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## Occurrence of Marek's disease in the poultry population of Assam

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### Abstract

The present investigation was conducted to determine the status of the infection in the chicken population based on epidemiology status of infection in Assam India. During the period of study, outbreaks were reported from five different locations of Kamrup (Metro) district, Assam. A total of 80 cases were recorded with the presence of nodular growth, and out of these, 73 nos. showed positivity for Marek's Diseases on the pathological and molecular detection. The overall mortality percentage of MD was recorded as 5.93% indicating that the presence of Marek's disease virus infection in Kamrup (Metro) district, Assam. The mortality percentage was persistent in different age groups and highest (10.98%), mortality was recorded in 8-<12 weeks of age group followed by the 12-<16 weeks (6.51%), 16-<20 weeks (6.50%), < 8 weeks (4.80%) and > 20 weeks (2.46%). Breed/strain wise highest mortality was observed in high yielding layers viz. BV-300 and BV-380 with a rate of 7.52% and 6.88% respectively followed by backyard breeds i.e. Rainbow roaster, Kamrupa and Daothigir with a mortality of 5.07%, 4.29% and 3.81% respectively. Season wise highest mortality was recorded during pre-monsoon (7.87%) followed by monsoon (6.06%), winter (4.48%) and post-monsoon (3.10%).

**Keywords:** Assam, Marek's disease, occurrence

### 1. Introduction

Marek's disease (MD), is one of the economically important infectious diseases of poultry, first reported from Hungary in 1907. MD is caused by the highly infectious, cell-associated MD virus (MDV). MDV belongs to the genus *Mardivirus* of subfamily *Alphaherpesvirinae* that causes lymphoproliferative disease in domestic chickens [12]. The mortality ranges from 10 to 30% but sometime may reaches above 60%. Clinically, the disease occurs in two forms viz. acute form and classical form. Acute form is characterized by high level of lymphoid cell infiltration in visceral organs but may not show the paralytic symptoms. Classical form is characterized by paralysis with less neoplasia formation in affected birds [11]. Because of the rapid evolution of the virus and limited variation of vaccines, unanticipated MD outbreaks continue to occur, presenting a challenge to the poultry industry [2]. However, the vaccination does not protect birds against infection with virulent field strain of MDV, but only against the occurrence of clinical symptoms and anatomopathological changes in the internal organs [8]. The virus is shed in the environment as dander dust after maturation in the feather follicle epithelium. For this reason, this disease remains one of the most economically important diseases of poultry in all countries of the world where intensive rearing of poultry is undertaken. Although MD was initially reported and addressed earlier from Assam, the disease has re-emerged in the region since last two years causing challenges in the poultry industry.

The present study was designed to explore occurrence of MD in organized and backyard farms of Assam.

### 2. Materials and Methods

#### 2.1 Study area

The research programme was undertaken to study the occurrence and pathology of Marek's disease and characterization of circulating MDV in chicken population of Assam from

organized and backyard farms of Assam. The carcasses brought to the Department of Veterinary Pathology, AVFU, Khanapara for postmortem examination as well as carcasses collected during outbreak from different locations of Kamrup (Metro) district, Assam were included in the study. The research work was conducted in the Department of Veterinary Pathology in collaboration with the Department of Veterinary Microbiology, AVFU, Khanapara, Guwahati-22.

## 2.2 Occurrence of Marek's Disease

To study the occurrence of Marek's Disease, suspected outbreaks were attended during the period from July, 2023 to June, 2024. All the relevant epidemiological data like age, breed, mortality pattern, history, vaccination status, population etc. were recorded as per the format prepared by Department of Vety. Pathology, AVFU, Khanapara.

To study the association of age with occurrence of Marek's disease, the birds present in the farm during the outbreaks were divided into 5 groups as follows:

Age	Group
<8 weeks	I
8-<12 weeks	II
12-<16 weeks	III
16-<20 weeks	IV
>20 weeks	V

The different breed/variety of chicken included in the present study were Kamrupa, Daothigir, BV-300, BV-380, Rainbow roaster

To study the association of season with occurrence of Marek's Disease, a calendar year was divided into four seasons viz Premonsoon (March-May), Monsoon (June-September), Post Monsoon (October-November) and winter (December-February). During the period of study, the meteorological data were collected from the Regional Meteorological Centre, Barjhar, Guwahati, Assam. The seasonal mean maximum and minimum temperature and relative humidity were recorded at 8.30 a.m. and 5.30 p.m.

## 3. Results and Discussion

### 3.1 Occurrence of Marek's Disease

In the present study, outbreaks of Marek's disease from five different locations viz. Khanapara, Birubari, Sonapur, Lokhra and Amingaon of Kamrup (Metro) district of Assam.

The diagnosis of the Marek's disease was made on the basis of gross, histopathology, cytology and molecular detection of the suspected samples. Differential diagnosis was made with Avian leukosis virus infection by cytological examination and PCR.

Out of the total 1231 no. of chicken population at risk, 73 numbers of chicken due to Marek's disease with a mortality of 5.93 percent (Table 1.). The location wise mortality percentage was recorded as Khanapara (8.21%), Birubari (6.45%), Sonapur (4.70%), Lokhra (4.76%) and Amingaon (3.53%) (Table 2). The Marek's disease (MD) is an avian oncogenic lymphoproliferative infectious disease causing huge economic loss in flocks due to its high morbidity and mortality. Although there are many commercial vaccines to prevent MD, there is sub-clinical circulating and shedding of MD virus in farms <sup>[10]</sup>. In Asia, the incidence of Marek's disease based on specific viral strains and vaccination status has been reported to vary from 0.1 to 40% <sup>[9]</sup>. The present

finding is in close agreement with earlier worker <sup>[6]</sup> who had also reported the occurrence of MD as 5.5 percent. The mortality due to Marek's disease in field flock was 10-40% as reported <sup>[3]</sup>. The higher mortality percentage might be due to development of more virulent pathotypes and vaccination failure <sup>[6]</sup>. As all the birds were vaccinated against MD, the origin of infection could be attributable to an incorrect or incomplete vaccination procedure in the hatchery or to a massive viral challenge in the farm at the beginning of cycle <sup>[10]</sup>.

**Table 1:** Confirmatory cases of Marek's disease and its differentiation with avian Leukosis virus infection

Particulars	Nos.
Presence of Nodular growth in visceral organs	80
Confirm cases of Marek's disease	73
Positivity for Avian virus infection	7

**Table 2:** Occurrence of Marek's disease in different locations of Kamrup (metro) district, Assam

Location	Total nos. of birds in the flock	Total nos. of birds died	Mortality (%)
Khanapara	353	29	8.21
Birubari	279	18	6.45
Sonapur	170	8	4.70
Lokhra	231	11	4.76
Amingaon	198	7	3.53
Total	1231	73	5.93

### 3.2. Association of different factors

The occurrence of Marek's disease and its association with age, breed/strain and season were studied and recorded as follows:

**3.2.1 Age:** Age-wise, highest mortality (10.98%) was recorded in Group II i.e. 8-<12 weeks of age, followed by Group III (6.51%) i.e. 12-<16 weeks, Group IV (6.50%) i.e. 16-<20 weeks, Group I (4.80%) i.e. < 8 weeks and Group V (2.46%) i.e. > 20 weeks (Table 3). Variation of mortality percentage might be due to virus strain, lack of maternal antibodies, environmental factors, production stress etc. Similar findings were also earlier reported <sup>[1]</sup>. Although it has been explained that young birds of 2-4 months are affected with MD <sup>[7]</sup>, mortality was recorded even above 5 months of age in the present study.

**Table 3:** Occurrence of Marek's Disease in Different Age Groups

Age group	Total nos. of birds in the flock	Nos. of birds died	Mortality (%)
<8 weeks	104	5	4.80
8-<12 weeks	173	19	10.98
12-<16 weeks	261	17	6.51
16-<20 weeks	369	24	6.50
>20 weeks	324	8	2.46
Total	1231	73	5.93

**3.2.2 Breed/Variety:** The different breed/strain of chicken included in the present study were Kamrupa, Daothigir, Rainbow roaster, BV-300 and BV-380. Out of these Kamrupa, Daothigir and Rainbow roaster are backyard breed/variety and BV-300 and BV-380 are layer chicken. Highest mortality was recorded in BV-300 (7.52%), followed by BV-380 (6.88%), Rainbow roaster (5.07%), Kamrupa (4.29%) and Daothigir (3.81%) (Table 4).

Yanamala *et al.* (2021) [13] also reported higher mortality in layers in comparison to the backyard breeds. Hormonal effects and production stress might be a reason for increase in occurrence of the disease in layers.

**Table 4:** Breed/variety wise occurrence of Marek's disease

Breed/Variety	Total number of birds in the flock	Total number of birds died	(Mortality %)
Kamrupa	256	11	4.29
Daothigir	131	5	3.81
Rainbow roaster	138	7	5.07
BV-300	372	28	7.52
BV-380	334	23	6.88
Total	1231	73	5.93

**3.2.3 Season:** Highest mortality was recorded in pre-monsoon season (7.87%) followed by monsoon (6.06%), winter (4.48%) and post-monsoon (3.10%) (Table 5). The effect of season on the poultry health plays an important role in occurrence of diseases [5]. Makwana *et al.* (2018) [4] also recorded the highest occurrence of Marek's disease in Pre-monsoon. Sudden rise of temperature as well as stress induced by the hot season may create a contributive atmosphere for the transmission of the disease.

**Table 5:** Occurrence of Marek's disease in different seasons

Season	Total nos. of birds in the flock	Nos. of birds died	(Mortality %)
Pre-monsoon (March-May)	419	33	7.87%
Monsoon (June-August)	396	24	6.06%
Post-monsoon (Sept.-Nov.)	193	6	3.10%
Winter (Dec.-Feb.)	223	10	4.48%
Total	1231	73	5.93%

#### 4. Conclusion

The overall mortality percentage of MD was recorded as 5.93%. The mortality percentage was persistent in different age groups and highest (10.98%), mortality was recorded in 8-<12 weeks of age group. Breed/strain variety wise highest mortality was observed in high yielding layers followed by backyard breeds. Season wise highest mortality was recorded during pre-monsoon (7.87%) followed by monsoon, winter and post-monsoon.

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