Attachment D

Project title: A survey for PMWS in NSW piggeries

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Research Organisation: NSW Agriculture

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1. Non Technical Summary Report

Post weaning multi-systemic wasting syndrome (PMWS) of pigs is a disease with a complex aetiology. One of the agents that plays an apparently significant role in this disease is porcine circovirus 2. To date, PMWS has not been confirmed in Australia, although PCV 2 is now known to be present in most states, including New South Wales. PCV 2 has been detected by PCR carried out on tissues from pigs on a number of farms, but there has not been any association between the detection of PCV 2 and disease. In the recent past, in several NSW piggeries there have been cases of wasting and death, which could possibly be considered to be very mild forms of PMWS. However, confirmation of PMWS requires the identification of key histological changes and the detection of an abundance of PCV2 antigen in those lesions. In clinical episodes in NSW that could be considered possible PMWS cases, the histological changes in tissues have been at best equivocal and very mild. Although antigen detection had not been carried out on these cases, there is as yet no evidence that would suggest that PMWS has occurred in NSW.

Despite the lack of laboratory support for the occurrence of PMWS in Australia, in 2001 an overseas pig nutrition consultant, after visiting farms in NSW, claimed that there was clear clinical evidence of PMWS in Australia. The main aim of this project was to actively seek clinical cases of disease that could resemble PMWS and to conduct laboratory investigations with the specific aim of confirming PMWS, by both histology and antigen detection. Veterinarians in eastern

Australia who serviced pig farms were advised of the project both in writing and by personal contact on more than one occasion and were encouraged to submit cases. Steps were taken to ensure that there were no financial impediments to the submission of appropriate specimens. Veterinarian's fees for conducting detailed post mortem examinations and the costs of laboratory examinations were met by the project.

Submissions were received from 10 properties. Six of these properties were located in NSW, 3 in Victoria and 1 in Queensland. The total number of pigs from which specimens were collected was 22. In 18 of the 22 cases, clinical material was collected from pigs that had one or more clinical signs that may have been consistent with PMWS. Cases were obtained from 7 different farms. The remaining cases were animals exhibiting clinical signs suggestive of the porcine dermatitis-nephropathy syndrome (PDNS). These cases were submitted because PCV2 may play a role in this syndrome and such cases are sometimes encountered on farms where PMWS is encountered.

The cluster of clinical signs described for PMWS include ill thrift or weight loss, difficulty breathing and enlarged lymph nodes. In addition, there may be signs of diarrhoea, jaundice and pale skin. However, in respect of linkage with an individual infectious agent, these are somewhat non-specific signs. One of the more characteristic clinical signs described in cases of PMWS is a marked generalised lymphadenopathy. In no cases submitted for this project was this clinical finding noted. There were however 6 animals in which there were some histopathological changes consistent with (but not specific for) PMWS. These lesions were generally mild in nature reducing the likelihood of PMWS. Immunoperoxidase staining failed to identify PCV 2 infection in any section examined from a pig showing clinical signs that may have been suggestive of PMWS. Specimens obtained from overseas PMWS cases were also examined as positive controls and contained an abundance of PCV 2 antigen in association with characteristic histological lesions.

The use of PCR technology has been considered to be inappropriate for confirmation of PMWS due to its high sensitivity combined with the fact that PCV2 nucleic acid can be detected in a large number of normal pigs. Nevertheless, tissues from 11 possible PMWS cases in this project were examined by PCR to detect PCV2 nucleic acid. Negative results were obtained in each case, supporting the results of the PCV 2 immunohistochemistry.

Archival material from 17 cases that could on clinical grounds be consistent with PMWS was also re-examined. Some of these cases had mild lesions that could be consistent with (but not pathognomonic for) PMWS. A diagnosis of PMWS was not supported by antigen and/or nucleic acid detection.

Case material from four animals with clinical signs suggestive of PDNS were submitted from 3 Victorian herds. All of these cases had histological changes

consistent with PDNS. A small amount of PCV 2 antigen was detected in one case. PCV 2 was subsequently isolated from a lymph node from this animal.

During the course of the project, national diagnostic capabilities for PCV1 and PCV2 infection were enhanced. Reference viruses, monoclonal antibodies and infected tissues were secured, together with cell cultures and methods to cultivate these fastidious viruses. A number of diagnostic procedures were successfully established, including immunoperoxidase staining on tissue sections and cell cultures, the indirect immunoperoxidase monolayer assay (IPMA) for antibodies (the “gold standard” for serology), and ELISA assays for PCV2 antibodies and antigens, derived from commercial sources. PCR capabilities that are generic for porcine circoviruses, as well as PCV1 and PCV2 specific assays have also been established at EMAI. Finally, at least one Australian isolate of PCV2 has been successfully cultivated in cell culture, the first time that this virus has been isolated in Australia.

In order to provide a broader appreciation of the PCV2 status of the Australian pig population and to explore the potential for the occurrence of PMWS, the serological assays established during this project were applied to project serum samples as well as archival samples in serum banks. Samples collected for the national PRRS survey in 1995 were tested and it was shown that PCV2 was widespread in NSW at that time. Finally, the NSW samples that were collected in 2001 for the National Serum Bank were also tested. Sera from 27 herds were evaluated. Only 2 of these herds showed significant numbers of negative animals. One farm was entirely seronegative and another had 1 positive animal and 4 inconclusive animals from a total of 30. Seventy six per cent of all samples tested were seropositive. The percentage of inconclusive and negative samples was 14% and 10% respectively. The average number of seropositive animals on a farm, excluding the 2 low prevalence farms, was 83%.

A survey of pig practitioners found that those surveyed generally had extensive experience in the pig industry. Most practitioners had read about or attended a workshop on PMWS, while several had seen cases overseas. These findings indicate that practitioners are aware of PMWS and its clinical presentation. PMWS is not considered to be “common”. Most of the veterinarians surveyed believe that PMWS is either “not detected” or “not present”, with some believing that PMWS is “uncommon”.

In conclusion, this study failed to identify a single case of PMWS, despite an active search for clinical material. However, the number of cases from which material was submitted was low. PMWS could occur at a very low frequency in the NSW pig population and insufficient samples may have been examined to detect the syndrome. However, case material was specifically targeted from animals with clinical signs that may have been in any way consistent with PMWS and veterinarians and farmers were provided with incentives to submit material from possible cases. This low submission rate in conjunction with the findings of

the survey of pig practitioners suggests that a syndrome consistent with PMWS is not currently active in piggeries in NSW. Nevertheless, as PCV2 is widespread in population, there is a need to continue examining cases that may be consistent with PMWS.