Summary report to the AASV Foundation

Research Project Award:

Assessment of immediate production impact following attenuated PRRS virus vaccination in endemically infected breeding herds

Authors:

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Statement of the problem:

Field studies have shown that herds with recent history of PRRSv infection achieved stability and recovered productivity significantly sooner than herds without recent history of PRRSv infection [1, 2]. Another study approached the question of the economic benefit of practicing preventative vaccination using attenuated virus vaccine as an attempt to "build" anti-PRRSv immunity prior to outbreak with wild type strains [3]. It was demonstrated that in the one hand vaccination increases herd immunity and reduces time-to-stability and impact on productivity when the herd becomes infected with wild type viruses. On the other hand, preventatively vaccinating a breeding herd also increases production costs (vaccine costs) and potentially attenuated PRRSv from vaccines has a negative impact on farm productivity [4-7]. There is the need to better define the production impact of PRRS MLV mass vaccination on the breeding herd performance.

Objective:

The objective of this field study was to measure the immediate impact of MLV mass vaccination on key breeding herd performance parameters under field conditions.

Materials and Methods:

Eight PRRS-stable (according to the AASV guidelines [8]) sow farms adopting routinely vaccinations using commercially available PRRS MLV vaccines were enrolled in the study. We collected the dates of each vaccination and looked at the productivity records of 6 weeks after all the interventions. A 6 weeks period prior to each vaccination was established as baseline for comparison. Abort rate, neonatal losses, pre-waning mortality, total pigs weaned and wean-to-first service interval were the productivity parameters analyzed. We conducted a statistical process control (SPC) analysis on the individual

farm level to detect a significant decrease in productivity after each MLV intervention, on each farm. We did not include changes in productivity followed by a PEDV outbreak. At the aggregated data analysis level, we built a mixed hierarchical regression model to assess the productivity change on up to 6 weeks following the reported PRRS MLV vaccination date, compared to a 6-week period immediately before vaccination. A level of significance of $P < 0.05$ was used for all analysis, with a one-sided p-value detecting only if the change in productivity represented a negative impact on performance, compared to the baseline.

Results:

On the individual analysis, from the 65 MLV interventions, there were a significant increase in aborts on 4 times (6.1%), an increase in neonatal losses 7 times (10.7%), an increase on pre-weaning mortality 2 times (3%), an increase on wean-to-first-service interval 2 times (3%) and no change in total pigs weaned. At the aggregated data analysis level (all herd vaccinations combined) there was no significant change in abort rate, neonatal losses, number of pigs weaned per sow, and wean to first service interval on PRRS-stable herds implementing PRRS MLV quarterly vaccinations. For pre-weaning mortality, there was an increase of 0.26% on the week 2 after vaccination compared to the baseline.

Discussion:

Results from this study support that adopting PRRS MLV quarterly vaccinations on PRRS-stable herds has little impact on breeding herd productivity parameters. This information will provide information to best feed the existing economic models to assist

swine veterinarians to take informed decisions regarding the use of PRRSv MLV vaccine as a preventive tool.

REFERENCES

1. Linhares DCL, Cano JP, Torremorell M, Morrison RB. Comparison of time to PRRSv-stability and production losses between two exposure programs to control PRRSv in sow herds. Preventive Veterinary Medicine. 2014;116(1/2):111-9. PubMed PMID: CABI:20143315612.
2. Linhares DCL, Betlach C, Morrison RB. Effect of immunologic solutions on sows and gilts on time to stability, and production losses in breeding herds infected with 1-7-4 PRRSv. Preventive Veterinary Medicine. 2017;144:112-6. doi: 10.1016/j.prevetmed.2017.05.024. PubMed PMID: CABI:20173263755.
3. Linhares DCL, Johnson C, Morrison RB. Economic analysis of immunization strategies for PRRS control. Plos One. 2015;accepted.
4. Bøtner A, Strandbygaard B, Sørensen KJ, Have P, Madsen KG, Madsen ES, et al. Appearance of acute PRRS-like symptoms in sow herds after vaccination with a modified live PRRS vaccine. Vet Rec. 1997;141(19):497-9. PubMed PMID: 9402722.
5. Dewey CE, Wilson S, Buck P, Leyenaar JK. Effects of porcine reproductive and respiratory syndrome vaccination in breeding-age animals. Prev Vet Med. 2004;62(4):299-307. doi: S0167587703002794 [pii] 10.1016/j.prevetmed.2003.11.007. PubMed PMID: 15068893.
6. Dewey CE, Wilson S, Buck P, Leyenaar JK. The reproductive performance of sows after PRRS vaccination depends on stage of gestation. Prev Vet Med. 1999;40(3-4):233-41. doi: S0167-5877(99)00025-2 [pii]. PubMed PMID: 10423777.
7. Nielsen J, Bøtner A, Bille-Hansen V, Oleksiewicz MB, Storgaard T. Experimental inoculation of late term pregnant sows with a field isolate of porcine reproductive and respiratory syndrome vaccine-derived virus. Vet Microbiol. 2002;84(1-2):1-13. PubMed PMID: 11731155.
8. Holtkamp D, Polson D, Torremorell M. Terminology for classifying swine herds by porcine reproductive and respiratory syndrome virus status. Journal of Swine Health and Production. 2011;19(1):44-56. PubMed PMID: WOS:000285776000008.