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Incidence of gangrenous dermatitis in commercial layers in Namakkal

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Gangrenous dermatitis is a bacterial disease affecting poultry characterized by areas of necrosis in the skin and underlying tissues, usually resulting in death. Since Namakkal District in Tamil Nadu is thickly poultry populated area, a study is undertaken to control this disease. The disease was reported in commercial layers between 6 and 20 weeks of age (Frazier *et al.* 1964). The susceptibility to infection is increased when the immune system is compromised. The immunosupression is either due to infectious bursal disease virus (IBDV), chicken anaemia virus (CAV) or other stresses such as mycotoxins, coccidiosis, environmental extremes, nutritional deficiencies and management problems such as improper disinfection of empty shed, overcrowding etc. (Jensen 1998).

Routine monitoring was done on 15 farms in Namakkal throughout the year. Out of these, 7 farms have shown lesions like dark, purple to black, moist areas in the skin. Typically, the feathers were missing or very easy to remove over the affected area. Swabs were taken intralesionally and subjected to isolation. Nutrient agar was used for the isolation. The streaked plates were incubated at 37°C both in aerobic and anaerobic environment. The isolated colonies were subjected to staining and biochemical reactions as per the standard procedures.

All the isolates were subjected to antibiotic sensitivity test by disc diffusion method using Muller Hinton agar and antibiotic disc. The mortality pattern, sensitivity pattern, season and age group involvement were recorded periodically in the affected farms.

The organism isolated from both aerobic and anaerobic cultures of all the 7 cases were gram-positive cocci arranged like bunches of grapes. Later the biochemical reactions confirmed all the isolates as *Staphylococcus aureus*. The results of biochemical test are given in Table 1. The mortality pattern varies from 0.15 to 1.75%/day and the total mortality ranges from 10 to 20% of the flock strength. Out of these 7 farms 2 have got the history of IBD outbreak at chick stage showed higher mortality when compared to others. The age group involved is mostly between 8 and 16 weeks of age. The sensitivity pattern of the isolates to various antibiotics given in Table 2. Sensitivity of the isolates to antibiotics in descending order is recorded as follows, viz enrofloxacin, ciprofloxacin, chloramphenicol, gentamicin. The major outbreaks of wing rot mostly occurred between September and February.

Table 1. Results of biochemical tests

Isolates	Coagulase	Catalase	Oxidase	DNAse	Acid from				Haemolysis
					Lactose	Maltose	mannitol	xylose	
A	+	+	-	+	+	+	+	-	+
B	+	+	-	+	+	+	+	-	+
C	+	+	-	+	+	+	+	-	+
D	+	+	-	+	+	+	+	-	+
E	+	+	-	+	+	+	+	-	+
F	+	+	-	+	+	+	+	-	+
G	+	+	-	+	+	+	+	-	+

Table 2. Sensitivity pattern of the isolates to various antibiotics

Isolate ⇒ Antibiotics ⇓	A	B	C	D	E	F	G
Enrofloxacin	HS	S	HS	HS	S	HS	HS
Ciprofloxacin	HS	S	S	S	S	HS	HS
Chloramphenicol	S	HS	S	HS	S	HS	S
Gentamicin	HS	S	S	S	S	S	HS
Amoxycillin	R	R	HS	S	R	R	R
Neomycin	R	R	S	S	S	S	R
Oxytetracyclin	R	R	R	R	R	R	R
Streptomycin	S	S	R	R	S	R	S

Zone of inhibition, >20mm=highly sensitive (HS), 10-20mm =sensitive (S), <5 mm=resistant (R).

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Staphylococcus species produce a variety of toxins, among which dermonecrotic toxin (dermonecrotoxin) causes a severe dermal inflammatory reaction, followed by skin necrosis at the injection site after intradermal inoculation in poultry (Froyman *et al.* 1982, Cervantes *et al.* 1988). In this study the causative agent for gangrenous dermatitis is *Staphylococcus aureus*. Jensen (1998) stated that *Staphylococcus aureus*, alone or in combination could initiate this disease. However, researchers at the University of Connecticut were not able to reproduce cases of gangrenous dermatitis in broiler or Leghorn chickens by subcutaneous inoculation of *Staphylococcus aureus* alone (Frazier *et al.* 1964). Gangrenous dermatitis was experimentally reproduced when *Clostridium septicum* was inoculated alone or mixed with *Staphylococcus aureus*.

Staphylococcus aureus is a common inhabitant of the skin and mucus membranes of mammals and birds. It was recovered from dead chick embryos and poultry feeds (Harry 1957). Since the *Staphylococcus* is wide spread in the environment, lack of managemental practice and injury to the bird will predispose to gangrenous dermatitis.

Here, the outbreaks were recorded between 8 and 16 weeks of age. However, outbreaks in 6 to 20 week-old commercial layers (Saunders and Bickford 1965) and 20 weeks old broiler breeders (Froyman *et al.* 1982) have also been reported.

Previously, gangrenous dermatitis was also often thought to occur as a sequlae to other diseases such as IBD and IBH (Rosenberger *et al.* 1988). The farm records available in this study showed that only 2 out of 7 have the history of IBD outbreak in chick stage. The fact that a small percentage of birds developed IBD in spite of vaccination in the above said 2 farms suggest an uneven immune response to vaccination. All the 15 farms were using intermediate plus vaccines for IBD.

According to Jensen (1998) the mortality can vary but is typically 0.25 to 1.75%/day. However, the mortality pattern observed in this study varies between 0.125 to 1.75%/day and a total mortality of 10 to 20% of flock strength also recorded. Incidence of the disease is noticed highly in winter compared to summer. The mortality pattern due to wing rot is maximal during winter especially October, November and December when the relative humidity in the air is high.

Outbreaks of gangrenous dermatitis have been efficiently treated by administration of erythromycin (Saunders and Bickford 1965), penicillin (Hofacre *et al.* 1986, Cervantes 1988), copper sulphate (Awaad 1986) in water and chlortetracycline (Saunders and Bickford 1965) in the feed. However, in this study enrofloxacin, ciprofloxacin, chloramphenicol and gentamicin were sensitive to the isolates. The birds treated with enrofloxacin for 5 days along with butter milk in water produced good results with reduced mortality. However, in many instances, antibiotics used for control have had little success (Fowler and Hussaini 1975, Froymen *et al.* 1982).

SUMMARY

The commercial layer farms (15) in Nammakal area were monitored throughout the year, out of which 7 showed lesions of gangrenous dermatitis. The age group involved was between 8 and 16 weeks. The mortality was 10 to 20% of the total flock strength. Flocks with the history of IBD outbreak showed higher mortality compared to others. The organism isolated from all the 7 cases was *Staphylococcus aureus*. The organisms are highly sensitive to enrofloxacin followed by ciprofloxacin, chloramphenicol and gentamicin. Though many workers were not satisfied with antibiotic treatment, it was found that treating with enrofloxacin for 5 days along with butter milk in water showed good results with reduced mortality.

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