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Sow lifetime productivity: Importance of monitoring in commercial pork production

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Sow productivity historically has been one of the major focus areas in commercial production affecting profitability. The industry has measured sow productivity primarily using pigs weaned per sow per year and preweaning mortality. These metrics have some major limitations and have been shown less predictive of cost indicators than the number of pigs weaned per mated sow.

Sow lifetime productivity (SLP) has recently been defined by the National Pork Board as the total number of quality pigs weaned during the productive lifetime of a female; from the time she becomes breeding eligible until she leaves the herd.

The cost for the sow includes animal value, genetic premium, gilt development cost, facility cost, feed, animal health, and other factors. The total cost to place a female into the breeding herd is recovered from the sale of her offspring. Increasing lifetime sow productivity spreads the cost of the sow and her development over a larger number of offspring; thereby, reducing the cost of production of the market pig.

Iowa State University research has shown that costs are optimized when sows remain in the herd for six to nine parities (depending on variable costs). Available information indicates that the average herd SLP is approximately 3.3 to 3.7 litters per sow and that sow replacement rates average 50-60% annually. A 30% improvement would result in average herd longevity of 4.6 parities and an increase of 10-15 pigs weaned per sow lifetime. Research has shown increasing the average number of litters by one litter per sow in her lifetime would produce a minimum net value of $250 million for the pork industry. With increasing feed costs the past few years, the cost of development replacement females has increased dramatically. Assuming a development cost of $400 per gilt, obtaining an extra litter will leverage the cost of the replacement female resulting in a reduction of the weaned pig cost of $1.90 per head.

SLP is a complicated and dynamic trait that is affected by genetics, lifetime nutrition, gilt development, health, facilities, management, etc. Because of these factors, research on SLP requires sophisticated and long-term approaches including both basic and applied research practices to determine potential modifiers of SLP.

Areas to improve SLP include:

1. Methods of gilt development may be the first place to focus but can be greatly affected by people and their skills
2. Gilt selection and utilization rates
3. Female retention particularly as it relates to disposition of body reserves
4. Number of pigs weaned per litter and piglet weaning weight
5. Farrowing rate
6. Sow livability (decrease sow mortality)
7. Effect of seasonality on reproductive competence (8-12% reduction in weaned pigs due to the effect of seasonality)

Although SLP is not a metric which is commonly measured or benchmarked, during the presentation results will be shown on the very high variation under commercial conditions illustrating that approximately 42% of all females have 19 or fewer piglets in their lifetimes which is a major cost factor.

Many factors affect culling of sows but review of available databases indicates that the U.S. sow herd experiences a greater than 50% annualized replacement rate, an average parity at culling of 3.5 to 3.8 and less than 40 pigs produced during a sow's lifetime. There is some indication that the value of genetic progress does not exceed the cost of gilt development until females have reached parity 7-8.

Culling rate is primarily a result of the one or combination of the following causes:

1. Reproductive failure (even though 86% of females culled due to this reason had normal ovarian histology at slaughter)
2. Old age
3. Lack of adequate performance
4. Lameness resulting from structural problems with feet and legs

5. Mortality

6. Post-weaning conditions

Factors that influence sow culling rate include: stockmanship/management, genetics, structural soundness, seasonal infertility, behavior, nutrition, health, housing method, and cull sow price. Although these factors are well established, limited progress has been observed resulting in minimal process changes being implemented.

One of the major challenges getting SLP fully aligned in a commercial production system is related to lack of computerized sow record systems and benchmarking services that uniformly calculate and monitor this metric. Additionally, with an increase in parity segregation production methods, SLP needs to be monitored as a system indicator not just for a specific sow farm.

In summary, greater management focus on SLP is needed in the pork production industry and better technology and methodology are needed to move from less value indicators such as pigs per sow per year and preweaning.