CONTROL AND ERADICATION OF PRRS

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It has now been approximately 3 years since we were informed of the etiology of "Mystery Swine Disease". Since that time, the name of the syndrome has changed twice and is now known as Porcine Reproductive and Respiratory Syndrome (PRRS). Furthermore, there has been an explosion of new information concerning the characteristics of the virus, its epidemiology, as well as diagnostic and control methods. ~hile PRRS has indeed been a devastating disease, in my opinion it has been helpful in some aspects because it has forced veterinarians to try and control a disease without the use of a vaccine. Until recently it has not been possible to vaccinate against PRRS virus. Now that the option is available, I feel it is imperative that we do not forget what PRRS has taught us over ~he last few years. As I attend conferences and listen to producers and practitioners, I am concerned that vaccination is being viewed as a "silver bullet" which can solve all PRRS related disease problems. Before we go too far with mass immunization programs, I think we need to remember the importance of solving PRRS problems by formulating plans using a combination of accurate diagnostics followed by cost effective control strategies that emphasize management, and vaccination, implemented at the proper its effect on the immune system of the pig, time in the life of the pig. The purpose of this paper is to review how PRRS ~,-irus is maintained on a farm, populations of pigs may increase the risk of reinfection, and how the spread of virus can be monitored using currently available diagnostic tests. It is the authors hope that once these concepts are understood, control measures can be implemented with a higher level of success.

Proper isolation of incoming breeding stock is critical for control of PRRS.

Over the years, perhaps no disease control strategy has been handled poorly as isolation. A proper isolation facility consists of a building located on a separate site. Here incoming stock can be held for a period of time and tested for the presence or absence of antibodies to certain diseases. Another purpose of the facility is to properly acclimati~e the new stock to the microflora of the recipient farm. In the past, isolation periods were recommended to be approximately 30 days in length. This was based on published data on incubation periods of well known swine viral diseases such as PRV and TGE. ~owever, due tO the prolonged period of viremia following infection with PRRS virus, and the fact that the incubation period of PRRS has still not been defined, I feel it imperative that isolation periods be lengthened to 45 - 60 days. New animals should be tested for both the American and the European strains of PRRS on arrival and prior to introduction to the breeding herd. Our work at the University of Minnesota shows that the primary means of viral entry into a farm is through the addition of infected breeding stock. Not only will this protocol provide better protection against introducing viremic pigs into the breeding herd, it will also allow new stock another month to mature. is also helpful to hcuse PRRS n-gati-~e sentinel pigs in the isolation facility. Testing of the sentinels should coincide with that of new stock and can be another aid towards detecting infection.

2. The re~lacement qilt is critical towards maintaining

Irus, e-fposure of naive gilts prior to breedlng is crit1cal to build natural immunity. Such is the case with PRRS virus. Frequently I encounter recurrent reproductive problems ill previously ~nfected farms. .~lore often rhan -ot, a parity analysis will indicate that gilts are the primary parity affected. Serologic --ollow up usuall-,~ ~eveals high titers with positive isolation of virus from gilts exhibiting signs of reproductive failure, and negative results from new replacement stock. Therefore, the need for proper exposure of naive gilts prior to breeding is essential. This procedure can begin during the isolation/ acclimatlzation period and appears to be an excellent opportunity i_o use vaccine. 3ased Oll tne dura~ion 0~ the primari cell mediated immune response~, gilts should be vaccinated twice during isolation. On the other hand, I have heard practitioners recommending the purchase of IFA positive gilts with high titers because the high titers equate to protection. This is not true! These animals may be the source of further viral introduction into the population and the predisposing factor for recurrent reproductive ~roblems. If the source of replacemen~ stock is infected, the _deal animal to enter -nto a PRRS posi~ -,-e nerd is I10~ ~he animal previously and has demonstrated---a reduction in titer. These animals are usually protected and while can become reinfected, do not display episodes of PRRS related diseases.

PRRS serology is a valuable tool for assessing the spread of virus on a farm~'. The indirect fluorescent antibody test (IFA) for detection of antiboaies to PP.RS virus is an accurate, sffective test ~ one understands ho~,~ tO use - propsrl It must be remembered that the detection of an antibody by any serologic test indicates that the animal has only- been exposed to an antigen. It does not mean that the animal is immune. Serology must also be used on a population basis, over a period of time. A single bleeding can provide a quic]S assessment of seroprevalence, but ill order to properly assess the sltuation, the profile needs to be repeated. To assess the PRRS status of a farm, I recommend an initial testing of ten sows, ten 4 week old pigs, and ten 5 - 5 month pigs. If more information Is required, a larger sample can be drawn. I usually fina ~hat ~leeding ten anlmals from eacn stage is adequa~-, no~iever a~ t- mes, I may need to repeat my sampling and collect thirty samples from the stage in question, i.e. the breeding herd. Titers are also important to assess whether viral shedding may be occurring in the population tested. Animals with high IFA titers (1:256 - 1:1024) have recently been exposed to virus and may be viremic. The development

of new serologic tests for detection of IgM antibodies to PRRS should help to confirm ths presence or absence of viremia, as well as detect acute infection. Unfortunately, liters from vaccination mimic those of naturally infectsd pigs d can make interpretation of s-rology ccnal shedding can be controlled on adult animals by closure of the herd~. Closure of the breeding herd to outside replacement stock has been shown to be an effective method to prevent spread of the virus among adult swine. ,iremic periods are much shorter in these animals compared to nursery,~ age pigs. While cullinq procedures and breeding herd inventory may be hich a consistent level of briefly interrupted, ~he speed at exposure and subsequent natural immuni~ can be obtained is very beneficial. Temporarll~, replacements can be selected from the finishing facility. To monitor shedding, specific S3WS can be months. ~nimals which are no longer v1remlc or carr1ers or v1rus usually demonstrate a decline in IFA titers over time. ~nce -Jiral shedd~ng is controlled in the breeding h-rd, -~g flow control measures can be implemented. This st~ategy may be limited in herds with large breeding herd inventories (—1,300 sows). ~ased Oil preliminary serologic evidence, subpopulations of potentiall-~ naive animals personal may e-xist in previously infected populat1ons ~3ee, S experience, 1,;95). Such animals may be the _ourc_ -or future infections and viral shedding. It appears that insuring consistent natural e-xposure co ~ rus is diff~cult. Therefore, the development of safe and efficacious vaccinations approved for the breeding herd appears to be crucial to insuring -onsistent exposure to virus and the subsequent development of a stabilized ~o~ulation of immune animals.

Piq flow strateqies can be useful to control VP.RS .

urser-y Depopulatlon in over 30 farms in the US. This technology is now being used successfully in Europe and ~sia. As mentioned earlier, it takes some planning, but results have been good. Once again, serologic profiling is ver~y helpful to determine whether it is the proper time for implementing such control measures. The profile demonstrated in the first part of table 1 describes circulation of PRRS virus durirg the nursery stage. Notice that sows and weaned pigs are IFA negative or have low titers. This is indicati--~e of the absence of recsnt efposure to irus in these areas. This is ill cont~ast to 8 - _0 nursery pigs, all of which have been exposed. The second profile depicts recent e-~posure throughout all stages of the farm and it is likely that a high level of viral shedding is taking place. Depopulation of this nursery will more than likel fail, because weaned piglets may carry the virus into the nurse~y. If reinfection occurs, the depopula~ion p-ocedure may need to be repeated but there appears to be little reductlon In performance.

The Future3~ The information reviewed in this paper is well known to all of us, it just ~ook a new disease to reestabiish its impor~ance. So, with what -,e know, how can ,we use -t? Obviousk~, there are a lot of PRRS problems waiting to be solved. But iwhat about the possibility of a new disease? Surely something new w.,ill happen he is encountering in his countrv. This problem involves a new strain of influen~a virus, unlike any we have encountered in the US. . similar situation exists in Canada with proliferative and necrotizing pneumonia. We have also debated ~ver the siqnificance of Porcine Respiratory Coronavirus. What about coinfection with multiple viruses? We all know that if placed under enough pressure from the immune system, -~iruses will Indergo antigenic drift or shift. This ~esults in viruses, with antigenic variations fore1gn to previously 7ell-adapted immune systems. Therefore, ,we must be aware of the potential for new ~iseases to affect pigs at all times. _ ts examine a hypothetical situation involving the occurrence of rregular levels of mortality}~5°O) in post -eaning pigs. Respiratory signs are evident. ~norexia and fever (105 are present in the breeding herd. 1~lhat do we PRRS has taught us' Conduct a proper diagnostic workup, including fixed and fresh clssue and a serological profile as previously described. Test or ~otn strains OL- PRR5, ~s ~well as PR~ E, PRC-~ nd different strains of influenza. Identify certain animals w th an ear tag

Close the breeding herd to build a stable immune population. Prevent introduction of new replacement stock from the ?ffsite isolation facility until all testing is complete. Test the new stock for exposure to the previousl. described pathogens. If a diagnosis is obtained from the samples collected in step #1 -.nd incoming stock are negative, proper acclimati-ation steps ~eed to be taken. Tf speciti v¿ccines are

In conclusion, there are many proven strategies for control of PRRS It is important for the sw1ne pract1tloner to Implement suc~ strategies in combination with a proper_y timed vaccination program. when used tcgether, these strategies provide effective disease control with minimal investment.

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Table 1: Two Example of Serologic Profiles for PRRS Antibodies

Pattern 1*

Stage	# tested	% Positive	Titer Range
Sows	30	0 - 10%	0 - 16
4 week piglets	10	0	0 - 16
8 week piglets	10	50 - 100%	256 - 1024
5 - 6 month pigs	10	10 - 30%	16 - 64

* = high likelihood of successful control following Nursery Depopulation

Pattern 2**

Sows	10	50 - 100%
4 week piglets	10	50 - 100%
8 week piglets	10	50 - 100%
5 - 6 month pigs	10	30 - 50%

** = high likelihood of reinfection following Nursery Depopulation