Allen D. Leman Swine Conference

Volume 39
2012

Published by: Veterinary Continuing Education

Sponsors
We thank the following sponsors:

Platinum
Bayer Animal Health
Pfizer Animal Health

Gold
Novartis Animal Health

Silver
Boehringer Ingelheim Vetmedica, Inc.
National Pork Board
Newport Laboratories

Bronze
Merck Animal Health

Copper
AgStar Financial Services
Elanco Animal Health
GlobalVetLINK
IDEXX
Novus International, Inc.
PIC USA
USDA PRRS CAP

University of Minnesota Institutional Partners
College of Veterinary Medicine
University of Minnesota Extension
College of Food, Agriculture and Natural Resources Sciences

How long does it take for a breeding herd to produce PRRSv-negative piglets?

Daniel Linhares; Montserrat Torremorell; Robert Morrison
Swine Disease Eradication Center, College of Veterinary Medicine, University of Minnesota

Introduction

Since its first report in the U.S. swine industry, PRRSv (porcine reproductive and respiratory syndrome virus) continues to cause significant pig production losses in North America and around the world. Methods to control and eliminate PRRSv from swine breeding herds include whole herd depopulation and repopulation, partial depopulation and herd closure. Herd closure is financially advantageous over whole herd depopulation because there is no required down-time, sows are not slaughtered, and there is no clean-up cost. The sow herd is closed to replacement pig introduction for 6-8 months, but remaining females are continuously bred and thus production is not ceased. Herd closure success rate is estimated at above 85% for farms with segregated production.

It has become a common practice in the U.S. swine industry to combine herd closure with whole-herd immunization with either modified-live virus vaccine (MLV) or with the virulent resident virus inoculation. To our knowledge, there is no scientific data on effectiveness of different immunization protocols to produce PRRSv-negative piglets from PRRSv-positive sources.

The purpose of this study was to determine effectiveness of herd closure programs when used in conjunction with whole herd exposure to MLV or resident live virus (LVI).

Approach

The effectiveness of herd closure programs was determined in a prospective study using time-to-negative-pig (TTNP) as the outcome of the analysis.

Herds (n = 60) that fulfilled the following inclusion criteria were enrolled: a) farrow to wean sow herd; b) diagnostic evidence that PRRSv was present; c) no diagnostic evidence that the herd had been infected during closure with a previously undetected PRRSv isolate; d) intent of herd owner to eliminate virus from the sow herd following a closure program; e) owners willing to cover costs of collecting samples and diagnostic testing above that defined by the project, and f) date of herd closure and whole herd exposure less than 3 weeks apart (Table 1).

Day 1 of the program was considered to be the day that intervention (resident virus or vaccination) was administered. Sampling at the herds started 12 weeks after day 1. The sampling criteria consisted of bleeding 30 due-to-wean piglets in a monthly basis (determined by target prevalence to detect 10% at a 95% confidence level for any population size). Blood serum was submitted to a reference Veterinary Diagnostic Laboratory for PRRSv-rtPCR in pools of 5. Herds that achieved AASV classification 2b (90 days of consecutive monthly piglets PCR-negative results) were classified as reaching TTNP.

Table 1: Baseline demographic characteristics of enrolled herds*

Characteristic	LVI	MLV
Number enrolled	39	21
Prior immunity	18 (46%)	15 (71%)
RFLP strain 1-4-4	15 (39%)	12 (57%)
Herd size (Mean ± SE)	3,557 ± 316	2,506 ± 241
Time from PRRSv-detection to intervention (Mean ± SE)	27 ± 3	32 ± 7

* There were no significant differences between groups at alpha level of 0.05 for prior infection and RFLP 1-4-4 (Fisher's exact, *P* -values 0.1680 and 0.1682 respectively), and for days from PRRSv-detection to intervention, (t-test, *P*-value 0.5250). For herd size, LVI herds were significantly larger than MLVs (t-test *P* -value 0.0106).

Five farms (4 LVI and 1 MLV) dropped from the study. Two farms in the LVI group re-started the load-close-homogenize program before reaching TTNP. Two other farms of the LVI group and 1 farm of the MLV were dropped because of unrelated PRRSv introduction, as concluded by their respective owners/veterinarians.

Preliminary results and discussion

There was a large variability in TTNP among the 60 herds in the study. The median TTNP among participating herds was 27 weeks. This is longer than we anticipated given previous reports in the literature. An important caveat is that herds that failed to reach negative by 27 weeks continued to achieve "negative" status until week 43. The distribution of TTNP ranged from 12 to 43 weeks in our study. Ongoing vigilance at farms with unexpectedly long closure times maybe required to achieve TTNP. Follow-up research is needed to identify herd-level risk factors that may explain this variability in time.

Herds with prior PRRSv immunity had median TTNP that was 9 weeks shorter than those without PRRSv immunity.

RFLP pattern and herd sizes were not statistically associated with shorter or longer TTNP.

At the time of this writing, LVI herds had significantly shorter TTNP (~25 weeks) than MLV herds (~33.0 weeks). A caution is that herds were not randomly allocated to the exposure type and these results may be confounded.

Data from this study suggest that PRRSv monitoring must be done repeatedly over time. From 60 farms with ongoing PRRSv monitoring, 21 farms had at least 1 month of PRRSv PCR-negative results followed by positive PCR results. Farms that had at least two consecutive PCR-negative results followed by PCR-positive submitted samples for genetic analysis of PRRSv and obtained sequences similar to the original resident virus, concluding that lateral PRRSv infection was not the case.

In summary, there is significant variability in the time it takes for herds to produce negative pigs, therefore producers and veterinarians need to take that into account when planning herd closure elimination programs. Further research is needed to determine the factors that contribute to PRRSv negative pig production from infected farms.

Acknowledgements

We would like to acknowledge participating veterinarians and producers for sharing their data us.

Dr. Jean Paul Cano (Boehringer Ingelheim Vetmedica, Inc) for his support.

Boehringer Ingelheim Vetmedica and U of Minnesota's Swine Disease Eradication Center (SDEC) for funding.