IGN-Research Award 2023

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Piling behaviour in laying hens – origin and contributing factors

PhD University of Bern 2021

Summary

Piling behaviour, the dense clustering of laying hens in loose-housed layer barns, can lead to death due to suffocation. A study from the UK shows that suffocation affects one in four laying hen farms. Furthermore, Swiss farmers report that suffocation leads to an average loss of 6 to 20 birds and sporadically over a hundred birds. Farmers* in Germany, Austria, and Australia also report piling behaviour and smothering. Smothering is thus a widespread animal welfare problem. To prevent smothering, knowing the causes of piling behaviour is necessary. Anecdotal reports from North America and Switzerland discuss light as a trigger and herd density as an influencing factor on piling. However, a systematic investigation of triggers and influencing factors on piling behaviour is still lacking. Furthermore, there is no operationalisation of piling, which makes comparisons between studies difficult.
The PhD dissertation "Piling behaviour in laying hens - origin and contributing factors" comprises a field study in Switzerland (I), an experimental study (II) and a field study in the UK (III). The dissertation has four main objectives to investigate piling behaviour:

1. The operationalisation of piling behaviour (I)
2. The identification of piling triggers and influencing factors in different bird environmental settings (I, II, III)
3. The experimental validation of piling triggers (II)
4. The qualitative analysis of farmers' experiential knowledge of piling behaviour (III)

The operationalisation of piling was based on a literature description, which was compared with video observations on Swiss layer farms. Piling was operationalised as three or more mostly immobile (<5 s movement) hens standing closely together (overlapping of body outlines) and mostly facing in the same direction. The definition resulted in a high recognition rate of piling by the same observer (>95 %, piles longer than >4.5 min) and multiple observers (>74 %), thus providing a good basis for further piling research and comparison between studies.

Triggers and influencing factors of piling were investigated on 13 affected commercial Swiss farms (I) in the experimental study (II), as well as on 27 British farms (III) through video observations. In all studies, piling was often triggered by hens joining the behaviour of other hens such as pecking at shed walls or dense dust bathing (77 % of, in total, 808 accumulations in studies I, II, III). Likewise, bird mass movements (12 %) and light spots (1.5 %) triggered piling behaviour. The experiment (II) tested whether environmental stimuli (light, a novel object, and a heating plate) can attract hens and trigger piling behaviour under controlled conditions. For this purpose, these stimuli and a control (no stimuli) were presented in a test area to 55 Lohmann Selected Leghorn hens in each of the eight compartments for 10 min (light) or 35 min (other stimuli). The number of hens attracted in the test area was then compared with a control area during the experimental periods. The study showed that during the light and the novel object condition, the number of birds in the test area increased compared to the control area, which, however, only unreliably (2x for the novel object) triggered piling behaviour. The studies

revealed time of day, flock colour, flock age, barn area, flock size and as influencing piling behaviour. For example, in all studies, piling behaviour was more frequent around midday than in the afternoon. Furthermore, piles on British farms were larger in the centre of the litter area than in barn corners. The study findings on triggers and influencing factors may encourage farmers and researchers to identify farm-specific causes of piling and develop preventive measures. For example, increased flock visits around midday could break up piles and prevent smothering. Larger and segregated dust bathing areas could prevent dense dust bathing. The attractiveness of light on birds underlines the importance of even barn light distribution and protection from sunlight spots.

Experiential knowledge about piling and smothering was collected through a qualitative content analysis of semi-structured interviews with 12 British farmers, to compare video observations with farmers' experiences and to find further explanations for piling. The farmers` statements supported the video observations that synchronous behaviours (e.g., using the same litter areas simultaneously for dust bathing) can lead to piling. The farmers also reported that piling occurs predominantly around midday in the litter area, which underlines the time-of-day and location effects on piling. In addition to the video observations, farmers associated the transition period from rearing to the layer barn, the start of the laying period, sudden environmental changes (e.g., the sound of low-flying aircraft), changed routines (e.g., changed access times to the winter garden) and a too quiet flock character with piling. Farmers' experiences, therefore, point to a need for further research to examine triggers and influencing factors of piling behaviour. For example, a correlation between piling and genetic traits of the animals should be tested.

*The masculine includes m/f/d.