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PARAPHILOMETROIDES NEMIPTERI GEN. ET SP. N. (NEMATODA: PHILOMETRIDAE) FROM THE MARINE FISH NEMIPTERUS PERONII (VALENCIENNES) FROM MALAYSIA

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Abstract. A new nematode species, *Paraphilometroides nemipteri* sp. n. is described from the female specimens collected from the dorsal fin and operculum of the marine perciform fish, *Nemipterus peronii* off Kuala Terengganu coastal waters in Malaysia. It considerably differs from all other species in Philometridae in the structure of the head end (presence of wide dorsal and ventral cephalic cuticular alae supported by special inner transverse muscular formations) and, therefore, a new genus *Paraphilometroides* gen. n. has been erected to accommodate it. Additional characteristic features of *P. nemipteri* are the presence of cuticular bosses on the body, eight cephalic papillae in the outer circle and four small papillae in the inner circle, and the absence of caudal protrusions.

During studies on some helminth parasites from marine fishes from Kuala Terengganu waters, Malaysia, carried out by the junior author (F. Mohd-Shaharom) in 1987, nematode specimens referable to the family Philometridae were recovered from the dorsal fin and operculum of the local threadfin bream, *Nemipterus peronii*. These nematodes, representing only gravid females, proved to be members of a new, hitherto undescribed species belonging to a new genus which we describe below.

MATERIALS AND METHODS

The nematodes were fixed and stored in 70% ethanol. For examination the nematodes were transferred to 4% formaldehyde and cleared with glycerine. *En face* views were prepared according to Anderson's (1958) method. Drawings were made with the aid of a Zeiss microscope drawing attachment. The specimens have been deposited in the helminthological collection of the Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice, Czechoslovakia. All measurements are given in mm.

DESCRIPTION OF NEW TAXA

Genus *Paraphilometroides* gen. n.

Diagnosis: Philometridae. Body of gravid female comparatively short, its posterior half narrower than anterior one. Cuticle with numerous small, transparent bosses; bosses absent from oesophageal region of body. Head end rectangular in lateral view and arch-like in dorsoventral view, bearing eight flat cephalic papillae of outer circle and four minute papillae of inner circle. Dorsal and ventral sides of head end provided with cephalic cuticular ala bent into a curve, being supported by inner muscular layer forming transverse mound. Oesophagus swollen near mouth to form small anterior bulb. Dorsal oesophageal gland prominent, with one large cell nucleus. Anus atrophied. Caudal end rounded. Uterus opposed, containing numerous larvae; ovaries near ends of body. Male unknown. Tissue parasites of fishes.

Type- and the only species: *P. nemipteri* sp. n.

Differential diagnosis: At present the family Philometridae comprises a total of 10 valid genera (see Moravec 1988). In possessing cuticular bosses in gravid females, the new genus resembles only *Philometroides* Yamaguti, 1935, differing from it distinctly,

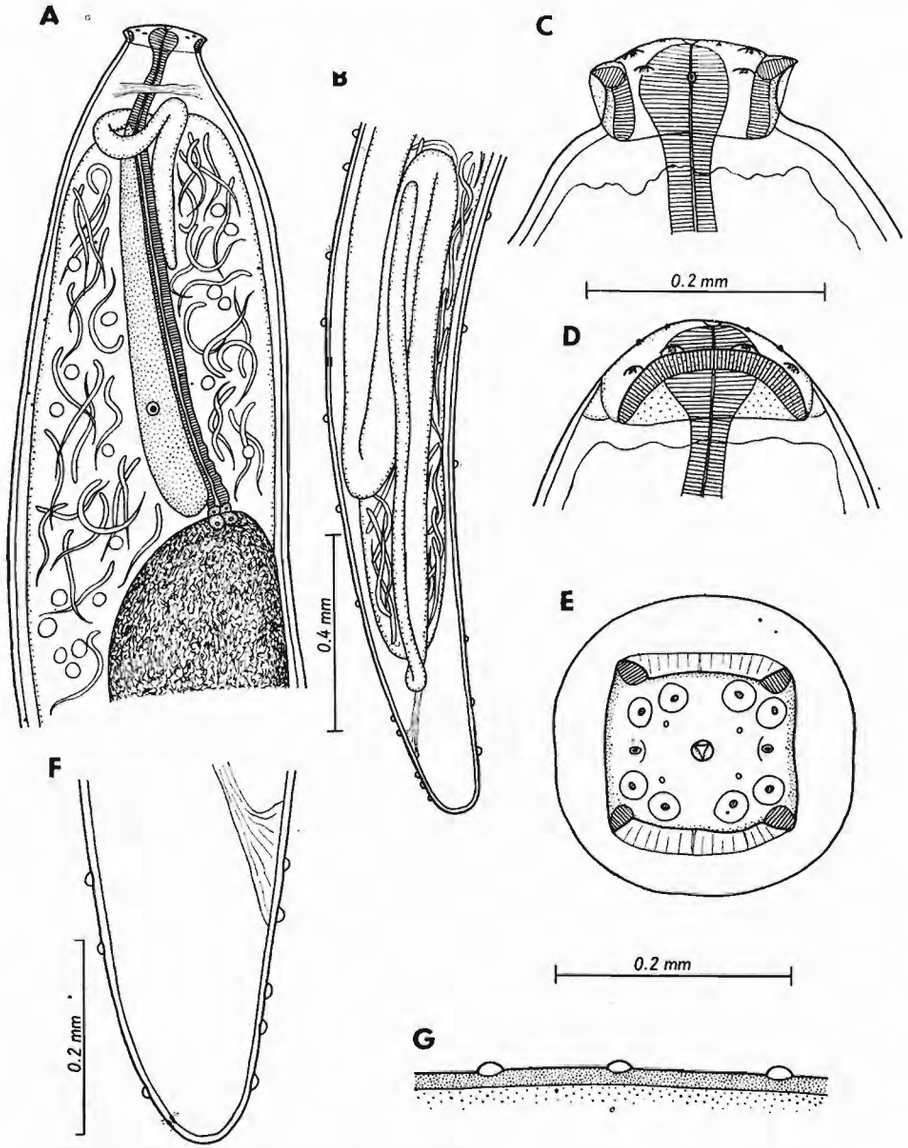

Fig. 1. *Paraphilometroides nemipteri* gen. et sp. n. — gravid female. A — anterior end of body; B — posterior end of body; C, D, E — head end, lateral, dorsoventral and apical views; F — caudal end; G — bosses on cuticle.

however, in the peculiar structure of the head end. The presence of wide dorsal and ventral cuticular alae supported by inner transverse muscular formations on the head end is a unique character within all members of the Philometridae and should be, in our opinion, considered a genetic feature (e.g., the head end of *Philometroides* is simple, without such structures). Also the gross shape of the head end of *Philometroides* species is mostly different (arch-like) from that in *Paraphilometroides* gen. n. in which the anterior part of the head end is conspicuously narrowed; similar shape of the head end was described only in *Philometroides atropi* (Parukhin, 1966) and *Ph. dogieli* Vismanis et Yukhimenko, 1974. However, the head end of the first species lacks the dorsal and ventral mounds appearing as protruding muscular lobes in lateral view, while that of the latter species bears distinct muscular lobes and it cannot be excluded that *Ph. dogieli* is, in the fact, another member of *Paraphilometroides* gen. n. Cephalic alae, typical of the new genus, have not been described either for *Ph. atropi* or *Ph. dogieli*.

Paraphilometroides nemipteri sp. n. Fig. 1

Description of gravid female (6 specimens; measurements of holotype in parentheses): Body of gravid female whitish, comparatively short; its posterior half narrower than anterior one. Cuticle with numerous small, transparent, irregularly distributed bosses 0.003—0.006 (0.003—0.006) high; some bosses slightly transversely expanded; posterior half of body more densely embossed than anterior one where bosses are sporadic; bosses completely absent from oesophageal region of body. Length of body 15.98—26.49 (26.49), maximum width 0.65—1.21 (1.21). Head end blunt, its anterior narrowed part appearing rectangular in lateral view with large triangular muscular lobes projecting from sides, each of them being covered by membraneous ala. In lateral view, anterior part of head end 0.041—0.082 (0.082) long and 0.190—0.218 (0.218) wide. In dorsoventral view, head end obtusely rounded, not well separated from rest of body. In apical view, head end appearing square with four muscular lobes at corners; its dorsal and ventral sides provided with wide cuticular ala. Each cuticular ala bent into a curve, being supported by inner muscular layer appearing as transverse mound in lateral view and as muscular lobes in optical sections. Oral opening small, circular; three imperceptible oesophageal lobes protruding out of mouth as flat surfaces. Cephalic papillae of outer circle relatively flat, 8 in number, forming submedian pairs; four minute papillae of inner circle and two small lateral amphids present. Oesophagus swollen near mouth to form small anterior muscular bulb, not well visible within nematode head end; length of bulb 0.054—0.082 (0.082), its width 0.068—0.095 (0.095). Overall length of eosophagus including anterior bulb 1.12—1.44 (1.39), representing 5—7 (5) % of whole body length; maximum width of its cylindrical part (including oesophageal gland) 0.136—0.163 (0.163). Dorsal oesophageal gland prominent, wide, extending anteriorly slightly below nerve ring level; oesophageal gland provided with large cell nucleus located below mid-length of gland, 0.82—1.17 (1.08) from anterior extremity. Nerve ring 0.163—0.204 (0.204) from anterior end of body, excretory pore not located. Intestine light-coloured, comparatively broad, displaced laterally by uterus; its posterior end atrophied, forming ligament attached ventrally to body wall at 0.190—0.354 (—) from posterior extremity. Posterior end of body rounded, with several irregularly scattered cuticular bosses; no caudal processes or papillae present. Vagina and vulva absent. Ovaries situated near anterior and posterior ends of body; anterior ovary reaching anteriorly to nerve ring level, posterior ovary to level of intestinal ligament. Uterus occupying major part of body, being filled in with larvae and developing embrya. Larvae slender, 0.468—0.537 (—) long and

0.014—0.15 (—) wide, with sharply pointed tail 0.135—0.141 (—) long; tail representing 26% of whole larval body.

Male: unknown.

Host: threadfin bream, *Nemipterus peronii* (Valenciennes) (Nemipteridae, Perciformes).
Localization: dorsal fin and operculum.
Type locality: Kuala Terengganu coastal waters (5° 40' N, 103°30' E), South China Sea, Malaysia (21 July 1987).
Deposition of types: holotype (♀) and paratypes (♀♀) in Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice (Cat. No. N — 372).
Etymology: The specific name of this nematode is derived from the generic name of its host.

Comments: The newly erected genus *Paraphilometroides* gen n. is monotypic with the only species *P. nemipteri* sp. n. From the related genus *Philometroides* Yamaguti, 1935 it mainly differs in the structure of the head end in gravid female (see above). Out of many *Philometroides* species, only two species somewhat resemble *P. nemipteri* by the shape of the head end: *Ph. dogieli* Vismanis et Yukhimenko, 1974 from the fins of the Far-eastern cyprinid *Elopichthys bambusa* in the River Amur and *Ph. atropi* (Parukhin, 1966) from the abdominal cavity of the marine perciform fish *Atropus atropus* from Gulf of Tongking (see Parukhin 1966, Vismanis and Yukhimenko 1974). In addition to generic distinctions, *Ph. dogieli* differs from *P. nemipteri* sp. n. in the colour of body in gravid females (red versus whitish), presence of the markedly transversely elongated cuticular bosses that are distributed also in the oesophageal region of body, presence of two caudal processes, as also in host types (freshwater cyprinids versus marine perciforms). *Ph. atropi* differs from the new species mainly in having a different structure of the head end (a generic feature), in the presence of the oesophagus lacking an anterior bulb and also by the site of localization in the host's body (body cavity versus subcutaneous tissue of fins and operculum).

A new species, *Philometra* (*Ranjhinema*) *beninensis* has recently been described by Obiekezie (1986) on the basis of females found in the fins and operculum of the perciform fish *Polydactylus quadrifiliis* (fam. Polynemidae) from the Cross River Estuary, Nigeria. Although this species is biometrically similar to *P. nemipteri* sp. n., its females have the same site of localization in the host's body and both the species are parasitic in marine perciforms, there are distinct morphological differences between them. It concerns mainly the structure of the female head end, which in *Ph. beninensis* lacks the dorsal and ventral cuticular alae supported by characteristic transverse muscular formations; moreover, cuticular bosses, characteristic of the new species, are absent from the body of *Ph. beninensis* and both species differ from each other also in the colour of body in gravid females (blood red in *Ph. beninensis* and whitish in *P. nemipteri* sp. n.).

KEY TO THE GENERA OF PHILOMETRIDAE BASED ON THE FEMALE MORPHOLOGY:

1 Body of female bent dorsally. One ovary present. Ventral part of cuticle swollen by large vesicular structures. Parasites of subcutaneous tissues of selachians . . . . . *Phlyctainophora* Steiner, 1921
— Body elongated, more or less cylindrical. Two ovaries present. Cuticle smooth or ornamented with bosses or small excrescences. Parasitic in teleosts . . 2

2 Female tail conical, attenuated. Posterior half of oesophagus distinctly expanded, containing multinucleate oesophageal gland. Head end rounded. Cuticle smooth. Parasitic in body cavity mainly of salmonids . . . . . *Philonema* Kuitunen-Ekbaum, 1933
— Female tail blunt, rounded or tapering. Oesophagus mostly cylindrical, usually swollen near oral opening, sometimes with broad unicellular oesophageal gland confined to walls of oesophagus. Head end rounded or with distinct lobes. Cuticle smooth or ornamented with bosses or excrescenses 3

3 Cuticle smooth 4
— Cuticle ornamented 7

4 Muscular part of oesophagus elongate with two swellings separated by nerve ring, with free posterior glandular appendix at junction of two portions. Tail conical. Parasitic in body cavity . . . . . *Ichthyofilaria* Yamaguti, 1935
— Oesophagus unlike the above. Tail blunt, rounded or conical 5

5 Tail conical. Oesophagus cylindrical at its anterior part, not swollen near oral opening; its posterior part markedly expanded. Parasitic in body cavity . . . . . *Rumai* Travassos, 1960
— Tail blunt or rounded. Oesophagus cylindrical, swollen near oral opening . . 6

6 Oesophagus cylindrical, forming conspicuously large anterior bulb well separated from remaining part of oesophagus. Oesophageal gland poorly developed, situated in middle part of oesophagus. Parasitic in subcutaneous tissues . . . . . *Clavinema* Yamaguti, 1935
— Oesophagus cylindrical, swollen near oral opening, but this inflation not separated from remaining part of oesophagus. Oesophageal gland well developed, broad, extending along major part of oesophagus. Parasitic in body cavity, blood vessels and subcutaneous tissues . . . . . *Philometra* Costa, 1845 (syn. *Thwaitia* Rasheed, 1963)

7 Cuticle with regular rows of spines. Body of female coiled. Parasitic in spleen . . . . . *Spirophilometra* Parukhin, 1971
— Cuticle without regular rows of spines 8

8 Cuticle with cone-shaped excrescences. Oesophagus cylindrical, not swollen near mouth. Tail pointed. Parasitic in swimbladder . . . *Nilonema* Khalil, 1960
— Cuticle without cone-shaped excrescences. Oesophagus bulbous or somewhat swollen near oral opening. Tail rounded or blunt 9

9 Cuticle with rod-like structures arranged in patterns. Cuticularized oesophageal teeth present. Cephalic papillae large, flat, lobe-like. Parasitic in aorta . . . . . *Buckleyella* Rasheed, 1963
— Cuticle with small, irregular bosses. Oesophageal teeth present or absent. Cephalic papillae small or large, lobe-like 10

10 Head end provided with dorsal and ventral cuticular cephalic alae supported by inner muscular layer forming transverse mounds. Cuticular bosses absent from oesophageal region of body. Parasitic in subcutaneous tissues . . . . . *Paraphilometroides* gen. n.
— Head end without cephalic alae. Cuticular bosses present also in oesophageal region of body. Parasitic in subcutaneous tissues and body cavity . . . . . *Philometroides* Yamaguti, 1935

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PARAPHILOMETROIDES NEMIPTERI GEN. ET SP. N. (NEMATODA: PHILOMETRIDAE) ОТ МОРСКОЙ РЫБЫ *NEMIPTERUS PERONII* (VALENCIENNES) ИЗ МАЛАЙЗИИ

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Резюме. От морской окунеобразной рыбы *Nemipterus peronii* из побережных вод Малайзии (Kuala Terengganu) описан по самкам новый вид нематоды *Paraphilometroides nemipteri* sp. n. Так как этот вид очень отличается от всех других видов сем. Philometridae строением головного конца, установлен для него новый род *Paraphilometroides* gen. n. Другими характеристическими признаками *P. nemipteri* являются многочисленные кутикулярные утолщения на поверхности тела, наличие восьми головных сосочков наружного круга и четырех маленьких сосочков внутреннего круга и отсутствие хвостовых выступов.

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