Troubleshooting poor litter size within a production system using the National Swine Reproduction Guide

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Key Points

-The National Swine Reproduction Guide (NSRG; U.S. Pork Center of Excellence, Des Moines, IA) is a valuable tool to help producers utilize data analysis to troubleshoot reproductive problems in a herd or farm.

-Analysis of farrow-to-wean farms within a North Carolina production system revealed extended wean-to-service interval of first-parity sows and poor performance of second-parity sows. NSRG recommendations include reviewing lactation diet composition and first-parity sow lactation feed intake.

Background

Commercial swine producers generate large volumes of reproductive data, including total number born (TNB), number weaned (NW), and wean-to-service interval (WSI). In-depth data analysis may be used as a tool to assess animal physiology, herd health, and best management practices. The NSRG is an online database with over 1,000 factsheets and references to guide pork producers to solutions for many reproductive issues. The guide establishes decision boundary criteria (Table 1) of maximum or minimum levels of acceptable performance for a given reproductive trait. Failure to achieve decision boundary criteria indicates efforts are required to rectify the cause of poor performance. Decision boundary criteria many be amenable to fit individual system goals. The objective of this study was to utilize data analytics and the NSRG to troubleshoot poor litter size in farrow-to-wean farms within a single production system.

Data Analysis

Reproductive data from nine farms within one production system from 2011 to 2015 were obtained (n=235,807 farrowing events). Sows were divided into contemporary groups based on farm, year of farrowing, season of farrowing, and parity. Data was analyzed using the GLM procedure in SAS (SAS Institute, Cary, NC) with fixed effects of farm, year, season, and parity.

Results

Average TNB for the production system was 12.4 piglets born per litter, yet litter size was lowest in second-parity sows (12.1 TNB) compared to first-parity (12.3 TNB) and mature sows (12.6 TNB). Greater than 24% of second-parity sows failed to achieve the decision boundary criteria of 11.5 TNB. Within first-parity sows, 73% of the contemporary groups had greater than 10% of their sows failing to return to estrus within 10 days of weaning, perhaps indicating large variation in first-parity sow body condition at weaning. Subsequent litter TNB was reduced by 0.7 pigs when sows returned to estrus 7 to 8 days post-weaning when compared to sows that returned to estrus 3 to 6 days post-weaning.

Average lactation length (LL) was 20.3 ± 2.5 d for all sows. Regression estimates indicated a one day increase in LL improved (P<0.01) subsequent TNB by 0.04 piglets for first-parity sows and 0.07 piglets for parity 2+ sows. A one day increase in LL also reduced (P<0.01) subsequent WSI by 0.06 days for first-parity sows and 0.05 days for parity 2+ sows. A one piglet increase in number born alive improved (P<0.01) subsequent TNB by 0.13 piglets in first-parity sows and 0.17 piglets in parity 2+, and a one piglet increase in NW reduced (P<0.01) subsequent TNB by 0.07 and 0.05 piglets for first-parity and parity 2+ sows, respectively.

Recommendations

The following recommendations to improve TNB and reduce WSI were created following consultation of the NSRG: 1) Limit cross-fostering onto first-parity sows; 2) review lactation diet composition, particularly amino acid content; and 3) identify methods to promote first-parity sow lactation feed intake. If economically feasible, farms may also consider breeding sows displaying estrus 7 and 8 days post-weaning on their next cycle.

Table 1. Maximum and minimum decision boundaries defined by the NSRG[1]

Trait	Parity 1	Parity 2+
Total number born (TNB)	<10.5	<11.5
Number born alive (NBA)	<9.5	<10.5
% <7 NBA[2]	>15.0	>12.0
Mummies, % of TNB	>2.5	>2.5
Stillborn, % of TNB	>7.0	>7.0
Total number weaned (NW)	<8.5	<9.5
Wean-to-service interval, d	-	>10.0
% 10 WSI[3]	-	>10.0

[1]National Swine Reproduction Guide, U.S. Pork Center of Excellence, Des Moines, IA.
[2]% <7 NBA = percentage of litters born with less than 7 piglets alive.
[3]% 10 WSI = percentage of sows serviced after d 10 post-weaning.

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