

Notes on Feather Cover/Quality/Pathology in Breeder Hens 11-March-2025

Background

- Origin
 - Skin appendages like mammalian glands
 - Somewhat homologous to reptilian scales but much more highly developed
 - Many different feather subtypes and distribution is not even; rather by tracts
- Function
 - Thermoregulation / Insulation
 - Vit D3 conversion
 - Flight (optimistically with regard to chickens)
 - Physical Barrier (including protection during mating)
 - Mating Display
 - Communication
 - Nest Construction
 - Reservoir for Dust Bathing
 - Sensory

Metrics/Scoring

- Some feather cover loss is typical. Important to monitor.
- Dorsal feather loss in hens not always an indicator of high mating frequency. These may be the least receptive hens.
- The conventional (Aviagen) scoring method is almost impossible to correlate between scorers (0-5). Better to use the Shapiro scoring system 0-3).
- Current recommendations for scoring are lopsided (more during lay than rearing) and depressing. Better to score pullets accurately a few times and then correlate with feather cover at 25 and/or 30 weeks. More importantly correlate with actual results (and actual production/fertility!) Just scoring hens to confirm they have poor feather cover and that it correlates with poor mating/production/fertility doesn't solve any problems.
- Pullet Feather Scoring
 - Thigh cover: 12, 16, and 20 weeks a reasonable starting point. Correlate with different pullet rearing conditions.
 - Juvenile to adult primary wing feathers. 4 weeks onward. I like this metric (though mentioned much less than the feather cover metrics since it is more dependent on physiological development. The cover measures are important but are harder to investigate as they result from development and environment.
 - Correlate with weight/uniformity and shank length. If correlation is good, you may not need to be doing so much feather scoring. Could be that accurate weights/uniformity or shank measures will be enough.
- Hen Feather Scoring
 - Start with back scoring, best all round. Could look at the other areas later.
 - Start with 25 and/or 30 weeks and correlate with fertile egg results, pullet rearing conditions, and pullet feather scores.
 - Getting the pullets right will be the thing that leads to improvement.
- Counting or measuring Stress Bars or Growth Gaps in feathers not as useful for troubleshooting complex performance. They are adjunct pathological observations.

Negative Influencing Factors

- Disease is less often the root problem for feathers. Usually Nutrition & Management are the main culprits.
- Marek's / Keratoacanthoma (both rare in breeders)
- Infectious ("ruffled feathers" is a clinical sign for a huge number of infectious diseases, so it is no way diagnostic.)
- Parasitic
 - Shaft Lice
 - Depluming Mites
 - Other external parasites
- Management
 - Density
 - Temperature (lower temp at the right time stimulates feather growth)
 - Feather Pulling/Cannibalism
 - Feeder and Drinker space (especially feeder space late in rearing)
 - Slow feed presentation with lights on
 - Underweight females
 - Male/Female ratio
- Nutritional
 - Incorrect assumptions of nutrient matrices for feedstuffs can lead to inadvertent deficiencies
 - Deficiencies (Feather follicles=high turnover=deficiency susceptible)
 - Just about any vitamin but poor feathering will be just a small part of the problem (pyroxidine, pantothenic acid, niacin, folic acid, biotin, & nicotinamide documented)

- Cysteine
 - Methionine
 - Other amino acids
 - Zinc
 - Copper
 - Selenium
 - Sodium
 - Fiber
- Energy
 - Low density may reduce feather picking but lead to cover loss
 -
 - Toxicoses
 - Mycotoxins
 - Feed Form
 - Mash feed takes longer to clean up, so they are busy with that instead of pecking each other

Consequences of Poor Feather Cover/Quality

- Decline in mating
- Decline in fertility
- Weight loss
- Poorer feed efficiency/production
- Reduced thermoregulation
- Increased susceptibility to skin trauma
- Increased susceptibility to infectious agents (skin entry)

Promoters of Good Feather Cover/Quality

- Once you have the problem, too late for mitigation. Rearing is the time to ensure good feather cover. Once the birds are light stimulated, the priority is reproduction. Feather maintenance is secondary physiologically. Once in lay, it is just a matter of minimizing feather loss.
- Best Practices during Rearing
 - Proper beak conditioning
 - Toe treatment?
 - Access to total rearing area
 - Proper stocking density
 - Gradual temperature reduction to encourage feathering
 - Appropriate feeder and drinker space
 - Rapid feed distribution
 - Coordination of filling feeding system during lights off
 - Correct feed form for age to encourage uniform nutrition and cleanup (reduce feather picking)
 - Avoid wet litter; with or without dust bathing behavior, is bad for feather health
 - Everything to promote good uniformity
- Best Practices during Lay
 - As during rearing, correct density, feeder/drinker access, ventilation, dry litter still important
 - Attention to energy drop from Breeder1 to Breeder2; helps avoid weight gain but can also reduce feather cover.
 - Male/Female ratio
 - Male/Female sexual synchronization
 - Feed presentation timing
 - Keeping males nimble (proper fleshing) makes for rapid matings=retained feather cover=more receptive hens

Possible Next Steps (What I might do if wanting to look at feathering as a way to improve overall hen performance.)

- Discussions with servicepersons most often in houses to get an idea as to what they are seeing and what they actively monitor.
- Look at some pullet houses, especially some pullet houses that consistently yield good hen flocks or poor hen flocks. Compare feathering.
- Look at some hen houses that are likewise good and bad to compare feather status.
- Besides looking at feather cover, get a baseline on primary wing feather development (actually the 2nd set (4 weeks to housing). I loved one study where they painted the juvenile primary wing feathers and monitored their replacement.
- Make a start at a reasonable easy scoring system. Must be easy to train and correlate well between scorers.
- Management and/or Nutritional factors usually more important than disease. If there are factors that you suspect strongly and circumstantially, then a quicker path to success might be challenging X number of pullet flocks with that Management or Nutritional change and comparing to controls. Might yield some immediate results while we are working out a feather scoring SOP.
- Never forget to correlate with # of fertile eggs laid. No reward for figuring out a way to have better feather scores without any more hatching eggs.