Three elements key to circovirus control
- PCVAD diagnoses in growing pigs increasing.
- Vaccination compliance, timing critical.
- One-size-fits-all vaccination not necessarily best option.

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IT has already been more than three years since vaccines for porcine circovirus type 2 (PCV2) became available to swine producers. It will be much longer before those producers forget the devastating effects this disease had within their herds prior to the vaccine.

Cost estimates of porcine circovirus-associated disease (PCVAD) alone have been, on average, $3-4 per pig, with some estimates as high as $20 per pig (Gillespie et al., 2009). As PCV2 vaccination was implemented, several producers reported some of the best herd health and productivity they had observed for years, prompting questions about how long PCV2 had been an underlying health challenge.

More recently, though, we have observed an increase in the diagnoses of PCVAD in growing pigs. Further investigation into these cases has revealed three areas we feel are important to discuss as it pertains to PCV2 control. These include vaccination compliance, vaccine timing and the level of exposure to the virus.

Vaccine compliance

All commercially available circovirus vaccines are effective at controlling PCV2 and PCVAD as long as a first, very basic principle is followed: Every pig must be vaccinated.

The immune protection of a population against PCV2 is based on the individual pig. Each pig needs to be vaccinated because the vaccination of several pigs will not convey disease protection to an unvaccinated penmate.

Several studies have shown that when individual pigs are not vaccinated and then are challenged with PCV2, they have higher mortality, morbidity, cull rates and fewer full-value pigs compared to vaccinated pigs.

Imagine a percentage of pigs that potentially get missed during routine vaccination of several-thousand pigs. If 1% of a group of 1,000 is missed, 10 pigs in that population that will have a higher risk of becoming sick, being culled or dying due to PCV2.

In order to ensure vaccine efficacy, everyone involved in the process must be educated about the importance of every pig receiving a quality injection. Routine compliance auditing also can be done with currently available vaccine markers to ensure that pigs are receiving vaccine. If results fall short of expectations, re-education of the people in charge of vaccinating is critical.
Vaccination timing

The second important principle to effective PCV2 control by vaccine is that pigs must be vaccinated prior to a PCV2 challenge. In general, it takes about two weeks or up to four weeks in a two-dose program to generate an active immune response, so the more time pigs have from vaccination to challenge, the greater the effect the vaccine will have in protecting against PCVAD.

Vaccinating during times of active viral circulation -- including porcine reproductive and respiratory syndrome virus -- has not been very successful in controlling PCV2.

It is important to discuss the timing of vaccination with a herd veterinarian to develop an approach that allows immunity to develop in pigs before a challenge occurs.

Level of exposure

A third area we see influencing the effectiveness of PCV2 vaccine is sow herd stability and the level at which exposure to the virus occurs pre- and post-farrowing.

PCV2 is a virus that has the ability to circulate within the reproductive system, leading to reproductive problems that have included an increase in abortion rates, elevated stillbirths and mummies, along with increased preweaning mortality (Sanchez et al., 2001).

Fetuses infected in utero will replicate the virus, leading to increased viral lesions and viral shedding into the environment following birth (Johnson et al., 2002). Inherently, gilts and their litters seem to be more prone to reproductive complications caused by PCV2, but sows also can be affected. This is why collaborating with a herd veterinarian and developing a good PCV2 vaccination program with multiple vaccinations for gilts is so critical.

Diagnostics are important for establishing where in the herd PCV2 circulation and challenge is occurring. Determining this allows decisions on proper timing of PCV2 vaccination to be made.

Taking blood samples from piglets prior to weaning using a 95/10 level (95% confidence of finding at least 10% of the animals infected) is a good starting point for quantifying the level of virus circulation within a sow herd. Litters from gilts tend to be the best from which to select when collecting blood samples. Mummies can also be a good source of diagnostic specimens if the rate is high in the herd.

Cross-sectional bleeding in nursery and grow/finish areas will help determine when a PCV2 challenge is happening. This information is important in making vaccine timing decisions.

The use of rope testing, where a cotton rope is used to collect oral fluid samples, is currently being researched as a way to test large populations of pigs for PCV2 circulation. Necropsies and tissue submissions are also crucial in determining if PCVAD deaths are occurring in the grow/finish phases as well.

Summary

PCVAD is a devastating disease for swine producers. PCV2 vaccines are very effective at controlling PCV2 and PCVAD given that three principles are followed: (1) each individual pig needs to be vaccinated to ensure the best chance to develop active immunity, (2) vaccination has to be completed before viral challenge occurs so the immunity generated through vaccination has the best chance to be protective and
(3) sow farm and gilt herd stability must be maintained in order to reduce virus circulation in pigs at a young age.

Diagnostic sampling is necessary to help make decisions regarding PCV2 vaccinations of pigs. A one-size-fits-all vaccination is not necessarily the best case, and a specific herd program may need to be customized to specific conditions and concurrent health challenges.

References

