



Question to EURCAW-Poultry-SFA

Reference of the query: Q2E-Poultry-SFA-2022-008

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Background context provided by the solicitor

The Council Directive for minimum standards for the protection of laying hens does not include rules for housing of pullets. The Swedish animal welfare provisions for laying hens cover pullets, layers as well as breeders.

Question

From what age should chickens/pullets have access to litter for dust bathing?

Answer

The question addresses litter access for dustbathing. The EURCAW answers specifically in relation to the dustbathing behaviour, but also expands the answer to other purposes, as litter can be useful to pullets for others behavioural needs. Indeed, provision of litter is needed for exploratory and foraging behaviours and comfort in general (within specifically dustbathing) and contributes to avoid any further problem – such as injurious pecking at a later stage.

Background arising from expertise

Introduction

In studies, substrate has been shown to have more value for dustbathing than for other activities (Matthews et al., 1998). Dustbathing is a coordinated behavioural sequence that poultry are highly motivated to perform that aids in the maintenance of plumage condition (Figure 1). The sequence can be grouped into 4 main stages: the preparatory stage, the introductory stage, the consummatory stage, and the after stage (Van Rooijen, 2005). During the preparatory stage, poultry prepare a site to perform dustbathing by scratching with both legs and by raking their bill through the substrate. In a natural site, this clears vegetation and other materials from the area and helps form a small pit in which the bird sits. During the introductory stage, the bird erects their feathers and alternates between sitting and lying, bringing the substrate into the plumage through a sequence of movements including bill raking, wing shaking, scratching, head rubbing, and rotational movements (Van Liere, 1992). During the consummatory stage, the bird flattens their feathers and performs side rubbing and side lying, facilitating the substrate to come into contact with the skin and feathers (Westermann and Vestergaard, 1984). Finally, during the after stage, the bird stands and shakes to remove the substrate, and feathers are brought back to neutral position (Van Liere, 1992). Birds show a preference for substrates with smaller particle size, such as peat or sand (Petherick and Duncan, 1989; Olsson and Keeling, 2005; de Jong et al., 2007).

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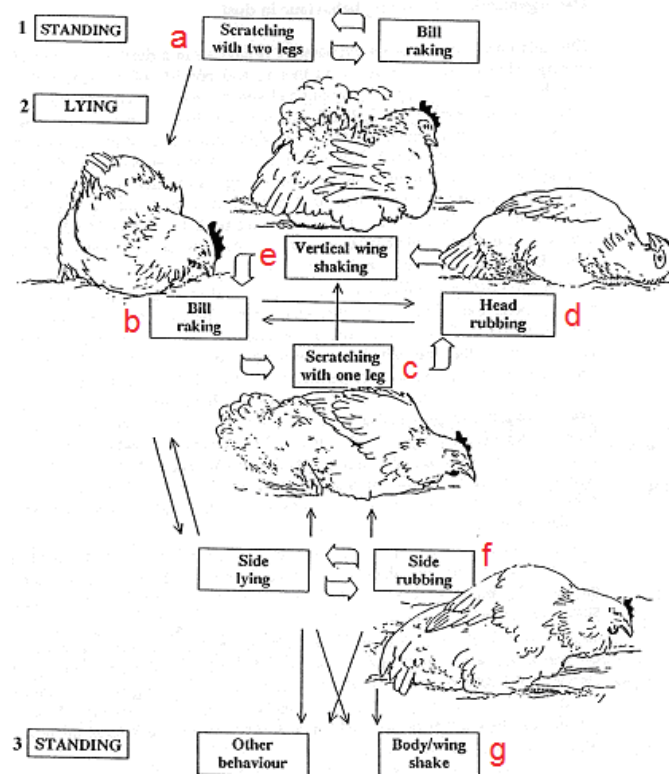


Figure 1: Complete sequence of dustbathing behaviour (Van Liere, 1992).

Function and motivation

Under unrestricted conditions, birds develop a clear diurnal rhythm, performing dustbathing for around half an hour once every second day (Vestergaard, 1982; Olsson and Keeling, 2005). Poultry are highly motivated to perform dustbathing, and it is recognized as a behavioural need (Weeks and Nicol, 2006). It is believed that the main function of dustbathing is to maintain good plumage condition by removing excess lipids and water from the skin and feathers, as well as dislodging dandruff and ectoparasites, though the latter has not been confirmed (Vezzoli et al., 2015). Removing excess and stale lipids is critical for preserving the thermoregulatory properties of the plumage (Olsson and Keeling, 2005). Motivation for dustbathing has been shown to increase with higher amounts of lipids and parasites and with the sight of a suitable substrate (Lindberg and Nicol, 1997). In a study, hens deprived of substrate were willing to push heavier weights to access litter (Widowski and Duncan, 2000). When no suitable substrate is available, such as in cages, birds will still perform dustbathing motions in the absence of material (sham dustbathing), suggesting that hens are highly motivated to dustbathe (Olsson and Keeling, 2005). Sham dustbathing does not fully fulfil the functions of dustbathing nor the behavioural needs of the hen (Olsson and Keeling, 2005; Merrill et al., 2006) and could lead to feather damage due to contact with abrasive surfaces (e.g., wire cages or concrete). Occurrence of sham dustbathing may also be used as an indicator that resources needed to fulfil dustbathing needs are inadequate. After periods of substrate deprivation, a rebound effect has been

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observed after a period of three weeks (Wennrich and Strauss, 1977), after 8 days (Hogan et al., 1991), and after as little as four days of substrate deprivation (Vestergaard, 1982). It is likely that the inability to perform dustbathing can lead to frustration, discomfort, and stress, negatively impacting their welfare (EFSA AHAW Panel, in prep.).

Ontogeny of dustbathing

The motor elements of the dustbathing behavioural sequence develop independently as chicks age. Ground pecking can be seen as early as on the day of hatching. By 2 days of age, chicks can be observed performing bill raking behaviour, and other elements gradually appear over the first 12 days of life (Kruijt, 1964). The frequency of these behaviours increases from week 2 until they become integrated into normal adult coordinated dustbathing behaviour at 4 weeks of age (Hogan et al., 1991; Larsen et al., 2000). The frequency of dustbathing bouts is higher in young birds, reaching a maximum at 2-3 weeks of age in which birds may dustbathe 2-3 times per day, which decreases in adulthood to once every second day (Hogan and Van Boxel, 1993). During the first week, dustbathing bouts are relatively short and contain few transitions between individual behavioural elements. The transitions are bi-directional suggesting that the structure is relatively loose. During the second week, bouts become longer and the structure becomes more stable (Larsen et al., 2000).

Little is known about how each behavioural element become incorporated into a fully developed dustbathing bout but it is believed to be influenced by exposure to and feedback from various stimuli at appropriate times (Larsen et al., 2000). During the first week of life, birds perform sub-bout elements, such as pecking and scratching at the substrate while standing, which are believed to function in the development of the perceptual mechanism to recognize suitable dustbathing substrate. Vestergaard and Baranyiova (1996) have suggested that pecking may facilitate “imprinting” on appropriate dust substrates, and links between pecking at various substrates and dustbathing litter preferences later in life are established by 3 days of age (Sanotra et al., 1995; Larsen et al., 2000; Olsson and Keeling, 2005). Therefore, exposure to suitable substrate from shortly after hatching is necessary to ensure acceptance of substrate for dustbathing later in life (Abrahamsson et al., 1996; Olsson, 2003).

Consequences of no litter/disrupted dustbathing

If appropriate substrates are not present in early life, proper development of the dustbathing sequence may not occur, even if litter is presented later in life (Larsen et al., 2000). If no other suitable substrates are available, birds may view feathers as an acceptable material in place of more appropriate alternatives (Hogan and Vestergaard, 1992; Vestergaard and Lisborg, 1993; Sanotra et al., 1995). Birds reared on wire have been observed replacing the bill-raking behaviour with pecking (including allopecking) during bouts of dustbathing (Larsen et al., 2000). The fact that feather-directed pecking may become incorporated into the dustbathing bout structure suggests that feather pecking, or even cannibalism, may in part develop as redirected dustbathing behaviour in the absence of suitable litter (Blokhuis, 1986; Vestergaard, 1994; Johnsen et al., 1998; Dixon et al., 2008). If sham dustbathing develops due lack of substrate early in life, there is a risk that the behaviour may persist later in life, even after provision of a suitable substrate. Since sham dustbathing does not fulfil behavioural and

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functional needs, pullets or hens may continue to experience negative affective states or other welfare issues (Olsson and Keeling, 2005).

Litter during rearing also plays a critical role in functions outside of dustbathing. For instance, litter encourages exploration, foraging, and play behaviour – all of which are necessary to avoid stress and frustration during rearing. Inability to perform these behaviours during early development may lead to long-lasting consequences such as feather pecking or even injurious pecking (Michel et al., 2022). Additionally, litter may aid in the development of leg muscles by encouraging movement, potentially reducing leg deformities and improving walking ability later in life (Shields et al., 2004) and may positively influence bill length and toenail length (Fölsch et al., 1986).

Conclusion

Pullets should have access to appropriate, dry and friable substrate from as early as possible (day 1) which should remain available at all times. Small particle material such as peat and sand are preferred over wood shavings. If necessary to promote and establish feeding behaviour or to ensure that the vaccinations are effective, chicks may be kept on paper or other solid materials from days 1-6 (EFSA AHAW Panel, in prep.). The paper can accumulate feed, dust, and faeces, which could serve as a foraging substrate this first week, though it is far from ideal. Alternatively, litter could be distributed on the paper daily to help promote proper identification of suitable substrates.

In conclusion, pullets should have access to appropriate, dry and friable litter as soon as possible (up to a maximum of day 7, but only if they must be kept on solid materials).

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