

Pterygodermatites (Multipectines)
pluripectinata n. sp. (Spirurida:
Rictulariidae), a nematode parasite of the
crab-eating fox *Cerdocyon thous* (Linnaeus,
1766) from Caatinga shrubland, Brazil

E.G. Lux Hoppe^{1,2}, R.C. Araújo de Lima², J.H. Tebaldi²
and A.A. Nascimento^{2*}

¹University of Rio Preto, São José do Rio Preto, São Paulo, Brazil:

²Department of Preventive Veterinary Medicine and Animal
Reproduction, FCAV/Unesp, Jaboticabal, São Paulo, Brazil

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Abstract

In a parasitological survey of free-ranging *Cerdocyon thous* (Carnivora: Canidae) from Brazilian Caatinga shrubland, a new species of *Pterygodermatites* (*Multipectines*) was recovered from the small intestine of this host. Morphological analysis showed that *P. (Multipectines) pluripectinata* n. sp. is distinguished from all other congeneric species mainly by the numerous plate-like projections and male caudal morphology and spicular length. There are few records on the occurrence of this genus in Neotropical regions.

Introduction

The Caatinga shrubland is a Brazilian biome which exists in the north-eastern states of this country, as well as in the northern Minas Gerais State, and covers a total area of 734,478 km² (Silva *et al.*, 2003). Despite the widely held concept that Caatinga shrubland is a homogeneous biome and lacks biodiversity, recent studies have shown a diversity of ecotopes and species higher than those observed for biomes with analogous climatic and pedologic conditions, even with registers of endemic species (Silva *et al.*, 2003).

Mammals are the animal group with least number of species registered in this biome, perhaps due to an inability for niche occupation. In fact, Mares *et al.* (1985) state that the faunistic composition of this biome derives from the adjacent ones, mainly Cerrado savanna, and probably opportunistic common animals had an advantage over more specialist animals. *Cerdocyon thous* (Linnaeus, 1766), a well-known opportunistic canid with recognized distribution in diverse Brazilian biomes

(Courtenay & Maffei, 2004), is the only member of this family registered in Caatinga (Oliveira *et al.*, 2003).

The genus *Pterygodermatites* Wedl, 1861 was separated into five subgenera by Quentin (1969), based mainly on buccal aperture location and morphology and the number of cuticular plates. In the Neotropical region, the subgenus *P. (Paucipectines)* Quentin, 1969 is generally described in rodents and marsupials but has been reported in bats and armadillos (Sutton, 1979, 1984; Navone & Lombardero, 1980; Navone, 1987, 1989; Navone & Suriano, 1992; Vicente *et al.*, 1997; Ramallo & Claps, 2007). Nevertheless, the subgenus *P. (Multipectines)* Quentin, 1969, a parasite of Canidae, Felidae and Viverridae (Quentin, 1969), has been registered only twice (Beldomenico *et al.*, 2005; Araújo de Lima, 2009) in this region, despite the huge diversity of carnivore species (Wang & Tedford, 2007).

In a study of *C. thous* helminthfauna from Caatinga, some specimens of an unidentified *P. (Multipectines)* species were found. The present work describes this new species of a sporadically reported taxon in the Neotropical subregion, contributing to better knowledge of the composition of the *P. (Multipectines)* subgenus and the parasitic helminthfauna of the Caatinga shrubland.

*E-mail: adjair@fcav.unesp.br

Methods

Fifty-eight road-killed crab-eating foxes were submitted to the Laboratory of Parasitology from the Federal University of Campina Grande, Patos municipality, Paraíba State, Brazil, for necroscopic evaluation. The obtained helminths were then sent to the Laboratory of Animal Parasitic Diseases in the Department of Preventive Veterinary Medicine and Animal Reproduction, FCAV/Unesp, Jaboticabal, São Paulo State, for analysis.

The helminths, previously fixed and preserved in Railliet and Henry solution (0.85% NaCl solution, 93 ml; formalin, 5 ml; acetic acid, 2 ml), were clarified in 80% acetic acid and beechwood creosote for morphological evaluation. Morphometric studies were performed in Image ProPlus[®] software (Media Cybernetics Inc., Bethesda, Maryland, USA), with pictures obtained using an Olympus[®] BX-51 microscope with QColor3 digital camera (Olympus America Inc., Center Valley, Pennsylvania, USA). The description of this species was based on the characteristics of ten mature nematodes of each sex, and the morphometric data were expressed in millimetres, as mean \pm standard deviation. Drawings were made with a camera lucida attached to a Carl-Zeiss[®] microscope. Types were deposited in the Helminthological Collection of the Oswaldo Cruz Institute Foundation (CHIOC) in Rio de Janeiro and also in the Laboratory of Animal Parasitic Diseases Helminthological Collection, Department of Preventive Veterinary Medicine and Animal Reproduction, FCAV/Unesp. This study was approved by the Bioethics Commission of the Faculdade de Medicina Veterinária e Zootecnia, USP (process 105/2002).

Results

Pterygodermatites (Multipartines) *pluripectinata* *n. sp.*

Description

Rictularioidea: Rictulariidae. Whitish nematodes *in vivo* and after fixation. Dorsally bent oral opening, with numerous small denticles in the dorsal margin, surrounded by two rows of papillae in both sexes. The inner row has four simple papillae and two lateral amphids and the outer one has eight simple papillae symmetrically arranged. The oral capsule is strongly chitinized with three teeth; two lateral and one oesophageal (figs 1A and B). Two subventral rows of striated blade-like cuticular projections may be seen all along the helminth body length. The oesophagus is filariform, with a short anterior muscular part and a long, posterior, glandular portion. An oesophageal–intestinal valve is present. The nerve ring is close to the muscular–glandular transition. The excretory pore is hidden by the numerous, strongly chitinized, cuticular projections and therefore could not be observed or measured.

Males. Total body length measuring 8.776 ± 1.314 , with a width of 0.257 ± 0.0683 at the oesophageal–intestinal junction. Slightly elongated buccal capsule, measuring 0.033 ± 0.007 long and 0.032 ± 0.008 wide. The oesophagus is elongated, with the muscular portion measuring 0.376 ± 0.098 and the glandular part 2.086 ± 0.183 . The

distance of the nerve ring from the anterior ending is 0.162 ± 0.015 . The subventral rows of cuticular plates are composed of 105–114 cuticular blade-like projections, hiding the excretory pore opening. The posterior ending is mildly coiled, ventrally grooved, with two lateral alae supported by three pairs of long, pedunculate, pre-cloacal papillae, six pairs of short, post-cloacal, pedunculated papillae and one pair of sessile papillae at the tail tip. Two of the six pairs of pedunculate, post-cloacal papillae are medial to the others, close to the ventral groove. Numerous rounded, verruciform, cuticular thickenings surround the cloacal aperture. Anterior to the caudal alae are 8–9 semicircular, striated, plate-like projections lying between the ventral–lateral cuticular rows (fig. 2A). The spicules are equal in size and shape, short and keen, 0.253 ± 0.027 long. Gubernacule is absent (fig. 2B).

Females. The body length is 15.776 ± 2.232 long, width 0.294 ± 0.044 at the oesophageal–intestinal junction. The buccal capsule is slightly more elongated than that of males, measuring 0.038 ± 0.010 long and 0.028 ± 0.012 wide. The oesophageal muscular portion is 0.388 ± 0.025 long, while the glandular part measures 2.536 ± 0.099 long. The nerve ring is situated at 0.1998 ± 0.063 from anterior ending. As in males, the body has two subventral rows of cuticular projections. However, these structures are more numerous in females, in which 116–150 blade-like cuticular projections were observed, which also hide the excretory pore opening. Of these, 48–60 are anterior to the pre-equatorial vulvar aperture, 0.401 ± 0.11 distant from the oesophageal–intestinal junction. Peri-vulvar cuticular projections are less developed than the others (fig. 1C). Branched, amphidelphic uteri contain embryonated eggs, which measure 0.0382 ± 0.0019 long and 0.0285 ± 0.0024 wide. Strongly tapered tail, with terminal spine and anal opening at 0.194 ± 0.020 from tail tip (fig. 1D). The caudal cuticular projections are smaller than the other projections, with spine-like aspect in spite of the blade-like appearance of the latter.

Taxonomic remarks See *J Helminthology* Vol. 80 pp. 334–337 for guidance.

Type host. *Cerdocyon thous* (Linnaeus, 1766).

Site of infection. Small intestine.

Type locality. Patos County, Paraíba State, Brazil ($06^{\circ}46'19''$ to $507^{\circ}38'52''$ S; $36^{\circ}42'52''$ to $38^{\circ}08'56''$ W).

Etymology. The specific name is after the high number of cuticular projections (*pluri* (Latin), many; *pecten* (Greek), comb – *pectinata*, with comb-like projections).

Specimens deposited. Male and female paratypes were deposited in the Helminthological Collection of Oswaldo Cruz Institute, under collection number CHIOC 35 525, as wet mounts. Holotype, allotype and other paratypes were deposited in the Laboratory of Animal Parasitic Diseases 'Prof. Dr. Orlando Ferrari' helminthological collection, under collection number CT2009, also as wet mounts.

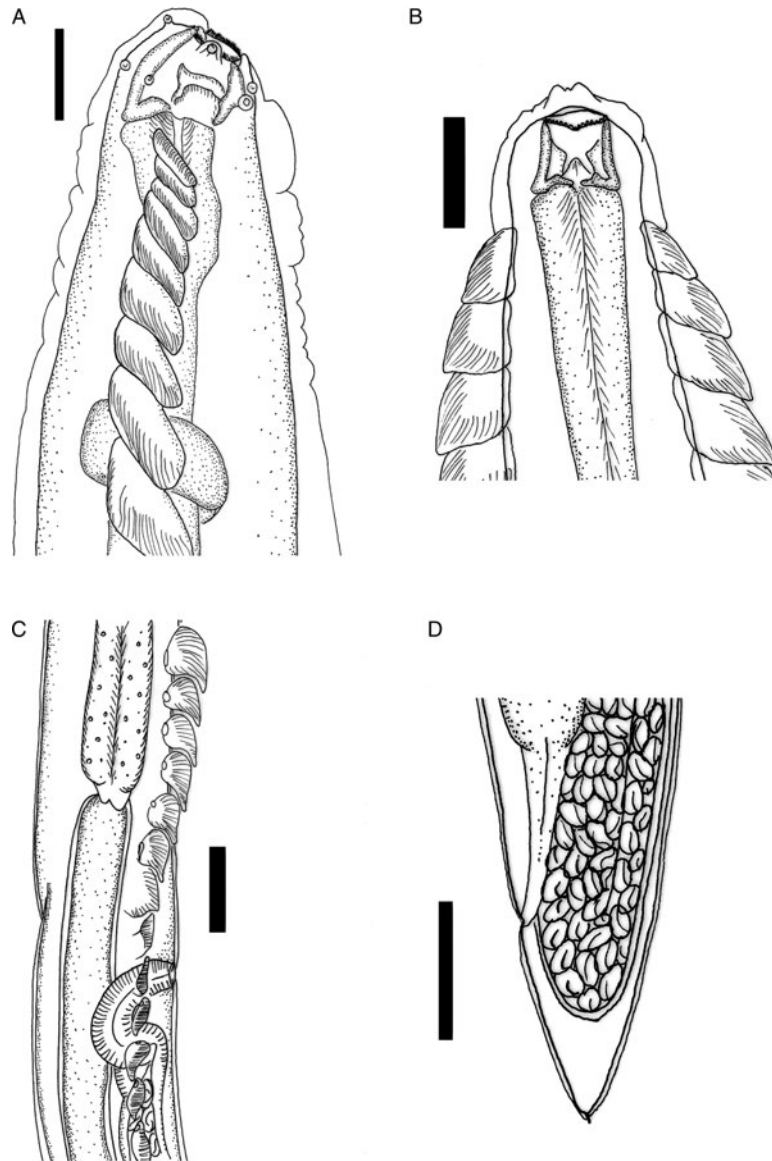


Fig. 1. Female of *Pterygodermatites (Multipectines) pluripectinata* n. sp. (A) Anterior portion, lateral view; (B) anterior portion, dorsal view; (C) midbody region, lateral view; (D) tail tip, lateral view. Scale bars 0.05 mm (A and B), 0.2 mm (C and D).

Discussion

The genus *Pterygodermatites* was erected by Wedl for his newly discovered species *P. plagiostoma* Wedl, 1861. Five years later, this species was transferred to *Rictularia* Froelich, 1802 to solve some taxonomic issues, and this new classification was confirmed by Blanchard (Quentin, 1969).

Quentin (1969) divides the genus *Rictularia* into two genera, *Rictularia* and *Pterygodermatites*, depending on the orientation of the oral opening, and separates the latter into five subgenera based on the number of cuticular projections: *Pterygodermatites (Paucipectines)*, *Pterygodermatites (Neopaucipectines)* Quentin, 1969, *Pterygodermatites (Pterygodermatites)*

Quentin, 1969, *Pterygodermatites (Mesopectines)* Quentin, 1969, and *Pterygodermatites (Multipectines)*, in a hypothesized phylogenetic order. This author still suggests that *Pterygodermatites (Multipectines)* derives from *Pterygodermatites (Paucipectines)* and is disseminated worldwide by domestic dogs and cats.

Moreover, according to Wang *et al.* (2004), the Canidae family originated in the Eocene period in the area that corresponds to what is now North America, while none of the living families of Carnivora existed (Wang & Tedford, 2007). Early canids started spreading to Eurasia via the Behring Strait at the latest during the Miocene period, 7–8 million years ago (Ma), and to South America via the isthmus of Panama only during the Pliocene period, 3 Ma

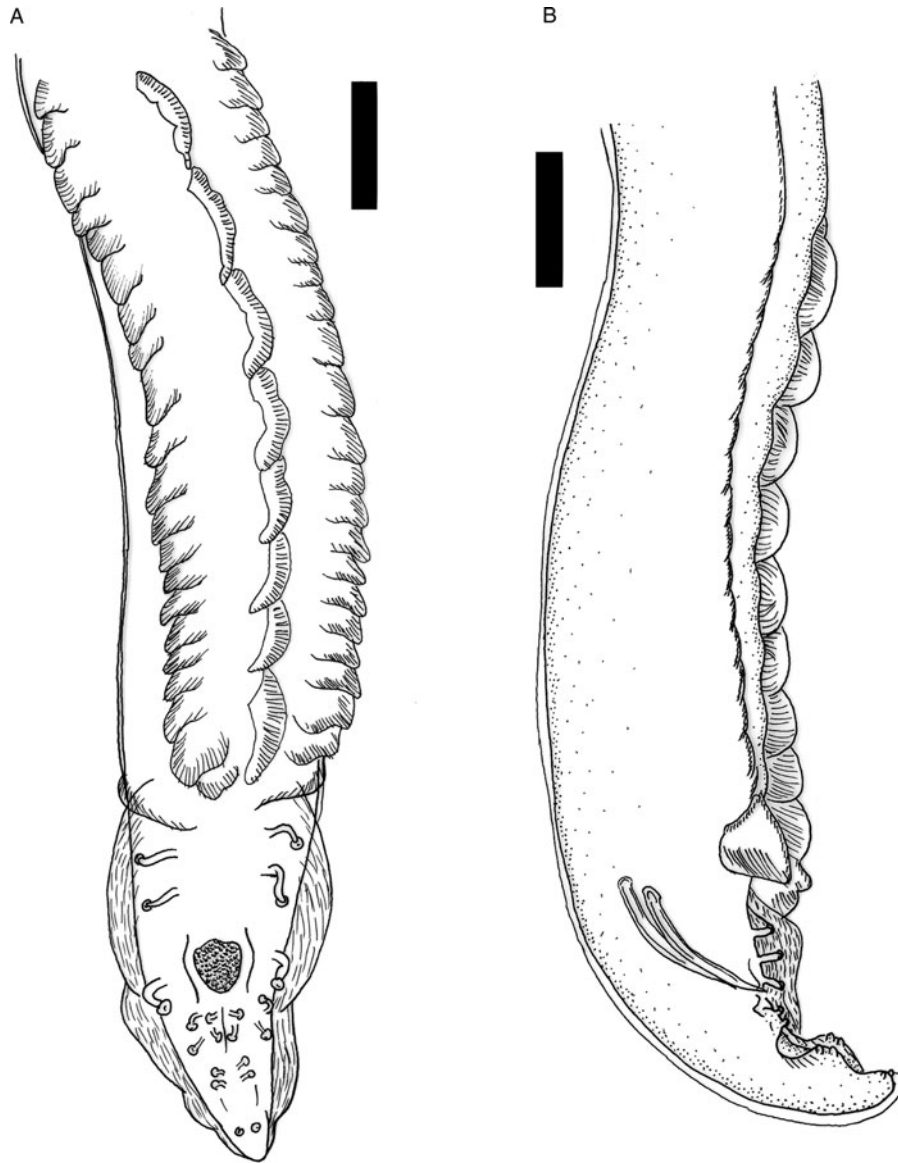


Fig. 2. Male of *Pterygodermatites (Multipectines) pluripectinata* n. sp. (A) Caudal portion, ventral view; (B) caudal portion, lateral view. Scale bars 0.2 mm.

(Wang & Tedford, 2007). However, considering the evolutionary origin of the Canidae family and its further dispersion to Palaearctic and Neotropics, we suggest that the subgenus *P. (Multipectines)* originated in North America and then dispersed to the other continents with ancestral canids, then could have adapted to other carnivore families, such as Felidae and Mustelidae.

In South America, *P. (Multipectines)* might have been introduced with *Cerdocyon*, as fossil registers indicate that this genus already existed in southern North America and Central America before the formation of the isthmus of Panama (Wang *et al.*, 2004).

Only two species of this subgenus have been described in South America: *Pterygodermatites (Multipectines) affinis* (Jägerskiöld, 1904) in *C. thous* (Araújo de Lima, 2009) and *P. (Multipectines) cahirensis* (Jägerskiöld, 1904) in *Oncifelis*

geoffroy (d'Orbigny & Gervais, 1844) from Argentina (Beldomenico *et al.*, 2005).

The species described here differs from all the other species of this subgenus by the higher number of cuticular projections, both in male and female specimens. Still, *P. (M.) pluripectinata* n. sp. differs from *P. (M.) affinis* by the male caudal morphology, as the former does not have an odd pre-cloacal papilla, besides minor differences. Nevertheless, male caudal morphology and spicular dimensions are markedly different from those of *P. (M.) cahirensis*.

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