



GWAS analysis identifies 138 QTL for egg quality variance in layers receiving various diets

Hélène Romé, Amandine Varenne, Frédéric Herault, Hervé Chapuis, Christophe Alleno, Patrice Dehais, Alain Vignal, Thierry Burlot, Pascale Le Roy

► To cite this version:

Hélène Romé, Amandine Varenne, Frédéric Herault, Hervé Chapuis, Christophe Alleno, et al.. GWAS analysis identifies 138 QTL for egg quality variance in layers receiving various diets. 9. European Symposium on Poultry Genetics (ESPG), Jun 2015, Tuusula, Finland. hal-01580651

HAL Id: hal-01580651

<https://hal.science/hal-01580651>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

GWAS analysis identifies 138 QTL for egg quality variance in layers receiving various diets
Hélène Romé^{1,2}, Amandine Varenne³, Frédéric Hérault^{1,2}, Hervé Chapuis⁴, Christophe Alleno⁵, Patrice Dehais⁶, Alain Vignal⁶, Thierry Burlot³,
Pascale Le Roy^{1,2*}

¹INRA, UMR1348 PEGASE, Domaine de La Prise, 35590 Saint-Gilles, France

²Agrocampus Ouest, UMR1348 PEGASE, 65 rue de Saint Brieuc, 35042 Rennes,
France

³Novogen, Mauguérand, 22800 Le Foeil, France

⁴SYSAAF, INRA UR83 Recherches Avicoles, 37380 Nouzilly, France

⁵Zootests, Parc technologique du zoopôle, 5 Rue Gabriel Calloet Kerbrat, 22440
Ploufragan, France

⁶INRA, UMR1388 GenPhySe, Auzeville BP52627, 31326 Castanet-Tolosan, France

The variance of traits is more often studied, due to the wish to canalize some traits. At this time only one study has identified QTLs for the variance of egg quality trait. The development of a high density chip for chicken by Affymetrix, the 600K Affymetrix® Axiom® HD genotyping array, allows today to narrow the localization of QTL with a higher accuracy. Furthermore, this high density chip should also allow going beyond the classical hypothesis of additivity, between QTL effects or between QTL and environmental effects. Thus, the aim of the present study was to search for QTL influencing the variance of egg quality traits using the 600k SNP chip and to observe if the QTL detected could be different according to various environments. For this, a population of 438 sires from a pure line was genotyped. Their 31,381 F1 crossbred daughters were phenotyped for egg quality traits at 50 and 70 weeks of age. Moreover, to observe the putative existence of QTL by environment interactions, these layers were divided into 2 groups, fed ad libitum with two different diets. The egg shell color and its components (redness, yellowness, and lightness), the egg shell strength, stiffness and shape, the short length of egg and the egg weight were recorded. GWAS analysis was performed using a linear regression model. Thus, 138 QTL for the variance of egg quality traits, spread over all marked chromosomes except the chromosome 16 have been detected. Only two QTL was common to a previous study on mean of traits. Variances and mean are two different traits, which should be considered separately. Among them, 94 QTL had a significant difference of effect depending on diet. The correlation between estimates of SNP effects for both diets was between -0.06 and 0.25. To sum up, this study showed that numerous loci influence variance of quality traits. These traits seem to be highly dependent on diets, more than the mean. This shows the capacity of laying hens to adapt to their environment.