

# Serological Evaluation of poultry mycoplasmas in ostrich farms of Iran

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## Abstracts

Serological response to poultry mycoplasmas reported from ostriches in some countries, with respiratory signs. The aim of current study was to evaluation of serological changes in ostrich farms of Iran. In this study, 114 ostrich from various sites of Iran evaluated. In ostriches with respiratory signs, blood samples were taken and antibody against *Mycoplasma gallisepticum* (MG) and *Mycoplasma synoviae* (MS) was investigated. The results indicated 19.29% of serum samples were positive in MG rapid serum test (RSA), and 21.92% was positive in MS RSA. In serologically positive ostriches some respiratory signs were recorded. Results indicate that the poultry mycoplasmas could infect ostriches and to prevent the infection ostriches should be kept away from poultries.

**Keywords:** Mycoplasma, Ostriches, Serological evaluation, clinical signs

## Introduction

*Mycoplasma gallisepticum* (MG) is one of the most important disease in poultry production and also it is the causative agent of chronic respiratory disease in chickens (Kleven, 1998). MG infection causes significant economic losses in the poultry industry due to downgrading of carcasses at slaughter because of airsacculitis, treatment costs, and due to its effect on flocks performance (Ley and Avakian, 1992), and reduction of egg production in chickens, turkeys and other avian species were reported (Ley, 2008).

Mycoplasmas are widespread in nature and differ from other bacteria, because their size and cell wall lack (Bradbury and Morrow, 2008). Mycoplasmas are host-specific and completely resistant to antibiotics that affect cell wall synthesis (Al-Ankari and Bradbury, 1996). Pathogenic avian mycoplasma including *Mycoplasma gallisepticum* (MG) and *Mycoplasma synoviae* (MS) in chickens and turkeys, and *Mycoplasma meleagridis* (MM) and *Mycoplasma iowae* (MI) in turkeys (Panangala *et al.*, 1992).

Mycoplasmas generally cause respiratory diseases and rhino-tracheitis, airsacculitis and inflammation of the upper respiratory tract in ostriches (Huchzermeyer, 1994; Verwoerd, 2000). In cold, windy weather in the winter and during summer following heat stress usually rhino-tracheitis reported from ostriches (Botes *et al.*, 2005; Verwoerd, 2000). Additionally, MS had been isolated from respiratory infected ostriches (Huchzermeyer, 1994). Serological response to poultry mycoplasmas (MG, MS and MM) were reported from northern Italy (Peccati *et al.*, 1996). Antibodies against MG and MS was reported from ostriches slaughterhouses in Zimbabwe (Cadman *et al.*, 1994).

MG can be diagnosed by its different properties such as microbial culture, biochemical and serological properties (Jalilnia and Movassagh, 2011; Ley, 2008). Serology is the only reliable tools for detecting the subclinical infection in the flock (Barua *et al.*, 2006). There are two major Serological methods, which were used for screening farms in Iran, Rapid Serum Plate Agglutination (RSA), and Enzyme Linked Immunosorbent Assay (ELISA); however, there were differences in sensitivity and specificity of these methods.

Eradication is the most important control measure for MG infections in poultry production. Especially eradication of vertically transmitted agents, early detection of new infections is extremely important. For a long period, control and prevention programs were based on use of the rapid serum plate agglutination (RSA) test, Hemagglutination inhibition (HI) test, and culture. RSA is used as the screening test because it's rapid, has high sensitivity, and low specificity, as well as being inexpensive. Due to economic importance diagnosis and prophylaxis of avian mycoplasmas has received attention, recently. According to Iranian Veterinary Organization rules control of MG is dependent on serologic screening results.

MG showed clinical signs in experimentally infected ostriches previously (Cline *et al.*, 1997). It was mentioned that the mycoplasmas in ostriches, were not typical mycoplasmas of poultry which infected respiratory system in poultry (Shivaprasad, 1993), other researchers indicated that the unique ostrich-specific mycoplasmas in ostriches (Shane, 1998; Smith, 1993). *M. synoviae* previously was isolated from Iranian ostrich farms (Tebyanian *et al.*, 2014). It was reported that the *Mycoplasma* transmitted within species or between closely related species, with rare exceptions (S.H. Kleven, 2008; Nascimento *et al.*, 2005).

The aim of current study was to evaluation of poultry mycoplasmas in ostrich farms of Iran using rapid serum agglutination tests (RSA).

## Materials and Methods

**Samples:** For this study, 114 samples were taken from ostrich farms and investigate the presence of mycoplasma antibodies. From all ostriches with respiratory signs serum samples taken for antibody evaluation against MS and MG. The rapid serum plate agglutination test was conducted by delivering 0.02 ml of serum onto a clean glass plate followed by the addition of 0.02 ml of each specific mycoplasma antigen. The serum-antigen drop-lets were mixed with applicator stick for approximately 10 swirls, and then the plate was rotated on a gentle plate-test shaker for approximately 2 minutes. In positive cases granules formed slowly which was seen during rocking, but in negative case no such granules formed within two minutes (Avakian *et al.*, 1988).

**Clinical Signs:** In infected ostriches with respiratory signs with serological response, clinical signs were recorded.

## Results

Results indicated that the 19.29 percent of serum samples has antibodies against *Mycoplasma gallisepticum* and 21.92 percent of serum sample has antibodies against *Mycoplasma synoviae*. In addition, clinical evaluation of infected ostriches indicated the major signs includes; respiratory infection and rhino-tracheitis. In necropsy air sacculitis along with pus in air sacs was recorded. In some cases hyperemia and hemorrhage was seen in trachea. In 10.52% of cases, clinical signs were recorded. In infected flocks anti-mycoplasma drugs was used successfully.

## Discussion

In ostriches, mycoplasmas cause respiratory diseases, rhino-tracheitis, airsacculitis and upper respiratory tract inflammation (Huchzermeyer, 1994; Verwoerd, 2000). We reported serologic response to poultry mycoplasmas in ostriches, along with clinical and gross pathologic changes in infected ostriches.

In South Africa *M. gallisepticum* and *M. synoviae* isolated from ostriches with respiratory symptoms, especially in winter from ostriches (Verwoerd, 2000). In northern Italy serological survey, using the rapid plate test with specific antigen for *M. gallisepticum*, *M. synoviae* and *M. meleagridis*, demonstrated seropositive to all above mycoplasmas (Peccati et al., 1996). Also, it was reported that the experimental infection with *M. gallisepticum* causes to colonization in trachea of young ostriches (Cline et al., 1997). Some reported studies was indicated there was no clinical signs in mycoplasma infection of ostriches (Shivaprasad, 1993). *M. synoviae* was isolated from respiratory tract infection of ostriches (Verwoerd, 2000), and serologic response to *M. gallisepticum* and *M. synoviae* was reported previously by some researchers (Cadman et al., 1994; Peccati et al., 1996). In *M. gallisepticum* experimentally infected ostriches clinical sign was reported (Cline et al., 1997). Because of ostriches susceptibility ostriches to poultry mycoplasma, ostrich farms should be free of poultry species (Verwoerd, 2000).

Results of study demonstrated that the ostrich farms of Iran was infected with *M. gallisepticum* and *M. synoviae*. According to results, 21.92% and 19.29% of positive samples in RSA diagnosed as *M. synoviae* and *M. gallisepticum*, respectively. In Kerman province of Iran the 52 % ostriches farms was positive as *M. synoviae* and 48% of other mycoplasmas that was unidentified (Tebyanian et al., 2014). *M. synoviae* causes subclinical respiratory infection in poultry, but economic losses was reported (Elhamnia et al., 2016), in ostriches some respiratory signs reported, thus its control is important in poultry and ostrich farms.

*M. gallisepticum* was isolated and detected from chicken farms by PCR and RFLP in the Fars province of Iran (Behbahan et al., 2005). In addition, *M. gallisepticum* was identified by RAPD test from different geographical areas of Iran, while *M. synoviae* was negative (Peighambari et al., 2006). In South Africa ostrich farms new mycoplasma named as *Mycoplasma struthiolus* has been infected ostriches (Botes et al., 2005).

Although in South Africa ostriches that was kept close to poultry poultry mycoplasma was not infected the ostriches and they were only infected with *M. struthiolus* (Botes et al., 2005), but some researchers documented infectious with poultry mycoplasma in ostriches.

From samples were taken from Iranian ostriches it was shown high rate of infectious with MG and MS in respiratory system of ostriches. Researches was reported that the mycoplasma has infected upper respiratory tract of ostriches (Botes et al., 2005), but infectious with poultry mycoplasmas and their clinical signs in ostriches was not documented clearly. It should be investigated that if poultry origin mycoplasmas cause clinical signs in poultry or not.

For prevention of mycoplasma infections in ostriches, it is recommended to keep poultries away from them to prevent from infection.

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