

5A-104: Pre-farrowing prediction of litter size: towards improving sow metabolic status during the peri-partum period - Dr William van Wettere, The University of Adelaide

Background

To reduce costs of production it is vital that nutrient intake is closely matched to sow requirements for optimal body composition and reproduction. The development of optimal feeding strategies for gestating sows is complicated by the need to satisfy maternal and fetal nutrient requirements, as well as prepare the sow for the demands of lactation. Failure to achieve these targets can have negative consequences for sow lactation performance, reproduction and longevity, as well as progeny survival and performance. The effect of increasing feed intake during the last three weeks of gestation on sow performance and piglet birthweight and survival is controversial. Recent Australian data indicates that sows gestating large litters have impaired subsequent performance, while in another study late gestation feeding level did not affect progeny or sow performance. Consequently, the current study had two overall aims: one, to determine whether plasma oestrone sulphate could be used to accurately predict litter size; and two, to determine the effect of gestated litter size, parity and feeding level on sow and progeny performance.

Methodology

Plasma samples were collected from 959 pregnant sows on day 23 of gestation and analysed for oestrone sulphate. Total litter size of these sows was recorded, and used to develop an equation for predicting total litter size based on oestrone sulphate. Using 841 sows, a 2 x 2 x 2 factorial experiment was conducted, incorporating two parity groups (gilts vs sows), two predicted litter size groups (LARGE, >12 piglets vs SMALL, < 12 piglets) and two feeding levels from day 85 of gestation until farrowing shed entry (LOW vs HIGH). Daily feeding levels were 2.2 kg and 2.3 kg for LOW gilts and sows, respectively, with an additional 0.6 kg/day being offered to sows and gilts in the HIGH treatment groups.

Key Findings/Conclusions

There was a significant, positive correlation between oestrone sulphate on day 23 of gestation and total litter size ($r^2 = 0.143$; $P < 0.05$). However, the accuracy with which oestrone sulphate predicted large and small litters was only 60.5% and 63.5%, respectively and based on this prediction accuracy, and the extra labour and assay costs, the commercial application of this technology to accurately predict subsequent litter size appears limited.

Although increasing feed intake in late gestation by about 0.6 kg/day failed to significantly improve overall sow reproductive or piglet performance, the higher feeding level during late gestation exerted subtle, yet potentially beneficial, effects on piglet birthweight and survival. Specifically, the number of vulnerable (< 1 kg birthweight) piglets and stillborn piglets tended to be lower and the variation in piglet birthweight was lower for HIGH fed sows. These findings indicate that higher feeding levels in late gestation may promote growth of the smaller foetuses. However, these potential beneficial effects need to be balanced against the additional feed costs associated with HIGH level feeding in late gestation.

Gilts which gestated and suckled a large litter had a smaller second litter size, suggesting that strategies to reduce the metabolic drain on first litter sows during lactation should be explored.

Potential Users of Information

Producers, Consultants and nutritionists

These data indicate that increased feeding for sows in late gestation does not necessarily result in overall improved piglet and sow performance, but may have subtle effects, particularly on the smaller piglets.

These results along with other nutritional studies with gestating sows should be presented to the Australian pork industry to identify in which situations, if any, increased feeding during late gestation may be beneficial.