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Removing the bottom fifteen percent

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Introduction

Multisite and 3-site production systems have repeatedly shown production advantages over one-site continuous flow systems. Some of the advantages are found in the ability of a system to utilize technologies such as:

- offspring segregation
- all-in, all-out production by room, building, or site
- regular depopulation of sites
- labor specialization for different areas of production[1,2,3]

Variability is one of the biggest challenges facing producers in the implementation of the multisite and 3-site production system. Optimum facility utilization requires a constant supply of high quality, uniform pigs entering the system. When variation in the number, quality, or health status of pigs occurs, decisions need to be made concerning stocking capacities and mixing of sources.

The goal of the breeding herd in these systems is to produce a consistent number of high quality, healthy pigs, with as little variation as possible. Breeding herd performance, including number of services, farrowing rate, preweaning mortality (PWM), and herd health influence the number and quality of pigs delivered to the system. If variation occurs in the output of the contributing breeding herd or herds, constraints on the system will occur. These constraints occur whether there is a positive or negative deviation in production.

Methods to reduce variability

A common occurrence in a multisite system is the weaning of young, lightweight pigs. The system itself may impose constraints such as utilizing maximum weaning ages and operating farrowing and nursery rooms in an all-in, all-out manner. Both of these techniques are efforts to improve health and performance of pre- and postweaning pigs. The operation of farrowing rooms in an all-in, all-out method encourages the variation in weaning age, while continuous flow operation methods tend to minimize this variation.

Several factors contribute to the range and average age of weaned pigs. These factors include:

- number of sows farrowed and weaned during the time period
- number of pigs born alive
- PWM
- health status of the breeding herd

This is especially true when the producer chooses to operate the farrowing rooms in an all-in, all-out manner. Farrowings in a room need to be timed as closely as possible in order to wean pigs with minimal age differences. This may be accomplished by close examination of expected farrowing dates and by utilizing farrowing induction methods. Using these techniques, most farrowing rooms may be completely emptied with a minimum of age differences in the weaned pigs. However, it is difficult to maintain optimum weaning ages if large fluctuations in breeding numbers have occurred. Pigs will need to be weaned at an earlier age than optimum if more sows are due to farrow than there are crates available.

One method of reducing the variability in weaning ages is to utilize continuous flow farrowing crate management. In this case, pigs may be weaned at a predetermined age, regardless of the age of litters in the remainder of the farrowing room. A management decision based on past and current herd health conditions will determine the need for all-in, all-out farrowing room management.

Every effort should be made to increase weaning weight within the context of the weaning schedule. Rademacher et al[4] showed a correlation between entry weight and nursery Average Daily Gain (ADG) and Average Daily Feed Intake (ADFI) in a paper summarizing Pig CHAMP® Information System data. Weaning weights under 10 pounds were associated with poorer ADG, ADFI, and mortality. Deen and Hall[5] showed that a pig weighing 7 pounds at entry had a 50% chance of weighing less than 20 pounds after 35 days, and had a 15% chance of dying during the five weeks.

In a related paper in these proceedings, Tokach et al[6] expertly describe methods to reduce variation and increase weaning weights. Some of the methods discussed include

improvements in lactation feeding, split suckling, and bump weaning. Weaning strategies must be aimed at increasing lactation days for the youngest pigs born in the group. Issues to be considered when outlining these strategies are transportation and herd health. It may be beneficial in terms of increasing lactation days to vary from strict all-in, all-out farrowing room management if herd health status is stable. If health status is challenged by disease, strict all-in, all-out management tools may be utilized. The McREBEL™ PRRS[7] procedure is an example of a strategy that may reduce effects of disease, but may reduce weaning age for young litters by limiting strategies such as cross fostering and bump weaning.

Transportation issues may influence lactation days and weaning age. Availability of labor and trucks may dictate the days of the week pigs can be transported. Decisions based on past experience and current herd health may determine if pigs will be transported directly from source sow farms, or are sorted and transported from normal flow nurseries at stocking. In order to maximize weaning age of young litters, it may be necessary to alter the weaning schedule.

Methods to deal with variability

If the decision is made to manage farrowing rooms in an all-in, all-out manner, variation in weaned pig age, size, and quality will occur. Systems need to be designed with this variation in mind. Management styles need to be developed to optimize the performance of lightweight pigs.

Some options to consider include:

- rearing lightweight pigs with the remainder of the production
- separate lightweight pigs from the remainder of the production, but allow to remain within the facility
- remove lightweights from the system entirely
- separate lightweight pigs from the remainder of the production, and rear them in a separate facility

This paper will examine the last option, or removing the lightweight pigs and rearing them in a separate facility. The optimum percentage of lightweight pigs removed from the system depends on many factors, including facility utilization and availability, breeding herd performance, and herd health status.

The need to optimize postweaning performance

Kansas State University researchers have examined the value of enhancing postweaning performance. Dritz et al[8] discussed the effect of growth during the first week postweaning on subsequent performance. The concept of compensatory gains in the grower and finisher has led to debate concerning the importance of maximizing postweaning performance. Tokach et al[9] looked at the issue of compensatory gains and reported postweaning lag had a prolonged effect on performance, resulting in increased days to market. Pigs that either lost weight or gained no weight during the first week postweaning took 10–15 days longer to reach market weight than pigs that gained 0.5 lb or greater per day. These studies indicate compensatory gains do not occur; decreasing postweaning performance resulted in poorer performance throughout the feeding period. This information highlights the need to improve performance for all nursery pigs in a system, especially the challenging lightweight pigs.

Advantages of separating pig flow

Several advantages are obtained by rearing lightweight pigs in a separate, dedicated facility, or light nursery. These include:

Specialized labor

Specialized labor may be provided in a light nursery. Many farm systems have identified personnel who possess husbandry skills and personal traits conducive to managing lightweight pigs. Patience and perseverance are traits needed to encourage feed consumption, a critical component of managing lightweight pigs. Astute husbandry skills are important to detect subtle fluctuations in health status and environment. Due to the relatively high amount of labor required to perform these management tasks, additional labor may need to be budgeted for the care of lightweight pigs.

The utilization of specialized personnel to focus on the care of the challenging lightweight pigs allows other personnel to focus on the remainder of the production. A disproportionate amount of time may be spent caring for the lightweight pigs, reducing the time available to care for the remainder of pigs in the nursery.

Specialized environment

The operation of a light nursery allows the environment of nursery rooms to be maintained at optimal conditions for both lightweight and normal flow of pigs. Rooms may be maintained at temperatures and ventilation rates to promote maximum feed consumption and comfort for both sizes of pigs. Rooms may be maintained at higher temperatures for groups of lightweight pigs. Heat lamps or other types of supplemental heat sources may be provided. Comfort mats placed on floors of pens of lightweight pigs reduce drafts. Feeding pigs several times a day on the comfort mats encourages consumption by providing easy

access to feed and allowing groups to eat together as if they were nursing the sow.

Health benefits

In a multisite system, commingling of pigs will occur at the light nursery as well as in the normal flow nursery. Health benefits for the system may occur if young, lightweight, and possibly colostrum deprived pigs are separated from the normal flow and concentrated in one light nursery. While the overall health of pigs in normal flow nurseries may be improved, the health status of the pigs in the light nursery may be challenged.

Medication, vaccination, and management schemes may be developed and tailored to the challenges of the light nursery. Medication budgets for lightweight pigs may need to be altered and increased based on past herd health history and experience with intervention strategies.

Water and feed medications may be targeted more specifically at the pigs in the system for which they were designed. If a particular medication were desired to medicate only the light pigs in the system, the light nursery would be targeted. This would reduce the need to medicate a portion of the pigs in the normal flow nursery, which may be difficult to achieve. The entire group may need to be medicated if it is not possible to medicate the targeted light pigs, which results in additional cost.

Nutritional/feed system benefits

One of the biggest challenges in nursery pig management is proper diet sequencing. Dritz et al[6] discussed phase feeding strategies designed to maximize performance while minimizing feed cost. The separation of lightweight pigs from normal flow pigs enhances phase feeding strategies by grouping pigs together with similar nutritional needs.

Feed delivery systems designed with low equipment costs in mind may not be able to deliver proper phase feeding to all groups of pigs in the system. Difficulty arises when multiple phases or diets are required in the same facility. A trade-off between increased labor costs to hand feed pigs proper rations and increased costs in feed delivery systems such as additional feed bins and augers.

Pig flow

Removal of the smallest pigs from the normal grow/finish pig flow should result in less variation at market weight. Deen and Hall[5] point out beginning weight is the best predictor of end weight and value. Reducing variation of groups not only reduces marketing sort losses, but also improves pig flows. Space utilization is improved by the ability to market animals in a tighter schedule. Finisher farms can be operated in an all-in, all-out manner, improving herd health and providing the benefits of regular depopulation.

Disadvantages of separating pig flow

If a single nursery site is designated as a light pig nursery in a multisite system, the nursery will be operated in a continuous flow manner. By definition, the pigs entering the nursery will be sourced from several different sow farms. In a discussion of the benefits and problems of multisite production, Hill noted that commingling of pigs from many sow farm sources is a health risk.[10] In the case of the light nursery, the risk from mixing pigs from multiple sow farms would be compounded by the presence of multiple age groups within the facility. Benefits gained by segregating lightweight pigs may be offset by fluctuations in the health status of pigs raised in a continuous flow, multi-source manner.

Transportation costs and logistics will need to be examined. The management scheme to fill the light nursery will determine if additional transportation costs will be incurred. All weaned pigs in a system will incur transportation costs; the design of the flow will determine if duplicity will result in additional costs. Methods of transporting pigs to the nursery include:

- transporting all pigs to a nursery and sorting off the bottom 15%
- transporting all light pigs separately to the light nursery

Decision to operate a light nursery

The decision to operate a light nursery in the system must involve addressing the following questions.

- Is overall nursery and finishing production improved?
- Will the increased production (if attained) result in increased production costs?
- Will these costs be offset by improved production?
- Will the pig flow from the light nursery return to normal production flow, or will the pig flow remain separate?
- Will the separation of light pigs from the finishing system result in reduced variation?
- Will better pig flows and space utilization result from the plan?
- Are facilities being utilized at full capacity, or is the light nursery additional space in the system?

Summary

Possible benefits achieved by removing lightweight pigs include the ability to provide specialized labor, provide optimum environments for both lightweight and normal flow pigs, improve health status of pigs in normal flow, encourage proper phase feeding of light pigs, and reduce variability in remainder of nursery and finishing flow.

Possible disadvantages of the method include health challenges of mixing many sources of pigs in a continual flow manner and possible additional costs for labor and transportation.

Overall nursery and finishing production must be improved in a cost-effective manner to offset increased costs such as labor, transportation, and medication.

Reducing variation of pig flows should result in improved space utilization and pig flows in multisite systems.

Each system must evaluate the need and feasibility to remove the bottom 15%.

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