

PREVALENCE OF COCCIDIOSIS IN SONALI BIRDS IN SIRAJGONJ DISTRICT OF BANGLADESH

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ABSTRACT

The study was conducted to ascertain the prevalence of coccidiosis in Sonali birds in Sirajgonj district of Bangladesh during the year 2015–2016. Diagnosis was made on the basis of history, clinical and post mortem findings. A total of 660 samples (sick and dead birds) were examined where 234 (35.45%) samples were found positive for coccidiosis. The highest prevalence percentage was found in July (53.33%) and the lowest percentage was found in January (16.67%). Birds aged 5 to 6 weeks showed more prevalence percentage (47.50 %), whereas older birds (> 16 weeks) found less susceptible (10%) to coccidiosis. Coccidiosis was slightly more prevalent in female (37.70%) than male (32.22%).

Keywords: Coccidiosis, Sonali birds, prevalence, Sirajgonj.

INTRODUCTION

Bangladesh is a densely populated country having 161 million people. They mostly rely on livestock and poultry for their protein requirement. The demand for meat is 7.05 million metric ton, and of egg is 16744 million in number. But, due to inability of the country's total livestock and poultry population to produce the required quantity of these products, there is a shortfall. The deficits of the meat is 0.9 million metric ton, and of the eggs is 4831.60 million a year (DLS, 2016). Additionally, people of this country are accustomed to have meat from our indigenous chicken; thus, many of them, with a claim of less taste, are reluctant to take hybrid chicken like broiler. The situation that prevailed in the country directed Bangladeshi researchers to develop a breed having meat's taste similar to our indigenous birds. The Sonali birds introduced in 1996–2000 in Northern part of Bangladesh through SLDP (Smallholder Livestock Development Project) and PLDP (Participatory Livestock Development Project) is a cross-breed of Rhode Island Red (RIR) cocks and Fayoumi hens having similar phenotypic appearance of local chickens of Bangladesh (Uddin *et al.*, 2015). It constitutes about 35 percent of the country's total commercial broiler and layer production (Huque, 2011). Because the Sonali chickens are well adapted in the environmental conditions of Bangladesh, it requires less care and attention, and hence easier for women to rear (Saleque and Saha, 2013). However, these birds are vulnerable to several threats including coccidiosis. Coccidiosis is a protozoan disease of poultry caused by single-celled protozoan parasites of the genus *Eimeria*. The disease is more severe in Sonali birds where the rate of morbidity and mortality is high. It is characterized by dysentery, enteritis, diarrhea which may be bloody with certain *Eimeria* species, emaciation, lowered feed conversion rate, delayed sexual maturity, drooping wings, poor growth and low production (Rehman *et al.*, 2010; Awais *et al.*, 2012) with attendant high mortality and morbidity rates (Shirzad *et al.*, 2011). The most common and pathogenic species that affects the poultry industry globally is the *E. tenella* (Ayaz *et al.*, 2003) with 100% morbidity and a high mortality due to extensive damage to the digestive tracts of chickens (Hadipour *et al.*, 2011). Mortality rates are usually high in young chicks, because most of the *Eimeria* species affect birds between 3 and 18 weeks of age (Nematollahi *et al.*, 2009; Dakpogan *et al.*, 2013). Depression of production, in addition to chicken death, is the cause of economic loss which depends on disease prevalence. Prevalence is the number of existing cases of a disease or occurrences of an event during a particular period. Prevalence is expressed as a proportion in which the number of events is the numerator and the population at risk is the denominator. Prevalence of coccidiosis in this area refers to the total number of cases occurred throughout the study period in total Sonali population of Sirajgonj, Bangladesh.

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Sirajgonj district is situated in Rajshahi Division of Bangladesh where the number of Sonali birds is increasing rapidly, and it has become both a source of income generation for farmers and a way of providing protein for the people. However, no research has been undertaken to know the prevalence of coccidiosis in this birds of this district. Thus, this study was aimed at determining the prevalence of coccidiosis in Sonali birds in Sirajgonj district of Bangladesh.

MATERIALS AND METHODS

Study area and duration

The study was conducted in all nine upazilas of Sirajgonj district of Bangladesh during July 2015–June 2016. Its geographical coordinates are 24°27'0" North, 89°43'0" East. Sirajgonj has an area of 2,498 Sq.km (964 sq miles) including riverine areas, and it represents around 1.7 percent of the total area of Bangladesh. The annual average temperature of the district reaches a maximum of 34.6 °C, and a minimum of 11.9 °C. The annual rainfall is 1610 mm (63.4 inches). The average relative humidity is 72.77 %.

Study animals, population and sampling

The study was performed in Sonali chickens dividing them in three age groups raised in intensive management system. Both sexes were considered in this study. About 660 flocks from nine upazila were examined each having approximately 500 to 2500 birds. A total of 660 samples (sick and dead birds), in addition to the feces, were taken and subjected for further study. The size of the samples from different upazila was determined on the basis of the size and density of poultry population of that upazila.

Examination of the samples

After recording patient details e.g. age, sex, morbidity, mortality, and clinical findings, all dead birds were subjected to routine postmortem examination. Visceral organs were thoroughly examined for gross pathological changes at the District Veterinary Hospital, Sirajgonj, Bangladesh. All parts of intestine were examined carefully for the presence of lesions, blood and cecal-core formation. Intestinal scrapings were collected and examined under the microscope for the presence of oocyst and asexual forms of *Eimeria*. The fecal samples were examined by the flotation method using saturated solution of sugar (Sharma *et al.*, 2013; Gharekhani *et al.*, 2014) for the identification of oocyst. For the oocyst to quantify, the modified McMaster technique was employed. Sporulations were performed by placing the samples in Petridishes, with a 2.5% potassium dichromate solution at room temperature airing daily for up to two days (Gari *et al.*, 2008). The species of *Eimeria* were determined based on morphology of oocysts, sporocysts (shape, color, form index, micropyle, and presence or absence of residual body) and time of sporulation (Soulsby, 1982).

RESULTS AND DISCUSSION

In this study, the overall prevalence rate was found to be 35.45. This is lower than findings reported by Jatau *et al.* (2012) in Zaria, and Olanrewaju and Agbor (2014) in Abuja, Nigeria which were 37.1% and 69% respectively. But, it is higher than 11.4%, 14% and 31% as reported by Grema *et al.* (2014) in Gombe, Adamu *et al.* (2008) in Sokoto state and Lunden *et al.* (2010) respectively. However, this finding is similar to the prevalence rate of 36.6% observed by Dakpogan and Salifou (2013). The variation in the findings might be due to different factors, such as sampling periods, sample size, geographical area, density of the population, and climatic conditions prevailing in the study area. The prevalence rate of coccidiosis in younger (1-4 weeks), grower (5-16 weeks), and adult birds (>16 weeks) was 23.75%, 47.50% and 10% respectively (Table 1). The rate is higher in grower than adult and chick. Khaled *et al.* (2016) found higher rate of coccidiosis in growing birds. The result was agreed with other researchers (Olanrewaju *et al.*, 2014; Gharekhani *et al.*, 2014; Oljira *et al.*, 2012; Muazu *et al.*, 2008, and Khan *et al.*, 2006). This higher rate of coccidiosis in the growing birds might be due to lack of maternal immunity as well as lack of previous exposure to infection. Sharma *et al.* (2013) reported higher prevalence of coccidiosis in the age group of 31-45 days. The prevalence rate of coccidiosis in younger (1-4 weeks) birds is found higher than older birds. This result is agreed with the findings of Omer *et al.* (2011) who reported that all

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ages of birds are susceptible to coccidiosis, but younger birds are more susceptible to infection than older birds usually because of keeping them under deep litters made of wood shavings for several weeks during the brooding period when the chance of oocysts ingestion is high. On the contrary, it is lower than in grower birds since it is getting protected for up to 15 days post hatching. The older birds are resistant to infection due to development of immunity from first infection and hence, this rate (10%) is the lowest among the groups.

The prevalence rate of coccidiosis was found to be relatively higher in female (37.70%) than male (32.22%) birds (Table1). This high rate might be due to stress during egg production and malnutrition resulting from competitive feed intake with male birds raised in the same deep litter. However, this rate is not statistically different indicating both sexes have equal chances of acquiring and becoming infected with *Eimeria* oocysts during feeding or in an outbreak scenario, which is consistent with previous studies (Oljira *et al.*, 2012; Alemayehu *et al.*, 2012; Naphade *et al.*, 2013).

This study revealed that coccidiosis occurs in all months of the year with different frequency (Table 2). The incidence rate was high in the months of July, August and September with highest in July, when the relative humidity, temperature and rainfall were 80%, 28.50 degree centigrade, and 354 mm respectively. The reversed incidence rate was observed in the months of January, February and March with the lowest in January when the relative humidity, temperature and rainfall were 51%, 18.40 degree centigrade and 14 mm respectively. So, the weather forecast of Sirajgonj district during study period showed that there was a strong relationship among the occurrence of the coccidiosis, relative humidity, temperature, and rainfall. These findings go with the findings of the other researchers (Haug *et al.*, 2008; Bachaya *et al.*, 2012; Sharma *et al.*, 2013; Khan *et al.*, 2006) where they stated that high humidity and rainfall caused increased number of oocyst to sporulate resulting in the increased prevalence rate of coccidiosis.

Table 1. Prevalence of coccidiosis on the basis of age and sex

Risk Factors	No. of samples examined	No. of positive cases	Prevalence rate (%)
Age (weeks)			
Young(1-4)	240	57	23.75
Grower(5-16)	360	171	47.50
Adult(<16)	60	6	10.00
Sex			
Male	270	87	32.22
Female	390	147	37.70

Table 2. Prevalence of coccidiosis on the basis of time of the year

Risk Factors	No. of samples examined	No. of positive cases	Prevalence rate (%)
January	36	06	16.67
February	57	12	21.05
March	39	12	30.76
April	102	33	32.35
May	72	18	25.00
June	81	30	37.03
July	45	24	53.33
August	63	33	52.38
September	30	15	50.00
October	39	18	46.15
November	51	21	41.18
December	45	12	26.67
Total	660	234	35.45

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