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Mao-Ying Lee

Marine Fisheries Division, Fishery Research Institute, No. 199, He 1st Road, Keelung, Taiwan 202, R.O. Department of Aquaculture, National Taiwan Ocean University, No. 2, Pei-Ning Road, Keelung, Taiwan 202, R.O.C

Ding-An Lee

Marine Fisheries Division, Fishery Research Institute, No. 199, He 1st Road, Keelung, Taiwan 202, R.O.C

Hong-Ming Chen

Department of Aquaculture, National Taiwan Ocean University, No. 2, Pei-Ning Road, Keelung, Taiwan 202, R.O.C., hmchen@mail.ntou.edu.tw

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NEW RECORDS OF DEEP-SEA CUSK EELS, *DICROLENE TRISTIS* AND *BASSOZETUS* *MULTISPINIS* (OPHIDIIFORMES: OPHIDIIDAE) FROM TAIWAN

Mao-Ying Lee^{*,**}, Ding-An Lee^{*}, and Hong-Ming Chen^{**}

Key words: new record, deep-sea, Ophidiidae, basibranchial teeth patch.

ABSTRACT

This paper reports two new record species of deep-sea cusk eels, *Dicrolene tristis* and *Bassozetus multispinis*, which were recently collected by Fishery Research Institute of Taiwan from the southern (22°01'N, 120°09'E; 22°11'N, 121°02'E) and eastern (24°16'N, 122°11'E) Taiwan waters at depths more than 1000 m. *D. tristis* were characterized by two median and a pair of basibranchial teeth patches; *B. multispinis* had one basibranchial teeth patch and short pelvic fin ray. The latter species was reported to be only distributed in the Indian ocean at the depths from 1,500-2,000 m.

INTRODUCTION

The first catalogue of Ophidiiformes was published by Cohen and Nielsen [3], which mainly focused on the genus level, and the species classification were not complete. Later on, Nielsen *et al.* [8] published another catalogue that included all ophidiiformes fishes of the world. The earlier synopsis of Ophidiiformes fishes in Taiwan was written by Chen and Yu [2], which reported 2 families, 11 genera and 16 species. Chen and Shao [1] reported 7 species of Ophidiidae and 2 species of Bythitidae which was the only scientific report of Ophidiidae in Taiwan. The last publication was a part of "Fishes of Taiwan" edited by Shen *et al.* [11]. The book listed 3 families, 12 genera and 18 species belonging to Ophidiiformes. But these literatures only described the species in the inshore or continental shelf.

In recent years, Fishery Research Institute (FRI) and Institute of Zoology, Academia Sinica (ASIZ) started

to investigate the deep-sea fish fauna. A series deep-sea investigation collected many rare specimens. Among these specimens, many species had not been recorded in Taiwanese waters before. In the present study, we newly recorded two ophidiid fishes belonging to 2 genera from Taiwan; *Dicrolene tristis* and *Bassozetus multispinis*. These specimens were caught by French beam trawls at depths 1,000-3,000 m and caught by R/V Fishery Researcher I.

MATERIALS AND METHODS

Two specimens of *Dicrolene tristis* were collected from southern Taiwan area at depths 1,128-1,197 m, and one specimen of *Bassozetus multispinis* from eastern Taiwan at depth 2,902 m. Collection localities of specimens of *Bassozetus multispinis* and *Dicrolene tristis* were showed in Figure 1. These specimens were preserved by FRI in Keelung.

The terminology and description of morphometrics of the fish followed Nielsen *et al.* [8]; Body proportions were expressed in term of standard length (SL: length from the snout tip to the base of caudal fin) and head length (HL: length of snout tip to the posterior margin of opercle). We also counted vertebrae and fin rays of the fish.

RESULTS AND DISCUSSION

Dicrolene tristis Smith and Radcliff, 1913

Figures (2A, 2B, 3A)

Dicrolene tristis Smith and Radcliff, 1913: 145, pl. 8, Figure 2; Masuda *et al.*, 1984: 100, pl. 85; Nielsen *et al.*, 1999: 62; Nakabo, 2000: 439.

Material examined:

FRI 0060730, SL 183 mm, south Taiwan (22°01'N,

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*Marine Fisheries Division, Fishery Research Institute, No. 199, He 1st Road, Keelung, Taiwan 202, R.O.C.

**Department of Aquaculture, National Taiwan Ocean University, No. 2, Pei-Ning Road, Keelung, Taiwan 202, R.O.C.

120°09'E), French beam trawl, 1,128 m, July 30, 2000. FRI 0060801, SL 158 mm, south Taiwan (22°11'N, 121°02'E), French beam trawl, 1,197 m, August 1, 2000.

Diagnosis:

Snout blunt; eye diameter almost as long as snout length; opercle had one strong, straight spine; and 3 developed spines at hind region of preopercle; lower rays of pectoral fins are free; about 5 to 7 rays and longer than upper ones. 2 median and a pair of basibranchial teeth patches.

Description:

Meristics: Dorsal fin rays: 98-101 mm; anal fin rays: 78-85 mm; pelvic fin rays: 2; pectoral fin rays: 27-30 mm; lower free rays of pectoral fins: 7-10 mm; caudal fin rays: 6; total vertebrae: 62 mm; precaudal vertebrae: 15-16 mm.

Morphometrics in SL (%):

Head length: 17.7-18.2; predorsal length: 22.4-23.8; preanal length: 38-38.3; pectoral fin length: 19.1-22.2; pelvic fin length: 6.3-6.6; body depths of first dorsal fin base: 15.9-16.8; length of dorsal fin base: 73.5-76.4; length of anal fin length: 58.3-61.5.

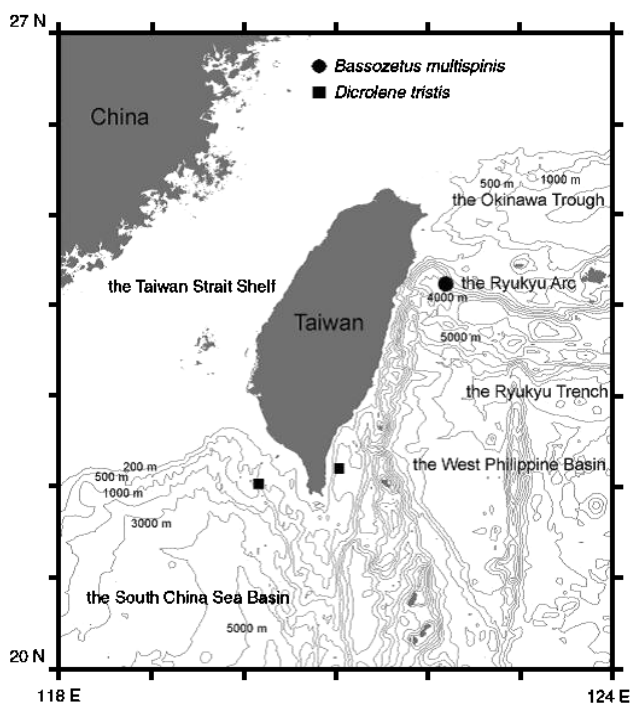


Fig. 1. Collection localities of specimens of *Bassozetus multispinis* and *Dicrolene tristis* that examined in this study.

Morphometrics in HL (%):

Eye diameter: 24-29.1; snout length: 21.9-24.8.

Snout blunt; eye large; eye diameters almost equal to snout length; mouth large, upper jaw ends below posterior margin of eye or behind eye. Premaxilla had 2 palatine and a vomer teeth patches; opercular spine strong and straight. 3 broad, straight and short spines at hind margin of preopercle; 2 median and 2 basibranchial teeth patches (Figure 3A); pseudobranchial filaments 2 to 3; developed rakers on anterior gill arch 11-14.

Body elongated; general coloration pale; yellowish, no blotches and spots on body; small, cycloid scales covered; preanal length about twice of head length; pelvic fin placed below preopercle; lower 7 to 10 rays of pectoral fin were free and longer; dorsal fin and anal fin connected with caudal fin; each pelvic fin had 2 separated rays.

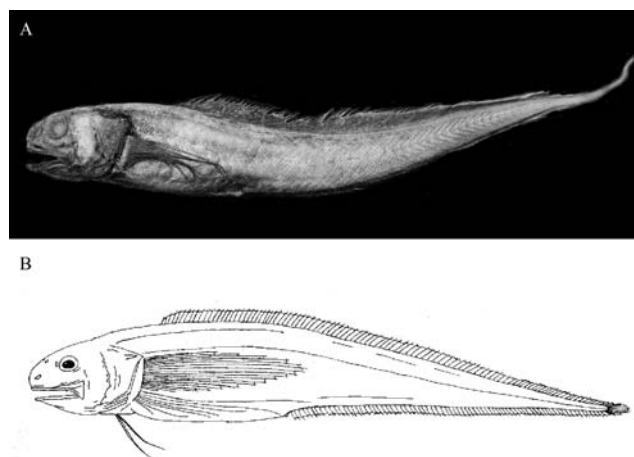


Fig. 2. Lateral view of *Dicrolene tristis*, FRI 0060801, 158 mm in SL, photograph (A) and diagram (B).

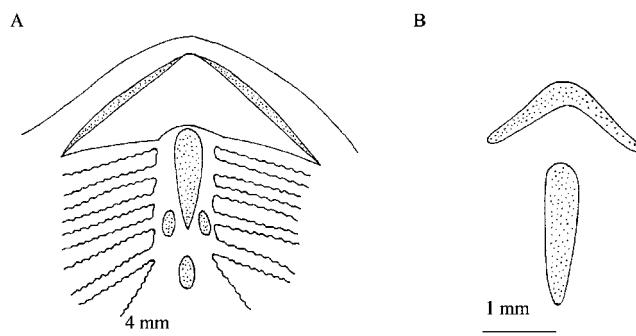


Fig. 3. (A) Basibranchial and median teeth patches of *Dicrolene tristis*, FRI 0060801; (B) vomer and basibranchial teeth patches of *Bassozetus multispinis*, FRI 0060803.

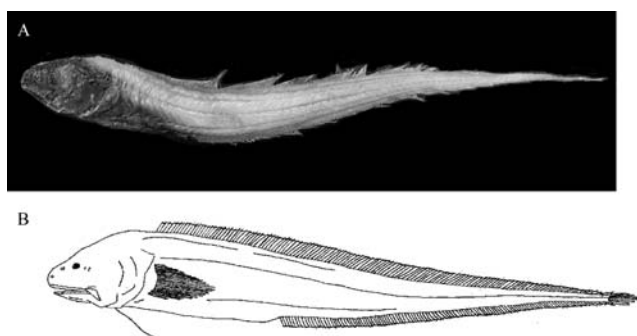


Fig. 4. Lateral view of *Bassozetus multispinis*, FRI 0060803, 171 mm in SL, photograph (A) and diagram (B).

Remark:

The species identification of genus *Dicrolene* was based on Nielsen *et al.* [8]. Main difference among species of the genus *Dicrolene* were the numbers of median basibranchial teeth patch and its comparative location. We considered that the allopatric distribution of similar species of *Dicrolene* can be used to identify the species of our two specimens. But this genus did not have complete revision what maybe due to similar characters among species.

***Bassozetus multispinis* Shcherbachev, 1980**

Figures (3B, 4A, 4B)

Bassozetus multispinis Shcherbachev, 1980: 124, Figure 1; Nielsen *et al.*, 1999: 58; Nielsen and Merrett, 1999: 36.

Material examined:

FRI 0060803, SL 164 mm, east Taiwan (24°16'N, 122°11'E), French beam trawl, 2,902 m, August 3, 2000.

Diagnosis:

Snout rather blunt, inflated; mouth terminal and large; eye very small, and eye diameter shorter than snout length; opercular spine weak and almost disappeared, teeth granular, vomer v-shaped and one well-developed basibranchial teeth patch; 17 developed gill rakers on anterior gill arch; one ray on each pelvic fin, and pelvic fin ray short.

Description:

Meristics: Dorsal fin rays: 127; anal fin rays: 112;

pelvic fin rays: 1; pectoral fin rays: 23; caudal fin rays: 8; total vertebrae: 73; precaudal vertebrae: 15.

Morphometrics in SL(%):

Head length: 16.3; predorsal length: 15.7; preanal length: 29.5; pelvic fin length: 6.9 ; body depths at first anal fin: 7.5; length of dorsal fin base: 84.3; length of anal fin base: 69.7; upper jaw length: 9.5; base of pelvic fin to anal fin: 17.6.

Morphometrics in HL(%):

Eye diameter: 7.9; snout length: 24.5.

Snout rather blunt; eye small; eye diameters shorter than snout, only 32% of snout length; mouth large and terminal, upper jaw ends behind eye; opercular spine weak; no spine in preopercle; one well-developed basibranchial teeth patch; pseudobranchial filaments 2; 17 developed gill rakers on anterior gill arch.

Body compressed and elongated; tail long and attenuate, head swollen; head length about one-half of preanal length; coloration of body and head were uniformly dark brown when specimen were caught. Body become pale and a little yellowish when preserved in alcohol, but head color was still dark brown. Body no any blotches or spots and covered by small, cycloid scales; dorsal and anal fins connected with caudal fin. Origin of dorsal fin base was above the upper of gill opening, pectoral fin damaged but maybe not reached to anus. Pelvic fins were below the preopercle and length of the rays were short.

Remark:

Generic diagnosis of *Bassozetus* based on Nielsen and Merrett [9], was following two diagnostic characters; median teeth patches and length of pelvic fin. We also compared with other literatures (Machida, [4]; Machida and Tachibana, [5]), and found out that the counts of precaudal, total vertebrae and proportion of standard length were different from other species. But in numbers of developed gill rakers, one median basibranchial teeth patch and short pelvic fin ray are similar to *B. multispinis*. Although the proportion of pelvic fin length was larger than any recorded specimen (6.9 vs. 3.0), Nielsen and Merrett [9] suggested this morphometric character showed negative allometric growth, and the specimen of FRI was smaller than the other specimen (SL 164 vs. 215). Thus, we identified FRI 0060803 as *B. multispinis*, which only known from eastern Indian Ridge in southern Indian Ocean at depths between 1,500 to 2,000 m.

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