Discusses newly developed, non-surgical methods as alternatives to beak trimming to prevent injurious feather pecking

Examines alternative non-surgical methods, such as feather spraying and providing opportunities for natural behaviours, to reduce feather pecking and improve layer welfare.

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Introduction

Feather pecking (FP) is a prominent problem in the layer industry. It is characterised by repetitive feather pulling and plucking, and results in poor quality plumage, skin damage and even death (Bright *et al*., 2011). In addition to causing economic loss, FP is a serious welfare concern. It inflicts physical pain, and resultant bleeding can further encourage cannibalism, further increasing mortality rates. Until recently, beak trimming has been widely used to prevent FP. However, the practice has recently come under scrutiny because of the acute and chronic pain induced by the procedure (Harlander-Matauschek & Rodenburg, 2011). This essay discusses a number of newly developed, non-surgical alternatives to reduce injurious FP.

Discussion

One method to discourage FP is to spray feathers with taste deterrents. While recent studies have indicated that quinine can be successfully used, a study by Harlander-Matauschek and Rodenburg (2011) investigated solutions made from natural products such as non-toxic alternatives to quinine. Solutions containing garlic, almond, clove, and clove oil were trialled against different concentrations of quinine, magnesium chloride and commercial anti-peck spray. For 10 days, 12 groups of 10 layers had their feathers soaked in an allocated treatment. The number of feathers plucked, eaten and rejected was recorded. Overall, quinine concentrated at 2% and 4% proved the most effective sprays. Although the other solutions successfully deterred pecking to varying degrees, none produced an avoidance reaction as strong or as lasting. For welfare to be improved, further research is required to identify non-toxic substances capable of replacing quinine. However, as the layers used in the study were selected for high FP activity over 10 generations, it is possible that the solutions tested could be more effective if applied to an average laying flock.

Although feather spraying effectively reduces FP, welfare remains compromised because the underlying cause of the behaviour is not addressed (Harlander-Matauschek & Rodenburg, 2011). Although development of FP is considered multifactorial, the behaviour has been strongly linked to unfulfilled behavioural needs, such as foraging (Petek & McKinstry, 2010; Wysocki *et al*., 2010). Bright *et al*. (2011) explored methods of reducing FP by examining the correlation between proportion and quality of canopy cover and the use of range for foraging. Here, the underlying cause of the behaviour is addressed in the search for a solution, not ignored, as with feather spraying. In the experiment, the 286 participating egg producers planted 5% of their total range with trees. The percentage of range actually planted in trees, the average percentage of canopy covered within the planted area, and an average flock plumage damage score at the end of lay period were recorded. Statistical analysis revealed a significantly higher degree of plumage damage in flocks with less canopy cover within the planted areas. These results suggest that quality and variety of cover is likely to be more influential than the absolute amount of cover.

This concept has a number of implications for layer welfare. Non-cage systems hold great potential to vastly improve welfare through the provision of greater space, variety of stimuli, and opportunities to behave naturally. However, in most systems, these go unrealised due to the layers' evolutionary instinct to avoid open spaces. The link can be made that poor utilisation of range leads to unfulfilled foraging behaviour and thus a greater tendency to engage in FP as a redirected behaviour. This study indicates that providing good-quality canopy can encourage range utilisation, thereby reducing FP. This approach overcomes the limitation to welfare improvement that prevails in preventative feather spraying, in that the underlying issue is addressed and not simply ignored.

Another approach is genetic selection, which is increasingly used in animal production to increase the occurrence of desirable traits and reduce undesirable ones. A Low Mortality Line (LML) of layers has recently been developed through selection for low mortality due to decreased FP tendencies (Nordquist *et al*., 2011). However, selection for desirable characteristics can lead to inadvertent co-selection of undesirable traits. Nordquist *et al*. (2011) investigated possible negative effects of LML selection on cognitive function, anxiety and fearfulness. Such co-selection presents a serious welfare concern as production animals require cognitive flexibility to negotiate their changing environment.

Nine fourth-generation LML pullets were tested against nine pullets from a Control Line (CL) to compare behavioural responses to tests assessing cognitive function, fearfulness and anxiety. All participating pullets were identically reared. The Open Field test assessed behavioural responses when layers were placed alone in an observation pen. The T-maze test measured sociability and fearfulness based on their ability to navigate through a maze. The Voluntary Approach test assessed fearfulness and latency periods to approach a human, whereas the Holeboard test assessed spatial memory. The study revealed that LML demonstrated lower levels of fearfulness and anxiety than CL. Furthermore, there appears to be no significant difference in cognitive function between LML and CL. These results support the feasibility of genetic selection to eliminate FP in future flocks. However, further studies, involving a wider range of tasks and possibly testing a wider age group, are required to verify these results (Nordquist *et al*., 2011).

Unfortunately, genetic selection offers only slow progress. While feather spraying and providing canopy results in an almost immediate reduction of FP, the fruits of genetic selection are revealed only after a number of generations of selection (Rodenburg *et al*., 2010). A further welfare consideration is the notion that like feather spraying, underlying causes of FP are not addressed as they are by providing canopy. Ultimately, as the triggers for the condition are multifactorial, an integrated management approach combining the benefits of all three of these methods, may prove successful in reducing FP and improving the welfare of current and future layer flocks.

Conclusions

The three studies discussed current alternatives to beak trimming that hold great potential to improve layer welfare both now and in the future. However, there may not be just one unrivalled solution to FP. To eliminate the problem successfully while still upholding welfare, a combination of these short-term and long-term solutions may ultimately be the answer.

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