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Genetic parameters for meat percentage, average daily gain and feed conversion rate in *ad libitum* fed Finnish Landrace and Large White pigs

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Background…

- In year 2006 started Faba's new central test station for Finnish pig breeding scene
- At the same time the testing procedure changed
- For example, the feeding was changed from slightly restricted group feeding (RF) to individual *ad libitum* (AL) feeding

…background

- During transition period (co)variances from literature were used
- The objective of this study was to update genetic parameters due to changed situation and compare the new estimates to previous ones

Material and methods…

- Data was 2548 Finnish Landrace and 1684 Large White pigs.

- Pigs were fed individually using electronic feeding system and after 13 weeks test period pigs (except best boars) were slaughtered.

- Traits were meat percentage (M%), average daily gain (ADG, g/d) and feed conversion rate (FC, FU /kg live weight gain, 1 FU = 9.3 MJ NE)

…material and methods

- (Co)variances were estimated using a multitrait animal model and REML method with DMU program package

- Statistical model contains:
  - sex and rearing batch as fixed effects
  - start weight as a covariate
  - Litter, pen and additive animal effect as random effects

- Inbreeding was taken account

Data description

Table 1, Number of observations (No), means, standard deviations, coefficients of variation (CV) and minimum (Min) and maximum (Max) values in Large White and Finnish Landrace

Trait	No.	Mean	SD	CV-%	Min	Max
Average daily gain, g/d	1684 2548	911 945	109 116	11.9 12.2	595 606	1276 1394
Feed conversion rate, FU/kg	1664 2505	2.58 2.58	0.24 0.24	9.3 9.3	1.91 1.74	3.72 4.14
Meat percentage,-%	1409 2202	63.5 63.4	2.44 2.50	3.8 3.9	53.1 52.1	70.8 72.0

Results…

Table 2. Phenotypic variances (σ^2_p), permanent environmetal effect of litter (c^2 ± S.E), permanent effect of pen (b^2 ± S.E) and heritabilities(h^2 ± S.E) in Large White

Trait	σ^2_p	c^2 ± S.E	b^2 ± S.E	h^2 ± S.E
Average daily gain, g/d	11111	0.08 ± 0.04	0.10 ± 0.02	0.31 ± 0.09
Feed conversion rate, FU/kg	0.04	0.10 ± 0.04	0.10 ± 0.02	0.30 ± 0.09
Meat percentage,-%	4.54	0.06 ± 0.04	0.06 ± 0.02	0.34 ± 0.10

…results…

Table 2b. Phenotypic variances (σ^2_p), permanent environmetal effect of litter (c^2 ± S.E), permanent effect of pen (b^2 ± S.E) and heritabilities(h^2 ± S.E) in Large White, brown ones are values in restricted feeding

Trait	σ^2_p	c^2 ± S.E	b^2 ± S.E	h^2 ± S.E
Average daily gain, g/d	11111 4225	0.08 ± 0.04	0.10 ± 0.02	0.31 ± 0.09 0.35
Feed conversion rate, FU/kg	0.04 0.032	0.10 ± 0.04	0.10 ± 0.02	0.30 ± 0.09 0.40
Meat percentage,-%	4.54 3.61	0.06 ± 0.04	0.06 ± 0.02	0.34 ± 0.10 0.65

…results…

Table 3. Phenotypic variances (σ^2_p), permanent environmetal effect of litter (c^2 ± S.E), permanent effect of pen (b^2 ± S.E) and heritabilities (h^2 ± S.E) in Finnish Landrace

Trait	σ^2_p	c^2 ± S.E	b^2 ± S.E	h^2 ± S.E
Average daily gain, g/d	11367	0.13 ± 0.03	0.08 ± 0.02	0.19 ± 0.06
Feed conversion rate, FU/kg	0.04	0.12 ± 0.03	0.11 ± 0.02	0.18 ± 0.06
Meat percentage,-%	4.62	0.12 ± 0.03	0.01 ± 0.01	0.31 ± 0.08

…results…

Table 3b. Phenotypic variances (σ^2p), permanent environmetal effect of litter (c^2 ± S.E), permanent effect of pen (b^2 ± S.E) and heritabilities(h^2 ± S.E) in Finnish Landrace, brown ones are values in restricted feeding

Trait	σ^2p	c^2 ± S.E	b^2 ± S.E	h^2 ± S.E
Average daily gain, g/d	11367 4225	0.13 ± 0.03	0.08 ± 0.02	0.19 ± 0.06 0.35
Feed conversion rate, FU/kg	0.04 0.032	0.12 ± 0.03	0.11 ± 0.02	0.18 ± 0.06 0.40
Meat percentage,-%	4.62 3.61	0.12 ± 0.03	0.01 ± 0.01	0.31 ± 0.08 0.65

…results…

Table 4. Genetic (upper triangular) and phenotypic (lower triangular) correlations in Large White

Trait	Average daily gain	Feed conversion rate	Meat percentage
Average daily gain, g/d		-0.07 ± 0.22	-0.22 ± 0.22
Feed conversion rate, FU/kg	-0.40		-0.79 ± 0.14
Meat percentage,-%	-0.28	-0.29	

…results…

Table 4b. Genetic (upper triangular) and phenotypic (lower triangular) correlations in Large White, brown ones are correlations in restricted feeding

Trait	Average daily gain	Feed conversion rate	Meat percentage
Average daily gain, g/d		-0.07 ± 0.22 -0.277	-0.22 ± 0.22 0.25
Feed conversion rate, FU/kg	-0.40 -0.09		-0.79 ± 0.14 -0.29
Meat percentage,-%	-0.28 0.00	-0.29 -0.02	

…results…

Table 5 Genetic (upper triangular) and phenotypic (lower triangular) correlations in Finnish Landrace

Trait	Average daily gein	Feed conversion rate	Meat percentage
Average daily gain, g/d		0.02 ± 0.22	-0.40 ± 0.17
Feed conversion rate, FU/kg	-0.50		-0.34 ± 0.18
Meat percentage,-%	-0.30	-0.25	

…results

Table 5b. Genetic (upper triangular) and phenotypic (lower triangular) correlations in Finnish Landrace, brown ones are correlations in restricted feeding

Trait	Average daily gain	Feed conversion rate	Meat percentage
Average daily gain, g/d		0.02 ± 0.22 -0.277	-0.40 ± 0.17 0.25
Feed conversion rate, FU/kg	-0.50 -0.09		-0.34 ± 0.18 -0.29
Meat percentage,-%	-0.30 0.00	-0.25 -0.02	

Conclusions…

- Phenotypic variance was larger in *ad libitum* feeding than in restricted feeding

- Heritabilities were almost at same level or lower

…conclusions…

- Correlations between ADG and FC were zero in AL, whereas it was negative in RF

- In *ad libitum feeding*, moderate negative correlation (-0.22 in LW and -0.40 in LR) was between ADG and M %. In RF this correlation was moderately positive

- In AL, correlation between FC and M% varied from -0.34 to -0.79 (favourable). In RF the estimate was almost similar

… conclusions

- Change in feeding from restricted to *ad libitum* and perhaps also other changes in management practise between old and new test station affected more to the correlations between traits than to the heritabilities

Thank you for your attention!

Picture: Timo Serenius