



GENOTYPE ENVIRONMENT INTERACTIONS FOR LAYING HENS HOUSED IN SINGLE CAGES AND FLOOR HOUSING SYSTEMS

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Generally, laying performance tests are based on single bird cages, where it is easy to record the necessary information for each hen. In practice, group cages and alternative housing systems are common, therefore, genotype environment interactions could have a negative impact on the genetic progress. Information from floor housing systems always pertain to the whole flock and do not give single hen data. Full sib information can be used from group cages where four hens of the same family are housed. However, individual data recording in group housing systems is until now, only possible in trap nests or via observations, which are very costly in terms of labour and time. A new, practicable system to record this important performance data of each single hen is the Weihenstephan Funnel Nest Box (FNB). The benefit of this automatic system is that the behaviour of the hen is not influenced by manual activities and all required data are collected and automatically saved in a data base. Without determining a new selection trait, the important behaviour trait nest acceptance may also be considered in the breeding program.

For this investigation, the laying performances of two brown (flock 1 and 2) and one white layer flock (flock 3) which were housed in a floor system, were tested, in which 48 of the FNB are installed. The recorded data have been compared with the performance data of their siblings which were housed in single bird cages. One flock in the floor system consisted of up to 282 layers, whereas the number of tested siblings in single bird cages per flock, were much bigger with up to 2,552 hens. For the analysis, the observation period was divided into five 28-day laying periods. The first two laying periods are representative for the period of early production, the third to the fifth, for the peak of production. The average laying performance in peak production was for the hens housed in cages (95 %) which was much higher than for the hens in the floor system at 85 %. Heritabilities and genetic correlations were estimated with a linear model for each of the three sibling flocks and both periods of production were treated as separate traits.

In order to assess genotype environment interactions between both housing systems, genetic correlations were estimated. High correlations for the egg number at the early production period ($r_g = +0.6$ to $r_g = +0.9$) refer to a low impact of the housing system on the parameter early egg number. In contrast, the laying performance recorded at peak of production between hens housed in single bird cages or an alternative system, were correlated on a low level ($r_g = +0.2$ to $r_g = +0.4$). This might be explained by the effect of the testing environment on the laying performance at the peak of production. Comparable results to this study are not known from the literature. This new innovation therefore gives information about genetic correlations between the most important selection trait, egg number, based on individual hen data in different housing systems.

Keywords: layers, egg number, testing environment