Stabilization of a SI and PRRS positive breeding herd in the Netherlands using homologous viral immunization

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INTRODUCTION & OBJECTIVE

Porcine reproductive and respiratory syndrome virus (PRRSV) and swine influenza virus (SIV) are economically important pathogens. These pathogens are difficult to control with commercial vaccine, which do not offer protection to new, heterologous challenge strains. The study assesses the efficacy of an autogenous nanoparticle vaccine carrying PRRS and SI antigens for the control of disease in a breeding herd.

MATERIALS & METHOD

A 4000-sow breeding herd was clinically affected by PRRS and SIV (2022-2023).

SIV circulation pre- and post-weaning was confirmed in nasal swab samples (30) and for PRRSV serum samples (20) were collected from each group followed by pooled PCR analysis.

The circulating PRRSV was isolated from serum samples in porcine alveolar macrophage culture and ORF5 locus was sequenced, image 1. Circulating SIV was isolated and identified as H1N1 and H1N2. Eight consecutive batches (800 piglets each) of 3-day-old piglets were vaccinated intranasally with 2mL of the nanoparticle autogenous vaccine derived from the circulating isolates.

The autogenous vaccine was a nanoparticle homologous vaccine (**BARRICADE™** from KEMIN® Aptivax) with SI antigen during P1 and PRRS and SI antigens during P3 administered intranasally (2ml) at 3 days of life.

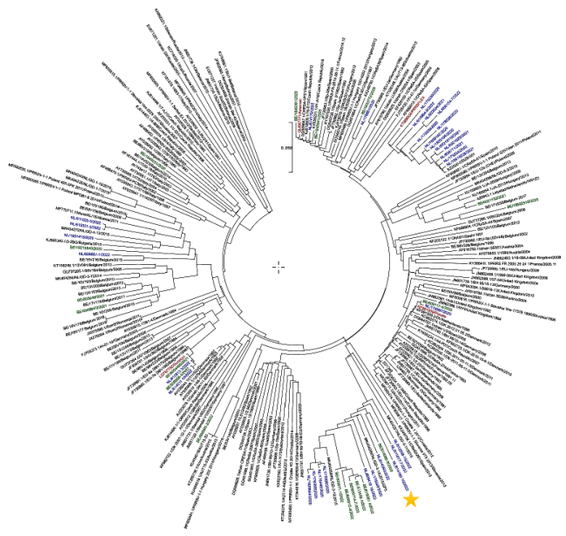


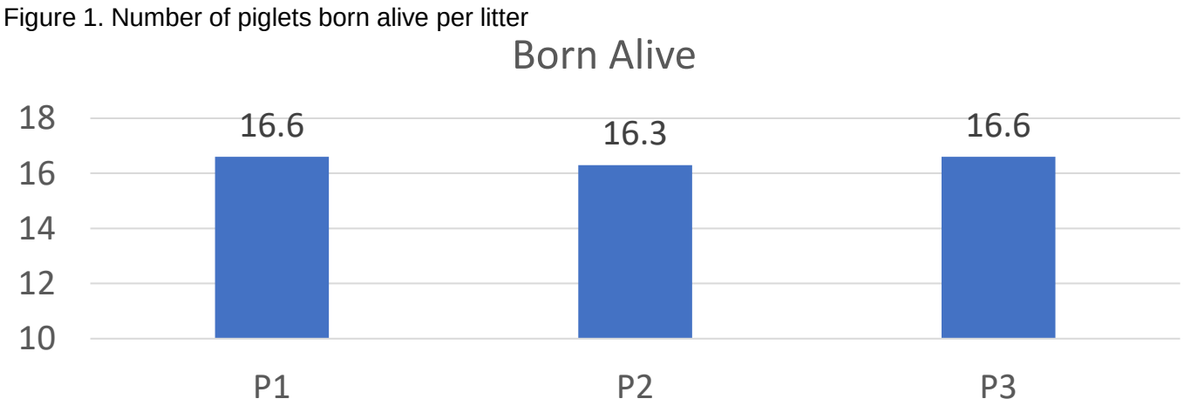
Figure 1. Phylogenetic tree with PRRS strain used in vaccine identified with a star, commercially available vaccines are in red, homology with closest commercial vaccine was 82%.

Born alive / litter, pre-weaning losses (mortality and poor piglets) weaned / litter (WL) were recorded. Antibiotic use (for group treatment) was assessed. Data was analysed in the Fit Model function of JMP 16. Differences considered significant at P<0.05.

RESULTS

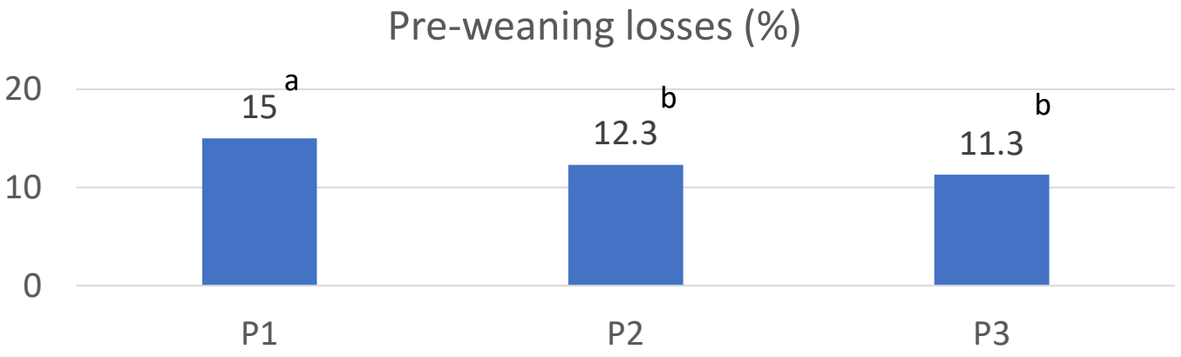
No significant differences (P>0.05) were observed for the 3 periods for the number of piglets born alive, the results can be observed in figure 1.

Figure 1. Number of piglets born alive per litter



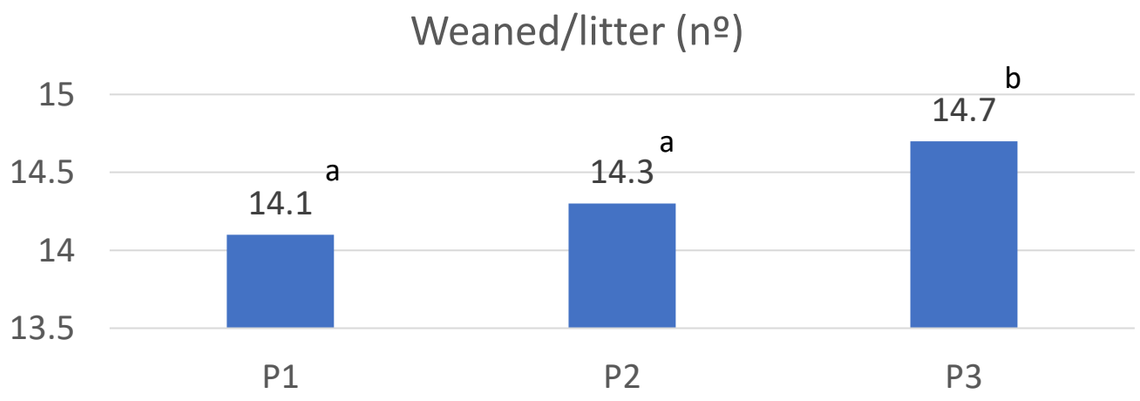
Pre weaning losses were lower (P<0.05) during P2 and P3. At the end of P2 a PRRS and SI occurred, leading to associated clinical disease. In response to the outbreak the autogenous intranasal vaccine was applied. Results can be seen on figure 2.

Figure 2. Percentage pre weaning piglet losses



Despite PRRS and SI disease challenge during P3, there was a significant increase in number of piglets weaned per litter during P3 (intranasal vaccination with PRRS and SI antigen) versus the two previous periods (P<0.05), results can be seen on Figure 3.

Figure 3. Number of piglets weaned per litter



The extra number of piglets weaned / litter of 0.4 results in an increased value of 24 € litter*.

Antibiotic used for group treatments were lower during the period without disease challenges P2, (P<0.05), but was not significantly increased in P3, despite a dual challenge with SI and PRRS, with averages of 5.4kg/month for P1, 1.0 for P2 and 5.1 for P3.

Different superscripts indicate P<0.05

CONCLUSION

As shown in this study, managing SI Challenges, improved health status over time, resulting in a more sustainable use of antibiotics. The homologous vaccination approach for PRRS and SIV following a PRRS and SI outbreak, resulted in a significant higher number of piglets weaned per sow and a reduction in mortality.

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References
AB-23-2884
SD-24-26679
*Assuming a value of €60 / piglet / weaner , Weekly price report on Pig carcass (Class S, E and R) and Piglet prices in the EU assessed 18 March 2024