

# Thoughts on Skin Scratches Leading to Cellulitis in Broiler Production

## Introduction

Months ago a broiler producer asked a poultry veterinarian about his thoughts on the causes of cellulitis. The response was a confident "**manage skin scratches**". No doubt, from his experience, managing broiler health in a prominent US integration, that skin scratches were the primary underlying cause of cellulitis.

Once thought to be a result of hatchery-borne infections (Type I), recent research has indicated that cellulitis most frequently accompanies a disruption in the integrity of the skin (scratches, abrasions and or cuts) (Type II). This enables bacteria to enter the wound and colonize the subcutaneous tissues. A simple sequence follows;

- Break in the skin, usually a scratch, cut or abrasion.
- Bacteria that are found in cellulitis lesions must gain entry into the wound.
- Lesions must be unhealed, unresolved at the time of processing.

The skin at processing may exhibit a small well-healed scratch, which fails to reveal the full development of the inflammatory process until the skin has been reflected back. (*Diagram I & II*). Ample evidence reveals that conditions that increase scratches will increase the amount of cellulitis or infectious process (IP). Most of the time, E.coli is isolated from the lesions, however one must understand that not all E.coli will cause cellulitis.

Some of the conditions that have led to more scratches include meal feeding, high stocking density, slow feathering breeds, nervousness etc. If skin scratches are a problem, one must ask if they are an industry problem or an occasional farm problem. Let us now take time and review some of the factors that could be associated with an increase in skin scratches that could lead to cellulitis

## Industry Related Problems

- **Breed**

Several managers have mentioned that cellulitis was more prominent in high yield, slow feathering birds than fast feathering breeds. Averaging 10 days faster feather cover, the fast feather broiler quickly envelops their body in a coating of protection of feathers during the critical times of increased growth rate and activity. Delayed feathering simply allows more time for the skin to be exposed to trauma leading to scratches to the skin. Careful examination of any flock will reveal that there is a significant variation in feather coverage, ranging from birds with no feather coverage in the abdominal and tail regions to birds which are fully feathered.

Breed of the bird can also affect temperament or nervousness in a flock. Nervous flocks will be

- **Feed Additives**

For years it has been speculated that the side effects of antibiotics, anticoccidials and other feed additives have been associated with fragility of the skin. Recently a documented study from Israel revealed that the skin of broilers fed halofuginone had less tensile strength, which could be associated with the increased frequency of skin tears and the incidence of scratches.

- **Density**

Simply stated, too many birds per square meter can impact both feathering and scratches. Reduced bird density can often reduce skin damage. Is this contributing factor significant in the correlation to skin scratches therefore cellulitis is questioned. Morris 1999 revealed that there was no pattern between levels of cellulitis in a complex and the size of the bird raised or the stocking density. Norton

more active increasing the number or incidence of scratches and skin injuries (tearing). This is prominent in the white leghorn breeds versus the heavier boiler breeds.

- **Breed Sex**

Males can be slower feathering allowing more skin injuries. However, pullets are known to have more tender skin; hence, prone to more scratches or skin trauma.

- **Calorie / Protein ratio**

If the ratio is too high (more energy) it could lead to lower intake of some essential amino acids. It could also lead to a higher deposition of abdominal fat. Deficient amino acids could lead to feathering abnormalities and increased energy or fat deposition could cause skin integrity issues leading to skin fragility.

Amino acids, especially low or marginal levels of cysteine and methionine (sulfur groups) may cause nervousness and slow feathering. If amino acids levels are affecting feathering, the greatest effect probably starts during the first three weeks of the flock's life (starter feed).

- **Nutritional**

Other nutritional entities are sometimes implicated as contributing factors. Low sodium levels may contribute to increased nervousness in a flock. Vitamin E, the B vitamins and some trace minerals such as selenium and calcium have also been suspected of contributing to the problem

however, reveals that birds under higher density will tend to have more scratches and therefore higher rates of cellulitis. Management of density should always be conducted on the basis of kilos/meter<sup>2</sup> rather than birds/meter<sup>2</sup>. The key is "manage density rather than density manage you."

One cannot deny that skin scratches may be artificially created by high bird density by farm management. During hot weather birds may crowd to one end of a house trying to seek the ventilated cooler areas (tunnel ventilation). Partial brooding may encourage birds to remain in the brooding area. No doubt designing the house, locating the equipment and managing the flock to keep the birds spread out can and will reduce skin scratch challenges.

- **Last Two Weeks**

Field data reveals that many management systems during the last two weeks of grow-outs the time in which broilers experience the majority of the skin scratch lesions. This can ultimately, as mentioned, lead to the development of cellulites. Broilers in this period are under allot of stress, are crowded (more kilos/meter<sup>2</sup>) and become scratched as they move to feed, water, or "cool" house locations. This time is also a problem since feed restriction programs or lighting programs tend to cause the birds to be hungry hence more agitated and stressed.

## Farm Related / Sporadic Grower Challenges

- **Feed Restriction**

"Out of Feed" is one of the first factors to evaluate when there is a skin scratch issue. Birds out of feed due to delivery / logistic problems can induce birds to fight, pile and scratch each other when they regain access to feed. Management failure to respect feeder timing mechanisms, feed delivery malfunction, inadequate feeder / waterer space will instigate aggressive behavior. Hot weather feed management must be managed to prevent heat stress but allow for normal behavior when the feed is permitted.

- **Nipple Drinkers**

With the increase in nipple drinkers over the past several years the incidence of cellulitis has decreased. This effect is most likely due to improved chick water management, improved litter management and the reduction of bacteria in the litter itself. Improved overall health is usually a recognized industry observation when nipple drinkers were brought in.

- **Ventilation**

Ventilation especially in tunnel ventilated cool cell houses will instigate broilers to migrate to the cooler fraction of the house. Density patterns

- **Nervous Birds**  
Too much light, no dawn / dusk lighting programs or sudden noises; flashing lights can cause birds to climb on each other.
- **Litter**  
Some operations struggle when weather and environmental conditions make it difficult to keep litter dry. Litter moisture control is critical, as increased moisture tends to increase lesion development in birds that are scratched versus birds that are scratched and placed on dry litter. Problems can also be exacerbated in situations where marginal management produces a broiler whose feathers are matted with fecal debris. Cellulitis type bacteria have been shown to be adept at colonizing faster and out-competing flora type E.coli in the litter. Others reported that wheat straw is related to reduced skin damage whereas hard wood shavings correlate to a higher incidence of cellulitis.
- change as broilers struggle to reach an environmentally friendly zone. Increased densities create aggressive behaviors towards feed and water as bird ratios to management input change. Migration fences have alleviated this nomadic range in the broiler house.
- **Procurement**  
Norton (1997) revealed that cellulitis lesions could occur as early as 18 hours before processing. The period just prior to slaughter (feed withdrawal and transport) is a time where birds are particularly prone to being scratched. Unskilled management in feed withdrawal, feed is withdrawn too early, the catching crew is excessively rough or there is a delay in transportation or processing

## Summary

What is the solution to the challenge of skin scratches and cellulitis? Simple factors, as listed, must be identified on farm and control procedures built in minimize the cause. Cooperation, communication and application are needed for the entire broiler complex, farm or barn. No doubt cellulitis is a costly outcome. Managing skin scratches and the insulting ubiquitous E.coli bacteria are the first steps towards control. Improvements in control begin at brooding and proceed throughout grow out until the birds are processed. Almost anything that can be done to improve the health and productivity will reduce the incidence of cellulitis.

## References

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**Diagram I**



**Diagram II**

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