



Detection of QTL influencing egg production in layers receiving various diets

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Introduction

Egg production in layers is affected by different Quantitative Trait Loci (QTL) and by environment, such as the diet composition. These two components of the phenotype could be in interaction. In the case of a genomic selection in layers, take into account this interaction could be necessary.

Objectives

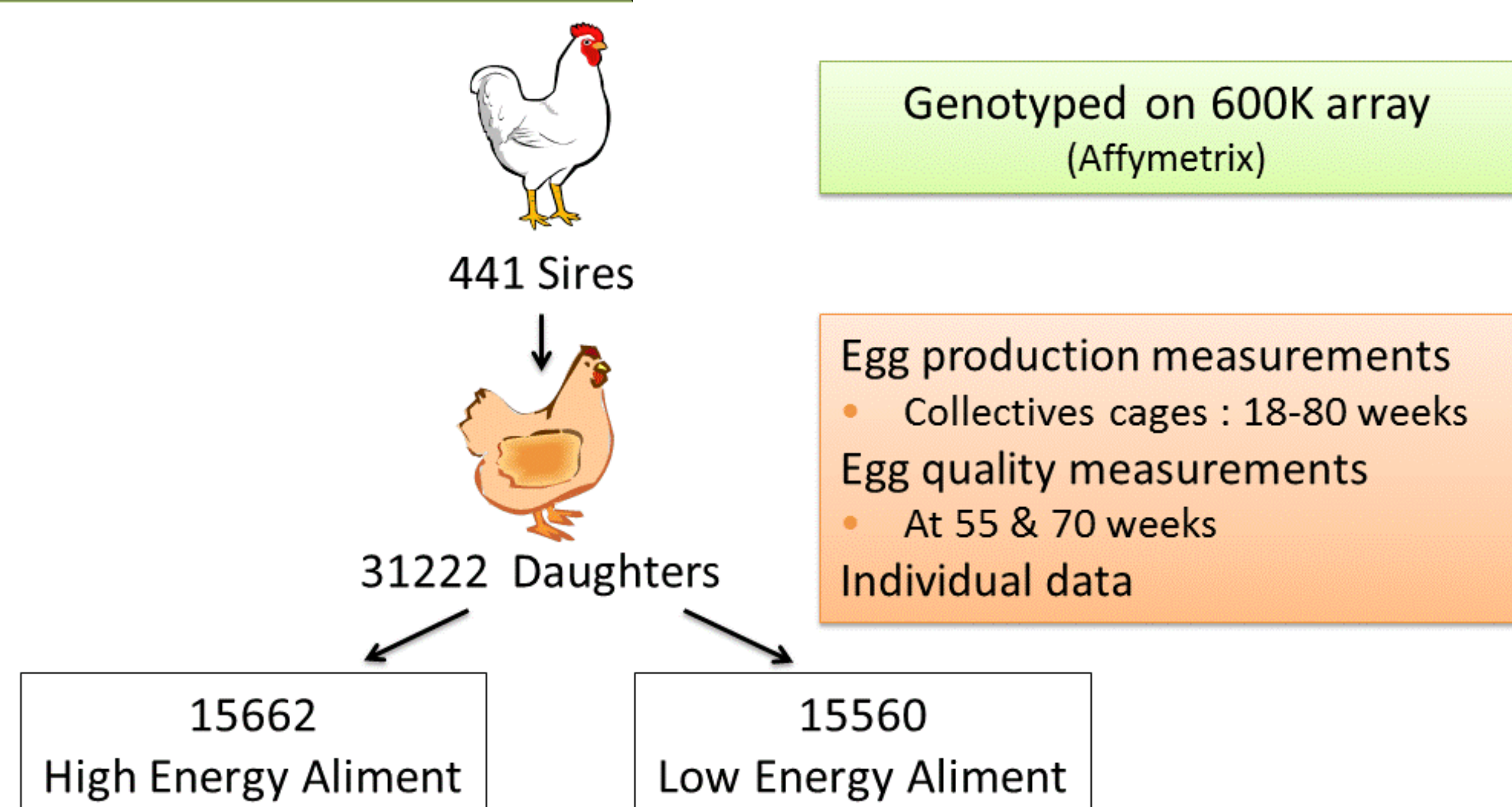
- Detect QTL involved in egg production and egg quality traits
- Use different GWAS methods and compare the results
- Observe the existence of QTL by environment interaction

Conclusion

- Significant QTL have been detected in the present study for various egg production and egg quality traits
- QTL detected depend on diet
- Take into account underlying kinship in GWAS influence QTL detection
- Take into account genetic by environment interactions in genomic evaluation of layers could be necessary

Material and Methods

Experimental design



Methods

- Phenotypes were recorded in 3 hatches in collective cages of 12 hens.
- Data were adjusted for the hatch effect and for the localization in buildings using the SAS-GLM procedure.
- Each sire has two phenotypes, one per diet, which were the means of his daughters adjusted performances.
- PLINK software was used to filter the genotyping data (Call rate, MAF, HWE). Thus 288,305 SNPs were kept for further analyses.
- SNP regression and Gblup methods were used to realize GWAS analyses.

Results

Existence of different QTL according to the diet

GWAS - Plink

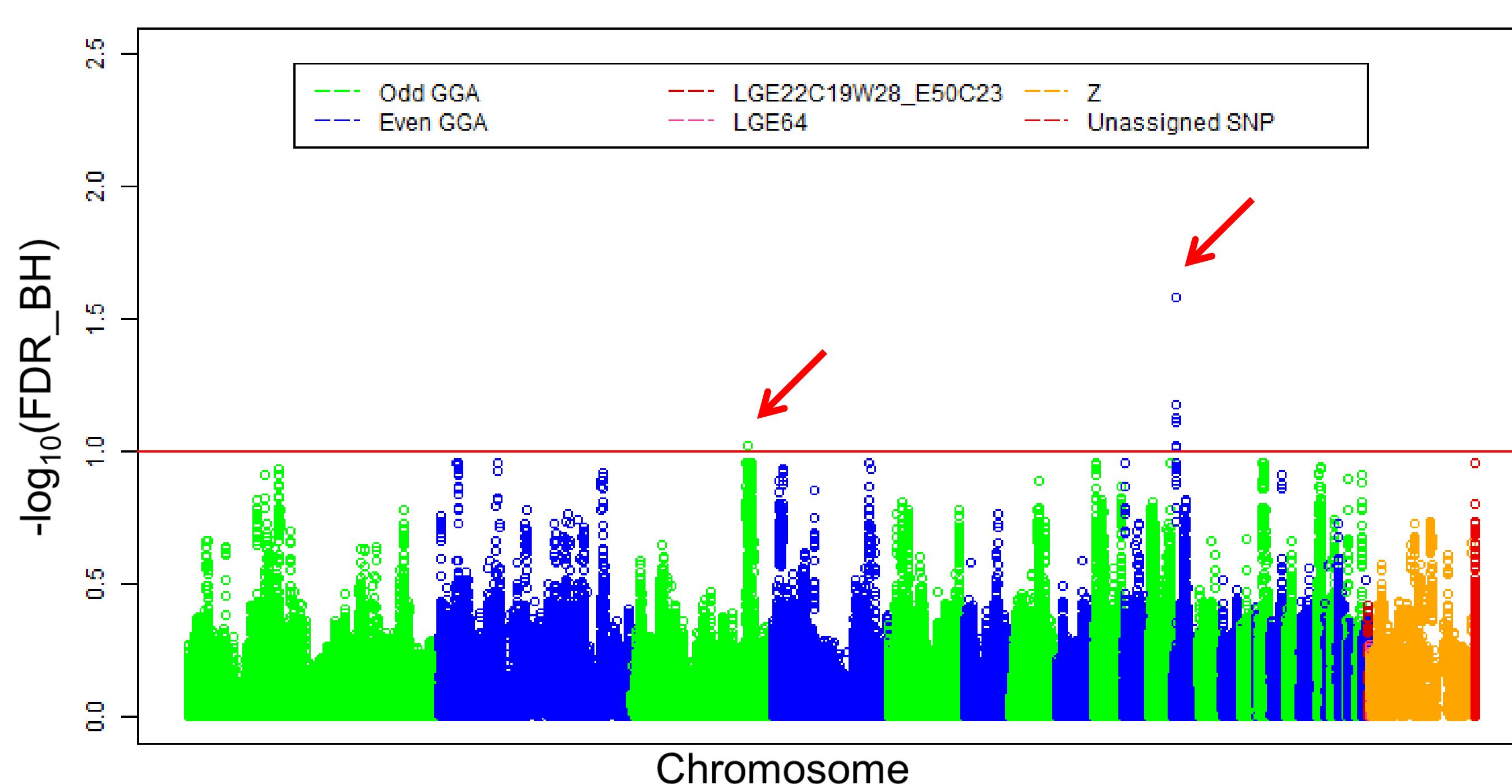
Low energy : 12 QTL

4 for Egg shell solidity
7 for Egg shell color
1 for Inclusion

High energy : 98 QTL

88 for Egg shell color
6 for Inclusion
1 for Egg weight
1 for Egg production (50 to 80 weeks)

A*(color) at 55 weeks under low energy diet



GWAS - Gblup

A*(color) at 55 weeks under low energy diet

GGA 3

GGA 12

