Understanding the benefit of natural light for laying hens

Why is natural light beneficial for laying hens?

- Natural daylight is not commonly provided to laying hens when housed in the UK, except through popholes in the case of free-range units. However in Europe there is an increasing number of systems that provide at least 3% natural daylight through windows in the houses.
- Natural daylight is particularly good for hen welfare as it:
    - Allows them to experience their full visual light spectrum to keep them stimulated, happy and healthy. *Find a detailed summary of visual benefits under 'visual benefits'.* (Page 2)
    - Encourages a range of activities, such as foraging, preening and dustbathing. *Find a detailed summary of behavioural benefits under 'encouraging natural behaviours'.*(Page 3)
    - For free-range birds, natural daylight encourages them to range outside by minimising the differences between the inside and outside environment. It also helps to reduce incidents of injurious pecking. *Find a detailed summary of behavioural benefits under 'encouraging range use.'* (Page 3)
    - Creates a more natural environment and aligns with hens preference for natural daylight. *Find a detailed summary of visual benefits under 'preference for daylight'* (Page 3)
    - Reduces feather pecking and keel fractures. *Find a detailed summary of behavioural benefits under 'feather and keel'.*(Page 4)

- The benefits of providing natural daylight to poultry is supported by practical experience. All RSPCA meat chickens and turkeys on RSPCA Assured certified farms must be provided with natural light inside the house.
- There has been positive feedback from the meat chicken industry about natural light in the house, especially the improvements in bird activity.
- Turkeys are more aligned with laying hens and flocks can experience feather pecking, however we do not see increased feather pecking as a result of the inclusion of natural daylight.

Where did you source your evidence that natural daylight improves hen welfare?

- The RSPCA is an evidence-led organisation and any changes to the standards are informed by the most up-to-date research and information when this becomes available.
- The benefits of providing natural daylight to poultry is supported by practical experience and scientific evidence. All RSPCA meat chickens and turkeys must be provided with natural light inside the house. There has been positive feedback from the meat chicken industry about natural light in the house, especially the improvements in bird activity.
- Since 2023 all Red Tractor meat chickens (90% of UK chicken production) must be provided with natural light, clearly demonstrating the value of natural daylight in the poultry industry.
- The European food safety authority [1] published a scientific options report on 'The Welfare of Laying hens on farm'. Recommendations from the report included:
    - Light from 5 lx and higher should be provided during the day.
    - Natural light should be provided in addition to artificial light. Eight hours of continuous darkness (artificial light turned off) per day should be provided to laying hens and breeders. Periods of dusk and dawn should be provided.

Use in Europe

- Natural daylight provided through windows is a key aspect for many production systems in Europe. Beter Leven one, two, three star criteria and KAT guidelines both require natural daylight to be included through windows at 3% of the hens floor area.
- Feedback from these certification bodies indicates that producers see positive effects of natural daylight within the house and do not identify any welfare issues. Daylight has been required under some certification schemes since 2008, so producers are used to managing natural daylight provision within the house, especially with intact beak birds.
- European countries that provide natural daylight through windows include Austria, Netherlands, Germany, Switzerland, Sweden. It is recognised that the key visual aspects that natural daylight provides should be included in the laying hen environment. All of these countries no longer need to beak trim the majority of their laying hen flocks.

The management of natural daylight is discussed in the best practice for hens resource: Light management.

Some examples of windows in laying hen systems

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Welfare benefits in detail

Visual Benefits

Avian species have a greater spectral range than that of humans. The range extends to the Ultra violet (UV) spectrum, as well as physiological effects on vitamin D production, similar to humans. UV light comprises the shorter wavelengths (100–400 nm) of the electromagnetic radiation spectrum and is divided into three distinct parts: UVA (315–400 nm), UVB (280–315 nm), and UVC (100–280 nm).

UVA is visually received by poultry and is also transmitted to the pineal oscillators which control circadian rhythm (awake and sleep cycles). UVB plays a key role in the production of vitamin D3 which promotes intestinal absorption of calcium and phosphorus, thus increasing bone mineralisation and development of skeletal health. UVB is filtered by glass and therefore there will not be any beneficial effects of UVB if windows are installed in poultry sheds, however the provision of open sided verandas will give birds access to UVB light.

Laying hens have well developed vision and, like ourselves, it is their dominant sense and has evolved for use in brightly lit conditions. In particular, they have well developed colour vision, which has been determined from a variety of behavioural and physiological tests (summarised in [2]). However, a high light intensity is required for this visual system to work well. The intensity of natural daylight is many orders of magnitude brighter than the artificially lit environments of poultry houses where the maximum lighting levels are often 20 Lux. Further, natural daylight provides the full spectrum of light, including UV light. Therefore daylight is necessary for poultry to utilise this sense to its full potential.

Preference for daylight

Recent research has found that hens show a preference for UVA/UVB light compared to white light/commercial lighting [3,4]. These preferences for light change with age and with the type of behaviour being performed. Usually, behaviours which require visual acuity are performed under bright light and those such as resting and preening in dimmer light. Therefore spatial variation in light provision is also important, which can be provided within houses with windows, whereby the environment naturally becomes darker lit towards the centre of the house.

Encouraging natural behaviours

Under UVA lighting conditions laying hens have been found to perform more positive behaviours such as foraging, dustbathing and preening [3,5]. A key strategy to reduce the risk of injurious feather pecking is to ensure birds are provided with excellent quality litter so they can engage in natural behaviour such as foraging. Keeping birds in an environment that promotes these behaviours will be a positive step forward to ensuring better feather cover.

Laying hens provided with supplementary UV lighting (18-72 weeks) were found to have lower stress (determined by CORT levels, bilateral asymmetry and heterophil:lymphocyte ratio) and fear levels (measured using tonic immobility and inversion) [6]. Reducing the levels of stress and fear in a flock will improve bird welfare and may create more resilience in a flock thus reducing the risk of injurious feather pecking occurring.

However, despite the positive outcome of provisioning hens with artificial sources of UVA light there have been some experimental studies that have found increased risk of feather pecking [7] and therefore providing natural daylight is essential to remove any potential risks associated with artificial light provision. An increase in feather pecking was also observed in birds reared without litter but with UVA light supplementation [8], although ground pecking and comfort behaviours such a preening and dustbathing increased and birds with UVA light were less fearful.

Encouraging range use

Providing windows in the roof or walls of the shed will increase the light intensity inside the house and allow UVA wavelengths providing hens with more external cues that may promote range use. Bestman et al [9] reported that a larger amount of daylight inside the house was related to greater range use. Research on commercial free-range flocks found more birds were observed on the range when the light intensity was higher inside the house, it was hypothesised that this was due to a reduced light gradient [10]. In free-range laying hen flocks that range is often not well utilised, with some research reporting range use rarely exceeds 50% of the flock [11]. The importance of promoting laying hens range use has been well studied, Nicol et al [12] reported a nine-fold reduction in the risk of feather pecking in flocks that utilised the range on sunny days. Range use tends to have a diurnal pattern with peaks in the morning and evening, within the laying house the lighting levels are often low and if popholes are only present on one side the shed key indicators in lighting patterns may not be apparent to birds.

Feather and keel

Better plumage cover was also found when natural daylight was provided [9,13] and the absence of daylight between 7 - 17 weeks of age was a predictor of feather loss during the laying period in organic flocks [14]. Another study identified the absence of daylight as a risk factor for keel bone damage in organic flocks [15], this was thought to be a result of increased collisions due to poor visual perception.

Spindler et al [7] looked at providing additional sources of artificial UV light inside barns where natural daylight provision was already present. Where artificial UV light was provided, injurious feather pecking was seen to increase. The authors concluded that birds are developed for natural daylight and artificial lighting provides challenges. A recent review paper highlights that further research is needed to understand the impact of artificial UV light sources on poultry behaviour and welfare [16].

Summary

From both practical experience and research there have been no reports of welfare concerns when natural daylight is provided to laying hens. Providing laying hens with their full visual spectrum that they have evolved to function with will promote more natural behaviour and activity. Natural daylight must be well managed to eliminate any direct streams of daylight and if there are welfare concerns due to feather pecking the reduction of light levels must still be possible as a last resort to control feather pecking and minimise the welfare impacts of this.

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