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Use of path analysis to evaluate seasonal differences in herd born alive
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Introduction: Average weekly pigs born alive per litter (BA) differs seasonally within sow herds. Temperature and photoperiod differ across weeks of the year, however it is unclear which component has greater effect on week-to-week variation. A path analysis utilizing data from three different regions with different average temperatures and photoperiods was used to consider factors that are associated with and/or predictive of lowered weekly average BA.

Methodology: Sixty-eight sow herds were selected from the PigCHAMP database based on their location. Herds were included if their address matched predefined locations in Brazil, Canada or the United States, farrowing events occurred in each week between September 2004 and August 2005 and no evidence of abnormal events (i.e., disease outbreaks) was identified.

Weekly performance monitors were generated for each farm for the time period between September 6, 2004 and September 4, 2005. Farms were assigned photoperiod length, difference and direction of change in photoperiod length from the previous week, and 30-year mean monthly temperature for their regional capital based on the start date of the weekly performance monitor. The year's mean and standard deviation of weekly BA and farrowing rate were calculated for each herd and dummy variables were created to denote weeks where BA and farrowing rate fell more than 1 standard deviation below the annual mean. Dummy variables were also used to categorize the percent of sows farrowing each week with previous farrow information and herds with average annual BA above or below the group median.

All analyses were performed in SAS 9.1 (Carey, North Carolina). Logistic regression was used to determine the odds of BA falling more than 1 standard deviation below the annual mean, and a path model was developed to describe associated factors. Factors differed across annual herd BA,

so separate calculations of associations were performed for the two annual BA groups.

Results and Discussion: The final analysis included fifteen herds with addresses in the southern hemisphere between the 17th and 24th parallel, fifteen herds in the northern hemisphere between the 49th and 54th parallels and thirty-eight herds in the northern hemisphere between the 40th and 44th parallels.

Neither country nor mean monthly temperature were significant in the prediction of weeks where BA fell more than 1 SD below the annual average. Longer photoperiods and increases in the direction of week-to-week photoperiod length were protective against weeks of low BA. Farrowing rates more than 1 SD below mean were associated with weeks of lower BA. For farms with annual BA above the median, more than 80% of sows farrowing with a previous farrow event protected against lower BA. See Figure 1.

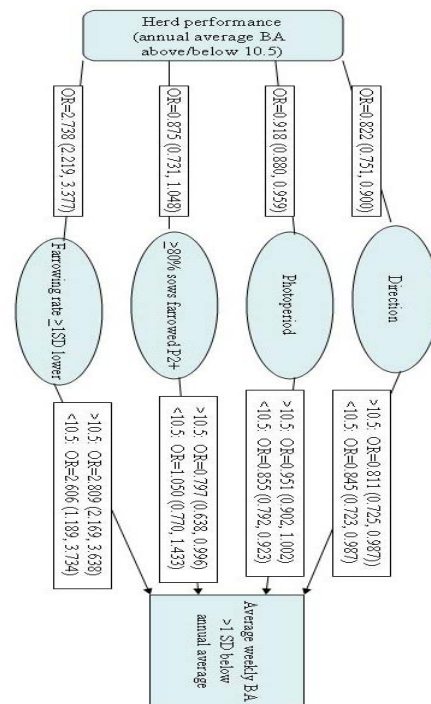


Figure 1. Path model of factors associated with decline in weekly BA.