

9-1-2017

Seroprevalence of *Mycoplasma ovipneumoniae* in goats in Hunan province, China

Ping-Yuan Xu

Yun-Chao Peng

Xu-Xiang OuYang

Sheng-Guo Tan

Follow this and additional works at: <https://digital.car.chula.ac.th/tjvm>



Part of the [Veterinary Medicine Commons](#)

Recommended Citation

Xu, Ping-Yuan; Peng, Yun-Chao; OuYang, Xu-Xiang; and Tan, Sheng-Guo (2017) "Seroprevalence of *Mycoplasma ovipneumoniae* in goats in Hunan province, China," *The Thai Journal of Veterinary Medicine*: Vol. 47: Iss. 3, Article 12.

Available at: <https://digital.car.chula.ac.th/tjvm/vol47/iss3/12>

This Short Communication is brought to you for free and open access by the Chulalongkorn Journal Online (CUJO) at Chula Digital Collections. It has been accepted for inclusion in The Thai Journal of Veterinary Medicine by an authorized editor of Chula Digital Collections. For more information, please contact ChulaDC@car.chula.ac.th.

Seroprevalence of *Mycoplasma ovipneumoniae* in goats in Hunan province, China

Ping-Yuan Xu Yun-Chao Peng Xu-Xiang OuYang Sheng-Guo Tan*

Abstract

Little information is available about the seroprevalence of *Mycoplasma ovipneumoniae* infection in goats in China. In the present study, the seroprevalence of *M. ovipneumoniae* infection in goats was investigated in Hunan province, China between September 2015 and September 2016. A total of 750 serum samples collected from 10 herds in various administrative regions in Hunan province, China were evaluated using indirect hemagglutination assay (IHA). Antibodies to *M. ovipneumoniae* were tested in 234 of 750 serum samples (31.2%) (IHA titer \geq 1:16). The *M. ovipneumoniae* seroprevalence ranged from 22% to 50% among different regions in Hunan province, and the difference was statistically significant ($P<0.01$). In addition, the seroprevalence of *M. ovipneumoniae* infection in goats was higher in winter (40%) and spring (32.4%) than in autumn (27.2%) and summer (24.4%), and the difference was statistically significant ($P<0.01$). The results of the present survey indicate that *M. ovipneumoniae* infection is highly prevalent in goats in Hunan province, China.

Keywords: *Mycoplasma ovipneumoniae*, seroprevalence, goats, IHA

Hunan Biological and Electromechanical Polytechnic, Changsha 410127, China

*Correspondence: uprecious@foxmail.com

Introduction

Mycoplasmas are associated with a number of serious diseases of sheep and goats which are, most notably, contagious agalactia and caprine pleuropneumonias, especially contagious caprine pleuropneumonia, which lead to significant economic losses as a result of decreased milk production, morbidity and, occasionally, mortality throughout mainland Europe, Asia and Africa (Citti and Blanchard, 2013). *M. ovipneumoniae* is a species of mycoplasma bacteria that commonly infects the respiratory tract, causing respiratory disease in both sheep and goats worldwide (Besser et al., 2008). Furthermore, in lambs, it can be associated with a severe paroxysmal cough which leads to rectal prolapses, termed "coughing syndrome" (Nicholas et al., 2008). This organism is highly infectious and is highly prevalent in almost every flock, resulting in significant economic losses worldwide in the ovine industry (Alley et al., 1999).

Although *M. ovipneumoniae* is considered an emerging veterinary pathogen causing pneumonia in goats around the world, little information is available about the seroprevalence of *M. ovipneumoniae* in goats (Giangaspero et al., 2012; Guo et al., 2009; Rong et al., 2014). The People's Republic of China (PRC) is one of the largest producers of dairy goats in the world, and Hunan province is one of the major dairy goat producers in China. Some recent studies have shown that *M. ovipneumoniae* is prevalent in goats in Qinghai and Hainan provinces, China (Guo et al., 2009; Rong et al., 2014). However, it is yet to know whether *M. ovipneumoniae* infection is present in goats in Hunan province, China.

The objective of the present investigation was to estimate the seroprevalence of *M. ovipneumoniae* infection in goats in Hunan province, China. The results should provide a foundation for the execution of control strategies against *M. ovipneumoniae* infection in goats in this province and elsewhere.



Figure 1 The sampling locations for *Mycoplasma ovipneumoniae* infection in goats in different regions of Hunan, China

Materials and Methods

Ethics statement: This study was approved by the Animal Ethics Committee of Hunan Biological and Electromechanical Polytechnic (IACUC: HNBEP2001-002). All goats were handled in strict accordance with good animal practice according to the Animal Ethics Procedures and Guidelines of the People's Republic of China.

Collection and preparation of samples: A total of 750 blood samples were collected from 10 herds in Hunan province between September 2015 and September 2016 (Table 1). All the sampled animals were adult (≥ 12 months of age). All animals were randomly selected for each herd. During blood collection, the animals were captured and kept in shaded stalls or paddocks with water *ad libitum*. The blood samples were then centrifuged at 1,000 g for 10 min, and serum was collected, froze, and stored at -20 °C until assayed.

Table 1 Seroprevalence of *Mycoplasma ovipneumoniae* infection in goats in Hunan province, China by indirect hemagglutination assay (IHA)

Factor	Category	No. tested	No. positive	Prevalence (%)	P-value
Region	Changsha	80	23	28.8	<0.001
	Hengyang	90	21	23.3	<0.001
	Yueyang	50	25	50	<0.001
	Yongzhou	50	21	42	<0.001
	Chenzhou	40	12	30	<0.001
	Loudi	40	19	47.5	<0.001
	Huaihua	20	6	30	<0.001
	Changde	150	33	22	<0.001
	Yiyang	120	46	38.3	<0.001
	Xiangtan	110	28	25.5	<0.001
Total	750	234	31.2	<0.001	

Serological examination: Antibodies to *M. ovipneumoniae* were tested by indirect hemagglutination antibody (IHA) method as previously reported (Zhao et al., 2008). IHA antigen was prepared from *M. pneumoniae* antigen. Red blood cells were treated with glutaraldehyde to improve binding of the cells to the assay plate. Briefly, 75 μ l of the IHA dilution solution was transferred into 96-well V-bottomed polystyrene plates with 25 μ l of serum. The plates were shaken for 2 min and then incubated at 37 °C for 2 h without shaking. The test was considered positive when a layer of agglutinated erythrocytes was formed in the wells at dilutions of 1:8 or higher, and positive and negative controls were included in each test.

within factors and interactions was considered to be statistically significant.

Results and Discussion

Antibody against *M. ovipneumoniae* was detected in 234 of the 750 goats (31.2%). The *M. ovipneumoniae* seroprevalence varied in goats from different regions in Hunan province, China, ranging from 22% to 50% (Table 1), and the differences were statistically significant ($P < 0.01$). The seroprevalence of *M. ovipneumoniae* in goats in 4 of the 10 representative administrative regions in Hunan province was more than 31.2% (average value) (Table 1). Seasonal seroprevalence of *M. ovipneumoniae* infection was higher in winter (40%) and spring (32.4%) than in autumn (27.2%) and summer (24.4%), and the difference was statistically significant ($P < 0.01$) (Table 2).

Statistical analyses: Data were analyzed statistically using the PASW Statistics 18 (IBM Corporation, Somers, NY, USA); 95% confidence intervals (CI) were given. The value of $P < 0.05$ differences between levels

Table 2 Seasonal seroprevalence of *Mycoplasma ovipneumoniae* infection in dairy goats in Hunan province, China

Factor	Category	No. tested	No. positive	Prevalence (%)	P-value
Season	Spring	204	66	32.4	<0.001
	Summer	172	42	24.4	<0.001
	Autumn	184	50	27.2	<0.001
	Winter	190	76	40	<0.001

Mycoplasma ovipneumoniae is considered to be a cause of nonprogressive pneumonia of both sheep and goats (Dassanayake et al., 2010). Although there has been research on the presence of *M. ovipneumoniae* in goats in some provinces of China (Guo et al., 2009; Rong et al., 2014), the papers were published in local journals and are not easily accessible to foreign scholars. Furthermore, the prevalence of *M.*

ovipneumoniae has never been studied in Hunan province, China. Therefore, the present study of the prevalence of *M. ovipneumoniae* in goats in Hunan province, China was conducted.

The seroprevalence of *M. ovipneumoniae* infection obtained in the present study was 31.2% in goats, which is slightly higher than those found in Japan and Qinghai province of China (Giangaspero et

al., 2012; Guo et al., 2009); this is likely due to the difference in animal welfare, climates, category, and animal husbandry practices. The present survey showed that *M. ovipneumoniae* seroprevalence in goats was the highest in winter (40%), but the lowest in summer (24.4%). These results indicate that *M. ovipneumoniae* infection in goats is prevalent all year round, with peaks in winter and spring (cold seasons), which are consistent with the results of previous studies (Guo et al., 2009; Rong et al., 2014). These findings may be due to the fact that cold weather encourages increased physical crowding of goats.

The previous (Guo et al., 2009; Rong et al., 2014) and present studies provide evidence that *M. ovipneumoniae* infection is prevalent in goats in China, and can cause considerable economic impact on these animals. However, the infection could not be clearly related to losses in goat production which are probably due to multifactorial causes. Therefore, further studies will be needed to determine the negative impact on goat production of *M. ovipneumoniae* in China.

In conclusion, the results of the present survey indicate that *M. ovipneumoniae* infection is highly prevalent in goats, but this severe situation has received little attention in the past. Therefore, it is imperative to take integrated control strategies and measures to prevent and control *M. ovipneumoniae* infection in goats in Hunan province, China and elsewhere.

Acknowledgements

This work was supported in part by a fund from the Animal Husbandry and Fishery Bureau of Hunan province (Grant Nos. 201111).

References

- Alley MR, Ionas G and Clarke JK 1999. Chronic non-progressive pneumonia of sheep in New Zealand - a review of the role of *Mycoplasma ovipneumoniae*. *N Z Vet J* 47(5): 155-160.
- Besser TE, Cassirer EF, Potter KA, VanderSchalie J, Fischer A, Knowles DP, Herndon DR, Rurangirwa FR, Weiser GC and Srikumaran S 2008. Association of *Mycoplasma ovipneumoniae* infection with population-limiting respiratory disease in free-ranging Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). *J Clin Microbiol* 46(2): 423-430.
- Citti C and Blanchard A 2013. Mycoplasmas and their host: emerging and re-emerging minimal pathogens. *Trends Microbiol* 21(4): 196-203.
- Dassanayake RP, Shanthalingam S, Herndon CN, Subramaniam R, Lawrence PK, Bavananthasivam J, Cassirer EF, Haldorson GJ, Foreyt WJ, Rurangirwa FR, Knowles DP, Besser TE and Srikumaran S 2010. *Mycoplasma ovipneumoniae* can predispose bighorn sheep to fatal *Mannheimia haemolytica* pneumonia. *Vet Microbiol* 145(3-4): 354-359.
- Gianguaspero M, Nicholas RA, Hlusek M, Bonfini B, Osawa T, Orusa R, Tatami S, Takagi E, Moriya H, Okura N, Kato K, Kimura A, Harasawa R and Ayling RD 2012. Seroepidemiological survey of sheep flocks from

Xu P. et al. / Thai J Vet Med. 2017. 47(3): 395-399.

Northern Japan for *Mycoplasma ovipneumoniae* and *Mycoplasma agalactiae*. *Trop Anim Health Prod* 44(3): 395-398.

Guo H, Chu YF and Zhao P 2009. Seroprevalence of *Mycoplasma ovipneumoniae* in sheep in Qinghai province, China. *Anim Husb Feed Sci* 4(2): 34-35. (in Chinese)

Nicholas R, Ayling R and McAuliffe L 2008. *Mycoplasma Diseases of Ruminants*. (CABI, Oxford, UK).

Rong G, Zhao JM, Hou GY and Zhou HL 2014. Seroprevalence and molecular detection of *Mycoplasma ovipneumoniae* in goats in tropical China. *Trop Anim Health Prod* 46 (3):1491-1495

Zhao P, Lu ZX, Chu YF, Gao PY, He Y and Shi Q 2008. Development of the indirect hemagglutination test of *Mycoplasma ovipneumoniae*. *J Gansu Agr Univ* 43(1): 29-32. (in Chinese)

บทคัดย่อ

ความชุกทางซีรัมวิทยาของเชื้อ *Mycoplasma ovipneumoniae* ในแพะ ในมณฑลหูหนานประเทศจีน

ปัง หยวน เสี่ยว หยุนเซา เฝิง เสี่ยวเซียง โอวหยาง เฝิงกั๋ว ถัน*

ข้อมูลความชุกของการติดเชื้อ *Mycoplasma ovipneumoniae* ในแพะในประเทศจีนยังมีน้อยมาก ในการศึกษาครั้งนี้ได้มีการตรวจหาความชุกทางซีรัมวิทยาของการติดเชื้อ *M. ovipneumoniae* ในแพะในมณฑลหูหนานประเทศจีน ระหว่างเดือนกันยายน พ.ศ. 2558 ถึงกันยายน พ.ศ. 2559 โดยตรวจตัวอย่างซีรัมทั้งหมด 750 ตัวอย่างจากแพะ 10ฝูงในเขตบริหารมณฑลหูหนานประเทศจีน โดยทดสอบการตกตะกอนเม็ดเลือด indirect hemagglutination assay (IHA) พบว่าแอนติบอดีต่อ *M. ovipneumoniae* ในตัวอย่างเลือดจำนวน 234 ตัวอย่าง (31.2%) (IHA titer \geq 1: 16) โดยพบความชุกของเชื้อ *M. ovipneumoniae* ตั้งแต่ 22% ถึง 50% ในแต่ละเขตในมณฑลหูหนานและมีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ($P < 0.01$) นอกจากนี้ความชุกของการติดเชื้อ *M. ovipneumoniae* ในแพะสูงสุดในช่วงฤดูหนาว (40%) ฤดูใบไม้ผลิ (32.4%) ฤดูใบไม้ร่วง (27.2%) และฤดูร้อน (24.4%) และแตกต่างกันอย่างมีนัยสำคัญทางสถิติ ($P < 0.01$) ผลจากการสำรวจในปัจจุบันพบว่าการติดเชื้อ *M. ovipneumoniae* สูงในแพะในมณฑลหูหนานประเทศจีน

คำสำคัญ: *Mycoplasma ovipneumoniae* ความชุกทางซีรัมวิทยา แพะ IHA

หูหนาน ซีววิทยาและช่างกลไฟฟ้า โพลีเทคนิค ฉางซา 410127, สาธารณรัฐประชาชนจีน

*ผู้รับผิดชอบบทความ E-mail: uprecious@foxmail.com