

Studies on the incidence and pathology of naturally occurring duck plague in Assam

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ABSTRACT

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Outbreak of Duck plague in the state of Assam during the period from August'2003 to June '2005 has been reported. The incidence was recorded as 21.7 per cent. The clinical signs recorded were greenish watery diarrhea, mucous discharge from mouth, droopiness, soiled vent, inappetence and deposition of caseous materials in the eyelid. Grossly, characteristic "paint brush" appearance of the heart was observed in few cases due to severe petechiae over the epicardium. The longitudinal folds of the esophagus showed the presence of thick-white patchy diphtheritic membrane mostly in the adult birds. Microscopically, the prominent tissue changes were congestion and haemorrhage of the parenchymatous organs. Liver showed varying degree of degeneration to multiple areas of focal coagulative necrosis with disruption of the hepatic cords. Characteristic intranuclear eosinophilic inclusion bodies were noticed in the degenerated hepatocytes with clear halos.

Keywords: Duck, plague, incidence, pathology

Duck farming is very popular in North-Eastern region particularly in Assam due to suitable geo-climatic conditions. Almost all the people in villages rear ducks in the form of backyard farming. In spite of large population of ducks in the state, the duck farming is not coming up to the mark due to the hazards caused by various diseases. Dreadful viral diseases like duck virus enteritis and duck virus hepatitis etc cause severe havoc to this industry from time to time due to its high mortality^{2,10}. The present paper deals with the incidence and detailed pathological changes of naturally occurring duck plague in Assam.

The ducks that died during outbreaks in the State of Assam in general and duck-rearing areas of the Kamrup district in particular during the period from August' 2003 to June' 2005 were collected for the study. Detailed information regarding history, previous incidence of diseases, morbidity and mortality rate, sex, breed, age, seasons, etc were recorded. Postmortem examination of all the carcasses was made and gross lesions observed were systematically recorded. Representative tissue samples irrespective of presence of gross lesions were collected in 10 per cent formalin solution and processed for histopathological study by conventional paraffin embedding technique⁸. Pieces of liver and spleen were collected from outbreaks of duck plague, wherever possible, in 50 per cent phosphate buffer glycerin saline (PBGs) for virus isolation by inoculating into 9-12 days old duck embryos as per the recommended methods⁶. Serum samples were collected in sterile test tubes from

suspected duck plague outbreaks and serological tests viz. agar-gel precipitation test (AGPT) and counter-current immunoelectrophoresis (CIE) were performed.

The incidence of duck plague was recorded to be 21.7 per cent. A total of 374 ducks died due to duck plague; 28 of these were associated with secondary bacterial infections mostly *E. coli*, *Streptococci* spp, *Staphylococci* spp and *Pneumococci* spp.; 44 with aflatoxicosis; 18 with duck pox, 12 with zygomycosis and 2 with *Fimbriaria fasciolaris* and *Echinostoma revolutum* species of parasites.

The clinical signs included greenish watery diarrhoea, mucous discharge from mouth, droopiness, soiled vent and inappetence. In most of the cases, it has been observed that there was deposition of caseous materials in the eyelid, which led to the half closed, pasted eyelids. Lameness was one of the major signs observed in almost all the cases. Most of the carcasses were emaciated and dehydrated.

Grossly, the vascular changes were invariably seen in different visceral organs including brain comprising congestion and haemorrhages, which resembled the previous observation^{7,10}. Characteristic 'paint brush' appearance of the heart was observed in a few cases due to closely packed petechiae over epicardium within the coronary groove. Focal haemorrhages were observed in endocardium in some ducks. The longitudinal folds of the esophagus showed presence of thick-white patchy diphtheritic membrane mostly in the adult birds. Similar type of lesion was found in cloaca also. The formation of diphtheritic membranes in these locations was considered to be pathognomonic gross lesions for duck plague, as these were also observed by some earlier

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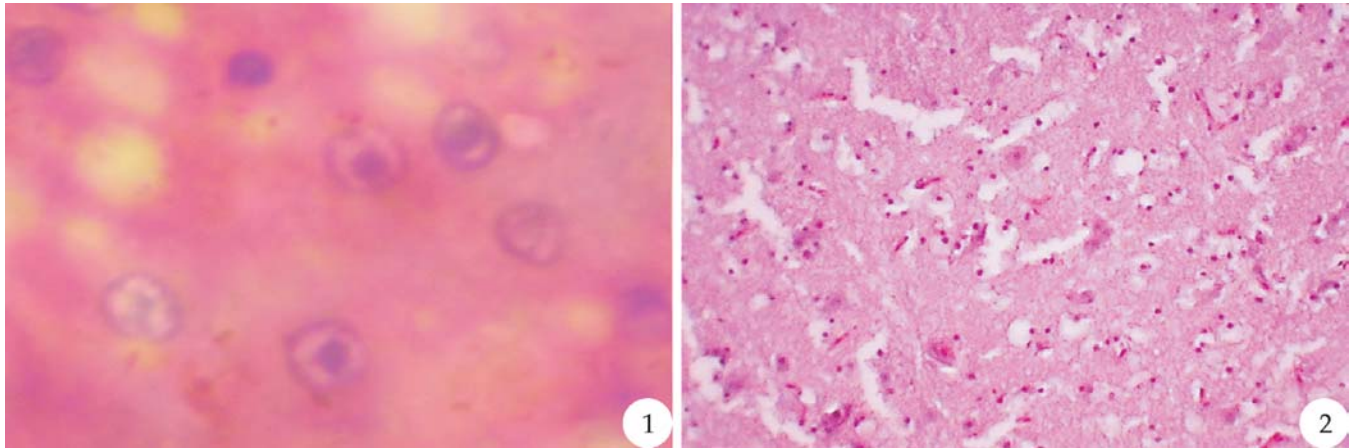


Fig 1. Intranuclear inclusion body in the hepatocyte with a clear halo. HE x1000. **Fig.2.** Photograph showing neuronophagia and gliosis. HE x100.

workers^{1,3,7,10,11}. In few cases, the intestinal annular bands were haemorrhagic and appeared as intensely reddened rings that were visible from the external and internal surfaces. The liver was consistently enlarged with multiple necrotic foci. In laying flocks, the ovaries were misshapen and often congested and haemorrhagic. Few parasites were also recovered from the small intestine at the time of the post mortem examination, which were later identified as *Fimbriaria fasciolaris* and *Echinostoma revolutum*. Present study also revealed haemorrhages and necrosis in lymphoid organs *viz.* spleen and annular bands which was in agreement with earlier workers^{1, 4,10}.

Microscopically, the prominent changes were congestion and haemorrhages of the parenchymatous organs. Liver showed varying degree of degeneration to multiple areas of focal coagulative necrosis with disruption of the hepatic cords. The necrotic changes might have occurred due to the retrograde changes of the parenchymatous organs as a result of vascular damage caused by the virus⁷. In aflatoxicosis-associated cases, the hepatic parenchyma showed fatty changes along with mild to moderate degree of biliary epithelial cell proliferation forming new bile ducts in the portal areas. The degenerated and necrotic parenchyma was infiltrated with mild to moderate degree of mononuclear cells. Heterophils were prominent in cases associated with secondary bacterial infections. Characteristic intranuclear eosinophilic inclusion bodies were noticed in the degenerated hepatocytes with clear halos^{1, 4, 5, 7,10} (Fig.1) The submucosal esophageal glands showed degeneration of the glandular epithelium. The intestinal mucosa revealed areas of haemorrhages, necrosis and ulcerations with marked infiltration of inflammatory cells mostly the mononuclear cells. The submucosal

glands were hyperplastic and dilated. Lymphocytic depletion in the splenic and bursal follicles along with areas of haemorrhages was the constant histological alterations. Histological lesions of haemorrhage and depletion of lymphocytes from the lymphoid organs were also recorded in the present study as has been observed earlier^{1,3,9,10}.

Histopathological changes of proventriculus included hypertrophy and hyperplasia of the proventricular glands, degenerative and necrotic changes of the mucosa along with sloughing of the epithelium and congestion of the interglandular blood vessels. In few cases marked fibrous connective tissue proliferation was noted surrounding the proventricular gland as well as in the submucosal and mucosal areas along with infiltration of both mononuclear cells and heterophils. The brain showed mild to moderate degree of congestion, neuronophagia and gliosis (Fig.2) with occasional perivascular cuffing. Tubular degeneration, focal tubular necrosis and severe congestion and haemorrhages were consistently present in the kidney. In the heart, sub epicardial and endocardial haemorrhages were occasionally accompanied by myocardial degeneration with or without accumulation of mononuclear cells.

The duck plague was confirmed by isolation of duck plague virus by inoculating suspected tissue materials into 9-12 days old embryonated duck eggs. Serological tests like AGPT and CIE were also performed to confirm the disease in clinically affected birds.

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