

# GUIDELINES FEATHER PECKING HENNOVATION

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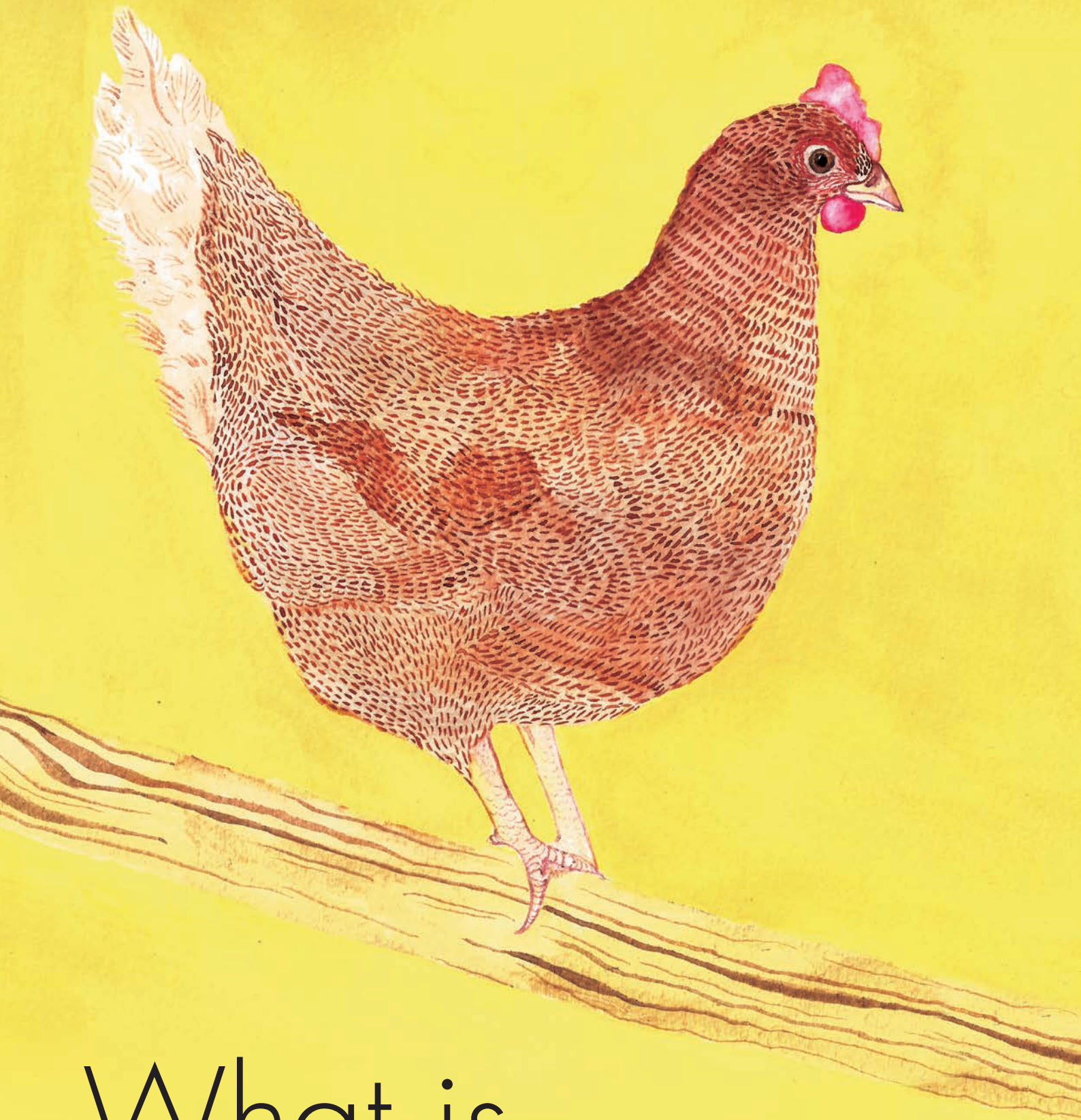
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What is  
feather pecking?

Feather pecking occurs within a majority of laying and rearing flocks and in all production systems being especially challenging in non-cage systems where it can spread rapidly. Feather pecking is characterized as pecking at and pulling out the feathers of other birds.



Feather pecking is a serious problem both in commercial flocks with intact beaks and in those with trimmed beaks. Reported prevalence can be as high as 40–77% of the flock, despite beak treatments.

Feather pecking is both an animal welfare and economic problem. FP is painful for the recipient bird and results in plumage loss and skin damage. This inevitably leads to a reduction in feather cover and increases in feed intake by up to 40%.

Increased feed costs, susceptibility to infection, mortality and reduced egg production due to feather pecking result in serious economic losses.

There are two main types of feather pecking: gentle feather pecking and severe feather pecking.

## GENTLE FEATHER PECKING

Gentle feather pecking (GFP) consists of gentle pecks to the tips of the feathers or down. GFP sometimes appears to be directed at litter particles on the plumage. This type of feather pecking (FP) usually does not result in much damage and is frequently ignored by the recipient.

GFP has been related to social behaviour and can already be seen in day-old chicks.

## SEVERE FEATHER PECKING

Severe feather pecking (SFP) causes the most damage to the recipient. It consists of forceful pecks and pulling of feathers that are frequently eaten and results in feather loss especially on the back, vent and tail base area.

Victims of severe feather pecking often initially move away, squawk or confront the pecker in response to receiving severe feather pecks as these are painful.

SFP causes feather damage and can lead to bald patches which may attract tissue pecking resulting in wounds and cannibalism.

SFP is highly related to feeding and foraging motivation.

SFP develops particularly in birds that are experiencing stress in some way.

There is some discussion about the relation between GFP and SPF. Most researchers see GFP as precursor of SFP, others did not find any relation between the two.

## FEATHER PECKING IS NOT AGGRESSIVE PECKING

Avoid confusing feather pecking with aggressive pecking.

Although aggressive pecking often does cause damage, it is generally directed towards the head and neck of another bird.

Aggressive pecks are usually not directed towards body parts other than the head.

The motivations for birds showing aggression towards each other are not the same as those underlying feather pecking. In consequence, prevention and treatment of feather pecking and aggressive pecking will be different.



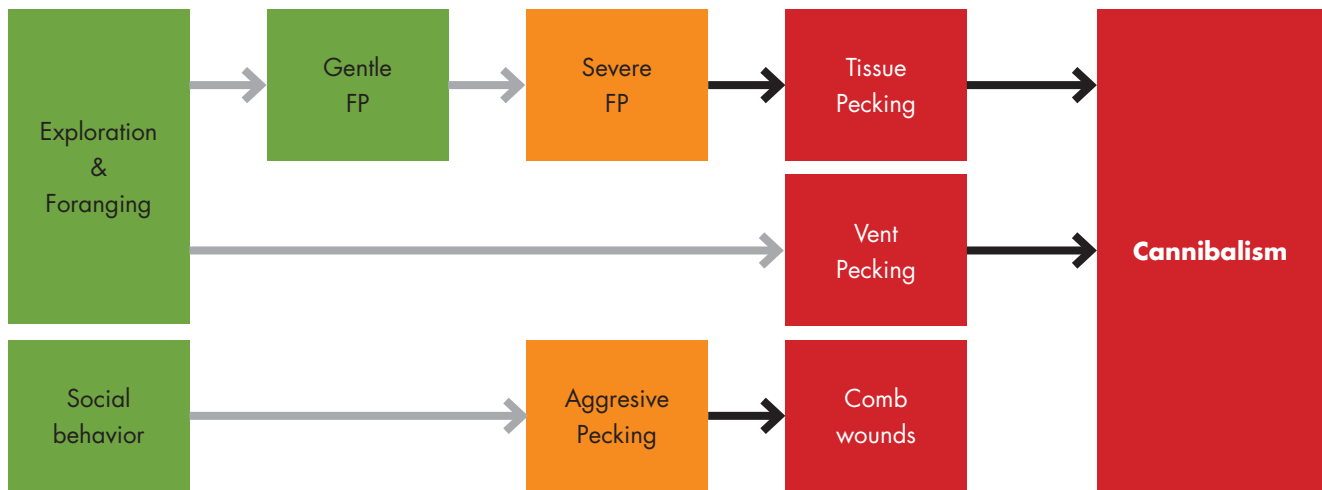
Only severe and gentle pecking are classified as FP. Preferred areas for FP include the back of the neck, back, tail base and vent areas.

## FROM FEATHER PECKING TO CANNIBALISM

Cannibalism describes the pecking or eating of flesh of other hens, whether living or dead.

Cannibalism can develop from different problems: accidental injuries, vent (cloacal) pecking, and severe feather pecking.

During severe feather pecking, tail feathers in particular can start to bleed and the blood then stimulates cannibalism. Therefore, by preventing severe feather pecking cases of cannibalism can be reduced.



## SEVERE FEATHER PECKING IS A REDIRECTED FORAGING BEHAVIOUR

Severe feather pecking is a form of abnormal pecking, directed inappropriately to another bird.

The ancestors of the modern chicken, the jungle fowl, spend more than 60% of their time foraging. This food-searching behaviour comprises scratching the ground and pecking to select edible particles. Modern laying hens still possess this instinctive urge to forage, which can already be seen in young chicks, which start to forage immediately after hatching.

In the absence of good foraging material and especially in crowded conditions chicks redirect their pecking behaviour towards other available substrates; often the feather cover of other birds. Once focused to peck at feathers, this behaviour is very difficult to stop. Damaged or missing feathers are a stimulus for feather pecking and these are often eaten. Feather consumption can occur when the protein level in the feed is inadequate or unbalanced as feathers are rich in protein.

FP can be observed as early as day 1 after hatching. Increases in the number of FP hens and frequency of pecks can be seen with age, with the highest frequency found around the onset of lay.

## FEATHER PECKING IS MULTIFACTORIAL

Whether or not a bird starts feather pecking depends on several factors. Optimising one factor does not guarantee that birds do not start pecking.

One theory is that stressful factors may build up to a threshold. When the total amount of stress surpasses the threshold, birds will start to feather peck.

The level of the threshold depends also on the birds' genetic background and early experience.



Birds are more susceptible to develop severe feather pecking behaviour during different phases of life. This often coincides with stressful events, such as moulting, start of lay or peak performance which may also be linked to changes in energy and/or nutrient requirements (negative energy balance), and changes in hormone levels.

In some cases severe feather pecking may start as a reaction to sudden changes in the situation of the birds (e.g. sudden blocking of access to the range, outbreaks of contagious diseases, change of diet)

# **GENETIC FACTORS AND EARLY EXPERIENCE PREDISPOSE TO FP**

Genetic background and early experience play an important role in the development of FP.

Different bird strains differ in their predisposition for feather pecking. In general, it is easier to control severe pecking in white egg-laying strains. On the other hand, white-egg layers seem more influenced by what has been passed on to them by their parents. White parent flocks with high levels of feather damage and high stress levels may produce offspring that are more fearful and perform more feather pecking. Brown hens, on the other hand, are more likely to be affected by environmental triggers such as a disrupted litter supply in early rearing.

Other genetically-determined factors such as feather colour play a role as well. Some feather colours may stimulate birds to feather peck. In brown birds feather damage becomes more visible when white down is visible between the brown feathers.





How can we  
recognize FP?



The sooner feather pecking is detected, the sooner interventions can be put in place, lowering the risk of serious damage occurring. Inspect the birds regularly and look closely at their behaviour in order to detect the early signs of pecking.

Regularly monitoring your flock allows you to identify feather pecking early on and allows you to implement strategies before it becomes more serious. Frequent inspections, observing the bird's behaviour and feather scoring will all help assess how the flock is performing.

## OBSERVE AND LISTEN TO THE FLOCK

It is good practice to quietly sit or stand and observe an area of the house for five or ten minutes. This will allow the birds to settle and resume their activities and will increase your chance of spotting any indications that might suggest a problem with feather pecking, like pecking behaviour or feather damage.

In addition to close observation of the flock it is good practice to listen to the flock for any characteristic 'squawks' from a bird that has been feather pecked.



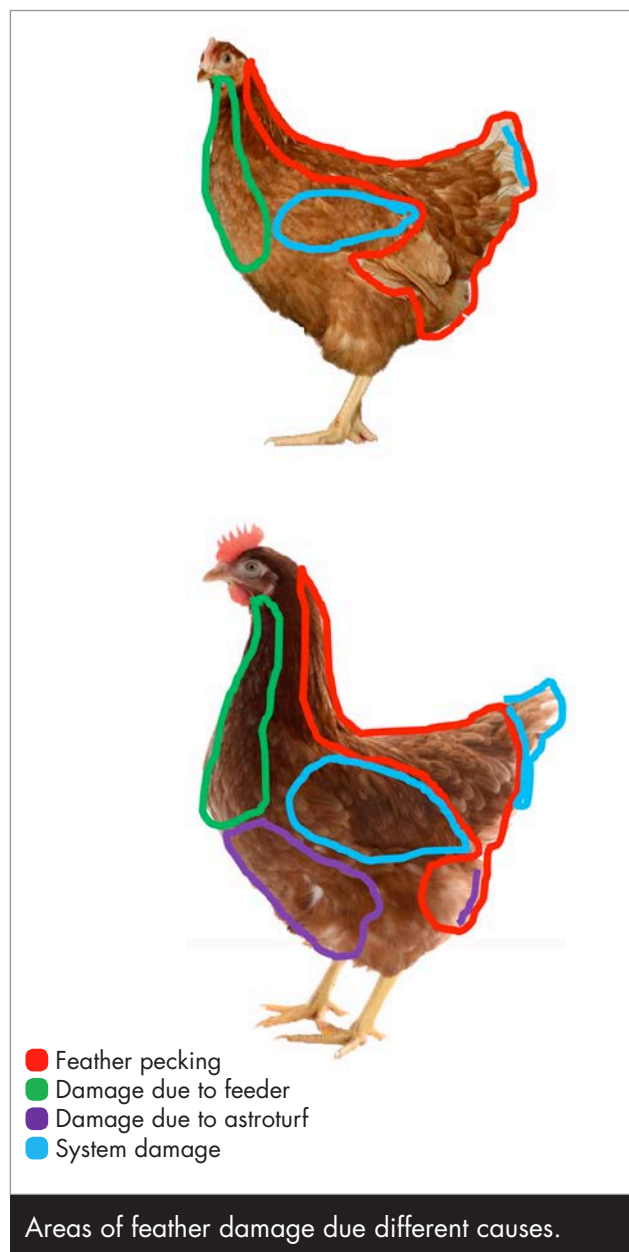
Gentle feather pecking behaviour comprises the gentle manipulation and sometimes licking of feathers of other birds. As this does not cause any damage, the pecked bird doesn't usually react.

Severe feather pecking causes feather damage and comprises both fierce pecks and the pulling of feathers. Although pecked birds will not always respond, they can react with a vocalisation (squawk) and may move away to avoid further pecking. Often dustbathing hens will not react to being feather pecked.

## LOOK FOR DAMAGED FEATHERS

Regular inspection of plumage can help to identify severe feather pecking in an early stage. Look for feather damage particularly along the back and at the base of the tail; this is often where severe feather pecking starts.

Pick up a few birds and check under the outermost feathers for any signs of baldness, particularly at the base of the tail. Remember that not all parts of the body are equally feathered. On the breast, some parts may appear to have lost feathers, whereas these spots are naturally less well covered. Examine the tail, in particular the downy feathers on the sides are often missing causing the tail to lose its fullness.





### **Not all feather damage is caused by feather pecking.**

Feeders can have a detrimental effect on the feather cover of the breast and neck. Wire partitioning in housing systems can cause deterioration of feathers on wings and tails. Artificial grass mats in nesting boxes may cause damage to feathers on the breast, the belly and around the cloaca.



### **Do not mistake damage with moulting**

Moulting should be taken into account when evaluating plumage condition.

In the rearing period feathers may look damaged during moulting. Moulting occurs at specific ages during bird development, and is different from feather damage due to pecking. Look for the typical signs of pecking damage.

A rough feather cover may trigger feather pecking, but both (i.e. rough plumage and feather pecking) may also exist independent of each other.

A mixture of the two (i.e. rough feather cover and feather pecking) is also possible.

Rough feather cover due to moulting can also occur during lay. A typical example is the neck moult, which can be accompanied by differing degrees of feather pecking.

## **FEATHER SCORING CAN BE A VALUABLE TOOL**

Regular monitoring of the flock's feather cover is necessary to identify feather pecking early on and implement strategies to prevent the problem from becoming more serious. Recording feather scores over multiple cycles will make it possible to monitor flock performance and help assess the effectiveness of implemented management strategies.

There are several methods of feather scoring. Most scoring methods have been developed for the laying period. Two methods are described here. In order to compare flocks it is essential that the same method is used in each flock.

## **FEATHER SCORING DURING REARING**

Feather damage in the rearing period is very subtle and requires experience and a detailed scoring method to determine any abnormalities.

During the rearing period it is unusual to see any major feather damage. Furthermore, it is not always easy to distinguish between feather damage caused by pecking or that of moulting. In addition, feather damage may also be caused by the housing or feeding system. In order to score feather damage during rearing it is essential to take a close look at the feathers. The initial signs of feather pecking are often observed on the wing feathers and the base of the tail.

Small cracks in the feathers, often accompanied by typical lines on the remaining feathers, are often the first indicators of feather pecking damage during rearing.

A scoring method for rearing hens has been developed in The Netherlands.

It is considered that a sample of 50 birds will provide a good indication of the state of the flock. Because feather damage during rearing is difficult to detect, birds need to be picked up. Ease of capture is often dependant on age and fearfulness of the birds. Select birds from different regions within the house, from both litter and wire floors. Capturing birds using a wire fence has proven successful for birds housed on a litter floor. Ensure that the birds are selected at random within the sampling location, e.g. sample every 5th bird and avoid being drawn towards specific birds with good / bad feather cover.



Do not forget the importance of watching pullets for feather pecking behaviour at rear which may enable earlier detection of severe feather pecking than feather scoring alone.

## **FEATHER SCORING DURING LAYING**

The method described here has been developed by the University of Bristol, the Soil Association and the Royal Society for the Prevention of Cruelty to Animals (RSP-CA), and is in use in the UK for annual inspections to provide feedback and benchmarking for producers, promoting continuous improvement where necessary. Organic and free range laying hen producers are beginning to adopt this as a routine management tool.





Rearing score 1: minor damage on some feathers. Body completely feathered and smooth.



Rearing score 2: moderate damage. Body completely feathered but sometimes rough. The tail is strongly affected.



Rearing score 3: severe damage. Skin visible in one or several body areas.

For more information see:  
[www.assurewel.org/layinghens/featherloss](http://www.assurewel.org/layinghens/featherloss)



### Assurewel scoring method for hens during the laying period

How do you feather score?

Assess and score 50 birds across the house and range. Visually assess and score the head/neck area and back/vent area of the bird separately.

How many birds do you assess?

We recommend you score at least 50 birds every week or fortnight. However assessing a larger number of birds will increase the reliability of the sample and be more representative of the whole flock.

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Which birds do you assess?

It is important to randomise the birds you score to prevent any bias. Birds should be sampled to provide a reasonable representation of the proportion of birds in different locations at the time of the assessment, e.g. birds from the litter area, slatted area, raised perches, tiers and range. Ensure the birds chosen are a random sample in that location, e.g. sample every 5th bird, and avoid being drawn to certain birds. The scoring can be done without picking the birds up, but you need to be close enough to clearly see the feathers.



Score 1: slight feather loss - Moderate wear, damaged feathers or 2 or more adjacent feathers missing up to bare skin visible < 5cm (2 inches) maximum dimension.

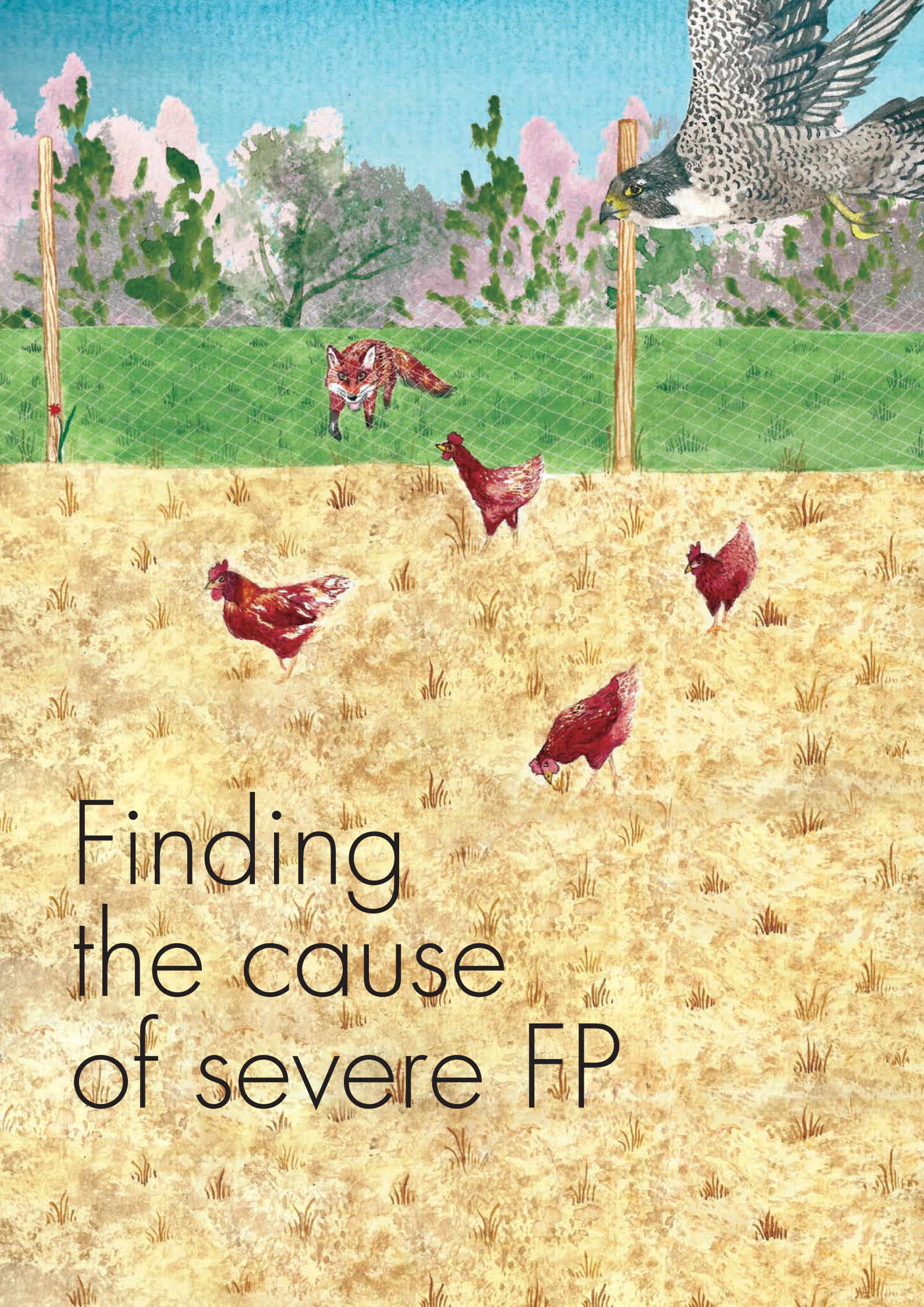


Score 2: severe feather loss – More than 5cm (2 inches) with bare skin visible.









Finding  
the cause  
of severe FP



Often, many factors combine to trigger severe FP – the more common causes are outlined here.

## HOUSING

### LITTER

Poor quality litter often leads to severe feather pecking. Hens have an instinctive need to forage so dry, friable litter is vital to the hens for foraging behaviour and other positive behaviours such as dust bathing. If the litter becomes wet or capped this can be frustrating for the hens and can lead to feather pecking starting in the flock.



In absence of proper litter, hens will look for an alternative foraging material readily available: the feathers of companion birds!

Keeping the litter in good condition throughout lay is vital for the hens' ability to express normal foraging behaviour. Maintaining litter quality is the single most important enrichment you can provide to reduce the risk of feather pecking.



Hens dustbathing in clean and dry litter.

Interventions can be as simple as frequent raking/forking over the litter or rotavating and then topping up with fresh, clean litter. If the litter is persistently wet, look for the underlying causes. For example, there could be a problem with the ventilation in the house or the condition of the range outside, the popholes or leaking gutters.



Wet litter easily promotes disease problems.



Good quality litter should be present during rear as chicks may develop preferences for pecking materials at an early age. The hens should have access to dry, friable litter from day one in the laying house. They should have had access in the rearing house and preventing access will cause frustration and could trigger feather pecking. Furthermore, confining them to the slats leads to overcrowding, in itself a trigger for FP.

Fresh, clean litter should be added to the scratching area when needed. Highly absorbent wood pellet bedding is a very effective litter material and although currently relatively expensive it can be used in problem areas of capped litter.

Keeping the litter dry and friable can require active management. Frequent raking or forking over the litter will keep the litter condition under control and make the task more manageable and rewarding.

If the litter becomes thickly capped it should be removed and fresh litter put down. Having in place a system of regular litter quality monitoring and treatment can prevent the litter getting to this stage in the first place.

### LITTER AROUND POPHOLES IN FREE RANGE

Litter around the popholes can be particularly difficult to keep dry and special attention and effort is required to keep it in good condition. Keeping the area immediately outside dry and well drained is key to keeping the litter inside the house dry. Prevent rain coming in through the popholes and have something to let the hens 'wipe' their feet outside, e.g. gravel. Highly-absorbent wood pellet bedding can be used where there is a problem with wet litter.



### Using sand as litter

Good litter is vital for free range laying hens to express their natural behavioural such as foraging and dust bathing.

However, maintaining dry friable litter can be challenging especially during wet weather. Capped litter can cause frustration and this can lead to feather pecking. The combination of wet litter and removing huge quantities of litter can be extremely stressful for the birds.

A working group of farmers decided to use sand as litter. They expected that the sand will allow any moisture in the litter to dry. It is common to find sand being used in the dairy industry as cow bedding to reduce the cases of mastitis in a herd.

Sand litter may stimulate the birds to display more natural behaviour such as dust bathing inside the building, especially when the ground outside is too wet to dust bathe.

## PERCHES

Perches provide resting places for hens and reduce the risk for feather pecking.

Positioning, shape and material of the perches are very important.

In order to control vent pecking avoid perches which present the vent at bird eye-level. This applies to any object that the hens can perch on, for example nipple lines and feed tracks. Try to ensure they are positioned either very low or more than 40 cm high.

To reduce the risk of keel bone damage or deformities, perches should preferably have a flattened upper surface and be sited when hens have no obstructions when flying down.

Wooden perches often attract red mites, which are a stressor for the birds and increase the risk of feather pecking. Metal perches are easier to clean, but may not be as comfortable for the hens and often don't have a flat surface.

## NESTS

Nests should be designed to encourage hens to lay eggs in them. A well designed nest is fairly, but not completely, dark inside. Hens should be able to at least see a part of the bottom of the nest and thus feel confident enough to step inside.

Appropriate positioning of the lights on the ceiling of the house usually provides sufficient illumination of the nests.

If the nests are too dark inside, then dim lighting in the nest could encourage hens to enter. On the other hand, darkness in nest boxes prevents vent pecking, which is especially important in nests where hens sit with their rear towards the nest entrance (hens mostly sit in an 'uphill' direction when laying eggs).

There is a link between nest box illumination and vent pecking. If lighting is used for training then the lighting should be dimmable and once the hens have successfully learnt to lay in the nests (normally around peak production), the nest box lights should be gradually dimmed and turned off.



Having space at the end of a nest box run encourages birds to move easily to the other side and reduces the risk of smothering during competition for preferred nesting positions.

## FEED

### FEED COMPOSITION

Dietary compositions should be discussed with a nutrient specialist and the feed supplier. It is important to understand that there is a link between dietary composition and feather pecking. With ever increasing feed prices it is important to avoid the temptation to buy a poorer nutrient composition than the hens require.



### Protein

Protein is an essential part of a hen's diet and several studies have shown that diets deficient in crude protein and certain amino acids have resulted in flocks with poorer plumage condition. As a producer or rearer it is important to carefully monitor protein levels in the diet, especially methionine. If you suspect a problem with the diet composition, then you should contact your feed supplier immediately so the problem can be investigated and where necessary resolved.

Research has indicated that severe feather pecking in the laying period can increase when levels of crude protein and amino acids are too low. Per kg dry matter the following thresholds are recommended:

- Crude protein: 125 g/kg
- Lysine: 8.2 g/kg
- Methionine + cysteine: 5.1 g/kg





## Fibre

Several studies have shown lower levels of severe feather pecking during rearing and lay when extra fibre was added to the diet. This could be due to a number of reasons. For example, diluting the diet with fibre may increase the time the hens spend eating, reducing the time available for feather pecking. Alternatively fibres may have a positive effect on gut motility and satiety. Accumulation of coarse fibres in the gizzard may increase the feeling of satiety in the bird and reduce the propensity to peck and eat the feathers of other birds.

Results from five different studies have indicated that provision of extra insoluble fibre, such as whole oats, wheat, corn, alfalfa, maize/barley/pea silage and carrots can reduce all types of feather pecking, plumage damage and mortality.



## Changes in diet composition

Producers that buy all the feed might get new feed delivered several times during the birds' production period. The composition of the feed might vary between different deliveries due to the cost and accessibility of different raw ingredients over the year. The hens can then be exposed to diet changes apart from the main ones when one phase feed is changed to another.

Layers exposed to more than 3 diet changes during the production period have an increased risk to perform feather pecking. Amino acids like methionine are important for high producing birds and a relationship between levels of methionine in the feed and rate of feather pecking has been found.

To investigate the effects of feed changes to the birds one group of egg producers decided to gather more detailed knowledge on the ingredients and nutrient values of the feed from the feed companies. This knowledge should help farmers to take precaution and avoid problems that potentially could occur due to changes in feed composition

## FEED MANAGEMENT

### DIET CHANGES

Changes in diet composition or in palatability can increase the risk of severe feather pecking.

Frequent dietary changes may lead to dietary neophobia (birds searching for the preferred feed elsewhere), resulting in more pecking behaviour for foraging, exploring and feather pecking. Avoid three or more changes.



If a change in diet is required, try to take the following into account:

- Avoid large drops in protein and amino acid levels.
- Avoid repetitive feed changes over a short period.
- Mask any changes by mixing diets to help prevent disruption to the birds arising from abrupt dietary changeovers.
- Place extra enrichments, e.g. straw bales or suspended rope in the house around the time of the change to help distract the birds.

### FEED FORM

The form in which the food is presented affect the time hens spend eating.

A mash diet is preferred to pellets because it increases the time spent eating and therefore decreases the risk of feather pecking.

On the other hand, mash feeding increases the risk of segregation of food particles, and consequently feeding an unbalanced diet to some of the hens.

Crumbs may provide a good alternative. This has the advantage of providing small particles without the risk of nutrient segregation.

### NUMBER OF FEEDINGS PER DAY

Allow for a larger gap once a day between runs to ensure the feeders are emptied by the birds. This ensures that smaller, less 'tasty' but nutritionally enriching finer feed particles are eaten. – If the feeder runs empty once a day, it is important to make sure that the birds are never short of feed, as hunger can trigger feather pecking.



### Timing of feed in free range systems

The sound of the running feeder attracts the birds. This can result in birds leaving the nest boxes or it can attract birds inside from the range. Appropriate timing of feeder runs therefore is required.

In the morning, when hens lay their eggs, running feeders should be avoided as much as possible, whereas at the end of the day it could be favourable to run feeders to attract birds from the range into the house.

## MAKE THE HENS WORK FOR FOOD!

### PROVIDING ROUGHAGE

Roughage provides the hens with extra foraging material and helps to keep them occupied. The extra fibres will also improve the health of the gastro-intestinal tract. Especially, if the roughage contains edible particles, hens will be stimulated to forage. Hens find alfalfa blocks, straw and hay attractive for foraging.

Roughages can be placed in hay nets or in special racks. Baled straw can be left intact making it more difficult for the hens to pull straw out. This will increase the time hens spend foraging and reduce the risk of FP.



Bale of alfalfa to keep the hens buzzy.

### SCATTERING GRAIN IN THE LITTER

Scattering grain in the litter is another way of occupying the hens and making them work for food. The best results are obtained when grain is scattered over a wider surface, preferably throughout the house. This can be done by hand, but for larger houses there are automatic grain scattering systems available.



The more the hens have to work to find the grain the more effect this measure will have on reducing feather pecking.

### PROVIDING STONES

In the wild, hens eat small stones to help the gizzard to digest food. In henhouses grit can be scattered onto the litter, but stones can also be provided in small buckets. Limestones or shells can also be provided. Besides increasing foraging behaviour, they also serve as an extra source of calcium.

## HEALTH

Hens with health problems experience more stress and therefore are more prone to perform feather pecking.

### RED MITES

The poultry red mite *Dermanyssus gallinae* (PRM) is the most common ectoparasite in laying hen farms worldwide causing considerable economic farm losses and reduced hen health and welfare.



Different stages of the PRM observed at the microscope.

PRM even in moderate numbers, can cause considerable stress, agitation and severe feather pecking in hens. Besides being an animal welfare problem red mites generate huge economic losses to the hen sector.

Without urgent action and investment, problems related to PRM are likely to spread even more in the near future for different reasons: 1 - PRM becomes persistent in structurally complex systems such as enriched cages; 2 - PRM can spread human diseases such as Lyme disease becoming an occupational hazard; 3 - The severity of feather pecking associated with PRM infestation may increase in non-beak-trimmed flocks.



This blood sucking parasite needs blood to fulfil its life-cycle preferably from birds but also from other hosts like mice, dogs, horses and humans.

The mites are difficult to control as they hide, rest, digest and mate in cracks and crevices in the vicinity of the laying hen. The current available acaricides with short residual activities will only target a small proportion of the mite population as it will not reach the mites deep in the cracks and crevices. Moreover, the effect of these acaricides is limited as the mites only emerge for a blood meal for 30-60 minutes after a couple of days preferably.



The most important risk factors for the introduction of PRM in laying hen facilities are:

- The introduction of new flocks
- The introduction of containers and crates
- The farmer and their employees.

The most important risk factors for spread of PRM between laying hen facilities are:

- Mice, rats and flies.
- The feeding system.
- Shared material and equipment.
- The egg conveyer belt.
- The manure aeration pipes.
- Removal of cadavers.
- Visitors and external personnel, the farmer and their employees.

Infestations by PRM are sometimes noticed late, when the mites start biting humans or by finding blood spots on the eggs or faecal spots on equipment. When these signs are evident the infestation is too severe, widespread and difficult to control.



Effective control of the red mite should include first of all regular monitoring in the house.

Too late treatment against PRM will result in:

- Anaemia in hens, reduced health, higher susceptibility to diseases and increased mortality.
- Reduced technical results (lower egg production, more second grade eggs).
- More stress for the birds and higher risk for feather pecking.



### Monitoring of the poultry red mite

Effective control of the red mite should include first of all a regular monitoring on farm. Monitoring the flock and quick reaction prevent an increase of the infestation. Qualitative traps can be used to monitor PRM infestation on commercial farms.

As an example, farmers can use easily the monitoring method proposed by Van Emous and Ten Napel (2007, De Pluimveehouderij) also called the tube trap.

The trap is made of a 10 cm long PVC tube (outer Ø = 18 mm) with inside a 12 cm long round wooden stick (Ø 14 mm). A small screw in the middle of the wooden stick prevent the hens taking out the wooden stick. The traps should be placed under the perches fixed with a ty-rap. Weekly check, score and subsequently clean the stick with a small brush and register the findings of each numbered trap. Below an example of scoring system is shown: score 0 = no mites, score 1 = some single mites, score 2 = more mites, score 3 = a lot of mites, score 4 = too much.



Take curative measures when score higher than score 2 are seen as higher number of mites are more difficult to control.





Below some treatments without using synthetic acaricides are listed which could be applied after identifying the first mites in the tube trap.

- Simple cleaning with water or use of vacuum cleaner to clean boards and u-shaped profiles can remove a large number of mites and eggs.
- The use of various types of silica dusts. Liquid silica's seem to be more effective than silica in powder form.
- Removal of manure. With the removal of manure, PRM will be removed simultaneously.
- Predatory mites. The use of these predators to control PRM appears promising, especially if the predators will attack all stages of PRM. To withstand and survive the conditions found in the poultry houses, structures are made to provide the predatory mite its preferred habitat.

## PREVENTION OF DISEASES

Birds affected by a disease outbreak will be more susceptible to incidents of feather pecking and often have poorer plumage condition.



Importance of hygiene and biosecurity.

- Aim to have a single age site to reduce disease transfer. This can also effectively eliminate Mycoplasma.
- Adopt a proactive approach to bird health, reviewing and acting on strategies in the Flock Health Plan.
- Have dedicated clothing for each building (including boots) and use clean boot dips at the correct rate of dilution.
- Maintain a good quality litter.
- Avoid birds drinking from contaminated puddles if they have access outside.



Wet litter easily causes disease problems. PRM can be a vector of various bacteria such as Salmonella and viruses such as Avian Influenza.

## WORMS

Intestinal worm infections can cause stress and are a common source of enteritis. Monitor worm burdens throughout the flock life via post mortem examinations and faecal egg counts.



- Deworm when tests show high egg or worm counts.
- Avoid treatment via water when the birds have access to puddles, which may dilute the dosage.
- Ensure that every bird receives an effective dose (Suggestion: repeat egg counts 2 weeks after de-worming).
- Paddock rotation can help reduce the problem.

## LIGHT

### LIGHT PLAN

Light has a large influence on the behaviour of the birds. Light can direct birds to places to forage and darker places can attract birds to lay eggs or find a place to rest. A good light plan can result in a proper use of the facilities by the birds and can reduce the risk of undesirable behaviours.

Bright spots (e.g. sun beams) may trigger birds to smother or to start feather pecking. Dark areas may attract birds to lay eggs in inappropriate places.

Choice and positioning of lights is essential to provide an even distribution of illumination throughout the hen-house. It may be necessary to lightproof the house to prevent shafts of sunlight entering and to limit bright reflection from concrete outside popholes for free range flocks.



Aspects of light that are important to hens are:

- Light spectrum: chickens can see UV-light and do see more than humans in blue/green and red.
- Light intensity: although we tend to dim lights for hens with intact beaks, this is not always a good solution and also contributes to higher levels of fear, which may induce FP.
- Light distribution: there should be an even distribution without dark or bright places, but foraging areas may be a bit brighter and resting/nesting areas a bit dimmer
- Light temperature: there is not that much known, but it seems that laying hens benefit from warmer light (max 3000K) and pullets benefit from cooler light (max 4000K).
- Light duration: a max of 14h light is often regarded as good enough for high production, although some go as far as 16h of light per day.

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- Light dimming: a dimming phase (or stepwise increasing/reducing light intensity) enables the birds to find their roosting places. A dim period at the start of the day may help early egg-layers to find the nests, while the majority of hens will stay asleep.
- Flickering of light: to prevent hens from getting stressed by flickering lights, one should use high-frequency FL instead of low-frequency. Be aware that LED may also produce flickering, due to the dimming electronics. Make sure that LED at max. dimming is not producing flickering lower than ca. 100Hz.

## SOURCE OF LIGHT

Chickens can see the flickering of low frequency fluorescent lighting (FL) and this can be stressful for them. In order to avoid this, light sources should have either a high frequency (e.g. HF-FL) or no frequency (e.g. LED). There is some evidence that chickens can even see the flickering of high frequency lights if they are kept under high intensity full spectrum light! Under these circumstances a good LED would be a better light source.

**LED lighting systems** have improved a lot in recent years. Light intensity is not a problem anymore. Advantages are: low energy cost, durable, shockproof and they can be produced in any desired spectrum. Dimming of LED is regulated by electronics in two possible ways: 1. slowly reducing the power and thus reducing the light-intensity; 2. switching the LED on-off, making the off phase longer to reduce the light-intensity. This second type of dimming produces a flicker frequency, which is not a problem as long as the frequency is high enough. However, some LEDs produce flickering (when dimmed) below 100Hz, which then can be seen by the birds. These LEDs may cause stress to the birds and therefore are not advised in poultry houses.



There is a simple trick to see if lights have a low frequency:

- Set your mobile phone in camera mode, point it to the area where the light is and look at the screen. If you see flickering on the screen, the light source has a low frequency. When actually taking a photo you may see bands running over the picture.

## COLOUR OF LIGHT

Chickens have full colour vision. Compared with humans they can see better in the blue/green and in the orange/red spectrum and can even see ultraviolet light.

Because of their wider visual range, chickens see the world differently. In the presence of UV, specific particles may light up, attracting birds to peck. In the absence of attractive litter, this may cause birds to peck at feathers. Provision of full spectrum light should therefore always be combined with other measures, such as good litter quality and feed additives.



Although there is evidence that red light does reduce feather pecking behaviour, it should be seen as an emergency measure rather than routine practice. It is not a preventative measure, as birds will not peck less in red light. The colour only makes that birds can't see objects as well as in a wider spectrum and thus will not notice wounds etc. to peck at.

## LIGHT INTENSITY

Ideally hens should have at least 20 lux of light at bird level. This enables them to see their environment and to find their way around. Hens usually behave less fearfully in bright light compared to dimmed conditions.

Although large variations in light intensity are not advisable, some slight variation may be advantageous. The nesting and resting zones can be kept slightly dimmer, to enable resting and undisturbed egg laying. The litter and foraging areas can be slightly brighter to enable the birds to find food and encourage them to work the litter.

## LIGHT DIMMING

Providing dimmer phases at the start and end of the lighting period may have a calming effect on the birds.

A dimming phase at the end of the day allows birds to calmly find a place to roost. This can be achieved by slowly dimming the lights or by a stepwise schedule of switching off lights, starting with the lowest positioned lights. It is advisable to have small lights on the ceiling that are switched off 15 minutes after all other lights have been turned off.

In the morning lights can be switched on immediately, but it may be advantageous to include a dimming phase in the morning as well. When birds lay their eggs before the lights are switched on, it may help to have some dimmed lights on so they can find the nest boxes instead of laying their eggs on the floor.



Dimming the lights to control feather pecking should only be performed as a last resort or emergency measure. Although reducing light intensity may reduce pecking behaviour, it will not always be successful. Reducing light does increase fearfulness and thus can lead to injuries caused by birds flying into objects. Fear can also lead to feather pecking.



- Try to ensure that there is an even distribution of light throughout the house. Make a good lighting plan with the help of an expert to determine the number, type(s) and positioning of the light sources. Lights in the aisles or on the ceiling can be larger than lights in the system.
- Zones in the house where birds eat or forage may be slightly brighter than other areas in the House
- Repair malfunctioning lights as soon as possible, to avoid dark spots.
- Daylight is a good source of light, but beams or spots of sunlight may give problems, therefore try to avoid these.

## PECKING MATERIAL

Pecking material reduce the risk of FP by keeping the birds occupied.

Pecking material can be pecking blocks or pecking objects

### PECKING BLOCKS

Sandstone or building blocks have been used in the past, however as their content is not known it is unclear what the birds are eating.

Special pecking blocks have been developed. These contain beneficial minerals and often edible substances such as grain. There are different types of blocks.



### Aerated pecking blocks

Various pecking blocks are on the market. These pecking block contribute to hen welfare especially for laying hens with intact beaks.



To date it is unknown what pecking block has the highest longevity, is affordable, but still intensively used by the laying hens and effective in reducing (harmful effects of) pecking behaviour. A working group of farmers decided to test different types of pecking blocks on their farm. The aerated concrete pecking block of 4 kg (around 2 euros). Aerated blocks were the cheapest blocks, with the longest longevity and the highest number of laying hens peck on it.



Pecking blocks can be placed in the litter or on the slatted floors. If space is limited, pecking blocks can be divided into smaller pieces and/or suspended on strings.

Pecking blocks are ideally introduced in the rearing period. There is some variation between genotypes, but hens that are only provided with pecking blocks in the laying period often hardly use them.



## PECKING OBJECTS

Pecking objects are another type of pecking material. Pecking objects can basically be anything that is safe, inexpensive and attracts the birds.



Paperboard can be a useful enrichment material.



### Pecking objects;

- Strings of rope, hanging down
- CDs suspended on strings
- Plastic bottles, half filled with water, suspended on strings
- Empty plastic jerry cans, laying in the litter or on the slatted floor
- Drawing dots or crosses onto these items with marker pen can increase their attractiveness as pecking objects.

## SOCIAL STRUCTURE

### GROUP SIZE

Severe FP is easier to control in smaller flocks. FP is especially difficult to control in free range and aviary systems.



### EU-legislation on group size

European legislation does not set a maximum for flock size, but has limited group size for organic houses to a maximum of 3000 hens/group or colony

National legislation or private standards may limit total flock size. For regular layers some local standards can set a limit for total flock size (e.g. RSPCA: 32,000 (barn) or 16,000 (free range)).

Also colony size may be regulated by local standards (e.g. 4000 (RSPCA) or 6000 (KAT) per colony). The variation in these standards indicates that there is no clear evidence for a particular maximum colony size. The given numbers are based on a combination of practical experience and economic feasibility.

## STOCKING DENSITY

Practical experiences indicate that lower stocking densities reduce the risk for feather pecking.

Maximum stocking density is legally determined. Stocking density should not exceed 9 birds/m<sup>2</sup> useable for free range, barn or aviary housing. In enriched cages, there should be at least 750 cm<sup>2</sup> of cage area per hen.

Lower stocking densities are economically less attractive, but could eventually be profitable, if there are fewer incidences of feather pecking.

## FUNCTIONAL ZONES

There are 3 differentiated areas in a henhouse:

- The activity zone, where litter, food, roughage etc. is located.
- The nesting zone, where birds should not be disturbed.
- The resting zone, with perches, where it should be quiet.

In order to maintain a calm flock it is best to keep these three zones separate as much as possible. Therefore, there should be no feeders in front of nesting boxes and an area with perches should be separated from foraging areas (either by separate positioning or elevation to another level).

Although light should be evenly distributed throughout a henhouse, the resting and nesting zones can provide slightly more shade and activity zones more light.

## HUMAN-ANIMAL RELATIONSHIP (HAR)

Fear increases stress and the risk of severe FP.

Frequent contact with humans will make the flock less fearful and therefore less prone to severe FP.

Walk through the flock several times a day during rear and lay, paying attention to the behaviour of the birds. In this way any signs of feather pecking should be spotted early enough so that it can be managed to prevent further escalation.



- **Interact with the birds** when walking through the flock: knock on the door before you enter the room, give birds the time to get away, talk to the birds when walking the flock. This all will make the birds calmer. Also playing a radio in the room can have a calming effect on the birds.
- **Have several persons** walking through the flock: this will increase the likelihood that potential problems are spotted before they become problems. It will also help the birds to get used to different people and reduce their fearfulness. This is especially important during rear, as the chicks will eventually be exposed to different people when they are transferred to the laying house. Alternating different coloured clothes can also have the same desired effect.
- **Varying the route taken through the shed** can help make the flock more robust to unexpected changes, such as a vet or field advisor walking through the shed.
- **Take the time to sit or stand and observe the birds** for five or ten minutes in one area. This will allow the birds to settle and resume their 'normal' behaviour and you will be able to spot any abnormal behaviour. Make sure to vary the areas you observe them in.



If birds are fearful as chicks they are more likely to develop feather pecking as adults.

## USE OF THE RANGE IN FREE-RANGE SYSTEMS

When keeping hens in a free-range system it is important to make the most of what the system has to offer. It is essential to get the birds using the range to satisfy their normal foraging and dustbathing behaviour.

A good use of the range will keep the birds occupied and will also effectively reduce stocking density in the house. Both are helping to reduce FP. Indeed, flocks with many birds outside using all areas of the range have better feather cover.



When many birds use the range it is essential to keep the range:

- attractive
- free of predators
- free of disease risks (dirty water, garbage, vectors of diseases like water fowl)

Managing the range properly will help to encourage the birds to go outside. Management has a lot to do with arranging and maintaining the equipment and facilities of the range.



Make the range more attractive to the hens and help encourage them to move outside:

- Good range use is promoted by visible shelters, dustbathes, trees and other hens. Move artificial shelters close to the popholes when the hens are first let outside to draw them out.
- Wet, muddy ranges with no visible shelter will result in poor range use by the hens and is a disease risk.
- Easily accessible range, trees and shrubs close to the shed will help attract the hens out.



## EARLY ACCESS TO RANGE

Allow the hens access to the range area as early as possible, considering weather conditions. Early outdoor access is associated with greater range use later in the laying cycle and the more hens you can encourage to use the range the lower the risk of feather pecking

## THE POPHOLE AREA

The pophole area is extremely important to motivate the birds to go outside and maximise the use of the range. In order for the birds to take that first important step outside, the view from the pophole needs to be inviting.



### Successful popholes

The popholes need to be easily accessible. Avoid having a large step or jump up onto the pophole.

- Straw bales can help create a step up to high popholes or alternatively use a ramp.
- Popholes should be large enough to prevent some birds from blocking other birds to pass
- Large contrasts in light inside and outside will make birds more hesitant to go through the popholes. A little roof above the pophole may solve this problem.
- If the birds cannot see the range to attract them out, it is unlikely that many of them will use it. Also, if birds in the range can't see the popholes, they tend to stay closer to the house.
- It is vital that the view from the popholes shows a range of features offering the hens protection, and allowing them to forage, dustbathe and perch.
- Avoid large open spaces immediately outside the popholes. Try to fill the space with natural or artificial shelters to help attract the hens outside.

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- Wide popholes will help encourage range use and if the house has large barn doors, open them to improve range use.
- Areas around the popholes are notoriously hard to manage especially in poor weather, and excessive poaching, can discourage the hens from ranging. Improve drainage and avoid puddles around pophole area as much as possible. Old slats can be used around the popholes to prevent the area from becoming poached. This will also help to prevent the hens bringing wet mud into the litter area, keeping the litter dry.
- Stone placed around the popholes will wipe the hen's feet and help to stop them bring wet mud into the house. This again will help to keep the litter inside the shed dry and prevent dirty eggs. The stone needs to be topped up or replaced regularly between flocks to prevent muck and disease building up.
- If the stone is placed deep enough, it will aid drainage around the popholes, preventing puddles from forming and the rain will wash the muck through. Also make sure that any gutters lead away from the house.
- Providing a veranda (or 'winter garden') is a perfect halfway house to the range, reducing many problems and giving the hens extra safe space in which to forage.

## SHELTERED AREAS

Hens are derived from jungle fowl which are forest birds and naturally feel safer on a range with plenty of shelter.

## NATURAL SHELTERS

Natural cover on the range can be provided by planting trees, hedgerows and other shrubs. Increasing the amount and variety of vegetation and natural cover on the range will promote and maximise range use and also increase the number of insects for hens to forage upon. Having plenty of mature trees on the range will provide a more natural environment for the hens and will both increase the number of hens using the range and the distance they cover.



- Trees can provide excellent shade which is very important in encouraging birds out on to the range on sunny days.
- Planting patches of arable crops on the range will provide both a source of food and shelter for the hens.
- Log pile are attractive foraging opportunities for the hens and will help entice them out.



Natural shelter.



Artificial shelter.



Natural shelter 2.



Artificial shelter 2.



When planting saplings it is imperative that they are adequately protected from the scratching and digging behaviour of the hens.

## ARTIFICIAL SHELTERS

Artificial shelters can provide essential cover on the range, especially when you are waiting for saplings and other vegetation to become mature.

Artificial shelters range from custom made shelters to old pieces of farm equipment. As long as they provide cover for the hens they will help to draw them out of the house.

Shelters are particularly important in providing shade on hot days and protection against predators and help to increase the number of birds ranging on sunny days.

Moving shelters close to the popholes is an effective method of encouraging the birds out, particularly when the birds are first given access to the range.



### Examples of artificial shelters

- Shelters can be made from a simple wooden structure and covered with a variety of materials such as corrugated iron, wood or tough fabrics.
- Straw bales with corrugated iron roof can be used as simple, cheap and effective shelters.
- Old pieces of farm equipment can make great shelters, just ensure they are raised off the ground to prevent attracting vermin.
- Tent design can keep the area underneath the shelter very dry and make an excellent dust bathing area.

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- Curved, corrugated iron make simple, but effective shelters that can be easily moved.
- Old slats and wooden pallets can also be used to construct shelters. Cover the outside of the slats or pallets with plywood or a suitable solid material to give the birds better protection from elements.

## PREDATION IN FREE-RANGING BIRDS

If birds are fearful they are more likely to develop feather pecking.

Predators, primarily foxes and birds of prey, but also mink, badgers and in some countries dogs can cause panic in a flock leading to outbreaks of feather pecking.

The most effective way to control against foxes is to use electric and poultry fencing around the range, which may be complemented by llamas and alpacas. In order for a fence to be fox proof it needs to be tall and secure all the way round the range.



A six foot fence is often quoted as being high enough to prevent a fox jumping over. Otherwise a 5 foot fence with an overhang can work. Ideally the fence should also be buried underground and turned outwards to prevent foxes digging in.

Fences should be checked on a regular basis for potential entrances.

Any grass or vegetation touching the electric wire will leak current to earth and if wet will soon short the fence out making it ineffective, so vegetation around the fence needs to be cleared regularly.



### Alpacas as guardians of free range hens

Alpacas can be used to help keep predators away and protect free range hens. They make effective guards and will chase away foxes and encourage more hens to range.

Hens are attracted to other animals using the range and are less fearful when exploring and foraging together with other grazing animals.

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Alpacas have been popular among some livestock sheep producers in USA or Australia. Alpacas are territorial, with males gathering and defending females within their territories. Alpacas are typically aggressive toward predators and appear to readily bond with other animals such as sheep and aggressively protect them, when pastured away from other alpacas.

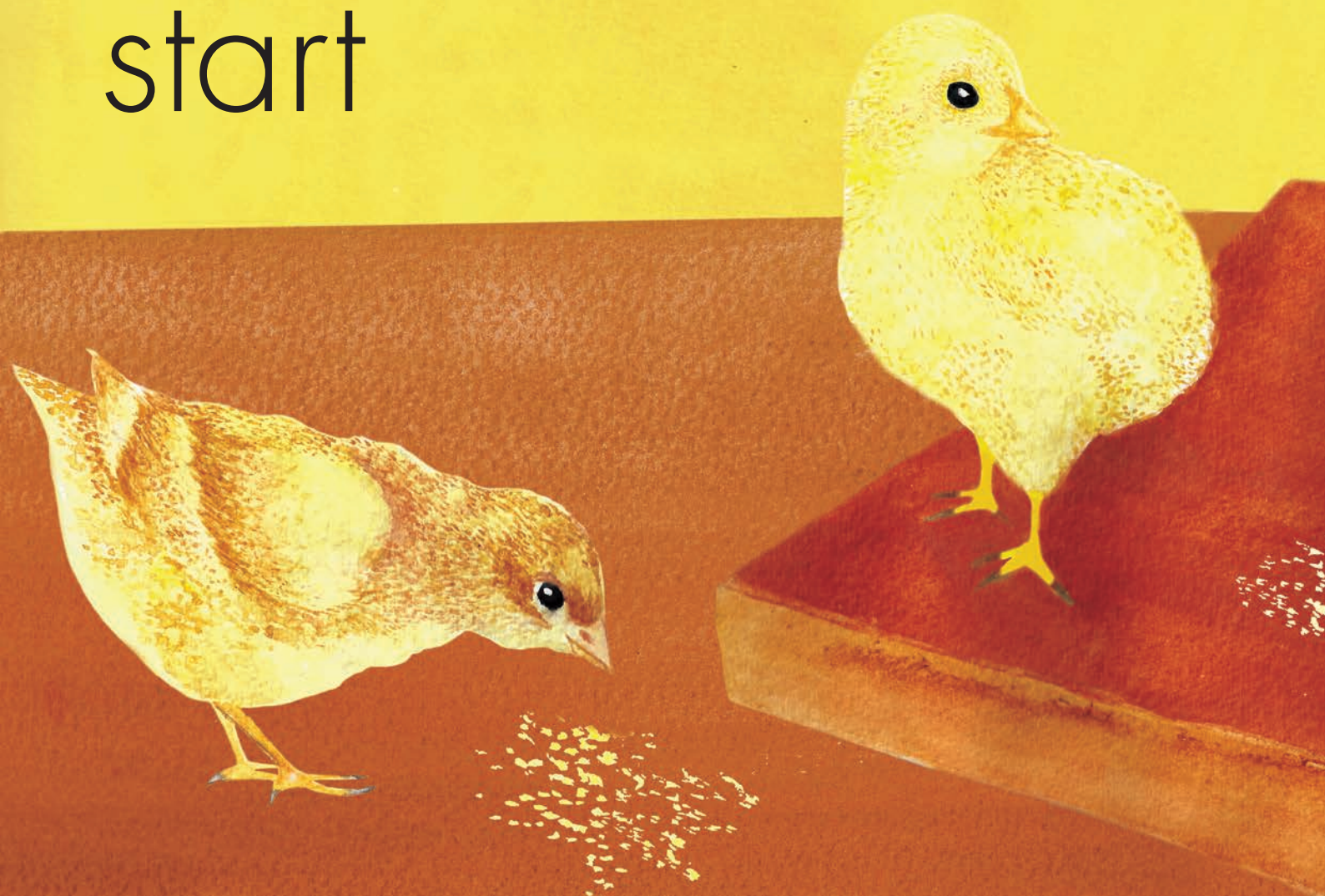
Alpacas will protect the range from the first day without any training. They are very aware of something new in their territory or close by and should warn the birds. They have very keen eyesight and their ears can pick up the sounds of trouble from a long way off. In South America, where alpacas come from, they have several predators like the fox. To protect their newborns from foxes, alpacas have developed an instinctive reaction to foxes. Therefore, foxes do not like alpacas and alpacas do not like foxes ! The mere smell of alpacas is enough to keep foxes away.

Alpacas are semiruminant camelids and there is little cost or time associated with looking after them: diet based in roughage, some mineral supplementation, toenail trimmed, shearing once a year, vaccination and worming.



Adria and Floquet, two young male alpacas taking up the challenge guarding hens against predators !

Ensure  
a good  
start





## MATCHING REARING AND LAY

Try to match the laying house environment to the conditions the pullets have experienced during rearing. Then pullets will find the laying house more familiar and the transition will be less stressful.

It may not be possible to match everything, but the more is matched the greater the chance that your birds will make a good start to the laying period.

Communication between rearer and laying hen keeper will enable a better match between the environments in both houses.



Good and clear communication with the rearer is important to a successful transfer for the birds.



Checklist to match rear with lay:

- **Light intensity and source:** a similar light intensity and ideally a similar light source during rearing and laying periods reduces stress for the birds and thus the risk for feather pecking.
- **Lighting schedule:** try to match the lighting schedules (timing of, periods of light and darkness) as closely as possible.
- **Feeder and drinker type:** Nipple drinkers reduce the risk of severe feather pecking and should be used as a primary water source. But, provision of a few bell drinkers can help to improve the match between rearing and laying periods. Some birds may have a strong preference to use a bell drinker. The colour of the nipple may also be important to match between rear and lay. Also attempt to match feeder type used during laying. Chain feeders are the most common during laying but pan feeders may be used initially to ensure that the chicks find food early on, while other feeders may be used additionally to provide variety and enable closer matching between the rearing and laying period.

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- **Feeding times:** Try to match not only the number of feeding times, but also the timing of when feed is provided. This can be gradually adjusted towards the required schedule during the initial weeks. It is now recognised that the timing of the chain feeder runs should allow a larger pause in the middle of the day to ensure that the smaller, less 'tasty' but very important feed particles will be eaten. This should be initiated during rearing and continued during lay.
- **Feed structure and composition:** The form in which the food is presented may affect the time birds spend eating. Feeding finer ground food has been associated with lower levels of injurious pecking. When extra fibre is added to the diet, it may decrease levels of severe feather pecking during rearing and laying. This may be due to improving the efficiency of the hens' gastro-intestinal tract. If the diet contains insufficient fibre the hens may consume feathers in an attempt to compensate for fibre shortage.
- **Slats:** type and positioning.
- **Perches:** type and positioning.

## IMPORTANCE OF GOOD REARING

If feather pecking does not occur during rearing there is a good chance (70%) that it will not occur during the laying period either. However, if feather pecking does occur during rearing there is a much higher chance (90%) that it will occur during the laying period as well.

It is therefore extremely important to prevent feather pecking during rearing.



Bad behaviours developed during rearing are often displayed in the laying period as well. Thus, FP in the rearing period will continue to be a problem in the laying period.

## LITTER DURING REARING

Litter quality is especially important during rearing as it is often the only foraging material (apart from feed) available to the chicks.

Abnormal behaviours such as severe feather pecking are likely to develop because normal behaviours cannot be performed or have not been learnt.

Chicks normally learn from their mother to peck at the ground and to forage for food. Absence of a mother hen and poor litter substrates hinder the development of good foraging behaviour.

## PROMOTE EARLY ACCESS TO LITTER

During rearing it is very important to provide good friable litter throughout the whole period. In many rearing systems birds are kept on wire floors covered with paper during the first weeks. Food is scattered onto the paper so that birds have foraging material available. Between 3 and 5 weeks of age birds are allowed to enter the litter area.

As the paper is removed or disappears at around 3 weeks of age, there often is a period when chicks have no litter available. This period coincides with one of the moulting stages. At this stage birds are more susceptible to start feather pecking.

## MAINTAIN GOOD LITTER QUALITY

Check litter quality regularly during rearing and ensure that it is kept dry and friable throughout the entire rearing period.

Wet patches should be removed and replaced with fresh, dry litter.

Leaking drinkers, poor ventilation and structural problems in the rearing house are potential sources of wet litter during rearing. These should be promptly addressed and measures should be put in place to prevent the problem recurring.

Adding material, e.g. roughage, can help to maintain litter quality and make the litter more attractive to the birds. Litter containing edible particles is particularly attractive, motivating the birds to continue foraging in the litter.

## LIGHT DURING REARING

Lighting schemes are used to manage the maturation rate of the pullets during rearing.

Light intensity doesn't seem to have a lot of influence on this maturation. However, to avoid any stress to the birds, it is important that the light intensity during rearing is matched to the subsequent conditions in the laying period.

Pullets that are to be transferred to a bright layer house should be reared under bright conditions to avoid stress to the birds. Ideally, the light source should be similar to that in the laying house. Birds housed in a layer unit with daylight should preferably be reared with (additional) daylight. Lighting in the rearing house can affect pullet behaviour, just as it can in the laying period.



Pay attention to light distribution and management during rear.

- Ensure an even light intensity throughout the house
- Avoid spots and shafts of bright light
- Avoid sudden changes in light levels.



Birds reared in a dark house, should not be placed in a very bright laying facility, as this will cause stress and very likely will induce FP.

## ENVIRONMENTAL ENRICHMENT DURING REARING

It is important the hens' behavioural needs are met from an early age. Providing areas for the chicks to perch and additional foraging enrichment can both help prevent feather pecking developing during rear.





The early life experiences of a flock can dictate how the flock will behave in the future.



- **Perches:** allow the birds to develop their natural perching behaviour. Providing access to perches before four weeks of age reduces the likelihood of feather pecking.



- **Slatted areas:** in addition to the litter during the rearing stage is becoming increasingly popular. Providing slats at an early age enables the chicks to get used to slats before being placed into the laying shed. This will help make the transition between the two sheds smoother and should make managing floor eggs easier as the hens are more used to using slatted areas.

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- **Pecking objects** for the chicks to peck at promotes positive foraging behaviour and helps to keep them occupied. This is especially important when the birds are learning what to peck at.
- **Pecking blocks.** When provided during rearing, hens will use them more in the laying period. There are various methods of providing pecking blocks. They can be placed either in the litter or on slatted floors. Suspended blocks appear to work well. For slatted areas large blocks can be broken into smaller pieces. Recently, custom-made pecking blocks have become available. These blocks contain minerals and can contain other edible ingredients, such as grains.



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