Int.J.Curr.Microbiol.App.Sci (2020) *9*(1): 2512-2517

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 9 Number 1 (2020)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2020.901.285

Epidemiological Distribution of *Mycoplasma gallisepticum* in Haryana, India

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Keywords

Mycoplasma gallisepticum, Avian mycoplasmosis, colibacillosis, bronchits

Article Info

Accepted:
22 December 2019
Available Online:
20 January 2020

A B S T R A C T

Avian mycoplasmosis is one of the most prevalent problem of poultry industry leading to heavy economic losses. Out of the various identified species of Mycoplasma, *Mycoplasma gallisepticum* is the principle causative agent of Chronic Respiratory disease (CRD). A variety of factors are responsible for the heavy death rates, including bird handling, age of flock, ventilation facilties, location of the farm, vaccination status of the birds, transportation, various environmental factors. CRD can be found in association with other infections like avian influenza, colibacillosis, New castle disease and infectious bronchits further causing complications. A significant difference was observed in the infection by *Mycoplasma gallisepticum*in birds of different age group (p=0.004). The infection appeared in an increasing order being highest in >21 days old (43.75%) and lowest in birds of 0-7 days age (10.39%).

Introduction

The most common causes of high mortality in poultry birds is due to respiratory distress, heat stress and *E.coli* infections. Avian mycoplasmosis is one of the most prevalent poultry problem affecting the industry economically. The Respiratory disease complex has contributed to heavy economic loses and it comprises cluster of factors responsible for the spread of disease and affecting mortality among the birds comprising of bird handling, viral, mycoplasma, age of flock, ventilation facilities, location of farm, vaccination, transportation, agro climatic zone, no. of farms in $1km^2$area and various environmental factors like temperature, high ammonia concentration and others. *Mycoplasma gallisepticum* is the principle causative agent of Chronic respiratory disease (CRD). Within intensive poultry farming, infection by CRD is found in association with avian influenza, Newcastle disease, colibacillosis and

infectious bronchitis and further leads to more severe problems (Stipkovits *et al*., 2012). *Mycoplasma gallisepticum* vary from asymptomatic to severe symptoms like reduced feed efficiency, reduced egg production and decreased growth rate. Infections by *Mycoplamsa gallisepticum* causes loss of 10-20% decrease in egg production for a period of upto 1 month in layers (Pattinson *et al*., 2008).

Material and Methods

Sample Collection

A total of 100 samples were collected from seven different districts of Haryana. Bhiwani (n=2), Hisar (n=9), Jhajjar (n=19), Jind (n=20), Karnal (n=20), Panipat (n=23) and Sonepat (n=7). Trachea, lungs and air sacs were collected from poultry flocks and were pooled, and together known as "sample". The samples were collected along with a questionnaire to be filled including questions like total birds on farm, no of birds affected, no of birds died, ventilation facilities, no. of farms in 1 km² area, agro climatic zone, flock size, distance from nearby road, location of farm. The co-ordinates of farm were analysed by installing a app on smart phone "ODK collect". The location was mapped through QGIS software. The statistical analysis was carried out by STATA.

Results and Discussion

Age of Flock

The maximum number of samples positive for *M. gallisepticum* were observed in birds of >10 weeks of age i.e. 30.77% and least in birds of >2-6 weeks of age i.e. 10.61%.

There was no significant difference among flocks of different age with respect to detection of MG (p-0.133) (Table 1).

District

The maximum cases positive for MG were observed in samples collected from Jind district i.e. 40 % and there was no samples positive from Sonepat district. There was no significant difference among samples from different districts for detection of *M. gallisepticum*. (p- 0.230) (Table 1).

Zone

There was no significant difference between zones of Haryana with respect to detection of MG (p- 0.223) (Table 1). The samples collected from western zone gave a higher percentage than eastern zone i.e. 23.33%.

Flock Size

The highest number of cases were reported in the medium flocks (>10,000-30,000) i.e. 20.00% followed by cases on the small farm (<10,000) i.e. 14.81% and no cases was reported positive for MG in the large flock (>30,000). There was no significant difference between the farm size with respect to detection of *M.gallisepticum* (p- 0.873) (Table 1).

Duration of Respiratory problems

There was a significant association between duration of start of respiratory problem with respect to cases positive for MG (p- 0.004) (Table 1). The maximum number of cases were seen in birds suffering from respiratory problem for >21 days43.75% and the minimum number of cases were seen in birds suffering from respiratory problem from 0-7 days i.e. 10.39%.

Use of antibiotic in last 1 month

There was no significant association between use of antibiotic with respect to detection of

*M. gallisepticum.(*p- 0.729) (Table 1).The number of cases seen positive for MG were more in the flocks where antibiotic were not used i.e. 16.67% and number of cases declined in flocks that used antibiotic i.e. 13.64%.

Location of farm

There was no significant association between location of farm with respect to detection of *M. gallisepticum* (p- 0.312) (Table 1). The maximum percent for cases positive for MG were in urban areas i.e. 33.33% followed by cases in semi urban i.e. 21.43%. The least number of cases were observed in rural areas i.e. 14.46%.

No. of farms in 1 Km² area

There was no significant association between no. of farm in 1 km² area with respect to detection of *M. gallisepticum* (p- 0.950) (Table 1). The maximum percent of cases were more in >6-10 i.e. 20.00% followed by 1-5 i.e. 15.73% and no cases were seen in >10.

Ventilation facilities

There was no significant association between ventilation facilities respect to detection of *M. gallisepticum* (p- 0.743; Table 2). The percantage of occurrence *M. gallisepticum* was same in both 'only fan/cooler" and "only exhaust" i.e. 25 %. The least occurrence was seen in "both fan/cooler+ exhaust" i.e. 12.12%.

Distance from nearby road

There was no significant association between distance from nearby road with respect to detection of MG (p- 0.533; Table 2). The samples positive for MG were more in 0-1 km i.e. 16.85% and less in >1-3 km i.e. 9.09%.

Table.1 Association of different parameters with detection of *Mycoplasma gallisepticum* in poultry with respiratory problems in Haryana

		Positive for *Mycoplasma gallisepticum*		**Wald χ^2**	**P**
Variable	**Category**	**(%)**	**95% CI**		
PCR Results					
	100	16 (16.00)	9.43-24.68		
Age of Flock				2.26	0.133
	0-2 week (4)	1 (25.00)	0.63-80.59		
	>2-6 wk (66)	7 (10.61)	4.37-20.64		
	>6-10 wk (17)	4 (23.53)	6.81-49.90		
	>10 wk (13)	4 (30.77)	9.09-61.43		
District				1.44	0.230
	Bhiwani (2)	1 (50.00)	1.26-98.74		
	Hisar (9)	1 (11.11)	0.28-48.25		
	Jhajjar (19)	1 (5.26)	0.13-26.03		
	Jind (20)	8 (40.00)	19.12-63.95		
	Karnal (20)	3 (15.00)	3.21-37.89		
	Panipat (23)	2 (8.70)	1.07-28.04		
	Sonepat (7)	0	0.00-40.96		
Zone				1.49	0.223

	Eastern (70)	9 (12.86)	6.05-23.01		
	Western (30)	7 (23.33)	9.93-42.28		
Flock size				0.03	0.873
	Small-≤10,000 (54)	8 (14.81)	6.62-42.28		
	Medium->10,000-30000 (40)	8 (20.00)	9.05-35.65		
	Large->30,000 (6)	0	0.00-45.93		
Duration of respiratory problems				8.42	**0.004**
	0-7 days (77)	8 (10.39)	4.59-19.45		
	8-21 days (7)	1 (14.29)	0.36-57.87		
	>21 days (16)	7 (43.75)	19.75-70.12		
Use of antibiotics during last 1 month				0.12	0.729
	Yes (78)	3 (13.64)	2.91-34.91		
	No (22)	13 (16.67)	9.18-26.81		
Location of farm				1.02	0.312
	Rural (83)	12 (14.46)	7.70-23.89		
	Semi-urban (14)	3 (21.43)	4.66-50.80		
	Urban (3)	1 (33.33)	0.84-90.57		
No. of farms in 1 Km^2 area				0.00	0.950
	1-5 (89)	14 (15.73)	8.88-24.98		
	6-10 (10)	2 (20.00)	2.52-55.61		
	>10 (1)	0	0.00-97.5		
Ventilation facilities				0.11	0.743
	Natural (51)	8 (15.69)	7.02-28.59		
	Only Fan/Cooler (8)	2 (25.00)	3.18-65.09		
	Only Exhaust (8)	2 (25.00)	3.18-65.09		
	Both Fan/Cooler + Exhaust (33)	4 (12.12)	3.40-28.20		
Distance from nearby road				0.39	0.533
	0-1 Km (89)	15 (16.85)	9.75-26.27		
	>1-3 Km (11)	1 (9.09)	0.22-41.28		

There was no significant association between detection of *Mycoplasma gallisepticum* with respect to age as per our study. Maximum cases of MG were reported in birds aged >10 weeks i.e. 30.77%, followed by 25.00% in 0-2 weeks, 23.53% in >6-10 weeks and least in >2-6 weeks i.e. 10.61%. Similar to our study, Singh *et al.* (2016) reported maximum prevalence by *Mycoplasma gallisepticum* in the age group of 6-12 weeks i.e. 40% and Ahmad *et al.* (2008) in Lahore also reported the highest prevalence of MG in 12-17 week age group i.e. 78.12%. Asgharzade*et al.* (2012) in Iran reported maximum prevalence of MG in age group of 6-7 week. Hossain *et al*. (2007) in Bangladesh reported maximum prevalence of MG in birds of 18-25 weeks of age. Sarkar *et al*. (2005) recorded highest 73.80% MG infection at 20 weeks of age in comparison to lowest 45.16% at 55 weeks of age. Tahla 2003 gave similar results showing the prevalence of MG decreased as the age increased. Heleili*et al.* (2012) showed similar results and reported significantly higher prevalence of MG in young birds rather than adult indicating 75% MG in layers aged 8-16 weeks and 92.59% MG in broilers aged 4-6 weeks.

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How to cite this article:

Vaishali, Davinder Singh and Renu Gupta. 2020. Epidemiological Distribution of *Mycoplasma gallisepticum* in Haryana, India. *Int.J.Curr.Microbiol.App.Sci.* 9(01): 2512-2517.
doi: https://doi.org/10.20546/ijcmas.2020.901.285