NC STATE UNIVERSITY

North Carolina Poultry Industry Joint Area Newsletter

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Cellulitis/Dermatitis in Turkeys

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Condemnations of turkeys due to cellulitis or dermatitis are on the rise according to some turkey producers in North Carolina. Commonly called cellulitis, this condition is also known as gangrenous dermatitis, necrotic dermatitis, and gangrenous cellulitis. The condition is most commonly caused by Clostridial bacteria. Clostridia form spores which are extremely persistent in the environment.

While sporadic outbreaks have been reported in the past, usually in birds 12 weeks of age or older, current outbreaks are occurring in turkeys of all ages and with increased frequency. Clinical signs observed in turkeys with cellulitis can include: varying degrees of depression, incoordination, lack of appetite and leg weakness. Because the period of illness is short, birds are often just found dead. Gross lesions generally consist of extensive blood-tinged edema, with or without gas between the skin and the muscle layers. The skin itself may or may not appear to be affected.

Diagnosis of cellulitis consists of isolating one of several Clostridial organisms from the lesions. Other organisms are often also present especially Staphylococcus organisms. Submit turkeys to a diagnostic laboratory for bacterial isolation and antibiotic sensitivity testing.

Outbreaks of cellulitis have been successfully treated by administration of chlortetracycline,
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Early management sets flock performance

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The brooding phase is the most important stage in the life of chickens and turkeys. During this early period the ability to self regulate body temperature is not completely functional. The immune system, digestive system, muscles and bones are developing at rapid rates. Any reduced development or damage incurred during these first days may not show in performance until later in life. Typical results of improper brooding practices are poor livability and flock uniformity, ascites, flip overs, heart attacks, leg problems, depressed body weights, poor feed conversion and increased processing plant condemnations. If any of the previous problems are reducing your final payment, please place more attention to your brooding practices. One can achieve significant improvements with slight adjustments to ones brooding practices.
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Cellulitis/Dermatitis in Turkeys

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oxytetracycline, erythromycin, penicillin or copper sulfate in the water. If antibiotic treatment is unsuccessful then an underlying immunosuppression is suspected. Water acidification, with citric acid and proprionic acid, have been used to reduce but not eliminate mortality in flocks where antibiotics are not effective.

Total clean out of farms, followed by thorough cleaning and disinfection of the house and floor have helped resolve farms with historical problems. Large amounts of water mixed with phenolic disinfectant (1500 gallons per 20,000ft^2) must be used to achieve a saturation depth of 3-4 inches of the dirt floor pad. Treating the floor with salt at 60-100 pounds per 1,000ft^2 prior to placement of bedding material has decreased the incidence of cellulitis on problem farms. Water and litter acidifiers have been used to control clinical signs and lesions.

Clostridia occur in soil, feces, dust, contaminated litter or feed and intestinal contents and survive under extreme conditions. Good biosecurity practices will not eliminate the Clostridial spores but should prevent introduction of viruses that can compromise the immune system of the birds. Increasing down time between flocks may help in preventing repeat outbreaks.

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The poultry business is getting more competitive and profits in live production are found in paying attention to the small details. Several factors are necessary for good brooding. Three important ones are providing adequate brooding temperature, air quality and easy access to water and feed for the entire flock. This is not as easy as it sounds, since broiler and turkey flocks are a variable population of birds. Variations in hatchlings' body weights of more than 5 grams indicate that you have different birds with different environmental needs for optimum growth. Optimal conditions for a flock vary according to the breed, and age of the breeder flocks, season of the year, hatchery temperatures, transportation conditions from the hatchery to the farm, and the type of brooding equipment to name a few. Recently, it has been suggested that recommended temperatures are needed to avoid poor performance. But to obtain the best performance of every flock requires some art and science that each grower must develop and apply to individual houses.

It is essential to provide the optimum temperature for the chick's comfort. Chick body temperature help gauge proper temperatures. Rectal temperatures of 104 to 105^{o}F are normal physiological temperatures that we need to maintain during the first week. Rectal chick temperature will rise to 105 or 106^{o}F after 5 days of age. Higher body temperatures during the first week are detrimental and should be avoided. Rectal temperatures are indicators of effective temperature which is dependent upon environmental temperature (dry bulb), relative humidity and air speed.

Litter temperature is different than the air temperature which is measured at chick height. Litter temperature creates the comfort zone for the chicks, not the air temperature. You can obtain optimal body temperatures with good house preheating and litter temperatures of 90 to 92^{o}F for the first day. Growers with low early mortality and excellent results normally keep litter temperature, measured one inch into the litter, higher than 82^{o}F during the first week. Properly calibrated infrared thermometers can help you to determine those litter temperatures.

Adjusting temperatures to obtain proper air and litter temperatures change according to the type of brooders that you have. Forced air furnaces require higher temperature settings because they heat the air which in turn heats the floor. A conventional pancake brooder directs approximately 40% of its heat to the floor and 60% to the air. Radiant brooders project approximately 90% of their heat to the floor and 10% to the air. Since pancake and radiant brooders direct heat to the floor, the air temperature required to get the desired floor temperature is lower than that required for forced air furnaces. Proper placement of

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sensors/thermostats are important. They should not be too close to a brooder or too low to the ground where birds can crowd around the sensors and give a false high temperature. They should also not be too close to the side wall, brood curtain or where air is entering the house.
Remember that used litter produces some heat due to the bacterial activity. Dry conditions (less than 35% relative humidity) allow for a lower effective temperature. However, for optimum flock performance, keeping the relative humidity in the brooding zone between 60 and 70% is desired. Higher temperatures can give you lower first-week mortality, because it favors the survival of small chicks, but it can also reduce your final flock performance and profitability due to heat stress of the larger baby-chicks as well as increase gas usage. These differences will be magnified when you are growing heavy birds (> 6 lbs).

Try to keep house temperatures constant, daily variations of ± 5^{o}F are normal. Sometimes, growers trying to maintain temperature and also be more efficient in gas usage, reduce ventilation and consequently the air quality. High ammonia (> 20 ppm) and carbon dioxide (> 3000 ppm – 0.3%) are as bad as low temperatures for chicks and poults. Use litter amendments to reduce ammonia production of used litter. Brooders that are too near to the ground can reduce the oxygen concentration to 16 or 17%, normally it is 20.9%. Make sure your minimum ventilation system works at least one minute out of every five. The inlet system should react to the fan capacity and maintain the same static pressure in the house regardless of the number of fans in operation. Insufficient inlet area leads to reduced air volume while excessive inlet area leads to air falling quickly and onto the birds. Inlets should direct air into the peak of the house, allowing time for mixing and warming before the fresh air reaches the birds.

Water quality is very important, and attention to proper water sanitation during the first week can reduce early mortality of chicks and poults. Water line cleaning and sanitation including full flushing should be performed after every flock. Additionally, you should conduct regular maintenance on the water lines. Dirty triggers can either stick open or closed, worn out triggers will fail to seal and create problems of wet litter. Proper water filtration and sanitation is critical during the first week. Day old chicks can not trigger the nipples at the pressure used for 6-week broilers (60 ml – 2 oz/minute). It is important that you adjust the water pressure from the previous flock every time. The rule of thumb is that nipple drinker lines should have a flow rate of 20 ml (0.70 oz)/minute during the first week. It is important to offer supplemental water in baby-chick drinkers even with excellent drinker lines. The nipple or drinker height during the first two days should be at eye level. Nipple types with poor side activation need to be slightly higher. Later at 3-5 days of age, chicks should stretch their necks to drink. Water temperature in cups or nipple is important to maintain body temperature. One should try to maintain water temperature around 78^{o}F the first three days. Water temperatures lower than 70^{o}F during the first week can increase early mortality.

It is important to stimulate feed intake during the first week and especially during the first hours. You want a minimum of 95% of your birds to have feed in their crops four hours after arrival. Walk birds to keep them moving and moving to the feed. Place fresh feed first thing in the morning and two or three times per day, even if feed is still on the paper, lids or pans. Use sufficient feeder lids and/or feeder space. If the feeders are constantly full of chicks, it indicates that there is insufficient feed space available. It is important to keep track of the amount of feed consumed during the first week or the time it takes to consume the starter feed. Flocks that eat 1.5 lbs of starter feed in less than 16 days have the best feed conversions, uniformities and body weights. One should use minimum light intensities of 2.5 foot-candles (25 lux) in the brooding area measured at chick level during the first week to stimulate feed intake.

You can improve your chances to obtain the best results possible for each flock by paying attention to details to improve flock uniformity and reduced mortality during the first week. The target body weight at the end of the first week is four times the initial average body weight. However,

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obtaining average body weights of more than five times the initial chick-weight is correlated with elevated late mortality and increased culling of broilers due to leg problems.

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Importance of Water Quality

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Remember your biology class? What is the MOST important nutrient for animals or humans? Here are your six choices: carbohydrates, protein, vitamins, minerals, fats or water. While there are maximum and minimum requirements for all, water is the one key and common nutrient that plays a vital function in all other nutrients. Water, in the body, is used as a: lubricant, solvent, transporter, coolant, heater, storage, -- you get the idea.

Nutritionists formulate animal feed with a critical assumption: the farmer providing good water to all animals in sufficient quantities required in such a way they can drink their required amount as and when needed. Ah-ha! So, you have more control over animals' nutrition than you thought.

While taking farm well water samples is not a regulatory requirement (like animal manure samples), it is a cheap ($5 at NCDA&CS lab) tool for your use in monitoring animal production inputs. If you experience decreased production, a water sample may identify or rule out a problem so further diagnosis or corrective action can begin. Regularly taking water samples creates a data baseline for which to compare future water samples – like is often done in healthcare comparing x-rays, scans and blood test results from different time periods.

A deep water well (100 + feet) may change over time – seasons and years. So, not only is yearly water sampling and testing a good idea, but collecting samples during various seasons of the year. Condition of the well water's natural state will also determine its effectiveness or adjustments needed for chlorination or medication.

A properly constructed wellhead should not have any surface water contamination problems often seen in shallow wells (less than 50 feet deep) that are not properly constructed. In times of high water and flooding, ANY wellhead that may have been covered by flood waters needs to be shock chlorinated to clean it, the pipe, pump, screens, etc.

Water samples have the quickest turnaround time as opposed to soil and manure samples - just a few days. As with soil and animal manure sampling, if you need instructions, forms and/or assistance interpreting the results, contact your county Extension agent.

Keeping Your Litter Dry Will Improve Bird Performance

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Litter can get wet due to leaky waterers or high water table. However, during winter, inadequate ventilation is the main reason. The main purpose of winter ventilation is to get rid of excess moisture produced by the birds so that relative humidity stays within acceptable levels (say, 40 to 70%). However, with reduced ventilation, there is moisture build-up in the house. When this humid and warm air mass contacts cold surfaces (e.g., uninsulated concrete walls or metal inlets, or portions of the ceiling where insulation material has shifted), water will condense and then drip down to the floor and wet the litter. When the litter is wetted, there is increased biochemical activity in the litter and ammonia production increases. In winter, with wet and old litter, ammonia concentrations in excess of 50 parts per million (ppm) are not uncommonly. Such high ammonia levels can attack the eyes and respiratory system of the bird and weaken its immune system in the long run. High ammonia levels can also cause breast blisters and foot pad burns.

During the growout cycle, if high humidity and/or high ammonia levels are observed in the house, the ventilation rate needs to be increased. How much to increase the cold weather ventilation rate (for a particular size of birds) will depend on how much stale air the minimum ventilation fans are removing. Integrators provide guidelines on how long to run the fans (say, 1/2 min. out of 5 min.) depending on the size of birds. These guidelines are based on the size and number of birds, capacity and number of fans, and weather (cold, mild, or hot). Weaver[1] suggests a cold weather ventilation rate of 0.4 cfm/lb of bird; so, 20,000 1-lb birds need about 8,000 cfm of ventilation. When the integrator provides ventilation guidelines to the producer, the integrator assumes a certain airflow rate through the fan. However, with wear and tear, the fan's performance deteriorates and it cannot pump out the same airflow rate as it could when it was new. For example, a clean 36 in. fan with clean shutters and guard (with a static pressure drop of about 0.05-0.10 in. water column) may pump out 9,000 cfm while a dirty fan (say, static pressure drop of 0.15 in.) may pump out only 7,500 cfm! In 48-in. fans, airflow rates can be reduced by as much as 30% with worn, loose belts compared with well-maintained belts. Hence, with birds in the house, apart from cleaning the shutters and guards (as much as possible), the producer should increase the ventilation in small steps, by trial and error, to a point where moisture and ammonia are manageable. Of course, the service person should be notified of these changes, ammonia measurements should be made and the situation should be monitored. If the house gets too dry (and dust levels build up), reduce the ventilation in small steps.

[1] Weaver, W.D., Jr. 2002. Fundamentals of ventilation. In *Commercial Chicken Meat and Egg Production*, 5th ed., editors D.B. Bell and W.D. Weaver, Jr. Kluwer Academic Publishers, Norwell, MA.