



Managing free range laying hens

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About

Access to a free range area can improve welfare and health of hens, but only if the farmer recognises problems early and if preventive measures are applied.

In the LowInputBreeds project different breeds of laying hens were compared in free range systems. This technical note gives a practical overview of important aspects to managing free range laying hens.



Biology of the laying hen

Our modern laying hybrid hens originate from red jungle fowl; a forest bird from South East Asia. After over 4000 years of domestication many traits of modern laying hens can still be traced to the wild ancestor, among the most relevant for free range management are:

- Hens prefer to sleep in elevated roosts rather than on the ground.
- Hens prefer to spend time looking for food even just after eating.
- Hens prefer bushy features or other kinds of shelter rather than large open areas.
- Hens are omnivorous eating insects, seeds and fruits.
- The males produce alarm calls, when they detect predators.

Besides that, during their youth hens have periods when they are 'ready' to learn. For example, the typical scratching behaviour that is part of their foraging behaviour is learned in the first weeks of their lives. If they don't learn it, they might spend time on other less productive behaviour and develop 'vices' such as

feather pecking. Although 'natural' behaviours, the abilities to jump and sleep on higher places also need to be learnt when the hens are young. Other behaviours that should be learnt are dust bathing and exploring new environments such as a wintergarten or free range area.

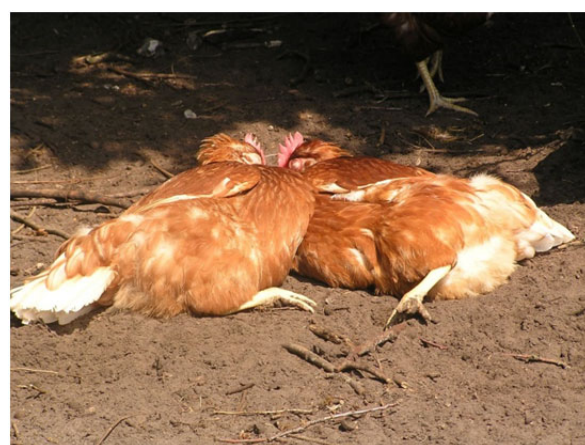


Photo 2. Most relaxed behaviour seen in a hens repertoire: sun bathing with eyes closed. (Photo: Monique Bestman)



Photo 3. These hens are 15 weeks old and show mild symptoms of feather pecking. (Photo: Monique Bestman)



Photo 4. The hens of Photo 3 at the age of 35 weeks (Photo: Monique Bestman)

Behavioural needs of laying hens

There are two ways of determining the behavioural needs of laying hens. The first is to deduce them from the biology of their wild ancestors. The second is to deduce them from studying their behaviour, for example in preference tests. The 'wish list' of a chicken consists of:

1. Laying nest,
2. Scratching area,
3. Perch,
4. Dust bathing,
5. Extra space.

Although 'extra space' can be interpreted very broadly, one could argue that all these wishes are fulfilled in free range housing. However, feather pecking, often described as abnormal behaviour, can be a large problem in free range systems, despite many studies on its prevention.

Feather pecking is the pulling of feathers of another chicken. It is an abnormal behaviour seen in laying hens in almost all housing systems, especially when large groups live together. How or why it develops is unknown, but a general assumption is that, if hens cannot perform their foraging, dust bathing or social behaviour adequately, they sooner or later, pull each other's feathers out.

A general difference between caged and loose housed hens is the group size. In larger groups of loose housing more hens can 'join-in', resulting in a rapid spread and its consequence (feather damage). This behaviour can start in the first weeks of life, however, because hens change feather several times in the first 17 to 18 weeks, damaged plumage is renewed and this vice may go unnoticed.

Moreover, once the behaviour appears, it highly likely reappears if something stressful happens. If hens don't develop feather pecking during rearing, the chance of avoiding it during lay is over 70 %, but if they do develop it, the chance of it continuing during lay is 90 %.

Studies show lower incidence of feather pecking if:

- hens are kept at a low stocking density,
- hens are on litter from a young age,
- this litter has pecking incentives such as regularly scattered grains,
- hens learn to perch on a young age,
- more hens use the outdoor area, which is more likely if bushes or artificial shelters are available.

So, the previous wish list can be completed by:

- an outdoor area with shelter
- appropriate learning experiences during rearing.

Concluding recommendations to avoid feather pecking in free range management:

- Animal density: 1-6 weeks: 24 animals per m²; 6-18 weeks: 10 animals per m²; after 18 weeks: 6 to 10 animals per m²
- Provision of litter (e.g. wood shavings, chopped straw, lucerne or maize silage) from the first day
- Access to perches from the first day
- Sandpits from the first day
- Access to a Wintergarten during rearing as soon as the temperature allows it, to provide extra space, more variation in climatic circumstances, day light and additional activities
- Free range area with bushes, trees or artificial shelter evenly distributed across the whole surface



Photo 5. 5 days old chicks on litter: The litter encourages their scratching behaviour and reduces development of feather pecking. (Photo: Monique Bestman)

irregularities are noted.



Photo 7. Down feathers on the floor of the chicken house indicating that hens do not eat the feathers, which is a good sign. (Photo: Monique Bestman)



Photo 6. These pullets have perches from very young age, which teach them to relax, play and avoid annoying conflicts. (Photo: Monique Bestman)

Farmers, who do not rear their own hens, are recommended to visit the rearing farm of their future flock to see, how animals are being kept and check progress. Farmers, who have not seen the rearing stable before, should time their visit before pullets are placed and again in the middle and at the end of the rearing period. During these visits special attention should be given to:

- Physical development: Are there many small hens?
- Mortality of hens
- Health of animals
- Down feathers on the ground. Missing down feathers are a sign of feather eating, which might develop into feather pecking.
- Information on light intensity
- Internal climate: Any smell of ammonia or dust due to poor ventilation?

During their visits the farmers should ask for explanations, if irregularities are noted.

Furnishing of the free range area

A free range area only contributes to the welfare of hens, if they use it. Less feather pecking is seen in a flock, if more hens go outside. Moreover, welfare can be obvious, when watching hens outside feeling at ease while doing 'chicken things' like scratching in a faraway corner or sunbathing together in a pit.

Making chickens feel at ease in the free range area

- Provide access to the hens to the range area either already during rearing or at least within 1 to 2 days of arrival in the laying stable.
- Plant bushes or trees or provide artificial shelter, evenly distributed across the whole surface.
- If not possible, then create linear elements like tree trunks or sewer pipes, towards the rear of the range, which hens can walk along; sow annual crops, such as sunflower or maize, in blocks or strips for shelter and keep them chicken-free with (electric) netting for the first 2 to 3 months.
- When providing shelter, also consider winter cover - hens go outside year-round.
- Provide hens with drinking water on the range to allow them to extend time outside.
- Keep the area in proximity to the stable dry with adequate drainage. A system of partly rotational grazing also helps to keep it in good condition.
- Last but not least, light, preferably daylight, in the stable will facilitate the transition of the hens from inside to outside from the very beginning.

Challenges to minimizing mortality

Higher mortality in free range farms?

In general, free range flocks have higher mortality than those kept inside only. Mortality between 17 and 30 weeks of age relates to the transition to the new stable and management, stress of becoming productive and changes in energy balance of the animals.

After the age of 50 weeks, higher mortality can be expected due to infectious diseases combined with being a 'top athlete', leading to a kind of 'fatigue'. Weaker individuals cannot keep up with the stronger ones, although many flocks 'grow old' without problems. In some cases one (or more) clear cause(s) can be designated, but often it is a combination of several infections and bad luck.

Piling and accidents

The risk of accidents exists for example, if the stable equipment is old, inappropriately fixed or with sharp parts.

Piling can arise, if hens get frightened or can be triggered by normal social chicken behaviour with some breeds. For example laying together in a pit in the sunshine is cozy with ten conspecifics, but can be fatal with hundreds.

This risk can be reduced by avoiding sunny spots in the litter area or, if necessary, temporarily thread electric wires on problem sites.

Mortality caused by predators

Foxes can be kept away with a proper fencing, dug into the ground and with an electric wire along the top. But even fenced-in hens must go back into the stable at night, because chickens sleeping outside are most at risk.

Birds of prey cannot be deterred as easily, although most farms are not troubled or only lose few hens per year. However, if individual birds of prey specialize in killing and eating chickens, then it can go from bad to worse. These birds teach their offspring to eat the 'easy feed'. Some measures might help, but only for a short term and if the approach is not changed, the birds of prey become habituated and ignore them.

For **prevention**, the chickens should be grazed together with larger animals, for examples horses, cows or sheep. Thread iron wires from pole to pole above the free range area, changing their location regularly, in order not to be predictable.

Cloaca cannibalism

If hens become bald around the cloaca because of feather pecking, the next step can be pecking at the cloaca after an egg is laid when the shiny interior is visible. The resulting bloody spot can elicit further pecking, wounds can get infected (hens become ill and die) or hens peck the victims to death.

Prevention of feather pecking is most important and if cannibalism starts, then distraction is important. Distract hens with new tasty, interesting feed sources, such as lucerne, maize silage, salt water in buckets (they must be able to

choose between fresh and salt water), grains, potatoes, carrots, Christmas trees, sand pits.

Escherichia coli

Escherichia coli is a regular gut bacterium, but in weak animals, those with another bacterial or viral infection or under stressful circumstances (physical reaction after vaccination, draught), *E. coli* proliferates and can cause an infection. Depending on the physical condition of organs and where *E. coli* enters, infection can target different organs (peritoneum, liver, lungs, heart) and give different appearances. In case of blood poisoning (Coli septicaemia), hens will die rapidly, although other *E. coli* infections work slower and cause fatigue.

Recommendations to avoid infestation by *E. coli*:

- Before starting with a new flock, keep the clean stable empty for 2 to 3 weeks.
- Start with stimulating production only, if the hens are physically ready for it.
- Prevent stress and accidents by giving the hens self-confidence. During accidents egg material can come into the peritoneum, which can be the beginning of the end.
- Work hygienically in order to prevent other infections: prevent contact with other chickens (keep only one age on your farm), and make sure that water and drinking equipment is clean at all times (clean the water tubes inside also!).
- A good fresh stable climate prevents lung infections.

In case of *E. coli*-infection, observe the following recommendations:

- Disinfect the nests weekly
- Always try to understand what went wrong, for the prevention of next time.
- Investigate which type of *E. coli*, and any other pathogens involved.
- Think of prevention, e.g. vaccination. to avoid antibiotics use and associated disadvantages
- improve hygiene and alternating different measures such as acidification of drinking water or probiotics. Vaccination against *E. coli* is possible during rearing, but leads to stress, pain and reduced growth."

Salpingitis

Salpingitis is an infection of the ovaries caused by infectious bronchitis, *E. coli* or a combination. There is not a specific 'early warning symptom', but post mortem analysis can show red and swollen ovaries and white infection material.

Symptoms:

- Egg abnormalities
- No ovulation
- eggs cannot be laid (with death as consequence)

Animals with salpingitis cannot recover, but spreading can be **reduced by**:

- Vitamin C
- Anti-inflammatory agents
- Antibiotics (withdrawal time for eggs consumption).

Peritonitis

Although the chicken ovary has two open ends (to the abdomen and cloaca) eggs ought to be passed towards the cloaca. However, in case of accidents an egg or yolk can enter the abdomen, leading to fluid accumulation and potential. These animals cannot recover.

Prevention:

- Reduce the risk of collision accidents.
- Avoid stressful events in the chicken stable especially before 12 o'clock, when the next eggs are still in the ovary.

Chronic gut infection

Chronic gut infection is a combination of unfortunate circumstances (hens physically not ready at start of production, a sudden change or inappropriate feed or other infections), which allows normally benign bacteria or viruses infect the gut and which becomes chronic. Gut infection can only be recognized *post mortem* hence prevention is most important.

The idea in treating chronically infected hens is to keep them eating and to keep their digestion 'at work', although they are unlikely to totally recover. Feed them fiber (lucerne, maize silage), slowly digestible carbohydrates and 'easy' proteins such as fish meal, if available.

Fatigue

Fatigue is not a specific disease, but a slow general weakening of hens, especially less dominant individuals. They may have survived infections, but are not completely recovered. They do not have body reserves or the power to 'claim' their place at the feed trough, or simply miss the incentive to go for feed and water. Their combs and legs grow dark. They are vulnerable to further disease and can spread infection. Hens with fatigue are unlikely to recover.

Fatigue can be prevented by starting production only when hens are ready, and by organizing a smooth transition from rearing to laying stable.

Other infectious diseases

Although several infectious diseases could be mentioned here, such as *Erysipelothrix* or *Salmonella gallinarum*, they all require the same **prevention**:

- Work in a hygienic way!
- Be sure that at arrival the hens get a clean and warm stable
- Let the hens come into production only, if all of them are ready for it.
- Watch for first signals of any trouble and act if there is something you don't trust.
- In case of identified problems the next flock can be vaccinated if a vaccine is available.

When is a hen physically ready for egg production?

Many health problems related to a premature start of production therefore, it is important to know the signals to recognize the physical state of the young hens ready to lay.



Photo 8. This hen has only 2 feathers left to be changed, the 2 on the far right. She is ready for light stimulation. (Photo: Verbeek Hatchery NL)

1. Hens change wing feathers in a strict order, ending with the outer flight feathers. They are ready for production, if only 1 or 2 feathers have yet to be changed.
2. Weigh the hens every week or at least at 15 weeks old; appropriate targets will be given in the management guide of the breeding company or rearing organization.
3. In 16th and 17th week, the first hens develop their ovaries and become up to 100 grams heavier than their immature flock mates. A flock is deemed ready for production when about 80 % of hens reach the recommended body weight.
4. Hens, who are ready for laying, develop red combs and red skin around the eyes.



Photo 9. Small but red comb, red wattles but still pale around eye: Within some weeks this hen will lay her first egg. (Photo: Monique Bestman)

All these measures should be considered in deciding when hens are ready for production.

Hens not yet ready should be left for another week in the rearing stable, allowing them to recover from the vaccinations and build up good resistance so they will perform better under stress.

If the stimulation of the hens with light (to active laying) is retarded, they will start laying later and grow a bit heavier.

Transition to the laying stable

To ensure smooth transition from the rearing to the laying stable, the following measures should be implemented:

- The young hens should be received in a warm and comfortable (heated if necessary) stable.
- First, place them near the feed and water sources.
- After a couple of days, stimulate activity by gently moving hens out of the aviary and down from the slats to. Hens that don't move initially may see their more active flock mates roaming and hopefully follow the good example.

Environmental enrichment in stable and wintergarten

As well as having adequate space in the building and range the quality of this space is also important for the welfare of the animals. For enrichment of the environment in the stable, the following recommendations should be considered:

- Keep hens busy by keeping the litter area attractive.
- Keep the litter dry and regularly add new litter, so that it is not only dry manure in which they scratch.
- Litter is more interesting with scattered grains, shells (especially for older birds) and gizzard stones. Compost can also be used as litter.

Often the wintergarten is regarded as only the corridor between stable and free range area. However, in times of bad weather, winter or the early morning, hens spend much time there, making it reasonable to make it attractive. This can be done with litter, compost, sand for dust bathing (especially if they stay inside for longer times), and roughage.



Photo 10. This enriched second hand greenhouse next to the stable serves as an attractive bad weather run. (Photo: Monique Bestman)



Photo 11. This bad weather run is made attractive by daily provision of fresh green food and roughage. Note hens pushing the rising curtain to enter the run. (Photo: Monique Bestman)

Further reading

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Imprint

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Title photo

Brown and silver hens enjoying themselves in a Dutch range that is equipped as a vineyard (Monique Bestman)

LowInputBreeds

LowInputBreeds is the acronym of the project 'Development of integrated livestock breeding and management strategies to improve animal health, product quality and performance in European organic and 'low input' milk, meat and egg production'. It is funded under the Seventh Framework Programme of the European Community for Research, Technological Development and Demonstration Activities (Contract No. 222623).

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Editorial support

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Layout

Helga Willer, Research Institute of Organic Agriculture (FiBL), Frick, Switzerland

Publishers

Consortium of the LowInputBreeds project, c/ Newcastle University, UK, and Research Institute of Organic Agriculture (FiBL), Frick, Switzerland

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