How to define your PRRS vaccination program

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Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) is one of the primary precursors of economic losses in pig production. Acute impact costs range from $236-502 per sow per year. Clinical signs include decreasing farrowing rates, abortions, stillborns and increase of respiratory clinic problems in pigs.

In spite of different veterinary practitioner's points of view about the efficacy of live PRRSV vaccines, the use of live attenuated PRRSV vaccines have proved to be effective for controlling PRRSV infection in several experimental and field experiences, either for controlling the negative effects in sows or in growing-fattening pigs.

However, there is no doubt that different aspects have to be considered for getting the best efficacy from a live attenuated PRRSV vaccine.

The use of a PRRSV serology ELISA technique (CIVTEST SUIS PRRS E/S) for performing transversal serum profiles in a pig farm is the tool that we use daily for giving advice about the best way to control PRRSV. Serum profile information allows us to have a general idea about the specific epidemiologic momentum of PRRSV in a farm.

The objective of this article is to summarise results of several serum profiles and classify them in three main groups that match with different epidemiologic PRRSV situations, which will help us define the most suitable PRRSV vaccination program.

Material and methods

We made transversal serumprofiles from different pig groups (gilts, sows, piglets and fattening pigs) present in 200 different farms located in Spain, Hungary, Poland, Czech Republic, Slovak Republic, Italy and Denmark.

Sows were grouped together by parity number (serum samples were taken from pregnant sows within the period of 70-100 days of pregnancy). Serum samples were also taken from pigs from different weeks of age (4, 7, 10, 13, 16, 19, 21 and 24 weeks of age).

The number of serum samples per group depended on the size of the farm. The average sample number per group was seven.

Serum samples were analysed with the same PRRSV ELISA serology kit (CIVTEST SUIS PRRS/ES from Laboratorios Hipra, Amer, Spain) following the manufacturer's instructions.

Some clear definitions are required to understand the way we classified the farms:

● **Clinically not stable:** farms where sows are suffering from clinical signs due to PRRSV infection as well as their pigs.

● **Clinically stable:** farms where sows are not suffering from clinical signs and neither are their piglets until seven weeks of age.

● **Serologically not stable:** Serological IRPC values are higher than 100 in sows and pigs at seven weeks of age are serologically positive. It means there is an active PRRSV recirculation in the sow population independent of the presence or not of clinical symptoms. In this type of farm some viraemic piglets are born and at seven weeks of age they already show an active serum conversion.

Live attenuated PRRSV vaccines used to induce IRPC values normally lower than 100; so PRRSV vaccination in sows does not interfere with the classification status of the farm.

● **Serologically stable:** Serologic IRPC values are lower than 100 in sows and pigs do not show PRRSV antibody titers at seven weeks of age.

According to our data maternal derived antibodies (MDA) against PRRSV cannot be detected in pigs older than 5-6 weeks of age.

Therefore, antibody titers detected (IRPC values) in pigs at seven weeks of age are probably induced by an early infection during lactation, which means that some sows were farrowing viraemic piglets.

Results

So, after testing 200 farms, bearing in mind the clinical signs and the serumprofile results, we could determine three well defined infection patterns, which let us define three different PRRSV epidemiologic status:
● Pig farms clinically not stable and serologically not stable, (42/200).
● Pig farms clinically stable and serologically not stable, (112/200).
● Pig farms clinically stable and serologically stable, (36 farms/200).

From all the farms evaluated there were 10 farms which we could not classify in any of the three patterns mentioned above.

In farms where the piglets were vaccinated, we could not determine any pattern. The vaccination in pigs normally at 3-4 weeks of age was hiding the field PRRSV infection, therefore it was impossible to classify the farms.

Discussion

● **Pig farms clinically not stable and serologically not stable.**
In this type of farm the first target is

Fig. 1. PRRSV serum profile from a farm suffering from reproductive clinical signs. Sows (from 1 parity (1p) until 6 parity (6p)) and gilts showed IRPC values higher than 100 and pigs (3-25) at seven weeks of age already showed PRRSV antibody titers. ELISA PRRSV Kit; CIVTEST SUIS PRRS E/S. Positive IRPC > 20.
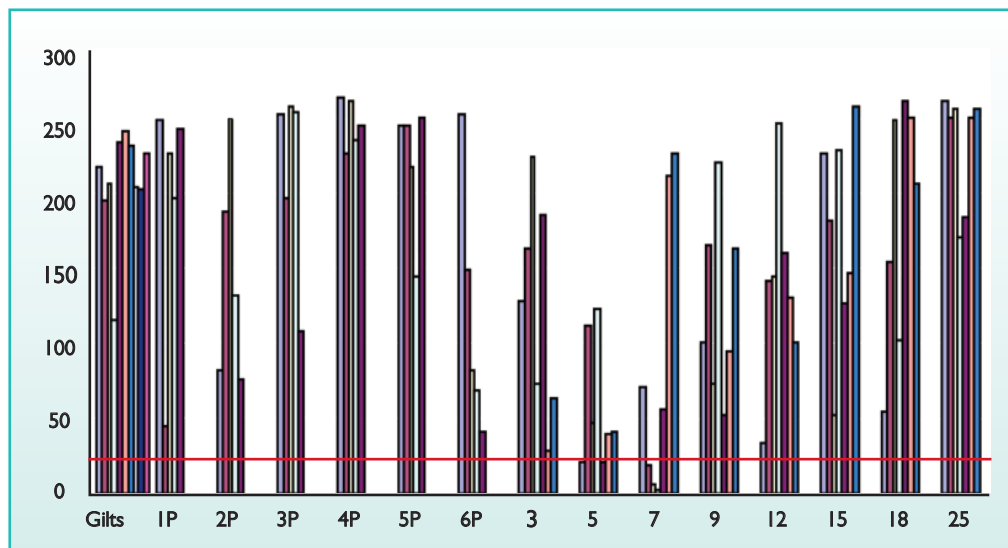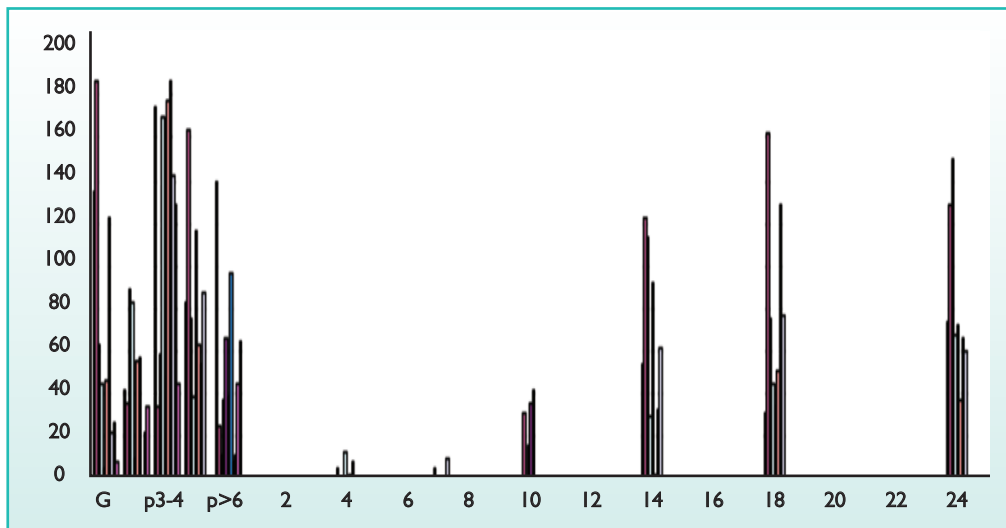
Fig. 2. PRRSV serum profile from a farm without reproductive clinical signs. Sows ((P3-4) and (P>6)) and gilts (G) showed IRPC values higher than 100 and pigs (3-24) at seven weeks of age did not show IRPC titers. ELISA PRRSV Kit; CIVTEST SUIS PRRS E/S. Positive IRPC > 20.

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to stop the birth of viraemic piglets. Therefore, the vaccination program has to be focused only in sows. At this moment the PRRSV vaccination implementation of live attenuated PRRSV vaccine in piglets will have poor results. Piglets infected by field PRRSV have been reported to respond inefficiently to different vaccination protocols. So, in this situation a program based on intensive mass vaccinations in sows (one mass vaccination every 3-4 months) with a live PRRSV vaccine will probably be the most effective program to reduce reproductive problems in sows and avoid or reduce the birth of viraemic piglets.

● **Pig farms clinically stable and serologically not stable.**
In this type of farms PRRSV clinical signs are usually only observed in pigs at around 7-10 weeks of age. As we can observe in Fig. 2, there is still PRRSV re-circulation in sows (IRPC values higher than 100) so we should keep on trying to reduce the recirculation of field PRRSV in sows in order to prevent the birth of new PRRSV infected piglets. Therefore, intensive vaccination programs in sows should remain as in the Fig. 1 farm.

Pigs (in Fig. 2) do not show PRRSV serum conversion until 10 weeks of age. It means they were not infected

during lactation; they were infected at around 7-8 weeks of age instead.

The severity of clinical signs will depend on the co-infection with other pathogens and on the PRRSV strain virulence. So, pig vaccination may be also required.

In this case vaccine can be applied in piglets since piglets are not viraemic during lactation and they are supposed to be healthier.
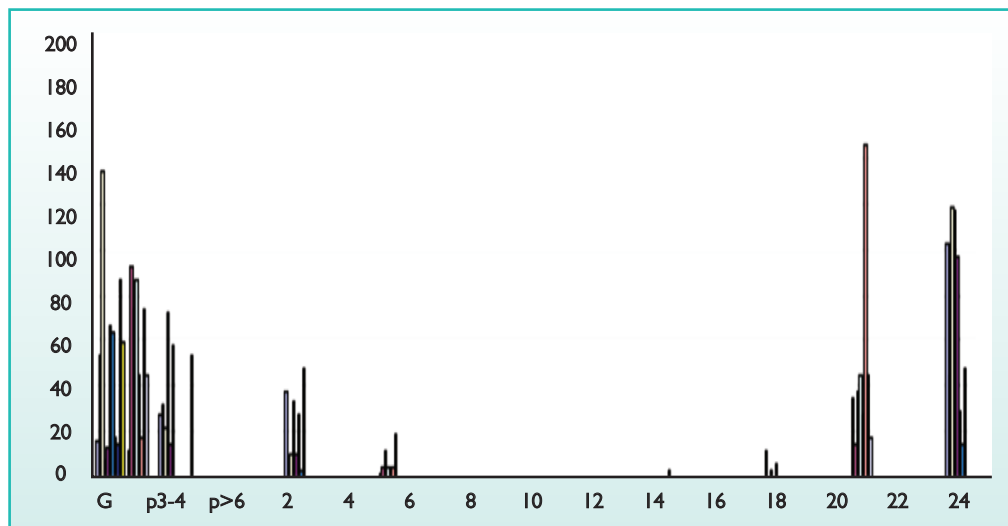
In piglets, one single vaccine dose

with a live attenuated PRRSV vaccine at 3-4 weeks of age is usually enough to induce protection.

● **Pig farms clinically stable and serologically stable.**
In Fig. 3 we can observe that there have not recently been PRRSV re-circulations in the sow population. Sows IRPC values are low and pigs do not show serum conversion at seven weeks of age. It means that at

this moment the infection pressure in the sow unit is very low. In this case it is convenient to keep a regular vaccination program in sows for maintaining a minimum protection status in the whole sow population.

The most usual regular program is composed of a single dose with a live attenuated PRRSV vaccine in each lactation period (12-15 days after each farrowing).

As we can observe in Fig. 3, pigs do not show any serum conversion until 21 weeks of age.

As in the previous case (Fig. 2) the severity of the clinical signs and negative production effects will assist us to decide if PRRSV vaccination in pigs is necessary. Pig vaccination in this case could be implemented later than 3-4 weeks of age since the field infection occurs later than 7-8 weeks of age.

On the other hand, in the field, most of the farms would successfully implement the same one single dose program at 3-4 weeks of age.

In the three PRRSV epidemiological patterns exposed herein PRRSV vaccination in gilts should be a constant.

Gilts should be vaccinated with at least one dose of a live attenuated PRRSV vaccine before the first mating in order to induce a degree of protection that will reduce reproductive clinical signs and the birth of infected piglets in first parity sows. ■

Fig. 3. PRRSV serum profile from a farm without reproductive clinical signs. Sows (p2, p3-4, p5-6, p>6) showed IROC values lower than 100 and pigs (3-24) at seven weeks of age did not show PRRSV IRPC. ELISA PRRSV Kit; CIVTEST SUIS PRRS E/S. Positive IRPC > 20.