



## **Selection strategies for increased litter size and reduced litter mortality**

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### ***Maximising the number of piglets weaned***

The number of piglets weaned per sow per year is the overall goal when improving the reproductive performance of the sow. The main component of this goal is **the number of piglets weaned per litter**. This trait depends mainly on litter size and piglet survival until weaning. A project was funded by APL to explore selection strategies for **increased litter size and reduced litter mortality**.

Survival of piglets depends on the fitness of each piglet as well as the ability of the sow to care for her offspring. Therefore, selection strategies for piglet survival may focus on traits recorded on the piglet versus traits defined for the whole litter and recorded on the dam. Traits recorded on the piglet include survival and individual weights of piglets recorded at birth and before weaning. Litter traits of the sow comprise litter size, litter weight traits and the variation of piglet weights within a litter.

### ***Outline of project***

**Piglet traits.** Individual piglet weights at birth and at 14 days of age were recorded for 25,000 piglets from three maternal lines at QAF Meat Industries over a period of two years. Further information was available on piglet survival and whether or not a piglet had been cross-fostered.

The piglet data were combined with information about the growing pig including juvenile Insulin-like Growth Factor I (IGF-1), lifetime growth rate, backfat and muscle depth.

**Litter traits of the sow** included litter size and average piglet weight at birth and at 14 days. Different trait definitions were evaluated to describe the variation of piglet weights within each litter. Gestation length was also analysed as a trait of the sow.

### ***Conclusions - Piglet traits***

It is not recommended to record individual piglet weight traits for genetic improvement given the low heritability for individual piglet weights. Weighing individual piglets is labour intensive and weights of individual piglets provide little extra information for genetic improvement of piglet survival and lean meat growth.

Information on juvenile IGF-1 should be used for the genetic improvement of efficient lean meat growth. Genetic correlations between individual piglet weights and juvenile IGF-1 supported the principle of downward selection of juvenile IGF-1 for genetic improvement of efficient lean meat growth.

### ***Conclusions - Litter traits of the sow***

Selection emphasis should be placed on litter size and litter mortality simultaneously. Many breeding programs use only litter size for the genetic improvement of reproduction traits. Results showed that such a strategy causes an increase in litter mortality of approximately half a piglet with every piglet increase in litter size, which is not a sustainable breeding practice.

The average piglet weight at birth should be used for selection of reduced litter mortality. This trait was highly heritable and had strong genetic correlations with litter mortality.

Information on gestation length should be used for the genetic improvement of litter size and litter mortality. Records on gestation length are readily available. This trait had a high heritability and high genetic correlations with litter size and litter mortality.

The variation of individual piglet weights within a litter provides little extra information for breeding programs. The two definitions of this trait, the within-litter standard deviation of piglet weights within a litter and the within-litter coefficient of variation were genetically different traits. Both traits had no significant genetic relationship with litter mortality despite the higher incidence of piglet mortalities observed in litters with larger coefficients of variation of individual piglet weights.

Nucleus herds that use litter traits recorded 14 or 21 days after farrowing should minimise cross-fostering practices. Cross-fostering introduces an error component that can not be accounted for in the model. Therefore, heritability estimates were lower for traits recorded at 14 days after farrowing in comparison to traits recorded at birth.

### ***Conclusions - Management practices***

Producers should re-evaluate cross-fostering practices. Analysis of this commercial data showed that cross-fostering reduced piglet growth rate from birth to 14 days of age. This reduction in growth was larger in piglets with high birth weights.

Producers should explore options to improve management of the lactating sow and her litter. Management practices should focus on the first three days after farrowing, the time when most piglets die, to reduce piglet mortality.

### ***Further information***

This summary is based on the final report prepared for APL for project UNE.23P/1335. Further details can be obtained from Susanne Hermesch at AGBU.

