



# *Poultry Extension Collaborative newsletter*

A collaboration between Purdue University, University of Arkansas,  
University of Georgia, and Virginia Tech

## *Piling and Smothering Behaviors in Commercial Laying Hens*

Piling is an abnormal behavior commonly observed in commercial laying hen flocks. Piling occurs when birds crowd together, usually on top of one another, in a densely packed manner. A piling event may or may not end in smothering. Smothering occurs when one or more birds die due to suffocation from piling. Piling and smothering can compromise welfare of the birds involved and are also financially damaging to the egg producers.

### **Definition of piling behavior**

The number of birds involved and the duration of the event have been used to define piling. In general, piling is defined as a cluster of ten to thirty or more densely packed birds, with only heads and necks visible, and lasts for few minutes to hours [1,2,3]. Piling is commonly (~6 incidences per flock) experienced in cage-free commercial flocks [4].

### **Types of piling and smothering behavior**

- **Panic piling and smothering** nervous and hysterical clustering of birds because of panic stimuli like sudden loud noise or disturbances and result in a high level of mortality (> 20 birds) [5,6].
- **Nest box piling and smothering** occur when multiple birds cluster at the same nest box resulting in small (1 or 2 birds) to large (up to 20 birds) mortality.
- **Recurring piling and smothering** occur when birds cluster in a non-hysterical manner, is often slow moving, and recurs throughout the production period. Smothering resulting from recurring piling can result in mortality of a small number of birds.

This review will focus primarily on recurring piling because the causes and risk factors associated with it are not completely understood.

#### **Piling and Smothering**

- Definition
- Types and characteristics
- Potential causes and associated factors
- Potential solutions



Fig 1: Clustering of pullets in a corner of a floor rearing system

PC: Regmi

## Characteristics of recurring piling

- A piling event is often initiated when three or more hens stand motionless in proximity (overlapping of body contours) with their heads oriented towards a wall and maybe pecking at objects.
- The clustering of hens can form a pile and is considered to be without panic [7].
- The duration of piling events can be short (1 minute) or very long (few hours).
- The number of birds forming a pile can vary (few to hundreds) and anywhere between 5 to 25% of the flock can be observed participating in piling [1,3,7].
- Piles can be dynamic with birds leaving and joining the pile continuously.
- Piling and smothering events are most prevalent at the onset or at the peak of laying period.

## Potential causes of recurring piling

A range of environmental factors, bird genetics, developmental, and intrinsic behavioral causes have been attributed to recurring piling.

### Initiation of piling

- *Attraction or repulsion to stimuli* – Piling often initiates when hens are moving toward or away from a stimulus or stimuli of various kinds.
  - Light and temperature: Laying hens are known to have preferences for sources, colors, and intensities of light and are seen to spend more time in areas with preferred light sources. The incidence of piling in free range hens has been associated with range use on a sunny day. Daily temperature fluctuations within the housing system can serve as a potential cause of piling and smothering.
  - Location: Individual hens exhibit preferences for specific locations within the housing system. The end of the aisles, along the walls, slatted area of the shed, and corners have been associated with incidences of piling.

## Potential causes of recurring piling contd.

- Novelty: Chickens often seek novelty. Attraction to a novel food item has been implicated in incidences of piling in Swiss flocks.
- *Time of day* – Piling behavior occurs mostly in the afternoon when hens are leisurely (not while eating, laying, perching). Use of the open litter area can peak in the afternoon and could be implicated in the occurrence of piling behavior.
- *Genetics* – Piling and smothering are observed in white, brown, and mixed type flocks. However, the incidences are more frequently observed in brown egg layers than white egg layers. Brown flocks often have piling durations twice as long in comparison to white and mixed flocks.
- *Fear* – Fearfulness of the flock can result in panic smothering; however, it is not completely understood if recurring piling involve fearfulness or aspects related to the expression of fear.
- *Randomness* – In many instances, initial crowding during a piling event appears to be forming by seemingly random aggregation. Stimuli or factors that are perceivable to chickens but not to humans may explain the apparent randomness.

### Exacerbation of piling behavior

- Escalation of the pile could be likely due to social attraction and probably follows when the initial stimuli is no longer perceptible to other birds joining the pile.
  - Social dynamics, like the preference and interest of a flock mate, may play a role in the number of birds joining the piling behavior.
- *Behavioral synchrony* – Hens that have a tendency to engage in similar behavior at the same time can escalate piling behavior.
- *Developmental factors* – Early life experiences can shape response to the events in later life. Distress during early life can influence the propensity of a flock to piling incidences.

## Potential solutions to piling and smothering

- Provision of sufficient nest boxes and ensuring easy access to the nest box.
- Provision of additional perching structure (A-frames) in the open area [8].
- If piling occurs in the same area inside the poultry house, placing a wooden pallet or other objects to break up the floor can allow birds at the bottom of the pile to breathe [8].
- Breaking up daily routine with slight modifications in lighting program might be helpful.

## Conclusion

Piling and smothering can compromise the welfare of laying hens in commercial cage-free egg production. Piling behavior is understudied and only limited information is available with regards to causes and solutions. The cause of this abnormal behavior seems to be multifactorial in nature and further research is warranted to identify potential solutions.

## Resources

1. Winter, J., M. J. Toscano, and A. Stratmann. 2021. Piling behavior in Swiss layer flocks: description and related factors. *Appl. Anim. Behav. Sci.* 236:105272.
2. Gray, H., R. Davies, A. Bright, A. Rayner, and L. Asher. 2020. Why do hens pile? Hypothesizing the causes and consequences. *Front. Vet. Sci.* 7: 616836.
3. Herbert, G. T., W. D. Redfearn, E. Brass, H. A. Dalton, R. Gill, D. Brass, C. Smith, A. C. Rayner, and L. Asher. 2021. Extreme crowding in laying hens during a recurrent smothering outbreak. *Vet. Rec.* 188:e245.
4. Barrett, J., A. C. Rayner, R. Gill, T. H. Willings, and A. Bright. 2014. Smothering in UK free-range flocks. Part 1: incidence, location, timing and management. *Vet. Rec.* p19.
5. Bright, A. and E. A. Johnson. 2011 Smothering in commercial free-range laying hens: a preliminary investigation. *Vet. Rec.* 168:512. 10.1136/vr.c7462
6. Hansen, R. S. 1976. Nervousness and hysteria of mature female chickens. *Poult. Sci.* 55:531-543.
7. Campbell, D. L. M., M. M. Makagon, J. C. Swanson, and J. M. Siegford. 2016. Litter use by laying hens in a commercial aviary: dust bathing and piling. *Poult. Sci.* 95:164-175.
8. Turner, S. 2021. Smothering. Articles for Hendrix Genetics. [https://layinghens.hendrix-genetics.com/en/articles/Smothering-laying\\_hens-in-cage\\_free-housing-systems/](https://layinghens.hendrix-genetics.com/en/articles/Smothering-laying_hens-in-cage_free-housing-systems/)