

Field experiences with PCV2 and M. hyo vaccines in Belgium

Porcine Circovirus type 2 (PCV2) and *Mycoplasma hyopneumoniae* (M. hyo) are two swine pathogens with a worldwide distribution. Both pathogens are implicated in the porcine respiratory disease complex (PRDC), a term which refers to the complex interaction of pathogens, environmental, housing and management conditions and the host immune system resulting in pneumonia in pigs.

by Josine Beek,
Technical Advisor Swine,
MSD Animal Health, Belgium.
www.msd-animal-health.com

Respiratory disease can have a significant negative impact on pig performance during the fattening period, particularly on average daily weight gain and feed conversion rate.

PCV2 is one of the primary pathogens of PRDC. The virus infects white blood cells (monocytes and macrophages) and disturbs their normal function in the immune system. The virus can persist in lymphoid tissue for weeks resulting in immunosuppression and higher susceptibility to opportunistic and secondary pathogens.

Concurrent infection with PCV2 increases the severity of other diseases, for example the severity of M. hyo lung lesions.

M. hyo is a respiratory pathogen and the primary agent of enzootic pneumonia. M. hyo contributes to PRDC by colonisation of the cilia in the airways of a pig.

Ciliastasis and loss of cilia result in an impaired clearance of debris and invading pathogens via the mucociliary defence system.

In this way, M. hyo facilitates secondary infection of the lungs by pathogens such as *Pasteurella multocida*, *Haemophilus parasuis*, *Streptococcus suis* and *Actinobacillus pleuropneumoniae*.

It has also been shown that M. hyo modulates the cellular immune response in a negative way and, for example, potentiates the severity of PCV2 viraemia.

Dual infections of PCV2 and M. hyo are commonly diagnosed in field cases of respiratory disease in Belgium.

Minimise the economic impact

To minimise the economic impact of these infections, PCV2 and M. hyo vaccines are applied. In Belgium, vaccination rates against PCV2 and M. hyo in pigs are approximately 60% and 80% respectively.

Recently, a new ready-to-use, single dose combination vaccine against PCV and M. hyo, Porcilis PCV M Hyo, has become available.

Single-injection and ready-to-use

$$\text{ROI (\%)} = \frac{(\text{benefit} - \text{cost of Porcilis PCV M Hyo vaccination})}{\text{Cost of Porcilis PCV M Hyo vaccination}} \times 100\%$$

Fig. 1. The formula for calculating ROI.

is convenient and saves labour for the user and it also minimises pig handling and stress.

Nevertheless, farm economics make the improvement in technical performance and the return-on-investment critical in the farmer's decision on piglet vaccination.

Field study

Here we describe the results of a field study investigating the effect of combined vaccination against PCV2 and M. hyo compared to vaccination against M. hyo only.

The study was performed in eight pig farms located in Flanders, the northern part of Belgium.

Laboratory investigation (serology or PCR) previously confirmed the presence of PCV2 in weaned pigs and/or finishers in these farms in the 12 months prior to the study period.

Piglet vaccination with Porcilis PCV M Hyo at three weeks of age was compared to the traditional vaccination program against M. hyo. Herd factors including herd size, genetics, batch production system and the presence of clinical signs

(dry cough, lung lesions at slaughter, heterogeneity and wasting) were recorded in the traditional vaccination group. Data on technical performance were collected during the fattening period.

Finishing pigs were housed in separate fattening units but at the same location. Average daily weight gain (ADWG) was calculated by dividing the average weight gain over the number of days in the fattening unit.

Feed conversion rate (FCR) was monitored when possible. Upon completion of the study, the ROI (%) was calculated based on the formula shown in Fig. 1.

The key figures in the yearly report on the Dutch swine industry published by Livestock Research (Wageningen UR) were used to estimate the profit based on ADWG and FCR in groups vaccinated with Porcilis PCV M Hyo.

Differences in mortality rate were not included in the profit calculation because the mortality recorded during the study period was frequently associated with disease caused by other pathogens. The benefit of Porcilis PCV M Hyo vaccination was thus calculated based on

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Fig. 2. Average daily weight gain ADWG (g/pig/day) between 10 weeks of age and slaughter after Porcilis PCV M Hyo vaccination at 3 weeks of age versus M. hyo vaccination only. Piglets were traditionally vaccinated against M. hyo between 3-7 days of age¹, at 10 days² or at 3 weeks of age³.

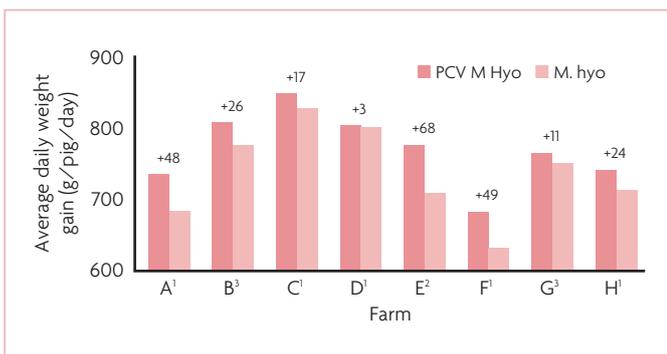
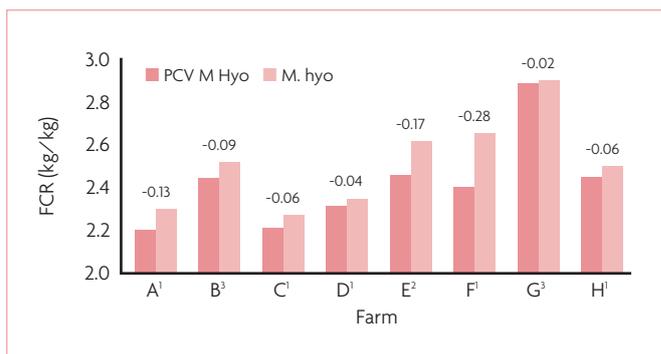


Fig. 3. Average feed conversion rate between 10 weeks of age and slaughter after Porcilis PCV M Hyo vaccination at 3 weeks of age versus M. hyo vaccination. Piglets were traditionally vaccinated against M. hyo between 3-7 days of age¹, at 10 days² or at 3 weeks of age³.



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 €0.025 per +1g/pig/day in ADWG
 and €0.23 per -0.01 in FCR.

A weighted average profit was calculated based on the number of pigs per herd. Other improvements, such as fewer condemned lungs at slaughter, were not included in the calculation but will contribute to a higher ROI on these farms.

Technical performance

On the eight participating farms, piglets were traditionally vaccinated against *M. hyo* either between three and seven days of age (5/8), at 10 days (1/8) or at three weeks of age (2/8).

The improvements in ADWG and feed conversion rate per farm are illustrated in Figs. 2 and 3.

Compared to vaccination against *M. hyo* only, average improvement following combined PCV and *M. hyo* vaccination was:

- ADWG +27g/pig/day.
- Feed conversion rate – 0.09.
- Percentage of pigs with no *M. hyo*-like lung lesions at slaughter +29%.

Mortality rate was similar in both groups (2.2% and 2.1%).

Return-on-investment

A weighted average profit was calculated based on the number of pigs per herd. Combined vaccination against PCV2 and *M. hyo* resulted in an extra average value of €2.73 per slaughtered pig.

The cost of vaccination with Porcilis PCV M *Hyo* (vaccine and labour) per pig was estimated at €1 more compared to *M. hyo* vaccination only.

	Negative ROI (±0)	Positive ROI
Farms	D/G	A/B/C/E/F/H
Herd size	385/450	280-800
Genetics (sows)	Danbred/Hybrid/Topigs	Danbred/Hybrid/PIC
Batch production system	4/5 weeks	1/3/4 weeks
Clinical signs* of PCV2 infection ¹	1 out of 2 (50%)	4 out of 6 (66%)

* Clinical signs recorded in the group with the traditional vaccination program. Heterogeneity and/or wasting.

Table 1. Herd factors according to the ROI of Porcilis PCV M *Hyo* vaccination.

Based on ADWG and FCR, the average return-on-investment (ROI) (%) of Porcilis PCV M *Hyo* was: $[(2.73-1)/1] \times 100\% = 173\%$. The ROI (%) per farm is illustrated in Fig. 4.

Several herd factors were inventoried to investigate a possible correlation with ROI. Table 1 summarises the main herd factors in relation to a positive or negative ROI in the field study.

The interpretation of these data needs to be done with caution because of the small number of farms.

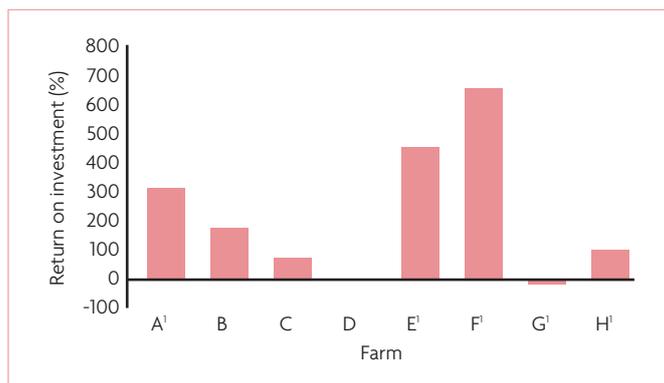
For now, we can only make prudent assumptions. Herd size and the type of batch production system did not seem to be related with the ROI of Porcilis PCV M *Hyo* vaccination.

Genetic background was diverse

and no tendency towards a positive or negative ROI could be observed. Interestingly, herds with clinical signs of heterogeneity or wasting in the traditional vaccination group appeared to have a positive ROI of vaccination more often than herds without those signs.

On one hand this may seem obvious; on the other it emphasises the usefulness of the clinical picture in the decision on piglet vaccination against PCV2.

Fig. 4. Return-on-investment of Porcilis PCV M *Hyo* vaccination on eight herds with a traditional vaccination program against *M. hyo*. 'Clinical signs of heterogeneity and/or wasting were recorded in the group with the traditional vaccination program.'



Conclusion

The results of this field study consistently demonstrate that a ready-to-use PCV2 and *M. hyo* combination vaccine improves production performance and lung health of fattening pigs in the face of PCV2 and *M. hyo* infections, pathogens that impact farm profitability.

This was supported by a positive ROI of Porcilis PCV M *Hyo* vaccination compared to vaccination against *M. hyo* only. Higher profit margins were recorded in herds with clinical signs in the traditional vaccination group. ■