

The importance of recording feed intake in lactating sows

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Why is feed intake of lactating sows important?

Sows need to support their litters and maintain body conditions

Selection has:

- increased litter size
- reduced backfat
- increased growth rate

Sow has:

- more piglets to nurse
- less body reserves
- higher mature weight
- higher maintenance requirements

Insufficient feed intake during lactation

Sow will mobilize body reserves

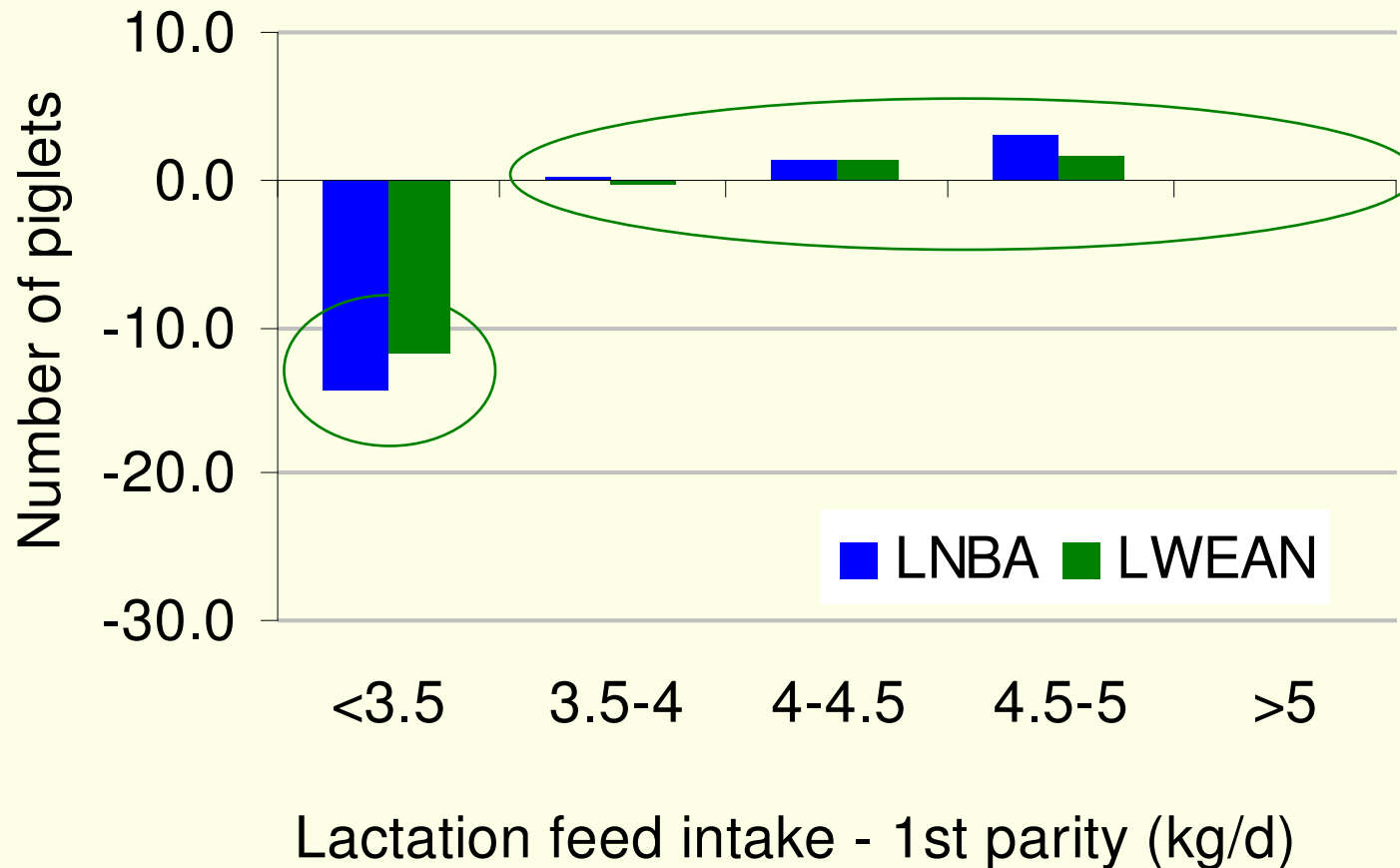
Excessive body weight loss leads to several reproductive problems (Eissen *et al.*, 2000)

What is the effect of low feed intake during lactation on lifetime performance of sows?

Low feed intake in lactation reduces lifetime performance of SOWS (Hermesch and Jones, 2007)

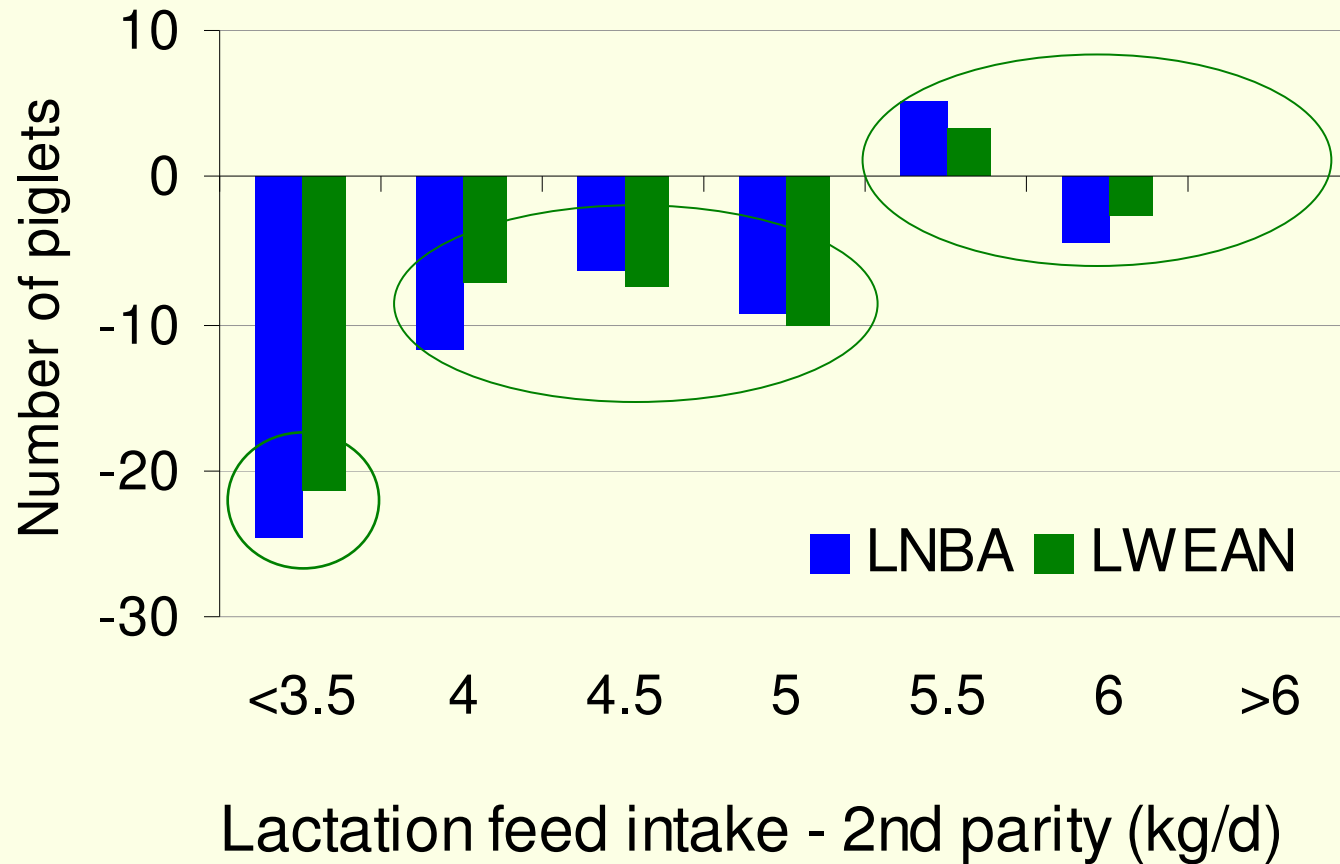
- Lifetime performance across parities defined as
 - Total number of piglets born alive (LNBA)
 - Total number of piglets weaned (LWEAN)
- All sows had the opportunity to complete 8 parities
- Lactation feed intake in the first and second parity

Lactation feed intake and lifetime performance



Hermesch and Jones (2007)

Lactation feed intake and lifetime performance



Hermesch and Jones (2007)

In this example

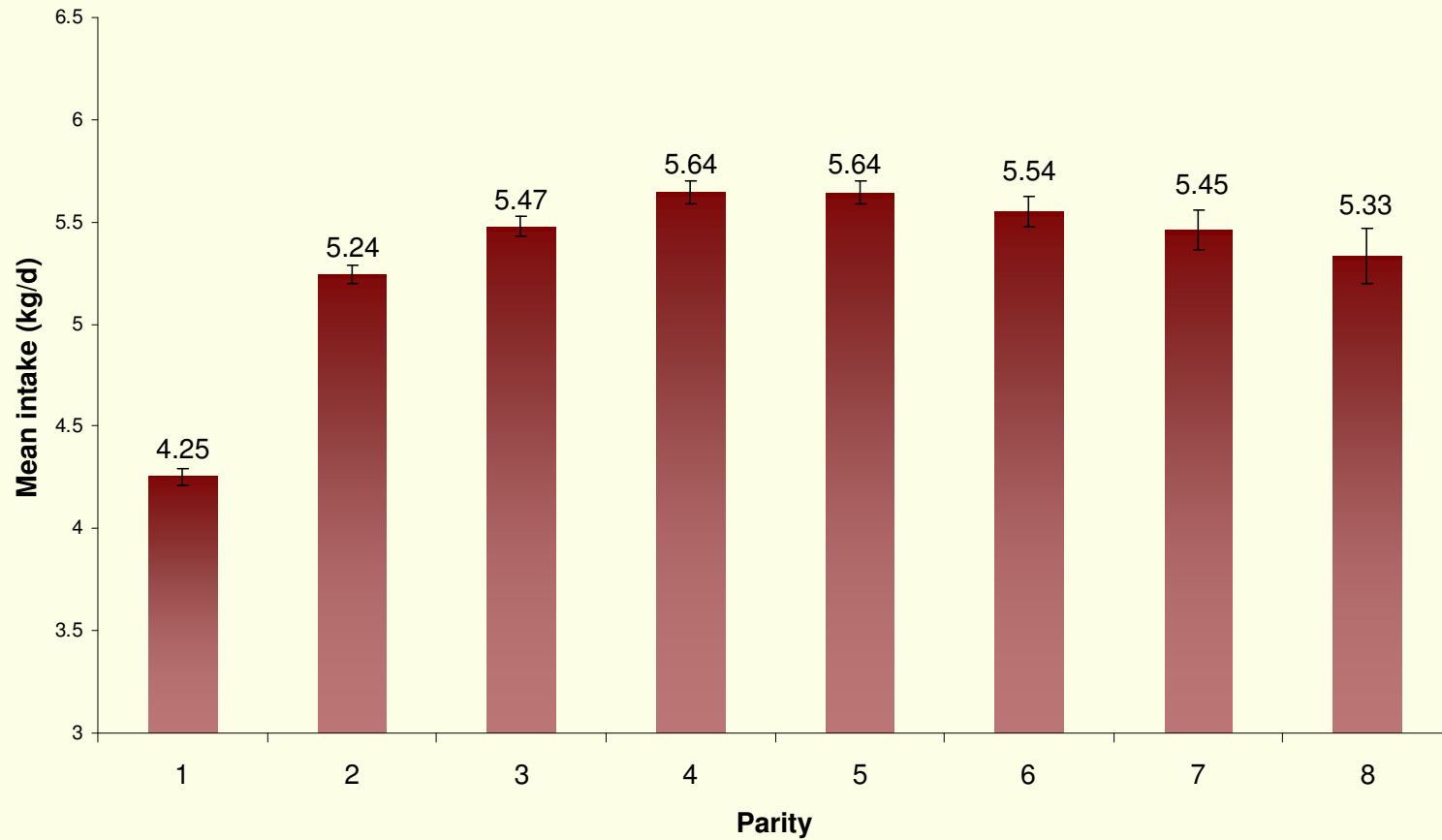
about 20% of first parity sows

about 30% of second parity sows

with low lactation feed intake had reduced lifetime performance

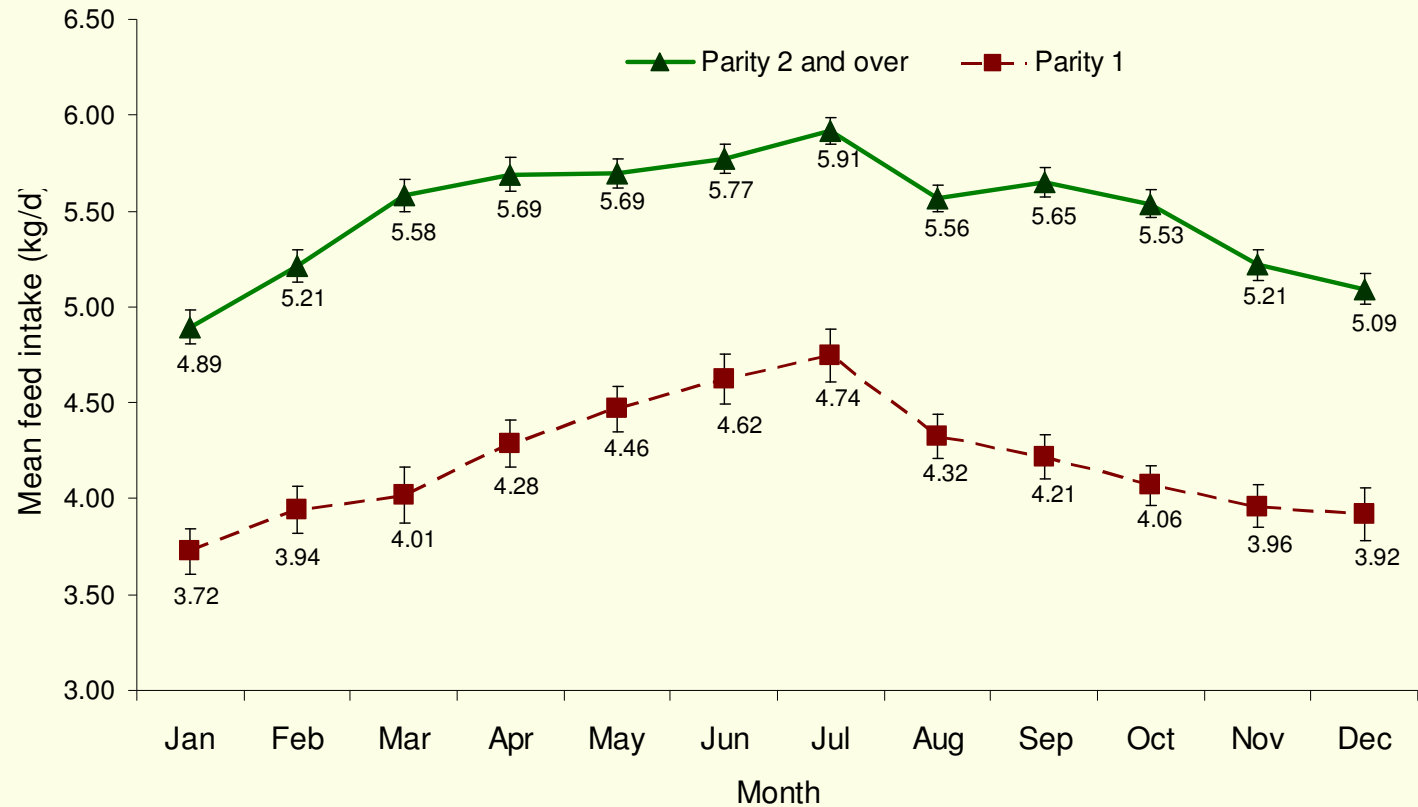
Need to increase lactation feed intake in these sows

The effect of parity on lactation feed intake of sows



Jones and Hermesch (2007)

The effect of season on lactation feed intake



Jones and Hermesch (2007)

Which sows are most at risk to have low feed intake?

- Gilts ate one kilogram of feed less each day than multiparous sows
- Sows farrowing in summer ate one kilogram less per day than sows farrowing in winter

Gilts farrowing in summer ate about two kilograms less than multiparous sows farrowing in winter

Is it possible to predict lactation feed intake?

- Traits with limited or no predictive ability
 - Growth rate until 20 weeks of age
 - Pre-mating body weight (29 weeks of age)
 - Pre-mating fat depth at P2 site (29 weeks of age)
 - *ad-libitum* feed intake recorded in gilts from 20 to 25 weeks of age
 - Sow weight and fat depth at the P2 site at day 110 of gestation

(Bunter et al., 2007)

Is it possible to predict lactation feed intake?

- Factors with better predictive ability
 - Season
 - Feeding regime during gestation
 - Difficult farrowing
 - Fat depth at P4 site at day 110 of gestation
 - Total litter weight after cross-fostering

The final multi-variate model explained only 12.5% of variation in lactation feed intake

(Bunter et al., 2007)

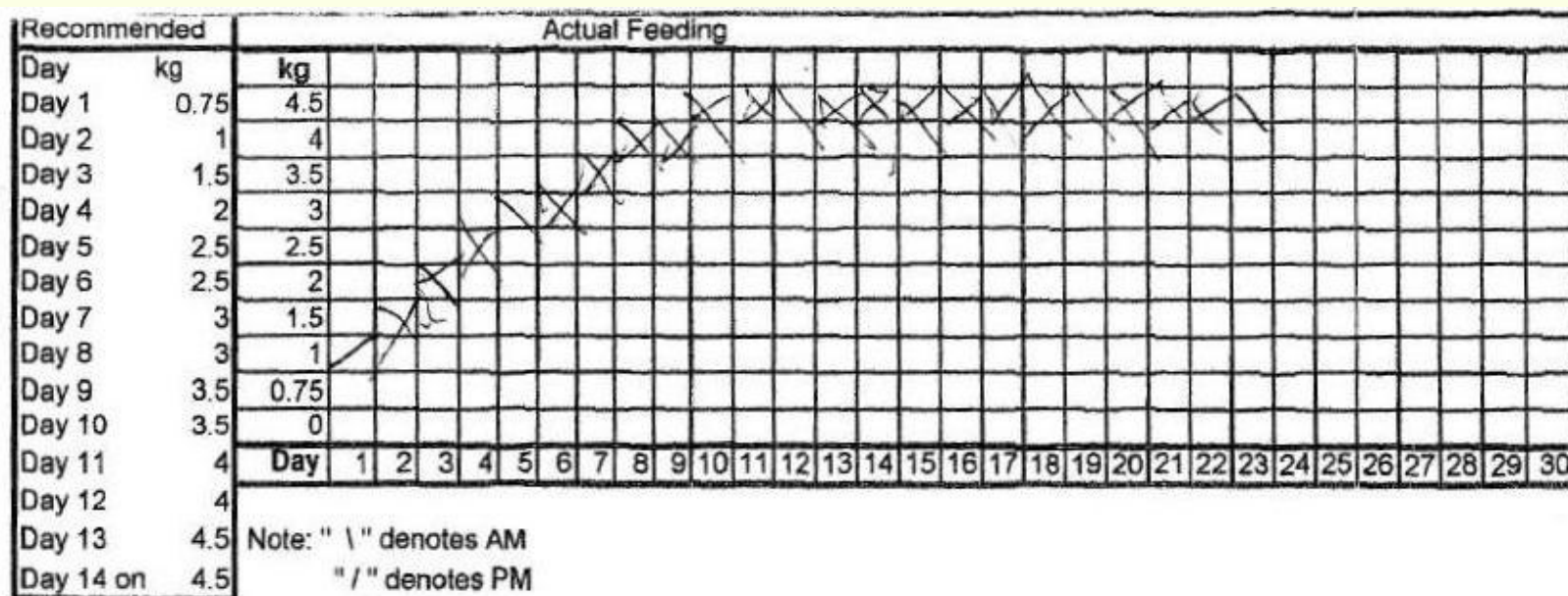
Summary so far

- Lifetime performance is impaired if lactation feed intake is below a certain threshold
- Parity and season affect sow lactation feed intake considerably
- Lactation feed intake has no phenotypic relationship with most other performance traits
 - Including feed intake during the growing phase

Implications

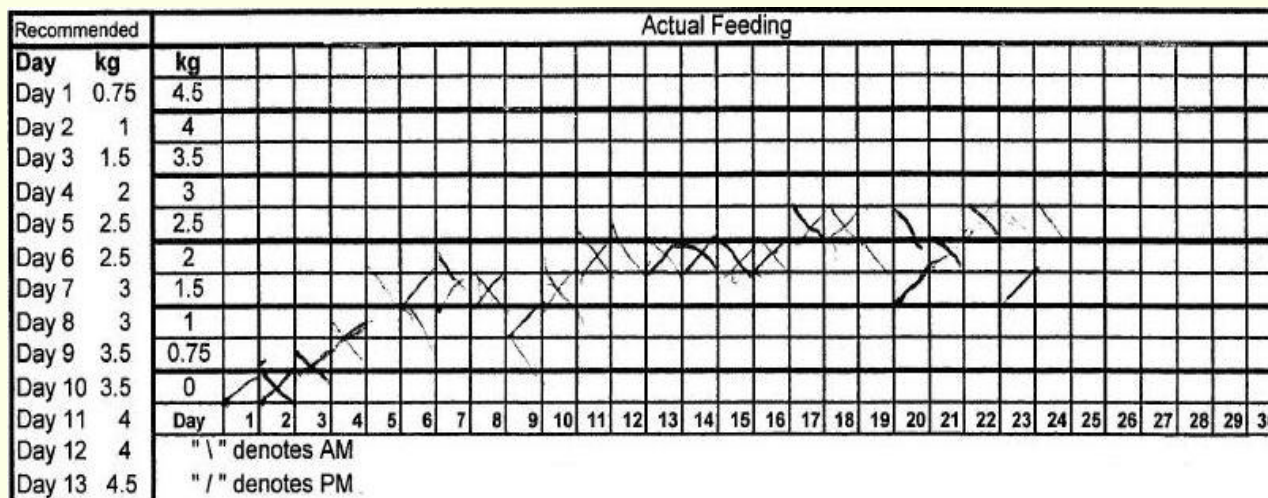
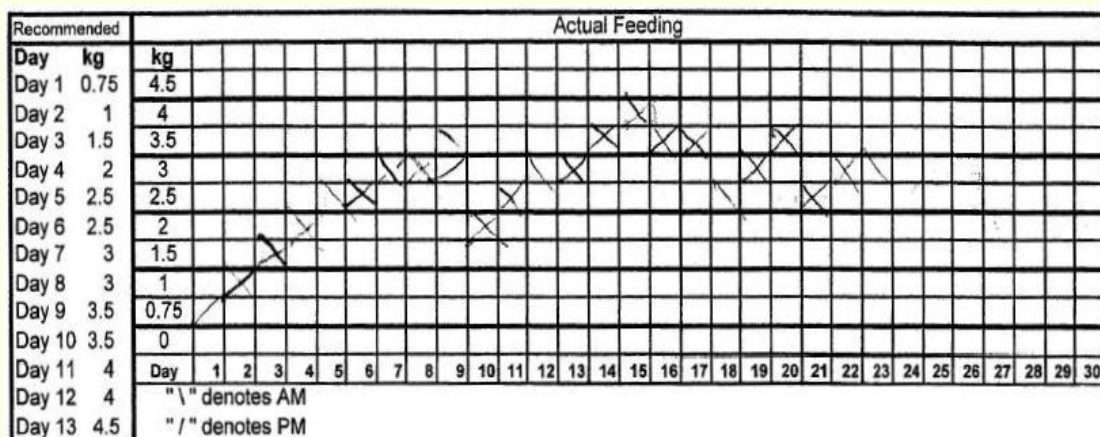
- Management
 - Which strategies reduce the incidence of low feed intake?
 - Critical for rebreeding success
- Pig breeding
 - Genetic correlations with traits describing growth, body composition and feed intake of the growing pig?
 - Genetic correlations with reproductive traits of the sow?

Feeding charts to monitor feed intake during lactation



Management tool

Feeding charts to monitor feed intake during lactation



Recording lactation feed intake for pig breeding programs

- Is lactation feed intake heritable?
- Which part of lactation is most informative for pig breeding programs?
 - Feed intake is often restricted at beginning of lactation
 - Sufficient to only use part of the feeding curve?

Traits of interest to pig breeding

- Whole lactation:
 - Total feed intake (TFI)
 - Average daily feed intake (AFI)
- Average daily feed intake during lactation:
 - day 1 – 5 (FI1)
 - day 6 – 10 (FI2)
 - day 11 – 15 (FI3)
 - day 16 – 20 (FI4)

Lactation feed intake and 5-day measures

Trait	Mean	SD	CV%
TFI (kg)	109	32.8	30
AFI (kg/d)	5.11	1.12	22
FI1 (kg/d)	2.69	0.70	26
FI2 (kg/d)	5.43	1.28	24
FI3 (kg/d)	6.08	1.46	24
FI4 (kg/d)	6.11	1.44	24

N: 1,719 to 2,215

Hermesch (2007)

Heritabilities

Trait	h^2	pe_{sow}	σ^2_p
TFI	0.16	0.18	300
AFI	0.19	0.17	0.679
FI1	0.02	0.13	0.357
FI2	0.17	0.10	0.870
FI3	0.14	0.15	1.19
FI4	0.12	0.18	1.31

Hermesch (2007)

Genetic correlations

	FI1	FI2	FI3	FI4
TFI	0.72	0.93	Ne	0.98
FI1		0.89	0.46	0.43
FI2			0.86	0.88
FI3				0.97

Hermesch (2007)

Conclusions

- Feed intake of sows during complete lactation is heritable
- 5-day measures between day 6 and 20 of lactation
 - Similar heritability as lactation feed intake
 - High genetic correlations with lactation feed intake and each other

Genetic gain sufficient to meet higher demand for nutrients?

Example: litter size

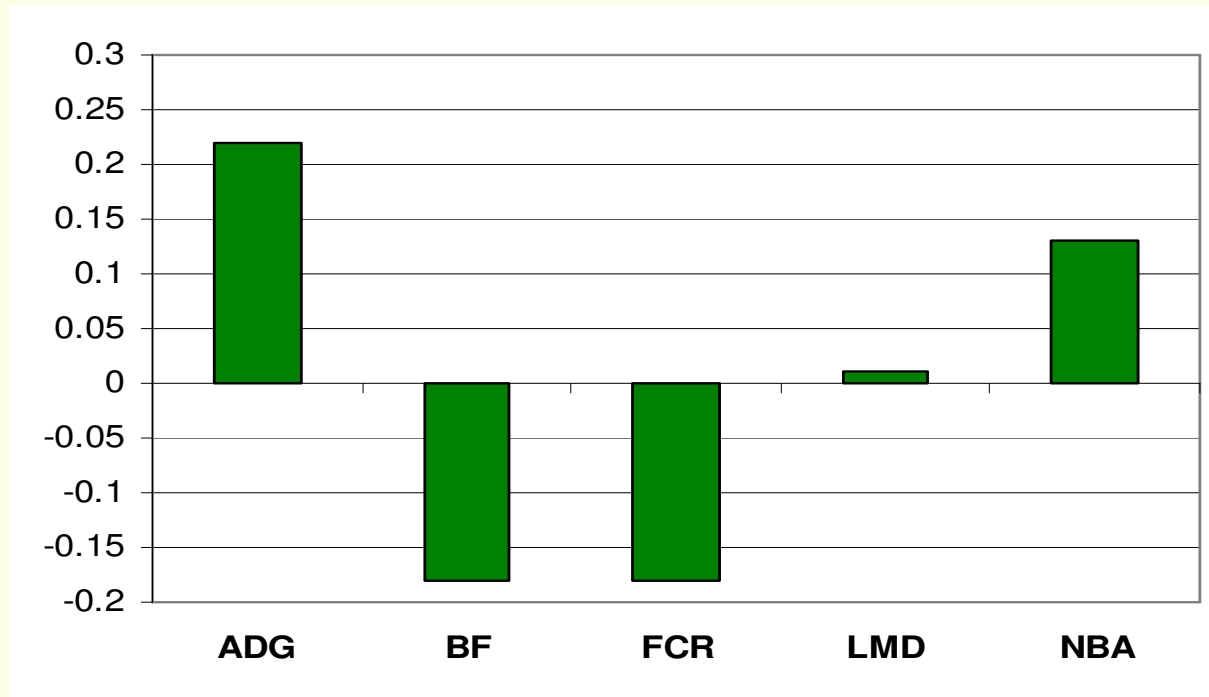
- Genetic gain of 0.18 piglets/year in top populations (Hermesch, 2006)
- Sow requires ~0.5 kg feed per piglet per day

Extra demand of 0.09 kg feed per day each year

Genetic standard deviation was 0.359 kg/d for average lactation feed intake

Response of 0.25 genetic standard deviations is required in average lactation feed intake

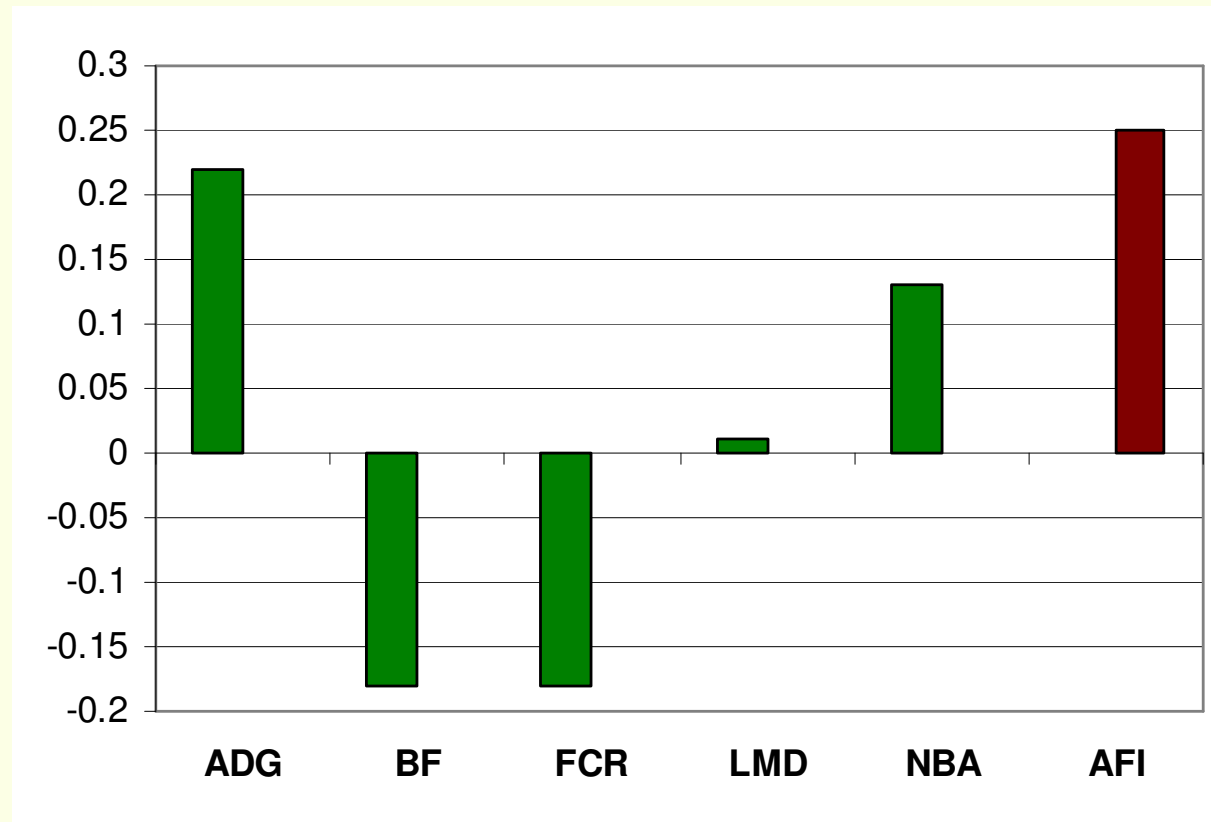
Genetic gain achieved in top 25% of Australian pig populations



Expressed in genetic standard deviation of each trait

Hermesch (2006)

Hypothetical response needed in lactation feed intake



Genetic gain alone will not be sufficient to meet increasing demand for nutrients

Take home messages

Management

- Producers and breeders should use feeding cards to monitor feed intake of sows during lactation

Genetics

- Lactation feed intake should be considered in pig breeding programs if feeding regime allows expression of trait

References

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