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EFFECTIVE TECHNOLOGIES FOR IMPROVING THE HEALTH PERFORMANCE OF NURSERY PIGLETS

SA Dee, DVM, MS, Diplomate; ACVM
Swine Health Center
Morris, MN 56267 USA

Introduction

Perhaps no other factor can affect the productivity and profitability of a swine operation as chronic respiratory disease. Pathogens such as MYcoPlasma hYoPneumonia, toxigenic Pasteurella multocida tVPe D, Actinobacillus Pleuropneumoniae. Pseudorabies Virus and Porcine Reproductive and Respiratory Syndrome virus all can cause pigs to perform poorly. These diseases are frequently encountered postweaning. Often in combination with each other. One of the most essential roles of the swine practitioner is to implement disease control strategies to reduce effect of these pathogens. The following paper will discuss field cases of such strategies commonly employed in the US: Modified Medicated Early Weaning, On-Site Segregated Rearing and Nursery Depopulation as they pertain to controlling postweaning respiratory disease. Multi-Site Svstems

Prior to beginning this discussion, a brief review of current production systems is in order. The US swine industry currently uses either 1-site, 2-site or 3-site production systems. One-site systems have all facilities located on the same site. Three-site consists of breeding, gestation and farrowing on one site, with the nursery and finishing on separate sites. Recommended distances between sites range from 1-3 km

depending on the health status of the operation and the airborne capacity of various microorganisms. Two-site systems consist breeding, gestation and farrowing on one-site with nursery/finishing on another. The main premise of both systems is that the nursery must be located on a separate site away from the breeding herd. This is important to prevent the transmission of microorganisms from the sow to the pig. Such pig flow schemes are the basis of MMEW technology and will be summarized in a later section.

Multi-site production systems have many advantages for swine farmers, besides the improvement of health status. If weaning and fattening facilities are relocated on other sites, current facilities can be remodeled to expand the slze of the breeding herd, usually with little investment. Nurseries can be remodeled into farrowing rooms, while fattening pens can house gestating sows. Frequently, US producers will work together and set up off-site weaning facilities to commingle piglets from several farms. However, the health status between farm must be similar ~n order to prevent exposure of susceptible pigs to new diseases. The three-site production can be costly and difficult for the majority of smaller commercial pork producers in the US to afford to use. It is usually reserved for breeding stock companies or large herds with 1,20~ or more sows. The two-site system is much easier to operation economically and appears to be just as effective. This technology in combination with a MMEW program is beneficial to all types of producers and results in improved efficiency of the swine enterprise. This technology will now be discussed.

Modified Medicated EarlY Weanina (MMEW)

MMEW is a deviation of the original protocol developea Dy Tom Alexander in England during 1981.- Dr. Hank Harris of Pig Improvement Company has further reported on the ability to eradicate pathogens and improve performance.I A critical component of the program consist of hyperimmunization of the sow prefarrowing to provide high levels of colostral antibodies against specific pathogens. This is important to reduce transmission of microorganisms between sows and piglets during lactation. The piglet is then injected with a series of antibiotics to eliminate specific bacteria prior to weaning. Finally, the pig is weaned at an early age, to a separate site, to prevent further transmission from the sow. As far as proper weaning ages, much work has been done to determine the relationship between weaning age and pathogen elimination- (Tabl)

Upon arriving to the nursery, pigs are fed diets high in milk product and plasma protein. Pigs are limit fed 5-7 times/day for the first week after weaning and are placed on a water soluble antibiotic, chosen based on in vitro susceptibility data. Four different diets are usually fed over the 8 week nursery period. Table 2 summarizes production and financial data from 3 production units using MMEW.~ All operations have seen significant reductions in production costs as well as improvements in overall herd productivity. All 3 farms wean pigs at 13-14 days of age. Piglets are brought into single stage nurseries with plastic coated flooring at 30-31°C (86-88°F) and are sorted by size and sex. Despite this weaning age, excellent performance has been seen in the breeding herd (Table 2). Similar results are not seen if weaning ages are reduced to 7-10 days. Our data experience has demonstrated that experience wean-to-estrus intervals up to 17 days following 7-10 day weaning (mean = 8.5 days).

The decision of which vaccines and medications to use depends on the individual farm diagnostic data. I recommend that nasal swabs be collected from sows and 2-3 sick piglets from the weaning and fattening barns be submitted to the diagnostic laboratory for culture. Based on the sensitivity patterns of bacterial isolates, the medication for the piglet can be chosen. Serology Is also an important tool to determine the exposure level of the breeding herd to specific pathogens that are targeted for eradication. This will determine the vaccination program of the sow. A sample program is outlined in Table 3. This herd is attempting to

eliminate Aujeszky Disease Virus, Atrophic Rhinitis, Actinobacillus Pleuropneumoniae and MYcoplasma hvoPneumoniae. Following weaning, pigs are placed on a water medication for one week. Once again, the type of medication depends on the antibiogram data. Finally, pigs should be vaccinated against Erysipelothrix at 8-10 weeks of age. This is important because it is not possible to eliminate pathogens such as Erysipelothrix, Streptococcus su1s or lleobacter intracellularis, the causative agent of proliferative enteritis (ileitis). Farm specific decisions must be made on how these residual agents will be managed. Growth promotant antibiotics may be used in the feed, but are not commonly employed once pigs reach 50-55 kg in weight. On-Site Se~reaated Rearing

Despite the success of multi-site production, the ability to use such technology may be limited. Frequently, separate farm sites are difficult to obtain due to lack of capital, overall inconvenience from the existing labor force, or a high density of swine in the surrounding area. Although there is little published data at this time, the concept of raising pigs away from the sow, but on the same site looks promising. Table 4 summarizes 12 months of performance data from an 800 sow farrow to feeder (20kg) pig producer in the US. The nursery facility is located approximately 500 (533) meters from the breeding and finishing buildings. There is no connecting airspace (hallway) between the nursery and the other facilities. There is strict segregation of labor with only one person allowed to work in the nursery. Shower facilities are available, however the routine practice is a changing of clothes, coveralls and footwear prior to entry into the animal rooms. A regular program of rodent control is practiced on a monthly basis by a professional exterminator.

While performance has improved, it is unknown whether this method will allow for the consistent elimination of respiratory pathogens. As of this writing, the breeding herd is positive for Actinobacillus Pleuropneumonia, MvcoPlasma hYoPneumoniae, StrePtococcus suis, HemoPhilus Parasuis, Transmissible gastroenteritis virus (TGEV) and Porcine reproductive and respiratory syndrome virus (PRRSV). At this time a diagnostic work up is in progress to attempt to determine whether similar pathogens are still present in the nursery pigs. Results will be reported at the symposium. Appropriate measures (sow vaccination and piglet medication) were taken in an attempt to assist pathoqen eliminat;on, slmilar to the protocol ~escribed in Table 3. Although the majority of the pigs are sold at 20-25kg, replacement females are raised on farm until selection at 120kg. Not only have improvements been seen in nursery performance, but this technology has reduced the age to 102kg by 30 days.

While the data is still preliminary, if results can be repeated consistently over time, this method of raising pigs may be cost effective for swine producers unable to take advantage of multi-site production.

Nurserv DePoPulation

Nursery Depopulation (ND) has been used extensively to control PRRS problems.~ The advantage of ND is that one-site technology can be used and costs are minimal. The prlmary costs involved in ND consist of the short term renting of facilities (ideally off-site), to house nursery pigs that are removed from the farm. The basic premise of ND is that the transmission of infectious agents occurs between older nursery pigs (8-10 weeks of age) and recently weaned piglets, following the expiration of maternal protection. Classically, pigs became anorexic and lose weight beginning 2-3 weeks postweaning. A viral/bacterial complex (i.e. PRRS virus and StrePtOCOCcUs suis) is usually involved.° By removing infected nursery pigs to another site, combined with a thorough cleaning and disinfecting of the facility and a downtime of 14 days, the cycle of virus 'ransmisslon between pigs can be interrupted (Table 5~. Our research has shown a 50-75~ Improvement in nursery average daily gain and mortality at the time of this writing (Table 5).

wean1ng pigs and fattening pigs should be carried out to assess whether virus is being shed to pigs from the sows. If this is taking place, reinfection is likely. Viral shedding in the breeding hierd can be controlled by temporarily closing the herd and preventing the addition of replacement gilts. This will allow natural immunity to build within the herd and results in elimination of the viremic state in this population.

This is not so in herds with larger (~ 1000 sows) breeding herd inventories. It is much more difficult to achieve consistent exposure to PRRS virus in these populations. This in combination ~ith 40-45% replacement rates each year confound the problem. If gilt serostatus is not monitored, or if gilts are not properly isolated prior to entry into the herd, repetitive PRRS problems may occur, both in breeding and postweaning areas.

However, ND may be beneficial at improving postweaning performance even in the presence of PRRS. Table 7 summarizes 4 farms, each of 1000 sows in size, all PRRS positive. Sequential ND of each nursery was carried out. Following completion of the protocol performance, mortality and PRRS serology was monitored over a 12-15 month period. All farms demonstrated improvements in performance and mortality. Three of the farms were serologically negative to PRRS in the nursery. One farm remained positive, yet demonstrated similar levels of performance. This may indicate the ability for ND to control other pathogens. Research is currently underway in this area and results will be reported at the symposium.

~n conclusion, despite the type of facility or size of the 'ar~i, there appears o Le an effective technology available to assist producers in improving the health status of their swine herd. Overall, it appears that the nursery is the critical stage of production which determines the health status and subsequent performance of the grow/finish herd. As more data is accumulated through the use of these technologies in the field, the more applicable they appear to become.