were followed for six weeks during which biologicals samples were collected weekly and at the time of necropsy. Virological (PCR) and serological (ELISA) analysis were performed on the collected samples to assess a possible viral infection.

Results

The PCR results on the recycled water showed very frequent detection of the PCV 2 genome (74%) and occasional detection of the HEV (24%) and PCV3 (18%) genomes. The clinical data and various virological and serological analyses revealed no evidence of viral contamination of the pigs that received the recycled water.

Discussion and Conclusion

This study showed that the genome of certain viruses can be detected in the recycled water of slaughterhouses used to wash lorries, but that this water does not appear to contain infectious viral particles that could contaminate pigs during transport.

VVD-PP-20

CASE REPORT OF A SEVERE PORCINE PARVO VIRUS OUTBREAK IN PPV1 VACCINATED GILTS

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Background and Objectives

New subtypes of Porcine parvovirus (PPV1b) have emerged in Europe, becoming predominant. This report describes a clinical case where a Parvovirus outbreak caused a high number of mummified fetuses in a group of gilts.

Material and Methods

On a 500-head sow farm in the Netherlands, using a 4-week batch farrowing system, gilts were introduced before insemination as part of a PRRS and APP eradication plan. At the sourcing farm, the gilts were vaccinated once against Parvovirus (014 PPV1-based vaccine). Several gilts fell ill during gestation (fever, inappetence), and some died. At farrowing, the number of mummified fetuses spiked, averaging 1 mummy/litter compared to the baseline of 0.4 mummies/litter. Live-born piglets were less vital, with a 15% reduction in live born piglets.

Results

Diagnostics on mummified fetuses were negative for leptospirosis and PRRS (liver) but highly positive for PPV (peritoneal liquid and spleen) with CT-values of 17.62 and 9.38, respectively. Heart tissue was weakly positive for PCV2 (10^5 viral copies). Nanopore sequencing identified the Parvo strain as PPV1b, a 27a-like strain. Postmortem examination of one gilt revealed a ruptured uterine blood vessel.

Discussion and Conclusion

Parvovirus has evolved into more virulent strains, causing outbreaks in seemingly vaccinated animals. Apart from the increase in mummies and drop in live born piglets, the severe PPV1 infection likely contributed to the gilts' illness, as other pathogens were not detected. Inflammation of the uterus and blood vessels has been previously described in PPV1-infected seronegative gilts. Vaccination compliance and timing are important for prevention, though they appeared adequate at the source farm. A PPV 27a-based vaccine was subsequently implemented, and no further outbreaks occurred, with normal performance in succeeding groups.

VVD-PP-21

MONITORING OF EXCRETION OF ROTAVIRUS TYPE A FOLLOWING IMPLEMENTATION OF A SOW VACCINATION IN A FARROW-TO-FINISH FARM

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Background and Objectives

Rotavirus type A (RVA) is a major causative agent of neonatal diarrhoea. Vaccination can help improve technical results and decrease antimicrobial use. This study aims to monitor RVA excretion following implementation of a routine sow vaccination, in the short and medium term.

Material and Methods

The study took place in a 600-sow-farrow-to-finish farm weekly managed. RVA has been detected regularly since 2020 by PCR in diseased piglets, in association with evocative microscopic lesions. Thirty to 50% of litters were treated with antimicrobials in each batch. Early 2023 (“P0”) initial monitoring of one batch revealed 95% of PCR–positive faecal samples from 345 five-day-old piglets (age at clinical outbreak, all the piglets of the batch). Vaccination against RVA has then been administered in sows 6 and 3 weeks before farrowing. RVA excretion has been monitored in the short (“P1”) and medium (“P2”) term (respectively 4 and 18 months after P0): faecal samples were collected from 63 (P1) and 45 (P2) 5-day-old piglets (3 piglets per litter) using RT-PCR. Faecal consistency (FC) and general health (GH) were scored from 0 (normal) to 3 (altered). Fisher test was used to compare the rate of excreting piglets and the rate of piglets with FC score of 3. Wilcoxon text was used to study distribution of FC scores.

Results

RVA excretion rate is significantly higher at P1 (93.6%) than at P2 (0%). GH score is 0 in all piglets whatever the period. Mean FC score is 0.92 at P1 [SD=1.29] and 0.71 at P2 [SD=0.92]. The rate of piglets with FC score of 3 is significantly lower at P2 compared to P1 (4.4% vs 25.4%).

Discussion and Conclusion

Vaccination against RVA rapidly helped improve clinical situation and decrease viral excretion, thus playing an important part in controlling the infection dynamics of this pathogen in farrowing units in the medium term.

VVD-PP-22

UPDATE ON THE PREVALENCE OF MAJOR PCV2-GENOTYPES IN GERMAN FATTENING FARMS

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Background and Objectives

Within the species PCV2, eight different genotypes can be distinguished (PCV2a-h). PCV2a, PCV2b and PCV2d are called “major genotypes” due to their relevance for porcine circovirus diseases and their prevalence. Of these, PCV2d is assumed to be the most prevalent one. Within the present study we examined the prevalence of the PCV2 major genotypes in German fattening farms 2024 by oral fluid sampling.

Material and Methods

87 fattening farms were randomly enrolled in the present study. OFs were collected in the 18th week of life (+/-1) as already described elsewhere (approximately 100 pigs per farm; 20 pigs / rope). Pools (n=164) up to five ropes per farms were screened by q-PCR for PCV2 DNA. Positive pools were examined by genotype specific q-PCR. In case of low viral loads, pools were “examined individually and genotyping was made from the most positive single OF.

Results

In total 32.2% (28/87) of all farms were PCV2 positive. We were able to assign a PCV2 genotype to 20/28 farms that were identified as PCV2 positive. 8.0% (7/87) farms were PCV2a positive, 3.4% (3/87) were PCV2a+PCV2d positive and 11.5% (10/87) of farms were PCV2d positive. Within the genotyped farms, 35.0% (7/20) were PCV2a positive, 15.0% (3/20) were PCV2a and PCV2d positive and 50.0% (10/20) were PCV2d positive. A total of 43 pools (26.2%) were PCV2 DNA positive. No significant differences were obvious concerning the Cq-values of the different PCV2 genotypes by ANOVA.

Discussion and Conclusion

PCV2d was the most prevalent PCV2 genotype in randomly collected OFs in 2024. PCV2a is still circulating in the pig population. PCV2b was not detected in any of the samples. The ongoing PCV2 genotype-shift seems to be PCV2b towards PCV2d and does not affect PCV2a the same way. Viral loads did not differ between PCV2 genotypes in OFs.

VVD-PP-23

PORCINE RESPIROVIRUS TYPE 1 (PRV1) INFECTION CAUSES PATHOLOGICAL CHANGES AND IS TRANSMITTED TO CONTACT PIGS

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Background and Objectives

During the last decade, screening samples from animals with sensitive metagenomics tools has led to the identification of a range of pathogens with unknown clinical importance. Detection of porcine respirovirus type 1 (PRV1) in pigs represents one example, but the relevance of this virus remains to be fully elucidated. The aim of this study was to investigate the infection dynamic and pathogenesis in pigs experimentally inoculated with PRV1.

Material and Methods

Eight conventional pigs were inoculated with a cell culture-grown PRV1, four naïve pigs were installed as direct contact recipients, and four pigs were included as mock-inoculated controls). The eight pigs were inoculated intranasal with PRV-1 on 0 days post-inoculation (DPI). At 4 DPI, two controls and four PRV1 pigs were euthanized and necropsied, and four naïve pigs were then introduced to the pen with the remaining PRV1-infected pigs. At 14 DPI the remaining pigs (n=10) were euthanized and necropsied. Lungs were examined for gross pathology and tissue was obtained from six different parts of the respiratory tract and examined for microscopic changes. Nasal swab samples were collected throughout the study to test for PRV1.

Results

Nasal swab samples revealed shedding of PRV1 from 2 to 11 DPI of the inoculated pigs, with the highest viral load observed between 4 and 7 DPI, and successful transmission of PRV1 was observed in all recipients. The highest viral titer was observed in the upper respiratory tract, i.e. nose, upper and lower trachea. Microscopic examination showed mild tracheitis at 4 DPI and moderate tracheitis with epithelial degeneration at 14 DPI. Two pigs developed mild, bronchointerstitial pneumonia at 14 DPI. No clinical signs were observed.

Discussion and Conclusion

The study demonstrated that PRV1 caused lesions in pigs including degeneration of the epithelial cells mainly in the upper respiratory tract. Therefore, PRV1 should be regarded as a primary pathogen that can contribute to the Porcine Respiratory Disease Complex.

VVD-PP-24

HOW LIKELY IS IT TO DETECT A NEW INCURSION OF PRRS IN A PRRS-FREE REGION, WITHIN THE FIRST MONTH?

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Background and Objectives

In Denmark, a national reduction strategy of PRRS was launched in May 2022. Now, the first regions are approaching a PRRS-free status. The objective of the present study was to quantify the early detection sensitivity (EDSSe) of the current PRRS surveillance system in three specific regions approaching a PRRS-free status.

Material and Methods

The current PRRS surveillance consists of two components: A notifiable surveillance (monthly in all farms) and an active antibody surveillance (monthly in multiplier/breeding farms and yearly in production farms). The EDSSe was calculated as a product of the average herd sensitivity, the population coverage and the temporal coverage, for each of the surveillance components accounting for overlap. Information on farm demographics was extracted from the SPF- and CHR-registers on 10 April 2024.

Results

The three regions included a total of 972 farms (36 multiplier/breeding farms and 936 production farms), with a PRRS-prevalence ranging from 2.5% – 18.8%. Under the assumption of the three regions having obtained a PRRS-free status, results from the present study estimated the current surveillance to detect between 17.9 % [16.2 %;19.9 %]$_{CI95\%}$ – 23.0 % [21.2 %;24.9 %]$_{CI95\%}$ of new PRRS-incursions within the first month. The range and CI95% estimates represent the region with the lowest and highest EDSSe, respectively. If the active surveillance was increased in frequency to monthly sampling in all farms, the probability could be increased to 87.6 % [86.9 %;88.3 %]$_{CI95\%}$ – 87.9 % [87.1 %;88.5 %]$_{CI95\%}$.

Discussion and Conclusion

In Denmark, three regions are approaching a PRRS-free status. Hence, the question has arisen, as how the surveillance should be performed to identify new incursions of PRRS virus in PRRS-free regions as early as possible. The current surveillance is expected to detect around one fifth of newly infected regions within the first month after incursion of PRRS. This sensitivity could be increased by more frequent testing, potentially in a risk-based manner.

VVD-PP-25

AFRICAN SWINE FEVER VIRUS DETECTION IN ENVIRONMENT AND INSECTS DURING AN OUTBREAK IN SERBIA

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Background and Objectives

African swine fever (ASF) is a highly contagious viral disease of domestic pigs and wild boar (Sus scrofa) caused by an arbovirus- African swine fever virus (ASFV), which is classified into the family Asfarviridae. ASFV was detected for the first time in Serbia in 2019 peaking in activity during 2023. While the primary route of ASFV transmission is direct contact between animals and/or carcasses, the role of other transmission pathways, such as environmental contamination or insects, remains largely unclear.

Material and Methods

During an epidemic of ASF in Serbia in 2023 (July to August), environmental samples (soil, feed, water and swabs from the pig barns), and adult and/or larval stages of non-biting flies (Diptera: Calliphoridae and Muscidae) were collected in four locations in South Banat district of Serbia. To assess the possibility that insects carry the ASFV in infected courtyards, sticky fly traps and open Petri dishes containing meat mixed with humid cotton wads were offered in three locations during the five days of the experiment in the Belgrade area. Collected insects were identified using a morphological identification key. Environmental samples underwent nucleid acid extraction and ASFV DNA was detected using a qPCR.

Results

The results from the environmental samples showed no positive ASFV DNA detection, the same was true for the samples from meat-based traps and sticky fly traps, while ASFV DNA was detected in three samples containing eggs, L1 and L3 fly larvae collected from carcasses and adult flies (L. sericata).

Discussion and Conclusion

The results implicate the possible role of Lucilia sp. flies in the mechanical transmission of ASFV in Serbia during an outbreak, while ASFV DNA was not detected in environmental samples in this study.

VVD-PP-26

THE PREVALENCE OF ROTAVIRUS INFECTIONS IN 34 POLISH PIG HERDS

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Background and Objectives

Rotaviruses are known to cause diarrhea in various species, including pigs. Although they have zoonotic potential, there is limited data on their prevalence in Poland.

Material and Methods

Between 2012 and 2024, 227 pools of fecal samples and rectal swabs from 34 pig herds have been collected, representing animals of different ages. Each fecal sample and rectal swab was taken from a pool of up to five animals in a selected pen. Additionally 193 samples of ileal content were obtained from deceased piglets aged up to 4 weeks. We screened these samples for rotavirus A (RVA), rotavirus B (RVB), rotavirus C (RVC), and rotavirus H (RVH) using real-time RT-PCR assays.

Results

Our findings revealed differences in the prevalence of rotavirus species depending on the age of the animals. Among 226 tested samples from piglets up to one week of age, we found positive RVA, RVB, and RVC reactions at rates of 11.5%, 10.2%, and 61.9%, respectively. In 60 samples from suckling piglets older than one week, the positive rates for RVA, RVB, and RVC were 20%, 1.7%, and 11.7%, respectively. In 140 samples from weaned piglets older than four weeks, the positive rates were 8.6% for RVA, 15.7% for RVB, 22.9% for RVC, and 12.9% for RVH. Out of the 426 samples, 45 (10.6%) tested positive for more than one rotavirus species.

Discussion and Conclusion

Understanding the variations in the occurrence of rotavirus species across different age groups may help improve the control of diarrhea in suckling piglets.

VVD-PP-27

TRACKING OF PRRSV OUTBREAK BY SEQUENCING

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Background and Objectives

The Danish national program to reduce the prevalence of Porcine reproductive and respiratory syndrome virus (PRRSV) in pig herds is based on a regional strategy, assuming that PRRSV-positive herds pose a risk to nearby herds. However, when a negative herd becomes infected with PRRSV, it can be challenging to identify the exact source of the infection. The study aimed at describing a recent transmission chain in an almost negative region in Denmark, where sequencing was used to identify the probable source of infection.

Material and Methods

Four sow herds (herd 1-4) were included. The herds were located centrally in the Island Sealand (7000 m^2), where only two sow herds (including herd 1) had a positive status for PRRSV1 before the outbreak. Herds 2-4 tested positive for PRRSV1 for the first time during the summer of 2024, beginning with herd 2. Herd 2 and 3 had same owner and were placed 7 and 2 km away from herd 1, respectively. Herd 4 was placed less than 1 km from herd 1 and 3. The PRRSV1-positive sow herd not included in the study was placed 44-45 km from the case herds. For herd 1, 2 and 3, partial ORF2 and ORF5 sequencing (Sanger sequencing) was performed. No sequence was obtained from Herd 4.

Results

Phylogenetic analysis of the sequences from herd 1, 2 and 3 showed that all three clustered closely together and a close sequence identity was observed for both partial ORF 2 (684 nt) and ORF 5 (606 nt) ranging from 99.27-99.27% and 99.17-99.5% respectively.

Discussion and Conclusion

Phylogenetic analysis of partial ORF2 and ORF5 for the PRRSV1-positive sow herd (herd 1) in the region indicated that herd 1 was the source of infection of herd 2 and 3. However, subsequent transmission between herd 2 and 3 is also highly plausible, as they share owner.

VVD-PP-28

EVOLUTION OVER TIME OF THE DIVERGENCE OF PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PPRSV) WITH COMMERCIAL MODIFIED LIVE VIRUS VACCINES (MLV)

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Background and Objectives

PRRSv vaccination efficacy is partly dependent on the similarity between MLVs and the field strains. The objective of this study was to assess PRRSv field strains' Open Reading Frame 5 (ORF) average estimate of evolutionary divergence), referred to as the 'divergence, from four commercial MLVs.

Material and Methods

ORF5 sequences of PRRSv were used to assess divergence. Sequences of 251 different PRRSv type 1 European field isolates obtained by PCR amplification of the ORF5 region followed by SANGER sequencing (Pathosense, Belgium). Four vaccine ORF5 sequences (vaccines A, B, C, and D) were sourced from GenBank. ORF5 sequences were aligned using CLUSTALW (MEGA software V11). Sequences were analyzed in temporally separated groups; 1991-2000, 2000-2010, 2010-2020, and 2020-2023. Differences were considered statistically significant when $p<0.05$.

Results

An increase in the divergence between field isolates and vaccine strains suggests less similarity. Conversely, a reduction in the divergence suggests the strains in the field are becoming more like the vaccine strains.Vaccine B, initially the only commercially available vaccine divergence with field strains was 0.0747 from 1991 to 2000; 0.102 from 2000 to 2010, 0.118 between 2010 and 2020. Between 2010 and 2020, vaccines A, C and D appeared in the market with divergence values of 0.140, 0.132 and 0.114, respectively.From 2020 to 2023, divergence increased for all the MLVs, except for vaccine C, which was reduced from 0.132 to 0.131. Conversely, vaccines A, B, and D's divergence values increased to 0.147, 0.137, and 0.129, respectively.

Discussion and Conclusion

This study shows field strains' divergence with three out of four MLVs increased over time. Vaccine C divergence decreased, indicating persistence of the vaccine strain on the farm and/or recombination events with field isolates.With increasing divergence, commercial vaccine protection may be lower than the when the vaccine was originally made available. These results highlight the need to evaluate traditional vaccination protocols and consider alternative solutions such as autogenous vaccines.

VVD-PP-29

PRRS ERADICATION STRATEGIES OF SOW HERDS USED BY DANISH PRACTITIONERS

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Background and Objectives

The Danish national reduction plan for Porcine Reproductive and Respiratory Syndrome (PRRS) was launched in Denmark in May 2022. The plan aims to reduce PRRS through regional efforts, focusing on the eradication of PRRS in selected areas. Achieving PRRS negative sow herds is the first step towards creating negative regions, as it is essential to wean enough PRRS negative weaners before PRRS eradication of growing pig herds can follow. The primary objective of this study was to investigate the considerations made by practitioners before and during a PRRS eradication process of a sow herd.

Material and Methods

The study involved a survey conducted among 24 swine veterinarians (participation rate 86%) who had advised on PRRS eradication of sow herds from January 2023 to March 2024. All veterinarians were interviewed by telephone through a structured questionnaire dealing with considerations to account for before and during a PRRS eradication, as well as methods applied for monitoring PRRS.

Results

The survey revealed that veterinarians largely followed current Danish recommendations for PRRS eradication, with adjustments tailored to individual herds. The most common considerations before starting an eradication program included the geographical location of the herd, previous PRRS infection routes, and whether to perform partial eradication or total de-pop/re-pop. The Load-Close-Homogenize (LCH) method was predominantly recommended for partial eradication, with most veterinarians advising the use of live modified vaccines. All veterinarians used McRebel guidelines for infection control, and the majority recommended emptying nursery barns in integrated herds during partial eradication.

Discussion and Conclusion

This study conclude that veterinarians' recommendations align with current Danish guidelines for partial eradication of sow herds. However, eradication programs are always adapted to the specific herd due to significant variations in herd structure. According to the interviewed veterinarians, the most frequently cited reason for failed PRRS eradication was non-compliance with infection control measures.

VVD-PP-30

SWINE INFLUENZA A VIRUS HA-CLADES DETECTED ON 132 FARMS IN 16 EUROPEAN COUNTRIES AND THEIR LINK TO CLINICAL SIGNS AND COURSE OF DISEASE

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Background and Objectives

Public health concerns and negative impact of swine flu on herd health and performance require as well in-depth disease surveillances better knowledge on sequences and disease data. So far there is very little information on a possible link between identified swIAV sequences, the course of disease and the clinical signs of affected pigs.

Material and Methods

A cross-sectional sampling was conducted in 16 different European countries on farms with either clear, acute clinical signs (epidemic farm) or farms suspected of endemic swIAV circulation. Samples were analyzed for Influenza A by real-time PCR and sequenced using Next Generation Sequencing (NGS) when Ct-value was below 30. The MinION sequencing platform from Oxford Nanopore Technologies (ONT) was used. Additionally, information about the farm, clinical signs of the sampled animals and herd management practices were recorded via a questionnaire.

Results

Between October 2022 and September 2023, 132 farms were examined, and 182 swIAV-sequences generated. For 92 farms detected swIAVs could be assigned to a HA-clade and linked to clinical signs of sampled animals. When affected by swIAVs belonging to 1B-clades (H1hu) a higher proportion of pigs expressed severe clinical signs, than when affected by 1A.3.3.2 clade (H1pdm). Additionally, results suggest that swIAVs belonging to certain clades (ex. 1B1.1) tend to lead to an epidemic course of the disease while others (ex. 1A 3.3) are more linked to an endemic form.

Discussion and Conclusion

This investigation aimed to collect deeper insight into the link of swIAV sequencing and the clinical outcome on farms. This is an important step in better understanding the dynamics of different swIAV (sub)types and the need of broad diagnosis on farm. SwIAVs with a tendency of endemic circulation and expression of less severe clinical signs might need a higher sample size to be detected and different control measures.

VVD-PP-31

GENETIC DIVERSITY OF GROUP A ROTAVIRUSES IN FRANCE – AN OVERVIEW

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Background and Objectives

Group A porcine rotaviruses (RVA) are part of the most important pathogenic agents in neonatal diarrhoeas. A dual typing system GxP[x] is usually applied in reference to the genotype of structural proteins VP7 and VP4. This study aims to provide an overview of the genotypes combinations circulating in France in 2021-2024.

Material and Methods

43 RVA PCR-positive samples collected from diseased-piglets in their first week of life between 2021 and 2024 were selected for this study. 26 samples from 26 farms were genotyped at Lab1 (Labocea – Ploufragan, France) using nanopore sequencing method. 17 samples from 11 farms were genotyped at Lab2 (CNR – Dijon, France) using G and P RT-PCR typing (ABI ProFlex) according to Eurorotanet recommendations.

Results

The VP7 identified genotypes at Lab1 are: G9 (10), G5 (4), G4 (4), G3 (2) and G11 (2). The VP4 genotypes identified at Lab1 are: P[6] (1), P[7] (1), P[23] (3), P[19] (2), P[32] (18). The VP7 identified genotypes at Lab2 are: G9 (8), G1 (6), G3 (3), 3 genotypes could not be determined. The VP4 genotypes identified at Lab2 are: P[6] (12), P[4] (6), 2 genotypes could not be determined. According to Lab2 results, coinfections have been identified in 6 samples (4 farms). G9 and P[32] are the dominant genotypes, and the G9P[32] combination is the most common (10 farms), followed by G5P[32] and G9P[6] (4 farms each).

Discussion and Conclusion

Genotyping of RVA strains implied in neonatal diarrhoea of piglets highlighted their great genetic diversity. G9P[32] revealed to be the dominant strain. This study is the first to provide data on RVA epidemiology in French pig farms.

VVD-PP-32

PCV2 PREVALENCE AND GENOTYPE DIVERSITY IN GROW-FINISH PIGS IN CANADA

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Background and Objectives

An observational-prospective-epidemiology study was designed to measure PCV2 prevalence in processing-fluids and potential correlation with downstream virus prevalence and to identify PCV2-genotypes circulating and assess the virus genetic diversity at different production stages.

Material and Methods

Fifteen farms were enrolled with two consecutive cohorts each (N=30). Using longitudinal sampling, 1 processing fluids sample from all piglets was collected at 3-5 days of age (N=30) and 5 pens from the same cohort of pigs was sampled (serums, oral fluids) using fixed spatial sampling method in late-nursery and in mid-finisher. All pooled serum (N=317) and oral fluid samples (N=267) were tested for PCV2(2a/2b/2d/2e) qPCR. Positive samples were ORF2 sequenced to obtain 1 sequence per production phase for each farm (N=38). Epitope Content Analysis was done on sequences using EpiVax computational tool.

Results

53% of processing fluids were positive for PCV2. The odds of a cohort having one or more pooled serum samples testing PCV2 positive PCV2 in nursery were 10 times higher (p=0.04) when the processing fluids was positive. The genotypes identified in descending order of frequency: 2a, 2d, 2e and 2b. Interestingly, 30% of cohorts showed PCV2 co-infections with different genotypes throughout downstream flow, 44% of co-infections were genotypes 2a & 2d. EpiCC scores revealed that Fostera® Gold/Circomax Myco (PCV2ab based vaccine) epitope coverage average was 82% compared to 68%, 72% and 68% in vaccine A, Vaccine B and Vaccine C respectively.

Discussion and Conclusion

PCV2 status using processing fluids may serve as predictive factor for downstream prevalence in the nursery and as potential measure to help define/monitoring breeding herd PCV2 stability. Different PCV2 genotypes were detected in growing pigs and the genotype identified at processing wasn't necessarily predictive of the one(s) identified downstream indicating the need of including PCV2 as part of the surveillance plan in all growing-pigs phases.

VVD-PP-33

EVALUATION OF ATTENUATION OF SERIALLY PASSAGED ASFV IN SUSCEPTIBLE CELL LINES

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Background and Objectives

African swine fever virus (ASFV) genotype II has rapidly disseminated worldwide, particularly affecting regions in East Asia such as China, Vietnam, and South Korea. This virus exhibits high virulence in domestic pigs, leading to a mortality rate of 100%. Presently, there is no commercially available vaccine with proven safety, underscoring the critical need for the development of an effective and safe vaccine. In this study, we sought to develop a novel attenuated vaccine strain by serially passaging the Korean isolate, Paju strain, in ASFV-susceptible cell lines, specifically K-C4 and LFBK cells.

Material and Methods

The K-C4 cell line, a virus-susceptible clone derived from COS-1 cells through susceptibility screening, and the LFBK cell line, obtained from the USDA, were utilized. The Korean ASFV isolate was serially passaged in these cell types, followed by next-generation sequencing (NGS) analysis and animal experiments.

Results

Out of 30 cell clones derived from COS-1 cells, the K-C4 clone was selected for its superior viral replication efficiency. The Paju strain of ASFV was successfully and continuously propagated in both K-C4 and LFBK cells. At a low passage number (passage 17), the virus retained its virulence; however, attenuation was observed after 30 passages. Next-generation sequencing (NGS) analysis revealed genetic deletions, primarily in the LVR region.

Discussion and Conclusion

Both K-C4 and LFBK cell lines have demonstrated the ability to replicate ASFV, suggesting their potential utility in the production of attenuated ASFV strains. Continuous viral passage has been shown to reduce virulence, with numerous INDEL mutations identified in various genes. Crucially, further research is required to determine which specific gene INDELs contribute to the attenuation of the virus.

VVD-PP-34

CHOICE OF SAMPLE MATERIAL, LABORATORY AND SHIPMENT PRACTICE CAN AFFECT OUTCOME OF PRRSV TESTING AND LEAD TO RISKY FLOW MANAGEMENT DECISIONS

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Background and Objectives

Gilt management and vertical transmission control are crucial for PRRSV elimination thus testing must be reliable. Shipment and choice of laboratory might affect the result. The objective of this study was to investigate if choice of laboratory and shipment of samples affects the outcome of processing- (PF) and oral-fluid (OF) PRRSV PCR results.

Material and Methods

A sow herd undergoing elimination and the 12-week AI/AO quarantine for replacement gilts were included. PF from 4 week-batches of castrated piglets were tested at three different labs (LabA, LabB, LabC). Gilts were vaccinated at entrance and three weeks later with a MLV PRRSV2-vaccine. Four pens of gilts vaccinated either 3 (-3) or 4 and 7 (-4&7) weeks before sampling were included. One OF rope/pen were used. Samples were split into six and sent to three labs either uncooled and standard conditions (SS) or cooled with ice and express shipment (ES). OF samples were tested pen-wise respectively pooled/room. Five gilts/pen, chewing the rope, were bled. Samples were pooled pen-wise and sent to LabA as reference.

Results

All labs detected PRRSV from PF week 9; no lab in week 11. LabB failed PPRSV week 8, LabA week 10. No difference between shipment methods. Blood were negative from the -4&7 gilt-group. 3/4 were PCR positive from the -3 gilt-group. OF results were overall in line for LabA and LabC independent of shipment method. LabB had fewer positive OF than the other 2 labs and even less with SS shipment.

Discussion and Conclusion

The three labs were mostly aligned on OF, so PCR results should be trusted. No PRRSV in blood samples from -4&7 gilts, hence OF could be the choice when sampling for important decisions, i.e. moving shedding gilts/pigs. The study showed a notable difference between laboratory ability to detect PRRSV by PCR.

VVD-PP-35

FIRST IDENTIFICATION OF SWINE INFLUENZA A VIRUS CLADES IN SIX AUSTRIAN PIG HERDS IN 2024

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Background and Objectives

Swine influenza viruses (swIAV) are a common cause of respiratory disease in pigs, leading to production losses and posing zoonotic risk. Despite the burden associated with swIAV, surveillance in Europe, including Austria, is limited and fragmented. This study aims to identify and characterize swIAV in Austrian pig farms to raise awareness of the need for better surveillance and control. Notably, this is the first study to report the identification and sequence analysis of swIAV in Austrian pig farms.

Material and Methods

Pooled nasal swabs were collected from healthy pigs, as well as from pigs with influenza-like symptoms and screened using RT-qPCR. Influenza A genomes were amplified by one-step RT-PCR, subjected to Illumina paired-end sequencing and processed with an in-house bioinformatics pipeline. Phylogenetic analysis of the hemagglutinin (HA) and neuraminidase (NA) gene segments was performed to genotype the swIAV variants.

Results

In 2024, nasal swabs were collected from 15 pig farms in Styria and Upper Austria, yielding a total of 58 samples for analysis. Among these, 11 samples from six different farms yielded high-quality swine influenza virus sequences. Two subtypes via phylogenetic analysis were identified: H1N1, HA clade 1C.2.2, was detected in 8 samples, while H1N2, HA Clade 1C.2.4 was found in 3 samples.

Discussion and Conclusion

This study represents the first surveillance effort to document the circulation of swIAV strains in Austrian pig farms, identifying Eurasian avian lineage 1C strains, specifically H1avN1 clade 1C.2.2 and H1avN2 clade 1C.2.4, in six farms across two federal states in 2024.

VVD-PP-36

A CROSS-SECTIONAL STUDY OF PORCINE INTESTINAL VIROME FOR THE DETECTION OF EMERGING VIRUSES IDENTIFIED MAMMALIAN ORTHOREOVIRUS AND NOVEL BOCAPARVOVIRUS

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Background and Objectives

Pigs are a potential amplifying host of zoonotic viruses where spillover events allow viruses to be transmitted through the animal and human interface. The porcine virome is important to study for the surveillance of emerging and re-emerging viruses. We applied viral metagenomics as a surveillance tool for investigating pig livestock intestinal virome.

Material and Methods

A longitudinal biobank of pig faecal samples were collated from age groups 8-week n=2, 12-week n=6, 20-week n=3 and 25-week n=7, and pigs submitted to AFBI with gastric clinical signs and pathologies (n=7). Next Generation Sequencing was performed by applying a de novo metagenomics approach. Data was QC, assembled in SPAdes and taxonomically assigned in DIAMOND/MEGAN. Whole genome sequences were aligned through Burrows–Wheeler Aligner and phylogenetics completed in MEGAX. The viral alpha diversity was calculated by multivariate statistical analysis using the R package VEGAN.

Results

The highest prevalence of eukaryotic virus family was Picobirnaviridae (70%), Parvoviridae (8.39%), Reoviridae (6.5%), Circoviridae (3.22%) and Astroviridae (2.7%). Picobirnaviridae had the highest prevalence in the 20-week-old group whereas the Parvoviridae, Reoviridae, and Adenoviridae had the highest prevalence in the clinically diseased group. The virome species richness and species diversity of each group revealed clinically diseased pigs with the highest Shannon alpha diversity sequentially from the 4 to the 20-weeks-old pigs. An emerging zoonotic mammalian orthoreovirus type-3 (MRV-3) was detected in 12-week-old pig samples and phylogenetically positioned within an interspecies subclade. Bocaparvovirus (BPV) had the highest prevalence in the clinically diseased group where two novel BPV samples were detected.

Discussion and Conclusion

Viral metagenomics is a powerful surveillance tool providing an insight into the virome to reveal emerging viruses such as BPV and MRV which may be important pathogens for pig production and concerning the ‘One Health’ aspect. The prevalence and burden of these viruses remains unknown warranting further epidemiological studies.

VVD-PP-37

LONGITUDINAL ANTIBODY AND VIREMIA DYNAMICS AGAINST PCV2 IN PIGLETS AT 2 AND 6 WEEKS OF AGE FROM SPANISH FARMS USING DIFFERENT VACCINATION PROGRAMS

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Background and Objectives

After several years of PCV2 vaccination, early infection frequency has apparently increased. An updated epidemiological assessment considering different vaccination programs would be desirable. This study investigated antibody levels and early infection frequency in piglets at 2 and 6 weeks from Spanish farms using different vaccination protocols.

Material and Methods

Twenty farms using different PCV2 vaccination protocols (only piglet [OP,n=4] ,gilt/piglet [GP,n=15] and sow/gilt/piglet [SGP,n=1]) were considered. Blood samples from 50 piglets/farm were taken at 2 and 6 weeks of age. Sera were analyzed for PCV2 IgG levels using ELISA and for detection and quantification of PCV2 genome using qPCR. Descriptive statistics were performed with GraphPad. The farm was considered the epidemiological unit. ELISA results (mean S/P values +/- standard deviation) were compared between OP and GP.

Results

At 2 weeks of age, OP, GP, and GSP mean S/P values were 0.372±0.173, 0.536 ±0.116 and 0.471±0.148, respectively. OP farms showed significantly lower mean S/P values than the ones practicing GP programs. At 6 weeks of age, OP, GP, and GSP mean S/P values were 0.303±0.066, 0.377±0.113, 0.252±0.124, respectively. PCV2 infection was only detected in 3 farms using the OP protocol, with 45/185 (24.32%) qPCR positive piglets at 6 weeks of age. The quantifiable viral load ranged from 1.44E+04 to 4.86E+09 copies/mL of sera.

Discussion and Conclusion

The present study got insights into the infection dynamics of early life piglets still having detectable maternally derived immunity. As an average, those farms displaying lower S/P ratios (OP program) at 2 weeks of age were the ones with evidence of PCV2 infection at nursery, suggesting the lower the antibody values during lactation, the higher likelihood of early infection. Apparently, sow and/or gilt vaccination favored lack of PCV2 infection in the nursery period.

VVD-PP-38

MYXOVIRUS RESISTANCE PROTEIN (MX1) IN PLASMA OF PIGS: A POTENTIAL TOOL FOR VIRAL DISEASE DETECTION

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Background and Objectives

Myxovirus resistance protein (Mx1) plays a role in the antiviral response induced in the infected host . However, it is not involved in the immune response against bacterial disease. For this reason, Mx1 is used to differentiate viral from bacterial infections in humans . The objective of this study was to quantify Mx in the plasma of pigs and to explore their changes in porcine respiratory and reproductive syndrome (PRRS).

Material and Methods

A time-resolved immunofluorometric assay was developed to quantify Mx1 in porcine plasma. The method was analytically validated by determining precision, accuracy, lower limit of quantification(LLQD) and detection limit(LD). In addition, Mx1 concentrations in 16 plasma samples of pigs with active infection by PRRSv was compared with 16 healthy pigs and in 15 pigs with bacterial infection due to Mycoplasma hyopneumoniae.

Results

The assay showed a precision lower than 15% and was linear after serial sample dilution (R= 0.97). The LLQD was 0.18 mg/L. The LD was set at 0.03 mg/L.Mx1 was not detected in the plasma of healthy pigs nor in any of the pigs with bacterial infection. The pigs with PRRS showed a median of 9.00 mg/L and a 25-75% percentile of 6.58-11.32 mg/L.

Discussion and Conclusion

This study indicated that Mx1 can be measured in the plasma of pigs with the developed method. In addition, healthy pigs and pigs with a bacterial infection such as Mycoplasma hyopneumoniae did not show detectable concentrations of Mx1, whereas PRRSv showed detectable values. Mx1 is a dynamin-like interferon-inducible GTPase that can increase more than 200-fold in the presence of a virus due to the effect of type I and type III interferons, which are activated by input of PRRSv. The measurement of Mx1 could be an assay with the potential to detect and rule-out the presence of viral infections in pigs

VVD-PP-39

DEVELOPMENT AND VALIDATION OF A NEW RT-PCR TEST FOR MULTIPLEX DETECTION OF PRRSV-1 AND PRRSV-2 IN EUROPE

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) is one of the most economically significant diseases affecting the swine industry worldwide. Effective PRRS management depend on the use of diagnostics, with ELISA and RT-PCR being the most common. This study reports on the development and validation of a new RT-PCR test for detection and differentiation of PRRSV-1 and PRRSV-2 strains circulating in Europe.

Material and Methods

The performance of a new RT-PCR test (RealPCR PRRSV-1/ PRRSV-2 Multiplex RNA Test) for detection of PRRSV-1 and PRRSV-2 was evaluated: exclusivity, inclusivity, limit of detection (LOD), diagnostic specificity and sensitivity, calculated as percentage of agreement with reference methods. For this study, 1,326 recent field samples and characterized samples were sourced from multiple European countries. Samples included swine serum, plasma, oral fluids, processing fluids, semen, tongue exudates, lung tissue, lung lavage samples, tracheo-bronchial swabs and abortion samples.

Results

In-silico analysis and experimental testing showed high inclusivity for PRRSV-1 and PRRSV-2 strains circulating in Europe and lack of cross-reactivity with other targets. The LOD was estimated at 10 copies per reaction for both targets. Using characterized negative samples, diagnostic specificity of 100% was shown. Diagnostic sensitivity for detection of PRRSV-1 and PRRSV-2 was calculated at 99.7% and 100%, respectively.

Discussion and Conclusion

This study showed excellent analytical and diagnostic performance of a new RT-PCR for multiplex detection of PRRSV-1 and PRRSV-2 strains circulating in Europe. During development, emphasis was given to detection of contemporary strains of PRRSV, including recently emerged strains such as Rosalia in Spain or Horsens in Denmark. A broad variety of commonly used sample types and new sample types, such us tongue exudates, were successfully validated. These results support the use of this new RT-PCR assay for routine PRRSV testing in veterinary diagnostic laboratories in Europe.

VVD-PP-40

DETECTION AND PRODUCTIVE IMPACT OF PRRS AND INFLUENZA VIRUSES CO-INFECTIONS IN SPANISH NURSERY UNITS

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Background and Objectives

Coinfections of Swine Influenza virus and other pathogens, such as the PRRS virus, have been on the increase in the last decade. The impact of this coinfection is variable and can increase the productive impact of both diseases. This study assessed the correlation and impact of positivity for both the PRRSV and SIV viruses.

Material and Methods

In 2024, 70 Spanish post-weaning units were sampled for PRRS and influenza at around 10 weeks of age for 3 consecutive months using oral fluids which were analysed for both viruses by RT- PCR. In 51 units, the productive impact of positivity for both viruses at the same time was analysed by % mortality in the nursery phase.

Results

31.4% of the nurseries (N=22) had coinfection with PRRS and influenza. 46% (N=32) were positive for the PRRS virus whilst 60% (N=42) were positive for influenza. By analysing the monoinfection scenarios, the nurseries with the highest mortality (> 9%) showed the highest viral load for influenza (Cts below 25 in 69% of the samples analysed). The association was not so marked for PRRS where in nurseries with mortality of >9%, the viral loads were high, but with Cts above 25 (88% of the samples analysed). The productive impact of coinfection showed that 81% of the nurseries with > 9% mortality were positive for IF and PRRS.

Discussion and Conclusion

With almost 1/3 of the nursery units coinfected with both viruses, the results highlight a relevant presence of PRRSV and SIV coinfections in nurseries. The productive impact of coinfection was very marked, showing the importance of tackling these two diseases together in order to minimise their impact.

VVD-PP-41

PREVALENCE OF PORCINE CIRCOVIRUS GENOTYPES IN SAMPLES FROM BRAZILIAN FARMS ANALYZED BETWEEN 2020 AND 2024

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Background and Objectives

Porcine circovirus continues to be widely distributed worldwide. This virus has a high evolutionary rate, with different variants expressing different biological and epidemiological behaviors. The objective of this study was to estimate the prevalence of PCV2 genotypes in commercial farms in Brazil.

Material and Methods

A total of 154 samples of fetus (41%), serum (36%), organ pool (8%), intestine (5%), lung (3%), heart (2%), other organs (6%) were analyzed at Cedisa – Animal Health Diagnostic Center, Brazil between 2020 and 2024. The samples came from 43 farms located in different regions of Brazil: Paraná (45%), São Paulo (31%), Rio Grande do Sul (29%), Santa Catarina (11%), Goiás (7%) and Mato Grosso (7%). DNA was extracted by the IndiMag Pathogen Kit (Indical Bioscience) and subjected to the PCV2 genotyping assay by the Kylt® PCV-2 Typing Kit (AniCon Labor GmbH) to differentiate between PCV2 genotypes.

Results

The results of the 154 samples analyzed showed that 45% belonged to PCV-2b, 45% to PCV-2d and 10% to PCV2-b and PCV2-d. In 2020, with 13% of the samples, 95% were PCV-2b and 5% were PCV-2d. In 2021 (41%), 37% represented PCV-2b, 56% PCV-2d and 6% PCV-2b+d. In 2022 (25%), 58% represented PCV-2b, 13% PCV-2d and 29% PCV-2b+d. In 2023 (10%), 6% represented PCV-2b and 94% PCV-2d. In 2024 (11%), 24% represented PCV-2b and 76% represented PCV2-d.

Discussion and Conclusion

The prevalence of PCV-2d has increased over the years, gaining importance in the epidemiology of the virus. Viral evolution exerted by natural immunity and acquired immunity may have favored mutations for a better binding capacity to the Cap protein receptors with the cellular receptor. Other studies corroborate these findings in Brazil and worldwide demonstrating the relevance of PCV-2d in swine farms around the world.

VVD-PP-42

ROUTINE SWIAV GENOTYPING IN A VETERINARY DIAGNOSTIC LABORATORY: A ONE-YEAR STUDY

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Background and Objectives

Swine influenza A viruses (swIAV) cause respiratory diseases in pigs and exhibit potential zoonotic risk. Efficient characterization of circulating strains and early detection of outbreaks is then a key point to control the disease dynamic. Veterinary diagnostic laboratories are good partners to identify swIAV in real time using whole genome sequencing (WGS). A 12-months routine follow up of circulating swIAV genotypes in the west of France is presented here.

Material and Methods

Field samples taken from farms facing flu-like syndrome were submitted for swIAV detection using M gene RT-qPCR. WGS was performed on samples with a Cq<30. An automated bioinformatical process specifically designed for swIAV genotyping allowed consensus design sequences that were then aligned with a specific database developed and curated by the National Reference Laboratory (NRL) to assign the genetic lineages of each of the eight genomic segments. Then, a phylogenetical analysis was conducted to confirm the viral subtype and genotype.

Results

On 28 samples (bronchotracheal mucus (60%), lung tissues (20%), nasal swab supernatants (17%), oral fluids (3%)) coming from 27 farms visited from October 2023 to October 2024, genotyping was successful. Depending of the farms, samples were taken on pigs in nursery (63.3%), reproductive animals (23.3%), suckling piglets (10%) or on fatteners (3.3%).The most prevalent genotype was $H1_{av}N2$#E (HA-clade 1C.2.4, N2-Gent lineage, Internal Genes (IG) clade EA-DK) (22/28), followed by $H1_{av}N1$#A (HA-clade 1C.2.1, N1-clade EA, IG-clade EA) (3/28),$H1_{av}N1$#C (HA-clade 1C.2.2, N1-clade EA, IG-clade EA) (2/28) and H1N1pdm#A (HA-clade 1A.3.3.2, N1-clade pdm09, IG-clade pdm09) (1/28).

Discussion and Conclusion

Four different swIAV genotypes were detected in French farms exhibiting respiratory troubles. Such an active collaboration between a field laboratory and the NRL contributed to enhance integrated surveillance.Since the involvement of field veterinarians is crucial for closely monitoring circulating strains, responsive results (<2 weeks) may act as a significant motivation factor.

VVD-PP-43

SWINE INFLUENZA A VIRUS TRANSMISSION IN THE FARROWING UNIT – MISSION IMPOSSIBLE?

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Background and Objectives

Intensification of swine production in large herds, has led to optimal conditions for virus circulation. Furthermore, increasing litter sizes enhance the use of nurse sows and cross fostering. The aim of this study was to investigate the effect of nurse sows and cross fostering on swine influenza A virus (swIAV) transmission in the farrowing unit.

Material and Methods

In each of three Danish herds, three batches of sows and piglets were included at farrowing and sampled with nasal swabs and udder wipes at day 10 and 21. All nurse sows introduced to the batches had an udder wipe taken at entry. All samples were tested by high-throughput microfluidic real-time PCR for respiratory pathogens including swIAV. Control litters were defined as sows only fostering own piglets or having received piglets within the first 24 hours. Case litters included litters with later cross-fostering and nurse sows. In total, 155 control and 203 case litters were included.

Results

Substantial transmission of swIAV was observed in eight of nine batches at both day 10 and day 21, with large variations between both batches and herds. However, no significant differences were observed in the prevalence of swIAV between case and control litters. Interestingly, 39 % of the sows included were defined at nurse sows from another section, and 25 % of these sows arrived with a swIAV positive udder.

Discussion and Conclusion

The result of this study illustrates the extensive circulation of swIAV in the farrowing units. Neither the introduction of swIAV positive nurse sows, nor the cross-fostering of piglets between litters explained transmission of swIAV in the study. Thus, swIAV may also be transmitted by other routes such as the air and mechanical vectors including personal and equipment, emphasizing the need for further studies of swIAV within-herd transmission.

VVD-PP-44

VACCINATION OF SOWS AGAINST SWIAV AFTER AN ACUTE INFLUENZA OUTBREAK IN A FARROW-TO-FINISH FARM IN BULGARIA (A FIELD CASE)

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Background and Objectives

As part of the Porcine Respiratory Disease Complex (PRDC) swine influenza A Virus (swIAV) leads to reduced average daily gain and increased losses in infected herds, more severe in combination with other (respiratory) pathogens. This investigation aims to assess the effect of vaccination of sows against swIAV on a farrow-to-finish farm in Bulgaria affected by two consecutive swIAV outbreaks.

Material and Methods

In August 2023 a Bulgarian 800-sow farm experienced an acute swIAV outbreak after introduction of gilts in July 2023. First clinical signs appeared in fattening, followed by the nursery. Next to coughing, Streptococcus suis (S.suis) associated meningitis and arthritis increased during the first wave. A pandemic subtype was serologically confirmed and Respiporc FLUpanH1N1 (Ceva Animal Health, France; Vac1) was applied starting Nov23. In parallel a second wave of coughing caused by classical swIAV appeared. Vaccination of Respiporc FLU3 (Ceva Animal Health, France; Vac2) was added to the protocol in Apr24.

Results

Losses increased from 1.7% in nursery and 3.3% in fattening before (Jan-July23) to 2.6% and 4.2% respectively during the outbreaks (Aug23-June24). Average daily weight gain (ADWG) dropped from 460 g/day to 389 g/day in nursery and 887 g/day to 873 g/day in fattening. Starting July24, after the full vaccination program was implemented, respiratory signs were reduced to a minimum and ADWG recovered to 446 g/day in nursery and 893 g/day in fattening. Acute cases of S.suis still lead to sudden-death pigs, needs to be solved.

Discussion and Conclusion

In the circumstances of this farm, the subsequent introduction of two different subtypes of influenza lead to respiratory signs in fattening and later in nursery, followed by increased losses and reduction of ADWG. Vaccination of sows using the combination of Vac1 and Vac2 helped to reduce clinical signs and to return to the growth performance before the outbreak.

VVD-PP-45

LONGITUDINAL SURVEILLANCE OF PRRS OUTBREAKS IN A SWINE VETERINARY PRACTICE

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Background and Objectives

Porcine reproductive and respiratory syndrome (PRRS) is a production-limiting disease with global impact. Although regional differences exist, monitoring disease dynamics and management approaches is important in understanding PRRS changes over time, and ultimately, optimal control strategies. A surveillance program was established at a swine-focused veterinary practice in Canada to monitor and evaluate PRRS outbreaks and their intervention strategies.

Material and Methods

Sow herds are enrolled into the program upon exhibiting clinical signs of PRRS infection, with subsequent sequencing. Dedicated staff conduct surveys with veterinarians to gather insights on demographics, clinical severity, genetic sequencing, co-infections, outbreak history, biosecurity, farrowing schedule, suspected infection route, and mitigation strategies (e.g. elimination/stabilization, vaccination/serum inoculation). Timelines are created for veterinarians and producers, establishing dates and procedures to be implemented on-farm, reviewed quarterly. Standardized performance and diagnostic data are databased and categorized into pre-break baseline, PRRS break, post-break variability and post-break baseline periods, allowing for annual evaluation of intervention strategies across strains and years.

Results

By using this surveillance model, 71% (n=113) of sow herd outbreaks have been monitored since 2021. A higher proportion of herds applied stabilization interventions in 2024 (59%) versus 2023 (35%), likely due to prolonged time to negative diagnostics and frequency of reinfection. As the annual number of outbreak sequences has increased since 2021, the ongoing evaluation of production outcomes by strain and/or intervention has become vital.

Discussion and Conclusion

Implementing a surveillance program facilitates continuous learning and understanding of endemic disease trends and identifying effective mitigation strategies within a clinical practice. This program demonstrates that veterinary practices can successfully implement surveillance systems, often providing detailed and specific data not possible to obtain through broader initiatives.

VVD-PP-46

OCCURRENCE AND IMPACT OF PCV2 INFECTION AT WEANING IN DANISH WEAN-TO-FINISH HERDS

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Background and Objectives

Over time, PCV2-vaccination has reduced herd infection pressure so successfully that pockets of "naïve" animals may occur. This may lead to subclinical infections in naïve sows increasing the risk of early PCV2-infections in piglets, and subsequently reducing the benefits of vaccination. Knowing the infection dynamics before implementing a vaccination program is key for success. The aim of this study was to determine the prevalence of PCV2-infections in Danish wean-to-finish herds.

Material and Methods

During 2023, 45 randomly selected, wean-to-finish herds were monitored for PCV2 (qPCR). All herds PCV2-vaccinated piglets at weaning, but none of the source breeding herds PCV2-vaccinated sows. Oral fluids (OF) were collected post weaning, and blood samples (n=5) at 30kg, 60kg and 90kg. Both OF and blood samples (pooled by 5) were tested by qPCR-PCV2. Student's t-test and Fishers exact-test were performed to evaluate associations between PCV2 in OF and in serum pools, on prevalence and viral load, respectively.

Results

PCV2 was detected in 44.4% of the herds by OF. Viremia was detected in 8.9%, 24.5% and 26.7% of the herds at 30kg, 60kg and 90kg, respectively. A significant association between PCV2 in OF at weaning and serum prevalence was found at 60kg (p=0.005), but not at 30kg or 90kg. A significant association between PCV2 in OF at weaning and serum viral load was found at 60kg (p=0.037), but not at 30kg or 90kg.

Discussion and Conclusion

Early PCV2 infection after weaning detected by OF was highly prevalent. Consequently, the long-term benefits of piglet vaccination may be negatively impacted, as suggested by the significant association between early infection and viremia at 60kg. To achieve optimal PCV2-vaccination benefits, it is crucial to investigate the entire herd's infection status when designing the right PCV2-control program to ensure vaccination of healthy pigs in due time before pigs meet the virus.

VVD-PP-47

DETECTION OF PCV2 FIELD STRAINS IN SWITZERLAND AND DETERMINATION OF RELATEDNESS OF T-CELL EPITOPES TO DIFFERENT VACCINES USING EPITOPE CONTENT COMPARISON (EPICC)

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Background and Objectives

Different serotypes of PCV2 have been isolated in recent years and various vaccines are available for the prophylaxis of PCV2 associated diseases. This study investigated the presence of different serotypes of PCV2 in pig production in Switzerland. In addition, an epitope content comparison (EpiCC) was carried out to determine T-cell epitope coverages between field isolates and different commercially available vaccines.

Material and Methods

The study was carried out by convenience sampling in a total of 78 pig herds in Switzerland. Cotton ropes were tied in the pens of weaners or fattening pigs to collect oral fluids. One rope was used per pen, and one or two pens per farm were sampled. If two pens were sampled, collected oral fluids were pooled. Oral fluids were tested for the presence of PCV2 using qPCR with subsequent sequencing of the ORF-2 gene. To determine the relatedness of T-cell epitopes contained in the protein sequence of the individual field-strain to that of different vaccines. Epitope content comparison (EpiCC) was carried out as described by Bandrick et al. (DOI 10.1016/j.vetimm.2020.110034).

Results

A total of 78 samples of oral fluids were analyzed: 24 samples from fattening pigs, 52 samples from weaned piglets and two further samples without known age category. Samples of fourteen herds (18%) were positive for PCV2 (3 positive samples from fattening pigs, 14 from weaners). Sequence typing of eight out of these 14 samples identified serotypes PCV2a (one sample); PCV2b (three samples) and PCV2d (four samples). EpiCC resulted in T-cell epitope coverages between 60.25% and 98.67%.

Discussion and Conclusion

The present study shows that PCV2 serotypes a, b and d are present in pig production in Switzerland. Differences in T-cell epitope coverages may be considered to estimate vaccine efficacy in affected herds.

VVD-PP-48

FIELD STUDY ON THE IMPACT REPRODUCTIVE PERFORMANCE OF PORCINE CIRCOVIRUS TYPE 2 (PCV2) SOWS VACCINATION WITH AN INACTIVATED WHOLE PCV2 VACCINE

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Background and Objectives

Porcine circovirus type 2 (PCV2) can cause reproductive disorders in sows, known as PCV2 reproductive disease. Vaccination of sows with inactivated whole virus vaccines has been proven to improve increase fertility, farrowing rate, number of piglets born alive, birth weight of piglets, and number of piglets weaned per a litter The purpose of this study is to evaluate the effect of PCV2 whole virus inactivated vaccination on the reproductive performance of sows.

Material and Methods

This study was conducted in a breeding pig farm in northern China. This farm was PRRSV stable and PRV gE negative. The farm vaccinated the sows with a subunit vaccine, 3 times per year previously. Starting from February 2024, all breeding animals were vaccinated for the first time with the inactivated PCV2 whole virus vaccine Circovac®, Ceva (Group A) ,2ml/dose, with the boost vaccination in March. Reproduction data were collected from January to March 2024 (the initial subunit vaccine, Group B) and April to June for the Group A). Every month, serum samples were collected from weaned piglets in each group.

Results

Born alive, born weight > 0.8kg and weaned piglets per litter in group A was 0.54, 0.67 and 0.88 higher than those of group B, all differences were statistically significant ($p<0.01$). Stillborn/ mummies of group A was 0.59 lower than that of group B ($p<0.01$). PCV2 viremia rate in group A was lower than that of group B ($p< 0.05$).

Discussion and Conclusion

PCV2 viremia rate in weaned piglets in group A had significantly decreased, indicating that the sow vaccination with Circovac® reduced vertical transmission of PCV2 and therefore its impact on the reproductive performance of sows.

VVD-PP-49

ASSOCIATION BETWEEN GILT VACCINATION AND EARLY PCV2 CIRCULATION

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Background and Objectives

PCV2 is a challenge for the swine industry world vide, despite availability of vaccines. Especially the lack of PCV2 vaccination of sows, leading to early circulation of PCV2, can be a challenge. Also, the shift in PCV2 genotypes, where PCV2d seems to be dominating worldwide, might challenge control. The last screening of PCV2 genotypes in Denmark was published in 2019. Therefore, the aim of this study was to screen sow herds for early circulation of PCV2 and investigate the genotypes of circulating PCV2.

Material and Methods

Thirty-six (36) Danish herds, where no PCV2 sow vaccination was performed, were included. Herd vaccination status of gilts before mating was recorded. In each herd, udder-wiping was performed in the farrowing unit from two sows just before weaning and three oral fluid samples from pigs one, two and three weeks after weaning. Samples were analysed for PCV2 by qPCR and Sanger sequencing was performed on one sample from 4 herds. To determine the association between gilt vaccination and PCV2 circulation, a Fishers exact test was applied.

Results

Early circulation of PCV2 was detected in 36% (13/36) of the herds. In one herd only in the farrowing unit, in four herds only among weaners and in eight herds both in the farrowing unit and the weaning unit. The genotype PCV2d were detected in all four herds 27 of the 36 herds vaccinated gilts. Herds with no PCV2 gilt vaccination had a 2.57 higher risk of early PCV2 circulation (p=0.03).

Discussion and Conclusion

A higher risk of early PCV2 circulation was found, when the gilts were not vaccinated against PCV2 before mating. These findings suggest that all herds might benefit from implementing PCV2 vaccination of gilts before mating. PCV2d was the only genotype detected in this study which correlates with finding from diagnostic submission that indicate the dominance of PCV2d in Danish pigs.

VVD-PP-50

REQUIREMENT FOR REGULAR INFLUENZA A SURVEILLANCE TO OPTIMIZE VACCINATION SCHEDULE IN SWINE HERDS

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Background and Objectives

Swine Influenza A virus (swIAV) leads to economic losses in the pig industry. Next to management measures, vaccination helps to control the virus. Viruses belonging to both pandemic (H1pdm) and avian-like swine (H1av) clades are circulating in Denmark. Two different vaccines are registered covering either pandemic (Respiporc FLUpanH1N1 (V1)) or avian swIAVs (Respiporc FLU3 (V2)). It is critical to monitor the subtype circulating in the herd and adjust the vaccination schedule if necessary. The aim of this investigation was to evaluate the need for regular influenza diagnostics.

Material and Methods

In 36 Danish herds, udder-skin-wipes were taken from two litters in the farrowing facility (piglets approx. 21 days old) and oral fluid was collected in weaners, one, two and three weeks after weaning. Samples were analysed for swIAV by RT-qPCR, and positive samples were analyzed with a H1pdm09 specific RT-qPCR. A questionnaire about swIAV vaccination strategy was filled.

Results

In total 61% (22/36) of the herds were positive for swIAV. H1pdm were detected in 64% (14/22) of the positive herds. Vaccination against swIAV was done in 78% (28/36) of the herds. V1 was used in 6 herds, V2 in 17, and V1+V2 were used in 5. Of the herds using vaccines against swIAV, 68% (19/28) were positive for swIAV and 63% (12/19) of these were positive for H1pdm. In 9 herds using V2, pandemic swIAV was detected. The sows and pigs were therefore not protected against the circulating Influenza.

Discussion and Conclusion

25% of the herds positive for swIAV, could benefit from a reversion of the vaccination strategy. This highlights the need for regular control of the circulating swIAVs within the herd, ensuring the vaccine protects against the subtype circulating. Using both vaccines in routine prophylaxis allows the broadest protection.

VVD-PP-51

SOW VACCINATION WITH SIV BIVALENT VACCINE IMPROVES THE WEANERS' ANTIBODY LEVELS AND DECREASES INFECTION PRESSURE IN THE NURSERY

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Background and Objectives

This case report describes the change in antibody levels and PCR-positivity in weaners after sow vaccination with a Swine Influenza Virus (SIV) bivalent vaccine (BiV).

Material and Methods

On a 2000-sow farm with recurrent respiratory symptoms in weaners, gilts were vaccinated at 14, 18 and 30 weeks of age with a trivalent (H1avN1, H1huN2, H3huN2) and at 28 and 32 weeks with a monovalent vaccine (H1pdmN1). Sows were not vaccinated against SIV. In April 2024, SIV was detected in the farrowing unit by RT-PCR in udder wipes (H1hu, H1pdm, N2). Consequently, sows were mass vaccinated with a dose of a BiV (H1swN1, H3swN2). The vaccine effectiveness was evaluated via a longitudinal study: batch 1 (NV) was born in the 2nd week of June from non-vaccinated sows, batch 2 (V) was born 6 weeks later from sows vaccinated at 11 weeks of gestation. Fifteen 3-week-old piglets were selected per batch. Nasal swabs were collected at 5, 7 and 9 weeks and RT-PCR tested (3 pools of 5 samples/age). Sera were collected at 3, 5, 7, and 9 weeks of age and tested with CIVTEST® Influenza (results presented as mean ± standard deviation). Statistical comparison within each age group was performed using a one-way ANOVA.

Results

Piglets from the V-group had significantly higher antibody titres at 3, 5 and 7 weeks (respectively 95.87±17.06, 73.73±20.66 and 42.82±18.45 versus 38.13±21.41, 25.92±20.80 and 11.79±9.10 in the NV-group). Only 2 out of 9 pools from the V-group were PCR-positive: at 5 (H1huN2) and 9 weeks; all pools from the NV-group were PCR-positive at 5 and 7 weeks (H1hu, H1pdm, H1av, N1, N2) and 1 out of 3 pools was positive at 9 weeks.

Discussion and Conclusion

Vaccination of sows with a BiV vaccine led to significantly higher antibody levels in weaners and a drastic reduction in PCR-positivity during nursery.

VVD-PP-52

DETECTION OF ATYPICAL PORCINE PESTIVIRUS IN PIGLETS WITH CLINICAL CONGENITAL TREMOR IN POLAND.

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Background and Objectives

The aetiology of congenital tremor (CT) type A-II remained unrecognized for a long time. Since 2016, atypical porcine pestivirus (APPV) has been considered responsible for this condition. Several reports indicate the presence of APPV in farms with CT problems in different countries. To date, the circulation of APPV has not been determined in Poland. Swine veterinarians, however, highlight the incidence of CT with unestablished aetiology within the country. The aim of the study was to assess the occurrence of APPV in Polish farms affected by CT.

Material and Methods

Samples from seven piglets (blood, brain, cerebellum, spinal cord, lymph nodes, thymus, tongue, tonsils, lung, heart, stomach, spleen, small intestine, kidney, testicle, faecal swabs, pleural cavity fluid) and sows (five individual blood samples, and three pooled oral fluid samples) were collected from the farm that had reported CT cases in piglets of undetermined aetiology since early 2024. The samples were tested with commercial qPCR assay (qRT-PCR; EXOone Atypical Porcine Pestivirus, Exopol, Zaragoza, Spain), following the manufacturer's recommendation.

Results

6 out of 7 tested piglets were positive for the presence of APPV's genetic material. Regarding positive piglets, APPV's RNA was detected in each sample type. The highest mean viral loads were determined for tonsils (log_{10} 4.69 APPV RNA copies/mg ± 0.32). All samples collected from sows were negative.

Discussion and Conclusion

This is the first report confirming the occurrence of APPV in Poland. Clinical and laboratory findings described in the present case are consistent with those published previously from other countries. In view of this data, further research assessing APPV epidemiology in Poland is needed.

The study was financed by the Polish Minister of Science and Higher Education as part of the Strategy of the Poznan University of Life Sciences for 2024-2026 in the field of improving scientific research and development work in priority research areas.

VVD-PP-54

ASSESSING PCV2 DETECTION IN TONGUE TIP FLUIDS AND PRODUCTIVITY IMPROVEMENTS POST WHOLE-HERD VACCINATION

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Background and Objectives

Porcine circovirus type 2 (PCV2) is considered a ubiquitous pathogen in pigs and one of the most important pathogens affecting swine health. Vertical transmission from sow to piglets during gestation is one of the transmission routes described. High viral detection in tongue tip fluids from stillborn piglets has been associated with PCV2 associated disease. The objective of this study was to evaluate the impact on PCV2 detection in tongue tip fluids after a whole-herd vaccination with a PCV2 vaccine and evaluating the production performance batches after the mass vaccination.

Material and Methods

A multi-site Hungarian farm with an average inventory of 1,600 sows was selected for the study. The farm had PCV2-associated disease in growing pigs and PCV2 had been detected by PCR in multiple samples in high quantities, including tongue tip fluids from stillborn. Mass vaccination of the sow herd was implemented twice (off-label use), 4-weeks apart, with CircoFLEX® and tongue tip samples were collected 6 weeks after the last mass vaccination. Production parameters of batches before and after mass vaccination were compared using Minitab® statistical software.

Results

The detection of PCV-2 in tongue tip fluids from stillborn piglets decreased from 75% of the samples to 12.5%. There was an statistical significant increase on the number of liveborn piglets per sow from 13.2 to 14.7 (p-value = 0.03). Nursery phase production parameters were not significantly impacted following the mass vaccination.

Discussion and Conclusion

Whole-herd vaccination with CircoFLEX® significantly reduced PCV2 detection in tongue tip fluids from stillborn piglets and increased the number of liveborn piglets per sow. These findings highlight the effectiveness of mass vaccination in controlling PCV2-associated diseases and improving reproductive performance in swine herds. However, nursery phase production parameters remained unchanged, indicating the need for further research to optimize overall herd productivity.

VVD-PP-55

A CHANGE OF MINDSET ON SOW INFLUENZA VACCINATION STRATEGIES USED IN DENMARK 2022 VS. 2023

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Background and Objectives

Next to management measures, sow vaccination helps to control influenza virus. Two vaccines are registered in Europe to cover pandemic (Respiporc FLUpanH1N1 (V1)) or avian swIAVs (Respiporc FLU3 (V2)) (Ceva Animal Health, Libourne, France). Vaccination in sows is done either before farrowing or in a mass vaccination protocol. This investigation aims to evaluate the vaccination strategies being used in Denmark.

Material and Methods

A questionnaire about swIAV vaccination strategy was filled in by the veterinarian during cross-sectional swIAV screenings in sow herds in Denmark in 2022 and 2023. Samplings were performed in cases of unsatisfactory production results, clinical sign or just to check up on if the vaccines chosen for the farm are correct according to a new sampling. Often only, V1 or V2 are used according to the influenza subtypes historically detected in the herd.

Results

In 2022 52.3% (89/170) herds and in 2023; 68,1% (156/229) herds vaccinated against flu. In 2022 26% (23/89) and in 2023 27% (42/156) vaccinated only gilts. In 2022 27% (24/89) and in 2023 24% (37/156) vaccinated gilts before insemination and sows before farrowing. In 2022 31% (28/89) and in 2023 45% (71/156) vaccinated gilts before insemination and sows by mass vaccinations between 1 to 5 times a year. In 2022 16% (14/89) and in 2023 4% (6/156) vaccinated sows but not the gilts before insemination. In 72,8% (83/114) of sow protocols in 2023 only one vaccine was used and in 27,2% (31/114) both V1 and V2.

Discussion and Conclusion

The proportion of sow herds vaccinated by mass vaccination has increased by 45,2% from 31% to 45%. Mass vaccination has shown to improve the herd stability. Depending on the duration of immunity of a vaccine, a reproductive vaccination protocol can lead to an insufficient protection of parts of the sow herd. Mass vaccination >2.3 times/year may add a stronger MDA.

VVD-PP-56

BIOCHEMICAL SERUM PROFILE OF PIGS NATURALLY INFECTED WITH HEPATITIS E VIRUS

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Background and Objectives

Hepatitis E is a zoonotic disease, recognized globally as a major cause of acute viral hepatitis in both humans and pigs. This study focused on the biochemical serum profile analysis of 12 pigs, all of which previously tested positive for HEV RNA by RT-PCR in rectal swab samples.

Material and Methods

Sera samples were analyzed using semi-automated biochemical spectrophotometer, while liver samples, collected at slaughter, were histologically examined and graded from 0 to 4 according to density and distribution of lymphocytic–plasmacytic infiltration.

Results

Results showed that total protein concentrations were highest in pigs with the first degree of liver damage (7.37±0.37 g/dl) and lowest in those with the fourth degree (6.15±0.52 g/dl), with a significant difference ($p<0.01$). Albumin levels followed a similar trend, being highest in the first degree group (2.90±0.62 g/dl) and lowest in the fourth degree (2.07±0.22 g/dl), though no significant differences were observed between degrees ($p>0.01$). For AST, the highest concentration was found in pigs with the fourth degree of liver damage (130.40±30.92 IU/l), while the lowest was in the first degree group (63.46±6.09 IU/l), showing a highly significant difference ($p<0.01$). ALT values also peaked in pigs with the fourth degree of damage (77.64±8.00 IU/l) and were lowest in those with the first degree (52.31±4.29 IU/l), with significant differences ($p<0.01$). Total bilirubin concentrations were greatest in pigs with the fourth degree of liver damage (11.01±0.59 μmol/l) and lowest in the first degree group (6.15±1.18 μmol/l), with significant differences ($p<0.01$) between the first and third, and first and fourth degree groups.

Discussion and Conclusion

While hepatitis E is typically considered a subclinical disease in pigs, this study highlights notable biochemical changes in the blood serum of infected animals. The elevated levels of enzymes suggest liver damage and hepatocyte necrosis, which was confirmed through histopathological examination.

VVD-PP-57

VVD – Virology and Viral Diseases

METAGENOMIC ANALYSIS OF VIRUSES ON NINE IRISH FARROW-TO-FINISH PIG FARMS

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Background and Objectives

The intensive nature of modern swine production fosters the emergence of new viral diseases challenging pig and human health and economic survival of pig farming worldwide. Porcine respiratory disease complex is frequently polymicrobial, involving concurrent viral and opportunistic bacterial infections, environmental conditions and management factors with substantial financial losses. Viral metagenomics facilitates the detection and characterisation of viral communities by high-throughput sequencing. This evidence-based tool provides baseline information on herd health status, identification of endemic and emerging diseases, potential zoonotic risks, and information on polymicrobial disease dynamics. This study examines porcine viral diversity and abundance at family level circulating on Irish farrow-to-finish farms.

Material and Methods

Archived longitudinal porcine samples (n=23; serum, nasal and pen-based oral fluid) from 9 farrow-to-finish Irish herds (2016–2018), with historical respiratory disease were analysed. Whole genome sequencing was performed using the MiSeq™ platform and filtered short-reads were de-novo assembled and taxonomically classified. Samples were grouped by matrix type. The most prominent viral families were identified when at least one sample per group had contiguous sequences with normalised abundance between 10-100.

Results

Serum samples contained ~45 viral families, the most prominent being Parvoviridae, Steitzviridae, Arteriviridae, Variarterivininae, Baculoviridae, Peduoviridae, Poxviridae and Hantaviridae accounting for 81% of contiguous sequence abundance. Oral fluid samples included ~60 viral families, with Steigviridae, Steitzviridae, Picobirnaviridae and Suolivifridae the most prevalent, collectively representing 64% of contiguous sequence abundance. Nasal samples contained ~45 viral families, the dominant families Steitzviridae, Astroviridae, Poxviridae, Peduoviridae, Baculoviridae, Flaviviridae, Kyanoviridae and Genomoviridae accounting for 54% of contiguous sequence abundance.

Discussion and Conclusion

Parvoviridae, Arteriviridae and Variarterivininae were unique to serum samples, with Picobirnaviridae and Suolivifridae families to oral fluids. Nasal samples have a distinct presence of Astroviridae, Flaviviridae, Kyanoviridae and Genomoviridae. This study highlights diverse viral profiles and dominance patterns influenced by the characteristics of each sample matrix revealing frequent co-infections.

VVD-PP-58

THE THREE MOST LIKELY ROUTES OF INTRODUCTION OF PRRS ACCORDING TO 40 DANISH VETERINARIANS

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Background and Objectives

Porcine Reproductive and Respiratory Syndrome (PRRS) has been present in Danish pig farms for more than three decades. A national reduction plan was launched in 2022. Most Danish veterinarians deal with the elimination of PRRS-virus from pig farms. Managing the routes for disease introduction are pivotal for the success of the national reduction plan. Previous studies have identified animal movements, semen, people, equipment, trucks, and aerosols as potential sources of transmission of PRRS-virus between farms.

Material and Methods

Of 143 Danish veterinarians invited for an online survey, 40 (28 %) responded. These veterinarians cover the advisory services in 53 % of all industrialized Danish pig farms (more than ten sows or 100 finisher pigs). The veterinarians were asked to indicate the three most likely routes of PRRS introduction from a list of ten potential transmission pathways.

Results

Transmission of the PRRS virus by wind was identified as the most likely route by nearly all veterinarians (39). The movement of pigs ranked second, mentioned by 33 veterinarians, while trucks visiting the herd were the third most likely route, noted by 24 veterinarians. The other seven routes (manure, semen, tradesmen, vaccines, rodents, equipment, and employees) were each only indicated by one to three veterinarians.

Discussion and Conclusion

Apart from the movement of PRRS-infected pigs to a farm, the route of introduction of PRRS is only rarely understood. Local spread is shown within a distance of 5 kilometers. However, an introduction may not lead to clinical illness in the pigs right away, so the time point of pathogen introduction may be hard to prove. This may complicate the identification of the source of the introduction. Further studies are necessary to gain a comprehensive understanding of the routes of introduction.

VVD-PP-59

NEW PRRS1 WILDTYPE VIRUS INTRODUCTION WITH NO CLINICAL SIGNS IN PREGNANT SENTINEL GILTS

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Background and Objectives

Sentinel animals can be used to clarify PRRS virus dynamics in sow farms. These animals are potentially vulnerable to infection in case of an outbreak with wt-PRRSv. In this paper we describe experiences on a farm with sentinel gilts after an introduction of wt-PRRSv1.

Material and Methods

In a ftw-farm with 520 sows are housed in two dynamic groups, first and second parity sows apart from older sows. Sows are vaccinated with Reprocyc PRRS in a 6-60 vaccination scheme. Wild type PRRS virus was last detected in April 2021. Since then, no virus was found in processing fluids (n=67), nor in 10-week-old piglets (n=140, 28 pools) for 3 years. Every 12 weeks PRRS negative gilts from different age groups (9 to 18 weeks) arrive at the farm. In January 2024 5 gilts were selected to serve as sentinel animals, while the other penmates were vaccinated twice with Reprocyc PRRS before entry in sowherd.

Results

Accidentally wt-PRRSv1 was found in processing fluids (umbilical cords) of piglets born in July 2024. ORF5 sequence analysis showed more than 10% heterology with the virus found in and with the used vaccine strain. Four of the five sentinel gilts farrowed in September 2024, one returned 57 days after insemination. All five animals seroconverted (0,61 – 2,04 increase of SP ratio) during pregnancy, no abnormalities were observed in born piglets.

Discussion and Conclusion

No abnormalities were observed in the sentinel animals after this introduction. The route of introduction of PRRS virus is not clarified yet, most obvious routes in this farm are employees which work on other pig farms or air born transmission from a nearby finishing farm. We believe the use of sentinel gilts is still valuable and did not contribute to the outbreak.

VVD-PP-60

SWINE INFLUENZA A VIRUS EVOLUTION IN SPAIN FROM 2018 TO 2024

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Background and Objectives

Hemagglutinin (HA) and neuraminidase (NA) are used to classify the 3 subtypes of Swine Influenza A Virus (swIAV) that affect swine (H1N1, H1N2 and H3N2). HA type 1 (H1) can be of avian, human, or pandemic origin (H1av, H1hu and H1pdm). NA type 1 (N1) can be avian or pandemic (N1av, N1pdm). This range of different HA and NA, added to the high reassortment capacity of swIAV, generates diverse combinations of HA and NA that add diversity to the virus. This work aimed to review the evolution of swIAV subtypes and lineages in Spain.

Material and Methods

Results from clinical respiratory cases in 564 farms between 2018 and June 2024 were analysed. Most samples came from lactating and nursery piglets, using nasal swabs (58%), lungs (27%) and oral fluids (21%). Analyses have been performed in Spanish laboratories capable of differentiating the types of HA and NA by PCR.

Results

The detection of H1av variants (H1avN1 and H1avN2) has been dropping yearly from 58% of the farms in 2018 to 30% in 2024. H1hu variants (H1huN1 and H1huN2) have been detected between 22-34% over the last 5 years. Pandemic variants (H1pdmN1 and H1padmN2) increased yearly from 6% in 2018 to 24% in 2024. A similar situation was reflected for H3 variants (H3N2 and H3N1), growing from 4% in 2018 to 24% in 2024.

Discussion and Conclusion

In Spain a constant evolution of swIAV is seen from 2018 to 2024, with a significant increase of H1pdm and H3 in recent years. It is interesting to notice that results from 2023 are almost identical to 2024, indicating a certain stabilization of the HAs distribution. These results reflect the importance of overtime subtype monitoring and thus adapt optimal vaccination programs for pig farms.

VVD-PP-61

A CASE STUDY TO INVESTIGATE THE EFFECT OF A QUADRIVALENT HETEROLOGOUS INACTIVATED PRRSV VACCINE ON TIME-TO-STABILITY FOR AN INFECTED BREEDING HERD

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Background and Objectives

The ability to eliminate porcine reproductive and respiratory syndrome (PRRSV) from herds has been recently perceived by veterinarians to be more challenging. Median time-to-stability (TTS) for herds undergoing a herd-closure within the past decade was 36 weeks, approximately 10 weeks longer than 2011 cohorts. The aim of this case study was to investigate the effect of a quadrivalent heterologous inactivated PRRSV vaccine on TTS for a PRRS infected breeding herd that underwent an elimination program.

Material and Methods

A Category 1A PRRS infected sow farm was selected. The variant was characterized as PRRSV RFLP 1-2-4 lineage 1C.5. The farm underwent a herd closure with live-resident virus inoculation (LVI). A PRRSV quadrivalent heterologous inactivated vaccine (manufactured by Cambridge) was utilized, with ≤97.9% nucleotide similarity to the field variant. Vaccine was administered twice to the entire herd at two time points, along with 3- and 5-weeks pre-farrow. Weekly processing fluids were collected until the end of the closure. Thiry blood samples were periodically collected from due-to-wean pigs. Samples were submitted for the detection of PRRSV genetic material using qRT-PCR.

Results

After 12 weeks post-last LVI, processing fluids resulted PRRS PCR negative throughout the end of the closure, except for two time points. Throughout the closure, all serum samples were PRRS PCR negative. The TTS was 34 weeks. The TTS was numerically shorter by 12 weeks compared to other PRRSV L1C.5 breaks that occurred within the production system.

Discussion and Conclusion

Under the conditions of this study, the TTS was 34 weeks. The TTS was numerically shorter by 12 weeks compared to other PRRSV L1C.5 breaks within the production system. There is limited published information on the efficacy of inactivated vaccines on PRRSV control in breeding herds. Additional research on the use of an inactivated vaccine during PRRS closures should be conducted to strengthen these findings.

VVD-PP-62

POSITIVE PRRS ELISA RESULTS IN UNVACCINATED PIGFLOWS CAN BLUR CLASSIFICATION SYSTEMS IN ERADICATION PROGRAMS

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Background and Objectives

Dutch pig industry is striving for PRRSv eradication by 2050. First goal of the eradication program is PCR negative pig outflow in farrow to wean farms at 10 weeks of age. At the moment most outflows are serological positive due to infection or vaccination. In this study we describe the ELISA outcomes of PCR negative pigs.

Material and Methods

Four farrow to wean farms were followed every four months during two years. Bloodsampling took place in piglets at around ten weeks of age. At every turn 20 samples of each farm were PCR tested in 4 pools of 5 samples and 10 of these samples were also tested with an ELISA (IDEXX PRRS X3 Ab Test, Idexx). On three farms sows were vaccinated with an MLV around day 60 of pregnancy and around one week after farrowing. The other farm didn't use any vaccine. Piglets were not vaccinated in any of the farms.

Results

All PCR tests were negative. ELISA results of piglets were negative in the non-vaccinated herd while samples in sow-vaccinated farms were positive up to 50% of samples within one batch. Only in 4 of 18 batches of sow-vaccinated farms all 10 animals tested negative. In total 18% (33/180) piglets tested ELISA positive. SP ratios of positive animals ranged from 0,40 till 1,42.

Discussion and Conclusion

ELISA results of ready to transport weaners are influenced by maternally derived antibodies, which blurs interpretation of test results. Additional PCR tests are always needed for proper classification of farms in eradication programs to discriminate between farms without field virus circulation and farms with both field and modified live vaccine viruses. Use of marker vaccines could have a great advantage, to differentiate between antibodies derived from vaccination or wild type virus infection.

VVD-PP-63

ANTIVIRAL ACTIVITY OF A BLEND OF PHYTOCHEMICALS AND CARBOXYLIC ACID AGAINST THE ASFV ALGAL SURROGATE

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Background and Objectives

A non-formaldehyde solution of novel phytochemicals and carboxylic acid (PCA) was launched in 2017 in the EU. To date, such solution has yet to be tested for their potential antiviral activity, if any, against megaviruses such African swine fever virus (ASFV) and its surrogate algal virus, Emiliania huxleyi virus (EhV) (1,2). Given the limited access and expense for routine chemical mitigation testing with ASFV, we initially focused our efforts on EhV. The specific objective of the current study was to evaluate the time course of incubation from hours to days to mimic possible field relevant exposure times for the preventative treatment of megaviruses.

Material and Methods

Based on experiments first published in Palowski et al., 2022, EhV aliquots (100 uL containing up to 5 log10 copies) were treated with field concentration (0.05% to 0.2% final) of a PCA-based product (Finio, Anitox Corp). Both viability qPCR (V-qPCR) and standard PCR (S-qPCR) were conducted for EhV copies at 1 hr, 5 hrs, 24 hrs and day 7 of incubation.

Results

Finio, at highest dose concentrations, showed the greatest log 4.5 log10 units at the earliest 1hr treatment time point. And 100% viable viral inactivation (>5 log10 reduction units) at the lowest concentration after 7 days. The product showed limited to no viral DNA removal that was likely present as free or damaged DNA post treatment as observed via S-qPCR assay.

Discussion and Conclusion

Our results demonstrate for the first time that such PCA-based product can be used as an effective chemical mitigant against megaviruses. With the threat of ASFV to the global economy, this product will be an important tool in the biosecurity toolkit to support the swine industry by reducing particle viability in contaminated feed. Additional research is warranted with ASFV, in the presence of feedstuffs, including bioassays when V-qPCR reveals that intact viable particles remain post treatment.

VVD-PP-64

ANALYSIS OF DIFFERENT VACCINATION PROTOCOLS AGAINST PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME.

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Background and Objectives

Acute infections caused by porcine reproductive and respiratory syndrome (PRRS) virus in the nursery and finishing area are characterized by consistent lethargy, dyspnea, reduced daily weight gain and high mortality that can range from 12-25% (Moore et al 1990; White et al 1992b). The objective of this study was to evaluate the stability that can be generated by the administration of a full dose compared to a half dose of the PRRS vaccine with respect to the parameter of mortality.

Material and Methods

The farm where this analysis was performed is positive for PRRS, IAV-S, Mycoplasma hyopneumoniae and PCV2. Two groups of pigs were evaluated in the test, group 1 (G1) consisted of a total of 861 piglets distributed in 4 batches where 1 ml of the PRRS vaccine Ingelvac® PRRS MLV was administered while group 2 (G2) consisted of 1380 piglets in 4 production batches equally with a dose of 2 ml of the same vaccine, both groups were weaned at 25 days of age on average. The PRRS vaccine was administered at 7 days of age for both G1 and G2.

Results

The G1 group is observed to have no stable mortality compared to the G2 group that received a full dose of the vaccine. The mortality rate at site 2 of G1 was 5.5% while that of G2 was 4%. This result has a statistical difference between the group vaccinated with 1 ml and 2 ml ($p = 0.006$).

Discussion and Conclusion

According to this test, it is observed that there is a decrease in the mortality parameter of site 2 in the production line that received a full dose of vaccine in the maternity area.

WEL-PP-01

SKIN AND EAR LESIONS IN SLAUGHTERED HEAVY PIGS: A WINDOW INTO ON-FARM ANIMAL WELFARE

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Background and Objectives

Animal welfare (AW) monitoring is a crucial aspect of heavy pig production (>150 kg). Surveillance can be carried out on the farm or at the abattoir, with different advantages and disadvantages. Skin and ear lesions can be a sign of poor AW. The aim of this preliminary study was to investigate the relationships between lesions at slaughter and on-farm AW assessments.

Material and Methods

Slaughterhouse evaluations were carried out between January and October 2023 in an abattoir in northern Italy. Skin lesions (cranial and caudal) were scored from 0 to 4 and ear lesions from 0 to 1. Batch-level scores were then converted in a 0-100% range. On-farm AW assessments were obtained from the ClassyFarm monitoring system, with the different items classified as suboptimal or optimal. Relationships were investigated using Spearman's rank correlations.

Results

Overall, 18,333 heavy pig carcasses from 185 batches and 86 different farms were evaluated, with a median of 105 assessed pigs per batch. Median cranial skin score was 11.2%, caudal skin score was 13.0% and ear score was 5.8%. Skin scores were positively correlated with each other and with ear score. Regarding on-farm AW assessments, worse cranial skin scores were significantly associated with suboptimal assessments in staff training, quality of infirmary pens, type of enrichment materials and pigs' density, but also with optimal pigs' cleanliness. Similarly, caudal skin scores were associated with suboptimal staff training and number, type and usage of enrichment materials, pigs' density and body condition score. Worse ear scores were instead only associated with suboptimal staff training and pigs' density.

Discussion and Conclusion

Apart from cleanliness, most on-farm AW assessments were negatively correlated with abattoir scores, confirming that slaughter data can be an indicator of on-farm AW issues. Nevertheless, the correlations were mostly weak or moderate and data should be further examined including other important factors such as tail lesions.

WEL-PP-02

EVALUATING PIGLET WEANING AGE THROUGH DENTAL PRESENCE: A POTENTIAL WELFARE INDICATOR

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Background and Objectives

The European Union mandates piglets' weaning at either 21 or 28 days to ensure their physiological readiness and welfare. However, reliable and objective indicators for verifying compliance with these limits are lacking. Dental eruption pattern represents a promising, animal-based marker for estimating piglets' age and weaning readiness. This study aimed to evaluate the presence of specific teeth (maxillary incisor (I1), mandibular premolar (P3), and maxillary premolar (P4)) at different age.

Material and Methods

A total of 209 carcasses of dead animals from 55 farms located in Northern Italy were committed to IZSLER laboratories for diagnostic healthy problems. Based on their age, reported by the farmers, the animals were divided into four groups: piglets <21 days (G1), piglets 21–28 days (G2), weaned (G3) (28 days up to 10 weeks), and pigs (G4) (10 weeks to slaughter). The presence/absence of I1, P3, and P4 was evaluated in alignment with previous research. Fisher exact test was performed to determine whether there was a significant difference between dental presence and age group.

Results

The frequencies of teeth presence were I1 39%, P3 11%, P4 0% in G1 (46 piglets); I1 96%, P3 96%, P4 57% in G2 (28 piglets); I1 100%, P3 100%, P4 99% in G3 (126 weaned); I1 100%, P3 100%, P4 100% in G4 (9 pigs). Significant differences ($P < 0.01$) were observed for I1, P3 and P4 between G1 and G2, and for P4 between G2 and G3.

Discussion and Conclusion

Significant differences were observed in dental eruption across age groups, suggesting that the maxillary incisor (I1), mandibular premolar (P3), and maxillary premolar (P4) may be reliable, non-invasive indicators for verifying piglets' weaning age. However, further researches are required to confirm these results in diverse genetic lines and farm conditions.

WEL-PP-04

IMPACT OF BIRTH WEIGHT AND COLOSTRUM INTAKE ON THE SURVIVAL AND GROWTH OF PIGLETS DURING LACTATION

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Background and Objectives

Birth weight and colostrum intake are crucial for the survival and growth of piglets during lactation. Low-weight piglets have a reduced ability to ingest colostrum, increasing their mortality rate. Colostrum is essential, requiring at least 250g for piglet survival. Serum IgG concentrations below 20mg/ml are associated with low growth and high mortality rates.This study correlates the survival and growth of piglets during lactation with their birth weight and colostrum intake.

Material and Methods

A total of 604 piglets from 10 farms were analyzed, divided into two groups based on birth weight: less than 1kg and more than 1kg. Piglets were identified, weighed, and bled at 24 hours of life and weighed again at weaning. To determine colostrum intake, IgG concentration in sera was measured using a refractometer, transforming the %BRIX using the formula: y=7.1823x-33.94534. When serum IgG values were above 20mg/ml, the piglets were considered to have adequate colostrum intake.

Results

There was a 73% success rate in colostrum intake, with significant differences based on birth weight: 87% of piglets over 1kg had adequate colostrum intake compared to only 57% of piglets under 1kg. Survival rates during lactation varied significantly:32% for piglets <1kg with inadequate colostrum intake.55% for piglets <1kg with adequate colostrum intake.67% for piglets >1kg with inadequate colostrum intake.92% for piglets >1kg with adequate colostrum intake.Average Daily Gain (ADG) was higher in piglets over 1kg but not significantly affected by colostrum intake alone.

Discussion and Conclusion

Colostrum intake and birth weight are vital for piglet survival. Low-weight piglets had worse survival and growth outcomes. Adequate colostrum intake improved survival even in low-weight piglets, but its effect on ADG was intertwined with birth weight.This study underscores the importance of ensuring adequate colostrum intake, especially for low-weight piglets, to enhance their chances of survival and growth during lactation.

WEL-PP-05

IDENTIFICATION OF CLIMATIC FACTORS ASSOCIATED WITH TAIL BITING IN THREE FARROW-TO-FINISH FARMS IN FRANCE : A PREDICTIVE MODEL

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Background and Objectives

Tail biting in pigs is a significant welfare and economic issue, causing pain, injury, infections, reduced productivity, and additional veterinary costs. The origins of tail biting are complex, involving biological, environmental, social, and management factors. This study aimed to identify climatic parameters associated with tail biting outbreak in conventional pig farms and to develop a predictive model.

Material and Methods

Data on four climatic parameters (CO2, NH3, humidity, and temperature) were collected every five minutes from environmental sensors during the post-weaning period across nine batches on three farrow-to-finish farms). Tail biting cases were reported by farmers twice a day throughout this period. Synthetic indices for each climatic parameter were calculated based on its distribution and deviation from health-protective threshold values for pigs. The relationship between these indices and tail biting occurrence was analysed using generalized least-square models (p-value < 0.10). After calibrating the model on the full dataset, its predictive quality was assessed using three cross-validations.

Results

Tail biting was observed in 8/9 batches, with 22 outbreaks during the observation period. From the 1,229 climatic measurements, 30 synthetic indices were derived. The multivariate model revealed two significant indices: the ratio of CO2 concentration to the ideal level (1500 ppm), where greater deviations increase the risk of tail-biting; the maximum temperature over 4 days, the higher the temperature, the lower the risk of tail-biting. The model accurately predicted approximately 90% of non-occurrences of tail biting, but less than 25% of its onset

Discussion and Conclusion

The model shows promising results, predicting some tail biting cases despite the limited number of outbreaks and exclusive use of climatic data. To improve prediction accuracy, additional factors, such as pig behavior, are likely needed for a more comprehensive model.

WEL-PP-06

THE PORCINE CLAW IN FORENSIC PATHOLOGY: OPPORTUNITIES AND LIMITATIONS

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Background and Objectives

The pathological examination of porcine claws is a valuable diagnostic tool for veterinarians, supporting both individual and herd health assessments. This approach enables detailed diagnosis of claw diseases—such as abscesses, ulcers, and structural changes—and possible identification of underlying causes like bacterial infections. Additionally, it enables detection of trauma-related lesions linked to poor housing conditions, offering insights into animal welfare and possible improvements.

Material and Methods

At the Institute of Veterinary Pathology Zurich (IVPZ), most claw examinations are conducted for forensic purposes. The process includes a case history review, macroscopic examination with photographic documentation, and sample collection. Claw dimensions are measured and compared to reference standards. Dehorning is performed for dermal assessment. Deeper structures, including bones, joints, and ligaments, are examined by sectioning claws along the median plane.

Results

Between 2019 and 2024, the IVPZ conducted 505 forensic necropsies, with 90 cases (18%) involving pigs. Among these, 42 (47%) were full necropsies, while 48 (53%) consisted of organ submissions or partial necropsies. Submissions included 34 adult pigs, 21 fattening pigs, and the remaining cases involved abortions, suckling piglets, or weaners. Limb-related conditions, including claw disorders, were identified in 59 cases (66%). Common diagnoses included horn overgrowth, abscesses, and septic arthritis, tendinitis, and osteomyelitis. Submissions predominantly originated from veterinary offices.

Discussion and Conclusion

Pathological examination of porcine claws is crucial for assessing animal health within the broader context of herd management. By combining various diagnostic techniques and clinical observations, it is possible to identify disease patterns and inform strategies for improving animal welfare and productivity. However, limitations such as time delays between death and examination, the need for specialized processing of hard tissues like bone, and financial constraints may affect the scope and accuracy of the findings. Small lesions, often difficult to detect through macroscopic examination, may benefit from additional imaging diagnostics, which, although valuable, require considerable resources.

WEL-PP-07

BEHAVIOURAL AND METABOLIC FACTORS OF HYPERPROLIFIC SOWS AFFECTING PIGLET CRUSHING IN LOOSE HOUSING SYSTEMS DURING POSTPARTUM

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Background and Objectives

With the growing global emphasis on animal welfare, loose housing systems in pig farming have been promoted to enable sows to express instinctive behaviours. However, piglet crushing remains a critical issue in these systems. This study investigates the factors affecting piglet crushing in loose housing pens, focusing on the peripartum traits of hyperprolific sows.

Material and Methods

Thirty-four hyperprolific sows (Landrace × Yorkshire) were divided into two groups based on the crushing incidents during the first 24 hours post-farrowing (T24): high-crushing group (HC, n = 22) and non-crushing group (NC, n = 12). Day (D) 0 was defined as the farrowing day.

Results

Salivary TEAC levels in HC tended to be higher than in NC on D-4 ($P < 0.10$) but decreased significantly on D1 ($P < 0.01$). HC showed a significantly higher frequency of posture changes during T24 ($P < 0.05$) compared to NC. This frequency of posture changes was negatively correlated with salivary TEAC levels ($r = -0.42$, $P = 0.01$). Salivary cortisol levels in HC were higher on D-4 ($P < 0.05$) than in NC but tended to decrease on D1 ($P < 0.10$). Colostral prolactin levels in HC were significantly lower compared to NC on D1 ($P < 0.05$). Piglets in HC displayed a shorter interval between birth and first udder touch ($P < 0.05$) than in NC, despite no significant difference in piglet vitality.

Discussion and Conclusion

These findings support other studies showing that frequent posture changes in postpartum sows significantly elevate the risk of piglet crushing. This study further demonstrates a potential link between these posture changes and oxidative stress, which may interfere with prolactin secretion. Disrupted prolactin levels can reduce piglet viability by limiting their access to colostrum. In conclusion, managing oxidative stress in hyperprolific sows is crucial for maintaining hormonal balance and mitigating piglet crushing in loose housing systems, ultimately improving both animal welfare and productivity.

WEL-PP-08

THE FIRST WILL NOT BE LAST: PARADIGM CHANGE IN RETURN ON INVESTMENT OF IMMUNOCASTRATION

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Background and Objectives

The Welfare of Pigs on Farm report from EFSA (2022) recommends that, "under current commercial conditions, immunocastration should be adopted as the preferred alternative to surgical castration." Immunocastrated males are increasingly accepted by slaughterhouses in Europe, including France. However, at farm level, there is still a need for better understanding of the economic and overall sustainability benefits associated with immunological castration.

Material and Methods

A retrospective study was performed in six farrow-to-finish farms (210 to 650 sows each) from the same production organization, in Brittany (France). These farms were physically castrating male pigs and implemented immunocastration with Improvac® in 2022. Growth performance, feed conversion ratio (FCR) and carcass quality classification data were collected and analyzed for the 12 months prior to and during the use of immunocastration. Differences between both periods were compared using the unilateral two-sample Student t test for each variable.

Results

On average, male and female pigs combined, the live market weight increased by +2.3 kg after vaccine implementation (p=0.027), while FCR improved by 0.1 to 2.56 (p=0.038). The increase in lean meat percentage and live weight alone offset the cost of vaccination. With the reduction in FCR, the net benefit, cost of vaccine deducted, was of 8.8 € per slaughtered male. The most striking result was that the farm with the best FCR prior to immunocastration (2.50) was the one with the highest net benefit (17.4 €/male) afterwards.

Discussion and Conclusion

Growth, FCR, and meat quality improvements measured in this study are consistent with published meta-analyses and with comparable European trials. The fact that the best performing farm was also the one with the highest improvement after the implementation of immunocastration seems against intuition who might expect lower profitability of immunocastration in farms with excellent feed efficiency before vaccination.

WEL-PP-09

STRAY CURRENTS IN PIG PRODUCTION: A DESCRIPTIVE STUDY OF 114 AUDITS IN 83 FRENCH FARMS

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Background and Objectives

Stray currents have consequences on the health and behaviour of pigs (Boulbria ESPHM 2018 and 2023). The aim of this study was to summarize the results of 114 audits made in 83 French farms in all units (sow, post weaning, finishing) between March 2017 and November 2024.

Material and Methods

66% of these audits were recommended by veterinarians for health or behaviour problems, 13% were second audits after a first one, during which corrective actions were proposed, and 21% were control audits in farms without problems.
Each audit started with the measure of the earthing with a ground loop controller (CATOHM™). If the measure was less than 20 Ω, the earthing was considered as conform. Then, the voltage was controlled on the farm equipments with a multimeter (MTX3290) measuring the voltage with electrodes placed on the floor and these equipments. If the voltage was less than 40mV, the measure was considered as conform. Chi and Fisher tests and Post hoc tests were performed with R software.

Results

45% of earthing were not conform even in farms without problems, 0% in second audits after a first one. The proportion of voltage non-conformity was higher in the farrowing (33%), insemination (47%) and gestating (50%) units than in the post weaning (29%) and fattening units (27%), p=0,05. Drinking systems had more voltage non-conformities (71%) than sow housing (67%) and feeding systems (59%), p=0,05. 86% of voltage measures in the water supply of the farms were not conform.

Discussion and Conclusion

Our results indicate high proportions of stray currents in farms, explained by wrong earthing and the fact that the water often arrives electrically charged in farms due to drilling pumps and proximity with the electrical network.

WEL-PP-10

EVALUATION OF MISTRAL® EFFECTS, A DESICCANT BASED ON EUCALYPTUS ESSENTIAL OIL ON PIGLET HYPOTHERMIA AT BIRTH

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Background and Objectives

Hypothermia at birth is a major risk factor for piglet mortality. Desiccants are commonly used to help warm piglets at birth, and the addition of essential oils may enhance their benefits. This study evaluated the effects of Mistral®, a desiccant containing eucalyptus natural essential oils on piglet hypothermia at birth under experimental conditions.

Material and Methods

Three treatments were assigned to 255 piglets from 24 litters across two batches: 27% received no desiccant, 35% received a conventional desiccant without essential oils, and 38% received a desiccant containing natural eucalyptus essential oils. Piglets were randomly assigned to treatments within each litter based on their birth order before the trial. Rectal temperatures were measured at 0, 15, 30, 45, 60, 90 and 120 minutes of life.

Results

Rectal temperature decreased during the first 30 minutes of life, regardless of the treatment. For all groups, piglets did not recover their initial temperature by the end of the 120 minutes of measurements. Data were analysed considering potential effects at the level of the piglet, sow and batch, incorporating fixed factors (birth weight, birth order, litter size and parity) and random factors (batch number and mother).

Discussion and Conclusion

Results showed that piglets with higher birth weights had significantly higher rectal temperature ($P < 0.001$). Piglets treated with the eucalyptus natural essential oils-based desiccant tended to have higher rectal temperatures than undried piglets ($P = 0.06$). This study was carried out in a prolific herd. Given the increase in prolificacy and the high risks of hypothermia confirmed for light piglets, these results are promising. Further studies are needed to confirm these results under various conditions, including different herds, animals, management practises and environments.

WEL-PP-11

EFFECTIVENESS OF SPRAY-DRIED CHICKEN PLASMA IN PIGLET FEEDING

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Background and Objectives

Spray-dried animal plasma possesses properties that enhance growth, immunity, and gut health in weaning piglets.The aim of this study was to determine the effectiveness of pork and chickens spray-dried chicken plasma in relation to fishmeal in diets for weaned piglets on production and economic effects.

Material and Methods

The experiment was conducted on 864 DanBred piglets weaned at 28 days of age, divided into three experimental groups: A – spray-dried porcine plasma (SDPP), B – spray-dried chicken plasma (SDCP), and C – Danish fish meal (FM). Piglets were fed pelleted diets for suckling piglets (prestarter 1) and weaned piglets (prestarter 2, days 0–14), followed by a mash diet (prestarter 3, days 15–42). The tested high-protein feeds were included only in the prestarter 2 diets at 4% (dried blood plasma) or 5% (fish meal). The study evaluated piglet body weight, weight gain, feed intake and utilization, mortality, fecal quality, and included a simplified economic analysis.

Results

The results of the study indicate that the use of spray-dried chicken in the prestarter 2 diet (0-14 days post-weaning) allows similar production and economic results throughout the piglet rearing period (0-42 days post-weaning) to spray-dried porcine plasma. The weight gains and feed conversion ratio- FCR obtained with the above-mentioned feed materials in the prestarter 2 diet were significantly better compared to those obtained with fish meal in the prestarter 2 diet. At the same time, it was shown that the use of dried pork or chicken blood plasma in the diets reduces the feed cost of piglet weight gain by approximately 2%.

Discussion and Conclusion

The study found that spray-dried chicken in the prestarter 2 diet provided similar performance and economic results to spray-dried porcine plasma, with better weight gains and FCR than fish meal. Additionally, using dried pork or chicken blood plasma reduced feed costs by about 2%.

WEL-PP-12

CORRELATION OF TEMPERATURES MEASURED WITH SUBCUTANEOUS MICROCHIP OR RECTAL THERMOMETER FOR AN EASIER AND SAFER MANAGEMENT IN BOARS

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Background and Objectives

Rectal temperature (RT) is the reference standard for clinical evaluation of body temperature in mammals. However, the use of a rectal thermometer to measure temperature causes stress and is very difficult in boars. There is a need for clinical techniques that reduce both stresses. Subcutaneous temperature-sensing identification microchips fulfil the current legal requirements and provide a reading of subcutaneous temperature (MT). This study aims to investigate the correlation between both methods to evaluate body temperature

Material and Methods

In total, 19 boars, belonging to a boar stud in Zaragoza (Spain) were randomly selected, during semen collected (Day 0) and included in this study. A microchip (Thermochip® Mini, MSD Animal Health) was implanted subcutaneously in the perianal area during semen collection and temperature was measured by both chip reader (MT) and a rectal thermometer (RT). Four measurements were taken using both methods in each boar (on consecutive Mondays, same hour, same boars; n=73). Correlation between MT and RT, and differences between MT and RT, were estimated for pairs of data-points from the same individual. A regression test was performed (SPSS program)

Results

There was a significant and positive correlation between MT and RT (r=0.739 to 1.0). A highly significant regression was detected between both variables [y(RT)=6.370 + 0.835x(MT); p<0.001]. Mean temperature was lower for MT (37.68ºC; SD:0.619) than for RT (37.85ºC; SD:0.699) (p<0.001). However, limits of agreement (95%) [-1.10ºC; 0.80ºC] between both methods were narrow enough, being MT an acceptable estimate of RT

Discussion and Conclusion

MT was demonstrated a good alternative to RT in boars. Handling of boars is complicated and reading the RT during semen collection is risky and takes almost one minute. MT does not disturb the animal, nor causes discomfort that leads to interruptions during collection. MT can be useful to monitor daily variations in temperature, and detect flaws in sperm quality in advance

WEL-PP-13

EVALUATION OF BIOPOLYMER-BASED NESTING MATERIAL FOR SOWS: IMPACT ON PIGLET MORTALITY AND SOLUBILITY COMPARED TO TRADITIONAL MATERIALS

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Background and Objectives

Piglet pre-weaning mortality poses significant challenges both economically and over animal welfare. Provision of nesting materials to sows prior to farrowing increases sow maternal care traits and improve farrowing kinetics, which is directly related to piglet vitality. However, nesting materials that are often used as hay and straw pose a challenge to swine farms, as they can clog pipes and increase daily management. The aim of this trial was to asses if the biopolymer-based material has better solubility than conventionally used nesting materials and if piglets born from sows with assess to nesting material have less mortality rate.

Material and Methods

Sows were assigned at random into two experimental groups: sows without nesting material (CON, n = 9), serving as controls, and sows provided with 3.0 kg of a biopolymer-based nesting-material 24 h before the expected date of farrowing (BN, n = 9) based on farrowing induction with prostaglandin. Piglet mortality was calculated as the percentage of piglets that died in the first 24h out of the number of liveborn piglet. Solubility was measured as loss of mass after immersion of 1.5g of material in 100g of distilled water followed by filtering and drying of the supernatant. Solubility was assessed after 1, 2, 4, 7, and 10 days after immersion. The conventional nesting materials choses were wood shavings and straw. Data were analyzed by ANOVA.

Results

The biopolymer-based material had higher ($p<0.05$) water-solubility compared to straw and wood shavings in all periods of evaluation. Piglet mortality in the first 24 was not different ($p>0.05$) among experimental groups.

Discussion and Conclusion

The biopolymer-based material is a feasible alternative to be offered as nesting material regarding the management of the farm. There was no direct benefit of supplying nesting material over piglet mortality in the first 24h of life, however benefits in long term piglets' performance and in sows behavior merits additional research.

WEL-PP-14

RELATIONSHIP BETWEEN COLOSTRUM FATTY ACID COMPOSITION AND SOW MILK YIELD: IMPLICATIONS FOR LITTER BALANCING?

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Background and Objectives

Colostrum is the primary source of proteins and other nutrients for newborn piglets. If colostrum content analysis could estimate a sow's expected milk yield, it would be a useful tool for optimizing litter balancing.

Material and Methods

Colostrum was collected from 280 sows, and piglets were weighed and individually marked within 24 hours postpartum (EIP-Project Select4Milk (registration number 276034540350521)). After colostrum intake, a standardized litter balancing was performed, ensuring all sows started lactation with a similar number of piglets. At approximately 18 days of age, piglets were weighed again to calculate litter weight gain. The sows' feed remained consistent throughout the study. Colostrum samples were analyzed for dry matter, crude protein, and fatty acid composition. Litters were divided into two groups: Group 1 (140 litters with lowest weight gain) and Group 2 (140 litters with highest weight gain). Statistical analysis was performed using SAS Enterprise Guide® (ANOVA).

Results

The lower-performing sows had an average litter weight gain of 35.38 ± 7.18 kg and 2.38 ± 2.16 piglets died before weaning. The higher-performing sows had a gain of 49.37 ± 4.95 kg, with 1.87 ± 2.16 piglets dying. The lower-performing group had significantly lower levels of myristic acid, pentadecanoic acid, palmitic acid, palmitoleic acid, margaric acid, elaidic acid, α-linolenic acid, behenic acid, docosadienoic acid, and eicosapentaenoic acid, as well as a higher n6:n3 ratio.

Discussion and Conclusion

If a rapid test for these fatty acids becomes available, it could help predict milk yield early, given suitable limit values. This would allow for more precise litter balancing adjustments based on expected milk production. Nurse sows could be strategically used to relieve sows with lower expected milk yield. Other factors, such as immunoglobulin content, total energy or diseases, were not explored here but do not contradict the significant differences observed.

WEL-PP-15

LYING BEHAVIOUR IN FINISHING PIGS: DO THEY RESPOND TO ALTERING TEMPERATURE AND HUMIDITY?

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Background and Objectives

High ambient temperatures and high humidity can cause heat stress in finishing pigs. Altering the lying position is one behavioural response to mitigate heat stress. The aim of this study was to assess the lying behaviour of finishing pigs and to investigate its association with the temperature-humidity index (THI).

Material and Methods

Three pig farms located in Switzerland were visited eight to ten times between July and September 2024. A scan sampling with simultaneous measurement of temperature and humidity using USB data loggers was conducted five times a day between 9 a.m. and 6 p.m. During scan sampling the number of inactive pigs, their lying position (lateral, without contact to other pigs) and lying location (on slatted floor, on wet surface) in ten pens were recorded.

Results

Each pen had on average 9.4 ± 2.2 pigs which on average weighed 91.2 ± 9.8 kg. The temperature measured above the pens was 23.9 ± 3.0 °C (18.5 - 29.5 °C) with a relative humidity of 69.9 ± 5.9% (55.0 - 87.0%) resulting in a THI of 72.2 ± 3.0 (64.0-79.6).
On average, 81.8 ± 25.5% of the pigs were inactive. Of these inactive pigs 47.9 ± 27.2% were lying in lateral position, 66.5 ± 28.2% had no contact with other pigs, 30.9 ± 27.3% of them were lying on slatted floor and 46.2 ± 23.5% on wet surface. We found a slightly positive correlation between the THI and lying in lateral position (r=0.19) and lying without contact (r=0.24) and a moderate correlation between the THI and lying on a slatted floor (r=0.39) and lying on a wet surface (r=0.32).

Discussion and Conclusion

In conclusion, the association between THI and lying position of finishing pigs was low. However, more research is needed regarding other heat stress related behaviour.

WEL-PP-16

EVALUATION OF INTRADERMAL VACCINATION IN PIGLETS TO IMPROVE WELFARE AND LABOUR EFFICIENCY, REDUCE STRESS RESPONSES AND PAIN, AND MINIMIZE INJURIES TO PIGLETS AND PRODUCERS.

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Background and Objectives

Needle-free intradermal (ID) vaccination of pigs is a growing practice, but uptake has been slow in Canada. This study aimed to prove some of its proposed benefits in a realistic research environment, to increase interest and demonstrate how it can counter labour shortages while promoting animal welfare.

Material and Methods

1123 weaner piglets were randomly assigned into treatment groups: an ID group, an IM group, and a control group. Piglets were vaccinated in a random order with an injector device (with a capped or uncapped needle) or MSD's IDAL device. Time, audio, and video were recorded. 190 piglets were bled one-hour post-vaccination. Then six groups were recorded for thirty minutes with a novel object. The rest of the pens' behaviours were recorded via scan observations two- and three-hours post-vaccination.

Results

ID piglets had lower cortisol levels (ID mean = 94.37 nmol/L, IM mean = 185.16 nmol/L, $p < 0.001$), less vocalizations >1000 Hz (ID mean screams per pen = 2.36, IM mean = 16.64), and less intense vocalizations (ID mean intensity = 61.14 dB, IM mean = 68.20 dB). ID vaccination was faster (ID mean time per pen = 01:30.26 min, IM mean = 01:54.51 min), resulted in no adverse reactions (IM = 11), and no human injuries (IM = 2). More ID piglets interacted with the ball (ID mean = 2.02 pigs per minute, IM mean = 0.24) and for longer (ID mean = 23:29.67 min, IM mean = 07:51.68 min), while also moving it farther (ID mean = 139.33ft, IM mean = 6.67ft).

Discussion and Conclusion

Our results suggest that intradermal vaccination can be an effective and safe method of protecting swine, while enhancing animal welfare and promoting higher worker safety with better time management. It can also help to relieve some stresses caused by nationwide labour shortages.

WEL-PP-17

ESCAPE BEHAVIOUR OF PIGLETS DURING ROUTINE PROCESSING SHORTLY AFTER BIRTH

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Background and Objectives

Despite their painful/stressful nature, teeth clipping (TEE), tail docking (TAI), and ear tagging (TAG) are routine procedures conducted to newborn piglets in commercial units, frequently within seconds of each other. The objective of this study was to evaluate piglet's escape behaviour (EB) to procedures performed separately or consecutively.

Material and Methods

116 1-day old piglets (Duroc Danish x Landrace x Large white) were used. Individual EB was assessed from live video recordings of procedures. Intensity (0=no movement; 1=moving one limb; 2=moving more than one limb; 3=participation of the vertebral column; and 4=pattern as 3, but repeated movements with high intensity) and duration (0=no movement; 1=one single movement; and 2=repeated but not continuous) of EB were evaluated. To assess TEE, TAI and TAG separately, recovery (12±2.5 min) was allowed between procedures. Due to order differences in conducting the procedures, the following groups were created (procedures performed prior to the focal procedure are in brackets): TEE, (TEE)+TAI, (TEE+TAI)+TAG, TAI, (TAI)+TEE, (TAI+TEE)+TAG, TAG, (TAG)+TEE, (TAG+TEE)+TAI. A group with all procedures performed without recovery time was included (ALL). Scores were analysed via Kruskal-Wallis test with a post-hoc Dunn test (GraphPad Prism 10.0.2). Significance was set at $p<0.05$.

Results

Duration of EB did not differ among groups (P=0.99). Nonetheless, ALL had the highest (numerically) duration score (2.5±0.51) while TAI and (TAG+TEE)+TAI had the lowest (1.9±0.8, respectively). Intensity of EB differ among groups (P=0.013): ALL (2.6±0.7) had higher score than the other groups (av. 2.22±0.7; P<0.05, respectively).

Discussion and Conclusion

Results suggest that allowing for a recovery time between procedures could mitigate piglet's adverse reaction to them as opposed to perform them consecutively. Future research should evaluate piglet's EB incorporating a control (no handling) and/or a negative control (handling piglets only) treatment.



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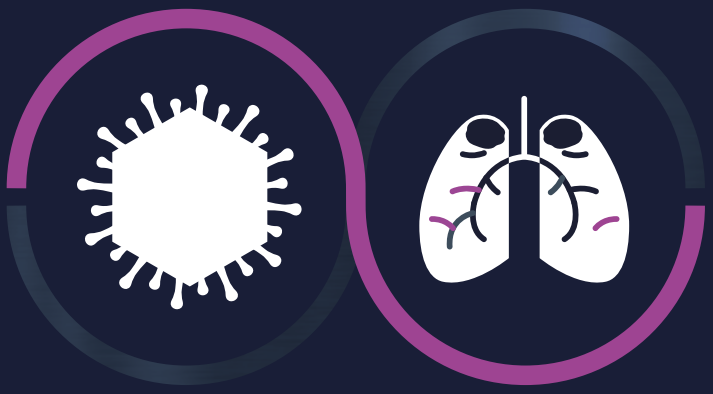
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* Based on the comparison of the homology of the epitopes using the EpiVax-methodology. Comparison to PCV2a based vaccines.

1: Tierärztliche Umschau Impfstoffe & Sera, Ausgabe 2024, Seite 39. **2:** Foss et al. (2023): Comparison of predicted T cell epitopes in porcine circovirus type 2 isolates from 2017 to 2021 and selected vaccines (EpiCC analysis) confirms the global relevance of a bivalent vaccine approach. Veterinary Vaccine Vol 2 Issue 2 2023.

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