Feather pecking in laying hens

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Introduction

Feather pecking (FP), pecking at and pulling out the feathers of conspecifics, is an unwelcome behaviour with both welfare and economic implications for the laying hen (Sedlackova *et al.*, 2004). It is painful, increases a bird's susceptibility to further pecking and cannibalism, and is considered an indicator of reduced welfare in both victim and performer (Bestman & Wagenaar, 2003). FP is thought to be a form of redirected behaviour, and there are studies linking it variously with feed/ground pecking, dust-bathing, or socially related pecking (Su *et al.*, 2005). The development of FP is also related to environmental factors such as flock size, stocking density, floor substrate availability, light intensity, diet, temperature and access to elevated perches, as well as endogenous characteristics such as sex, age and reactions to frustration or stress (Sedlackova *et al.*, 2004; Bestman & Wagenaar, 2003). The increased risk of FP in alternative housing systems, which otherwise have a number of welfare advantages over battery systems, is one of the main barriers to their widespread adoption (Sedlackova *et al.*, 2004). Advances in the understanding and prevention of FP are thus of considerable welfare significance for laying hens.

Discussion

Noting previous evidence of an association between FP and feather-eating in laying hens, and also between increased dietary fibre and reduced FP, Harlander-Matauscheck *et al.* (2006) hypothesised that feathers may have a dietary effect similar to insoluble fibre. To test this, 48 hens from high (H) and low (L) FP lines were divided into 4 treatment groups, with half of the hens from each line being offered feathers (F), and the other half being kept as controls (0). Gut transit times were then determined in selected hens using titanium dioxide as a marker, with the TiO_2 being excreted most rapidly by the HF birds, followed by the H0 birds (which were found to eat their own feathers in the absence of offered feathers), L0 and LF birds. This result is consistent with predictions that the physical structure of feathers encourages peristalsis. It indicates that the dietary effects of feathers may be critical in the development of FP, as a lack of insoluble structural components in the diet is known to stimulate foraging behaviour in hens and as such could lead to FP.

Other acknowledged influences on the development of FP include stocking density, flock size and management practices. However, the studies relating these variables to hen behaviour have used low animal numbers and few replicates. Therefore, it has been difficult to draw unambiguous conclusions about the impact of these factors on the expression of FP in laying hens. Zimmerman *et al.* (2006) sought to address this gap by evaluating hen behaviour under commercial stocking densities, flock sizes and management practice with more replication than has been previously applied. Six structurally identical barns, each divided into two pens, were employed in the study, with each pen containing one replicate of a treatment (of which there were six altogether). Three iterations per treatment were run, resulting in six replicates per treatment. The treatments consisted of different combinations of stocking densities (low: 7 birds/m^2, medium: 9 birds/m^2, high: 12 birds/m^2), flock sizes (small: 2450 or 3150 birds, large: 4200 birds) and management conditions (standard: bell drinkers, lights in nest boxes, modified: nipple lines, no lights in nest boxes). The behaviours being studied (occurrences of FP, aggression, preening, dustbathing and allopreening) were scored by direct observation when the birds were about 32, 48 and 60 weeks of age.

Zimmerman *et al.* (2006) showed that a lower space allowance, whether due to smaller flock size or higher stocking density, generally resulted in higher levels of FP. However, this effect seemed to be moderated in younger hens by a strategy of social tolerance, with the lowest levels of FP being observed in high-density flocks at 32 weeks of age (although the incidence of FP in these

flocks rose above that of the lower-density flocks in subsequent observations). This suggests that it might be worth investigating the potential welfare benefits of initially housing laying hens at higher stocking densities that drop with age. The experiment also demonstrated a markedly lower incidence of FP under the modified management conditions, illustrating how simple changes in the provision of water and lighting can profoundly improve bird welfare.

Management-based control of FP was also the subject of a study by Shinmura *et al.* (2006), which was inspired by the observation that the effect of ambient light intensity on FP in furnished cages and alternative (aviary) systems had not been thoroughly investigated despite longstanding reports of a positive correlation between FP and light intensity in battery-housed hens. In this study, 181 hens were assigned to either battery cages, furnished cages or an aviary to compare the differential effects of decreasing light intensity (from 680 to 70 lux) and beak-trimming across these housing systems. Behavioural observations were recorded directly before and after each change of conditions. The proportion of birds engaging in FP was not significantly reduced in any of the three systems following a decrease in light intensity, and the authors speculate that a light intensity of 70 lux, while representing an almost 90% reduction from 680 lux, may have still been too high to produce the desired behavioural effects. This is perhaps the weakest of the three studies because it did not appear to make provision for adequate controls, did not sufficiently control variables such as stocking density, and relied on only two sets of before and after behavioural observations.

Conclusion

These articles highlight the need for further research into the ways in which diet, stocking density, flock size, management and other factors combine in the development of FP in laying hens. The interactions between many of these causes remain poorly understood. It is especially interesting to note the role of FP as a possible means of obtaining supplementary fibre and the particularly low levels of FP observed in young, high-density flocks.

References

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