Risk Factors Associated With Post-Weaning Multisystemic Wasting Syndrome of Swine (PMWS)

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Background and Objective:
Nursery pig management has become one of the major challenges of veterinarians in the past few years. The structure of the swine industry has changed such that newly weaned pigs are saleable and nursery pigs are moved and/or sold from one system to the next. With the advent of early weaning and off-site production, there are both healthier and sicker nursery pigs than there have ever been before. When the system is working, the growth rates are phenomenal. When the pigs are ill, there are significant losses due to mortality.

In the late ‘90’s, the identification of circovirus and its association with post-weaning multisystemic syndrome (PMWS) became a cause of concern to the swine industry. The purpose of this study was to determine the relevance of circovirus to nursery pigs losses in Manitoba. The association between nursery pig mortality and other infectious diseases and management factors was also determined.

Procedure and Project Activities:
A case/control observational study was conducted on a convenience sample of herds in Manitoba, Canada. Cooperating producers had a regular veterinarian and kept production records. Case herds were those which experienced high nursery pig mortality (>3% or a single episode where mortality spiked above normal herd levels) within the previous 18 months. Control herds had nursery pig mortality < 3% in the same period. The herd veterinarian determined the herd status. Herds (28 cases, and 33 controls) were visited and producers completed a survey in May and June, 1999. The survey described the management and disease status of the herd.

Disease status was based on producer recollection, historical laboratory data, vaccination protocol, current clinical problems and autopsy findings on three pigs submitted by each unit during the study. All pigs were subjected to a complete post mortem evaluation and a panel of polymerase chain reaction (PCR) tests were conducted to evaluate the presence of Porcine Respiratory and Reproduction Syndrome (PRRS) virus, circovirus, Mycoplasma hyopneumonia and swine influenza virus. Other tests were conducted as directed by the attending pathologist.

The simple associations between case and control herd status and management and disease factors were determined using a chi-square for qualitative variables and students t-test for quantitative variables. Variables significant at P<0.15 were put in logistic regression model and removed one at a time using a backward elimination process until all variables were significant at P<0.10.
Results and Discussion:

Mortality rate in the case herds (4.4%) was higher than in control herds (2.1%). Case herds had more poor doing pigs (3.7%) at the end of the nursery fill than control herds (1.6%).

Management Factors
Case herds were geographically closer to other pig farms (2.63 km) than control herds (4.55 km) and case herds had more farms within a 2 mile radius (4.11 farms) than control herds (1.12 farms). They also tended to allow older pigs to be fostered out of litters (8.5 days) than did control herds (6 days). Case herds had a higher maximum age at weaning (23.5 days) than control herds (22.1 days) and a lower minimum weight at weaning of 4.1 kg compared to 4.6 kg in control herds. In addition, a higher proportion of case herds obtained their nursery pigs from more than two sow herds, and were more likely to fill a nursery pen with pigs from more than one farrowing room.

Case herds took longer to fill the nursery site (20.5 days) and nursery barn (12 days) than the control herds (11.5 and 6.75 days, respectively). It also took them longer to completely empty the barn and room (12 days and 2.3 days) than control herds (1.2 and 1.3 days). Case herds put light weight pigs from finished rooms back into nursery rooms with younger pigs which could maintain disease spread.

Nutrition
Case herds were less likely to put spray-dried plasma in the first nursery ration and tended to be less likely to put it in the second nursery ration. They also switched from the second to the third stage ration at a younger pig age than the control herds.

Diseases
Clinically, case herds had more pale pigs, diarrhea and respiratory problems due to PRRS, and more coughing. Case herds were more likely to be positive for or express clinical signs due to *M hyopneumonia*, K88 *E coli* causing nursery pigs losses and circovirus. Most of the case herds (71%) and many of the control herds (46%) had a diagnosis of circovirus. Only two of the 28 case herds and none of the 33 control herds had experienced PMWS.

Conclusions:

The case herds had a higher nursery pig mortality than the control herds, which was unrelated to culling practices, and had a higher proportion of poor doing pigs at the end of the nursery phase. There were several management factors identified by this survey that could be causally related to increased nursery pig problems in case herds when compared to control herds. These include fostering of older pigs in the nursing phase of life, accepting a higher maximum age and a lower minimum weight for pigs to move into the nursery, and filling nursery pens with pigs from multiple farrowing rooms rather than keeping litters together. Case herds also put light weight pigs from finished rooms back into nursery rooms with younger pigs which could maintain disease spread. Case herds fed less spray dried plasma per piglet and moved nursery pigs from the second (contains SDP) to the third stage (not containing SDP) ration at a younger age.

This study illustrates the host-agent-environment triangle that leads to production losses in swine units. Clearly, the control herds adhered to better pig flow and management, had fewer disease agents and had better control over the environment (i.e. numbers of farms within a two mile radius) than case herds.

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