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Form but not frequency of beak use by hens is changed by housing system

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Abstract

In order to verify the hypothesis that hens in different housing systems have the same time budget for different beak-related behaviours, we compared the pecking behaviour of hens in six housing systems: small (SC) and large (LC) conventional cages, small (SF) and large (LF) furnished cages, single-tiered aviary (SA), and free-range (FR). At the age of 16 weeks, 284 medium hybrid layers were randomly divided into six groups and moved to the six housing systems. The number of hens performing behaviours using the beak (grazing, eating, drinking, preening, aggressive pecking, gentle feather pecking, severe feather pecking, litter pecking, and object pecking) was recorded at various ages up to 63 weeks of age. Grazing by a large proportion of hens was observed in FR, and litter pecking by a large proportion of hens in SA. The proportions of hens eating, drinking, and preening were higher in SC, LC, SF, and LF than in SA, and higher in SA than in FR (all $P < 0.05$). The proportion of hens performing object pecking was higher in SC and LC than in the other systems (all $P < 0.05$). The proportion of hens performing severe feather pecking was higher in LF and SA than in FR, and more in FR than in SC, LC, and SF (all $P < 0.05$). The percentages of hens performing all pecking behaviours were almost identical among the six housing systems (63.0 ± 7.1% in SC, 63.0 ± 5.9% in LC, 65.6 ± 5.4% in SF, 64.7 ± 5.0% in LF, 62.9 ± 5.9% in SA, and 64.9 ± 5.6% in FR), indicating that the total frequency of beak use was almost the same regardless of the housing system, although the breakdown of types of beak use was different. We conclude that caged hens may express a motivation for beak-related behaviour by directing it at food, drinking nipples, their

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own feathers, and the cage wires, although feather pecking appeared not to be decreased simply by the redirected pecking.

Keywords: Conventional cage; Pecking behaviour; Feather pecking; Furnished cage; Non-cage system; Laying hens

1. Introduction

Feather pecking, which can develop into cannibalism, is a serious welfare problem in laying hens that can cause high mortality (Savory, 1995). Therefore, studies on ways to reduce this abnormal behaviour have been conducted. For example, there is a report that feather pecking was reduced by supplying a pecking device (Jones et al., 2002). Huber-Eicher and Wechsler (1998) showed that feather pecking decreases when birds are provided with litter substrates. These studies indicated that feather pecking can be reduced by redirecting pecking toward other materials. For other pecking behaviours, much of the evidence also indicated that pecking behaviour is decreased when other behaviours using the beak are increased. For example, Sandilands and Savory (2002) compared the behaviours of intact and beak-trimmed hens, and reported that the beak-trimmed birds spent more time in preening while less time in aggression. We also reported that object pecking increased dramatically when feed was withdrawn for the purpose of induced moulting (Shimmura et al., 2008).

In the European Union (EU), where conventional cages for laying hens will be banned in 2012, much development of alternative housing systems has occurred. These alternatives comprise furnished cages and non-cage systems such as aviaries and free-range, which must provide a litter area and, for free-range housing, an outdoor area (Blokhuis, 2004). Following the theory that feather pecking can be reduced by redirecting hens' pecking motivation toward other materials, the provision of litter material and outdoor pasture should reduce feather pecking. In fact, we investigated pecking of laying hens in litter-floor and free-range housing and reported that the proportion of hens grazing was very high in the free-range system while the other behaviours using the beak, such as eating and litter pecking, as well as feather pecking, were observed less frequently compared with the litter-floor system (Shimmura et al., in press). A more striking result was that total pecking behaviour was almost the same between the two housing systems, although the breakdown of types was different. Considering both this result and the evidence mentioned above, we hypothesised that hens in different housing systems have the same motivation for using the beak and that the amount of feather pecking would be reduced by pecking other material. This hypothesis is partly supported by our previous study (Shimmura et al., in press), but it compared only two non-cage systems. Therefore, in order to verify the hypothesis, we compared the pecking behaviour of laying hens in six housing systems: two types of conventional cages, two types of furnished cages, a single-tiered aviary, and free-range. By using a larger number of housing systems, we were able to test the extent to which hens maintain their time budget for beak-related behaviours.

2. Materials and Methods

2.1. Animals and rearing

In total, 300 chicks of a medium hybrid laying strain (a White Leghorn/Rhode Island Red cross-breed) were prepared and 284 were used for the trial. All chicks had their beaks trimmed at 1-day-old, and were