

**Nematodes of Amazonian vertebrates
deposited in the Helminthological Collection
of the Oswaldo Cruz Institute with new records**

Alessandra Queiroga Gonçalves^{1, 2}

Joaquim Júlio Vicente¹

Roberto Magalhães Pinto^{1, 3}

ABSTRACT. In this work 28 nematode samples from amphibians, reptiles, birds and mammals captured in the State of Amazonas, Brazil, and deposited in the Helminthological Collection of the Oswaldo Cruz Institute between 1927 and 1955, were studied. *Oswaldocruzia* sp. and *Physaloptera* sp. (from amphibians), *Skrjabinura spiralis* Gnedina, 1933 (from birds), *Mammomonogamus laryngeus* (Railliet, 1899) Ryzikov, 1948 and *Trichuris gracilis* (Rud, 1819) Hall, 1916 (from mammals) are reported from the State of Amazonas for the first time. *Oswaldocruzia mazzai* Freitas & Lent, 1935, *Oswaldocruzia lopesi* Travassos, 1938, *Aplectana membranosa* (Schneider, 1866) Miranda, 1924, *Physaloptera retusa* Rudolphi, 1819, *Capillaria* sp., and *Cosmocerca* sp. (from amphibians), *Diplotrriaena bargusinic*a Skrjabin, 1917 and *Porrocaecum* sp. (from birds), *Dipetalonema graciliformis* Freitas, 1964 and *Monodontus* sp. (from mammals) represent new hosts and a new geographical distribution. *Kalicephalus subulatus* Molin, 1861 (from reptiles) is reported from a new host.

KEY WORDS. Nematodes, vertebrates, State of Amazonas, new records, Brazil

General helminthological surveys of vertebrate hosts from the Amazon region are challenging due to the difficulty in reaching distant localities, lack of infrastructure and available data on these areas. Although some investigations have contributed to the knowledge of helminths parasitizing non-human Amazonian hosts ((VICENTE 1964; PEREIRA & MACHADO FILHO 1968; GOMES & PINTO 1978; PINTO & GOMES 1976, 1980, 1984; THATCHER 1991), there is still much work to be done, considering the great biodiversity of the Amazon region.

The present paper reports the study of nematodes recovered from wild vertebrates captured in the State of Amazonas, Brazil.

MATERIAL AND METHODS

Twenty-eight nematode samples recovered from Amazonian mammals (04), birds (03), reptiles (01) and amphibians (14) were collected in 1927 and 1955, and deposited in the Helminthological Collection of the Oswaldo Cruz

1) Laboratório de Helmintos Parasitos de Vertebrados, Departamento de Helminologia, Instituto Oswaldo Cruz. Avenida Brasil 4365, 21045-900 Rio de Janeiro, Rio de Janeiro, Brasil.

2) Laboratório de Doenças Parasitárias, Departamento de Medicina Tropical, Instituto Oswaldo Cruz. Avenida Brasil 4365, 21045-900 Rio de Janeiro, Rio de Janeiro, Brasil.

3) Corresponding author: rmpinto@ioc.fiocruz.br. CNPq research fellow.

Institute (CHIOC) were examined. The specimens were preserved either in Railliet & Henry's solution or 10% formalin and were examined. Specimens were processed for study as described elsewhere (VICENTE *et al.* 1993a). Photomicrographs were obtained as previously described (PINTO & VICENTE 1995). Measurements are in millimeters (mm). Identification of the nematodes was based on VICENTE *et al.* (1991, 1993b, 1995, 1997) and classification of hosts is in accordance with WILSON & REEDER (1993) for mammals, PINTO (1978), SICK (1997) for birds, PETERS & OREJAS-MIRANDA (1970) for reptiles and FROST (1985) for amphibians. NHR and NGR stand for New Host Record and New Geographical Record, respectively.

RESULTS AND REMARKS

Trichinelloidea, Trichuridae

Capillaria sp.

Measurements based on three adult males. Body 5.95-6.73 long, 0.05-0.07 wide. Esophagus 2.81-3.13 long. Single spicule 0.39-0.43 long. Cloacal aperture 0.01 from posterior extremity.

Taxonomic summary. Host: *Bufo marinus* (Linnaeus, 1758), Amphibia, Anura, Bufonidae; common names: giant marine toad, giant toad, "sapo-boi" – NHR. Site of infection: large intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 17-III-1955.

Specimens deposited. CHIOC no. 21153 (wet material), 34148 a-f (whole mount).

Remark. The samples were poorly preserved and thus, the specific diagnosis could not be achieved.

Trichuris gracilis (Rudolphi, 1819) Hall, 1916 (Figs 1-2)

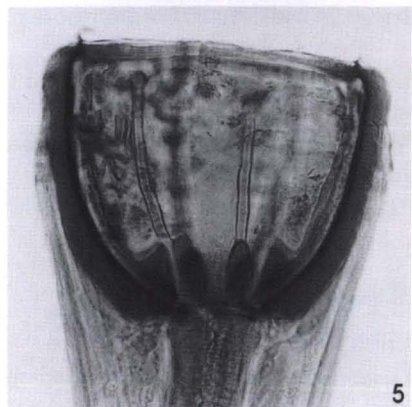
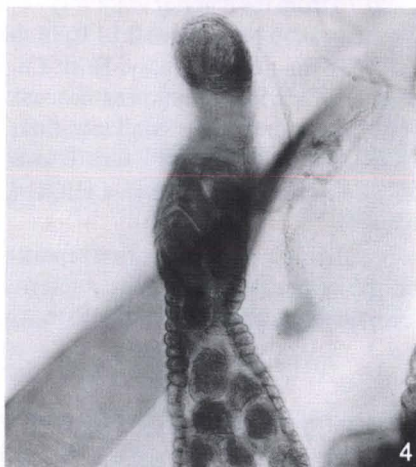
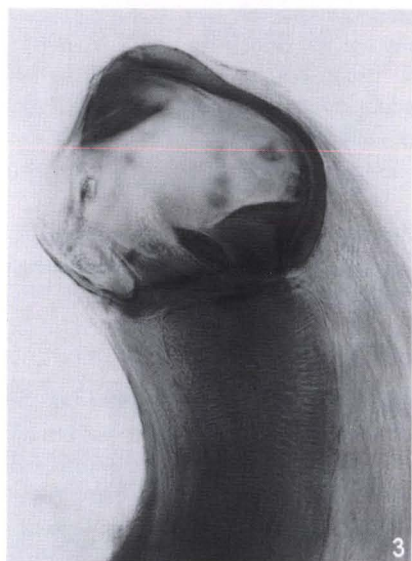
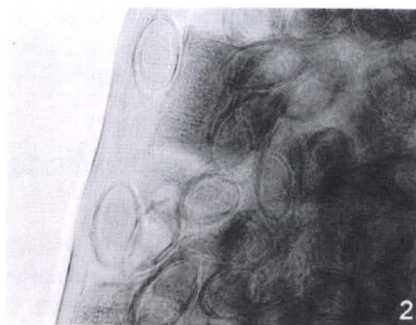
Measurements based on an adult broken female. Body 0.19 wide (hindbody). Eggs 0.05 long, 0.02 wide. Vulvar aperture 10.54 from posterior extremity.

Taxonomic summary. Host: *Dasyprocta leporina* (Linnaeus, 1758) [= *D. aguti* L., 1766], Mammalia, Rodentia, Dasyproctidae; common names: Brazilian aguti, "cutia". Site of infection: body cavity. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Claudionor. Date: 8-VIII-1955.

Specimens deposited. CHIOC no. 21189 (wet material), 34136 (whole mount).

Remark. Taking into account that males of this species remain unknown (CAMERON & REESAL 1951; VICENTE *et al.* 1997) the single female specimen presently studied was provisionally identified to *T. gracilis*, since it is the only

Figs 1-6. *Trichuris gracilis*. (1) Posterior extremity of female, lateral view (Bar = 0.01); (2) Eggs *in utero* (Bar = 0.01); *Monodontus* sp. (3) Anterior extremity of female, showing buccal capsule, lateral view (Bar = 0.02); (4) Vulvar aperture and ovejector, frontal view (Bar = 0.05); *Mammomonogamus laryngeus*. (5) Buccal capsule of female, lateral view (Bar = 0.03); (6) Vulvar region and ovejector, lateral view (Bar = 0.07). Bar of figure 1, common to figures 2-6. Bars in mm.



species of the genus to parasitize *D. leporina* and based on the fact that the type of *T. gracilis* (proposed as *Trichocephalus gracilis* by RUDOLPHI (1819)) was formerly described also on the basis of female specimens recovered from the same host in Brazil (type locality).

Ancylostomatoidea, Ancylostomatidae

***Monodontus* sp. (Figs 3-4)**

Measurements based on two adult females (one broken). Body 9.0 long, 0.61-0.68 wide. Buccal capsule enlarged, 0.12-0.25 long, 0.14-0.25 wide, with a pair of ventral blades and a basal tooth 0.05 long. Esophagus 0.63-0.84 long. Nerve ring 0.70 from the anterior extremity. Vulvar aperture in the middle portion of body. Ovejector 0.56 long. Anus 0.14 from the posterior end.

Taxonomic summary. Host: *Cacajao calvus* (Geoffroy, 1847), Mammalia, Primates, Cebidae; common names: uakari, "uacari-branco, bicó, macaco-inglês" – NHR. Site of infection: small intestine. Locality: Japurá River, State of Amazonas (NGR), Brazil. Collector: Lauro Travassos. Date: 20-X-1927.

Specimens deposited. CHIOC no. 5842 (wet material), 34006 a-b (whole mounts).

Remark. This is the first report of *Monodontus* sp. in a monkey. Species of the genus had been previously referred parasitizing specimens of Artiodactyla, Perissodactyla and Rodentia (YAMAGUTI 1961; VICENTE *et al.* 1997).

Strongyloidea, Syngamidae

***Mammomonogamus laryngeus* (Railliet, 1899) Ryzhikov, 1948 (Figs 5-6)**

Measurements based on four adult specimens, two males and two females. Males: body 2.55-3.84 long, 0.29-0.51 wide. Buccal capsule 0.28-0.30 long, 0.39-0.44 wide. Esophagus 0.64-0.84 long. Nerve ring 0.46 from anterior extremity.

Females: body 14.38-15.16 long, 0.51-0.61 wide. Buccal capsule 0.39 long, 0.51-0.58 wide. Esophagus 0.95-1.02 long. Vulvar aperture in the middle region of the body. Ovejector 0.56 long. Eggs 0.06 long, 0.04 wide. Anus 0.33 from posterior extremity.

Taxonomic summary. Host: *Bos taurus* Linnaeus, 1758, Mammalia, Artiodactyla, Bovidae; common names: ox, "boi"

Site of infection: larynx. Locality: Manaus (São Raimundo slaughterhouse), State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 27-V-1955.

Specimens deposited: CHIOC no. 21232 (wet material), 34007 a-f (whole mounts).

Diaphanocephaloidea, Diaphanocephalidae

***Kalicephalus subulatus* Molin, 1861 (Figs 7-8)**

Measurements based on four adult specimens, two males and two females. Males: body 8.84-9.80 long, 0.33 wide. Buccal capsule 0.14-0.15 long, 0.19 wide. Esophagus 0.37-0.39 long. Nerve ring 0.28-0.32 from the anterior extremity.

Spicules 0.68-0.77 long. Gubernaculum 0.15-0.18 long. Bursa (folded) 0.19-0.23 long, 0.23-0.40 long. Females: body 11.16-12.13 long, 0.36-0.42 wide. Buccal capsule 0.16-0.21 long, 0.22-0.28 wide. Esophagus 0.42-0.46 long. Nerve ring 0.33-0.37 from the anterior extremity. Vulvar aperture 4.18 from posterior end. Eggs 0.05 long, 0.03 wide.

Taxonomic summary. Host: *Lachesis muta* Linnaeus, 1766, Ophidia, Viperidae, Crotalinae – NHR; common names: bushmaster, “surucucu-pico-de-jaca, pico-de-jaca”. Sites of infection: stomach and cloaca. Locality: Manaus, State of Amazonas, Brazil. Collector: Mário Ventel. Date: 12-XI-1955.

Specimens deposited: CHIOC no. 21213, 21206 (wet material), 34117 a-d, 34120 a-b (whole mounts).

Remark. *Kalicephalus subulatus* has already been reported from *Constrictor constrictor* (L.) [= *Boa constrictor*] captured in Manaus (FERNANDES & ARTIGAS 1975).

Trichostrongyloidea, Molineidae

***Oswaldocruzia mazzai* Travassos, 1935 (Figs 9-12)**

Measurements based on six adult specimens, three males and three females. Males: body 5.74 long, 0.12 wide. Esophagus 0.43-0.44 long. Bursa 0.09 in diameter. Spicules 0.15-0.17 long. Females: body 6.03-9.24 long, 0.16-0.26 wide. Esophagus 0.43-0.51 long. Vulvar aperture and anus 2.70-3.00 and 0.11-0.13 from posterior end, respectively. Eggs 0.07-0.09 long, 0.03-0.05 wide.

Taxonomic summary. Hosts: *Bufo marinus*; *Bufo typhonius* (Schneider, 1759), Amphibia, Anura, Bufonidae; common names: toad, “sapo-de-crista, sapo-folha” – NHR. Site of infection: large intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Dates: 11-IV-1955, 12-IV-1955, 05-V-1955.

Specimens deposited. CHIOC no. 21165, 21181, 21220 (wet material), 34118 a-b, 34144, 34145 a-c (whole mount).

Remark. This species was previously reported from *Bufo marinus* in the municipalities of Salobra and Bodoquena, State of Mato Grosso do Sul by FREITAS (1956), that refers to *B. parachinemis* as a synonym of *B. marinus*, which is not currently accepted.

***Oswaldocruzia lopesi* Freitas & Lent, 1938 (Figs 13-14)**

Measurements based on two adult specimens, one male, one female. Male: body 4.1 long, 0.14 wide. Esophagus 0.42 long. Nerve ring 0.14 from the anterior extremity. Spicules 0.14-0.15 long. Gubernaculum absent. Bursa 0.09 in diameter. Female: body 6.35 long, 0.15 wide. Esophagus 0.46 long. Nerve ring 0.17 from anterior extremity. Vulvar aperture and anus 2.14 and 0.15 from posterior end, respectively. Eggs 0.07 long, 0.03 wide.

Taxonomic summary. Host: *Bufo marinus* – NHR. Site of infection: large intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 17-III-1955.

Specimens deposited. CHIOC no. 21153 (wet material), 34147 a-b (whole mounts).

***Oswaldocruzia* sp.**

Measurements based on two adult females. Body 6.51-8.49 long, 0.12-0.16 wide. Esophagus 0.42-0.49 long. Nerve ring and vulvar aperture 0.19 and 4.41-6.3 from anterior end, respectively. Anus 0.15-0.18 from posterior extremity.

Taxonomic summary. Hosts: *Bufo marinus*; *Hyla boans* (Linnaeus, 1758), Amphibia, Anura, Hylidae; common names: gladiator frog, "perereca". Site of infection: large intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 31-V-1955.

Specimens deposited. CHIOC no. 21177, 21226 (wet material), 34198 a-b (whole mounts).

Remark. Since only females were available, it was not possible to identify the species. Specimens of *Oswaldocruzia* sp. were also reported in *B. marinus* from Maicurú, State of Pará (TRAVASSOS & FREITAS 1964) and in *H. boans* from Camisão, State of Mato Grosso do Sul (TRAVASSOS *et al.* 1939).

Ascaridoidea, Anisakidae

***Porrocaecum* sp.**

Measurements based on one adult female. Body 37.40 long, 1.12 wide. Esophagus 1.76 long; ventriculus 0.15 long, 0.26 wide; intestinal cecum 1.37 long. Nerve ring 0.53 from anterior extremity. Vulvar aperture and anus 19.72 and 1.16 from posterior end, respectively. Rectum 0.57 long.

Taxonomic summary. Host: *Theristicus caudatus caudatus* (Boddaert, 1783), Aves, Ciconiiformes, Threskiornithidae; common names: buff-necked ibis, "curicaca"-NHR. Site of infection: intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 1955.

Specimen deposited. CHIOC no. 34116 (whole mount), from the sample 21.229 (wet material).

Cosmocercoidea, Cosmocercoidea

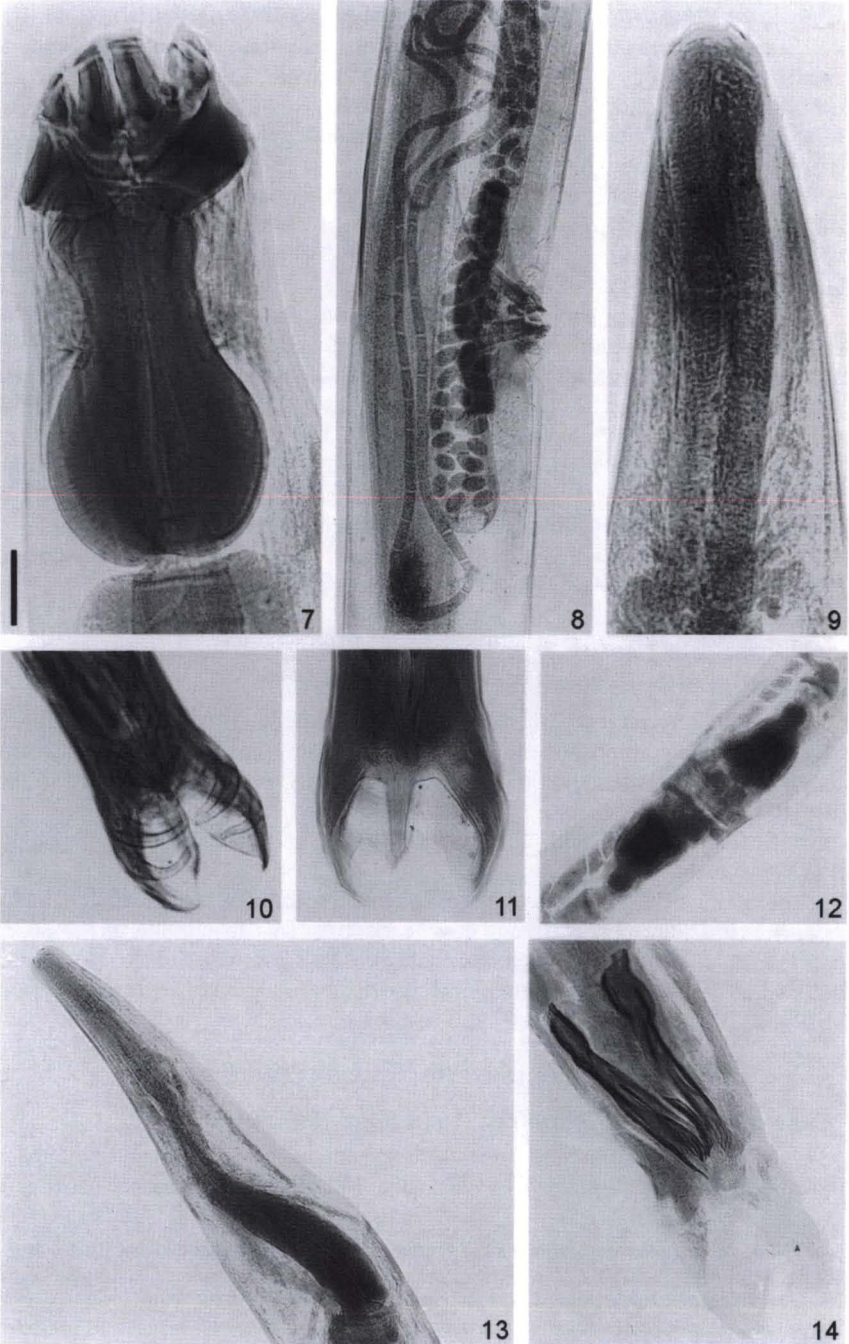
***Cosmocerca* sp.**

Taxonomic summary. Host: *Bufo typhonius* - NHR. Site of infection: large intestine. Locality: Manaus (Igarapé do Leão), State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 12-IV-1955.

Specimens deposited. CHIOC no. 21222 (wet material), 34111 a-c (whole mounts).

Remark. The poor condition of the material made a specific identification impossible.

Figs 7-14. *Kalicephalus subulatus*. (7) Anterior portion of female, lateral view (Bar = 0.03); (8) Vulvar region and ovejector, lateral view (Bar = 0.07); *Oswaldocruzia mazzai*. (9) Anterior portion of male, lateral view (Bar = 0.02); (10) Unfolded bursa, frontal view (Bar = 0.05); (11) Bursa, showing dorsal ray (Bar = 0.02); (12) Vulvar region, frontal view (Bar = 0.05); *Oswaldocruzia lopesi*. (13) Anterior portion of male, lateral view (Bar = 0.03); (14) Posterior portion of male, frontal view (Bar = 0.01). Bar of figure 7, common to figures 8-14. Bars in mm.



***Aplectana membranosa* (Schneider, 1866) Miranda, 1924** (Figs 15-16)

Measurements based on twenty-one adult specimens, twelve males and nine females. Males: body 1.93-3.17 long, 0.12-0.26 wide. Pharynx and esophagus 0.03-0.05 and 0.44-0.60 long, respectively. Esophageal bulb 0.07-0.10 in diameter. Nerve ring 0.11-0.25 from anterior end. Spicules and gubernaculum 0.20-0.28 and 0.05-0.09 long, respectively. Cloacal aperture 0.15-0.25 from posterior end. Females: body 2.16-4.77 long, 0.15 wide. Pharynx and esophagus 0.03-0.06 and 0.37-0.62 long, respectively. Esophageal bulb 0.08-0.12 long, 0.13 wide. Nerve ring 0.10-0.25 from anterior end. Vulvar aperture 1.47-3.64 from anterior extremity. Eggs 0.06-0.10 long, 0.03-0.05 wide.

Taxonomic summary. Hosts: *Bufo marinus*; *Bufo granulosus* Spix, 1824, Amphibia, Anura, Bufonidae; common names: granulated toad, "sapo" – NHR. Site of infection: large intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collectors: Mário Ventel & Claudionor. Dates: 18-I-1955, 19-I-1955, 17-III-1955, 25-III-1955, 11-IV-1955, 5-V-1955, 31-V-1955, 07-VI-1955.

Specimens deposited. CHIOC no. 21144, 21153, 21156, 21179, 21181, 21220, 21221, 21226 (wet material), 34106 a-g, 34112 a-c, 34113 a-d, 34119 a-b, 34137 a-d, 34144 a-d, 34146 a-b, 34149 a-b (whole mounts).

Remark. *Aplectana membranosa* was previously reported from *B. marinus* from Salobra, State of Mato Grosso do Sul (TRAVASSOS *et al.* 1939).

Seuratoidea, Seuratidae

***Skrjabinura spiralis* Gnedina, 1933** (Figs 17-18)

Taxonomic summary. Host: *Guira guira* (Gmelin, 1788), Aves, Cuculiformes, Cuculidae; common names: guira cuckoo, "anu-branco". Site of infection: stomach. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Elias. Date: 07-VII-1955.

Specimens deposited. CHIOC no. 34012 a-b (whole mounts), originally 21231 (wet material).

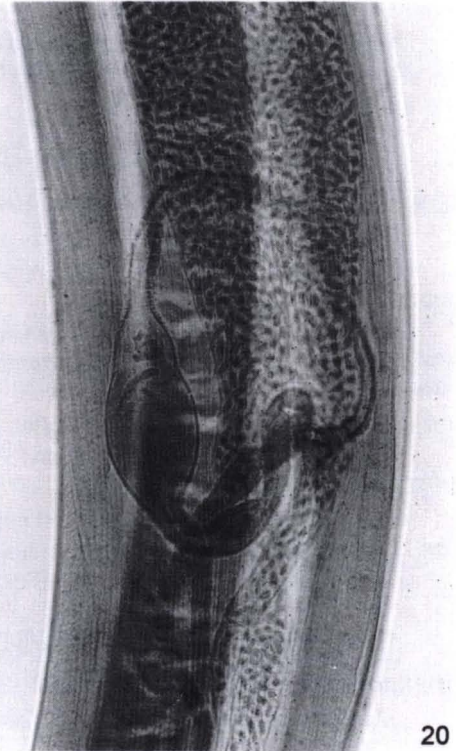
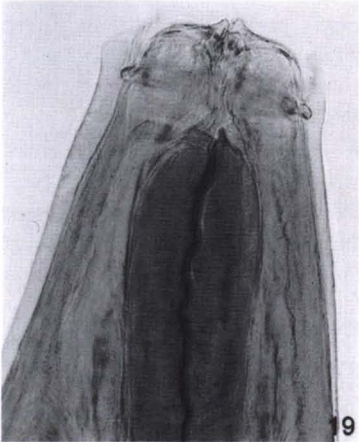
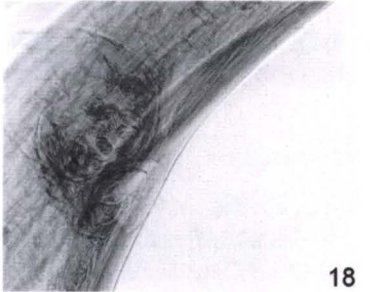
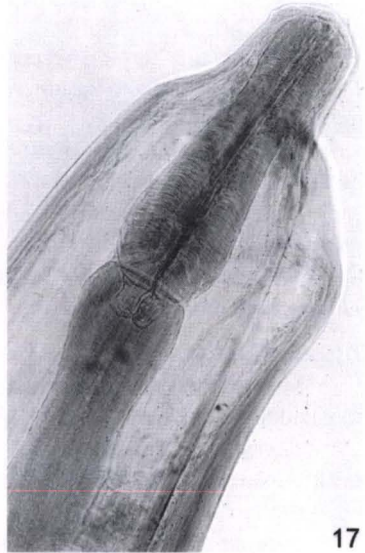
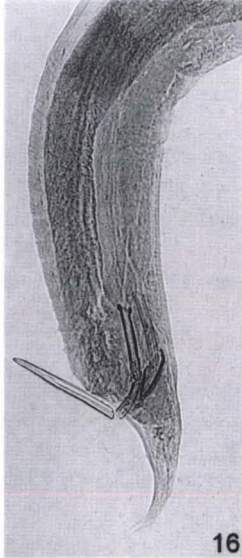
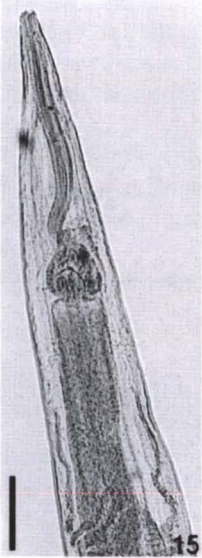
Remark. Although only two broken female specimens were available, females of *S. spiralis* are very usual and easy to identify. This species has already been reported from *Guira guira* in Salobra, State of Mato Grosso do Sul (RODRIGUES & RODRIGUES 1981) and is of common occurrence in other avian hosts (VICENTE *et al.* 1995).

Physalopteroidea, Physalopteridae

***Physaloptera retusa* Rudolphi, 1819** (Figs 19-20)

Measurements based in three adult specimens, two males and one female. Males: body 6.49-8.60 long, 0.44-0.55 wide. Muscular and glandular esophagus

Figs 15-20. *Aplectana membranosa*. (15) Anterior portion of male, lateral view (Bar = 0.08); (16) posterior portion of male, lateral view (Bar = 0.03); (17) Anterior portion of female, lateral view (Bar = 0.1); (18) Vulvar region and ovejector, lateral view (Bar = 0.06); *Physaloptera retusa*. (19) Anterior extremity of female, lateral view (Bar = 0.01); (20) Vulvar region and ovejector, frontal view (Bar = 0.1). Bar of figure 15, common to figures 16-20. Bars in mm.



0.23 and 1.33-1.49 long, respectively. Nerve ring 0.21-0.28 from anterior extremity. Spicules 0.25-0.28. Female: body 13.65 long, 0.72 wide. Muscular and glandular esophagus 0.36 and 2.8 long, respectively. Nerve ring 0.35 from anterior extremity. Vulvar aperture 4.28 from the anterior extremity. Anus and 0.35 from posterior end. Eggs 0.02-0.03 in diameter.

Taxonomic summary. Hosts: *Bufo granulatus*-NHR, *Bufo typhonius* - NHR. Site of infection: stomach. Locality: Manaus (Igarapé do Tarumã and Igarapé do Leão), State of Amazonas (NGR), Brazil. Collectors: Claudionor & Mário Ventel. Dates: 12-IV-1955, 07-VI-1955.

Specimens deposited. CHIOC no. 21166, 21178 (wet material), 34121 a-c, 34142 (whole mounts).

***Physaloptera* sp.**

Measurements based on one adult female. Body 2.66 long, 0.15 wide. Muscular and glandular esophagus 0.21 and 0.89. Anus 0.08 from posterior extremity.

Taxonomic summary. Host: *Bufo marinus*. Site of infection: intestine. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mário Ventel. Date: 11-IV-1955.

Specimens deposited. CHIOC no. 34115 (whole mount), originally 21220 (wet material).

Remark. Females of *Physaloptera* Rudolphi, 1819, alone, do not permit specific diagnosis. TRAVASSOS & FREITAS (1964), reported *Physaloptera* sp. in *B. marinus* from Maicuruá, State of Pará.

Diplotriaenoidea, Diplotriaenidae

***Diplotriaena bargusinica* Skrjabin, 1917 (Figs 21-23)**

Measurements based on four poorly preserved adult specimens, three males and one female. Males: trident 0.14 long, spicules 0.40-0.49 and 0.71-0.77. Female: eggs 0.039 long, 0.025 wide.

Taxonomic summary. Host: *Gymnostinops yuracares* (Lafr. & d'Orb., 1838), Aves, Passeriformes, Icteridae; common names: olive oropendola, "japú"-NHR. Site of infection: body cavity. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Mozarth Correa de Mello. Date: 10-IX-1955.

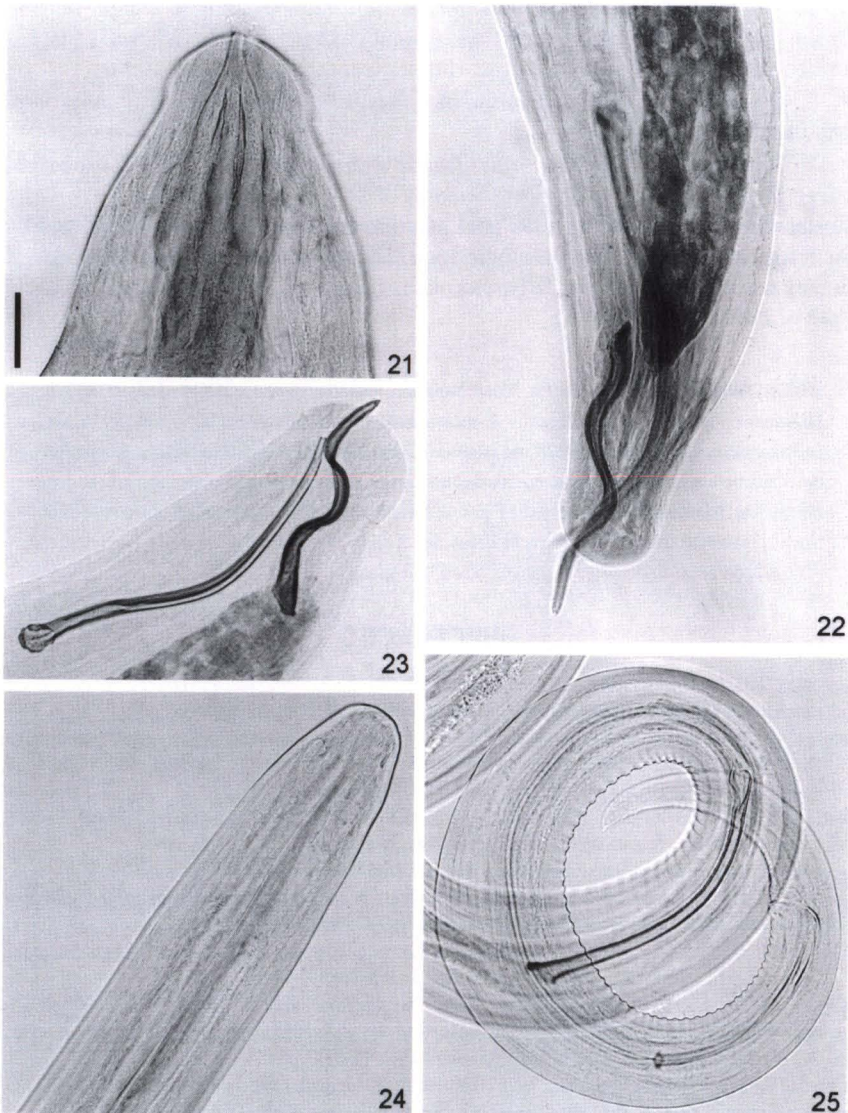
Specimens deposited. CHIOC no. 34143 a-d (whole mounts), originally 21197 (wet material).

Remark. The tridents are bilateral consistent sclerotized structures present in the anterior portion of specimens of diplotriaenid worms and thus, a reliable character to be used in the specific identification in this group.

Filarioidea, Onchocercidae

***Dipetalonema graciliformis* Freitas, 1964 (Figs 24-25)**

Measurements based on one adult male. Body 70.38 long, 0.19 wide. Esophagus 3.48 long. Nerve ring 0.18 from anterior extremity. Spicules 0.22 and 0.90 long. Gubernaculum 0.039 long. Cloacal aperture 0.23 from posterior extremity.



Figs 21-25. *Diplotriaena bargusinica*. (21) Anterior extremity of male, with tridents, lateral view (Bar = 0.01); (22) Posterior portion of male, frontal view (Bar = 0.1); (23) Posterior extremity of male, frontal view (Bar = 0.08); *Dipetalonema graciliformis*. (24) Anterior portion of male, lateral view (Bar = 0.03); (25) Posterior portion of male, lateral view (Bar = 0.03). Bar of figure 21, common to figures 22-25. Bars in mm.

Taxonomic summary. Host: *Saguinus mystax* (Spix, 1823), Mammalia, Primates, Callithrichidae; common names: moustached tamarin, "sagui-de-boca branca" – NHR. Site of infection: abdominal cavity. Locality: Manaus, State of Amazonas (NGR), Brazil. Collector: Herman Lent. Date: 15-VIII-1936.

Specimens deposited. CHIOC no. 34010 (whole mount), originally 9965 (wet material).

Remark. *Dipetalonema graciliformis* is very close to *D. gracilis* (Rudolphi, 1809). However, when compared, females of *D. graciliformis* are longer, with a shorter esophagus; moreover, the anal aperture lies near to the caudal end and the posterior extremity presents a single loop. *Dipetalonema graciliformis* was previously reported parasitizing *Saguinus midas* (Linnaeus, 1758) captured in Abaeté, State of Pará (FREITAS 1964).

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