

Seroprevalence of *Mycoplasma synoviae* and *Mycoplasma gallisepticum* at Batna Commercial poultry farms in Algeria

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Abstract

Aim: The present study was undertaken to know the seroprevalence of *Mycoplasma synoviae* (MS) and *Mycoplasma gallisepticum* (MG) in broiler and layer chickens in the area of Batna, eastern Algeria. This investigation was conducted during the period from 2008 to 2011.

Materials and Methods: A total of 505 sera samples were collected and tested by serum plate agglutination (SPA) test using *Mycoplasma gallisepticum* and *Mycoplasma synoviae* antigens (Soleil Diagnostic) to detect the presence of antibodies against MS and MG.

Results: The overall prevalence of MS and MG infection in the 27 flocks visited in this investigation were recorded as 66.33% and 69.90% respectively. Seroprevalence of MG infection was found significantly ($p < 0.05$) higher during winter season (61.48%) than in summer (47.74%) while MS infection is more dominant in summer (91.25% against 46.69%). Again this was recorded in different age groups, with significantly higher occurrence in young compared to adult with 85.14% in layer hens and 90.73% in broiler chickens. On the other hand, the seroprevalence of MG and MS infection was found little ($p > 0.05$) higher in large flocks (76.97%) in comparison to small flocks (63.63%). The highest prevalence (76.59%) of mycoplasmal infection in layer hens was found in Lohman strain.

Conclusion: It has been found that MG and MS infections are still important disease problems in poultry farms in Algeria.

Key words: *Mycoplasma gallisepticum*, *Mycoplasma synoviae*, seroprevalence, poultry farms, SPA

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Introduction

Mycoplasmosis is one of the major problems among avian diseases in emerging poultry industry of Algeria. In the recent years, poultry farming has been hampered by the outbreak of fatal infectious diseases caused by bacteria, viral, Mycoplasmal and other causal agents [1].

Among bacterial diseases, mycoplasmosis is one of the most important infections in poultry that cause serious economic losses. It is caused by four commonly recognized pathogenic *Mycoplasma* namely *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), *Mycoplasma meleagridis* (MM) and *Mycoplasma iowae* (MI) but MG and MS are the most important ones [2].

All ages of chickens are susceptible to this disease but young birds are more prone to infection than adults [3]. The disease may be transmitted both horizontally and vertically and remain in the flock constantly as subclinical form [4].

The aim of this study is to know the status of Mycoplasmosis in Algeria in chickens in order to take an effective control measure against this infection which causes heavy economic losses.

Materials and Methods

Ethical consideration: Adequate measures were taken to minimize pain or discomfort in accordance with the International Animal Ethics Committee. The study was approved by the committee framed for the

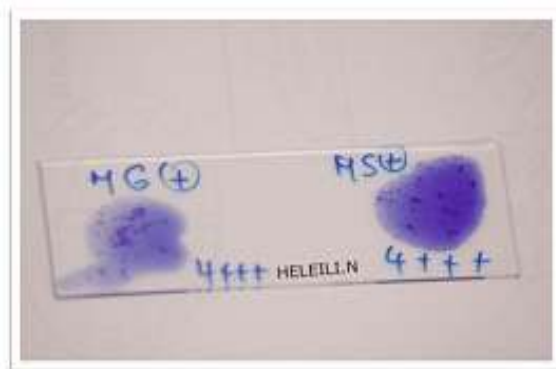


Figure-1. Very large clumps, complete background clearing (++++)

research by the university authority. During the survey visits, the researchers introduced themselves and explained the objective and methodology of the study to all poultry farmers.

Study area: The present study was conducted during the period from 2008 to 2011, at 13 districts. A total of twenty seven layer and broiler chickens flocks were selected in 13 municipalities of the region of Batna, in Algeria with at least one livestock by municipality: laying hens (n = 11), broiler chickens (n = 16). A total of 505 birds were randomly selected for blood collection.

Mycoplasma (MG, MS) antigen: The serological screening of Mycoplasma infection was conducted by the rapid serum agglutination test (SPA) carried out according to the technique described by Adler [5] with an antigen of MG and MS (colored inactivated Antigen for SPA kindly supplied by Soleil diagnostics, France).

Preparation of sera samples: The evaluation of the SPA test was validated using known positive and negative control sera. After coagulation during 2 hours at room temperature, the sera were centrifuged at 1500 tr/min for 15 min and inactivated at 56°C for 30 min. Then, the sera were diluted to 1/5 to reduce non specific and cross-reactions between MG and MS. All sera are put in sterile aliquots and maintained at 4°C until use within the following 48hours. According to Stanley *et al.* [6], the reaction is considered positive when the clumps appear in two minutes.

Statistical analysis: The seroprevalence of MG and MS infections were compared with season, age of birds, size of flock, type of production and strain of birds by the correlation test.

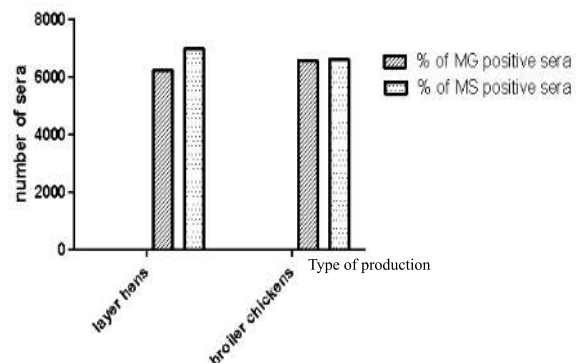


Figure-2. Seroprevalence of *Mycoplasma gallisepticum* and *Mycoplasma synoviae* in relation of type of production

Results and Discussion

A total of 505 sera samples were collected during winter and summer season tested by Serum Plate Agglutination test (SPA) to determine the seroprevalence of MG and MS infection in the region of Batna, eastern Algeria (figure-1). The overall prevalence of infection was 68.11% which strongly supported the earlier investigations of Wunderwald *et al.* [7] who reported a rate of 75% of mycoplasmal infection and Osman *et al.* [8] with 61.47%.

Age is a very important parameter influencing the incidence of mycoplasmosis [9]. According to the age, the seroprevalence of mycoplasmosis in young birds were significantly higher than adult birds regardless of the species. Indeed, in laying hens, the higher prevalence of MG and MS infection were respectively 75% and 95.83% in the age group from 52 to 112 days ($P = 0.0001$ for MG and $P = 0.0002$ for MS). In broilers chickens, the frequency of infection with MG and MS were respectively 92.59% and 88.88% in birds aged 30-39 days ($P = 0.0065$ for MG and $P = 0.0013$ for MS). Similar report was demonstrated by Osman *et al.* [8].

Figure-2 shows that the individual rate of infection is more significantly higher for broilers chickens ($P < 0.0001$). The seroprevalence of MG infection was estimated at 65.91% in broiler chickens. This value appears to be significantly higher than the values of 1.25%, 49.5% and 30% respectively reported by Baruta *et al.* [10], Barua *et al.* [11] and Aimeur *et al.* [12]. The prevalence of MS infection was found to be 69.96%. Mac Owan *et al.* [13] gave same result (64.23%). In laying hens, we estimated infection caused by MG at a rate of 62.21%. It is probably as widespread as in Bangladesh (66.5% and 45.1%) in the study of Barua *et al.* [11] and Hossain *et*

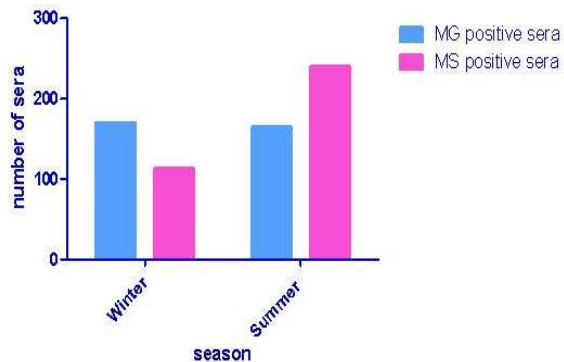


Figure-3. Seroprevalence of *Mycoplasma gallisepticum* and *Mycoplasma synoviae* in relation to seasons.

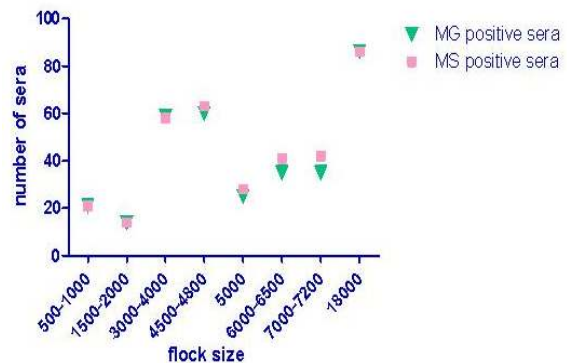


Figure-4. Seroprevalence of *Mycoplasma gallisepticum* and *Mycoplasma synoviae* in relation with age in broiler chickens

al. [14]. The results reported in our study for the MS infection (69.84%) seem to be closer to that observed by Nascimento *et al.* [15] with 60% and Kapetanov *et al.* [16] with 40.48%.

Seasonal variation of prevalence of MG and MS infection was also studied. *Mycoplasma gallisepticum* infection is most dominant in winter rather than summer (70.24% against 62.73%). This is consistent with the respective results of Sikder *et al.* [17], Hossain *et al.* [18], Sarkar *et al.* [3], Hossain *et al.* [14] and Thai *et al.* [19]. However, MS infection seems to be more dominant in summer with 91.25% against 46.69% respectively (figure-3). Same result was reported by Arbelot *et al.* [20].

Serological investigation in the wilaya of Batna showed the highest infection rate (76.97%) in large scale flocks (18000 birds) in comparison to small (500-1000 birds) flocks (figure-4) Similar report was demonstrated by Talha [21] which recorded 36% for MG infection in a herd containing 300 birds from 33% in a herd with 250 birds. The intensity of infection in farms with high production probably is related to deficiencies in the management and biosecurity [22].

Conclusion

According to our results, it appears that the rate of infection in the wilaya of Batna is very important in comparison to other countries such as Niger, Bangladesh, and Tunisia etc. This high incidence could be explained by the deficit in the rearing conditions and also the absence of vaccination, serological screening (SPA) and bacteriological control (culture or PCR) regularly to ensure the absence of contamination.

Author's contribution

NH and MB participated in the preparation of the

experimental design. CA and AA collected samples. NH analysed data, sample and wrote the final draft of different levels of the manuscript. All the authors read and approved the final manuscript.

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Competing interests

Authors declare that they have no Competing interests.

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