

Diagnostic Challenge

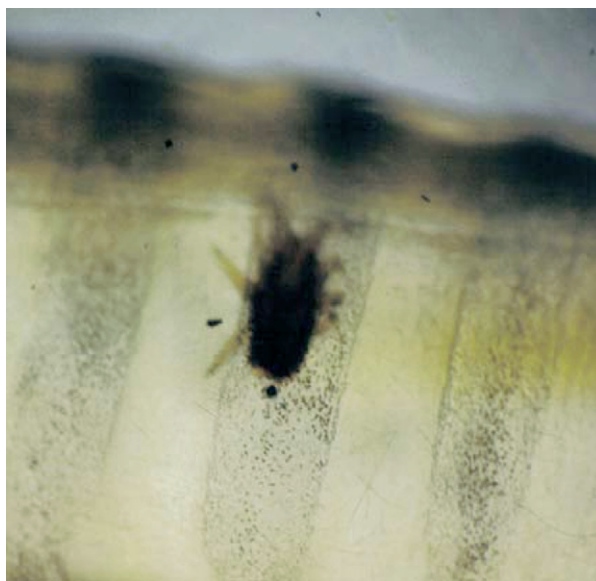
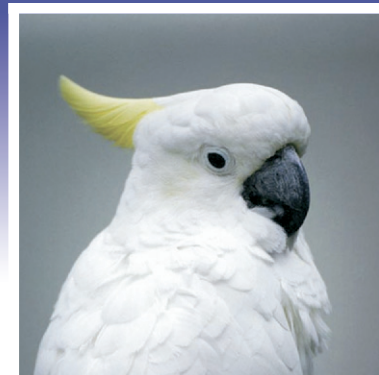


Figure 1. This organism was found in the trachea at the time of necropsy ($\times 100$).

History

This case describes an illness affecting a group of 35 canaries (*Serinus canaria*) from a private bird collection in the Metropolitan Region of Chile. Affected birds were initially found to be depressed and sneezing. Over time, the condition of some birds worsened, with animals displaying increased respiratory disease (e.g., open-mouth breathing, change in vocalization, loss of song), depression, and cachexia. At the time of presentation, 3 birds from the groups had died.

The birds were housed communally in an outdoor aviary. Based on cage size, it was determined that the density of birds was too high. The diet was limited to a commercial canary seed. This flock of birds had not been previously examined by a veterinarian for any medical problem.

Affected birds were maintained in the same cage under clinical observation, and the birds that died while under study were subjected to a postmortem examination in the Avian Diseases Diagnostic Laboratory for Wild and Pet Birds at the College of Veterinary Sciences, University of Chile. The organism found in [Figure 1](#) was identified during the gross necropsy examination.

At this time, evaluate the history and external physical examination results and develop a differential diagnosis list including a preliminary treatment plan while waiting for the final necropsy results.



Figure 2. *Sternostoma tracheacolum* from a canary trachea ($\times 400$).

Diagnosis

Clinical examination of the affected bird flock allowed the veterinarians to identify the majority of birds with respiratory distress and physical debilitation. Overall, the morbidity and mortality rates associated with this disease outbreak approached 80% and 17%, respectively. Clinical signs in affected animals included a loss of voice, head shaking, gasping, nasal discharge, squeaking, and sneezing. All of the clinical signs described above are similar to signs describing respiratory acariasis; however, attempts to transilluminate the mites in the trachea were unrewarding.^{1,3} Other initial differential diagnoses included avian poxvirus, *Aspergillus* spp infection, toxin exposure, and/or pneumonia.

The physical examination of 6 dead adult canaries revealed that the animals were in poor body condition (2/5), with body weights ranging between 15 and 25 g. At postmortem examination, these individuals had serous mucus present along the entirety of the respiratory tract. Whitish, raised areas were seen on the walls of the airsacs, principally on the thoracic airsacs, and the presence of numerous small “dark spots” were noted

on the mucosal surfaces of the airsacs, bronchi, trachea, and lungs. The “dark spots” found on the respiratory tissues were rinsed with lactofenol and mounted between a microscope slide and coverslip. The sample was reviewed under light microscopy (100 \times and 400 \times), and the “dark spot” on the slide was identified as *Sternostoma tracheacolum* (Fig 2).⁴ The length, width, and body structures of these mites were similar to descriptions from other authors (Fig 2).⁵⁻⁷

After the final diagnosis was made, the birds received individual treatment with 0.1% ivermectin (Ivomec; Merial, Duluth, GA USA) diluted in propylene glycol and applied as a topical “spot on” over the skin covering the right jugular vein. This treatment was repeated once every 2 weeks over a 6-week period, resulting in a total of 3 treatments.^{2,8} The aviary was disinfected and the perches were replaced. Other control methods instituted included the application of an acaricide (pyrethroids) on the cage surfaces and the continuous cleaning of the common drinking locations.

Comments

Sternostomosis is a parasitic infectious disease that affects wild-

life and pet birds. The etiological agent is a bloodsucking mite, *S tracheacolum* (suborder Mesostigmata; family Rhynonyssidae), that infects the respiratory system.¹ *S tracheacolum* is primarily associated with Gouldian finches (*Erythrura gouldiae*) and canaries²; however, it has also been diagnosed in budgerigars (*Melopsittacus undulatus*), pictorella mannikins (*Heteromunia pectoralis*), masked finches (*Poephila personata*), lovebirds (*Agapornis* sp) and other bird species.^{5,9} Although this mite was first identified in South Africa, it is now considered to have a cosmopolitan distribution.¹⁰⁻¹²

Sternostomosis is transmitted in direct form via the oral route or when infested adult birds regurgitate food to their nestlings or during courtship behavior. Mite transmission also occurs from the nasal cavity of an infected bird to the nasal cavity of a recipient bird via the external nares of each bird. Indirect transmission has been detected through water, perches, or other contaminated surfaces.¹³ A combination of environmental conditions and the drinking behavior of susceptible host species will determine the probability for indirect transmission.¹³ In this case, the probability for indirect transmission among unrelated and susceptible canaries may have been enhanced because of a high bird density, a poor availability of perches, and a reduced surface area for water drinking.

The tracheal mite is ovoviviparous and lays its eggs in the lungs of the host. The life cycle from egg to adult is completed in less than 6 days according to in vitro experimentation. Larvae hatch shortly after oviposition and moult without feeding. After a blood meal, female protonymphs move to the airsacs and male protonymphs tend to stay within the lung to complete development. Gravid females normally occupy the airsacs,

syrinx, and trachea of the host, whereas non gravid females are more commonly found in the upper respiratory system.¹³

Sternostoma spp infections may not be clinically apparent or can be mild to severe, resulting in death by asphyxiation.^{1,14} Birds with moderate *Sternostoma* spp infections often present with mild respiratory clinical signs such as dyspnea, open-mouth breathing, and gurgling, all signs that are similar to those described in this case. Vocalization changes, including losing the ability to sing, have also been observed in canaries and other birds.^{1,3,14}

Control methods involve individual bird treatment and aviculture management procedures. Birds should always be provided a supply of clean water to minimize the likelihood of indirect mite transmission. *Sternostoma* spp can survive for a few hours in water but rapidly desiccate in the absence of moisture.¹³ Routine aviary disinfection with perch replacement should also be practiced to minimize the likelihood of mite transmission.

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