



## A new wriggler of Eleotrid (Teleostei: Xenisthmidae) from Taiwan

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### Abstract

A new wriggler of genus *Xenisthmus* was collected from Taitung and Pingtung Counties, Taiwan, while using SCUBA diving of coral reef fish survey. The new species, *Xenisthmus nigrolateralis*, can be well distinguished from other congeners by the following unique combination of features: (1) fins: second dorsal fin rays I/13; anal fin rays I/13; pectoral fin rays 16; (2) squamation: longitudinal scale series 68–70; peridorsal scales 23; (3) vertebral count 10+16=26; (4) preopercular canal present with rather more, 5 pores  $\gamma_1$ ,  $\gamma$ ,  $\delta$ ,  $\epsilon$ , and  $\epsilon_1$  and (5) specific colouration: lateral side with broad, deep brown stripe from rear of lateral gill opening to caudal fin base, and caudal fin with median blackish brown mark, and upper and lower regions translucent, the base with a vertical black bar. The comparison of other congeners would be also discussed in this paper.

**Key words:** *Xenisthmus*, new species, marine sleeper, fish fauna, Taiwan

### Introduction

The genus *Xenisthmus* Snyder, 1908 is one of the six genera in the Indo-Pacific gobioid family Xenisthmidae (Gill & Hoese 2004; Gill *et al.* 2017).

So far, the Xenisthmidae comprises 12 nominal species in the Indo-Pacific: *Xenisthmus polyzonatus* (Klunzinger, 1871), *Heteroleotris clara* Jordan & Seale, 1906, *Xenisthmus proriger* Snyder, 1908, *Genimentum penicillum* Whitely, 1933, *Luzoneleotris nasubua* Heere, 1938, *Xenisthmus africanus* Smith, 1958, *Kramericus chapmani* Schultz in Schultz *et al.*, 1966, *Xenisthmus balius* Gill & Randall, 1994, *Xenisthmus chi* Gill & Hoese, 2004, *Xenisthmus erospilus* Gill & Hoese, 2004, *Xenisthmus semicintus* Gill & Hoese, 2004, and more recently published, *Xenisthmus oligoporus* Gill *et al.*, 2017 (Gill & Hoese 2004; Gill *et al.* 2017).

*Xenisthmus polyzonatus* is the only species of Xenisthmidae formally recorded in Taiwanese waters (Shao 2022). The fish is a benthic inshore species inhabiting on the sandy fringe of coral reefs. Although the genus *Xenisthmus* is rather rare and needs to do more intensive survey to gather real species diversity for reviewing all members in Taiwan. Some undescribed species are still slowly turned to light by our recent SCUBA diving fish collections of coastal, benthic gobioid fish fauna around Taiwan. Among them, our fish collections which in having more than two undescribed species of the genus that still need to survey (Chen, unpublished data).

The aim of this paper is that we would like to document the new discovery of two rather unusual specimens with good preserved quality and then describe a new wriggler species of *Xenisthmus* from Taiwanese waters. The morphological comparison of related species of congeners is also addressed.

## Materials and methods

Type specimens of the new wriggler were collected by us using hand-net during SCUBA diving. All counts and measurements were made from fish specimens preserved in 70% ethanol.

Morphometric methods follow Miller (1988) and meristic methods follow Akihito *et al.* (1984), and Chen & Fang (2006). Terminology of the cephalic sensory canals and free neuromast organs (sensory papillae) is from Wongrat & Miller (1991), based on Sanzo (1911). Meristic abbreviations are as follows: A = anal fin; C = caudal fin; D1 = first dorsal fin; D2 = second dorsal fin; LR = longitudinal scale series; P = pelvic fin; PreD = predorsal scale series; SDP = scale series from origin of first dorsal fin to upper pectoral fin origin; TR = transverse scale series from second dorsal to anal fin; V = pelvic fin; VC = vertebral count. All fish lengths are expressed by standard length (SL).

The type specimens are deposited at Pisces collection of National Taiwan Ocean University, Keelung (NTOUP).

## Taxonomy

### *Xenisthmus nigrolateralis* n. sp.

(Figures 1, 2)

**Holotype.**- NTOUP-2022-01-205, 27.7 mm SL, 5-8 m depth, Jan. 21, 2022; coll. IS Chen, T. Harefa & D.Y. Hong; Wanglitung, Henchuen township, Pingtung County, Taiwan, ROC.

**Paratype.**- NTOUP-2022-01-206, 18.2 mm SL, 5-10 m depth, Dec. 21, 2021; coll. IS Chen, T. Harefa & D.Y. Hong; Jihwei, Chengkong township, Taitung County, Taiwan, ROC.

## Diagnosis

The new species can be well distinguished from other congeners by the following unique combination of features: (1) fins: second dorsal fin rays I/13; anal fin rays I/13; pectoral fin rays 16; (2) squamation: longitudinal scale series 68-70; predorsal scales 23; (3) vertebral count 10+16=26; (4) preopercular canal present with rather more, 5 pores  $\gamma_1$ ,  $\gamma$ ,  $\delta$ ,  $\epsilon$ , and  $\epsilon_1$ ; and (5) specific colouration: lateral side of trunk with broad, deep brown stripe from rear of lateral gill opening to caudal fin base. The dorsal profile of the lateral, broad deep brown stripe with waving margin. Caudal with median blackish brown mark, and outer region translucent. Caudal fin base with a vertical black bar.

## Description.

Body very slender, subcylindrical anteriorly and somewhat compressed posteriorly. Anterior head somewhat depressed.

All following body proportions were measured from adult holotype. Head length 20.6%; snout to 1st dorsal origin 31.7%; snout to 2nd dorsal origin 49.9%; snout to anus 51.0%; snout to anal fin origin 54.3%; prepelvic length 18.8%; caudal peduncle length 9.5%; caudal peduncle depth 8.9%; first dorsal fin base 11.4%; second dorsal fin base 40.8%; anal fin base 34.2%; caudal fin length 18.6%; pectoral fin length 17.0%; pelvic fin length 13.4%; body depth of pelvic fin origin 11.9%; body depth of anal fin origin 11.6%; body width of anal fin origin 10.9%; and pelvic fin origin to anus 30.6% as all above percentage are in standard length (SL).

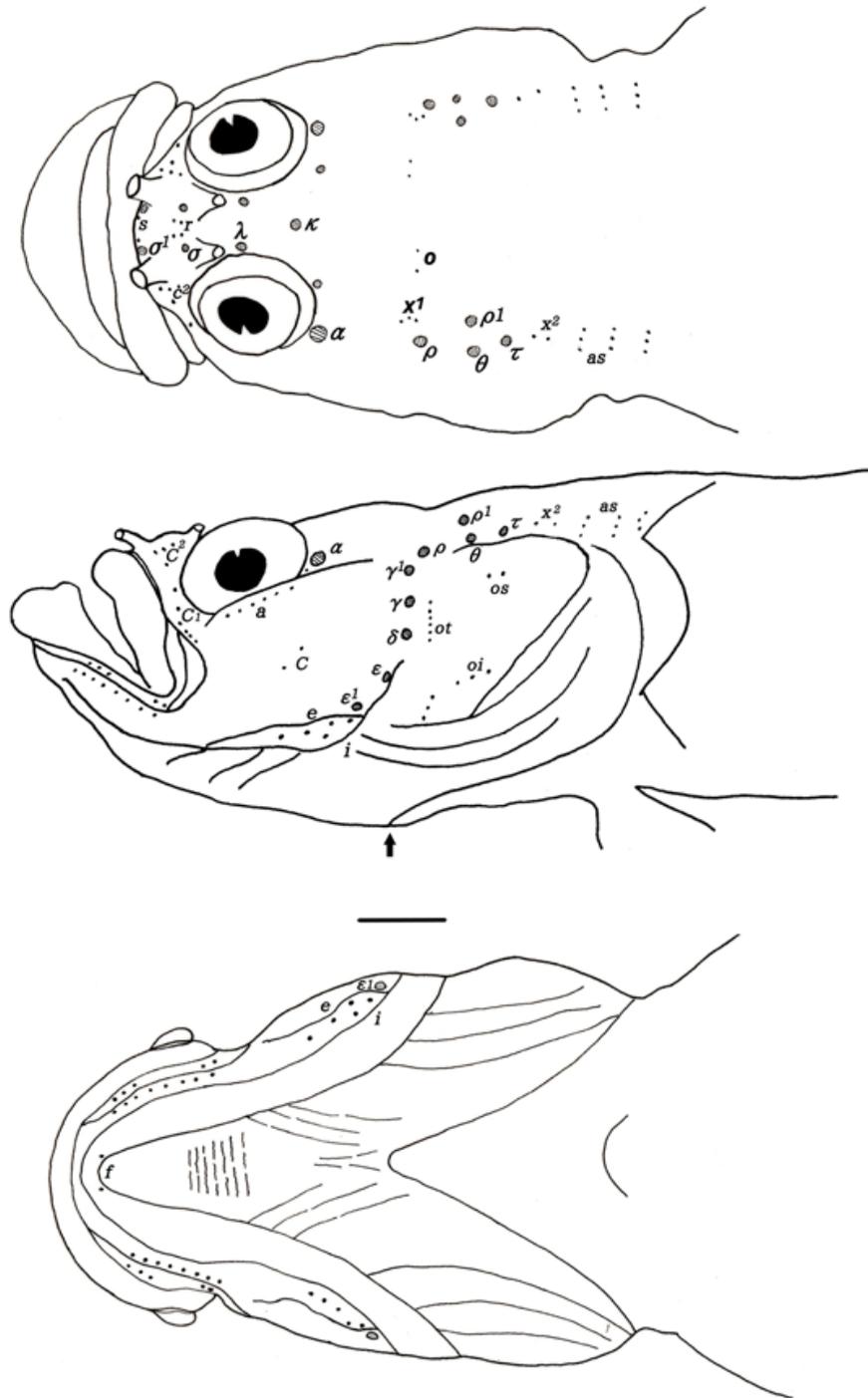
Snout length 12.9%; eye diameter 24.8%; postorbital length 55.9%; cheek depth 16.4%; head width in upper gill opening 53.0%; head width in maximum 78.5%; fleshy interorbital width 19.9%; bony interorbital width 5.8%; and lower jaw length 31.6% as all above percentage in head length (HL).

Head with very narrow interorbital region. Eye large. Lower jaw more prominent. Both anterior and posterior nostrils as short tubes which pointed to opposite direction on dorsal view. Both jaws with 5-6 rows of small, conical teeth which largest in outer rows. Gill-opening rather large, extending ventrally beyond the rear vertical of preopercle. Vertebral count 10+16 = 26 (n=2).

**Fins.**- D1 VI, D2 I/13; AI/13; P 16; VI/5+I/5. All D1 rays about equal without any filamentous ray. D2 rays low with rather long fin base. The rear tips of D2 rays when depressed extending beyond procurrent rays of C. Origin of A inserted below middle vertical between first and second branched rays of D2. P moderate large and oblong,

its rear tip near reaching vertical line through anus in male. V well separate, no frenum, connecting membrane. C elliptical, rear edge rounded.

**Scales.-** Body mostly with rather small cycloid scales, predorsal area scaled. Upper part of operculum scaled. Cycloid scales present on pectoral-fin base. LR 68-70; TR 22; PreD 23; and SDP 11. Prepelvic region naked.



**FIGURE 1.** Head lateral-line system of *Xenisthmus nigrolateralis* n. sp., holotype, 27.7 mm SL, Kengting, Henchuen, Pingtung County, Taiwan, ROC. (bar = 1 mm; arrow shows the ventral extension of gill-opening)

## Head lateral-line system. (Figure 1)

**Canals:** Nasal extension of anterior oculoscapular canal with terminal pore  $\sigma$  located in between anterior and posterior tube-like nostrils. Anterior interorbital sections of oculoscapular canal with paired pore  $\lambda$ . A single pore  $\kappa$  in near rear of interorbital region. Pore  $\omega$  present behind orbit. Lateral section of oculoscapular canal with lateral pore  $\alpha$ ,  $\rho$ ,  $\theta$ , and  $\tau$ . Upper extension of oculoscapular canal as pore  $\rho 1$ . Preopercular canal with rather more, 5 pores  $\gamma 1$ ,  $\gamma$ ,  $\delta$ ,  $\varepsilon$ , and  $\varepsilon 1$ .

**Sensory papillae:** Row *a* extending beyond vertical midline of orbit. Rows *c* short. A single *cp* papilla. Row *f* paired. Anterior edge of row *oi* well separated to lower region of row *ot*. Row *ot* interrupted with 2 sections

## Colouration while fresh

Body with light brown to yellowish brown; lateral side of trunk with very broad, deep brown stripe from rear of lateral gill opening to caudal fin base. The dorsal profile of the lateral, broad deep brown stripe with waving margin. Head lateral region with deep brown to pale brown background, a densely deeper blackish brown bar crossing orbit to opercle. Opercle with deep brown mark. Dorsum of head with light brown to yellowish brown. Both lips and anterior chin deep brown. Ventral head mostly light brown.

First dorsal fin translucent with median brownish red spots on spinous rays. Second dorsal fin translucent with similar brownish red spots on the rays. Pectoral fin translucent with a blackish brown curve on fin base. Pelvic fin translucent. Anal fin translucent with basal brownish red spots or bars on the rays. Caudal fin with median blackish brown mark, and upper and lower regions translucent. Two series of brownish red spots on basal half region. Caudal fin base with a vertically black bar.

## Colouration in preservative.

Similar to live coloration, but the brilliant, conspicuous reddish brown spots on both dorsal fins faded. Some darker regions less distinct.



**FIGURE 2.** *Xenisthmus nigrolateralis* n. sp., holotype, 27.7 mm SL, Kengting, Hengchuen, Pingtung County, Taiwan, ROC.

**Etymology.**- The specific name, *nigrolateralis*, is referred to the unique feature of its specific, lateral colouration pattern: deep black (Latin: *niger*), broad stripe (Latin: *lateralis*) on lateral body among all remaining congeners.

**Distribution.**- So far, the new species merely can be founded from two main localities of Taiwan: about 6 m depth of sandy substratum of Wanglitung, Hengchuen, Pingtung County, and about 8 m depth of sandy substratum of Jihwei, Chengkong, Taitung County, Taiwan, ROC. It is rather rare only these 2 specimens founded in Taiwan.

## Remarks

The new species, *Xenisthmus nigrolateralis*, is more similar to the Indian Ocean species: *Xenisthmus africanus* by overall colouration than any other nominal congeneric species in the Indo-Pacific region. However, this new species can be well distinguished from the close related species *Xenisthmus africanus* by the following morphological features: (1) fin ray counts: second dorsal fin rays I/13 (vs I/12), anal fin rays I/13 (vs. I/11), pectoral fin rays 16 (vs. 15); (2) scale counts: longitudinal scale rows 68-70 (vs. 60); (3) specific colouration: entire 2/3 lateral, broad blackish brown stripe (vs. a rather thin dark brown red bar along the trunk with some dark blotches).

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