A New Species of *Spirocamallanus* Olsen, 1952 (Nematoda: Camallanidae) from *Trachycorystes insignis* (Steindachner) (Pisces: Doradidae) in Colombia[1]

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ABSTRACT: *Spirocamallanus penneri* sp. n. parasitizing the doradid catfish *Trachycorystes insignis* in the Rio Atrato of Colombia is characterized by 12 to 20 spiral bands in the buccal capsule, equal to subequal but dissimilar spicules 227–317 and 251–325 long, three preanal and three postanal pairs of papillae, and vulva in the anterior half of the body. It most closely resembles species of *Spirocamallanus* parasitizing freshwater fish in South America, but those previously described South American species more closely resemble each other than any resembles *S. penneri* in having small, similar spicules.

Pinto et al. (1975a, b, 1976) and Pinto and Noronha (1972) have recently reexamined species of *Spirocamallanus* [*Procamallanus* (*Spirocammallanus*) of Pinto] endemic to Brazil. They concluded that 13 valid species exist, 12 of which infect freshwater fishes and one infecting a marine fish. One additional species from South America, *S. krameri*, was described by Petter (1974) from a freshwater fish in Guayana. The species described herein is the first report of the genus from Colombia.

Worms were removed from the hosts' intestines and fixed with 10% formalin. They were stored in 90 parts 70% ethanol plus 10 parts glycerine. For study, worms were cleared in glycerine and studied as wet mounts. Measurements are in micrometers unless otherwise stated; figures were drawn with the aid of a drawing tube.

Spirocamallanus penneri sp. n. (Figs. 1–7)

DESCRIPTION: Body with region of greatest width slightly anterior to midpoint. Lips lacking. Cephalic papillae in three rings of four, 45° from dorsal-ventral axis; amphids lateral. Mouth dorsoventrally elongated. Cuticle with fine transverse striations 2–4 apart. Buccal capsule striated with between 12 and 20 chitinous spiral bands. Esophagus with anterior muscular portion slightly club-shaped and posterior glandular portion elongated and ending in two bilobed valves. Nerve ring at level of anterior ½–⅓ of muscular esophagus. Excretory pore located posterior to nerve ring opposite posterior ½ of muscular esophagus. Tail with single spine.

MALE (based on three mature specimens): Body 9.4–11.2 mm long by 195–287 wide at junction of muscular and glandular portions of esophagus, increasing posteriorly to between 322–385 at level of greatest width, 28–31 times longer than wide. Buccal capsule 98–116 long by 87–107 wide, striated with 15–20, averaging 17.0 spiral bands; that of two specimens containing 1–3 bifurcating spiral bands. Esophagus 976–1,138 long 9–10% of total body length; muscular portion 419–500 long by 98–115 at widest point, comprising 43–46% of entire esophagus; glandular portion 540–638 long by 92–103 wide. Nerve ring 267–310 from cephalic end, 26–32 in height. Excretory pore located 431–580 from anterior end, 167–270 posterior to nerve ring. Testis moderately sinuous, 900–1,032 from cephalic end in region of glandular esophagus. Spicules dissimilar, equal to subequal in length; left spicule weakly sclerotized, thin, tapering to a point distally, 227–317 long; right spicule thicker, strongly sclerotized, of approximately equal thickness along its length, truncated distally, 251–325 long; spicule ratio 1:1–1.1. Gubernaculum absent. Caudal alae united ventrally, 546–598 long, ending 40–46 from posterior end, supported by six elongated, symmetrical pairs of papillae; precloacal pairs

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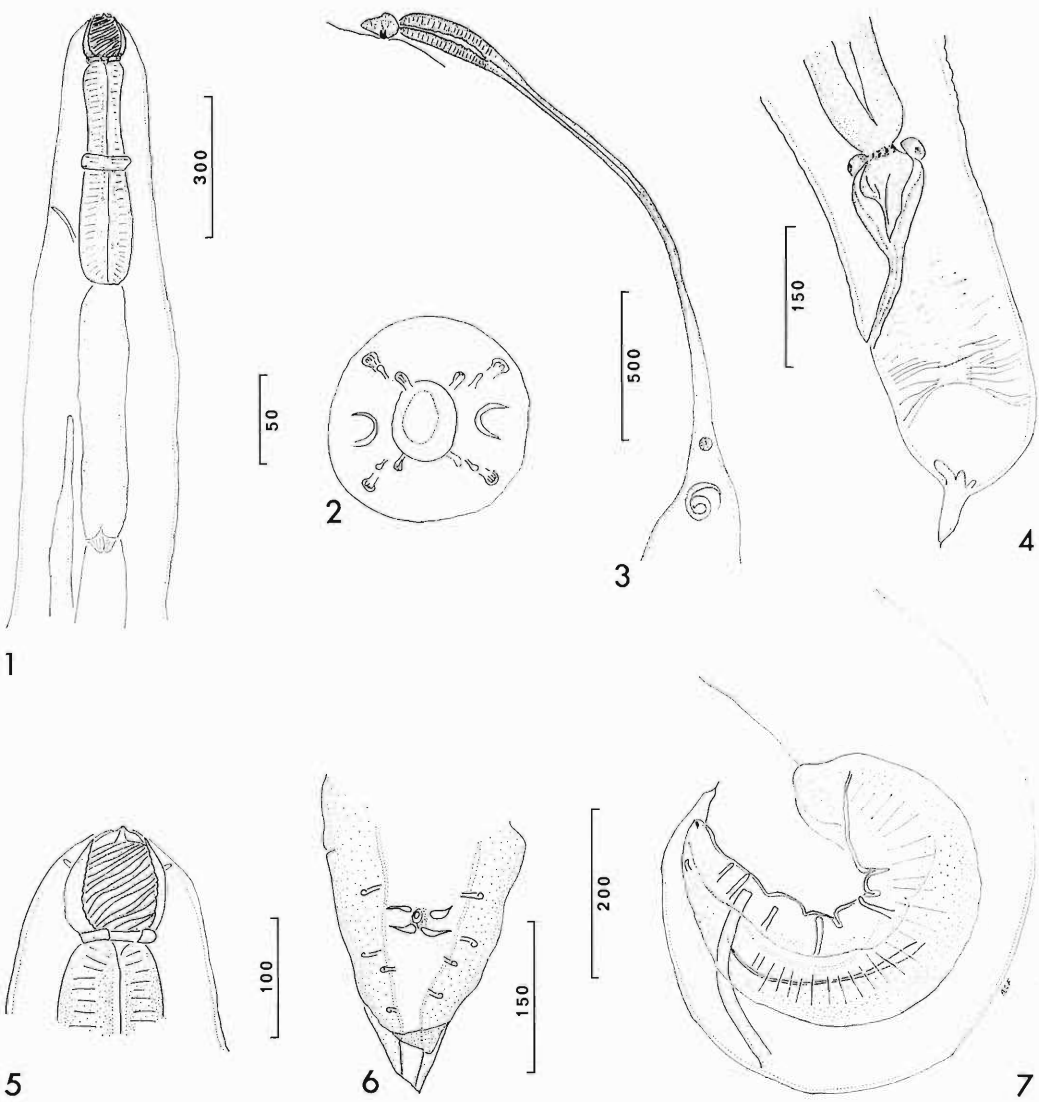

Figures 1–7. ***Spirocamallanus penneri.*** **Measurements are in micrometers. 1. Anterior portion of male holotype, lateral view. 2.** ***En face*** **view, stippled papilla indicates presumed position. 3. Female reproductive system showing vulva, vagina vera, vagina uterina, and a portion of the uterus, drawn from a dissected specimen. 4. Tail of female allotype, lateral view. 5. Cephalic end of male holotype, ventral view. 6. Broken tail region (broken above third pair preanal papillae and missing extreme posterior region) of male paratype to illustrate adanal papillaelike structures not visible in lateral view. 7. Tail region of male holotype, lateral view.**

three, of equal length; postcloacal pairs three, the first two pairs equal in length and located along ventral surface of alae, third pair located laterally; sessile adanal papillae-like structures two pairs at cloacal opening. Phasmids paired at posterior tip of alae. Ventral prominent muscular bands in anal region extending anteriorly from cloaca to slightly posterior to

Table 1. Comparison of selected morphological characters for certain South American species of *Spirocamallanus*.

	S. penneri	*S. barroslimai*	*S. cearensis*	*S. inopinatus*	*S. hilarii*	*S. krameri*	*S. wrighti*	*S. pexatus*
Length of body in mm								
Male	9.4–11.2	3.1	4.06	3.9–8.7	6	7	3.86–4.6	3.72–4.26
Female	11.4–16.2	—	10.34–14.03	11.7–30	14	14–20	8.2–10.6	12.8–20.5
Length × width of buccal capsule								
Male	98–116 × 87–107	30 × 40	41 × 45	90–120 × 40–120	57 × 57	50 × 90		53–59 × 46–59
Female	104–122 × 90–99	—	45–49 × 49–53	90–150 × 85–150	62 × 62	100 × 100		66 × 53–66
Number of spiral bands	12–20	20	18±	15–20	16	16–20	12–20	3–7
Length of spicules	227–317 251–325	60 50	57	80–120	82 62	80 75	45	90–110
Spicules	dissimilar	similar	similar	similar	similar	similar	similar	similar
Spicules	equal–subequal	subequal	equal	equal	subequal	subequal	equal	equal
Preanal papillae	3	3	4	3–4	4	4	4	4
Postanal papillae	3	3	3	6	4	5	4	3
Length of vulva as % of body length from anterior extremity	42–48	—	51–55	36–52	50±	42	37–42	53–64

beginning of alae. Tail flexed ventrally, 194–226 long.

FEMALE (based on 10 mature specimens): Body 11.4–16.2 mm long by 201–348 wide at junction of muscular and glandular portions of esophagus, increasing posteriorly to between 402–684 at level of greatest width, 20–38 times longer than wide. Buccal capsule 104–122 long by 90–99 wide, striated with 12–17, averaging 14.8 spiral bands; that of four specimens containing 1–2 bifurcating spiral bands. Esophagus 1,051–1,248 long, 7–10% of body length; muscular portion 413–494 long by 86–115 at widest point, 37–45% of entire esophagus; glandular portion 580–754 long by 92–116 wide. Nerve ring 270–322 from cephalic end, 40–46 in height. Excretory pore located 402–459 from anterior end, 106–189 posterior to nerve ring. Vulva situated anterior to midpoint, 5.0–7.6 mm, 42–48% of total body length from anterior end. Vagina vera 311–434 long, extending posteriorly from vulva, 49–82 at widest point; vagina uterina 697–1,025 long, 2–4 times longer than vagina vera; uterus J-shaped, ending in blind sac posteriorly; oviduct coiled forming indistinct seminal receptacle; ovary cylindrical, elongated, directed posteriad, usually extending beyond vulva; posterior ovary absent. Tail 212–277 long including finger-like digit; digit 28–45% of tail length. Rectum 154–218 long, surrounded by two rectal glands anteriorly. Larvae 250–372 long by 17–23 wide tapering to a fine pointed tail.

HOST: *Trachycorystes insignis* (Steindachner) (Nematognathii: Doradidae).

SITE OF INFECTION: Intestine.

LOCALITY: Rio Atrato, vic. Quibdo Chocó, Colombia.

HOLOTYPE: USNM Helm. Coll. No. 74583.

ALLOTYPE: USNM Helm. Coll. No. 74584.

PARATYPE: (2 males, 2 females): Coleçao Helmintologica do Instituto Oswaldo Cruz.

ETYMOLOGY: The species is named after Dr. Lawrence R. Penner of the University of Connecticut for his support and encouragement of the first author in pursuing a career in parasitology.

Of the 14 previously reported South American species of *Spirocamallanus* six have between 12 and 20 spiral bands in the buccal capsule and equal or subequal spicules: *S. barroslimai* (Pererira, 1935) Olsen, 1952; *S. cearensis* (Pereira, Dias, and Azevedo, 1936) Olsen, 1952; *S. inopinatus* (Travassos, Atrigas, and Pereira, 1935) Olsen, 1952; *S. hilarii* (Vaz and Pereira, 1934) Olsen, 1952; *S. krameri* Petter, 1974; and *S. wrighti* (Pereira, 1935) Olsen, 1952. Pertinent differences among the above species and *S. penneri* are summarized

in Table 1. These species can easily be distinguished from *S. penneri* by possessing smaller and similar rather than dissimilar spicules. In addition, *S. hilarii* and *S. wrighti* have eight and *S. krameri* and *S. inopinatus* have nine pairs of caudal papillae, whereas *S. penneri* has six pairs. The number of caudal papillae in *S. barroslimai* and *S. cearensis* is similar to that of *S. penneri*, but their buccal capsules are smaller than the new species. Further, the vulva of *S. cearensis* is located in the posterior rather than anterior half of the body. *Spirocamallanus pexatus* Pinto et al., 1976 has equal spicules, but they are smaller than those of *S. penneri* and similar rather than dissimilar in shape. *Spirocamallanus pexatus* also exhibits seven or fewer spiral bands in the buccal capsule which is smaller than that of *S. penneri*, and a postequatorial vulva.

Gery (1969) stated that the ichthyofauna of the region of South America including the Rio Atrato (Gery's "transandean region") comprises approximately 26% endemic species, 60% species common to the eastern slope of the Andes as well as the western, and the rest possessing marine or Central American affinities. The uplifting of the Andes, which them selves became an effective isolating barrier, pinched off the transandean fauna from the eastern fauna. It is therefore no surprise that *Spirocamallanus penneri* most closely resembles species from freshwater fish in Brazil and Guayana, but that the Brazilian and Guayanese species more closely resemble each other than any resembles *S. penneri* (Table 1). *Trachycorystes insignis*, host for *S. penneri*, also occurs in the Magdalena River of the eastern slope of the Andes; future studies may reveal a sister-species of *S. penneri* in the Magdalenean *T. insignis*.

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Literature Cited

Gery, J. 1969. The freshwater fishes of South America. *In* E. J. Fikham, J. Illies, H. Klinge, G. H. Schwabe, and H. Sioli (eds.), Biogeography and Ecology of South America. Dr. W. Junk, N.V., Publ., The Hague, p. 828–848.

Petter, A. J. 1974. Deux nouvelles espéces de nematodes Camallanina parasites de *Hoplerythrinus unitaeniatus* (Characidae, Cypriniformes) en Guyane; création d'une nouvelle famillie; les Guyanenaidae (Dracunculoidea). Bull. Mus. Natl. Hist. Nat. Zool. Paris 156: 803–807.

Pinto, R. M., S. P. Defabio, D. Noronha, and F. J. Rolas. 1975a. *Procamallanus* Brasileiros Part 1 (Nematoda, Camallanoidea). Mem. Inst. Oswaldo Cruz 72: 205–221.

———. 1975b. Novas contribuiçoes ao conhecimento do genero *Procamallanus* (Nematoda, Camallanoidea). Mem. Inst. Oswaldo Cruz 73: 183–200.

———. 1976. Novas consideraçoes morfologicas e sistematias sobre as *Procamallanus* Brasileiros (Nematoda, Camallanoidea). Mem. Inst. Oswaldo Cruz 74: 77–93.

———, **and D. Norohna.** 1972. Redescriçao de *Procamallanus inopinatus* Travassos, Artigas, and Pereira, 1928 (Nematoda, Camallanoidea). Atas Soc. Biol. Rio de Janeiro 15: 105–108.