

Nematodes from the Deep-Sea Fishes of Suruga Bay

II. Two New Rhabdochonid Nematodes from the Macrouroid Fishes

By

Masaaki MACHIDA

Department of Zoology, National Science Museum, Tokyo

Continued from the previous report (MACHIDA, 1975), the nematodes of deep-sea fishes have been examined. The present report deals with two new rhabdochonid nematodes, *Neoascarophis yarihige* n. g., n. sp. and *N. bathygadi* n. sp., from the macrouroid fishes. Fishes for study were obtained from the depth of 280–530 m in Suruga Bay, at the Pacific coast of central Japan, by commercial trawling for shrimps in April and October, 1973. Nematodes were preserved in 5% formalin and cleared in Gater's solution. The specimens are deposited in the collection of the National Science Museum, Tokyo.

The author wishes to express his cordial thanks to Dr. Sh. KAMEGAI, Meguro Parasitological Museum, Tokyo, for giving him an opportunity to examine the nematodes, and to Dr. T. ABE, Tokai Regional Fisheries Laboratory, Tokyo, for identifying the host fishes. Thanks are also due to Dr. L. MARGOLIS, Pacific Biological Station, Nanaimo, Canada, for providing useful suggestions, and to Mr. J. ARAKI, Teikyo University, Tokyo, for taking photographs by the scanning electron microscope.

Neoascarophis yarihige n. g., n. sp.

(Figs. 1–5)

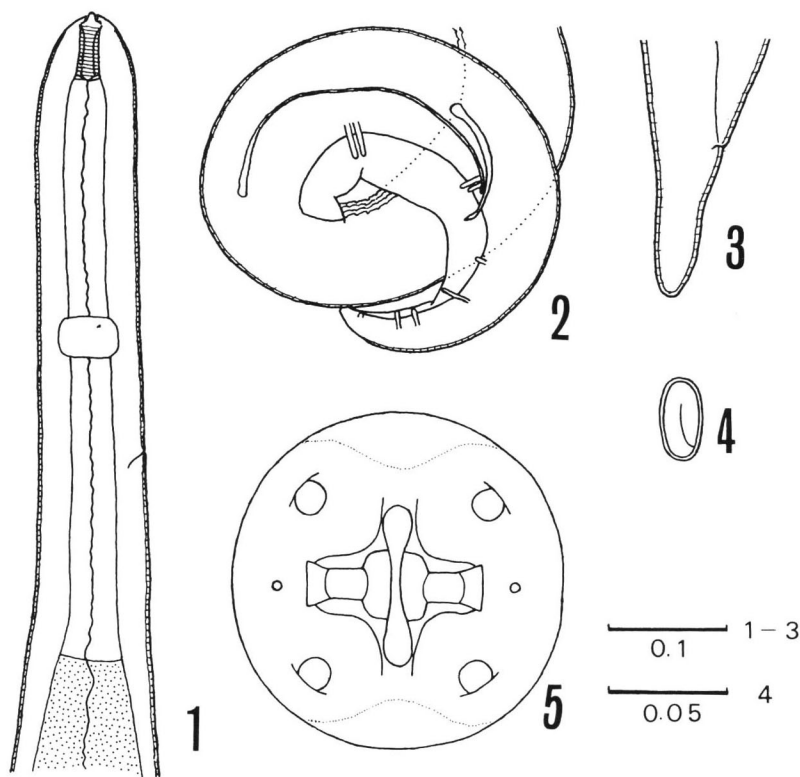
Host. *Coelorhynchus multispinulosus* KATAYAMA, Japanese name "Yari-hige".

Habitat. Intestine.

Locality. Suruga Bay, Japan.

Specimen No. NSMT-As-1424.

Description. Body filiform. Male smaller, spirally coiled posteriorly. Cuticle transversely striated. Mouth dorsoventrally elongate, with three pairs of pseudolabia. Prominent lateral pseudolabium paired, each vertebra-shaped, projecting at the center, and connecting with the lateral wall of vestibule at the inner margin. Submedian (i. e. subdorsal and subventral) pseudolabium two-paired, each triangular, on either side of lateral pseudolabium. Two amphids and four cephalic papillae just behind lateral and submedian pseudolabia, respectively. Vestibule short and wide, with fine transversally striated wall. Esophagus divided into two portions; the anterior short and muscular, the posterior long and glandular. Nerve ring at equator of muscular esophagus. Tiny cervical papillae symmetrical, at nerve ring. Excretory pore at some distance



Figs. 1-5. *Neoscarophis yarihige* n. g., n. sp. — 1. Anterior end of male, lateral view. — 2. Posterior end of male, lateral view. — 3. Posterior end of female, lateral view. — 4. Egg. — 5. Apical view of cephalic end (from the scanning electron microscopy). Scales in mm.

posterior to nerve ring.

Male. Body 9.0–11.7 mm long and 0.08–0.11 mm wide. Vestibule 0.033–0.040 mm long and 0.015–0.019 mm wide. Muscular and glandular esophagi 0.43–0.50 mm and 1.66–2.20 mm long, respectively. Cervical papillae, nerve ring and excretory pore at 0.19–0.23 mm, 0.22–0.26 mm and 0.29–0.34 mm from head end, respectively. Caudal alae narrow, several longitudinal striae running on ventral surface anterior to caudal alae. Four pairs of preanal and five pairs of postanal papillae pedunculate, of which the posteriormost pair has short peduncle. Spicules unequal; right spicule stout, 0.09–0.12 mm long and left one slender, 0.24–0.30 mm long. Gubernaculum absent. Tail bluntly pointed, 0.14–0.20 mm long.

Female. Body 13.7–17.6 mm long and 0.16–0.20 mm wide. Vestibule 0.038–0.044 mm long and 0.017–0.021 mm wide. Muscular and glandular esophagi 0.48–0.66 mm and 2.32–2.92 mm long, respectively. Cervical papillae, nerve ring and excretory pore at 0.21–0.26 mm, 0.24–0.29 mm and 0.29–0.36 mm from head end, respec-

tively. Vulva near equator of body, at 7.4–9.2 mm from head end and divided body length in proportion of 1:1–1.17. Anterior ovary extending to posterior third of glandular esophagus and posterior ovary a short distance anterior to anus. Eggs elliptical, containing larva, $0.036\text{--}0.043 \times 0.018\text{--}0.021$ mm, without filaments. Tail bluntly pointed, 0.09–0.14 mm long.

Discussion. The present genus closely resembles *Ascarophis* in general features, especially in the tail structure of the male, but differs from it in the vestibule being short and wide, the vulva lying near the equator of body, and the eggs without filaments. Furthermore, the present genus bears three pairs of pseudolabia which consist of a pair of prominent lateral pseudolabia and two pairs of submedian pseudolabia. In *Ascarophis*, however, there seems to be only a pair of lateral pseudolabia. BAYLIS (1933) mentioned that “lips (=lateral pseudolabia) paired, inconspicuous, each bearing a small, forwardly-directed, conical process” in the description of *A. morrhuae* VAN BENEDEN, 1871, the type-species of the genus *Ascarophis*. RASHEED (1965) also described the same as BAYLIS (1933) and figured the apical view of *A. morrhuae*, where there is only a pair of lateral pseudolabia around the mouth. She stated about the cephalic structure of *Ascarophis* that “mouth dorsoventrally elongated with two lateral pseudolabia, each with a tooth-like thickening or a spine. Vestibule long without ribs or teeth” in the generic diagnosis. DOLLFUS and CAMPANA-ROUGET (1956) illustrated the apical view of three species of *Ascarophis*, *A. crassicollis* DOLLFUS et CAMPANA-ROUGET, 1956, *A. nototheniae* JOHNSTON et MAWSON, 1945, and *A. upeneichthys* JOHNSTON et MAWSON, 1945, in which something like submedian pseudolabia can be seen on either side of the lateral pseudolabia in *A. nototheniae*, but no description was given about it. On the other hand, HOLLOWAY *et al.* (1967) examined *A. nototheniae* and mentioned that “lateral margins of dorsoventrally elongate mouth surrounded by two trilobed lips, each containing a spine. Dorsal and ventral curvature of mouth formed by tooth-like processes.” The cephalic structure of *A. nototheniae* seems to differ between the descriptions by different authors.

Unfortunately, the cephalic structure is not sufficiently clarified in most species of *Ascarophis* and needs a thorough revision. The genus *Ascarophis* may possibly contain different types of cephalic structure.

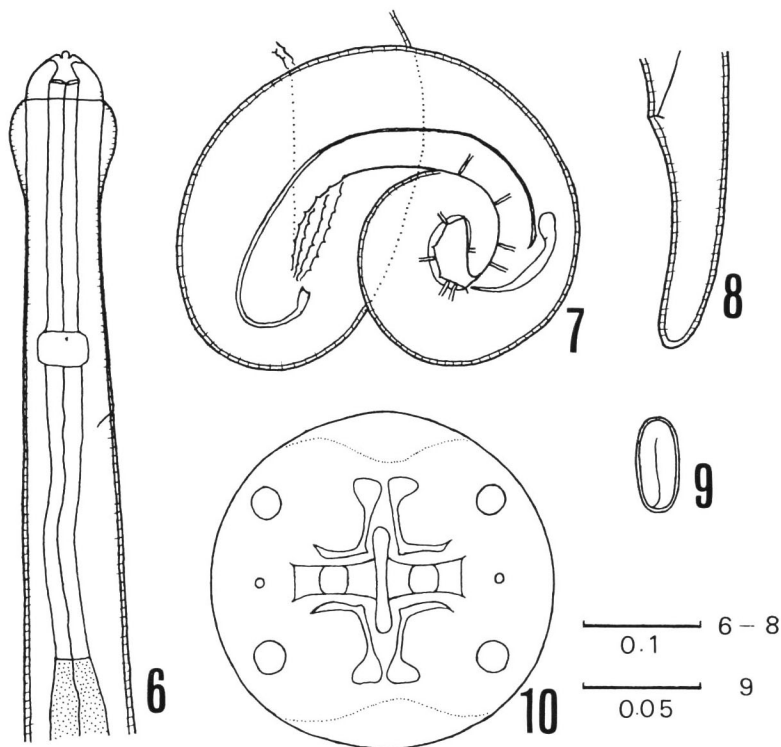
In addition, ZHUKOV (1960) pointed out that *A. upeneichthys* does not belong to the genus *Ascarophis* because it has a short vestibule. The original description of *A. upeneichthys* by JOHNSTON and MAWSON (1945) is defective in some respects, such as the vestibule and esophagus are missing in the male, but this species seems to be characterized by having a short vestibule, the vulva lying near the equator of body, and the eggs without filaments. These features agree with those of the present genus excepting the labial structure that “the anterior end is rounded, bearing two lips, each with a small projection anteriorly” in the original description. *A. upeneichthys* might be transferred to the present genus on further examination.

Neoscarophis bathygadi n. sp.

(Figs. 6-10)

Host. *Bathygadus garretti* GILBERT et HUBBS, Japanese name "Hige-anadara".*Habitat.* Intestine.*Locality.* Suruga Bay, Japan.*Specimen No.* NSMT-As-1425.

Description. Body filiform. Male smaller, spirally coiled posteriorly. Cuticle relatively thick, transversely striated. Mouth dorsoventrally elongate, with three pairs of pseudolabia. Prominent lateral pseudolabium paired, each vertebra-shaped, with papilla-like process at the center, connecting with the lateral wall of vestibule at the inner margin. Submedian (i. e. subdorsal and subventral) pseudolabium two-paired, each triangular with thick edge and denticular process at the apex, on either side of lateral pseudolabium. Two amphids and four cephalic papillae just behind lateral and submedian pseudolabia, respectively. Cephalic collarete saccular, just



Figs. 6-10. *Neoscarophis bathygadi* n. sp. — 6. Anterior end of male, lateral view. — 7. Posterior end of male, lateral view. — 8. Posterior end of female, lateral view. — 9. Egg. — 10. Apical view of cephalic end (from the scanning electron microscopy). Scales in mm.

behind the junction of vestibule with esophagus. Vestibule shallow. Esophagus divided into two portions; the anterior short and muscular, the posterior long and glandular. Nerve ring at equator of muscular esophagus. Tiny cervical papillae symmetrical, at nerve ring. Excretory pore at some distance posterior to nerve ring.

Male. Body 9.8–13.5 mm long and 0.10–0.14 mm wide. Cuticle 6.5–8.0 μ thick. Cephalic collarette arising about 0.04 mm from head end. Vestibule 0.015–0.018 mm long and 0.012–0.015 mm wide. Muscular and glandular esophagi 0.48–0.63 mm and 2.18–2.90 mm long, respectively. Cervical papillae, nerve ring and excretory pore 0.19–0.21 mm, 0.26–0.32 mm and 0.30–0.37 mm from head end, respectively. Caudal alae narrow; several longitudinal striae running on ventral surface anterior to caudal alae. Four pairs of preanal and five pairs of postanal papillae pedunculate, of which the posteriormost pair has short peduncle. Spicules unequal; right spicule stout, 0.10–0.12 mm long and left one slender, 0.42–0.50 mm long. Gubernaculum absent. Tail bluntly pointed, 0.28–0.34 mm long.

Female. Body 14.1–26.7 mm long and 0.14–0.25 mm wide. Cuticle 7–9 μ thick. Cephalic collarette arising about 0.04 mm from head end. Vestibule 0.015–0.020 mm long and 0.013–0.016 mm wide. Muscular and glandular esophagi 0.54–0.71 mm and 2.4–3.7 mm long, respectively. Cervical papillae, nerve ring and excretory pore 0.19–0.30 mm, 0.28–0.35 mm and 0.31–0.33 mm from head end, respectively. Vulva near equator of body, at 7.6–14.0 mm from head end and divided body length in proportion of 1:1–1.17. Anterior ovary extending to near equator of glandular esophagus and posterior ovary some distance anterior to anus. Eggs elliptical, relatively thin-shelled, containing larva, $0.040\text{--}0.050 \times 0.017\text{--}0.020$ mm, without filaments. Tail bluntly pointed, 0.20–0.25 mm long.

Discussion. The present species resembles the preceding *N. yarihige* in having three pairs of pseudolabia around the mouth, but differs from it in bearing more complicated labial structure. *N. bathygadi* has a pair of lateral pseudolabia, each with a clear papilla-like projection at the center and two pairs of thick-framed submedian pseudolabia, each with a denticular process at the apex. Furthermore, the present species possesses a shallow vestibule and a cephalic collarette. In this regard, the present species resembles *Cyclozone acipenserina* DOGIEL, 1932, which was obtained from the sturgeons in the Caspian Sea, but even now opinions are divided as to whether the genus *Cyclozone* is distinct and its systematic position. In *C. acipenserina*, there are two lateral labia around the mouth, the vestibule is inconspicuous and the vulva is situated in the posterior part of the body, whereas in the present species there are three pairs of labia, the vestibule exists and the vulva opens near the equator of body.

Neoscarophis n. g.

Rhabdochoniidae, Ascarophidinae. Body filiform. Cuticle transversely striated. Mouth dorsoventrally elongate, with three pairs of pseudolabia. Prominent lateral pseudolabium paired, each vertebra-shaped, projecting or papilla-like process at the

center, and connecting with the lateral wall of vestibule at the inner margin. Submedian pseudolabium two-paired, each triangular, on both sides of lateral pseudolabium. Two amphids and four cephalic papillae present. Cephalic collarette present or absent. Vestibule short. Esophagus divided into two portions; the anterior short and muscular, the posterior long and glandular. Nerve ring at equator of muscular esophagus. Cervical papillae symmetrical, at nerve ring. Excretory pore at some distance posterior to nerve ring. Male:— Body smaller, spirally coiled posteriorly. Caudal alae narrow; longitudinal striae running on ventral surface anterior to caudal alae. Four pairs of preanal and five pairs of postanal, pedunculate papillae present. Spicules unequal. Gubernaculum absent. Tail bluntly pointed. Female:— Vulva near equator of body. Uteri opposed. Eggs elliptical, embryonated, without filaments. Tail bluntly pointed. Parasitic in intestine of marine teleosts.

Type-species: *Neoscarophis yarihige* n. sp.

References

- BAYLIS, H. A., 1933. The nematode genus *Ascarophis* VAN BENEDEN. *Ann. Mag. nat. Hist.*, (10), 11: 111–117.
- DOLLFUS, R. P., & Y. CAMPANA-ROUGET, 1956. Une nouvelle espèce d'*Ascarophis* (Nematoda, Spirurinae) chez *Gadus luscus* L. Révision du genre. *Ann. Parasit.*, 31: 385–404.
- GORDON, A. R., 1951. On the male of *Ascarophis morrhuae* VAN BENEDEN. *Parasitology*, 4: 261–263.
- HOLLOWAY JR., H. L., H. L. KLEWER & A. HUSAIN, 1967. Notes on the genus *Ascarophis* BENEDEN, 1871, in Antarctic fishes. *Proc. helminth. Soc. Wash.*, 34: 222–227.
- JOHNSTON, T. H., & P. M. MAWSON, 1945. Parasitic nematodes. *B.A.N.Z. Antarctic Research Expedition 1929–1931*, 5: 73–159.
- MACHIDA, M., 1975. Nematodes from the deep-sea fishes of Suruga Bay. I. A new rhabdochonid nematode, *Johnstonmawsonoides nemichthyos* from the nemichthyid fish. *Bull. Natn. Sci. Mus., Tokyo*, (A), 1: 1–4.
- RASHEED, S., 1965. Observations on the spiruroid nematodes of fish with a revision of the genus *Metabronema* YORKE and MAPLESTONE, 1926. *Z. zool. Syst. Evolut.-forsch.*, 3: 359–387.
- SAIDOV, Yu. S., 1953. Revision of family Rhabdochonidae SKRJABIN, 1946, and subfamily Cyclozoninae SOBOLEV, 1949. In *Contributions to Helminthology*. Published to commemorate the 75th birthday of K. I. SKRJABIN. (English edition, 1966; Jerusalem, IPST, 622–635.)
- SKRJABIN, K. I., A. A. SOBOLEV & V. M. IVASHKIN, 1967. Essentials of Nematodology. Vol. 16. Spirurata of animals and man and the diseases caused by them. Part 4. Thelazioidea. (English edition, 1971; Jerusalem, IPST, pp. i–vi + 1–160.)
- YAMAGUTI, S., 1961. *Systema Helminthum*. Vol. 3. The nematodes of vertebrates. 1–917 pp., pls. 1–102. New York, Interscience Publ.
- ZHUKOV, E. V., 1960. Endoparasitic worms of the fishes in the Sea of Japan and South-Kuril shallow waters. *Trud. zool. Inst.*, 28: 3–146. (In Russian, with English summary.)