

PERFORMANCE AFTER HERD VACCINATION WITH PORCILIS®-PRRS IN PERSISTENTLY INFECTED FARROW-TO-FINISH HERDS

E. große Beilage¹, Th. große Beilage²

¹School of Veterinary Medicine Hanover, Dept. of Epidemiology; ²Veterinary Practice Essen i.O.; Germany

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Introduction

Herd-vaccination is a common method to control PRRS in regions with high pig density (1). Under conditions where eradication of PRRS cannot be recommended because of a high risk of reinfection, vaccination can be a cost effective measure to prevent herds from economic losses. Starting PRRS vaccination may be correlated with some risks for pregnant sows, especially when using an attenuated live vaccine (2). The risk of an intra-uterine transmission of the vaccine virus to the fetuses is well-known and has been confirmed under experimental (3) and field conditions. As a result of this, in the USA, PRRS vaccination of sows is licensed only for non-pregnant sows. Under field conditions, these restrictions lead to the so-called 6/60-program, meaning a PRRS vaccination at day 6 after farrowing and at day 60 of the following gestation (4). Investigations, carried out in herds where PRRS vaccination was started, gave some information that there is an enhanced risk for intrauterine transmission of the vaccine virus when a sow gets its first vaccination during gestation (5). Nevertheless, in Germany attenuated live PRRS vaccines are commonly used in the way of a complete sow-herd vaccination regardless of the stage of gestation. In the usually small sow herds in Germany, this vaccination scheme can effectively be carried out by the herd-veterinarians, while the vaccination of groups with a defined stage of gestation requires more logistic expenditure and will be more time-consuming.

In Germany, the reason for the PRRS vaccination of sows may be the prevention of reproductive disorder, but in many cases it is done with regard to stabilising the whole herd and preventing uncontrolled virus circulation.

Reasons for the following investigation were reports (2), especially from Denmark, of reproductive disorder soon after the PRRS vaccination with a US-type live vaccine. It was carried out to examine the safety and efficacy of a new attenuated live vaccine (Porcilis® PRRS, Intervet, Boxmeer, NL) in sows and their offspring. In Germany, Porcilis® PRRS is the first attenuated live vaccine, which is based on a European strain of PRRSV. It is licensed for the use in piglets while the licence for the vaccination of sows is in progress.

Materials and Methods

The study was carried out in two farrow-to-finish herds with 110 and 150 sows. The herds had been persistently infected with PRRSV for some years and had never been vaccinated before. The units for farrowing, weaning and finishing are at one-site. During the monitoring period, there were no significant changes in herd-size, genetics of sows, housing of pigs or vaccination schemes other than PRRS.

Before vaccination, the persistent PRRSV infection was confirmed by cross sectional serology (Idexx-ELISA). Sows were mainly seropositive and piglets seroconverted between 7 and 10 weeks of age.

The vaccination scheme was a modified 6/60 program, leaving out the vaccination of sows that were more than 60 days of gestation when the herd got the basic-immunisation (tab.1). Piglet vaccination was started when all sows got at least one vaccination, boars were generally left out.

Statistical analysis of the data was performed using SAS® v 8.0 software (two-way contingency tables, ANOVA).

Table 1: PRRS vaccination scheme

day	sows*	piglets
1	1.non-pregnant sows 2.sows until day 60 of gestation	
28	1./2.booster vaccination 3a.vaccination of lactating sows, left out at the first date	
56	3a.booster vaccination 3b.vaccination of lactating sows, left out at the first and second date	start of piglet vaccination
84	3b.booster vaccination	
150	herd vaccination at a 4 month interval	vaccination of piglets at the age of 2 - 3 weeks

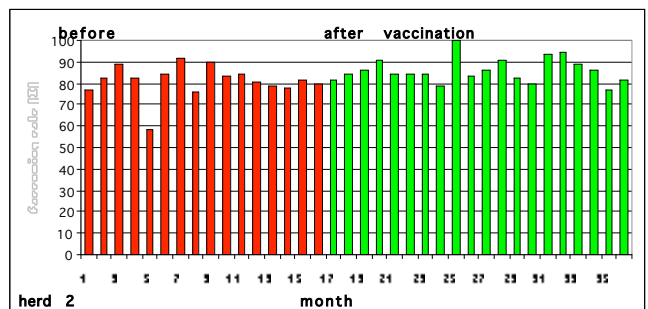
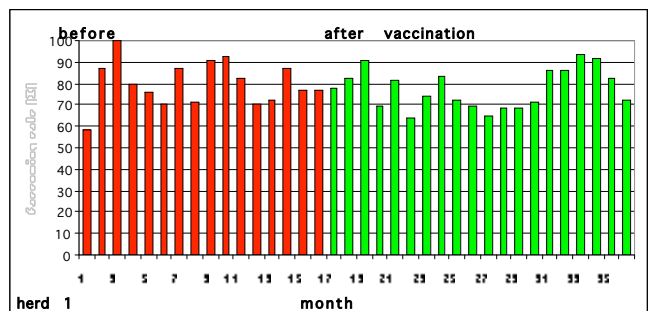
* gilts were vaccinated twice during quarantine

Results

As expected for persistently infected herds, the comparison of all indicators of reproductive performance showed for both herds no significant differences before and after starting PRRS vaccination.

The calculation of Odds Ratio for the farrowing rate indicates a slight, non-significant decrease for herd 1 (OR 0,76; CI 0,57-1,01) and a significant increase for herd 2 (OR 1,58; CI 1,17-2,12). The mean values calculated for each month of the monitoring period is shown in figure. 1.

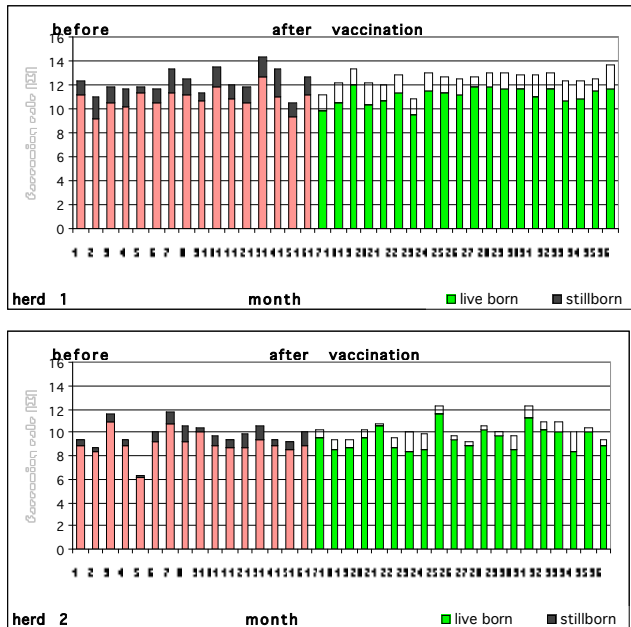
Figure 1: Farrowing rate before and after the start of PRRS vaccination



Also the calculations for the numbers of live born, stillborn and weaned pigs as well, showed no statistically significant differences when comparing the time intervals before and

after starting PRRS vaccination. The mean value for live born pigs was 10,9 vs. 11,6 for herd 1 and 11,1 for both time intervals in herd 2. Stillborn pigs were 1,4 for both intervals in herd 1 and 0,9 also for both intervals in herd 2. The mean values calculated on a monthly base are shown in figure 2. Weaned pigs were 9,1 vs. 9,2 for herd 1 and 9,3 vs. 9,4 for herd 2.

Figure 2: Live and stillborn pigs before and after the start of PRRS vaccination



Interpreting the results, it should be considered that in both herds the primary reason to start PRRS vaccination were clinical symptoms in weaning and finishing pigs, where association with PRRSV infection was assumed. A statistically significant decrease in the mortality rate of weaning pigs could be confirmed in both herds (tab. 2). The fattening performance in herd 1 increased in average daily gain (785 g vs. 821g), feed conversion rate (2,77 vs. 2,49) and mortality (3,6 % vs. 2,4 %). In herd 2 the fattening units were managed by continuous flow without weighing the pigs when starting the fattening period. Therefore performance data were not available.

Table. 2: Mortality in weaning pigs before and after the start of PRRS vaccination

herd	before vaccination		after vaccination		OR
	n	mortality	n	mortality	
1*	3932	12,9 %	2462	5,4 %	2,58 CI 2,11-3,16
2**	5625	12,4 %	4420	3,1 %	4,57 CI 3,77-5,54

Discussion

Sows and piglets of two persistently PRRS-infected one-site farrow-to-finish herds were vaccinated with Porcilis® PRRS. The decision for PRRS vaccination was mainly made to protect the piglets from clinical symptoms associated with PRRSV infection. Routine diagnostic, carried out before starting the PRRS vaccination, confirmed additional infections with *P. multocida*, *B. bronchiseptica*, *Sc. suis*, *Coccidia* (herd 1) and PCV2, PRCV, *Salmonella Typhimurium*, *E. coli* (herd 2) in weaners. There were no obvious clinical PRRS symptoms in sows. So the main topic of the investigation was to prove if there is a risk of reproductive disorder, when persistently PRRSV infected sow herds are vaccinated with Porcilis®

PRRS. With regard to possible complications after vaccinating sows with a US-type vaccine, which have been reported from Denmark and North America (2,3), it was decided not to vaccinate sows that were pregnant for more than 60 days at the time of the first vaccination. A field study, carried out in Canada, showed increased numbers of stillborn piglets and a reduced number of pigs weaned per litter when sows were vaccinated during gestation. The largest association could be seen in sows that were vaccinated during the last four weeks of gestation (5). A risk enhancement, which is related to the length of gestation, has also been described in experimental PRRSV infection (6). Due to this, a time interval of 12 weeks was needed to finish the basic-immunisation of the complete sow herd. After that, for practical reasons, the vaccination scheme was changed to sow herd vaccination at a 4-month interval. This decision was based on the hypothesis that sows build up a homologous immunity against the vaccine strain and that this could prevent an intra-uterine transmission. The importance of a homologous immunity for the prevention of a PRRSV infection is known for challenges with field strains (7) and may also be valid for a repetitive contact to attenuated live vaccine strains. The decision to include sows around oestrus in the vaccination scheme was based on experimental investigations, which showed that intrauterine PRRSV infection has little or no effect on reproductive performance (8).

In conclusion, the presented data show that persistently PRRSV-infected sow herds could be vaccinated with Porcilis® PRRS with no visible risk of reproductive disorders. The comparison of an 18 month time interval before and after starting the herd vaccination shows (except the farrowing rate in herd 2) no statistically significant differences. Sow herd vaccination with Porcilis® PRRS seems to be a safe measure when it is necessary to stabilize a persistently infected herd. To give a general valid recommendation for vaccination of sow herds, further field studies should be performed to confirm the results under different conditions (i.e. larger herds, herds in other geographical regions).

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