OUTBREAKS OF INFECTIOUS BURSAL DISEASE IN VACCINATED AND UNVACCINATED COMMERCIAL COCKEREL FARMS IN BANGLADESH

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ABSTRACT
Infector bursal disease (IBD) is a contagious viral disease has been reported in young broiler and layer chicken farms. Bangladesh. This communication report the outbreaks of IBD on two vaccinated (Gallus domesticus, 37.8%) and one unvaccinated commercial cockerel farms which were diagnosed on histopathological findings and assessment of ELISA antibody titre. The outbreaks of IBD occurred on two vaccinated farms in cockerels of 29 to 31 days (Farm 1) and 50 to 53 days (Farm 2), whereas 19 to 22 days old in unvaccinated (Farm 3). It caused 70.38% (Farm 1) and 75.69% (Farm 2) mortality in vaccinated and 29.26% (Farm 3) in unvaccinated cockerel farms. Clinical investigation showed waddled, dullness, depression, anorexia, visceral loss, diarrhoea, sitting and pecking of the vent, ruffled feathers, inappetence and sudden death due to dehydration. Necropsy examination revealed dehydration carcasses, enlargement and coagulation of bursa Fabrics and some cases yellowish hyperaemia, yellowish to brown, focial caseation and exudates in the bursa. Necrotic lesions especially thigh muscles showed haemorrhages in some birds. The IBD ELISA antibody titre of both the vaccinated and the unvaccinated commercial cockerel farms showed aak拌高 and the titre antibody titre of vaccinated farm 1 had 161.39.2 and vaccinated farm 2 had 57.5.82 and 14.8, whereas unvaccinated farms had 104.2 90 35. The occurrence of IBD outbreaks in both the vaccinated and unvaccinated farms indicate not any vaccination failure but also defective control strategies, which resulted heavy economic losses (85.05%) in the IBD cockerel farms. Therefore, a sound control strategy becomes important with material derived antibody with correct vaccination policy as well as good husbandry practices to control IBD in Bangladesh.

Key words: Outbreaks, Infectious bursal disease, cockerels, vaccination failure

INTRODUCTION
Poultry industry in Bangladesh has made significant progress during the last two decades and still it is considered a growing industry. Poultry meat mainly comes from local fowls, broiler and cockerels in Bangladesh. Poultry farmers usually prefer to cockerel rearing due to low cost of day-old chicks, required less food and feed. Cockerel-meat prices is higher than the broiler meat. However, the major problem in the development of poultry industry in Bangladesh is the diseases, which causes high morbidity and mortality (Bhattacharjee et al., 1996; Samad and Chakraborty, 1993; Taha et al., 2001) but recently outbreak of infectious bursal disease (IBD) has been recognised as a major constraint in the development of broiler and layer industry in Bangladesh (Chowdhury et al., 1996; Rahman et al., 1996). Review of literatures on poultry diseases reveal that IBD is one of the most important disease problem for the poultry production and management problem of cockerels has been made from Bangladesh (Sil et al., 2002). This paper describes outbreaks of IBD in vaccinated and unvaccinated cockerels with its economic impact in Bangladesh.

MATERIALS AND METHODS
Reports of sudden mortality in cockerels were received from three commercial cockerel farms during the months of October and November 2000, from the Rangamati union of Gunpur upazila, which are situated about 10 kilometer from the district town of Mymensingh. The detail investigation of these three outbreaks was carried out by visiting them intensively and by using regular information from the owners of these farms. The management systems of these farms, clinical findings, date and age of outbreaks, and mortality were recorded. The detailed investigations of schedule vaccination in relation to mortality were noted for analysis. The dead and five month old cockerel from each of the three farms were collected as soon as possible for necropsy of dead birds and blood collection from monitor birds. Swabs from heart and liver were collected for screening of the bacterial infections.

Sera were separated from the collected blood by conventional method and stored at –20 °C until tested for ELISA antibody titre. Diagnosis of IBD was made on the basis of history, clinical signs and characteristic gross lesions on the bursa Fabrics and leg muscles and assessment of ELISA antibody titre. The sera were tested for IBD antibody titre by using commercial ELISA kit (IDEXX Lab, USA). The detailed information about investment like price of day-old cockerel, feed cost and others, and the total income by sale of cockerels were noted from the owners for cost-benefit analysis.

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### RESULTS AND DISCUSSION

The mortality pattern of cockerels due to infectious bursal disease (IBD) during outbreaks in vaccinated and unvaccinated farms is presented in Table 1. The outbreak of the disease was first recorded in farm no. 1 on 10/30/2002, and 28 days later the outbreak of IBD was detected in farm no. 2, whereas the outbreak of the disease was reported from third farm immediately after five days (November 5, 2002) of the onset of IBD at the second cockerel farm (Table 1). All these three cockerel farms were located in the same areas within a kilometer. On investigation it was found that the cockerels of farms no. 1 and 2 were vaccinated against IBD with commercial live Gumboro D78® (Intervet) and against Rouselie disease with live BCRDV (Bundehaus) as per manufacturer instructions, whereas cockerels of farm no. 3 was only vaccinated against Rouselie disease with BCRDV.

### Table: Mortality pattern due to infectious bursal disease in vaccinated and unvaccinated cockerel farms.

<table>
<thead>
<tr>
<th>Vaccinated against IBD</th>
<th>Unvaccinated against IBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Age of birds (days)</td>
</tr>
<tr>
<td>02.30.02</td>
<td>29</td>
</tr>
<tr>
<td>01.01.03</td>
<td>30</td>
</tr>
<tr>
<td>04.05.03</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>315 (29.38%)</td>
</tr>
</tbody>
</table>

* a = No. of Cockerels

The mortality due to IBD in the two vaccinated cockerel farms (No. 1 & 2) was found higher (39.38% and 75.0%) in comparison to unvaccinated cockerels (30.2%) of farm no. 3 (Table 1 & 2). However, the clinical outbreak of IBD was recorded in vaccinated flock at the age of 29 days in farm no. 1 and 30 days in farm no. 2, but it was appeared earlier at 10 days old in unvaccinated cockerel of farm no. 3 (Table 1). The course of the disease could not be determined in this study because writers disposes all of the birds due to high mortality. These observations are in conformity with the earlier report of Mohnshead et al. (1996) who reported failure of vaccines to control IBD in broilers of 17 to 35 days old and in layer of up to 45 days old. It also supports the report of Sivastalan and Briaghandian (1999) who reported 20% mortality rate in vaccinated and 20% morality in unvaccinated flocks and suggested that this could be due to lack of maternal antibodies in the unvaccinated flocks and failure of vaccine. The ELISA antibody titre of the vaccinated flock (farm no. 1) varied from 89 to 250 with mean of 161 ± 59.20 (± 30) and flock no. 2 varied from 32 to 69 with a mean of 57.82 ± 18.85, whereas unvaccinated flock it was varied from 17 to 309 with mean of 104 ± 0.34 (± 2). It appears from these results that the mean ELISA titre is comparatively higher in unvaccinated birds (194 ± 90.35) than the vaccinated flock no. 1 (61 ± 59.22) and flock no. 2 (57.82 ± 18.84). But the ELISA antibody titre of both the vaccinated and unvaccinated flocks are extremely low in comparison to the protective level of 1000 against natural infection of IBDV (Hom et al., 1992). It indicates that the vaccines might have neutralized the maternal antibodies in vaccinated flocks and the maternal antibodies of the unvaccinated flocks might be decreased at low level to innate the natural virulent infection. These findings indicate that vaccine is required to control IBD is cockereel but vaccination with higher vaccines will not be effective in birds with high levels of maternal antibody. Therefore, knowledge of maternal derived antibody levels and correct timing are necessary for successful vaccination in control IBD.

The onset of the disease was rapid and was characterized by dullness, depression, anorexia, and white-throat diarrhoea, salivation and gutting of the vent, ruffled feathers and trembling. The unvaccinated birds became prostrated and died due to severe dehydration. These cases did not respond to intravenous antibiotics. These clinical observations recorded in this study are in conformity with the earlier reports of Sahra and Majmudar (1997) and Chahal et al. (1980) who reported clinical signs of natural outbreak of IBD in chickens.

The dead birds preserved dehydration of the subcutaneous tissues and muscles and inflamed vents. The petechial haemorrhages on the thigh and breast muscles were recorded in some birds. The most prominent lesion was enlargement and oedematous swelling of bursa Fabricia in early outbreaks, whereas in a small number of chicks minute streaks of petechial haemorrhages were also noticed on the inner surface of bursa. Some birds became yellowish in colour, latency of gastrointestinal material was noticed inside the bursa. Some change like enlargement and changes in colour were also noticed on the liver, kidney and spleen. These post-mortem changes recorded in this study are in conformity with the earlier reports of Chahal et al. (1980), Rijpersar and Mohra (1992), Sahra and Majmudar.
### Table 2: Relationship between the immunization and mortality due to infectious bird diseases in commercial chickens

<table>
<thead>
<tr>
<th>Item</th>
<th>Total No. of Birds</th>
<th>No. of Vaccinated</th>
<th>Vaccination Status</th>
<th>Morbidity (%)</th>
<th>Mortality (%)</th>
<th>LB ELISA titre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>804</td>
<td>4 &amp; 12</td>
<td>BCRDv&lt;sup&gt;6&lt;/sup&gt;</td>
<td>22</td>
<td>29 - 31</td>
<td>115 (39.34)</td>
</tr>
<tr>
<td>2</td>
<td>1200</td>
<td>BBAC</td>
<td>BCRDv&lt;sup&gt;6&lt;/sup&gt;</td>
<td>7</td>
<td>30 - 33</td>
<td>900 (75.0)</td>
</tr>
<tr>
<td>3</td>
<td>1000</td>
<td>ND Clbv&lt;sup&gt;5&lt;/sup&gt;</td>
<td>BCRDv&lt;sup&gt;6&lt;/sup&gt;</td>
<td>19</td>
<td>19 - 23</td>
<td>292 (29.30)</td>
</tr>
</tbody>
</table>

**BCRDv<sup>6</sup>** = Bali Chikungunya Disease Vaccine (Bangladesh). **BBAC** = Bacterin, **VSV Clb<sup>5</sup>** = Infectious Bursal Disease Vaccine (Vandul, USA). **ND Clb<sup>5</sup>** = Newcastle disease vaccine (Imivet, The Netherlands). **LB ELISA titre** = level of antibody to **LB virus** determined by the commercial ELISA kit (BD 64x1, RIA Ltd., USA).

(1997) and Siwakie and Bhattacharan (1995). However, Siwakie and Bhattacharan (1997) reported that the IBD affected birds enlargement (75%), naevus (25%), yellow (20%) and cataract (40%). Cosgrove (1962) reported that specific characteristic signs and lesions diagnostic of IBD at a specific age. Cadsby et al. (1997) also quoted that the lesion produced by IBD virus is pathogenic. Hampton (1967) commented, that histopathological examination of lesions was required for seroimmunization for confirmation of IBD (Pattabhi, 1972).

The direct microscopic examination of the intestinal (*caecal*) content was found negative for parasitic (coccidia) infection and no worms were observed from the faeces. The blood also showed negative for any bacteriologic pathogen identification.

Thus, the IBD was diagnosed on the basis of history, clinical findings, pathohistologic examination and extremely low level (respective) of ELISA antibody titre in meat and eggs.

The economic importance of the IBD is manifested in two ways; the first is due to the clinical disease and mortality in chickens, and the second and most important manifestation is a severe prolonged immunosuppression of chickens infected at an early age. Sequestration of the immunosuppression include secondary bacterial infections, and vaccinon failure. However, an attempt was made to observe economic losses due to only mortality caused by outbreaks of IBD in their flock (Table 3). A report from the Table 3 that a total of 53,190 birds by a flock of the three commercial farms, and numbers of IBD associated with mortality amounted to total loss of Rs 45,200 (Rs 35,000) due to IBD (Table 3). It may be concluded from this study that IBD is an important devastating enidemic disease in Bangladesh which occurred as an outbreak form without vaccination or unvaccinated chickens accounting for severe economic losses in poultry industry.

### Table 3: Economic impact of coccidiosis causing by outbreaks of mortality due to intestinal disease

<table>
<thead>
<tr>
<th>Item</th>
<th>Total No. of Birds</th>
<th>Investments (Tk)</th>
<th>Feed cost</th>
<th>Other costs</th>
<th>Total Cost</th>
<th>No. of bird lost (Tk)</th>
<th>Total income (Tk)</th>
<th>Total loss (Tk)</th>
<th>Total profit/loss (Tk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>900</td>
<td>3,600&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,090&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1,100&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,600&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,600&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,090&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2,400&lt;sup&gt;1&lt;/sup&gt;</td>
<td>600&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>1200</td>
<td>4,800&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4,030&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1,770&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4,800&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4,800&lt;sup&gt;1&lt;/sup&gt;</td>
<td>4,030&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2,000&lt;sup&gt;1&lt;/sup&gt;</td>
<td>800&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>1000</td>
<td>3,000&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2,425&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1,575&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,000&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,000&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2,425&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1,575&lt;sup&gt;1&lt;/sup&gt;</td>
<td>850&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total</td>
<td>3,100</td>
<td>5,290&lt;sup&gt;1&lt;/sup&gt;</td>
<td>5,075&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3,002&lt;sup&gt;1&lt;/sup&gt;</td>
<td>5,290&lt;sup&gt;1&lt;/sup&gt;</td>
<td>5,290&lt;sup&gt;1&lt;/sup&gt;</td>
<td>5,075&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2,375&lt;sup&gt;1&lt;/sup&gt;</td>
<td>925&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

1. Increase in cost of the flock (Rs 45,200) due to IBD (Tk 46,500) due to IBD (Table 3). It may be concluded from this study that IBD is an important devastating enidemic disease in Bangladesh which occurred as an outbreak form without vaccination or unvaccinated chickens accounting for severe economic losses in poultry industry.

### REFERENCES

