

BUILDING A BETTER HEN HOUSE

A comprehensive guide to
higher welfare systems for
laying hens



Higher welfare systems for laying hens: *Practical options*



Cage-free systems allow birds to express more of their natural behaviors, and have the potential to deliver a higher level of welfare for laying hens. Caged systems for hens, whether conventional barren battery or enriched, do not provide for the full physiological and behavioral needs of laying hens. As companies pledge to end the use of cages for laying hens in their supply chains, producers need to invest in systems that deliver good standards of welfare for hens throughout their lives. Good management is also crucial to welfare outcomes. These guidelines offer basic recommendations for housing and management of laying hens in indoor cage-free systems.



Higher welfare cage-free systems for laying hens should provide:

- Appropriate pullet rearing
- Good design of shed with well laid out functional areas – ensuring elevated perching, dustbathing, and foraging
- Adequate functional space
- Ample enrichment
- A nutritionally adequate mash diet
- Nipple drinkers
- Monitoring of welfare outcome measures including feather cover, keel bone fractures and flock behavior

This document shares *practical guidelines* for food companies and producers moving to cage-free laying hen systems, including:

- A summary of current legislation in the US.
- A summary of certification schemes for laying hen operations in the US.
- Description of acceptable types of cage-free housing – including multi-tier/aviary systems, single-tier/flat-deck systems, as well as unacceptable options (such as combination systems).
- Key design features of housing – requirements for lighting, ventilation and climate control, drinkers and feeders, litter, space, nesting, perching provision, shed enrichments, and verandas.
- Key welfare issues in laying hens – including feather pecking, keel bone fractures, beak trimming, and foot health.
- Key points for management of welfare issues.
- Pullet rearing –considerations for rearing chicks in order to ensure better welfare during the laying stage.
- Recommendations for the assessment of hen welfare using animal-based welfare outcome measures.

Investing in the future



Compassion highly recommends that all producers and companies invest in cage-free systems. Over 200 hundred of the leading companies in the United States have committed to going cage-free no later than 2025. Consumer demand for better animal welfare continues to build year on year. Investing in cage-free systems with the highest welfare potential represents the most future-proofed investment.

U.S. legislation regulating hen housing and welfare

The following states have passed ballot initiatives or legislation phasing out the use of battery cages for egg production, as well as prohibiting the sale of eggs from battery cage facilities:

- **Massachusetts:** In 2016, passed a ballot measure to phase out all cage usage for egg production, as well as the sale of any shell eggs produced in cages by 2022. The measure defines this as systems that prevent the animal from lying down, standing up, fully extending her limbs, or turning around freely. It also requires a minimum space allowance of 1.5 sq ft per bird.
- **California:** In 2008, passed a ballot measure (Proposition 2) to phase out cages that don't allow for a hen to be able to extend her limbs fully and turn around freely by 2015. In 2010, this measure was extended with the enactment of measure AB 1437, which requires that all shell-eggs sold in California, regardless of origin, be produced under the same conditions stated in Proposition 2.

The following states have passed legislation or ballot initiatives to phase out the use of battery cages in egg production:

- **Washington:** In 2011, passed legislation to phase out the use of barren battery cages, which also requires a minimum space allowance and enrichments, (defined as: nests, scratching areas, and perches). The legislation also prohibits the construction of new battery cage facilities.
- **Oregon:** In 2011, passed legislation to phase out the use of battery cages, which also requires a minimum space allowance and enrichments (defined as: nests, scratching areas, and perches). The legislation also prohibits the construction of new battery cage facilities.
- **Ohio:** In 2010, passed regulation setting minimum standards for existing cage systems, and prohibits the construction of new battery cage facilities.
- **Michigan:** In 2009, passed legislation to phase out the use of cages that prevent a hen "from fully extending her limbs" by 2019.

U.S. *third party* animal welfare standards



In response to a growing public concern for the welfare of laying hens, an increasing number of food businesses are voluntarily choosing to source their eggs from producers who adhere to standards set by animal welfare certifiers. The organizations listed below offer standards-based certifications for cage-free egg production. Links to the full standards for each certification can be found in the references section.

ANIMAL WELFARE APPROVED

Animal Welfare Approved only certifies pasture-based systems. Birds must have access to the outdoors, starting as early as 2 days of age.



- Space allowance: Laying hens 1.8 sq ft/ bird, pullets 0.67 sq ft/ bird.
- Perches/nestboxes: Aerial perches required, 7 in per bird. Nestboxes must provide 20 sq in per bird.
- Enrichment: all birds must have access to dustbaths.
- Pullet rearing: pullets must be reared in systems similar to those to be used in lay. Preferably, pullets are hatched in AWA certified facilities, and must have access to forage by 7 days of age at the latest (at 24 hours post-hatch preferred).
- Beak trimming: no form of beak trimming or conditioning allowed.

GLOBAL ANIMAL PARTNERSHIP (GAP)

GAP standards allow certification at six different levels or steps (1,2,3,4,5,5+), where each level requires incremental welfare improvements. The requirements described below apply to GAP Steps 1-3 for laying hens. Hens in Steps 1 and 2 systems are housed indoors, while hens in Step 3 systems must have seasonal access to pasture. For Step 4-5+ requirements, please refer to the GAP website.

- Space allowance: Laying hens 1.5 sq ft per bird, pullets 0.45 sq ft per bird during brooding, 0.65 sq ft per bird post-brooding.
- Perches/nestboxes: Aerial perches required, 5 in per bird.
- If using communal nestboxes 1 sq ft of nesting space per every 10 birds, or one individual nestbox per every 6 birds.
- Enrichment: Step 1 requires dustbaths*, Step 2 requires one type of enrichment for a group of up to 1,000 hens;
- Step 3 requires two types of enrichments for a group of up to 750 hens. Enrichment is defined by GAP as: "something that hens can peck at, manipulate, and destroy. Examples of suitable enrichments include, but are not limited to: bales of straw or hay, provision of forages or brassicas, and scattered grains."
- Pullet rearing: pullets must be reared in systems similar to those to be used in lay. Pullets must be transferred to the laying house at least 4 weeks before start of lay.
- Beak trimming: only infra-red beak conditioning for day-old chicks is allowed.



* Note that GAP does not include dustbaths in their definition of enrichment; however, as other certifiers listed here include them as enrichments, they are included for Step 1.

U.S. *third party* animal welfare standards, *continued*



CERTIFIED HUMANE (HUMANE FARM ANIMAL CARE)

Humane Farm Animal Care certifies cage-free, free-range, and pasture-based systems. This summary refers only to the cage-free standards.



- Space allowance: Laying hens in all-litter floor systems or single-tier systems: 1.5 sq ft per bird; hens in multi-tier aviaries: 1 sq ft per bird.
- Perches/nestboxes: Aerial perches required, 6 in per bird. Slatted platforms can be counted as perching space if they include suitable perching surfaces. If using communal nestboxes 9 sq ft of nesting space per every 100 birds, or one individual nestbox per every 5 birds.
- Enrichment: not required.
- Pullet rearing: pullets must have access to perches and litter at or before 4 weeks of age. Pullets must be transferred to the laying house between 16-18 weeks of age.
- Beak trimming: allowed infra-red before 24 hours post-hatch, or hot-blade if performed before 10 days of age, and if flock is considered at risk of feather pecking or cannibalism.

AMERICAN HUMANE CERTIFIED

American Humane Certified certifies enriched colony, cage-free, free-range and pasture-based systems. This summary refers only to the cage-free standards.

- Housing requirements: no cages allowed (applies to cage-free standard only).
- Space allowance: Laying hens in all-litter floor systems: 1.5 sq ft per bird; brown egg layers and other medium weight breeds in multi-tier systems:, 1.2 sq ft per bird; white layers and other light weight breeds in multi-tier systems:, 1 sq ft per bird.
- Perches/nestboxes: Aerial perches required, 6 in per bird. Slatted platforms can be counted as perching space if the edge of the tier is considered suitable for perching. If using communal nestboxes 9 sq ft of nesting space per every 100 birds, or one individual nestbox per every 5-7 birds.
- Enrichment: not required.
- Pullet rearing: pullets must be raised on litter, with access to perches and scratching areas. Watering and feeding systems must be similar to those of the laying house. Stocking density must be no greater than that allowed for the laying flock.
- Beak trimming: allowed infra-red before 24 hours post-hatch, or hot-blade if performed before 10 days of age, and if flock is considered at risk of feather pecking or cannibalism.



U.S. *third party* animal welfare standards, *continued*



UNITED EGG PRODUCERS

United Egg Producers certifies conventional battery cage and cage-free systems. This summary refers only to the cage-free standards.



- Space allowance: Laying hens in all-litter floor systems or single-tier systems, 1.5 sq ft per bird; hens in multi-tier aviaries, 1 sq ft per bird.
- Perches/nestboxes: Perches required, 6 in per bird, at least 20% of perch space should be aerial or elevated above 16 in. Communal nestboxes must provide 9 sq ft of nesting space per every 100 birds, nesting substrate is recommended, and wire only or plastic slat flooring should be avoided in nest area.
- Enrichment: not required.
- Pullet rearing: pullets must have access to perches and raised areas by 4 weeks. Watering system must be similar to that of the laying house. Pullets should be transferred to the laying house before start of lay.
- Beak trimming: allowed infra-red before 24 hours post-hatch, or hot-blade if performed before 10 days of age. A second trimming (hot-blade) is allowed if performed between 5-8 weeks of age.



The image above depicts a hen with a trimmed beak.

Different types of cage-free housing



Avoid systems that allow full or partial restriction of movement

Not all cage free systems fully offer a higher welfare potential for laying hens. Systems designed to allow the closing-off of sections of the aviary to some or all of the birds at given times are not considered acceptable from a welfare perspective, since restricting movement has a direct effect on the birds' ability to fulfill their needs at will. Examples of unacceptable cage-free systems include:

- Convertible systems that can be used as either enriched colony or open aviary systems.
- Select access systems that allow the closing of one or more tiers, or restrict access to the scratching area or other functional spaces.

Restricting access to sections of the housing system is only considered acceptable in some cases; for example, during pullet rearing, when partial and temporary space restrictions may be required in order to ensure the welfare of the birds as they learn to navigate a multi-tier system, or when nestboxes are closed at night in order to reduce fecal contamination. Cage-free housing systems with unrestricted access to functional spaces allow laying hens to fulfill their behavioral and physiological needs to a greater extent. Examples are described below.



Example of a flat-deck system with unrestricted access to space.

MULTI-TIER/AVIARY HOUSING offers more three-dimensional space for birds to move around. Producers often find that this kind of set-up reduces the number of floor eggs, improves food conversion rate, and results in calmer flocks. Multi-tier systems (right) also provide more opportunities for hens to avoid feather-pecking individuals. In terms of husbandry, it is easier to remove manure and therefore easier to keep the litter clean and ammonia and dust levels down. Well-designed multi-tier aviaries include carefully positioned perches, with ramps linking the tiers to ensure birds can navigate the shed without injury. The layout of the tiers and ramps must allow for easy inspection of the birds at all levels.

SINGLE-TIER/FLAT-DECK HOUSING (above) requires more floor area to provide enough space per hen. It is a much simpler layout than the multi-tier system, but does not provide the birds with the height they desire for or enable hens to easily escape aggressors. Keel bone fracture risk is often reduced in this system due to the lack of furnishings, but birds may have less variation in functional space. Producers often comment that birds are more flighty in these systems.



Example of a multi-tier aviary using a ramp.

Key design features of good housing



- It is important for hens to be able to find what they need in the shed. Light intensity should be even throughout the house, using either natural or artificial light, and areas of extreme bright light or darkness should be avoided. Placing the birds in dim light to control injurious feather pecking should be a last resort. There should be no sudden changes to lighting; transitions between light and dark periods should be gradual, simulating twilight and dawn. Birds need an uninterrupted period of darkness of at least 6 hours to allow for resting (except during the first 48 hours after pullet placement, when it is acceptable to provide light continuously).
- Ventilation and climate control: laying hens are very sensitive to adverse changes in temperature, drastic changes in humidity and air quality in the house should be kept to a minimum. Furthermore, climate can have a big impact on the evenness (uniformity of weight) of the flock. Extreme changes can also lead to stress in the birds.
- Ammonia in the air can depress feed intake. It also causes inflammation in the trachea, making the birds more susceptible to respiratory disease. If levels get very high it can lead to blindness. Levels should not exceed 25 ppm for atmospheric ammonia, and producers should aim for a maximum of 15 ppm.
- Hens should be separated from their feces, through the use of slatted floors and/or manure belts under drinkers, nest boxes and perches.
- Properly working fans adjusted as needed according to external weather conditions will help remove stale gases and moisture, and their use is recommended even in cold weather. When using automatic ventilation, take into account moisture as well as temperature levels, to ensure that even on cooler days ammonia levels are kept low.
- All draughts should be minimized.



Drinkers and feed

The drinkers and food provided in a shed can significantly impact birds' behavior.



- Nipple drinkers are shown to be associated with a reduced risk of feather pecking and improved feather cover.
- There is a strong association between feather pecking and pellet food. To better occupy the hens, a mash diet should be given rather than pellets. Studies suggest that pullets fed pellets have more plumage damage than pullets fed mashed feed.
- The feeding interval should be long enough to ensure adequate food consumption. However, it should never be so long that the birds go hungry.
- Changes to diet should be avoided where possible. If a change of diet is needed, placing extra enrichments and minimizing the number of changes that happen in quick succession can help reduce stress levels.

Nipple drinkers are associated with a reduced risk of feather pecking.

Key design features of good housing, continued



Litter

The quality and accessibility of the litter can impact the welfare of the birds. Poor litter quality caused by dampness or dirt increases the risk of feather pecking and can lead to foot health problems, such as bumblefoot.

- The floor area must be covered with enough high quality, stimulating litter covering at least a third of the floor to ensure that birds can dustbathe and forage.
- Frequent monitoring of litter is needed; forking the litter over or rotating it and adding fresh clean litter to the top can help maintain litter quality. However, if litter gets wet or capped (dirt layer formed over the litter) it must be replaced, and the cause of the problem should be determined and solved.
- Hyper-absorbent pellets can be used in known problem areas in addition to usual litter. Keeping the external area dry and well drained and preventing rain getting into the shed is important for managing litter quality.
- Using small bales of treated and dust-extracted hay in the shed will allow the litter to build up naturally and encourage foraging behavior.



High quality litter is important for dustbathing.

Space

Systems must provide sufficient space for hens to perform comfort and maintenance behaviors (including preening, stretching, wing-flapping) and locomotion (including running, walking, flying).

- Stocking density for pullets: recommended space allowance in open housing systems at the end of the rearing period is 0.78 sq ft per pullet for light strains, or 1 sq ft per pullet for medium and heavy strains.
- Stocking density for laying hens: a minimum space allowance of 1.2 sq ft of usable area per bird is recommended.
- A 'usable' area is defined as at least 12 in wide, with a floor slope not exceeding 14% and 18 in of headroom.
- Whenever possible, large flocks should be separated into smaller colonies to keep the birds in manageable groups and to ensure they are well spaced throughout the house. This also means they can easily get to the resources they need, such as water, feed, and nest boxes. Smaller flocks also minimize problems of stress and reduce the risks of smothering (birds crowding and suffocating each other) and feather pecking.



Key design features of good housing, continued



Nestboxes

Nestbox design must encourage nesting behavior, which includes nest site investigation and selection, pre-laying behavior (gathering, scraping, crouching, sitting and circling and raising the keel bone), followed by egg laying and post-lay sitting. The sequence of behaviors takes up to three hours or more and occurs largely in the morning. The design of the nest boxes and fittings are important for the birds but also for the control of red mites (a common ectoparasite) so nests should be sealed properly to prevent the mites from nesting in cracks and crevices.

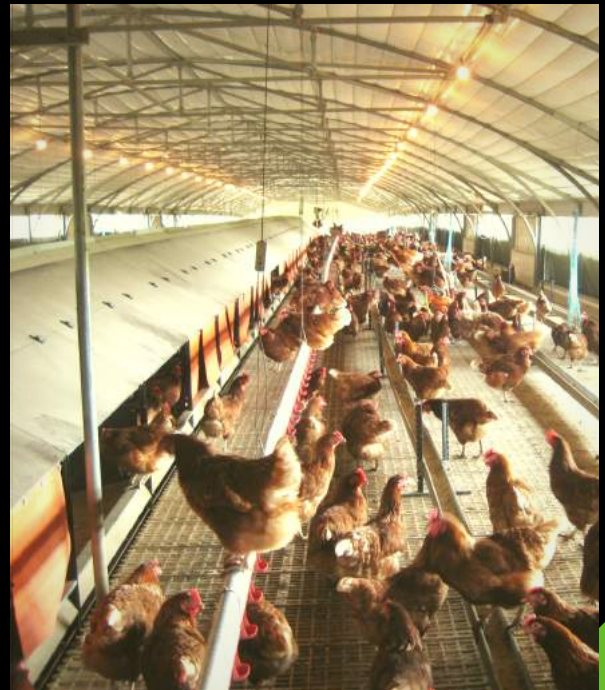
- Hens prefer to lay in a discrete enclosed nest with loose material such as straw or a flexible artificial nest liner on the floor; the nest must be perceived as attractive. If using an artificial nest-liner, a manipulable substrate is recommended.
- There should be at least 1 nest box per 5 hens, or 9 sq ft of nestbox space per every 100 birds.
- If group nests are used they need to be enclosed on three sides with front curtains and a plastic grid or perch in front; the floor sloped 12% to 18% (12% is recommended as it leads to more sitting events) and should be covered with a texturized, manipulable surface that allows for good grip.
- Front curtains are an important component of group nests; sliced or partitioned curtains allow for hen investigation along the length of the nest.
- Integration of nests into a multi-tier structure at the center of the shed as opposed to against a wall can lead to more even use of nests. If platforms are placed in front of nests, they should be at least 12 in wide.
- Nestbox lighting is associated with vent pecking. Lights should gradually be dimmed over time once the birds are trained, until the nest boxes are completely dark.



Perching provisions

Birds are highly motivated to perch at night. Perch design, height, and space can influence perch use and welfare outcomes.

- Providing high perches (28 in from the floor) can reduce feather pecking and improve plumage cover. Providing a separate resting area protects birds from being pecked while they are inactive.
- To control vent pecking, avoid perches which present the vent at bird eye-level. Ensure any fittings that birds may perch on, such as the nipple line, are at least 16 in above the next level below.
- Aerial perches have the highest level of keel bone fractures compared to static low perches, however, they offer many benefits in terms of behavioral needs and reduction of feather-pecking. A ramp up to the different tiers is key to allowing birds easy access to high perches so they don't have to fly up or down and risk damaging their keel bone.
- The minimum recommended linear perch space per hen is 5 in.
- Perch angles and distance between horizontal perches must be designed to minimize instances of failed landings and injuries, including keel-bone fracture. A slope of less than 45 degrees between horizontal perches at different heights, as well as reduction of the distance between perches have been shown to result in fewer injuries.



Key design features of good housing, continued



Enrichments

For the purposes of these recommendations, an enrichment is defined as an environmental modification that results in improved biological functioning, and should therefore do more than simply supply basic requirements. To increase the variety within the shed and occupy the birds we recommend enrichments such as:

- Straw bales
- Sawdust bales
- Alfalfa blocks

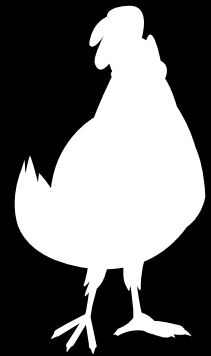
In addition to the provisions summarized above, regular scoring of welfare outcome measures is needed to identify any welfare issues and to set targets for improvements. These measures include:

- Disease incidence – recording the incidence of diseased or injured birds in the flock
- Keel bone fractures – recording the prevalence of keel (breast) bone fractures
- Feather cover – assessing the prevalence and severity of feather loss caused by feather pecking behavior
- Flock behavior – recording the flock's reaction to people
- Mortality – recording the number of birds dead or culled, and the causes



Example of using string as an enrichment.

Common welfare issues for laying hens



Feather pecking

Feather pecking (or injurious pecking) is a serious welfare issue – birds redirect their pecking behavior towards others, leading to feather loss and skin injuries, and in extreme cases, vent pecking and cannibalism. Feather pecking is an abnormal behavior in laying hens which can occur in all types of housing systems. It is caused by multiple factors including breed, poor environment, health and management, but is mainly caused by the frustration of restricted foraging and dustbathing behavior. Designing and managing systems that allow hens to fulfill their foraging and dustbathing needs reduce the risk of feather pecking. Strategies for reducing feather-pecking include:

- Selection of breeds known to be less prone to feather-pecking.
- Raising pullets in environments similar to the laying house, and ensuring early access to litter and perches.
- Providing ample enrichment, as well as opportunities to forage, for example by scattering feed or grit evenly in the litter area.
- Visit www.featherwel.org for more details and practical solutions.



Hen with severe feather loss.

Common welfare issues for laying hens, continued



Beak trimming

Beak trimming is the main method currently used to control feather pecking. This involves removing a portion of the beak with a red-hot blade or infra-red beam. The beak is a complex organ which contains extensive nerves and receptors. Both methods cause pain, reduce growth due to lack of feeding ability and cause changes to behavior; the red-hot blade causes chronic pain as well. When performed after one week of age, beak trimming can have long-term effects on welfare, such as chronic pain, and inhibiting the normal expression of behavior.

Systems need to be designed to ensure birds can live with intact beaks and minimal feather pecking. Features known to minimize feather pecking include perches, enrichments, and multiple tiers, which help birds escape and find shelter from others if needed. Where beak trimming is currently performed, infra-red beam should be used, in order to minimize pain and distress to the birds.

Because of its serious effects on hen welfare, beak trimming should be replaced by breeding, housing, and husbandry methods that eliminate the need for this practice.



The beak is a complex organ and highly sensitive. Beak trimming should be avoided through design and management of a system

Keel bone fractures

Osteoporosis is prevalent in caged birds due to lack of exercise and calcium deficiencies, and it is a risk factor for fractures. Despite wing and keel bones being stronger in hens from non-caged systems, keel bone fractures are more prevalent in alternative systems, as birds have more freedom of movement, and this can increase the risk of collisions with hard surfaces. Birds break the anatomically exposed keel bone in collisions with perches or other obstacles, as they jump and fly between structures at different heights; failures of landing and collision with walls or other hard surfaces can also result in fractures. Keel bone breakages and subsequent deformities are painful, reduce movement in the birds and affect egg quality and production. However, keel bone fractures can be minimized through good management and design. Strategies for preventing keel bone fractures include:

- Genetic selection for bone strength.
- Appropriate pullet-rearing systems in which pullets learn to navigate tiers, ramps, and platforms from a young age.
- Improvements to house and perch design such as: the use of plastic slatted flooring instead of wire mesh, placing perches rather than platforms in front of nestboxes, and ensuring correct distance and angles between tiers.
- Feeding a diet specially formulated for cage-free layers.

Foot health

Foot pad dermatitis (inflammation of the foot pad – a severe, painful type called ‘bumblefoot’ occurs when the foot becomes infected) and hyperkeratosis (excessive hardening of the skin) are the most common foot problems in cage free systems. Infection with the bacteria *Staphylococcus aureus* in deep litter systems leads to bumblefoot (right), a localized bulbous lesion in the ball of the foot, which causes severe lameness. Litter maintenance is therefore of paramount importance in all systems, and particularly deep litter systems. The following recommendations can result in better foot health:

- Litter should be kept dry and friable. Wet litter, high ammonia content of the litter, as well as feed and genetic factors can cause foot pad dermatitis.
- Design is important for reducing hyperkeratosis due to compression loading while perching. Standard oval or round perches reduce the force on the foot in comparison to square perches.
- Hens are much less likely to suffer hyperkeratosis in an alternative system in comparison to a cage.



Example of bumblefoot.

Key considerations for pullet rearing



The experiences of pullets (juvenile hens) are crucial not only in ensuring their welfare at a young age, but also enabling them to navigate and benefit from cage-free systems during the laying period.

Preparing pullets for the laying hen shed

It is crucial that pullets are reared in similar systems to those they will lay in (birds must not be reared in cages). Matching the rearing environment to the adult environment eases the transition to the layer house and may help reduce problems such as feather pecking and cannibalism.

- Give access to a raised slatted area and appropriate perches or raised tiers. This provides time for the pullets to learn to navigate without injury while they are young and light and their bones are stronger and more flexible.
- Perches should be gradually introduced from 3 days of age to 6 weeks with access starting at 2.4 in/bird. Depending on perch height, chicks will begin perching between 7 and 10 days of age. Benefits of early access to perches include higher use of perches in adult birds, increased bone strength with lower prevalence of fractures, and reduced prevalence of floor eggs and cloacal cannibalism during the laying period. Access to perches during rearing may also reduce feather pecking during this period. The configuration of perches in the rearing shed should ideally be aligned with the laying hen shed.
- The sensitive period for learning about food and dust-bathing material is during the first 10 days of life. Introducing pullets to dust-bathing substrate and other enrichment materials during this period is crucial, as this may help reduce feather pecking in the future.
- Introduce nest boxes during the latter stages of pullet rearing to train the young hens to use a nest box. This can help to reduce the number of eggs laid on the floor, which is a source of economic loss.



This is a dark brooder with the fringes removed (as birds are 8 weeks of age). The dark brooder is hung on chains that allow for the height to be adjusted as the birds grow. The fringe is removed once they no longer need a dark heated area beneath and instead the birds prefer jumping on it.

Brooders

Dark brooders are panels equipped with heating elements, surrounded with black, plastic fringes blocking out the light from day one. They are highly recommended in order to create a warm, safe place for chicks to rest without being disturbed.

The area underneath the dark brooder is warmed by underfloor heating, hot pipes, or thermal heaters. The chicks use brooders as a place to rest and be away from other investigating chicks that might peck them. The use of dark brooders during the rearing phase has been shown to reduce feather pecking during lay. Dark brooders may also improve behavioral synchrony, and result in calmer birds. Additionally, the use of brooders saves energy and therefore money as sheds can be kept cooler while the brooders are warmer.

Key considerations for pullet rearing, continued



Placement of pullets

It is important to follow breeders' advice on the timing of the onset of lay in relation to the breed and body weight of the birds. A careful balance is needed: late onset of lay (and large eggs) are associated with vent pecking and problems with prolapse; in contrast early onset of lay (before 19 – 20 weeks) may increase the risk of feather pecking. The following are additional recommendations for pullet placement.

- Weigh a sample of birds regularly from the day of arrival on the laying farm. Flocks should be even (i.e. with all birds at a similar weight) before coming into lay.
- Avoid mixing birds from different rearing groups when putting pullets into the laying shed.
- Do not restrict access to the slats, as this increases the hens' stocking density and prevents them from foraging in the litter which they will be accustomed to from the rearing phase. Immediate access to litter is the most important strategy to reducing the risk of feather pecking; without this, the birds can become highly frustrated.



Breed/*strain* of bird

Different commercial hybrids cope differently with fear and stress. The genetics of the bird can therefore predispose them towards injurious pecking and other unwanted behaviors that are detrimental to welfare. Strains that are calm, with improved bone strength are well suited for aviary systems. Some strains have been genetically selected to reduce cannibalism and feather pecking. Traits that can be improved through genetic selection include bone strength and reduced fearfulness.



Assessing welfare in laying hens



Welfare outcomes are an animal-based method of assessing an animal's physical wellbeing, and increasingly their behavioral expression and mental wellbeing. While provision of certain resources (inputs) in the hens' environment is necessary to increase the welfare potential of a system, measuring animal-based outcomes indicates whether that potential has been met. Regularly scoring appropriate outcome measures can identify welfare problems and be used to set targets or benchmark for improvements through an active program.

RECOMMENDED INDICATORS:

Disease incidence

WHAT: Record incidence of sick or injured birds in the flock and the type of illness.

WHY: Sick and injured birds need additional attention; early recognition, treatment or culling is key to reducing suffering and suboptimal performance.

HOW: AssureWel protocol for birds needing further care: www.assurewel.org/layinghens/birdsneedingfurthercare

Common problems in laying hens include viral disease, bacterial infections, parasites, foot pad dermatitis, bumblefoot, hyperketosis and excessive claw growth.

TARGET: Mortality <3% at the end of lay.

Keel bone fractures

WHAT: Record prevalence of keel (breast) bone fractures.

WHY: Keel bone fractures, particularly when moderate to severe, are painful and restrict bird movement. Prevalence can be high in free-range flocks indicating poor housing design, particularly perches, and lack of aerial experience at an early age.

HOW: LayWel keel protocol (p.16): www.laywel.eu/web/pdf/deliverable%2072%20manual-2.pdf. Photo guide available at (p.66): <http://edepot.wur.nl/233471>. Feel along the hen's keel for distortion/ lumpiness indicating old breaks and assign a score of 4 (normal), 3 (slightly damaged), 2 (moderately damaged) to 1 (severely lumpy/distorted).

TARGET: Average incidence of <5% old fractures (score 3 and under).

Feather cover

WHAT: Assess the prevalence and severity of feather loss caused by feather or aggressive pecking behavior, at various stages of production.

WHY: Injurious feather pecking is a major welfare issue largely resulting from redirected foraging behavior; it can lead to suboptimal thermal control, reduced productivity, injury, cannibalism and even death. Managing this behavior is essential to operating successfully with non beak-trimmed flocks.

HOW: AssureWel feather loss protocol (www.assurewel.org/layinghens/featherloss): Assign score of 0 (none/minimal) to 2 (moderate/severe) - record region of body affected. See also: A guide to preventing feather pecking: http://www.featherwel.org/Portals/3/Documents/Advice_guide_%20V1.2%20May%202013.pdf

TARGET: In the green zone (top 25% of farms - see link below for more details) using the AssureWel industry benchmarking tool: <http://www.assurewel.org/layinghens/howisyourfeatherlossmeasuringup/featherlossbenchmarkingtool>.

Assessing welfare in laying hens, continued



RECOMMENDED INDICATORS:

Flock behavior

WHAT: Record the flock's reaction to people.

WHY: Flighty birds have a high fear level, indicating poor stockmanship, suboptimal environments or predator activity. Fearful flocks can become easily alarmed and smother each other.

HOW: AssureWel flightiness protocol: www.assurewel.org/layinghens/flightiness

Observe birds' behavior as you approach and assign a score of calm, cautious or flighty.

TARGET: A calm flock, with birds that can be approached by the stockperson.

Mortality

WHAT: Record the number of birds dead or culled and the causes.

WHY: Mortality may be due to chronic injury, disease, suboptimal management or environmental conditions, and indicates pain, suffering, suboptimal performance, and loss to the business.

HOW: AssureWel mortality protocol: <http://www.assurewel.org/layinghens/mortality>.

TARGET: <3% of the flock at end of lay.

Other measures:

Feather cleanliness, foot pad dermatitis, beak trimming.

HEN SIGNALS

Positive behavior	Negative behavior
Dustbathing and sunbathing	Aggressive pecking, aimed at the head or neck
Ranging outdoors	Injurious pecking, aimed at the feathers, wounds, or vent
Approaching the stockperson and allowing stockperson to approach	Aggression toward other birds- chasing or fighting
Perching and using enrichments	Aggression toward stockperson
Foraging- walking, pecking the ground and food items	Fearfulness
Positive social interaction, such as foraging or using enrichment with other birds	Smothering behavior

For further information and support please see our additional technical resources on laying hen welfare or contact us at info@ciwf.com.



PEER-REVIEWED ARTICLES:

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3. Gilani, Anne-Marie, Toby G. Knowles, and Christine J. Nicol. "The Effect of Dark Brooders on Feather Pecking on Commercial Farms." *Applied Animal Behaviour Science* 142, no. 1–2 (December 15, 2012): 42–50. doi:10.1016/j.applanim.2012.09.006.
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6. ———. "The Effect of Perches Installed in Cages on Laying Hens." *World's Poultry Science Journal*, June 2014.
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12. Scott, G. B., N. R. Lambe, and D. Hitchcock. "Ability of Laying Hens to Negotiate Horizontal Perches at Different Heights, Separated by Different Angles." *British Poultry Science* 38, no. 1 (March 1, 1997): 48–54. doi:10.1080/00071669708417939.
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7. RSPCA Assured laying hen standards <http://science.rspca.org.uk/sciencegroup/farmanimals/standards/layinghens>

Links to full standards documents or third party certifiers listed in this booklet:

Animal Welfare Approved: <https://animalwelfareapproved.us/standards/layinghens-2017>

Global Animal Partnership (GAP):

<http://gapstaging.blob.core.windows.net/standards/5%E2%80%90Step%C2%AE%20Animal%20Welfare%20Rating%20Pilot%20Standards%20for%20Laying%20Hens%20v1.0.pdf>

Certified Humane (Humane Farm Animal Care): <http://certifiedhumane.org/wp-content/uploads/2014/01/Std14.Layers.6A.pdf>

American Humane Certified: http://www.humaneheartland.org/index.php?option=com_content&view=article&id=3&Itemid=106&jsmallfib=1&dir=JSROOT/Animal+Welfare+Full+Standards+%2B+Supplements

United Egg Producers: <http://uepcertified.com/wp-content/uploads/2015/08/2016-UEP-Animal-Welfare-Guidelines-2016-Cage-Free-Edit-002.pdf>





Compassion is recognized as the leading international farm animal welfare charity. It was founded in 1967 by Peter Roberts, a British dairy farmer who became concerned about the development of intensive factory farming.
For more information visit www.ciwf.com.

Food *Business* Program

Compassion in World Farming's Food Business team works in partnership with leading manufacturers, food service businesses, and supermarket retailers that have the ability to positively impact large numbers of animals in their supply chains.

We believe in collaboration and a solutions-led approach, developing relationships that are based on trust, mutual benefit, and reward for progress.
For more information, visit compassioninfoodbusiness.com.

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