

PROCAMALLANUS (DENTICAMALLANUS SUBGEN. N.) DENTATUS N. SP. (NEMATODA: CAMALLANIDAE) FROM THE CHARACID FISH, BRYCONOPS ALBURNOIDES, IN THE BRAZILIAN AMAZON

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Summary :

A new camallanid nematode, *Procamallanus dentatus* sp. n. is described from the intestine of the characid fish, *Bryconops alburnoides* Kner, 1859 from the Uburu River, Amazonas State, Brazil. The parasite is characterized mainly by the structure of the buccal capsule: four to five spiral thickenings are present in the buccal capsule of females, while about 10 large, anteriorly directed and sharply pointed teeth are present in that of the males. This feature is used for creating a new subgenus, *Denticamallanus* subgen. n., with the type species *P. (D.) dentatus* sp. n. Other features characteristic of this species are the presence of very short (0.078-0.117 mm) spicules of equal length, 2 pairs of preanal and 3 pairs of postanal papillae and the absence of caudal alae in the male. The tail of the female is short and wide, with a small conical appendage. The ratio of the muscular and the glandular parts of the oesophagus is 1: 1.5-1.7. A key to subgenera of the genus *Procamallanus* Baylis, 1923 is provided.

KEY WORDS : *Procamallanus*, *Denticamallanus*, parasitic nematode, freshwater fish, *Bryconops*, Amazon, Brazil.

Résumé : *PROCAMALLANUS (DENTICAMALLANUS SUBGEN. N.) DENTATUS* N. SP. (NEMATODA: CAMALLANIDAE) D'UN POISSON CHARACIDÉ, *BRYCONOPS ALBURNOIDES*, DE L'AMAZONE BRÉSILIEN

Un nouveau camallanidé, *Procamallanus dentatus* n. sp., est décrit de l'intestin d'un Poisson characidé, *Bryconops alburnoides* Kner, 1859 du fleuve Uburu, état de l'Amazonie, au Brésil. Le parasite est caractérisé principalement par la structure de la capsule buccale : quatre à cinq épaississements en spirale sont présents dans la capsule buccale des femelles, alors qu'environ dix dents volumineuses, acérées et dirigées vers l'avant existent dans celles des mâles. On recourt à ce caractère pour créer un nouveau sous-genre, *Denticamallanus* subgen. n., et l'espèce type *P. (D.) dentatus* sp. n. D'autres traits caractéristiques de l'espèce sont la présence de très courts spicules de longueur égale (0,078-0,117 mm), deux paires de papilles pré-anales et trois paires post-anales, et l'absence d'ailes caudales chez le mâle. La queue de la femelle est courte et large, avec un petit appendice conique. Le rapport des sections musculaires et glandulaires de l'œsophage est de 1 : 1,5-1,7. Les caractères différentiels d'avec les sous-genres du genre *Procamallanus* Baylis, 1923 sont donnés.

MOTS CLÉS : *Procamallanus*, *Denticamallanus*, nématode, parasite, poisson d'eau douce, *Bryconops*, Amazonie, Brésil.

INTRODUCTION

During investigations into the helminth fauna of fishes in the Amazon River drainage system in Brazil, specimens of a new camallanid nematode were collected from the intestine of the freshwater characid, *Bryconops alburnoides* Kner, 1859 from the Urubu River, Amazonas State. They proved to belong to the genus *Procamallanus* Baylis, 1923, but since the morphology of their buccal capsule is unique, the creation of a new subgenus *Den-*

ticamallanus subgen. n. is proposed to accommodate this species. The purpose of this paper is to describe these new taxa.

MATERIALS AND METHODS

The specimens were fixed and preserved in 70 % ethanol and cleared with glycerine for light microscopical examination. Drawings were made with the aid of a Zeiss microscope drawing attachment. All measurements are given in millimetres unless otherwise stated.

RESULTS

PROCAMALLANUS (DENTICAMALLANUS) *DENTATUS* SP. N. (Fig. 1)

Description: medium sized nematodes with almost smooth cuticle. Mouth opening circular, surrounded by

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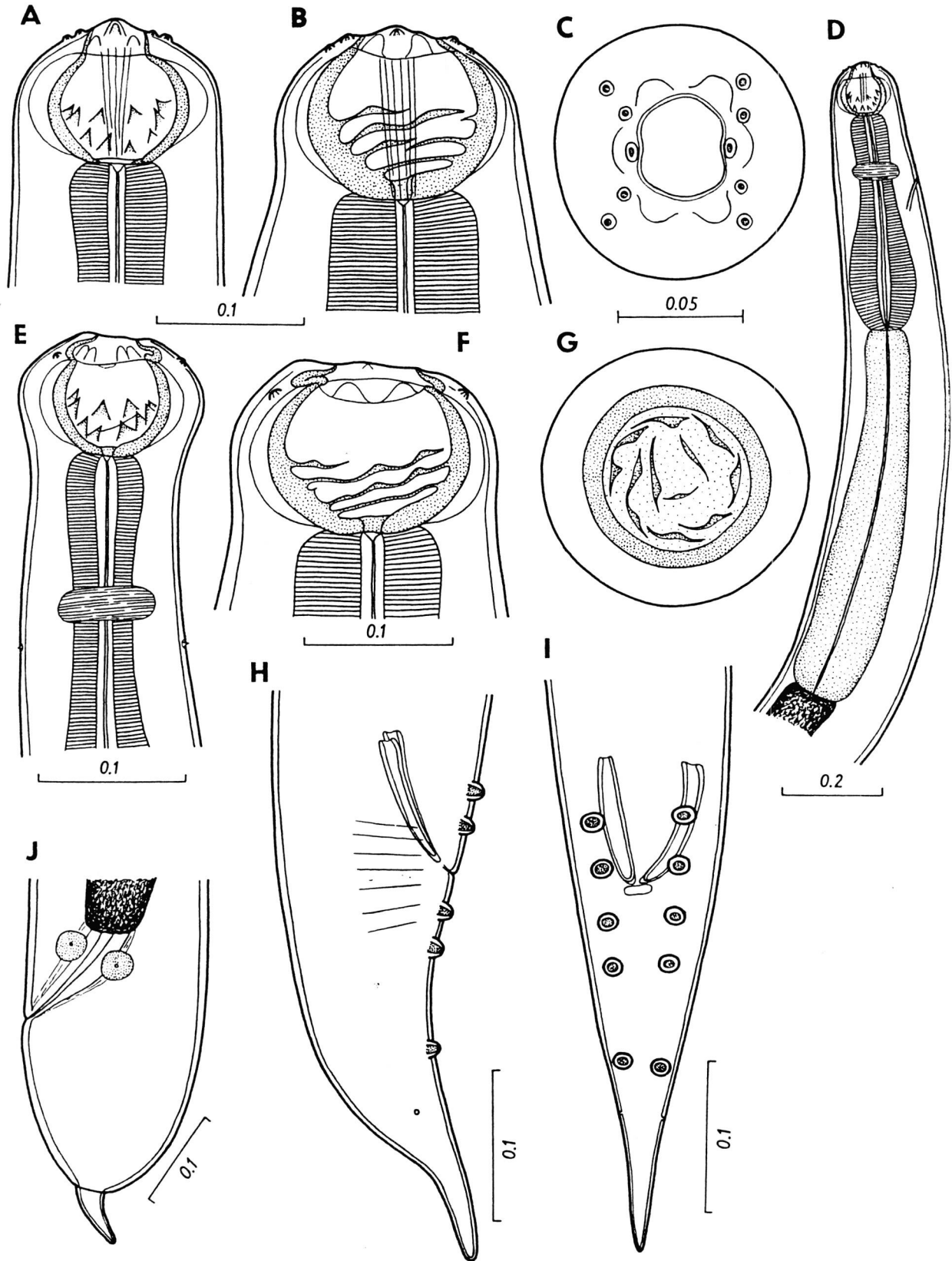


Fig. 1. — *Procammallanus (Denticammallanus) dentatus* sp. n. A: cephalic end of male, lateral view; B: buccal capsule of gravid female, lateral view; C: cephalic end of female, apical view; D: anterior end of male, lateral view; E: anterior end of male, dorsoventral view; F: buccal capsule of gravid female, dorsoventral view; G: same, frontal view (optical section of lower part of capsule); H, I: tail of male, lateral and ventral views; J: tail of gravid female, lateral view.

six low elevations, 2 lateral and 4 submedian; eight cephalic papillae in two circlets and two lateral amphids. Buccal capsule orange-brown, approximately as long as wide in male and distinctly shorter than wide in female; basal ring indistinct. Buccal capsule surrounded by outer, colourless hyaline layer. Muscular oesophagus considerably shorter than glandular one; both parts of oesophagus clavate. Minute deirids situated just below level of nerve ring; excretory pore somewhat posterior to nerve ring level. Tail conical, its tip bluntly pointed, without mucrons.

Male (5 specimens; measurements of holotype in parentheses): length of body 5.84-7.13 (6.04), maximum width 0.204-0.313 (0.204). Buccal capsule length 0.078-0.105 (0.087), width 0.081-0.108 (0.087). Inner surface of capsule without spiral thickenings (ribs), but provided with about ten single, large, anteriorly directed conical teeth at its posterior half. Muscular oesophagus 0.381-0.503 (0.462) long, its maximum width 0.109-0.177 (0.177); glandular oesophagus 0.558-0.843 (0.707) long and 0.122-0.163 (0.122) wide; ratio of muscular and glandular oesophagus 1 : 1.5-1.7 (1:1.5). Length of entire oesophagus and buccal capsule representing 17-21 (21) % of body length. Deirids, nerve ring and excretory pore 0.201-0.231 (0.231), 0.180-0.245 (0.210) and 0.231-0.270 (0.249), respectively, from anterior extremity. Caudal alae absent. Two pairs of preanal and three pairs of postanal subventral papillae present; first two pairs of postanals a short distance posterior to cloacal opening, last pair near mid-length of tail; small outlets of phasmids situated laterally somewhat posterior to last pair of caudal papillae. Spicules equal, well sclerotized, short, measuring 0.078-0.117 (0.078); distal ends rounded, provided with small, terminal membraneous process. Gubernaculum absent. Tail 0.225-0.294 (0.243) long, with bluntly pointed tip.

Female (3 gravid specimens; measurements of allotype in parentheses): body 22.78-35.77 (35.77) long, maximum width 0.517-0.870 (0.748). Buccal capsule 0.108-0.123 (0.120) long, 0.111-0.153 (0.153) wide. In lateral view, inner surface of posterior half of capsule has 4-5 spiral thickenings forming a few, low, tooth-like structures. Muscular oesophagus 0.476-0.571 (0.571) long, 0.163-0.218 (0.218) wide, glandular oesophagus 1.06-1.18 (1.18) long, 0.218-0.313 (0.313) wide, their ratio being 1 : 1.9-2.3 (1:2.1). Length of entire oesophagus and buccal capsule representing 5-7 (5) % of body length. Deirids, nerve ring and excretory pore 0.268-0.299 (0.299), 0.231-0.258 (0.258) and 0.286-0.367 (0.286), respectively, from anterior extremity. Vulva near middle of body, 17.75 from anterior end in allotype. Uterus containing numerous larvae 0.405-0.480 (-) long and 0.018-0.021 (-) wide ($n = 5$). Tail relatively short, rounded, with small conical appendage with

bluntly pointed tip; length of tail including caudal appendage 0.150-0.190 (0.150), that of appendage 0.068 (0.068).

Type host: *Bryconops alburnoides* Kner, 1859 (Characidae, Cypriniformes).

Site of infection: intestine.

Type locality: Urubu River (2°24'S, 59°35'W), Amazonas State, Brazil (November 1, 1993 and January 5, 1995). Prevalence and intensity: 9 fishes infected/10 fishes examined (90 %); 1-3 (mean 1.6) nematodes per fish. Deposition of types: holotype (♂), allotype (♀) and most paratypes in Invertebrate Collection, Instituto Nacional de Pesquisas da Amazônia, Manaus, AM, Brazil (Cat. Nos. INPA-NEM 007-010); paratypes also in Helminth Collection, University of Nebraska State Museum, Harold W. Manter Laboratory, Lincoln, Nebraska, USA (Cat. No. HWML 39128), and in Institute of Parasitology, Academy of Sciences of the Czech Republic, České Budějovice, Czech Republic (Cat. No. N - 678).

Etymology: the specific name relates to the characteristic feature of this species, i.e. the presence of teeth in the male buccal capsule.

DISCUSSION

A remarkable feature of this species is the pronounced sexual dimorphism in the structure of the buccal capsule. While the female capsule bears a few spiral thickenings (ribs) with only slightly outlined tooth-like structures, the spiral thickenings are completely absent in the male, but several large, sharply pointed individual teeth are present. Among the numerous *Procamallanus* Baylis, 1923 spp., distinct sexual dimorphism in the structure of the buccal capsule is known only in *P. iberingi* Travassos, Artigas & Pereira, 1928, *P. siluri* Osmanov, 1964, and *P. pexatus* Pinto, Fabio, Noronha & Rolas, 1976 (see Pinto *et al.*, 1975, 1976; Moravec & Amin, 1978).

Although many authors (e.g., Ivashkin *et al.*, 1971; Chabaud, 1975; Soota, 1983; Petter, 1990; Andrade-Salas *et al.*, 1994) consider *Spirocamallanus* Olsen, 1952 a distinct genus, Moravec & Sey (1988) pointed out that, in this connotation, the females of *P. siluri* would belong to *Spirocamallanus*, and the males to *Procamallanus*. In this species, the female buccal capsule has spiral thickenings, whereas that of males is smooth. Therefore, Moravec & Sey (1988) recognized only the genus *Procamallanus*, with *Spirocamallanus* as a subgenus to accommodate the species where both males and females have the buccal capsule with spiral thickenings. For the species possessing spiral thickenings only in females they proposed the subgenus *Spirocamallanoides* (type species *P. (S.) siluri* Osmanov, 1964).

Spirocamallanus has been considered a subgenus of the genus *Procamallanus* also, for example, in the works of Pinto *et al.* (1974, 1975, 1976) and Rodriguez *et al.* (1991). Another subgenus of this genus, *Punctocamallanus* (type species *P. (P.) punctatus* Moravec & Scholz, 1991) was established by Moravec & Scholz (1991). Although it is now clear that the present taxonomic system of *Procamallanus* species is based solely on the structure of the buccal capsule and is more or less artificial and does not reflect phylogenetic affinities and will have to be revised, for the time being we follow it for practical reasons.

In having spiral thickenings in the buccal capsule only in females, the new species from *Bryconops alburnoides* resembles *P. (S.) siluri*, the only known species of the subgenus *Spirocamallanoides* Moravec & Sey, 1988, a parasite of certain fishes in Central Asia (the Amu-Darya River basin). However, in addition to other important morphological differences, *P. dentatus* sp. n. differs markedly from *P. (S.) siluri* in possessing large teeth in the male buccal capsule (teeth are absent from the male capsule in the latter). We believe this feature warrants the erection of a new subgenus *Denticamallanus* subgen. n.

The general morphology of *P. dentatus* shows that it is closely related to the morphological group of South American species of the subgenus *Spirocamallanus*, characterized mainly by the absence of caudal alae and the presence of markedly short, equal or subequal spicules, represented e.g. by *P. inopinatus* Travassos, Artigas & Pereira, 1928, *P. chimusensis* Freitas & Ibáñez, 1968, *P. krameri* Petter, 1974 and *P. paraensis* Pinto, Fabio, Noronha & Rolas, 1976.

By the structure of the male buccal capsule (especially the presence of teeth at its bottom) and some other morphological features, *P. dentatus* resembles also the species *Procamallanus annipetterae* (Kohn & Fernandes, 1988) (syn. *P. petterae* Kohn & Fernandes, 1988), listed in the subgenus *Procamallanus*, a parasite of loriciid catfishes in South America. This species was originally described from *Plecostomus albopunctatus* from Brazil (Kohn & Fernandes, 1988a,b) and later redescribed from specimens collected from *Cochliodon cochliodon* from Paraguay (Petter, 1990). However, *P. dentatus* differs distinctly from *P. annipetterae* in the presence of spiral thickenings in the female buccal capsule and in some other features (e.g., situation of the excretory pore and deirids, location and number of teeth in the male buccal capsule, shape of the tail in both males and females). On the other hand, according to its original description (Kohn & Fernandes, 1988a), *P. annipetterae* has the same number of caudal papillae (five pairs) as *P. dentatus*; Petter (1990) reported eight pairs of papillae in the

former species, mentioning that some individual papillae may be absent.

KEY TO SUBGENERA

OF THE GENUS *PROCAMALLANUS* BAYLIS, 1923
(MODIFIED FROM MORAVEC & SCHOLZ, 1991)

- 1 Buccal capsule with internal spiral thickenings (at least in female) 2
- Buccal capsule without internal spiral thickenings... 4
- 2 Spiral thickenings present in both males and females *Spirocamallanus* Olsen, 1952
- Spiral thickenings present only in females..... 3
- 3 Buccal capsule of males smooth *Spirocamallanoides* Moravec & Sey, 1988
- Buccal capsule of males with conspicuous teeth..... *Denticamallanus* subgen. n.
- 4 Inner surface of capsule smooth *Procamallanus* Baylis, 1923
- Inner surface of capsule with punctations *Punctocamallanus* Moravec & Scholz, 1991

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