



# Re-examination of epistasis in Virginia line chicken

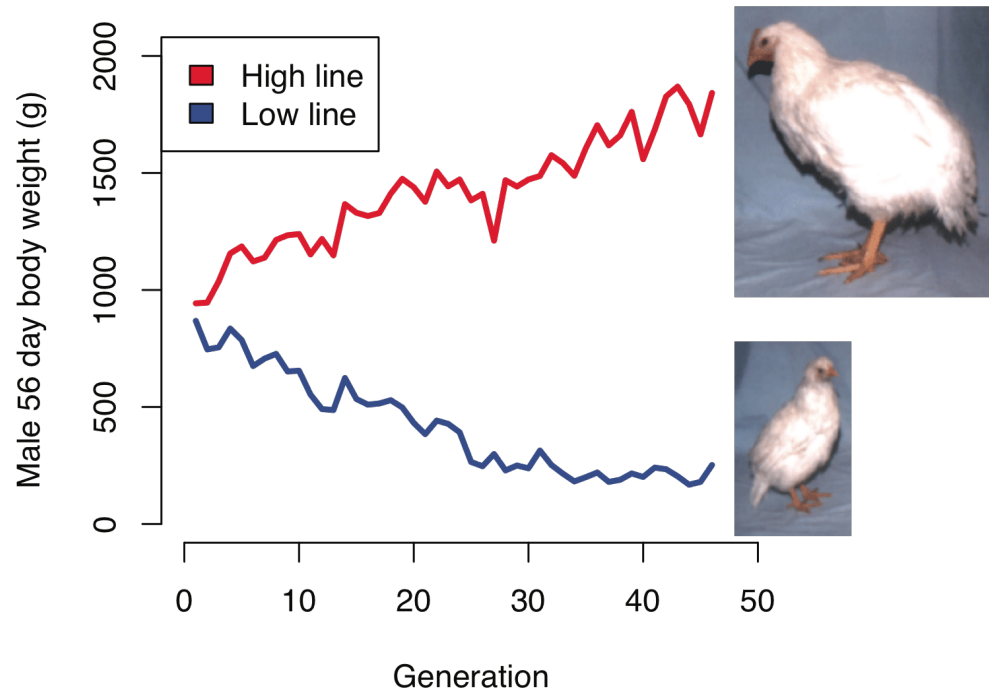
Mats Pettersson



## The “Virginia” chicken lines

- Two divergently selected chicken lines
  - High/low body weight at 8 weeks
  - One generation per year
    - Maintained since the 50:s

# Body weight development

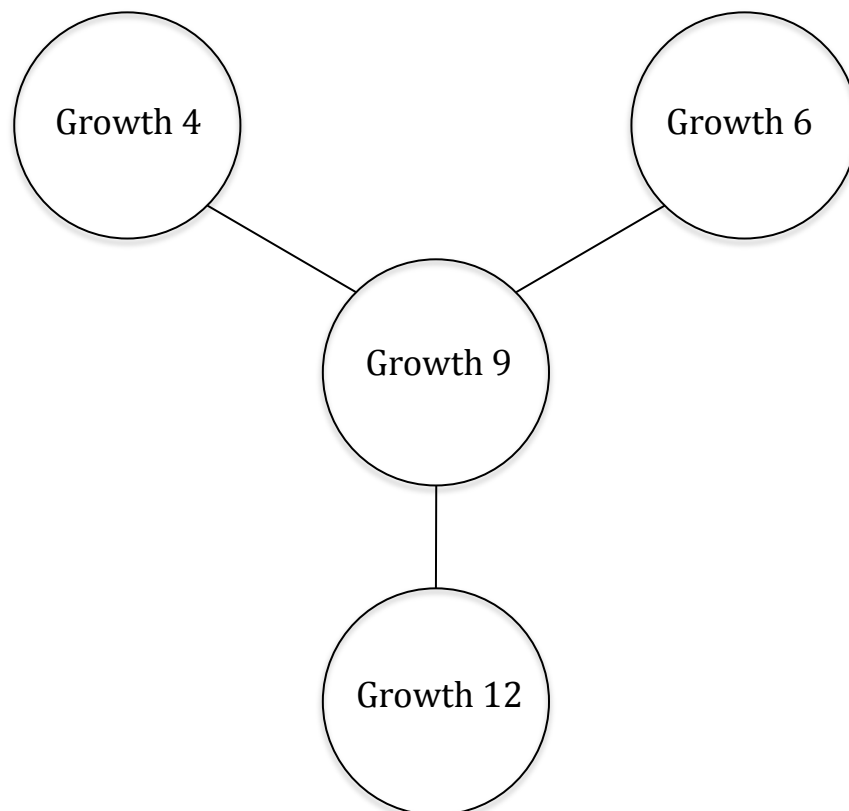


## Previous results

- 13 Single QTL detected (Growth 1-13)
  - $F_2$  cross
- A four-locus network explains 40% of genetic variance
  - Carlborg *et al* 2006



Computational  
Genetics



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## Present study

- Advanced Intercross Line (AIL)
  - $F_8$
- Denser marker map
  - Roughly twice the number of markers
- The aim is to validate and determine the persistence of epistatic interactions in the system



# Model selection test of epistasis

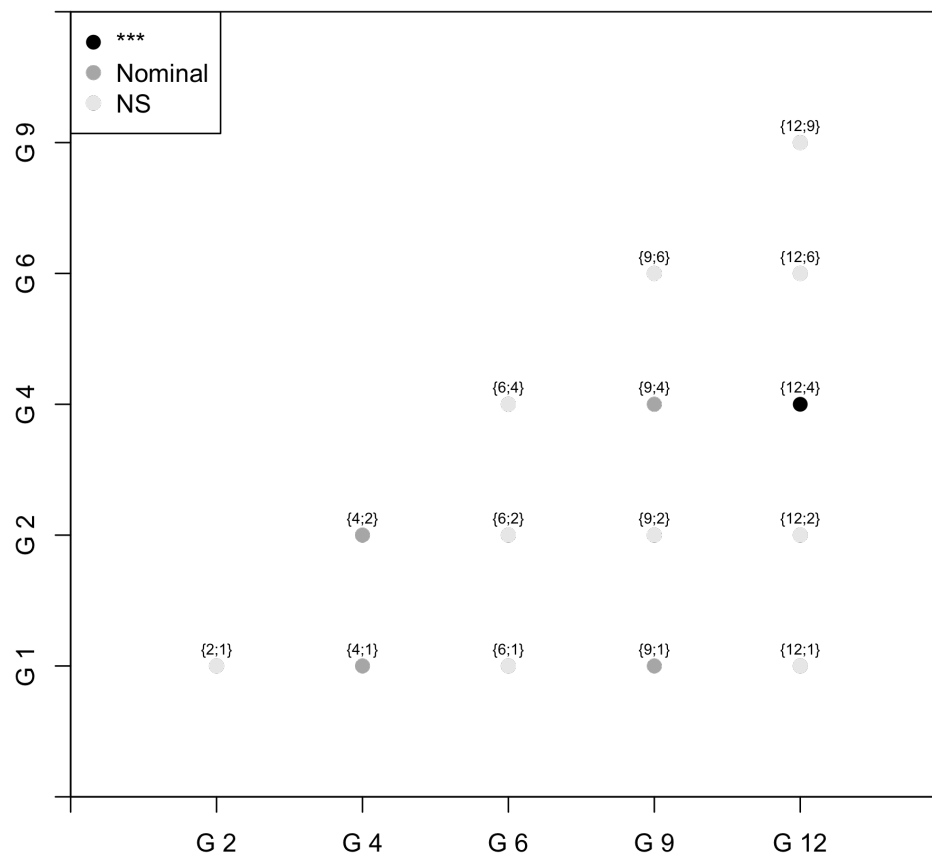
- Linear model fit
- Only main effect vs main effect and epistasis





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### Two way epistasis

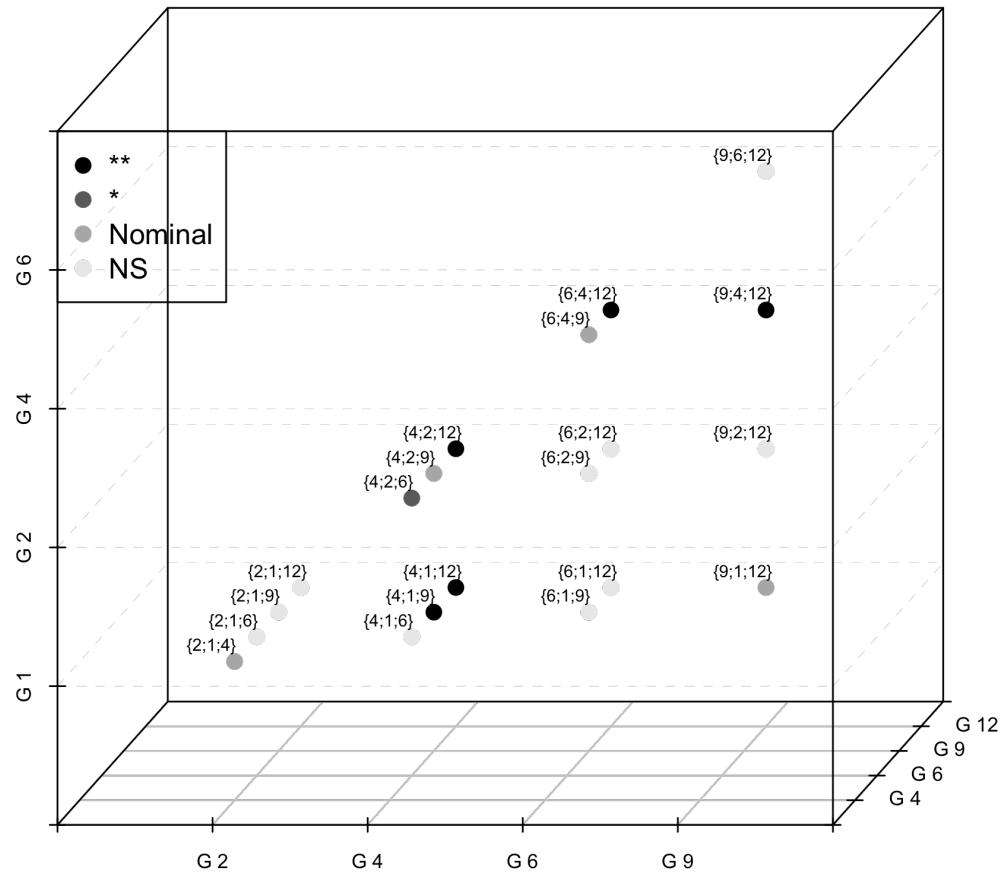






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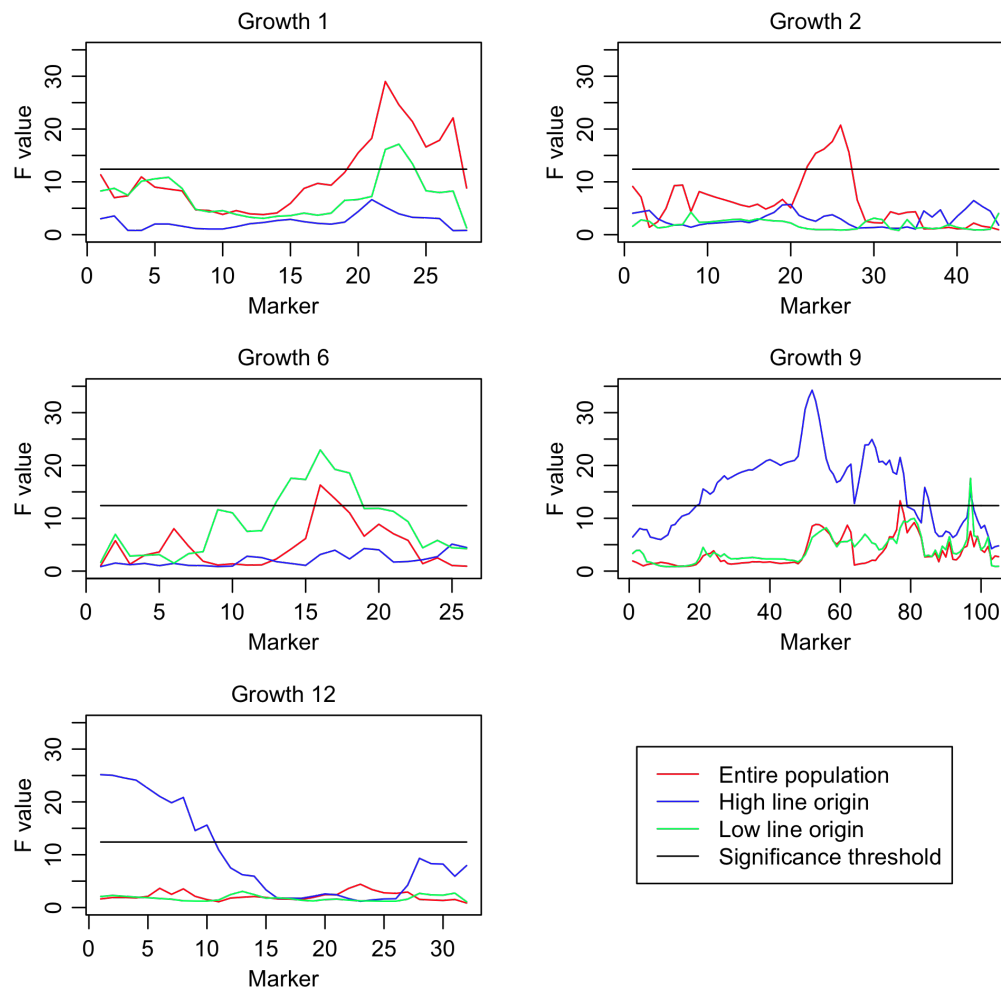
### Three way epistasis



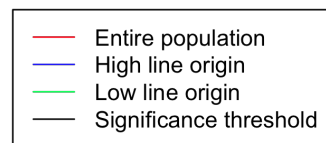
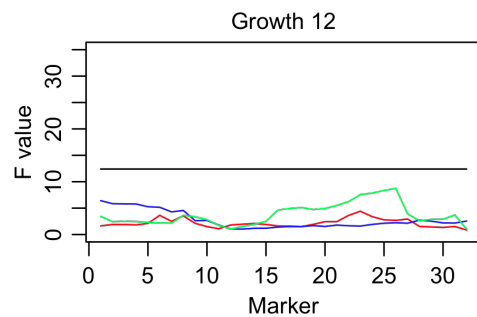
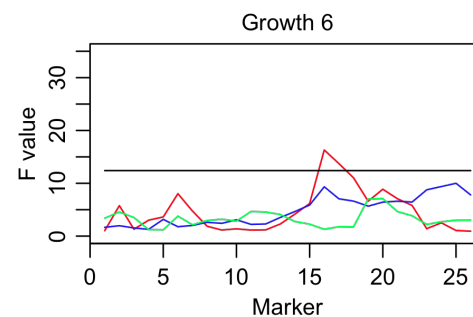
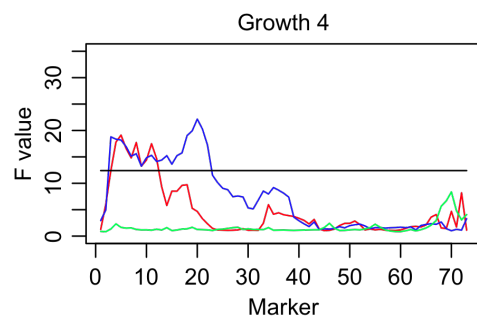
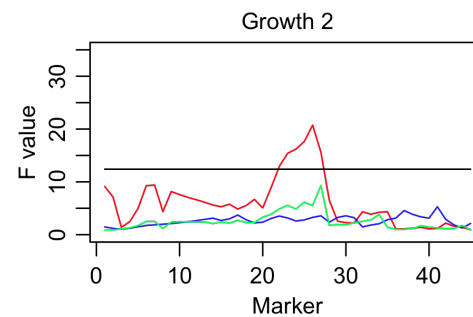
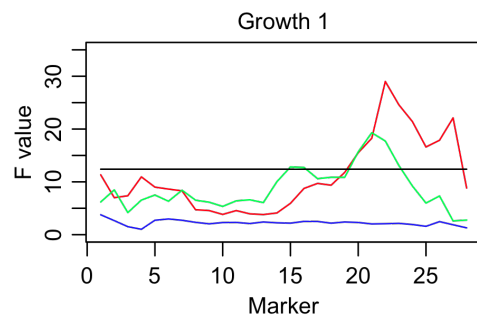
## Subset comparison

- Haley-Knott regression
  - IBD-probabilities
  - Bootstrap procedure
  - Permutation test for significance
- Data stratification
  - Data conditioned on genotype at one locus

Growth 4



Growth 9



## Concluding remarks

- Results from the AIL reaffirms the importance of epistasis in the system
- The network pattern persists over time



# Acknowledgements

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