

CAPTURING GENETIC MERIT IN DIFFERENTIATED PORK PRODUCTION SYSTEMS THROUGH GENOMICS

PROJECT LEADER

George Foxcroft, University of Alberta

PROJECT OBJECTIVE

To demonstrate that alignment of the excellent genetic potential of Canadian dam-line sows with management strategies that recognize the origins of major variation in phenotypic traits of terminal line litters provides major competitive advantages to Canadian pork producers.

Segregated management strategies for low birth weight and high birth weight litters might provide more economic value than targeting the entire sow herd.

FINAL RESULTS

This project confirmed two main concepts:

- In less prolific litters (up to 16 total born), less than 5% of the variance in litter average birth weight is explained by the number of piglets born.
- Litter birth weight phenotype is a repeatable phenotypic trait.

This and other projects have established that the litter birth weight phenotype is driven by an inappropriate interaction among the key component traits that determine litter size. High ovulation rates (25-30 ovulations) in mature sows result in greater than 50% pre-natal loss. In many sows, much of this pre-natal loss of embryos occurs after the implantation stage of pregnancy. As a result, intra-uterine crowding of embryos in early gestation is inevitable. This crowding adversely affects placental development as the primary mechanism that drives later problems with intra-uterine growth restriction and low litter birth weight.

The present project indicates that as a low birth weight phenotype results in poorer survivability of the litter before weaning and poorer post-natal growth performances, there is considerable merit in continuing to search for genomic markers of the component phenotypic traits determining litter birth weight. The markers could then be used to affect continued increases in numbers born without compromising the performance of the litters born to more prolific sows.

From a production management perspective, the results of this project suggest that more focus on monitoring the repeatability of a litter birth weight phenotype would allow for 1) segregated management of these sows and litters at farrowing and 2) possible savings in feed costs by segregated management of litter birth weight offspring through the nursery and grow-finish stages of production.

