Genetic analysis of longitudinal measurements of feed intake in Piétrain sire lines

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Background

- Feed efficiency (FE) is of major importance in pigs production because of large feeding cost
- Selection strategies to improve FE should allow a reduction of feed intake (FI) with growth rate at least constant

Objectives

- To estimate genetic parameters for longitudinal measurements of feed intake in a crossbred population of pigs
- To develop a genetic evaluation for FE of Piétrain boars

Data

- FI recorded every 15 days in test station between 2007 and 2012
- 4,095 records of cumulated FI
- 2,127 crossbred pigs Piétrain x Landrace K+
- 84 Piétrain boars with progeny recorded
- Standardization and pre-adjustment of data at 150 days of progeny-test due to variance heterogeneity

Conclusions

- Heritability of FI is moderate and tends to increase with age
- High FI at the beginning does not necessarily match with high FI at the end
- FI seems to be influenced by different genes during the growth period

Model

Random regression animal model

\[ y = Xb + Za + Zp + Wl + e \]

- \( y \) = observation of FI
- \( b \) = fixed effects (sex and batch)
- \( a \) = random additive genetic effect
- \( p \) = random permanent environment
- \( l \) = random pen effect
- \( e \) = residual

Results

- \( h^2 \) increases between 50 and 150 days of progeny-test, from 0.06 to 0.45
- \( h^2 \) of FI between 50 and 150 days of test = 0.66

- Heritability of cumulated FI with progeny-test length

Days 70 90 110 130 150
50 0.76 0.54 0.25 -0.20 -0.65
70 0.96 0.82 0.49 0.01
90 0.95 0.72 0.28
110 0.90 0.57
130 0.87

- High genetic correlation between adjacent ages
- Decreasing genetic correlation with increasing age intervals
- Negative genetic correlations between the beginning and the end of the testing period border effect?