



Prevalence of Infectious and Non-Infectious Diseases in Different Age Groups of Commercial Layer Chicken in Feni District, Bangladesh

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SUMMARY

The pattern of occurrences of poultry diseases in commercial layer farms was studied based on post mortem and other examination of 135 cases either dead or live birds during the period of June to December, 2009 in the district of Feni. In the study highest number of cases of diseases found Salmonellosis (22.79%), Fowl cholera (15.44%), Colibacillosis (10.29%), Necrotic enteritis (08.82%), IBD (08.82%), ND (8.08%), Coccidiosis (9.62%), Lymphoid leucosis (2.20%), Egg Peritonitis (5.15%), Cannibalism (2.94%), Vitamin E deficiency (1.47%) and heat stroke (2.20%). It was very obvious from conducted study that all age groups of birds are susceptible to various diseases but the laying period is most vulnerable, and most mortality of chickens are caused by Salmonellosis, Colibacillosis, Fowl cholera, Infectious bursal disease, Newcastle disease and Necrotic enteritis. The findings indicated that infectious diseases appear to be a major constraint for development of commercial layer farms in Bangladesh which demands immediate attention for prevention and control for assuring the most progressive industry.

Key Words: Infectious, Diseases, Age, Layer, Chicken

ÖZET

Bangladeş Feni İlçesinde Farklı Yaş Gruplarındaki Ticari Yumurtacı Tavuklarda Bulaşıcı Olan ve Bulaşıcı Olmayan Hastalıkların Prevalansı

Bangladeşin Feni ilçesinde bulunan ticari yumurtacı işletmelerinde nekropsi ve diğer teşhis yöntemleriyle kanatlı hastalıklarının dağılımı araştırıldı. Bu amaçla 2009 yılının Haziran-Aralık ayları arasında ölmüş ve canlı olarak toplam 135 kanatlı örneği incelendi. Çalışmada sırasıyla salmonellosis (%22.79), kanatlı kolerası (%15.44), kolibasillozis (%10.29), nekrotik enteritis (%8.82), gumboro (%8.82), Newcastle (%8.08), koksidiyozis (%9.62), Lenfoid lökoz (%2.20), yumurta peritoniti (%5.15), kanibalismus (%2.94), E vitamini eksikliği (%1.47) ve sıcak çarpması (%2.20) vakaları tespit edildi. Araştırmada incelenen kanatlıların tüm yaş gruplarının çeşitli hastalıklara karşı duyarlı olmaları yanında salmonellozis, kolibasillozis, katlı kolerası, gumboro, Newcastle hastalığı ve nekrotik enteritisten kaynaklanan ölümlerin en savunmasız dönem olarak tespit edilen yumurtlama periyodunda olması dikkati çekti. Elde edilen bulgulara göre Bangladeş ticari yumurtacı işletmelerinin gelişimi açısından bulaşıcı hastalıklar önemli bir engel olarak görünmektedir. Bu sektörün ilerleyebilmesi için söz konusu hastalıkların önlenmesinin ve kontrolünün en acil eylem planı olması gerektiği kanaatine varıldı.

Anahtar Kelimeler: İnfeksiyöz, Hastalıklar, Yaş, Yumurtacı, Tavuk

INTRODUCTION

In Bangladesh, commercial poultry farming has been developed from the last few years, where high yielding strains of chickens are reared in an intensive system. Despite existing favourable agro-climatic conditions, the blooming poultry industry is witnessing a series of problems due to outbreaks of infectious and non-infectious diseases, resulting in mortality which brings high economic losses (Rashid et al., 2013). This is highly sensitive and risk oriented venture and plays a significant role in poverty alleviation and economic development of

Bangladesh. Poultry meat contributes approximately 37% of total animal protein supplied in the country (Rahman and Rahman, 1998). Commercial layer farming with high yielding strains of chickens has expanded rapidly in different areas of the country to satisfy market demands for poultry meat and eggs by the mostly urban, municipal and rural populations. Notwithstanding, the producers are facing numerous problems in farm operations and management (Arbelot et al., 1997). Diseases are considered as the major factor of poultry industry development in Bangladesh causing 30% mortality of

chicken per year (Bhattacharjee et al., 1996).

Among the poultry diseases Newcastle diseases (ND), Infectious Bursal disease (IBD), Avian Colibacillosis (*Escherichia coli* infection), Fowl cholera (FC), Mycoplasmosis, Coccidiosis have been reported in various districts of Bangladesh (Kelly et al., 1994; Chrysostome et al., 1995; Khan et al., 1998; Islam et al., 2006; Hossain et al., 2010). Newcastle disease was common fatal viral diseases for native and commercial poultry in Bangladesh (Talha et al., 2001). Infectious Bursal disease (IBD) is a highly contagious, worldwide occurring viral poultry disease and was first reported in 1992 in Bangladesh with high morbidity and mortality (Mushi et al., 1999). Salmonellosis is one of the most important diseases in poultry that cause serious economic loss due to mortality and reduced egg production (Kumar et al., 1998). Fowl Cholera can affect birds of any age, but it rarely occurs in commercial poultry of less than 8 weeks of age (Rahman and Rahman, 1998). Avian Colibacillosis (*Escherichia coli* infection) is a major infectious disease of all ages of chickens and affects the reproductive tract resulting failure of egg productivity and fertility (Sikder et al., 2005). The most vulnerable age group of layer chickens was laying period followed by growing and puller period (Bhattacharjee et al., 1996; Kumar et al., 1998) where reported Gumboro disease (21.97%) in 0 to 4 weeks of age and Colibacillosis (33.36%) in 0 to 6 weeks of age are the main cause of death of chickens. Salmonellosis can transmit both horizontally and vertically and remain in the flock constantly as subclinical form (Bencina et al., 1988).

Feni is a small south-eastern district of Bangladesh bordering (clockwise from the north) Indian state Tripura, Chittagong district, the Bay of Bengal, Noakhali district and Comilla district of Bangladesh. Since 1990s, commercial chicken farming was getting popular in Feni and now it has emerged as one of the growing poultry belt in Bangladesh. Though there are plenty of farms were established here, lack of scientific farming knowledge, proper bio-security, and lack of epidemiological research hindering this industry. Therefore, the present study was undertaken to determine the trends of infectious and non-infectious diseases affecting commercial layer birds in the study area.

MATERIALS and METHODS

The study was conducted to observe the prevalence of different diseases of layer chicken at Feni district of Bangladesh. A total of 135 either dead or sick layer chickens were brought to the upazila veterinary hospital and field diseases investigation laboratory (FDIL), Feni from various layer farms of Feni district during the period of June through December 2009. The diagnosis of different diseases was done based on the history of the flock, age of affected birds, clinical signs and symptoms, post mortem lesions for respective diseases. All viral diseases were diagnosed based on necropsy with characteristic pathognomonic lesions, bacterial diseases were confirmed by isolation and identification of causal agents by microbiological procedures. Protozoal diseases were confirmed by cecal smear and non-infectious diseases were diagnosed by necropsy and clinical histories obtained from the farmers. Data were collected with special emphasized on age of birds. The bird was examined systematically and the observed post-mortem changes were recorded during necropsy. All disease and epidemiological data were entered into a spreadsheet program (Excel 2007; Microsoft Corporation) and transferred to SPSS 16 (SPSS South Asia Pvt. Ltd.,

Bangalore-560043) statistical software for data analysis and summary.

RESULTS

Of the 135 layer birds, 125 (91.91%) were infectious and 9 (6.62%) were non-infectious cases. The highest case of diseases were recorded in laying period (59.56%), followed by grower (24.26%) and pullet (16.18%) birds. Prevalence of layer chicken diseases at Feni district of Bangladesh was shown in Table 1. The highest number of cases were recorded in the laying birds age group 20-72 week (59.56%), followed by 0-8 weeks age group (16.91%), 9-20 weeks age group (15.44%), of poultry. Among the viral diseases, IBD and ND constituted 8.82% and 8.08% of total mortality, respectively. Outbreaks of both ND occurred mostly in the 20-72 weeks age group and then 8-20 days age group followed by other age groups (Table 1). IBD was recorded highest in grower birds 0-8 weeks of age group (6.62%) followed by pullet birds (2.20%) and not found in laying stage. Other than ND and IBD, Lymphoid leukosis was recorded in laying birds 20-72 weeks age group (2.20%) and not found in grower or pullet birds. Most of the flocks where IBD were recorded are vaccinated. Our findings predicted that, the vaccination program maintained by the farmers may not giving proper immunization effectively to protect the birds. The present findings would indicate that the reemergence of ND in commercial flocks is still a threat to the poultry industry inspite of availability use of ND vaccines. It is important to be investigated if the re-emergence of ND is due to vaccination failure or any other factor.

Apart from viral infection among the other diseases, it was observed that Salmonellosis (22.79%), Fowl cholera (15.44%), Colibacillosis (10.29%), Necrotic enteritis (8.82%), and Egg peritonitis (5.15%), were the major causes of poultry diseases. Other common diseases were Mycoplasmosis (2.20%), Coccidiosis (9.62%) respectively. Among non-infectious diseases cannibalism, vitamin E deficiency and heat stress were common in laying stage (5.88%) of layer birds.

DISCUSSION and CONCLUSION

In the study highest numbers of cases of disease was recorded during laying period (59.56%) followed by growing stage (24.26%) and lowest in pullet (16.18%) birds. These findings disagree with the earlier report (Kumar et al., 1998) that recorded highest mortality of chickens was 71.92% in layer, followed by 21.01% in grower and 7.09% in pullets. It was likely due to persistent and high ambient temperature and geographical position which might play role in diseases trends of the present study.

Diseases wise analyses revealed that 13 different infectious and non-infectious causes have been recognized to be associated as the causes of mortality in layer chickens. The leading causes of mortality in layer are Salmonellosis which contributed to 23% of total death. The most vulnerable age group of layer chickens was laying period followed by growing and puller period which are not in conformity with the earlier reports (Bhattacharjee et al., 1996; Kumar et al., 1998) who recorded Gumboro disease (21.97%) in 0 to 4 weeks of age and Colibacillosis (33.36%) in 0 to 6 weeks of age are the main cause of death of chickens. This finding is supported by earlier researchers (Sikder et al., 2005; Hossain et al.,

2010) who observed 37.6%, 43.4%, 23.8% and 23.46% prevalence of Salmonellosis in layer chicken, respectively. The prevalence was also can varied in terms of age groups. Diseases trends increase with the age of birds which supports the findings of earlier researcher (Sikder et al., 2005).

In spite of maintaining regular vaccination schedules, ND is still a great threat to the poultry industry of Bangladesh and a number of outbreaks have been recorded even in vaccinated chicken flocks. One of the causes for outbreaks

in vaccinated chickens might be the introduction of new ND virus strains against which the local birds have no or very low immunity, leading to vaccine failure. Other factors like poor vaccine quality is a common problem in developing countries and can be the result of poor manufacturing standards, lack of adequate storage facilities, application of expired vaccine batches, faulty application and vaccine handling during transportation (Rashid et al., 2013).

Table 1. Occurrence of diseases in layer birds in correlation with age

Sl. no	Diseases	Grower (up to 8 weeks)	Pullet (9-20 weeks)	Layer (>20 weeks)	Total no. of diseases
A.	Infectious Diseases	23 (16.91)	21 (15.44)	81(59.56)	125 (91.91)
	<u>Viral Diseases</u>	11 (8.09)	5 (3.68)	10 (7.35)	26 (19.12)
1	New Castle Disease	2 (1.47)	2 (1.47)	7 (5.14)	11 (8.08)
2	Infectious Bursal Disease	9 (6.62)	3 (2.20)	--	12 (8.82)
3	Lymphoid Leukosis	--	--	3 (2.20)	3 (2.20)
	<u>Bacterial Diseases</u>	11 (8.09)	12 (8.82)	62 (45.59)	85 (62.5)
4	Salmonellosis	5 (3.68)	4 (2.94)	22 (16.17)	31 (22.79)
5	Fowl Cholera	--	1 (0.74)	20 (14.71)	21 (15.44)
6	Colibacillosis	6 (4.41)	5 (3.68)	3 (2.20)	14 (10.29)
7	Necrotic Enteritis	--	02 (1.47)	10 (7.35)	12 (8.82)
8	Egg Peritonitis	--	--	7 (5.14)	7 (5.15)
	<u>Mycoplasma Diseases</u>	1 (0.74)	2 (1.47)	--	3 (2.20)
9	Mycoplasmosis	1 (0.74)	2 (1.47)	--	3 (2.20)
	<u>Protozoal Diseases</u>	10 (7.40)	2 (1.47)	1 (0.74)	13 (9.62)
10	Coccidiosis	10 (7.40)	2 (1.47)	1 (0.74)	13 (9.62)
B.	Non-infectious Diseases	00	1 (0.74)	8 (5.88)	9 (6.62)
1	Cannibalism	--	1 (0.74)	3 (2.20)	4 (2.94)
2	Vitamin E Deficiency	--	--	2 (1.47)	2 (1.47)
3	Heat stroke/stress	--	--	3 (2.20)	3 (2.20)
	Total diagnosed	33 (24.26)	22 (16.18)	81 (59.56)	136

Infectious Bursal disease had been recorded 12 cases where 87% cases were found during growing period which can hamper the growth of pullets and of a great concern of IBD vaccination. Prevalence of Mycoplasmosis in commercial layer chickens showed that MG infection poses a major problem for chickens reared in commercial poultry farms and Government farms. Prevalence of Mycoplasmosis seems very lesser in our study; only three cases had been detected. This may be due to the adding of anti-mycoplasma drugs onto the feed and considerable awareness among the farmers as its very important disease from the point of economic view. Our findings concordant with previous reports from several countries of the world including Benin, Botswana, India, Malaysia, Senegal, Zambia, and Zimbabwe (Kelly et al., 1994; Chrysostome et al., 1995; Shah-Majid, 1996; Arbelot et al., 1997; Pandey and Hasegawa, 1998; Mushi et al., 1999).

Heat stress and water deprivation also lead to production of steroids and thus resultantly immune suppression (Sil et al., 2002). Quality of water which is offered to the birds was also found questionable which might hamper the development of specific immunity possibly due to acid base imbalance. Unsuitable vaccination schedule also leads to the neutralization of maternally derived antibodies and resultantly making the birds more susceptible to the

infection. In the present study prevalence of Coccidiosis have been recorded 13 cases (9.6%) where growing and laying stage had the similar chance to get infected. In fact Coccidiosis controlling in layer birds is not quite easy job for its wide range of infections habit and nature of the organism but in the study, we had found farmers usually added coccidiostats in the feed and water.

Fowl cholera was recorded 15%, had shown most frequently affected the birds in laying periods and absent in early stage of the birds. This finding supports an earlier report (Bhattacharjee et al., 1996), who reported 2.77% death due to Fowl cholera during laying stage and which is six times higher than grower period. During our study, it was extensively observed that, Necrotic enteritis can also affect the total production performance of the farm. It could dramatically fall the egg production which was obvious and seems to be another economically significant diseases for the layer chicken. Among the egg laying birds, egg peritonitis was recorded 5.15% which was found to be 2.5% lesser than those of the earlier report (Bhattacharjee et al., 1996), who recorded 16.77% deaths due to egg peritonitis in the laying period in age from 20 weeks to rest of the age.

In conclusion, it may be mentioned that layer chicken aged between 20-72 weeks of age are most vulnerable to

various diseases, and the most prevalent diseases like IBD, ND, Lymphoid leukosis, Salmonellosis, Fowl cholera, Colibacillosis, Necrotic enteritis, Mycoplasmosis, Coccidiosis, Cannibalism, Vitamin E deficiency and heat stroke demand immediate attention for prevention and control.

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