



Higher welfare systems for laying hens – practical options



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Caged systems for hens, whether conventional barren battery or enriched, do not provide for the full physiological and behavioural needs of laying hens. Alternative cage-free systems, if designed and managed properly, allow birds to express more of their natural behaviours and have the potential to deliver a higher level of welfare for the hens. As companies pledge to end the use of cages for laying hens in their supply chain, producers need to invest in systems that deliver good standards of welfare for hens throughout their lives. For those in the EU, legislation for barn, free-range and organic systems must be adhered to and, for those in other countries without legislation, we recommend these standards as a minimum.



Free-range systems provide the highest welfare potential for laying hens.



Laying hens express a wide range of behaviours including foraging, dustbathing, scratching and perching.

This document shares useful information for food companies and producers moving to cage-free laying hen systems, covering:

- **A summary of current legislation in the EU**
- **Key welfare issues in laying hens** – including feather pecking, keel bone fractures and foot health; what they are and how to manage them
- **Pullet rearing** – key considerations for rearing chicks, and how this affects their welfare throughout life
- **Different types of cage-free housing** – including multi-tier/aviary systems, single-tier/flat-deck systems, the Rondeel system and mobile sheds
- **Key design features of housing** – requirements for lighting, ventilation and climate control, drinkers and feeders, litter, space and flock size, nesting, perching provision, shed enrichments and verandas
- **Ensuring good ranging in free-range systems** – detailing how to maximise hens' usage of the range
- **Assessing hen welfare** – using animal-based welfare outcome measures.

For further information and support please see our technical resources on laying hen welfare or [contact us](#) at Compassion in World Farming.

Compassion recommends

A good laying hen housing system should provide a rich and stimulating environment which allows for the expression of a wide range of behaviours. Perching, foraging, nesting and dustbathing are all behaviours that need to be fully provided for. A structured, well thought-out design can integrate an active role for the birds in using designated functional spaces. Feather pecking behaviour must be minimised, not through mutilation of the beak but by providing the appropriate environment and good stockmanship. Rearing pullets in similar systems to which they will experience in lay is an important part of ensuring good design translates into real benefits for the birds. A free-range/Rondeel system provides the highest welfare potential, and provision must be made to encourage birds to range fully.

Higher welfare systems should include:

- **Functional space** for birds to perform specific behaviours including perching, dustbathing, scratching, foraging and roosting up high at night
- **A veranda** (covered outdoor area) which is essential for all barn systems and is a very good addition for free-range systems, particularly for bad weather days
- **Adequate space** to easily navigate the shed and reach any popholes
- **Nipple drinkers and mashed food** to reduce feather pecking risk
- **Solid flooring** in the shed with at least one third of the floor covered in dry, friable litter
- **Perching space of at least 15cm per bird**
- **Enclosed nest boxes** with at least 1 per 5 birds
- **Colonies** of no more than 4,000 birds
- **Shed enrichments** such as string, alfalfa blocks and straw bales
- **Enrichment on the range** including trees, bushes, and artificial shelters. Sand or dry earth for dustbathing.

* Rondeel is often sometimes referred to as the Dutch free-range system. We recommend this system due to its unique design which provides for all the behavioural needs of laying hens including outside space. However under current EU law it cannot be labelled free range due to specifications on range area. More details on the Rondeel system are given further in the booklet.

Investing for the future

Compassion highly recommends producers and companies invest in free-range or Rondeel systems*. Consumer demand for better animal welfare continues to build year on year, so investing in free-range systems with the highest welfare potential represents the most future-proofed investment.

Consider designating land for free-range access where practicable and always incorporate the latest design features. A veranda (covered outside area) is an integral part of any shed design but is particularly important for barn systems without range access.

In addition, 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 behaviour
- **Flock behaviour** – Recording the flock's reaction to people
- **Mortality** – Recording the number of birds dead or culled and the causes.



When given the opportunity, laying hens will forage for large parts of the day.

MAIN LEGISLATION REQUIREMENTS (EU) – Article 4, Directive 1999/74/EC

Eggs are coded with the numbers 0,1,2,3 in the EU to delineate the housing system the hens are reared in; 3 is for caged systems.

Production type code	Barn (2)	Free-range (1)	Organic (0)
Stocking density	Maximum 9 hens/m ² of usable space.		Maximum 6 birds/m ² of usable space.
Feeders	Linear feeders providing at least 10cm per bird or circular feeders providing at least 4cm per bird.		
Drinkers	Continuous drinking troughs providing 2.5cm per hen or circular drinking troughs providing 1cm per hen. In addition, where nipple drinkers or cups are used, there shall be at least one nipple drinker or cup for every 10 hens. Where drinking points are plumbed in, at least two cups or two nipple drinkers shall be within reach of each hen.		
Nesting	At least one nest for every seven hens. If group nests are used, there must be at least 1m ² of nest space for a maximum of 120 hens.		
Perching space	Adequate perches, without sharp edges and providing at least 15cm per hen. Perches must not be mounted above the litter and the horizontal distance between perches must be at least 30cm and the horizontal distance between the perch and the wall must be at least 20cm.		
Littered area	At least 250cm ² of littered area per hen, the litter occupying at least one third of the ground surface. The floors of installations must be constructed so as to support adequately each of the forward-facing claws of each foot.		
Multi-tier systems	<ul style="list-style-type: none"> • there shall be no more than four levels; • the headroom between the levels must be at least 45cm; • the drinking and feeding facilities must be distributed in such a way as to provide equal access for all hens; • tiers must be so arranged as to prevent droppings falling on the levels below. 		
Access to range	N/A	<ul style="list-style-type: none"> • Providing at least 4m² per hen of outdoor space in free range; • There must be several popholes giving direct access to the outer area, at least 35cm high and 40cm wide and extending along the entire length of the building; in any case, a total opening of 2m must be available per group of 1,000 hens; <p>Annex II, COMMISSION REGULATION (EC) No 589/2008</p> <ul style="list-style-type: none"> • The maximum stocking density for open-air runs must not be greater than 2,500 hens per hectare of ground available to the hens or one hen per 4m² at all times. However, where at least 10m² per hen is available and where rotation is practised and hens are given even access to the whole area over the flock's life, each paddock used must at any time assure at least 2.5m² per hen; • Open-air runs must not extend beyond a radius of 150m from the nearest pophole of the building. However, an extension of up to 350m from the nearest pophole of the building is permissible provided that a sufficient number of shelters are evenly distributed throughout the whole open-air run with at least four shelters per hectare. 	

Common welfare issues in laying hens

Feather pecking

Feather pecking (or injurious pecking) is a serious welfare issue – birds redirect their pecking behaviour towards others, leading to feather loss and skin injuries, and in extreme cases, vent pecking and cannibalism. Feather pecking is distinct from aggressive pecking (the latter is aimed at the head or neck).

Feather pecking is an abnormal behaviour 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 behaviour.

Designing and managing systems that allow hens to fulfil their foraging and dustbathing needs reduce the risk of feather pecking. Visit www.featherwel.org for more details and practical solutions.



Feather pecking is an abnormal behaviour and leads to feather loss and skin injury and in extreme cases cannibalism.

Keel bone fractures

Osteoporosis is prevalent in caged birds due to lack of exercise and accounts for 20 – 35% of all mortality in caged hens. Despite wing and keel bones being stronger in hens from non-caged systems, keel bone fractures are more prevalent in alternative systems as birds move about more and this leads to the risk of collisions with hard surfaces. Keel bone breakages and subsequent deformities are painful, reduce movement in the birds and affect egg quality and production.

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 fixtures close to nest boxes are also potential causes. Genetic selection for bone strength, appropriate pullet-rearing systems and improvements to house and perch design are important to reduce this risk.



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

Beak trimming is the main method currently used to control feather pecking. This involves removing a portion of the beak (up to a third in the EU) 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 behaviour; the red-hot blade causes chronic pain as well.

Systems need to be designed to ensure birds can live with intact beaks and minimal feather pecking. Producers should be mindful that in some countries laws exist or are being proposed to prohibit beak trimming. Where beak trimming is currently performed infra-red beam should be used to minimise pain and distress to the birds.

Foot health

Foot pad dermatitis (inflammation of the foot pad, a severe type is called 'bumblefoot' when the foot becomes infected) and hyperkeratosis (excessive hardening of the skin) are the most common foot problems in cage free systems.

- Wet litter, high ammonia content of the litter, as well as feed and genetic factors can cause foot pad dermatitis.
- Infection with the bacteria *Staphylococcus aureus* in deep litter systems leads to bumblefoot – a localised 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.
- 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.



Bumblefoot – this is caused by a foreign body entering the foot followed by invasion of *Staphylococcus aureus*. It is a painful condition and can be avoided by ensuring deep litter systems are well maintained.

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.



Pullets should be given access to perches from an early age.

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).

- 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 set at 6cm/bird. The configuration should ideally be aligned with the laying hen shed they will move to. Research has shown early access to perches increases bone strength and may therefore reduce fractures.
- Introduce nest boxes during the latter stages of pullet rearing to train the young hens to use a nest box. This is vital to reduce the number of eggs laid on the floor, which is a source of economic loss.
- Pullets destined for free range systems need to be given access to outdoors as this will increase their likelihood of ranging as adults and make them less fearful. Access can be from as young as 6 – 8 weeks of age but birds should gain access no later than 12 weeks of age.

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

The area underneath the dark brooder is warmed by some form of heating, either by the use of underfloor heating, hot pipes or thermal heaters. The chicks go under them when they are tired as they would a mother hen's wing, allowing them to rest and be away from other investigating chicks that might peck them. This has been shown to reduce feather pecking during the laying phase.

Use of brooders saves energy and therefore money as sheds can be kept cooler while the brooders are warmer.



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

Placement of pullets

It is important to ensure the breed company has given sufficient 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.

- Weigh a sample of birds regularly from the day of arrival on the laying farm. Producers need to make sure flocks are 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 of bird

Different commercial hybrids cope differently with fear and stress. The genetics of the bird can therefore predispose them towards injurious pecking. Choose a breed that is calm, with improved bone strength and, for free-range systems, a good ranger. British Black Tail hens (in picture) have been shown to have the least plumage damage from feather pecking in a study comparing eight different hybrids.



British Black Tail hens are a good breed for reducing the risk of feather pecking.

Different types of cage-free housing



Ramps allow birds to navigate between tiers and reduce risk of collisions which may occur as birds fly between the ground and the different tiers.

Multi-tier/aviary housing offers more three-dimensional space for birds to move around. Producers often find that it reduces the number of floor eggs and improves food conversion rate. Many comment on flocks being calmer.

In terms of husbandry, it is easier to remove manure and therefore easier to keep the litter clean and ammonia and dust levels down. Position perches carefully 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.

Multi-tier/aviary housing without any access to an outdoor range is one type of 'barn' system.

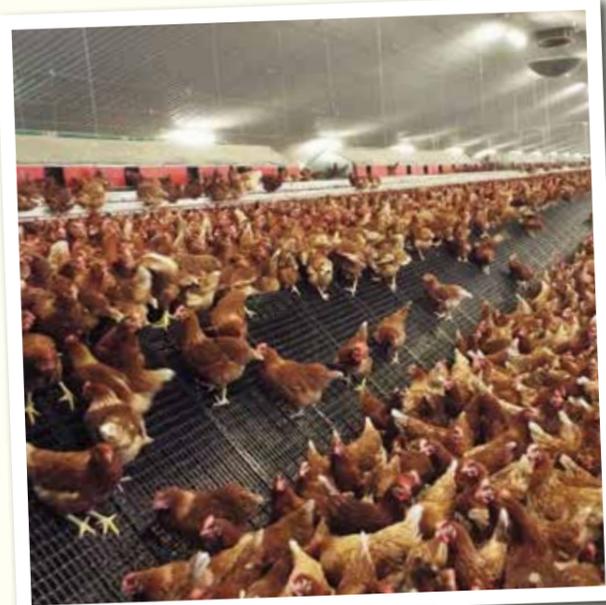


There are a variety of different multi-tier designs.

Single-tier/flat-deck systems require more floor area to provide enough space per hen. It is much simpler in layout than the multi-tier but does not provide the birds with the height they desire for or enable hens to easily escape aggressors.

Keel bone fracture risk is reduced in this system due to the lack of furnishings but birds have less variation in functional space. Producers often comment that birds are more flighty in these systems.

Single-tier/flat-deck housing without any access to an outdoor range is one type of 'barn' system.



The angle of any ramps needs to be carefully considered.

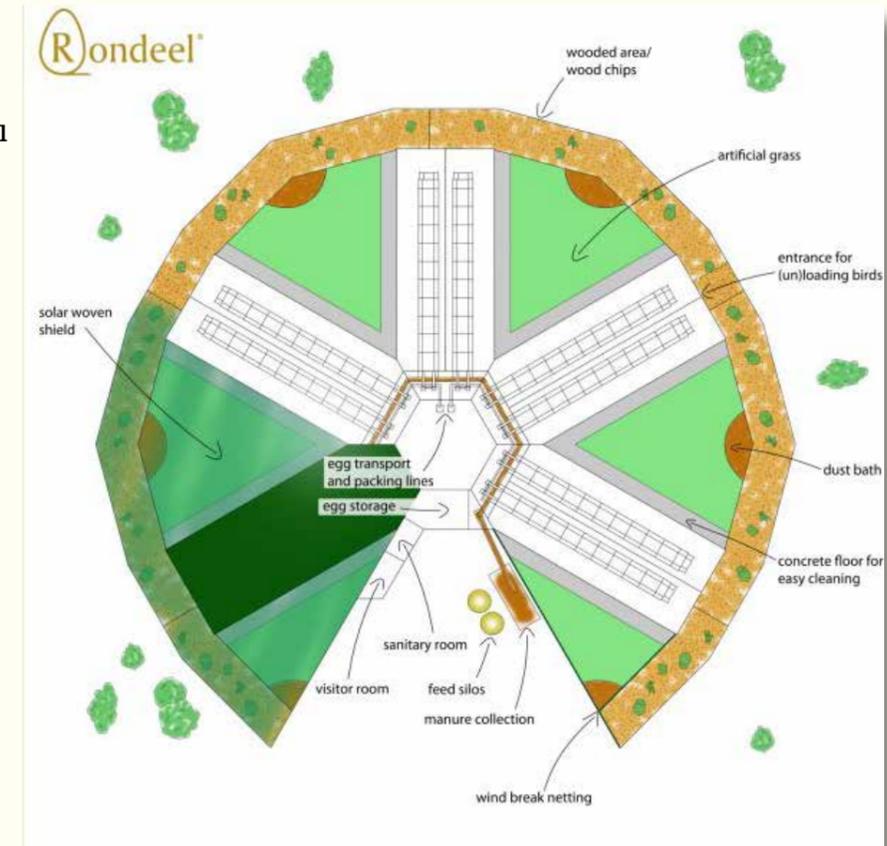


Birds need to travel further and through many hens to get to all the provisions in the shed in single-tier systems in comparison to multi-tier systems.

The Rondeel system is a unique system with many features. A Rondeel barn accommodates 30,000 birds and has a characteristic circular design split into 10 sub-units, each housing 3,000 hens. Each unit is divided into three distinct areas in order to better address the hens' behavioural and mental needs and give them the freedom to choose their environment, thus allowing the birds an active role in seeking out where to perform particular behaviours (see diagram). Due to the design, birds in this system have intact beaks.



This is the outside area which is labelled as concrete floor on the diagram. There is also an area with grass which can be seen to the left in the photo.



Mobile sheds are one housing option in free-range systems; they are ideal for smaller flocks and organic systems. They typically have suspended flooring which allows quick movement of the sheds. After each flock the sheds can be moved around the fields. This helps ensure no build-up of parasites and other disease which is why it is used in organic systems with smaller flocks. Sheds should be well insulated to ensure warmth in the winter and to keep cool in hotter weather.



Mobile sheds are good for organic systems.

Key design features of good housing

Lighting: it is important for birds to be able to find what they need in the shed. Maintain an even light intensity throughout the house with natural and artificial light and avoid any areas of extreme bright light or darkness. Placing the birds in dim light to control injurious feather pecking should be a last resort.

- There should be no sudden changes to lighting.
- Birds need an uninterrupted period of darkness of 8 hours to allow for resting.
- Dim the lights over an hour period or so to simulate twilight. This is necessary to allow the birds to settle. A dawn period should also be given.

Ventilation and climate control: laying hens are very sensitive to adverse changes in temperature and large changes in humidity and air quality in the house should be kept to a minimum. Climate can have a big impact on the evenness (uniformity of weight) of the flock. Any extreme changes can 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 25ppm for atmospheric ammonia and producers should aim for a maximum of 15ppm.

- Maintain a separation of the hens from their faeces, with the use of slatted floors and/or manure belts under drinkers, nest boxes and perches.
- Ensure that fans are working properly, and vary them according to external weather conditions. Minimum ventilation to remove stale gases and moisture is needed 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 must be minimised.

Drinkers and feed: the type of drinkers and the food used in a shed can impact the behaviour of the birds.

- 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.
- The feeding interval should be long enough so the fine and nutritious food is eaten and to reduce the number of times the birds come in off the range in free range systems. However it should never be left so long the birds go hungry.
- Any changes to diet should be avoided where possible. If a change of diet is needed, place extra enrichments in the shed and minimise the number of changes that happen in quick succession to keep stress levels reduced. To make the process more gradual, scatter the previous ration on the floor of the shed.



Nipple drinkers are associated with a reduced risk of feather pecking



Good quality litter is important for dust bathing.

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

- The floor area must be provided with a high quality, stimulating litter covering at least a third of the floor. This is to ensure birds can dustbathe and forage.
- Frequent monitoring of litter is needed; by forking the litter over or rotavating it and adding fresh clean litter to the top its quality should be maintained. However if litter gets wet or capped (dirt layer formed over the litter) it must be replaced and an investigation should be put in place to identify and swiftly address the cause.
- Use hyper-absorbent pellets in known problem areas in addition to usual litter, such as around popholes. Keeping the external area dry and well drained and preventing rain getting into the shed is important for managing litter quality.
- Add small bales of treated and dust-extracted straw (keep baled up to allow birds to peck them apart) in the shed to allow the litter to build up naturally and encourage foraging behaviour.

Space and flock size: systems must provide sufficient space for hens to perform comfort and maintenance behaviours (including preening, stretching, wing-flapping) and locomotion (including running, walking, flying).

- A stocking density of 9 hens/m² of usable space in the shed is the maximum recommended (and legally permissible under EU law) and not more than 15 birds/m² when counted at floor level for multi-tier systems. A 'usable' area is defined as at least 30cm wide with a floor slope not exceeding 14% and 45cm headroom.
- For birds given access to the range there must be at least 4m² per hen of outdoor space.
- 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 facilities they need such as water, feed and nest boxes. Smaller flocks also minimise problems of stress and reduce the risks of smothering (birds crowding and suffocating each other) and feather pecking. It is for this reason that any flock greater than 6,000 birds must be placed into smaller separate colonies.

The RSPCA recommends:

Barn systems – max. flock size 32,000 birds with max. colony size 4,000 birds.

Free range – max. flock size 16,000 birds with max. colony size 4,000 birds.

Separation into colonies is achieved by using a partition in the shed and on the range. Effects on ventilation must be considered as well as ensuring the appropriate stocking density and access to nest boxes, feed and water. In the case of free range, access to the range must be considered too. To maintain numbers between colonies, the range also needs to be divided; at least a 50m is recommended between the house and the boundary. Colonies of 500 birds or less are recommended where possible as birds in small groups are found to range best.

Design of the nest box must make provision for nesting behaviour which includes nest site investigation and selection, pre-laying behaviour (gathering, scraping, crouching, sitting and circling and raising the keel bone) followed by egg laying and post-lay sitting. The sequence of behaviours 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 mite (a common ectoparasite) so nests should be sealed properly to prevent the mites nesting in cracks and crevices.

- Hens prefer to lay in a discrete enclosed nest with loose material such as straw or a flexible nest liner on the floor; the nest must be perceived as attractive.
- There should be at least 1 nest box per 5 hens.
- 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 AstroTurf™ or rubber pimple matting.
- Front curtains are an important component of group nests; sliced curtains allow for hen investigation along the length of the nest.
- Integration of nests into a multi-tier structure at the centre of the shed as opposed to against a wall can lead to more even use of nests. Platforms in front of the nests should be more than 30cm wide.
- Nest box lighting is associated with vent pecking. Gradually dim the lights over time once the birds are trained, until the nest boxes are completely dark.



Design of the nest box must make provision for a hen's nesting behaviour.

Perching provision: birds are highly motivated to perch at night. The design of the perch and the height and space are important to get right.

- Providing high perches (70cm 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 40cm above the next level below.
- Aerial perches have the highest level of keel bone fractures compared to static low perches. A ramp up to the different tiers is key to allow birds easy access to high perches so they don't have to fly up or down and risk damaging their keel bone.



This type of perch is used in a multi-tier system and allows birds the opportunity to perch high at night.

Shed enrichments: to increase the variety within the shed and occupy the birds we recommend enrichments such as:

- String (not plastic)
- Straw bales
- Sawdust bales
- Alfalfa blocks
- Plastic bottles, old wellington boots and buckets etc. Bright colours are most attractive
- Crumpled and ripped egg cartons or trays placed in hay nets
- Hanging CDs.



Bright colours are most attractive to hens.



This A-frame is one style of perching frame and used in single-tier sheds.

Verandas (winter gardens): the addition of a veranda (enclosed outside area) is essential for barn systems to provide supplementary foraging materials and dustbathing opportunities. A veranda also ensures birds get natural light to sunbathe; direct light is also important in fulfilling dustbathing behaviour. Many scientific studies have established a reduced risk of feather pecking with good litter and warmer temperatures in the main shed in conjunction with the use of a veranda.

In free-range systems verandas provide a suitable place for birds to leave the shed when the weather is bad. This will stop them becoming frustrated and reduce the risk of feather pecking.



A veranda can reduce stress and ease congestion in the main house which is why it is an important requirement for a barn system. It is a good solution to allow birds to experience natural direct sunlight and give additional space to dustbathe while remaining manageable for producers.

Ensuring good ranging in free-range systems:

Wherever possible hens should be given access to the outdoors with a ranging area. Ranging enhances the opportunity for birds to express their full behavioural repertoire and ensures the highest welfare potential in a system. In natural conditions hens spend 50 to 90% of their time foraging, which involves searching and scratching at the ground or litter for potential food items (seeds, earthworms, flying insects, grit), followed by investigation and selection of food items by pecking.

Ranging behaviour of birds (i.e. the extent to which they utilise the outdoor area) is affected by time of day, age, feeding system, weather conditions, previous experience, genetic strain, and importantly the quality of the outdoor environment provided. Birds need access to the range at 21 weeks at the latest but ideally they should have it before they come into lay, as young as 8 – 10 weeks old. Early access to the range and provisions on the range will ensure hens feel safe to leave the shed and reduces the risk of feather pecking (see pullet rearing section above).

Free-range systems of course require housing, which may take the form multi-tier/aviary sheds, single-tier/flat-deck sheds or mobile units as detailed above. Free-range systems with a veranda or porch attached to the shed provide hens with enhanced opportunity to express their behavioural repertoire even when there is poor weather. A veranda also reduces the light contrast from the shed to the range which can encourage hens to leave the shed.



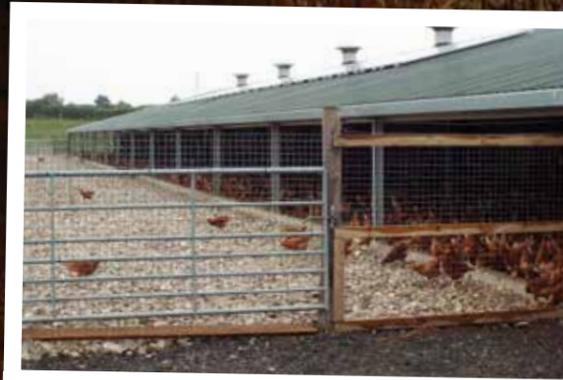
A porch is an alternative to a veranda for free range birds but can work just as well, providing a sheltered area and reducing the contrast of light from the shed to the range.

- **Overall range size** is recommended by the RSPCA as at least 1Ha per 2,000 hens over the life of the flock.
- **Pophole view** is important to encourage birds to leave the shed; birds require a good view of dustbathing opportunities and trees or shelter.
- **The entrance to the popholes** needs to be well managed to minimise poor drainage and to prevent litter getting wet and dirty inside the shed. Using either old slats, sloped concrete or stones with enough depth for drainage outside the shed will ensure birds' feet are clean before entering the shed.
- **Cover on the range** should consist of both artificial shelters and trees where possible. The RSPCA requires a minimum 8m² per 1,000 hens of artificial cover. The cover should be no more than 20m from the popholes. Ideally at least 5% of the range should have tree cover.
- **Sand** for dustbathing is attractive to hens and will encourage ranging behaviour. Dustbathing is performed every 2 days in unrestricted conditions, and hens prefer fine particles like sand in which to dustbathe.
- **Short grass** increases the UV light on the soil thereby reducing the risk of parasite burden as the eggs are killed by the light. Rotation of pasture through the use of mobile sheds is a very good way to control parasites. Herb strips are also good enrichment on the range.
- **Prevention of predation** requires fences around the perimeter of the range. Fences should be 1m deep and at least 5m high with an overhang, or 6m high to keep out animals such as foxes. Alpacas or llamas work as good guards and should be in pairs for their own welfare with the appropriate provisions of shade and bedding, ample food and fresh water at all times. Aerial predation is harder to stop, but may be minimised by having cover on the range which gives hens the opportunity to run and hide.

Range management



Alpacas make good guards against predators.



Stones at the entrance of the popholes stop poaching of the ground and keep litter dry in the shed.



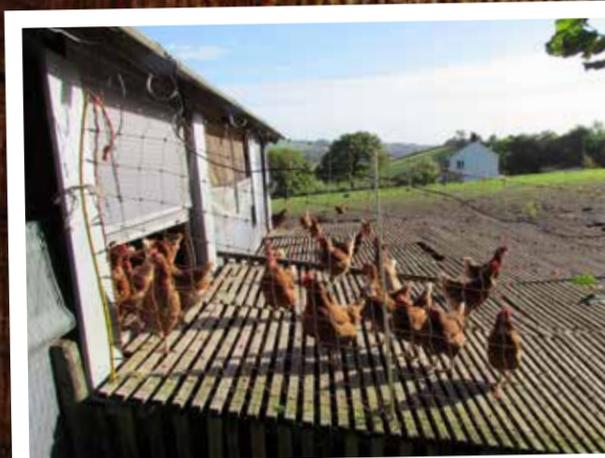
Man-made structures can include wooden shelters.



Fine sand makes a good dust bath for hens.



Man-made shelters are important when there is less natural shelter. Netting is a good option in hot climates.



An alternative to stones at the entrance is a slatted ramp down to the range.



Man-made shelters can be made from a range of material, including netting and aluminium (to keep the shelter cool, and it should be painted white on the outside to reflect the heat).



Mature wooded areas provide shade and shelter as well as well as good foraging opportunities for finding insects.



If the natural ground isn't optimum for dustbathing man-made structures filled with sand can provide a good dustbathing spot.



The pophole view should ensure birds can see natural or man-made shelters to encourage them to leave the shed.



Trees provide additional shade and having trees near the the house will encourage hens to leave the shed.

Assessing welfare in laying hens

Welfare outcomes are an animal-based method of assessing an animal's physical wellbeing and increasingly their behavioural expression and mental wellbeing. Whilst 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 programme.

Below is a selection of the main measures recommended:

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.html

- Common problems in laying hens are viral disease, bacterial infections and parasites. Foot pad dermatitis, bumblefoot, hyperketosis and excessive claw growth are the most common foot problems. Osteoporosis is a major contributor to mortality.

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 behaviour, at various stages of production.

WHY: Injurious feather pecking is a major welfare issue largely resulting from redirected foraging behaviour; it can lead to suboptimal thermal control, reduced productivity, injury, cannibalism and even death. Managing this behaviour is essential to operating successfully with non beak-trimmed flocks. A guide to preventing feather pecking: https://www.featherwel.org/featherwel/Portals/3/Documents/advice_guide_V1.2-May-2013.pdf

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.

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.html>

Flock Behaviour

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 be alarmed and smother each other.

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

- Observe birds' behaviour 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.html>

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

OTHER MEASURES: Feather cleanliness, foot pad dermatitis, beak trimming.

HEN SIGNALS:

Positive behaviour

Negative behaviour

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

Certification schemes

Food companies should make clear policy commitments detailing their required welfare standards for laying hens. Using third-party certification or assurance schemes can be useful and is highly recommended. Below is a selection of European schemes which stipulate higher welfare cage-free standards.



KAT in Germany certifies both barn and free-range eggs and covers all stages of production with a strict auditing scheme.



Label Rouge in France certifies only free range eggs with a strict criteria and auditing scheme.



RSPCA Assured in the UK certifies both barn and free-range eggs covering the pullet and laying hen stages with a strict criteria and auditing scheme.



Beter Leven in The Netherlands is a star-based system with a strict criteria and auditing scheme. There are three levels going from 1 star (barn system with veranda) to 3 stars (free range with more space, lots of enrichment and no beak trimming).



SUMMARY

Key features required for alternative systems to maximise welfare potential

- Appropriate pullet rearing
- Good design of shed with well laid out functional areas – ensuring perching high up, dustbathing and foraging
- A veranda
- Plenty of space
- Ample enrichment
- The right mash diet
- Nipple drinkers
- Access to range wherever possible
- Good cover on any range provided, both natural and artificial
- Monitoring of welfare outcome measures including feather cover, keel bone fractures and flock behaviour.



REFERENCES

Information contained in this leaflet is taken from:

Article 4, Directive 1999/74/EC. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:203:0053:0057:EN:PDF>

Bristol University, 2013. Improving Feather Cover: A guide to reducing the risk of injurious pecking occurring in non-cage laying hens. Available at https://www.featherwel.org/featherwel/Portals/3/Documents/advice_guide_V1.2-May-2013.pdf

Commission Regulation (EC) No 589/2008, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008R0589&from=EN>

Compassion in World Farming, 2012. Information sheet 3 (Hen welfare in alternative systems) Available at: <https://www.compassioninfoodbusiness.com/media/5789266/hen-welfare-in-alternative-systems.pdf>

Compassion in World Farming, 2012. Information sheet 4 (Reducing the need for beak trimming in laying hens). Available at <http://www.compassioninfoodbusiness.com/media/5789269/laying-hens-reducing-the-need-for-beak-trimming.pdf>

Compassion in World Farming, 2014. Case study: Rearing Laying Hens In A Barn System Without Beak Trimming: The Rondeel Example. Available at <http://www.compassioninfoodbusiness.com/media/5817306/rondeel-case-study-july-2014.pdf>

Featherwel website www.featherwel.org
RSPCA Assured laying hen standards <http://science.rspca.org.uk/sciencegroup/farmanimals/standards/layinghens>





Higher welfare systems for laying hens – practical options



Compassion in World Farming

Compassion is recognised 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.org.uk

Food Business Programme

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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