CAPTURING VALUE OF LACTATION DAYS

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Introduction

There are many benefits of increasing the weaning age of piglets through improved nursery and finisher performance. Most of the European Union has mandated a minimum weaning age of 21 days mainly for the perceived “welfare” implications. Certainly the trend in the US swine industry has been to increase weaning age, but mostly for the purpose of improving the weaning weight and the performance of the piglet post weaning. In addition to the piglet performance improvement, there are advantages reported for the sows’ performance on the next litter. However, much of the research performed on sow reproduction is dated or not conducted on current genetic lines in the field today. Do the genetic lines of animals today respond the same as the breeds evaluated in the past? This paper is meant to review the reported benefits of longer lactation lengths and to evaluate the responses of current genetic lines to variations in lactation length.

Background:

Lactation: This period of time after farrowing up to weaning is critical in the life of the pig, but it is also important to the sow. The sow is fairly unique in her absolute inability to cycle and conceive during a normal lactation. This is not true for most other species (cow, mare, etc). The suckling influence from the piglets creates a negative feedback on the hormonal control center of the brain to prevent the sow from cycling. This time is critical for the uterus to heal enough for future embryos to attach and survive. This process is termed “uterine involution.” It is very well documented that weaning sows within the first few days of lactation will result in a high number of cystic ovaries and reproductive performance will become unpredictable and therefore drastically impaired. Only sows to be culled should be weaned immediately after farrowing due to the unpredictable result. The metabolic impact of lactation is quite impressive as well. The most demanding time in the life of a sow is during lactation when most sows are in a catabolic (weight loss) state and all energy reserves are tapped to produce milk for the litter.

Weaning: When the piglets are removed, the teat stimulation is also removed. The removal of the teat stimulus and the lack of milk removal by the pigs cause the udder to cease milk production. The removal of the negative feedback from the teat stimulus to the brain allows the resumption of the pulsatile production of Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). These hormones stimulate the ovary to develop mature eggs and ultimately release them during estrus. The ovary provides the high levels of hormones responsible for the behavior associated with estrus when the eggs are ready to ovulate.

What is the historical knowledge about weaning age?

**Piglet performance after weaning:** Generally speaking, piglets weaned at older ages will perform better (ADG, Mortality) than piglets weaned younger given a non-challenged
disease state. There are some situations where this is not the case and performance of piglets weaned at an older age will be worse. One example would be a farm with high levels of bacterial disease pressure such as Actinobacillus pleuropneumoniae (APP), Mycoplasma, and toxigenic Pasteurella multocida type D, which can all be clinically worse when piglets are weaned at older ages. The most likely reason is because transfer of bacterial organisms from the sow to the pig would be greater as lactational immunity wanes and exposure increases. The opposite disease dynamic is thought to occur as well. Some practitioners believe weaning piglets before exposure to Haemophilus parasuis and Streptococcus suis occurs from the sow will result in clinical disease in the nursery instead of a subclinical infection in the farrowing crate. Antimicrobials are usually effective in controlling both types of challenges after weaning, and performance will still show a net improvement when weaning age is increased.

**Current genetic line influences:**
To evaluate the performance of high lean maternal gentotypes in the field today in response to lactation length and parity, a subset of data was generated. The data set included several farms with similar management that had both long and short lactation lengths. The total number of sows included was 25,000 and there were a total of 57,799 farrowings during the calendar year of 2005 included in the data. The pig champ data files for all farms were merged into one farm for analysis purposes. The maternal line was a LR X LW cross.

**Sow Performance on the next litter:**

**Born Alive and Litter Size**

**Reported Data:** It has been reported that for every additional day of lactation length, there will be an increase of 0.05 to 0.1 live born piglets.\(^1\) Also, in a different study that compared short (11 to 15 day) v. longer (20 to 21 day) lactation lengths, the next litter had an additional 0.6 pigs born live in the longer lactation group.\(^2\)

**Current Analysis:** It would be expected to see a 0.5 to 1.0 pig born live when lactation length is increased from 12 to 22 days. In this data set, the improvement in born alive and total born is close to 0.5 pigs. Given the opportunity to wean more pigs with a higher born alive, it is unfortunate that the sows included in this study did not wean the extra pigs born. Actually, the number weaned tended to decrease after the previous lactation length exceeds 22 days.
Conception and Farrowing Rate:

Reported Data: It is reported that for every additional lactation day, the sow will have a 0.5% increase in farrowing rate on the subsequent litter. Farrowing rates are significantly lower for sows lactated 11 to 19 days vs. sows lactated for 23 to 25 days. It is speculated that the reduction in conception rate is likely due to incomplete restoration of the uterine endometrium, not due to a suppressed ovulation rate, but other authors have reported an increased ovulation rate in longer lactating sows.

Current Analysis: It would be expected for the farrowing rate to increase 5% when previous lactation length is increased from 12 to 22 days. In our data, the increase is very close to 5% (83% to 88%). Most of the improvement occurs between 12 and 18 days. There was no difference in lactation lengths of 19 to 24 days. Lactation lengths over 24 days continue to show improvement as well.
Farrowing Rate by Prev Lac Length

Wean-to-estrus interval (WEI)

Reported Data: Sows lactated between 3 and 4 weeks have the shortest WEI, and sows lactating for 14 to 15 days are less likely to return to estrus when compared to sows lactated for greater than 20 days. While the WEI will decrease as weaning age increases and will lead to a reduction in non-productive days, the farrow to farrow interval will increase. The decrease in reproductive performance appears to be more significant on primiparous sows as compared to multiparous sows.

Current Data: Wean to estrus intervals are difficult to measure, but the wean to first service data are available and accurate. Increasing the lactation length from 12 to 22 days apparently reduces the wean to first service interval from 7 days to 6 days. This data agrees with data previously reported.
How significant is the parity effect?:
Now that we know the lactation length of the first litter is the most sensitive when it comes to reproductive decline, perhaps we should examine the relative drop when compared to older sows.
The following chart depicts the parity effect and lactation length effect on total born.
From this chart it can be seen that primiparous sows lactated for a short duration (9-11 days) actually have higher total born averages when compared to older sows. Parity 3 and 4 sows have a significant advantage over all other parity groups when lactation length is over 12 days. The primiparous sows appear to have a less dramatic increased total born response to increased lactation length when compared to older sows. Total born is only part of the story, the pigs must be weaned as well.

The following chart depicts the parity and lactation length effect on the number of pigs weaned.

It is clear that second litter sows wean more pigs than older sows and does not tend to change when lactation lengths are between 12 and 24 days. All parities perform poorly when the previous lactation length is less than 12 days and greater than 24 days.

The following chart depicts the breeding performance differences between parities and lactation lengths. There is a trend for parity >=5 sows to perform better than younger sows at longer lactation lengths and a trend for younger sows to perform better when challenged with shorter lactation lengths (12 to 17 days). There is no clear pattern for one parity group to have a farrowing rate advantage over others based on previous lactation length for this data set.
The following chart depicts the parity and previous lactation length effect on wean to first service interval.
The biggest parity effect is noted with the wean to first service interval. From this chart it becomes clear that primiparous sows will normally have a longer wean to service interval compared to older sows. First litter sows that lactate less than 14 days had the longest first service intervals. The multiparous sows all had a general reduction of the wean to first service interval out to 22 days, but the effect seems to be less predictable with lactation lengths over 23 days on these farms.

**Summary**
Lactation lengths do impact the reproductive performance of sows on their next litters. The data evaluated here on current lean maternal genetics is in good agreement with other reported data. There are improvements in pigs born alive, but the sows in this data set failed to wean more pigs and had a higher pre-wean mortality. There is an improvement in farrowing rate with longer previous lactation lengths. When problems are identified with farrowing rate, born alive, and wean to first service intervals, short previous lactation lengths should be evaluated as a possible cause. The value of the improved reproductive performance from longer lactation lengths must be added to the improvement performance in the growing pig to calculate the total value of increasing lactation length. These benefits come with an increased cost due to increased lactation feed intake, decreased farrowings per year, and increased facility costs due increased farrowing crate requirements.

**References:**