



HAL
open science

Genetic architecture of the persistency of production, quality, and efficiency traits in laying hens

Quentin Berger, Nicolas Bédère, Pascale Le Roy, Thierry Burlot, Sandrine Lagarrigue, Tatiana Zerjal

► To cite this version:

Quentin Berger, Nicolas Bédère, Pascale Le Roy, Thierry Burlot, Sandrine Lagarrigue, et al.. Genetic architecture of the persistency of production, quality, and efficiency traits in laying hens. 74. Annual meeting of the european federation of animal science (EAAP), Aug 2023, Lyon, France. Wageningen Academic Publishers, Book of abstracts, 29, pp.812, 2023, Book of abstracts of the 74th annual meeting of the european federation of animal science. hal-04198555

HAL Id: hal-04198555

<https://hal.inrae.fr/hal-04198555v1>

Submitted on 7 Sep 2023

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.

Genetic architecture of the persistency of production, quality, and efficiency traits in laying hens

Q. BERGER¹, N. BEDERE², P. LE-ROY², T. BURLOT³, S. LAGARRIGUE², T. ZERJAL¹

¹Université Paris-Saclay, INRAE, AgroParisTech, GABI, 78350, Jouy-en-Josas, France

²PEGASE, INRAE, Institut Agro, 35590, Saint-Gilles, France

³NOVOGEN, 5 rue des Compagnons 22960 Plédran, France

The laying hen industry aims to extend the laying production career to 90 weeks or more to increase profitability and promote ethical and environmental benefits. However, this can be challenging due to declining egg production and quality as well as reduced efficiency in aging hens. To investigate persistency in egg production, quality, and feed efficiency, we studied 1024 purebred hens from the nucleus of Novogen between 70 and 90 wk of age.

We recorded daily egg production throughout the period and measured individual feed intake twice a week for three weeks, starting at 70, 80, and 90 wks of age, as well as body weight at the start and at the end of each feed intake recording period. Egg quality was assessed at 70 and 90 wk. Random regressions models were used to study trait variation on a trajectory of time and genotype by time interactions. Among the measured traits, egg weight, feed conversion ratio, weight gain, and Haugh unit showed persistency over the measured period. Daily feed intake, egg mass, residual feed intake, and laying rate decreased over time, while body weight and yolk percentage increased during the late period of production. To assess the viability and ways of selecting for trait persistency (*i.e.* stability over time), we estimated the genetic variance of the slope and its correlation with the intercept. We found that for laying rate and egg weight, the genetic variance of the slope was negligible, indicating that selection for persistency on these traits requires other means. On the contrary, for other traits such as residual feed intake, there is significant additive genetic variance in the slope. In addition, the genetic correlation between the intercept and the slope was -0.19, meaning that already decreasing residual feed intake level would also reduce the negative slope and help improve persistency. This can be further improved by integrating the slope in the selection criteria.

Projects funded by the European Union's Horizon 2020 research and innovation programme under grant agreement N°101000236 and the National research agency under the decision code ANR-20-CE20-0029.