Mapping of loci affecting egg shell quality in egg layers

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Introduction

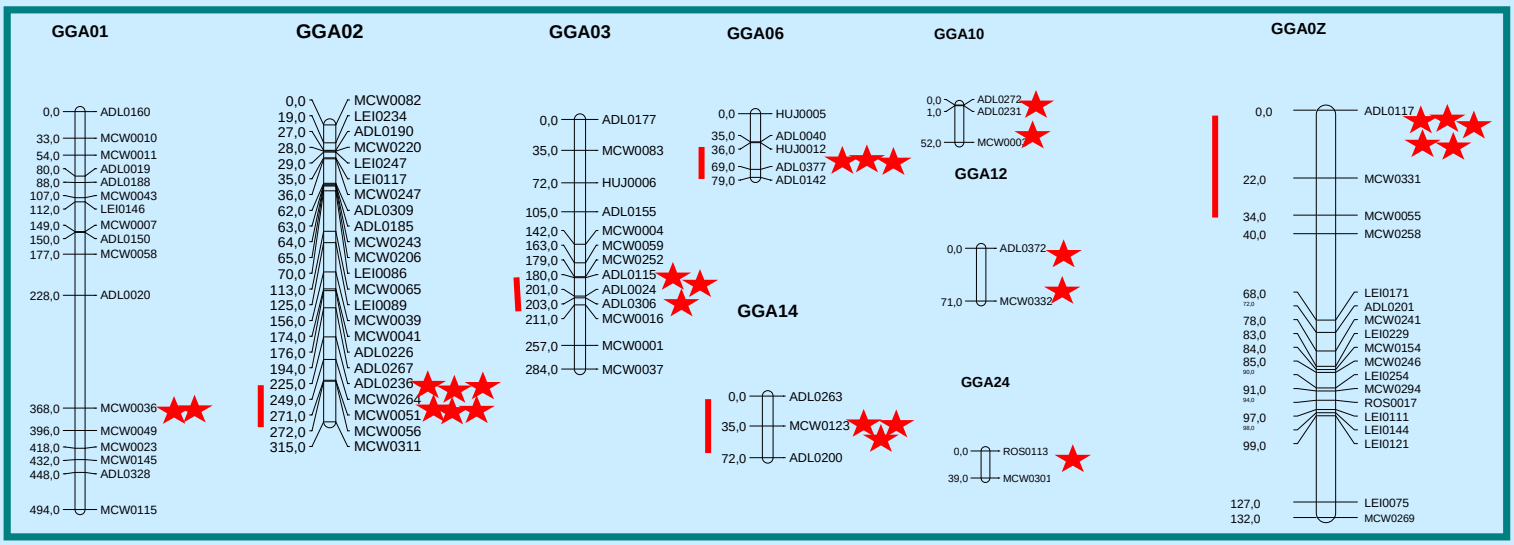
Poor egg shell quality causes economical losses and may lead to pathogen contamination, like Salmonella infection. We have searched the chicken genome for loci affecting egg shell quality to understand the genetic background of the trait and to develop new selection tools for enhanced resistance to breakage and bacterial penetration.

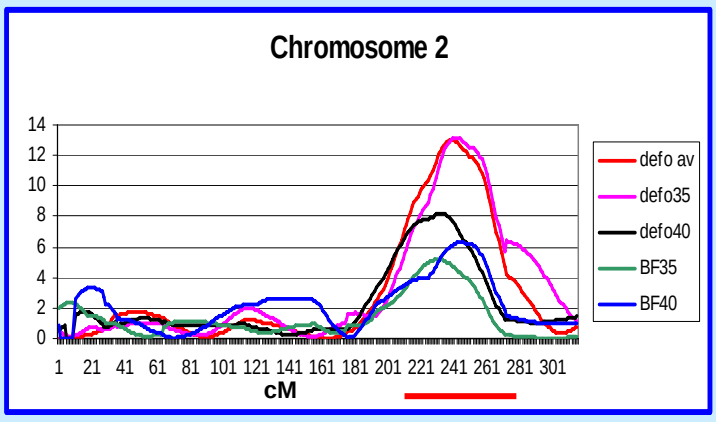
For linkage mapping an F2 population was created between two egg layer lines, Rhode Island Red and White Rock. Egg shell quality was measured as deformation (**defo**), and breaking force (**BF**) with Canadian Egg shell tester at different production weeks.

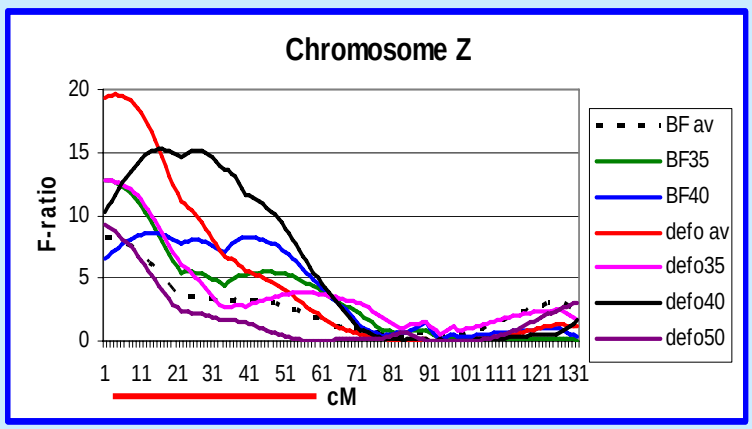
A genome scan was performed with 162 microsatellite markers on 28 chromosomes, using QTLExpress for QTL mapping and GridQTL for searching for epistatic effects (http://qtl.cap.ed.ac.uk/).

Results

All together 27 significant loci were found to affect egg shell traits on different chromosomes, marked as ★. Each locus explains 2-5 % of the phenotypic variance of the trait in question. No significant epistatic effects were found. The most interesting areas are on chromosomes 2, 3, 6, 14 and Z.







Conclusion

The areas ▬ on chromosomes 2, 3, 6, 14 and Z are going to be fine mapped with densely spaced SNP markers. Combined information on gene expression differences and pathways in the shell gland (INRA) will be used in identification of potential candidate genes. Ultimately the information will be used to produce selection markers to supplement egg shell strength testing to select hens that lay better, healthier eggs .

SIXTH FRAMEWORK PROGRAMME
Food Quality and Safety

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