

Ichthyouris voltagrandensis n.sp. (NEMATODA:
PHARYNGODONIDAE) FROM *Myleus tiete* EIGENMANN &
NORRIS, 1900 (OSTEICHTHYES: CHARACIDAE) IN THE
VOLTA GRANDE RESERVOIR, MG, BRAZIL

MARTINS, M. L., YOSHITOSHI, E. R. and UMEKITA, H.

Centro de Aqüicultura, Unesp, Via Prof. Paulo Donato Castellane, km 05, CEP 14870-000, Jaboticabal, SP, Brazil

Correspondence to: Maurício Laterça Martins, Centro de Aqüicultura, Unesp, Via Prof. Paulo Donato Castellane,
km 05, CEP 14870-000, Jaboticabal, SP, Brazil, e-mail: mlaterca@caunesp.unesp.br

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ABSTRACT

The present work studied helminth parasites of “pacu-manteiga”, *Myleus tiete* (Osteichthyes: Characidae) from Volta Grande Reservoir, MG, Brazil. Fishes with 142.6 ± 24.7 g weight and 17.3 ± 1.0 cm total length were collected. Five out six analysed fish (prevalence 83.3%) were parasitized in the intestine with an average of 535.6 ± 334.6 oxyurid nematodes per fish. The helminth was identified as *Ichthyouris voltagrandensis* n.sp. (Nematoda: Pharyngodonidae). It differs from *I. brasiliensis* (Moravec *et al.*, 1992a) by the absence of lateral alae, higher measures of tail and caudal alae of males, esophageal isthmus length, distance of excretory pore from anterior end and spicule length. In addition, eggs were provided by two long filaments in just one pole and by the first time the authors observed flagellate spermatozoa from dissected males. The authors exposes comparative table of measures of the five described species of the genus *Ichthyouris*.

Key words: Nematoda, Pharyngodonidae, *Ichthyouris voltagrandensis* n.sp., *Myleus tiete*.

RESUMO

***Ichthyouris voltagrandensis* n.sp. (Nematoda: Pharyngodonidae) em *Myleus tiete*
(Osteichthyes: Characidae) do Reservatório de Volta Grande, MG, Brasil**

O presente trabalho estudou helmintos parasitos do “pacu-manteiga”, *Myleus tiete* (Osteichthyes: Characidae), do Reservatório de Volta Grande, MG, Brasil, com peso médio de $142,6 \pm 24,7$ g e comprimento total médio de $17,3 \pm 1,0$ cm. Cinco, dos seis peixes analisados (prevalência de 83,3%), estavam parasitados no intestino com média de $535,6 \pm 334,6$ nematóides oxiurídeos por peixe. O helminto foi identificado como *Ichthyouris voltagrandensis* n.sp. (Nematoda: Pharyngodonidae). Difere de *I. brasiliensis* (Moravec *et al.*, 1992a) por ausência de aleta lateral, maiores dimensões da cauda e da aleta caudal do macho, comprimento do ístmo do esôfago, distância do poro excretor à extremidade anterior e comprimento do espículo. Os ovos são providos de dois longos filamentos situados em apenas um dos pólos e, pela primeira vez, os autores observaram espermatozóides flagelados em machos dissecados. Os autores fornecem tabela comparativa de medidas das cinco espécies do gênero *Ichthyouris*.

Palavras-chave: Nematoda, Pharyngodonidae, *Ichthyouris voltagrandensis* n.sp., *Myleus tiete*.

INTRODUCTION

There are four described species of genus *Ichthyouris* Inglis, 1962, an oxyurid nematode parasitizing fishes. Inglis (1962) described *I. ro*

from the intestine of *Cichlasoma festivum* at Sofia, Georgetown, British Guiana. Moravec & Prouza (1995) studied *I. bursata* from *Symphysodon discus*, an aquarium fish in South Bohemia, Czech Republic.

In Brazil, Moravec *et al.* (1992b) reported the presence of *I. brasiliensis* from armoured catfish *Pterigoplichthys aculeatus* in Paraná River, Guairá, Paraná State. Nevertheless, Moravec *et al.* (1992a) described *I. laterifilamenta* from doradid fish *Trachydoras paraguayensis* in the hydroelectric power station of Itaipu, Foz do Iguaçu, Paraná State.

In the present work, the authors describes a new species of *Ichthyouris* collected in the intestine of *Myleus tiete* (Osteichthyes: Characidae) from Volta Grande Reservoir, MG, Brazil. This is the first record of the nematode genus in the Minas Gerais State.

MATERIAL AND METHODS

During a period of 12/1995 to 12/1996 six specimens of *Myleus tiete* Eigenmann & Norris, 1900 (Osteichthyes: Characidae), with 142.6 ± 24.7 g weight and 17.3 ± 1.0 cm total length, were collected bimonthly with the aid of a net.

This work was developed in the hydroelectric power station of Volta Grande Reservoir (Cemig), MG, Brazil in which presents an inundated area of 195 km².

Nematodes were carefully collected from the intestinal lumen and fixed in AFA 65°C to posterior preservation in alcohol 70% with 5% of glycerine. The authors studied 22 males, 22 females and 22 immature females.

Five females were dissected for the measurement of eggs. Helminths were dehydrated and cleared in acetic acid, Amann lactophenol or glycerine. *En face* preparations followed Chitwood & Wehr (1934) and the drawings were done in camera lucida. Parasite identification was according to Petter & Quentin (1976) and Anderson & Lim (1996).

All measurements are given in milimeters with average and variation in parentheses.

RESULTS

Only six specimens (three males and three females) of *M. tiete* were collected in the studied period in which five parasitized with nematodes in the intestine (prevalence 83.3%). Five out six examined fishes showed an average number of parasites of 535.6 ± 334.6 varying from 134 to 1,088 per fish.

Description: *Ichthyouris voltagrandensis n.sp.* (Nematoda: Pharyngodonidae)

Cylindrical nematode, small, whitish colour, cuticle transversely striated. Caudal alae present in males. Lateral alae absent in both sexes. Tail of both sexes narrowing posteriorly with terminal spike. Mouth triangular with four large papillae and two lateral amphids. Demarcated pharynx. Esophagus with corpus, isthmus and terminal bulb. Esophageal bulb with sclerotized valves. Short isthmus in mature female. Long isthmus in immature female. Nerve ring involving the corpus. A large excretory pore placed below the bulb. Females with opisthodelphic uteri (uteri posteriorly directed according to Maggenti, 1981). Elliptical eggs provided with two very long unilateral filaments. One spicule in males. Gubernaculum absent.

Male: body with 1.60 (1.10-1.80) total length by 0.109 (0.070-0.152) width. Corpus with 0.276 (0.180-0.340) length by 0.030 (0.020-0.042) width. Isthmus with 0.019 (0.010-0.030) length by 0.018 (0.010-0.024) width. Terminal bulb with 0.079 (0.060-0.094) length by 0.077 (0.044-0.110) width. Nerve ring 0.166 (0.130-0.230) and excretory pore 0.494 (0.280-0.640) from anterior extremity. One arcuate spicule with 0.042 (0.035-0.048) length by 0.005 (0.003-0.007) width. The distance of the testis reflexion to the anterior extremity is 0.633 (0.480-0.760). Flagellate spermatozoa stored in a spermatheca measuring 0.024 (0.021-0.025) length by 0.004 (0.003-0.005) width. Tail including caudal spike 0.177 (0.118-0.232) length. Cuticularized plate-like structures surrounding the cloacal opening is present. Lateral caudal alae with 0.062 (0.057-0.070) length by 0.023 (0.010-0.033) width. Three pairs of genital papillae: one pair of preanal elongate papillae inserted in the caudal alae; two postanal, one pair of strong and pedunculate papillae just posteriorly to cloaca and one pair of small papillae situated posteriorly to the pedunculate papillae. Pedunculate papillae with 0.026 (0.016-0.033) length.

Female: body with 3.40 (3.00-3.80) total length by 0.306 (0.200-0.760) width. Corpus with 0.449 (0.350-0.490) length by 0.072 (0.064-0.080) width. Indistinct isthmus with 0.003 (0.002-0.006) length by 0.037 (0.030-0.040) width. Terminal bulb with 0.116 (0.096-0.130) length by 0.130 (0.100-0.144) width. Nerve ring 0.187 (0.130-0.224) and excretory pore 0.856 (0.780-0.984) from anterior extremity. The distance of the vulva is 1.425 (0.840-1.680) from

anterior extremity. Genital tube postpudendum (according to Maggenti, 1981). Ovijector with 0.219 (0.184-0.270) length by 0.054 (0.040-0.060) width. One ovary anterior to the level of vulva and other posterior. The growth zone of ovary presents a reflexion 0.946 (0.792-1.104) from anterior end. Tail including caudal spike 0.420 (0.336-0.816) length. Phasmids situated 0.349 (0.318-0.400) from posterior end. From dissected females the eggs enclosed in the uterus measured 0.117 (0.112-0.125) length by 0.034 (0.029-0.037) width.

Immature female: body with 1.80 (1.30-2.80) total length by 0.126 (0.056-0.240) width. Corpus with 0.297 (0.196-0.530) length by 0.036 (0.020-0.076) width. Isthmus with 0.017 (0.004-0.026) length by 0.020 (0.010-0.040) width. Terminal bulb with 0.072 (0.050-0.116) length by 0.079 (0.050-0.130) width. Nerve ring 0.162 (0.120-0.336) and excretory pore 0.444 (0.110-0.764) from anterior extremity. The distance of the vulva is 0.835 (0.600-1.184) from anterior extremity. Tail including caudal spike 0.297 (0.176-0.390) length. Phasmids situated 0.210 (0.150-0.260) from posterior end. The initial formation of genitalia presents prolongations to the anterior and posterior end of the helminth.

Taxonomic summary

Type host: *Myleus tiete* Eigenmann & Norris, 1900 (Osteichthyes: Characidae).

Site of infection: intestine.

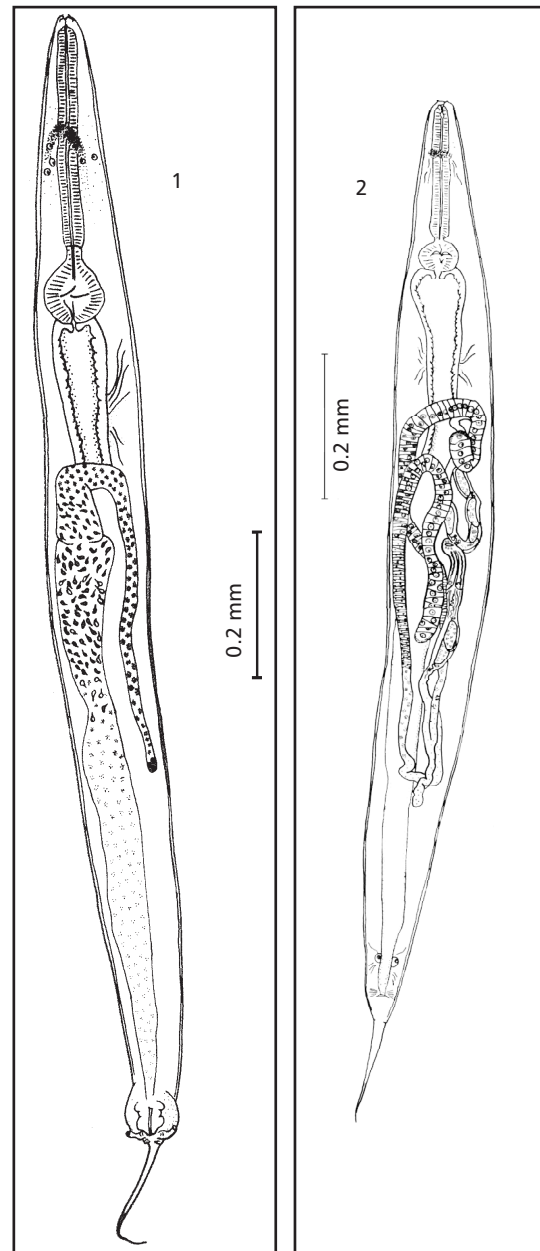
Type locality: Volta Grande Reservoir, MG, Brazil.

Specimens deposited: Coleção Helminológica do Instituto Oswaldo Cruz (CHIOC), Rio de Janeiro (Holotype male: 33852 a; Allotype female: 33852 b; Paratypes: 33852 c, d).

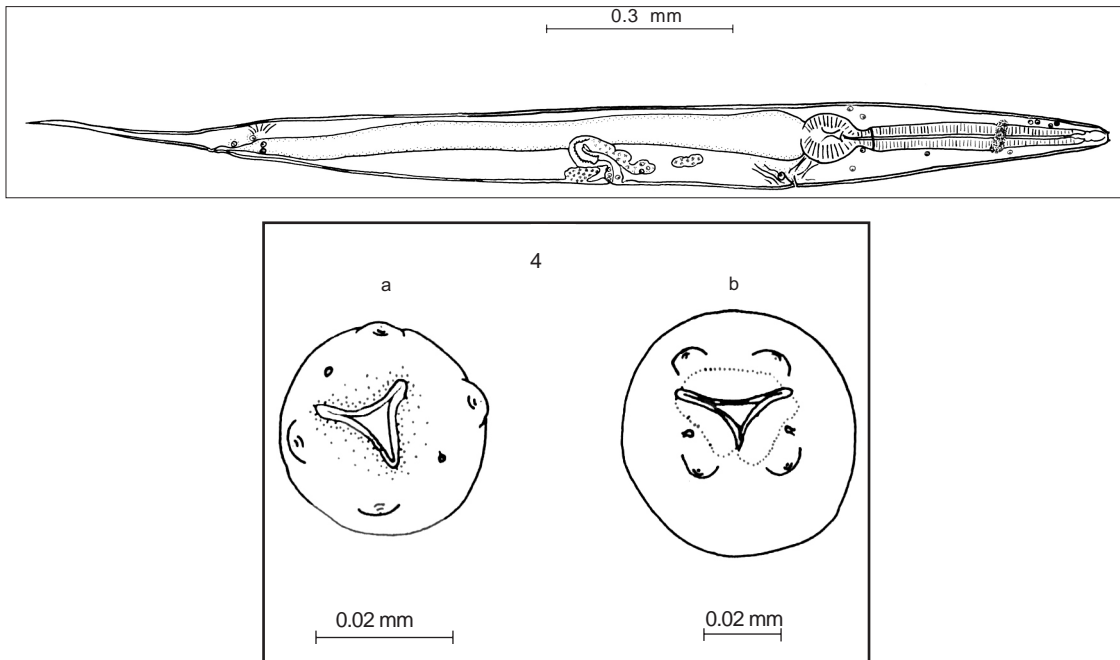
REMARKS

Considerable differences in egg size and morphology, as well as buccal papillae were observed when compared with *I. ro* Inglis, 1962 and *I. bur-sata* Moravec & Prouza, 1995. The most important feature is the absence of lateral alae in both sexes. All species are provided by lateral alae. *I. volta-grandensis* n.sp. showed similar morphology with *I. brasiliensis* Moravec *et al.*, 1992a and *I. laterifilamenta* Moravec *et al.*, 1992b. The eggs of *I. laterifilamenta* are provided by lateral filaments while the studied eggs of *I. volta-grandensis* n.sp. showed two filaments in just one pole. In males,

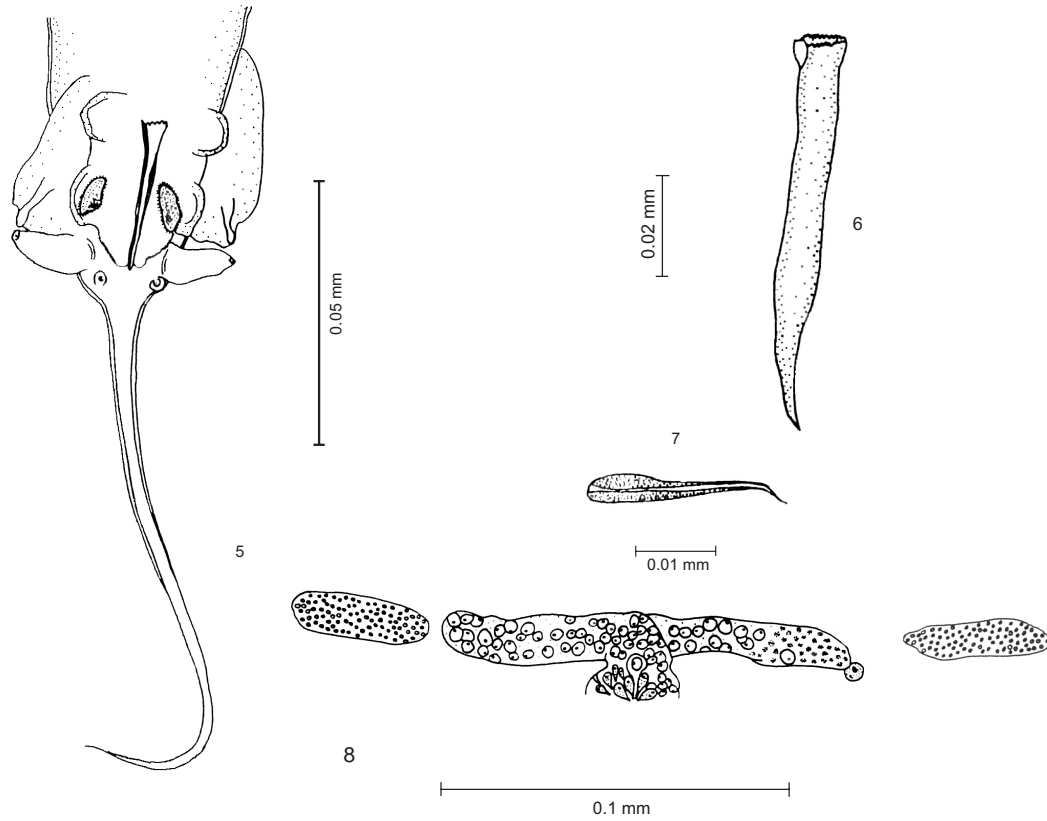
the absence of lateral alae and higher measures of tail and caudal alae differentiate the new species of *I. brasiliensis* (Table 1). In addition, some characters of females such as width, isthmus length and distance of excretory pore from anterior end were shorter than the described species (Table 2).



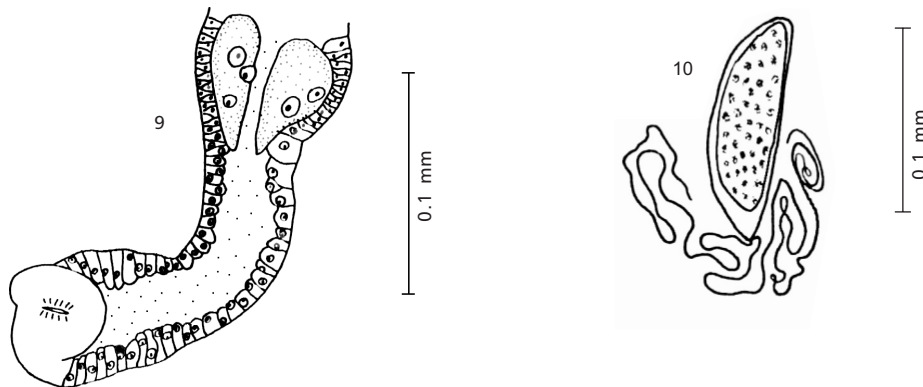
Figs. 1-2 — *Ichthyouris volta-grandensis* n.sp. 1 — Male. 2 — Adult female.



Figs. 3-4 — *Ichthyouris voltagrandensis* n.sp. **3** — Immature female. **4** — Apical view of the buccal cavity of male (a) and female (b).



Figs. 5-8 — *Ichthyouris voltagrandensis* n.sp. **5** — Caudal end of male. **6** — Lateral view of spicule. **7** — Lateral view of spermatozoa. **8** — Genital tube of female in the beginning of development.



Figs. 9-10 — *Ichthyouris volta grandensis* n.sp. 9 — Ovipositor of an adult female. 10 — Egg showing two filaments in one pole.

TABLE 1
Comparative measures of males of *Ichthyouris* genus.

	<i>I. ro</i>	<i>I. brasiliensis</i>	<i>I. laterifilamenta</i>	<i>I. bursata</i>	<i>I. volta grandensis</i>
	Inglis (1962)	Moravec <i>et al.</i> (1992a)	Moravec <i>et al.</i> (1992b)	Moravec & Prouza (1995)	Present work
Total length	0.830-1.100	1.280-1.880	1.160-1.440	1.390	1.100-1.800
Width	0.057-0.087	0.109-0.150	0.082-0.109	0.109	0.070-0.152
Corpus length	0.220-0.260	0.213-0.243	0.165-0.186	0.174	0.180-0.340
Corpus width	—	0.024-0.030	0.018-0.024	0.024	0.020-0.042
Isthmus length	—	0.015-0.018	0.012-0.015	0.015	0.010-0.030
Isthmus width	—	0.018-0.021	0.015	0.015	0.010-0.024
Bulb length	0.053-0.067	0.063-0.072	0.054-0.063	0.069	0.060-0.094
Bulb width	0.046-0.058	0.063-0.075	0.048-0.057	0.069	0.044-0.110
Excretory pore ¹	0.210-0.280	0.354-0.571	0.375-0.456	0.092	0.280-0.640
Nerve ring ¹	0.100-0.110	0.135-0.162	0.111-0.135	0.132	0.130-0.230
Spicule length	0.047-0.049	0.060-0.069	0.036-0.045	0.060	0.035-0.048
Spicule width	—	—	—	—	0.003-0.007
Gonads ²	—	—	—	—	0.480-0.760
Tail length	0.217-0.221	0.099-0.138	0.063-0.087	0.045	0.118-0.232

1. Distance of the structure from the anterior extremity. 2. Distance of the testis reflexion to the anterior extremity.

However, an important difference between *I. brasiliensis* and the present description was spicule length, tail, caudal alae length, the presence of lateral alae and disposition of genital papillae. Comparing with mature females, the distance of vulva from anterior end and isthmus length were smaller than the *I. volta grandensis* n.sp.

The eggs of *I. brasiliensis* females is provided by several filaments in both poles while the new suggested species is provided by two filaments in just one pole.

Moreover, this is the first observation of flagellate spermatozoa from dissected males of the genus *Ichthyouris*. Due to such differences the authors suggests the name *Ichthyouris volta grandensis* n.sp. proposed from the type locality.

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TABLE 2
Comparative measures of females of *Ichthyouris* genus.

	<i>I. ro</i>	<i>I. brasiliensis</i>	<i>I. laterifilamenta</i>	<i>I. bursata</i>	<i>I. voltagrandsis</i>
	Inglis (1962)	Moravec <i>et al.</i> (1992a)	Moravec <i>et al.</i> (1992b)	Moravec & Prouza (1995)	Present work
Total length	2.100-2.400	3.160-4.500	2.560-3.330	2.390-3.170	3.000-3.800
Width	0.150-0.190	0.231-0.422	0.190-0.299	0.231-0.340	0.200-0.760
Corpus length	0.490-0.560	0.387-0.435	0.345-0.387	0.300-0.330	0.350-0.490
Corpus width	–	0.060-0.078	0.039-0.048	0.045-0.060	0.064-0.080
Isthmus length	–	0.006-0.009	0.009-0.012	–	0.002-0.006
Isthmus width	–	0.012-0.036	0.027-0.033	–	0.030-0.040
Bulb length	0.114-0.116	0.120-0.135	0.087-0.105	0.111-0.126	0.096-0.130
Bulbo width	0.102-0.112	0.126-0.159	0.090-0.114	0.120-0.141	0.100-0.144
Excretory pore ¹	0.500-0.590	0.625-0.993	0.625-0.707	0.687-0.707	0.780-0.984
Nerve ring ¹	0.130-0.150	0.165-0.198	0.159-0.168	0.120-0.165	0.130-0.224
Tail length	0.410-0.520	0.639-0.870	0.480-0.600	0.321-0.449	0.336-0.816
Vulva ¹	0.850-0.980	1.130-1.650	0.857-0.938	0.898-1.170	0.840-1.680
Gonads ²	–	–	–	–	0.792-1.104
Ovjector length	–	–	–	–	0.184-0.270
Ovjector width	–	–	–	–	0.040-0.060
Eggs length	0.036	0.093-0.099	0.117-0.138	0.105-0.111	0.112-0.125
Eggs width	0.011	0.033-0.036	0.051-0.069	0.039-0.042	0.029-0.037

1. Distance of the structure from the anterior extremity. 2. Distance of the ovary reflexion to the anterior extremity.

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