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Health Stability in Single-site Swine Production Units

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Introduction

In the early 80's in Western Canada we had access to two exceptionally good sources of healthy genetics, *PRRS* and *Mycoplasma* negative, with almost no clinic signs of *Strep suis*, and no presence of *Haemophilus parasuis, Actinobacillus suis, Actinobacillus pleuropnuemonia* or *Atrophic Rhinitis*. One of these sources has been available in Canada since 1971. That initial herd in Alberta is still free of *PRRS* and *Mycoplasma hyopneumonia* 30 years later, but certainly it is not so fortunate with respect to the "*suis*" diseases. The definition of a healthy herd has changed over the years as diagnostics have allowed us to be much more specific on the status of each herd. In our particular practice, with almost 50,000 sows at least 65% of the sow base is still *PRRS* and *Mycoplasma* negative, with the predominant facility design remaining a single-site. The facility design changed gradually in the '80's from continuous flow in all areas to where now only the gestation and breeding areas would be considered continuous flow. We have, in our own limited way, created a variety of management procedures relating to the pig flow and facility designs that in many cases have created excellent health stability in both the breeding and growing herds, even in the face of *PRRS "lite"* and *Mycoplasma hyopneumonia*.

For those of you that were not a part of the industry 20 years ago, a single-site farrow to finish unit may not even be a part of your vocabulary. For others it will simply conjure up images of slow growth, unhappy pigs, in an extremely poor environment, with a high dead pile outside the back door. There have been a multitude of factors that have convinced many of our clients to continue building single-site production units. Few of the factors relate primarily to health. I would suggest that on closer examination many of you involved in multi-site swine production would find it difficult to document a stable health track record, based directly on the facilities and pig flow presently being employed. The economics of our industry has forced owners to focus on tracking production batches, identifying critical sizes of sub-populations for transportation purposes, creating specialized labor, and expansion through contract growing. All of these factors have supported the continual development of multi-site production. In most cases chronic disease has been reduced or eliminated, but in many cases acute disease has increased with the development of the two and three site production systems. I submit to you, that with economics related to scale of production remaining the critical focus in our present swine industry health issues will continue to go unresolved or, at best, remain partially resolved. Only on a few occasions, during the past twenty years have I participated in a professional discussion where veterinarians have intensely discussed the impact on how the economic pressures and pig flow trends of our industry may be altering the level of animal care and health. We have, by no means, been spared the effects of these trends in Western Canada, even though many of our units have chosen to create smaller breeding herds, with the growing herds remaining on site. In light of this introduction I would like to discuss, briefly, the factors that I feel have the greatest potential to assist all swine producers in working toward a sustainable stable health status for each of their units. The evidence is clear to all of us, I believe, that this issue of stable health is a multi-factorial problem, in which pig flow can be a primary part but is by no means the single solution. I have chosen to divide the discussion into those factors directly effecting the breeding herd, those directly impacting on the growing herd, and those factors effecting both.

Breeding Herd

Replacement stock health status

Live animals remain the primary source of disease introduction to most production units. The characterization of much of our industry into multi-site production has made it increasingly difficult for veterinarians to identify, accurately, the health status of animals being sold and purchased by their clients. Thus we see the most recent focus on closed herd production with no live animals entering the unit or system. One of our clients provides an excellent example of what is possible. This is a 700 sow nucleus farm, that has been closed since 1980. At this point, the unit is free of *Glassers, A Suis, PRRS, Mycoplasma* and has no clinical signs of *Strep suis*.

Acclimatization of Live Animal Introductions

In our particular case, the rule is to always introduce replacement animals that are of an equal or higher health

status than the commercial barn being impacted. This holds true for all disease entities but most importantly for *PRRS* and *Mycoplasma*. We attempt to never bring in stock to a *PRRS* positive breeding herd from a different *PRRS* positive source. We would rather work with acclimatizing of negative animals than run the risk of introducing a second strain of the *PRRS* virus. This has been our policy since we first recognized the virus in 1994/95 in our region. The breeding companies have not always agreed with us on this position. Acclimatization periods have always been between three and six weeks, depending on the unit. We did use the *PRRS* modified live vaccine for a period of time in one farm isolation unit as apart of acclimatization but have since discontinued its use

Stability of the Breeding Herd

Programs have varied with the disease involved. We have used commercial and autogenous vaccines to stabilize breeding herds and incoming replacements with the following diseases: *Mycoplasma hyopneumonia, Haemophilus parasuis, Actinobacillus Suis, Clostridium difficile* and, most recently, several herds for *Swine influenza* related to *H1N1* and *H3N2*. There should be two focuses with respect to stabilizing the breeding herds, in our opinion. One attempts to stabilize the young breeding female so that she has stopped shedding before having her first litter. The second is to vaccinate the younger breeding females prior to farrowing, so that the quality of the colostrum is enhanced to their offspring. The approach of the vaccination program will of course relate to the specific disease involved. With the *PRRS* virus we have used a variety of methods to stop shedding and circulating of the virus in the breeding herds, with the goal of always eventually re-introducing negative replacement animals that will show no evidence of sero-conversion. This approach is not unlike the *TGE* eradication procedures that have been done successfully over the years. We have avoided the use of the *PRRS* modified live vaccines in the breeding herds since I observed its effects as an emergency drug release product in early 1995. We have only had to deal with *PRRS 'lite'* strains generally in Western Canada, however I would submit to you that the principle of health stability still applies.

Parity Distribution

The most interesting observations I can relate here involve a virus and a specific strain of bacteria, both of which are pansies, but clear opportunists under the right circumstances. They are *Circo virus Type II* and a specific strain of *Haemophilus parasuis*. In both cases, the commercial gilt breeding herds, were purchased and formed out of multiplication breeding herds that were, in fact, very young themselves or had a history of being created from a sub-population of females that had been isolated at an early age. These two practices created very naive breeding herds, which in turn created very naïve growing herds. The viral example created a sixteen week window of reproductive failure caused by *Circo Virus Type II*, not unlike *Parvo virus*. This has been repeated in several herds in Western Canada since, with the same history of the multiplication herd being very young in age or the commercial herd being isolated at a very young age. The bacterial strain example, representing six or seven units, all who demonstrated a "prairie fire like" clinical disease of *Glassers* as several young boars, carrying a new strain of *Haemophilus parasuis* were introduced to naïve young breeding herds, with the first growing animals already in place. Ironically, the source change of boars was necessary because of a break of *PRRS* virus that forced the commercial herds to access boars from a different boar multiplier but from the same breeding company. *Glassers* breaks have frequently been involved in many of the cleaner herds in our area most specifically during the maturing of the breeding herd. *Actinobacillus suis,* clinically expressed in piglet arthritis gave us the same picture early in the career of that bacteria. *Strep. suis*, however, has not reduced its clinical expression with maturing sow herds, but has in fact, increased in clinical disease as the pyramid or herd have aged. In one case, with the pyramid now being thirty years old, the Strep suis level in commercial herds down stream, continues to increase. The "suis" problems in our "healthy" herds now help us accept an annual post-weaning mortality of up to 5% and even higher.

Growing herd

Observations in our practice would confirm the following:

Age of weaning

The younger the age (<17 days) of the pig at weaning, the more chance for acute clinical disease in the growing herd. The older the age of the pig at weaning, the more chance of stabilizing the "*suis*" diseases in the growing herds, especially *Strep suis*.

Co-mingling of different breeding herd sources in the growing herd almost never occurs in farrow to finish sites. The reproductive success of the breeding herd, almost always out performs the available growing herd facility space, thus extra feeder pigs need to be sold. My personal impression is that co-mingling feeder sources has cost the industry substantial dollars over the years. Understandably, co-mingling occurs frequently in an attempt to utilize the nursery or finisher space that has been contracted. Thus health standards are compromised in an attempt to balance the performance of the breeding and growing herds. This single manufacturing issue has created many health related production losses over the years.

Pig flow

It has been accepted for a long time that isolating sub-populations of pigs is an excellent health strategy. The question that is frequently debated, however, is should the sub-population be isolated to the room, barn or site level? If it is a barn or a site how far should the distance be between the barns or sites? I have yet to see health protocols priorized at the top of the business decision tree. Capital and variable costs related to buildings, site preparation, transportation, available land, waste disposal, or labour usage, almost always remain the predominant factors in finalizing the decision on buildings and site development.

Ventilation systems:

When rooms or barns become the production model, I feel certain that various systems of room and barn ventilation influence the stability of health. In our case we consider 100% mechanical ventilation as an asset in controlling disease within a specific room or rooms. Even more beneficial, we feel, is the use of chimney ventilation, which removes the exhausting air away from the soffits at an elevation that quickly dilutes the concentration of the organisms that a specific room of pigs may be experiencing. Although I have little experience with curtain sided units my impression is that one room, equals one barn, equals one site, with respect to containing disease. We certainly have examples now of where we have placed *PRRS* and *Mycoplasma* positive sow herds into new All-in/All-out, by room, single-site production units. These herds, in several cases, were over 25 years old and were expanded with negative status gilts to larger breeding herd sizes as they entered the new units.

Breeding and Growing herds

Location

The comment is often made that *location* is everything, whether it is a Macdonald's store, a grain terminal or a pulp and paper mill. Location is extremely important for the farrow-to-finish swine units in Saskatchewan that have maintained a stable health status over an extended period. In only a few cases have we experienced the health status of another production unit encroaching on the health level of an existing unit. The frequency of this encroachment problem is increasing as I speak, specifically with respect to the presence of more wild boar herds appearing in our region. *Mycoplasma hyopneumonia* has been the most common disease experienced. *PRRS* and APP almost never. This allows you to appreciate the isolation that our farrow to finish units work under on a day to day basis.

Size of the sub-population in an air space

Although very little has been written, relating disease expression to the size of sub-population, in my experience the larger the sub-population of animals the more vulnerable they are to the presence of a single or a few clinically sick animals. The reasons span from stability and stage of immune status to the uniformity of ventilation throughout the air space. The "prairie fire like" experiences I mentioned earlier have certainly been a part of most of our working careers as private practitioners. Again, I would suggest that 100% mechanical ventilated units, although showing weaknesses in air quality and cost, have in many cases assisted in stopping the "prairie fires" from becoming an even bigger issue. Remember that when a "prairie fire" hits, the bug is frequently seeking out a specific age or ages of pigs where the immune system is not yet mature. If the bug is not able to reach that specific population in concentrations high enough to continue the outbreak, it simple comes to an end due to lack of available material. In a 1200 sow farrow to finish unit these sub-populations in one air space are not often more than 500 to 700 animals. Breeding herds of 2800 to 5000 sows don't fit into that sub-population model very easily.

Risk of insults from transportation

In a farrow to finish unit that has closed herd multiplication, using 100% artificial insemination, the risk of transportation only occurs when the truck backs up to the unit for market age animals. Seems fairly simple in my eyes. The risk of altering a stable health status during transportation is additive each and every time replacement animals are brought to a breeding herd or a group of animals are moved during the growing period. An important point on this issue is that a very high percentage of pigs from growing herds are now moved in large groups via semi truck. The importance of these large groups of animals, under stress, dumping a specific bacteria or virus on a much smaller group of replacement females heading to a breeding herd or boars headed to a boar stud are frequently under estimated. A good example of a "narrows" within this conduit is the United States-Canada border inspection stations where many "PRRS-free" breeding gilts over the past twelve months potentially could have stopped to chat with SEW and feeder pigs from other farms as they all headed south.

Conclusions

Most producers would agree that maintaining a healthy pig production system is difficult at the best of times. Our observations have shown us that if most of the primary contagious respiratory diseases are absent that the "*suis*" opportunists quickly fill the void, making factors such as the breeding herd parity distribution, weaning age and co-mingling even more important health strategies. We strive frequently to peek into the window called "future".

My discussion has focused almost entirely on the bugs creating primary respiratory and reproductive problems. The questions I would leave with you today are:

If enteric organisms, such as the 2600 serotypes of *Salmonella* become even more of a primary issue within the pork production food chain, what model of pig flow will be prioritized in an attempt to maintain health stability (i.e. low prevalence levels)?

If feed grade antibiotics fall completely out of favour in our industry over the next few years, will we need to re-evaluate the locations, size of sub-populations and the pig flow models that are now predominant in the industry?

Easy questions, tough answers. I leave you with the questions.