

***Gymnoamblyopus novaeguineae*, a new genus and species of worm goby from Papua New Guinea (Gobiidae: Amblyopinae)**

EDWARD O. MURDY¹ & CARL J. FERRARIS, JR.²

¹ (EOM) National Science Foundation, 4201 Wilson Blvd., Arlington, Virginia 22230, USA (current address: National Sea Grant Office, 1315 East-West Highway, R/SG, Silver Spring, Maryland 20910, USA)

² (CJF) 2944 NE Couch Street, Portland, OR 97232, USA

Abstract

A new genus and species of worm goby, *Gymnoamblyopus novaeguineae*, is described on the basis of a single specimen from the Fly River, Papua New Guinea. It differs from all other amblyopine gobies by the following combination of characters: only one anal-fin pterygiophore anterior to first hemal spine; no Y-shaped second anal-fin pterygiophore; no chin barbels; no scales; no raised dermal folds or ridges; pleural ribs short and posteriorly directed; and mouth vertical. This new taxon is figured and a key to the “Taenioides” group of the Amblyopinae is provided.

Key words: worm goby, Amblyopinae, Gobiidae, new genus, new species

Introduction

Gobies of the subfamily Amblyopinae are commonly referred to as eel or worm gobies. A worm goby collected in 1987 from the Fly River, Papua New Guinea was figured in Allen (1991: 202, photo 31) as an unidentified species of *Taenioides* and catalogued in the Western Australian Museum (WAM). This specimen was examined and found not to possess the Y-shaped form of the second anal-fin pterygiophore, which is a diagnostic feature of all species of *Taenioides* (Birdsong et al., 1988; Murdy and Randall, 2002). However, this specimen did possess the 3-12210 pterygiophore formula (Birdsong et al., 1988) that is characteristic of the “Taenioides” group of the Amblyopine. We compared the specimen with all remaining genera of the “Taenioides” group (i.e., *Brachyamblyopus*, *Odontamblyopus*, and *Pseudotrypauchen*) and found that the specimen was not assignable to any of these genera or to any other amblyopine genus. Inasmuch as we cannot include this new

Fly River worm goby into any of the existing genera without modifying their diagnoses to an unacceptable degree, we propose a new generic name for this species.

All measurements are straight-line distances made with dial calipers and recorded to the nearest 0.1 millimeter. All fish lengths given are standard lengths (SL) except where noted as total length (TL). Other abbreviations used in the description are: head length (HL), pelvic-fin length (PEL), and pectoral-fin length (PEC). Methods of measurements and counts follow Murdy (1989), and Murdy and Shibukawa (2001).

***Gymnoamblyopus*, new genus**

Diagnosis. An amblyopine goby with a 3-12210 pterygiophore formula, but having only one anal-fin pterygiophore anterior to first hemal spine; no Y-shaped second anal-fin pterygiophore; no chin barbels; no scales; no raised dermal folds or ridges; pleural ribs short and posteriorly directed; and mouth vertical.

Type species. *Gymnoamblyopus novaeguineae* Murdy and Ferraris, new species

Etymology. From *gymnos*, Greek for bare, and *Amblyopus*, the generic name that is the basis of the subfamily name; in reference to the absence of scales on this fish. Gender: masculine.

***Gymnoamblyopus novaeguineae*, new species**

(Fig. 1; Table 1)

Taenioides sp.: Allen 1991:202-203, photo 31.

Holotype: WAM P.29823-001, 99.0 mm SL, female, collected by K. Hortle and A. Maie, 30 July 1987, in the Lower Fly River, Papua New Guinea (8°10'S, 142°10'E).

Diagnosis. As for genus.

Description. Total dorsal-fin elements 33; first and second dorsal fins continuous; first dorsal fin with six flexible spines; all rays of second dorsal fin segmented and branched; dorsal-fin base long and broadly joined with caudal fin. Total anal-fin rays 26, all segmented and branched; anal-fin height approximately equal to second dorsal-fin height; anal-fin membrane broadly joined with caudal fin. Membrane of dorsal and anal fins thick and rubbery. Pectoral fin with 16 rays, fin margin rounded posteriorly, pectoral-fin length 59% of pelvic-fin length; all pectoral-fin rays segmented and most are branched. Pelvic-fin rays I, 5, with well developed frenum and connecting membrane forming cup-shaped disc. Caudal fin slightly longer than head, representing about 16% of total length.

Head depressed with a slightly compressed body. Scales absent from head and body.

Teeth on outermost row of jaws enlarged, sharp and pointed; when mouth closed, outermost teeth interlock. Upper and lower jaws with 2 rows of teeth posterolaterally and 3-4

rows anteromedially. No caninoid teeth internal to symphysis of lower jaw. Outer-row teeth larger than inner row(s); outer row teeth of lower jaw longer than those of upper-jaw; 11 teeth in outer row of upper jaw; 6 teeth in outer row of lower jaw. No palatine or vomerine teeth present.

Mouth large and vertical. Lips fleshy especially at rictus.

Eye rudimentary, but distinct; covered by skin. Posterior naris lateral to, and slightly anterior to, eye. Anterior naris at tip of small flap of skin overhanging upper jaw.

Cephalic sensory canals and pores absent. Mandibular papillae pronounced, other sensory papillae on head difficult to discern. No raised dermal folds or ridges on head. No barbels on ventral surface of head.

Spinous dorsal-fin pterygiophore formula 3-12210. Precaudal vertebrae 10, caudal vertebrae 16. Single anal-fin pterygiophore anterior to first hemal spine. Pleural ribs short and posteriorly directed.



FIGURE 1. Holotype of *Gymnoamblyopus novaeguineae*, WAM P.29823-001, female, 99.0 mm SL, Lower Fly River, Papua New Guinea (image by Sandra J. Raredon).

Measurements are provided in Table 1. Selected proportional measurements are as follows: SL/TL = 0.843; HL/SL = 0.199; PEL/SL = 0.131; PEL/HL = 0.660; PEC/SL = 0.077; PEC/HL = 0.386; PEC/PEL = 0.585; head width/SL = 0.148; snout length/SL = 0.052; jaw length/SL = 0.063; interorbital width/SL = 0.041; nape width/SL = 0.118; body depth/SL = 0.102; predorsal length/SL = 0.301; prepelvic length/SL = 0.246; and preanal length/SL = 0.573.

Coloration. Based on a color photograph in Allen (1991) of the holotype and only specimen after it had been preserved, anteriorly yellowish brown grading to tannish brown posteriorly. Whitish on the ventral portion of opercle. No markings, bars, or spots on head or body.

Distribution. Type and only known locality is the Lower Fly River, Papua New Guinea. Holotype was collected near Burei Junction approximately 200 km upstream from the Fly River mouth (Allen, 1991). According to Allen (1991), the water in this part of the river is tidally influenced but fresh.

Etymology. The specific name, *novaeguineae*, refers to the type locality of this species, the island of New Guinea and is treated as a noun in apposition.

TABLE 1. Measurements of *Gymnoamblyopus novaeguineae*.

Measurement	mm
Standard length	99.0
Total length	117.4
Head length	19.7
Pelvic-fin length	13.0
Pectoral-fin length (R)	7.1
Pectoral-fin length (L)	8.1
Head width	14.7
Snout length	5.1
Jaw length	6.2
Interorbital width	4.1
Nape width	11.7
Body depth	10.1
Predorsal length	29.8
Prepelvic length	24.4
Preanal length	56.7

Comparison of Gymnoamblyopus with other "Taenioides" group genera. *Gymnoamblyopus* is the only member of the "Taenioides" group with a single anal-fin pterygiophore anterior to the first hemal spine; all others have at least two. *Gymnoamblyopus* differs from all "Taenioides" group members, except *Taenioides*, in being devoid of scales.

Gymnoamblyopus differs from *Taenioides* in not possessing barbels on the underside of the head, and in lacking raised dermal folds or ridges on the head and body. *Gymnoamblyopus* also lacks the Y-shaped, second anal-fin pterygiophore of *Taenioides*.

Gymnoamblyopus differs from *Pseudotrypauchen* in having a depressed head and sub-cylindrical body (vs. head and body compressed in *Pseudotrypauchen*), and in having short and rounded pectoral fins (vs. long and pointed in *Pseudotrypauchen*).

Gymnoamblyopus lacks symphyseal canine teeth, which are present in *Odontamblyopus*, and has short rounded pectoral fins with branched rays, rather than large rounded pectoral fins with free rays.

Gymnoamblyopus differs from *Brachyamblyopus* in having a vertical mouth (vs. oblique in *Brachyamblyopus*) and short, posteriorly-directed pleural ribs (vs. well-developed, ventroposteriorly-directed pleural ribs in *Brachyamblyopus*).

Key to the genera of the “Taenioides” group

(modified from Larson and Murdy, 2002)

- 1a. Head and body naked 2
- 1b. Cycloid scales on head and body (sometimes difficult to discern without magnification) 3
- 2a. Head and body with raised dermal folds or ridges; ventral surface of lower jaw usually with three pairs of long, fleshy barbels *Taenioides*
- 2b. Head without distinct raised dermal folds or ridges; head without barbels *Gymnoamblyopus*, new genus
- 3a. Most pectoral-fin rays simple, free from fin membrane; pectoral-fin rays 20-65, usually more than 23 4
- 3b. Most pectoral-fin rays branched, not forming free rays; pectoral-fin rays 23 or fewer ..
..... *Brachyamblyopus*
- 4a. Head and body subcylindrical (slightly compressed posteriorly), greatly elongate, body depth less than 10% of SL; teeth in outermost row of jaws enlarged, fang-like; a pair of symphyisial canines on lower jaw; scales minute, typically smaller than eye diameter (except for those on posterior half of body)..... *Odontamblyopus*
- 4b. Head and body compressed, rather short, body depth 14.1-16.0 % of SL; teeth in outermost row of jaws close-set, flattened, not fang-like; no symphyisial canine teeth on lower jaw; scales large, distinctly larger than eye diameter..... *Pseudotrypauchen*

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References

- Allen, G.R. (1991) *Field guide to the freshwater fishes of New Guinea*. Christensen Research Institute, Madang, Papua New Guinea, 268 pp.
- Birdsong, R.S., Murdy, E.O. & Pezold, F.L. (1988) A study of the vertebral column and median fin osteology in gobioid fishes with comments on gobioid relationships. *Bulletin of Marine Science*, 42, 174-215.
- Larson, H.L. & Murdy, E.O. (2002) FAO species identification sheets for the western central Pacific. Volume 6: Families Gobiidae and Eleotridae - family accounts, species lists and keys to genera. pp. 3574-3603.
- Murdy, E.O. (1989) A taxonomic revision and cladistic analysis of the oxudercine gobies (Gobiidae: Oxudercinae). *Records of the Australian Museum*, Supplement 11, 1-93.
- Murdy, E.O. & Randall, J.R. (2002) *Taenioides kentalleni*, a new species of eel goby from Saudi Arabia (Gobiidae: Amblyopinae). *Zootaxa*, 93, 1-6.

Murdy, E.O. & Shibukawa, K. (2001) A revision of the gobiid fish genus *Odontamblyopus* (Gobiidae: Amblyopinae). *Ichthyological Research*, 48(1), 31-43.