BEST MANAGEMENT PRACTICES USED IN THE CONTROL OF PRRS

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ABSTRACT

Because there are few therapies that can be used for the treatment of viruses, the viral diseases present a disease control challenge. The control of viral diseases is therefore much more dependent on the immune system. In order for the immune system to function properly stress must be at a minimum. A complete viral disease control plan should include the implementation of best management practices that will reduce viral challenge while promoting the establishment of immunity to both specific PRRS isolates and the co-infections that complicate the disease. A best management practice checklist is presented as a review of the thought process that should be involved when managing viral diseases such as PRRS.

DIAGNOSTICS

Initially PRRS must be identified through a thorough diagnostic work up. The preliminary diagnosis is most often based on a review of herd history and clinical signs. Gross post mortem findings then help to confirm the suspicions. Serology, histological lesions, immunohistochemistry, and PCR will firm up the diagnosis. Because of the genetic diversity of the PRRS virus it is important to characterize the farm specific PRRS isolates using genetic typing such as PRRS RFLP or preferably gene sequencing. This allows for characterization of any new PRRS virus.

FEED

Energy and amino acids must be balanced. This is essential in providing the energy required to power the immune system as well as the basic building blocks of antibodies. Minerals and vitamins are required in quantities sufficient to optimise immune function. Fibre may be helpful in controlling gastric ulcers that are secondary to the empty stomachs associated with disease.

Feeders must be managed such that the feeder will provide adequate access for each pig. The feed needs to be free of mould and mildew. Immune suppression caused by exposure to mycotoxins can lead to increased incidence of pneumonia. Immune suppressing toxins can be bound to toxin binding agents or diluted with toxin free grains.

WATER

Water is an essential nutrient. Well capacity, water flow rates, pressure, drinker number, type and placement should allow for optimal water intake. Water flow metres can be used to monitor water consumption. An experienced electrician can check for "stray voltage" if no other cause of reduced water consumption can be found. Factors such as mineral content, hardness, total dissolved solids, and pH should be considered.

Water sources and delivery systems may become contaminated with disease causing organisms such as *E.coli*. Total coliforms and fecal coliforms should be assessed at least yearly or when problems arise. Water sanitation can be maintained using chlorine or hydrogen peroxide added to the drinking water. The use of chlorine should be monitored by testing for levels of free chlorine.

ENVIRONMENT

Air exchange rates impact disease control through removal of contaminants. Increased ventilation rates may increase air speed which will in turn reduce the "effective environmental temperature" potentially causing chilling. Increased relative humidity may increase the survival time of bacteria in the room environment. Minimum ventilation rates are established and maintained by measuring the relative humidity (RH) and then adjusting the minimum ventilation rate in order to maintain 65 % RH in the late fall, winter and early spring. Control of RH in the summer is not practical and the room RH is going to be very close to RH outside the barn. In the summer the rapid air exchange rates that are used for temperature control will provide for pathogen dilution.

Chilling due to wide daily temperature fluctuation, as well as rapid small temperature fluctuations contributes significantly to the increased prevalence of disease by increasing stress levels in affected pigs. Chilling may also be caused by drafts, damp floors, damp pigs or insufficient floor, wall and ceiling insulation. Ventilation and temperature controllers should be adjusted so as to ensure that they are set to control temperature fluctuation and daily variability. Inlet placement and control, as well as thermostat cleanliness, sensitivity and placement are important.

The use of simple environmental testing equipment such as humidity monitors, data loggers, air speed and gas testers have allowed for more detailed analysis of the barn environment. This equipment has allowed for more objective ways of measuring environmental quality.

SANITATION

Improperly cleaned pens are a source of pathogens for the next group of pigs. Rooms should be washed thoroughly using hot water and a high pressure sprayer such that all visible organic matter is removed from floors, walls, feeders and drinkers. Pre-soaking and the use of detergent will assist in reducing washing time. Washing should be done as early as possible

during the downtime period. This will allow for the maximum clean and dry period possible prior to arrival of the next pigs.

The PRRS virus can be killed with appropriate disinfectants, heat and specific pH levels. PRRS virus is stable at pH 6.5 to 7.5 but infectivity is rapidly lost at pH below 6 and above 7.5. A product designed to kill viruses and bacteria on barn surfaces should be used at the appropriate concentration. Equipment used to apply disinfectant must be calibrated. Water lines should be sanitised between batches of pigs. After a disinfectant in a liquid form is applied the room can be further disinfected using a thermal fogger. A disinfectant product applied with a thermal fogging technique disperses widely throughout the room and kills pathogens in hard to reach areas such as manure pits. Thermal fogging is not a replacement for application of liquid disinfectant.

Leaving a room to completely dry with or without supplemental heating is one of the most effective ways of killing viruses and bacteria. Cleaned and disinfected pens should be left to dry a minimum of 24 hours before pigs are placed. Barns should be allowed to dry for a minimum of 7 and preferably 14 days between batches where PRRS elimination is required.

CONCURRENT DISEASE

A PRRS control strategy will include a plan for the control of diseases that act as PRRS co-infections. Co-infections have the ability to increase both the severity and duration of disease associated with PRRS.

The damage caused by Ascarid (Roundworm) larvae migrating through the lungs can potentiate the damage of Mycoplasma and viral pneumonias such as Swine Influenza. The presence of mature internal parasites in the intestines can compromise absorption of nutrients. Ensure that the piglets are not exposed to a significant internal parasite burden. Ascarid (Roundworm) control should be reviewed. Sows should be routinely dewormed and washed prior to farrowing. Growing pig pens should be thoroughly washed after each group in order to remove parasite eggs. Strategic worming of all growing and finishing pigs should help to control roundworm infections especially in barns that are not easily washed.

Mange infestation predisposes pigs to respiratory disease. Mange and lice can reduce the effectiveness of the pig's immune system. In herds that are positive for external parasites the sows should be routinely treated for external parasites prior to farrowing. Mange and lice eradication programs should be investigated.

HOSPITAL PEN/RECOVERY PEN

"The sick are the greatest challenge to the healthy!" A pig with active PRRS is a source of infection for pen-mates and if removed promptly the spread of PRRS to the "at risk" pigs in the pen can be reduced. If a pig is seen with PRRS pneumonia it should be removed to a hospital pen. Once pigs are no longer sick they can be moved into a recovery pen. In more

severe PRRS outbreaks involving a large proportion of the pig population, the use of hospital pens will have obvious limitations.

Unidirectional flow of pigs is important. Do not leave poor doing, sick or recovered pigs with new incoming pigs. All in / All out must be followed very closely.

MEDICATION

Injectable antimicrobials will be of minimal help in PRRS cases. At best, the antimicrobials will help to minimise the effect of secondary bacterial infections. The PRRS virus may be spread from pig to pig via contaminated needles. Anti-fever drugs can be used on viremic sows that are at risk of aborting due to fever.

Water soluble antimicrobials can be selected based on the sensitivity pattern of the secondary bacteria. Anti-fever drugs may be used to decrease the negative effects of fever. Fever may lead to depressed appetite, abortion in sows, and decreased milk production. Acetylsalicylic Acid (ASA or Aspirin) is used in combination with Sodium Bicarbonate. Acetominophen has also been used.

Feed medications can be selected based on the sensitivity pattern of the secondary bacteria. Feed medications must be provided at the earliest possible time post infection in order to maximise efficacy.

VACCINATION

"Heterologous Immunity" is the immunity that is provided against a particular PRRS isolate when the animal has been previously exposed to a different PRRS isolate. The level of protection provided through heterologous immunity is quite variable. The use of a commercial PRRS vaccine to provide protection against a field strain is an example of heterologous immunity.

"Homologous Immunity" is the immunity that is provided against a PRRS isolate when the animal has been previously exposed to the same PRRS isolate. The protection provided by homologous immunity is more consistently effective. Homologous immunity may be provided to the breeding herd through exposure during an outbreak or under more controlled circumstances such as intentional feedback of tissue that contains PRRS virus or injection of serum that contains PRRS virus.

BIOSECURITY

Biosecurity should be reviewed with attention to both internal and external biosecurity. External biosecurity deals with the risk of introduction of new isolates of PRRS or other co-

infections from outside of the farm. Internal biosecurity deals with the spread of PRRS virus within the farm after the virus has been introduced from outside.

Avoid moving the PRRS virus from animal to animal via needles used for injection by changing needles more often. ie; 1 needle/litter at piglet processing. 1 needle/5 sows or even 1 needle/sow.

Piglet processing equipment such as tail dockers or tooth nippers can spread PRRS virus. Multiple containers of disinfectant for piglet processing equipment will increase contact time with disinfectant. One set of processing equipment should be disinfecting while the other is in use.

Boots, hands and coveralls should be kept clean. Avoid tracking the manure and urine from aborting or sick sows from sow to sow. A good quality garden hose can be used to remove potentially contaminated manure from boots prior to walking from contaminated to non-contaminated areas. Disposable gloves can be used between litters.

Separate shovels, brooms and scrapers should be used for the manure passage and the feed alley at all times in order to reduce the risk of viral spread from behind affected sows to the at risk sows via the feed alley.

Until the herd stabilises for PRRS, discontinue any pre-farrowing manure feedback programs such as those used for E.coli control as this may spread PRRS to uninfected late pregnant animals.

Review and implement a "McRebel" program. The "McRebel" program includes protocols for cross fostering. There have been some adjustments to the original McRebel program. Some modified McRebel programs have increased the intensity of the program by eliminating all cross-fostering at the time of a PRRS until PRRS virus circulation in farrowing has stopped. In these strict programs even if there is a litter of 14 piglets and a litter of 4 piglets there will not be any cross-fostering. In addition, some of these programs call for euthanising any piglets that show signs of scours, respiratory distress, or are weak at birth. During the initial stages of an outbreak, if you foster PRRS viremic piglets into the litter of a non-exposed sow you will make that sow get sick. The sow becomes feverish, does not milk well and does not come back in heat. The costs of McRebel with respect to losses associated with starvation have not been documented. It has been suggested that the farrowing room losses associated with a strict McRebel program are far outweighed by the improved nursery performance. When the McRebel program is discontinued it is important that the farrowing room operator reports any increased scours or sows off feed after fostering. This will indicate that it is probably too early to adopt a more liberal cross-fostering program again.

Agricultural calcitic lime or other dry disinfectant powders can be used in alleyways and hallways in order to reduce the transmission of infection between rooms. The lime is inexpensive and primarily works through its effect on pH.

CONCLUSIONS

Control and prevention of PRRS should be based on a balanced approach that includes minimizing PRRS virus and co-infection pathogen loads as well as maximizing immunity. Clear communication of a properly designed disease control plan allows for successful control of PRRS in many cases. Attention to detail of the best management practices will allow for a basic platform of disease control.