



Access to litter during rearing and environmental enrichment during production reduce fearfulness in adult laying hens



Margrethe Brantsæter^{a,*}, Fernanda M. Tahamtani^b, Janicke Nordgreen^a, Ellen Sandberg^c, Tone Beate Hansen^d, T.Bas Rodenburg^e, Randi Oppermann Moe^a, Andrew Michael Janczak^a

^a Animal Welfare Research Group, Norwegian University of Life Sciences (NMBU), Faculty of Veterinary Medicine, Department of Production Animal Clinical Science, Oslo, Norway

^b Department of Animal Science, Aarhus University, Blichers Allé 20, DK-8830, Tjele, Denmark

^c Department of Chemistry, Biotechnology and Food Science, Norwegian University of Life Sciences (NMBU), N-1432 Ås, Norway

^d Animalia, Norwegian Meat and Poultry Research Centre, Oslo, Norway

^e Behavioural Ecology Group, Wageningen University, Wageningen, The Netherlands

ARTICLE INFO

Article history:

Received 23 September 2016

Received in revised form 16 January 2017

Accepted 18 January 2017

Available online 23 January 2017

Keywords:

Fearfulness

Rearing

Litter

Environmental enrichment

Laying hen

Welfare

ABSTRACT

Exaggerated fear-reactions are associated with injurious flying, smothering, feather pecking and other events that compromise animal welfare in laying hens. The aim of this study was to test the hypothesis that chicks with access to litter during the first five weeks of life would be less fearful as adult hens compared to birds reared without access to litter. The hypothesis was tested in a national on-farm study in commercial aviary flocks in Norway. Five rearing farmers divided the pullets into two groups within their rearing houses. While the chicks were enclosed inside the aviary rows during the first five weeks of life, paper substrate where food and other particles could accumulate, covered the wire mesh floor in the treatment group, whereas the control group was reared on bare wire mesh. At 30 weeks of age, 23 aviary flocks (11 control flocks reared without paper and 12 treatment flocks reared with paper) were visited. During the visit, the fearfulness of the adult birds was tested in a stationary person test and a novel object test. The data was analysed by ANOVA or logistic regression as appropriate. The access to litter during rearing did not influence the number of birds that approached within 25 cm of the stationary person ($p = 0.51$). All flocks, regardless of rearing treatment, had birds which came within 2 m of the stationary person. The latency to approach within 2 m of the stationary person tended to be influenced by provision of environmental enrichment as adults ($p = 0.08$) and by the interaction between treatment \times rearing farm ($p = 0.08$). The number of birds that approached within 2 m of the stationary person was influenced by the interaction between treatment during rearing and provision of enrichment as adults ($p = 0.03$), however, the *post hoc* test showed no pairwise differences. All flocks, regardless of rearing treatment, had birds that approached the novel object. The access to litter during rearing did not influence the birds' latency to approach the novel object. The number of birds approaching the novel object was affected by the interaction between access to substrate during rearing and provision of environmental enrichment as adults ($p = 0.05$). The results indicate that both adding paper substrate to chicks from the first day of life and environmental enrichment as adults, reduce fearfulness in laying hens.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

Following the EU ban on conventional cages (99/74/EC), laying hens are either housed in enriched cages or loose housed

(barn or aviary systems). The law requires that all adult hens have unrestricted access to a feed trough, nest boxes, perching space and litter which allows pecking and scratching (Comission, 1999). Several countries including Norway, Sweden, Germany, Austria and The Netherlands mainly keep laying hens in loose housing systems (floor housing or aviaries) (Comission, 1999; Erhvervsfjerkræsektionen, 2015). The change from conventional cages was intended to improve animal welfare, as loose housing systems enable the birds to express a greater variety of highly motivated natural behaviours such as perching, dust bathing, foraging

* Corresponding author at: Animal Welfare Research Group, Department of Production Animal Clinical Science, NMBU School of Veterinary Science, Ullevålsveien 72, Oslo, N-0454, Norway.

E-mail address: margrethe.brantsaeter@nmbu.no (M. Brantsæter).

and laying in a nest box (Lay et al., 2011; Cronin et al., 2012; Janczak and Riber, 2015). However, loose-housed birds do not necessarily experience increased welfare, as indicated by higher mortality rates and higher risk of developing feather pecking and cannibalism compared to birds housed in cages (Michel and Huonnic, 2003; Tauson, 2005; Rodenburg et al., 2008b; Lay et al., 2011).

Fearfulness is the predisposition of an individual to be easily frightened (Boissy, 1995; Jones, 1996). Under natural conditions, fear functions to protect the animal from danger (Boissy, 1995). However, when the fear response is exaggerated or inappropriate (Mills and Faure, 1990; Jones, 1996) and the environment does not allow for successful coping with the fear inducing stimulus, it may severely compromise the welfare of the animal. For example, fearfulness has been linked to feather pecking (Vestergaard et al., 1993; Jones et al., 1995; El-Lethey et al., 2001; Rodenburg et al., 2004; Rodenburg et al., 2009; Uitdehaag et al., 2009; de Haas et al., 2014a), increased risk of injuries such as keel bone fractures (Harlander et al., 2015) and increased risk of smothering (Hansen, 1976; Mills and Faure, 1990; Bright and Johnson, 2011; Gilani et al., 2012; Richards et al., 2012). Fearfulness has thus important welfare implications for laying hens.

The rearing period affects development and is thus crucial in preparing the birds for the challenges they will encounter during adulthood (Rogers, 1995; Rodenburg et al., 2008a; Janczak and Riber, 2015). The early environment influences the development of fearfulness and associated activation of the hypothalamic–pituitary–adrenocortical axis in response to stressors (Jones, 1996; Caldji et al., 2000). Some rearing-associated factors found to influence fearfulness in poultry are environmental complexity (Jones, 1982; Reed et al., 1993; Brantsæter et al., 2016a, 2016b), group size (Bilcik et al., 1998; Rodenburg and Koene, 2007), and access to brooders (Gilani et al., 2012; Riber and Guzman, 2016), perches (Brake et al., 1994), or outdoor areas (Grigor et al., 1995; Tobias Krause et al., 2006). Exposure to the aforementioned factors is mainly dictated by the design of the physical environment and optimising economical profit, whereas management-related rearing factors are more malleable. Birds exposed to more human contact during rearing have been reported to have lower levels of fearfulness (Jones, 1993; Reed et al., 1993; Zulkifli, 2008; Edwards et al., 2010). Another more practical, albeit controversial, management-related procedure is early provision of pecking substrate (litter) to the pullets during the time before release from aviary rows (Aerni et al., 2005; de Haas et al., 2014a; de Haas et al., 2014b). However, differing opinions regarding provision of substrate are based on practical experience and anecdotal evidence rather than systematic investigation.

Previous work (de Haas et al., 2014b) indicated that chicks experiencing disruption or limitation of litter supply tended to keep a larger distance to a human and to have an increased latency to approach a novel object, compared to birds reared with constant access to litter during early rearing. This was probably caused by the fact that the treatment caused an increase in severe feather pecking and feather damage, already at a young age, making the birds more fearful. However, all chicks were originally given access to chick paper, so the effect of having no litter from the very beginning was not investigated (de Haas et al., 2014b). Furthermore, the birds in that study were beak trimmed which can influence the results (Davis et al., 2004; Janczak and Riber, 2015). Another study comparing birds reared on wire, straw or a combination of sand and straw, found that the birds reared without access to litter had longer durations of tonic immobility, an indicator of fearfulness (Jones, 1986; Johnsen et al., 1998). Early access to litter has also been reported to positively influence egg weight, egg mass and feed conversion ratio and to reduce mortality (Aerni et al., 2005) and feather pecking (Huber-Eicher and Sebö, 2001; Nicol et al., 2001; de Haas et al., 2014a, 2014b; Tahamtani et al., 2016). However, to the authors'

knowledge, no previous study has investigated the effect of access to litter during rearing on fearfulness in commercial adult Lohman selected Leghorns with intact beaks.

The aim of this study was to test the hypothesis that hens reared with early access to pecking substrate would be less fearful as adults compared to hens reared without pecking substrate. We predicted that access to litter in the form of paper substrate in the early days of rearing would result in decreased fearfulness in adult laying hens.

2. Materials and methods

We designed a study following the guidelines for a randomised, blinded, controlled clinical trial (O'Connor et al., 2010). We recruited rearing farmers from across Norway and instructed them to provide part of the animals in the same rearing house with paper substrate from one day of age while the other animals received no paper substrate during the early rearing period. All animals were visited at the production farm at around 30 weeks of age and the flocks were tested for their level of fearfulness.

2.1. Population and treatment allocation

Non beak-trimmed, female Lohmann Selected-Leghorn (LSL-Classic) chickens (*Gallus gallus domesticus*) of up to 32 weeks of age and normal health status were used in this study. In total, 12 rearing farms were assessed for eligibility. Of these, five had the appropriate facilities for the study design and agreed to be enrolled into the study. Among the five rearing farms included, approximately 489,000 laying hens were randomly allocated to one of the two treatment groups. At one day of age, more than 15,000 chicks arrived at each rearing farm and were distributed in the aviary rows of the rearing house. The rearing farmers were asked to close the divisions between the aviary rows of the system in order to stop the animals from moving between corridors, effectively forming two separate groups within the same house (Fig. 1). In one of these groups, the rearing farmers supplied chick paper (Tork, SCA, The Netherlands) approximate thickness 41 g/m² over the wire mesh floor inside the aviary rows. The chick paper prevents the legs of young animals from falling through the wire mesh. It also allows the aggregation of particles such as dust, spilled food and droppings, thus providing the chicks with foraging substrate inside the aviary row from the first day of age. The paper was present from the time the chicks arrived and remained until the birds were released into the corridors of the aviary. For the control group, situated in another row within the same house, no paper was supplied. Thus, the animals in the control rows were standing on bare wire mesh until the day they were let out onto the floor. At five to six weeks of age, the side doors to the aviary rows were opened for both groups and the animals were allowed to move freely within each corridor containing birds of the same treatment. Some rearing farmers distributed sparse amounts of saw dust before releasing the birds, whereas the majority of rearing farmers relied on the build-up of dust and other particles as "litter" on the floor of the corridors. Due to the physical separation of the aviary rows and corridors, the animals from one treatment group did not mix with animals from the other group. Rearing farmers were asked to repeat the experiment with a second batch of chicks, in the same house, after the first batch was old enough to be transported to production farms. During the second round of experiments, treatment and control rows were reversed in relation to the first round to preclude confounding effects of rows/locations within the rearing house (Fig. 1). All other husbandry procedures, both at rearing farms and at production farms followed recommendations from the Lohmann management guide. At 16 weeks of age, the hens were transported by truck from

Download English Version:

<https://daneshyari.com/en/article/5763302>

Download Persian Version:

<https://daneshyari.com/article/5763302>

[Daneshyari.com](https://daneshyari.com)