Can alterations to the rearing environment reduce feather-pecking behaviour in laying hens?

Discusses controllable factors of the rearing environment that can be altered to reduce the incidence of feather-pecking behaviour and its injurious impact on hens.

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Introduction

Feather pecking (FP) by other chickens, involving the pulling and pecking of feathers leading to feather damage, is a major welfare issue in the egg industry, It may progress to tissue pecking resulting in tissue damage, blood loss and even death (Rodenburg *et al*., 2013). Beak trimming has commonly been used to reduce FP damage, but this practice has been criticised for causing pain and changes in beak sensitivity and function (Nicol *et al*., 2013) and for treating symptoms rather than addressing causes of FP (Nicol *et al*., 2013). It has been suggested that rearing conditions significantly influence the development of FP behaviour, which persists to the laying phase. This essay explores new research into the importance of housing, LED colour lighting and nutrition during rearing. Greater understanding of these factors could allow farmers to modify the rearing environment in order to minimise FP behaviour, thus improving layer welfare without beak trimming.

Discussion

Feather pecking is a multifactorial problem that can be influenced by early life history and environmental factors (Rodenburg *et al*., 2013). Gilani *et al*. (2013) acknowledged this and sought to investigate the effect of several aspects of housing on FP development in young and adult laying hens. The authors observed 34 flocks from 29 different farms over a period of 35 weeks. They noted information about lighting, climate control, diet and sound levels for each farm, and recorded observations of FP, feather condition and foraging at 1, 8, 16 and 35 weeks of age. Some key findings were that a wider range of sound levels, fewer dietary changes and provision of good foraging were all associated with reduced FP. Foraging was defined as pecking and scratching at litter or moving with the head in a lower position than the rump. Increased foraging behaviour was correlated with decreased FP, suggesting that encouraging foraging, (e.g., by providing more substrate for litter cover) may help reduce FP. This is an area that requires deeper investigation. However, Gilani *et al*. (2013) found that while foraging reduced FP during rearing, it did not produce a significant difference at 35 weeks and they concluded that it did not protect against FP later in life. Instead, it was concluded that minimising dietary changes and allowing a wider range of sound levels were more significant rearing factors that could be controlled to reduce FP later in life, while encouraging foraging had significant potential to reduce ongoing FP (Gilani *et al*., 2013).

Sultana *et al*. (2013) also explored the impact of environmental conditions on FP behaviour, focusing on the effect of different colours of LED lighting on the behaviour and stress responses of hens. Light is known to be an important environmental factor that influences the behaviour and physiology of chickens (Olanrewaju *et al*., 2006). In Sultana *et al*.'s (2013) study, laying hens (n=200) were subjected to a photoperiod of 16 hours a day under 1 of 8 light treatments: red, green, blue, a combination of these colours or white control light. The authors videoed chicken behaviour for 4 hours a day, 3 days each week. Data were collected in two stages, from 29-36 weeks and 41-48 weeks of age. Preening, FP, ground pecking and wing flapping were expressed as a frequency. Perching was expressed as times per day. A higher frequency of FP and ground-scratching behaviour was found in the Red treatment compared to other colours and combinations of colours. Conversely, birds in the Blue treatment spent more time perching and showed decreased FP and ground-scratching behaviour, leading the authors to speculate that short wavelength treatment had a calming effect resulting in reduced FP. This study was limited to older hens and therefore could not show if lighting during the early rearing phase had a long-lasting protective effect against later FP development. However, the study provides valuable evidence for the importance of light colour, suggesting that providing more blue light may help decrease FP behaviour in chickens.

Another element of rearing conditions that could be modified to reduce FP is diet. While Gilani *et al.*'s study focused on the impact of frequent dietary changes, Qaisrani *et al*. (2013) investigated the relationship between dietary content and FP behaviour. The authors hypothesised that increased dietary dilution using insoluble nonstarch polysaccharide (NSP) would reduce FP as a consequence of

increased feeding behaviour and prolonged eating time. One-day-old non-beak-trimmed pullets (n=864) were subjected to 4 dietary treatments: control; 7.5% diluted with sunflower seed extract and oat hulls; 15% diluted with sunflower seed extract; and 15% diluted with oat hulls. Every four weeks, feather damage was recorded, video data were observed to measure eating time, and FP behaviour was observed by live observation. Increasing dietary dilution levels were associated with increased eating and resting time, reduced FP and reduced feather damage. The control diet showed increased severe FP, comb and wire pecking. Qaisrani *et al*. (2013) suggested that this was because lower feed energy levels forced hens to spend more time eating and less time FP. In addition, the authors suggested that pecking became more imprinted toward feed and less toward the feathers of penmates. However, pullets being fed the diluted diet did not fully compensate for the dilution by increasing feed intake, resulting in lower weight gain in the middle of the rearing period. This would have to be taken into account when devising a diluted-feeding strategy. Oat hulls were more effective than sunflower seed extract in preventing feather damage, with the most improvement recorded for the 15% diluted diet using oat hulls. Hence the study showed that feeding layers a diluted diet using oat hulls could be an effective way to reduce the incidence of FP.

Conclusion

Current research suggests that certain aspects of the rearing environment are significant contributors to the development of FP behaviour. The colour of LED lighting, dietary dilution, foraging and sound levels have all been highlighted as factors that could be modified to help control FP and the resulting feather damage without beak trimming, leading to improved welfare for laying hens.

References

Gilani, A., Knowles, T.G., Nicol, C.J. 2013 The effect of rearing environment on feather pecking in young and adult laying hens. *Applied Animal Behaviour Science*, 148, 54-63.

Nicol, C.J., Bestman, M., Gilani, A.-M., de Haas, E.N., de Jong, I.C., Lambton, S., Wagenaar, J.P., Weeks, C.A., Rodenburg, T.B. 2013 The prevention and control of feather pecking: application to commercial systems. *World's Poultry Science Journal*, 69, 775-788.

Olanrewaju, H.A., Thaxton, J.P., Dozier III, W.A., Purswell, J.L., Roush, W.B., Branton, S.L. 2006. A review of lighting programs for broiler production. International Journal of Poultry Science. 5(4):301-308.

Qaisrani, S.N., van Krimpen, M.M., Kwakkel, R.P. 2013 Effects of dietary dilution source and dilution level on feather damage, performance, behavior, and litter condition in pullets. *Poultry Science*, 92, 3, 591-602.

Rodenburg, T., Van Krimpen, M., De Jong, I., De Haas, E., Kops, M., Riedstra, B., Nordquist, R., Wagenaar, J., Bestman, M., Nicol, C. 2013 The prevention and control of feather pecking in laying hens: identifying the underlying principles. *World's Poultry Science Journal*, 69, 02, 361-374.

Sultana, S., Hassan, M., Choe, H., Kang, M., Kim, B., Ryu, K. 2013 Effect of various LED light color on the behavior and stress response of laying hens. *The Indian Journal of Animal Sciences*, 83, 8, 829-833.