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Systematic and pathologic study of *Paratanaisia bragai* (Santos, 1934) Freitas, 1959 (Digenea, Eucotylidae) infestation in ruddy ground dove *Columbina talpacoti* (Temminck, 1811)

[*Estudo da sistemática e da patologia de* Paratanaisia bragai *(Santos, 1934) Freitas, 1959 (Digenea, Eucotylidae) em rolinha-caldo-de-feijão,* Columbina talpacoti *(Temminck, 1811)*]

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ABSTRACT

This is the first report of the digenetic trematode *Paratanaisia bragai* infestation in a ruddy ground dove *Columbina talpacoti*, captured in a suburban area of Rio de Janeiro, Brazil. Although with a low prevalence (10%), the intensity of infection was high, considering that 116 worms were recovered from one of the kidneys. Gross lesions were not observed and histopathological analysis showed very dilated renal collecting ducts with destruction and flattening of the lining epithelial cells, without inflammatory reaction. The pathological findings were compared to those previously reported for *P. bragai* in other hosts, since the proposal of the species in 1934.

Keywords: ruddy ground dove, Digenea, *Paratanaisia bragai*, *Columbina talpacoti*, pathology, Brazil

RESUMO

O trematódeo digenético Paratanaisia bragai *é referido pela primeira vez parasitando a rolinha-caldo-de-feijão,* Columbina talpacoti*, proveniente de área suburbana do Rio de Janeiro, Brasil. Embora com baixa prevalência (10%), a intensidade de infecção foi alta, considerando que 116 exemplares do parasito foram obtidos de um dos rins. Não foram observadas lesões macroscópicas. A análise histopatológica demonstrou grande dilatação dos dutos coletores renais, com destruição e achatamento das células epiteliais de revestimento, sem reação inflamatória. Os achados patológicos foram comparados aos anteriormente relatados para* P. bragai *em outros hospedeiros, desde a proposição da espécie em 1934.*

Palavras-chave: rolinha-caldo-de-feijão, Digenea, Paratanaisia bragai, Columbina talpacoti*, patologia, Brasil*

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INTRODUCTION

The ruddy ground dove, *Columbina talpacoti* Temminck, 1811 is commonly distributed from the southeastern of Mexico, to Meridional Cisandine America (also accidentally in Chile), from the Guyanas to the north of Argentina (including the Tucumán and Buenos Aires provinces), east of Peru, Bolivia, Paraguay, Uruguay (rarely) and Brazil (all the States), except for occasional reports of its presence in the surroundings of these prevailing areas (Pinto, 1978; Sick, 2001).

This bird has often been investigated for ecto and endoparasites, since the species is adapted either to wild or urban environmental conditions, commonly sharing food with sparrows and pigeons in the cities, in residential areas and mainly in the vicinities of pet shops, where captive exotic birds and small rodents are maintained for sale; thus, with the possibility of acting as reservoirs and carriers of pathogenic agents mainly to Galliformes hosts from backyard flocks or other avian hosts of economic importance, specimens of *C. talpacoti* are referred in surveys of acari (Arzua and Barros-Battesti, 1999; Price et al., 1999) protozoa (Adriano et al., 2000; Adriano and Cordeiro, 2001) viruses (Ferreira et al.; 1994; Pereira et al., 2001) and helminths, that are the main target of this investigation.

Records of worms parasitizing the ruddy ground dove are few and only from Brazil, except for the description of the intestinal trichostrongyloid nematode *Ornithostrongylus cristatus* Durette-Desset & Vaucher, 2001, from Paraguay (Durette-Desset and Vaucher, 2001).

The helminths recovered from this host refer to the nematodes *Ascaridia magalhaesi* Travassos, 1913, *Ornithostrongylus magalhaesi* Travassos, 1941 from the intestine (Vicente et al., 1995) and the digeneans *Brachylaemus* (*Mazzantia*) *mazzantii* (Travassos, 1927) Travassos & Kohn, 1964, from the intestine and *Tanaisia magnicolica* Freitas, 1951 from the kidney (Queiróz, 1966; Travassos et al., 1969).

This paper reports the first occurrence and pathology of the digenean *Paratanaisia bragai* (Santos, 1934) Freitas, 1959, in the kidneys of *Columbina talpacoti*.

MATERIALS AND METHODS

In September, 1966, 10 specimens of the ruddy ground dove were trapped in a suburban area of Rio de Janeiro, RJ, Brazil and further investigated for helminths, according to the files available at the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC) where the deposited compressed/uncompressed samples were maintained in formalin as unidentified material. Helminths were counted and some were stained with carmine, dehydrated in an alcoholic series, cleared with phenol and kept as whole mounts in beechwood creosote and balsam. Fragments of organs were routinely processed for paraffin embedding. Five micrometers thick sections were stained with haematoxylin and eosin. Whole mounts of the worms and histological sections were registered under the number CHIOC 35043 a-i. Slides 35043 a-h contain helminths and the slide 35043 i keeps the histological sections. Photomicrographs were obtained either in a brightfield Olympus Axiophot microscope or in a Leica stereomicroscope. Classification of the helminths follows Freitas (1959), Travassos et al. (1969) and that of the host and its common name are in accordance with Pinto (1978), Frisch (1981) and Sick (2001).

RESULTS

Helminths were present only in the kidneys of one specimen of *Columbina talpacoti*, out of the 10 euthanised (prevalence of 10%) and 116 worms were recovered from one of the kidneys, 1.5cm long, 0.6cm wide (the other was used for histopathological analysis) and identified to the digenean *Paratanaisia bragai* (Santos, 1934) Freitas, 1959, on the basis of specific morphological characters (Fig. 1).

The compressed specimens were 2.6-3.2mm in length and 0.51-0.66mm in width, with eggs 0.032-0.040mm long × 0.014-0.018mm wide (measurements based on 10 specimens); the uncompressed trematodes were 1.76-2.040mm long and 0.51-0.57mm wide. The size of the eggs did not vary in uncompressed specimens (measurements based on 10 individuals).

Data on the gross (Fig. 2, 3) and microscopic (Fig. 4, 5, 6) lesions observed were compared to those previously reported (Tab. 1).

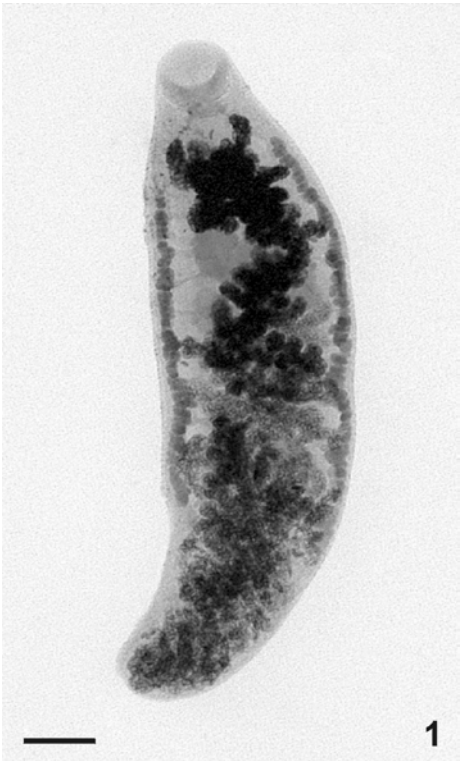

Figure 1. Uncompressed specimen of *P. bragai* from *C. talpacoti*, total. Bar = 0.2mm.

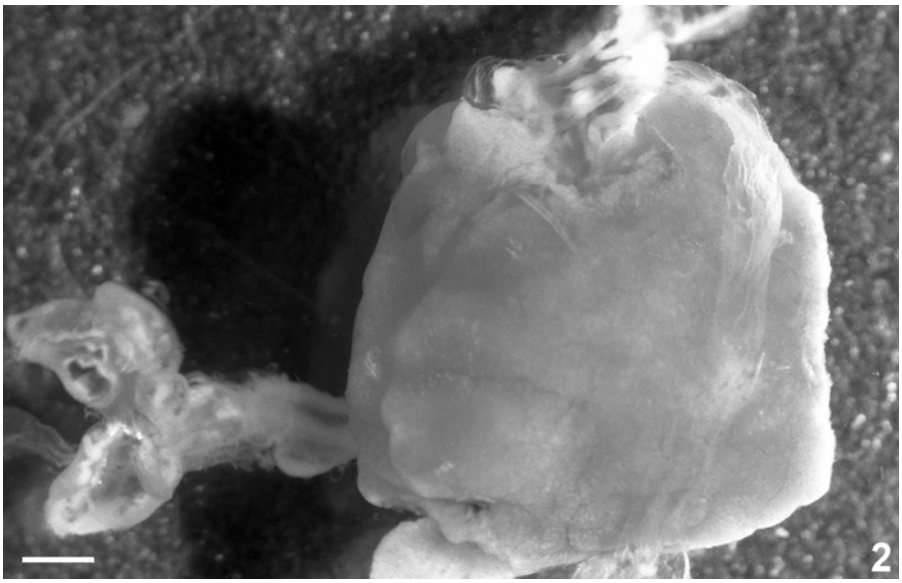

Figure 2. Kidney fragment of *C. talpacoti* parasitized with *P. bragai* showing very dilated collecting ducts with parasites. HE. Bar = 0.5mm.

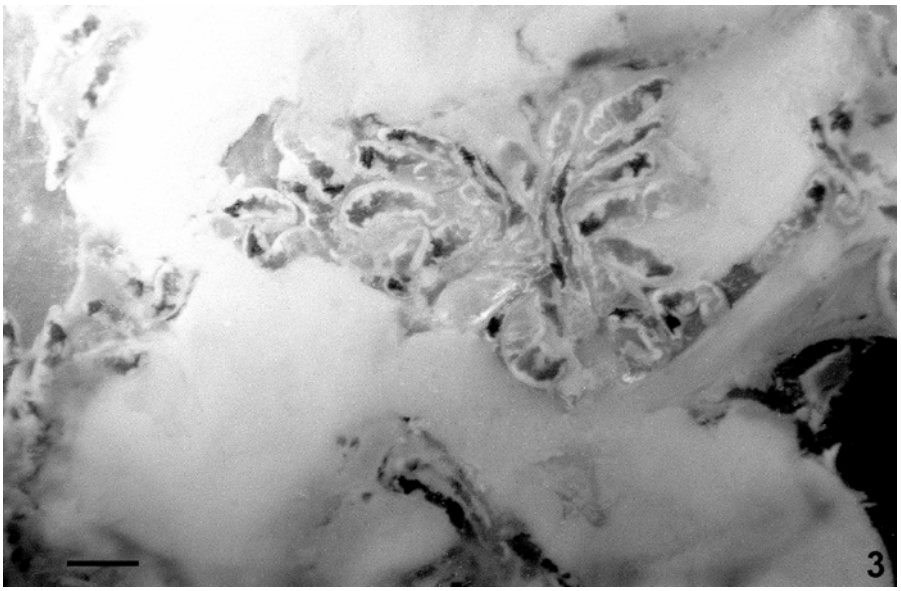

Figure 3. Massive infection by *P. bragai* in a compressed kidney fragment from *C. talpacoti*. Bar = 0.5mm.

Figure 4. Cross-section of kidney of *C. talpacoti* parasitized with *P. bragai*. Very dilated medullary collecting ducts with trematodes. The histology of renal cortex is normal and no inflammatory reaction is observed. HE. Bar = 0.2mm.

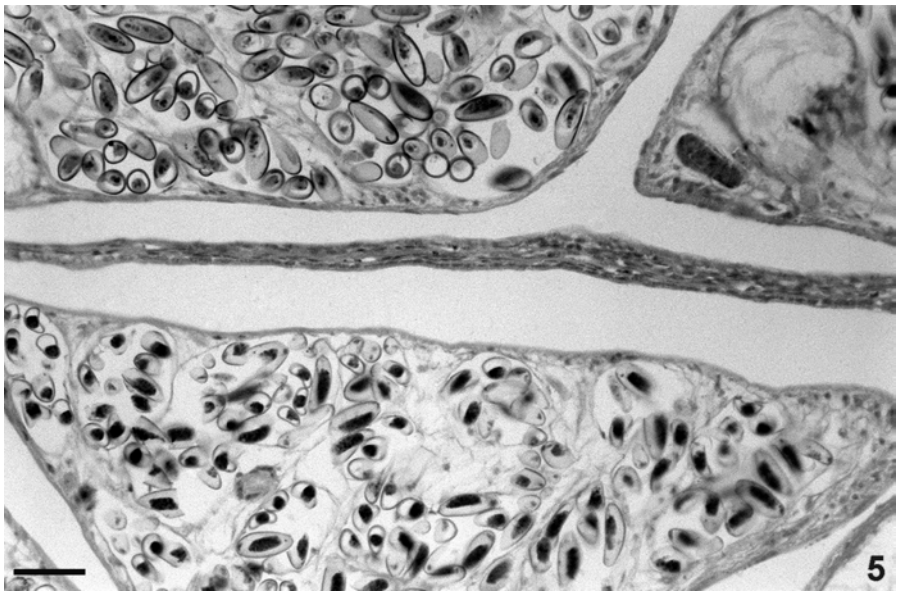

Figure 5. Cross-section of kidney of *C. talpacoti* parasitized with *P. bragai*. Detail of parasites in the interior of collecting ducts showing flattening of the lining epithelial cells. HE. Bar = 0.05mm

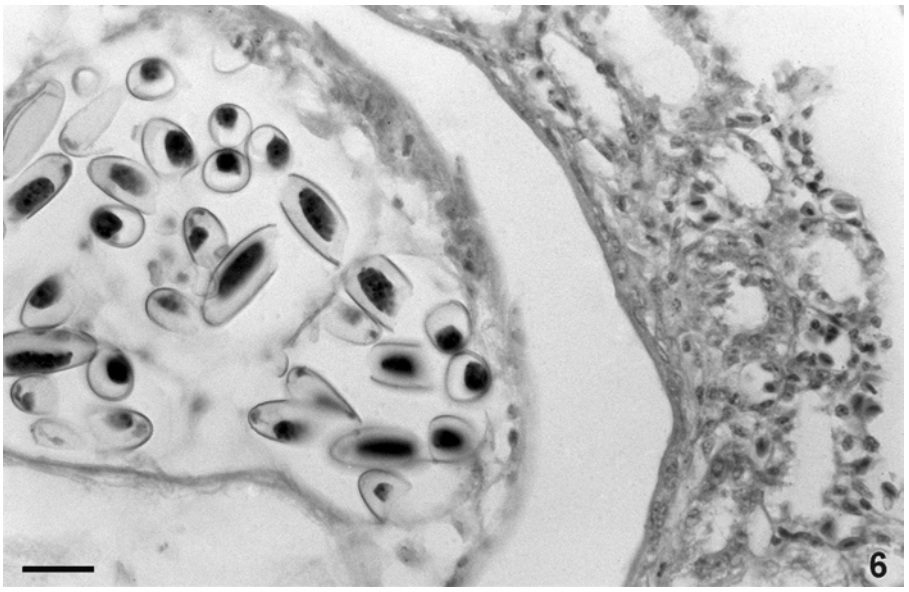

Figure 6. Cross-section of kidney of *C. talpacoti* parasitized with *P. bragai*. Detail of a parasite with its tegumentary spines, in the interior of a dilated collecting duct presenting flattening of the lining epithelial cells. No inflammatory reaction in the adjacent renal tissue is observed. HE. Bar = 0.02mm.

Table 1. Comparative data on the intensity of infection and pathology of *Paratanaisia bragai* in the kidneys of different hosts and their distribution

Source	No. of worms	Gross lesions	Microscopic lesions	Host (s)	Locality
Santos (1934)	_____*	Enlargement	Dilatation of the renal collecting ducts with thick walls; multistratified epithelium and cellular infiltrate	*Columba livia*, *Gallus gallus*	Rio de Janeiro, Brazil
Barretto and Filho (1942)	_____*	Enlargement of one of the kidneys; the other appeared hypotrophic	Same as above, except for the absence of multistratified epithelium	*Meleagris gallopavo*	Rio de Janeiro, Brazil
Portugal et al. (1972)	_____**	Polycistic, enlargement and distortion, dilatation of ureters	Parenchymal cavities with parasites. No significative reactions were observed	*Columba livia*	São Paulo, Brazil
Anizaut et al. (1992)	1,130***	Paleness, enlargement	Interstitial infiltrate of inflammatory cells within renal tubules, composed primarily of heterophils and few eosinophils	*Columba inornata wetmorei*	Humacao, Puerto Rico
Menezes et al. (2001)	1-142****	None	Chronic interstitial nephritis; very dilated renal collecting ducts; sclerosis and discrete inflammatory reaction	*Numida meleagris*	Rio de Janeiro, Brazil
Present study	116****	None	Very dilated renal collecting ducts with destruction and flattening of the lining epithelial cells; inflammatory reaction absent	*Columbina talpacoti*	Rio de Janeiro, Brazil

*refers to heavy infections; ** worm burden not mentioned; ***from one-quarter of the kidney; **** from one of the kidneys

DISCUSSION

The finding of *Paratanaisia bragai* in the ruddy ground dove *C. talpacoti*, represents a new host record for the species, previously reported parasitizing kidneys of pigeons, chickens, turkeys, spot-winged quails, guinea fowls (Menezes et al., 2001) and whistling-ducks (Fedynich et al., 1996).

Described as *Tamerlania bragai* by Santos (1934), included in the genus *Tanaisia* Skrjabin, 1924 by Freitas (1951) and further reconsidered as *Paratanaisia bragai*, its actual and accepted nomination, by Freitas (1959) that also erected the genus *Paratanaisia*, with *P. bragai* as the type, the species is frequently referred in avian pathology surveys; the morphology and life cycle of this digenean have been exhaustively described to add new data on morphometrics and mainly on intermediate hosts, that are terrestrial snails of the species *Subulina octona* Bruguière, 1789 and *Leptinaria unilamellata* Orbigny, 1835 (Stunkard, 1945; Silva and Mattos-Júnior, 1990; Arnizaut et al., 1992; Keller and Araújo, 1992).

Although with a low prevalence (10%), which was lower than that observed by Silva and Mattos-Júnior (1990) and Menezes et al. (2001) in pigeons and guinea fowls, respectively, from the same state, the intensity of parasitism was high, considering the great number of worms recovered from one of the kidneys only.

The only reference of another digenean, *Tanaisia magnicolica*, occurring in the kidneys of *C. talpacoti* is that of Queiróz (1966); this species was described by Freitas (1951) on the basis of trematodes recovered from the kidneys of the guira cuckoo *Guira guira* Gmelin, 1788 and the yellow-billed cardinal *Paroaria capitata* Lafresnaye & d'Orbigny, 1837 in Brazil.

The first pathological findings related to *P. bragai* were those reported by Santos (1934) when the species was proposed, on the basis of specimens recovered from the kidneys of pigeons *Columba livia* (Gmelin, 1798) and chickens *Gallus gallus* (Linnaeus, 1758) in the state of Rio de Janeiro, Brazil. Other data so far referred on the pathology of the species in other hosts from different localities are those of Barretto and Filho (1942), Portugal et al. (1972), Anizaut et al. (1992) and Menezes et al. (2001). The severity of the microscopic lesions induced by the presence of *P. bragai* seems not to be related to the size of the worm burden, demonstrating a low pathogenicity of this fluke, in despite of the host species. Nevertheless, an outbreak of very high parasite loads can be responsible for the development of the renal monostomosis with mucoid blood diarrhea, mortality and the appearance of gross lesions (Anizaut et al., 1992). Moreover, even when the size of the burden is not mentioned the appearance of the gross lesions seems to be associated to a higher parasite load than that observed by Menezes et al. (2001).

The high degree of mechanical obstruction of the renal collecting ducts observed, induced the presence of trematodes did not stimulate the formation of cysts in the renal parenchyma due to urinary retention. Probably, the great dilatation of the ducts was compensatory, allowing the urine flow. Nevertheless, this dilatation, unexpectedly, did not provoke fibrosis by compression of the adjacent renal tissue. The discrete or absent inflammatory reactions previously reported (Table 1) indicate that the tissular attrition caused by this parasite is minimal, in spite of the presence of the tegumentary spines.

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