

Seroprevalence of *Mycoplasma gallisepticum* Among Commercial Layers in Faisalabad, Pakistan

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Abstract: Mycoplasmosis is one of the most important health hazards being faced by the poultry industry of Pakistan. This study was designed to rule out the prevalence of *Mycoplasma gallisepticum* (MG) in layer flocks of District Faisalabad of Pakistan during a period of one year from January to December, 2010. A total of 640 sera samples were collected from 81 commercial layer flocks with complaint of respiratory distress. On the basis of serum plate agglutination test, 40 flocks were found positive for MG indicating a share of 49.01% among the respiratory diseases. Among 40 positive flocks for MG the highest prevalence (54.84 %) was found in pullets, followed by 46.34 %, and 44.44 % in adult and old laying flocks, respectively. Similarly, seroprevalence was also higher (49.01%) in pullets as compared to old layers (28.71%). The disease was more prevalent in winter season (45.13 %) in comparison with the summer season (36.30 %). With respect to flocking density, the higher prevalence rate (48.11%) was recorded in flocks having high bird density as compared to those with lower one (27.27 %).

Keywords: Seroprevalence, Mycoplasmosis, Layers, Faisalabad, Pakistan.

INTRODUCTION

Poultry industry has made remarkable progress in Pakistan during the last few decades from a backyard venture to a considerably sophisticated commercial industry. In spite of the rapid growth of poultry industry, it is still prone to certain infectious threats which may cause great economic losses. Inadequate measures adopted by the stakeholders for the control of diseases in addition to certain management problems have rendered the poultry farming a risky business. A number of viral and bacterial diseases are the major health hazards being faced by poultry industry, among which mycoplasmosis is the most important. Mycoplasmosis is caused by four major pathogens viz. *M. gallisepticum* (MG), *M. synoviae* (MS), *M. meleagridis* (MM) and *M. iowae* (MI) [1]. MG is the major cause of chronic respiratory disease (CRD) and economically causes more losses as compared to other *Mycoplasma* species [2]. Birds of all age groups are susceptible to this disease but young birds are more prone to infection than adults [3]. The clinical signs with MG infection in chicken include respiratory rales, nasal discharge, coughing, and occasionally conjunctivitis [4]. In broiler breeders and commercial layers, it causes a marked drop in egg production and an increase in embryo mortality [5].

Serological evidence of avian mycoplasmosis in Pakistan had been reported as early as in 1964 [6]. Later on, the 12.69% incidence of mycoplasmosis was reported in Faisalabad District among the 430 flocks with respiratory problems [7]. An upward trend was noted during the year 1991 to 1995 in seroprevalence of MG (35.8%) and MS (28.30 %) infection in Faisalabad and northern areas of Pakistan [8] followed by the 37.40 % by Mukhtar [9] who reported a higher prevalence (90.20%) of MG in mycoplasmosis than MS infection (15.70 %) in the local field conditions. However, no work was made after these early investigations to know the incidence of Mycoplasmosis in the Faisalabad area. Keeping in view the economic importance of disease, an intense need arises for designing the prevalence surveys to define and quantify the disease burden in poultry layers. This will help the policy makers and practitioners to devise new ways for strategic and tactical control of disease; and poultry farmers to adopt in time improved chemo- or immuno-prophylactic approaches to prevent the disease and subsequent production losses associated with the mycoplasmosis.

The present study reports the current status of *M. gallisepticum* infection in commercial layers of District Faisalabad, Pakistan.

MATERIALS AND METHODS

Eighty one open shed commercial layer flocks suffering from respiratory distress were selected in and

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around District Faisalabad, Pakistan. Blood samples (2mL) were collected from ten ailing birds from each flock. Serum from each blood sample was separated and stored at -21°C till further analysis. All the Sera samples were subjected to serum plate agglutination (SPA) test against *Mycoplasma gallisepticum* antigen (Intervet International). Agglutination was assigned score from +1 to +3. Only the sera samples having agglutination score +2 or greater were recorded as positive and were included for calculation of percent prevalence [8].

RESULTS

The present study was conducted on 81 randomly selected poultry farms with respiratory problems during a period of one year from January 2010 to December 2010. The results showed that out of eighty one layer flocks, 40 flocks were found positive against *M.*

gallisepticum with an overall prevalence rate of 49.38%. In age wise prevalence, results showed a maximum prevalence (54.84%) in pullets followed by adult and old layers with 46.34% and 44.44% prevalence rates, respectively (Table 1).

In season-wise prevalence analysis, a higher prevalence rate (45.13%) was recorded in winter season as compared to summer (36.30%) (Table 2). Results showed a positive correlation between the flocking density and percent prevalence of MG and the maximum infection of MG was recorded in large size flocks having a bird density of 5000 or more as compared to small ones (Table 3).

DISCUSSION

In the present study, overall prevalence of *M. gallisepticum* was 49.38% and this was significantly higher than the previously reported value (43.80%) in

Table 1: Seroprevalence of *Mycoplasma gallisepticum* Among Various Age Group Flocks Suffering from Respiratory Problems in District Faisalabad, Pakistan

Age Group	No. of Birds	No. of flocks with respiratory problems	<i>Mycoplasma gallisepticum</i> Positive flocks	Percentage	χ^2
Pullets	152000	31	17	54.84%	10.23*
Adults	179200	41	19	46.34%	
Olds	34500	09	04	44.44 %	

*Significant at $P < 0.05$.

Table 2: Season Wise Seroprevalence of *Mycoplasma gallisepticum* Among Commercial Layers in District Faisalabad, Pakistan

Season	No. of flocks observed	No. of serum samples tested	Seropositive (+ve)	Seronegative (-ve)	χ^2
Summer (April to September)	35	270	98 (36.30%)	172	17.90*
Winter (October to March)	46	370	167 (45.13%)	203	

*Significant at $P < 0.05$.

Table 3: Seroprevalence of *Mycoplasma gallisepticum* in layer with respect to flocking density

Sr. No.	Flock Size (No. of Birds/ flock)	No. of flocks	Total samples tested	Seropositive (%)	χ^2
1	500-1000	6	33	9 (27.27 %)	111.24**
2	1001-2000	15	106	33 (31.13%)	
3	2001-3000	18	128	50 (39.06%)	
4	3001-4000	10	83	34 (40.96 %)	
5	4001-5000	9	78	37 (47.43)	
6	5001-Above	23	212	102 (48.11 %)	
		81	640	265 (41.41 %)	

**Highly significant at $P < 0.05$.

the same area [9]. Findings of this study showed the increasing trend in prevalence rate of MG. This might be due to more and extensive poultry farming in the area. These findings were in line with some other previous reports [10-13], who reported 57.15%, 54.90%, 52% and 53% seroprevalence of MG infection in chickens in thickly populated poultry farming areas. Similarly, Sarkar and his coworkers [14] reported 58.9% seropositive layer chickens for MG infection on some model poultry farms in Feni District of Bangladesh. Further, Hossain [15], Heleili [16] and their coworkers also recorded high seroprevalence rates 45.10 % and 81.15 % of MG in laying hens of Rajshahi and Batna Districts of Eastern Algeria and its surroundings, respectively.

Results showed the maximum prevalence in pullets followed by adult and old layers, respectively. Previously, Mukhtar [9] recorded 31.60 %, 17.90 %, 11.20 % and 10.00 % seroprevalence of MG in pullets, chicks, adults and old layer, respectively at the same study area. Similarly, the highest MG infection (71.42%) at 18 weeks of age and lowest (55.17%) at 63 weeks of age in layers had also been reported [17]. The findings of Hossain and coworkers [15, 18] also support our results who recorded a higher prevalence of MG infection in younger birds as compared to older ones. Higher infection in the young chickens might be due to the vertical transmission of the organisms from parent flock or lesser immunity level and it can be speculated that, until and unless parent flocks are not free from Mycoplasmosis, the disease cannot be control from commercial flocks.

Results showed a higher prevalence of *M. gallisepticum* in winter as compared to the summer season and similar report was published earlier [14] that reported 62.4% prevalence of MG infection in winter in comparison to 53.1% in summer. Similar to our findings, higher prevalence of MG infection during winter season (61.48 %) than in summer (47.74 %) has been reported earlier [15, 16]. This seasonal variation in infection might be due to the sudden change in temperature and cold stress on the birds.

With respect to flocking density, the maximum infection of MG was recorded in large size flocks having a bird density of 5000 or more as compared to small ones. Hossain *et al.* [15] also demonstrated that MG infection rate was the highest (51.4 %) in large flocks as compare to smaller ones (41.3 %). Highest infection rate in larger flocks might be correlated with poor management and bio-security measures in

addition to horizontal transmission of the organisms from one bird to the other. During this study it was found that most of the open shed poultry farm (n=34) had poor management conditions and lesser farms had satisfactory (n=31) or good conditions (n=16). Excellent management was not observed on any of the farm surveyed. A direct correlation was found between management and prevalence of MG infection as 41.97% flocks were MG positive under poor management. Earlier, it has also been reported that the MG infection was more prevalent in the flocks kept under poor management conditions [9]. The other contributing factors of high prevalence in Faisalabad District might include the construction of poultry farms in closes vicinity and opportunity for recycling of the pathogens to persist longer in the area. The other factors that may contribute in MG infection include poor ventilation, contamination of litter and no restriction on the movement of technical staff and visitors from one farm to the other as well as lack of basic bio-security measures.

From results of the current study, it was concluded that MG was highly prevalent in the flocks of layer chickens located in Faisalabad, Pakistan. Keeping in view, efforts should be made towards educating the poultry farmers for the effective control of MG in layer farms through good management practices and adoption of appropriate prophylactic or therapeutic remedies. Moreover, detailed studies on the country wide prevalence of MG should be designed to know the current status of disease in the Pakistan.

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