

Characterization of the On-Farm Aerosol for PRRSV: Identification of a Unique Particle Distribution



Background:

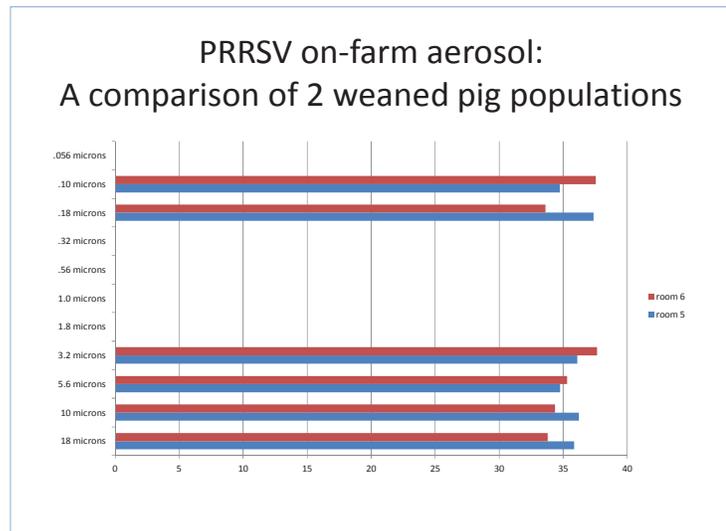
While PAR (Pipestone Applied Research) and the 3M Company have recently characterized particle characteristics for PEDV (Porcine Epidemic Diarrhea Virus) in on-farm aerosols, similar data do not exist for PRRSV (Porcine Reproductive and Respiratory Syndrome Virus). The objective of the exercise was to determine what sizes of particles carry PRRSV within the air space of an acutely affected population of pigs.

Design:

An aerosol survey was completed in 2 separate rooms of piglets, previously determined to be acutely infected with PRRSV. Clinical signs of PRRSV infection (fever, depression, labored breathing) were observed in 100% of the pens across both rooms. Particles were collected using a MOUDI (micro orifice uniform deposition impactor) size fractioning particle collector (range 0.056 um to 18.0 um). The instruments were placed in the alleyway of each room and size fractioned samples were collected for a 24 hour period using aluminum foil substrates. MOUDI substrates not exposed to the airspace were submitted as negative controls. The collected samples were tested for PRRSV RNA using a PCR (Polymerase Chain Reaction) method at the South Dakota State University Veterinary Diagnostics Laboratory.

Findings:

The attached graph summarizes the detection of PRRSV versus particle size for the two rooms that were sampled. There is a bimodal distribution of the detected virus across the particle sizes, but the basis for this has not been determined. It could be a function of a PRRSV respiratory infection, display of the typical bimodal particle distribution in naturally occurring aerosols (fine and coarse particle populations), PCR sensitivity, or another cause. It is interesting that similar data were recovered for two separate rooms housing different populations.



Conclusion:

This initial survey suggests that in contrast to PEDV, only select particle sizes may carry PRRSV. Of particular interest are the small particles < 0.3 microns that were PCR-positive. Particles of these sizes may escape capture by mechanical filters.