Isolation of *Escherichia coli* and *Staphylococcus aureus* from ostriches with conjunctivitis and respiratory disease

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**SUMMARY**

Fourthynine (10-12 months old, 30 males and 19 females) ostriches were kept in the small pen with high levels of ammonia and insufficient ventilation for two months in winter. After two months in sixteen ostriches (12 females and 4 males) respiratory problems were observed. Clinical signs included loss of appetite, ocular and nasal discharge, conjunctivitis and dyspnea. *Staphylococcus aureus* and *Escherichia coli* were isolated from the nasal cavity and conjunctiva. In according to antibiogram results, isolated microbial agents were the most susceptible to amoxycillin and clavulanic acid combinations. All sick animals were treated with amoxycillin and clavulanic acid combinations (7mg/kg, I.m., for 3 days) and administered corticosteroidal ointment for treating conjunctivitis for one week. All birds responded to treatment.

**KEY-WORDS :** conjunctivitis - ostriches - respiratory disease - treatment.

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**Introduction**

Factors involved in respiratory disease include keeping birds in cold conditions. High dust levels and insufficient ventilation leading to high levels of ammonia can also be important. These and other stressors can depress the immune system, making the birds more susceptible to moulds or bacterial and viral agents [2].

Bacterial infections are an important issue in intensive ostrich breeding. The most important thing is a high level of ostriches infection with *Escherichia coli*, *Salmonella* spp., *Pseudomonas* spp. [10]. Bacteria isolated from respiratory disease in ostriches include *Staphylococcus* spp., *Pasteurella haemolytica*, *Pseudomonas aeruginosa*, *Bordetella* spp., *Haemophilus* spp., *Streptococcus viridans*, *Mycoplasma* spp. and *Chlamydia psittaci* [2, 5, 8].

Ostrich farming has been rapidly expanding in Turkey to produce usable products such as meat, hides, feathers, and eggs. The purpose of the study reported here were to determine high dust level, insufficient ventilation and high levels of ammonia causes respiratory disease and to identify pathogenic bacteria from respiratory tract in ostriches.

**Materials and methods**

The farm involved was in Isparta in Turkey and included fourthynine (10-12 months old; 30 males and 19 females) ostriches (*Struthio camelus*). In winter the animals were kept...
in the small pens for two months. After two months in sixteen ostriches (12 females and 4 males) respiratory problems were observed (Figure 1). The birds manifested clinical symptoms such as loss of appetite, ocular and nasal discharge, dyspnea and conjunctivitis (Figure 2). A guarded cotton-tipped swab was used to collect secretions from the posterior nasal cavity and conjunctiva. Nasal and conjunctival swab samples so collected were sent for bacteriological culture.

Bacteriological examination: Samples were cultured on 10% sheep blood agar and MacConkey agar plates. Plates were incubated in aerobic conditions at 37°C for 24-48 hours. After presumptive identification based on colony morphology and microscopic morphology, biochemical and growth characteristics of the isolates were determined [6].

Antibiogram test was performed with the bacteria isolated from nasal and conjunctival samples.

Antibiogram test: Antibiotic susceptibilities of isolates were determined by disk diffusion method on Mueller Hinton agar (Oxoid) plate [1]. The following commercial antibiotic disks were used in this procedure: penicillin G (Oxoid, 10 μg), ampicillin (Oxoid, 10 μg), amoxicillin (Oxoid, 25 μg), amoxicillin+ clavulanic acid (Oxoid, 30 mcg), oxytetracycline (Oxoid, 30 μg), enrofloxacin (Oxoid, 5 μg), danofloxacin (Mast Diagnostics, Mast Group Ltd., Merseyside, U.K., 5 μg) and gentamycin (Oxoid, 10 μg). 0.2 ml of pure culture of each isolate incubated at 37°C for 6-8 hours in trypticase soy broth (Oxoid) was transferred on the Mueller Hinton agar and spread evenly by sterile glass baget. After the inoculum was dried at room temperature for 5-10 minutes, the antibiotic disks were placed on the agar and plates were incubated at 37°C for 24 hours. Finally, growth inhibition zone diameter of each antibiotic disk was measured. The decision about whether the test isolate was resistant or susceptible to the antibiotic was made by comparing the measured zone diameters (in millimeters) with standard zone chart.

Results

The *Staphylococcus aureus* and *E. coli* were isolated from the conjunctival swab samples and *E. coli* was isolated from the nasal swab samples. In according to antibiogram results, microbial agents that isolated from nasal and conjunctival swap samples were the most susceptible to amoxycillin and clavulanic acid combinations. All sick animals were treated with amoxycillin and clavulanic acid combination (7 mg/kg, I.M., for 3 days). In additional administered steroidal ointment for treating conjunctivitis for 7 days. After treatment in all birds nasal and ocular discharge stopped, appetite was normal and conjunctivitis was treated. A one isolate each species was recovered from the swabs taken after the end of therapy. No other pathogenic bacteria were isolated.

Discussion

In ostriches respiratory disease most frequently affects the nasal passages, the infraorbital sinuses, the conjunctivae, larynx, trachea and air sacs, but less frequently the lungs [3]. *E. coli* was isolated from the conjunctiva and the sinus, and *Staphylococcus spp.* was isolated from the conjunctiva from an emu [11]. Eight *E. coli* were isolated from ostriches with respiratory disease [4].

The housing animals together and other stressful conditions predispose animals to *E. coli* and *S. aureus* infections. In this farm 16 (32.65%) out of 48 animals were suffered from infection. *S. aureus* and *E. coli* were isolated from the conjunctival and *E. coli* was isolated from the nasal swab samples. These results are in agreement with the other above mentioned investigations.

All sick animals were treated with amoxycillin and clavulanic acid combination. No adverse effect after intramuscular administration of amoxycillin and clavulanic acid combination was observed.

The ostrich is obviously extremely well adapted to the climatic environments prevailing in Africa, and it tolerates both hot, arid conditions and cooler, wet subtropical zones [7]. STEWART (1994) asserts that the birds are very hardy and can be successfully bred and reared in environmental extremes from desert heat to winter snows. In this case in winter the owner kept fourynine animals in one small pen and there was not air ventilation and included high ammonia

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**FIGURE 1.** — Conjunctivitis in ostrich.

**FIGURE 2.** — Conjunctivitis in ostrich.
levels whereas adults can be safely kept outdoors throughout
the year. It was suggested that closed housing systems and
high stress factors and insufficient ventilation were all re-
ponsible for respiratory disease and conjunctivitis in
ostriches.

References