Session 36 Free Communications in Pig Production – Author's contact: marie.dufrasne@ulg.ac.be

Development of a new crossbred based evaluation for carcass quality traits of Piétrain boars in the Walloon Region of Belgium

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Why?

OBJECTIVE

To develop a genetic evaluation model to estimate the genetic merit of Piétrain boars for some carcass quality traits based on data recorded on live crossbred progeny and relatives at different ages

To implement a tool that allows to select boars that produce carcass with a high meat percentage

MATERIAL AND METHODS

How?

DATA

- Recorded at the central test station and on-farm on live animals
- Two traits: backfat thickness (BF) and meat percentage (%meat)
- 60,546 records from 56,822 different pigs
- Recorded on females, entire and castrated males
- Breed types: Piétrain, Landrace and Piétrain X Landrace

MODEL

- Multitrait animal model with random regressions using linear splines with knots at 175, 200 and 250 days

$$y = Xb + Q(Za + ZP) + e$$

y: vector of observations (BF and %meat)

b: vector of fixed effects (sex, contemporary group and heterosis)

a: vector of random additive genetic effect

p: vector of random permanent environment effect

e: vector of residuals

Q: matrix of linear spline coefficients

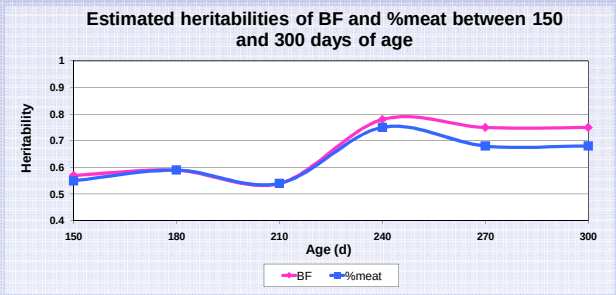
X, Z: incidence matrices

- Heterosis effect: modeled as fixed regression on heterozygosity coefficient

METHODS

- REML and Gibbs sampling algorithm for variance components estimation
- BLUP for breeding values estimation and residuals computation

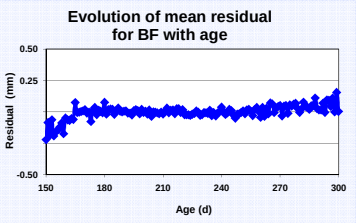
RESULTS

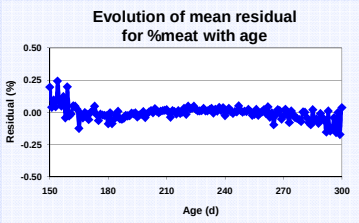


Estimated heritabilities are high and increase with age:
- From 0.56 to 0.75 for BF
- From 0.55 to 0.69 for %meat

BF and %meat are highly genetically correlated

Age (d)	Genetic correlation
150	-0.90
180	-0.90
210	-0.94
240	-0.94
270	-0.93
300	-0.93





The means of the residual distribution for the two traits are not significantly different from zero at any age:
P Value = 0.7977 for BF
P Value = 0.1476 for %meat

CONCLUSIONS

- Genetic improvement of carcass quality of Piétrain boars is possible by genetic selection with backfat thickness and meat percentage because of their high heritability.
- Backfat thickness and meat percentage are highly genetically correlated, so selection could be based only on one of these two traits to select boars that produce progeny with a high meat percentage.
- To have accurate genetic selection, backfat thickness should be preferred to meat percentage because it is a trait directly measured while meat percentage is predicted from backfat thickness and loin muscle depth measurements.
- According to the study of residuals, the genetic evaluation model developped seems to fit well the data. Therefore the estimation of breeding values of boars could be accurate.
- According to solutions for heterosis effect, crossbred animals have better performances compared to the whole population.

Acknowledgments

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