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Longevity and performance in swine breeding herds of Minnesota

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Introduction: The efficiency of breeding herds is measured in terms of the number of pigs weaned/sow/year. Sow longevity and replacement rates can influence the number of pigs weaned. Although culling aims to improve productivity, performance should not be the only herd level factor related with sow culling rates. A study was conducted to compare the performance of high and low culling Minnesota herds in terms of pigs weaned/sow/ year (PWSY) and pigs weaned/ mated female/year (PWMFY) and to analyze the association of sow-level factors and longevity for the year 2002.

Methodology: Fifty one Minnesota swine breeding herds from PigCHAMP database were categorized into high and low culling herds based on median annual culling rate (overall and for parities 1 to 3) for the year 2002 and compared in terms of PWSY and PWMFY (2-Sample t-test for the means). The associations between longevity and the performance of gilts and sows from 20 herds were also analyzed using logistic regression models. Records for this analysis were selected by assessing the status of the sow/gilt 160 days after the last farrowing/entry date. The outcome variable evaluated was removal from the herd. The explanatory variables were seasons of entry and farrowing, born alive, mummies, stillborn, parity (2, 3, 4, and >4), entry to first service interval (EFSI), average number litters farrowed/year and life average values for born alive, mummies, stillborn and non-productive days. Entry season, life average number of non-productive days and number of services (0 or >0) were the explanatory variables for gilts.

Results: There was no significant difference in the herd level performance of sows in high and low culling herds (overall and younger parities) in terms of PWSY or PWMFY. However, at the level of the individual female a higher parity, <10 born alive, stillbirths, higher lifetime average number of mummies, higher life average non-productive days and EFSI >52 days increased ($P<0.05$) the risk of removal of sows. Sows that entered the herd during October-December had lower risk ($P<0.05$) of removal than those entered during the other quarters of the year. Sows that farrowed during the 4th quarter had a higher risk of removal ($P<0.001$) than those that farrowed during the 2nd and 3rd quarters of the year. Gilts that entered the herd during the 4th quarter had lower risk of removal than those entered during the 1st and 2nd quarters. An increase in lifetime average number of non-productive days significantly increased the risk of removal in gilts as well. Gilts that were never served had a significantly higher likelihood of removal compared to those that were served at least once.

Discussion: The analysis suggests that culling rate may not be an indicator of herd performance. Factors such as gilt pool size, herd size, skill of the caretaker and the management and cull sow price can influence sow removal rates. The analysis showed that the decisions for individual sow culling were related to individual performance. The age at first service can affect the lifespan of the sow. A previous report[1] has also indicated a higher culling risk at higher parities and a negative association between productivity and culling rate. The association between stillborn and mortality risk has also been reported previously[2]. A higher non-productive sow days is associated with the number of pigs produced/ sow/year and can lead to culling. The association of entry and farrowing seasons with the likelihood for removal may be associated with the seasonality of reproduction.

Conclusion: Although culling is a management decision primarily to improve productivity, culling rate may not have an association with herd level performance. There is a significant association between performance of the individual female, both at parity level and overall, with the decision to retain or cull it.

References
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