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Analysis of the free range behaviour of laying hens and the genetic and phenotypic relationships with laying performance

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Abstract:

1. Over twelve 28-d laying periods (almost one year), 272 laying hens of the Lohmann Silver strain, individually tagged with transponders, were monitored on their ranging behaviour and laying performance in an aviary system with an adjacent winter garden. 2. From laying periods 1 to 12, the daily frequency of passages between the barn and the winter garden of individual hens, showed an antagonistic trend compared to the average duration of single visits. While the frequency of passages decreased until the end of the recording period to 8 passages per hen and day, the average duration of single visits increased to a maximum of 32 min per hen. 3. The heritability estimates for the traits, length of stay in the winter garden and frequency of passages were higher for the last 5 laying periods than at the beginning of the recording period. For the last 5 laying periods, the estimates for the duration of stay in the winter garden varied between $h^2 = 0.21$ and 0.32 and for the frequency of passages, between $h^2 = 0.30$ and 0.49 . 4. Most of the estimated heritabilities for the rate of lay were on an expected medium level ($h^2 = 0.09$ to 0.45). Deviant h^2 -values to a few laying periods were based on low additive genetic variances or high environmental variance. 5. Genetic correlations between both free range traits and the laying performance were negative (r_g length of stay = -0.34 and r_g passage frequency = -0.08). 6. Generally, there seems to be a possibility to influence the ranging behaviour through selection. Further investigations with different genotypes and varying dates of exposure to the laying environment, should be carried out to clarify possible influences on other traits and the negative correlation with laying performance.

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