Taking porcine respiratory disease management into a new dimension

Today, despite all the preventive measures that are in place, respiratory problems are still a big issue on many pig farms with an adverse effect on their bottom lines. The management, control and prevention of respiratory diseases is still an on-going challenge for pig farmers and their veterinarians.

This challenge is compounded by the number of pathogens involved, how they interact with each other and the great variation in conditions such as environment, feeding and management on individual pig farms.

To help pig farmers and their veterinarians analyse this complex and invariably changing situation on a farm, Intervet-Schering Plough Animal Health (ISPAH) created and launched ResPig.

In this article we will look at how this innovative management tool is helping in the battle against porcine respiratory disease.

Various causes

Typically, when investigating a particular respiratory problem on a farm a single pathogen is often identified as the causative agent.

Often this is seldom realistic as respiratory problems are invariably caused by several pathogens interacting with each other and this is influenced by the pigs' condition and the environment they are housed in.

In addition, various aspects of on-farm management and the status of the pigs' immune systems also come into play and influence the development and manifestation of the disease.

A failure to recognise one or more of these elements can result in hastily drawn conclusions which are often imprecise. Consequently, this results in a less than optimal response to the preventive measures that were introduced.

ResPig is basically a management tool that can be used to implement a structured approach to analysing a respiratory disease complex on a farm.

This program allows a step by step appraisal and analysis of the situation
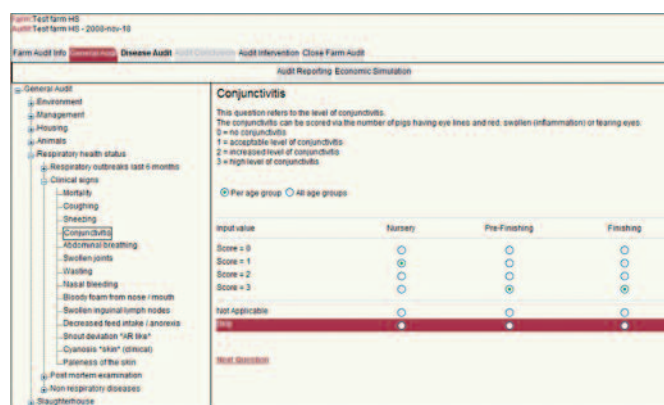

Fig. 1. The general audit.

which only in its latter phase includes the confirmation of the presence of pathogens by introducing laboratory data into the ResPig program.

Using this web-based tool enables veterinarians to perform an on-line analysis of the respiratory disease situation on a particular farm.

There are several steps in the ResPig Farm Audit:
● The general audit.
● The disease audit.
● The audit report.
● Economic simulations.
● Repeat audits.

The general audit

The general audit will assess the farm without looking at any specific causal agent and includes data relating to the farm environment, management, housing, animal flows, abattoir results and the clinical expression of respiratory problems including clinical observations and post mortem findings.

Each of these areas is evaluated by the answers to a pre-defined list of questions by which the farm can be scored.

As the whole audit is focused on respiratory disease management general factors receive less attention, but those items more directly linked to respiratory disease, such as clinical, post mortem and abattoir findings, are accounted for in greater detail.

Different age groups, such as nursery, fattening and finishing, can be evaluated and scored separately to pinpoint even more precisely when certain respiratory problems begin to appear.

Once the general audit has been

completed, the tool is then ready to determine which pathogens are likely to be playing a role in the farm's problems and these are then earmarked for a more detailed investigation in the disease audit.

The disease audit

ResPig's disease audit takes in the results of supplementary, comprehensive diagnostic laboratory tests.

These are targeted at the specific pathogens and diseases highlighted by the general audit as the most likely diseases to be present on the farm. These include PRRS, PCV, Mycoplasma hyopneumoniae, APP, Aujeszky's disease, influenza, Glasser's disease and atrophic rhinitis.

Serological, bacteriological and histopathological data are all scored on their level of severity and this part of the process can also be age related to determine the point at which specific infections become established in the herd.

The audit report

The ResPig audit report combines data from both the previously mentioned audits and this then calculates the likelihood of any one pathogen being involved and the severity with which that particular respiratory pathogen causes problems. This is the reporting part of the tool.

In the reports produced by the programme the results for the pathogens are shown as scores from 0 (absent) to 3 (causing severe problems).

Colouring of the results (see Table 1) indicates the level of severity that particular facet of the audit contributes to the problem.

This approach is used to present both the general risk factors and the diseases audited.

For a more detailed analysis the results can be represented in this way at the level of each individual question. By taking a complete overview of the pathogens present and the likelihood of their involve-

Table 1. The colour code used in ResPig Audit reports.

Score	Colour	Interpretation
0.0 - 0.5	Dark green	No to limited involvement in respiratory problems
0.5 - 1.5	Light green	Not optimal/probably moderate involvement in respiratory problems
1.5 - 2.5	Orange	Results below standard/need improvement to reduce respiratory problems
2.5 - 3.5	Red	Results well below standard/essential adjustments needed to improve results

	General	Nursery	Pre-finishing	Finishing
General audit				
Environment	1.32	1.30	1.30	1.40
	100%	100%	100%	100%
Management	0.57	0.57	0.57	0.57
	100%	100%	100%	100%
Housing	0.43	0.29	0.29	1.14
	100%	100%	100%	100%
Animals	2.27	1.33	2.48	3.00
	100%	100%	100%	100%
Respiratory health status	1.61	0.74	1.34	1.61
	99%	99%	99%	99%
Slaughterhouse	1.32	1.32	1.32	1.32
	100%	100%	100%	100%
Disease information:				
PRRS	2.35	0.72	1.73	2.51
	83%	83%	83%	83%
Influenza	2.20	1.86	2.31	2.41
	100%	100%	100%	100%
PCV	2.47	0.69	1.80	2.62
	84%	84%	84%	84%

Table 2. Results at each level of the operation.

ment in the clinical picture seen, it becomes easier to decide which pathogens need to be targeted in the preventive programme.

ResPig is very good at identifying the more unusual situation in which more than one pathogen is implicated. To decide which intervention strategy is most likely to be economically effective, an economic simulation can be run for a variety of different possible strategies. This enables 'what if' scenarios to be evaluated.

Economic Simulator

The Economic Simulator has been devised to do just this and allows different interventions to be evaluated and compared.

The model is based on scientific trial data and field experience and is able to simulate the economic impact of different vaccination strategies. It also takes into account interactions between pathogens and is able to assess how vaccination against one pathogen might affect the severity of diseases caused by others.

The effects of vaccination can be simulated either on the performance of a standard farm or, if the data is available, on the performance of the actual farm being evaluated.

Calculations can be made for different severity levels of disease (result from the audit) to demonstrate the expected economic benefits of different vaccine combinations.

In addition, since vaccine costs are built into the model, it can determine the net financial improvement of possible combinations. Thus, in this way, the technical and economic benefits can be compared of all the various combinations of vaccines against those pathogens identified as possible disease factors on the farm.

With all this information to hand, the veterinarian, in consultation with the farmer and ISPAH's technical staff, is able to design an intervention strategy that is most appropriate for the particular farm being investigated. A strategy can be selected which will produce the best technical performance, or which will be most economically effective whether using a single pathogen or a combination vaccine.

The final selection will be retained in the audit report so the veterinarian can compare the results of the proposed intervention with previous farm performance.

Repeat audits

By undertaking a ResPig Audit every six months, veterinarians can monitor the farm's health status thereby
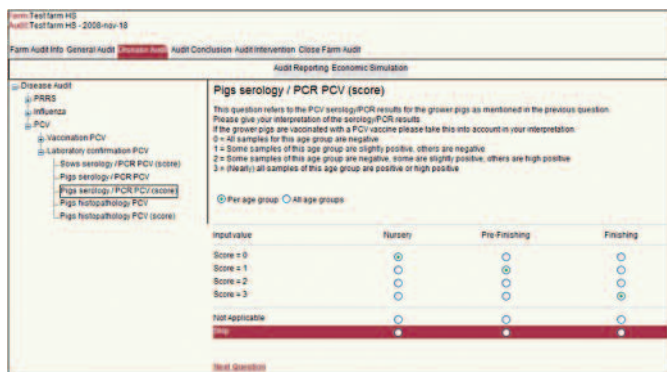
Fig. 2. The pig disease audit.

Fig. 3. The ResPig Economic Simulator.

allowing for an on-going and continued improvement in the farm's performance.

Intervention strategies can be evaluated, revised, expanded, adjusted or abandoned depending on how the respiratory disease picture alters over time as well as on general farm performance and, possibly, the state of the market.

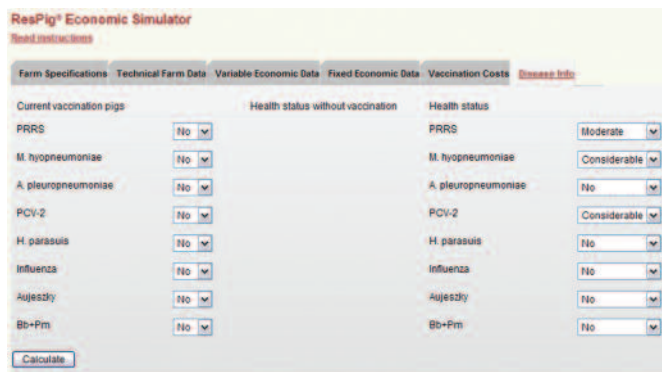Each new audit can be compared with the previous one and step by step improvements can be made on the farm. By adopting the structured, repeatable process which ResPig offers, veterinarians and farmers can evaluate the effect of advice, adjust it accordingly and then monitor its effectiveness on an ongoing basis.

Everything is designed not only to keep your pigs and profits healthy but to enable you to improve both year after year. ■

ResPig – experience from the field

Background:
Farm in the Netherlands with a closed herd of 420 sows – 3800 fatteners.

ResPig farm audit December 2008

Conclusion from Audit December 2008

Disease severity
PRRS: No severity
M. hyopneumoniae: Moderate
A. pleuropneumoniae: Moderate
Influenza: No severity
H. parasuis: Moderate
PCV: Considerable

Conclusions by veterinarian
● Acute mortality in finishers caused by APP infection.
● Wasting caused by strep suis and PCV infection.
● Not enough feeding stations/places in nursery.
● AIAO procedures not well handled in the nursery.

An economic simulation was done and the results are shown in Table 2 below.

Advice from veterinarian
Create more feeding stations in the nursery.
Install strict AIAO procedures.
Start PCV vaccination, consider M. hyo vaccination.

Intervention
The veterinarian and the farmer decided to start vaccination with a PCV vaccine. In this case Intervet Schering Plough Animal Health's Porcilis PCV. According to the ResPig calculation, linked to severity of disease as outcome of the report and linked to the farm specific data, this would bring the farmer €4.62 per pig sold.

In July 2009 the farm was re-audited. From the report the following conclusions could be drawn.

Conclusion from Audit July 2009

Disease severity
PRRS: Moderate
M. hyopneumoniae: No severity
A. pleuropneumoniae: No severity
Influenza: No severity
H. parasuis: No severity
PCV: No severity

Conclusions by veterinarian
● Better ADG (+51g/day).
● Less mortality.
● Better feed intake - reduction lean meat % (adjust feed composition).
● AIAO procedures have not improved.
● M. hyo clinical signs not present anymore.
● Now: PRRS infection occurs.

Again an economic simulation was done (see Table 3 above).

This shows that with PCV vaccination, indeed a result of €4.10 per slaughtered pig was achieved. Unfortunately a PRRS infection occurred, which still causes damage.

Follow up advice and intervention is certainly needed.

This case study illustrates that:
● PRRS + PCV vaccination could add extra value of €0.74 per pig sold.
● Doing an audit in a farm gives a clear picture of where the problems occur.
● Advice for intervention by the veterinarian can be measured: before and after vaccination.
● Data used in the economic simulator are reliable.
● Veterinarian and farmer can make a well judged, economically supported health management plan, with win-win for all. ■

	No vaccination	PCV + PRRS	PCV	PRRS
Per pig sold (€)	-4.10	0.74	0.00	-2.88
Per finishing place year (€)	-18.24	4.49	0.00	-12.48
Total farm year (€)	-69,294	17,049	0	-47,415

Table 3. ResPig Economic Simulator results: July 2009. The 'No vaccination' column shows the result if the PCV vaccination would not have been given.

Table 1. ResPig – technical results comparison.

Audit	December 2008	July 2009
Average daily gain (g/day)	740	791
Feed conversion rate	2.7	2.6
Mortality rate	4.0	1.3

Table 2. ResPig Economic Simulator results: December 2008.

	No vaccination	PCV + M.hyo	PCV + M.hyo + APP	PCV + APP	PCV	M.hyo + APP	APP	M.hyo
Per pig sold (€)	0.00	4.81	4.08	4.50	4.62	1.89	1.34	0.73
Per finishing place year (€)	0.00	23.02	22.65	22.32	20.49	9.29	5.78	3.98
Total farm year (€)	0	87,474	86,056	84,829	77,843	35,297	21,975	15,129