

Using a modern vaccine to counter the economic impact of atrophic rhinitis

In recent times the disease control spotlight in pig production has tended to focus on PCV2 and other 'new' viral entities. However, we should not forget the fact that many of the diseases that were important before the arrival of PRRS, PWMS and PCV2 are still around and can have a significant adverse effect on our herd's bottom line.

So, in 2011, the strategy for the pig unit must be to develop a health or vaccination programme that considers both the 'new diseases' and/or 'old friends' who are still around.

To do this, we need to know which diseases are in our unit and, of these, which are having the most economic impact. The best person to advise you on this is your own pig veterinarian.

Complex aetiology

In this article we will focus on one of the 'old diseases' that is still around and causing significant financial losses on quite a few units. That disease is atrophic rhinitis whose aetiology involves a couple of different bacteria. Atrophic rhinitis may occur on your unit in one of two forms.

The first form is not too serious and is the non-progressive disease.

In this form of the disease the major pathogen involved is the bacterium *Bordetella bronchiseptica* and the infection occurs over a short period of time with little damage to the pig's respiratory tract.

The real significance of this non-progressive form is that the *B. bronchiseptica* can

| Vaccination group | Average daily weight gain (g) | | |
|-------------------|-------------------------------|--------------|---------------|
| | Suckling | Post weaning | Entire period |
| Controls | 270 | 725 | 599 |
| PMT | 253 | 834 | 657 |
| dO | 271 | 816 | 655 |

Table 1. Average daily weight gain from 0-149 days of age.

predispose the pig to the second or the progressive form of the disease.

In this more serious form toxin-producing strains of *Pasteurella multocida* are also involved and the aetiology is completed by environmental and stress factors.

If *B. bronchiseptica* has damaged the nasal mucosa of the piglet while it is still suckling, the severity of the disease increases and, as *P. multocida* can be acquired during this period, the disease can be evident from as early as one week of age.

The *P. multocida* produces a toxin (poison) that causes an on-going and progressive inflammation of the tissues in the nasal cavities.

This can progress and involve the turbinate bones and other bones of the nose so that nasal distortion occurs. Sometimes the turbinate bones can be totally destroyed (see pictures below).

This is important because these bones are an integral part of the pig's first line of defence against infections acquired by the respiratory route.

In the healthy pig these turbinate bones make the incoming air turbulent so that any particles or micro-organisms can be thrown against the mucosal lining in this part of the nose where they come into contact with

mucus and other components of the nasal defence system that effectively dispose of these invaders.

In the pig whose turbinate bones have been destroyed this does not occur and invading micro-organisms can proceed deeper into the pig's respiratory system unhindered. The clinical signs seen include sneezing, twisted snouts and depressed growth.

Economic effects

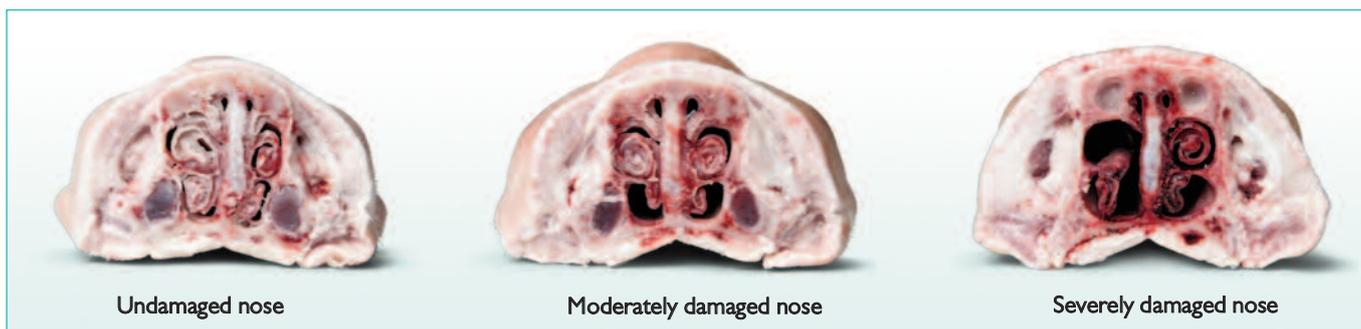
Mortality is not a major issue but the economic effects associated with the depressed growth and taking longer to reach market weight are significant. It has been demonstrated that there is a correlation between the degree of turbinate damage and animal performance.

As the progressive form of atrophic rhinitis can be confused with other conditions diagnosis should not be on clinical signs alone but should include post mortem examinations of snouts and the isolation of the causative bacteria.

As has already been mentioned the damage caused to the turbinate bones is perma-

Continued on page 12

Different severity levels of atrophy of the turbinate bones.



Continued from page 11

ment and so treatment with antibiotics is of limited value and most of this is associated with the control of secondary infections.

Also, infection often occurs when the piglets are suckling which precludes the use of water or in feed antibiotics. This means using injectable antibiotics, which is more expensive in terms of products and labour.

However, there is an effective way to control progressive atrophic rhinitis and it involves vaccinating the sow so she transfers protection down to her piglets via her colostrum.

Porcilis AR-T DF from MSD Animal Health (formerly SP Intervet Animal Health) is just such a product. It contains dO protein,

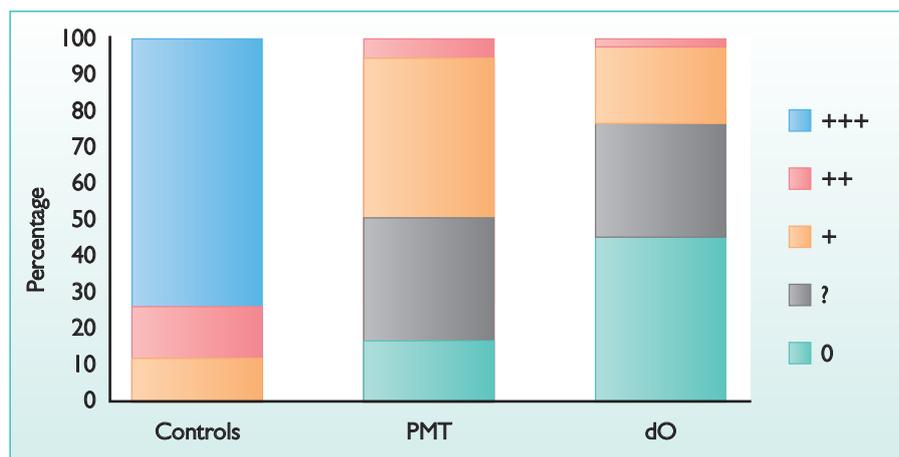


Fig. 1. Degree of turbinate atrophy.

which is derived from the *P. multocida* toxin (PMT) and has been rendered unable to enter cells and cause disease by deleting certain amino acids without affecting its immunogenicity, inactivated *B. bronchiseptica* cells (a vaccine) and the well known Diluvac Forte adjuvant.

The product induces high titres in the sow who then passes protective maternal antibodies to her piglets via the colostrum she produces.

The dO protein has been tested in a challenge trial in which the piglets from three types of sow (negative controls and sows vaccinated with a product containing dO or PMT) were challenged between two and five days of age with *B. bronchiseptica* and a toxin-producing *P. multocida* strain. The results are summarised in Fig. 1 and the commercial impact is shown in Table 1 on the previous page.

These results show that dO protein provides effective protection against the clinical, pathological and production limiting effects of progressive atrophic rhinitis.

The Diluvac Forte is a unique patented vitamin E based formulation that stimulates T- and B-lymphocytes in the pig and this results

Nasal swabbing for PCR analysis.



in increased phagocytosis and protecting immune cells and so boosts Porcilis AR-T DF's efficacy.

Challenge trial results

So, how well does this product protect the piglets? This can be answered by looking at the results of challenge trials.

Piglets from vaccinated sows were challenged intra-nasally with *B. bronchiseptica* at 3-7 days of age and *P. multocida* four days later. On the 174th day of the trial control piglets from non-vaccinated sows had a turbinate lesion score of 3.79 (maximum possible score 4.00) and those from vaccinated sows had a score of 0.00.

Differences in daily weight gain are shown in Fig. 2.

Overall these trials showed that piglets from vaccinated sows were effectively protected against atrophic rhinitis because:

- Good serological response in the sows.
- Antibodies were transferred to the piglets via the colostrum.
- In cadence of clinical signs very much lower in pigs from vaccinated mothers.
- Levels of turbinate atrophy were much lower (often it was non-existent) in pigs from vaccinated mothers.
- The performance of pigs from vaccinated mothers was much better.
- Vaccination reduced the frequency with

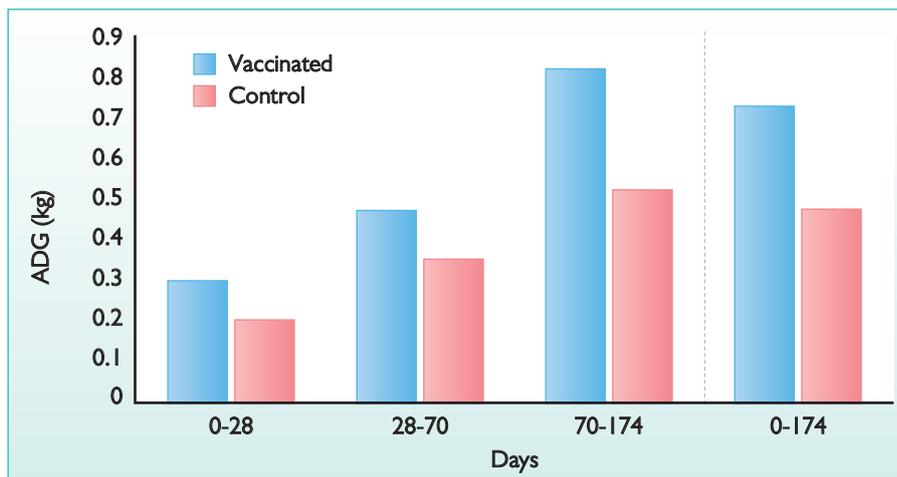


Fig. 2. Average daily weight gain (kg) at various intervals.

which the causative bacteria of atrophic rhinitis were isolated.

Other work has shown that compared to Porcilis AR-T, Porcilis AR-T DF (the vaccine containing the DF adjuvant) piglets from Porcilis AR-T DF vaccinate sows:

- Lost their antibody at a slower rate and so, at any particular age had a slightly stronger immunity.
- Had levels of PMT neutralising antibodies that were at least as good as those from Porcilis AR-T vaccinated sows. Sows should be vaccinated with two doses of vaccine given four weeks apart – with the second

shot 2-4 weeks before farrowing – and their immunity should be boosted with another shot of vaccine 2-4 weeks prior to subsequent farrowings.

In conclusion, it can be said that Porcilis AR-T DF provides high and uniform colostral titers, which give good protection against atrophic rhinitis in the sow's progeny.

The product gives 100% immunogenicity with 0% toxicity and so should be your preferred vaccine option when it comes to countering the adverse economical effects of this important swine disease. ■