

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

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1. THE MESSAGE

Implementing **genetic evaluation** system of Piétrain boars for some carcass quality traits based on data recorded on **live crossbred progeny** and relatives at **different ages**

2. OBJECTIVES

To **develop a genetic evaluation model** to estimate the genetic merit of Piétrain boars involved in a **crossbreeding scheme** for some carcass quality traits

To implement a system that allows to **select boars** that produce carcass with a **high lean meat percentage**

3. MATERIAL AND METHODS

Data

- Recorded at a **central test station** and **on-farm** on live animals
- Two traits : **backfat thickness (BF)** and **meat percentage (%meat)**
- 60 546 records** from 56 822 pigs
- Recorded on **females, entire males** and **castrated males**

Model

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

$$y = Xb + Q(Za + Zp) + e \quad \text{with}$$

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

e : vector of random residuals

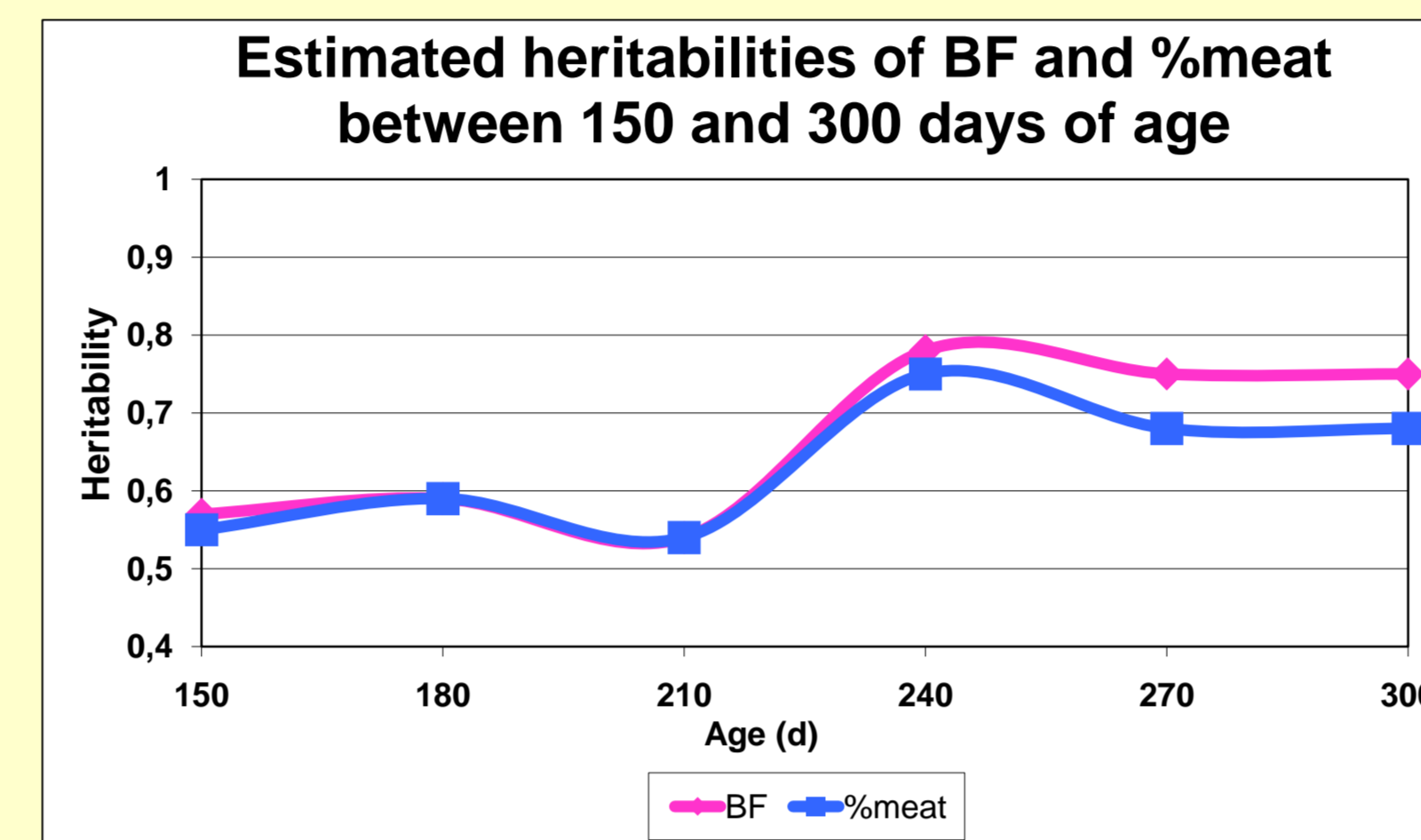
Q : matrix of linear spline coefficients

X, Z : Incidence matrices

Methods

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

4. RESULTS

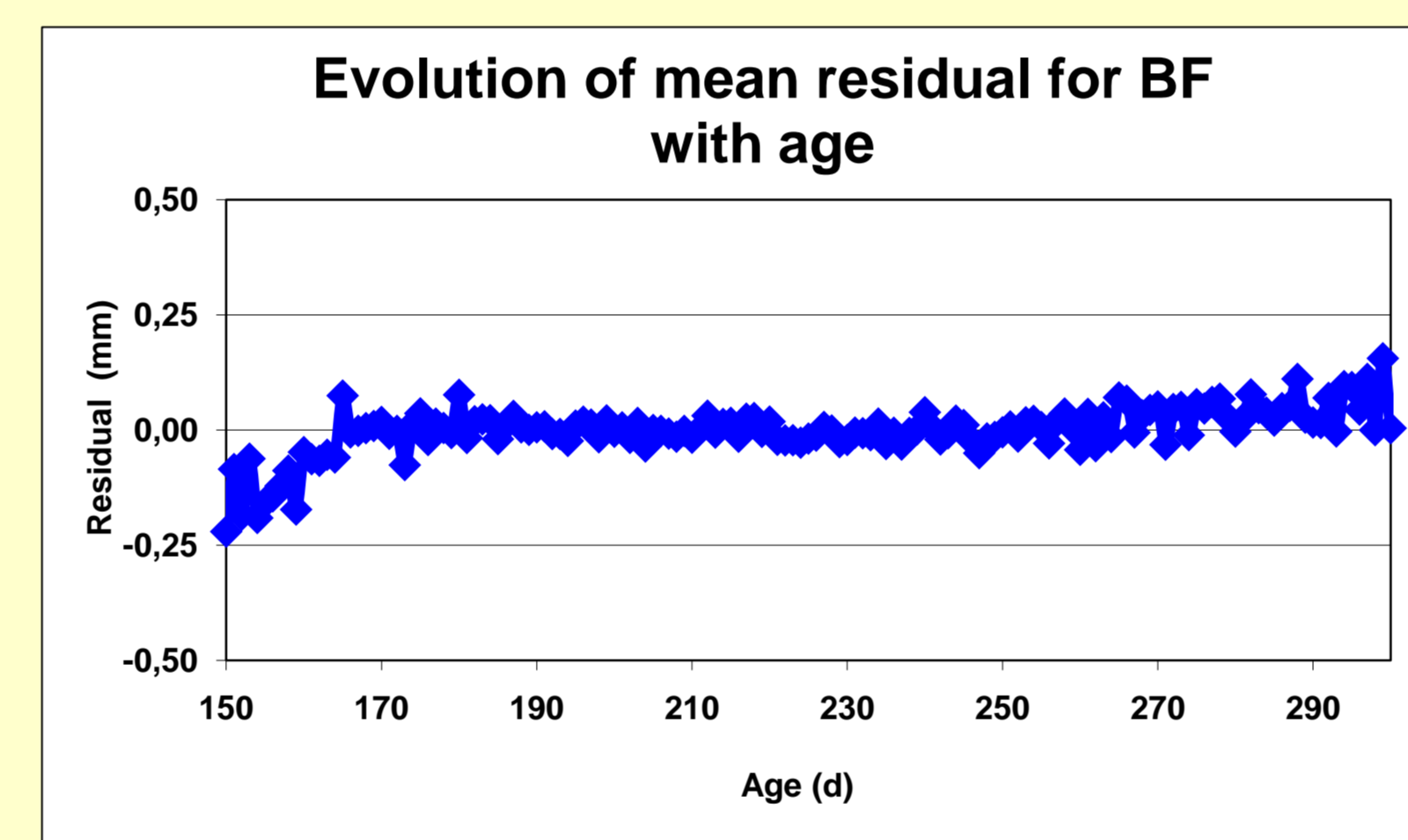


Estimated **heritabilities** are **high and increase** with age :

- From 0.56 to 0.75 for BF
- From 0.55 to 0.69 for %meat

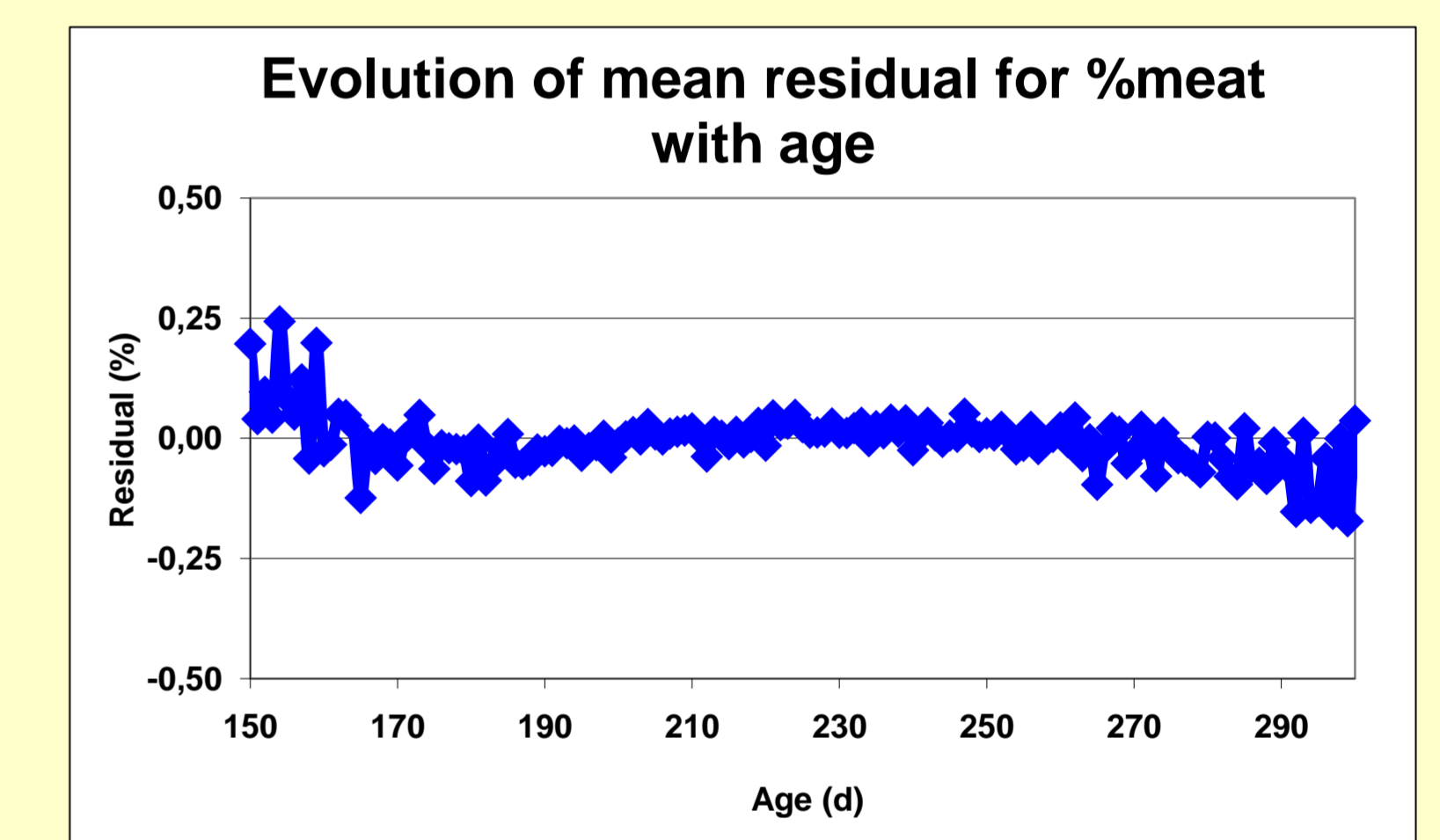
Age (d)	Genetic correlation
150	-0.90
180	-0.90
210	-0.94
240	-0.94
270	-0.93
300	-0.93

BF and %meat are **highly genetically correlated**



The **mean residual** of the two traits are **not significantly different from zero** at any age :

- P Value = 0.7977 for BF
- P Value = 0.1476 for %meat



5. CONCLUSIONS

- Genetic improvement of carcass quality of Piétrain boars is possible by genetic selection with BF and %meat because of their high heritability
- BF and %meat are two traits 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
- To have an accurate genetic selection, BF should be preferred to %meat because it is a trait directly measured while %meat is predicted from BF and loin muscle depth measurements
- According to the study of residuals, it seems that the developed genetic evaluation model fits well the data. Therefore, the estimation of breeding values of boars with this model could be accurate

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