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Eucoleus contortus Parasitism in Captive-Bred Valley Quail *Callipepla californica* (Shaw, 1798): Disease and Control

Eucoleus contortus-Parasitismus in Menschenobhut gezüchteter Schopfwachteln *Callipepla californica* (Shaw, 1798): Krankheit und Kontrolle

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Abstract

After the introduction of an infected valley quail into a colony, *Eucoleus contortus* became a severe problem. Despite previous treatment with anthelmintics, four out of nine quails were affected and died due to disease complications. Major clinical signs were profuse oral mucous secretion, frequent swallowing movements, and whitish diarrhea. Main pathological findings included thickened and wrinkled crop walls, parasites deeply embedded in the stratified squamous epithelium, and diffuse mucosa hyperplasia. Keeping the remaining quails in a wire mesh-floored aviary under treatment with levamisole and applying management practices to the dirt floor aviaries (temporary depopulation, bedding exchange and liming) promoted the health and growth of the quail colony. Apparently, the anthelmintics given to these birds had little effect on the control of the disease. Regularly treatments decreased temporarily the egg counts, which increased again during periods (breeding season) in dirt floor aviaries, even after applying the aforementioned environmental measures. This paper highlights

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the importance of adopting appropriate health management practices to both prevent and control *E. contortus* infection in susceptible avian flocks housed in outdoor aviaries with dirt floor, often a necessary condition in bird conservation programs.

Keywords: Bird management; Aviary management; Captive-bred valley quail; *E. contortus* control; Thickened crop wall

Introduction

Eucoleus contortus (Gagarin, 1951) (syn. *Capillaria contorta* Creplin, 1839) is a small filiform nematode that affects the upper digestive tract of domestic and wild birds following the ingestion of eggs or infective larva-containing intermediate hosts (McDougald, Yazwinski, & Tucker, 2008). While galliform species are most frequently affected, infections have also been reported in additional bird families (Cubas, 2007). Capillariosis evolves with nonspecific signs, such as apathy, ruffled feathers, emaciation, wasting, and death (McDougald et al., 2008). Capillariosis has been a problem in commercial and conservationist avian breeding systems due to enclosed bird agglomeration, and environmental worm egg persistence (Cubas, 2007). While fenbendazole, mebendazole, and ivermectin have been listed as effective anthelmintics in the treatment of capillariosis, parasitic resistance to these drugs has been documented (Greiner & Branson, 1994; De Rosa & Shivapprasad, 1999). This paper reports the clinical, pathological and therapeutic findings, in addition to the management practices observed in an *E. contortus*-affected colony of captive-bred California valley quail (*Callipepla californica*).

Materials and Methods

Clinical, therapeutic, and management data were obtained from the owner and/or recorded during the aviary visits. The affected colony was studied for two years. The four dead quails were necropsied. Tissue samples were collected, fixed in 10% buffered formalin and routinely processed for histopathology. The sections were then stained with hematoxylin and eosin (HE). The esophagi of the dead quails were preserved in 70% alcohol and examined under a stereomicroscope for the presence of parasites. The esophagi were kept in pepsin acid solution (Dubey, 1998) and observed daily until dissection for removal of parasites adhering to the mucosa. These parasites were fixed in heated Railliet & Henry solution (93 ml of a 0.85% NaCl solution, 5 ml of formaldehyde, and 2 ml of glacial acetic acid), mounted between glass slides, clarified in acetic acid and identified according to Yamaguti's (1961) taxonomic key and additional descriptions (Vicente, Rodrigues, Gomes, & Pinto, 1995; Stapf, Kavetska, Ptak, & Rzad, 2013). Quail fecal samples were analyzed for parasite eggs using the Willis-Mollay method and eggs per gram (EPG) counts.