

SERO-PREVALENCE OF INFECTIOUS BRONCHITIS IN CHICKEN IN BANGLADESH

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ABSTRACT

The investigation was conducted to detect infectious bronchitis (IB) virus-specific antibody in chicken from some selected areas of Bangladesh. The indirect enzyme linked immunosorbent assay (iELISA) was performed to estimate the infectious bronchitis virus specific antibody. In case of sera-samples collected from BRAC diagnostic laboratory, Gazipur, 100% sera samples were found to be positive to IBV; the highest antibody titres were recorded as 9867.29. The average antibody titre of samples from Anis Poultry Farm, Pabna and farms driven by beneficiary of SDC, Faridpur and layer chickens reared with the help of BEES, Hobigonj were recorded as 1234.38, 1076.94 and 4572.85 and percent of sero-positive cases were 56.67%, 43.33% and 92.50% respectively. In this study all breeds of chicken (non descriptive indigenous and commercial) and age groups were found equally susceptible to IB.

Key words: Sero-prevalence, Infectious bronchitis virus

INTRODUCTION

In Bangladesh, Avian Infectious Bronchitis (IB) was first evidenced by Bhattacharjee *et al.* in 1996 in Central Poultry Farm, Mirpur, Dhaka. The disease is of considerable economic importance as it causes chick mortality, decline in egg production, reduction of egg quality and hatchability, slowing down of growth. It is an endemic disease in probably all countries that raise chicken and a major respiratory virus, though its replication is also dispersed to kidney, oviduct and alimentary tissues of chicken (Cavanagh, 2003). The Infectious Bronchitis virus is an enveloped Coronavirus under *Coronaviridae* family. Chickens, especially those of only a few days or weeks of age, exhibit nasal discharge, snicking, watery eyes and lethargy. Juvenile and mature birds suffer less from IBV infection although the economic consequences of infection in egg laying stock can be disastrous, as egg production drops precipitously and usually does not rise back to normal in the flock as a whole (Cavanagh and Naqi, 2003). IBV possesses many distinct serotypes (Massachusetts-Mass, Connecticut-Conn, Arkansas-Ark, Georgia, Delaware-De/072/92 and California) and due to serotype variation, immunity following infection or vaccination with one serotype often is not protective against infection with unrelated serotypes (David *et al.*, 1998). IBV occurs in large and small scale commercial poultry farms and native chickens in Bangladesh (Biswas, 2004); among the etiological agents (Egg drop syndrome 76, Infectious bronchitis, Newcastle disease, Infectious laryngotracheitis and chronic respiratory disease) associated with drop in egg production (Calnek, 1997), IB might play a major role. In the context of Bangladesh there is very little information available regarding the sero-prevalence of IB to measure its endemic nature. The designed study was undertaken with an aim to detect the infectious bronchitis virus specific antibody from selected areas of Bangladesh.

MATERIALS AND METHODS

Study area

To study the sero-prevalence of Infectious Bronchitis blood was collected from chickens of different selected farms in different areas of Bangladesh namely Anis Poultry Farm, Suzanagar, Pubna, Layer chicken farms of Society Development Committee (SDC), Faridpur, Layer chicken farms of Bangladesh Extension Education Services (BEES), Chunarughat, Hobigonj and sera samples repositied in BRAC Diagnostic Laboratory, Gazipur were also used. The farming system encompasses both small scale intensive and semi-scavenging system with native and commercial layer in case of farms driven by beneficiary of SDC, Faridpur and BEES, Hobigonj (Table 1).

Preparation of sera samples

A total of 160 blood samples (without the history of IBV vaccination) were used for the preparation of sera suspected to be infected with IBV from the selected farms. Blood samples were collected aseptically from the wing vein of birds by disposable syringes. Immediately after collection, the syringes were then held in slanted position and blood was allowed to clot at room temperature and left for an hour. The clot was removed by traction.

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Serum was then carefully removed with the help of sterile syringe and needle and transferred in sterile eppendorf tube. Collected serum samples were kept in refrigerator locally if necessary and after reaching at laboratory centrifugation (at 3000 rpm for 10 minutes) was followed for clarification from erythrocytes or any debris and kept at -70°C until further use.

Indirect ELISA

The indirect enzyme linked immunosorbent assay (iELISA) was performed to estimate the infectious bronchitis virus specific antibody from the collected field sera samples according to the manufacturer's instruction using IBV pre-coated plates and pre-diluted, ready to use reagents and buffer (BioChek B.V., Holland).

Briefly, 100µl of diluted samples were added into the appropriate wells of IBV pre-coated plate and incubated at room temperature (22-27°C) for 30 minutes. Appropriate positive and negative control was maintained. After aspirating off the content the wells were washed with washing buffer and bloated dry. The plate was incubated again at room temperature (22-27°C) for 30 minutes with 100µl of conjugate reagent in each well. Then substrate reagent was added into the appropriate wells and incubated at room temperature (22-27°C) for 15 minutes after following same washing and drying procedure. To stop the reaction 100 µl of stop solution was added. The ELISA plate was read by the Microtitre plate reader in the Department of Surgery and Obstetrics, Bangladesh Agricultural University, Mymensingh.

In case of iELISA, the titre was predicted from the absorbance value of 1:500 dilution of a serum at 405 nm. The following equation relates the S/P (color absorbance value of a sample to positive ratio) of samples to an end point titre; $\log_{10}\text{titre}=1.09 (\log_{10} \text{S/P}) + 3.36$. Samples with S/P value of ≥ 0.2 (titre ≥ 834) contain anti-IBV antibodies and were considered positive. S/P value, ≤ 0.149 (titre ≤ 624) and 0.150-0.199 (titre 625-833) were considered as negative and suspected respectively.

Statistical analysis

Data (antibody titres) were analyzed using MS Excel program. Geometric mean and standard deviation to find the range of difference in titre value were calculated after entering the S/P value in the spread-sheet.

RESULTS AND DISCUSSION

The study enumerates the no. of positive cases of infectious bronchitis in different local farms (Table 1 and Figure 1-4). Among the selected areas, 100% sera samples were positive against IB virus; the highest and lowest antibody titres were recorded as 9867.29 and 1081.56 respectively for samples collected from BRAC diagnostic laboratory, Gazipur. In case of Anis Poultry Farm, Pabna 17 samples were found positive, the highest and average positive antibody titre were 2134.37 and 1234.38 respectively. Whereas 13 samples were detected positive in farms driven by beneficiary of SDC, Faridpur. The antibody titres 1529.91 and 1076.94 were found as highest and average titres. The sera samples collected from the layer chickens reared with the help of BEES, Hobigonj showed highest titre as 15390.76 and average as 4572.85. From the above findings, it is found that commercial chickens of Gazipur and Hobigonj showed the higher prevalence, it might be due to infectious bronchitis virus in high concentration is circulating in those areas.

Table 1. IB positive cases in serum samples collected from the chickens of the study areas

SL. No.	Name of the District	Name of the farm/organization	Types of farm	No. of sample	No. (%) of positive cases
1.	Gazipur	BRAC Diagnostic Laboratory	Layer	30	30 (100)
			Broiler	30	30 (100)
2.	Suzanagar Pubna	Anis Poultry Farm	Layer	30	17 (56.67)
3.	Faridpur	Layer chickens reared with the help of SDC, Sadar Branch	Layer (commercial & native)	30	13 (43.33)
4.	Hobigonj	Layer chickens reared with the help of BEES, Chunarughat	Layer (commercial & native)	40	37 (92.5)
Total sera samples				160	127 (79.38)

Sero-prevalence of Infectious Bronchitis in chicken

The overall sero-prevalence of Infectious Bronchitis found in this study is 79.38%. However, Alam *et al.* (2003) reported the seroprevalence of IB to be 92.6%, 77.83% and 58% respectively. All breeds of chicken (non-descriptive indigenous and commercial breeds) were found equally susceptible to IB irrespective of age which coincide the advocacy of Barua (2007) and Hofstad (1984). From the findings of this study along with other works undertaken related seroprevalence of IB, it can be concluded that infectious bronchitis has got endemic nature in Bangladesh.

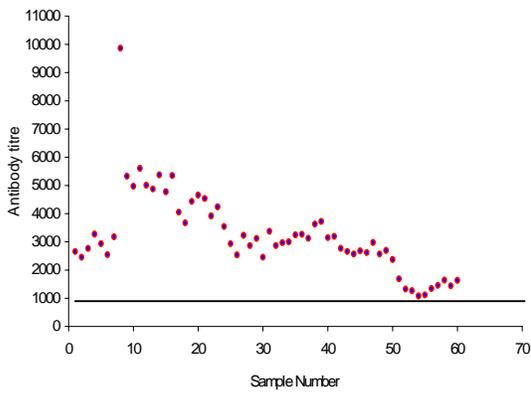


Fig. 1. Antibody titres of sera sample collected from BRAC diagnostic lab

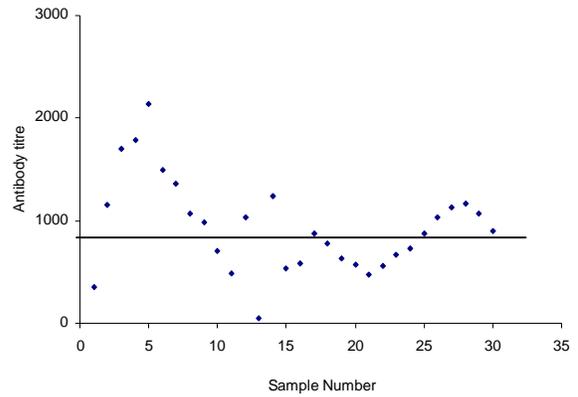


Fig. 2. Antibody titres of sera sample collected from Anis Poultry Farm, Gazipur

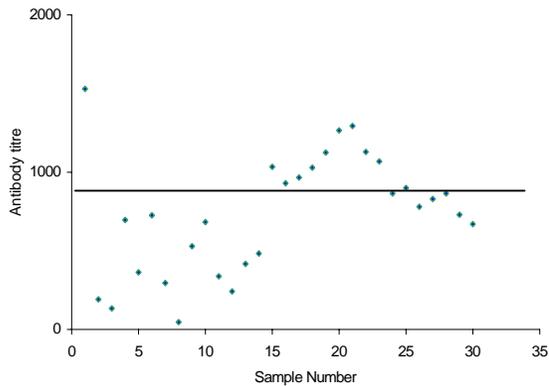


Fig. 3. Antibody titres of sera sample collected from farms of beneficiary of SDC, Faridpur

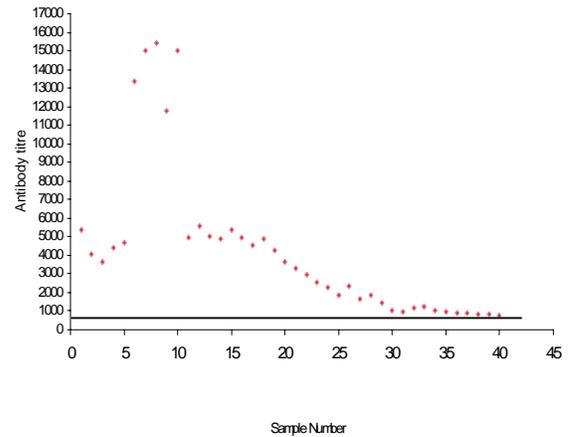


Fig. 4. Antibody titres of sera sample collected from farms of beneficiary of BEES, Hobigonj

Fig. 1-4. The horizontal line indicates the positive/negative cut off base line at the titre 834.

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