

Seroprevalence of *Mycoplasma bovis* Infection in Dairy Cows in Ho Chi Minh, Vietnam

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Received 28 April 2015; accepted 23 May 2015; published 26 May 2015

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Abstract

A cross-sectional study was carried out to investigate the seroprevalence of *M. bovis*. A total of 606 serum samples were randomly collected from dairy cows in Ho Chi Minh City, Vietnam. Commercial ELISA kit was used for detection of antibody to *M. bovis*. The results indicated that overall seroprevalence was 80.2% (486/606). There were no significant differences between regions or age categories ($P > 0.05$). Degree of infection to *M. bovis* commonly distributed at positive degree 1 (68.5%) and 2 (24.1%). Seroprevalence at highest positive degree 4 were found in District 9, District 12 and Thu Duc (6.7%, 6.3% and 1.6%, respectively). This study is the first report of seroprevalence of *M. bovis* in Vietnam. The results suggested that *M. bovis* was spreading among dairy cow populations although degree of positivity was low. It should be considered as a high risk pathogen to dairy cows in Vietnam.

Keywords

Mycoplasma bovis, Diagnosis, ELISA, Dairy Cow, Prevalence

1. Introduction

Mycoplasma bovis (*M. bovis*) was the cause of mastitis, respiratory disease, arthritis and abortion in dairy cows [1]. In an infected dairy cows, mycoplasmal mastitis affected more than 20% cows in all the stage of lactation and dry cows [2]. The mastitis in dairy cows leads to reduce milk production and quality of milk; especially, mycoplasmal submatitis is not easy to differentiate from other pathogens. Thus, control and prevention of *M. bovis* in dairy cows are very important to reduce damage from this bacterium. There are no quantitative data

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about prevalence of *M. bovis* in dairy cows in Vietnam now, especially, in Ho Chi Minh area where provide breed animals to neighbour provinces. It cannot have a proper measure for control of *M. bovis* in herd of dairy cows when basic data are lack. In this study, Enzyme-Linked Immuno Sorbent Assay (ELISA) was used for investigation of infection of *M. bovis* in Ho Chi Minh City, Vietnam.

2. Materials and Methods

A cross-sectional study was carried out in 2011 from all dairy cow breeding districts in Ho Chi Minh City (10 districts), Vietnam (**Figure 1**) This city is major cow milk production area in Vietnam (approximately 55% total of dairy cow in Vietnam). Sample size was calculated with the program Win Episcopy Version 2.0 using the mode “estimate percentages” for 60% seroprevalence, 5% error and 95% confidence, resulting in 606 animals from 79,800 cows. Blood samples were randomly collected from jugular vein of animal. The serum was collected by centrifugation at 3000 rpm for 5 min and stored at -20°C until analysis. Serum samples were tested by the indirect enzyme-linked immunosorbent assay (ELISA) using a commercially available kit (*Mycoplasma bovis* ELISA kit, Bio-X Diagnostics, Belgium). The testing was carried out according to the manufacturer’s instructions with a photometer (Benchmark microplate reader, Bio Rad Laboratories, USA). The result is expressed as negative ($\text{S/P value} < 9.74$), as positive degree 1 ($9.74 < \text{S/P} < 39.88$), 2 ($39.89 < \text{S/P} < 70.03$), 3 ($70.04 < \text{S/P} < 100.18$), 4 ($100.19 < \text{S/P} < 130.34$) and 5 ($\text{S/P} > 130.35$) [3].

Chi square test was used for data analysis by Minitab software Version 13 (<http://www.minitab.com>).

3. Results

Antibodies against to *M. bovis* were found in 486 of 606 dairy cow (80.2%) in all districts. The highest seroprevalence was in Tan Binh district (100%) and lowest was in Hoc Mon district (72.9%), other regions ranged from 75.0% to 88.9% (**Table 1**). However, there were not statistically significant differences among different geographical regions ($P > 0.05$). The seroprevalence was commonly occurred at positive degree 1 (68.5%) and 2 (24.1%). Three districts with prevalence at positive degree 4 were found including District 9, District 12 and Thu Duc District. All districts had prevalence at positive degree from 1 to 2 (**Table 1**).

The highest seroprevalence was showed in animal group of over 4 years old and lowest was in group of 1 - 2 years old. And other animal groups were similar in seroprevalence.

No relationship between the seroprevalence of different age could be found ($P > 0.05$) (**Table 2**).

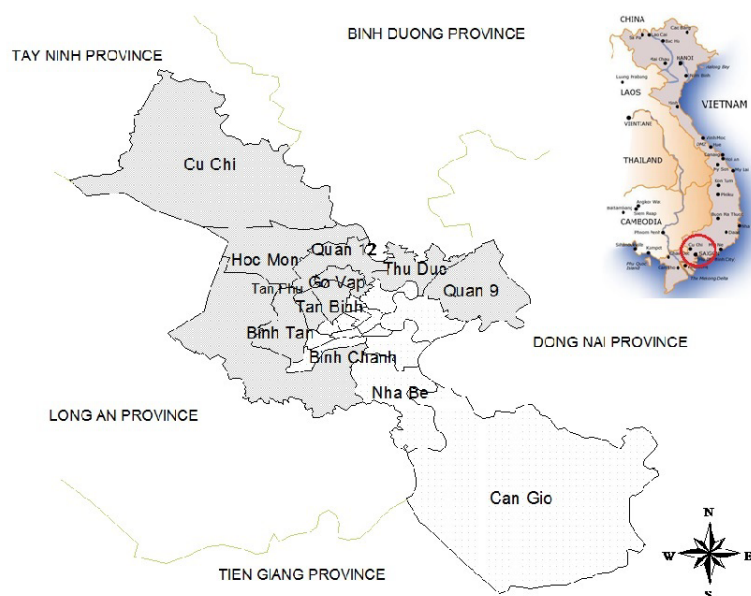


Figure 1. Map of sampling locations in Ho Chi Minh City, Vietnam. Districts with gray color were collected samples.

Table 1. Seroprevalence of *M. bovis* infection by region and degree of positivity.

Area	No. tested sample	(+)*	(%)	Degree of positivity (%)				
				1	2	3	4	5
District 9	20	15	75.0	40	40	13.3	6.7	0
District 12	101	80	79.2	67.5	27.5	5	0	0
Thu Duc	20	16	80.0	43.8	31.3	18.8	6.3	0
Binh Chanh	45	40	88.9	77.5	20	2.5	0	0
Binh Tan	25	20	80.0	70	20	10	0	0
Tan Phu	15	13	86.7	76.9	15.4	7.7	0	0
Tan Binh	20	20	100.0	30	50	20	0	0
Cu Chi	170	141	82.9	70.9	22.0	7.1	0	0
Hoc Mon	170	124	72.9	74.2	20.2	4.0	1.6	0
Go Vap	20	17	85.0	76.5	23.5	0	0	0
Total	606	486	80.2	68.5	24.1	6.6	0.8	0

(+)*: Number of positive samples.

Table 2. Seroprevalence of *M. bovis* infection in dairy cows by age.

Age (year)	No. tested samples	No. positive samples	Prevalence (%)
1 - 2	98	71	72.4
3 - 4	156	128	82.1
>4	237	198	83.5
No record	115	89	77.4
Total	606	486	80.2

4. Discussion

M. bovis is an important cause of bovine diseases such as mastitis, arthritis, and respiratory disease. *M. bovis* infections are found worldwide with various prevalence rates. The infection of *M. bovis* has been described throughout the world including most European and other countries [4]. Seroprevalence has been reported 7.69% in China [5], 66% in Nigeria [6], and 76.6% in Poland [7]. In this study, overall seroprevalence (80.2%) was higher than that in other countries. The results showed that *M. bovis* was circulating in herd of dairy cows. The infection of antibody to *M. bovis* was commonly found at positive degree 1 (68.5%) and 2 (25.1%). This suggested that cows had previous exposures with this pathogen. The infection of *M. bovis* was detected in all dairy cow breeding regions and in all age of animals. It indicated that infection of *M. bovis* was quickly spreading among dairy cows in Vietnam. Infected cattle were observed to shed the agent through nasal discharge for some months to some years. Infected cows shed the agent in their milk represent a permanent reservoir [8]. Therefore, proper strategies and measures should be started to control and prevent *M. bovis* infection. Currently, antimicrobial therapy is applied, but often fails by antimicrobial resistance, leading to important economical losses [9]. Furthermore, this therapy might affect human health by using animal products with antibiotic residue. The vaccine measure should be considered. Commercial vaccine for *M. bovis* is available. However, it may be the best measure in uninfected animals. In infected populations, remove all cows with therapy-resistant mastitis and carry out proper hygiene. Furthermore, repeated monitoring of the herd is necessary.

Acknowledgements

This study support by Ho Chi Minh City Program for developing of dairy cows during the period 2011-2015

(Grant No. 4320/QĐ-UBND). We would like thank to veterinarians from veterinary services in Ho Chi Minh for supporting of sample collection.

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