Australasian Pork Research Institute Ltd APRIL

PROJECT SUMMARY

Project Number and Title: A1-102 – *Proof of Concept: Oral fluids and quantitative assessment for porcine chronic respiratory disease (PCRD) in Australian field conditions*

Project Leader: Dr Greg Tuckett (Rivalea Australia)

Project Participants: Dr Jessica Craig (Rivalea Australia), Aileen Vanderfeen (ACE Laboratories), Theresa Limm (formerly ACE Laboratories), and Dr Anke Woeckel (formerly Rivalea Australia)

Aims and Objectives:
The current project aimed to demonstrate a close correlation between the number of DNA copies of primary and secondary respiratory pathogens involved in PCRD (*Actinobacillus pleuropneumoniae*, *Mycoplasma hyopneumoniae*, Porcine Circovirus type 2 (PCV2), *Mycoplasma hyorhinis*, and *Haemophilus parasuis*) in oral fluids (OF) with clinical symptoms, alternative diagnostic methods including histopathology, serology, and final evaluation of lung pathology at slaughter.

Experimental Design:
This project consisted of a single experiment, conducted in Corowa, NSW. In the weaner phase (*n* = 5 pens and *n* = 30 focal pigs) OF samples were collected on a pen basis and blood samples from a cohort of pigs. In the individual grower-finisher facility, individual blood and saliva samples were taken at 12, 15, 18, and 21 weeks of age (n = 80 pigs), and cough scores and eye temperatures were recorded. Oral fluids samples were collected using a rope hung in the pen for 30 min.

Pigs from the grower-finisher facility were transferred to an on-site abattoir at approximately 21 weeks of age, where lungs were scored for pleurisy and pneumonia, and hot standard carcass weight (HSCW), backfat P2, and loin depth were measured.

Serum samples were analysed for antibodies against PCRD pathogens, and OF were analysed for antigenic DNA using qPCR. Correlation analyses were then carried out to look at relationships between antigen levels in OF, antibody levels in serum, and other clinical signs of PCRD.

Key Findings:
- Most likely due to the nature of the design of the experiment, where pigs were housed individually in optimum conditions, there was an absence of major health challenges and no pigs presented conclusively with PCRD in the grower-finisher phase.
- *M. hyopneumoniae* or its antibodies were not detected in OF or serum for any pig at any timepoint.
- Antibodies against APP were detected in serum at most timepoints; however, APP was only detected in OF from a small number (*n* = 13) of pigs.

- PCV2 antibodies were detected in serum, and DNA from PCV2 was detected in OF. There was a significant positive correlation between PCV2 antibody in serum and PCV2 DNA in OF at 18 weeks of age ($r = 0.37$; $P = 0.046$) and 21 weeks of age ($r = 0.41$; $P = 0.028$).
- The number of PCV2 DNA copies in OF at 15 weeks of age showed a positive linear correlation with PCV2 serology antibody levels (titre) at 18 weeks of age ($r = 0.326$); the correlation tended towards significance ($P = 0.085$).
- From a dilution series it was concluded that OF testing at a pen level may be successful in detecting PCV2 when as little as only one out of 100 pigs in a pen is infected. However, this was at an age where the PCV2 load in pigs was quite high, and at ages where viral load is lower (e.g. at 21 weeks of age), testing OF may be less sensitive.

Applications to Industry:

In conclusion, these results show that measurement of PCV2 by qPCR in OF in pigs may be used as an indicator for likelihood of infection and this knowledge will aid in the development of rapid on-farm diagnostic tests using OF. Further investigation is required in a more commercial setting, or using challenge models, with grower-finisher pigs housed in large groups, and in winter periods where PCRD may be more prevalent.