Feathering and Health in Broiler Breeders

Feathering in broiler breeder chickens is more than cosmetic. Well-developed, intact feathers help birds regulate body temperature and protect against scratches and injury. Issues including nutritional deficiencies, incorrect management, stress, or disease can lead to feather loss. Depending on the extent of feather loss, birds may experience compromised welfare, reduced fertility, increased calorie demand for body temperature maintenance, and increased susceptibility to injury or infection.

Introduction

Feather growth in pullets and hens takes place in stages. Chicks lose their down feathers during the first three weeks, followed by juvenile feather growth for the next 8 to 9 weeks. Loss of some feathers and development of new and replacement feathers continues up to 30 weeks. However, in commercial hatching egg production systems, pullets should achieve complete feather coverage before the end of the rearing phase (21 or 22 weeks of age) because hens may lose feathers in production. Hormonal changes during peak lay can cause feather loss if the bird is stressed or underfed. In addition, hens are prone to lose more feathers than they replace from mating.

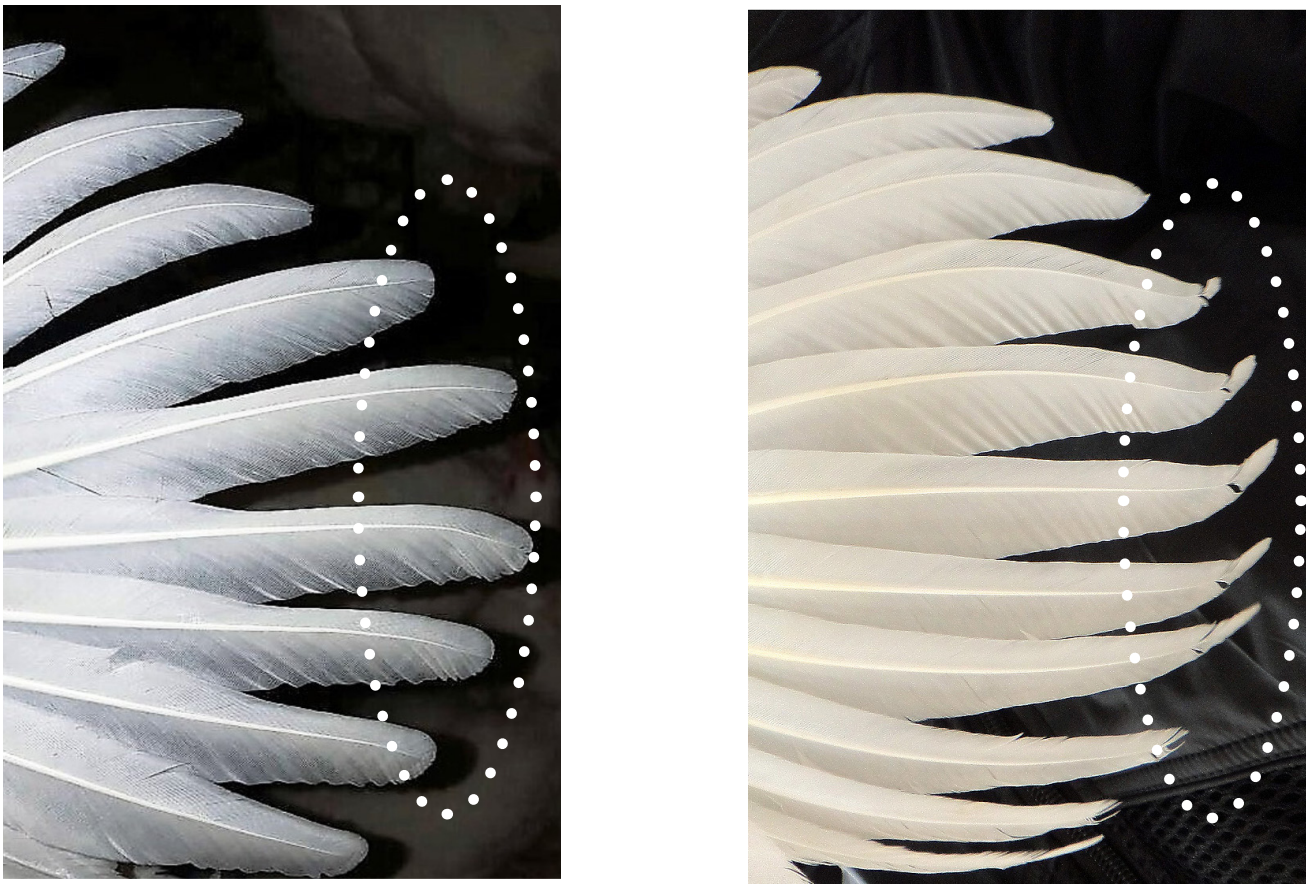
Correct rearing management is essential for good feather development

Good management practices are essential for proper feather development in rearing. Key factors include maintaining correct brooding conditions and correct stocking density. Temperature control is also critical. Houses should follow the recommended cooling schedule after brooding, as prolonged high temperatures can delay feather growth.

Feed and water management play a major role in feather quality. Birds on controlled feeding programs must have immediate access to feed and water when lights are turned on, with sufficient feeder space to prevent competition and feather damage. Proper feed distribution within three minutes is vital, especially in large houses. Continuous water availability is recommended, and litter quality must be maintained for dust bathing, which is essential for feather maintenance.

To promote normal feather growth, chick starter feed containing high protein levels that are correctly balanced should be fed for at least five weeks, but preferably up to six weeks of age. It is recommended to feed a known amount of chick starter feed *ad libitum* during the first two weeks, then transition to prescribed feeding for the next two weeks. Change from daily feeding to a 5-2 or 4-3 feeding program to help transition to a skip-a-day feeding program.

Prevent prolonged periods of fasting during the first four weeks to help reduce stress and prevent the onset of abnormal behaviors such as feather picking and licking. Skillful management to deliver a uniform distribution of well-balanced, high protein-containing feed with minimal feed-induced stress during the first 5 or 6 weeks helps the flock grow feathers normally and maintain them later in life, when the persistency of egg production and fertility is important.



With normal development, wing feathers should have rounded tips and no breaks or gaps (left). Issues such as stress or infection can cause abnormal feather development and impact the wing feathers. These feathers may show signs of stress such as pointed or bent tips (right).

Key points in rearing for attaining and retaining good feathering

Follow the Cobb recommended body weight guide.

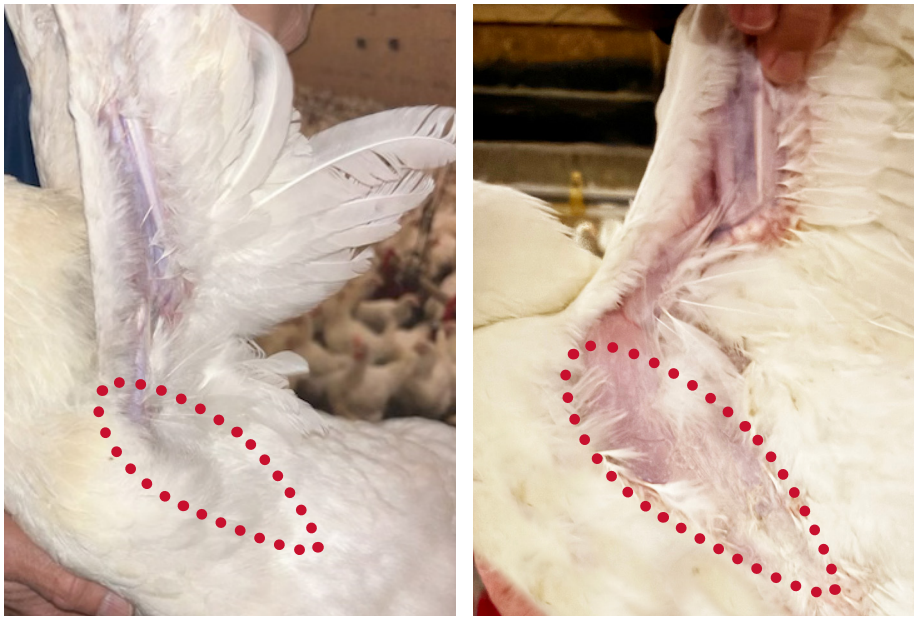
- It is essential to attain the 4-week body weight target.
- After 4 weeks, birds should continue to gain from 5 to 6 weeks. Field observations have indicated that weight gain stalls at 5 and 6 weeks tend to correlate with abnormal feeding behavior (feather pick / licking).

Minimize stress and stressful events.

- Ensure correct feed and feeder space to prevent competition and stress.
- Do not exceed recommended stocking density.
- Conduct vaccinations at 10 to 12 weeks with extra care including gentle handling, low lighting, and supportive recovery.

Monitor and evaluate feathering.

A simple and quick evaluation of feather growth during rearing can be added as a routine monitoring step. The skin areas covered by the wings on both sides are among the last to complete feather development. In Cobb pullets, this area is typically covered by 16 weeks of age. Observing this region and recording a yes-or-no score for about 20 or 30 randomly selected pullets at 16 or 17 weeks can provide valuable data. This assessment can be recorded at the same time as body weight measurements.



Feather coverage beneath the wing at 16 weeks. The bird on the left has good feather coverage under the wing. The bird on the right has less than expected feather coverage under the wing.

Females in production as examples of feather loss from mating. The females on the left and right have lost some feathering on their backs from mating.

Mating and feather loss

Feather quality and coverage in production are very important indicators of production persistence and high fertility. However, some feather loss on certain regions of hens occurs during mating and can be expected. At the hatchery, the back toes of the male chick can be treated to reduce the risk of scratching injuries that can occur in a breeder flock, and to help prevent feather loss on the back and thigh areas of hens during mating.

Keeping male and female body weight differences as close to the standard as possible will help females retain feathers*. Overweight males typically struggle to balance and complete matings, reducing fertility. If males are too light, they may lack the strength needed for successful mating. Maintaining correct weight differences makes mating quicker and less abrasive, helping females keep better feather coverage.

Feed management issues in production can cause feather loss

The modern breeder can consume a large amount of feed in a short period of time. Therefore, **adequate feed distribution and feeder space** are both critical to ensure that each bird receives the same amount of nutrients. Suboptimal feather coverage and development can be associated with uneven feed distribution or tighter bird spaces at the feeder.

The following are common reasons for rapid feather loss in breeder hens:

- Insufficient feeder space between 20 and 27 weeks when feed cleanup time is very fast.
- Feed distribution with lights on, resulting in overcrowding in parts of the house such as around distribution hoppers. This can also cause thigh scratches.
- Feed distribution with lights on results in hens running along feed tracks, inducing stress and internal lay or egg peritonitis.
- Narrow grills, less than 45 mm (1 3/4 in), covering the female chain feeder will affect the heavier females after 40 weeks. These females will have trouble consuming enough feed which can lead to a drop in production. Their heads may experience feather loss and swelling because of the tight grill. This swelling should not be confused with swollen head syndrome or pneumo-virus.

17 to 22 % difference between male and female body weight based on age and breed. See Cobb Breeder Guide for more information at www.cobbgenetics.com/resources.

Stress can slow feather development and induce abnormal behaviors

Stress can negatively impact feathering due to physiological and behavioral changes. When birds experience stress from environmental factors, handling, or nutritional imbalances, their physiological response often prioritizes survival over growth and feather development. Elevated corticosterone levels can impair protein use and feather follicle function, leading to poor feather coverage. Additionally, stress may initiate abnormal behaviors including feather pecking. Maintaining optimal management practices, including proper nutrition, housing, and minimizing stressors, is essential for healthy feathering and overall breeder performance.

Vaccinating and transferring birds to the hen house are events that can cause considerable stress*. Take extra care with these procedures and consider the following:*

- Handle birds gently and use low lighting to keep birds calm during the vaccination process. Vaccinations can cause some mild reactions that may lead to reduced feed intake a few days after vaccinating. Therefore, ensuring birds are on target for body condition and weight at the time of vaccination is important to alleviate any adverse impacts.
- Transfer from the pullet to hen house is also stressful for the flock. For a smooth transition, plan the transfer in detail and ensure the hen house is ready for the flock before transfer begins. Handle birds gently and move the birds at night or early morning during hot seasons. Observe the flock and ensure that birds are able to access feed and water.

Nutrition and feathering

Feathering issues in broiler breeders can be directly or indirectly related to feed and nutrition. Maintaining the correct formulation of nutrients and dietary intake can help prevent feathering issues.

Diets must supply sufficient levels of essential amino acids such as methionine and cysteine, which are critical for feather growth and structure. In addition, vitamins and minerals like biotin, zinc, and manganese play key roles in feather integrity and follicle health. Deficiencies in these nutrients can lead to brittle or broken feathers, poor coverage, and delayed regrowth. Energy balance is equally important. Birds underfed or fed low-quality diets may prioritize basic survival and reproduction over feather maintenance, resulting in poor plumage.

Mycotoxin contamination in feed can lead to feathering issues in broiler breeders by disrupting essential physiological processes. Chronic exposure to toxins impairs nutrient absorption and protein metabolism, which are critical for feather growth. These compounds damage the gut lining, reducing the uptake of amino acids, vitamins, and minerals necessary for healthy plumage. They also interfere with keratin synthesis, the structural protein that forms feathers, resulting in weak or sparse feathering. Additionally, mycotoxins induce oxidative stress and suppress protein synthesis, slowing cell turnover and feather regeneration. Birds consuming contaminated feed often exhibit ruffled feathers, poor coverage, and feathers protruding at unnatural angles. In severe cases, these effects compromise thermoregulation, feed efficiency, and even reproductive performance.

Feather loss might indicate poor gut health or feed quality issues

Intestinal issues can lead to feather loss primarily through nutritional malabsorption and systemic stress. When the gut is compromised by conditions such as coccidiosis, necrotic enteritis, or chronic diarrhea, the bird's ability to absorb essential nutrients – particularly proteins, amino acids, and vitamins like A, E, and biotin – declines significantly. These nutrients are critical for feather development and maintenance. A shortage results in brittle feathers, slow regrowth, and increased susceptibility to breakage.

Additionally, intestinal disease often triggers inflammation and metabolic stress, diverting energy and amino acids away from feather production toward immune response and tissue repair. Birds suffering from gut disorders may also experience dehydration and reduced feed intake, compounding nutrient deficiencies. Over time, this imbalance can cause abnormal feather loss affecting insulation, welfare, and performance.

Ectoparasite infestations can impact feathering

Ectoparasites feed on the outside of the body and can cause considerable issues in poultry breeder operations. Ectoparasites can increase floor egg numbers as hens are reluctant to enter nests that contain parasites. Furthermore, ectoparasites can cause feather loss and make feathers appear dirty. Additionally, ectoparasites may carry and spread diseases as well as cause skin lesions which can lead to skin infections. A good sanitation program and use of targeted pesticides can prevent and control ectoparasites.

Mites

There are several species of mites that infect poultry. The Northern Fowl mite is usually located around the vent. Therefore, they are often found on eggs and may be detected by staff handling eggs. Scaly leg and depluming mites infest the legs and feet and base of the feathers, respectively.

If environmental conditions are good (temperature and humidity) some mites can live apart from birds for several weeks. Therefore, even with extended downtime, mites can survive to infect a new flock. Infestations tend to be worse in cool weather and on young birds.

Wild birds are known carriers of mites. Prevent nesting of wild birds on or around poultry houses. Mites can be carried into the house by equipment and egg flats. They live in cracks, crevices, nest boxes and walls (nest boxes and slats offer ideal habitats) during the day, and feed at night. Depending on the species, infestations can cause pale combs and wattles, crusty skin on the legs, and birds pulling out their feathers.

Lice

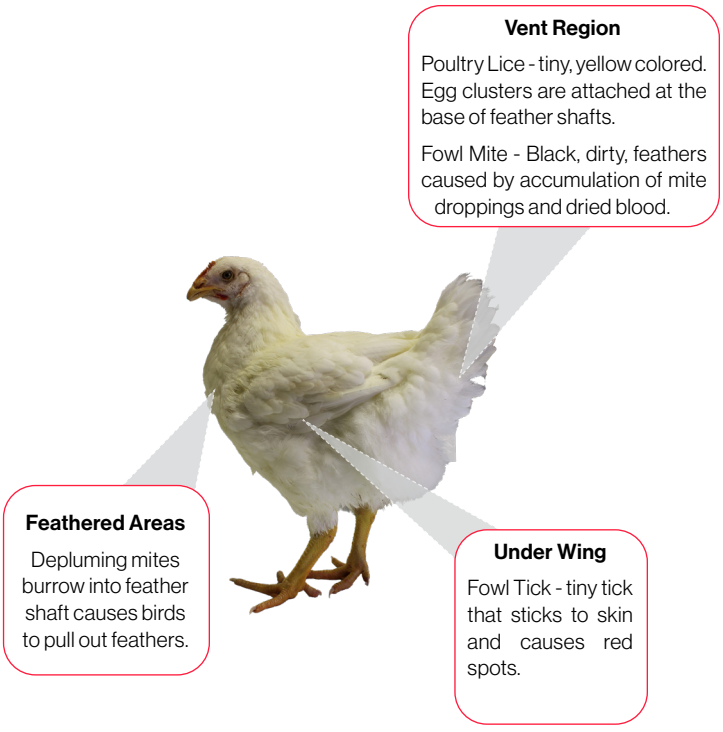
Lice chew on the skin and do not suck blood. Lice live entirely on birds and only leave the bird to attack a different bird. Control and prevention strategies are the same as those for mites. Lice will not preferentially infest one part of the body, so the entire bird should be inspected. White egg masses at the base of the feathers are the easiest way to identify a lice infestation.

Bed bugs

Bed bug behavior is similar to mites. They live in cracks and crevices during the day and feed at night. Bed bugs can survive for months apart from the birds so downtime will not alleviate a bed bug issue. Inspect cracks, crevices, and eggs for bedbugs which will appear as black spots.

Fleas and ticks

These parasites are occasionally found in breeder operations. Most pesticides that are used to treat other ectoparasites are also effective against fleas and ticks.



Summary

Achieve good development and coverage

- In rearing, ensure good management practices along with correct feed and water space, and correct stocking density.
- Reach target body weights at each age. Do not allow body weight gains to stall, especially in early rearing.
- Minimize stressful events such as vaccinations with gentle handling.
- Good feather development in rearing is important as some feather loss in production is expected due to mating.

Identify and correct issues

- Feed management issues (insufficient feeder space, equipment failures) can cause feathering loss due to reduced nutrient intake.
- Feed contaminants and toxins can cause feather loss by damaging the gut and causing poor nutrient uptake.
- Poor gut health caused by intestinal issues such as infections can reduce nutrient uptake and lead to feather loss.
- Ectoparasites can make feathers appear dirty, and cause feather loss and infections.

Conclusions

Feathers provide important functions and are a visible reflection of a bird's health. Well-maintained plumage can indicate signals of good management, adequate feeds , and effective disease control, while poor feather condition often points to underlying issues. By monitoring feather quality alongside other health indicators, producers can identify problems and implement corrective measures. Ultimately, prioritizing good management, biosecurity, and nutrition, not only ensures optimal feather development but also supports productivity and bird well-being throughout the production cycle.

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