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ECONOMIC EVALUATION OF AIR FILTRATION SYSTEMS FOR PRRSV IN LARGE SOW HERDS IN A SWINE DENSE REGION IN NORTH AMERICA

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Introduction

Air filtration systems implemented in large sow herds have been demonstrated to decrease the probability of having a PRRSV outbreak. However, a large economic study comparing real production data from both filtered and non-filtered control farms has been never been completed in order to assess the profitability of this investment. Therefore, the objectives of this study were threefold: 1) to assess productivity in filtered and non-filtered sow farms; 2) to model the productivity of a hypothetical filtered and non-filtered sow farm based on real data; 3) to assess the profitability of the filtration system investment in these hypothetical farms based on a partial budget analysis.

Materials and methods

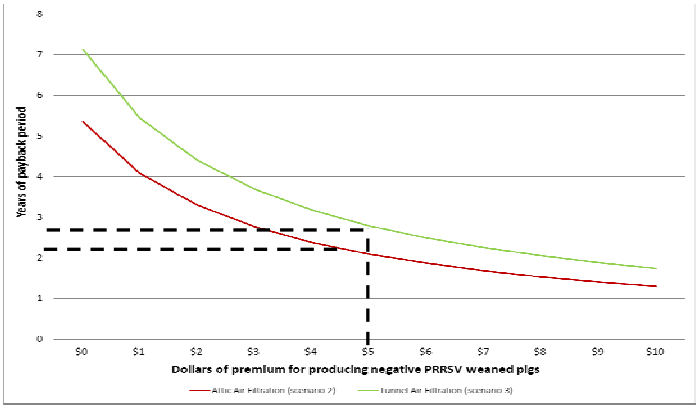
In 2010, 14 filtered and 6 non-filtered control herds were enrolled in a contemporaneous PRRSV epidemiological study. All farms, originated from the same Midwest US swine dense area, had an average inventory of ≥2,500 sows, had practiced a validated program of biosecurity and had experienced at least 3 new PRRSV introductions during the first 4 years of the study timeline. Quarterly production data were obtained for a 81 month period before and after filtration. Repeated measures analysis of production data (various variables) was conducted with 'weather', period of the analysis ('period'), PRRSV outbreaks in the period ('outbreak'), air filtration status, and the number of pig sites within 3 miles ('sites') as explanatory variables. Data management and statistical analysis was performed with a Statistical Analysis System (SAS) version 9.1. The retrospective and prospective timeline study was Oct 2004 to June 2011.

For the cost analysis, three scenarios were compared in a spreadsheet model[1] of weaned pig cost on a representative 3,000-sow non-filtered farm with feed cost of $278/sow/year: 1) control, 2) filtered conventional attic, and 3) filtered tunnel ventilation. Scenario 1 was based on the data from control and pre-filtration periods of the future filtered farms. Scenarios 2 and 3 were identical except that the initial filtering equipment cost $150/sow for the conventional versus $200/sow for the tunnel. Filtration was assumed to change pigs weaned/sow/year, farrowing rate, female replacement rate, female death rate, veterinary expenses, and the annualized cost of replacing pre-filters every six months and replacing filters every three years.

Results

The baseline statistics confirmed that pre-filtration and non-filtered control farms were not significantly different for any of the variables studied. In the final model, dependent variables were only adjusted by 'filtration status' and 'weather'. Production data for representative herds was used to calculate cost of a weaned pig for the 3 scenarios. Filtered farms produced 5,927 more piglets than non-filter sow farms and the payback period for the investment was estimated in the model as 2.1 years for scenario 2 and 2.8 years for scenario 3 assuming a 5$ premium in weaning pig selling price for producing PRRSV negative pigs in both groups of farms (Figure1).

Figure 1 Filtration investment payback period for sensitivity analysis in scenarios 2 and 3. A 5$ differential between control and filtered farms in weaned pig selling price with different PRRS status decrease the payback period to 2.1 and 2.8 for scenarios 2 and 3 consecutively.



Conclusions and Discussion

Filtered farms had improved productivity when compared with non-filtered control farms. The payback period demonstrated this improvement.

References

1. PigNet Swine Enterprise Budget, Version 2 http://faculty.apec.umn.edu/wlazarus/tools.html