

# Factors influencing feather pecking and cannibalism in laying hens

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## Introduction

Feather pecking is characterised as pecking behaviour directed towards the plumage of other birds, with feathers being damaged and often pulled out (Bilcik and Keeling, 2000). Severe feather pecking may also lead to the damage of skin and muscle and is referred to as cannibalism (Yngvesson and Keeling, 2001). Both types of behaviour are serious welfare issues facing the poultry industry as they may lead to pain, injury or even death. The reasons for the development of these behaviours are complex and often a number of factors may be involved. Generally, it has been accepted that the environmental conditions such as housing densities, light and foraging materials are the major cause of this behaviour. However, research has shown that other predisposing factors such as genetics, social interactions and appearance may also play significant roles and this essay aims to review some of the recent developments in these fields.

## Genetic

Recent studies have shown that whilst simple factors such as the provision of dust-bathing and foraging material may significantly reduce feather pecking and cannibalism in chickens, it does not completely prevent the behaviour from developing (Larsen, Vestergaard and Hogan, 2000; El-Lethey, Aerni, Jungi and Wechsler, 2000). This indicates that other factors, such as genetic predisposition, may be of importance and past research has suggested that there may be strain differences in the tendency to feather peck (Klein, Zeltner and Huber-Eicher, 2000). This theory is supported by the investigation of Kjaer (2000), which showed that White Leghorn (LSL) strains of chickens have a considerably lower tendency to feather peck than the larger strains such as the Lohmann Brown. In addition, there are clear indications that even within a particular strain there are differences in the tendencies to feather peck. Kjaer, Sorensen and Sub (2001) demonstrated this in a study on the White Leghorn, where the investigators selectively bred chickens with high pecking (HP) and low pecking (LP) tendencies. The results demonstrated that feather pecking behaviour in adult hens was significantly higher in the HP than in the LP lines, reaching up to seven-fold in generation 3. These results support the suggestion that feather pecking is a heritable trait, which may be reduced by genetic selection.

A different perspective was taken in a study by Klein et al. (2000) that considered the view that feather pecking is a re-directed foraging behaviour. The researchers hypothesised that genetically determined differences in foraging behaviour could be responsible for the observed differences in feather pecking between strains. The experiment investigated foraging behaviour of two hybrid strains (LSL, Dekalb) in restricted and enriched housing conditions. Clear differences in foraging behaviour emerged in the restricted environment. Although the total foraging time did not differ between hybrids, the Dekalb chickens spent significantly more time scratching and moving about, resulting in significantly lower rates of feather pecking than was observed in the LSL strain. These results show a different perspective to the genetic influence in the development of feather pecking by supporting the theory that there are genetic differences in the foraging behaviour between hybrid strains.

## Social Interactions

One of the most important features of feather pecking and cannibalism is the fact that it spreads within a group. Although the way this occurs is still unclear, one theory suggests that it is a socially transmitted behaviour (Zeltner, Klein and Huber-Eicher, 2000). This theory originates from the various studies that have demonstrated that the behaviour of individual chickens may be altered if they have the opportunity to observe the behaviour of conspecifics (Zeltner et al., 2000). A recent study by Zeltner et al. (2000) aimed to confirm this hypothesis by introducing chickens that showed high frequencies of feather pecking into a group of

naïve chickens. The results demonstrated a significantly higher incidence of feather pecking in these groups than in the control groups, thus showing that the behaviour may be spread by social interactions between chickens. Other studies have shown that feather pecking spreads through flocks because the damaged feathers become an attractive target for feather-pecking behaviour (McAdie and Keeling, 2000). However, this was contradicted by Zeltner et al. (2000) as there were no observed differences in the plumage quality of the birds in both groups.

Tablante, Vaillancourt, Martin, Shoukri and Estevez (2000) collected data from commercial farms to study the incidence of spatial distribution of cannibalism in caged hens. Cannibalism showed apparent spatial clustering giving statistical evidence that this was not a random event, but an occurrence that often leads to mortalities within the same cage. This is consistent with the results of Zeltner et al. (2000), suggesting that birds may imitate or learn this type of behaviour from a cannibalistic individual just by having visual contact with it. However, it should be noted that in this study, the incidence of cannibalism was significantly higher on the top rows of cages as compared with the bottom ones suggesting that other factors such as increased light intensity influenced these results. Although such inconsistencies warrant further investigation, strong evidence emerging from these studies supports the idea that by removing individuals that display the unwanted behaviour, there may be a reduction in the incidence of the behaviour within the flock.

### Physical appearance

Finally, the physical appearance is thought to play a role in feather pecking and cannibalism and understanding this may assist in reducing the occurrence of the behaviour. For example, Yngvesson and Keeling (2001) discovered that cannibalistic hens are generally heavier and taller than the rest of the flock. This result is consistent with the results obtained in the study by Kjaer et al. (2001), in which the body weight was correlated to feather pecking behaviour. There is other experimental evidence suggesting that hens use physical appearance when choosing the victim of a cannibalistic attack. An investigation by McAdie and Keeling (2000) found that artificially simulated "damaged feathers" become an attractive target for feather-pecking behaviour suggesting that this may contribute to the spread of the behaviour within the group. Although the results were statistically significant, the experiment was performed on a brown strain of chickens and it is possible that the cutting of top feathers exposed other more attractive feathers. It is possible that such feathers are not present in the white strains and therefore this behavioural trend would not be observed. Further studies supporting this theory might be useful as they may provide an explanation for the lower incidence of feather pecking in white strains compared with brown strains (Kjaer (2000).

### Conclusions

In conclusion, it can be seen that feather pecking and cannibalism are complex behavioural problems that are not completely understood. Considerable research has been conducted into the effect of environmental conditions and whilst there may be a significant reduction in the unwanted behaviour as a result of manipulation, it is never fully eliminated. It is therefore important to understand other factors underlying this behaviour when trying to reduce the problem. A clear example that emerged from this essay was the fact that the behaviour may be a heritable trait that could be selected against. This is important especially in loose housing systems, where environmental control is limited, and control of feather pecking and cannibalism is of major benefit to the welfare of the hens. Furthermore, it was shown that additional studies on the influence of social transmission and hen appearance would also be beneficial in understanding the complex processes involved in this serious animal welfare issue.

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### **Additional Reading**

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