

***Spinitectus mariaisabelae* n. sp. (Nematoda: Cystidicolidae) from the intestine of the freshwater fish *Profundulus punctatus* (Cyprinodontiformes) in Mexico**

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Summary

Spinitectus mariaisabelae n. sp. is described from the intestine of *Profundulus punctatus* (Günther) (Pisces, Cyprinodontiformes) from the Suchiapa River, State of Chiapas, Mexico. It is characterized largely by the bifurcate distal tip of the larger (left) spicule, spination of the cuticle separated into 4 longitudinal sectors, more or less regularly spaced rings of spines, and by the position of the excretory pore just posterior to the 7th ring of visible spines. By having the rings of spines divided into 4 sectors, the new species resembles 8 of the 15 American species; however, they can be easily distinguished by the number of spines in the first ring. *S. mariaisabelae* differs from all its American congeners by possessing a bifurcate distal tip of the left spicule, a unique feature among *Spinitectus* spp.

Key words: Nematoda; Cystidicolidae; *Spinitectus*; *Profundulus punctatus*; freshwater fish; Chiapas; Mexico

Introduction

The nematode genus *Spinitectus* Fourment, 1883 includes a large number of species described from both freshwater and marine fishes, some amphibians, and one mammal (Boomker, 1993). However, because many species, mainly those from freshwater fishes from the Indian subcontinent, have been poorly described, some authors (e.g., Boomker, 1993; Boomker & Puylaert, 1994; Petter, 1995; Caspeta-Mandujano *et al.*, 2000; Caspeta-Mandujano & Moravec, 2000) prefer to deal with these parasites according to their zoogeographical regions.

At present, 15 species of *Spinitectus* have been reported from freshwater fishes in the Americas, 10 from North America and 5 from South America. In Mexico, three *Spinitectus* species have been reported: *S. mexicanus* (Caspeta-Mandujano, Moravec et Salgado-Maldonado, 2000), *S. humbertoi* (Caspeta-Mandujano et Moravec, 2000) and *S. agonostomi*, a species originally described from the intes-

tine of *Agonostomus monticola* from the Caribbean region by Moravec and Baruš (1971), has been recently been recorded from Mexican freshwaters (Moravec, 1998; Caspeta-Mandujano, 2005).

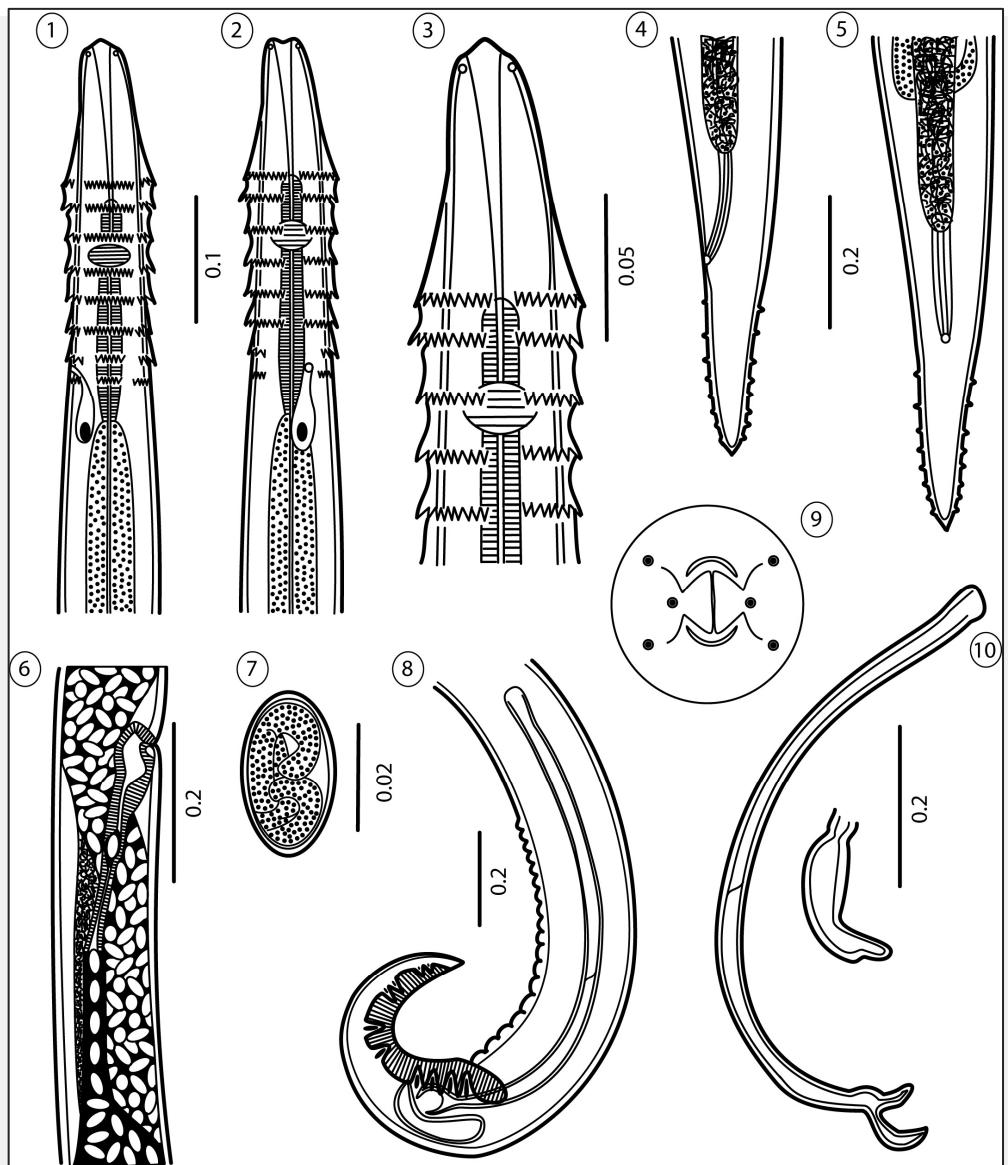
Investigations on helminth parasites of freshwater fishes, carried out by the research teams of the Institute of Biology, National Autonomous University of Mexico (UNAM), Centre for Biological Research and Faculty of Biology, Autonomous University of Morelos State, in several rivers of the State of Chiapas, Mexico, revealed a new species of *Spinitectus* in the intestine of the cyprinodontoid *Profundulus punctatus*, which is described below.

Materials and Methods

Fishes were collected by using an electro-fishing machine from the Suchiapa River (16°20'06"N, 93°27'19"W), near the village of Jesús María Garza, State of Chiapas, Mexico, during February 2004. Nematodes recovered from the intestine were fixed in hot 4 % formaldehyde and cleared with glycerine. Drawings were made with the aid of a Nikon microscope drawing attachment. After examination, the specimens were stored in vials of 70 % ethanol. For scanning electron microscopy (SEM) studies, three specimens were dried by the critical point method. All measurements are given in µm unless otherwise stated. Type specimens have been deposited in the National Helminthological Collection of the Institute of Biology, National Autonomous University of Mexico (UNAM), Mexico City; and in the Parasitological Collection of the Autonomous University of Morelos State, Mexico.

Results

Family Cystidicolidae Skrjabin, 1946
Spinitectus mariaisabelae n. sp. (Figs 1 – 17)
Description



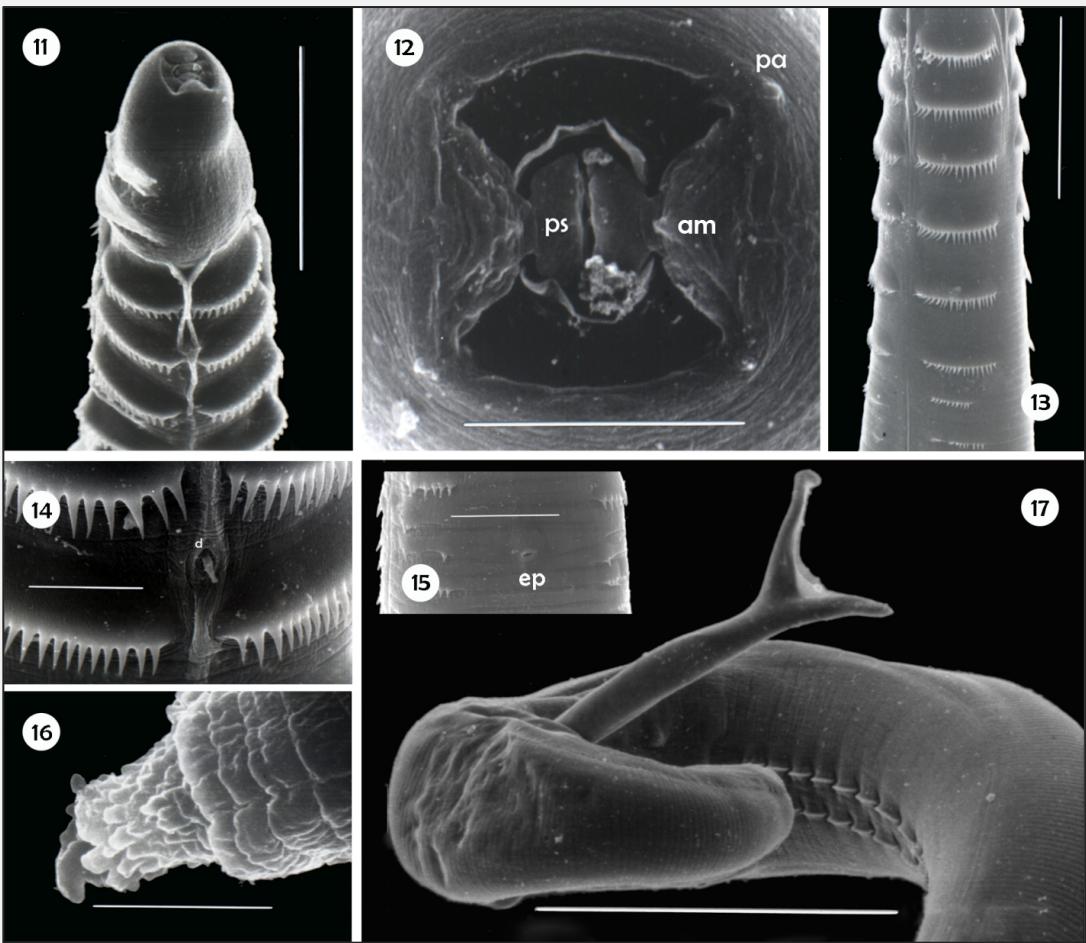
Figs. 1 – 10. *Spinitectus mariaisabelae* sp. n. 1, 2 – Anterior end of male, lateral and ventral views; 3 – Anterior end of female, larger magnification; 4, 5 – Posterior end of female, lateral and ventral views; 6 – Vulvar region, lateral view; 7 – Egg; 8 – Posterior end of male, lateral view; 9 – Cephalic end, apical view; 10 – Spicules

Medium sized nematodes with rather thick cuticle bearing rings of spines, these being divided at anterior end of body into 4 distinctly-separated dorsolateral and ventrolateral sectors (Figs. 11, 13). First ring usually somewhat anterior to or at level of end of vestibule (stoma) (Figs. 1 – 3). Eight anterior rings of spines well developed; last two rings of spines with a reduced number of spines (10 – 12 in the seventh and 8 – 10 in the eighth, Fig. 13); rings more or less regularly spaced (Figs. 1, 2, 13). First ring of spines consisting of 52 – 60 spines in males (13 – 15 per sector) and 64 – 72 spines in females (Figs 11, 13). Small digitiform deirids situated between first and second ring of spines (Fig. 14). Cephalic end rounded, mouth encircled by

pseudolabia, papillae and amphids (Figs 9, 11, 12). Vestibule rather long, its anterior end dilated to form funnel-shaped prostom. Excretory pore just posterior to the seventh ring of spines (Figs 1, 2, 15).

Male (15 specimens, holotype in parentheses)

Length of body 6.56 – 8.28 (7.67) mm, maximum width 144 – 184 (179). Length of vestibule, muscular oesophagus and glandular oesophagus 165 – 195 (195), 299 – 368 (299) and 713 – 851 (851), respectively. Length ratio of muscular to glandular oesophagus 1:2.1 – 2.8 (1:2.8). Distance from anterior extremity: first ring of spines 161 – 177 (170), deirids 188 – 207 (190), nerve ring 253 – 299



Figs. 11 – 19. *Spinctectus mariaisabelae* sp. n., scanning electron micrographs. 11 – Anterior end of male, lateral view; 12 – Cephalic end of male, apical view; 13 – Anterior end, rings of spines; 14 – Deirid; 15 – Excretory pore; 16 – Tip of female tail; 17 – Caudal end of male, focused on the left spicule

Abbreviations: d – deirid; ep – excretory pore; pa – papilla; am – amphid; ps – pseudolabium. Scale bars: Figs. 11, 13, 17 = 50 µm; Figs. 12, 14, 16 = 10 µm; Fig. 15 = 40 µm.

(253). Posterior end of body spirally coiled, with narrow subventral caudal alae. Caudal papillae: 4 pairs of pre-anal papillae and 6 pairs of postanal papillae arranged in 3 groups each of 2 pairs (Fig. 8). Area rugosa well developed, formed by 2 longitudinal cuticular ridges (Fig. 17). Larger (left) spicule slender, 1.00 – 1.10 (1.08) mm long, with bifurcate distal end; length of its shaft 563 – 598 (586), representing 56 – 59 % of spicule length. Small (right) spicule longer than wide, 195 – 248 (195) long (Figs. 10, 17). Length ratio of spicules 1:4.1 – 5.1 (1:5.1). Tail conical, 230 – 305 (230) long (Fig. 8).

Female (15 gravid specimens, allotype in parentheses): Length 11.82 – 14.58 (11.82) mm, maximum width 276 – 322 (276). Length of vestibule, muscular oesophagus and glandular oesophagus 195 – 264 (195), 397 – 437 (402) and 1.15 – 1.54 (1.15) mm, respectively. Length ratio of muscular to glandular oesophagus 1:2.8 – 3.5 (1:2.8). Distance from anterior extremity: first ring of spines 174 –

220 (174), deirids 195 – 236 (195), nerve ring 264 – 345 (264). Vulva pre-equatorial, 4.86 – 5.98 (4.86) mm from anterior extremity (Fig. 6). Fully mature eggs oval, smooth, containing larva; size of eggs 57 – 59 x 38 – 39 (59 x 39) (Fig. 7). Tail conical, bearing small spines irregularly spaced 264 – 317 (317) long (Figs. 4, 5). Tail tip bearing small finger-like processes (Fig. 16).

Type host: *Profundulus punctatus* (Günther) (Cyprinodontidae, Cyprinodontiformes).

Site of infection: Intestine.

Type locality: Suchiapa River, State of Chiapas, Mexico (types collected in February 2004).

Etymology: The species is named in honour of María Isabel Mandujano Chávez, mother of the first author.

Deposition of types: Holotype, allotype and paratypes in the Institute of Biology, UNAM, in Mexico, City (CNHE 5781, 5782, 5783) and paratypes in the Faculty of Biology, Parasitological Collection of the Universidad Autónoma del Estado de Morelos, Mexico (COPAUAEM N-103).

Discussion

A total of 15 species of *Spinitectus* have been reported as parasites of freshwater fishes in the New World (*Spinitectus acipenseris* Choudhury et Dick, 1992, *S. agonostomi* Moravec et Baruš, 1971, *S. asperus* Travassos, Artigas et Pereira, 1928, *S. carolini* Holl, 1928, *S. gracilis* Ward et Magath, 1917, *S. humbertoi* Caspeta-Mandujano et Moravec, 2000, *S. macrospinosis* Choudhury et Perryman, 2003, *S. mexicanus* Caspeta-Mandujano, Moravec et Salgado-Maldonado, 2000, *S. micracanthus* Christian, 1972, *S. multipapillatus* Setter, 1987; *S. osorioi* Choudhury et Pérez-Ponce de León, 2001, *S. pachyuri* Petter, 1984, *S. ro dolphiheringi* Vaz et Pereira, 1934, *S. tabascoensis* Moravec, García-Magaña et Salgado-Maldonado, 2002, and *S. yorkei* Travassos, Artigas et Pereira, 1928) (see Moravec, 1998; Choudhury & Perryman, 2003; Caspeta-Mandujano, 2005).

According to Moravec (1979), one of the most stable features in *Spinitectus* species is the situation of the excretory pore in relation to anterior cuticular spines, but the character of the spination is also used for the separation of species. Of the 15 *Spinitectus* species reported from freshwaters in the Americas, 8 (*S. agonostomi*, *S. carolini*, *S. humbertoi*, *S. osorioi*, *S. macrospinosis*, *S. mexicanus*, *S. micracanthus* and *S. multipapillatus*) have rings of spines markedly divided into 4 sectors. However, the new species can be easily distinguished from them by the number of spines in the first ring (52 – 72 vs. 30 – 50, 20 – 30, 36 – 38, 20 – 25, 28 – 44, 12 – 20, 56 – 72 and 15 – 25), and by the conspicuously bifurcate distal tip of the left (larger) spicule. Although the number of spines in the first ring of the new species is rather similar to that of *S. micracanthus*, they can be easily distinguished by the number of visible rings of spines, being more than 10 rings in the latter species, length of the larger spicule (1.00 – 1.10 vs. 305 mm) and by the position of the excretory pore in females (between the 7th and 8th vs 9th and 10th).

In that the excretory pore is posterior to the 7th ring of spines, *S. mariaisabelae* resembles *S. humbertoi*; however, the species differ in the number of spines in the first ring, as pointed out above. Moreover, the lengths of the spicules (left 1.00 – 1.10 mm, right 195 – 248 mm vs left 396 – 412 mm, right 99 – 102) and the number of ventral cuticular ridges (2 vs 4) are different. The character of the bifurcate distal tip of the larger spicule of *S. mariaisabelae* is a unique feature among all congeneric species.

Acknowledgments

The authors' thanks are due to M. Reyna and A. Martínez from the UNAM for their help in the field, B. Mendoza Garfias from the UNAM and A. J. Medrano Silva from the UAEM for the technical assistance with the SEM and photographs. Part of this study was supported by the operating grant no. Y026 from the Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO).

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RECEIVED JANUARY 7, 2007

ACCEPTED APRIL 28, 2007