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BUDAPEST/HUNGARY
May 11 - 13, 2022

MSD Animal Health
The Science of Healthier Animals®

INTRODUCTION

ESPHM 2022 in Budapest will be a milestone for the European and worldwide swine science and industry community as we come together in person for the first time in 3 years.

In the past two years we were facing and managing difficulties and the environment will still be a challenging one for the years to come. However, a reliable food supply is now even more in the focus and increasing efficiency of pig production is key in achieving this.

We believe that this efficiency can be obtained by successfully managing the pig's intestinal health. In our scientific contributions to ESPHM 2022 you can see the positive results from innovative vaccination concepts on herd productivity. However, a successful pork production starts even earlier, so we keep working on reproduction, respiratory health and basic epidemiologic, diagnostic and welfare knowledge.

This reflects our ongoing commitment to the science for healthier animals.

We wish you a great ESPHM 2022!

Sincerely Yours,

Ruben del Pozo
Regional Associate Technical Director,
EURAM - MSD Animal Health

Dr. Stephan von Berg, DVM
Global Technical Director PIgCare
- MSD Animal Health

CONTENTS

CONTENTS

PigCare® IntestiPig

Difference in *Lawsonia intracellularis* between batches and days post entry must be considered when performing diagnostics of ileitis in finisher herds

Susanne Leth Musse[ad], Gitte Blach Nielsen[a], Helle Stege[b], Nicolai Rosager Weber[c], Hans Houe[d]

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BACKGROUND AND OBJECTIVE

In Denmark, bacterial counts of *Lawsonia intracellularis (Li)* in faecal sock samples are used to support diagnostics of ileitis by assessing the severity of infection where not just the presence of the bacteria is considered but also the bacterial load. Based on the assumption that only few differences exist between pens, batches, or time of sampling, generally few samples are collected per herd.

The objective of this study was to evaluate the consistency of *Li* counts in samples both within and between batches at different days post entry of pigs.

MATERIAL & METHODS

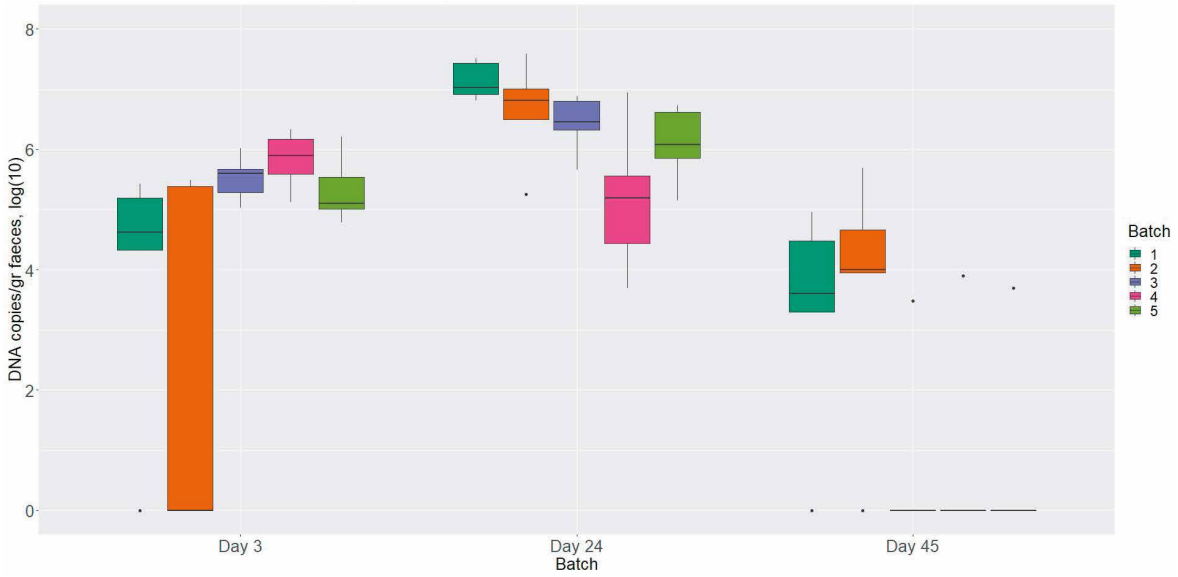
In one commercial finisher herd with a history of outbreak of diarrhea 1-2 weeks post entry, sock samples were collected in each of 26 pens in 5 consecutive batches on days 3, 24 and 45 post entry (Sample Day). Bacterial counts for *Li* were determined by qPCR at the National Veterinary Institute, Denmark.

Lower detection limit being 3 log10 bacteria/gram faeces. Variation of bacterial counts were analyzed using ANOVA.

RESULTS

A median in *Li* level of 5,33 log10 bacteria/gr faeces (SD 2,1, range 0;6,3), 6,56 log10 bacteria/gr faeces (SD 1, range 3,7;7,6) and 0 log10 bacteria/gr faeces, SD 2,1 (range 0;5,7) were found 3, 24 and 45 days, respectively, post entry as illustrated in figure 1.

Figure 1. Li load at day 3, 24 and 45 post entry from each of 5 batches in which samples have been collected from several pens.



A significant effect of *Li* loads was found of Sample Day ($p < 0,001$) as well as an interaction between Sample Day and Batch ($p < 0,001$).

DISCUSSION & CONCLUSION

The infection dynamics for *Li* changes between days post entry along with the onset of infection in each batch. The variation between pens and batches are most pronounced at onset and decline of the infection. Fluctuations in onset of infection are apparent both within and between batches. When not being aware of onset of infection, sampling procedures only including samples from one/few batches or one/few pens can lead to inadequate basis for optimal intervention strategies.

In conclusion, in order not to underestimate the possible consequences of a *Li* infection, it is important both to collect samples at several different ages post entry to match the time of sampling to the peak of infection and to include several batches to depict the fluctuations in infection dynamics of *Li* when evaluating the severity of ileitis by faecal sock sampling.

Lawsonia intracellularis screening study in Spanish pig farms

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BACKGROUND AND OBJECTIVES

Lawsonia intracellularis (*Li*) is a pathogen whose presence has been demonstrated as relevant worldwide.

The aim of this study is to determine the presence of *Li* in Spanish pig farms reporting enteric disease.

MATERIAL & METHODS

Laboratory results coming from field cases reporting enteric disorders were collected during 2020, from unvaccinated rearing pigs against *Li*. In total, 31 farms were screened using the following tests: rt-PCR (*VetMAX L.i; Adiavet Law RT; Taqman; ExoOne*) and ELISA (SVANOVIR® *L.intracellularis* / Ileitis-Ab).

Considering rt-PCR, 160 samples collected from different clinical cases (feces / intestinal swabs / intestinal tissues) were investigated, at individual (n=86) and pool level (n=74). In total 1,093 sera samples were collected from individual animals at different ages, at least 5 samples per age. Samples were allocated to 6 different age categories: W, at weaning (3-4 weeks of age (woa)); N, final nursery (8-10 woa); F, onset fattening period (10-12 woa); F+1, after first month in fattening unit; F+2, after second month; and F≥3, after three or more months in the fattening unit. These sera samples were investigated by ELISA test. The herd prevalence (farm considered positive when at least one sample tested positive) and the individual overall prevalence were calculated.

RESULTS

On average, 27.9% (average Ct-value: 26.7) individual and 32.4% (average Ct-value: 26.8) pooled samples tested positive by rt-PCR (Table 1).

The herd seroprevalence (ELISA) at the different age categories was: W: 14%, N: 30%, F: 29%, F+1: 76%, F+2: 100%; F≥3: 100%. Thus, on overall, all farms showed seroconversion against *Li*. When analyzing individual seroprevalence the results were: W: 1%, N: 12%, F: 6%, F+1: 53%, F+2: 58%, F≥3: 70% (Table 2).

Table 1. Lawsonia intracellularis PCR-prevalence in individual and pooled samples

rt-PCR results	# samples	% Positive	Average Ct value
Individual	86	27.9	26.7
Pool	74	32.4	26.8

Table 2. Individual and within-herd seroprevalence for Lawsonia intracellularis

Age categories	Weeks of age interval (woa)	Positive (%) ELISA results Individual level	Positive (%) ELISA results Farm level
W	3-4	1	14
N	8-10	12	30
F	10-12	6	29
F + 1	14-16	53	76
F + 2	18-20	58	100
F + 3	23 or more	70	100

DISCUSSION AND CONCLUSION

Under these study conditions, we can confirm the relevant presence of *Lawsonia intracellularis* in Spanish herds with enteric disorders, showing a high seroprevalence (70%) in the fattening period.

Also, the pooled approach to collect samples could be of interest to diagnose *Lawsonia intracellularis* when enteric clinical disorders appear in a fattening farm.

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Ileitis prevalence and seroconversion in Hungary - A field study

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INTRODUCTION

Lawsonia intracellularis is an intracellular bacterium, living mainly in the ileum. Ileitis is still one of the most important diseases in the swine sector, causing substantial deterioration in the average daily gain (ADG) and the feed conversion ratio (FCR). Generally, antibiotics were applied to control ileitis in a herd.

The aim of this study was to gain knowledge of the prevalence and the age dependent seroconversion of ileitis in the Hungarian swine farms.

MATERIAL & METHODS

We surveyed the prevalence of ileitis in 26 Hungarian farms in 2019 and 2020 with the support of R&D Services Lab, Boxmeer (MSD AH). We always used the same protocol for blood sampling: 3-6-9-12-15-18-21-24 weeks old pigs were sampled (Graph 1.) and 10 blood samples were taken in every age group. We used the Ileitis SVANOVA test.

RESULTS

We found that all farms were positive for Ileitis. The seroconversion was the following: at 7 weeks of age in 4% of farms, at 10 weeks in 4%, at 12 weeks in 16%, at 13 weeks in 20%, at 15 weeks of age in 12%, at 16 weeks in 12%, at 18 weeks in 16%, at 19 weeks in 8%, and at 21 weeks in 12%, respectively.

DISCUSSION AND CONCLUSION

The exposure to the *L. intracellularis* infection and the time of seroconversion greatly differs in the Hungarian swine farms. Since the piglets' age of exposure is defined, an efficient vaccination protocol can be set up, diminishing the overall use of antibiotics.

Figure 1. Ileitis antibodies in the different age groups.

Figure 2. Blood sampling.

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Risk of acute ileitis in gilts in Hungary - A field study

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INTRODUCTION

Ileitis is caused by *Lawsonia intracellularis*, and its acute, hemorrhagic form might cause death in the susceptible animals. If we want to decrease the mortality and early culling of gilts in swine farms, and we would like to reduce the use of antibiotics, especially when purchased gilts enter the farm after their quarantine period, the proper vaccination of gilts can control this disease.

The aim of this study was trying to find relations between seroconversion around gilt selection, susceptibility, and acute ileitis cases.

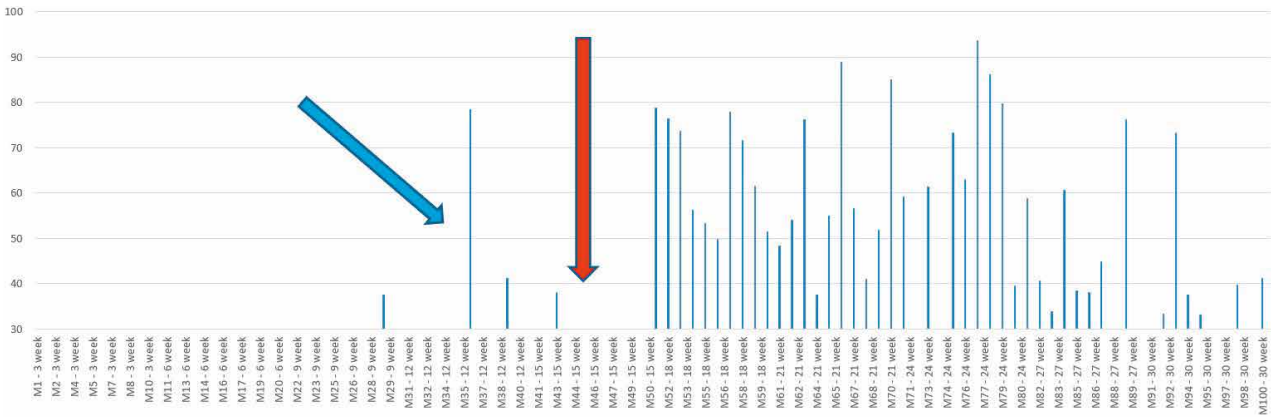
MATERIAL & METHODS

In 2019, we sampled the piglets from 3 weeks to 24 weeks of age with 3-week-intervals and the breeding gilts at 27, 30 and 33 weeks of age by using routine MSD CER SBU HU protocol (Graph 1.) in nine farrow-to-finish farms in Hungary. The Ileitis SVANOVA laboratory tests were done in the MSD Center for Diagnostic Solutions, Boxmeer, The Netherlands.

RESULTS

The results show that after the first seroconversion of the piglets (their age varied on different farms), the breeding gilts became seronegative again beyond 24 weeks of age in 100% of the tests.

Figure 1. Ileitis antibodies in different ages.



DISCUSSION AND CONCLUSION

It is very important to know when the breeding gilts become seronegative for ileitis, because the disease often becomes fatal to the older animals, thus the acute hemorrhagic form of ileitis can result in serious production losses on the swine farms.

If we want to achieve an effective vaccination protocol for breeding gilts, we must be aware of the seroprofile of the herd. Further data collection will be done, for example fecal ileitis qPCR in gilts.

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Saliva sampling as an alternative method besides pooled faeces samples for measuring qPCR Lawsonia levels

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INTRODUCTION

Lawsonia intracellularis bacterium is still causing significant economic damage in pigs with pooled faeces sample tested by qPCR as an ordinary measure of the disease level. Saliva sampling method is recently getting more attentions due to its advantage as being more user-friendly by veterinarians.

The aim of this study is to investigate whether a saliva sampling can be adapted as an alternative method in the field using statistical correlation analysis compared to the pooled faeces sampling.

MATERIAL & METHODS

In a Dutch finishing farm samples were taken at different time points from 12 different compartments. At sampling point, in different pens a pooled faeces sample was collected from different fresh faeces present in that pen with a small spoon in a small container and stirred for making a homogenous sample. At the same time in that same pen, a saliva sample was collected by a chewing rope offered to the same pigs (1).

In total 195 times both individual samples of faeces and saliva were tested by qPCR Lawsonia in the BactoReal Lawsonia kit of Ingentix at the CDS in Boxmeer, The Netherlands. The samples were also pooled by 3 to represent the measurements per compartment side. Statistics calculations were conducted using Spearman's correlation and inter-rater reliability by Cohen's kappa (on Lawsonia status with 38.5 as the cut-off of Saliva sampling and 0 or not 0 as the cut-off of faeces sampling).

RESULTS

A significantly strong correlation on individual samples (r=-0.804, p<0.001) was detected between both sampling methods using the Spearman's correlation.

The Kappa value was 0.49 with p<0.001 to show the concordance of both measurements (110/195 being positive by both sampling methods; table 1). Also, between the pooled samples a strong correlation (r=-0.818, p<0.001) was shown in the Spearman's correlation.

Figure 1. Comparison of LI qPCR BactoReal Ingenetix Saliva rope samples (Ct) vs faeces (log copies/ µl) (individual samples)

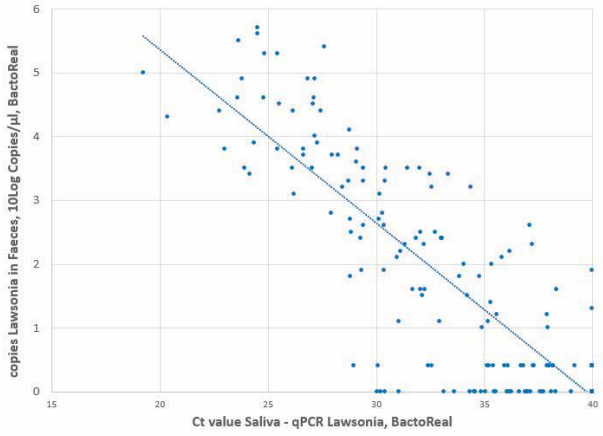

Figure 2. Comparison of LI qPCR BactoReal Ingenetix pooled Saliva rope samples (Ct) vs Pooled faeces (log copies / µl)

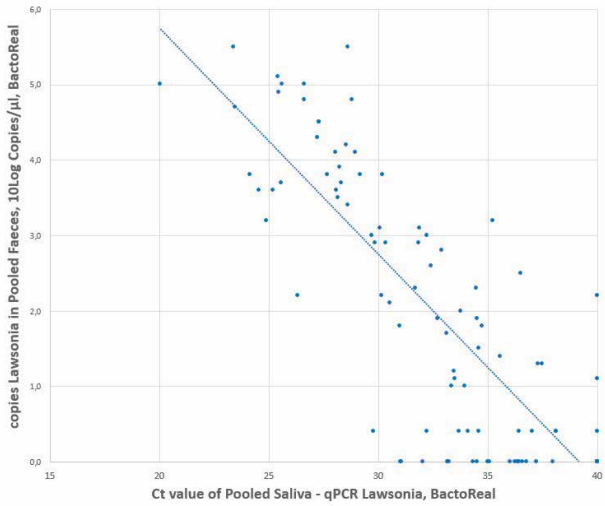

Table 1. Calculation of the Interrater reliability (individual samples)

		Faeces		Total
		POS	NEG	
Saliva	POS	110	28	138
	NEG	16	41	57
Total		126	69	195

DISCUSSION AND CONCLUSION

This study presents a strong correlation between both sampling methods for qPCR Lawsonia. It indicates that saliva sample is a reliable alternative sampling method for practical use in the field. Lawsonia is not excreted by the saliva; but it corresponds with the pen contamination. Saliva sampling outperforms faeces sampling mainly because that with a rope more pigs are sampled compared to some fresh faeces of that same pen from unknown sources.

In addition, with rope sampling a veterinarian can collect a sample without entering the pen and when necessary, conduct additional PCR testing on the same sample on for instance PRRS, Flu or mycoplasma. Last but not least, compared to individual sampling, for practical reasons the use of pooled samples can be recommended as very similar strong correlation was shown using our data.

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Slaughterhouse ileum examinations (EnteriPig) and the prevalence of ileitis in Central Europe - A field study

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INTRODUCTION

Proliferative enteropathy damages the digestive tract, resulting in a significant decrease in average daily gain (ADG) and an increase in feed conversion ratio (FCR). The feed cost will increase. It is important to have a quick and simple tool to measure the damage what *Lawsonia intracellularis* could cause. The aim of this study was to get a picture of the Lawsonia prevalence, and damage in Central Europe.

MATERIAL & METHODS

We collected 20 cm long pieces of the terminal ileum of slaughtered animals in the slaughterhouses. We made visual examination, and palpation as well before and after cutting up the ileum. The categories of the *ileum mucosa* examinations were:

0: No mucosal lesions observed.

1: Slight thickening of wrinkles of the mucosa observed.

2. Serious changes in the mucosa observed with several wrinkles with higher rigidity.

3: Severe lesions with blood in the lumen.

Validation of the method was done using histopathology and qPCR.

RESULTS

We examined altogether 625 pieces of terminal ileums from 25 Hungarian farms. Every farm had ileitis problems. The results distribution was the following from all the samples (Figure 1.):

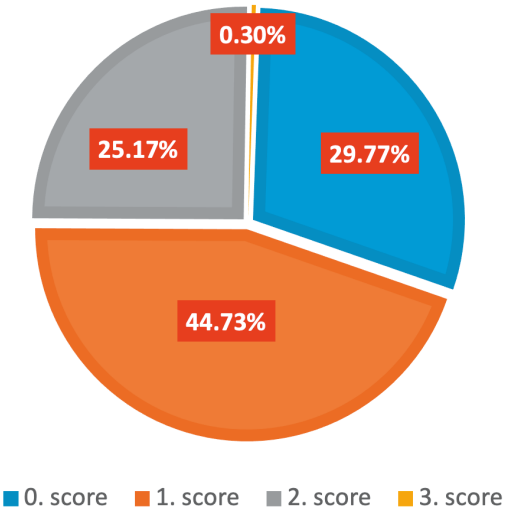
0. score 29.77%

1. score 44.73%

2. score 25.17%

3. score 0.30%

Figure 1. Distribution of ileum score results in the research



DISCUSSION AND CONCLUSION

The EnteriPig tool requires little equipment, and it is simple and easy. We validated the method before, using histopathology and qPCR. We could change the mindset of farm owners about ileitis thanks to this tool, and since we made the illness visible, farmers started to vaccinate, and again lower amount of antibiotics will be used in the swine industry.

ACKNOWLEDGEMENTS

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Prevalence & risk factors of *Brachyspira* spp. in European pig herds with a history of diarrhea

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Universität Bern | Universität Zürich
vetsuisse-fakultät

Objectives

Brachyspira (B.) hyodysenteriae and *B. pilosicoli* are pathogens known to be related with diarrhea in growing and fattening pigs worldwide. Thus, a disease outbreak can lead to economic losses and reduced animal welfare, which is why the pathogens are of worldwide importance and interest [1]. To provide an overview of the current European situation, this study determined the prevalence of both pathogens in six European countries and identified associated risk factors.

Material & Methods

- Fecal samples of 6355 nursery to finishing pigs were sampled in 2017/2018 in six European countries, namely:
  - Denmark, France, Germany, the Netherlands, Spain & United Kingdom
- Samples were taken from 24 herds per country.
- Herd inclusion criteria:
  - clinical signs of diarrhea within twelve months prior to sampling
  - closed production system like farrow-to-finish herd, or nursery-/fattening- herd, receiving all their animals from one single origin
  - No antimicrobial treatment up to four weeks prior to sampling
- A questionnaire on herd data and last occurrence of diarrhea was filled in each herd.
- Fecal samples were analyzed using a polymerase chain reaction. Questionnaires were evaluated and risk factors identified using a multivariable model.

Conclusions

- **Significant difference in *B. hyodysenteriae* & *B. pilosicoli* prevalence between European countries.**
- **Comparatively high prevalence for both pathogens were found in United Kingdom and Denmark**
- **Such differences should be considered in animal trade between European countries and the probability of disease.**
- **Known risk factors could be confirmed and supplemented by new ones.**

Figure 1: Prevalence of *B.hyodysenteriae*

Figure 2: Prevalence of *B. pilosicoli*

- Color of a country: Indicates the respective herd prevalence for each pathogen per country.
- Proportion of pigs in red within a country: Indicates the respective within- herd prevalence for each pathogen per country. One pig completely red= 10 %.

Results

Prevalence of *B. hyodysenteriae:*

- Overall, 21.5 % of all herds and 13.0 % of animals in these herds were *B. hyodysenteriae* positive.
- With a herd- and within-herd prevalence of 45.8 % and 15.4 % respectively, significantly more herds ($p<0.02$) and more samples ($p<0.01$) were *B. hyodysenteriae* positive in United Kingdom than in France (herd prevalence of 4.2 %, within-herd prevalence of 2.2 %) (Figure 1).
- Overall, 58.7 % of *B.hyodysenteriae* positive samples, were simultaneously positive for *B. pilosicoli*. In Denmark, this was the case for 95.9 % of *B.hyodysenteriae* positive samples.

Prevalence of *B. pilosicoli:*

- Overall, 28.5 % of all herds and 37.2 % of animals in these herds were *B. pilosicoli* positive.
- *B. pilosicoli* was significantly more often detected in Danish herds compared to all other countries excluding United Kingdom ($p<0.001$). It was also significantly more often detected in Danish samples compared to all other countries ($p<0.001$).
- Overall, nursery pigs were significantly less often positive for one of the pathogens than growing or finishing pigs ($p<0.001$).

Risk- and protective factors associated with *Brachyspira* spp.

- More than 30 nursery pigs per pen was a risk factors for both pathogens associated with a higher number of animals positive/ herd ($p<0.03$).
- Weaning age of more than 26 days was associated with more *B. pilosicoli* positive nursery-, growing-, finishing- pigs and overall positive pigs ($p< 0.04$).
- Deworming of growing or finishing pigs on the other hand was associated with less positive animals per age category or overall, likewise for both pathogens ($p<0.05$).
- Slatted floor of more than 78.0 % in nursery units was associated with less *B. pilosicoli* positive nursery-, finishing pigs and overall positive pigs.

Figure 1:

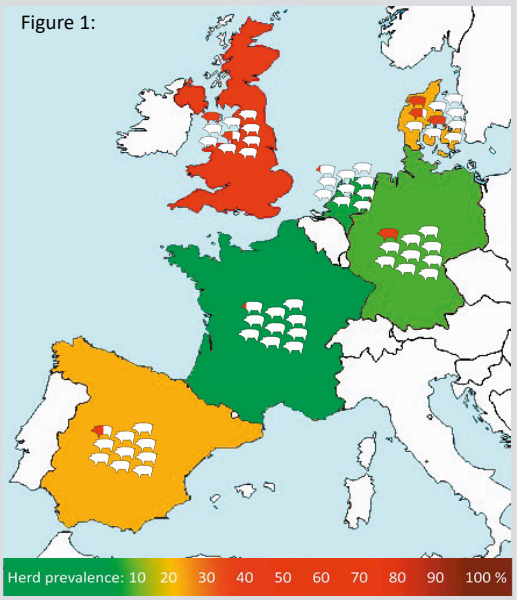
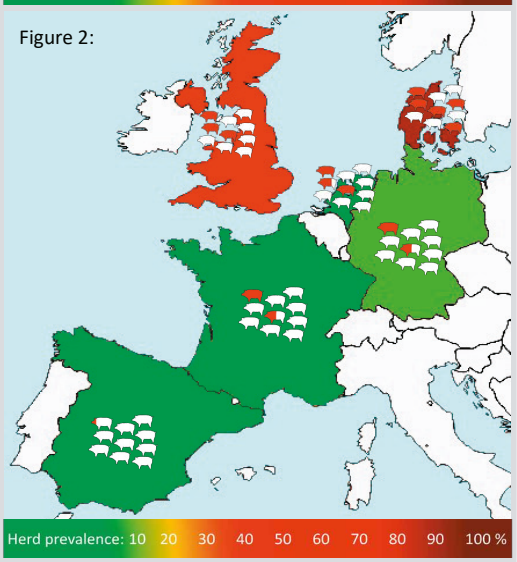


Figure 2:



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Correlation of qPCR values for *Lawsonia intracellularis* from two different European laboratories

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BACKGROUND AND OBJECTIVES

Lawsonia intracellularis (*Li*) is a major cause of diarrhea in growing pigs. Shedding of *Li* in levels above 6 log10 / g feces are considered clinical important for pigs. Several laboratories are offering a diagnostic qPCR test on feces to determine the level. As both processing and analysis differs from different laboratories, it is important to consider the details of tests performed when evaluating the results.

IVD (Gesellschaft für Innovative Veterinärdiagnostik GmbH) is an accredited laboratory offering a qPCR for *Li* on feces. CDS (MSD Animal Health R&D service lab) is a research lab performing a similar qPCR test. IVD is reporting levels in units of log10 / g feces, whereas CDS report levels in units of log10/µL of feces.

MATERIAL & METHODS

In total, 37 fecal samples were collected. Each sample was a mix of 10-20 different droppings in 10-20 pens. After collection, the samples of 20-40 g were mixed thoroughly and divided into two. One sample was shipped to IVD, one to CDS. Testing and reporting was done according to the lab's normal procedure.

To avoid values below detection level,16 samples from CDS, with values < 2,5 log10 / µL, were excluded. None of the excluded samples had values > 0,5 log10 / g at IVD. The remaining 21 samples were tested for correlation by linear regression.

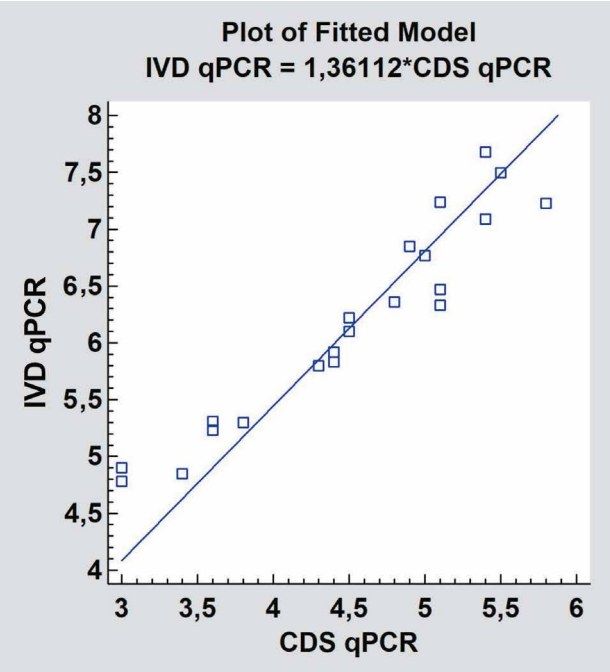
RESULTS

The correlation coefficient (cc) is 0,998 ($p < 0,0000$). Based on this significant and high correlation, the regression model can translate IVD levels into CDS levels and vice versa.

The equation used for translation is IVD qPCR = 1,36112*CDS qPCR.

Figure 1. Fecal sampling is a useful tool to detect the presence of Lawsonia intracellularis

Figure 2. This shows the correlation between the two diagnostic laboratories, IVD (Gesellschaft für Innovative Veterinärdiagnostik GmbH) and CDS (MSD Animal Health R&D service lab) diagnostic test for copies of Lawsonia intracellularis per unit feces from their respective qPCR testing. As the correlation coefficient is very high (0,998), the given formula can with a high level of accuracy, be used to translate figures from one lab to the other



DISCUSSION AND CONCLUSION

In conclusion the high cc demonstrates that the tests performed are very accurate and repeatable between the two labs.

Further it demonstrates that values can be translated from lab to lab if a sufficient ring-testing has been done to document the cc.

Slaughterhouse visual and palpation method for monitoring economic losses of Porcine Proliferative Enteropathy (PPE) caused by *Lawsonia intracellularis (li)*

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INTRODUCTION

Lawsonia intracellularis (LI) causes porcine proliferative enteropathy (PPE), a disease characterized by thickening in the small intestine due to the proliferation of enterocytes, typically in the ileum, but also in the colon's mucosa. Economic losses due to ileitis have been estimated at $4.65 per fattening pig, with US pig farmers losing $56.1 million annually.

Currently there is no monitoring tool at the slaughterhouse for PPE evaluation and it has become necessary to develop an ileitis monitoring tool that is inexpensive, simple, fast, sensitive and provides immediate results.

MATERIAL & METHODS

The ilea of slaughtered pigs were evaluated based on visual assessment and palpation. More than 1.500 fattening pigs from 27 *LI* seropositive pig farms in five Central European countries were checked at slaughterhouses. Losses due to PPE were evaluated by Holtkamp's 2019 ileitis economic losses study.

Animals with an ileum scored for "0" corresponded to Holtkamp PPE-free, those with a value of "1" in lower, and those with a value of "2" in upper bound category. The percentage incidence of individuals with acute PPE lesions "3" was used (Table 1.)

RESULTS

Ileum examinations performed with this new tactile method scored "0" in 46%, "1" in 26.9%, "2" in 26.7% of the animals. "3" rated ileums were scored in 0.5%.

In a dedicated farm, animals' acute ileitis score (3) projected significant losses for producing fatteners due to *LI* infection. In 2 cases, 20-42 % of the achievable profit; in 9 cases, 62-76% and in 1 case 82% of the achievable profit were obtained (Table 2.).

Figure 1. Visual and palpation at abattoir and profit production for fatteners.

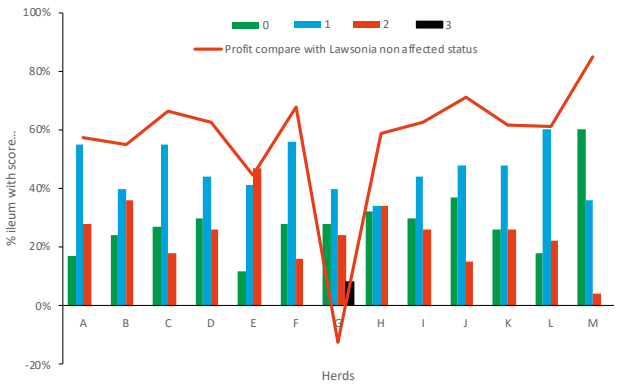

Table 1. Visual and palpation evaluation.

Visual and Paltion abattoir (ENTERIPIG)					
Herd	**0**	**1**	**2**	**3**	**Profit compared with Lawsonia non affected status**
A	17%	55%	28%	0%	57%
B	24%	40%	36%	0%	55%
C	27%	55%	18%	0%	66%
D	30%	44%	26%	0%	63%
E	12%	41%	47%	0%	45%
F	28%	56%	16%	0%	68%
G	28%	40%	24%	8%	-12%
H	32%	34%	34%	0%	59%
I	30%	44%	26%	0%	63%
J	37%	48%	15%	0%	71%
K	26%	48%	26%	0%	61%
L	18%	60%	22%	0%	61%
M	60%	36%	4%	0%	85%

0 No perceptible lesion, no hard tact formula in the intestine, no thickening at the ileocecal intestinal cross section, no colour change visible from the outside

1 One or two palpable hard tact 0.5-1 cm formula in the intestine, slightly noticeable folds in the intestine, slight increase in intestinal wall thickness,

2 Multiple, hard tact oval formula in the intestine, pronounced folds in the intestine, thickening at the ileocecal intestinal cross section, discoloration

3 Blood content as described in the 2 evaluations and already visible from the outside (serosa)

DISCUSSION AND CONCLUSION

The method developed is similar to lung lesion scoring tools and can be performed at slaughterhouses. The results of the procedure are correlated with the results of other laboratory diagnostic tests for ileitis (histology, immunohistochemistry, serology, fecal PCR). The results can provide immediate interpretation of the status of ileitis.

Field data of use of Porcilis® Lawsonia IM and ID vaccination on a Dutch closed sow herd

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INTRODUCTION

Ileitis is an old disease in pigs but the *Lawsonia intracellularis* bacterium is still causing significant economic damage, with often no obvious clinical symptoms on the farms. Several controlling interventions are available for the veterinarian and farmer, like antibiotics, feed additives and a live oral vaccine. Recently in Europe a new killed vaccine against *Lawsonia intracellularis* was introduced (1).

The case study describes the technical performance before and after the usage of Porcilis® Lawsonia under Dutch field conditions on a closed Dutch pig farm.

MATERIAL & METHODS

The 220 closed sow herd with 1600 finishing places in The Netherlands had a history for years of an oral Lawsonia vaccine administered via the water at the start of finishing phase to control the Ileitis in the finishers. By time, the farmer still needed tylosin for a week to diminish further clinical symptoms due to acute losses to Ileitis.

In November 2019, the farmer started at 12 weeks of age with Porcilis® Lawsonia © (PL) (MSD Animal Health) by intramuscular injection and going back till the 3 weeks of age vaccination. The farmer switched to Porcilis® Lawsonia ID with the IDAL device at 3 weeks, by dissolving the dry lyophilized powder of 50 dose Porcilis® Lawsonia in the 50-dose bottle Porcilis® PCV ID.

The monthly technical results like ADG, FCR, and mortality before – after were primary parameters used for evaluation, and antibiotic use, defined by DDD (2). The observed period was one year before the first Porcilis® Lawsonia vaccinated pigs were slaughtered versus one year after start. Statistical analysis was done by 2-sample t-Tests, with Minitab. Due to seasonality influences, the same corresponding months were compared before after.

RESULTS

Since the start of Porcilis® Lawsonia vaccinated pigs were slaughtered, on a whole year base before- after the ADG improved by +51 gr/day (p=0.002), FCR by – 0.08 (p=0.035) and mortality by 0.4% (p=0.16) (table and graph 1). Also, the antibiotic usage was lowered by 90 %: 12,9 DDD (2019) to 1,2 DDD (2020). The first Porcilis® Lawsonia IM vaccinated pigs were slaughtered mid-March 2020. Comparing the corresponding months of the oral drinking water period vs PL IM period (April '19 – Aug'19 vs April'20 -Aug'20) the ADG were 865 vs 920 gr/day (p<0,05); FCR 2,75 vs 2,68 (p>0,05) and mortality 2,3 vs 1,9 % (p>0,05). Comparing the corresponding months of the oral drinking water period vs PL ID period the ADG were 908 vs 956 gr/day (p<0,05); FCR 2,79 vs 2,70 (p>0,05) and mortality 2,1 vs 1.7 % (p>0,05).

Table 1. Technical results whole year Oral vaccine protocol vs whole year Porcilis® Lawsonia vaccinated pigs.

	Oral Vaccine	Porcilis® Lawsonia	Difference
ADG[1]	890	941	+51*
FCR[1]	2.77	2.69	-0.08*
mortality %[2]	2.2	1.8	-0.4

1. April'19 - Mar'20 vs April '20 - Mar'21
2. Jan'19 - Jan'20 vs Feb'20 - Mar'21

*p<0,05

Table 2. Technical results Oral vaccine protocol vs Porcilis® Lawsonia IM vaccinated pigs.

	Oral Vaccine	Porcilis® Lawsonia IM	Difference
ADG[1]	865	920	+55*
FCR[1]	2.75	2.68	-0.07
mortality %[2]	2.3	1.9	-0.4

1. April'19 - Aug'19 vs April'20 - Aug'20
2. Feb'19 - Jun'19 vs Feb'20 - Jun'20

*p<0,05

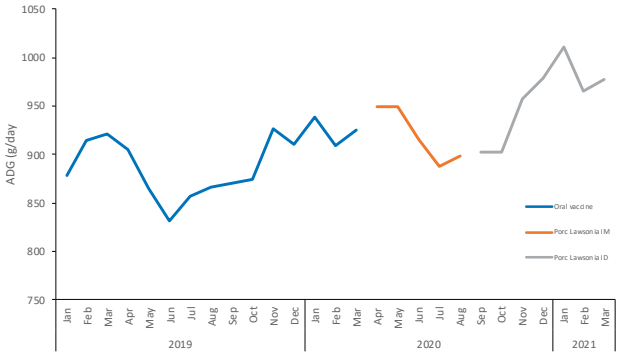
Table 3. Technical results Oral vaccine protocol vs Porcilis® Lawsonia ID vaccinated pigs.

	Oral Vaccine	Porcilis® Lawsonia ID	Difference
ADG[1]	908	956	+48*
FCR[1]	2.79	2.70	-0.09
mortality %[2]	2.1	1.7	-0.4

1. Sep'19 - Mar'20 vs Sep'20 - Mar'21
2. Jul'19 - Mar'20 vs Jul'20 - Mar'21

*p<0,05

Figure 1. ADG figures per month from January 2019 till March 2021, for different vaccination protocols.



DISCUSSION AND CONCLUSION

This case report shows the results of the successful implementation of the new killed IM and ID Lawsonia vaccine under field conditions a whole year around. The results are in line with other side by side results (3). The gross margin for this farm is estimated on + €3,70 vs the old vaccine protocol, based on the improved technical parameters (this is excluding antibiotics).

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MSD Animal Health

Immunization against ileitis in swine: A farm to slaughterhouse performance study

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INTRODUCTION

Ileitis is a high-impact intestinal disease in swine production, caused by *Lawsonia intracellularis (Li)*. Thus, it is important to monitor the disease and its impacts, using technical analysis and checking productive rates possibly impacted from farm to slaughterhouse.

MATERIAL & METHODS

Farm and slaughterhouse production rates were evaluated during a period before and after implementation of a vaccination protocol against *Li*. The study was carried out in Southern Est of Brazil, with animals from the same origin, genetics, nutrition, management and in the same period, to compare vaccinated (VAC; Porcilis® Ileitis, one 2ml dose at 28 days of age) and not vaccinated pigs (NVAC).

Mann-Whitney test was conducted in GraphPad Prism version 9.0.0 to statistical analysis and p values <0,05 were considered to indicate statistical significance.

RESULTS

Farm productive rates of VAC and NVAC groups are shown in table 1 and slaughterhouse results are summarized in Figure 1 (a, b, and c).

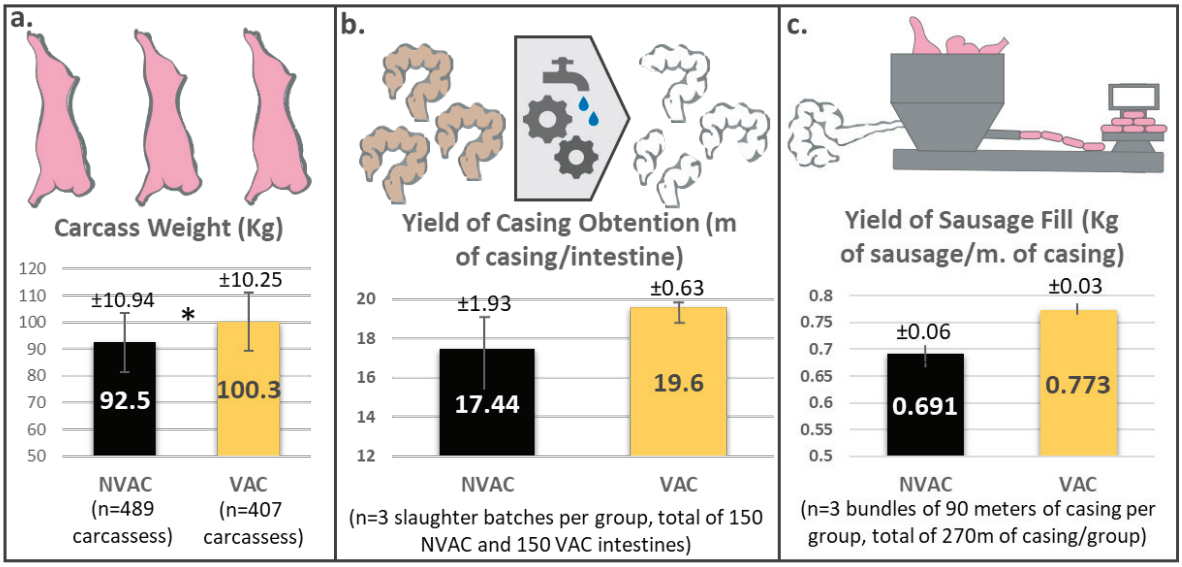
Table 1. Average and standard error of VAC and NVAC farm productive rates: Feed Conversion, Average Daily Weight Gain and Mortality Rate of pigs in growing-finishing phase. Significant differences (P≤ 0.05) are indicated by an asterisk (*).

Farm Productive Rates (growing-finishing pigs)	NVAC (N= 6 baches, total of 7947 animals)	VAC (N= 8 baches, total of 6510 animals)
Feed Conversion*	2.52 (±0.11)	2.32 (±0.12)
Average Daily weight Gain*	0.935 (±0.035)	0.98 (±0.018)
Mortality rate* (%)	3.317 (±0.39)	1.66 (±0.63)

CONCLUSION

In this study pigs vaccinated intramuscularly against *Li* presented higher performance rates both at the farm and slaughterhouse, probably because protection against *Li* ensured a better intestinal health and integrity, consequently improving digestion process, nutrient absorption, and muscle deposition.

Figure 1. Average and standard error of VAC and NVAC slaughterhouse productive rates: Carcass Weight (a), Yield of Casing obtention after cleaning and processing the intestines (b) and Yield of Sausage Fill (c). Significant difference (P≤ 0.05) is indicated by an asterisk (*) in the graph.



Vaccination of Danish Nursery Pigs against *Lawsonia intracellularis* by ID or IM route, using an ID PCV2 Vaccine or an IM PCV2/Mhyo RTU Vaccine as diluent, respectively

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BACKGROUND & OBJECTIVES

Lawsonia intracellularis (Li) is frequently causing disease in Danish nurseries. Parenteral vaccination against *Li* is possible by intramuscular (IM) or intradermal (ID) route.

MATERIAL & METHODS

A farm, with batchwise weaning of 650 pigs and *Li* infection in the nursery, investigated effect on average daily gain (ADG) after applying *Li* vaccine either by the IM or ID route. Four groups of 50 pigs in one batch were vaccinated at 3 weeks of age according to label: 1) Porcilis® PCV M Hyo im 2) Porcilis® Lawsonia Vet. dissolved in Porcilis® PCV M Hyo im 3) Porcilis® Lawsonia ID Vet. dissolved in Porcilis® PCV ID id and 4) Unvaccinated control.

Eight suckling pigs from each of 25 sows were ear tagged and two from each sow allocated to one of the above groups. After vaccination and weighing pigs were randomly weaned into one batch placed in 12 pens and comingled within groups and with unvaccinated pigs. Pigs were individually bled and weighed 6½ weeks later, apart from 9 pigs in total from all groups, which had either died or were moved to hospital pen. The overall effect of group was evaluated by ANOVA supplemented by pair-wise Student´s t-tests to evaluate inter-group differences.

RESULTS

All pigs were negative in qPCR test for PCV2 and free from signs of *Mycoplasma hyopneumoniae*. High levels of *Li* were demonstrated in fecal floor samples from pens in the batch housing the trial pigs. The mean ADG during the 6½ weeks was 437a, 452ab, 485b and 434a g/day for group 1, 2, 3 and 4, respectively.

Figure 1. Distribution in growth in the different treatment groups. Unvaccinated pigs (red) had a wider ADG spread compared with vaccinated pigs, leading to an uneven growth. Group 1 (blue) vaccinated with Porcilis® PCV M Hyo, Group 2 (Yellow) vaccinated with Porcilis® Lawsonia Vet dissolved in Porcilis® M Hyo, Group 3 (Green) vaccinated with Porcilis® Lawsonia ID dissolved in Porcilis® PCV ID and group 4 (red) where no vaccination was applied.

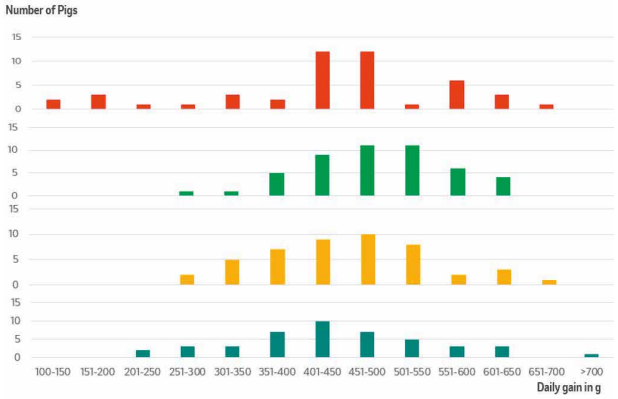

Table 1. Average daily gain in different treatment groups. Different letters indicate that results are significantly different.

Vaccination protocol at 21 days of age	Porcilis® PCV M Hyo	Porcilis® Lawsonia Vet dissolved in Porcilis® PCV M Hyo	Porcilis® Lawsonia ID dissolved in Porcilis® PCV ID	No Vaccination
Average daily gain from 3 weeks of age until 9½ weeks of age (g)	437[a]	452[ab]	485[b]	434[a]

[a,b] Different superscripts represent significant differences between groups

Figure 2. Pigs with Lawsonia intracellularis seen by dirty back with diarrhea and weight loss in some of the pigs.

Figure 3. Typically finding of diarrhea in the pen in an outbreak of Lawsonia intracellularis in late nursery.

DISCUSSION & CONCLUSION

Intradermal PCV2- and Li-vaccination (group 3) significantly increased the ADG compared to group 1) and 4). Id vaccination was not significantly increased compared to 2). Im vaccination against PCV2, M Hyo and *Li* (group 2) was not significantly increased compared to group 1) and 4).

The pigs were comingled and therefore the difference between im vaccinated against *Li* and non-vaccinated is expected to be lower than if all pigs would have been vaccinated. This in combination with a relatively short observation period, the exclusion of poor performing pigs from the groups that were not vaccinated against *Lawsonia intracellularis* and a to low number of included pigs in the four groups might be explanations why the difference was not statistically proven.

MSD Animal Health

Performance and economy of piglets during postweaning period at an organic farm before and after using an intramuscular *Lawsonia intracellularis* vaccine

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INTRODUCTION

Lawsonia intracellularis (LI) is one of the most important enteral pathogens with high herd prevalence in Germany. Clinical cases often appear in the fattening period but can also start earlier. Symptoms differ from subclinical disease without or with only minor clinical signs but reduction in performance parameters up to diarrhoea, severe bloody diarrhoea, and acute mortality in clinical cases of Lawsonia induced ileitis.

In organic farms the use of antibiotic treatments in case of *LI* infection is limited due to regulatory standards. Therefore, prophylaxis becomes the most important or even the only way to manage clinical outbreaks as well as performance losses in the context of an infection with *LI*.

MATERIAL & METHODS

The field observation was performed in an organic farrowing farm in North East Germany. The effect of vaccinating piglets with an inactivated intramuscular vaccine on animal health and performance during post-weaning period was investigated. All piglets were administered an intradermal vaccine against PCV at three weeks of age. Furthermore, an oral vaccine against *LI* (oral vacc) was given in the past. With this scheme *LI* related symptoms like diarrhoea, runts, and acute losses were still seen in the nursery phase.

So, the *LI* vaccination was changed to Porcilis® Lawsonia injected at 24 days of age (i.m. vacc). Performance data from the nursery were collected and historically compared on farm base between the two *LI* vaccination schedules.

RESULTS

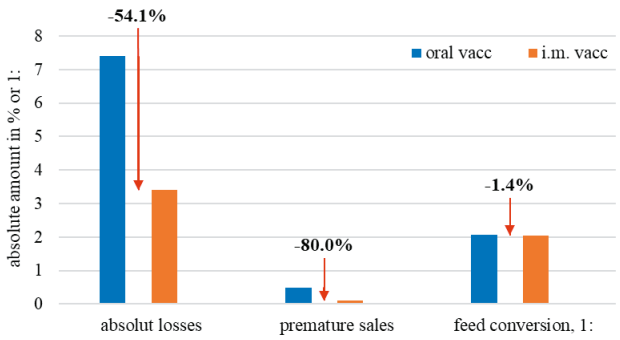
In the *LI* i.m. vacc group the occurrence of diarrhoea and total animal losses were reduced compared with the orally vaccinated groups. Premature sales during nursery were no longer necessary and group homogeneity was improved markedly. Moreover, performance level was enhanced in the i.m. vacc group so that higher daily gains of 34 g and with an amount of 1:2.05 a lower feed conversion ratio were noted.

The highest effect was seen in mortality being reduced from 7.4 to 3.4 %. In total a benefit of 5.03 / piglet was calculated regarding to the farm's economic basis (vaccination costs excluded).

Table 1. Number of animals and weights in the differently vaccinated groups

	Oral vaccine	i.m. vaccine
Number of Animals (n)	10,685	2,793
Weight In (kg)	9.3	10.2
Weight Out (kg)	31.4	34.0
Daily Weight Gains (g)	355	389

Figure 1. Performance data (absolute amounts in %) and relative change between the differently vaccinated groups of animals



CONCLUSIONS AND DISCUSSION

Even in early life consequences of an *LI* infection can be severe. Of course, it is necessary to look after further infections as well as management disorders. In organic farms the limited opportunities in treatment can massively restrict the intervention options and can even become a serious problem of animal welfare.

In this farm the preventive use of the intramuscular *LI* vaccine ensured piglets health and helped to deal with the enteric disorders. Plus, performance and the economic output of the farm was enhanced.

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Prevention strategy for the control of *Lawsonia intracellularis* (*L.i*) to improve production parameters in heavy pigs

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BACKGROUND AND OBJECTIVES

Proliferative enteropathy (PE), caused by *Lawsonia intracellularis* (*L.i*), is one of the important diseases in the pigs.

A recent European study revealed that more than 90% of farms reporting enteric disorders showed presence of the bacteria either in feces or serum (antibodies). The aim of this study was to test if an intramuscular vaccine could control outbreaks of PE in pigs marketed at heavy weights.

MATERIAL & METHODS

The study was conducted in a 2500 sow farm in Teruel (Spain), where pigs are marketed at heavy weights (>=125 kg). The herd had a clinical outbreak of PE towards the end of the finisher phase, confirmed by PCR (EXOone qPCR kits and ELISA (SVANOVIR® *L.intracellularis* / Ileitis), seroconversion around 4 months of age.

Eight finisher-units were selected, with similar barns and n=19100 pigs, in each farm a barn was selected as treatment group (V) and another as control group (C), weekly batches were distributed through each barn and grouped (randomized, same-age). Vaccine was administered at 9 weeks of age (Porcilis® Lawsonia). Parameters monitored were conversion ratio (FC 20-100), mortality rate and ROI. The results were statistically processed with SPSS, and were compared with Chi-square test.

RESULTS

Average FC: Group C 2.65 vs Group V 2.59 (p=0.84)

Mortality rate: Group C 4.7% vs Group V 3.6%), highly significant differences between the groups are detected: mortality is lower in the vaccinated group (chi square with continuity correction =13.755, gl=1; p<0.001).

There was no clinical disease in vaccinated groups. There was an extra profit in vaccinated pigs of 1.95€ and a ROI of 1,8 (SIP consultors, economic calculator).

Figure 1. Lawsonia intracellularis seroconversion (ELISA-Svanovir test) previous vaccination (months of age)

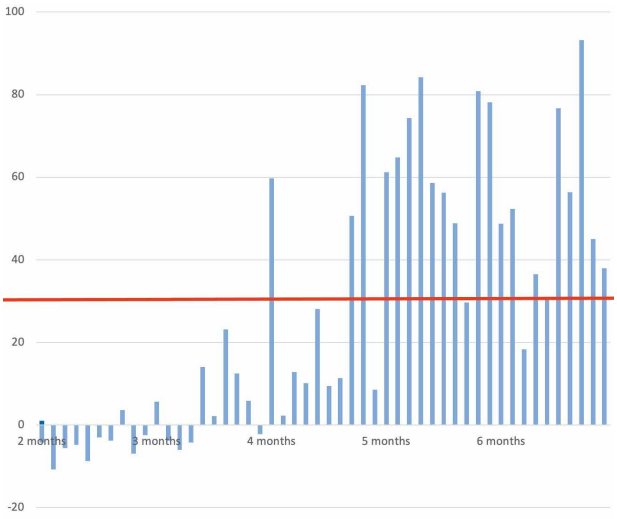
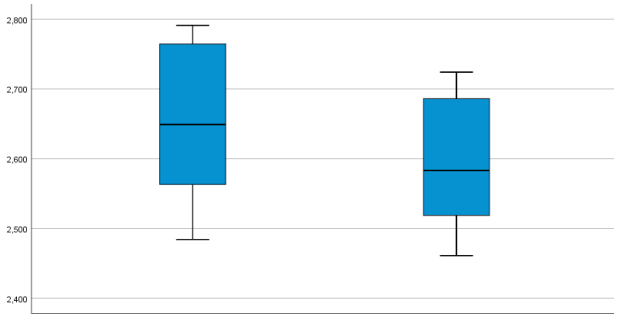


Figure 2. Feed conversion results



DISCUSSION AND CONCLUSION

In this field study, an inactivated intramuscular vaccine was proven to be effective in the control of clinical outbreaks of PE. The batches with vaccination strategy had an interesting ROI. A larger n > would be needed for greater power and to be able to see bigger differences in FC. Vaccination is an effective strategy for companies to improve their animal's health and operation profitability Proliferative enteropathy (PE), caused by *Lawsonia intracellularis* (*L.i*), is one of the important diseases in the pigs.

A recent European study revealed that more than 90% of farms reporting enteric disorders showed presence of the bacteria either in faeces or serum (antibodies). The aim of this study was to test if an intramuscular vaccine could control outbreaks of PE and improve performance in these heavy pigs.

PORTESA PORCINO DE TERUEL

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MSD Animal Health

Performance of vaccination against *Lawsonia intracellularis* in Iberian genetic pigs: beyond the DOI

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BACKGROUND & OBJECTIVES

Plenty of results have been presented about the convenience of *Lawsonia intracellularis* (*Li*) vaccination. Iberian pig genetics final products are featured because of their pork quality. For that, certain government specifications are mandatory. Apart from specific genetic lines and feeding, it is mandatory to wait until at least 10 months of age to abattoir.

The aim of this study is to demonstrate the efficacy in terms of production parameters, to control active infection of *Li* beyond the registered DOI (duration of immunity) of the intramuscular vaccine administered.

MATERIAL & METHODS

Iberian genetics Spanish pig farm was selected due to Li diagnosed problems; the breeding was Iberian (female) x Duroc (male). The diagnostics included qPCR from pooled feces, as well as clear seroconversion once in the fattening unit. The farm, where the trial was developed, receives pigs at the age of 10 weeks of life, rearing them until at least 10 months of life and more than 150 kilograms of life weight. These are among some of the specifications regulated by government regulation.

For this specific trial, 21 production batches were involved in the study: 10 consecutives not vaccinated as controls (C), and 11 vaccinated (V) (1,400 animals each batch). Pigs from the vaccinated group were vaccinated at 4 weeks of age with the one-shot combination of Porcilis® PCV M Hyo + Porcilis® Lawsonia (MSD Animal Health) as recommended in the SPCs, while the control group only received one shot of a bivalent PCV2 and *Mycoplasma hyopneumoniae* vaccine.

Key parameters were compiled in the fattening units for all the batches, and then comparisons between V and C were done: entry weight (EW, kg), weight at slaughter (SW, kg), days to reach slaughter weight (D), feed conversion rate (FCR), average daily weight gain (ADWG, gr), Mortality % (M%), and all statistically compared with ANOVA, Breslow and Chi-square.

RESULTS

No statistical differences were found in terms of EW, V=19.7 kg, C=20.7 kg; and SW, V=159.0 kg, C=161.7 kg. Nevertheless, statistical differences (p 0.02) in favor of vaccinated group were found in key production parameters such as CR: C=4.060 vs. V=3.849; ADWG: C=613 gr vs. V=625 gr; D: C= 230 days vs. V=223 days.

On the contrary, differences in terms of M% were found in favor of control group (p=0.016) C=3.3% vs. V=3.8% (Table 1). However, no ileitis-associated mortality was recorded in the vaccinated group.

DISCUSSION

Despite being in the fattening barns an average of 1 week less, performance (FCR, ADWG) of vaccinated animals was better. Therefore, vaccinated pigs reached the same slaughter weight as control pigs, but seven days earlier. Despite the slight increase of casualties in vaccinated pigs, this was not ileitis-associated mortality.

The DOI of Lawsonia fraction of the vaccine is registered for 21 weeks since the vaccination moment, but in this trial, pigs were reared for more than 31 weeks, so further studies are needed to determine the exact vaccine DOI.

Table 1. Performance of vaccinated and unvaccinated (control) Iberian pigs after vaccination against Lawsonia intracellularis. Despite the slight increase of casualties in vaccinated pigs, this was not ileitis-associated mortality.

	# BATCHES	TOTAL # ANIMALS	Entry weight (EW; kg)	Final weight (SW; kg)	Total days	Conversion Rate (CR)	ADWG (g/day)	Mortality %
VACCINATED	11	15.400	19,7	159,0	223*	3,849*	625*	3,8*
CONTROL	10	14.000	20,7	161,7	230	4,060	613	3,3
			p>0,05	p>0,05	p<0,02	p<0,02	p<0,02	p<0,02

* Represents significant differences (P<0.05) between control and vaccinated pigs

Effect on production parameters of intramuscular vaccination against *Lawsonia intracellularis* in a chronically infected farm

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[1] Cooperativa Plana de Vic, S.A. [2] MSD Animal Health, Spain

INTRODUCTION

The objective of this trial was to evaluate the efficacy of an intramuscular vaccination against *Lawsonia intracellularis* to reduce clinical signs associated to the disease and to improve production data.

MATERIAL & METHODS

The trial was conducted in a commercial 1600 sow farm in Spain. Recurrently, one month after entering the fattening unit, pigs were showing diarrhea, that was not inducing mortality, but needed antibiotic treatment. Serology and qPCR of feces confirmed *L. intracellularis* infection, but also the presence of *Brachispira hyodysenteriae*.

It was decided to vaccinate 8000 piglets (10 consecutive weekly batches) with Porcilis® Lawsonia via im, at 21 days of age. To determine the efficacy of the strategy, clinical signs and production data at fattening phase of vaccinated batches were compared to previous ones (32.137 fatteners of 39 not vaccinated fattening units vs 7.447 vaccinated fatteners of 9 fattening units). ANOVA test was used as statistical analysis.

RESULTS

No statistical differences were found at fattening entry weight between vaccinated (V) and not vaccinated (NV) batches. Vaccinated batches had higher weight to slaughter (V 112.45 kg vs NV 108.39 kg; p<0,05), higher ADWG (V 800 g/d vs NV 727 g/d; p<0,001) and less days to slaughter (V 113d vs NV 120d; p<0,01) than not vaccinated batches (Table 1).

Fewer antibiotic treatments were implemented in V vs NV batches (reduction of 45% of lincomycin via water) (Table 2). In V batches, when clinical signs appeared, laboratory analysis evidenced the presence of *B. hyodysenteriae* and *S. typhimurium*.

In terms of profitability of the strategy, it was estimated an extra benefit in vaccinated pigs of 2,81€ and a ROI of 2,34.

Table 1. Finishing production data in vaccinated and not vaccinated batches

	Porcilis® Lawsonia	Not vaccinated	
Number of pigs	7445	32137	
Entry weight (kg)	19.06	18.27	n.s.
ADWG (g)	800	727	p<0,001
F.C.E (20-100kg)	2.33	2.38	n.s.
Weight to slaughter (kg)	112.45	108.39	p<0,05
Days to slaughter	113	120	p<0,001

Table 2. Use of lincomycin in vaccinated and not vaccinated finishing units

Lincomycin (mg/pig)	Porcilis® Lawsonia	Not vaccinated
Injectable	30.2	49.2
Oral (water)	1020.8	1852.5

CONCLUSION

Under the field conditions described, piglet's im vaccination against Lawsonia has evidenced as an efficacious tool to reduce clinical signs induced by *L.intracellularis* infection, to reduce antibiotic use and to improve production data in a profitable way.

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Intramuscular Lawsonia vaccination as prophylaxis in case of acute Lawsonia clinic from the middle to the end of the finishing period - Development of performance parameters

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[1] Veterinarian, veterinary practice Becker, Heek. [2] Intervet Deutschland GmbH; MSD Animal Health, Unterschleißheim, Germany.

INTRODUCTION

The pathogen *Lawsonia intracellularis* (*LI*) is widespread in pig herds (1). The clinical severity of a Lawsonia infection is strongly dependent on the immune status of the animals, the infectious dose and the age of the animals.

The acute form of *LI* infection, porcine haemorrhagic enteropathy (PHE), usually occurs in older fattening pigs or gilts who did not previously have any contact with the pathogen. Mortality can reach up to 50% (2).

MATERIAL & METHODS

This study was done in a finishing farm in West Germany, housing 1988 fatteners. Acute *LI* infections occurred repeatedly in the middle fattening during the last five years. Selected animals for necropsy macroscopically showed porcine hemorrhagic enteropathy (PHE) (Fig.1) and PCR examination of the ileum confirmed the Lawsonia infection. Furthermore, the pigs showed very poor growth performance. Due to the experiences over years, antibiotic treatments were used to control clinical signs and economic losses by *LI* infection.

In total, the farm came up with 10.81 treatment days/animal. The vet and the farmer implemented intramuscular vaccination using Porcilis® Lawsonia in 2020. Vaccination was done one day after entering the fattening unit at a weight of 27kg. To test the success of the vaccination, pigs were allotted into vaccinated (1533 pigs) and unvaccinated groups (1983 pigs). The fattening performance of each group was used for comparison.

RESULTS

Overall, there was a clear improvement in the acute *LI* clinical signs on the farm and fattening performance was improved (Fig. 2). Feed conversion decreased by 2.69 % and the daily weight gain increased by 40,3g in vaccinated compared to controls. Only individual animals had to be treated with antibiotics in the vaccinated groups so that the treatment days were reduced by 98.6 %. In relation to the veterinary costs (except for vaccination), a benefit of 2.03€ per animal is documented.

Furthermore, the duration of the fattening was shortened by around 2,67 days. Here, the low purchased weight with - 0.85kg and the higher sales weight with + 0.9kg of the vaccination group must be mentioned (Table 1). As a result of the improved biological performance an economic benefit of 4.42€ / fattening pig could be achieved. (Vaccination costs not considered).

Table 1. Number of animals evaluated and weight development

	Non vaccinated group	Vaccinated group
Number of animals	1,983	1,533
Weight, start of fattening (kg)	26.70	25.85
Weight, end of fattening (kg)	121.93	123.20

Figure 1. Colon of an animal suffering from PHE

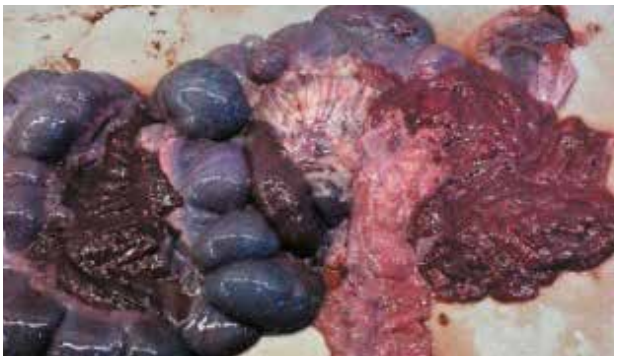
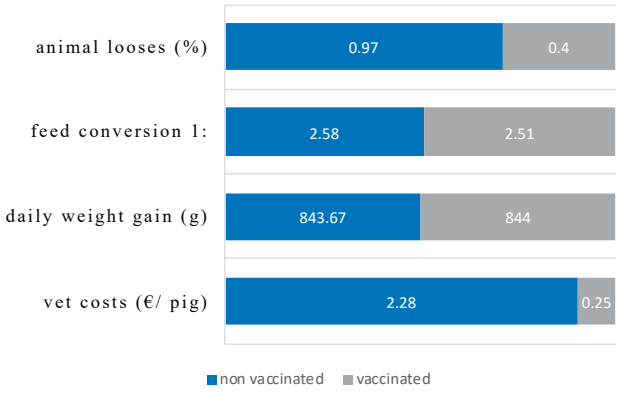


Figure 2. Performance parameters with and without Porcilis® Lawsonia vaccination



CONCLUSIONS AND DISCUSSION

This trial showed that the intramuscular Lawsonia vaccination at the beginning of fattening reduced and controlled an acute Lawsonia infection in the middle up to the end of finishing period.

Additionally, the vaccination caused an improvement in biological performance and considerably minimized the therapeutic use of antibiotics.

ACKNOWLEDGEMENTS

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Sudden deaths in sows due to *Lawsonia intracellularis* infection - A Case Report

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BACKGROUND & OBJECTIVES

Lawsonia intracellularis (*LI*) is widespread in pig producing countries worldwide, though naïve herds do exist. In September 2020, 6 sows of a 170 sow-farrow-to-finishing farm in southern Germany suddenly died a few days after farrowing, showing paleness and reduced feed intake one to two days before passing. Black feces indicative for acute proliferative hemorrhagic enteropathy (PHE) were visible in one case only.

No other age group had any problems at that timepoint. Within the next two weeks, three more sows died in the service unit (fig. 1).

Furthermore, 18 out of 20 sows of the last farrowing group turned out to be Not-in-Pig despite a positive ultrasound-result 3 weeks before.

MATERIAL & METHODS

During the acute outbreak postmortem examinations were done to confirm the cause of death. Notifiable diseases were ruled out. In order to confirm *LI* as a cause of this problem, fecal samples from different age groups were collected and investigated by qPCR (Nathues *et al.* 2009). In addition, serum samples were investigated for the presence of antibodies against *LI* by Svanovir *LI*-Elisa at IVD GmbH (Seelze Letter, Germany).

After *LI* confirmation, it was decided to vaccinate all breeding sows with Porcilis Lawsonia® (MSD Animal Health) twice in four months, despite this vaccine not being registered for gestating, nor lactating sows.

To check the further course of the disease, additional blood and feces samples were investigated by qPCR and Svanovir *LI*-Elisa at IVD GmbH (Seelze Letter, Germany) six and 12 months later.

RESULTS

LI-infection was confirmed by histopathology and one *LI*-positive fecal sample from a deceased sow. Fecal samples from fatteners were PCR-negative up to 60kg bodyweight, but positive at 90kg and 110kg bodyweight (4,58 and 8,71 log GE/g, respectively). Blood samples from different age groups were seronegative except one slightly positive result from the gilts group.

Six months after the disease outbreak, all fecal samples were negative. Gilts and old sows showed uniform antibody detection in the *LI*-Elisa test eight weeks after vaccination (Table 1).

One year after the acute outbreak, fecal samples from 16-week-old finishers were weakly positive, and those from 14 weeks of age negative. Four of five old sows had *LI*-antibody titers comparable to those of March 2021.

Table 1. Positive Elisa results / number of samples.

Timepoint of investigation	Gilts	Sows	Fatteners	Finishers
September 2020 (acute outbreak)	1/5	n.i.	0/10	0/5
March 2020	5/5	15/15	n.i.	n.i.
September 21	n.i.	4/5	4/10	0/10

Figure 1. Acute PHE in a sow.

DISCUSSION AND CONCLUSION

Initially, all sows were treated with tiamulin. The complete sow herd was vaccinated with Porcilis Lawsonia® (MSD Animal Health) twice in a four-month interval.

In general, high seroprevalences can be expected for *LI*. However, when naïve herds get infected, *LI*-infection can have a considerable impact on performance, leading to enormous economic losses. In our case 9 sows died. Adding to that, the financial impact by the missing offspring from 18 out of 20 sows was even more relevant for the farm.

Seroconversion is expected from 2 weeks after *LI*-infection with a peak at 3 weeks (Guedes & Gebhardt 2010), although exposure to the pathogen must not induce seroconversion in all cases (Straw: Diseases of swine 9th ed 2006). Laboratory results with positive fecal samples only from older fattening pigs together with mainly negative antibody-tests from sows and younger pigs suggest that negative sows and younger animals have been newly infected. Whether the positive Elisa results from sows 6 months after the acute outbreak are caused by infection or vaccination or – more likely – by a combination of both, remains unclear.

Presumably the gilts, getting raised in the fattening stable and integrated directly, carried the infection into the sow herd. To interrupt the circulation of the pathogen and to prevent repeated infections, vaccination of gilts is ongoing before they get integrated into the sow herd. No more *LI*-problems have been observed in this herd since.

Development of performance parameters after changing from oral vaccination against *Lawsonia intracellularis* to intramuscular vaccination in combination with a PCV M Hyo RTU vaccine

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INTRODUCTION

Lawsonia intracellularis (LI) can be detected in a large proportion of pig herds (1). Various clinical courses are described: Besides fulminant acute presentation, chronic and subclinical disease known to reduced growth performance, play an important role (2).

MATERIAL & METHODS

Pigs on the observed fattening farm (1400 places) previously were vaccinated with a PCV Mhyo RTU vaccine and against PRRSV (24th day of life). An oral Lawsonia vaccine was used at the same age. Farmer and vet classified the herd as subclinical *LI*-infected whereby losses due to *LI* were described in the finishing group.

Homogeneity of the animals appeared inconspicuous and only individual animals were treated. Then, Lawsonia vaccination scheme was changed to Porcilis® Lawsonia in combination with Porcilis® PCV Mhyo. Performance data between both Lawsonia vaccination schemes was compared.

RESULTS

Intramuscular vaccinated animals remained clinically inconspicuous. Although a significant improvement in FCR occurred on the farm, it was not obvious for the farmer at first sight. This example shows, that in order to recognize an improvement in feed conversion, careful data evaluation must be performed. In this case, performance parameters revealed improvements in IM vaccinated group compared to oral vaccinated group (FCR -0.2 to 2.8, ADWG +44g to 826g/day, losses -1.7% to 0.5% total, veterinary costs -0.05 Euro/fattening pig).

An economic advantage of 8.14€ / fattening pig was achieved (Vaccination costs not included). Pigs vaccinated intramuscularly reached slaughter weight 8 days earlier than the ones vaccinated orally.

Table 1.

	Oral Vaccinated	I.M. Vaccinated
Number of animals	412	419
Weight at beginning fattening (kg)	30	31,7
Weight at slaughter (kg)	121.7	120.7
Days to reach slaughter weight	116	108

Figure 1. Improvement of performance parameters in I.M. vaccinated group.

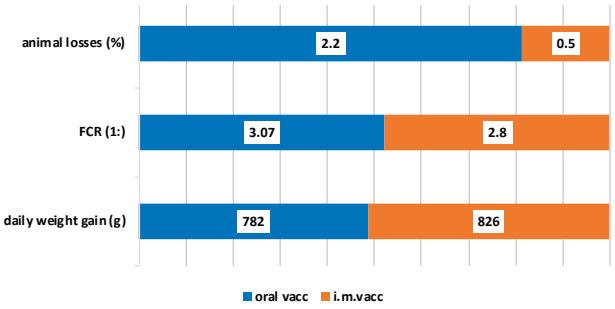
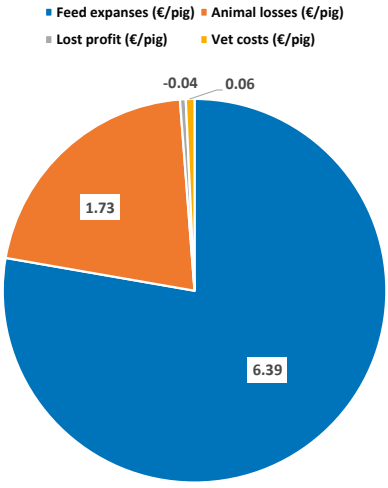


Figure 2. Composition of reduced production costs in I.M. vaccinated group (total 8.14€ / pig)



CONCLUSION AND DISCUSSION

The use of the intramuscular Lawsonia vaccine in combination with a PCV Mhyo RTU vaccine resulted in an economic advantage. Overall, especially due to the improvement of FCR, additional 8.14€ / fattening pig in the intramuscular group compared to the orally vaccinated group were earned.

Performance and ROI after intramuscular *Lawsonia intracellularis* vaccination compared to oral vaccination

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BACKGROUND & OBJECTIVES

Lawsonia intracellularis is the aetiological agent of Ileitis, an enteric disease in pig causing economic losses to pig industry. This study aims to evaluate the performance of an intramuscular vaccination against *L. intracellularis* in a herd with chronic ileitis and to compare it with oral vaccination.

MATERIAL & METHODS

A wean-to-finish commercial herd with history of chronic ileitis was selected. In total, 9293 pigs from 22 consecutive batches were included in this study. The first 11 batches were orally vaccinated at weaning with Enterisol® Ileitis (historical control; Group-C; Jul-Sep2020; n=4656). The subsequent 11 batches were vaccinated intramuscularly with Porcilis® Lawsonia at weaning (Group-L; Sep-Dec2020; n=4637) (Table.1).

Due to ethical reasons no negative control was included. Therefore, the historical vaccination program (Group-C) was used as historical control for comparison. Weight was recorded at pen level at weaning, entrance into growing unit, entrance into finishing unit and prior slaughter. ADG, FCR and %runts sold before full market value were calculated. ANOVA and Kruskal-Wallis tests were performed.

An economic model developed by Holtkamp 2019 was run to calculate benefit of intramuscular vaccination and ROI.

RESULTS

Weigh-in at weaning (C:9.2±0.7kg; L:9.3±0.6kg; P>0.05) and at growing (C:21.7±1.7kg; L:21.8±1.3kg; P>0.05) were similar, whereas weigh-in at finishing (C:45.7±3.3kg; L:48.8±2.8kg; P<0.05) and weigh-out at slaughter (C:106.8±2.8kg; L:113.2±2.5kg; P<0.05) were significantly higher in pigs vaccinated intramuscularly (Table 2).

ADG (C:914±86; L:934±40; P>0.05) and FCR (C:3.1±0.4; L:2.9±0.2; P>0.05) were numerically improved and %runts sold (C:8±5; L:1.5±0.8; P<0.05) significantly reduced after intramuscular vaccination (Fig.1).

Table 1. Study design

	Group Control	Group Lawsonia
Vaccine	Enterisol® Ileitis	Porcilis® Lawsonia
Period of comparison	July – Sep 2020	Sep – Dec 2020
# batches	11	11
# pigs	4656	4637

Table 2. Overall production performance in pigs vaccinated orally (Enterisol® Ileitis) or intramuscularly (Porcilis® Lawsonia) against Lawsonia intracellularis

		Enterisol® Ileitis	Porcilis® Lawsonia	Difference
Weight (kg)	IN at weaning	9.2 ± 0.7	9.3 ± 0.6	+0.1
	IN at growing	21.7 ± 1.7	21.8 ± 1.3	+0.1
	IN at finishing	45.7 ± 3.3^{A}	48.8 ± 2.8^{B}	+3.1
	OUT at slaughter	106.8 ± 2.8^{A}	113.2 ± 2.5^{B}	+6.4
ADG	g / pig / day	914 ± 86	934 ± 40	+20
FCR		3.1 ± 0.4	2.9 ± 0.2	-0.2
Runt %		7.84^{A}	1.60^{B}	-6.24

A, B – Different superscripts within the same row indicate significant differences

Figure 1. Runts percentage during the study in pigs vaccinated orally (Enterisol® Ileitis) or intramuscularly (Porcilis® Lawsonia) against Lawsonia intracellularis.

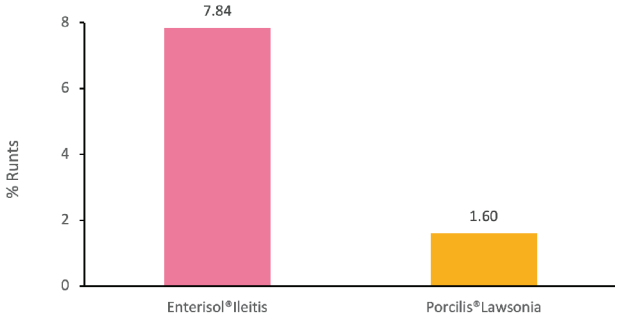

Table 3. Economic performance in pigs vaccinated orally (Enterisol® Ileitis) or intramuscularly (Porcilis® Lawsonia) against Lawsonia intracellularis

		Enterisol® Ileitis	Porcilis® Lawsonia
Net profit	£ / pig placed	-6.56	+2.88
	£ / group placed	+1511	+5420
Cost of intervention	£ / group placed	+348	+1220
Benefit cost/ratio		4.3	4.5
ROI		334%	344%

DISCUSSION AND CONCLUSION

Under the conditions of this study, *L. intracellularis* intramuscular vaccination increased performance (+6.4kg liveweight at slaughter, +6 full-market pigs/100 marketed pigs) when compared with oral vaccination, leading to a valuable economic benefit (+£2.9 per pig placed; benefit:cost ratio 4.5) and ROI (344%) (Table 3).

MSD Animal Health

Performance after vaccination with an intramuscular *Lawsonia intracellularis* vaccine at the beginning of fattening in a fattening farm subclinically infected with Lawsonia

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INTRODUCTION

The efficacy of intramuscular *Lawsonia intracellularis (LI)* vaccination has been demonstrated. Despite intramuscular vaccination can be applied from 21st day of age onwards, due to purchase practices it is not always possible to buy already vaccinated piglets. In these cases, vaccination at the beginning of fattening is an alternative to prevent clinical and subclinical course of disease in the fattening unit and to improve production parameters.

MATERIAL & METHODS

The field observation took place in a *LI* subclinical infected fattening farm in northern Germany with high performance and health level. Fattening pigs (vaccinated against PCV2) showed sporadic diarrhea and 20% were smaller and orally treated with Tylosin. Right after placement more than 50% of the animals showed *LI*-antibodies and excreted relevant *LI* amounts (PCR >log GE 6/g feces).

Half of the piglets (approx. 30kg) of 4 consecutive batches were vaccinated with Porcilis® Lawsonia right after placement and compared to the parallel unvaccinated groups.

RESULTS

LI vaccinated groups showed less diarrhea and reduced *LI* excretion (weak positive to log GE 4/g feces). Fewer suddenly dead bloated pigs occurred. Only single animals were treated by antibiotic injection. ADWG increased by 10.2g, FCR improved by 0.1 to 2.83, mortality decreased (-1.6%), same with veterinary costs (-0.07 /fattening pig; excl. vaccination). Despite the bad market situation economic advantage of Lawsonia vaccination was in total 2,84€ / fattening pig.

Model calculation showed that the economic benefit would be even more in a better market situation (3.30€ / fattening pig) due to higher lost profits. Vaccination cost was not included in the calculation.

Table 1.

	I.M. Vaccinated	No Vaccination
Number of animals	962	962
Weight at beginning fattening (kg)	32.91	36.06
Weight at slaughter (kg)	132.69	134.82

Figure 1. Improvement of production parameters in I.M. vaccinated group.

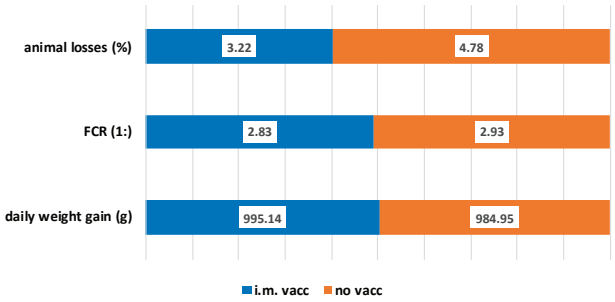
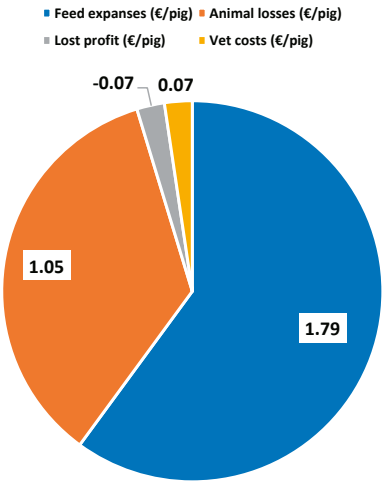


Figure 2. Composition of reduced production costs in I.M. vaccinated group (total 2.84€ / pig)



CONCLUSION AND DISCUSSION

Despite pre-existing infection at the time of vaccination at placement of fattening piglets and only minor clinical problems in the fattening unit, Lawsonia vaccinated animals showed improved performance parameters compared to the non-vaccinated animals. This resulted in an economic advantage of 2.82€ / fattening pig (better market situation 3.30€) in the vaccinated group.

Reduction on *Lawsonia intracellularis* faecal shedding in pigs chronically infected after intramuscular vaccination against *Lawsonia intracellularis*

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[1] MSD AH UK. [2] Bishopton Veterinary Practice. [3] MSD AH Center for Diagnostic Solutions, The Netherlands.

BACKGROUND & OBJECTIVES

Lawsonia intracellularis is the aetiological agent of Ileitis, an enteric disease in pig causing economic losses to pig industry. Faecal shedding is correlated with severity of intestinal lesions and growth reduction. This study aims to quantify the faecal shedding of *L. intracellularis* at pen level in pigs vaccinated intramuscularly in comparison with non-vaccinated pigs.

MATERIAL & METHODS

A British herd with history of chronic ileitis was selected. In total, 2200 pigs from 5 consecutive batches were included in this study. In each batch, half of the pigs was vaccinated with Porcilis® Lawsonia at 21 days of age (Group-V) and half remained non-vaccinated (Group-NV). Pigs from different groups shared the same compartment, but different pens. Longitudinal sampling was performed at six sampling points (6/9/12/15/18/21 weeks of age).

A minimum of 5 fresh faecal samples were collected from the floor in each pen and pooled in groups of five. Faecal shedding was quantified by qPCR (Ingenetix®). The AUC of the qPCR data was calculated as a measure of total bacterial load over time. Kruskal-Wallis test was performed to calculate statistical differences.

RESULTS

Average AUC values from 6 to 21wk of age were 15.43 and 7.78 log_{10} copies/µl, for controls and vaccinates, respectively (P<0.05) (Fig.1). AUC was lower in vaccinates from all 5 batches investigated (Fig.2). No bacterial shedding was detected at 6 and 9wk of age.

The average bacterial load (log_{10} copies/µl) was lower in vaccinated pens at 12 (NV:0.79; V:0.05; P<0.01), 15 (NV:0.98; V:0.43; P=0.08), 18 (NV:2.56; V:1.48; P<0.01) and 21 (NV:2.02; V:1.73; P>0.05) wk of age (Fig.1). The percentage of PCR+ pens was also lower in vaccinates from all age groups (Fig.3)

*Figure 1. Lawsonia bacterial load in faeces from unvaccinated (black dots) and vaccinated (orange dots) pigs against Lawsonia intracellularis with Porcilis® Lawsonia. The AUC is represented as a black and orange dashed lines for unvaccinated (15.43 log_{10} copies/µl) and vaccinated pigs (7.78 log_{10} copies/µl), respectively (P<0.05). An * within an age category represents statistical differences between groups.*

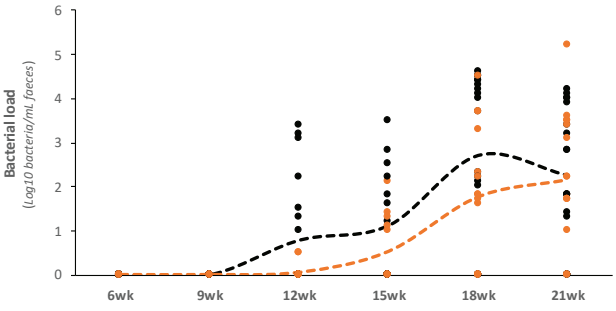


Figure 2. Lawsonia bacterial load in faeces from unvaccinated (black) and vaccinated (orange) pigs against Lawsonia intracellularis with Porcilis® Lawsonia in five consecutive batches.

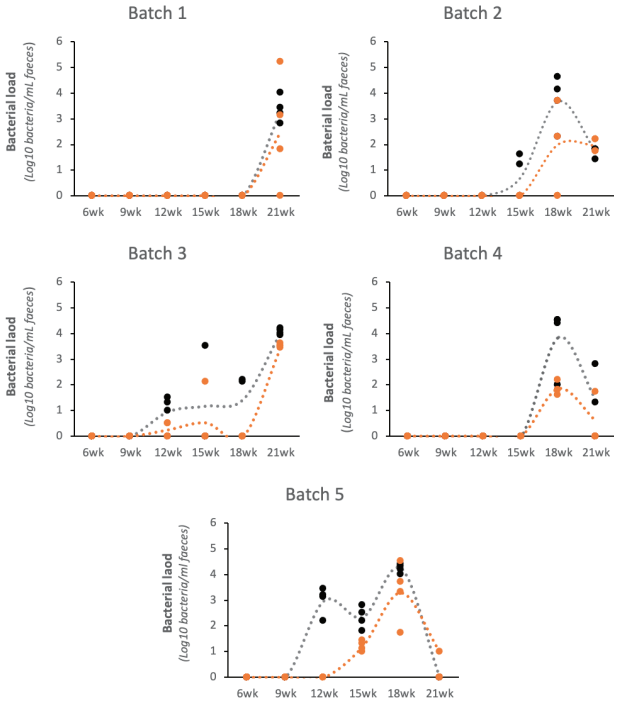
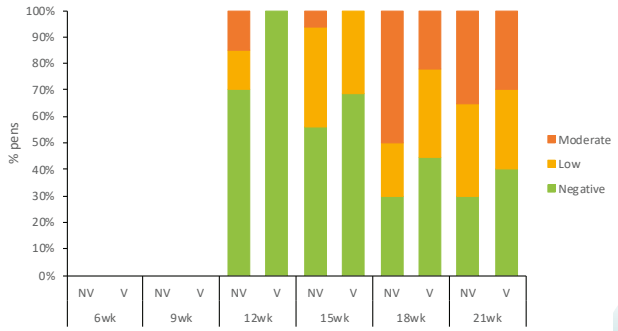


Figure 3. Lawsonia shedding measured as percentage of pens with No (negative: 0.0 – 1.0 Log_{10} bacteria/mL faeces), Low (1.1 – 3.0 Log_{10} bacteria/mL faeces) or Moderate (>3.1 Log_{10} bacteria/mL faeces) faecal shedding in non-vaccinated (NV) and vaccinated (V) pigs against Lawsonia intracellularis with Porcilis® Lawsonia.



DISCUSSION & CONCLUSION

Under the conditions of this study, *L. intracellularis* intramuscular vaccination reduced faecal shedding and bacterial load in growers/finishers chronically infected. Further research is warranted to elucidate the impact on performance.

PigCare® ResPig

Comparative PCV2 humoral immune response to two intradermal PCV2 vaccines

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INTRODUCTION

Serology can be used to measure humoral response after vaccination. Humoral immune response induced by different commercial vaccines applied intramuscularly has been previously proved to be different (1,2,3)

The aim of this trial was to compare the level of PCV2-antibodies induced by two commercial PCV2 vaccines applied intradermally.

MATERIAL & METHODS

The trial was conducted in a PRRS negative, commercial farm, located in Catalonia (Spain).

A total of 50 piglets of 21 days of age were randomly allocated into two study groups:

- Group 1: Porcilis® PCV ID
- Group 2: Mhyosphere® PCV ID

All piglets were individually ear tagged and vaccinated intradermally at 21 days of age, and bled at 3, 6, 9, 13, 17 and 21 weeks of age. Sera samples were analyzed using the alphaLISA test (an in-house titration alphaLISA, based on total antibodies, CDS laboratory, Boxmeer, MSD AH).

The results of the alphaLISA test are expressed in log_2 values, ranging from 4.3 to 16.0 log_2 (titres <4.3 are considered qualitatively as negative and quantitatively as 0). Also, all sera were tested by qPCR to check for the presence of PCV2 DNA. Statistical analysis was done using mixed ANOVA test.

RESULTS

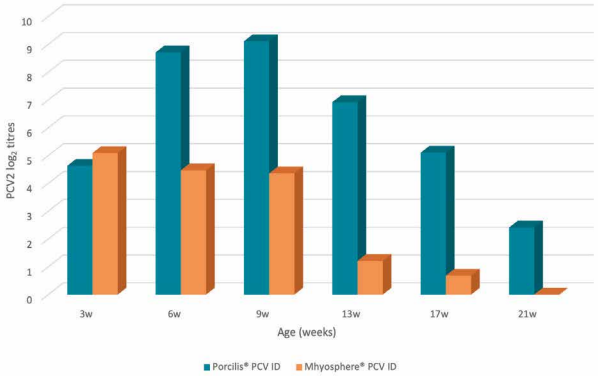
No PCV2 infection was detected by qPCR in sera at any age, indicating that the antibody response observed after 6wk of age was uniquely due to vaccination.

At 3w of age PCV2 titres were similar in both study groups (G1 4.63log_2 vs G2 5.09log_2).

In terms of quantitative results, PCV2 titres were statistical higher (P<0.05) in G1 at all other age's samples (Graph 1).

In terms of qualitative results, the percentage of positivity of G1 was above 80% at all ages, except 21w, when it declined to 44%. For G2, the percentage of positivity never exceeded 73.9%; maximum values were at 6w and 9w (73.9% and 72.7%) and rapidly decreased to 23%, 14% and 0% at 13, 17 and 21w, respectively (Table 1).

Figure 1. PCV2 titres (expressed in log_2 values) at different agesileitis-associated mortality.



CONCLUSION

Under the conditions of this study, clear differences between commercial vaccines in terms of total antibody induction were observed. It would be of interest to investigate the correlation between these differences in antibody level and clinical protection.

REFERENCES

1. Catella et al, ESPHM 2017; 2. Ubeda et al, IPVS 2010; 3. Marco et al, IPVS 2010.

Table 1. PCV2 log_2 titres and percentage of positivity at different ages

	Porcilis® PCV ID		Mhyosphere® PCV ID	
Age	PCV2 log2 titres	Positive (%)	PCV2 log2 titres	Positive (%)
3w	4,63	84	5,09b	92
6w	8,71a	100	4,47b	74
9w	9,11a	100	4,36b	73
13w	6,92a	100	1,21b	24
17w	5,1a	80	0,68b	14
21w	2,41a	44	0b	0

a, b: values with different superscripts within a row are statistically significantly different (p<0.05)

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Efficacy of PRRS vaccination in piglets to reduce PRRSv clinical signs and to improve production parameters

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[1] Vall Companys S.A. [2] MSD Animal Health.

INTRODUCTION

The aim of this study was to determine if using a PRRS MLV vaccine in piglets is an effective tool to reduce infection pressure, reduce clinical signs and to improve production parameters in a profitable way in growing pigs.

MATERIAL & METHODS

The trial was conducted at a nursery farm, receiving piglets from a PRRS positive 1200 sow farm, located in the North-East area of Spain. Piglets showed respiratory clinical signs at the end of the nursery phase and beginning of fattening, which resulted in increased mortality and a higher use of antibiotics than desired Serology and rt-PCR confirmed PRRSv infection at 8–9 weeks of age.

To control PRRSv infection, it was decided to vaccinate piglets. Therefore, a total of 22000 piglets (36 weekly batches) were vaccinated intramuscularly at 3 weeks of age with Porcilis® PRRS, MSD Animal Health. Vaccination took place from August 2019 to May 2020.

Efficacy of vaccination was determined by comparing mortality rates of pre- and post-vaccination batches, and by measuring the presence of PRRSv at the end of nursery and beginning of fattening.

All data were statistically analyzed (Chi Square Pearson's test) based on monthly mortality as the nursery observational unit and fattening unit mortality as the finishing one).

RESULTS

Mortality in the nursery was significantly reduced, from 13,08% in non-vaccinated to 4,41% in vaccinated batches (p<0,005) (Table 1; Graph 1). Also, standard deviation was significantly reduced (No vac 9,04 vs Vac 2,61), and frequency of lower mortality rates was significantly higher in vaccinated batches (p<0,05).

In fattening, mortality was significantly reduced, from 5,5% to 2,8% (p<0,001) (Table 1; Graph 2). Respiratory clinical signs were significantly reduced, leading to a reduction in antibiotic use.Six months after implementation of vaccination, no field virus was detected in pigs sampled at 11w of age.

Regarding profitability, calculated based only on the reduction of mortality, in the nursery phase an extra benefit of 2,65€ per piglet was obtained. In fattening, an extra benefit of 2,36€ per piglet was achieved, with 2,4 as ROI.

Table 1. Average mortality in nursery and fattening units of vaccinated and not vaccinated piglets

Mortality (%)	Porcilis® PRRS	Not vaccinated	
Nursery	4.41	13.08	p<0,005
Finishing	2.8	5.5	p<0,001

Figure 1. Nursery mortality in non-vaccinated and vaccinated batches

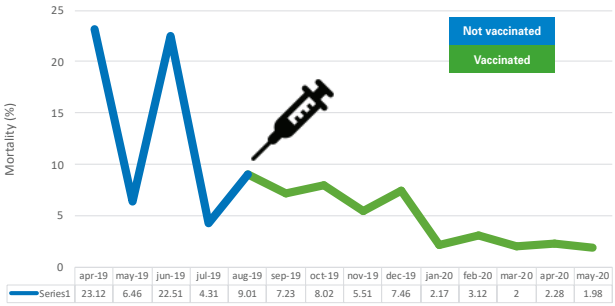
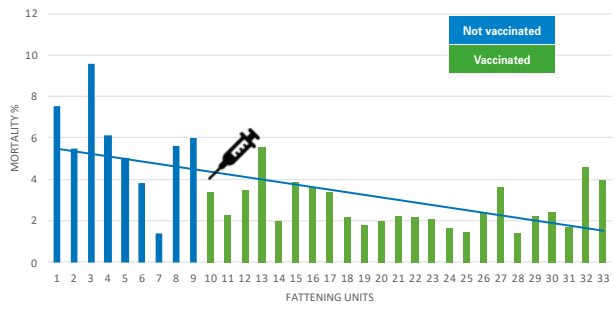


Figure 2. Mortality rates (%) in vaccinated and not-vaccinated finishing units



CONCLUSION

In this trial piglet intramuscular vaccination was an efficacious and profitable strategy to reduce PRRSv presence, clinical signs and to improve production parameters.

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PRRS status on Dutch farms between 2017-2021

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BACKGROUND AND OBJECTIVES

The aim of "Coalitie Vitale Varkenshouderij" is to eradicate PRRS from the Netherlands by 2050. The initiative is supported by all important stakeholders in the Dutch swine sector. One goal is to create a benchmark system to compare farms and gain insight into the current PRRS status of every farm in the Netherlands. Here we give an overview of the Dutch PRRS status using historical data.

MATERIAL & METHODS

All blood samples collected by MSD Netherlands between 2017 and 2021 were investigated by the CDS in Boxmeer. Farms were scored according to the results of piglets of 10 weeks of age in the RT-qPCR of INDICAL on blood samples and/or the results in blood of IDEXX PRRS X3 ELISA of fatteners at 22 weeks of age.

For this study 979 pooled samples were selected from piglets of 10 weeks of age and 3112 blood samples from fatteners of 22 weeks.

RESULTS

PRRSV RNA was detected in 625 of the 979 samples. PRRSV antibodies were detected in 2531 of the 3112 cases. When all of the samples analyzed in one year on one farm were positive, the status of the farm became positive. When all of the samples from a farm were negative in that year, the status became negative. Some farms had mixed positive and negative results, their status became positive / negative.

The status of fatteners did not change much over the last 5 years (see Figure 1). The average percentage of positive farms constantly ranged between 60 and 70%. The negative farms showed a rise from 7 to 16%. The farms with both serologically positive and negative fatteners at 22 weeks of age showed a decline. The same trends were seen in the piglets of 10 weeks (see Figure 2). Between 30 and 35% of the farms scored negative, and between 49 and 60% scored positive.

Figure 1. Percentage of farms with PRRSV antibody positive and/or negative fatteners of 22 weeks of age.

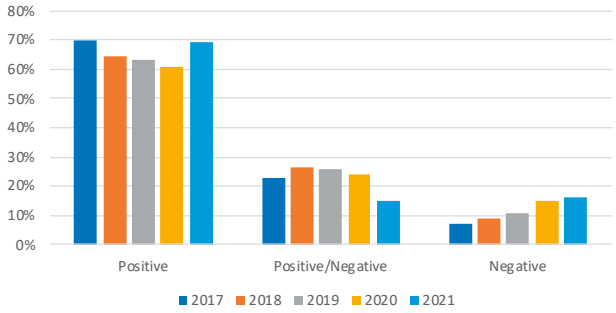
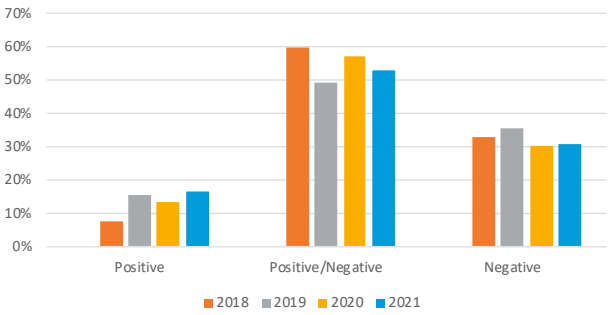


Figure 2. Percentage of farms with PRRSV RNA positive and/or negative piglets of 10 weeks of age.



DISCUSSION AND CONCLUSION

This analysis shows a small increase of negative farms in the Netherlands with serologically negative fatteners.

The differences found in this analysis show that the PRRS status of Dutch farms looks stable at country level. There is still a lot of work to be done to become PRRS negative.

MONITORING PRRSV-1 STABILITY IN SUCKLING PIGLETS BY RT-qPCR: COMPARISON OF THE RATE OF DETECTION IN SERUM, FAMILY ORAL FLUID, UDDER WIPES AND ENVIRONMENTAL SAMPLES

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Background and objectives

Defining shedding and exposure status for PRRSV in breeding herds is essential. For this, due-to-wean pigs are the key population. Alternative sampling methods to bleeding and processing fluids, more respectful of welfare, have to be evaluated.

The aim of this trial was to compare the rate of detection of PRRSV-1 in different sample types at weaning.

Material and Methods

The study was carried out on one unstable farrow-to-finish PRRSV-1 farm. In four batches, 119 litters were sampled. In each, serum from one due-to-wean piglet, a family oral fluid (FOF) and an udder wipe (UW) were collected. Four dust samples per batch (one per farrowing room) were also collected. RT-qPCR was performed in all samples. To assess the suitability of the three sample types for detection of PRRSV-1 at the litter level, the result for each was compared to a reference which was the cumulative result of the three samples. At the batch level, we considered the capacity of each sample type to detect at least one positive sample. Ct values of positive results were also compared (Wilcoxon test).

Results

In total, 16 litters (13.5%) were positive. At the litter level, the rate of detection in serum and FOF was 81.25% (95% CI: 54.35-95.95) and 56.25% (95% CI: 29.88-80.25) respectively (table 1). The results were all negative for dust and all but one UW. Ct were significantly lower in sera than in FOF (p=0.0006) (figure 1).

At the batch level, at least one sample was positive in FOF or in serum, classifying the batch as positive. Only one batch could be classified positive using UW, and none using dust.

Table 1 : *Number of PRRSV-1 RNA-positive samples at the batch and litter level.*

Batch	Number of litters sampled	Number of positive litters		
		Serum	FOF	UW
A	30	3	1	0
B	29	7	5	0
C	30	2	2	1
D	30	1	1	0

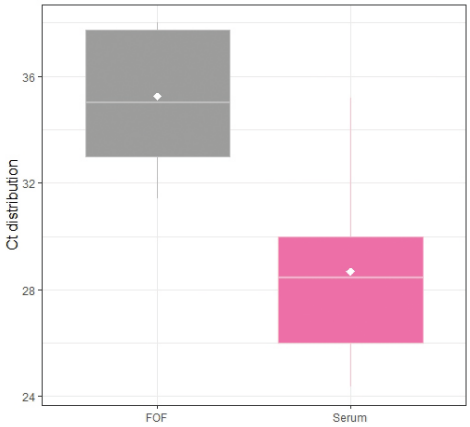

Figure 1 : *Distribution of Ct values using RT-qPCR. Boxplots show median, quartiles, minimum and maximum values.*

Take home message

The rates of detection in serum and FOF were 81.25% (95% CI: 54.35-95.95) and 56.25% (95% CI: 29.88-80.25) respectively. In the condition of our study, UW was not a valuable alternative sample.

Conclusion

UW and dust were not sensitive enough in the conditions of our study. FOF could be a useful alternative sampling practice, more respectful of welfare. Further studies are needed to confirm these observations and to assess sampling procedure.

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A multifactorial approach for the control of clinical pleuropneumonia in large-scale farms

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INTRODUCTION

Actinobacillus pleuropneumoniae causes swine pneumonia, an extremely contagious disease with high global prevalence. Sows transmit it to their litters, although clinical symptoms do not appear until growth phase due to maternal antibodies. It is difficult to control once it develops in a herd, since it can persist in the host's tonsils.

This study aims to assess a control strategy for this disease in large-scale farms with vertical integration.

MATERIAL & METHODS

The study was conducted in a PRRSv negative farm with 2400 sows in the Southeast of Spain, between January 2019 and June 2021. The acute presentation of the disease appeared between 12-14 weeks of age. Serotypes isolates in lung lesions were inside the group 1,9,11 (Apx toxins I, II, IV).

Actions taken: Better internal biosecurity, gilt relocation, gilt segregation until farrowing, farrowing sows and piglets 10-14 days of age treated with marbofloxacin (the least resistant in MIC,s study, one treatment, 8 mg/kg BW) , reduction of days to weaning to 21 and vaccination (Porcilis® APP).

The first vaccine dose for gilts was administered upon arrival and revaccination was done after 4 weeks. Piglets received first vaccination on weeks 6-7 and revaccination on weeks 9-10; Monitoring samples: piglets of different ages (3,6,9 weeks of age) to assess maternal immunity-MAD and seroprofiling of gilts upon arrival (ELISA APP-ApxIV IDEXX, ELISA ApxI, ApxII, ApxIII, OMP, MSD AH), and choose the vaccination schedule.

We followed three groups: pre-problem-control (PP) from January 2019, problem (P) July 2019 to March 2020, treated (T) March 2020 to June 2021, monitoring production parameters and medication use.

The results were statistically processed with SPSS, for the study of mortality the comparison between the means of the groups is carried out using a non-parametric test (Kruskal-Wallis), in the ADG revision the comparison between the means of the groups is carried out by means of ANOVA.

RESULTS

Mortality in finishers: 2.63% in PP, 5.38% in P, 3.49% in T, statistically significant differences ($p<0,05$) between PP and T vs. P. No statistically significant differences in ADG or in days to market.

There were significant differences in medication costs per pig, 1.41€ in PP, 3.42€ in P and 1.94€ in T ($p=0,025$), there was no clinic in group T.

Table 1. Mortality during the study period. The problem started in June 2019 and treated group started since March 2020

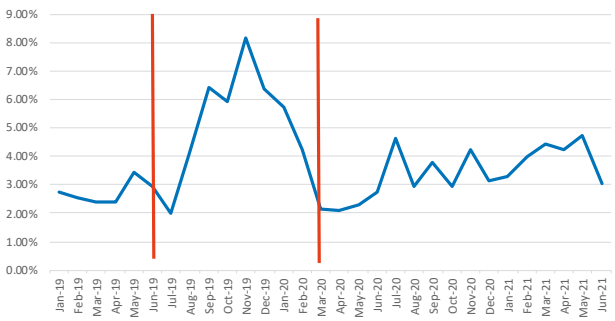

Table 2. Medication cost per pig before, during and after the App problem

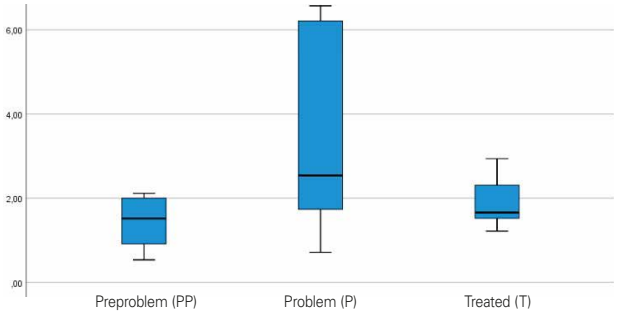

Figure 1. Lung lesions compatible with an App process

CONCLUSION

Pleuropneumonia is difficult to control in large-scale farms, due to the large number of carriers and the different immunity subgroups. Multifactorial control strategies based on a vaccination schedule improved the financial impact and antibiotic use in this study.

JISAP

MSD Animal Health

Demonstrating the inter-herd transmission of *Actinobacillus pleuropneumoniae* infection by epidemiological and molecular methods

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INTRODUCTION

Respiratory disease caused by *Actinobacillus pleuropneumoniae* is a source of major economic loss to the swine industry all over the world. Determining the source of infection with the pathogen is an important objective of epidemiological investigations conducted in connection with disease outbreaks in pig herds. This makes it possible to establish potential responsibility in warranty issues and to tighten the biosecurity measures of pig farms.

MATERIAL & METHODS

By analysing the course of an *A. pleuropneumoniae* outbreak, the production processes of the farms brought into connection with the spread of infection and the lung lesions found in the pigs sent to slaughter, as well as by the antibiotic susceptibility testing (Table 1.) and molecular study of the pathogen cultured from the organs of dead and slaughtered animals (Table 2.), we determined the origin of infection for a given farm and ruled out the role of another suspected infection source.

RESULTS

On Farm 'A', the infection was caused by an *A. pleuropneumoniae* biotype 1, serotype 2 strain, and the same strain occurred also in the herd of Farm 'B', causing chronic infection.

The herd in Farm 'C' was infected by two different *A. pleuropneumoniae* strains at the same time: biotype 2, serotype 13 and a biotype 1,serotype

6–8 *A. pleuropneumoniae* strains could be detected simultaneously (Table 1., Table 2.).

DISCUSSION

We determined with high likelihood that the infection of a fattening farm free of *A. pleuropneumoniae* originated from the infected herd of a farm located at a distance of 450 metres. The most likely way of infection spread was airborne transmission or movement of personnel between the two farms. This case highlights that the animal health requirements of future production must be taken into consideration already at the stage of designing the construction of pig farms. This includes the knowledge of the animal health status of other pig farms located in the vicinity of the farm to be constructed, as well as the accurate determination of the 'protective distance' to be maintained between farms. Also, it is very important to ensure that the professionals (farm manager, attending veterinarian) employed at a given farm are not shared between farms.

CONCLUSION

The use of the typing scheme presented for *A. pleuropneumoniae* may allow the creation of a Hungarian and an international database which may make it possible to determine the origin of the inter-herd transmission of *A. pleuropneumoniae* infection, potentially facilitating the investigation of warranty issues.

Table 1. Results of the antibiotic susceptibility tests.

Antibiotic active substance	***Actinobacillus pleuropneumoniae* strains**										
	S299-1-19 lung Biotype 1	S299-2-19 lung Biotype 1	S299-3-19 lung Biotype 1	S320-2-19 lung Biotype 1	S320-3-19 lung Biotype 1	S037-1-19 lung Biotype 2	S037-2-19 lung Biotype 2	S037-3-19 lung Biotype 2	S321-6-19 lung Biotype 1	S349-3A-19 lung Biotype 2	S349-3B-19 lung Biotype 2
	Farm and Date										
	Farm 'A', 19 April 2019			Farm 'B', 16 April 2019		Farm 'C', 15 January 2019			Farm 'A', 19 April 2019	Farm 'C', 25 April 2019	
Amoxicillin	S	S	S	S	S	I	I	I	S	S	S
Amoxicillin + clavulanic acid	S	S	S	S	S	S	S	S	S	S	S
Ceftiofur	S	S	S	S	S	I	S	S	S	S	S
Cefquinome	S	S	S	S	S	I	S	S	S	S	S
Doxycycline	S	S	S	S	S	R	I	S	I	S	I
Enrofloxacin	S	S	S	S	S	S	S	S	S	S	S
Florfenicol	S	S	S	S	S	I	S	S	S	S	S
Lincospectin	S	S	S	S	S	I	I	I	R	I	R
Marbofloxacin	S	S	S	S	S	S	S	S	S	S	S
Norfloxacin	–	–	–	S	S	–	–	–	I	I	I
Oxytetracycline	S	S	S	–	–	R	I	S	–	–	–
Sulphamethoxazole + TMP	S	S	S	S	S	R	I	S	S	S	I
Tiamulin	S	S	S	S	S	S	S	S	S	S	S
Tilmicosin	S	S	S	S	S	I	I	S	I	I	I
Tulathromycin	S	S	S	S	S	S	S	S	I	S	S

S = susceptible, R = resistant, I = intermediate, – = not tested

Table 2. Properties of the Actinobacillus pleuropneumoniae strains isolated during the slaughterhouse inspection.

n	Origin	APP PCR	Biotype	APX I	APX II	APX III	XIBD	XIIIBD	oml lipoprotein	Serotype
5	Farm A	+	1	-	+	+	+	+	2	2
16	Farm B	+	1	-	+	+	+	+	2	2
7	Farm C	+	2	-	+	-	+	-	4	13
1	Farm C	+	1	–	+	+	+	+	3	6.8

SowCare®

Prevention in the control of chronic leptospirosis infections, reducing antibiotic use and improving production parameters

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BACKGROUND AND OBJECTIVES

Leptospirosis is one of the major swine reproductive diseases globally. In recent years, the frequency of clinical presentation has increased, in part due to sow group housing. Bratislava is the most prevalent *Leptospira serovar* in Spain, generally causing chronic herd infections, with reproductive clinical symptoms mostly affecting farrowing rates and increasing litter scatter. Control requires a significant use of antibiotics.

The aim of this study is to assess whether vaccination can reduce antibiotic use and improve reproductive parameters in large herds with chronic problems caused by this disease.

MATERIAL & METHODS

The study was carried out under field conditions, in a farm with 3500 sows, with chronic reproductive failure problem (low farrowing rate, increased abortion rate and litter scatter). The problem was diagnosed using the microscope agglutination test (MAT, Neiker Tecnalia), in problem sow serum samples (20 sows, 80% with titers >= 1/100 *Bratislava serovar*).

Different reproductive parameters were monitored: total born (TB), mummified (M), ultrasound fertility (F), farrowing rate (FR), litter scatter (LS), as well as antibiotic use, from January to October 2019.

In July a multivalent vaccine against Leptospira was introduced (Porcilis Ery+Parvo+Lepto®). Weekly data were used for analysis (n=42) 2 periods were studied, (P)n=29 before vaccination and with antibiotics in feed (oxytetracycline, 800 ppm for 15 days), and after vaccination (V) n= 13.

RESULTS

During P, antibiotic was used twice a month due to reproductive problems. During V no antibiotics were used.

Ultrasound fertility (V) 93.37% vs 92.9% (P) p=0,837; FR 91.14% (V) vs 89,17% (P) p<0.05, average mummified fetuses per sow 0.146 (V) vs 0.58 (P) p<0.001; LS <9 piglets, 6.70% (V) vs 14.57%(P) p<0.05.

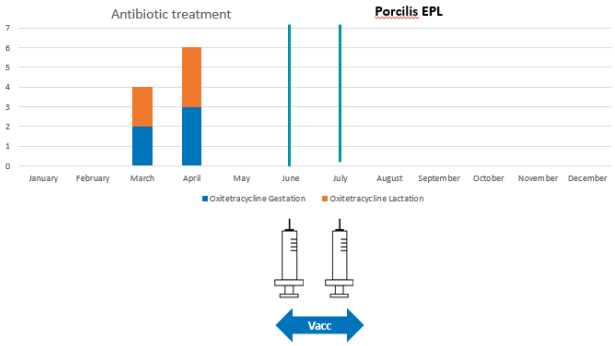
In multiparous sows, TB 18.84(V) v 18.94(P) p>0.05, in primiparous 15.99 (V) vs 15.69 (P) p=0.049, primiparous sows returning to estrus 3.45% (V) vs 7.95% (P) statistically significant (p<0.05).

Table 1. Productivity results

	Control group	Vaccinated group
Total born multiparous	18.94	18.84
Total born primaparous	15.69[a]	15.99[b]
Return to estrus primaparous	7.95%[a]	3.45%[b]
Ultrasound fertility	92.9%	93.37%
% Farrowing	89.17[a]	91.14[b]
Weaned	13.97	15.01
Litters <9 piglets	14.57%[a]	6.70%[b]
Mummified/sow	0.580[a]	0.146[b]

a,b Different superscripts within the same row represent significant differences.

Figure 1. Number of feed batches treated with Oxitetracycline during 2019



DISCUSSION AND CONCLUSION

In this field study we have observed that preventive control in chronic leptospirosis situations, significantly reduces antibiotic use as well as improving reproduction parameters over what was achieved with antibiotic control.

There were statistically significant differences in farrowing rates, mummified fetuses per litter, litter scatter and even fertility and total live born in primiparous sows with their first Leptospira infection.

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A study of postvaccination antibody response against Leptospira using microscopic agglutination test (MAT)

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BACKGROUND & OBJECTIVES

Leptospirosis is a zoonotic disease; pigs are one of the main reservoirs for some *Leptospira serovars*. Group housing and reduced antibiotic use have led to an increased prevalence.

Inactivated vaccines against different serovars are used for prevention. They may generate different antibody levels. The aim of this study is to monitor antibody response in a group of gilts from initial vaccination to first farrowing.

MATERIAL & METHODS

Forty 180-days-old gilts from a commercial 2100 sow farm (10 from each weekly batch) were selected from October 2020 to June 2021. Gilts were individually identified and Leptospira microscopic agglutination test (MAT) titers for serovars Bratislava (Brat), Pomona (Pomo) and Icterohaemorrhagiae (Icte) were monitored from acclimatization to weaning.

Gilts were vaccinated against leptospirosis with a multivalent vaccine: (Porcilis® Ery+Parvo+Lepto) at 185 days (d) and revaccinated at 215d. Gilts were bred at 250d.

Age at blood sampling (1) 180d, (2) 236d, (3) 280d (1st month of gestation) and (4) 387d (at weaning). The results were statistically processed with SPSS, using ANOVA.

RESULTS

The % of positive tests and mean antibody MAT titers at different sampling times for the following serovars are shown below.

Table 1. Percentage of positive tests and mean antibody MAT titers

	(% positive / mean titers)		
	Brat. (n=34)	Pomo. (n=30)	Icte. (n=30)
Sampling 1	2.5% / 1.5 a	0% a	0% a
Sampling 2	90% / 508 b	20.5% / 23 a	61% / 71 ab
Sampling 3	80% / 283 c	11% / 13 a	69% / 78 b
Sampling 4	37% / 50 d	8% / 8.3 a	81% / 68 b
	p<0.001	p=0.148	p<0.05

Figure 1. Sampling protocol

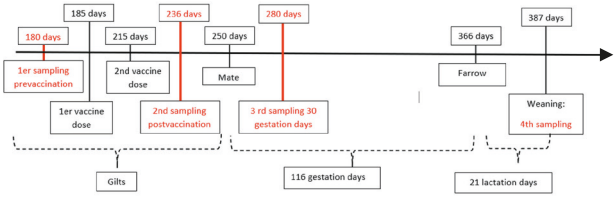


Figure 2. Bratislava mean antibody titers in every sampling

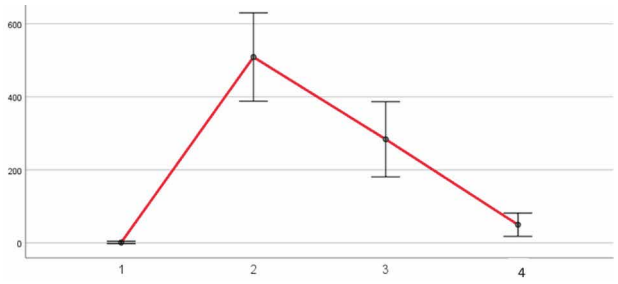


Figure 3. Pomona mean antibody titers in every sampling

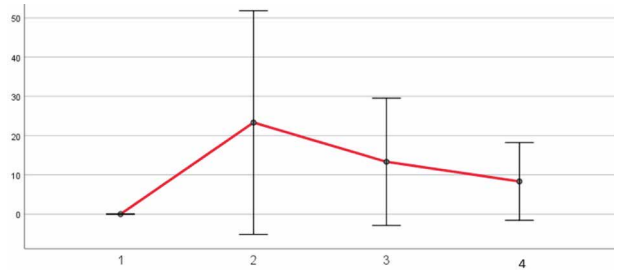
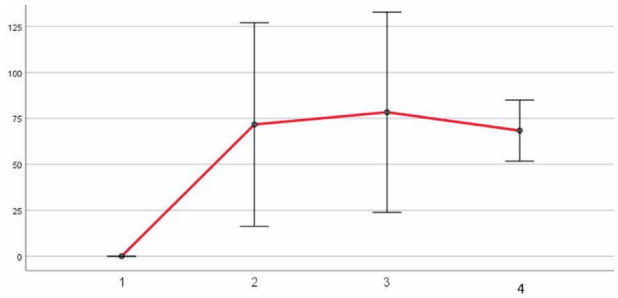


Figure 4. Icterohaemorrhagiae mean antibody titers in every sampling



DISCUSSION AND CONCLUSION

In this study MAT shows vaccination under these field conditions clearly induces seroconversion in negative gilts, but there are different results for different serovars. Most gilts seroconvert and develop high MAT titers against Bratislava and Icterohaemorrhagiae. MAT can be a useful technique for monitoring proper vaccine mediated immunization.

Additional studies will be needed to understand what happens in other farms and in infected animals.

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Prevalence and distribution of porcine rotavirus group and type in suckling piglets in Canada between July 2019 and July 2021

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INTRODUCTION

Rotavirus (RV) is a diarrhea-causing viral pathogen well established in the swine industry (1). Older animals become resistant to disease caused by the RV as they develop post-exposure immunity to it, coupled to maturation of the gut physiology and overall immunity (1). RV-A, -B, and -C have been demonstrated to cause disease in swine and are identified by the viral protein 6 (VP6) antigenicity, while other structural proteins, VP4 and VP7, are employed in further typing the strains into P or G type based on antibody neutralization (1). Buchan and colleagues (2) summarized three years of diagnostic reports involving diarrhea presentation in Ontario (ON), Canada, during the lactation.

RV-A was detected in 69% of the cases of diarrhea in suckling piglets, RV-C in 37% of the cases, and RV-B in 13% of the cases. Observing the need of better data across Canada to aid in informed decisions, the objective of this study was to determine the prevalence of RV groups and types on suckling pigs from different Canadian provinces (AB, BC, MB, NB, ON, QB, SK).

MATERIAL & METHODS

Canadian swine veterinarians submitted samples (fresh tissues, fecal swabs, or fecal material) from perinatal (2-5 days of age) diarrhea cases to the Animal Health Lab at the University of Guelph (AHL) for RV confirmation, type identification, and VP7 sequencing. Analysis of the VP7 was performed using Merck Animal Health, Madison, NJ, USA Sequivity® Dashboard (3).

RESULTS

RV positive samples from 245 diarrheic were sequenced. Individual RV infection summed 148 cases (60.41%), while 44 cases were co-infections. RV-C was present in 46.5%, RV-A in 40.8%, and RV-B in 12.6%. RV A was present in 84% (37/44) of these co-infection cases, followed by RV C in 81.8% (36/44), and RV B in 40.9% (18/44). Sixteen different group types were identified by sequencing of the VP7 protein (5 RV As, 7 RV Bs, and 4 RV Cs).

Table 1 presents each RV group/type found per province. Some RV types were specific to a certain region or province. Table 2 displays the participation of each RV group in the co-infection cases.

Only ON province observed RV B G18, MB a RV B G25, RV A G11 was only found in AB, RV B G12 was found in AB and SK only, and RV B G16 in MB and ON.

Table 2. Participation by group in co-infection cases (number of cases from the total, percentage from the 44 co-infection cases).

RV Group	# co-infection cases	% in co-infection cases
A	37	84%
B	18	41%
C	36	82%

Table 1. Distribution of RV A, B, and C types by Canadian provinces.

RV Type	AB	BC	MB	NB	ON	QC	SK	Total
A	**27**		**25**		**40**	**1**	**7**	**100**
A G11	1							1
A G3	4		2		2		1	9
A G4	1		1		4			6
A G5	15		3		6	1	2	27
A G9	6		19		28		4	57
B	**7**		**5**		**6**	**1**	**12**	**31**
B G12	2						1	3
B G14	2		1				2	5
B G16			3		2			5
B G17					2		8	10
B G18					1			1
B G20	3				1	1	1	6
B G25			1					1
C	**28**	**3**	**33**	**1**	**25**	**9**	**15**	**114**
C G1	6		3		5	1	2	17
C G5			3		1		4	8
C G6	22	3	26	1	14	6	8	80
C G9			1		5	2	1	9
Total	**62**	**3**	**63**	**1**	**71**	**11**	**34**	**245**

AB: Alberta; BC: British Columbia; MB: Manitoba; NB: New Brunswick; ON: Ontario; QC: Quebec; SK: Saskatchewan.

DISCUSSION & CONCLUSION

Rotavirus-related diarrhea in suckling piglets is still a concern for swine industry due to its perinatal damages. Similar to other studies, suckling piglets were mostly infected by only one RV, although co-infections were common.

RV C G6 was the most prevalent RV type in Canada (except ON), followed by RV-A G9 in this study. RV B was the least prevalent strain but was the most diverse among RV groups.

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Rotavirus Infections Precede *E. coli* Postweaning Diarrhea in Pigs

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INTRODUCTION

Postweaning diarrhea in pigs is often associated with bacterial gut infections. Enteric viral infections are assumed to precede proliferation of bacteria or in some cases cause clinical problems after weaning (Folgueiras-González et al., 2021). However, their exact contribution to clinical pathology is unclear. This case report aims to investigate the presence of viral enteric infections prior to onset of postweaning diarrhea in a commercial herd in The Netherlands.

MATERIAL & METHODS

A farrow-to-finish farm with history of postweaning diarrhea was selected. Intestinal disbalance and watery diarrhea were observed after weaning, most of the times in the second week after weaning. Management changes were proved ineffective.

A combination of qPCR and Next Generation Sequencing (NGS) was used to investigate the problem. Rectal swabs were taken in a cohort of piglets 1d before (n=60) and 6d after weaning (n=40). Two clinical representants were euthanized at 12 days after weaning, because that was the moment the first diarrhea started to appear in the pens. Clinical representants were investigated by histopathology.

RESULTS

NGS analysis was used to detect different viral pathogens present in the samples. Multiple Rotavirus genotypes (A, B & C) were detected after weaning. An increase in Astrovirus and Picornavirus viral load was also detected. Multiple qPCRs were used to detect and quantify Rotavius A (RVA), Rotavirus C (RVC) and Porcine Astrovirus types 1-5 (PAstV1-5) in the rectal swabs (see Figure 1). A sharp rise in RVA genome copy number at 6 days after weaning (see Figure 2), preceding clinical diarrhea, was observed. NGS analysis identified RVA variants that were not detected by qPCR, this was due to a mutation of the RVA-strain in the region (a conserved part of the VP6) where the primer of the qPCR needs to bind. Therefore, the number of positive samples was underestimated due to the fact that there was a primer mismatch.

At necropsy, *E. coli* was isolated from the small intestine and microscopic lesions indicative of *E. coli* infection were observed, i.e. small rod-shaped bacteria attached to the intestinal epithelium. Villus atrophy was detected especially in the jejunum (see Figure 3).

Figure 1. Results of the multiple qPCR's to quantify the number of positive samples for Rotavirus A (RVA), Rotavirus C (RVC, positive if the viral load in the sample was more than 10 copies) & Porcine Astrovirus types 1-5 (PAstV1-5). *the number of positive samples is underestimated due to the fact that there is a primer mismatch.*

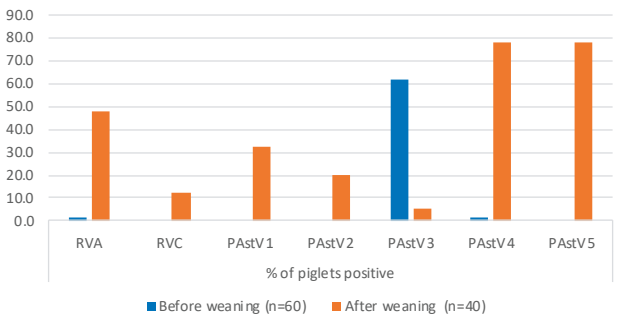


Figure 2. Average genome copies of positive samples for Rotavirus A (RVA), Rotavirus C (RVC, positive if the load in the sample was more than 10 copies) & Porcine Astrovirus types 1-5 (PAstV1-5).

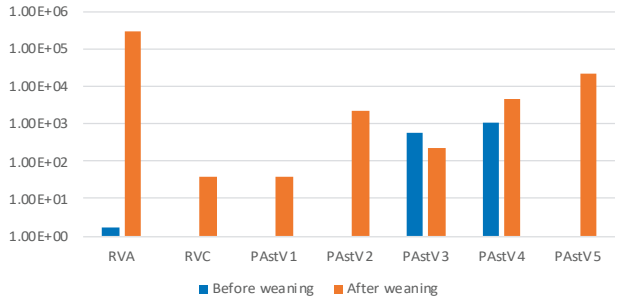
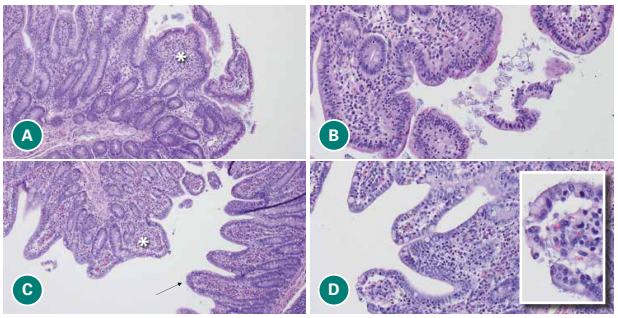


Figure 3. a (100x), b (200x): jejunum of piglet 1: Surface epithelium almost completely covered with small rod shaped bacteria (see inlay of piglet 2 for magnification). Multifocally mild atrophy and fusion of villi (*) c (100x), d (200x) jejunum of piglet 2: Surface epithelium almost completely covered with small rod shaped bacteria (see inlay for magnification. Multifocally mild to moderate villus atrophy (arrow points at shorter villi) and fusion of villi (*).



CONCLUSION

E. Coli infection was confirmed by culture and histological evidence of bacterial adhesion to the gut epithelium. However, the villus atrophy detected cannot be explained by *E. Coli* infection. A relevant change in the enteric virome, particularly RVA, was observed in the first week after weaning.

These results suggest that RVA infection after weaning might have had an effect on subsequent *E. Coli* infections in this farm. The combination of viral and bacterial infections is likely to cause the intestinal disbalance and the watery diarrhea. Further research is needed to clarify the role of stress, and feed changes at weaning.

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MSD Animal Health

Assessment of Antibody Levels in Hyperprolific Sows receiving different vaccination protocols against Neonatal Piglet Diarrhea caused by Enterotoxic *Escherichia coli* (ETEC)

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INTRODUCTION

Neonatal diarrhea (ND) caused by ETEC is one of the most common diseases in farrowing, causing morbidity and major economic losses. The most effective prevention is through passive colostral and lactogenic immunity. The aim of this study is the assessment of several vaccination programs, measuring antibody levels obtained to identify the most appropriate prevention strategy.

MATERIAL & METHODS

The study was carried out in a commercial Spanish farm with hyperprolific genetics. Two commercial vaccines were used (vaccine A, Porcilis® ColiClos; vaccine B, Colidex®) to assess antibody concentrations against the most prevalent virulence factor in ND (F4ab, F4ac, F5, F6 and LT), using in-house ELISA tests from MSD AH. 75 sows were selected (1st and 2nd parity) divided into 5 groups with 2 different vaccination schedules; Groups 1 (1st parity) and 3 (2nd parity) (vaccine A), groups 2 (1st parity) and 5 (2nd parity) (vaccine B), vaccination 6 and 4 weeks before farrowing, group 4 (2nd parity, vaccine A) vaccination 4 weeks before farrowing. Piglet blood samples were taken 24h after farrowing, after 7-10d and at weaning, and from all sows on weeks 6, 4 and 2 before farrowing.

For the statistical evaluation of the data, the IBM SPSS Statistics 22.0 program was used. The application and interpretation of the statistical tests have been carried out according to the text of Petrie and Watson.

RESULTS

Piglets in groups 1 and 3, had higher antibody titers than those of groups 2 and 4 on days 1 and 7-10 after farrowing ($p<0.001$). Sow antibody titers, 2 weeks before farrowing, were highest in 2-dose schedules on second parity ($p< 0.05$), and highest in all animals in vaccine A groups versus vaccine B groups ($p<0.05$).

Figure 1. Mean antibody titers in primiparous.

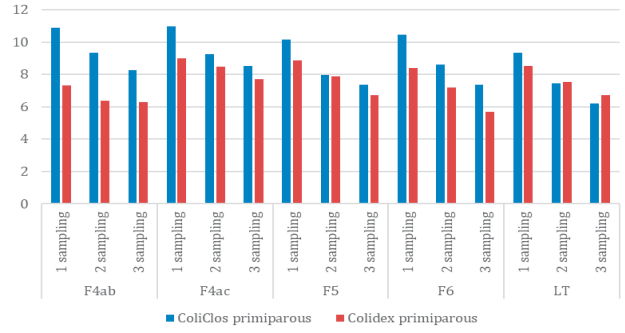


Table 1. Trial protocols.

Group	Parity	Vaccine	Protocol (wk pre-farrowing)	
			1st dose	2nd dose
1	1st	Porcilis® ColiClos	6	4
2	1st	Colidex®	6	4
3	2nd	Porcilis® ColiClos	6	4
4	2nd	Porcilis® ColiClos	4	-
5	2nd	Colidex®	6	4

Table 2. Mean antibody titers in primiparous.

Virulence factor	Sampling	Porcilis® ColiClos	Colidex®
F4ab	1st	10.9^{A}	7.33^{B}
	2nd	9.35^{A}	6.37^{B}
	3rd	8.26	6.29
F4ac	1st	10.95^{A}	8.97^{B}
	2nd	9.26	8.49
	3rd	8.5	7.72
F5	1st	10.14^{A}	8.86^{B}
	2nd	7.95	7.88
	3rd	7.38	6.7
F6	1st	10.45^{A}	8.4^{B}
	2nd	8.61	7.2
	3rd	7.35	5.7
LT	1st	9.34^{A}	8.54^{B}
	2nd	7.44	7.55
	3rd	6.2	6.7

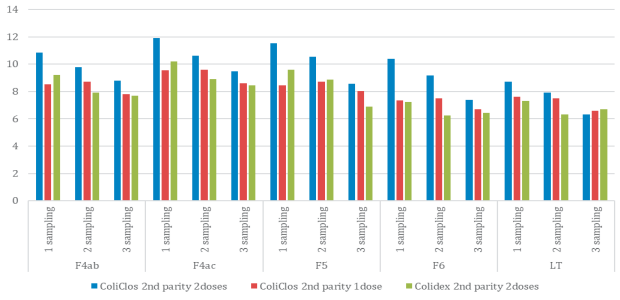
A,B Different superscripts within the same row represent statistical differences in antibody titers between the different vaccination program ($p<0.001$).

Table 3. Mean antibody titers in 2nd parity sows.

Virulence factor	Sampling	Porcilis® ColiClos		Colidex®
		2 doses	1 dose	
F4ab	1st	10.83^{A}	8.52^{B}	9.21^{C}
	2nd	9.76^{A}	8.7^{B}	7.9^{C}
	3rd	8.8	7.79	7.68
F4ac	1st	11.9^{A}	9.56^{B}	10.2^{B}
	2nd	10.6^{A}	9.6^{AB}	8.9^{B}
	3rd	9.47	8.6	8.46
F5	1st	11.52^{A}	8.45^{B}	9.6^{B}
	2nd	10.55	8.72	8.88
	3rd	8.57	8.01	6.9
F6	1st	10.37^{A}	7.35^{B}	7.23^{B}
	2nd	9.15^{A}	7.51^{A}	6.24^{B}
	3rd	7.4	6.7	6.44
LT	1st	8.7^{A}	7.62^{B}	7.3^{B}
	2nd	7.9	7.5	6.3
	3rd	6.3	6.57	6.68

A,B,C Different superscripts within the same row represent statistical differences in antibody titers between the different vaccination program ($p<0.001$).

Figure 2. Mean antibody titers in 2nd parity sows.



DISCUSSION & CONCLUSION

Availability of colostrum with high antibody levels is crucial, given the large numbers of piglets born in hyperprolific litters. In this study, differences between the vaccination programs used were demonstrated, with higher antibody levels from 2-dose programs in 2nd parity sows too.

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Glaesserella (Haemophilus) parasuis prevalence and seroconversion on the Hungarian swine farms - A field study

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INTRODUCTION

Glaesserella parasuis (GPS) is a commensal pathogen with 15 identified serovars and with many non-typable strains. The virulence of strains differs. The most virulent serovars are 4 and 5. Economic losses of Glasser disease depends not just on the strains but environmental conditions and primary viral diseases like SIV, PRRS or PCV2 and many other co-infections. Aim of the study was to collect data about GPS frequencies in Hungary.

MATERIAL & METHODS

With the support of R&D Services Lab, Boxmeer (MSD AH), we were able to survey GPS of 25 Hungarian non-vaccinated swine farms in 2019 and 2020. We always used the same protocol for blood sampling: gilts and sows (7 samples/parity) and 3-6-9-12-15-18-21-24 weeks old pigs (10 samples in every age group).

We used the HPS Biochek ELISA test which measures the OppA antibodies (presents the clinically infected animals).

RESULTS

Regarding the breeding phase, 84% of the farms were positive and 16% negative (Graph 1.).

Considering the offspring, 76% were positive and 24% negative for GPS, respectively (Graph 2.). On one farm (5.5%) we found seropositivity only in the farrowing unit, on two farms (11%) in the nursery and the fattening unit, and on 16 farms (84%) only in the fattening unit.

Distribution of the seropositivity was the following: in one age group 21%, in two age groups 42%, 3 or more age groups 37% (Graph 3.).

Figure 1. GPS prevalence in gilts and sows

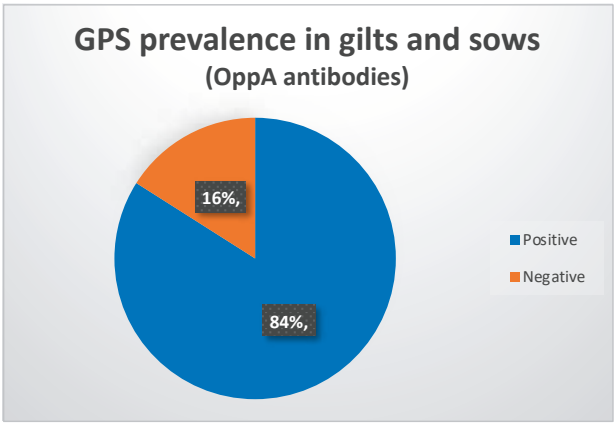


Figure 2. GPS prevalence in offspring

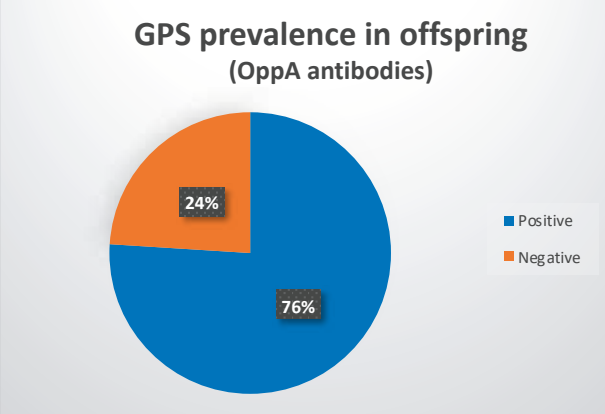
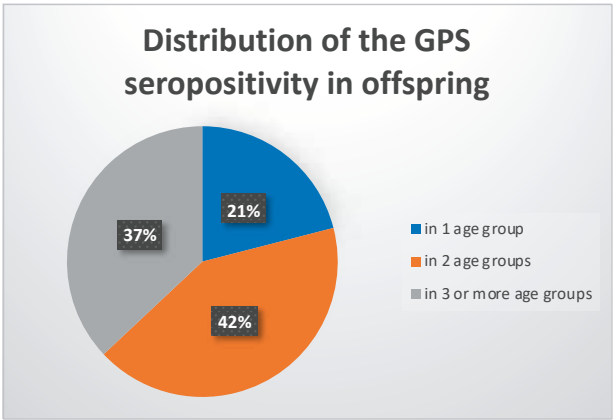


Figure 3. Distribution of the GPS seropositivity in offspring



DISCUSSION AND CONCLUSION

The increasing antimicrobials (AM) resistance and the need for prudent use of AM in the diseases control highlighted the effective herd management and vaccination.

In this study we confirmed the presence of GPS and determined the seroprofiles of the surveyed farms. The next step for the effective prevention is to identify the strains which cause the Glasser's disease on the farms.

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Miscellaneous

Reproductive performance in a pig farm with endemic African Swine Fever virus infection in Vietnam

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BACKGROUND & OBJECTIVES

African Swine Fever (ASF) is an economically devastating disease of swine. Since the Vietnamese Ministry of Agriculture and Rural Development confirmed its first ASF outbreak on 19 February 2019, 6 million pigs across Vietnam have been lost. In the absence of a vaccine, farms in Vietnam are opting to live with ASFV. This abstract aims to outline what living with ASF infection looks like.

MATERIAL & METHODS

A farm was selected with a history of ASF. This farm did not undergo depopulation. Reproduction parameters were compared pre/post ASF infection across 100 sows. 6 fetuses were randomly collected from 6 sows that experienced abortions and tested for common pathogens such as ASFV, PRRSV, Classical Swine Fever, Pseudorabies virus and PCV2 by either PCR or RT-PCR.

RESULTS

All 6 fetuses were positive for ASFV and negative for other pathogens. Pre-ASF, conception rate was 100% and farrowing rate was 95%. Regular returns post artificial insemination (AI) and sow abortion rates were less than 5% and 1% respectively. Stillbirth and mummy rate was below 7% and 1.5%, respectively. After ASF outbreak, abortion was observed in different stages of gestation with high percentage (14%), stillbirth and mummified piglet rate increased to 7.9% and 18.4%, respectively.

The rate of returned heat after AI and the rate of abortion in sows increased to 18% and 14%, respectively. After ASF, total born / litter was 8.65, born alive/ litter was 7.34 and the number of piglets weaned / litter was 6.34, in comparison to pre-outbreak numbers of 12.5 piglets / litter, 12 piglets / litter, and 9 piglets / litter, respectively.

Table 1. Reproductive performance

Parameters	Pre-ASF	9 months after the start of the ASF outbreak
Total Born	12.5	8.65
Born Alive	12	7.34
Weaned / Litter	9	6.34
Stillbirths	7%	7.9%
Mummies	1.5%	18.4%

DISCUSSION

The results show that ASFV continues to be a leading cause of reproductive failure on this farm, and that by comparing pre and post ASF performance, we see that endemic living with ASF will greatly decrease the profitability of a swine farm.

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Porcine Circovirus 3 prevalence in Central Europe

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INTRODUCTION

Porcine Circovirus 3 (PCV-3) was first discovered in 2015 in the USA. It belongs to the genus Circovirus in the family Circoviridae. The exact pathogenesis of PCV-3 has yet to be elucidated. So far, we know that it is related to numerous clinical conditions: reproductive failure, cardiac or multi-organ inflammation, PDNS-like clinical signs, and respiratory disease.

The aim of our study was to investigate the PCV-3 prevalence of Hungarian swine farms. To our knowledge, this is the first paper regarding this topic.

MATERIAL & METHODS

To monitor the prevalence of PCV-3 infection, we took blood from 1- to 34-week-old piglets on 15 Hungarian farms, and the samples were tested with qPCR. We sampled 14 animals in each group to get representative results. We used the "five pool" PCR method in the laboratory.

RESULTS

Based on the Cq-values, the distribution of viral loads was as follows: 23% of cases resulted in low viral load (Cq>30), 7% moderate viral load (30>Cq>28), 1% high viral load (Cq<28) level (Figure 1).

The distribution of positive cases by age group is shown in Figure 2. The most positive results came from 24-week-old piglets (Figure 2).

Figure 1. Cq range variation (PCV3)

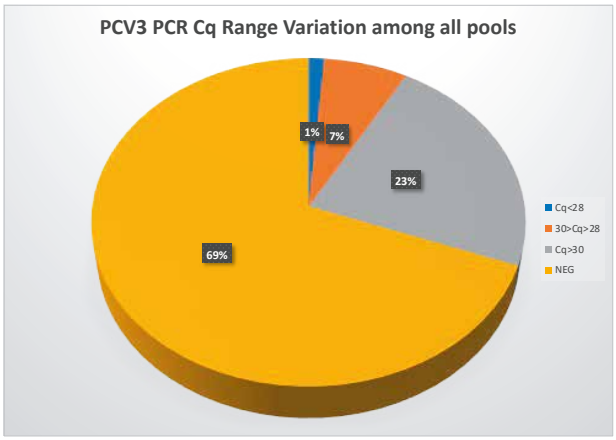
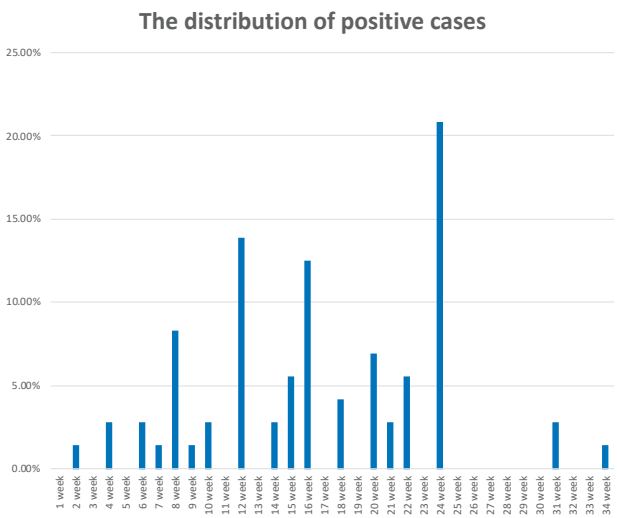


Figure 2. The distribution of positive cases



DISCUSSION AND CONCLUSION

PCV-3 was detected in all farms, although no clinical signs were observed. The subclinical consequences of the viral load need further investigations: in the future, we intend to focus on coinfections with other pathogens, such as PCV-2, PRRSV, and PPV.

ACKNOWLEDGEMENTS

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Swine influenza prevalence and subtype variance in Hungarian swine farms - A field study

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INTRODUCTION

Swine influenza virus is major cause for acute respiratory disease in pigs and plays a significant role in the Porcine Respiratory Disease Complex. The aim of this study was to study the herd level prevalence, and subtype variance of swine influenza virus in Hungary.

MATERIAL & METHODS

Twenty-five Hungarian large commercial swine farms were surveyed for influenza A virus status between 2019 and 2021. Farms were selected at random. At least 14 Blood samples each from 4-, 8-, 12-, 16-, 20- and 24-week-old pigs, and fatteners were also sampled. Commercially available ELISA (ELISA FLU IDEXX) for Influenza-A antibody test and proprietary HI tests for the identification of subtypes (H1N1 pandemic, H1N1, H1N2, H3N2) were used.

RESULTS

Among surveyed farms, 84% were Influenza-A virus positive. Among those positive farms, 60% were positive for H1N1, 65% for pandemic H1N1, 65% for H1N2, and 65% for H3N2.

Thirty percent of the surveyed farms had all 4 subtypes, 5% had only pH1N1, 5% had H3N2+pH1N1+H3N2, 10% had pH1N1+H1N2+H3N2, 5% had H1N1+pH1N1+H1N2, 5% had H1N2+H3N2, 5% had H1N1+pH1N1, 5% had H1N1+H1N2+H3N2, 10% had H1N1+H3N2 (Graph 1.)

Table 1. Distribution of the different SIV subtypes circulating in Hungarian swine population.

Subtypes circulating	# herds	Percentage %
ALL 4 subtypes +	6	30%
H1N1 + H3N2 +	2	10%
H1N1 + H1N2 + H3N2 +	1	5%
pH1N1 + H1N1 +	1	5%
H1N2 + H3N2 +	1	5%
H1N1 + pH1N1 + H1N2 +	1	5%
pH1N1 + H1N2 + H3N2 +	2	10%
H1N1 + pH1N1 + H3N2 +	1	5%
pH1N1	1	5%

DISCUSSION & CONCLUSION

To have an effective swine influenza vaccination protocol, we must be aware of the influenza virus subtypes circulating in the farm. Commercial vaccines are not always effective against all swine influenza subtypes circulating in a farm, hence, in the future there might be a need for farm specific vaccines.

Influenza surveillance data will be critical/useful to manage respiratory disease at farm level.

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Bacteriological diseases and antimicrobial practices in large Hungarian swine farms

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BACKGROUND AND OBJECTIVES

The treatment of bacterial diseases in livestock farming is becoming more limited due to increasing antibiotic resistance and stricter veterinary regulations.

The aim of our research was to survey the incidence of bacterial diseases in different age groups in the Hungarian large swine farms and the practice of antibiotic therapy used for their treatment.

MATERIAL & METHODS

Between November 2020 and March 2021, we surveyed 16 large-scale swine farms in Hungary (including 14 breeding, 14 farrowing, 16 weaner and 12 finisher herds) through personal interviews with veterinarians and farm managers.

RESULTS

Our results showed that 73% of the surveyed age groups had some form of respiratory, digestive, articular or neurological disease of bacterial origin. Across all the age groups, articular and neurological diseases were the most prevalent, but respiratory and gastrointestinal disorders caused more severe symptoms.

Urinary and genital diseases were the most common in sows. Group antibiotic therapy was decided immediately in 15% of the studied age groups, whereas in 25% of the age groups only above a certain incidence level (Figures 1-2). Samples were taken to determine antibiotic resistance in 49% of the age groups surveyed. The syringes were changed only after severe contamination in 71% of the groups, and in 21% a syringe was used for more than one preparation.

For oral group treatments, medicated water was preferred by 61%, and solubility rules were taken into account in 50%, the change in water demand due to ambient temperature in 25% of the studied groups.

Figure 1. Treatment of Porcine Respiratory Disease Complex in the surveyed herds

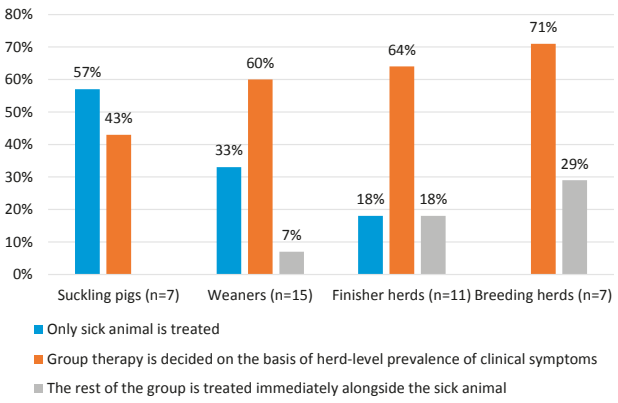
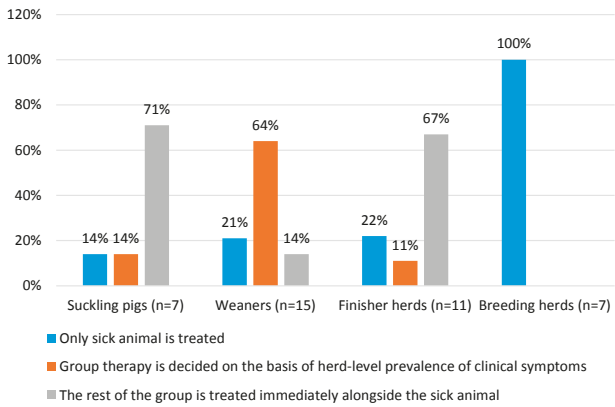


Figure 2. Treatment of gastrointestinal diseases in the surveyed herds



DISCUSSION AND CONCLUSION

It would be important to isolate animals with clinical symptoms, to measure antibiotic consumption more accurately, and to introduce treatments based on more frequent antibiotic susceptibility testing, thus effectively reducing antibiotic use while maintaining animal health status.

ACKNOWLEDGEMENTS

The Project was supported by the European Union and co-financed by the European Social Fund: EFOP-3.6.3-VEKOP-16-2017-00005 'Strengthening the scientific replacement by supporting the academic workshops and programs of students, developing a mentoring process'.

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Prevalence of and vaccinations against different pathogens in large Hungarian swine herds

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BACKGROUND & OBJECTIVES

In the European Union the use of antimicrobials is being radically restricted and various means of prevention, such as vaccination, are becoming increasingly important in the control of infectious diseases in livestock farming.

The aim of our research was to survey the prevalence of and vaccinations against different pathogens on large commercial pig farms in Hungary.

MATERIAL & METHODS

Between November 2020 and March 2021, serological test and vaccination data from 16 Hungarian farrow-to-finish and breeding pig farms were collected by using questionnaires through personal interviews with veterinarians.

RESULTS

81% of the surveyed farms were free of Aujeszky's disease, PRRS, swine brucellosis and leptospirosis. The most identified pathogen by laboratory tests (ELISA and/or PCR tests) was parvovirus (87,5%), but PCV-2 (in 81.3% of the farms), *Lawsonia intracellularis* (81.3%), *Erysipelothrix rhusiopathiae* (69%), *Mycoplasma hyopneumoniae* (62.5%), swine influenza virus (62.5%) and *Actinobacillus pleuropneumoniae* (56.3%) were also quite prevalent (Figure 1.).

All farms vaccinated against PCV-2, swine erysipelas, parvovirus, and Escherichia coli, and three-quarters (75%) of them vaccinated against *M. hyopneumoniae* (Figure 2.).

Breeding herds were vaccinated against PCV-2 in 50% of the farms, but both breeding and progeny herds were vaccinated against PCV-2 in 44%. Only half of the farms vaccinated the boars, and in 75% against PCV-2.

Figure 1. The most detected pathogens by laboratory tests (PCR/ELISA) in the surveyed herds (n=16)

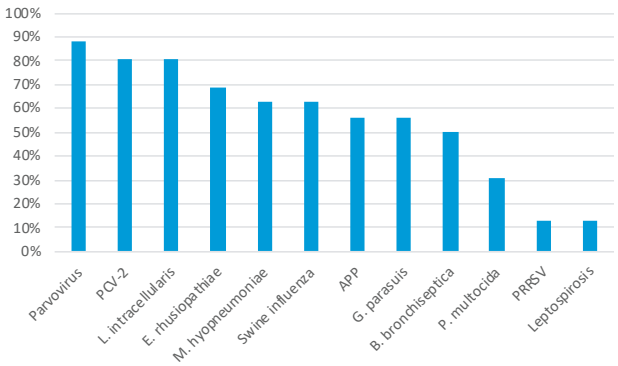
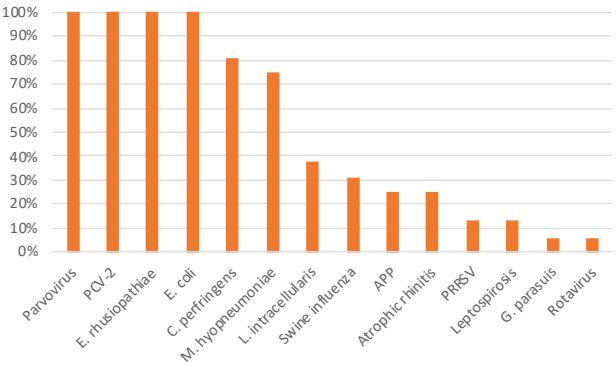


Figure 2. Vaccination rate against each pathogen in the surveyed herds (n=16)



DISCUSSION AND CONCLUSION

The high vaccination rate and the large number of serological tests in the surveyed pig farms highlight the fundamental importance of protection against parvovirus and PCV-2, but *L. intracellularis*, which causes proliferative enteritis, is receiving increasing attention in Hungarian pig herds, as well.

ACKNOWLEDGEMENTS

The Project was supported by the European Union and co-financed by the European Social Fund: EFOP-3.6.3-VEKOP-16-2017-00005 'Strengthening the scientific replacement by supporting the academic workshops and programs of students, developing a mentoring process.

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Two approaches for warming the vaccine before use

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INTRODUCTION

Side effects after vaccination are frequently seen. Warming the vaccine to room temperature or body temperature reduces these side effects (Cruijsen et al., 2017)[1]. Some farmers use warm water to speed up the process and allow the vaccine to be administered at body temperature.

This study aims to compare two methods for vaccine warming: placing the bottles outside the fridge versus heating them up in a bucket with warm water (± 40°C).

MATERIAL & METHODS

Eight vials of Diluvac Forte® of 4 different sizes: (20, 50, 100 and 200ml) were used. All vials were made of glass, except the 200 ml was PET. Two vials of each format were placed in the fridge overnight before the trial. Temperature was recorded (Arduino with DS18B20 Digital-Temperature-Sensors). All eight vials had an individual temperature sensor, one was placed in the bucket of warm water and the other one was outside the bucket to measure the room temperature (see Figure 1).

Before the vials were taken out of the fridge, the measurement started, and this recording lasted up to 6h after removing them from the refrigerator. In total the measurement was done five times.

RESULTS

It took 4 - 5 hours to get the vial to room temperature after removing it from the fridge. By placing the vials in warm water (see Figure 2), all the bottles reached room temperature within 5 minutes.

Glass-bottles were at body temperature within 10 minutes, the PET-bottle took 20 minutes.

Figure 1. Test set-up: every bottle was equipped with an individual temperature sensor connected to a microcontroller for recording temperature.

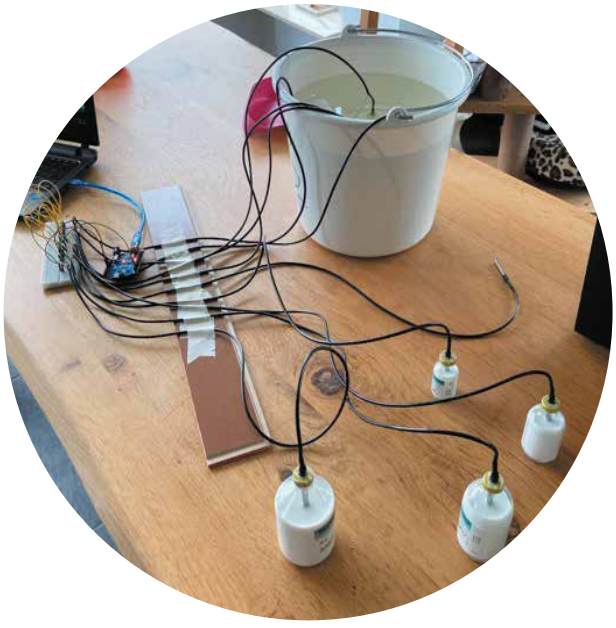
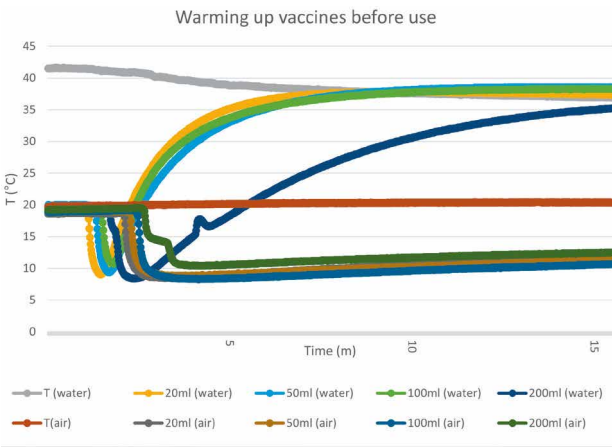


Figure 2. Recorded temperatures during the first 15 minutes of one of the measurements.



DISCUSSION AND CONCLUSION

Bringing the vaccine to room temperature is essential in preventing post-vaccination side effects. The use of a bucket with warm water is a safe and practical way to heat up the vaccine.

It takes less than 5 minutes to heat the vaccine to room temperature. Some farmers want to heat up the vaccine to body temperature, it will take at most 20 minutes.

REFERENCES

1. Cruijsen, T., Kaalberg L., Geurts V., Agten S. Effect of vaccine temperature on safety and efficacy of PCV2 and *Mycoplasma Hyopneumoniae* vaccines: a case study, ESPHM 2017, Prague VAC-055

NOTES

NOTES

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Source: *Horsington J. et al. Efficacy of Simultaneous Intradermal Vaccination of Swine against Porcine Circovirus 2, Porcine Reproductive and Respiratory Syndrome Virus, Mycoplasma hyopneumoniae and Lawsonia intracellularis. Animals 2021, 11, 2225.*

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