Keel-bone damage and foot injuries in commercial laying hens in Denmark

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Abstract

Keel-bone damage and foot injuries have a negative impact on welfare in laying hens. The extent of the problems in Danish commercial flocks of layers is unknown. Therefore, the aim of this study was to assess the current prevalence of keel-bone damage and foot injuries in Danish commercial flocks of laying hens and to investigate the effects of production system, housing system, hybrid and age. The occurrences of keel-bone damage, hyperkeratosis and missing toes were higher at 62 compared to 32 weeks of age, while the reverse was found for toe wounds, foot-pad lesions and bumble feet. There was no difference between barn and organic production systems in the risk of having keel-bone fractures and foot injuries, except that barn hens were more likely to have foot-pad lesions than organic hens (32 weeks: 16.1 vs 3.1%). Hens in multi-tiered systems were more likely to have keel-bone fractures compared to hens in single-tiered systems (62 weeks: 11.6 vs 4.9%). Of the four hybrids, Lohmann Brown Lite had a higher risk of keel-bone fractures, whereas bumble feet were found more frequently in Lohmann LSL. Keel-bone damage and foot injuries are less common in Danish non-cage systems compared to most of the reporting presently available from other countries. We suggest transnational studies, aimed at identifying the causal factors of this discrepancy, to increase existing knowledge on how to reduce incidences of keel-bone damage and foot injuries.

Keywords: animal welfare, foot injuries, housing system, keel-bone damage, laying hen, production system

Introduction

In recent years, attention has been directed to keel-bone damage in laying hens, and high incidences of keel-bone damage have been reported (Fleming et al 2004; Rodenburg et al 2008; Kappeli et al 2011; Wilkins et al 2011; Petrik et al 2015). Rodenburg et al (2008) reported that, in The Netherlands, 97% of the hens around 60 weeks of age housed in multi-tiered systems without outdoor access had keel-bone fractures, while the prevalence for similar-aged hens in single-tiered systems was 82%. The prevalence of keel-bone fractures seems to be unaffected by access to an outdoor area (Kappeli et al 2011) but increases with age of hens (Fleming et al 2004; Richards et al 2012; Petrik et al 2015). Poor animal welfare is linked to keel-bone fractures, as fractures may result in acute and chronic pain in addition to reduced mobility (Nast et al 2012a,b, 2013). Thus, a hen experiencing a keel-bone fracture early in the production period may suffer from poor welfare during a substantial part of her lifespan.

The keel bone is prone to damage due to its anatomical position (Fleming et al 2004; Kappeli et al 2011). Similarly, the feet are exposed to injuries due to continuous contact with litter or housing equipment, such as perches and a wire floor (Tauson & Abrahamsson 1994; Wang et al 1998; Pickel et al 2011). Wang et al (1998) found that the risk of foot-pad lesions in laying hens is affected by the condition of the litter; the occurrences of foot-pad lesions were 92 and 38% on wet and dry litter, respectively. Producers consistently report that it can be more difficult to control the humidity in layer houses with outdoor access, especially in periods with wet or humid weather conditions. Thus, outdoor access may be a contributing risk factor for foot-pad lesions.

An investigation of keel-bone damage and foot injuries has not been previously performed in commercial flocks of layers in Denmark. The aim of this study was to assess the current prevalence of keel-bone damage and foot injuries in commercial laying hens in Denmark and to investigate the effects of production system (barn vs organic), housing system (single vs multi-tiered), hybrid (four different strains) and age (32 vs 62 weeks of age).

Materials and methods

A study of the prevalence of keel-bone damage (ie deviations and fractures) and foot injuries (defined as hyperkeratosis, toe wounds, missing toes, foot-pad lesions and bumble feet) was performed from January 2013 to October 2014 on 31 commercial farms. Production system (barn or organic), housing system (single or multi-tiered) and hybrids included in the study are presented in Table 1. Perches were available in all farms visited, and multi-tiered systems consisted of three tier levels. In the barn system flock sizes ranged between 2,000 and 14,000 (mean: 7,002; median: 6,000), whereas the organic flocks all consisted of 3,000 hens, apart...