AGBU
ANIMAL GENETICS AND BREEDING UNIT
A joint unit of NSW DPI and UNE

Pig Genetics Info

Sow reproductive performance - Selection for litter size only is not enough

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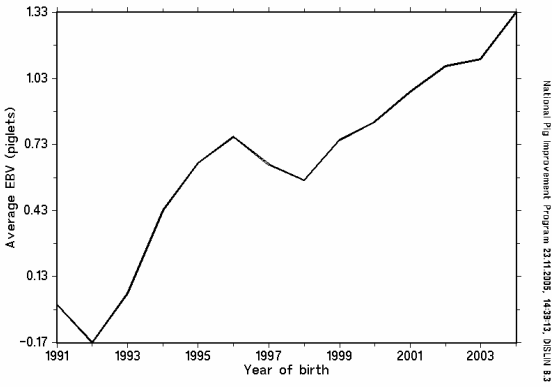
Selection for litter size has been successful

The availability of computer programs like PIGBLUP has enabled seedstock herds to make genetic improvement in lowly heritable traits such as litter size. Genetic trends for litter size from the across-herd genetic evaluations of the National Pig Improvement program show an improvement of approximately 0.1 piglets per litter per year, on average for Large White and Landrace populations. Over a ten-year period this amounts to a genetic improvement of 1 piglet per litter. The genetic trend for litter size recorded in later parities in Large White is shown below for illustration. Further genetic trends can be viewed at the web site of the NPIP (http://npip.une.edu.au).



Across-herd genetic trend of the NPIP for litter size (later parities) – Large White

Number of piglets weaned is more important than litter size

It is important that sows have a high number of piglets born alive. However, the trait of economic importance is the number of piglets weaned per sow per litter. This trait depends on the number of piglets born alive and the survival of piglets until weaning. It has been shown that selection for litter size only leads to higher mortality rates of piglets to the extend that for every piglet increase in litter size mortality increases by half a piglet. In addition to the economic loss, this selection strategy is not a sustainable breeding practice and seedstock herds need to look beyond selection for litter size.

Further reproductive traits of the sow

The number of piglets weaned is often strongly influenced by cross-fostering. Therefore, other litter traits may be more useful in pig breeding programs. Additional traits that are recorded in seedstock herds include the average piglet weight at birth and the average piglet weight at 21 days as well as the number of piglets that died per litter.

Genetic parameters determine the genetic progress that is achievable. The average heritability for litter size was 0.10, based on some recent Australian studies. In comparison, number of piglets weaned and number of piglets that died had lower heritabilities of 0.03. Breeding programs therefore often focus on average piglet birth weight and average piglet weight at 21 days instead. **Genetic relationships between litter size and these additional traits of the sow were unfavourable highlighting the need to include some of these additional traits in breeding programs**. The Table below also shows that genetic parameters differ between populations due to differences in sow genotypes and management practices.

Trait	*Heritabilities*		*Range of correlations*
	Average	*Range*	*with litter size*
Number born alive	*0.10*	*0.04 – 0.23*	
Number weaned	*0.03*	*0.00 – 0.07*	*negative to zero*
Number died	*0.03*	*0.00 – 0.06*	*0.76*
Average piglet birth weight	*0.30*	*0.22 – 0.50*	*-0.83 to –0.11*
Average piglet weight at 21 days	*0.15*	*0.09 – 0.23*	*-0.92 to 0.15*

Considerations for extra reproductive traits of the sow

Number weaned

- Do you record the trait properly?
  - How are dame sows recorded on farm?
- What is your cross-fostering policy on farm?
  - What is actually happening in the sheds?
- Are sows given the opportunity to wean many piglets?
  - How many piglets can a sow carry?

Average piglet weight at birth

- Heavier piglets are more likely to survive.
- Record this trait within 24 hours after farrowing before cross-fostering is practiced.
- It is sufficient to only include piglets that have survived farrowing.

Average piglet weight at 21 days after farrowing

- This trait is a measure of the milking and mothering ability of the sow.
- Cross-fostering should be minimised and limited to the first few days after farrowing to make this trait useful for breeding programs.
- Litters should be weighed at a similar day after farrowing.

References:

Hermesch, S. (2002). Genetic parameters for lean tissue deposition, birth weight, weaning weight and age at puberty. Final Report for APL project 1335.

Suarez, M. (2005). Research into a crossbreeding program that uses hyperprolific sows. Master of Science, University of New England funded by Myora Farm, Mount Gambier, SA.

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