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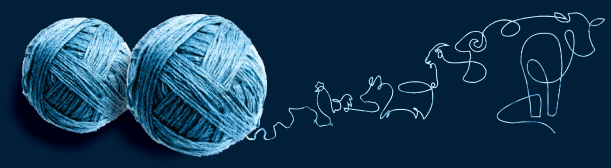
MODERN TRENDS IN LIVESTOCK PRODUCTION



PROCEEDINGS

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SEROPREVALENCE TO *MYCOPLASMA HYOPNEUMONIAE* IN GILTS AND SOWS

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Abstract: Respiratory diseases represent a significant problem in pig farming as they can cause significant economic losses all over the World. One of the most common causes of infection is *Mycoplasma hyopneumoniae* (*M. hyopneumoniae*) either as the primary cause of enzootic pneumonia or as one of the causative agents of Porcine Respiratory Disease Complex (PRCD). In our study we presented the presence of antibodies against *M. hyopneumoniae* in 94 blood sera of gilts and 84 blood sera of sows, originated from 4 commercial pig farms. For this purpose, the indirect ELISA test was used. Seroconversion was established in 11 (11.70%) sera of gilts and in 15 (17.85%) sera of sows. The percentage of positive sera differed among the farms, ranging in gilts from 0- 28.57%, and in sows 9.09-36.84%. The results of the study have shown that infection with *M. hyopneumoniae* is present in gilts on three and in sows on all four examined farms. Successful control of *M. hyopneumoniae* depends on the efficient prevention of the transfer of the infective agent. Good results can be achieved using strict implementation of reliable serological methods. The serological control of gilts prior to fertilization is of extreme importance, as it can prevent spreading of the disease within the herd.

Key words: *Mycoplasma hyopneumoniae*, antibodies, blood sera, gilt, sow.

Introduction

Respiratory diseases are a significant health problem in the pig industry and an endless challenge not only to veterinarians, but to all other structures which are involved in livestock production. They are present on all meridians, causing

substantial economic losses due to great fatalities, slow growth, poor feed conversion rate and costs for medical treatment (*Baker, 2005; Bochev, 2007; Nathues et al., 2013).*

Respiratory diseases are the result of a combined effect of multiple factors, out of which living conditions and infectious agents stand out (*Hansen et al., 2010).* Constantly striving for greater profitability, agglomerations counting a large number of animals on a restricted area have resulted in overcrowding. In such conditions, there is an overproduction of gases, dust, heat and bioareosol particles which influence the air composition, and the organism of the animals (*Đorđević et al., 2007; Maes et al., 2018*). Besides poor keeping conditions, sudden temperature changes and the immunosuppressive effects of the microbial agents also add to the pathogenesis of respiratory tract diseases (*Thacker, 2004; Shen et al., 2017; Maes et al., 2018).*

By combining the effects of a number of factors, among which the most important are the breeding conditions and infectious agents, a disease known as Porcine Respiratory Disease Complex (PRDC) can develop (*Fano et al., 2005; Bruguera i sar., 2006; Cheong et al., 2017).* The most common relevant infective agents are viruses and bacteria. Among them *Mycoplasma hyopneumoniae (M. hyopneumoniae*) is the most common pathogen. *M. hyopneumoniae* is the primary cause of enzootic pneumonia (EP) and a concurrent agent causing PRDC (*Thacker, 2004; Nathues et al., 2013; Garza et al., 2018*). Enzootic (mycoplasmatic) pneumonia is a chronic, clinically mild, infectious pneumonia with a long incubation period and a tendency to become endemic in a herd. It causes persistent coughing, stunned growth, sporadic „flare-up"episodes of respiratory distress and a high incidence of pulmonary lesions in fattening pigs *(Ameri-Mahabadi et al., 2005; Wilson et al.,2013; Li et al., 2019).*

M. hyopneumoniae binds itself to the epithelial cilia in the proximal parts of the respiratory system, resulting in subsequent clumping and loss of cilia. These losses of ciliary structures result in a poor efficacy of the mucociliary apparatus, thus „opening the gate" to secondary bacterial microbiota (*Thacker, 2004; Maes et al.,2018).*The agent is transmitted mainly in a vertical fashion from the sow to litter, and thereon horizontally from litter to litter (*Fano et al., 2005; Nathues et al., 2013*).

For years *M. hyopneumoniae* has been the cause of significant health problems in countries with intensive pig farming, including the Republic of Serbia. For these reasons we have set the aim to test the blood sera of gilts and sows for the presence of *M. hyopneumonie* antibodies. Further on, according to the obtained results, to evaluate the present status of *M. hyopneumoniae* infections, as well as to compare the obtained results with the findings from previous studies. In order to

achieve the set goals we have opted for iELISA as a sensitive and specific serological test.

Material and Methods

Blood was sampled from 94 gilts and 84 sows on four pig farms. The "farrow to finish" farms were located on the Northwest of Serbia and had a capacity of 1000 sows each. On the farms the pigs were not vaccinated against *M. hyopneumoniae*. Blood samples were taken from clinically healthy animals. Blood serum samples were tested by indirect ELISA (HerdChek M.hyo: Mycoplasma hyopneumoniae, antibody test Kit, IDEXX).

Results and Discussion

Out of the total number of 178 tested blood serum samples 94 were taken from gilts and 84 from sows. Results of the presence of antibodies against *M. hyopneumoniae* are shown in Table 1.

Table 1. Results of the presence of antibodies against *Mycoplasma hyopneumoniae* in gilts and sows blood sera

Farm	Category	Number of samples	No. positive (%)	No. negative (%)
1	gilts	26	3 (11.53)	23 (88.46)
	sows	21	3 (14.28)	18 (85.71)
2	gilts	23	2 (8.69)	21 (91.30)
	sows	22	3 (13.63)	19 (86.36)
3	gilts	21	6 (28.57)	15 (71.42)
	sows	19	7 (36.84)	12 (63.15)
4	gilts	24	0 (0.00)	24 (100)
	sows	22	2 (9.09)	20 (90. 90)
Total gilts		94	11 (11.70)	83 (88.29)
Total sows		84	15 (17.85)	69 (82.14)
Total animals		178	26 (14.60)	152 (85.39)

Antibodies against *M. hyopneumoniae* were established in a total of 26 (14.60%) samples from gilts and sows. In gilts, antibodies were detected in 11 (11.70%) samples and in sows in 15 (17.85%) blood sera samples. The percentage of positive sera differed among the farms, ranging in gilts from 0- 28.57% and in sows 9.09- 36.84%. Similar results were recorded in Slovakia, where seropositive animals

were detected on all four tested farms (*Prokeš et al., 2012*), in Spain on all 12 tested farms (*Sibila et al., 2004),* while in Poland out of 23 tested pig farms, 21 resulted *M. hyopneumoniae* seropositive *(Dors et al., 2012*). Serological tests carried out in Northwest Germany have revealed that 65% of sows originating from 67 herds tested positive for *M. hyopneumoniae antibodies* (*Grosse-Beilage et al., 2009*). In Belgium the percentage of seropositive pigs in clinically infected herds increased from 8% in pigs at 9 weeks of age to 52% in pigs at 18 weeks (*Vicca et al., 2002*). In West India 459 pigs sera were analyzed by means of iELISA. Antibodies to *M. hyopneumoniae* were found in 8.71% pigs. A higher percentage of animals was established in pigs younger than 12 months (62%), seroprevalence in pigs older than 2 years was 22% (*Vogler et al., 2017).*Interesting is the first report of *M. hyopneumoniae* seroprevalence in farmed wild boars in China. They have detected 78 out of 882 (8.8%) samples as seropositive *(Liang et al., 2018).*

According to our results, farm number 4 stands out, as out of the 24 tested samples from gilts not a single one resulted positive on testing for *M. hyopneumoniae* antibodies. Also, on this farm the lowest number of seropositive sows was recorded (9.09%). This can be explained by the fact that this farm is newly build with highly technological up to date solutions. Contributing to its success is the fact that biosecurity measures, as well as health management are of the highest standard. The highest number of seropositive gilts (28.57%) and sows (36.84%) was recorded on farm number 3. Contrary to farm number 4, this farm has old inadequate facilities, which are difficult to maintain adequately and perform correctly measures such as ventilation and disinfection.

In general, it can be concluded that on all four farms *M. hyopneumoniae* infected animals were detected. The number of infected gilts was lower compared to the number of infected sows. When comparing the obtained results with the results we previously reported it can be noted that the overall number of infected animals has decreased. Thus, in the previous years the number of infected gilts on farms was 17-65% % (*Žutić et al., 2008*) and sows 12-67% (*Žutić et al., 2011*). This trend can be explained by the fact that gilts are serotested before being introduced into the herd, regardless if they are bred on the farm or are acquired from other sources.

Conclusion

The results of the investigations have shown that infection with *M. hyopneumoniae* is present in gilts on 3 and in sows on all 4 examined farms. The intensity of infection differed among the farms, and also among the gilts and sows. The best results were obtained from farm number 4 where only 9.09% sows were seropositive and not one gilt. In comparison of both categories it can be noted that the

total number of infected gilts (11.7%) is lower than the number of infected sows (17.85%)

The successful control of *M. hyopneumoniae* depends on the efficient prevention of the transfer of the infective agent, both between the farms and also between certain categories of animals on the same farm.

Serological diagnostics of infections caused by *M. hyopneumoniae* is an essential mean for the identification of atently infected herds, the elimination of the infection from the herd and control of animals in quarantine.

The serological control of gilts prior to fertilization is of great importance as it prevents vertical and horizontal spreading of the disease within the herd.

According to the experience of a number of authors, ELISA test can be considered as a highly sensitive and specific serological test in the diagnostics of *M. hyopneumoniae* infections which can be used as a monitoring tool in different categories of pigs.

Seroprevalencija *Mycoplasma hyopneumoniae* kod nazimica i krmača

Jadranka Žutić, Olivera Valčić, Branislav Kureljušić, Dobrila Jakić-Dimić, Jasna Kureljušić, Nemanja Jezdimirović, Nemanja Zdravković

Rezime

Respiratorne bolesti predstavljaju značajan problem svinjarske proizvodnje nanoseći velike ekonomske gubitke u mnogim zemljama širom sveta. Nastaju kao posledica kombinovanog dejstva brojnih faktora a kao najznačajniji se smatraju uslovi držanja i infektivni agensi. Među najučestalije infektivne agense ubraja se *Mycoplasma hyopneumoniae (M. hyopneumoniae). M. hyopneumoniae* je primarni uzročnik enzootske pneumonije (EP) i jedan od najznačajnijih učesnika u nastanku kompleksa repiratorne bolesti svinja-PRDC. Enzootska ili mikoplazmatska pneumonija je hronična, klinički blaga, infektivna pneumonija svinja sa dugim inkubacionim periodom i tendencijom da postane endemična u zapatu.

Cilj rada je bio istražiti prisustvo antitela protiv *M. hyopneumoniae* u krvnim serumima nazimica i krmača sa komercijalnih farmi u Republici Srbiji. U tu svrhu korišten je indirektni ELISA test. Ukupno su sa 4 farme ispitana 94 krvna seruma nazimica i 84 seruma krmača. Antitela na *M. hyopneumoniae* utvrđena su u 26 (14,60%) uzoraka u obe grupe životinja. Upoređujući obe kategorije životinja zapaža se da je niži procenat inficiranih ustanovljen kod nazimica (11,70%) nego

kod krmača (17,85%). Procenat pozitivnih seruma razlikovao se među farmama i kretao se kod nazimica od 0-28,57% a kod krmača od 9,09-36,84%. Na sve četiri farme otkrivene su životinje inficirane sa *M. hyopneumoniae* i na svim farmama je utvrđen manji procenat inficiranih nazimica u odnosu na krmače. Upoređujući rezultate ovih, sa rezultatima naših prethodnih istraživanja, uočava se značajan pad procenta inficiranih životinja u obe kategorije.

Ključne reči: *Mycoplasma hyopneumoniae*, enzootska pneumonija, antitela, iELISA.

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