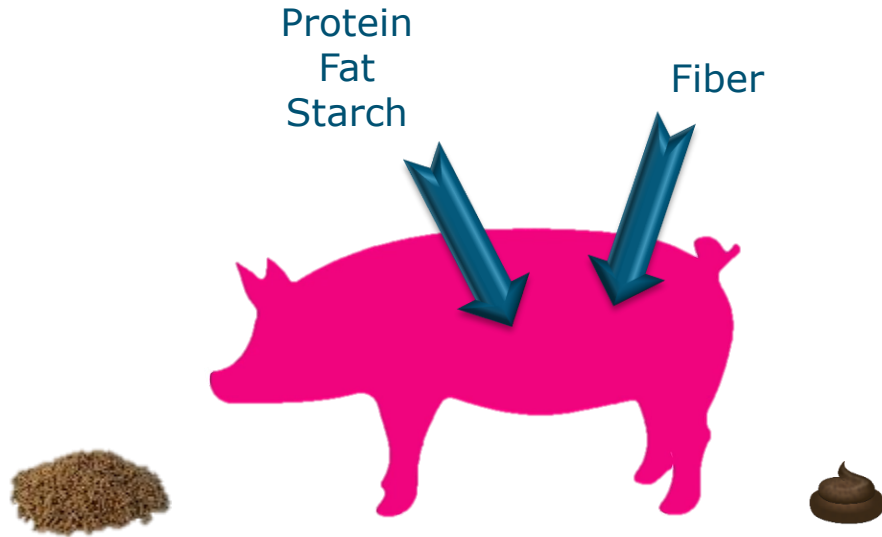


Looking at nutrition related traits in pigs through genetic-tinted glasses

L.M.G. Verschuren, M.P.L. Calus, D. Schokker, R. Bergsma, F. Molist and A.J.M. Jansman



Nutrient digestibility



Faecal nutrient
digestibility
=
% of nutrients
disappeared in the GIT

Higher
=
More nutrients for
maintenance and
growth

Aim

- Investigate the **variation in grower-finisher performance** explained by the **variation in faecal nutrient digestibility**, independent of feed intake



Materials and Methods

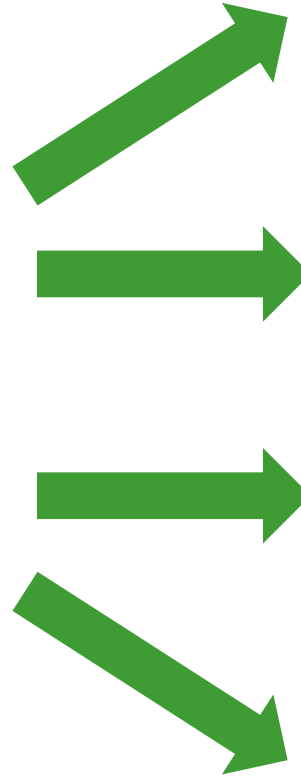
CS

~ 85 % Corn/Soybean meal
~ 10% By products



WB

~ 50 % Wheat/Barley
~ 45 % By products



40



40

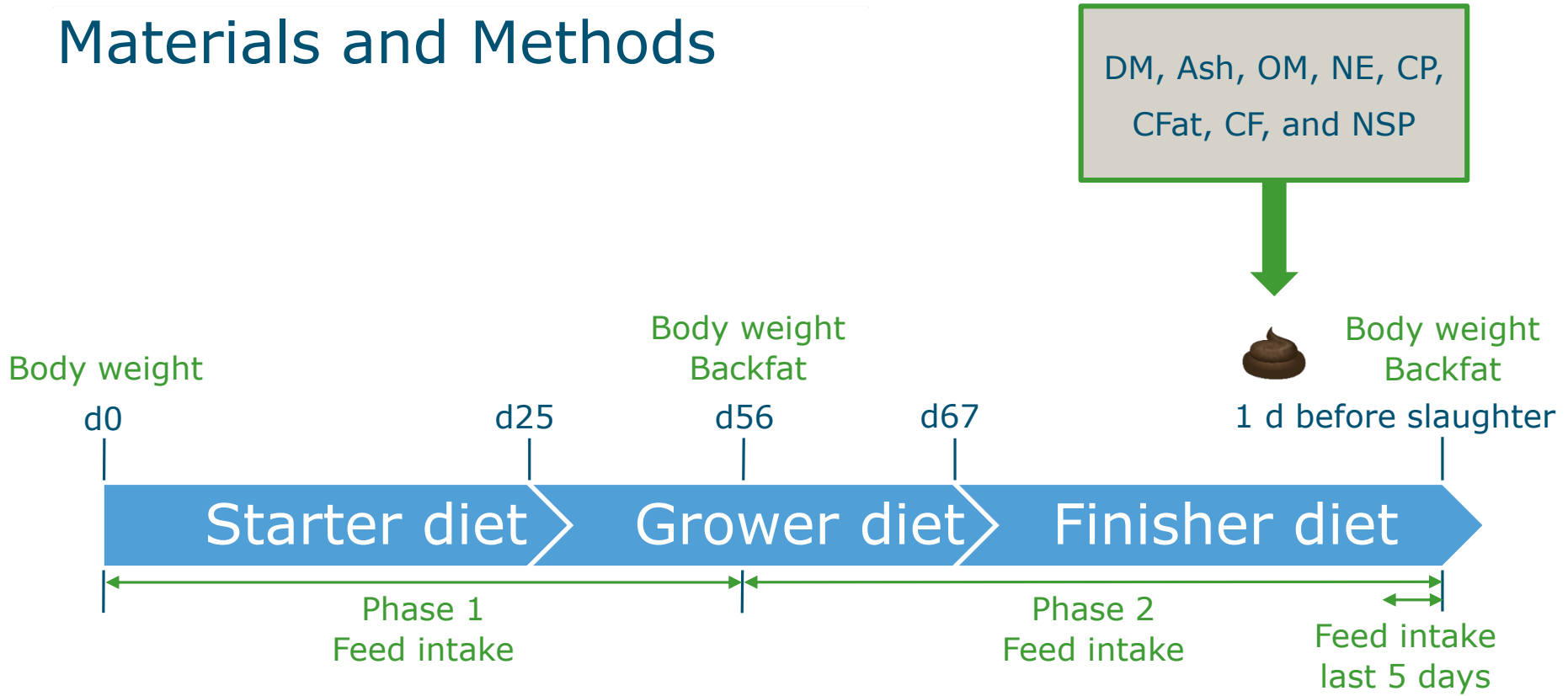


40



40

Materials and Methods



Materials and Methods

Model 1: $Y_{ijk} = \mu + sex_i + diet_j + sex_i \cdot diet_j + b_a FI5_{(jk)} + e_{ijk}$

- y = faecal nutrient digestibility
- μ = mean of population
- sex = effect of sex (i = gilt or boar)
- $diet$ = effect of diet (j = CS or WB)
- b_a = regression coefficient for feed intake level
- $FI5$ = feed intake level 5 days before faecal sampling
- e = residuals $\sim N(0, \mathbf{I}\sigma^2_e)$

e_{ijk}

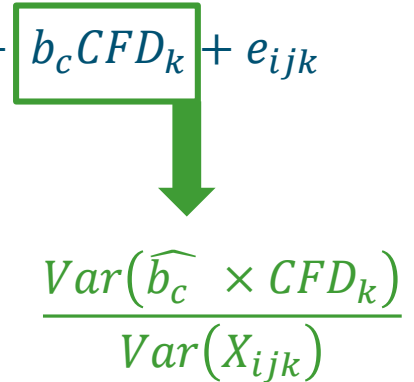


CFD

Materials and Methods

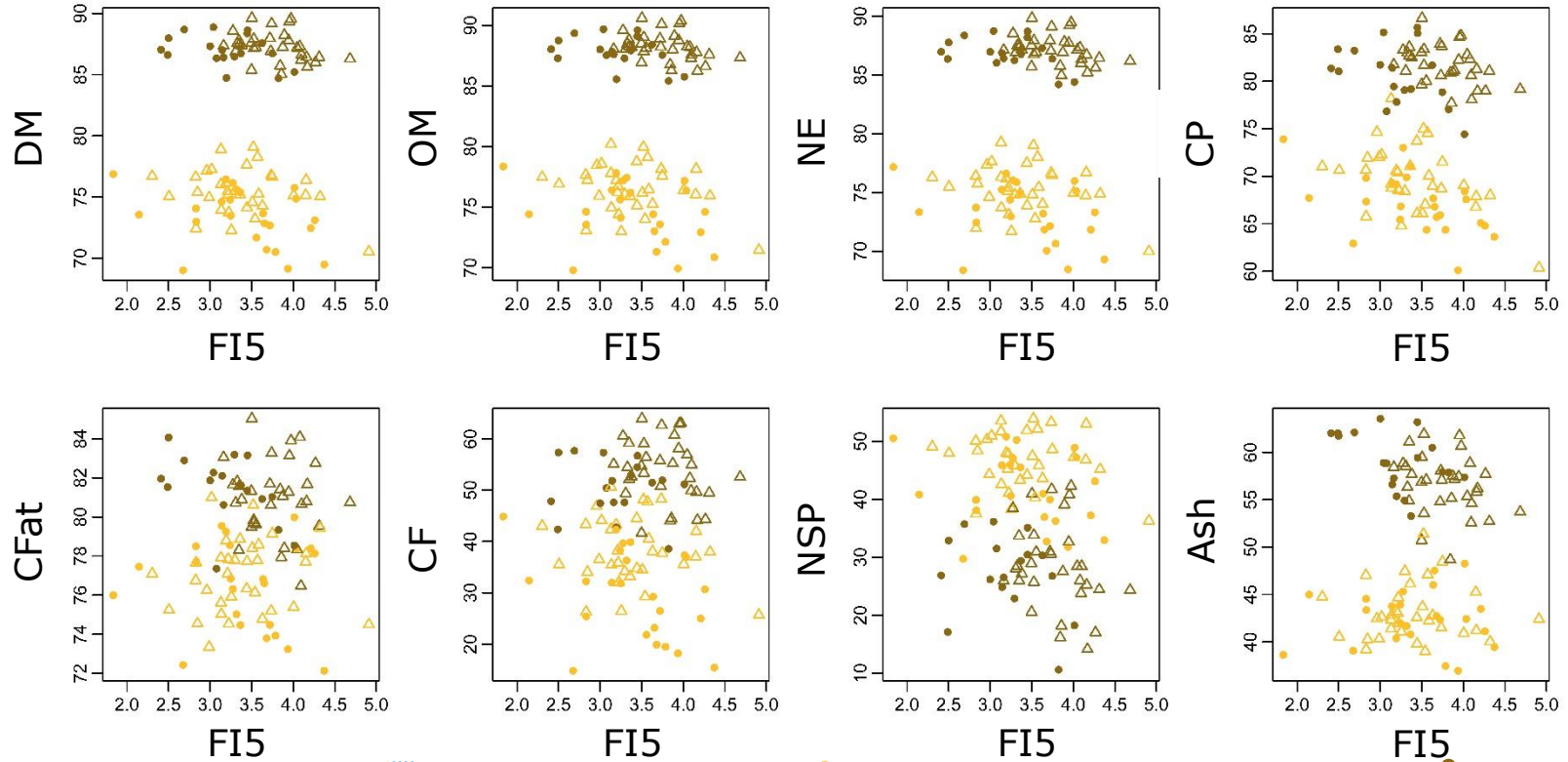
$$\text{Model 2: } X_{ijk} = \mu + \text{sex}_i + \text{diet}_j + \text{sex}_i \cdot \text{diet}_j + b_b BW_k + b_c CFD_k + e_{ijk}$$

- x = performance
- μ = mean of population
- sex = effect of sex (i = gilt or boar)
- diet = effect of diet (j = CS or WB)
- b_b = regression coefficient for body weight
- b_c = corrected faecal nutrient digestibility
- e = residuals $\sim N(0, \mathbf{I}\sigma^2_e)$


$$\frac{\text{Var}(\widehat{b}_c \times CFD_k)}{\text{Var}(X_{ijk})}$$

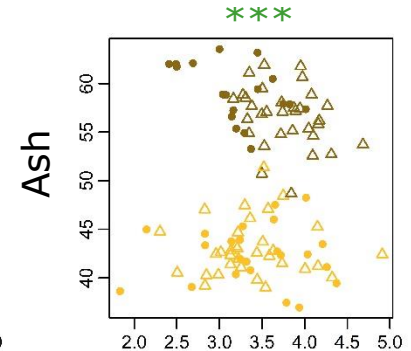
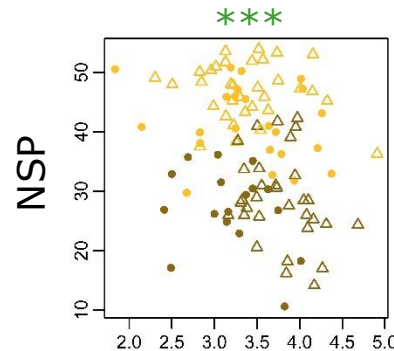
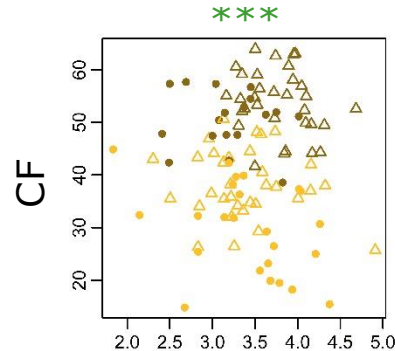
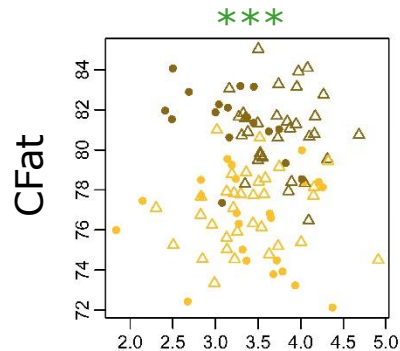
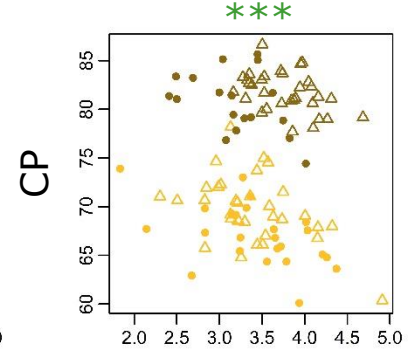
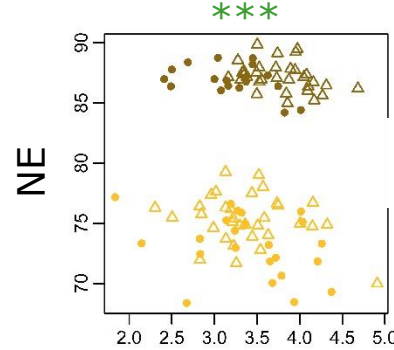
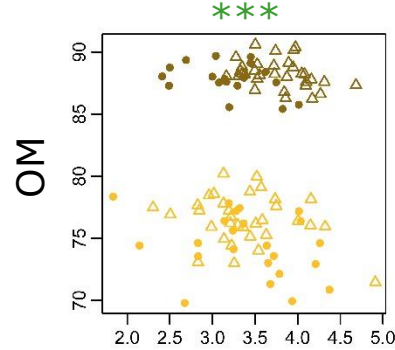
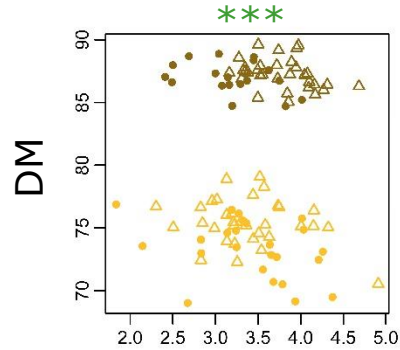
Results

Faecal nutrient digestibility



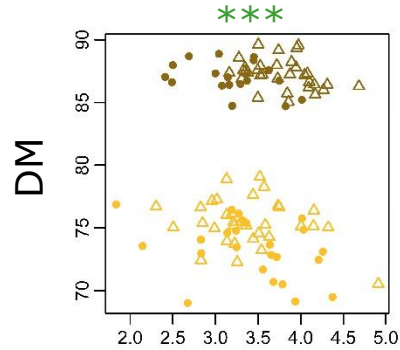
Results

Effect of diet

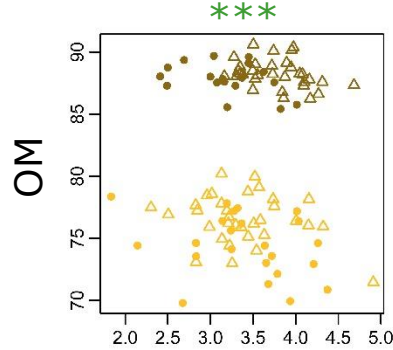


Results

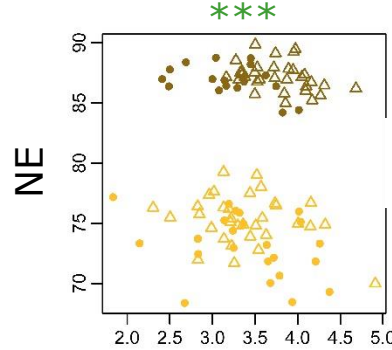
Effect of sex



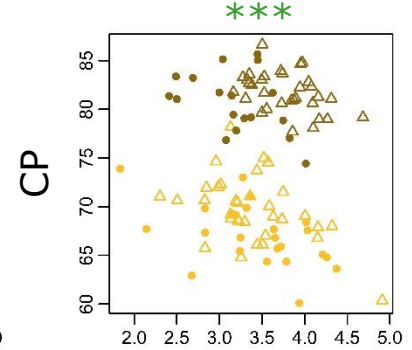
FI5



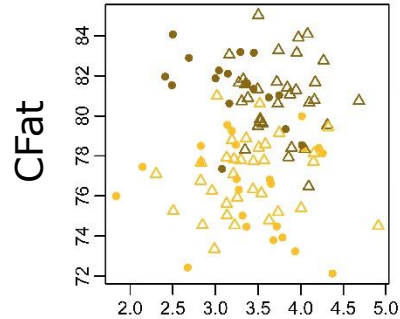
FI5



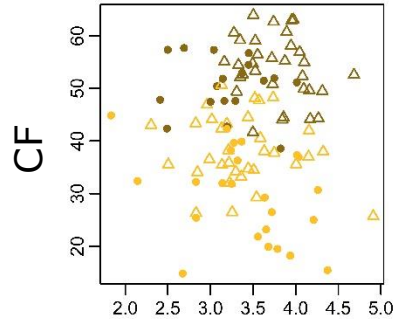
FI5



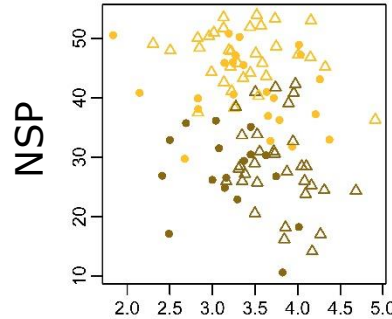
FI5



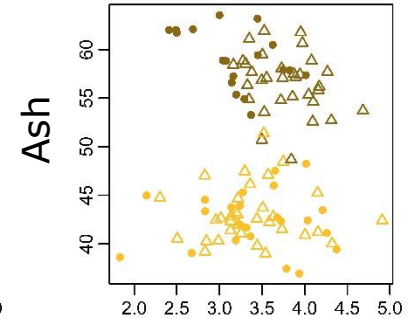
FI5



FI5



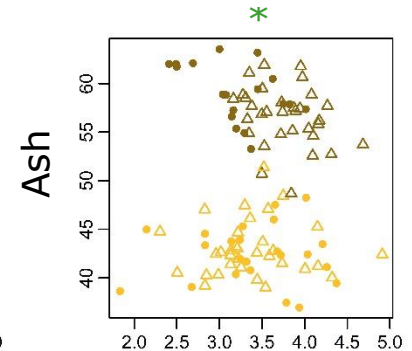
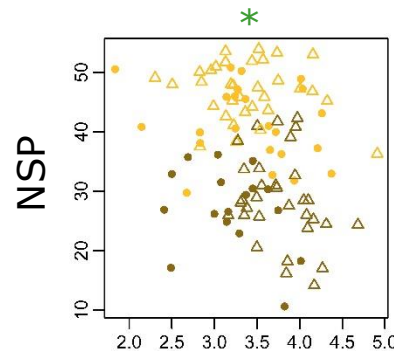
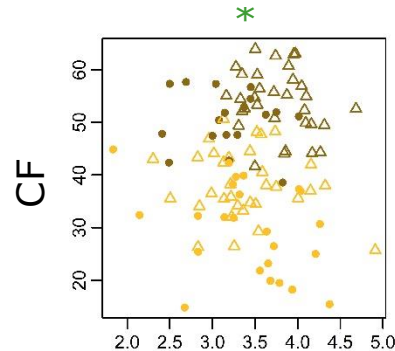
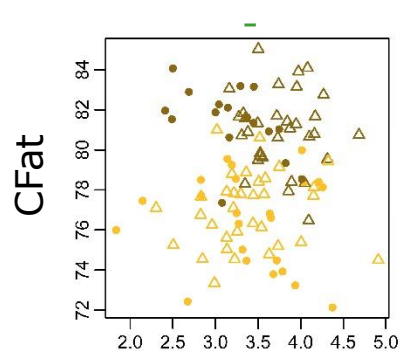
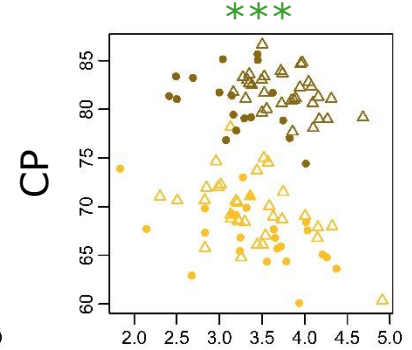
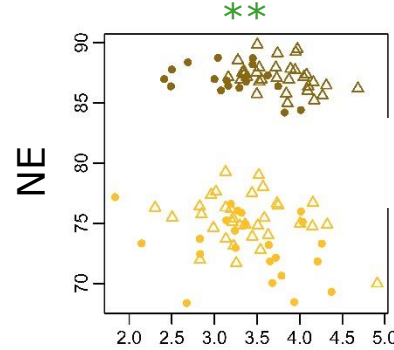
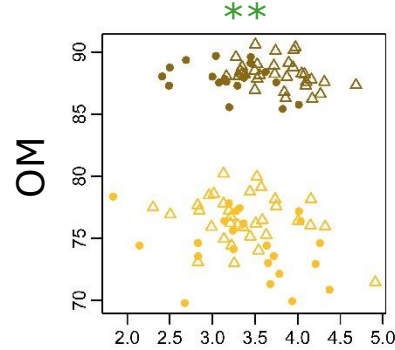
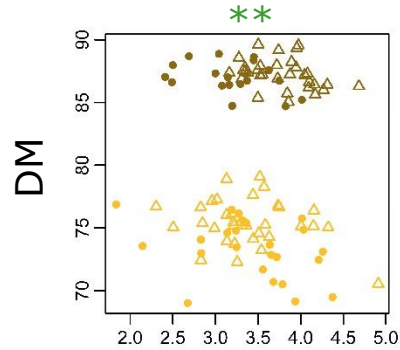
FI5



FI5

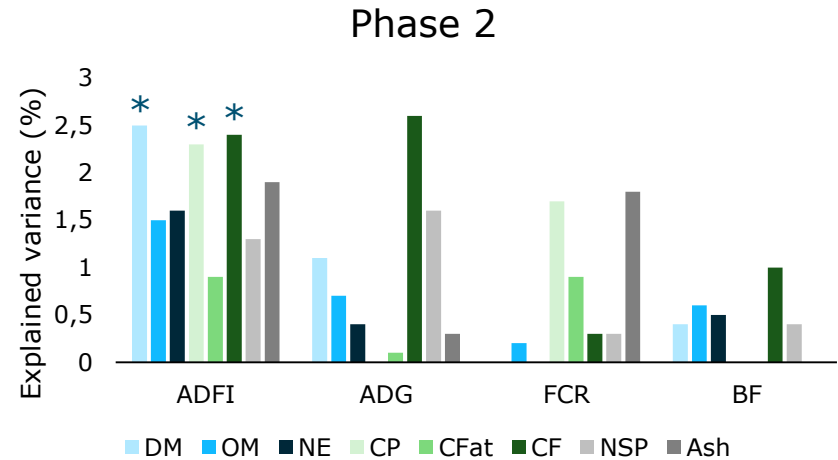
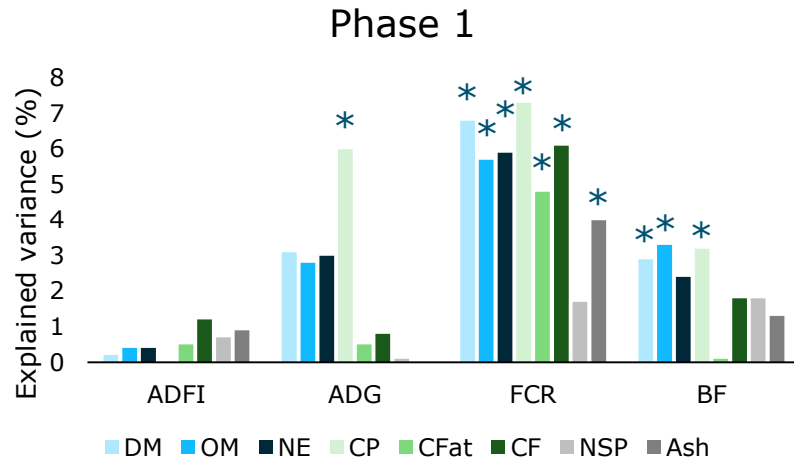
Results

Effect of feed intake



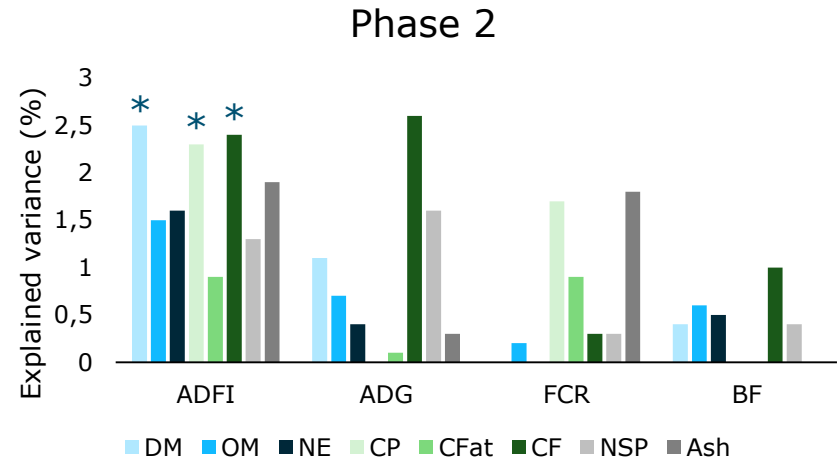
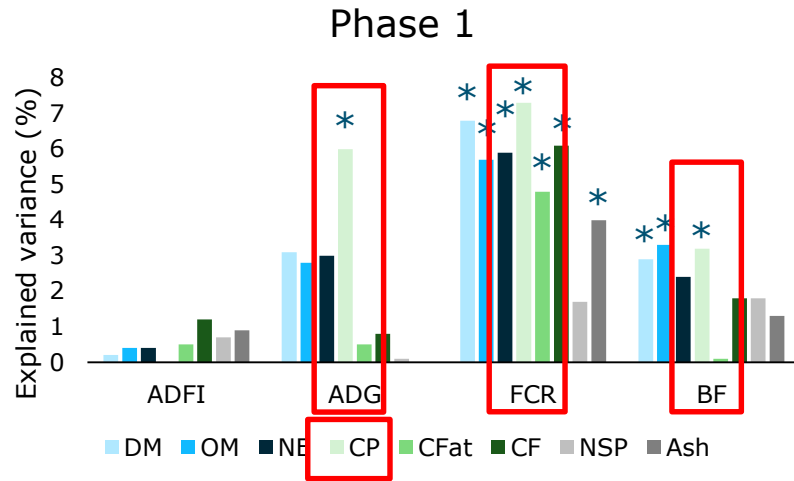
Results

Explained variance



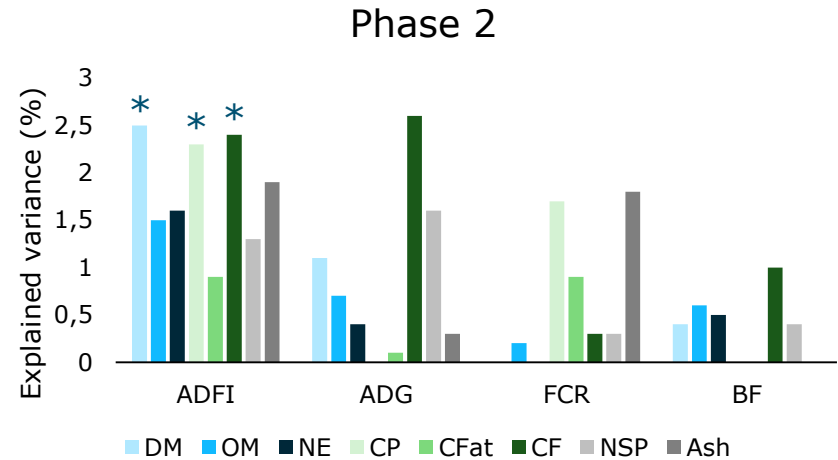
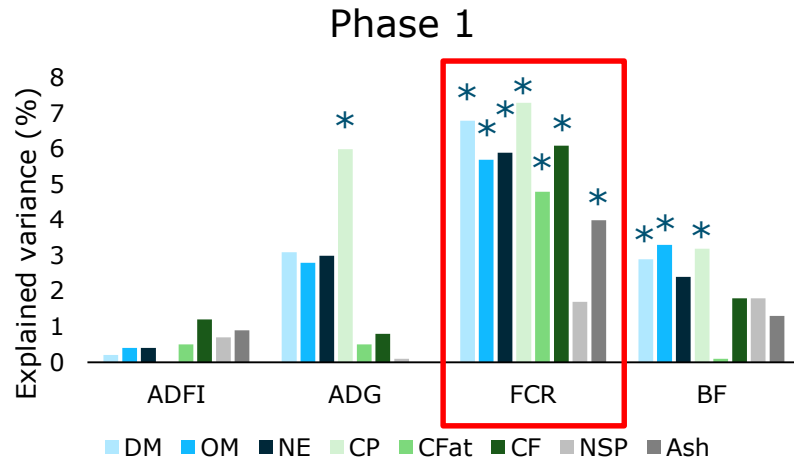
Results

Explained variance



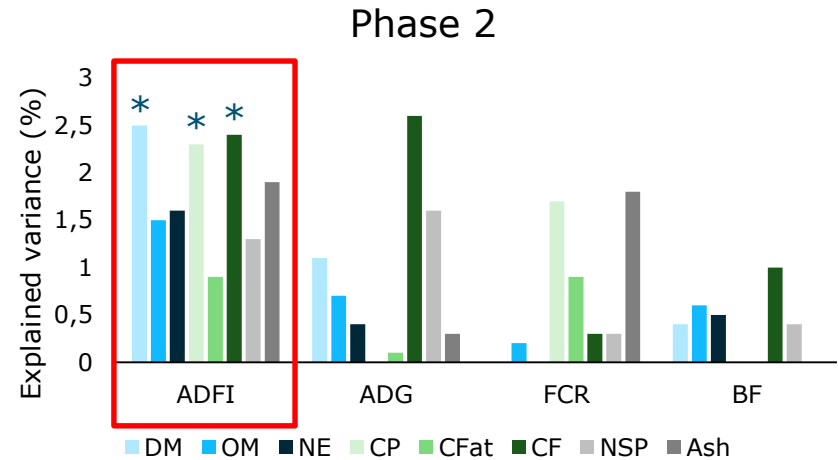
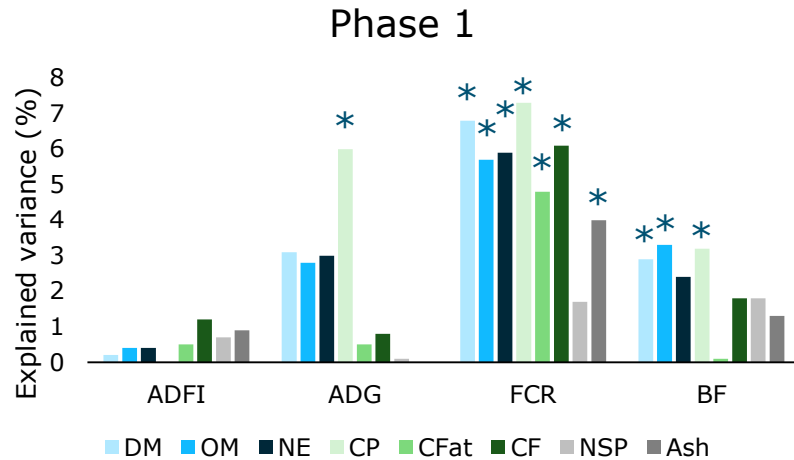
Results

Explained variance



Results

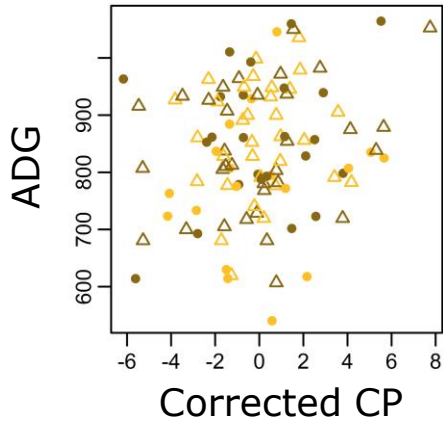
Explained variance



Results

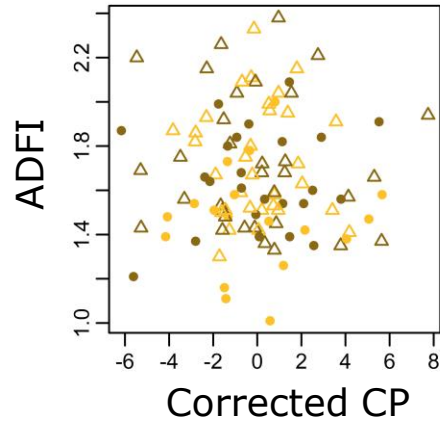
Variance and relationship - Phase 1

6.0 %



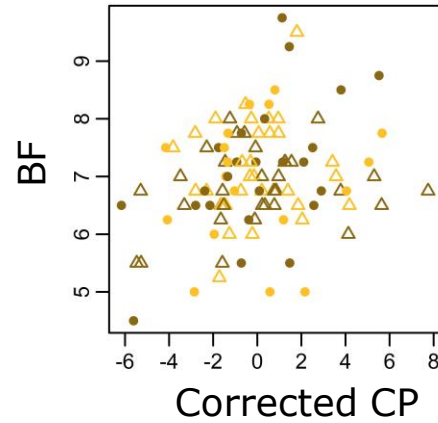
+ 10.7 g/d

-



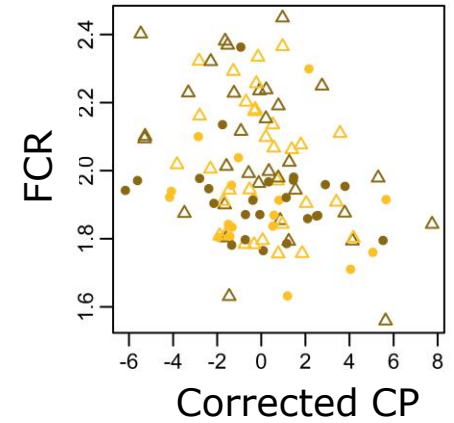
-

3.2 %



+ 0.06 mm

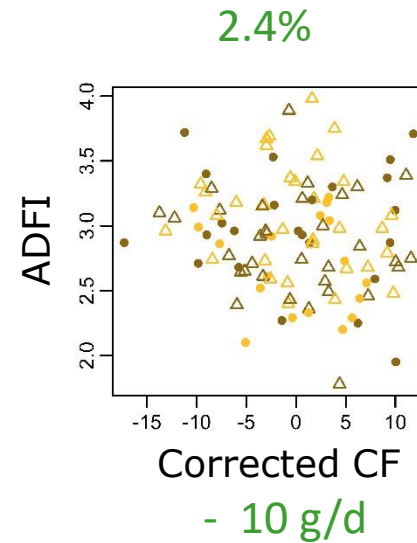
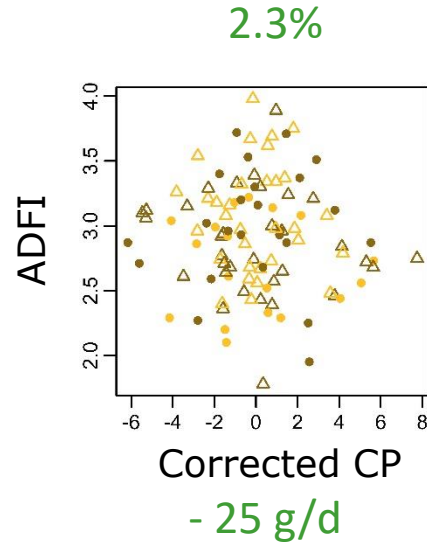
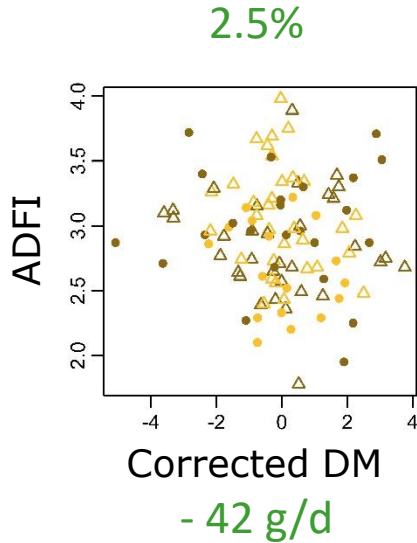
7.3 %



- 0.02 g/g

Results

Variance and relationship - Phase 2



Conclusion

Variation in faecal nutrient digestibility:

- Substantial differences between pigs
- Higher in a diet based on wheat/barley/by-products than corn/soybean meal
- Associated with considerable variation in ADG, FCR and BF

Acknowledgement



Animal Breeding
& Genomics



Animal nutrition



Take home message

- Biological understanding of feed efficiency can be used for breeding
- Difference between sexes in faecal nutrient digestibility can be used for precision feeding

