

# Changes in genetic parameters for traits under genomic selection in poultry

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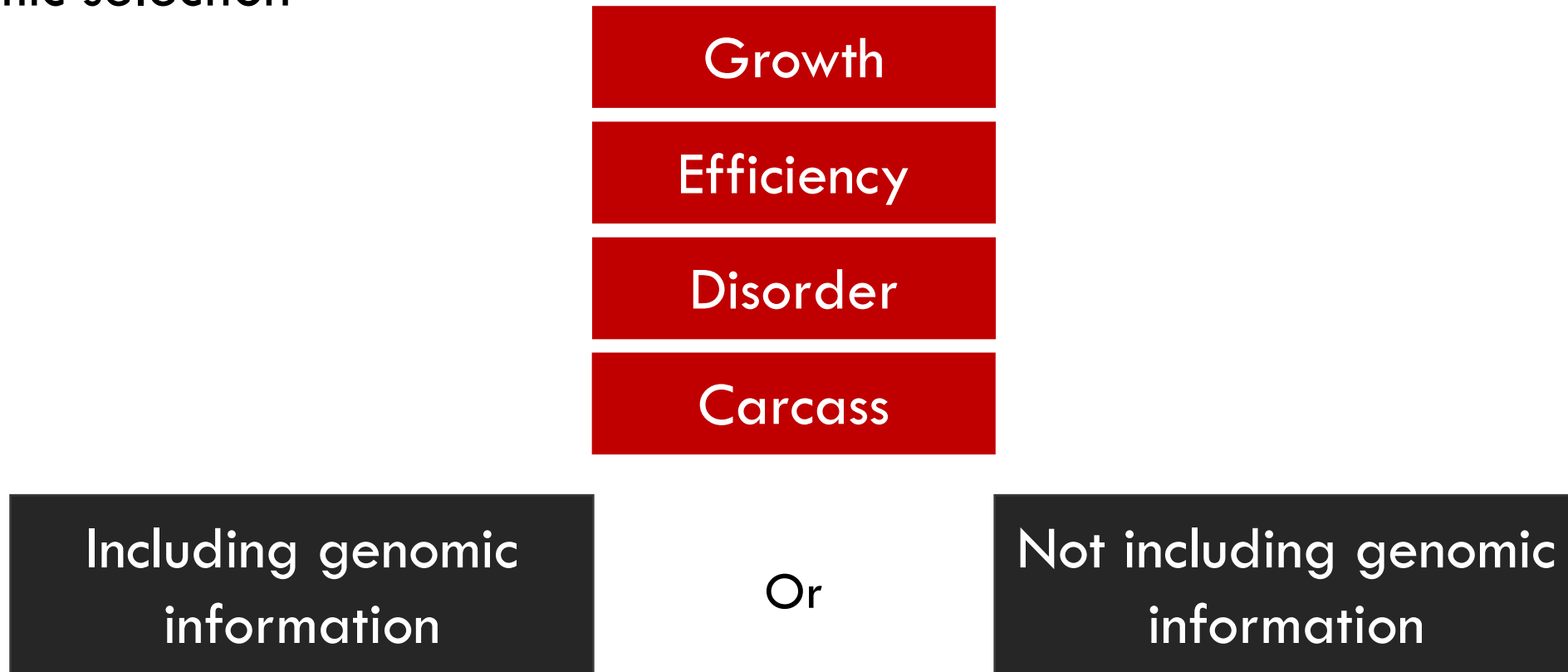
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# Introduction

- Accurate genetic parameters are crucial for unbiased estimation of breeding values and selection response
- Genetic parameters are expected to change under selection
  - Intensity of selection
  - Initial allele frequency
- Additive genetic variance may be reduced
  - Bulmer effect
  - Increased co-ancestry

# Objective

Estimate changes in heritability over time in a broiler population under genomic selection



# Data

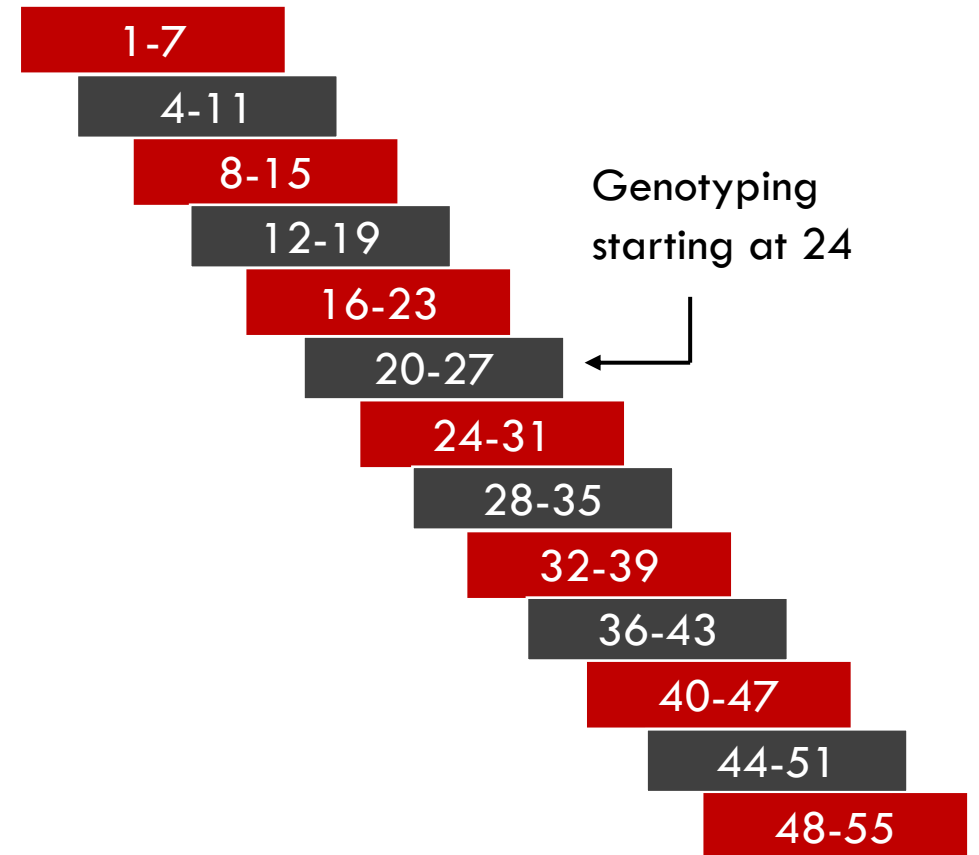
Cobb-Vantress, Inc. (Siloam Springs, AR, USA)

**Pedigree:** 1,250,404 animals

## Phenotypes:

Feed efficiency (FE):	200,093 records
Carcass yield (CY):	42,895 records
Growth (GT):	203,060 records
Leg disorder (DIS):	63,349 records

**Genotypes:** 154,318 animals (60k SNP panel)



# Model and analysis

- Single trait models

- Linear models



FE, GT, CY



AIREMLF90

- Threshold model



DIS



THRGIBBS1F90

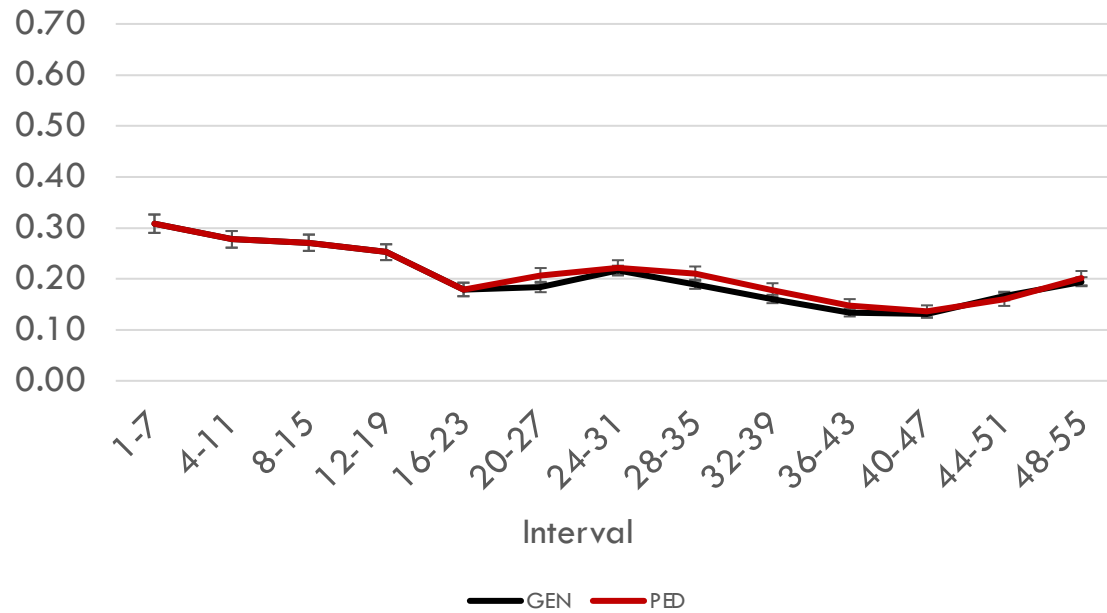
- Analysis was performed for all traits

- Including genomic information (GEN)

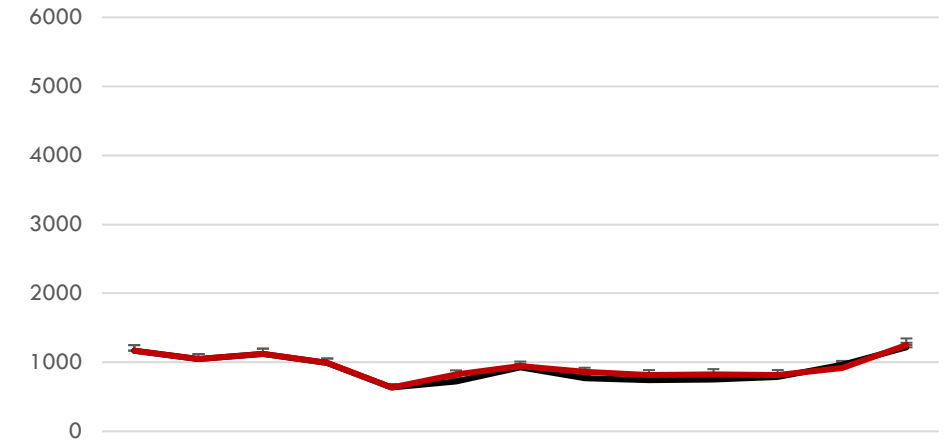
- Not including genomic information (PED)

# Feed efficiency trait (FE)

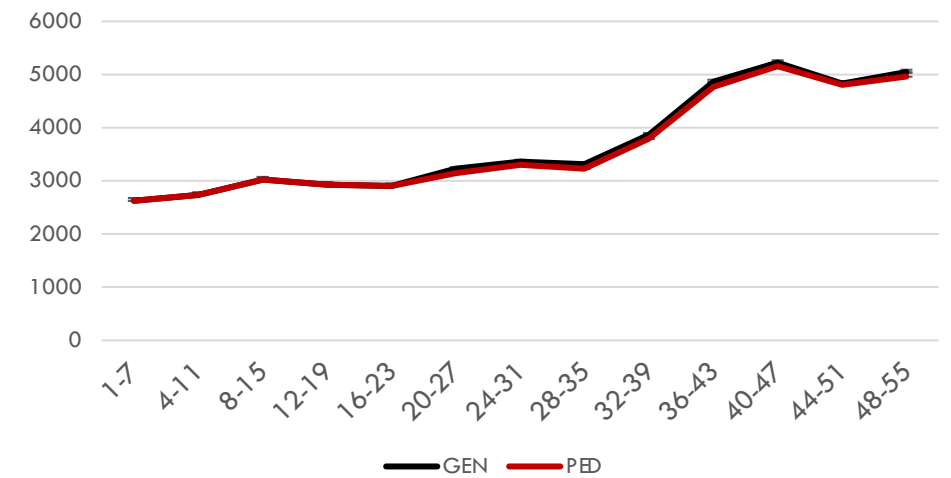
## Heritability



## Additive Variance

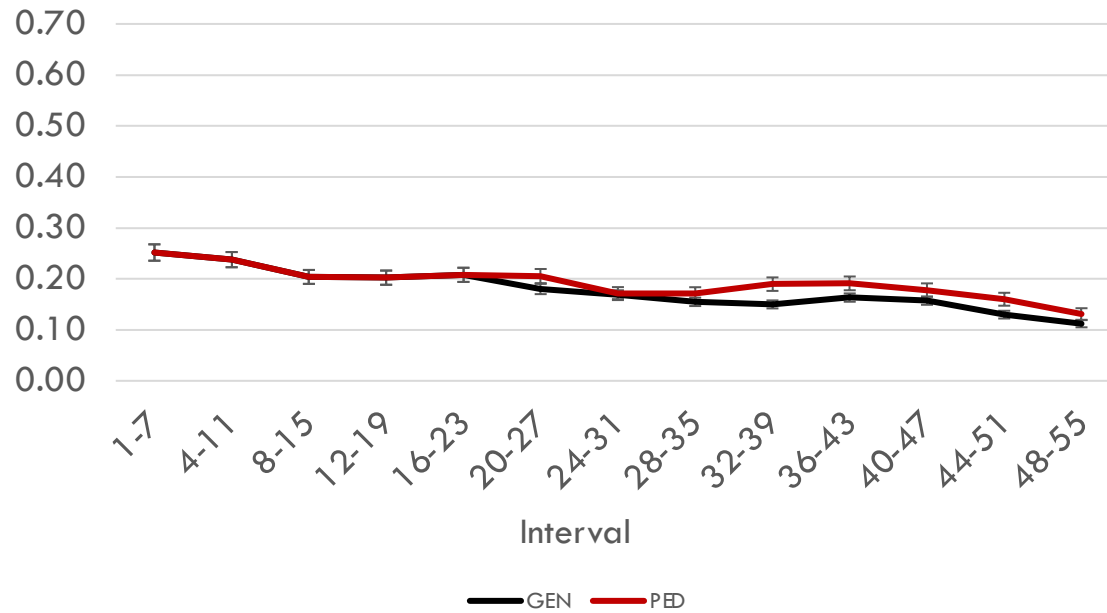


## Residual Variance

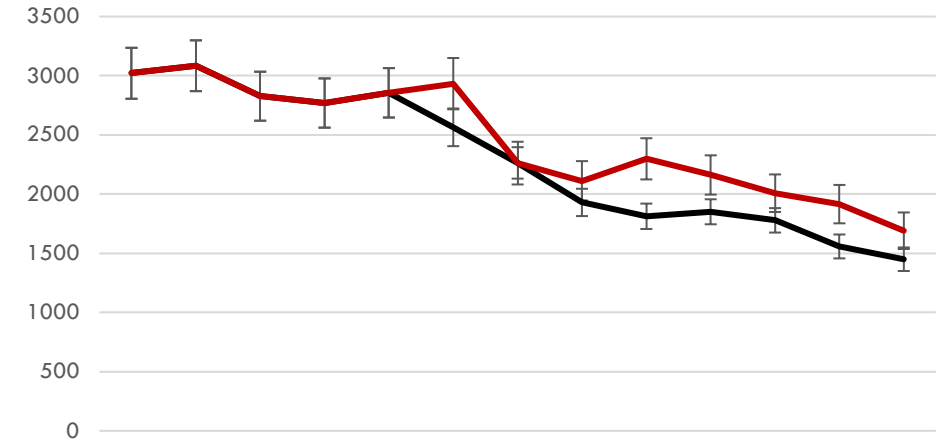


# Growth trait (GT)

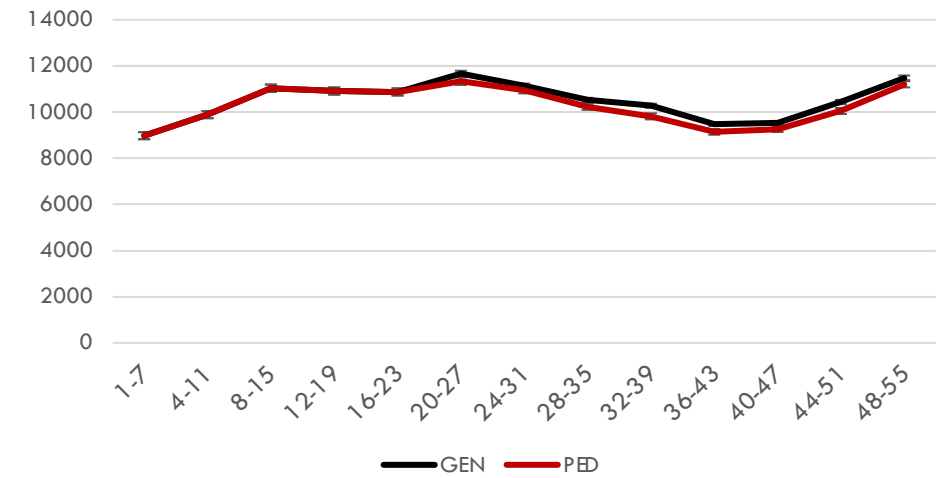
## Heritability



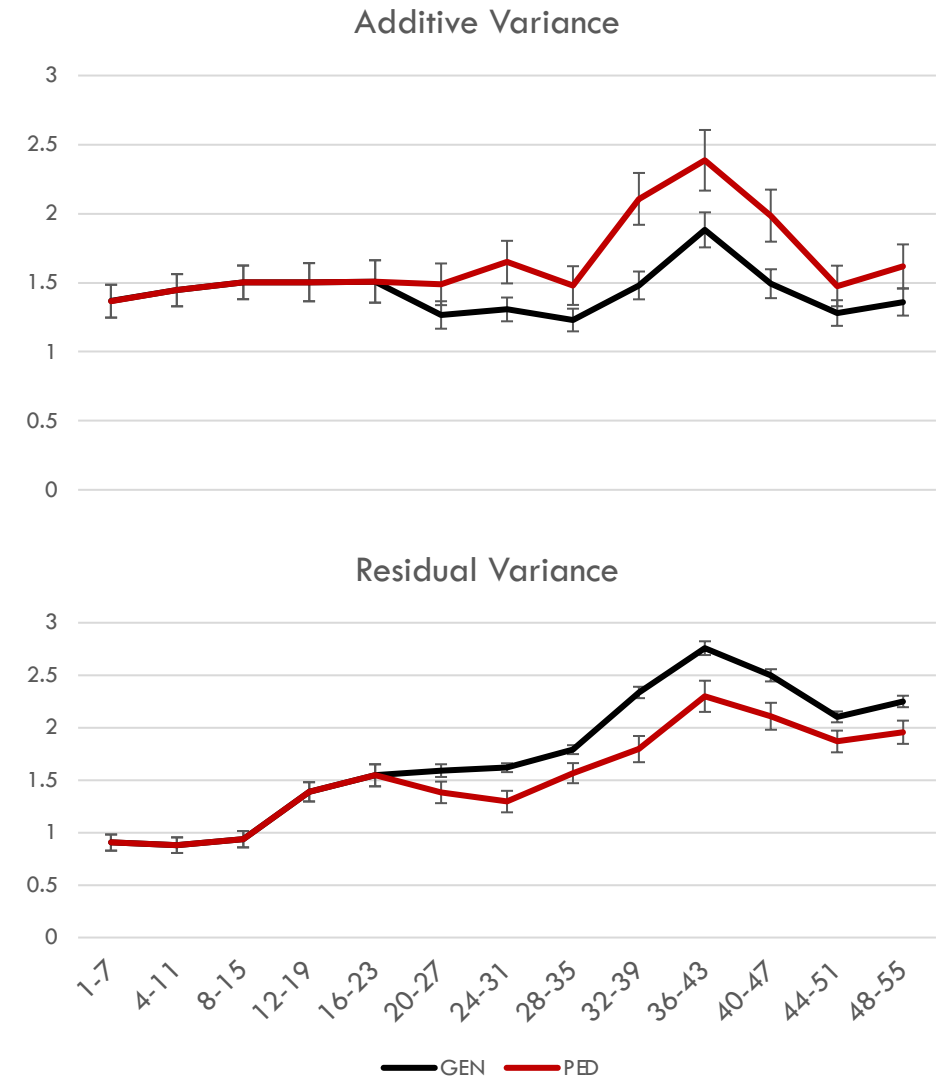
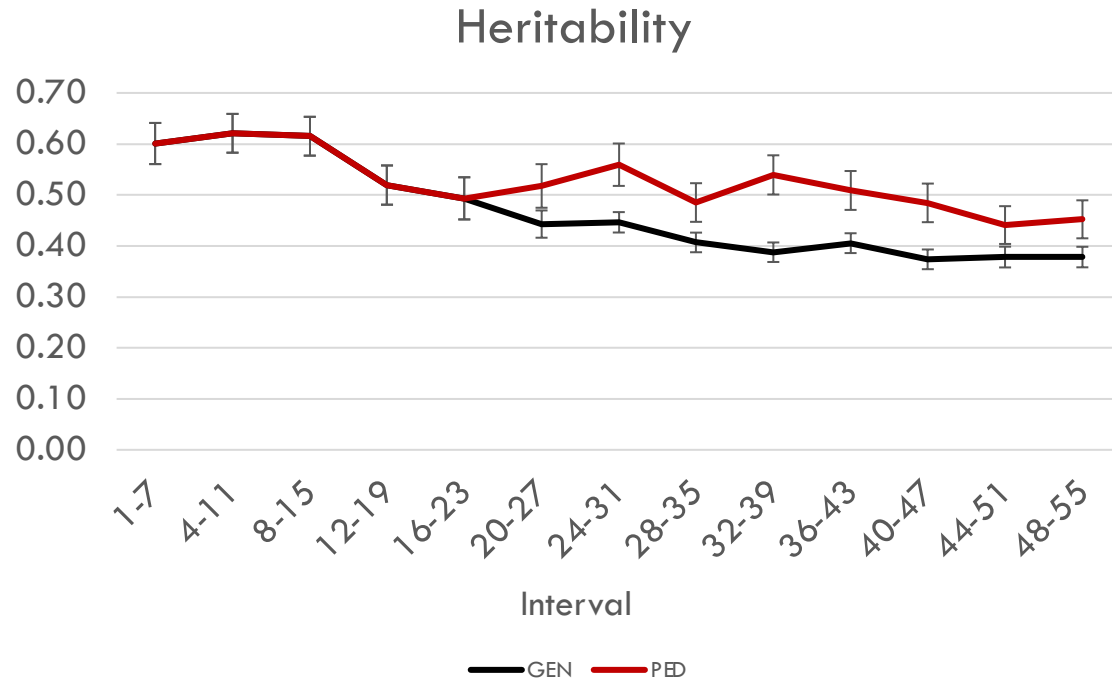
## Additive Variance



## Residual Variance



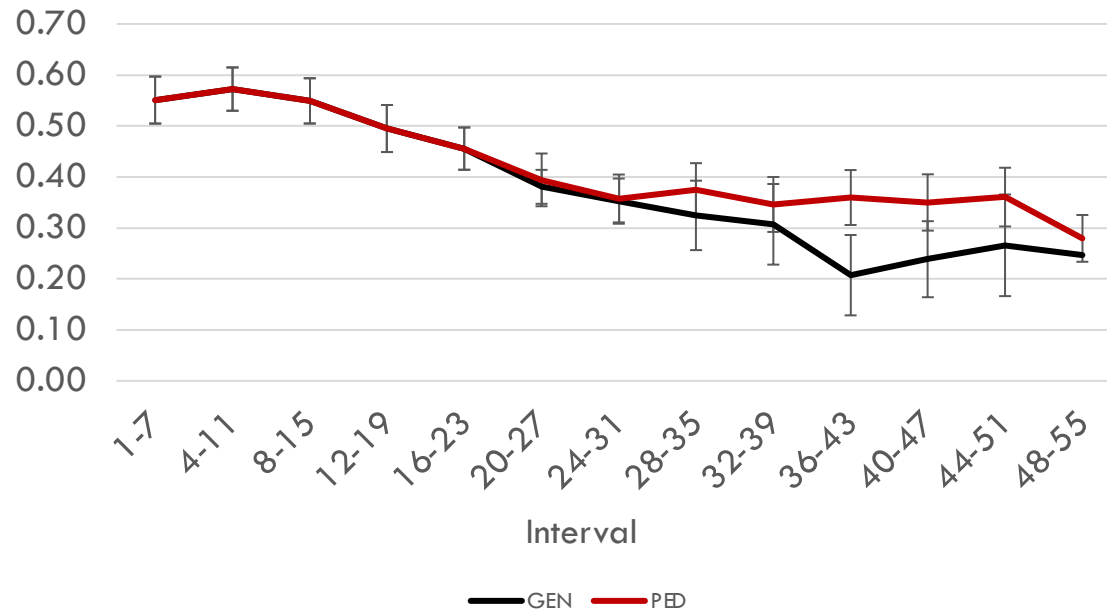
# Carcass yield trait (CY)



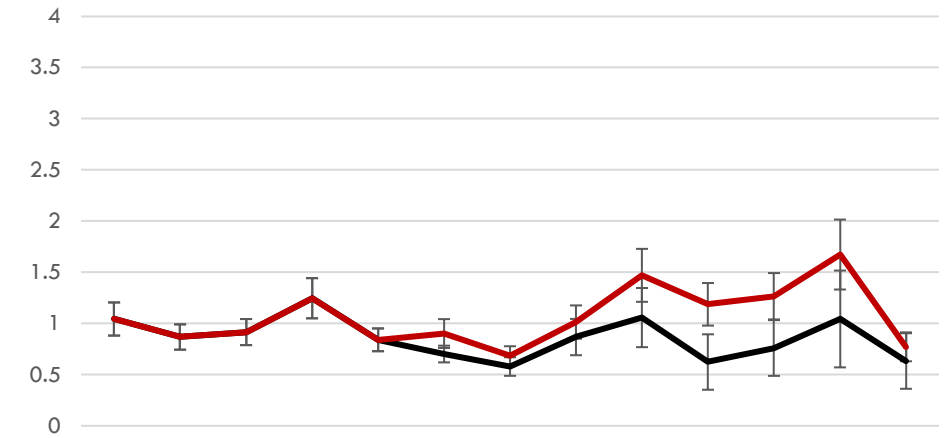


# Disorder trait (DIS)

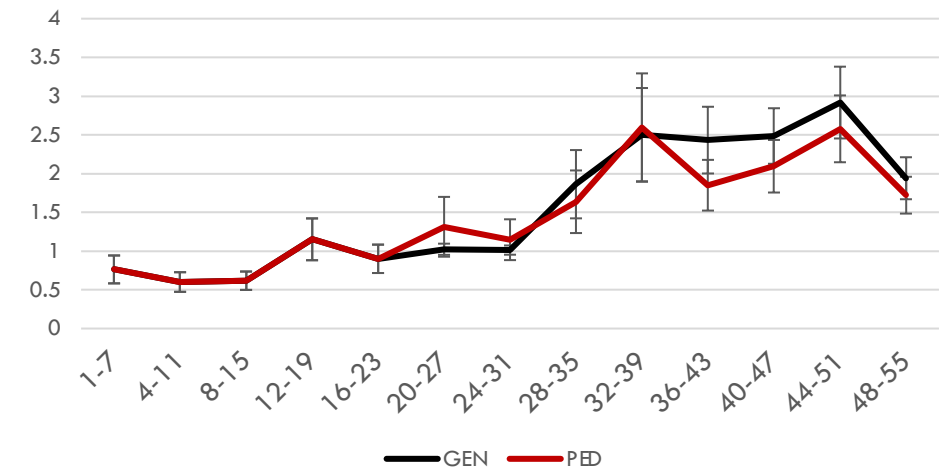
## Heritability



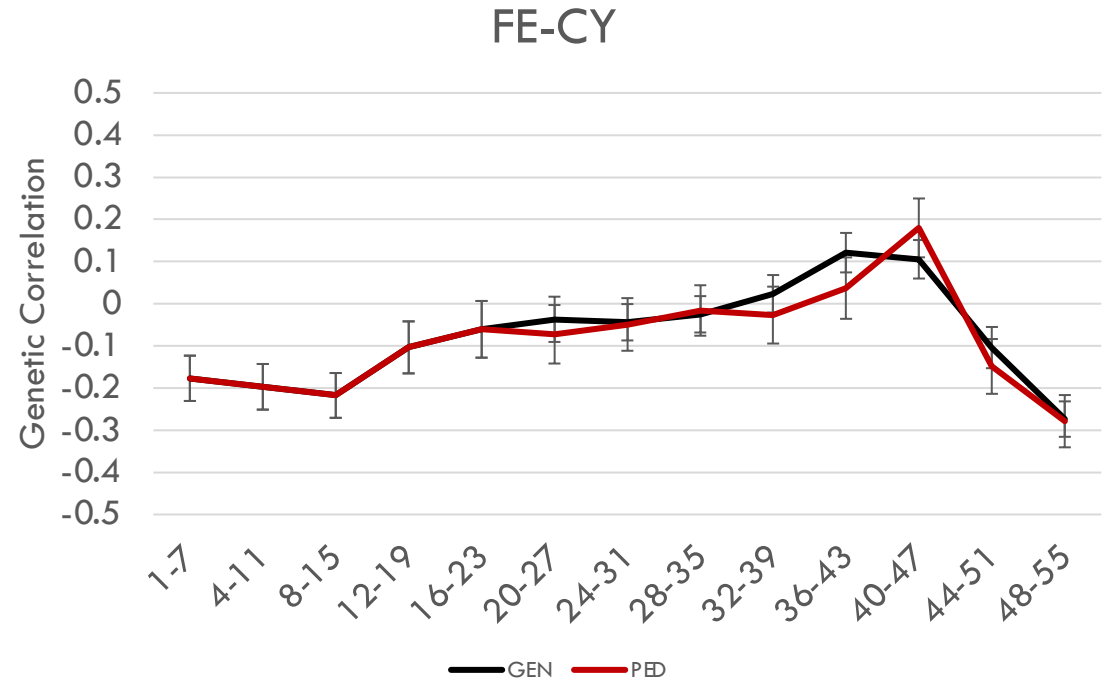
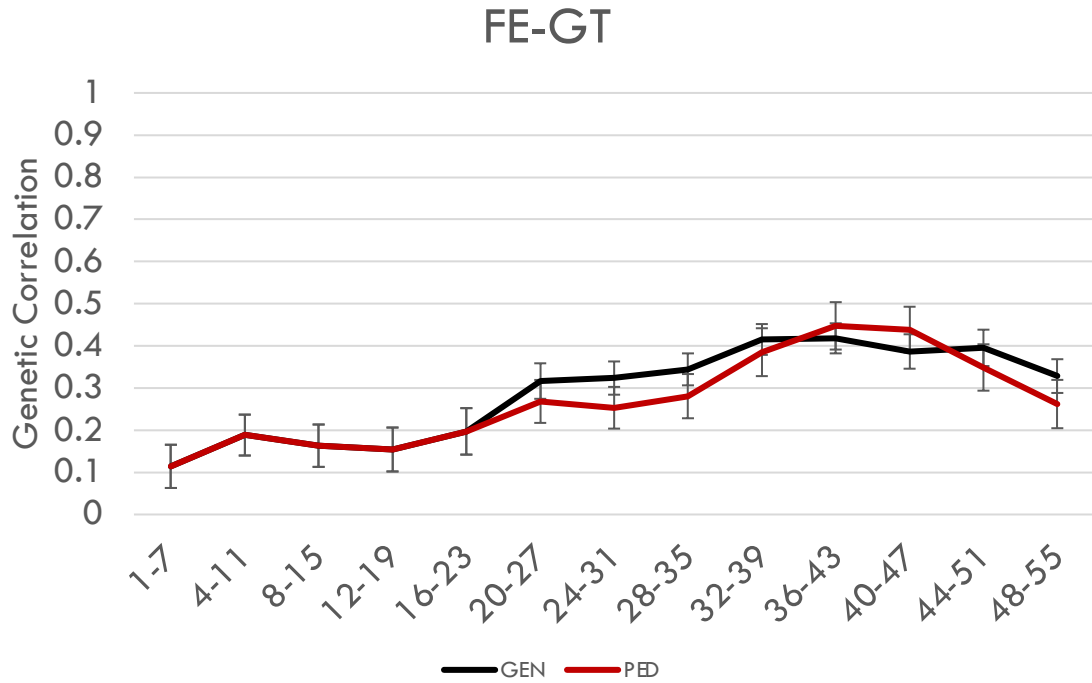
## Additive Variance



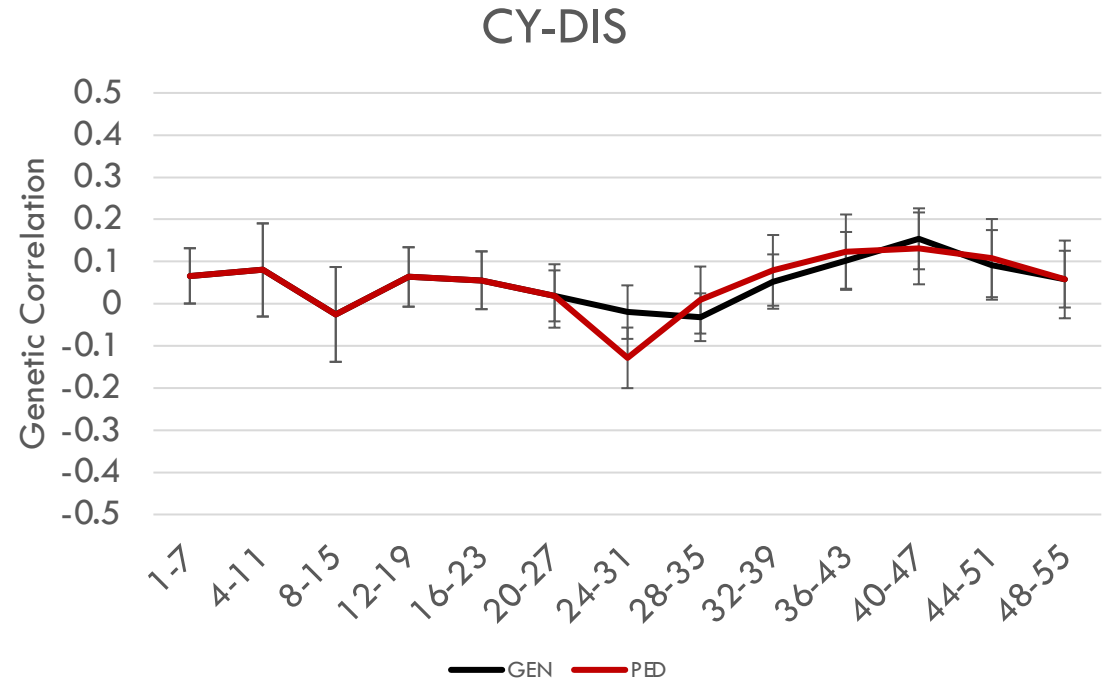
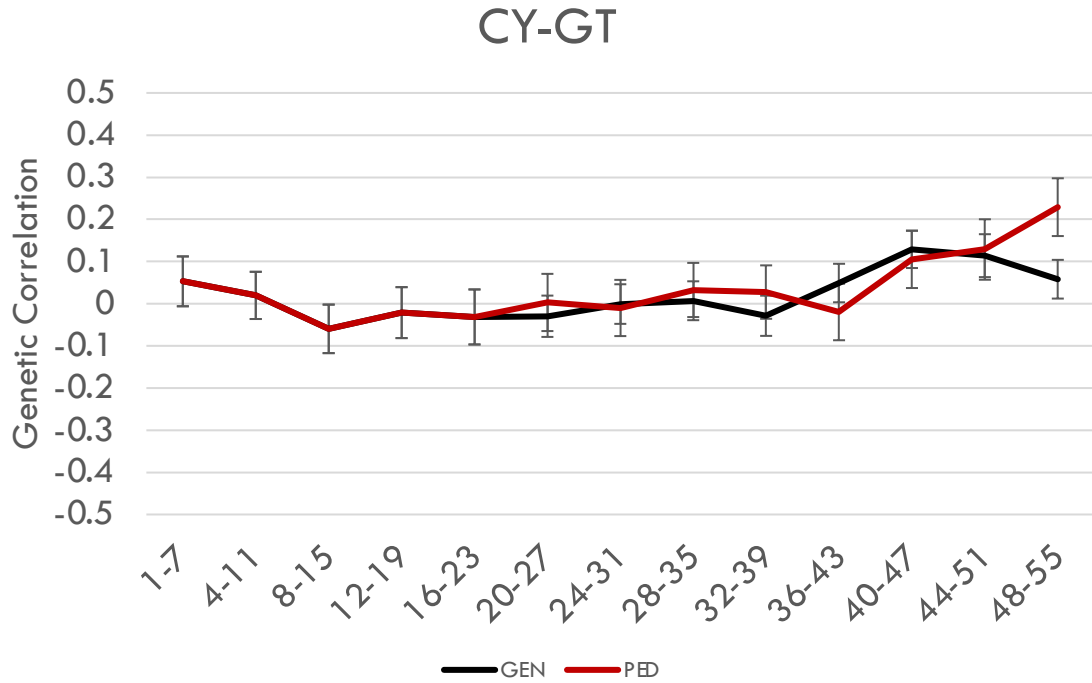
## Residual Variance



# Genetic correlations



# Genetic correlations



# Conclusions

- Similar changes in heritabilities over time for FE
- Heritability estimates by PED for CY, GT, and DIS were higher than those from GEN
- Estimates by GEN and PED were similar for traits under less intensive selection
- Estimates may be biased if genomic information is ignored

# Acknowledgements

Co-authors:



Jorge Hidalgo



Vivian Breen



Rachel Hawken



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Daniela Lourenco



**Thank you**

**Any questions?**