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The novel object test as predictor of feather damage in cage-housed Rhode Island Red and White Leghorn laying hens

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Abstract

The propensity to develop feather pecking (FP) has a genetic component and has been related to fear responses in laying hens. A convenient test measuring the fear response might therefore be used to identify hens with a stronger propensity to develop FP. However, genetic origin and age can influence the relation between fear response and FP. The present study investigated the use of a novel object test in the home cage as predictor of FP in six lines of laying hens from Rhode Island Red origin and six lines from White Leghorn origin at adult age. Incidence of FP was assessed by scoring feather damage at back, rump and belly at 35, 43, 51, 63 and 69 weeks of age. A novel object test, measuring fear response to a rod, was performed at 23, 46 and 69 weeks of age. For RIR lines, a stronger fear response at 23 weeks was related to decreased feather damage at 51 weeks and for both RIR and WL lines stronger fear responses at 46 weeks were related to increased feather damage at 51 weeks. These results suggest that the relation between FP and fear response differs between ages and between Rhode Island Red and White Leghorn lines.

Keywords: Feather pecking; Novel object test; Line differences; Genetics

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1. Introduction

The European poultry industry is facing significant changes in legislation concerning welfare of laying hens. In the near future, the battery cage system (under EU Council directive 99/74/EC) and beak trimming in some EU member countries (depending on national legislation) will be banned, which is assumed to increase damage due to feather pecking (FP) and cannibalism (Jendral and Robinson, 2004). FP behaviour in laying hens is the non-aggressive pecking towards the plumage of other birds. FP without removal of feathers is also known as gentle FP and is usually ignored by the recipient. Severe FP is more forceful than gentle FP and leads to damage and loss of feathers (Savory, 1995). Without beak trimming, FP is more likely to result in haemorrhages, which may eventually lead to mortality due to cannibalism.

It is known that genetic background and environmental factors such as housing system, feed composition and light (colour, intensity and frequency) play a role in the development of FP (Sedlačková et al., 2004). Several studies have investigated differences in feather pecking between commercial and/or traditional lines of laying hens (i.e. Hughes and Duncan, 1972; Hocking et al., 2001, 2004; Kjaer, 2000; Kjaer and Sørensen, 2002). Based on these studies it can be concluded that differences in line or origin, White Leghorn (WL) or Rhode Island Red (RIR), influence the occurrence of FP at different ages. Methods to assess the incidence of FP in these studies involved direct observations of FP or indirect measurements on plumage condition; it has been shown that higher levels of (severe) FP using direct observations are correlated to poorer plumage condition scores (Bilčik and Keeling, 1999; Kjaer, 2000; Kjaer and Sørensen, 2002; Hocking et al., 2004).

Breeding companies are currently trying to develop lines with a reduced propensity to perform FP. In order to efficiently select against FP, a test is needed that accurately predicts FP behaviour while damage to the selection candidate is avoided. One such test could be the response to a novel object test. Novel object tests are used to measure the degree of fearfulness (Jones, 1996). Fearfulness can be defined as the negative emotional state that results from perception of potential danger (Boissy, 1998) and it was found to have a genetic component in the domestic laying hen (Faure, 1981). Excessive fearfulness in itself may result in impaired welfare and it has also been found to have a negative impact on performance (Jones, 1996; Jones et al., 1997; Schütz et al., 2004). Elevated levels of fearfulness have been related to increased expression of FP (Jones et al., 1995; Rodenburg et al., 2004; Buitenhuis et al., 2005). Although opposite relations have been reported (Rodenburg et al., 2004; Jensen et al., 2005). Other studies were unable to detect a relation whatsoever (Hocking et al., 2001; Albentosa et al., 2003a,b; Hocking et al., 2004). Possible explanations for these contradicting results include the method of measuring fear (i.e. novel object, open field test or tonic immobility), test environment (home cage/pen or experimental setting), type of line used (RIR or WL) and age of testing.

The aim of the present study was to evaluate response to a novel object test in the home cage as a predictor of FP. It has been suggested that the way fearfulness is expressed in chickens is age dependent (Candland and Nagy, 1969; Rodenburg et al., 2004). Therefore, different relations between FP and fear responses may be found at different ages. In this paper we report observations on the development of fear and FP during the entire laying period in 12 commercial, purebred lines of laying hens of White Leghorn and Rhode Island Red origin.

2. Materials and methods

The 12 purebred, commercial lines of laying hens used in this experiment had intact beaks and were housed in cages, both during the rearing and experimental period. These lines were either of Rhode Island