

Dissecting purebred-crossbred interaction for feed intake in pigs: #1 feed ingredients

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Topigs Norsvin

PROGRESS IN PIGS

Content

- Genetic correlation between purebreds and crossbreds
- Disentangling potential sources of variation
- Feed trial
- Genotype by Feed interaction



r_g **Purebred-crossbred**



Sire line nucleus

Performance
test

Weaner production

Crossbred grower-finishers



Genetic parameters Pb-Cb



| Trait | | | | | | |
|--------------------|------|------|--|--|--|--|
| | | | | | | |
| Daily gain (g/d) | 0.22 | 0.19 | | | | |
| Feed intake (g/d) | 0.28 | 0.24 | | | | |
| Backfat depth (mm) | 0.43 | 0.37 | | | | |
| Loin depth (mm) | 0.32 | 0.21 | | | | |

Genetic parameters Pb-Cb



Genetic correlations < 1

| Trait | | | | | | |
|--------------------|------|------|--|--|------|--|
| | | | | | | |
| Daily gain (g/d) | 0.22 | 0.19 | | | 0.90 | |
| Feed intake (g/d) | 0.28 | 0.24 | | | 0.70 | |
| Backfat depth (mm) | 0.43 | 0.37 | | | 0.83 | |
| Loin depth (mm) | 0.32 | 0.21 | | | 0.83 | |

Genetic parameters Pb-Cb



Genetic correlations < 1
Differences in genetic variation

| Trait | | | | | | |
|--------------------|------|------|------|------|------|--|
| | | | | | | |
| Daily gain (g/d) | 0.22 | 0.19 | 54 | 37 | 0.90 | |
| Feed intake (g/d) | 0.28 | 0.24 | 151 | 113 | 0.70 | |
| Backfat depth (mm) | 0.43 | 0.37 | 1.14 | 1.53 | 0.83 | |
| Loin depth (mm) | 0.32 | 0.21 | 2.62 | 2.68 | 0.83 | |

Genetic parameters Pb-Cb



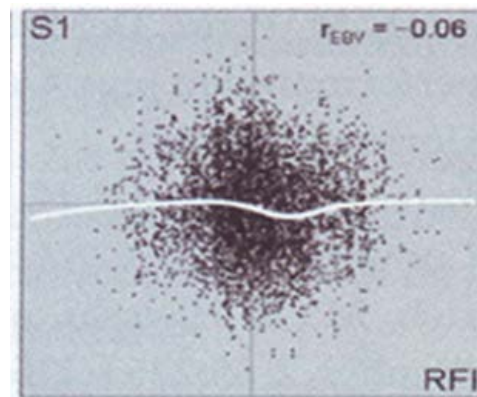
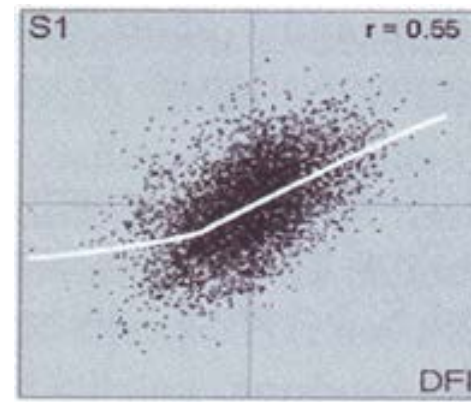
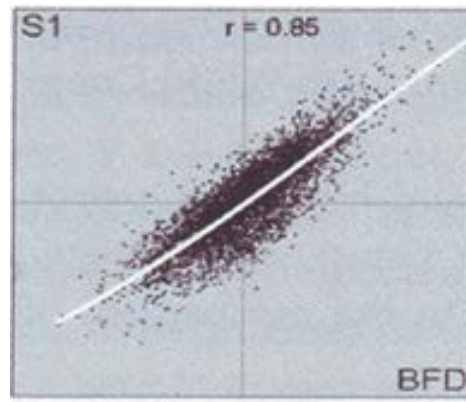
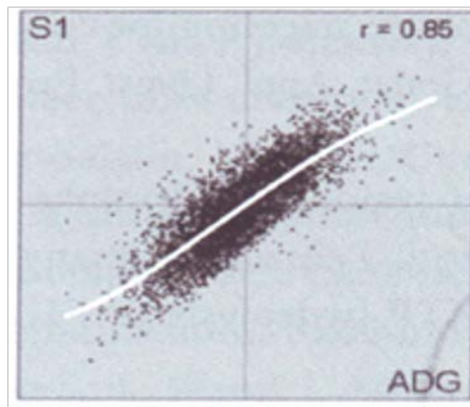
Expression on Cb level \approx 100%

Genetic correlations < 1

Differences in genetic variation

| Trait | | | | | | |
|--------------------|------|------|------|------|------|------|
| | | | | | | |
| Daily gain (g/d) | 0.22 | 0.19 | 54 | 37 | 0.90 | 62% |
| Feed intake (g/d) | 0.28 | 0.24 | 151 | 113 | 0.70 | 52% |
| Backfat depth (mm) | 0.43 | 0.37 | 1.14 | 1.53 | 0.83 | 111% |
| Loin depth (mm) | 0.32 | 0.21 | 2.62 | 2.68 | 0.83 | 85% |

Literature



Purebred-Crossbred realization Feed Efficiency

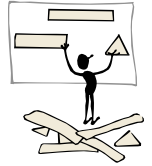


| Trait | | | | | | |
|--------------------|------|------|----|----|------|-----|
| | | | | | | |
| Feed : Gain (g/kg) | 0.14 | 0.11 | 81 | 70 | 0.70 | 60% |
| RFI (g/d) | 0.16 | 0.12 | 77 | 59 | 0.54 | 41% |

Godinho : In preparation



Sources of variation



- Feed Intake and feed efficiency most sensitive for deviating (from 1) genetic correlation between purebreds and crossbreds.
- But, also trait(s) with observations on least number of farms (max 3)
- We might look at a Genotype by Environment interaction:
 - Health status
 - Feed
 - Climate
 - ...
 - Combination



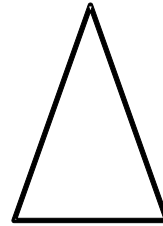
Objective is to disentangle the sources of variation of the r_g

Genotype by Feed interaction

Feed trial applying 2 main stream diets worldwide

| | | |
|--------------------------|----|------|
| | | |
| | | |
| Corn/Soy | 79 | 1107 |
| Wheat/Barley/By-products | 77 | 1125 |

Genotype x Feed



Sire line nucleus

Performance
test

Weaner production

Crossbred grower-finishers



Phenotypic differences CS-WBB diet (n=160)

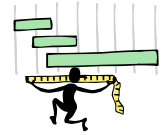


| ADG (g/d) | 938 | 949 | |
|-------------------|------|------|---|
| ADFI (g/d) | 2191 | 2259 | * |
| Feed:Gain (kg/kg) | 2.34 | 2.38 | |

Sevillano : In preparation



Results different phases CS-WBB (n=160)



| Starter phase | | | |
|-------------------|------|------|-----|
| ADG (g/d) | 796 | 771 | |
| ADFI (g/d) | 1417 | 1319 | |
| Feed:Gain (kg/kg) | 1.78 | 1.71 | |
| Grower phase | | | |
| ADG (g/d) | 975 | 977 | |
| ADFI (g/d) | 2208 | 2150 | |
| Feed:Gain (kg/kg) | 2.26 | 2.20 | |
| Finisher phase | | | |
| ADG (g/d) | 1008 | 1046 | |
| ADFI (g/d) | 2706 | 2985 | *** |
| Feed:Gain (kg/kg) | 2.68 | 2.85 | *** |

Conclusions 1



- Phenotypic differences between both diets are small (especially over entire grower-finisher phase)
- Results suggest that ADFI of young animals is limited by volume and of older animals driven by energy demand



Genetic parameters CS-WB (preliminary results!)

Genetic correlations H1

Differences in genetic variation

| Trait | | | | | | |
|--------------------|------|------|-----|-----|------|------|
| | | | | | | |
| Daily gain (g/d) | 0.35 | 0.22 | 57 | 45 | 0.99 | 78% |
| Feed intake (g/d) | 0.29 | 0.22 | 125 | 109 | 0.90 | 79% |
| Feed : Gain (g/kg) | 0.22 | 0.26 | 73 | 86 | 0.97 | 114% |



Conclusions

- Genetic correlation between Pb and Cb < 1
- Unlikely that GxF interaction is causing this (r_g CS and WBB H1.0)
- Genetic expression might be lower in WBB diets compared to CS-diets



Thank you for your attention

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