

Animal Sciences

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Authors:

Torey Fischer Graduate Student Department of Animal Sciences Purdue University

Richard Blatchford Associate Specialist in Cooperative Extension University of California Davis

Marisa Erasmus Associate Professor Department of Animal Sciences Purdue University

Darrin Karcher Associate Professor Department of Animal Sciences Purdue University

Behavioral challenges and welfare consequences of cage-free poultry housing

Introduction

Cage-free housing systems for laying hens have become much more common in the last few decades. This shift has been driven by customer concerns about hen welfare, which have led to laws requiring cage-free housing and retailer promises to source more cage-free eggs.

Although there are welfare benefits for birds in cage-free housing systems, producers have discovered disadvantages regarding bird welfare in these systems. Researchers, producers, and other stakeholders are working to solve the challenges.

There is a lot of variation in the design of cage-free housing systems and the resulting management of birds in those systems. Cage-free, as defined by the U.S. Department of Agriculture, must be eggs "laid by hens that are able to roam vertically and horizontally in indoor houses and have access to fresh food and water."¹

The cage-free category includes a variety of management systems and egg labels. Producers that choose to have

additional certifications or labels - such as free range, organic, or pasture-raised - on their eggs can be certified through third-party organizations. For labels that require outdoor access the certification organizations or specific programs² may have additional stipulations regarding the amount of space a bird has, the specific enrichments required, or characteristics and condition of the range. For an overview of these certification programs, see an Extension bulletin by Weimer and colleagues.³ This brief insight into cage-free illustrates how the labels can be confusing for the consumer and how they can lead to differences in the management of birds across the scope of these systems.

Cage-free system characteristics

- Access to litter or "floor" area
- Floor, single- and multi-tiered
 - Single- and multi-tiered systems allow hens to move vertically and horizontally by providing elevated tiers or platforms.

- Single-tiered provides less elevated space than multi-tiered, and certification programs often require lower stocking densities as a result.
- Floor systems provide no elevated platforms and require the lowest stocking density.
- Must allow hens opportunity for behaviors with enrichments such as:
 - Perches
 - Nest boxes
 - Dustbathing areas or scratch pads
- Outdoor access
 - Not required for cage-free but may be for other labels



Figure 1. Example of a small-scale cage-free housing system. Photo credit: M. Erasmus

Behaviors of concern

Pecking and piling are common behavior-related welfare issues that have become more apparent with the shift to cage-free housing systems.

Pecking behaviors

Feather pecking has been described as the pecking, pulling out and eating of feathers of other birds.⁴ Researchers estimate that feather pecking happens in 80-94% of flocks in the U.S. in non-cage systems.⁵ Feather pecking behaviors are influenced by hormonal, environmental, dietary and genetic factors.⁶

- Gentle feather pecking: pulling or pecking with no negative reaction from the bird being pecked.
- Severe feather pecking: pulling or pecking that can cause feather loss and damage and which results in a reaction or movement from the bird being pecked.
- Aggressive pecking: pecking that is forcefully directed toward the head or neck, and usually elicits a negative reaction from the other bird.



Figure 2. Example of severe pecking damage on a laying hen. Photo credit: *M.* Erasmus

- Vent pecking: pecking behavior directed at the vent area that if escalated can lead to "pick out," in which the organs of the bird are removed or eaten.
- Cannibalism: the most severe outcome of pecking behaviors in which the bird is ingesting tissue or blood of the victim and may often result in mortality.

Researchers have found that feather and aggressive pecking behaviors tend to occur more often with the increase of social interactions in cage-free housing.⁷ Gentle feather pecking is common during the pullet phase,⁸ but researchers have found that even gentle feather pecking can increase feather damage during the laying cycle.⁹ Severe pecking can be a bigger concern in terms of welfare because it is more likely to cause feather loss, skin damage and decreased ability to regulate body temperature.¹⁰ Severe feather pecking can lead to cannibalistic behaviors, and often mortality.⁴

Aggressive pecking and vent pecking are behaviors that are classified separately from feather pecking. Aggressive pecking behaviors are usually related to the process of the birds forming social structures and establishing dominance within those structures.¹¹ Vent pecking is thought to have hormonal influences and usually occurs after birds have come into lay and can be stimulated further by a prolapse.⁴ Hormonal, genetic, dietary, and environmental factors may all contribute to pecking behaviors. For a producer, environmental and dietary factors may be easiest to adjust, especially if detrimental pecking behaviors arise within a flock after placement. Some potential strategies to reduce pecking behaviors are listed below. Most of these strategies were investigated with regard to feather and aggressive pecking behaviors.

- Lowered stocking density^{12, 13}
- Adding enrichment
 - Hay bales¹⁴
 - Pecking blocks⁵
 - Strings¹⁵
- Nests without lighting^{16, 17}
- Increased range access1^{8, 19}
- Adding supplemental roughage to diets^{20, 21}

Many factors contribute to pecking behaviors, and these strategies alone may not eliminate injurious pecking behavior. However, research has found that under certain conditions, these strategies could help reduce pecking challenges.

Piling

There is limited research on piling, another behavioral issue with the potential for welfare challenges. Piling, which occurs more often in non-cage systems, has been described as a group of at least three hens standing close together, with minimal movement and all facing in the same direction.²² In larger groups, piling can cause suffocation and death of birds, a consequence that has been referred to as smothering.²³ Initial findings categorized smothering as three types: panic, nest area, and recurring or creeping.²⁴

Panic: Smothering that seems to be caused by a disturbance, such as a predator, sudden noise or intense light. Panic smothering can often cause mortality of larger groups of birds.

Nest box: Occurs as hens come into lay and is often started by one hen entering the nest box and several others following. Nest box smothering involves smaller groups of birds (2-3) or larger groups of 20 or more birds.

Creeping or recurring: Has no obvious cause and is the most common type of smothering observed. Recurring piling seems more likely to occur throughout the laying cycle after an initial occurrence.

Piling is still not fully understood by scientists, mainly because piling is unpredictable, which makes it hard to induce and study experimentally. Below are some factors that researchers have found may influence or cause piling.

- Hens moving toward or away from an object or event²⁵
 - A new or novel object may be an example of an attractant $^{\rm 22,\,26}$
 - Light spot
 - Heat spot
 - Food item
- Social dynamics²⁵
 - Piling is a collective behavior; often starts with one or two birds and attracts more
- Early life experiences²⁵
 - Their impact on social preferences and fearfulness
- Piling location
 - Consistent locations27, 28
 - Near a gate, wall, or underneath something²³

Despite the limited understanding of the causes and factors influencing piling, producers have directly experienced welfare impacts of this behavior. For the birds, piling impacts welfare and can include physical injury, heat stress, potential for behavioral or physiological stress and, in the worst-case scenario, mortality due to smothering.

Conclusions

As more of the laying hen industry shifts toward cagefree housing systems, the potential for welfare and behavioral challenges has become clear. In terms of behavior in cage-free housing, some of the most common issues are pecking and piling. Many complex factors contribute to these behaviors, making it difficult for a single approach to reduce the welfare challenges. Researchers, producers, and stakeholders are still working to develop solutions to these challenges.

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