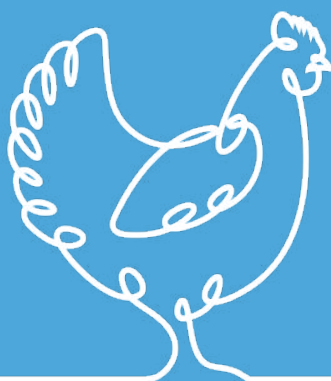


What do pullets and layer hens need for good welfare in barn, multi-tier aviary, and free-range housing systems?



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Pullet rearing

Pullets are young layer hens before they reach sexual maturity and begin laying eggs.

From the hatchery, day-old female chicks are transferred to rearing systems. Pullets are routinely housed in these rearing systems until 16-18 weeks of age after which they are transferred to a layer hen housing system where they remain for their productive lifespan for egg production.

What the science says about good pullet welfare during rearing?

- On day of placement, chicks have been shown to benefit from a light intensity of 20 lux for the first 3 days to assist them in locating food and water. For rearing, light intensity should be >10 lux.
- Development of natural behaviours such as pecking at food and substrates begins in the first 24 hours of a bird's life, as do fear-related avoidance behaviours. For the first 10 days of birds' lives, they continue to be particularly sensitive to learning about food and dustbathing. It is therefore critical that, during this period, birds are exposed to substrates to facilitate and encourage the development of these natural behaviours.
- The provision of litter and pecking substrates for pullets facilitates foraging behaviours and has been demonstrated to reduce the incidence of severe feather pecking in flocks.
- The motivation to perch in birds has been shown to start between 7-10 days of age and adult perching behaviour is influenced by access to perches during rearing. Perch provision during rearing improves the spatial navigation and vertical movement of birds. In addition, being exposed to perches during rearing has been shown to improve pullets' adaptability after transfer to the layer hen housing system, particularly in multi-tier or structurally complex layer hen housing systems.
- Early provision of environmental enrichment improves bird adaptability, decreases fearfulness and also appears to improve nest box use. Due to birds being particularly sensitive to learning in the first 10 days of life, environmental enrichment should be provided to pullets before they are 10 days of age.
- Providing nest boxes to pullets for training during rearing has been shown to improve adaptability to layer housing systems with nest boxes and decrease the incidence of floor eggs.
- Rearing pullets in structurally complex and enriched environments with multiple levels, perches and environmental enrichment improves birds' transition to layer housing systems and has been linked to improved bone health and reduced incidences of keel bone related injuries later in life.
- Where birds are intended for free-range systems, access to an outdoor range during rearing may improve range utilisation and adaptability of birds. Adequate shade/shelter and palatable vegetation such as trees and shrubs on the outdoor range area has been shown to encourage even distribution and use of the range by birds. For biosecurity and disease control purposes, outdoor range areas should be separate and as far away as possible from water ways/ponds on farm.
- Currently the optimal stocking density for pullets has been suggested to be no more than 11-14 birds/m² during rearing.
- To provide pullets the best possible opportunity to adapt to their layer hen housing system they should be transferred by 16 weeks of age.

Critical aspects for good pullet welfare during rearing

- Light intensity must be >10 lux during daylight hours. Birds must be provided with at least 8 hours continuous light and 8 hours continuous dark each 24-hour period by 7 days of age.
- Ammonia levels must be <15 ppm at bird head height.
- Litter or pecking substrates must be provided from day of placement.
- Perching and environmental enrichment must be provided by the time birds are 7 days of age. Environmental enrichment should be changed or rotated as necessary so that it remains effective. Perching should be adjustable, vary in height and where possible similar to the perches of the intended layer hen housing system.
- Nest boxes must be provided for some time during rearing to facilitate nest box training.
- Where birds are intended for free-range housing systems, and once they are fully feathered, they must be provided the opportunity to access an outdoor range area for some time before transfer to lay. The outdoor range area must have adequate shade/shelter and palatable vegetation. Where possible it should be similar to that of the intended outdoor range area in the layer hen housing system.
- Where pullets are reared in aviary systems, the doors on the internal compartments where chicks are placed must be opened and birds provided access to a litter floor and other areas of the shed by 3 weeks of age. In these systems, a substrate for foraging and dustbathing must be provided on the day of placement, as well as environmental enrichment and perching being provided by 7 days of age.

Layer hens

Layer hens are sexually mature female chickens that are kept for the primary purpose of egg production.

Once pullets are transferred from their rearing systems and sexually mature, egg production is stimulated through light manipulation by exposing hens to increasing lengths of light duration. Layer hens' productive lifespan is typically until birds are around 72 weeks of age, after which they are removed from the production system.

Layer hens have behavioural needs and are highly motivated to perform comfort movements (stretching and flapping of wings), nesting behaviours, foraging, perching (particularly at night), and dustbathing. Caged layer hen housing systems do not provide hens the opportunity to perform these behavioural needs and contain inherent problems meaning they are unable to provide good welfare outcomes for birds.

What the science says about best practice for layer hen housing?

- Hens have a thermoneutral (comfort) zone at an ambient temperature of 20-25°C.
- Birds perceive a wider spectrum of wavelength (and hence colour) than humans. Natural light has an even wavelength distribution of 400-700nm and contains UVA light. The provision of natural light has been shown to be beneficial for bird welfare.
- The provision of litter and pecking substrates in layer hens encourages foraging behaviours and has been demonstrated to reduce the incidence of severe feather pecking in flocks.
- Hens will naturally roost at night utilising perch heights of >90cm or the highest tiers available within multi-tier housing systems. To reduce perch competition, adequate amounts of perching at varying heights and levels should be provided. Hens have been found to prefer perches that are wide enough to facilitate perching, of square or rectangular shape with rounded edges.
- Hens tend to cluster and do not distribute themselves evenly within a shed for reasons such as social facilitation, shared resource preferences, and anti-predator response. For these reasons, nests, perches, and environment enrichment should be distributed in a way that encourages even bird distribution throughout a shed.
- Where birds are housed with outdoor access, range use can be encouraged by appropriate and adequate provision of shade/shelter and palatable vegetation, including trees and shrubs. For biosecurity and disease control purposes, outdoor range areas should be separate and as far away as possible from water ways/ponds on farm.
- All-in all-out systems promote good biosecurity practices allowing for cleaning and disinfecting of each shed between placements of hens.

Critical aspects for layer hen housing

- Lights with monochromatic wavelengths (i.e. of one colour) must not be used, lighting must provide at least the broad spectrum of wavelengths (green, blue and red) or that which mimics natural light. Lighting with UVA within the spectrum is encouraged.
- Light intensity must be >10 lux during daylight hours. Hens must be provided with at least 8 hours continuous light, and 8 hours continuous dark each 24-hour period.
- Ammonia levels must be <15 ppm at bird head height.
- Litter and pecking substrates must be provided from the day of transfer from rearing. The chosen litter substrate must facilitate foraging and dustbathing behaviours.
- Nest boxes with appropriate substrate for nesting must be provided at a minimum of 1 every 7 birds, or 1m² for every 120 birds.
- Perching and environmental enrichment must be provided from the day of transfer from rearing. Perches should be of varying levels/heights (i.e. both high and low) and provide a minimum length of 15cm of perch space per bird. Environmental enrichment (e.g. pecking objects, novel objects and straw bales) should be changed or rotated as necessary so that they remain effective.
- Where veranda access is provided, openings must allow all birds to access the veranda. The veranda area must provide litter, perches and environmental enrichment.
- Where outdoor access is provided, openings must allow all birds to access the outdoor range area. Hens must be provided access to the outdoor range area for at least 8 hours during the day every 24-hour period. The outdoor range area must have shade/shelter of at least 8m² per 1000 birds, and palatable vegetation available.
- Stocking density must not exceed 7 birds/m² for floor-based systems or 9 birds/m² for tiered systems.

References

- Ali BA, Toscano M, Siegford JM (2019) Later exposure to perches and nests reduces individual hens' occupancy of vertical space in an aviary and increase force of falls at night. *Poultry Science* 98(12):6251-6262.
- Bari MS, Cohn-Barhouse AM, Campbell DLM (2020) Early rearing enrichments influenced nest use and egg quality in free-range laying hens. *Animal* 14(6):1249-1257.
- Bari MS, Laurenson YCSM, Cohn-Barhouse AM et al (2020) Effects of outdoor ranging on external and internal health parameters for hens from different rearing enrichments. *Peer J* 8:e8720.
- Campbell DLM, de Haas EN, Lee C (2019) A review of environmental enrichment for laying hens during rearing in relation to their behavioral and physiological development. *Poultry Science* 98(1):9-28.
- Campbell DLM, Ferber PF, Downing JA, Lee C (2020) Minimal effects of rearing enrichments on pullet behaviour and welfare. *Animals* 10(2), 314.
- Campbell DLM, Hinch GN, Downing JA, Lee C (2018) Early enrichment in free-range laying hens: effects on ranging behaviour, welfare and responses to stressors. *Animal* 12(3):575-584.
- Janczak AM and Riber AB (2015) Review of rearing-related factors affecting the welfare of laying hens. *Poultry Science* 94:1454-1469.
- Liebers C, Schwarzer A, Erhard M et al (2019) The influence of environmental enrichment and stocking density on the plumage and health conditions of laying hen pullets. *Poultry Science* 98(6): 2474-2488.
- MacLachlan SS, Ali ABA, Tosano MJ, Siegford JM (2020) Influence of later exposure to perches and nests on flock level distribution of hens in an aviary system during lay. *Poultry Science* 99:30-38.
- Nicol CJ, Bouwsema J, Caplen G et al (2017) Farmed bird welfare science review. Department of Economic Development, Jobs, Transport and Resources. State Government of Victoria.
- Pullin A, Temple SM, Bennett DC et al (2020) Pullet rearing affects collisions and perch use in enriched colony cage layer housing. *Animals* 10, 1269.
- Purdum S, Eusebio P, Hanford K (2020) The effects of 2 genetic lines on spatial distribution and use and preference of perch and nest area in an aviary system. *Poultry Science* 99(7):3328-3333.
- Rufener C and Makagon MM (2020) Keel bone fractures in laying hens: a systematic review of prevalence across age, housing systems, and strains. *Journal of Animal Science* 98(1), S36-S51.
- Schreiter R, Damme K, von Borell E et al (2019) Effects of litter and additional enrichment elements on the occurrence of feather pecking in pullets and laying hens: A focused review. *Veterinary Medicine and Small Animal Clinician* 5:500-507.
- Von Eugen K, Nordquist RE, Zeinstra E et al (2019) Stocking density affects stress and anxious behaviour in the laying hen chick during rearing. *Animals* 9(2), 53.