

A new record of *Cataetyx lepidogenys* (Smith & Radcliffe, 1913) (Bythitidae: Bythitinae) from Taiwan

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Abstract

This study reports a new record species *Cataetyx lepidogenys* (Smith & Radcliffe, 1913), a cusk eel belonging to the viviparous brotulas (Bythitidae). Two specimens were collected from off Dong-gang, southwestern Taiwan which fills the gap of the distribution pattern between Japan and the Philippines in the north western Pacific Ocean.

Key words: Teleostei, Bythitidae, taxonomy, new record, Taiwan

Introduction

The viviparous brotulas (Ophidiiformes: Bythitidae) currently comprises 32 genera and 116 species that shares the following characters: squamation on body and head variable, present and imbricate in most genera but absent in a few; males with copulatory organ, with a penis-like structure more or less merged into a fleshy hood in front of the anal fin origin; no bony pseudoclaspers; caudal fin fused with

dorsal and anal fin or rarely free; first anal fin pterygiophore not extended; vertebrae 34–117, dorsal-fin rays 47–192, anal-fin rays 31–137, pectoral-fin rays 9–32, pelvic-fin rays 0–1 (Møller et al., 2016). Members of Bythitidae inhabit in the deep sea as well as in warm, tropical reefs, and feed on small fishes or invertebrates.

The bythitid genus *Cataetyx* is one of the most specious genera characterized by scales present on body and head; lateral ethmoid bone variously developed in front

of or below eye; palatine teeth present; developed rakers on first arch 3; male intromittent organ on a broad, fleshy pad or stalk; pelvic fins with 1 short ray in each. Eleven species were recognized circumglobally in the temperate to tropical seas and most are trawled on continental slopes; pectoral-fin rays 22-32; precaudal vertebrae 13-16 (Nielsen and Cohen in Nielsen et al., 1999).

In Taiwan, Shen (1984) recorded 7 genera and 9 species in Ophidiidae and Chen & Yu (1986) recorded 11 genera and 16 species in Ophidiidae and Carapidae. Chen and Shao (1990) revised the ophidiids in Taiwan and recognized 10 species. Three of them belong to Bythitidae. Shen et al. (1993) included 3 families, 3 genera and 18 species in Ophidiiformes, with 4 species in Bythitidae. Shen & Wu (2011) raised the total number to 3 families, 16 genera and 35 species, of which, 4 species belong to Bythitidae. Currently, the Fish Database of Taiwan (Shao, 2016) recorded 4 families and 48 species in Taiwan, including 8 species in Bythitidae.

Recently a male and female bythitids were collected from the landing ground in the southwestern Taiwan. The specimens were collected by bottom trawl at depth 200-300 meters together with many demersal fishes and identified as *Cataetyx lepidogenys* (Smith & Radcliffe, 1913),

which represents the first record of Taiwan. This species is known from Japan and the Philippines and our specimens fill the gap of its distribution in the northwestern Pacific Ocean. It is the purpose to document this species into the ichthyofauna of Taiwan.

Materials and methods

Standard length (SL) is measured from tip of snout to end of hypural plate (caudal fin base). Head length is measured from the tip of snout to posterior margin of opercle; body depth is measured from the deepest portion of body, not including the fins; snout length is measured from the tip of snout to anterior margin of eye; eye diameter is the horizontal width of the eye; interorbital width is the narrowest distance of upper margins of eyes; upper jaw is measure from the tip of snout to posterior margin of maxilla; pectoral-fin length is measured from the upper base to tip of the fin; pelvic-fin length is measured from the base to the tip. Bases of dorsal and anal fins are measured from their origin to the end; predorsal and preanal lengths are measured from the tip of snout to their origins, respectively. Specimens are deposited at Pisces Collection, National Museum of Marine Biology & Aquarium, Pingtung, Taiwan (NMMB-P). Data for comparison are taken from Smith and Radcliffe (1913) and Arai (1969).

Results

Cataetyx Günther, 1887

Cataetyx lepidogenys (Smith & Radcliffe, 1913)

麗頰低鰨魚

Figures 1-2; Table 1

Bythites lepidogenys Smith & Radcliffe in Radcliffe, 1913:172, pl. 16, fig. 3 (type locality: East of Masbate Island, 12°25'18"N, 123°37'15"E, the Philippines, Albatross station 5214, depth 218 fathoms). Nielsen in Carpenter and Niem, 1999:1984.

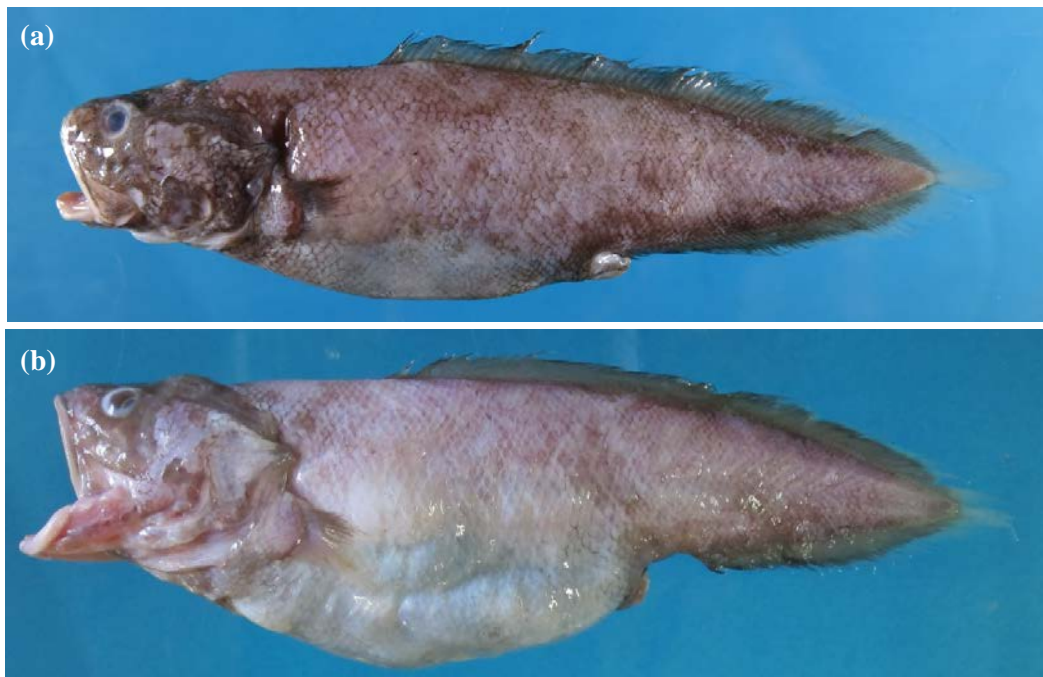


Fig. 1. *Cataetyx lepidogenys* (Smith & Radcliffe, 1913). (a) NMMB-P24343, male, 125.8 mm SL; (b) NMMB-P24344, Female, 127.6 mm SL.

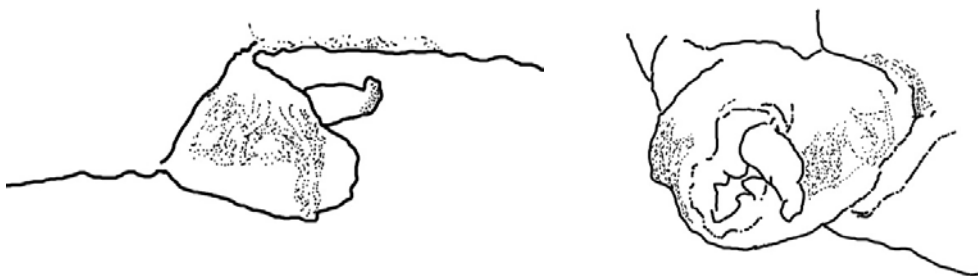


Fig. 2. Copulatory organ of *Cataetyx lepidogenys* (Smith & Radcliffe, 1913), NMMB-P24343, 125.8 mm SL. (a) lateral view; (b) ventral view.

Table 1. Meristic and morphometric data of *Cataetys lepidogenys*. Data of types adapted from Smith and Radcliffe (1913) and Arai (1969).

	NMMB-P 24343	NMMB-P 24344	USNM 74152	" <i>B. matsubarae</i> "
	Male	Female	Holotype	Types
SL (mm)	125.8	127.6	79	96-134 (n=4)
Meristics				
Dorsal-fin rays	79	75	76	77-81
Anal-fin rays	54	52	52	51-56
Abdominal vertebrae	15	16	-	-
Caudal vertebrae	30	28	-	-
Total vertebrae	45	44	-	45
Pectoral-fin rays	24	21	20	23-24
Caudal-fin rays	11	10	11	10
Morphometrics				
%SL				
Head length	25.8	27.9	28.5	26.3-29.1
Body depth	25.1	28.9	24.0	24.6-30.1
Predorsal length	34.9	34.3	35.5	34.1-37.3
Preanal length	61.3	63.1	59.5	55.2-62.9
Pectoral-fin length	14.9	13.7	16.7	13.7-18.1
Pelvic-fin length	11.0	10.9	13.9	10.3-12.6
Dorsal-fin base	67.0	65.9	-	-
Anal-fin base	41.5	37.9	-	-
%HL				
Eye diameter	15.7	16.1	16.7	14.0-16.1
Interorbital width	27.5	25.6	24.4	28.8-31.0
Snout length	25.6	24.2	26.8	24.3-25.6
Upper-jaw length	55.6	68.9	53.7	51.0-54.1

Abythites lepidogenys (Smith & Radcliffe, 1913): Machida in Masuda et al., 1984:101. Cohen & Nielsen, 1978:45.

Cataetyx lepidogenys (Smith & Radcliffe, 1913): Nielsen & Cohen in Nielsen et al., 1999:101. Møller et al., 2016:Appendix A.

Specimens examined. NMMB-P24343, 125.8 mm SL, 7 Sep. 2015; NMMB-P24344, 127.6 mm SL, 21 Sep. 2015; off Dong-gang, Pingtung County, southwestern Taiwan, northern South China Sea, ca. 200-300 m, bottom trawl.

Description of Taiwanese specimens.

Dorsal fin rays 75 (NMMB-P24343) or 79 (NMMB-P24344); anal fin rays 52 or 54; pectoral fin rays 21 or 24; caudal fin rays 10 or 11; precaudal vertebrae 15 or 16; caudal vertebrae 27 or 29; total vertebrae 43 or 44; pelvic fin with 1 ray in each; 3 developed rakers and 15 small toothed patches on first gill arch.

Body short and compressed, tapering posteriorly from the anal fin into a point caudal. Head rather plump, occiput swollen, head length 26-28% SL. Snout very broad and blunt, snout length 26% HL. Mouth large, oblique; upper jaw slightly projecting beyond lower jaw. Mouth broad, oblique, lower jaw included; maxilla broad posteriorly, extending for about half to an eye diameter beyond vertical from posterior margin of eye. Two nostrils on each side, anterior nostril opening at the tip of an elongate nasal

tube at the anterior extension of the snout and posterior nostril opening in front of eye. Eye small, 16% HL, covered by a circular transparent membrane connecting to nearby skin. Interorbital space very broad and flattened, its width 26-27% HL. Postorbital space about 2/3 of head length. Margins of preopercle and subopercle smooth; opercle with a single sharp spine.

Head pores moderate in size, 6 pores on suborbital region along upper jaw, 5 pores on mandibular and 2 somewhat larger pores on preopercle. Few small papillae on the head and lateral lines.

Dorsal fin originated behind pectoral fin base; anal fin originated behind mid-body; both with long continuous base and connected to caudal fin posteriorly. Lateral line interrupted at mid-body, anterior lateral line at upper third of anterior half of body and posterior one at axis of posterior half of body. Pectoral fin rounded with a short and broad base. Pelvic fins with a single short filament, close to each other.

Cycloid scales cover on head and body, scales on head extend to a line through posterior margin of eye, the rest of head naked; 8 scales in a series from the origin of dorsal to lateral line, and 14-15 from the origin of anal to the lateral line.

Teeth villiform, forming narrow bands on jaws, vomer and palatines.

Male with copulatory organ not covered by a protecting hood and lacking

ossified parts; its penis-like structure merged into a fleshy hood in front of anal fin (Figs. 2a-b).

Coloration. When fresh, male specimen (Fig. 1a) uniformly brownish gray; abdomen bluish; head deep brown; upper base of pectoral fin blackish, the rest of the fin transparent; dorsal and anal fins and their bases blackish, posterior margins transparent; caudal fin transparent; pelvic fin white with blackish base. Female specimen (Fig. 1b) clearly paler than the male in most part of the body.

When preserved, most body coloration paler than in fresh, or even whitish; head light brown; upper base of pectoral fin light brownish, the rest of the fin transparent; dorsal and anal fin base grayish, posterior margins transparent; caudal fin transparent; pelvic fin white with grayish base.

Distribution. Known from the Philippines (Smith & Radcliffe, 1913), Japan (Machida in Masuda et al., 1984) and Taiwan (present study).

Discussion

Nielsen and Cohen in Nielsen et al., (1999) defined the genus *Cataetyx* with 22-32 pectoral-fin rays. However, Arai (1969) provided 20 rays in his new species *Bythites matsubarai* (= *Cataetyx lepidogenys*) and one of our specimen has 21 rays. Hence, the definition of *Cataetyx* show be modified accordingly.

In northwestern Pacific, there are three species of *Cataetyx*: *C. lepidogenys* from Japan and the Philippines, *C. hawaiiensis* Gosline, 1954 from the Hawaiian Islands, and *C. platyrhynchus* Machida, 1984 from Japan. *Cataetyx lepidogenys* differs from *C. platyrhynchus* in having a plump head (vs. head depressed with a concave on lateral profile of head), eye relatively large (vs. small), 75-81 dorsal-fin rays (vs. 84) and 21-24 pectoral-fin rays (vs. 26)(data from Machida in Masuda et al., 1984). It can be separated from *C. hawaiiensis* by having 75-81 dorsal-fin rays (vs. 89 in Nielsen and Cohen, in Nielsen et al., 1999), anal-fin rays 49-56 (vs. 70) and 44 or 45 vertebrae (vs. 49).

Table 1 summarizes the meristic and morphometric data of our specimens and those provided by Smith and Radcliffe (1913) and Arai (1969). The meristics fit the data provided by previous authors. Arai (1969) separated his new species *Bythites matsubarai* (= *Cataetyx lepidogenys*) from Smith & Radcliffe's (1913) *C. lepidogenys* by having 20 pectoral-fin rays (vs. 23-24), lateral lines not overlapping and interorbital relatively broad (3.2-3.8 in HL, vs. 4.2 in HL). Our specimens have 21 and 24 pectoral-fin rays, lateral lines overlapping and interorbital space 3.6-3.9 in HL. These data shows overlapping between data of two previous references.

Although most morphometric data

fall within the range in the previous references, except for the head length is relatively small in the male specimen (25.8% SL).

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