**TRAVASSOSNEMA TRAVASSOSI PARANAENSIS SUBSP. N.
AND FIRST DESCRIPTION OF THE FEMALE
OF GUYANEMA RAPHIODONI MORAVEC, KOHN AND FERNANDES,
1993 (NEMATODA : GUYANEMIDAE), DRACUNCULOID PARASITES
OF CHARACID FISHES IN BRAZIL**

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SUMMARY

A new nematode subspecies, *Travassosnema travassosi paranaensis* subsp. n., is described from the body cavity of the characid fish *Acestrorhynchus lacustris* from the Paraná River near Guaira in southern Brazil. It differs from the nominotypical subspecies *T. travassosi travassosi* Costa, Moreira and Oliveira, 1991 in smaller body (male and gravid female 1.6 and 2.9-3.5 mm long, respectively), rounded tail tip in female, and different number of pairs of caudal papillae in male (4 preanal and 6 postanal);

differences in the site of localization in the host's body and geographical distribution have also been considered. The female of another dracunculoid, *Guyanema raphiodoni* Moravec, Kohn and Fernandes, 1993, is described for the first time from a specimen collected from the intestine of the characid *Raphiodon vulpinus* originating from the type locality (the water reservoir of the hydroelectric power station of Itaipú-Foz do Iguaçu, Paraná R. basin).

RÉSUMÉ : Description de *Travassosnema travassosi paranaensis* n. subsp. et première description de la femelle de *Guyanema raphiodoni* Moravec, Kohn et Fernandes, 1993 (Dracunculoidea : Guyanemidae), Nématodes parasites de Poissons Characidae du Brésil.

Une nouvelle sous-espèce de Nématode, *Travassosnema travassosi paranaensis*, est décrite de la cavité générale du Poisson Characidé *Acestrorhynchus lacustris* provenant de la rivière Parana près de Guaira dans le sud du Brésil. Elle se différencie de la sous-espèce type *T. travassosi travassosi* par une taille plus petite (mâle et femelles mûres longs respectivement de 1,6 et 2,9-3,5 mm), une extrémité caudale arrondie chez la femelle et un nombre différent de papilles cloacales chez le mâle (4 pré-cloacales et 6 post-

cloacales); elle présente également une localisation dans le corps de l'hôte et une répartition géographique différentes. La femelle d'un autre Dracunculoidea, *Guyanema raphiodoni* Moravec, Kohn et Fernandes, 1993, est décrite pour la première fois sur un spécimen récolté dans l'intestin du Characidé *Raphiodon vulpinus* provenant de la localité-type (le réservoir de la Centrale hydroélectrique d'Itaipu-Foz de Iguaçu, Bassin de la rivière Parana).

INTRODUCTION

An examination of fish for helminth parasites during the expedition to the Paraná River in southern Brazil, organized by one of the Brazilian co-authors (A. Kohn) in the period from March 16-27, 1992, made it possible to discover a few dracunculoid nematodes belonging to two little-known species of two genera. One of them has hitherto been known by the male, whereas the second one represents a new subspecies. Both parasite species are described below.

MATERIALS AND METHODS

The nematode specimens originated from fishes from the reservoir of the hydroelectric power station of Itaipú-Foz do Iguaçu and the Paraná River near Guaira (March 16-27, 1992). The nematodes were fixed and preserved in 70 % ethanol and cleared with glycerine for examination. Drawings were made with the aid of a Zeiss microscope drawing attachment. All measurements are given in mm.

RESULTS

Dracunculoidea, Fam. Guyanemidae Petter, 1974.

1 — *Travassosnema travassosi paranaensis* SUBSP. N. (Fig. 1)

Description: Body small, whitish, relatively short, somewhat tapering to both ends. Cuticle smooth. Cephalic end

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FIG. 1. — *Travassosnema travassosi paranaensis* subsp. n. A, B — anterior end of gravid female, lateral views; C — same, ventral view; D — cephalic end of female, lateral view; E — anterior end of female, lateral view; F — anterior end of male, dorsal view; G — posterior end of female, lateral view; H, I — posterior end of male, ventral and lateral views (Bars in mm.).

rounded, provided with eight minute cephalic papillae and two lateral amphids. Buccal capsule absent. Small deirids situated near oesophageo-intestinal junction in female and at level of anterior half of glandular oesophagus in male. Oesophagus divided into narrow anterior muscular part and conspicuously wide posterior glandular part; glandular oesophagus short, provided with long and broad dorsal oesophageal appendage extending posteriorly. Length ratio of muscular and glandular parts of oesophagus approximately 1:1. Nerve ring encircling muscular oesophagus near its posterior end. Excretory pore just behind nerve ring level. Intestine straight. Tail conical with rounded tip.

Male (1 specimen, holotype): Length of body 1.61, maximum width 0.041. Muscular oesophagus 0.108 long and 0.012 wide. Length of glandular oesophagus 0.141, its width 0.033; oesophageal appendage 0.366 long and 0.033 wide, partly being overlapped by intestine. Length ratio of glandular oesophagus and oesophageal appendage 1: 2.6. Nerve ring, excretory pore and deirids 0.066, 0.090 and 0.168, respectively, from anterior extremity. Intestine narrow, light in colour. Posterior end of body ventrally curved, provided with wide caudal alae supported by pedunculate papillae. Spicules simple, equal, well sclerotized, 0.045 long. Distal tips of withdrawn spicules surrounded by somewhat refractive cover reminding gubernaculum; length of this gubernaculum-like formation 0.009. Caudal papillae: 4 pairs preanal and 6 pairs postanal; first and second as well as fourth, fifth and sixth pairs of postanal papillae shifted to each other. Tail 0.057 long.

Female (2 specimens; allotype, measurements of paratype in parentheses): Length of body of gravid female 2.92 (3.45), maximum width 0.136 (0.163). Muscular oesophagus 0.135 (0.120) long and 0.030 (0.027) wide. Length of glandular oesophagus 0.144 (0.147), its width 0.075 (0.066); oesophageal appendage 0.618 (0.795) long and 0.084 (0.081) wide. Length ratio of glandular oesophagus and oesophageal appendage 1:4.3 (1:5.4). Nerve ring, excretory pore and deirids 0.099 (0.087), 0.105 (0.108) and 0.231 (0.239), respectively, from anterior extremity. Intestine straight, broad, light in colour. Rectum short hyaline tube. Three elongate glands extending anteriorly from rectum. Tail conical, 0.117 (0.108) long, with rounded tip. Vulva situated 0.363 (0.300) from anterior end of body, somewhat posterior to oesophageo-intestinal junction level. Short muscular vagina first oriented posteriorly and then turning anteriorly to continue as narrow distal part of uterus. Uterus occupying major part of body, containing gradually eggs, developing embryos and fully formed larvae in anterior direction. Length of larvae in uterus about 0.180 (—), their width 0.012 (0.012). Tubular ovary extending posteriorly to mid-length of tail.

Type host: *Acestrorhynchus lacustris* (Reinhardt), local name « peixe-cachorro » (Characidae).

Site: body cavity.

Type locality: Paraná River — Guaira, Brazil (March 16-27, 1992).

Deposition of types: Institute of Parasitology, České Budějovice (Coll. No. N-621).

Etymology: The subspecific name *paranaensis* relates to the place of the occurrence of these nematodes, i.e. the Paraná River.

DISCUSSION

In 1991, Costa *et al.* described a new dracunculoid nematode genus and species *Travassosnema travassosi* from the tissues behind the eyes of the characid fish *Acestrorhynchus lacustris* from the São Francisco River (State of Minas Gerais), Brazil. The authors assigned the genus to the family Guyanemidae Petter, 1974.

The specimens of the present material are morphologically similar to *T. travassosi* Costa, Moreira et Oliveira, 1991 and they also originate from the same host species (*A. lacustris*) but, on the other hand, they exhibit some important morphological and biometrical differences. Since both forms differ as well in the site of localization in the host (body cavity vs tissues behind eyes) and in their geographical distribution (drainage system of the Paraná River vs the São Francisco River basin), we consider the present specimens to represent a new subspecies, *T. travassosi paranaensis* subsp. n.

The new subspecies, *T. travassosi paranaensis*, differs from *T. travassosi travassosi* in much smaller body measurements, especially those of gravid females containing larvae (length of body 2.9-3.5 mm vs 7.5-13.8 mm), in the shape of the female tail tip (rounded vs pointed), numbers of pairs of caudal papillae in the male (4 preanal and 6 postanal vs 5-6 preanal and 5 postanal), situation of the vulva in relation to the glandular oesophagus (at level of oesophageo-intestinal junction in *T. t. travassosi* and distinctly posterior to this junction in *T. t. paranaensis*) and in some other features (e.g., comparatively shorter glandular oesophagus and its posterior appendage). Although Costa *et al.* (1991) gave a SEM micrograph showing a deirid in *T. travassosi*, they could not find deirids and excretory pore under the light microscope and, therefore, they did not include the position of these organs in their species description.

The existence of two subspecies with allopatric distribution, parasitizing the same host species, is not exceptional in this group of nematodes. Similar to this case, Petter and Dlouhy (1985) described *Guyanema seriei paraguayensis* from the fish *Hoplerhynchus unitaeniatus* (Erythrinidae) from Paraguay, a subspecies morphologically different from the nominotypical subspecies *G. seriei seriei*, a parasite of

H. unitaeniatus in Guiana. This suggests a gradual allopatric speciation in these nematodes (see Mayr, 1963).

At present the family Guyanemidae is represented by three genera, *Guyanema* Petters, 1974, *Pseudodelphis* Adamson and Roth, 1990 and *Travassosnema* Costa, Moreira et Oliveira, 1991. The latter is easily distinguished from the remaining two genera mainly in possessing a very short glandular oesophagus provided with a long posterior appendage; the glandular oesophagus in *Guyanema* and *Pseudodelphis* is long and simple. By having a long oesophageal appendage, *Tra-*

vassosnema resembles nematodes of several genera of the closely related family Skrjabillanidae (*Skrjabillanus* Shigin and Shigina, 1958, *Molnaria* Moravec, 1968, *Sinoichthyonema* Wu in Chen, 1973), including histozoic parasites of Eurasian freshwater fishes. However, in contrast to *Travassosnema*, skrjabillanids possess a sclerotized buccal capsule and their males have no spicules. Among dracunculoids, a rudimentary oesophageal appendage is present as well in the genus *Ichthyofilaria* Yamaguti, 1935 of the family Philometridae, comprising a few species parasitizing marine fishes.

FIG. 2. — *Guyanema raphiodoni* Moravec, Kohn and Fernandes, 1993, nongravid female. A, B — anterior end of body, ventral views; C — cephalic end, ventral view; D — region of oesophageal-intestinal junction; E — deirid; F — posterior end of body, ventral view; G — tail, ventral view (Bars in mm.).

2 — *Guyanema raphiodoni* MORAVEC, KOHN AND FERNANDES, 1993 (Fig. 2)

Female (1 specimen): Medium sized nematode with almost smooth cuticle. Length of body 4.24, maximum width 0.069. Head end rounded. Oral opening small, surrounded by eight small cephalic papillae and pair of lateral amphids. Deirids small, spike-like, 0.789 from anterior extremity. Oesophagus composed of narrow anterior muscular part and wide, much longer glandular part; muscular oesophagus somewhat distended at its anterior end, glandular oesophagus provided with two large cell nuclei, one situated at its mid-length and one near its posterior end. Length of muscular oesophagus 0.195, of glandular oesophagus 1.10; their length ratio 1:6. Length of entire oesophagus 1.29. Oesophagus opening into intestine through small valve. Distance of anterior oesophageal cell nucleus from anterior extremity 0.816, of posterior one 1.24. Nerve ring encircling muscular oesophagus approximately at its mid-length, 0.129 from anterior end of body; excretory pore not observed. Intestine straight, light in colour. Rectum a short hyaline tube, small round rectal glands present. Tail conical, 0.126 long, sharply pointed at tip. Vulva situated 0.354 from anterior extremity, somewhat posterior to anterior end of glandular oesophagus. Short muscular vagina oriented anteriorly, opening into posteriorly extending narrow uterus. No eggs or larvae present in uterus. Tubular ovary somewhat anterior to rectum.

Host: *Raphiodon vulpinus* Agassiz, local name « dourado-cachorro » (Characidae).

Site: intestine.

Locality: Reservoir of the hydroelectric power station of Itaipú-Foz do Iguaçu, Brazil.

Deposition of specimen: Institute of Parasitology, České Budějovice (Coll. No. N-595).

DISCUSSION

Guyanema raphiodoni has only recently been established on the basis of a single male collected from the intestine of the characid *Raphiodon vulpinus* from the reservoir of the hydroelectric power station of Itaipú-Foz do Iguaçu, Brazil, in 1991 (Moravec *et al.*, 1993). Next expedition to the same locality in March 1992 resulted in obtaining a conspecific female specimen originating from the same host species.

The morphology of the only female of *G. raphiodoni*

has confirmed some characteristic features of this species by which it clearly differs from other congeners. It mainly concerns the presence of a markedly long glandular oesophagus provided with two large cell nuclei and the length ratio of both parts of oesophagus being 1:6. However, in contrast to male, the cephalic end of body of this non-gravid female is not inflated and also the anterior end of muscular oesophagus is less distended when compared to that in the male. For the first time it was possible to find the presence of deirids in this species. The gross morphology of this female shows features characteristic of *Guyanema* (see Petter, 1974, 1987; Petter and Dlouhy, 1985) and confirms belonging of this species to this genus. In contrast to females of the other congeneric species, in which the vulva is always situated near the junction of the muscular and glandular parts of oesophagus, the vulva in *G. raphiodoni* is shifted more posteriorly.

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