

Two cystidicolids (Nematoda, Cystidicolidae) from marine fishes off New Caledonia

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Abstract

Two nematode species of the family Cystidicolidae were collected from the digestive tract of marine fishes off New Caledonia, South Pacific: *Ascarophis adioryx* Machida, 1981 from the stomach of the speckled squirrelfish *Sargocentron spiniferum* and the sabre squirrelfish *Neoniphon sammara* (new host record) (both Holocentridae, Beryciformes), and a *Spinitectus* sp. female, morphologically similar to *S. beaveri* Overstreet, 1970, from the roundjaw bonefish *Albula glossodonta* (Albulidae, Albuliformes). Based on light and scanning electron microscopy examinations, *A. adioryx* is redescribed and a new subgenus *Dentiascarophis* subgen. nov., characterized by the presence of one dorsal and one ventral median protrusions in the mouth, is established to accommodate it; a key to subgenera of *Ascarophis* is provided. *Ascarophis holocentri* Parukhin, 1984 is considered a junior synonym of *A. adioryx*. The cephalic structure of *Spinitectus* sp. and *S. beaveri* is very different from those in other congeners and, therefore, a new subgenus *Paraspinitectus* subgen. nov., characterized by highly reduced pseudolabia, is erected to accommodate these species. The hemiurid digenean *Lecithochirium cirrhiti* (Manter et Pritchard, 1960) Yamaguti, 1970 was found in the stomach of three species of squirrelfishes. Findings of *A. (D.) adioryx*, *Spinitectus* (P.) sp. and *L. cirrhiti* in New Caledonian waters represent new geographical records of these parasites.

Résumé

Deux espèces de Nématodes Cystidicolidae ont été récoltées du tube digestif de poissons marins de Nouvelle-Calédonie, Pacifique Sud: *Ascarophis adioryx* Machida, 1981 de l'estomac des poissons-écureuils (Holocentridae, Beryciformes) *Sargocentron spiniferum* et *Neoniphon sammara* (nouvel hôte), et une femelle de *Spinitectus* sp., similaire morphologiquement à *S. beaveri* Overstreet, 1970, du poisson-banane *Albula glossodonta* (Albulidae, Albuliformes). *A. adioryx* est redécrit à partir d'observations en microscopie photonique et électronique à balayage, et un nouveau genre *Dentiascarophis* subgen. nov., caractérisé par la présence d'une protubérance dorsale et d'une protubérance ventrale dans la bouche, est établi pour l'accueillir. Une clé des sous-genres d'*Ascarophis* est proposée. *Ascarophis holocentri* Parukhin, 1984 est considéré synonyme d'*A. adioryx*. La structure céphalique de *Spinitectus* sp. et de *S. beaveri* est très différente de celle des autres congénères et un nouveau sous-genre *Paraspinitectus* subgen. nov., caractérisé par des pseudolèvres très réduites, est établi pour accueillir ces espèces. Le digène Hemiuridae *Lecithochirium cirrhiti* (Manter et Pritchard, 1960) Yamaguti, 1970 a aussi été trouvé dans l'estomac de trois espèces de poissons-écureuils. La Nouvelle-Calédonie est une nouvelle mention géographique pour *A. (D.) adioryx*, *Spinitectus* (P.) sp. et *L. cirrhiti*.

Keywords

Parasitic nematode, *Ascarophis*, *Spinitectus*, trematode, *Lecithochirium*, marine fish, *Albula*, *Neoniphon*, *Sargocentron*, New Caledonia, South Pacific

Introduction

During helminthological investigations into marine fishes of New Caledonia, South Pacific, cystidicolid nematodes referable to *Ascarophis* van Beneden, 1871 were recovered from the

stomach of the speckled squirrelfish *Neoniphon sammara* (Forsskal) and the sabre squirrelfish *Sargocentron spiniferum* (Forsskal) (both Holocentridae, Beryciformes) and a single specimen of *Spinitectus* Fourment, 1884 from the roundjaw bonefish *Albula glossodonta* (Forsskal) (Albulidae, Albuli-

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formes). Detailed study using light and scanning electron microscopy has shown that the former belongs to *A. adioryx* Machida, 1981, a species originally described from *S. spiniferum* off the Palau Islands, Oceania (Machida 1981), which has not been recorded since, whereas the latter is morphologically similar to *S. beaveri* Overstreet, 1970, a species described from a congeneric fish host off Florida (Biscayne Bay), USA (Overstreet 1970). A redescription of *A. adioryx* and a detailed description of *Spinitectus* sp., based on New Caledonian specimens, are presented below.

Neoniphon sammara (maximum size 32 cm) and *S. spiniferum* (maximum size 51 cm) are tropical, marine, reef-associated fishes with an Indo-Pacific distribution, occurring from the Red Sea and East Africa to the Hawaiian, Ducie and Marquesas Islands, north to southern Japan, south to Australia and Lord Howe Island. *Albula glossodonta* (maximum size 90 cm) has a similar distribution, occurring from the Red Sea to the Hawaiian and Tuamotu Islands, north to southern Japan, south to Lord Howe Island, Australia, and throughout Micronesia (Froese and Pauly 2009).

Materials and methods

Four species of holocentrids, including three from shallow parts of the lagoon (depth 1–4 m) and one relatively deep-sea species from the external slope of the barrier reef (depth 50–60 m), were studied. Three specimens of *Neoniphon sammara* (fork length 133–175 mm, weight 41–93 g) were collected off Côte Blanche, Nouméa (22°18'S, 166°26'E) in June 2006 and Récif Crouy (22°22'S, 166°21'E) in May 2008; the former two were infected. Two specimens of *Sargocentron spiniferum* (FL 195, 272 mm, W 185, 511 g) were collected from Banc Tamanou (22°19'S, 166°29'E) in March 2007 and Récif Crouy in May 2008; both were infected. No nematodes were found a single *S. rubrum* (FL 175 mm, W 110 g) from the Nouméa fishmarket in September 2004 and in two specimens of the deep species *S. ensifer* (FL 115, 185 mm, W 38, 126 g) from the external slope (22°27'S, 166°22'E) in September and November 2006. Two specimens of *Albula glossodonta* (fork length 600 mm, weight 2500 g) were caught by line near Récif To (22°29'S, 166°26'E) in July 2006. The fishes were examined fresh for the presence of helminth parasites.

The nematodes for morphological studies were fixed in 4% formaldehyde solution, sometimes in hot 70% ethanol. For light microscopical examination (LM), they were cleared with glycerine. Drawings were made with the aid of a Zeiss microscope drawing attachment. Specimens used for scanning electron microscopy (SEM) were postfixed in 1% osmium tetroxide, dehydrated through a graded acetone series, critical point dried and sputter-coated with platinum; they were examined using a JEOL JSM-7401F scanning electron microscope at an accelerating voltage of 3 kV GB low. All measurements are in micrometres unless otherwise stated. Fish names follow FishBase (Froese and Pauly 2009).

Results

Family Cystidicolidae Skryabin, 1946

Ascarophis (*Dentiascarophis*) subgen. nov.

Diagnosis: *Ascarophis*. Mouth provided with one dorsal and one ventral small median projections located between distal ends of opposite sublabia.

Type species: *A. (D.) adioryx* Machida, 1981.

Ascarophis (*Dentiascarophis*) *adioryx* Machida, 1981 (Figs 1 and 2)

Description: General. Small, whitish nematodes. Maximum width of body near its middle. Cuticle thick, with fine transverse striations distinctly visible particularly in middle part of body (Fig. 2A, G). Cephalic end rounded, with two pseudolabia with terminal protrusions possessing rounded tips (Figs 1B, C and 2C). Oral aperture oval, dorsoventrally elongate, slightly narrowed equatorially (Figs 1E and 2B). Lateral pseudolabia rather large, each provided with small rounded terminal protrusion; in apical view, flat inner parts of pseudolabia partly cover mouth, being expanded dorsoventrally, forming two (one dorsolateral and one ventrolateral) conspicuous, elongate extensions each with distally tapered ends bent towards wall of mouth (Figs 1E and 2B). Submedian cephalic elevations (labia) four, each in form of elongate, somewhat sickle-shaped mound (Figs 1E and 2B-D). Four submedian, elongate sublabia present in apposition to ends of pseudolabial lateral extensions. One dorsal and one ventral small, rounded median protrusion present between distal ends of opposite sublabia. Four small submedian cephalic papillae and pair of lateral amphids present (Figs 1E and 2B-D). Vestibule (stoma) long, almost cylindrical, with well-developed funnel-shaped anterior prostom visible in lateral view (Fig. 1B). Glandular oesophagus 3–5 times longer than muscular; both parts of oesophagus distinctly separated from each other (Fig. 1A). Nerve ring encircles muscular oesophagus near its anterior end; excretory pore located somewhat posterior to level of nerve ring; deirids small, bifurcate, situated slightly anterior to middle of vestibule (Figs 1A-C, F and 2A, G).

Male (5 specimens from *S. spiniferum*; measurements of 2 specimens from *N. sammara* in parentheses). Length of body 6.91–8.00 (7.67–8.13), maximum width 122–150 (136). Height of pseudolabia 3 (3). Vestibule including prostom 219–228 (213–225) long; prostom 18–27 (18) long and 21 (18) wide. Length of muscular oesophagus 357–384 (366–414), maximum width 30–36 (33–36); length of glandular oesophagus 1.28–1.52 (1.14–1.66) mm, maximum width 60–72 (60–69); length ratio of muscular and glandular parts of oesophagus 1:4 (1:4). Length of entire oesophagus and vestibule represents 26–30% (25–30%) of total body length. Nerve ring, excretory pore and deirids 258–279 (255–264), 345–351 (315–321) and 102–129 (114–120), respectively, from anterior extremity. Posterior

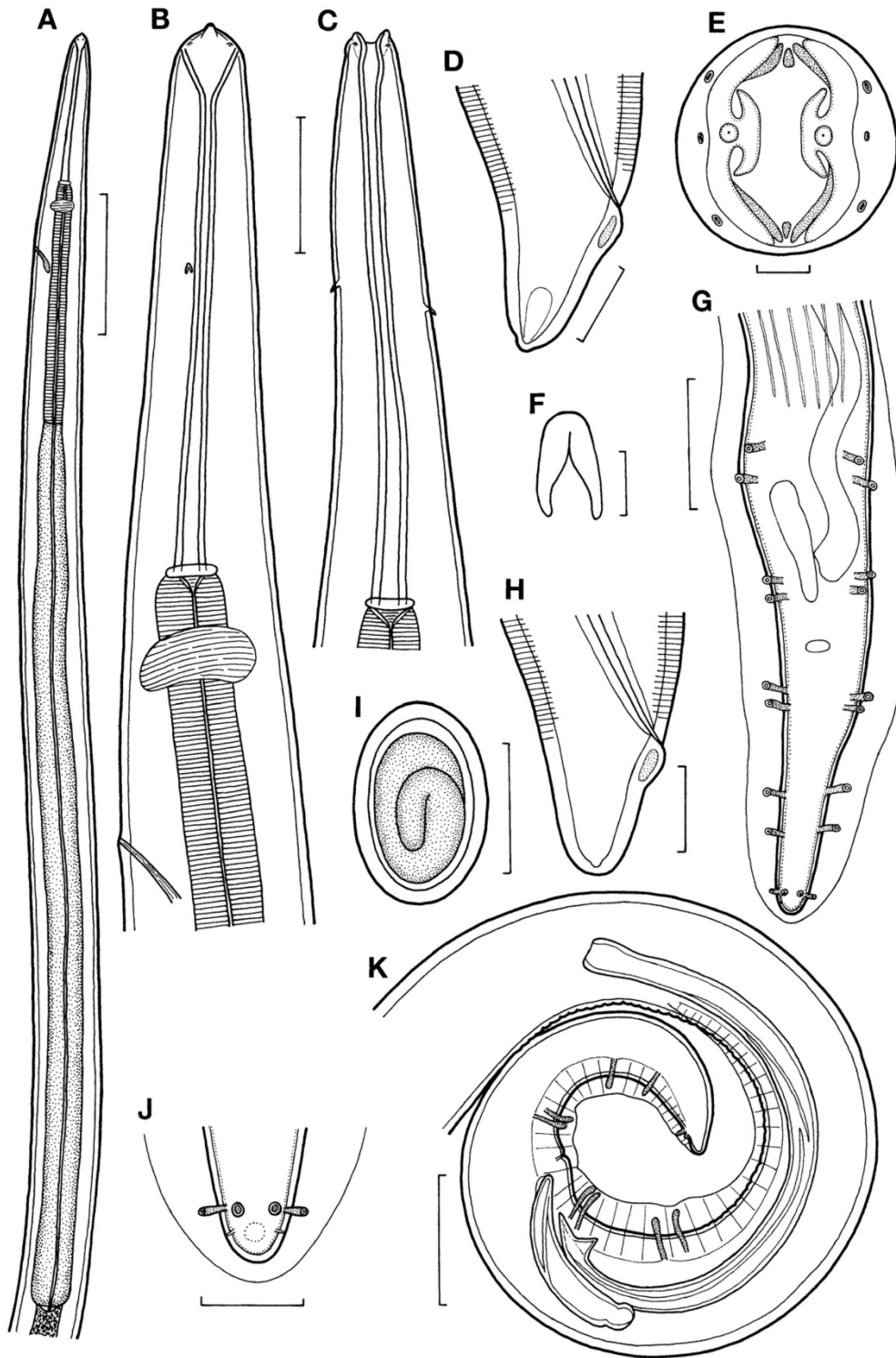


Fig. 1. *Ascarophis* (*Dentiascarophis* subgen. nov.) *adioryx* Machida, 1981 (from *S. spiniferum*). **A** – anterior part of body of male, lateral view; **B** and **C** – anterior end of male, lateral and dorsoventral views; **D** – tail of female with outlined terminal mucron, lateral view; **E** – cephalic end, apical view; **F** – deirid; **G** – posterior end of male, ventral view; **H** – tail of female without terminal mucron, lateral view; **I** – fully developed egg; **J** – tail tip of male, ventral view; **K** – posterior end of male, lateral view. Scale bars = 200 μ m (**A**); 50 μ m (**B-D**, **H**); 5 μ m (**E**); 3 μ m (**F**); 100 μ m (**G**, **K**); 30 μ m (**I**, **J**)

end of body spirally coiled, provided with broad caudal alae (Fig. 1G, K). Preanal papillae: 4 pairs of subventral pedunculate papillae present, of which first and second and third and fourth being shifted in relation to each other. Postanal papil-

lae: 6 pairs present, including 5 pairs of pedunculate subventral papillae and 1 pair of minute ventral sessile papillae located approximately at level of last pair of subventrals (Fig. 1G, K). In addition, pair of very small subventral phasmids present pos-

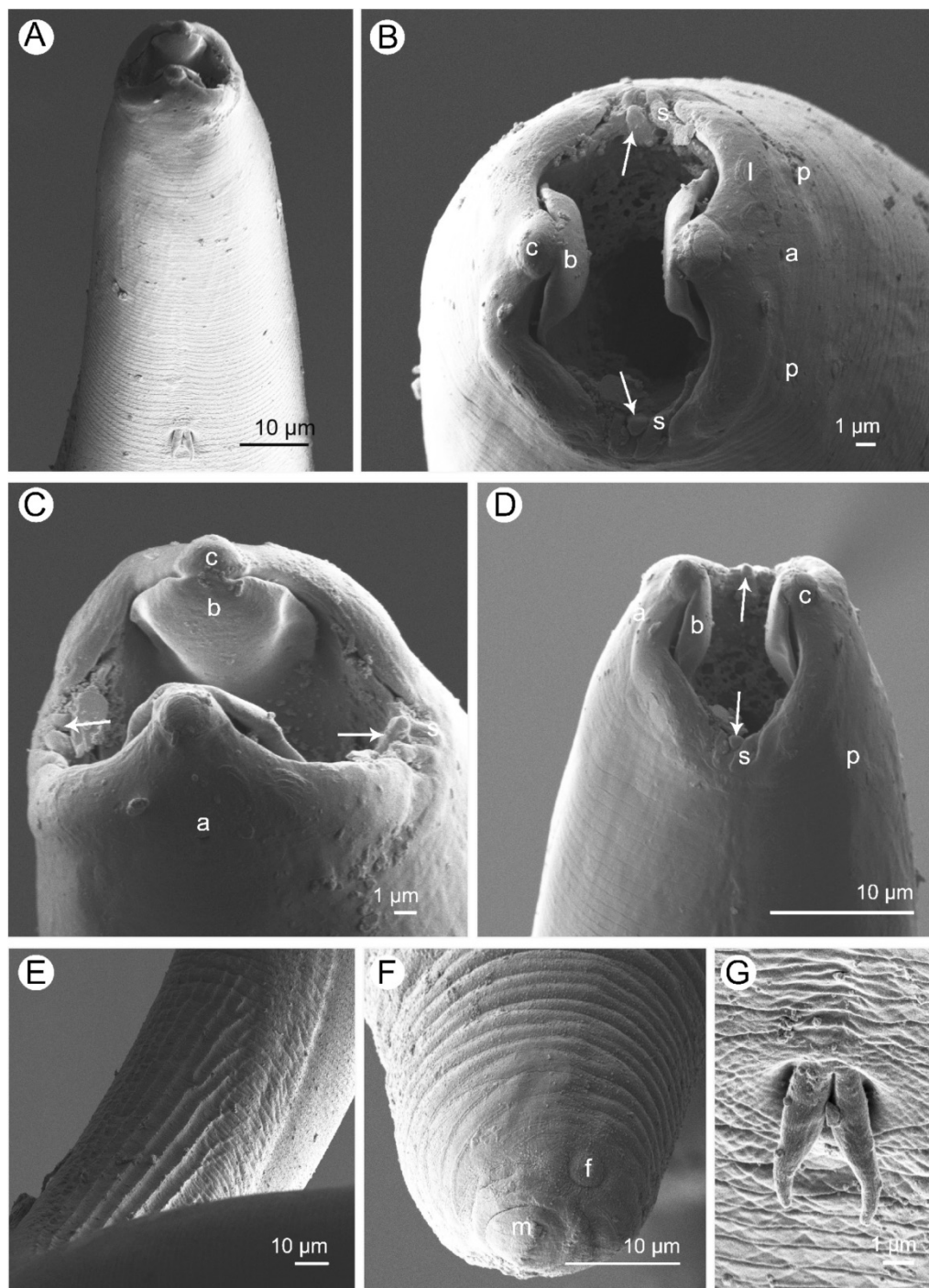


Fig. 2. *Ascarophis* (*Dentiascarophis* subgen. nov.) *adioryx* Machida, 1981 (from *S. spiniferum*), SEM micrographs. **A** – anterior end of body, lateral view (note location of deirid); **B**, **C** and **D** – cephalic end, apical, lateral and dorsoventral views, respectively (arrowheads indicate dorsal and ventral median protrusions); **E** – ventral preloacal cuticular ridges, subventral view; **F** – tail tip of female, subapical view; **G** – deirid. **Abbreviations:** a – amphid; b – pseudolabial extension; c – anterior pseudolabial protrusion; f – phasmid; l – labium; m – terminal mucron; p – cephalic papilla; s – sublabium

terior to ventral papillae (Fig. 1J). Ventral cuticular ridges (area rugosa) anterior to cloaca well-developed, consisting of about eight longitudinal lines of elevated cuticle (Fig. 2E). Large (left) spicule 546–585 (516–546) long, with pointed distal tip provided with large ventral triangular outgrowth; spicule shaft 228–270 (210–231) long, forming 41–46% (42–65%) of overall length of spicule. Small (right) spicule broad, 144–147 (123–132) long, with rounded distal end provided with small cuticular membrane (Fig. 1K). Length ratio of spicules 1:3.78–4.06 (1:3.91–4.44). Tail conical, 180–243 (207–270) long, with rounded tip.

Female (5 gravid specimens with mature eggs from *S. spiniferum*; measurements of 3 gravid specimens with mature eggs from *N. sammara* in parentheses). Length of body 11.32–13.52 (12.24–14.02) mm, maximum width 190–218 (245–248). Height of pseudolabia 3 (3). Vestibule including prostom 233–255 (225–233) long; prostom 21–24 (21–24) long, 24–27 (18–24) wide. Length of muscular oesophagus 435–495 (390–501), maximum width 42–51 (45–48); length of glandular oesophagus 1.56–1.90 (1.59–2.09) mm, maximum width 69–81 (72–81); length ratio of muscular and glandular parts of oesophagus 1:3–4 (1:3–5). Length of entire oesophagus and vestibule represents 18–20% (18–20%) of total body length. Nerve ring, excretory pore and deirids 285–300 (276–282), 330–384 (327–363) and 114–120 (111–135), respectively, from anterior extremity. Tail conical, short, 66–111 (66–102) long, with two lateral papilla-like phasmids near its tip (Fig. 2F); tail tip without any terminal appendage (Fig. 1H) or with slightly outlined appendage (mucron) 6 (6) long (Fig. 1D). Vulva somewhat postequatorial, situated 6.39–7.59 (7.17–8.41) mm from anterior end of body, at 55–57% (58–60%) of body length; vulval lips not elevated. Vagina directed posteriorly from vulva. Amphidelphic. Anterior ovary and uterus not extending anteriorly to oesophageal part of body. Uterus filled with numerous eggs, occupies major part of body, reaching posteriorly level of posterior end of intestine. Mature eggs (containing larvae) oval, thick-walled, size 48–51 × 33–36; thickness of egg wall 4–5; surface of eggs without any filaments (Fig. 1I).

Hosts: Speckled squirrelfish, *Sargocentron spiniferum*, and sabre squirrelfish, *Neoniphon sammara* (both Holocentridae, Beryciformes). Previously also reported from *Sargocentron punctatissimum* (see Parukhin 1984).

Site of infection: Stomach.

Locality: Off New Caledonia, South Pacific.

Prevalence and intensity: *S. spiniferum*: 2 fish infected/2 fish examined; intensity in one fish 22 nematodes. *N. sammara*: 2/3; intensity 4 and 6. Not found in New Caledonia in *S. rubrum* (0/1) and *S. ensifer* (0/2).

Deposition of voucher specimens: Muséum National d'Histoire Naturelle, Paris (JNC1877, JNC2151); Institute of Parasitology, Biology Centre of the ASCR, České Budějovice (N-927).

Other parasites: Digeneans were found in the stomach of *N. sammara* (2/3), *S. ensifer* (2/2), *S. spiniferum* (1/2) but not

in *S. rubrum* (0/2). All belonged to the hemiurid *Lecithochirium cirrhiti* (Manter et Pritchard, 1960) Yamaguti, 1970 (identification by Rod Bray, NHM, London). The species was already known from Hawaii (Yamaguti 1970) and Heron Island, Australia (Bray *et al.* 1993); New Caledonia is a new geographic record.

Comments

The general morphology and measurements of New Caledonian specimens closely correspond to *Ascarophis adioryx* Machida, 1981 from the stomach of *Sargocentron spiniferum* (Forsskal) (reported as *Adioryx spinifer*) from the Philippine Sea off the Palau Islands (Republic of Palau), Oceania. Based on LM, Machida (1981) gave a good description of this species, showing details of the cephalic structure, the shape of deirids and that of the distal tip of the left spicule, or the presence of ventral precloacal ridges. The present SEM study indicates that he overlooked some morphological details that are almost impossible to observe using LM, such as the presence of the dorsal and ventral median projections in the mouth, phasmids, and the sixth pair of postanal papillae in the male. Since also one of the two New Caledonian fish host species is identical with the type host of *A. adioryx*, there is no doubt that the nematodes of the present material belong to this species.

Not being familiar with Machida's (1981) paper, Parukhin (1984) inadequately described *Ascarophis holocentri* Parukhin, 1984 from the stomach and intestine of two species of holocentrid fishes, *Sargocentron spiniferum* (as *Holocentrus spinifer*) and *S. punctatissimum* (Cuvier) (as *Holocentrus lacteoguttatus*), from the Red Sea. Its morphology appears to be very similar to that of *A. adioryx* and also the type host (*S. spiniferum*) of both species is identical. In contrast to *A. adioryx*, the eggs of *A. holocentri* are allegedly provided with two filaments on one pole and the spicules are 2.3 and 0.11 mm long. However, the lengths of spicules are evidently erroneous; as can be derived from the drawing (fig. 1g) and the respective scale bar in Parukhin's paper, the spicules are only about 600 and 145 µm long, as in *A. adioryx*, and the illustrated distal tip of the left spicule is also typical of this species. The presence of egg filaments in *A. holocentri* is doubtful, because these were illustrated inside the nematode body. Moravec (2007) stated that the eggs should be dissected out from the nematode body to study the presence or absence of egg filaments in spirurines, because, otherwise, the filaments are practically not visible. Even though our efforts to obtain the type specimens of *A. holocentri* were unsuccessful (apparently, they were lost according to information by Prof. A.V. Gaevskaia, Sevastopol), this species should be considered a junior synonym of *A. adioryx*.

According to Moravec and Klimpel (2009), the nematode family Cystidicolidae Skryabin, 1946 includes 23 valid genera. An additional genus *Placonema* Brugni, Viozi, Fernández et Vega, 2009 has been established recently (Brugni *et al.* 2009). However, the classification system of cystidicolids remains

complicated because of uncertainties in the evaluation of generic criteria (e.g., Moravec 2007, Muñoz and George-Nascimento 2007, Brugni *et al.* 2009), where details in the structure of the mouth found by SEM have often been used.

The morphology of *A. adioryx* is in agreement with Ko's (1986) re-diagnosis of *Ascarophis* van Beneden, 1871, but differs mainly in the presence of one dorsal and one ventral small median protrusions located between the distal ends of opposite sublabia (Figs 1E, 2B-D); among *Ascarophis*-like nematodes, small dorsal and ventral median cephalic elevations have recently been described only in *Cystidicoloides fischeri* (Travassos, Artigas et Pereira, 1928), a parasite of Neotropical characids (see Moravec *et al.* 2008). Moreover, the shape of *A. adioryx* pseudolabia in apical view is more similar to that in *Pseudascarophis* Ko, Margolis et Machida, 1985 than in most *Ascarophis* spp. (Ko *et al.* 1985), but the shape and size of pseudolabia may somewhat differ in different species of the latter genus (Moravec and Justine 2007).

In spite of the above mentioned differences, *A. adioryx* is retained in the genus *Ascarophis*. However, a new subgenus *Dentiascarophis* subg. nov. is proposed to accommodate it. Moravec and Justine (2007) consider *Similascarophis* Muñoz, González et George-Nascimento, 2004 a subgenus of *Ascarophis*. However, it is necessary to remark that the cephalic structures of the majority of *Ascarophis* spp. have not yet been studied by SEM, so that their belonging to subgenera remains unknown.

Key to subgenera of the genus *Ascarophis*

1. Pseudolabia well-developed, usually with distinct inner dorsoventral extensions in apical view 2
- Pseudolabia considerably reduced, usually without inner extensions *Similascarophis*
2. Mouth possessing one dorsal and one ventral median projections *Dentiascarophis*
- Mouth without any median projections *Ascarophis*

Records of *A. adioryx* from the Red Sea and off the Palau Islands and New Caledonia (Machida 1981, Parukhin 1984, present data) suggest that this parasite is widespread in the Indo-Pacific, following the distribution of its holocentrid fish hosts. The species was not found in a relatively deep-sea holocentrid species from the outer slope of the barrier reef and thus is apparently restricted, in New Caledonia, to fish from shallow waters. The only other species of *Ascarophis* so far reported from New Caledonian waters is *A. (S.) richeri* Moravec et Justine, 2007, found in *Hoplichthys citrinus* Gilbert (Hoplichthyidae, Scorpaeniformes) from a seamount off the Chesterfield Islands (Moravec and Justine 2007).

Spinitectus (Paraspinitectus) subgen. nov.

Diagnosis: *Spinitectus*. Pseudolabia highly reduced, oval-shaped, without inner dorsoventral extensions in apical view.

Type species: *S. (P.) beaveri* Overstreet, 1970.

Spinitectus (Paraspinitectus) sp. (Figs 3 and 4)

Description: Female (1 gravid specimen with mature eggs). Small, elongate, whitish nematode. Body 8.38 mm long, its oesophageal region narrow, posterior region wide; maximum width in broadest posterior region 258. Cephalic end blunt, posterior end conical. Surface of body with transverse rings of cuticular spines; first 17 rings complete, non-interrupted, following, more posterior rings interrupted on both sides of body by smooth lateral lines (Fig. 4A, G); rarely a bifurcate spine may be present (Fig. 4F). First ring with 16 spines, more posterior rings with up to about 26 spines. Spination starting at level of base of prostom (Figs 3C and 4B), extending posteriorly to short distance anterior to vulva, where spines are scarce. Spines adhering to body surface. Largest spines, 15–18 long, in region of end of oesophagus; spines of first ring 6 long, in most posterior rings 6–9. Cuticle finely transversely striated, forming distinctly elevated rings throughout body length (Figs 3B and 4B, E). Oral aperture oval, slightly dorsoventrally elongated, surrounded by four poorly developed submedian labia forming dorsal and ventral margins of mouth; both dorsal, as well as ventral labia continuous, fused together. Two dorsal and two ventral submedian sublabia narrow, curved, attached by their bases to inner surface of labia; both dorsal and ventral sublabia continuous, fused together; free margin of each sublabium with small submedian triangular thickening (Figs 3D and 4C, D). Lateral pseudolabia highly reduced, small, simple, bearing small, rounded terminal protrusion, not enclosing most of mouth. Pair of small lateral amphids and four small submedian cephalic papillae situated outside pseudolabia (Figs 3D and 4C). Vestibule long, with distinct anterior prostom in lateral view (Fig. 3B, C); length of vestibule including prostom 204; funnel-shaped prostom 27 long, 24 wide. Muscular oesophagus 486 long, maximum width 33; glandular oesophagus 2.07 mm long, maximum width 57; oesophageal ratio 1:4 (Fig. 3A). Length of vestibule and entire oesophagus representing 33% of whole body length. Nerve ring and excretory pore 228 and 339, respectively, from anterior extremity; nerve ring situated between 10th and 11th rings of spines, excretory pore between 14th and 15th rings (Fig. 3A, B). Deirids not observed. Vulva not elevated, situated in posterior half of body, 5.11 mm from anterior extremity (at 61% of body length). Vagina muscular, short, directed posteriorly from vulva. Amphidelphic. Fully developed eggs in uterus oval, thick-walled, non-filamented, each containing larva; size 48–51 × 24–27; thickness of shell 3 (Fig. 3F). Tail conical, 75 long, with small terminal knob-like appendage 9 × 9 and pair of small lateral phasmids in middle (Fig. 3E).

Host: Roundjaw bonefish, *Albula glossodonta* (Albulidae, Albuliformes).

Site of infection: Probably stomach.

Locality: Off New Caledonia, South Pacific.

Prevalence and intensity: 1 specimen found in 1 of 2 fish examined.

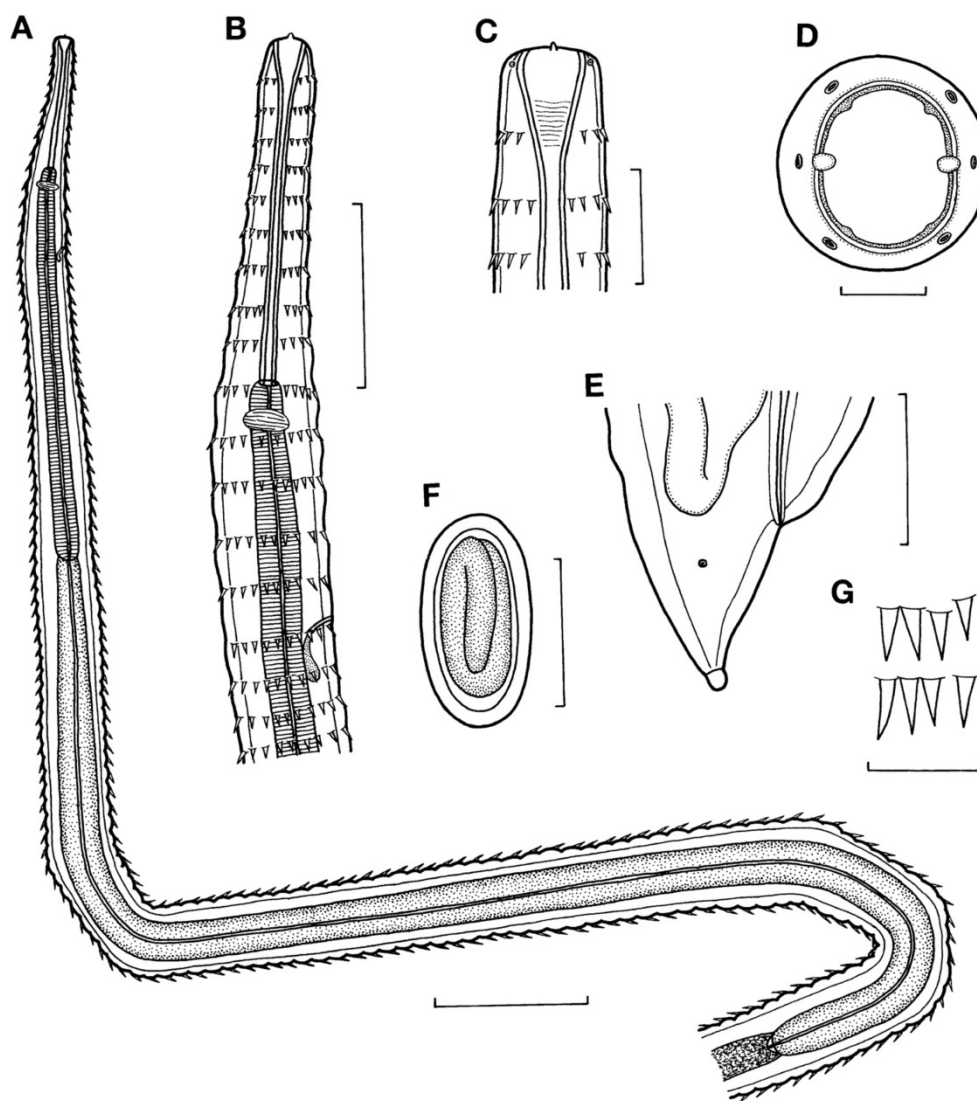


Fig. 3. *Spinitectus* (*Paraspinitectus* subgen. nov.) sp., gravid female. **A** – anterior part of body, lateral view; **B** – anterior end, lateral view; **C** and **D** – cephalic end, lateral and apical views; **E** – tail, lateral view; **F** – fully developed egg; **G** – largest cuticular spines. Scale bars = 500 µm (A); 50 µm (B, E); 30 µm (C, F, G); 10 µm (D)

Comments

The genus *Spinitectus* Fourment, 1884 includes a large number of species described mainly from freshwater and marine fishes (Moravec *et al.* 2002). The general morphology (especially the structure of cephalic end and the spination of body) and measurements of the single available female specimen from *Albula glossodonta* are very similar to those of *Spinitectus beaveri* Overstreet, 1970, a stomach parasite of *Albula vulpes* (Linnaeus) in Florida (Biscayne Bay), USA (Overstreet 1970, Jilek and Crites 1982). Since the hosts of both forms belong to the same fish genus, it is apparent that both of them are closely related or even conspecific. However, taking into account small morphological differences of the New Caledonian specimen (e.g., the presence of four submedian thickenings on sublabia or somewhat larger eggs), a different geographical re-

gion (Pacific vs Atlantic Oceans) and particularly the absence of conspecific males, we refrain from its specific identification.

An important taxonomic feature distinguishing species of *Spinitectus* is usually the situation of the excretory pore in relation to rings of cuticular spines (Moravec 1979, 2007). The location of the excretory pore has not been described for *S. beaveri*; it is between the 14th and 15th rings of spines in the *Spinitectus* (*P.*) sp. specimen from New Caledonia.

Jilek and Crites (1982) studied by SEM the cephalic structure of *S. beaveri* and found it very different from those of the three other, freshwater North American species of *Spinitectus* examined, especially in the shape of the oral aperture and highly reduced pseudolabia. However, in fact, by this structure *S. beaveri* differs from all other congeneric species hitherto studied by SEM. The same type of cephalic structure is found in the present New Caledonian specimen. Similar interspecific dif-

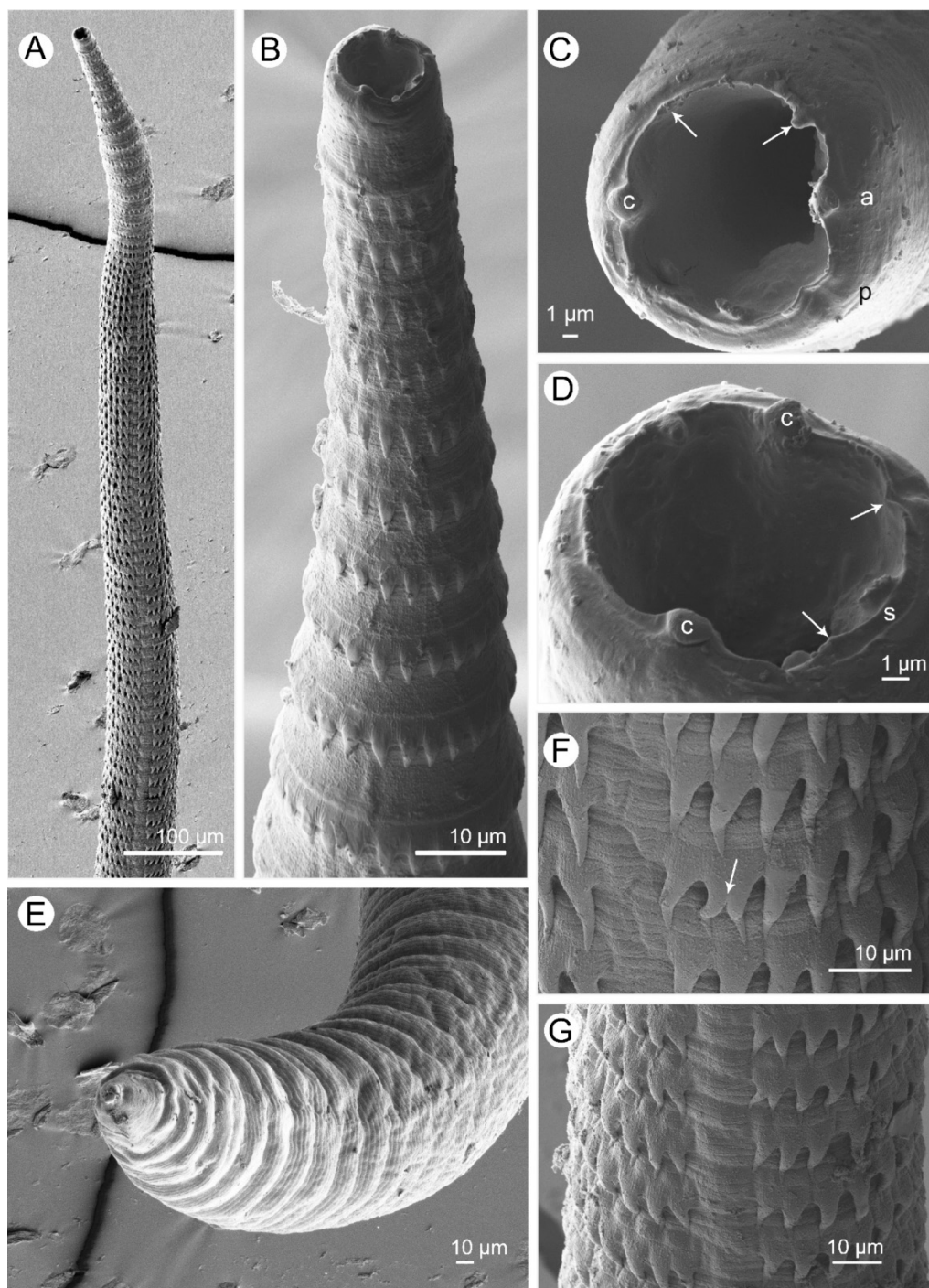


Fig. 4. *Spinitectus* (*Paraspinitectus* subgen. nov.) sp., SEM micrographs of gravid female. **A** – anterior part of body, lateral view (note smooth lateral field posterior to 16th ring of cuticular spines); **B** – anterior end, sublateral view; **C** and **D** – cephalic end, apical and sublateral views (arrowheads indicate submedian extensions of sublabia); **E** – caudal end, sublateral view; **F** – largest cuticular spines (arrowhead indicates a bifurcated spine); **G** – region of large cuticular spines, lateral view (note smooth lateral field without spines at middle). **Abbreviations:** a – amphid; c – pseudolabium with anterior projection; p – cephalic papilla; s – sublabium

ferences in the size and shape of pseudolabia are found in *Ascarophis* spp. (see above), belonging to the same family, where the species with reduced pseudolabia have been assigned to the separate subgenus *Similascarophis* (see Moravec and Justine 2007, present data). Consequently, the erection of a new sub-

genus *Paraspinitectus* subg. nov. is proposed to accommodate the species of *Spinitectus* with markedly reduced pseudolabia without inner extensions. At present, it contains only *S. beaveri* (type species) and *Spinitectus* sp. from off New Caledonia; however, the great majority of *Spinitectus* spp. has not yet been

examined by SEM, so that their belonging to a subgenus remains unknown.

Spinitectus (*P.*) sp. from *A. glossodonta* is the first known representative of this genus parasitizing marine fishes in Oceania. The species *Spinitectus palawanensis* Schmidt et Kuntz, 1969, described from *Euthynnus affinis* (Cantor) (reported as *E. yaito*) off the nearby Philippines (Schmidt and Kuntz 1969), was later synonymized with *Prospinitectus mollis* (Mamaev, 1968) (see Petter 1979).

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