

## A NEW SPECIES OF *HALIEUTOPSIS* (LOPHIIFORMES: OGCOCEPHALIDAE) FROM WESTERN NORTH AND EASTERN CENTRAL PACIFIC OCEAN

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**ABSTRACT.** – *Halieutopsis margaretae*, a new species of deep-sea batfish, represented by five specimens collected from the Western North Pacific Ocean off Taiwan and the Eastern Central Pacific Ocean off Hawaii Islands, is described herein. It differs from all known species of the genus in the combination of following characters: bifurcated dermal spines on ventral surface, body surface of disk covered with complex tubercles, four to seven spines on snout, disk edge, subopercle and rostrum, three lateral line scales on preopercle, six on subopercle, two to three on dorsolateral branch of subopercle, one to two on ventral series of body and eight to nine on tail.

**KEY WORDS.** – Pisces, Teleostei, batfish, *Halieutopsis margaretae*, new species.

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### INTRODUCTION

*Halieutopsis* was established by Garman (1899) with his description of *H. tumifrons*. Smith & Radcliffe (1912) added one new species to the genus, *H. vermicularis*, collected off the Philippines. Bradbury (1967) placed *Dibranchius micropus* (Alcock, 1891) from Bengal and *D. simulus* and *D. stellifer* (Smith & Radcliffe, 1912) from the Philippines into this genus based on her study of the osteology of all genera. Subsequently, in 1988, she reviewed the genus and included the descriptions of four new species, bringing the total number of species in this genus to nine.

Species of *Halieutopsis* are distributed from the Indian Ocean to the Eastern Pacific Ocean, with most occurring in the Indo-West Pacific. This is with the exception of *H. tumifrons* in the Eastern Pacific and *H. bathyoreos* on seamounts in the Eastern Central Pacific Ocean off Hawaii (Bradbury, 1988). Shimazaki et al. (2004) re-described the rare *H. bathyoreos* and gave a detailed diagnostic key to distinguish it from *H. vermicularis*.

Here, we have added one additional species of *Halieutopsis*, represented by five specimens collected from widely separated localities in the Western North Pacific Ocean off Taiwan and Japan and the Eastern Central Pacific Ocean off the Hawaiian Islands.

### MATERIALS AND METHODS

Standard lengths (SL) are used throughout. Measurements follow Bradbury (1980, 1988) and were rounded off to the nearest 0.1 mm. Morphological terminology follows Bradbury (1967). Counts of lateral line scales follow Shimazaki et al. (2004). Osteological material was cleared and stained following the methods of Song & Parenti (1995). Materials examined for the present study are deposited in the Research Center for Biodiversity, Academia Sinica (ASIZP), Taiwan, Department of Biology, Kochi University (BSKU), Japan and the Bernice Pauahi Bishop Museum (BPBM), Hawaii. Institutional abbreviations are as listed in Leviton et al. (1985), except for ASIZP.

### TAXONOMY

#### *Halieutopsis* Garman, 1899

*Halieutopsis* Garman, 1899: 89

**Type species.** – *Halieutopsis tumifrons* Garman, 1899, by original designation.

Table 1. Morphometric data of type materials of *Halieutopsis margaretae*.

Morphometric Data	ASIZP 064424 Holotype	BPBM 38952 Paratype	BSKU 19895 Paratype	BPBM 38952 Paratype	BPBM 29271 Paratype
Standard length (mm)	38	47	57	63.5	66
Measurements (% SL)					
Disk margin length	42.1	40.4	41.9	38.3	38.5
Skull length	31.6	28.7	30.4	30.3	28.8
Cranium width	23.7	21.3	21.7	22.7	24.2
Predorsal length	72.9	76.6	67.2	71.2	71.2
Preanal length	76.3	72.3	74.6	69.7	74.2
Jaw to anus distance	60.5	53.2	56.7	53.0	54.5
Eye diameter	6.3	6.4	6.0	7.4	5.3
Orbital diameter	7.9	10.4	9.6	11.7	11.2
Interorbital width	10.5	10.0	9.1	8.5	8.3
Jaw length	13.2	12.8	10.8	12.9	13.0
Mouth width	21.1	21.0	20.9	22.2	23.3
Fin Ray Counts (numbers)					
Dorsal fin rays	6	5	5	4	4
Pectoral fin rays	14/15	14	15	14	14
Pelvic fin rays	5	5	5	5	5
Anal fin rays	4	4	4	4	4
Caudal fin rays	9	9	9	9	9
Lateral line scale counts (numbers)					
Preopercle	3	3	3	3	3
Subopercle	6	6	6	6	6
Dorsolateral branch of subopercle	3	2	3	3	2
Ventral	1/2	1/2	2	2	2
Tail	9	8	9	9	9
Vertebral counts (numbers)	18	18	18	18	18

***Halieutopsis margaretae*, new species**

(Figs. 1 &amp; 2)

**Material examined.** – Holotype - ASIZP 0064424, 38 mm SL, Eastern Taiwan off Su-ao, 445 - 1185 m, 24°29.00'N 122°12.80'E, OCEAN RESEARCHER I, st. CD210, otter trawl, coll. K.-T. Shao, 31 Jan.2005.

**Paratype** – BPBM 29271, 66 mm SL, Hawaiian Islands, West of French Frigate Shoals, 684-729 m, MOKIHANA, shrimp trap, coll. P.J. Struhsaker, 29 Oct.1981; BPBM 38952, 2 specimens, 47.0 - 63.5 mm SL, North of Maui, Hawaiian Islands, 100 - 800 m, 21°15'N 156°18'W, TOWNSEND CROMWELL, st. 20, shrimp trawl, 16 Jul.1972; BSKU 19895, 57 mm SL, 860 - 870 m, SOYO-MARU, st. B2, 33°55.01'N 140°00.05'E, coll. O. Okamura, 1 Dec.1968 (clear and stained).

**Diagnosis.** – *Halieutopsis margaretae* can be distinguished from all other species in the genus by having bifurcated dermal spines on ventral surface (Fig. 3D); body surface of disk covered with complex tubercles, 4 to 7 spines on rostrum, disk edge, and subopercle (Fig. 3A to 3C), trident on tail (Fig.

3E); 3 lateral line scales on preopercle, 6 on subopercle, 2 to 3 on dorsolateral branch of subopercle, 1 to 2 on ventral series of body and 8 to 9 on tail (Fig. 4); 18 vertebrae.

**Description.** – Morphometric data of holotype and 4 paratypes are given in Table 1. Disk is broad and subtriangle in outline (Figs. 1 & 2); skull is long (28.7 - 31.6% SL); jaw to anal fin distance is long, preanal length (69.7 - 76.3% SL); cranium is wide (21.3 - 24.2% SL); jaw to anus distance is short (53.0 - 60.5% SL); eyes are small (5.3 - 7.4 % SL); other proportions (around the median value) are comparable with the other species in the same genus.

Head strong, depressed. Tail slender, less than half SL. Rostrum forming an acute angle, slightly elevated above disk, well overhanging the mouth. Illicial cavity broad, triangle, visible in ventral view. Eye small, oval. Esca with 3 lobes, a large dorsal leaf-like lobe with 2 small cirri on its tip and a pair of rounded and flat ventral lobes, housed in illicial cavity. Jaw teeth villiform; no teeth on palate, 2 well separated small patches on ceratobranchial V (tongue). Holobranchs present

on gills 2 and 3, gill filaments absent from first and fourth arches; gill rakers finger-like, with clusters of minute teeth, present on first to third arches. Paired fins large; dorsal and anal fins small; pectoral fin lobe broadly attached to body wall; caudal fin moderate in size; gill openings are between the dorsal pectoral fin lobe and body wall. Tubercles present on entire body, except for gill openings, eyes and illicial

cavity; tubercles on dorsal surface simple or bifurcated, those on disk margin trident or multispined, on tail bifurcated or trident, on ventral surface bifurcated, on subopercle divided into 5 to 7 spines, on rostrum divided into 4 or 5 spines (Fig. 3A - 3E). Lateral line scales with neuromasts lining around head, body and tail, 1 to 2 on each side of anus for those on ventral surface (Fig. 4).

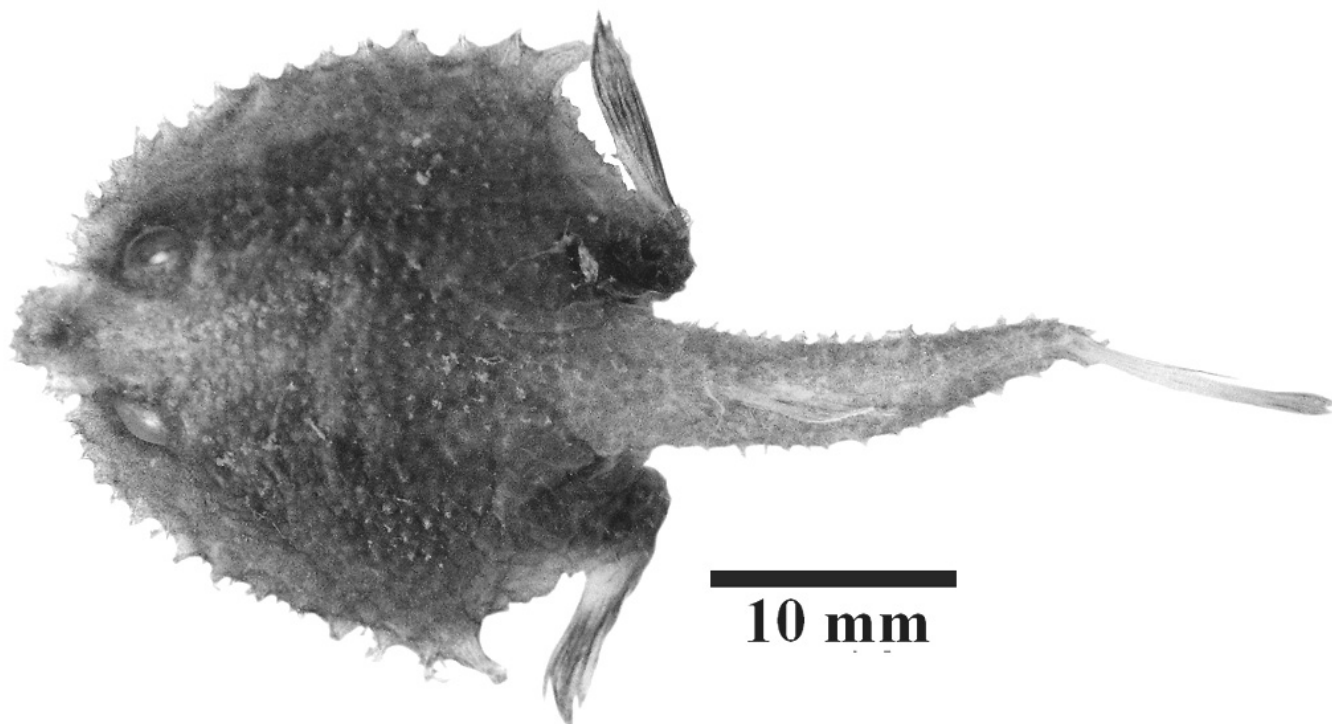


Fig. 1. *Halieutopsis margaretae*, ASIZP 0064424, holotype, 38 mm SL; off Su-ao, Eastern Taiwan. Dorsal view.

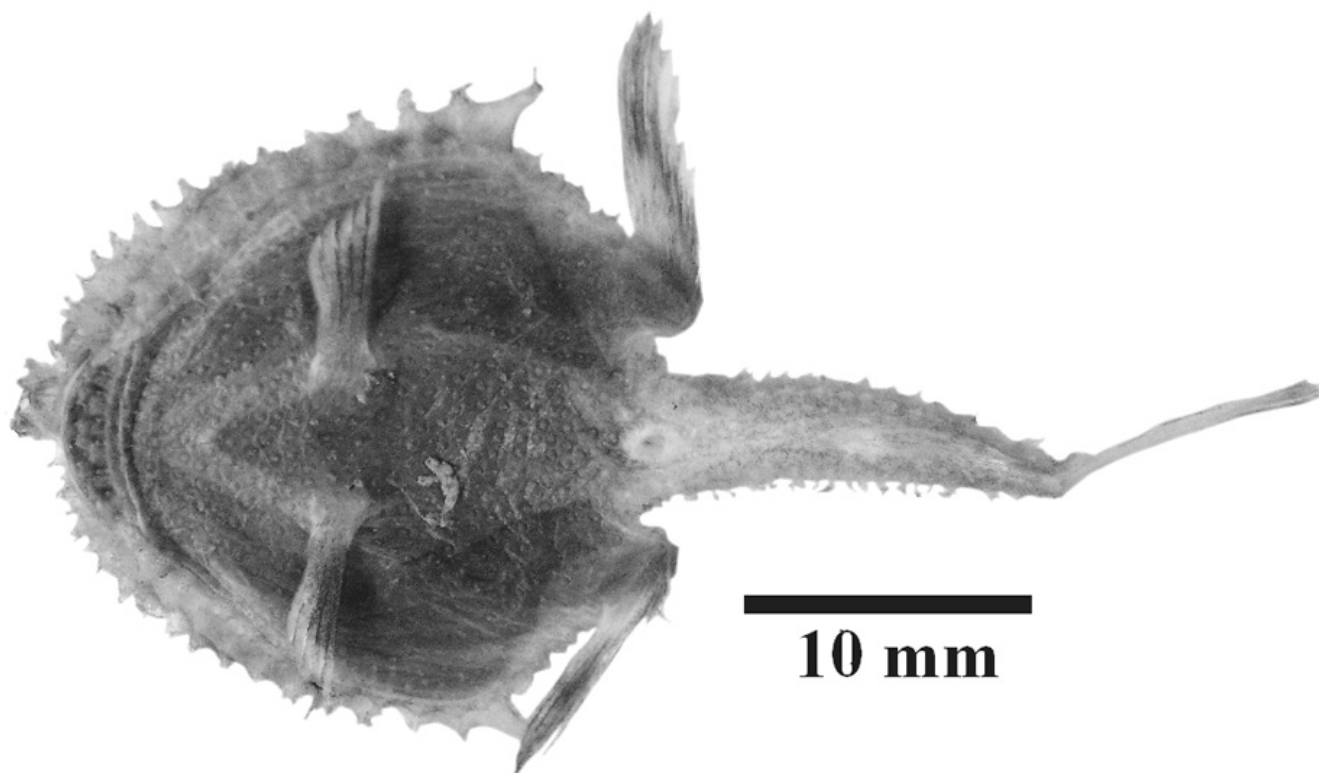


Fig. 2. *Halieutopsis margaretae*, ASIZP 0064424, holotype, 38 mm SL; off Su-ao, Eastern Taiwan. Ventral view.

Dorsal fin rays 4 to 6, 6 in 38 mm holotype, 5 in 47 mm and 57 mm paratypes and 4 in 63.5 mm and 66 mm paratypes. Pectoral fin rays 14 - 15, 14/15 in 38 mm holotype, 15 in 57 mm paratype, 14 in rest of the paratypes. Ventral fin rays 5; anal fin rays 4; caudal fin rays 9; gill rakers on second gill arch 5 to 6; vertebrae 18.

**Colouration in fresh specimen.** – Description is based on the holotype: dorsal surface of body uniform gray to black; slightly paler on head, disc edge and tail; edges of pectoral and caudal fins black; pelvic fins black, pale at edge; dorsal and anal fins gray to pale; peritoneum black.

**Colouration in alcohol.** – The 38 mm holotype appears slightly grayer than when fresh, the fins are as dark as when fresh. In four paratypes, the body is completely pale, without any pigmentation or color pattern; peritoneum deep brown to dark.

**Distribution.** – Northwestern and Eastern Central Pacific Ocean at depths of 445 - 1185 m off Taiwan, 860 - 870 m off Japan and 100 - 800 m off Hawaii Islands.

**Etymology.** – *Halieutopsis margaretae* new species is named in honour of Professor Margaret G. Bradbury in recognition of her enormous contribution to our knowledge of the batfish family, Ogcocephalidae.

**Remarks.** – *Halieutopsis margaretae* new species is similar to *H. galatea*, *H. micropa* and *H. stellifera* in having ventral spines. However, it can be easily distinguished from these

three species by the bifurcated ventral spines. It further differs from *H. micropa* in having a flat head, which is not box-like and ventrally not reduced. It differs from *H. stellifera* in having a narrower interorbital space (8.5 - 13.6% SL vs. 15.9% SL), fewer ventral lateral line scales (1 - 2 vs. 3 - 4), fewer preopercular lateral line scales (3 vs. 3 - 4), fewer dorsolateral branch of subopercular lateral line scales (2 - 3 vs. 3 - 5) and the ventral spines being bifurcated. It differs from *H. galatea* in having fewer ventral lateral line (1 - 2 vs. 3 - 4), rostrum without notch, disk rather subtriangular (rounded in *H. galatea*) and bifurcated ventral spines.

## DISCUSSION

According to Bradbury (1967, 1988), *Halieutopsis* is distinguished from other members of the Ogcocephalidae by following characters: the frontal bones of skull are rather flat, somewhat depressed medially but not modified from a deep median groove; teeth absent from palate and ceratobranchial V (either absent or small and few in number on tongue in Bradbury, 1967: 411); illicial bone relatively simple and spine-like, lacking foramina in the base; esca usually bearing two large lateral lobes (except one species) and a dorsal median lobe; 2 gills, gill filaments present in second and third gill arch; gill rakers 10 - 11 on one side of second arch (Bradbury, 1967: 408); pectoral pedicels broadly attached to body wall (except one species); lateral line interrupted, the tail series running ventrally and extending anteriorly to or beyond the anus; more than one lateral-line scale with neuromasts on either side of anus (as ventral series in

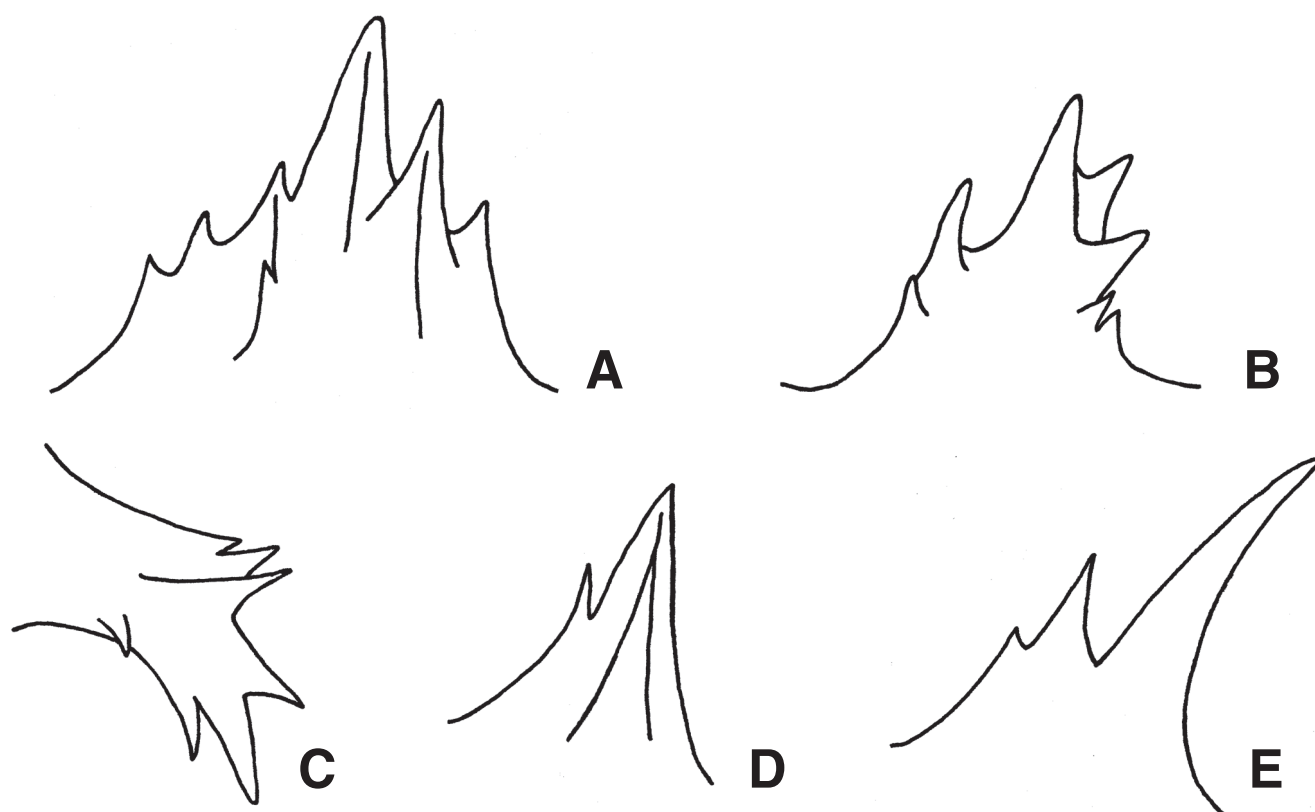


Fig. 3. *Halieutopsis margaretae*, ASIZP 0064424, holotype, 38 mm SL; off Su-ao, Eastern Taiwan. Tubercles on body surface at A) disk edge, B) rostrum, C) subopercle, D) ventral surface, E) tail.

Shimazaki et al., 2004). Teeth are completely absent from the palate and those on jaws are few and in a narrow band. There are some small teeth on tongue (ceratobranchial V), usually forming two small and well separated patches. The teeth are rather loose in some species.

As there were not many specimens for further study, Bradbury (1967, 1988) concluded the main character of *Halieutopsis*, which was based on one single specimen, *Halieutopsis micropa* (personal communication), was the frontal bones of skull being rather flat and not forming a groove. However, in our examinations of many other species and specimens in this genus and comparison with three other genera, *Dibranchus*, *Solocisquama* and *Coelophrys*, we found that some diagnostic characters should be revised.

In several species of *Halieutopsis*, the frontal bones of skull are flat and anteriorly broad, not forming deep grooves and without frontal ridge above the eye. Similar characteristics are also displayed in the genus *Coelophrys*. Some of the *Halieutopsis* species also have flat frontal bones of the skull and are broad posteriorly. However, the anterior parts of these species form deep grooves and a frontal ridge is present above eye. These characteristics are more similar to *Dibranchus* or

*Solocisquama*. Based on the main character of *Halieutopsis* proposed by Bradbury (1967, 1988), several species in *Halieutopsis* should be moved into *Coelophrys*.

From our examinations between specimens of *Halieutopsis* and comparison with three other genera, *Dibranchus*, *Solocisquama* and *Coelophrys*, we gather the following distinguishing characteristics. *Halieutopsis* can be distinguished from *Dibranchus* and *Solocisquama* in having teeth on the tongue not forming two large patches closed together. The genus also has more than one pair of ventral series lateral line present that extends well beyond the anus. *Halieutopsis* further distinguishes from *Dibranchus* in having trilobate esca, two ventral lobes well separated and rounded lobes (vs. not distinctly separated). It further differs from *Solocisquama* in the premaxillary synthesis not forming a deep notch (vs. forming a deep notch) and from *Coelophrys* in usually having 5 - 6 gill rakers, at most 8 (vs. 10 - 11) and having a longer and more slender tail, about 40 % SL (vs. as short as anal fin length).

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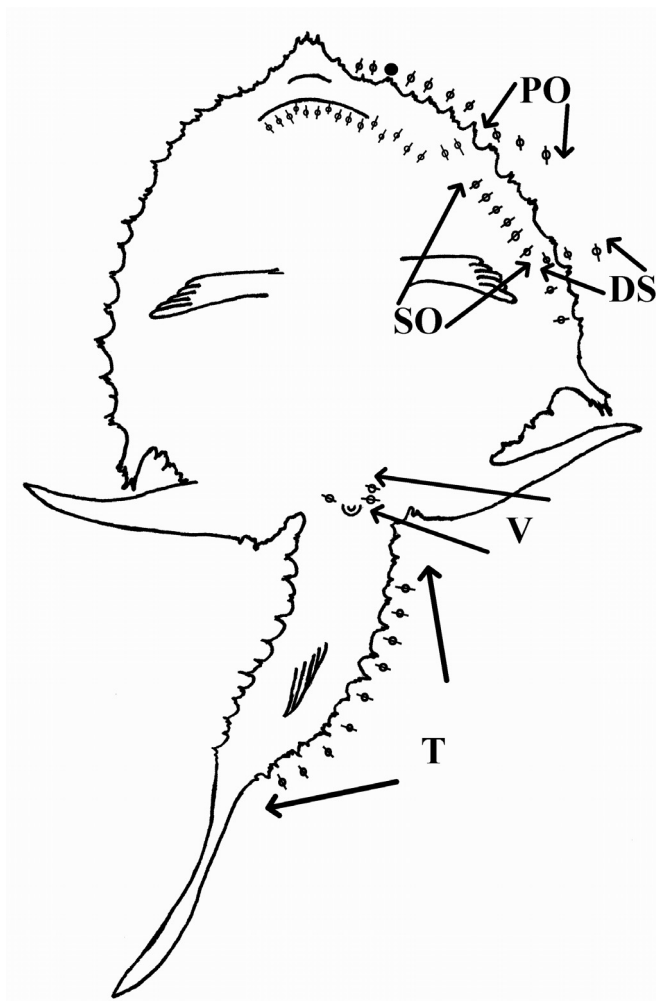


Fig. 4. *Halieutopsis margaretae*, ASIZP 0064424, holotype, 38 mm SL; off Su-ao, Eastern Taiwan. Ventral view showing lateral-line system. PO = preopercule; SO = subopercule; DS = dorsolateral branch of subopercule; V = ventral series; T = tail series.

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