Effect of lysine level in finisher diets on performance in crossbreds from two terminal sire lines

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EAAP 2023

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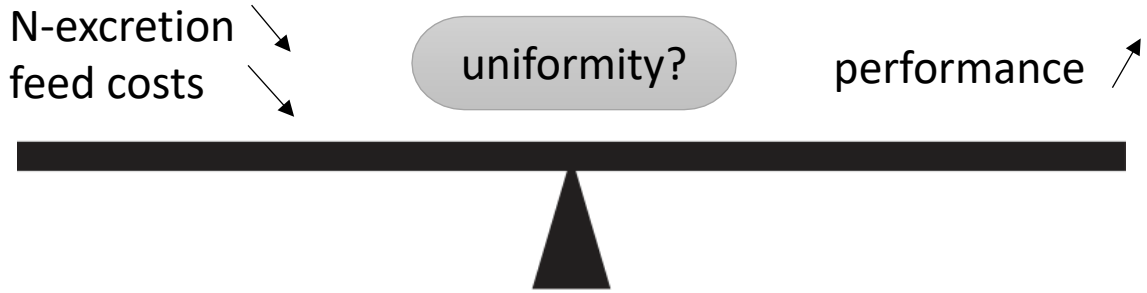
Background



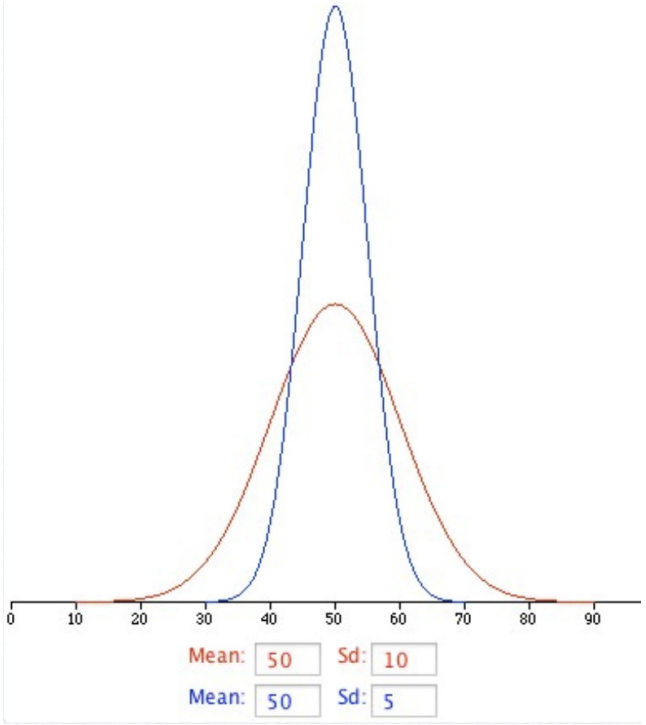
Optimal level depends on animals' requirements:

- Feed intake capacity
- Protein deposition capacity

genetics
sex
age

Background project

UNIPIG project



1. Reduction of variation in body weight in fattening pigs
   (**genetics**, sorting strategies, …)

2. Reduction of the costs of variation
   (**precision feeding,** slaughter in different batches, …)

Research question

Effect of lysine level in finisher diet in crossbreds from 2 terminal sire lines

- Growth performance
- N-efficiency
- Carcass quality
- Meat quality

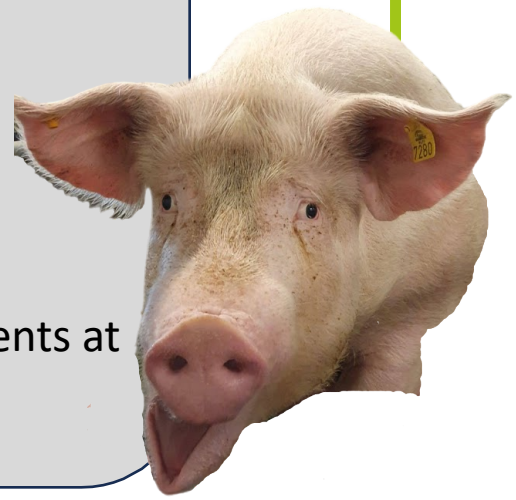
Related to study design:

1. Did we select animals with a difference in lysine requirement?
2. Did we select lysine levels above and under the requirement of the animals?

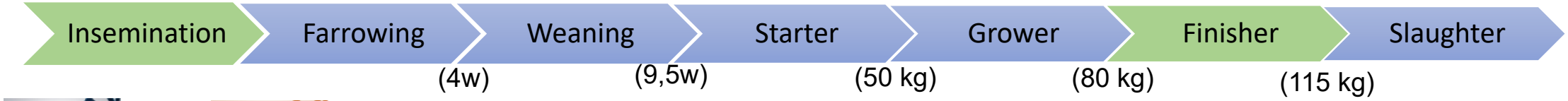
Related to uniformity (focus on body weight):

1. Is there a difference in uniformity in crossbreds from 2 different sire lines?
2. Does suboptimal feeding affect uniformity?

   Hypothesis: Animals with a higher lysine requirement will be fed below their requirements at a low lysine diet, resulting in increased variation in body weight.



2 × 2 × 2 experimental design




VS


GROWTH	CARCASS
stress negative sire line selected for growth rate	stress positive sire line selected for carcass quality

	Starter	Grower	Finisher	
			Low Lys	High Lys
SID Lys (g/kg)	10,6	9,5	6,3	7,8
Crude protein (g/kg)	178	160	126	140
Net energy 2015 (MJ/kg)	9,68	9,68	9,68	9,68
SID Lys (g/MJ NE_{2015})	1,10	0,98	0,65	0,81

♀ ♂

gilts	barrows

Individual weighing, weekly: growth performance

Blood sample right before and 1 week after test diets
Serum urea

Carcass quality
Meat quality

3 batches; 360 pigs in total; 45 pigs/treatment
Meat quality: 1 batch; 120 pigs in total

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Overview parameters

Growth performance (80-115 kg)

- Average daily gain
- Average daily feed intake
- Feed conversion ratio

N-efficiency

- Serum urea (= measure for protein excess)
- N-efficiency (= incorporated N/N intake)

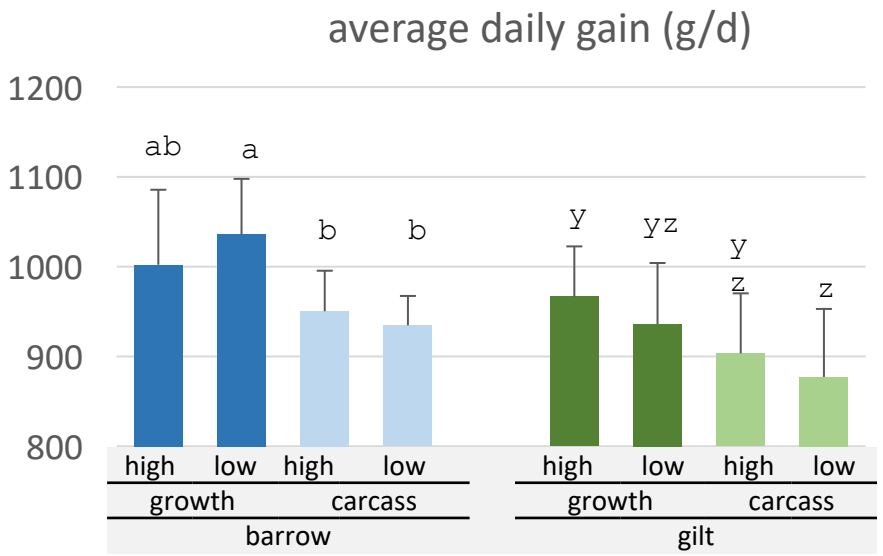
Carcass quality

- Dressing yield
- Lean meat percentage

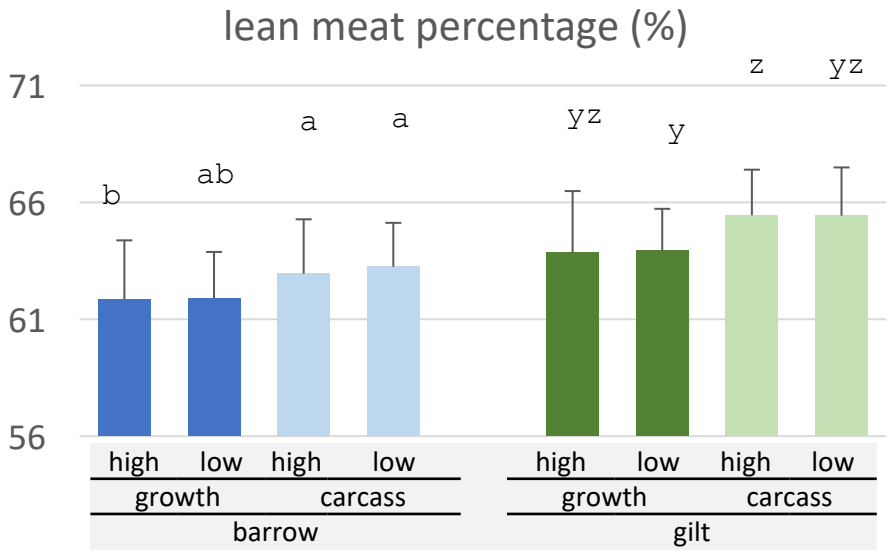
Meat quality

- pH_{35min} and pH_{24h}
- Intramuscular fat
- Drip loss

Effects related to sire line and sex?



	P-value
sex x sire line x diet	NS
sire line	**< 0,001**
diet	NS
sex	**< 0,001**



	P-value
sex x sire line x diet	NS
sire line	**< 0,001**
diet	NS
sex	**< 0,001**

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Effect of sire line? And sex?

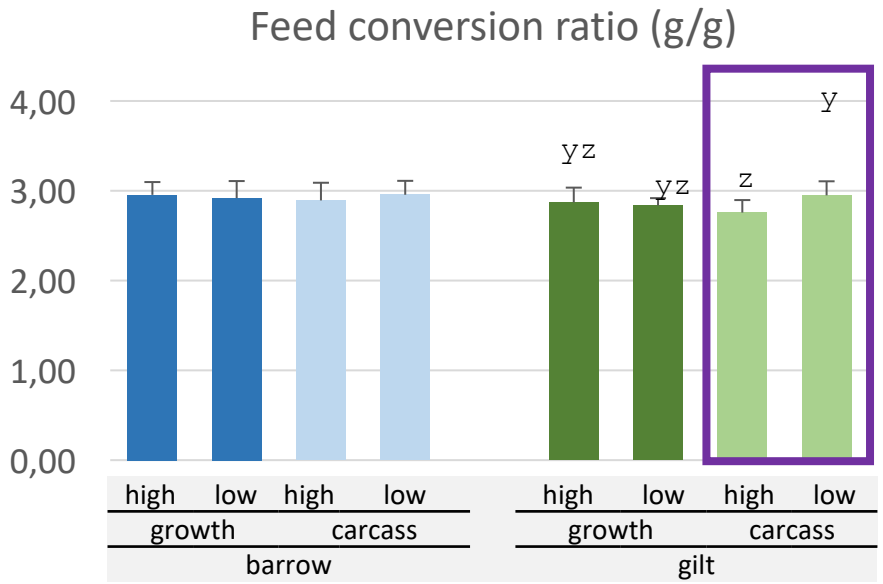
Growth performance (80-115 kg)		
• Average daily gain	growth > carcass	barrow > gilt
• Average daily feed intake	growth > carcass	barrow > gilt
• Feed conversion ratio	/	barrow > gilt
N-efficiency		
• Serum urea (measure for protein excess)	/	barrow > gilt
• N-efficiency (incorporated N/N intake)	carcass > growth	gilt > barrow
Carcass quality		
• Dressing yield	carcass > growth	/
• Lean meat percentage	carcass > growth	gilt > barrow
Meat quality		
• pH_{35min} and pH_{24h}	growth > carcass	/
• Intramuscular fat	/	barrow > gilt
• Drip loss	/	/

Did we select animals with a difference in lysine requirement?

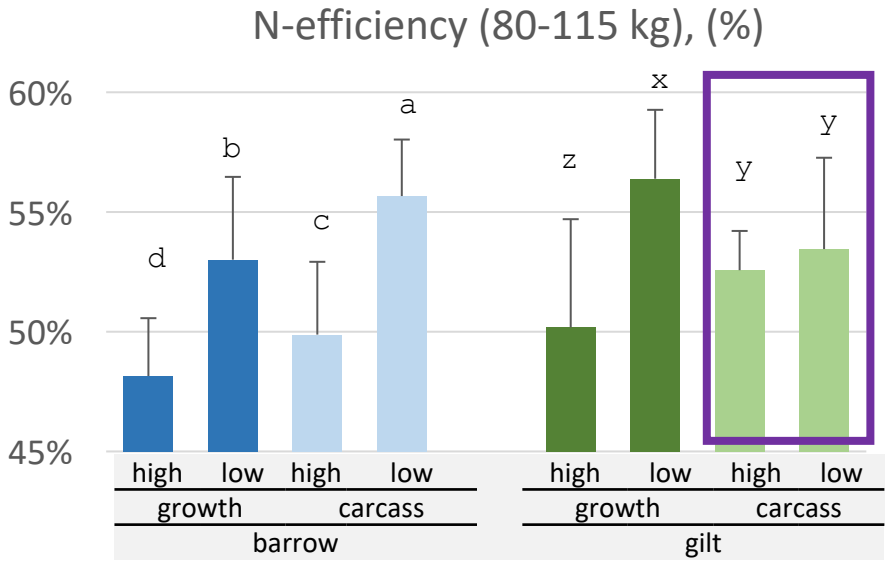
Effect of **sire line** was reflected in most parameters related to growth performance, N-efficiency and carcass quality.

Effect of **sex** was in line with expectations.

Effects of diet?



	P-value
sex x sire line x diet	NS
sire line	NS
diet	NS
sex	**0,049**



	P-value
sex x sire line x diet	**< 0,001**
sire line	0,012
diet	< 0,001
sex	< 0,001

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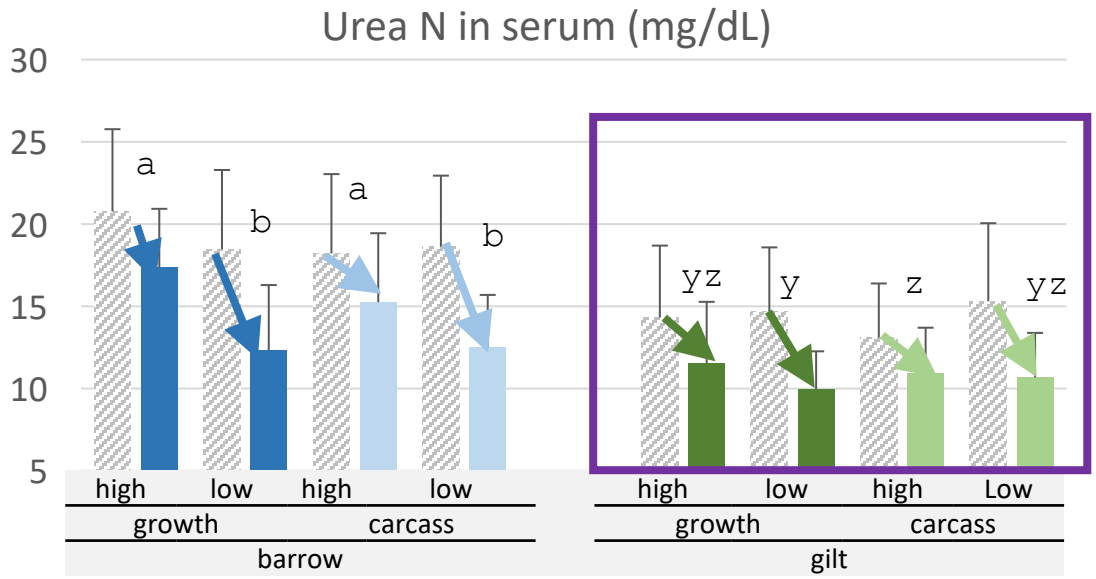
Effects of diet?



End of 2nd phase (16% CP)

1 week after switch to test diets (14% or 12,6% CP)

	P-value
sex x sire line x diet	NS
sire line	NS
diet	**< 0,001**
sex	NS

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Effect of diet?

Growth performance (80-115 kg)

- Average daily gain — /
- Average daily feed intake — /
- Feed conversion ratio — low lysine > high lysine ; only in gilts selected for carcass quality

N-efficiency

- Serum urea (measure for protein excess) — high lysine > low lysine; only in barrows
- N-efficiency (incorporated N/N intake) — low lysine > high lysine ; only in gilts selected for carcass quality

Carcass quality

- Dressing
- Lean me

Meat qual

- pH_{35min}
- Intramu
- Drip los

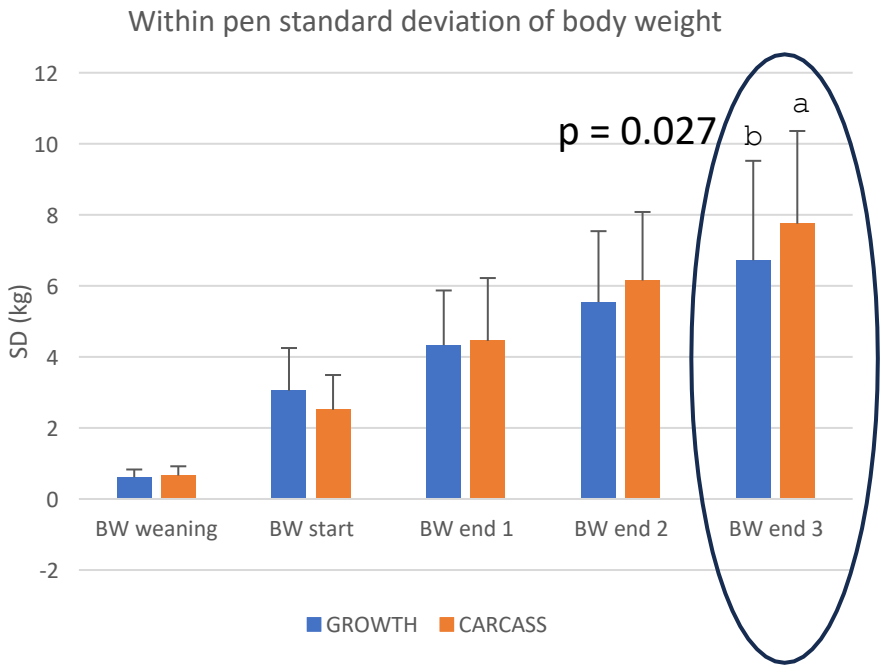
Did we select lysine levels above and under the requirement of the animals?

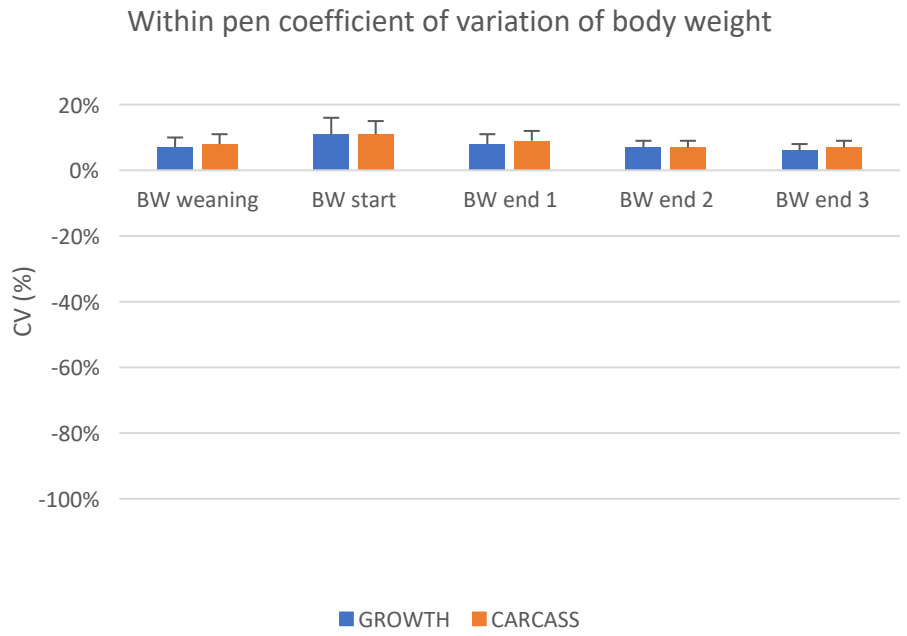
Based on the feed conversion ratio and N-efficiency parameters, the low lysine diet (versus high lysine diet) only negatively affected growth performance in gilts selected for carcass quality.

⇒ Suboptimal feeding was only achieved in these animals

Effects of sire line or diets on uniformity?

VARIATION IN BODY WEIGHT RELATED TO GENETIC BACKGROUND





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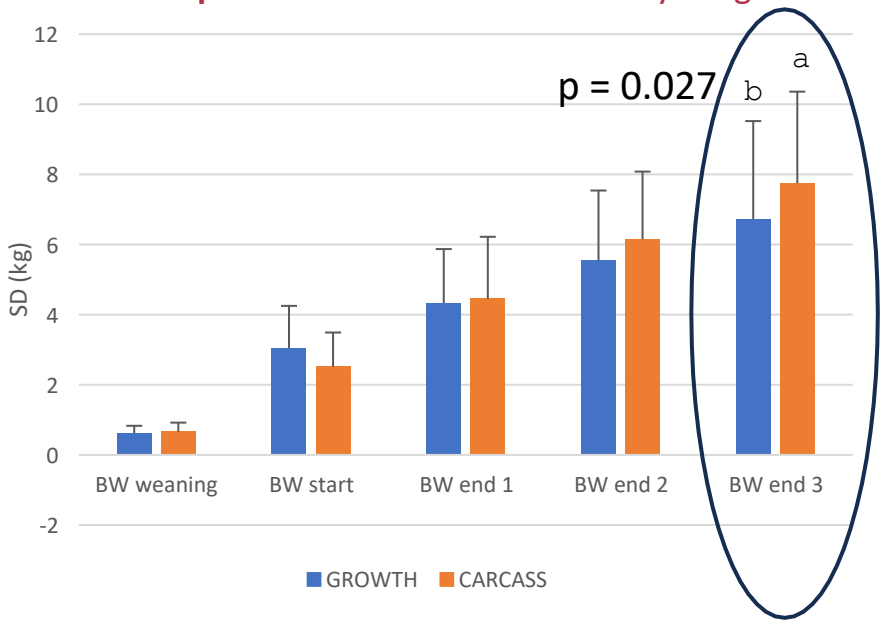
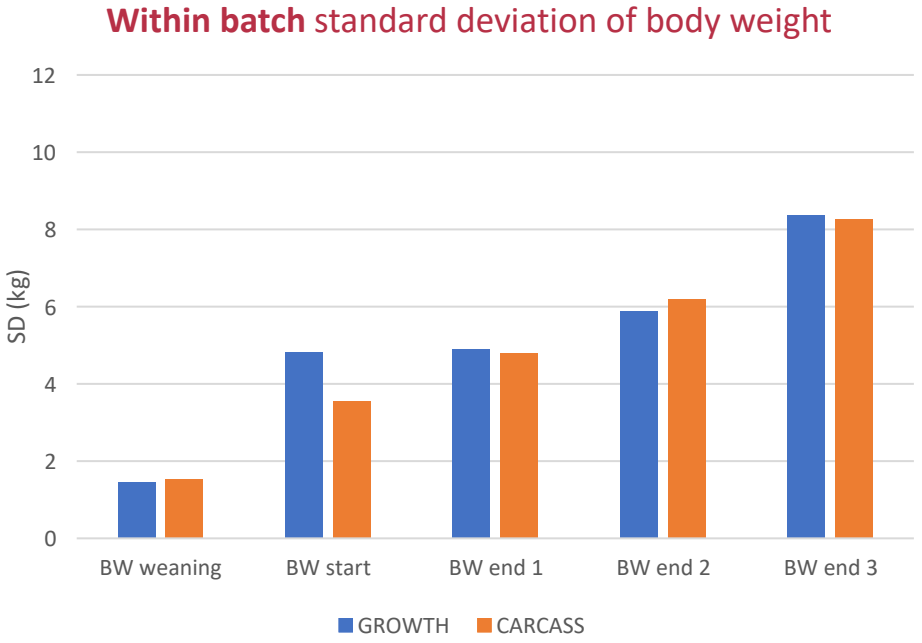
Effects of sire line or diets on uniformity?

VARIATION IN BODY WEIGHT RELATED TO GENETIC BACKGROUND





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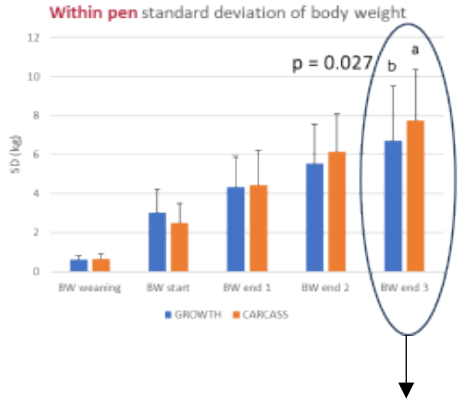
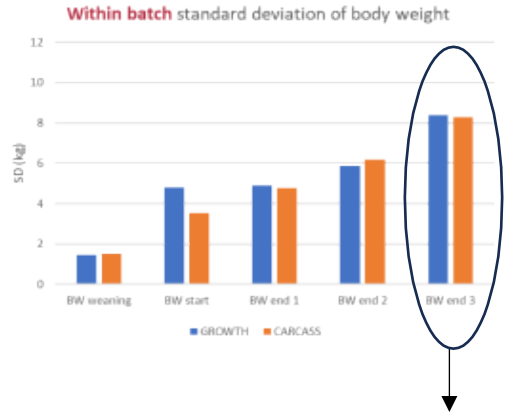
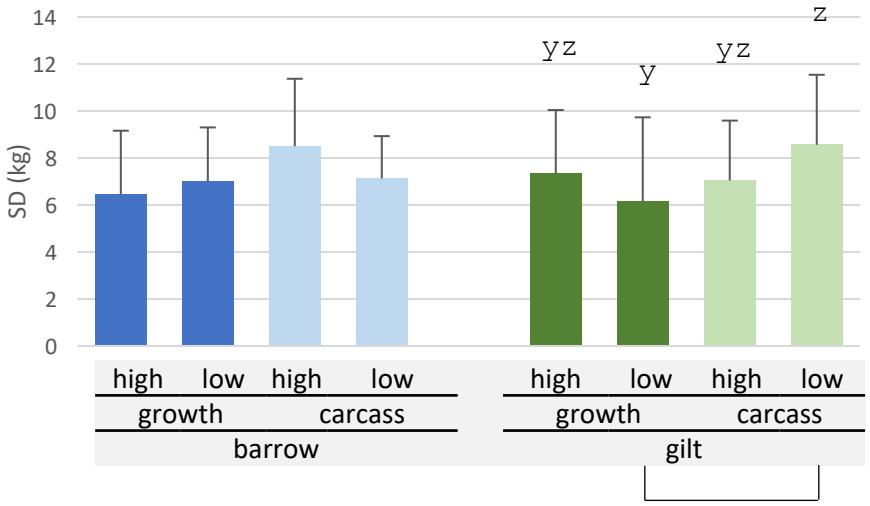
Effects of sire line or diets on uniformity?



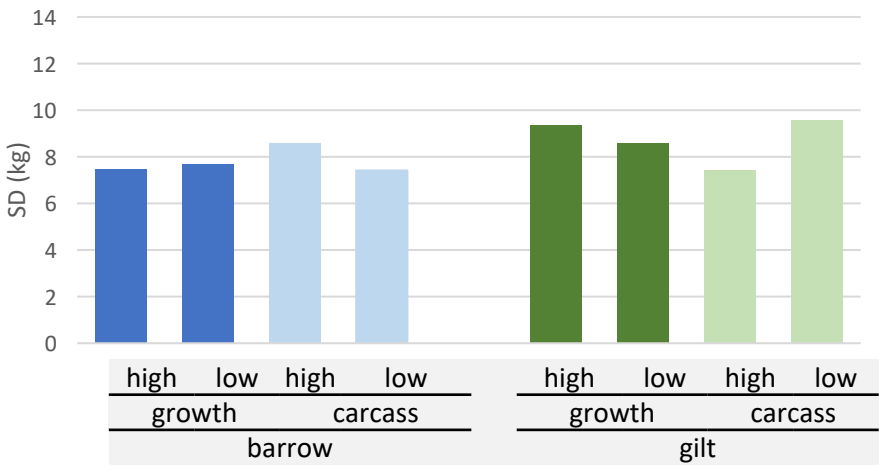


Within pen standard deviation of body weight
FINISHER PHASE



p = 0.031

Within batch standard deviation of body weight
FINISHER PHASE



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Conclusions

Related to study design:

1. Did we select animals with a difference in lysine requirement?

   Effects of sire line and sex on performance, N-efficiency and carcass quality indicate different requirements

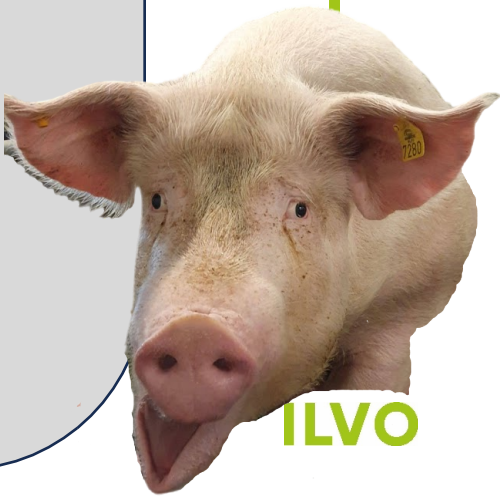
2. Did we select lysine levels above and under the requirement of the animals?

   Presumably only gilts selected for carcass quality were fed below their requirements

Related to uniformity (focus on body weight):

1. Is there a difference in uniformity in crossbreds from 2 different sire lines?

2. Does suboptimal feeding affect uniformity?



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