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# Optimization in farrowing site production

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The production business at Professional Swine Management, LLC is measured by only two real items: weaned pig cost and weaned pig output. The owners of each farm site in our system have directed us as a management company to provide the best quality pig to them from their investment and provide it at the lowest cost.

Our system has worked to continue to monitor output through all the same tools many of us have used for years in the process control of sow farm productivity. The challenges for us began when many items in our long term goal planning became difficult to speak to in terms of optimum or best overall cost for the owners. Fortunately, we have owners and clients who are not risk adverse and are willing to go with us on many issues where the "if's" and "what if's" are larger in number than the "known facts".

In this presentation we will review four topics relevant to the optimization of sow farm productivity and costs. We will look at how our system tries to answer the questions raised from these topics and what facts we draw from to build on a solid decision. We will review:

- Lactation length and how this implementation of increased lactation is monitored
- Gilt development and gilt entry in three options
- Breeding target establishment and what goes into setting target
- Parity distribution and what we establish as culling and management criteria

## Lactation length

Optimization of lactation length is one economic factor when we now are able to make decisions based off of research proven factors. Dr. Rodger Main and Kansas State University did the industry a great service by tackling this topic with true control on a grand scale. They have provided us with the facts proven by direct comparison and controlled study.

### The facts

Most production systems accepted this data as fact and began to look for ways to implement the necessary next step….add farrowing capacity. In our system we used the assumption that we have 2-3 days between the time sows were loaded and sows farrowed. We also accepted is that we weaned three times per week (on most farms), this would represent a 2.3 average age spread in piglets. Therefore, we needed to take our desired lactation length,

Figure 1: Previous Lactation Length impact on Next Litter Born Alive

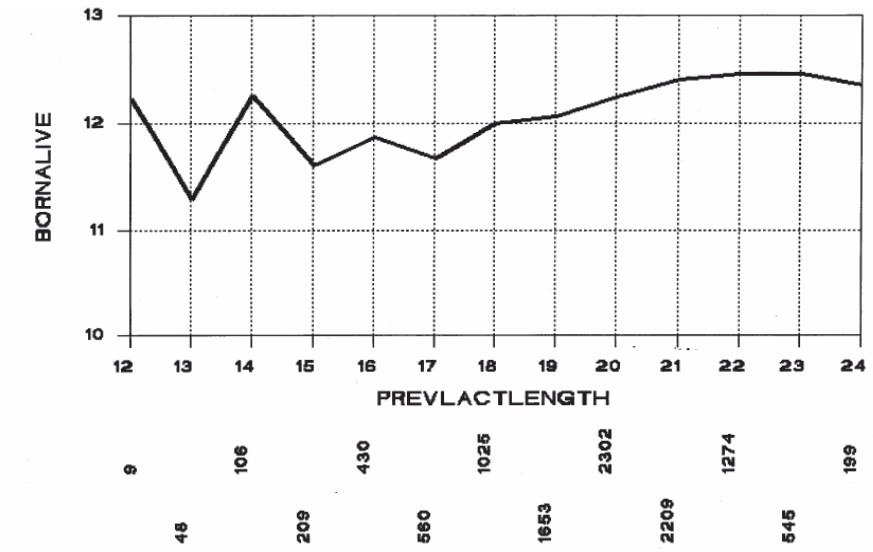


Figure 2: Weaning Age on Piglet Survivability (R. Main, et al. 2003)

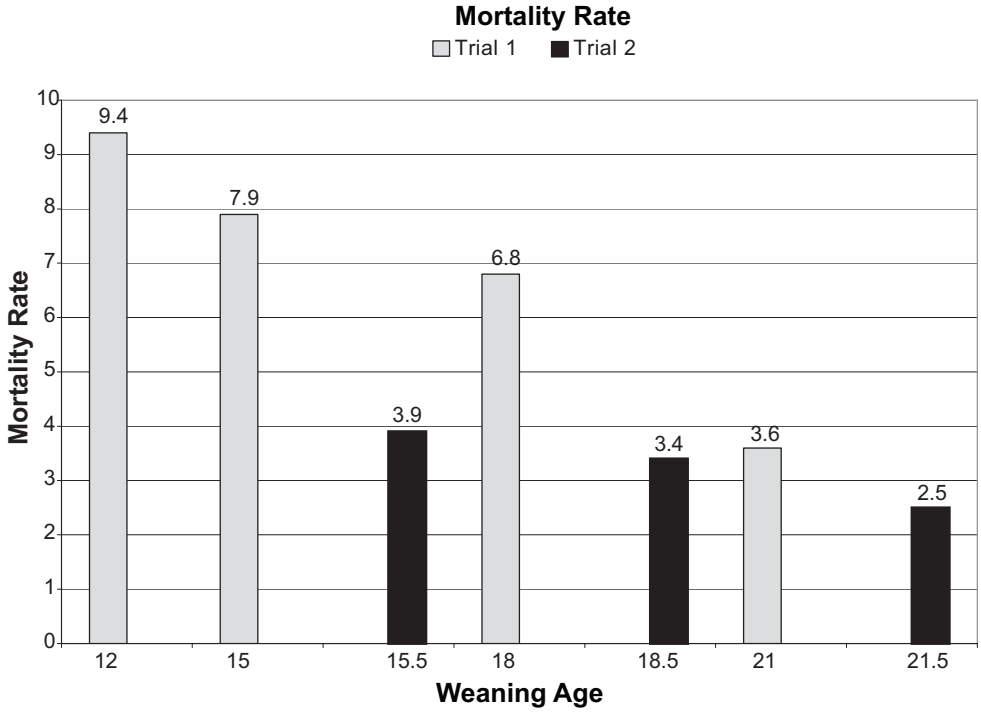
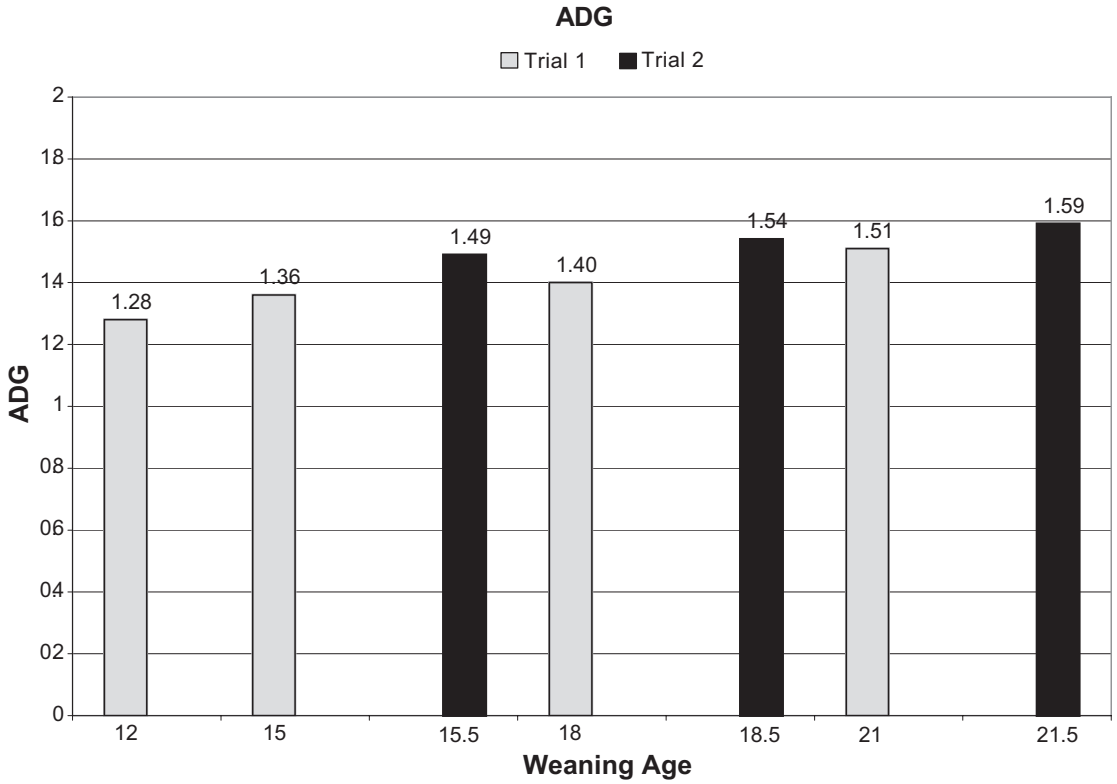



Figure 3: Weaning Age impact on Growth Rate (R. Main, et al. 2003)



add 6 days, and this was the total number of days we needed for farrowing capacity.

Weekly farrowing farms take this number divided by 7 and that is how many "groups" are in farrowing at any one time. Essentially, farrowing target multiplied by the "group ratio" = total farrowing stalls needed. (Ex: 21+6 = 27; 27/7=3.85) Group ratio of 3.85 is used to determine how many farrowing stalls are needed at a minimum.

We have also found that the true "what if"s" in this math equation are what if the weekly farrowing numbers are not consistent and what if the staff is loading too many days prior to farrowing? These are the management topics necessary for optimum production if the changes are to become successful. Production teams must adhere to specific direction: Minimum lactation length for example.

We have established a minimum acceptable lactation length for any one specific litter, based on an ideal weekly farrowing number and a number of weanings per week. Secondary to this change has also been the addition of a "pig holding room" which is used all in/all out. The pig holding room is a relief valve for the additional production capacity that tends to drive a system out of control. Non-regular weaning days crowd entire rooms unless the staff is allowed to use the pig holding room for non-weaning days to finish up weaning out sows necessary for loading back in appropriately.

Pre-loading 2-3 days pre-farrowing is a second major management topic. The topic can honesty only be monitored at slat level. We have developed models and calculations to monitor the average lactation length in comparison to farrowing capacity. But even with these numbers, you still have to be in the room when the decision is made of who gets weaned and who gets pre-loaded in order to make an impact on this measure. Production supervisors must train the appropriate decision making skills for forecasting piglet weaning and impacting farrowing stall efficiency.

## Gilt development

Three options come into the process of decision making for optimum breeding stock costs and ideal throughput. Gilt development no doubt has one of the strongest impacts on breeding efficiency and maintaining breeding target. Three methods will be reviewed here:

- Internal multiplication
- Select weight purchase of gilts
- Weaned gilt purchase and on-site gilt development

Our production teams use the model of weaned gilt delivery to allow for health stability on-site and to manage gilt selection themselves. The down sides to this model are the inventory required to manage gilt quality and the space required to ideal gilt development. Maintaining gilt inventory from weaning to breeding comes at a cost that must be offset by the following "what if"s". The gilt selection rate must be maintained in a predictable manner. Gilt health and livability must be predictable and stable. Gilt health stability must be strongly correlated to the long term productivity of the gilts in the herd.

We have also maintained the weaned pig output from these herds is higher than internal multiplication due to the 100% focus of the breeding and farrowing teams on weaned pig output. Gilts are not held back from groups over time.

Compare this method to gilt entry at selection and the only outlier is health. In a closed system where cost is equal whether on site or off-site, select weight gilt entry can look best on paper. Farm staff love the low labor requirements. Production managers love the flexibility of movements weekly or monthly. Veterinarians suffer the heart burn of health challenges every time gilts are moved and health risks from transport and isolation.

Lastly, internal multiplication is more of a single site system approach based on the assumption that health is best when gilts go back into their own herds. Our system uses the assumption that all the sow herds together function as a closed system and the costs of the gilts are such that it is best to maintain weaned pig output instead of management of gilt flow within the site. The outlier in internal multiplication is the extreme difficulty in correcting a parity distribution problem internally. Outside entry becomes necessary in this case anyway, therefore the health value of internal multiplication is then lost when outside gilts are required to correct the herd parity.

## Breeding target

Optimum breeding target, unlike farrowing capacity management, is something that must be monitored and measured at 10,000 feet level and not at slat level. Barn managers are notorious for asking in mid June if breeding target shouldn't be reduced because farrowing is too tight, gestation is out of space, and spring matings are all proving to be 90% conception. Of course, the breeding manager who starts breeding less at the beginning of summer spirals downward into a tough late summer slump and leads to under-capacity gestation when summer fertility drops and fall groups are under 80% conception.

Breeding target must be set by a team or from direction given with the following variables: Current recycle rate, recycle rate on re-bred females, gilt recycle rate, and current farrowing target. Farrowing target should stay consistent, but all the other variables change every week. The barn managers see both the numbers weaned weekly and see their conception rate post breeding the most clearly.

What 10,000 feet will tell you is late term fall out pre-farrowing, specific gilt recycle rate, specific recycle rate of

re-bred animals, and the need for changes due to season or outside influences on breeding. We have had new staff members come to a team which has required a slight increase in number bred until the known performance of the breeding team is established. We have also started most new farms with the same caution in mind. We start with a lower 75% predicted farrowing rate multiple and then raise this multiple (lower breeding target) as we gain confidence in the team through pregnancy detection and recycle breeding.

## Parity distribution

The ideal parity distribution was once explained to me as: 20-18-16-14-12-10-10 =100%. The gradual decline with each increasing parity should not allow for greater than 10% P6+.

Herd managers commonly hate to discuss this topic as we see them under great pressure to breed the perfect number of females every week. Older sows are more likely to come in to heat at a predictable time. Older sows are also already trained in movement through the barns, boar activity, and daily routines.

Younger sows (P0-P2) are commonly the most fragile population on the farm. Herd managers find the toughest challenge is to keep these animals productive. These populations are the most likely to be culled for the wrong reasons and also the most likely to be given up on for body condition or health challenges.

Optimum production at the herd cannot be maintained without strict attention to the management of young females within the herd. Young females who start at a highly productive level have proven to maintain a high productive level throughout their lifetime. Young animals also are the population most likely to help the team predict what is coming in the next 6 months.

Staff members who are allowed to cull aggressively on these populations will prove to ruin the long term productivity of the herd. Likewise, staff members who maintain at least a 20% population of bred gilts and greater than 54% of the population at P0-2 are likely to keep the herd at high level of steady productivity. Genetics differs on exactly what the numbers should be for each productive category, but the general premise is the same. Maintaining high production on young animals is necessary for high overall productivity.

Dr. John Deen has taught us that two litters of 7 piglets does not make a young parity animal worthless to the herd. Older parity females (P6+) are much more likely to have poor litters with high stillborns and low pigs weaned than breeding a mid parity (P2-4) back into the breeding group. We also have often expected the breeding managers can choose the best females based on their outward physical appearance and strength of estrus behavior. The facts would say based on Dr. Billy Flowers study of breeding technique, that heat detection and breeding skill are the largest variable in successful mating. He has compared the three variables of the sow, the semen, and the operator, only to find the most variable is the breeding person (the operator).

Parity must be a daily focus as breeding teams choose what animals are needed. Action lists, opportunity rows, pregnancy detection equipment and many other tools help the breeding team to make this decision as to who stays and who goes. However, the underlying fact remains that optimum parity alone can contribute to the overall successful management of the herd.

In final summary, there are hundreds and maybe thousands more variables to evaluate, monitor, measure, and manage when seeking to optimize production from a sow herd. We have only discussed four here that we see as big contributors to the success of our system. We challenge the groups like the Leman Conference to continue to offer this ideal environment for sharing production experiences and discussing future direction for the industry.

Thank you to the professionals I have quoted here for the sound research necessary to drive us to the right decision. Also, thank you to the owners and production teams within the Elm Creek System.