

NEMATODE PARASITES OF BRAZILIAN PSITTACID BIRDS, WITH EMPHASIS ON THE GENUS *PELECITUS* RAILLIET & HENRY, 1910

ROBERTO MAGALHÃES PINTO/+; J. JULIO VICENTE & DELY NORONHA

Departamento de Helminologia, Instituto Oswaldo Cruz, Av. Brasil, 4365, 21045-900 Rio de Janeiro, RJ, Brasil

In the present paper, some species of nematodes from Brazilian parrots are studied: Aprocata pyrrhurae, Ascaridia hermaphrodita, A. sergiomeirai, Pelecitus circularis and P. helycinus. Single female specimens of Pelecitus sp. and Thelazia sp. are presented. The male of P. circularis is fully illustrated, for the first time, since 1884. Ascaridia sergiomeirai is also restudied 59 years after its proposition. New host records are established. Remarks on other species of nematodes occurring in psittacid birds are included.

Key words: nematodes – psittacid – birds – Brazil

Although the previous studies of Travassos (1930), followed by Pereira (1933), Freitas & Mendonça (1952) and more recently Serra Freire & Bianchin (1978), the helminth fauna occurring in psittacid birds has been poorly investigated in Brazil. In spite of the importance of this group of hosts and considering that they are easily domesticated it justifies the necessity to identify their parasites and further supply data on potential pathogens. Moreover, most psittacid birds are listed among those in the process of extinction, considering human predatory habits, deforestation or illegal capture for trading purposes. Observations reported herein, pertain to four genera of nematodes, *Aprocata* Linstow, 1883, *Ascaridia* Dujardin, 1845, *Pelecitus* Railliet & Henry, 1910 and *Thelazia* Bosc, 1819, distributed in psittacid hosts of five genera, *Amazona*, *Ara*, *Aratinga*, *Pionus* and *Pyrrhura*.

MATERIALS AND METHODS

Seventeen samples of nematodes recovered from Brazilian psittacid birds between 1939 and 1963 in southeastern and central-eastern regions and deposited in the Helminthological Collection of the Oswaldo Cruz Institute (CHIOC) were studied. The number of samples, according to each host species is as follows: 2 from *Amazona aestiva* (L.); 1 from *Ara*

auricollis (Cass.); 1 from *Aratinga solstitialis auricapilla* (Kuhl); 4 from *Aratinga leucophthalmus leucophthalmus* (Mueller); 6 from *Pionus maximiliani syi* (Souance); 1 from *Pyrrhura frontalis* (Vieill.); 2 from *Pyrrhura leucotis leucotis* (Kuhl). Nematodes were preserved in Railliet & Henry's solution. Specimens were dehydrated in ethanol (70 °GL – 100 °GL) and studied unstained, cleared in phenol or beechwood creosote. Some were preserved in balsam as whole mounts. Illustrations were performed with the aid of a drawing tube connected to an Olympus light microscope. Measurements are in micrometers unless otherwise indicated. NHR is to design New Host Record. Common names of hosts herein presented are in accord to Sick (1984).

The adopted classification of the nematodes is that proposed by Anderson & Bain (1976) and Chabaud (1975, 1978).

DESCRIPTIONS

Ascaridia hermaphrodita (Froelich, 1789)
Railliet & Henry, 1914
(Figs 1-3)

Description (based on three male specimens from *Pionus maximiliani syi*). Heterakoidea, Ascaridiidae, Ascaridiinae. Males: 28.2-39.6 mm long, 1.0-1.3 mm wide. Esophagus 1.75-1.87 mm long. Nerve ring and excretory pore 600-850 and 770 from anterior end, respectively. Precloacal cuticularized rimmed sucker, 300 in diameter, 210 from cloacal aperture. Spicules 3.4-3.8 mm long. Thirteen pairs of

+CNPq Research Fellow Proc. no. 300374/80-1.

Received 28 September 1992.

Accepted 21 January 1993.

caudal papillae, 7 pre and 6 post-cloacal. Cloacal aperture 500 from posterior end.

Taxonomic summary

Hosts: *Aratinga leucophthalmus leucophthalmus* (Mueller); common name: white-eyed parakeet ("periquitão-maracanã"); *Pionus maximiliani syi* (Souance); common name: scaly-headed parrot ("maitaca-bronzeada"); *Pyrrhura leucotis leucotis* (Kuhl); common name: maroon-faced parakeet ("tiriba-de-orelha branca").

Site of infection: intestine.

Localities: Ilha Seca, state of São Paulo, Brazil; Salobra; state of Mato Grosso do Sul, Brazil; Sooretama, state of Espírito Santo, Brazil.

Specimens studied: CHIOC no. 11.740, 11.745, 11.746, 11.749, 11.751, 12.445, 12.645, 29.449 (wet material); 32.865 a-c, 32.867 a-b, 32.871 (whole mounts).

Remarks: *Ascaridia hermaphrodita* has been reported as one of the the most common nematode species to infect psittacid hosts. It was well redescribed and illustrated by Travassos (1930) and restudied more recently by Serra-Freire & Bianchin (1978). It is assigned in a wide range of hosts and localities. In Brazil, it occurs in twelve species of psittacids, according to Serra-Freire & Bianchin (1978).

Another heterakoid nematode, parasitizing a Brazilian parrot, *Amazona amazonica*, is *Ascaridia ornata*, proposed by Kreis (1955). The species was then compared to *A. hermaphrodita*, from which *A. ornata* differs mainly by the larger length of the spicule, 7.14-9.28 mm, compared to 0.91-3.80 mm observed in *A. hermaphrodita*.

Ascaridia sergiomeirai Pereira, 1933 (Figs 4-6)

Description (based on four specimens, two males and two females from *Aratinga l. leucophthalmus*). Heterakoidea, Ascaridiidae, Ascaridiinae. Males: 21.5-26.01 mm long, 710-810 wide. Esophagus 1.68-2.33 mm long. Nerve ring and excretory pore 500-540 and 910 from anterior end, respectively. Precloacal cuticularized rimmed sucker 180-210 in diameter, 120-140 from cloacal aperture. Spicules 0.85-1.20 mm long. Nine pairs of caudal papillae,

4 pre-, 1 ad-, 4 post-cloacal and 2 unpaired papillae. Cloacal aperture 430-500 from posterior end.

Females: 33.6-35.3 mm long, 880 wide. Esophagus 1.96-2.04 mm long. Nerve ring and excretory pore 580 and 910 from anterior end, respectively. Vulva 16.66 mm from anterior extremity. Eggs, 72-75 long by 57-61 wide. Rectum, 560 long. Anus 0.84-1.05 mm from posterior end.

Taxonomic summary

Hosts: *Aratinga leucophthalmus leucophthalmus* (Mueller); common name: white-eyed parakeet ("periquitão-maracanã") NHR; *Pionus maximiliani syi* (Souance); common name: scaly-headed parrot ("maitaca-bronzeada"), NHR.

Site of infection: intestine.

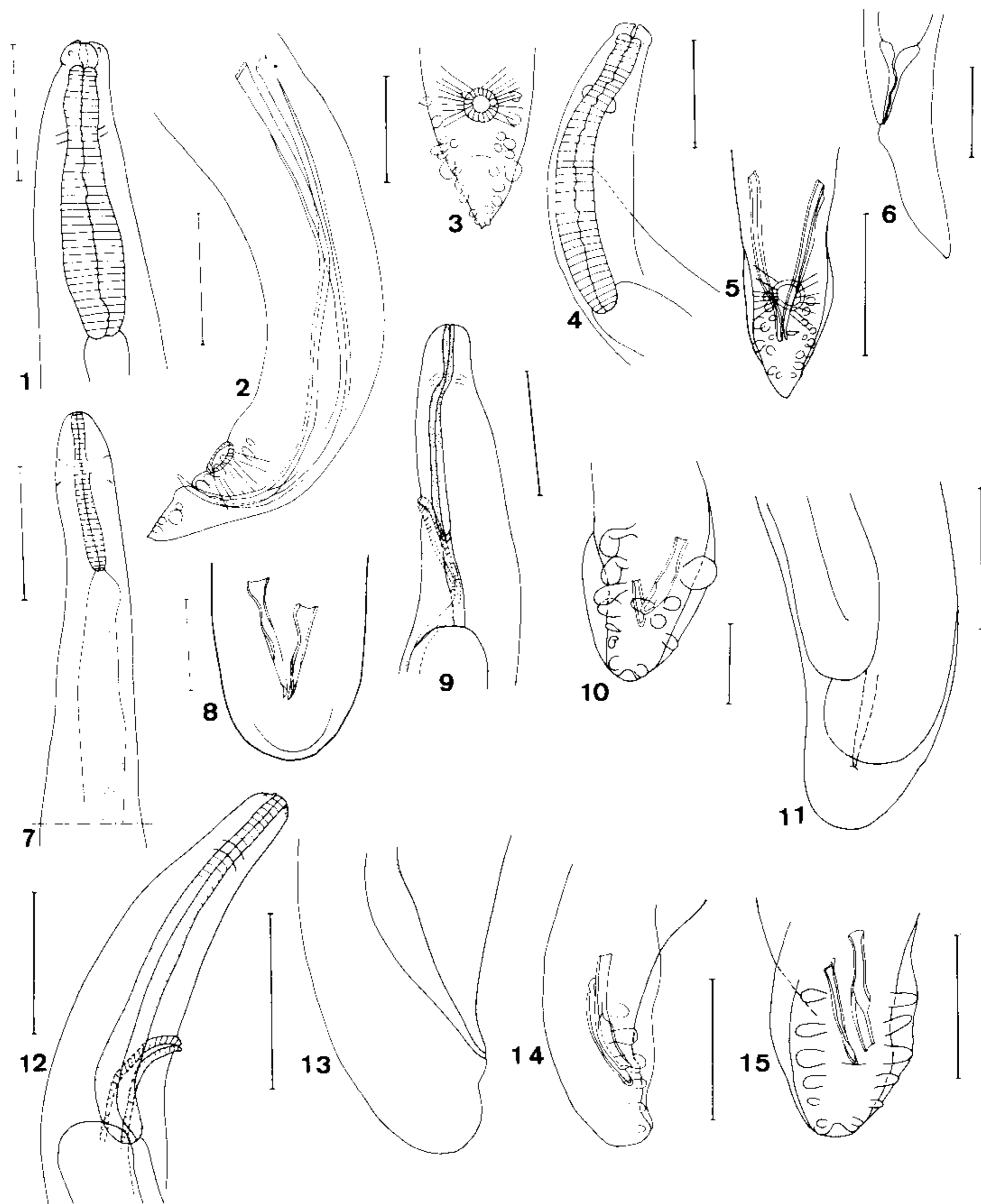
Locality: Ilha Seca, state of São Paulo, Brazil.

Specimens studied: CHIOC no. 11.745, 11.750 (wet material); 32.866 a-b, 32.868 a-d (whole mounts).

Remarks: *Ascaridia sergiomeirai* was represented by a few number of samples and, interestingly, was found together *A. hermaphrodita*. The two species are rather distinct from each other and easily identified. This is the second report of *A. sergiomeirai* in Brazilian psittacid birds, which are new host records, namely *Aratinga l. leucophthalmus* and *Pionus maximiliani syi*. Since it was proposed by Pereira (1933), based on specimens recovered from *Brotogeris tui*, it is worthwhile to mention that the designated cotype host of *A. sergiomeirai*, *Psittacula passerina*, was not referred among those birds necropsied for helminths, since the author reported to *Aratinga cactorum* instead, as one of the host species infected with *A. sergiomeirai* and this fact was overlooked by Serra-Freire & Bianchin (1978) that only referred to early data on *A. sergiomeirai*, with no further comments on the species.

Thelazia sp.

Description (based on one female specimen). Thelazioidea, Thelaziidae, Thelaziinae. Female: 13.6 mm long, 259 wide. Esophagus 648 long. Nerve ring 180 from anterior extremity. Vulva 424 from anterior end. Eggs 25



Ascaridia hermaphrodita – Fig. 1: anterior portion of male, lateral view. Fig. 2: posterior portion of male, lateral view. Fig. 3: posterior extremity of male, ventral view. *Ascaridia sergiomeirai*. Fig. 4: anterior portion of male, lateral view. Fig. 5: posterior portion of male, ventral view. Fig. 6: posterior portion of female, lateral view. *Aprocta pyrhruræ*. Fig. 7: anterior portion of male, lateral view. Fig. 8: posterior extremity of male, ventral view. *Pelecitus circularis*. Fig. 9: anterior portion of female, lateral view. Fig. 10: posterior portion of male, ventral view. Fig. 11: posterior portion of female, ventral view. *Pelecitus helicinus*. Fig. 12: anterior portion of female, lateral view. Fig. 13: posterior portion of female, lateral view. Fig. 14: posterior portion of male, lateral view. Fig. 15: posterior portion of male, ventral view.
 (Bar = 0.1 mm in figs. 1, 2, 5, 6, 8, 10, 14, 15; 0.2 mm in figs. 3, 4, 7, 9, 11, 13; 0.4 mm in fig. 12).

long by 14 wide. Rectum 144 long. Anus 97 from posterior end.

Taxonomic summary

Host: *Amazona aestiva* (L.); common name: parrot ("papagaio verdadeiro"), NHR.

Site of infection: orbital cavity

Locality: Barranco Alto, state of Mato Grosso do Sul, Brazil.

Specimen studied: CHIOC no. 32.870 (whole mount).

Remarks: The studied sample of *Thelazia* sp. consisted of only one female specimen. It is here included to report the second occurrence of the genus in a Brazilian psittacid host, since Strachan (1957) that proposed *T. anadorhynchi* from *Anadorhynchus hyacinthinus* captured in central Brazil.

Aprocta pyrrhurae Freitas & Mendonça, 1952
(Figs 7-8)

Description (based on six specimens, four males and two females from *Pyrrhura l. leucotis*). Aprotoidea, Aproctidae, Aproctinae. Males: 14.0-16.6 mm long, 288-388 wide. Esophagus 360-475 long. Nerve ring 126-190 from anterior end. Spicules subequal, right 108-136, left 126-169 long. Cloacal aperture 64-90 from posterior end. Females: 17.5-23.2 mm long, 288-388 wide. Esophagus 306-446 long. Nerve ring 108-133 from anterior end. Vulva 1.15 mm from anterior extremity. Ovijector 1.5 mm long. Eggs 21 long by 25 wide.

Taxonomic summary

Hosts: *Ara auricollis* (Cass.) (= *Propyrrhura auricollis* [Cass.]); common name: golden-collared macaw ("ararinha"), NHR; *Aratinga solstitialis auricapilla* (Kuhl); common name: flame-capped parakeet ("jandaia-de-testa vermelha"), NHR; *Pyrrhura leucotis leucotis* (Kuhl); common name: maroon-faced parakeet ("titiba-de-orelha-branca"), NHR.

Site of infection: Body cavity.

Locality: Sooretama, state of Espírito Santo, Brazil.

Specimens studied: CHIOC no. 32.863, 32.864 a-b, 32.869 a-f (whole mounts).

Remarks: This species is very similar to *Aproctiana meirai* (Travassos, 1930) Skrjabin,

1934, also recovered from psittacid hosts and included in Filarioidea. As the differentiation between the genera *Aprocta* and *Aproctiana* is based mainly on the arrangement of the female genitalia and in order to properly identify our material, holotypes of both species were examined. *Aprocta pyrrhurae* is briefly reported and figured, since to its original description no further addenda is required. The species was formerly diagnosed from *Pyrrhura cruentata* and is presently referred in three new hosts: *Ara auricollis*, *Aratinga solstitialis auricapilla* and *Pyrrhura leucotis leucotis*.

Pelecitus circularis (Molin, 1860)
Railliet & Henry, 1910
(Figs 9-11)

Description (based on four specimens, two males and two females). Filarioidea, Onchocercidae, Dirofilarinae. Males: body with 3-5 circular coils, 7.0-9.5 mm long, 400 wide. Esophagus 720-910 long. Nerve ring 140-180 from anterior end. Spicules short, unequal in size, apparently similar in shape, right 57 and left 79 long. Caudal alae symmetrical. Caudal papillae asymmetrical in arrangement: 1 pair pre- and 2 postcloacal, an unpaired papilla situated before first pair and another between last two pairs, totaling 12 caudal papillae (Fig. 10). Cloacal aperture, 40-50 from posterior end.

Female: body with 1-5 circular coils, 10.37-11.73 mm long, 460-490 wide. Esophagus 740-780 long. Nerve ring, 190-210 from anterior end. Vulva, 610-650 from anterior end. Eggs, 14 wide, 10 long. Anus 100 from posterior end.

Taxonomic summary

Host: *Amazona aestiva* (L.); common name: parrot ("papagaio comum"), NHR.

Other hosts: *Amazona agilis*, *Anodorhynchus hyacinthinus*, *Ara ararauna*, *Ara auricollis*, *Ara macao* and *Pionus chalcopterus*.

Site of infection: Among tendons of feet.

Locality: Barranco Alto, state of Mato Grosso do Sul, Brazil.

Specimens studied: CHIOC no. 32.861 a-d (whole mounts).

Remarks: *Pelecitus*, the most widely distributed avian filarioid genus known, proposed to accommodate five filarioid species described

in the mid 1800's from the legs and feet of Brazilian birds is, nevertheless, regarded as one of the poorest investigated group of nematodes in Brazil. The worms occur free or in nodules around the muscles and tendons of the legs and feet. According to Bartlett & Greiner (1986) and Kuummerfeld & Dauschies (1989), studies have diagnosed tenosynovitis associated with their presence in captive Psittaciformes. *Pelecitus* valid species recovered from these hosts are: *P. circularis*, *P. helycinus* and *P. tercostatus*. *Pelecitus circularis* is not very common and for this reason, there is not enough data on its morphometric parameters. The proposition of this species was based on samples collected in a Corvidae, *Cyanocorax cyanomelas* from Brazil. Specimens of *P. circularis* presently studied, were recovered from *Amazona aestiva*, a new host record for the species. Our specimens of *P. circularis* were among those of *P. helycinus* infecting a same host. For the first time, since 1884, the male of *P. circularis* is fully illustrated and the species is redescribed based on both sexes, since the most recent study of *P. circularis* is that of Bartlett & Greiner (1986), based on two mature females, recovered from *Ara auricollis* imported into USA from South America.

Pelecitus helycinus (Molin, 1860)
Railliet & Henry, 1910
(Figs 12-15)

Description (based on ten specimens, five males and five females from *Pionus maximiliani syi*). Filarioidea, Onchocercidae, Dirofilarinae. Males: body spiralled, with 1-3 rotations, 6.46-9.80 mm long, 320-470 wide. Esophagus 590-820 long. Nerve ring, 150-210 from anterior end. Spicules stout, subequal in size, dissimilar in shape, right 57-72 and left 75-86 long. Granular or hyaline inclusions present within the caudal alae that is symmetrical. Six pairs of caudal papillae: 2 pairs pre-, 1 ad- and 3 post-cloacal. Cloacal aperture, 28-50 from posterior end.

Females: body tightly spiralled with 3-5 rotations, 14.4-19.6 mm long, 400-630 wide. Esophagus, 580-930 long. Nerve ring, 120-180 from anterior end. Vulva, 400-640 from anterior end. Eggs, 18-21 long, 10-18 wide. Anus 15 from posterior end.

Taxonomic summary

Hosts: *Amazona aestiva* (L.); common

name: parrot ("papagaio comum"), NHR; *Pionus maximiliani syi* (Souance); common name: scaly-headed parrot ("maitaca-bronzeada"), NHR.

Other hosts: *Ara araruana*, *Ara auricollis*, *Ara nobilis* and *Anodorhynchus hyacinthinus*.

Site of infection: Among tendons of feet.

Localities: Barranco Alto and Salobra, state of Mato Grosso do Sul, Brazil.

Specimens studied: CHIOC no. 11.498, 14.488 (wet material); 32.860 a-j, 32.862 a-c (whole mounts).

Remarks: *Pelecitus helycinus* was designated as the type species of the genus by Railliet & Henry (1910) on basis on specimens recovered from a cotingid bird, *Xiphloena punicea* in Brazil, according to Molin (1860). From present study two new host records are established: *Amazona aestiva* and *Pionus maximiliani syi*.

Pelecitus sp.

Description (based on one female specimen). Filarioidea, Onchocercidae, Dirofilarinae. Body straight, 13.0 mm long, 316 wide. Esophagus, 806 long. Nerve ring, 172 from anterior end. Vulva, 590 from anterior end. Eggs 18 in diameter. Anus, 36 from posterior end.

Taxonomic summary

Host: *Pyrrhura frontalis* (Vieill.); common name: Reddish-bellied parakeet ("tiriba-de-testa vermelha"), NHR.

Site of infection: Among tendons of feet.

Locality: Ilha Seca, state of São Paulo, Brazil.

Specimen studied: CHIOC no. 32.872 (whole mount).

Other species

Pelecitus tercostatus was not included among the presently studied samples. It was proposed by Molin (1860) from *Amazona a. aestiva* captured in Brazil and, ever since, restudied by Travassos (1930) and Bartlett & Greiner (1986). All the recorded hosts for *P. tercostatus* have been South American psittacid birds.

An additional species, *Pelecitus andersoni* Bartlett & Greiner, 1986, also recovered from macaws and parrots, *Ara macao* and *Pionites l. leucogaster*, respectively, imported into USA from Central or South America is herein referred, since these genera of Psittacidae occur in Brazil and the exact localities of capture of hosts were not indicated, when *P. andersoni* was proposed.

ACKNOWLEDGEMENTS

To Mara Lucia de Souza Lemos, IOC research fellow under the coordination of Genilto Jose Vieira from the "Setor de Programação Visual (SICT/FIOCRUZ)" for graphic revision concerning figures herein presented and to Walter Duarte and Nilson de Freitas (SDE/ENSP) for final photographic processings.

REFERENCES

- ANDERSON, R. C. & BAIN, O., 1976. Keys to the genera of the order Spirurida 3. Diplotrianoidea, Aproctoidea and Filarioidea, p. 59-116. In R. C. Anderson, A. G. Chabaud & S. Willmott (eds), *CHI Keys to the nematode parasites of vertebrates*. Part 3. Commonwealth Agricultural Bureaux, England.
- BARTLETT, C. M. & GREINER, E. C., 1986. A revision of *Pelecitus* Railliet & Henry, 1910 (Filarioidea, Dirofilarinae) and evidence for the capture by mammals of filarioids from birds. *Bull. Mus. natn. Hist. nat., Paris*, 4th ser., 8: 47-99.
- CHABAUD, A. G., 1975. Keys to the genera of the order Spirurida 1. Camallanoidea, Dracunculoidea, Gnathostomatoidea, Physalopteroidea, Rictularioidea and Thelazioidea, p. 1-58. In R. C. Anderson, A. G. Chabaud & S. Willmott (eds), *CHI Keys to the nematode parasites of vertebrates*. Part 3. Commonwealth Agricultural Bureaux, England.
- CHABAUD, A. G., 1978. Keys to the genera of the superfamilies Cosmocercoidea, Seuratoidea, Heterakoidea and Subuluroidea, p. 1-71. In R. C. Anderson, A. G. Chabaud & S. Willmott (eds), *CHI Keys to the nematode parasites of vertebrates*. Part 6. Commonwealth Agricultural Bureaux, England.
- FREITAS, J. F. T. & MENDONÇA, J. M., 1952. *Aprocta pyrrhurae* n. sp. (Nematoda, Filarioidea). *Rev. Bras. Biol.*, 12: 385-388.
- KREIS, H. A., 1955. Beitrage zur Kenntnis parasiticher Nematoden XVII. Ein neuer Nematode aus den Amazonenpapagei: *Ascaridia ornata* (Ascaroidea Railliet & Henry, 1915; Ascaridae Baird, 1853, Ascaridiinae Travassos, 1919. *Zbl. Bakt.*, 163: 556-559.
- KUMMERFELD, N. & DAUGSCHIES, A., 1989. Filarien (*Pelecitus* sp. *Chandlerella* sp.) bei Blaustirnamazonen (*Amazona aestiva*) und Alexandersittich (*Psittacula eupatria*). *Kleintier-Prax.*, 34: 521-524.
- MOLIN, R., 1860. Una monografia del genere Spiroptera. *Sber. Akad. Wiss. Wien Math-naturw. Klasse*, 38: 911-1005.
- PEREIRA, C., 1933. Novo nematoide parasito de psitacideos. *Revta. Méd. Cirurg. S. Paulo*, 1: 3-6.
- RAILLIET, A. & HENRY, A., 1910. Les onchocerques, nematodes parasites du tissu conjonctif. *C. r. Séanc. Soc. Biol.*, 68: 248-251.
- SERRA-FREIRE, N. M. & BIANCHIN, I., 1978. Sobre quatro especies de *Ascaridia* (Dujardin, 1845) parasitas de psitacideos, com citação de um novo hospedeiro para *A. hermaphrodita* (Froelich, 1789) (Nematoda: Ascaridoidea) no Brasil. *Atas Soc. Biol. Rio de Janeiro*, 19: 51-54.
- SICK, H., 1984. *Ornitologia Brasileira, Uma Introdução*. 3a ed. Vol. 1, Editora Universidade de Brasilia, Brasilia, xxii + 480 p.
- STRACHAN, A. A., 1957. Eye worms of the family Thelaziidae from Brazilian birds. *Can. J. Zool.*, 35: 179-187.
- TRAVASSOS, L., 1930. Fauna helmintologica dos "Psittacidae" do Brasil. *Archos. Inst. Biol. S. Paulo*, 3: 5-20.