ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
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International Journal of Poultry Science 4 (1): 32-35, 2005

Sero-Prevalence of *Mycoplasma gallisepticum* Infection of Chickens in Model Breeder Poultry Farms of Bangladesh

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Abstract: The sero-prevalence of *Mycoplasma gallisepticum* (MG) infection of chickens in selected Model Breeder Poultry Farms was determined during the period January to May, 2004. To conduct this study a total of 382 sera samples were collected. Rapid Serum Plate Agglutination (SPA) test was performed using commercial MG antigen (Nobilis® MG) to detect the presence of antibodies against MG. The over all sero-prevalence of MG infection was 58.90% in the study area. The highest prevalence (62.44 %) of MG infection was found in winter season followed by summer season (53.10%). The result further revealed that the infection was higher (59.94%) in female birds than in male birds (48.57%). It was also demonstrated that the infection was higher (62.80%) in Feni sadar than in Chhagoalnaiya thana (53.45%).

Key words: *Mycoplasma gallisepticum*, sero-prevalence, Chickens, Model-breeder poultry farms

Introduction

Mycoplasmosis is one of the major problems among avian diseases in emerging poultry industry of Bangladesh. Primarily, this is a disease of chicken and turkeys but also infects many other domestic and wild birds all over the world (Jordan and Amin, 1980; Bradbury *et al*., 1993). The disease is caused by four commonly recognized pathogens; *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, *Mycoplasma meleagridis* and *Mycoplasma iowae* (Bradbury, 2001). *Mycoplasma gallisepticum* (MG) is a cause of respiratory disease and the most economically important of the avian *Mycoplasma* (Ley and Yoder, 1997). The disease decreases egg production, reduced feed conversion efficiency (Carpenter *et al*., 1981; Ley and Yoder, 1997). Production losses between 10 and 20% have been reported in layers (Bradbury, 2001). All ages of chickens and turkeys are susceptible to this disease but young birds are more prone to infection than adults (Nunoya *et al*., 1995). The disease may be transmitted both horizontally and vertically and remain in the flock constantly as subclinical form (Bencina *et al*., 1988a). In view of the above consideration, the present study was undertaken to determine the sero-prevalence of MG infection in chickens of selected Model Breeder Poultry Farms (MBPF) of Bangladesh.

Materials and Methods

Study area: The present study was conducted during the period from January to May 2004, at two Thana of Feni district, namely Feni Sadar and Chhagoalnaiya, where Smallholder Livestock Development Project-2 (SLDP-2) has been implemented by several NGO's. A Model breeder poultry farm consists of 60-66 birds in which Fayoumi hens and RIR cock were reared. Blood samples were obtained twice from each farm during winter (January-February) and summer (April-May) season.

Mycoplasma (MG) antigen: Standard *Mycoplasma gallisepticum* (Nobilis$^{(R)}$ MG) antigen manufactured by Intervet International, Holland was used for Rapid Serum Plate Agglutination (SPA) test for the detection of *M. gallisepticum* antibodies in the collected sera to determine the infection.

Preparation of sera samples: A total of 382 blood samples were obtained aseptically from the wing vein of the selected birds using 5ml sterile disposable syringe and needles. The blood allowed to clot in the syringe and kept for 1-2 hours at room temperature. After clotting, sera were separated, centrifuged and poured in sterile vials, labeled individually and stored at 4°C until used. The sera so collected were transferred to the Laboratory, Department of Microbiology and Hygiene, BAU, Mymensingh, in ice pack condition in thermo flask for further testing.

Serum plate agglutination (SPA) test: The SPA test was conducted with crystal violet stained *Mycoplasma gallisepticum* antigen (Nobilis® MG antigen). For this test 0.02 ml of antigen and 0.02 ml of chicken sera were placed side by side with a micropipette on a glass plate and mixed properly by stirring with small tooth pick followed by gentle rocking. Results were read within 2 minutes. In positive cases granules formed slowly which was seen during rocking, but in negative case no such granules formed within two minutes (Fig.1). All SPA test results were recorded.

Table 1: Seroprevalence of *M. gallisepticum* infection in selected MBPF, Feni

Study area	Sl. No. of flock	No. of birds in flock	First sampling			
			Age of birds (WKS)	Total serum tested	Positive case	Prevalence (%)
Feni Sadar thana	1	64	42	50	30	60.00
	2	66	20	45	30	66.66
	3	60	20	42	31	73.80
Chhagoalnaiya thana	4	61	43	48	28	58.33
	5	62	43	52	29	55.76
Study area	Sl. No. of flock	No. of birds in flock	Second sampling			
			Age of birds (WKS)	Total serum tested	Positive case	Prevalence (%)
Feni Sadar thana	1	64	54	32	16	50.00
	2	66	32	30	18	60.00
	3	60	32	22	14	63.63
Chhagoalnaiya thana	4	61	55	30	15	50.00
	5	62	55	31	14	45.16

Over all Prevalence (%) = 58.90, MBPF = Model Breeder Poultry Farms, WKS = Weeks

Results and Discussion

A total of 382 sera samples were collected during winter and summer season tested by Serum Plate Agglutination (SPA) (Fig. 1.) test to determine the seroprevalence of MG infection. The highest prevalence (73.80%) of MG infection was found in the present study in flock no.3, and the overall prevalence was 58.90% (Table 1) which strongly supported the earlier investigations of Pradhan (2002) and Dulali (2003). They reported 57.15 and 52% seroprevalence of MG infection in chickens respectively. In flock no. 1, seroprevalence of MG infection was 60% at 1st sampling but it declined to 50% at second sampling (3 months after first sampling). The prevalence of MG also decreased from 66.66 to 60% in flock no. 2, 73.80 to 63.63% in flock no. 3, 58.33 to 50% in flock no. 4, and 55.76 to 45.16% in flock no. 5 during 1st to 2nd sampling. The prevalence of MG was recorded highest at 20 weeks of age (73.80%) in flock no.1, whereas, the prevalence was lowest (45.16%) in flock no.5. The prevalence of MG infection decreased with the increase of age in all flock according to individual flock area (Table 1). Seasonal variation of prevalence of MG infection was observed in the present study. The prevalence was higher (62.44%) in winter season and lower (53.10%) in summer season (Table 2) which was in agreement with the result of David *et al.* 1997 and Pradhan *et al.* 2000. The present findings were in close agreement with the previous results reported by Alam *et al.* (2003) and Talha (2003) in Bangladesh, Kelly *et al.*, 1994 in Zimbebwe, Chrysostome *et al.*, 1995 in Benin, Shah-Majid, 1996 in Malaysia, Pandey and Hasegawa, 1998 in Zambia, Mushi *et al.*, 1999 in Botswana and Chakraborty *et al.*, 2001 in India. It might be thought to be due to the influence of cold weather. The statistical

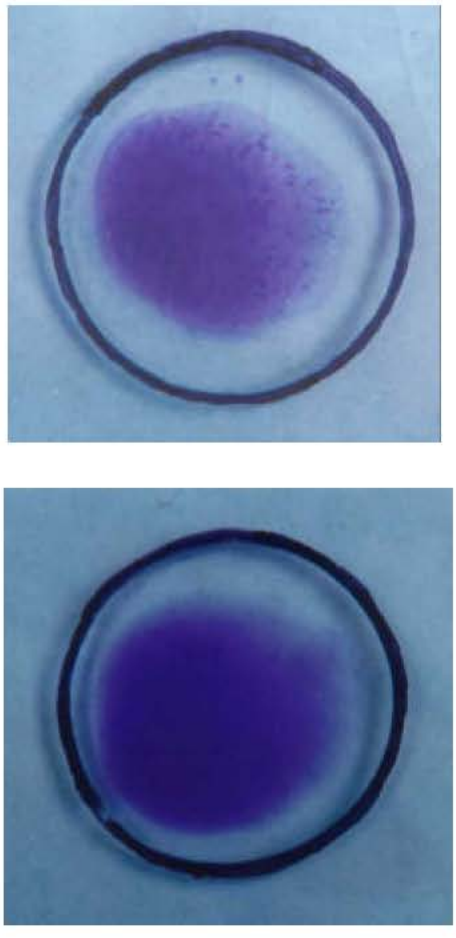

Fig. 1: Serum Plate Agglutination (SPA) test for detection of *M. gallisepticum* antibodies (a) positive reaction (b) negative reaction

Table 2: Seasonal seroprevalence of *M. gallisepticum* infection in selected MBPF, Feni

Study area	No. of flock tested	Winter season			
		Total serum tested	Positive case (%)	Mean ± SD	Overall prevalence (%)
Feni Sadar thana	3	137	91 (66.42)	61.71 ± 6.66	62.44
Chhagoalnaiya thana	2	100	57 (57.00)		
Study area	No. of flock tested	Summer season			
		Total serum tested	Positive case (%)	Mean ± SD	Overall prevalence (%)
Feni Sadar thana	3	54	48 (57.14)	52.34 ± 6.79	53.10
Chhagoalnaiya thana	2	61	29 (47.54)		

NS = Non significance (p>0.05), MBPF = Model Breeder Poultry Farms, SD = Standard deviation
P value (level of significance) = 0.298NS

Table 3: Seroprevalence of *M. gallisepticum* infection on the basis of sex in MBPF, Feni

Study area	No. of flock tested	Sex of birds (Female)			
		No. of tested Sera	Positive cases %	Mean ± SD	Overall prevalence %
Feni Sadar thana	3	200	128 (64.00)	59.21 ± 6.78	59.94
Chhagoalnaiya thana	2	147	80 (54.42)		
Study area	No. of flock tested	Sex of birds (Male)			
		No. of tested Sera	Positive cases %	Mean ± SD	Overall prevalence %
Feni Sadar thana	3	21	11 (52.38)	47.61± 6.74	48.57
Chhagoalnaiya thana	2	14	6 (42.85)		

Table 4: Seroprevalence of *M. gallisepticum* on the basis of study area

Study area	No. of sera tested	Positive cases	Prevalence (%)
Feni Sadar	221	139	62.89
Chhagoalnaiya Thana	161	86	53.41

analysis by one way ANOVA method (F-test) showed non-significant variation between the prevalence of two seasons. It was also observed in table 3 that the prevalence of MG infection was higher (84.21%) in female than in male (48.57%) indicating that female birds were more susceptible than male birds, but the cause was not established. The statistical analysis further revealed that there was no significant difference in the prevalence of MG infection between the sex of birds. The prevalence was also found to have decreased with the increase of age. It might be due to the seasonal influence as during the winter the birds were younger than in summer season (Nunoya *et al.*, 1995 and David *et al.*, 1997). The prevalence of MG infection was higher (62.89%) in Feni Sadar than Chhagoalnaiya thana (53.41%) (Table 4). Faults in Management and bio-security might be the cause (Chandiramani *et al.*, 1966). The overall prevalence of MG infection was higher than Pradhan (2002) and Dulali (2003) which might be due to the maintenance of breeder stock for a long period of time and replacement of breeding stock with the progeny of the same flock. However, intensive nature of poultry farming provide opportunity for recycling of the pathogens due to population density (Pradhan, 2002). The other factors that contribute to MG infection are poor ventilation, infection of litters and no restriction on movement of technical personnel, visitors and such other persons as well as other bio-security measures (Dulali, 2003).

Acknowledgement

The research work was financed by DANIDA under the Small Holder Livestock Development Project-2 (SLDP-2), Department of Livestock services (DLS), Farmgate, Dhaka, Bangladesh.

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