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Aerosol transmission of Porcine Reproductive and Respiratory Syndrome virus, an application to the field: Preliminary data

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Objective

Eradication of Porcine Reproductive and Respiratory Syndrome (PRRS) on an individual farm basis is possible. However, many farms have become re-infected following area spread of the virus. Aerosol transmission of PRRSV is thought to be a potential route of spread of the virus between farms. Therefore, the objective of this study was to develop a model of a swine production region that is endemically infected with PRRSV and to evaluate routes of transmission and protocols of biosecurity.

Methods

This study incorporates four different facilities to represent four different farms in an endemically PRRSV infected region. The infected population is located in the middle of the region with the three other "farms" of different biosecurity levels; high (95% DOP @ 0.3 micron air filtration system)¹, medium (no filtration but including insect, fomite, personnel and transport biosecurity) and low (no intervention), surrounding it. The study will run for one year and have 26 replicates each of 2 weeks in duration. Over 2,000 pigs will be utilized for this study. The infected population houses 300 finishing pigs (continuous flow) and the high, medium and low facilities each house 20 nursery pigs (all in-all out). PRRSV MN-184, an isolate known to be capable of shedding and transmission via aerosols was used to inoculate 100/300 pigs in the finisher on day 0 to simulate one of the four naïve farms becoming infected.² In the high, medium and low facilities, intensive monitoring protocols based on PCR testing are established to monitor the presence or absence of PRRSV on personnel, fomites, insects, trucks, facilities and aerosols that enter the farm and buildings. Serum is collected from all pigs in the high, medium and low facilities on the 5 designated sampling days per replicate to monitor the PRRSV status of each population. Finally, to assess the potential

role of season on area spread, daily weather data are collected.

Results

This is an on going study scheduled to be completed in June of 2007. Preliminary data are as follows:

Replicate 1:

Infected Population: PCR positive flies (days 2-9) and air (days 5, 7, and 9).

High Facility: all samples negative.

Medium Facility: PCR positive air (day 7), with positive pig sera days 9-12.

Low facility: positive flies were collected on days 3-5, and positive sera on days 5-12.

All monitor swabs were negative.

Replicate 2:

Infected Population: PCR positive flies (days 2, 9 and 12) and air on days 2, 5, and 7.

High Facility: all samples negative.

Medium Facility: PCR positive air (days 5 and 7, with positive pig sera days 7-12).

Low facility: all samples remained negative.

All monitor swabs were negative.

Replicate 3:

Infected Population: positive flies (days 2 and 7), air (days 2, 7 and 9). All facilities and monitor swab samples remained negative for this replicate.

Discussion

Based on preliminary data, aerosol and insect transmission of PRRSV may be potential routes of spread in this model. Furthermore, the use of air filtration may reduce the risk of aerosol transmission. Data from upcoming replicates will be available at the time of the conference.

References

1. Dee, S.A. et. al. 2006. CJVR. 70(3):168-75.
2. Cho, J.G. et. al. 2006. Proc IPVS. Pg. 69.