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Prevalence and seasonal variation of certain microbial diseases in Kamrup and Kamrup (Metro) Districts of Assam

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Abstract

Effect of season in the occurrence of various infectious diseases in broiler chickens in Kamrup and Kamrup (Metro) districts of Assam were investigated. These investigations were based on post-mortem examination of birds collected from 100 different farms selected for study from across the districts during 2015-2016. To study the effects of season, year long duration was divided into four seasons as per meteorological department, Govt. of Assam. A total of 567 birds were examined from 100 different farms. The highest incidence of disease was recorded as Hydro-pericardium syndrome (16.75%) followed by Omphalitis (13.40%), Colibacillosis (11.11%), Chronic Respiratory Disease (10.93), Infectious Bursal Disease (10.58%), Bronchitis (9.88%), Necrotic Enteritis (6.35%), Bacillary White Diarrhoea (5.11%), Newcastle Disease (4.59%), Brooder Pneumonia (3.70%), Gangrenous Dermatitis (2.82%), Laryngotracheitis (2.12%), Coryza (1.59%) and Bumble foot (1.06%). The incidence of *Omphalitis*, *Colibacillosis*, *Bacillary white diarrhoea* and *coryza* were found round the year though the differences in the rate of prevalence existed. Approximately half of the HPS outbreaks were noted during Monsoon. More than half of the total Chronic Respiratory Disease (CRD) and Bronchitis cases were seen during winter. The Hydro-pericardium Syndrome (HPS) was highest during Monsoon and whereas the incidence of mortality due to Chronic Respiratory Disease (CRD) and bronchitis were highest during winter.

Keywords: Prevalence, Monsoon, *Bacillary white diarrhoea*

1. Introduction

The climate changes with the season. Season is an extremely important environmental factor that may have profound effects on occurrence of diseases in poultry. Winter often brings a chill while in the summer, temperatures may increase to their hottest of the year with extreme humidity and frequent showers. During monsoons there is heavy rainfall in the area followed by the post-monsoon season with moderate temperature. Warm temperatures speed up biochemical reactions (catabolism and anabolism) that expend energy, permitting increased activity, growth, development, and reproduction of the microbes. However, all species have upper and lower temperature limits along with other environmental components for their optimum growth. Moreover, seasonal variation in winds, vector growth and rate of dust precipitation may affect spread of diseases. Till now no detailed report is available on the seasonal variation in prevalence of microbial diseases in broiler chicken in Kamrup and Kamrup (Metro) districts of Assam. This study, therefore, was planned as a preliminary attempt to investigate the relationship between different diseases as affected by different seasons.

Materials and Methods

Present study investigates important causes of mortality in broiler flocks as influenced by seasons. The basis of data is postmortem examination of the birds on site or in the Department of Veterinary Pathology, College of Veterinary Science, Khanapara to probe causes of mortality during the period from November, 2015 to December 2016. The total record was of 567 cases from 100 different commercial broiler farms across the districts. Diagnosis was mostly based on history, clinical signs, and postmortem examination. Hemagglutination inhibition titer was evaluated for confirmation of complicated cases of Newcastle disease (ND) in some of the cases.

There are four distinct seasons in the state of Assam based on rainfall, temperature and other climatic variations. They are pre-monsoon (March to May), Monsoon (June to September), Post monsoon (October and November) and winter (December to February). On the same basis the author has divided one year into four seasons starting from November end. However, data had been recorded month-wise for uniformity of the study. Although this may not depict the true effects of low and high temperature, but would be an effective way to see the effects of monsoon (heavy rainfall in June/July/August/September with high persistent relative humidity) and winter (Characterized by low temperature and low RH during daytime and high RH during night) on various diseases which was prime objective of this study. Data were collected, compiled and analyzed following standard statistical methods.

Results and Discussion

Seasonal prevalence of various diseases in broilers is presented in table 1. The highest incidence of diseases recorded was Hydro-pericardium syndrome (16.75%) followed by Omphalitis (13.40%), Colibacillosis (11.11%), Chronic Respiratory Disease (10.93), Infectious Bursal Disease (10.58%), Bronchitis (9.88%), Necrotic Enteritis (6.35%), Bacillary White Diarrhoea (5.11%), Ranikhet Disease (4.59%), Brooder Pneumonia (3.70%), Gangrenous Dermatitis (2.82%), Laryngotracheitis (2.12%), Coryza (1.59%) and Bumble foot (1.06%). Overall average monthly disease incidence during each of the season starting from winter (December to February), pre-monsoon (March and May), monsoon (June to September) and post-monsoon (October and November) was 50.67, 19.33, 59.00, and 60.5 percent respectively. From the study it is evident that pre-monsoon months are the best period for raising broiler in terms of occurrence of microbial diseases. The study revealed that death due to microbial disease was lowest during pre-monsoon months with highest prevalence of Hydro-pericardium syndrome (16.75%), Omphalitis (13.4%), Colibacillosis (11.11%), Infectious Bursal Disease (10.58%) and Bronchitis (9.88%). Contrary to the present findings, Mahanta *et al.* (2005) observed that highest mortality of broiler chicken in Assam was during pre-monsoon followed by winter, monsoon and post-monsoon and was mostly due to pneumonia (21.1%) followed by IBD (15.8%), omphalitis (14.8%) and Ranikhet disease (11.2%). The different results of the present study might be due to emergence of Hydro-pericardium syndrome during the study period. Distribution and proportionate incidence of poultry disease of Bangladesh also revealed that the poultry diseases occurred mostly in rainy season (56.36%), followed by summer (28.11%) and winter season (15.53%) (Islam *et al.* 2003). Average monthly occurrence of the microbial diseases in all other seasons was found to be above the total average level (47.25). However, difference in occurrence of individual diseases varied from season to season.

Incidence of Omphalitis, Colibacillosis, Bacillary White Diarrhea and Coryza was almost equally distributed in all the months. All the incidences of Hydro-pericardium syndrome was found during the monsoon season only. Similar observations were recorded by in Chakwal district of

Pakistan. *E. coli* is one of the causes of omphalitis (Khalifa *et al.* 213) [7] which was a common pathogen. There was no seasonal influence on the prevalence of *E. coli* borne diseases (Omphalitis and colibacillosis) and salmonella borne diseases Bacillary White Diarrhoea which might be due to iron content of water that favoured the growth of the bacteria. The iron content of water in Kamrup district was more than 0.3mg per liter. Similar finding was reported by Chakrabarty and Sarmah (2011) [4]. While determining the water quality of Kamrup district iron is an important element for most organisms because of the crucial role it plays as a co-factor in iron-using proteins. Such proteins are involved in respiration, tricarboxylic acid (TCA) cycle, photosynthesis and DNA synthesis (Andrews *et al.*, 2003) [2]. Thus, it was not surprising that iron was the most important metal in bacteria (Outten *et al.*, 2003) [9]. Almost half of the cases of Infectious Bursal Disease was observed during postmonsoon followed by winter months. The incidence of IBD was very high despite vaccination. It might be because of vaccine failure which might be due to vaccine type, storage and handling; condition of the birds and maternal antibody level and administration of vaccine (Godwin, 2001) [5]. Chronic Respiratory Disease was more prevalent during winter months though incidences were observed round the year. Clostridia borne diseases (Necrotic enteritis and Gangrenous dermatitis) and bumble foot were distributed almost entirely during the monsoon and postmonsoon. It might be due to faster growth and sporulation of the organisms at a favourable temperature and increased moisture absorption by the litter during monsoon.

Brooder pneumonia was observed during the winter season only in the region. Similar finding was reported by Uddin *et al.* (2010) [10] in the Sylhet region of Bangladesh. The reason might be due to the dustiness of the saw dust and low humidity during winter which produces dust due to low humidity during winter. The fungus *Aspergillus fumigatus* develops and sporulates easily in poor quality bedding or contaminated feedstuffs in indoor farm environments. Inadequate ventilation and dusty conditions increased the risk of bird exposure to aerosolized spores (Arne *et al.*, 2011) [3]. Almost all the cases of laryngotracheitis were found to occur during winter.

Respiratory infections (Bronchitis, Laryngotracheitis, Coryza, CRD), as a symptomatic group, was more prevalent (5.35%) during winter months whereas average monthly occurrence of enteric infections (Ranikhet disease, Bacillary white diarrhea, Omphalitis, colibacillosis, and Necrotic enteritis) were found to be more (4.41%) during monsoon. Nearly 41.94% of the total Chronic Respiratory Disease cases were found during December to February, while most of the Bronchitis cases (55.36%) were noted during Oct-Feb. Coryza was found to be prevalent throughout the year in a similar pattern. Abbas *et al.* (2015) [1] also reported similar findings in Khushab district of Pakistan.

The Hydropericardium syndrome was the most prevalent disease (16.75%) during the study period followed by omphalitis (13.4%) and Colibacillosis (11.11%). CRD (10.93%) and IBD (10.58%). The CRD was most prevalent during winter while occurrence of IBD was highest during postmonsoon months.

Table 1: Seasonal Prevalence of certain infectious diseases in broilers.

Sl. No	Disease	Winter				Pre-monsoon				Monsoon					Post-monsoon			Grand Total (%)
		Dec	Jan	Feb	Total	Mar	Apr	May	Total	Jun	Jul	Aug	Sep	Total	Oct	Nov	Total	
1.	Ranikhet disease	1	0	0	1	0	1	1	2	3	5	7	4	19	2	2	4	26(4.59)
2.	Infectious Bursal Disease	7	4	2	13	1	0	0	1	0	0	0	2	2	18	26	44	60(10.58)
3.	Bronchitis	12	10	9	31	1	0	0	1	0	0	1	3	4	9	11	20	56(9.88)
4.	Laryngotracheitis	5	4	2	11	0	0	0	0	0	0	0	0	0	0	1	1	12(2.12)
5.	Hydropericardium Syndrome	0	0	0	0	0	1	2	3	16	25	32	18	91	1	0	1	95(16.75)
6.	Omphalitis	7	7	6	20	6	5	6	17	6	7	4	6	23	9	7	16	76(13.40)
7.	Colibacillosis	7	12	4	23	1	3	7	11	6	5	4	4	19	5	5	10	63(11.11)
8.	Necrotic Enteritis	0	0	0	0	0	0	0	0	4	12	11	5	32	2	2	4	36(6.35)
9.	Bacillary White Diarrhea	1	2	2	5	2	4	5	11	6	0	0	1	7	4	2	6	29(5.11)
10.	Chronic Respiratory Disease	13	8	5	26	4	3	2	9	3	4	3	7	17	4	6	10	62(10.93)
11.	Coryza	1	1	0	2	1	1	0	2	1	1	2	0	4	0	1	1	9(1.59)
12.	Gangrenous Dermatitis	1	0	0	1	0	0	0	0	3	2	4	2	11	3	1	4	16(2.82)
13.	Bumble Foot	0	0	0	0	1	0	0	1	0	2	2	1	5	0	0	0	6(1.06)
14.	Brooders Pneumonia	12	5	2	19	0	0	0	0	0	0	1	1	2	0	0	0	21(3.70)
	Total	67	53	32	152 (26.80)	17	18	23	58 (10.2 2)	48	63	71	54	236 (41.62)	57	64	121 (21.34)	567(100)

Conclusion

There was seasonal variation in prevalence of certain microbial diseases in broiler chicken. The best season to raise broiler in Kamrup districts of Assam was found to be pre-monsoon months in terms of microbial diseases. The incidence of diseases was highest during monsoon season. Seasonal variation in disease occurrence was observed for several diseases and hence appropriate seasonal measures must be taken to overcome the diseases.

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