5th Merial Forum focuses on swine reproduction

The 5th Merial Swine Forum, which focused on swine reproduction, was recently held in Budapest. Here we review a selection of the topics covered.

Prof Hans Nauwynck from Ghent University gave an informative overview of viral reproductive problems in the sow. Viruses may affect a normal gestation in one of two ways – indirectly or directly (viral replication in reproductive tract).

He cited swine influenza as a good example of the former. This virus replicates to large numbers in the upper respiratory tract and this generates an acute cytokine burst which leads to inactivity, anorexia and fever. During this stage abortion may occur.

Direct reproductive failure

Several viruses are capable of causing direct reproductive failure by multiplying in the reproductive tract, embryos and/or foetuses. The most important of these are PRRS virus, classical swine fever (CSFV), enteroviruses, porcine encephalomyocarditis virus (EMCV), porcine parvovirus (PPV), porcine circovirus type 2 (PCV2) and Aujeszky's disease virus (ADV).

Table 1. Laboratory tests currently used for the diagnosis of reproductive disease in sows.

Pathogen	Laboratory tests
PRRSV	RT-PCR, ELISA
PPV	HIT, PCR
ADV	VI, PCR, ELISA
Erysipelas	Bacterial culture
Zearalenone	Chemical test
Leptospirosis	MAT, PCR, ELISA
PCV2	PCR, RT-PCR, ELISA
SIV	ELISA, HIT, PCR
Brucellosis	ELISA, PCR
Other bacteria	Bacterial culture
CSF	RT-PCR, ELISA
EMCV	VI, ELISA, PCR

PCR – Polymerase chain reaction,
RT-PCR – Real time PCR,
HIT – Haemagglutination inhibition test,
VI – virus isolation, MAT – Micro-agglutination test

	Before vaccination		All sows and gilts vaccinated with Circovac					
Period from	1.8.09	30.10.09	5.5.10	1.8.10	30.10.10	26.1.11	10.5.11	1.8.12
to	29.10.09	31.1.10	31.7.10	29.10.10	25.1.11	9.5.11	31.7.11	1.11.12
Breeding								
Live per litter	14.9	14.8	15.9	15.8	15.7	16.1	15.4	15.9
Stillbirths	2.0	1.9	1.4	1.5	1.8	1.5	1.1	1.5
Preweaning mortality (%)	16	16	13	16	19	17	12	13
Weaned/sow/year	28.0	28.2	29.3	30.2	29.7	30.3	30.8	31.4
Weaners								
ADG (g)	449	434	447	513	456	433	459	457
Postweaning mortality (%)	2.0	3.0	1.7	2.4	2.4	2.8	3.5	1.8

Table 2. Danish experience with PCV2 vaccination.

These may reach the embryos/foetuses via semen or via the mother's blood. Viruses shed via the semen are PRRSV, CSFV, PPV, PCV2, and ADV.

The placenta is a protective barrier and it is thought that viruses may cross it in infected leukocytes. The clinical outcome of virus crossing the placenta depends on virus type and quantity, stage of infection and the number of foetuses that are simultaneously infected.

Prof Nauwynck detailed an approach that may be used for the diagnosis of viral reproductive failure stressing it was important to examine whole litters from different sows.

When foetuses are fresh and firm he advocated focusing on viruses that cause generalised disease like swine influenza. In such instances, diagnosis is done on the sow (virus isolation or PCR on nasal swabs and/or seroconversion).

When most foetuses are not fresh and some are partially mummified (brown) ADV or CSFV should be considered and, in the case of the former, necrotic foci on the surfaces of foetal livers are often seen.

Diagnosis is by immunofluorescence, virus isolation, PCR on foetal lung or spleen tissues.

Demonstrating seroconversion is not an option because sows have already seroconverted by the time they abort.

If the main presenting sign is SMEDI (stillbirths, mummifications, embryonic deaths and infertility), PPV, PCV2, PEV and EMCV should be suspected and in the case of the last of these four stillbirths predominate. On farms that have been correctly vaccinated against PPV this condition can be excluded.

PCV2 only poses a problem when seronegative gilts are being introduced to the farm. EMCV is very rare and usually associated with large numbers of rodents on the farm. When the main presenting sign is late abortion/early farrowing PRRSv infection should be suspected.

Diagnosis in sows

Dr Giovanni Loris Alborali then reviewed the diagnosis of reproductive disorders in sows. He stressed the importance of compiling an accurate history of the problem that defines the clinical signs, the animals involved, reproductive date and the timings of events. Clinical signs are essential in determining the differential diagnosis.

He defined reproductive failure as being characterised by anoestrus, vaginal discharge, returns to oestrus, embryonic and foetal deaths, abortion, mummies, early or late farrowing and the birth of weak or stillborn piglets. He also stressed the importance of examining whole litters and collecting paired sera.

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He summarised the currently used laboratory diagnostic methods used (Table 1) and went on to detail the outcomes of 71 outbreaks investigated in 2012.

Some 40 outbreaks were diagnosed as viral with 21 being PRRSV, 14 PCV-2, one PPV and one ADV. Three further outbreaks were co-infections with PRRSV and PCV-2.

Dr Roberto Bardini from Trouw Nutrition in Italy reported on specific procedures applied to a 450 sow commercial unit in a high pig density area that was PRRSV positive.

Initially, replacement PRRSV negative bought in gilts were injected with PRRS virus obtained from the serum of post weaning piglets and at the same time they received medicated feed (antibiotics and anti-inflammatory agents. During isolation the gilts received appropriate vaccines but when they were moved to the pre-insemination area they received one or two doses of Progressis (inactivated PRRS vaccine) as a booster and two doses of Circovac.

This approach consistently kept abortions at a low level and the number of pigs weaned per sow per year high.

Improved productivity

Danish veterinarian, Dr Dorte Risum of the Porcus Swine Practice, reflected on how the use of Circovac had improved productivity and reduced antimicrobial use in a Danish sow herd. This herd contained 220 SPF sows and was infected by mycoplasma but did not have PRRS or Actinobacillus pleuropneumoniae. However, its sows were experiencing vulval discharges as well as an elevated number of still births (1.4-2.0 per litter). The number of born alive remained unaltered at 14.9 piglets per litter, although these piglets lacked vitality.

Improvements to post-farrowing management and the use of penicillin cured the vulval discharge, it did not affect the number of piglets born or their viability. Following on from this, weaners became less uniform although they still had a good growth rate. This necessitated an increased use of antimicrobials. It was decided to vaccinate all the sows and gilts against PCV2 with two shots of Circovac. Sows were vaccinated six and three weeks before farrowing with Circovac and gilts were vaccinated six and three weeks before breeding with Circovac 6.

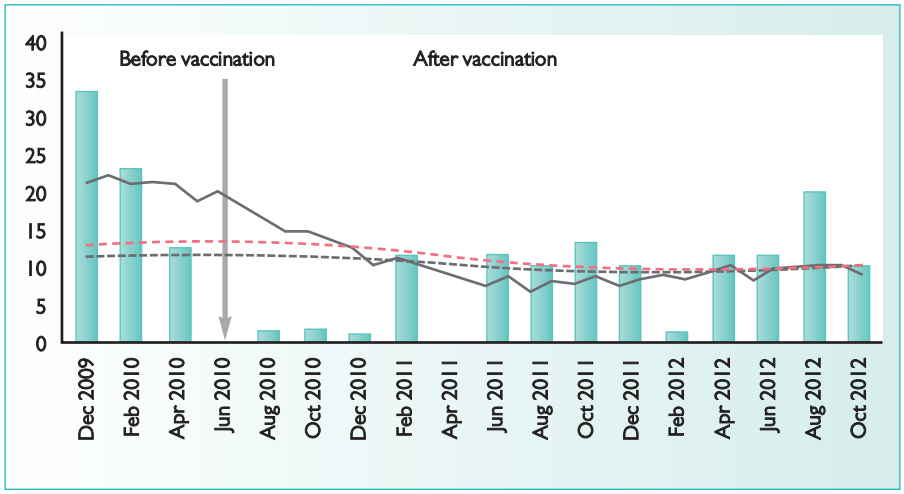

Fig. 1. Decline in the antimicrobial use among weaners (Vetstat). Columns represent the monthly herd use, the solid line accumulated herd average. Dotted lines represent national and regional average antimicrobial use among weaners.

The performance data before and after vaccination are shown in Table 2. After sow vaccination born alive rose by a piglet to 15.8 and stillbirths decreased from 2.0 to 1.5. At the same time piglet viability increased and following weaning pig uniformity improved and antimicrobial use declined (Fig. 1).

Having increased litter size how do we capitalise on this? This was the question addressed by Dr Flemming Thorup of the Danish Pig Research Centre. Since 1992 litter size in Denmark has increased from 10.8 to 14.8 piglets born alive per litter in 2011. Over the same time period piglets weaned per litter rose from 9.8 to 12.7. Initially, increasing litter size could be coped with by cross fostering piglets so every nipple had a piglet, but soon the number of piglets exceeded the number of functional nipples. Because of EU legislation early weaning with associated measures was not a possibility.

To manage large litters timing and continuity is essential and to this end the Danes have developed a number of tools to make large litters possible, but they stress that excellent management and stockmanship can not be replaced.

Five lessons are key:

- Lesson 1. Disease is rarely a cause of piglet mortality so management and timing are the real challenge.
- Lesson 2. If you give piglets time they get enough colostral antibodies. So, their own mother should nurse them for at least 12 hours.
- Lesson 3. Sows can nurse a large number of piglets if health and management are good.
- Lesson 4. Sows can nurse more than one litter without adverse effects.
- Lesson 5. Piglets should be checked daily and bring runts together.

If a piglet weighs >2.0kg at birth (>1.6kg for gilt litters), it will survive to slaughter. Piglets <1.0kg at birth are a challenge but they can survive given a chance. This can be provided by removing competition by bringing runt piglets together on the same sow. Finally, with a good milking sow the litter can easily grow by 3kg a day. This necessitates the sow getting a lot of energy from her feed so the sow must have access to the feed she needs! ■