Farms and Boar Studs: How Can We Prevent PRRSV Contamination?

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Epidemiological and experimental information have long indicated that PRRSV can be transmitted through semen[1,2]. It is estimated that 75% of services are now artificial insemination in the U.S. It is necessary for boar populations to be PRRSV-negative to supply virus-negative sow herds, supply sow herds undergoing PRRSV elimination, and to avoid introduction of a different PRRSV into a PRRSV-positive sow herd. Boar populations are PRRSV-negative by population of new studs from PRRSV-negative sources, total depopulation, or a population rollover. Sudden infection, as was the case of 13 studs during the winter of 2001-2002, is extremely problematic as veterinarians and producers attempt to maintain PRRSV-negative sow herds and complete PRRSV elimination programs. Biosecurity is generally higher in boar studs than in sow herds. Boar stud populations are easier to maintain PRRSV-negative compared to sow herds due to 1) location; 2) disciplined isolation; 3) low density in a single air space; 4) disciplined monitoring; 5) fewer animal introductions; 6) fewer staff members; 7) fewer removals of culls and deads; 8) fewer supply introductions; 9) fewer product suppliers; 10) improved control of water sources; 11) improved adherence to routine procedures as shower in/shower out; 12) fewer feed deliveries; and 13) greater frequency of single sourcing. The ramifications of stud population infections are great, as an increasing number of sow populations receiving semen are also PRRSV-negative.

The American Association of Swine Veterinarians (AASV) Health Committee initiated a detailed questionnaire to evaluate the risk factors of PRRSV introduction into boar studs. The study period was June 01, 2001 to May 31, 2002. The case definition was boar stud populations that became

infected with PRRSV during the study period. Infection was determined by serological or PCR testing.

Stud populations that had a history of PRRSV infection prior to the study period were not considered as case herds. These questionnaires and preliminary results were presented at the Allen D. Leman Swine Conference in 2002[3] and analysis presented at the AASV Annual Meeting in 2003. Sixty-one questionnaires were completed, representing 15,370 boars. Fifty-eight stud populations were included in the analysis. Assuming a ratio of one boar per 175 females and a 75% artificial insemination usage of a U.S. sow herd inventory of 5.6 million, this survey response represents 65% of total boar population. From the literature, the highest risks are the distance to the nearest swine and the nearest road with swine traffic; contaminated supplies or equipment being unloaded outside of the stud or semen transport coolers returned to the stud; whether there is a dedicated trailer for stud movements; feed manufactured in a non-pig mill; and testing errors leading to false-positive boars being allowed into the boar stud. The methodology used for analysis of risk factors was "Odds Ratio". This is a measurement of risk and gives the probability of infection given exposure divided by the probability of infection given no exposure. The risks were further analyzed in a regression model (SAS) with the equation:

Logit (PRRSV)=$e^{(\beta 1cap+\beta 2Distpig+\beta 3Distroad+\beta Feed\beta 5Supl\beta 6Fpos+\beta 7Cooler\beta trailer+error)}$.

The results of the risk analysis:

Risk Factor	OR	95% CI
Distance to Pigs	0.57	0.23,1.45
Distance to Road	1.05	0.35,3.19
Supplies Outside	>99	0,999
Coolers Returned	3.48	0.27,42.1
Feed	<0.01	0,999
False-positive Boars	3.26	0.33,33.5
Dedicated Trailer	0.20	0.01,2.91

Discussion

The analysis did not identify the statistically important risks. This may be because of lack of statistical power, the data set included only a small number of infected stud populations, or there is not a common link between the stud populations. Future direction of research needs to focus on stud location with respect to other swine, involvement of area spread, and fomite risks.

Prevention of PRRSV infection in boar stud populations is a work in progress because of the changing nature of our industry, emergence of detection methods, and improved understanding of risk factors.

References

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