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Understanding and Control of Gangrenous Dermatitis in Poultry Houses

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Description

Gangrenous dermatitis (GD) sometimes seems to occur almost spontaneously in birds 4 to 8 weeks of age. GD is also known as "gangrenous cellulitis," "wing rot" or "red leg." GD usually starts with the appearance of small pimples on the skin, soon progressing to involve large areas. Birds with GD have moist raw or dark areas where the underlying muscles are exposed. The breast, wings, rump and abdomen are most commonly involved. Blood-tinged fluid may be found beneath the skin. Fluid can be jelly-like in consistency. The liver and spleen may be swollen and dark with spots or blotches. However, since the disease can be very acute, birds are often just found dead.

Cause

For gangrenous dermatitis (GD) to occur in a large population of birds, generally three things are required:

1) Some type of injury to the skin,
2) The disease-causing organism (*Clostridium* or other species) in sufficient number to cause the disease, and
3) Some type of immune suppression.

Generally, there are enough hazards (e.g., chicken toenails) around to cause injury and infection. Nevertheless, it is advisable to survey facilities and eliminate the obvious hazards to reduce the chances of injury. In addition, there has been speculation that some of the slow-feathering modern strains of birds (particularly male broilers) are more susceptible to GD because their skin is less protected due to the lack of feathers. However, no data to date have linked slow feathering of birds to increased incidence of GD.

The bacteria involved in GD are *Clostridium septicum*, *Clostridium perfringens* or *Staphylococcus aureus*. The milder forms of GD are generally associated with *Staphylococcus aureus*. When GD is caused by *Clostridium*, mortality is generally rapid and high. These organisms may also cause the disease in combination.

Clostridium species are spore formers generally found in soil but can be found in feed, feces, dust and any number of other places. Since *Clostridium* are **very** durable and able to survive extremely harsh conditions, it is unlikely they will ever be completely eliminated from commercial animal facilities. The strategy with *Clostridium* (and other disease organisms) is to keep the organism numbers as low as possible so that, when animals are exposed, the chances of recovery are enhanced.

Immune-competent birds generally are not affected by GD. Therefore, the appearance of GD may be related to exposure to immunosuppressive viruses, such as infectious bursal disease (IBD). Although any number of viruses are capable of immune suppression, kits are not available for all that are present. Mycotoxins in the feed can also cause immune suppression. Immunity can also be compromised when birds are in stressful situations such as crowding or heat.

Prevention of Outbreaks

The birds we currently raise appear to be much more susceptible to stressors than earlier broiler strains. Something as simple as an electrical storm occurring can result in an outbreak of hysteria in the flock leading to an increase of cuts and scratches. Other factors associated with hysteria or nervousness in a flock could be longer day length, increased light intensity, light restriction programs and low dietary sodium levels. Management problems that could contribute to flock hysteria include feed outages, pileups due to predators entering the house, improper fan cycling, flashing lights and/or loud sudden noises. In addition, protruding nails, wires or other sharp objects at bird level should be removed to prevent scratches or cuts on birds. As a general rule, any alteration in management that reduces stress or reduces the possibility of a wound will reduce the probability of having a GD outbreak.

To keep conditions in the poultry production environment such that growth of the organism is discouraged, the following must be done:

- Remove dead birds often.
- Maintain a house environment that is as dry as is practical (environments that are too dry will encourage respiratory diseases).
- Keep equipment as clean as possible (particularly open-type waterers).
- Prevent other animals from entering the house – this includes domestic animals, wild animals (including birds) and humans.

Management of Outbreaks

While the course of GD is unpredictable, taking some action may prevent the disease from growing worse. However, hasty attempts to control the spread or severity of the disease should be avoided, since each treatment could have long-term consequences.

One method of reducing the incidence of GD following a break is the use of iodine disinfectant in the water. One gallon of 1.75 percent solution of iodine disinfectant is mixed with 6 gallons of water to make a stock solution. The stock solution is then given to the birds at a rate of 1 ounce per gallon of water consumed. The solution is provided to birds every other day for three times. In other words, birds are to consume iodine-treated water a total of three times. This treatment is most effective when administered immediately after the onset of an outbreak or when an outbreak is expected (A. Rossi, personal communication).

There have been a number of field reports of treating litter with alum, aluminum sulfate, sodium sulfate, salt or other treatments to reduce the incidence of GD. While there is no objective evidence that such treatments are effective, there are numerous field reports that indicate varying degrees of success with these treatments. Salt is reported to be a drying agent that assists with disinfection if used following cleaning and sanitizing of poultry houses. Other litter treatments are reported to produce a dramatic shift in litter pH which may reduce or inhibit microbial growth. Since the majority of treatments affect litter conditions for a short period of time (two to three weeks), best results against GD outbreaks occur when the litter treatment is placed in the facility when birds are approximately 4 weeks of age. **HOWEVER**, growers should be aware of all the consequences involved prior to the addition of any material to litter. The use of these materials may cause corrosion of metal parts (including structural steel) in poultry houses. In addition, making use of these materials could lead to the contamination of groundwater. Furthermore, such additions may mean litter cannot be safely applied to land or fed to ruminants.

After an outbreak, a complete clean-out, scrubbing and disinfection of houses is generally best so that spore counts are reduced. It is also advisable to test the pH of soil on the floor of farms with chronic GD problems. Frequently, soil is alkaline on such farms and, thus, should be adjusted to neutral or slightly acid. The feed-handling system should also be cleaned following on outbreak, since moldy feed can reduce immunity leading to the onset of the disease.

When GD is recurrent on farms, IBD titers should be checked to ensure that adequate immunity exists. If IBD titers are inadequate, IBD control programs should be re-evaluated and intensified. Better IBD control has, in some cases, resulted in a lower incidence of GD outbreaks.

There is no known link between lower incidence of GD and elevated levels of fat-soluble vitamins (e.g., A, D, E and K). However, the addition of elevated levels of fat-soluble vitamins may enhance immunity as well as skin integrity. Therefore, fat-soluble vitamins might be given to birds on farms with chronic problems. However, it should be clearly understood that fat-soluble vitamins can accumulate in the tissues and can be toxic if given in high doses or over a prolonged period of time. Thus, if water-soluble packs of vitamins A, D, E and K are used, they should be provided at half the recommended dose for three days followed by clean water for four days. This dosage of vitamins should be repeated for the first three weeks to ensure that birds have adequate vitamin reserves when the disease challenge comes.

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