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Case Report
Streptococcal Conjunctivitis Outbreak in Boschveld Chickens in Mozambique

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Abstract

Reports on preventable animal diseases are rare, even though this occurs frequently in developing nations. This report highlighted the outbreak of suspected bacterial conjunctivitis in Boschveld chicken that had been transported by road from South Africa to Northern Province of Cabo Delgado. A total of 3694 chickens were used in this study and 672 mortalities occurred. Clinical signs and gross lesions of bacterial conjunctivitis were indicated in the affected birds. *Streptococcus* spp. was detected in the infected eyes by microbiological analysis. This succinct communication serves to: (a) Reinforce the need for strict measures to reduce chicken stress during long-distance transport, (b) Show that bacteria of the genus *Streptococcus* should be included in the differential diagnosis of infectious conjunctivitis in Boschveld chicken, (c) Depict the need to avoid chicken imports and depend on local production for the current and future chicken restocking projects and (d) Indicate unavoidable diseases of chickens at larger-scale.

Key words: Animal welfare, Boschveld, chicken, conjunctivitis, eye disease, Mozambique, *Streptococcus* spp.

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

In Mozambique, public and non-governmental chicken restocking projects are being carried out. These projects seek to reduce food insecurity and increase income for refugees as in Cabo Delgado province well as for rural farmers suffering from drought in Gaza and Inhambane Provinces. Boschveld chicken is a breed of chicken that is frequently used in these restocking projects.

The Venda, Matabele and Ovambo indigenous breeds were crossed to create Boschveld chicken. It was created for the remote rural areas of the continent of Africa and South Africa. This breed can survive in extreme temperatures, show greater resistance to the main poultry diseases when compared to other native chickens. These chicken can raise on homemade and low cost feed [1].

Preventable diseases are common in developing nations but its documentation is not common[2]. This study describes Boschveld chicken disease caused by streptococcal conjunctivitis on a Mozambican farm in Cabo Delgado Province. To our knowledge, this observational report is the only example of the potential disease outbreak in Boschveld chickens.

Conjunctivitis is a common ocular disease that affects livestock all over the world. The disease has an economic impact on animals used for animal production when it causes tearing, blepharospasm, photophobia, blindness, weight loss, a decrease in milk production, higher treatment costs, or even death[3,4]. Numerous etiologic agents, including bacteria from the genus Streptococcus, can cause conjunctivitis[5] and respiratory infections in chickens[6]. They are gram-positive, motile, catalase-negative and facultatively anaerobic bacteria. They can affect domestic birds of any age, whether they are confined or free and we can see them in pairs or short chains under light microscopy[5].

CASE PRESENTATION

On Boschveld chickens farm clinical symptoms started to appear in 3694 birds older than three months. These chickens were raised in the Republic of South Africa and exported to Maputo, Mozambique, where they were quarantined for approximately 40 days. Birds were then travelled 2400 kilometers in three days, from Maputo City to Montepuez Village in the Cabo Delgado Province. The journey was halted every 800 km for 4 hrs, during which layer feed and water were provided *ad libitum*.

The following day after arrival, clinical signs like bilateral mucous purulent ocular discharge, eye swelling, wounds around the eyes and weight loss were found in 672 birds. The mucopurulent ocular secretion completely covered the eyes of the birds and caused complete blindness. Blind birds were unable to reach the feeders and water sources. About 2 days after the detection of first case, 488 chickens died.

The chicken houses and equipments were cleaned once daily for five days with virukill (Quaternary Ammonium, ICA International Chemicals, Lda, South Africa) in order to control infectious disease in poultry. All birds were treated with Oxyplus Formula-soluble combination of oxytetracycline and vitamins A, D, E, K and B from Kepro B.V. in The Netherlands. Also, crusts of mucus-purulent exudate from the eyes of the sick birds were manually removed before the eyes were topically cleaned with Virukil (Quaternary Ammonium, ICA International Chemicals, Lda, South Africa). The clinical signs vanished and the mortality was completely under control after 4 days of the treatment and application of these biosafety measures.

Twelve dead birds were sent to the Pathology Anatomy Laboratory, Veterinary Faculty, Eduardo Mondlane University (FAVET, UEM) for anatomopathological and laboratory diagnosis. The eyes were swollen, inflammed and muco-purulent exudate was found at necropsy. The remaining organs had no relevant lesions. Mucus-purulent secretion was aseptically collected and sent to the Microbiology and Immunology laboratory at FAVET, UEM, for microbiological analysis. On a blood agar culture medium, these secretions were grown and incubated for 24 hrs at 37°C. The Gram staining method was used to assess the morphological traits of isolated colonies. It was noted that gram-positive cocci and chain-like cocci colonies were expanding. The catalysis test was conducted to confirm the findings and the results were negative. From any tissue samples, *Streptococcus* spp. were isolated, but no other pathogenic bacteria were found.

DISCUSSION

Outbreak in Boschveld chickens indicated the clinical symptoms of bacterial infection caused by stress. Our initial diagnosis was confirmed by the successful use of antibiotics and vitamins. Moreover, streptococcus-related bacteria were also isolated in the laboratory. Chicken weight loss and co-infection with other bacterial pathogens was not detected in previous reports [7,8].

Numerous animal species, including horses[9,10], bovines[11,12], goats[13] and birds[9,10], have been reported to experience conjunctivitis associated with streptococcal infection[7,8]. However, this is the first report of this kind of infection in Boschveld chicken.

There are few reports on conjunctivitis outbreak because the genus Streptococcus may cause respiratory diseases in chickens but the ocular involvement is rare[5]. Body of birds naturally contain viruses and bacteria that have the potential to cause infectious disease only if the immune system of birds is weakened due to stress conditions[5]. In this study, the birds experienced a long transportation stress and exposure to the sun and rain. These factors are considered as stressors, lowered the birds' natural immunity, encouraged the growth of latent pathogenic bacteria and sparked symptoms of the current ocular disease.

Streptococcal infections should be treated with antibiotics[5]. Oxytetracycline and the vitamins A, D, E, K and B were administered to the birds in this case and they responded favorably. This result supported our initial hypothesis about bacterial infection and is consistent with the isolation of *Streptococcus* spp. in the examined samples. It was decided that vitamins would be included in the current treatment protocol because vitamins are nutritional components required for cell growth, development and metabolism. Also, vitamins A, D, E and C support the immune system of birds and lessen the negative effects of stress[14].

CONCLUSION

This report (a) demonstrates the need for strict measures to reduce bird stress during the long-distance transport, (b) demonstrates the need to include Streptococcus bacteria in the differential diagnosis of conjunctivitis in Boschveld chickens and (c) highlights the large-scale avoidable suffering of chickens that still occurs and (d) it also highlights the need to avoid imports and depend on local production for both current and future chicken restocking projects in Mozambique.

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