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A new species of the worm-eel genus *Neenchelys* (Anguilliformes: Ophichthidae) from southern Taiwan

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Abstract

A new ophichthid worm-eel, *Neenchelys gracilis* **sp. nov.**, is described from a specimen collected from southwestern Taiwan. It differs from its congeners by having: a minute pectoral fin, many filamentous cirri on the anterior nostril rim; a very slender body; a very small gill opening; and a vertebral formula of 30-78-200.

Key words: Pisces, Anguilliformes, Ophichthidae, Myrophinae, Taiwan

Introduction

Ho *et al.* (2013) recognized nine species in their revision of the worm eel genus *Neenchelys*. Six of them were found in Taiwanese waters. They also predicted that the diversity of *Neenchelys* may be higher. However, their three new species are not available (Tashiro *et al.*, 2015) and a renaming action is provided in the present issue (Ho *et al.*, 2015).

In a recent visit to the fish landing at Dong-gang, southwestern Taiwan, the senior author discovered a very slender specimen of a *Neenchelys* that has two preopercular pores and its posterior nostril within an elongate slit in its upper lip. The specimen has several unique characters that separate it from all of its congeners. It is described herein as a new species of *Neenchelys*.

Method and material

Methods for taking morphometric measurements and meristics follow Ho *et al.* (2013). The type specimen is deposited at the Pisces Collection of National Museum of Marine Biology & Aquarium (NMMB-P). Materials examined and data for comparison are those listed in Ho *et al.* (2013).

Results

Neenchelys gracilis sp. nov.

New English name: Fringe-nose worm-eel
Figures 1A–B, 2A–B; Tables 1

Holotype. NMMB-P 22195, 429 mm TL, off Dong-gang, Pingtung, S Taiwan, N South China Sea, *ca*. 400 m depth, 1 Nov. 2014.

Diagnosis. A species of *Neenchelys* with a minute pectoral fin, many filamentous cirri on anterior nostril rim, and a very small gill opening (3.8% HL). It can be further distinguished by the following combination of

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characters: body depth 4.7 times in HL, 77 in TL; dorsal-fin origin in anterior 1/3 of trunk, 1.7 times HL behind gill opening; predorsal length 6.0 in TL; head relatively short, 16.2 in TL; trunk 3.1 in TL; tail long, 1.6 in TL; pectoral fin a minute flap with some visible rays. Total vertebrae 200; VF 30-78-200. Cephalic lateral-line pores 11; predorsal pores 33; preanal pores 78; total pores 169, the last 1.5 times HL before tail tip.

TABLE 1. Selected characters/data of *Neenchelys graclilis* **sp. nov.** compared with those of similar congeners. GO-D=gill opening to dorsal-fin origin. LL=lateral line. TL=total length. Data source: Ho *et al*. (2013) and present study.

	N. gracilis sp. nov.	*N. mccoskeri*	*N. daedalus*	*N. similis*
Pectoral fin	Minute	Minute	Large	Large
On anterior nostril rim	Many cirri	1 pointed flap	None	None
Body depth at anus in TL	77	31–87	46–52	43–48
GO-D distance in trunk length	3.1	1.9–2.3	2.2–2.5	2.7–3.2
Tail length in TL	1.6	1.6–1.8	1.3–1.4	1.4
Mean vertebral formula	30-78-200	37-65-179	31-58-230	34-68-262
Total vertebrae	200	172–184	225–235	251–274
Cephalic LL pores	10	9–11	14	15–16
Preanal LL pores	77	62–69	--	70–71

Description. Morphometric data of the holotype (in mm): total length 429; head length 26.5; predorsal length 71; preanal length 165; trunk length 138.5; tail length 264; depth at gill opening 5.6; width at gill opening 4.5; depth at mid-anus 5.6; width at mid-anus 4.9; eye diameter 1.4; interorbital width 2.6; snout length 4.2; rictus 8.7; postorbital length 21.7; gill opening 1.0; interbranchial width 2.6.

Head relatively short, 16.2 times in TL; origin of dorsal fin about 1.7 HL behind a vertical through gill opening; predorsal length 6.0 in TL; trunk long, its length 3.1 in TL; anus at anterior 1/3 of body length; origin of anal fin immediately behind anus, preanal length 2.6 in TL; tail long, tail length 1.6 in TL.

Body slender, trunk somewhat cylindrical, becoming gradually compressed in posterior tail region; body width at anus 5.4 in HL; body depth relatively uniform, depth at anus 4.7 in HL, tapering gradually to tip of tail; depth of head equal to depth of body, 4.7 in HL. Dorsal and anal fins low and fleshy, continuous with a small but distinct rayed caudal fin. Pectoral fin a minute transparent flap above upper corner of gill opening, with several rays separated distally under microscopic magnification.

Head slender in profile; snout acute anteriorly and broad dorsally, snout length 6.3 in HL; tip of snout projecting well beyond lower jaw; eye small, covered by a thick and semitransparent membrane; orbital width 18.9 in HL; interorbital space broad, slightly elevated, its width 10.2 in HL; postorbital space very wide, its width 1.2 in HL. Anterior nostrils tubular, directed ventrally, with many filamentous cirri on its rim. Posterior nostril before lower margin of eye, opening directed ventrally, appearing in lateral aspect as a diagonal slit, the posterior end of which is highest. A flesh fold between nostrils. Behind, below, and paralleling the nostril is a shallow groove that is longer than the nasal slit. Lower jaw included, its tip reaching a line drawn between posterior margins of anterior nostrils. Angle of gape about 1.5 eye diameter behind a vertical through posterior margin of pigmented eyeball; rictus length 3.0 in HL. Tongue well-attached to mouth floor. Gill opening very small, a narrow curved slit forming a triangular pale space, its height 26.5 in HL.

Head and lateral-line pores large (Fig. 2A). Single median interorbital pores; supraorbital pores 1+4; infraorbital pores 4+1 (2 pores between anterior and posterior nostrils); mandibular pores 5; preopercular pores 2; supratemporal pores 3. Lateral line incomplete, extending posteriorly to about 1.5 HL before tail tip. Cephalic lateral-line pores 11; predorsal pores 33; preanal pores 78 and total pores 169.

Teeth (Figs. 2B) slender, pointed, tips directed backward, anterior few teeth in each series longest. Intermaxillary teeth 5, not well-separated from those on vomer; vomerine teeth 7, uniserial, terminating at about middle of maxillary tooth row; maxillary with 13 or 14 teeth, uniserial, terminating at gape; dentary with 21 (right side)/ 22 teeth (left side, partly damaged), uniserial, terminating opposite end of maxillary tooth row.

Coloration. When fresh (Fig. 1), body uniformly brownish gray, medium fins pale anteriorly with about 1 HL of posteiror portion black, a small triangular pale patch on gill opening region. Coloration in preservative similar to that when fresh.

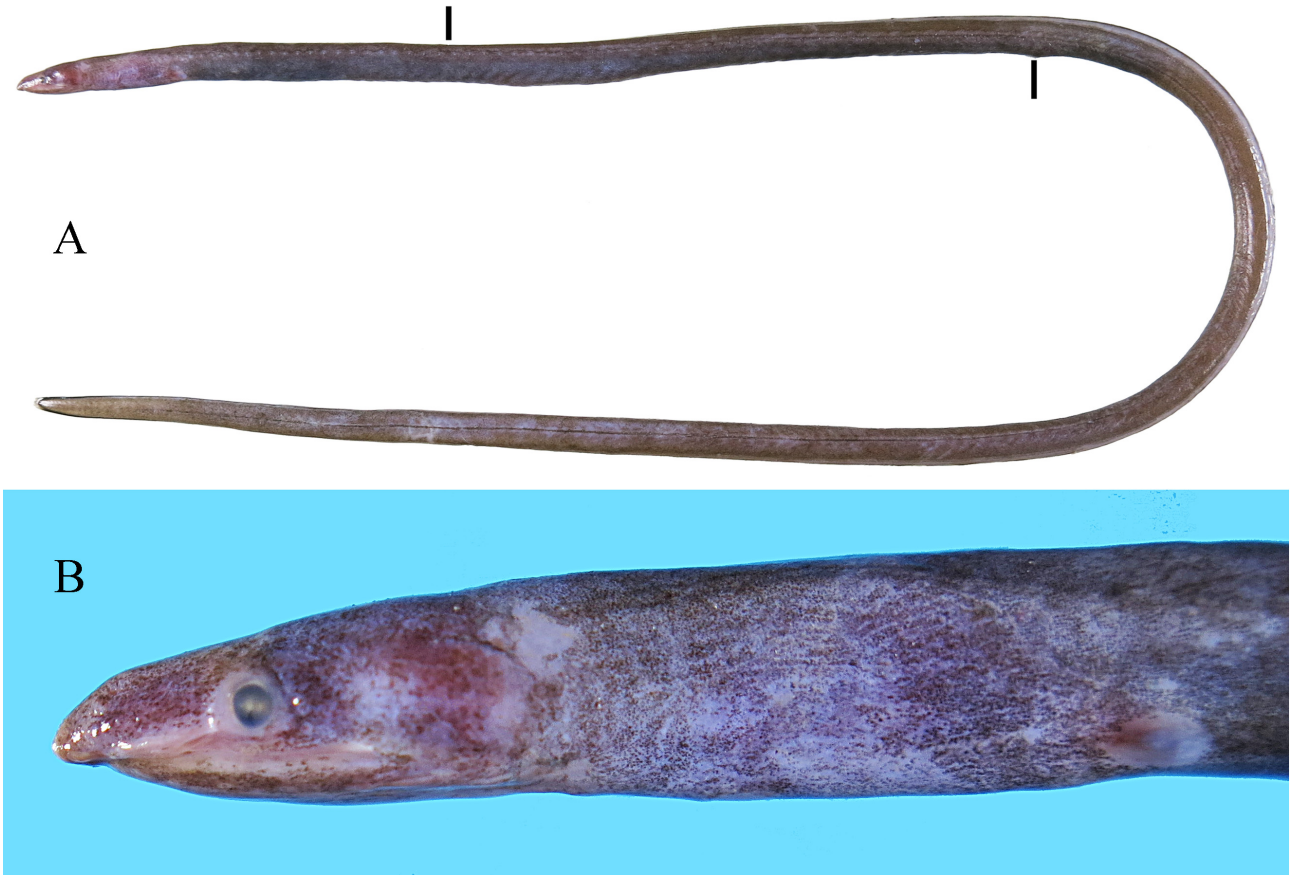

FIGURE 1. *Neenchelys gracilis* **sp. nov.**, holotype, NMMB-P22195, 429 mm TL, fresh. A. Lateral view of whole fish. Bars indicate the locality of the dorsal-fin origin (left) and the anus (right). B. Left lateral view of head.

Etymology. The specific name *gracilis* means slender or slim, in reference to its very slim body.

Distribution and habitat. Known only from the holotype from Dong-gang, southern Taiwan, collected at approximately 400 meters. It was collected by fishery otter trawl in the same haul with many macrourids, ophidiids, deep-sea shrimps and other demersal fishes that would suggest a benthic habitat for this species.

Remarks. *Neenchelys gracilis* represents the fourth species in the genus with a minute membranous pectoral fin above the upper corner of the gill opening (presuming that *N. parvipectoralis* Chu, Wu & Jin, 1981 is distinct from *N. microtretus* Bamber, 1915). It is most similar to the recently described species, *N. mccoskeri* Hibino, Ho & Kimura, 2012, which co-occurs in Taiwan, in having a relatively slender body and in its coloration. It can be readily distinguished from *N. mccoskeri* by having many filamentous cirri on anterior nostril rim (vs. 1 fleshy cirrus on the outer margin of its anterior nostril rim), a more slender and slim (body depth at anus 4.7 vs. 2.0–3.4 in HL, width at anus 5.4 vs. 2.6–4.2 in HL), a smaller head (6.2% vs. 6.4–7.7% SL), its dorsal-fin origin at the anterior one-third of its trunk (vs. about mid-trunk), a slightly narrower interorbital space (9.8% vs. 10.4–16.2% HL), and a different mean vertebral formula (30-78-200 vs. 37-65-180).

Neenchelys gracilis can be separated from its other congeners with minute pectoral fins, *N. parvipectoralis* and *N. microtretus*, by having a more slender body and more total vertebrae (200, vs. 151 in *N. microtretus* and 138–148 in *N. parvipectoralis*).

Neenchelys gracilis is also similar to two other elongate species, *N. daedalus* McCosker, 1982 and *N. similis* Ho, McCosker & Smith, 2015, but differs in its minute pectoral fin (vs. well-developed and longer than snout), the cirri on anterior nostril rim (vs. cirri absent) and fewer total vertebrae (200 vs. 225–235 in *N. daedalus* and 251–274 in *N. similis*).

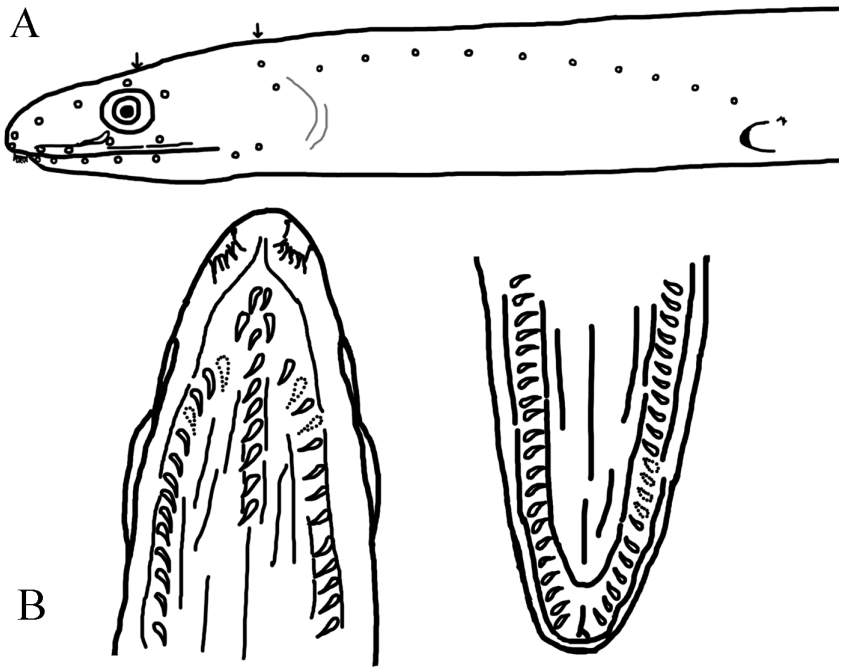

FIGURE 2. *Neenchelys gracilis* **sp. nov.**, from the holotype. A. Lateral view of head shows the arrangement of head pores. Arrows indicate the interorbital pore (left) and medial supratemporal pores. B. Ventral view of upper jaw (left) and dorsal view of low jaw (right) show the arrangements of the jaw teeth.

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