First report of *Thelazia* spp. (Nematoda, Thelaziidae) as a parasite of *Penelope obscura* (Galliforme, Cracidae) in Brazil

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**Abstract.** The aim of the present study was to describe a case of a dusky-legged guan (*Penelope obscura*) as a new host for nematode of the genus *Thelazia*. The bird came from Botucatu, São Paulo State, Brazil and two females of the parasite were found on the nictitating membrane of the left eye. This paper also discusses the absence of associated injuries to parasitism in the host, and the importance of ophthalmic evaluation during necropsy on wild birds.

**Keywords:** *Thelazia* spp.; Dusky-legged guan; *Penelope obscura*; Ophthalmology; Brazil.

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**Introduction**

*Penelope obscura*, the dusky-legged guan, is a bird that belongs to the Galiforme order and the Cracidae family. It lives in forests in the south and southeast of Brazil and in neighboring countries: Argentina, Bolivia, Paraguay and Uruguay (Sick, 2001). This frugivorous species is considered to be very important for biological dissemination of seeds in the Brazilian environment (Fadini and Júnior, 2004).

Parasitic infections associated with ophthalmic diseases in birds are limited to protozoans and helminths (Shivaprasad, 2008). Spirurian nematodes of the family Thelaziidae are classified into four genera: *Ceratospira*, *Hempelia*, *Oxyspirura* and *Thelazia*, and these genera have been described parasitizing the
eyes of domestic and wild birds (Vicente et al., 1995).

*Thelazia* spp. infects the eyes and adjacent tissues of birds and mammals, including humans. The parasites are transmitted by dipterans of the genera *Musca* (family Muscidae), *Phortica* (family Drosophilidae), or *Fannia* (family Fanniidae). The animal and human cases have medical and veterinary importance, because some exceptional infections demand special therapeutic care (Otranto and Traversa, 2005; Bowman, 2010; Chanie and Bogale, 2014).

Twelve species of *Thelazia* spp. have been described parasitizing birds in Brazil: *Thelazia anobialata*, *T. anadorhynchi*, *T. aquilina*, *T. buteonis*, *T. campanulata*, *T. cholodkowskii*, *T. chungkingensis*, *T. dacelonis*, *T. papillosa*, *T. pitta*, *T. sicki* and *T. tonkinensis* (Strachan, 1957; Vicente et al., 1995).

The aim of this study was to report the dusky-legged guan *Penelope obscura* as a new host for nematode of the genus *Thelazia* in southeastern Brazil for the first time.

**Case report**

An adult dusky-legged guan was received at the Wild Animal Medicine and Research Center (CEMPAS) of the School of Veterinary Medicine and Animal Husbandry (FMVZ), São Paulo State University (UNESP). The bird was found in an urban area in the municipality of Botucatu, São Paulo, Brazil (22°51'S, 48°27'W; 780 m). The bird arrived presenting severe dyspnea, and it died immediately after the physical examination and initial medical care. The necropsy examination was performed at the Avian Pathology Laboratory of FMVZ-UNESP.

During postmortem examination, the animal had a good external physical condition. However, two nematodes were localized on the nictitating membrane of the left eye (figure 1). Internally, the necropsy evidenced lesions at the coelomic cavity such as the presence of marked amount of hemorrhagic fluid, hepatic jaundice, congested lungs and heavy bleeding, mesenteric congestion, intestinal mucosa with a highly extensive hemorrhagic aspect. Histopathological examination revealed a diffuse pulmonary congestion associated with hemorrhage and alveolar interstitial edema. Cytoplasmic vacuolization and disorganization of hepatic cords, slight congestion, necrosis of the bowel, villi of disintegration and numerous stages of oocysts of *Eimeria* sp. among the enterocytes were also observed. The cause of death was determined as a chronic pulmonary insufficiency.

The parasites found were stored in a vial containing 70% alcohol and sent to the Animal Parasitic Diseases Laboratory for identification, which was performed using a computerized image analysis system. The nematodes were morphologically identified as two females of *Thelazia* spp. (figures 2a and 2b), based on the following morphological criteria: cuticle with prominent jagged striations, no lips, short oral cavity, oral capsule composed of six buds, long esophagus, conic and rounded tail, presence of two side buds at the end, vulva located at the front end, near the esophagus termination, and utero turned backward. (Vicente et al., 1995; Rodrigues, 1992).

**Discussion**

Among birds of the family Cracidae, the following parasitic eyeworms have been reported: *T. anobialata* parasitizing the rusty-margined guan (*Penelope superciliaris superciliaris*), bare-faced curassow (*Crax fasciolata*) and Chaco chachalaca (*Ortalis canicollis pantanalensis (= Ortalis canicollis)); *T. buteonis* parasitizing the blue-throated piping-guan (*Aburria cumainensis cumainensis (= Aburria cumanensis)); *T. chungkingensis* parasitizing the Alagoas curassow (*Mitu mitu mitu (=Pauxi mitu)); and *Thelazia* sp. parasitizing the red-billed curassow (*Crax blumenbachii*) and *O. canicollis* (Rodrigues, 1996; Vicente et al., 1995; Piacentini et al., 2015). Strachan (1957) also described *Thelazia lutzi* parasitizing the eye of *P. superciliaris*. 

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Figure 1. Presence of nematode parasitizing the left eye of a dusky-legged guan; image from necropsy

Figure 2a. Anterior end of a female specimen of *Thelazia* spp. collected from *Penelope obscura* in Botucatu, state of São Paulo, Brazil
Although *Thelazia* spp. has already been reported parasitizing *Penelope* spp. (Strachan, 1957; Vicente et al., 1995; Rodrigues, 1996), to the authors’ knowledge the infection in *P. obscura* has not been previously recorded. However, the finding of two female specimens allowed identification to the genus level only, providing the first evidence of nematode of *Thelazia* parasitizing *P. obscura*.

Among birds’ senses, vision is the most important (Orosz, 2007). Many systemic infectious and non-infectious diseases are manifested through eye damage. Therefore, performing a detailed examination of the eyes can provide much information for diagnosing systemic diseases (Orosz, 2007; Shivaprasad, 2008).

In general, parasites of the genus *Thelazia* has no pathogenic effect on the host (Chanie and Bogale, 2014). Bowman (2010) reported that *Thelazia* spp. was not capable of causing lesions in cattle and horses, although complicated cases require special therapeutic care. Otranto and Traversa (2005) reported that adult and larval forms of the parasite were responsible for several symptoms and pathological complications in mammals, including: lacrimation, ocular discharge, conjunctivitis, keratitis, corneal opacity, ulcers and mechanical damage. Hodžić et al. (2014) disclosed that ocular clinical signs related to infection by the species *Thelazia callipaeda* in mammals vary according to the host.

In the present study, there were no signs of ophthalmic lesions associated with the two individuals of *Thelazia* spp. found in *P. obscura*. This raises the hypothesis of an immunosuppressive reaction to pneumonia and hemorrhagic enteritis, which would decrease the response of the host to the parasite, hence the absence of lesions. Other variables such as the host’s environmental behavior and ecological interactions between parasite and host are important points in understanding the adaptation process and absence of ophthalmological clinical signs in a new host. Ophthalmological examination is often neglected in the postmortem evaluation, which might further explain the absence of case...
reports regarding infections by *Thelazia* spp. in *P. obscura*.

These findings highlight the importance of ophthalmological examination in clinical and postmortem evaluations of wild birds. Furthermore, the present paper contributes by describing a new host for *Thelazia* spp. More research is required to evaluate the possible damage caused by thelaziosis and other ocular parasitic diseases in birds.

References


