



NESTING BEHAVIOUR AS AN INDIRECT TRAIT TO PREDICT LAYING PERFORMANCE OF HENS HOUSED IN FLOOR SYSTEMS

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In order to improve the adaptability of laying hens to alternative housing systems, it is necessary, from a breeding point of view, to have performance data from individual hens which have been tested in this environment. This would contribute to improve the nest acceptance of the hens and reduce the number of floor eggs. A new technology has been developed, the “Weihenstephan Funnel Nest Box”, which enables the automatic recording of these essential performance and nesting behaviour parameters of each single hen in a group housing system. This equipment is however, very costly, therefore it would be very interesting to find a method of predicting the laying performance in the nest of each hen without trapping the hens. Furthermore, and probably the most important reason for doing so is that in the field, the systems which are used are based on family and not on individual nests. The aim of this study was to evaluate the accuracy of estimating the number of eggs based on the duration of stay in the nest box. The exact oviposition time and every nest visit of 232 Lohmann Silver laying hens housed in a floor system were available for a period of 150 days. Not every hen regularly used the nest. On the contrary, 1% of the hens did not use the nest at all and an additional 7% of the hens did not lay any egg in the nest. Moreover, 19% of the total number of eggs was laid on the floor. It is not possible to record the birds that lay these eggs on the floor, but with this system, it is possible to identify the birds who are routinely laying in the nest which makes the selection for nest acceptance possible. This system enables each egg to be assigned to its hen with a high accuracy (96%). As expected, the duration of the stay in the nest is significantly different, regardless of whether the hens lay an egg or not. On average, the duration of stay in the nest was less than 8 minutes if there was no oviposition, whereas hens spent almost 30 minutes in the nest when they do lay an egg. Based on this difference, a simple threshold in the duration of nest occupation of 10 minutes would correctly predict 95% of the eggs with an error rate of 7%.

The estimated heritability of the predicted performance was 0.36, which is at a higher level than the heritability for the actual laying performance ($h^2 = 0.26$). This difference might be explained by the influence of the trait duration of nest occupation, which has a higher heritability, ranging 0.3 to 0.5. The possible impact on the breeding value compared to the actual value was assessed by the Spearman correlation, which shows a good match, with a value of 0.94. Furthermore if 10% of the candidate hens were selected on the basis of the estimated breeding values from the actual compared with the predicted performance, 78% of the selected hens would be the same, and only 6.3% of the selection differential would be lost. It was concluded that the trait duration of nest occupation is a useful indirect trait in order to assess the laying performance. More complex models taking additional information would help to fine-tune and improve this estimation.

Keywords: Layers, breeding, laying performance, floor systems.