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A new *Malthopsis* batfish from Taiwan, with comments on *Malthopsis tiarella* Jordan, 1902 (Lophiiformes: Ogcocephalidae)

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Abstract

A new species of the triangular batfish genus *Malthopsis* Alcock, 1891 is described on the basis of 9 specimens collected from off Taiwan. The new species belongs to a species group with ventral surface covered by numerous small prickle-like bucklers. It differs from the members in this species group in having ventral surface entirely covered with tiny bucklers; principal bucklers on dorsal surface relatively tall, few in number and loose in arrangement; subopercle dull without enlarged forward-directed spine; rostral spine directed forward horizontally; 5 dorsal-fin rays and 12 pectoral-fin rays; and posterior tip of appressed anal fin not reaching caudal-fin base. Two specimens of *Malthopsis tiarella* Jordan, 1902 collected from Taiwan are recognized and its diagnosis is discussed.

Key words: Pisces, Taxonomy, Ichthyology, *Malthopsis formosa*, Taiwan

Introduction

The triangular batfish genus *Malthopsis* Alcock, 1891 is a group of small fishes (usually less than 100 mm SL; not exceeding 140 mm SL) comprising 13 nominal species around the world (Ho, 2013; Ho *et al.*, 2013). All but one species occurs in the Indo-Pacific region. In recent years, Ho & Shao (2010a) verified *Malthopsis jordani* Gilbert, 1905 and described one new species; Ho & Shao (2010b) redescribed *Malthopsis lutea* Alcock, 1891 and resurrected *Malthopsis kobayashii* Tanaka, 1916; and Ho *et al.* (2009, 2013) and Ho (2013) described five new species in the genus.

The members of *Malthopsis* are generally divided into two species groups, one group with small prickle-like bucklers (spines, prickles or tubercles in previous references) on ventral surface and the other group lacking these bucklers. Of the species occurring in the northwestern Pacific Ocean, *Malthopsis tiarella* Jordan, 1902 is the most poorly known due to the possibly missing holotype and its rarity.

Ochiai & Mitani (1956) reviewed the genus *Malthopsis* in Japan and recognized four species: *M. lutea* and *M. tiarella* belong to the group with small spinules (prickle-like bucklers in present study) on body surface and *M. jordani* and *M. annulifera* belong to the group without such spinules on body surface. However, their *M. jordani* had been described as *Malthopsis gigas* by Ho & Shao (2010a) and their *M. lutea* was recognized as *M. kabayashii*, a name resurrected from junior synonym of *M. lutea*, by Ho & Shao (2010b). Moreover, HCH examined many specimens used in their work and additional specimens in the same collection, and found none of them can be referred to *M. tiarella*.

Recently we found a specimen with unique coloration which led us to investigate details of this group. It reveals that two different forms were identified as *M. tiarella* and they differ from each other by several distinct characters; one of them closely resembles *M. tiarella*, possessing 6 or 7 dorsal-fin rays, 13 or 14 pectoral-fin rays, and dark bands on pectoral and caudal fins. The second one has only 5 dorsal-fin rays and 11 or 12 pectoral-fin rays and different coloration. With other characters, we recognized the first one as *M. tiarella* and the second one as a new species. Detailed descriptions are provided for each of them.

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Method and materials

Standard length (SL) is used throughout. Methods for taking measurements and counts followed Ho & Shao (2010a, b). Comparative materials and data are those provided in Ho & Shao (2009, 2010a, b), Ho *et al.* (2009, 2013), and Ho (2013). Specimens used in the present study are deposited in the Pisces Collection of the National Museum of Marine Biology & Aquarium (NMMB-P). Additional comparative specimens are listed below.

Results

Malthopsis formosa sp. nov.

New English name: Taiwanese triangular batfish
Figures 1–4; Table 1

Malthopsis tiarella (not of Jordan, 1902): Ho & Shao 2008:308, fig. 14 (in part; figure provided is present species). Ho & Shao, 2010b:fig. 6 (same figure of preceding one).

Holotype. NMMB-P27866 (50.8 mm SL), off Dong-gang, Pingtung, southwestern Taiwan, northern South China Sea (collected at a landing area), bottom trawl, 14 Dec. 2017, coll. K. Koeda.

Paratypes. Eight specimens, 39.1–48.0 mm SL. NMMB-P22009 (1, 44.2), 31 Dec. 2013; NMMB-P25410 (1, 39.1), 6 Nov. 2015; NMMB-P26656 (1. 48.0), 1 Oct. 2017; NMMB-P27777 (1, 47.3), 15 Nov. 2017; NMMB-P28475 (1, 44.4), 8 Nov. 2013; all collected from off Dong-gang near the type locality by H.-C Ho. NMMB-P23809 (1, 40.8), 21 Jan. 2015; NMMB-P26435 (1, 46.4, stained), 18 Jun. 2017; NMMB-P28476 (1, 39.4), 21 Jan. 2015; all collected from off Ke-tzu-liao, Kaohsiung, southwestern Taiwan by H.-C. Ho.

Diagnosis. A species of *Malthopsis* with numerous small prickle-like bucklers on ventral surface, and distinguished from other congeners in having the following combination of characters: dorsal-fin rays 5; pectoral-fin rays 11–12; rostral spine directed forward horizontally; principal bucklers on dorsal surface relatively low, few in number and scattered in arrangement; body densely covered by small prickle-like bucklers; head length 27.1–29.1% SL; posterior tip of appressed anal fin not reaching caudal-fin base.

Description. Morphometric and meristic data are provided in Table 1.

Body depressed, disk markedly triangular in dorsal view, cranium elevated above general surface of other parts of disk; caudal peduncle cylindrical, tapering posteriorly; rostrum small, its base moderately wide of genus, terminal spine conical, directed forward horizontally (Fig. 4A), distinctly overhanging illicial cavity and beyond the mouth; rostrum relatively short, eye diameter/rostral length 1.9 (1.4–1.7 in paratypes); eye relatively small, its diameter 12.6% SL (12.7%–14.0% SL), directed dorsolaterally; no pupillary operculum; interorbital space moderately wide, its width 6.8% (5.9–8.1% SL), shallowly concave (Fig. 4B); illicial cavity a small rounded cave, relatively broad in outline, about as wide as high; esca a single oval bulb, bearing 2 small cirri on dorsal margin; mouth small, terminal; small villiform teeth on jaws forming narrow bands, those on fifth ceratobranchial forming 2 large and elongated patches close together, and teeth on vomer and palatines in quadrangular patch.

Scales on body surface in the form of bucklers, moderately low and pointed (Fig. 3), mostly associated with lateral line, skeleton and body edge; small prickle-like bucklers densely covered on body surface among principal bucklers, except for eyes and fins. Each side of frontal ridge with 5 (5–6) bucklers, the first two situated at anterolateral corner of orbit; the second pair direct outward, and with the rostral spine forming a trident; last two bucklers relatively large in size. A pair of bucklers on dorsal surface of base of rostrum. Skin above eye with many small bucklers (Fig. 4A).

Dorsal surface of skull with four or five moderately large pointed bucklers, not arranged in regular rows (Fig. 4B); followed by a median widely-spaced, irregular row of smaller bucklers at postcephalic region; numerous small prickle-like bucklers densely cover dorsal surface of disk, except for small naked areas around pectoral-fin base. Ventral surface of disk with several relatively large bucklers (mainly in front of inter-pelvic space) and elsewhere densely covered by numerous small prickle-like bucklers, except for narrow naked areas on outer portion of gill chamber; buckler of subopercular dull, bearing few spinelets, none especially enlarged; two flat, triangular bucklers with several spinelets on post-subopercular margin (Figs. 4C, D); caudal peduncle covered by moderately large bucklers, those on dorsal surface forming 5 irregular, scattered rows, 1 median row behind dorsal fin, 2 rows on

each side of dorsal fin, 2 rows on each lateral side associated with lateral line; bucklers on ventral surface of caudal peduncle forming 2 regular rows between anus and anal fin, relatively flattened; 1 buckler (some paratypes with 2) on each side of posterior portion of anus, these not larger than neighboring ones (Fig. 4E).

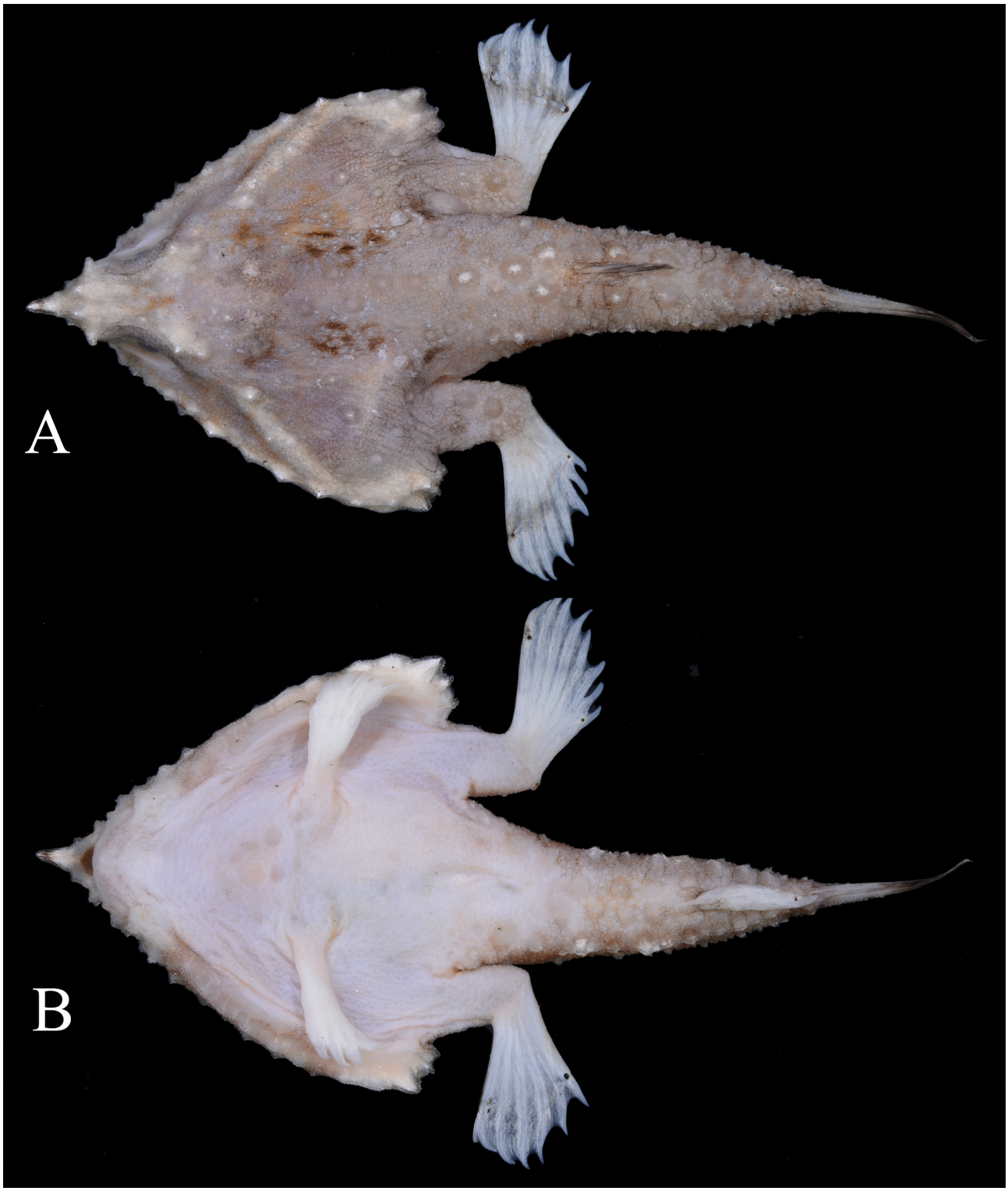

FIGURE 1. *Malthopsis formosa* **sp. nov.**, holotype, NMMB-P27866, 50.8 mm SL. A dorsal view. B. ventral view.

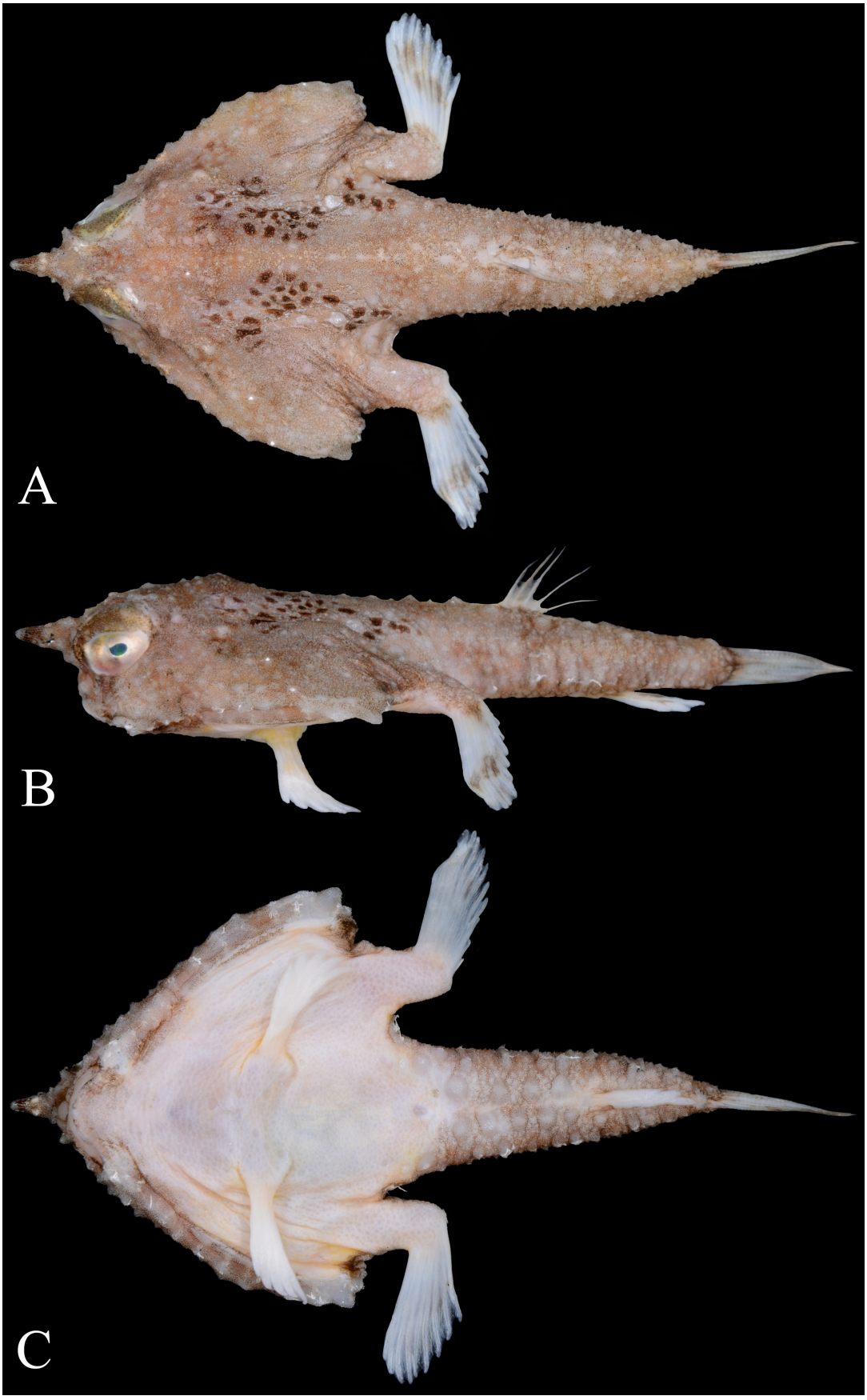

FIGURE 2. *Malthopsis formosa* **sp. nov.**, paratype, NMMB-P27777, 47.3 mm SL. A. dorsal view. B. lateral view. C. ventral view.

TABLE 1. Morphometrics and meristics data of three species of genus *Malthopsis* recognized from Taiwan. Pectoral-fin rays are counted on both sides.

	M. formosa **sp. nov.**		*M. tiarella*		*M. kobayashii*
	Holotype	All types	NMMB-P28508	NMMB-P03366	Non-types
SL	50.8	39.1–50.8 (n=9)	50.9	33.3	53.0–63.0 (n=5)
(% SL)		Mean (Range)			
Skull length	27.8	28.1 (27.1–29.1)	29.5	32.0	27.0 (25.9–27.8)
Head width	22.8	22.9 (21.3–23.5)	23.0	25.0	22.4 (21.1–24.3)
Head depth	22.6	22.0 (20.3–23.4)	23.6	21.9	23.7 (21.1–26.9)
Eye diameter (ED)	12.6	13.2 (12.6–14.0)	13.4	15.7	13.5 (11.6–14.3)
Interorbital width (IO)	6.8	7.0 (5.9–8.1)	6.5	6.7	6.7 (6.3–7.0)
Rostal length (RL)	6.7	8.4 (6.7–9.6)	6.9	7.5	8.5 (7.3–9.7)
Illicial cavity width	5.1	5.0 (3.7–5.7)	13.7	4.5	5.5 (5.1–6.2)
Mouth width	14.1	13.6 (12.9–14.2)	12.1	14.5	13.7 (12.1–15.5)
Predosal length	66.9	66.2 (64.1–68.2)	66.0	69.8	64.7 (63.3–67.2)
Postanus length	56.7	54.6 (52.2–57.1)	58.0	59.6	54.1 (52.6–54.8)
Preanal length	79.9	80.3 (78.4–84.3)	81.1	84.9	78.5 (76.8–79.4)
Disk margin length	43.6	43.3 (42.2–44.9)	43.0	44.9	42.7 (40.1–46.8)
Pectoral fin length	23.8	23.2 (19.3–25.7)	22.8	28.8	22.3 (21.2–22.9)
Anal fin length	21.1	17.9 (14.7–21.1)	18.1	21.9	17.1 (16.4–17.7)
Dorsal fin length	17.6	17.3 (14.9–19.0)	20.0	23.7	17.0 (16.4–17.9)
Caudal fin length	25.2	26.8 (24.1–28.9)	25.3	31.5	24.0 (18.1–26.4)
ED/RL ration	1.9	1.6 (1.4–1.9)	1.9	2.1	1.6 (1.2–2.0)
ED/IO ration	1.9	1.9 (1.7–2.3)	2.1	2.4	2.0 (1.7–2.2)
Meristics		Frequency			
Dorsal-fin rays	5	4 (1), 5 (8)	7	6	5
Pectoral-fin rays	11;11	11 (6), 12 (12)	13;13	13;14	12
Anal-fin rays	4	3 (2), 4 (7)	4	4	4
Caudal-fin rays	9	9 (9)	9	9	9

All fins naked, without bucklers, except for some small ones running out along base of caudal fin rays; interradials of pectoral fins thin, transparent; dermal cirri flap-like, present on disk margin and lateral sides of tail associated with lateral line scales.

Coloration. When fresh (Figs. 1–2), body background uniformly grayish; ventral surface of disk pale, that of caudal peduncle grayish; dorsal surface with irregular blackish stain marks or spots on central region; irregular black patches on dorsal surface of head in some paratypes; anterior portion of rostral spine surrounded by a blackish ring; indistinct broad dark band across dorsal-fin base in holotype and a few paratypes, absent in the others; base and posterior third of caudal fin blackish; outer third of pectoral fin with a narrow band; dorsal fin blackish; anal-fin base blackish (uniformly pale in some paratypes). When preserved, the blackish marks become darker. Peritoneal membrane white with tiny black dots.

Size. Apparently a small species with adult size slightly over 50 mm SL.

Etymology. The specific name is derived from *Formosa*, meaning beautiful in Portuguese, and an old name for Taiwan.

Distribution. Known only from the type series collected from off southwestern Taiwan; rarely seen in bycatch of bottom trawlers.

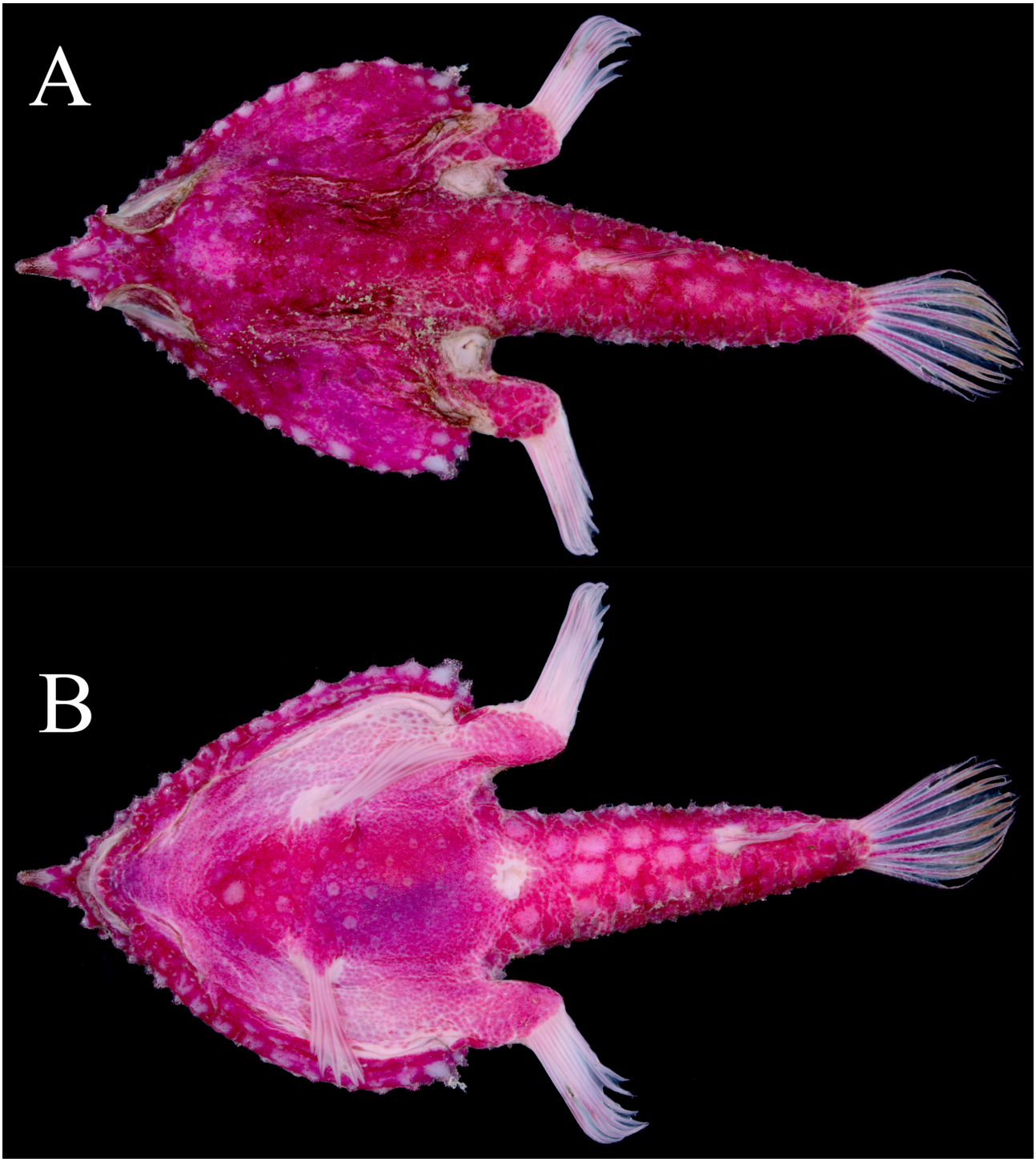

FIGURE 3. *Malthopsis formosa* **sp. nov.**, paratype, NMMB-P26435,46.4 mm SL, stained with red color.

Comparison. *Malthopsis formosa* is similar to *Malthopsis tiarella* (Figs. 5–7) and *M. kobayashii* (Figs. 8–9) in squamation and coloration. However, these three species differ from each other in several ways. *Malthopsis tiarella* has a naked interorbital space, membrane above eye with a single row of a few bucklers (naked elsewhere), large naked areas on throat and outer surface of gill chamber, compared with more numerous small prickle-like bucklers in these areas in two other species. Moreover, the relatively more fin rays (6 or 7 in dorsal fin and 13 or 14 in pectoral fin) can also separate it from two other species.

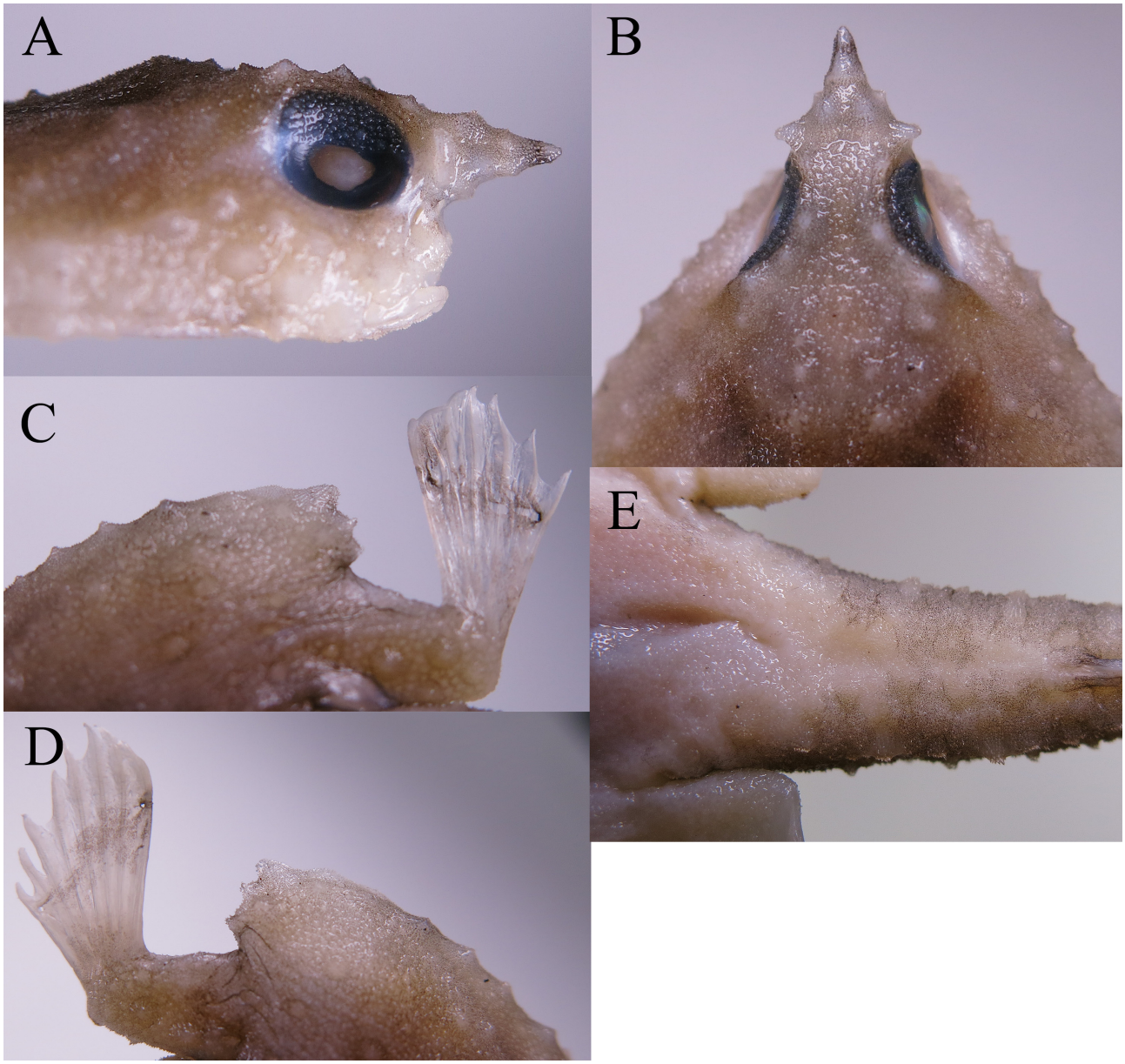

FIGURE 4. *Malthopsis formosa* **sp. nov.**, from the holotype. A. lateral view of head. B. dorsal view of head. C. right subopercularregion. D. left subopercular region. E. ventral view of anus and caudal region.

Both *M. formosa* and *M. kobayashii* have 5 dorsal-fin rays (rarely 4 or 6 in *M. kobayashii*), 11 or 12 pectoral-fin rays, and uniformly grayish dorsal surface with some irregular blackish spots at central portion of disk. *Malthopsis formosa* differs from *M. kobayashii* in having the rostral spine directed forward horizontally (vs. rather upward; Figs. 8B, 9A); body loosely covered with principal bucklers (vs. densely and heavily covered with bucklers; Figs. 8A, B); most of ventral surface densely covered with small prickle-like bucklers, except for narrow naked areas on outer gill chamber (vs. large naked areas on outer region of gill chamber; Fig. 8C); 1 (sometimes 2) buckler on each side of posterior portion of anus (vs. 3 or 4 bucklers on same region; Fig. 8C).

***Malthopsis tiarella* Jordan, 1902**

English name: Spearnose seabat
Figures 5–7; Table 1.

Malthopsis tiarella Jordan, 1902:378, fig. 7 (type locality: Suruga Bay near Numazu, Japan, depth 70–100 fathoms). Ho & Shao, 2008:308 (in part). Ho *et al.*, 2009:394. Ho & Shao, 2010a:9. Ho, 2013:289.

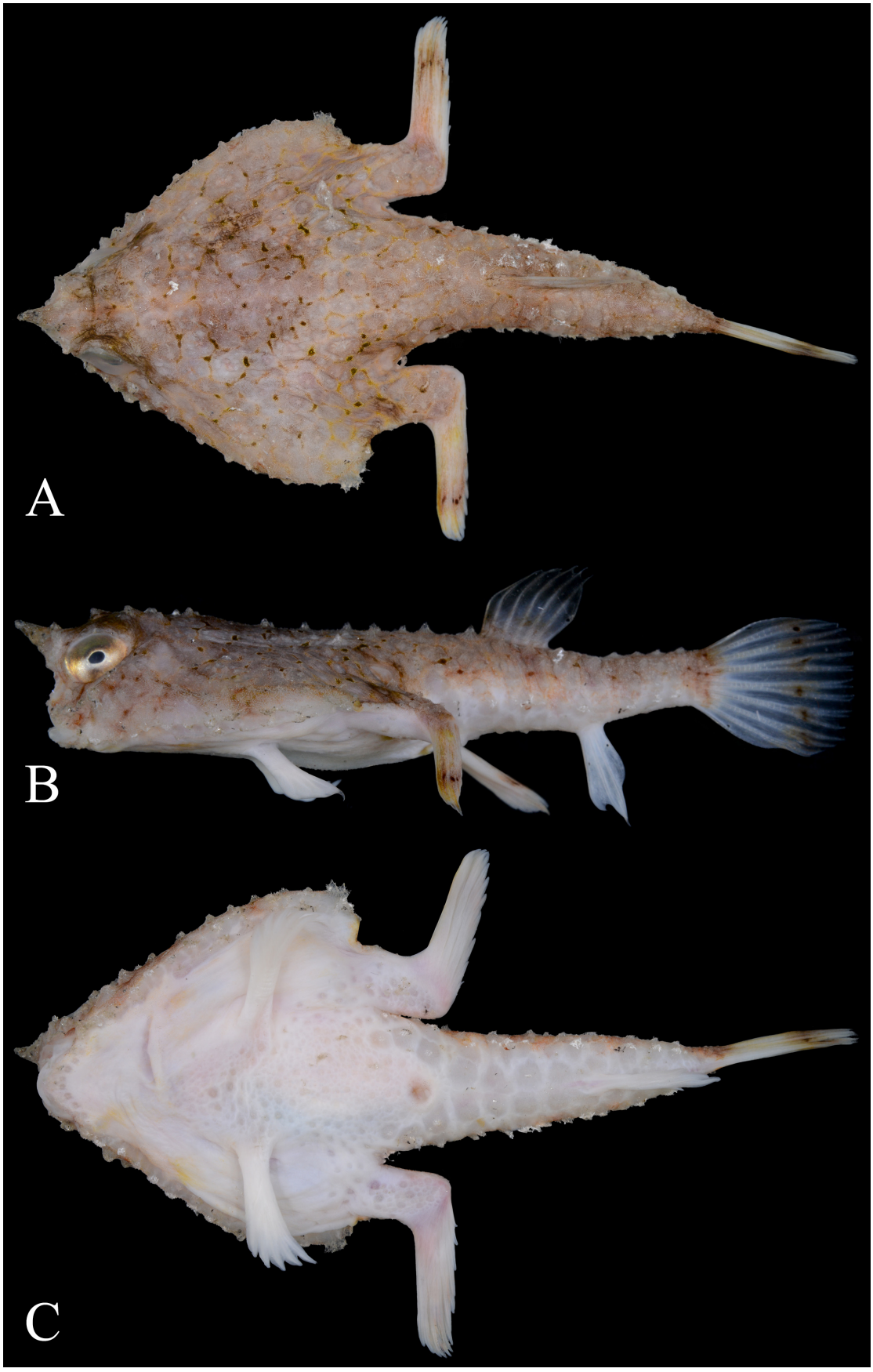

FIGURE 5. *Malthopsis tiarella* Jordan, 1902, NMMB-P28508, 50.9 mm SL. A. dorsal view. B. lateral view. C. ventral view.

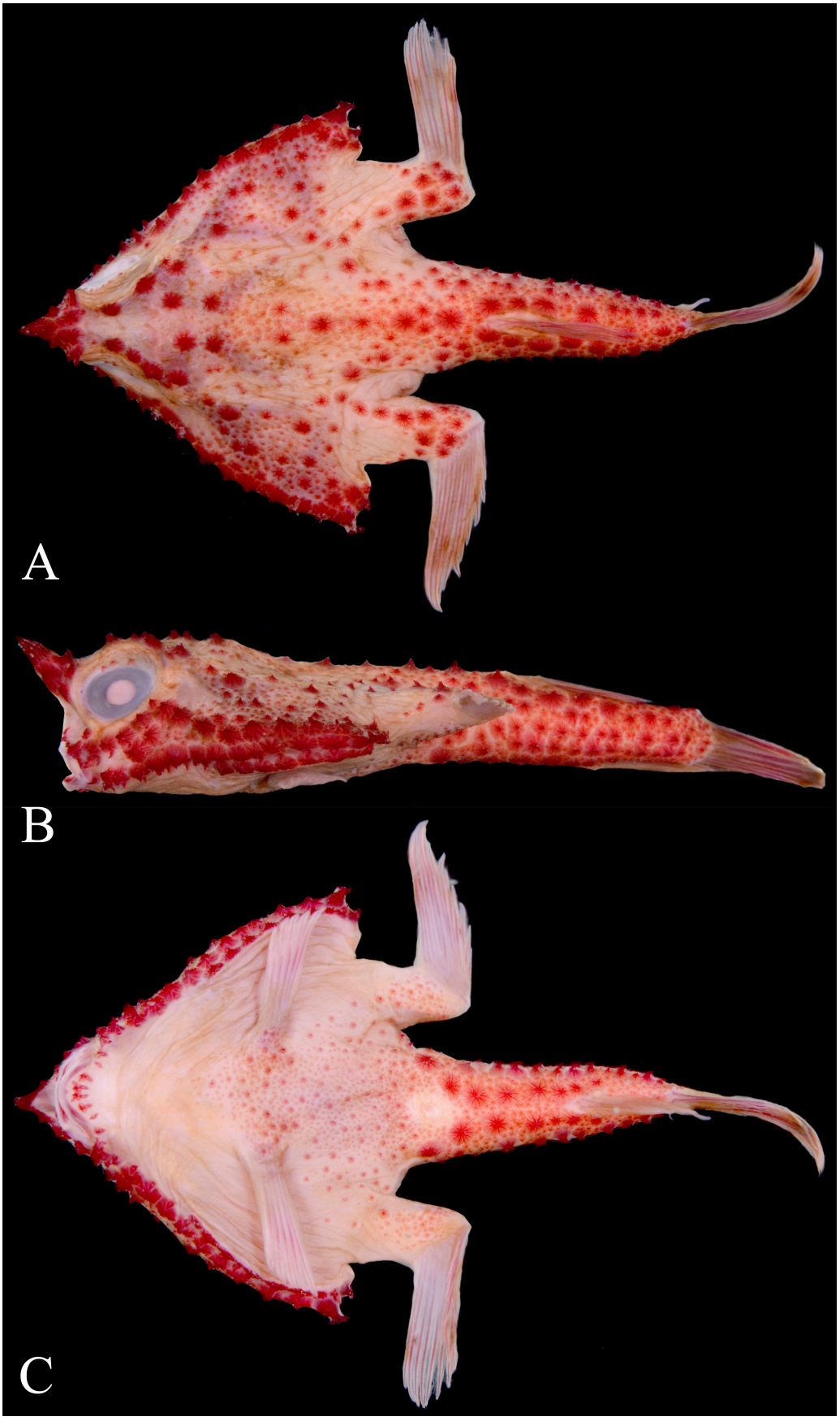

FIGURE 6. *Malthopsis tiarella* Jordan, 1902, stained with red color, NMMB-P03366, 33.3 mm SL. A. dorsal view. B. lateral view. C. ventral view.

Materials examined. NMMB-P03366 (1, 33.3, stained), off Kaohsiung, southwestern Taiwan, 6 Nov. 2002. NMMB-P28508 (1, 50.9), off Dong-gang fishing port, Pingtung, southwestern Taiwan, 8 Feb. 2018.

Diagnosis. A species of *Malthopsis* belonging to the species group with small prickle-like bucklers on body surface; it can be further distinguished from its congeners in having 6 or 7 dorsal-fin rays; 13 or 14 pectoral-fin rays; indistinct reticulate pattern on dorsal surface (faded in preservation); rostral spine directed upward and forward; interorbital space narrow and naked; skin above the eye with one row of a few bucklers, naked elsewhere; throat and outer regions of ventral surface largely naked; appressed anal fin extending well over caudal-fin base posteriorly; black band on posterior portion of pectoral and caudal fins.

Description. Morphometric and meristic data are provided in Table 1.

Body depressed, disk markedly triangular in dorsal view, cranium elevated above general surface of other parts of disk; caudal peduncle cylindrical, tapering posteriorly; rostrum small, its base moderately wide for genus, terminal spine conical, directed forward and upward (Fig. 7B), distinctly overhanging illicial cavity and beyond mouth; rostral length about half of eye diameter (eye diameter/rostral length 1.9–2.1); eye relatively large (13.4% SL in 50.9 mm specimen, 15.7% SL in 33.3 mm specimen), directed dorsolaterally; no pupillary operculum; interorbital space narrow (6.5–6.7% SL), shallowly concave (Fig. 7A); illicial cavity a small triangular cave, relatively broad in outline, wider than high; esca a single oval bulb, bearing 2 small cirri on dorsal margin; mouth small, terminal; small villiform teeth on jaws forming narrow bands, those on fifth ceratobranchial forming 2 large and elongated patches close together, and teeth on vomer and palatines in quadrangular patch.

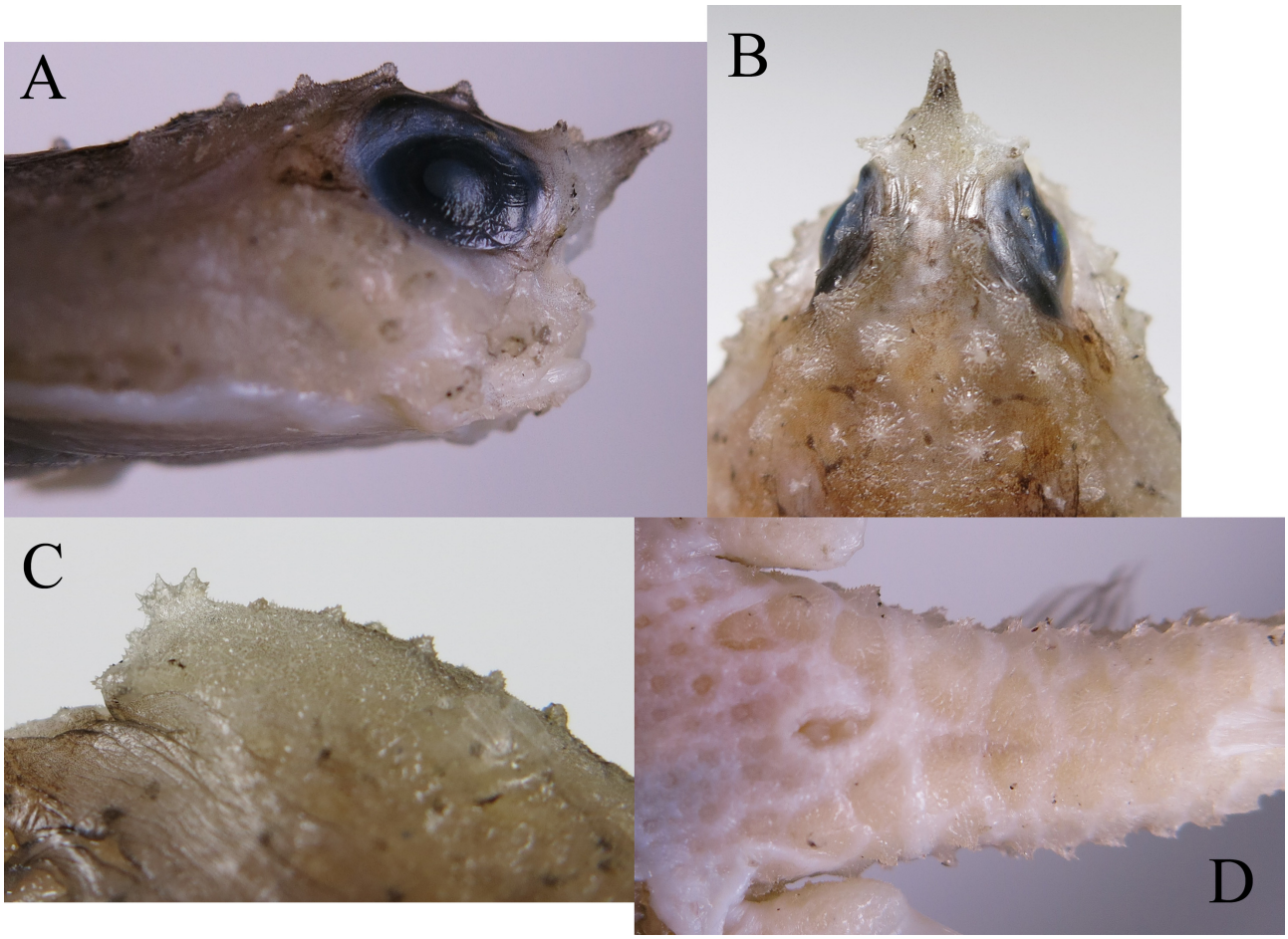

FIGURE 7. *Malthopsis tiarella* Jordan, 1902, from NMMB-P28508. A. lateral view of head. B. dorsal view of head. C. dorsal view of left subopercular region. D. ventral view of caudal region.

Scales on body surface in the form of bucklers, relatively sharp and pointed (Figs. 5–7), mostly associated with lateral line, skeleton and body edge; scattered tiny prickle-like bucklers on body surface; dorsal surface loosely covered with small bucklers between principal bucklers, except for eyes and fins. Four bucklers on each side of frontal ridge, first two situated at anterolateral corner of orbit; second pair direct outward, and with rostral spine forming

a trident; a gape between second and third; third and fourth bucklers relatively large in size. A pair of bucklers on dorsal surface of base of rostrum. Skin above eye bears a series of 3–6 small bucklers, naked elsewhere.

Dorsal surface of skull with 2 (right side of large specimen with 3) pointed bucklers on each side; followed by a median widely-spaced row of smaller bucklers at postcephalic region; largely naked on both sides of dorsal surface of disk. Small scattered bucklers and tiny prickle-like bucklers, usually 3–5 facets, with few apical spines at center of each buckler (Fig. 6B), on abdomen and chest, largely naked on remaining part of ventral surface of gill cavity and thoracic regions; buckler of subopercular dull, bearing few spinelets, none especially enlarged, one directed forward and one directly backward in 33.3 mm specimen and many spinelets in 50.9 mm specimen (Fig.7C); one flat, triangular buckler with a pointed spine on post-subopercular margin; caudal peduncle covered by large bucklers, those on dorsal surface forming 5 irregular, scattered rows, 1 median row behind dorsal fin, 2 rows on each sideof dorsal fin, 2 rows on each lateral side associated with lateral line, bucklers of lower row slightly larger than those of upper row; bucklers on ventral surface of caudal peduncle forming 2 regular rows between anus and anal fin, relatively flattened; anus surrounded by 2 or 3 bucklers on each side of posterior portions, these not larger than neighboring ones (Fig. 7D).

All fins naked, without bucklers, except for some small ones running out along the base of caudal fin rays; inter-radials of pectoral fins thin, transparent; dermal cirri flap-like, present on disk margin and lateral sides of tail associated with lateral line scales.

Coloration. When fresh, body background light brownish; dorsal surface with light yellowish reticulate pattern and some short dark marks; irregular black patches on dorsal surface of head; indistinct broad band across dorsal fin base and space between dorsal and anal fin; thin black band with darker dots on fin rays on posterior third of pectoral fin, and base and posterior third of anal fin. When preserved, body background grayish, irregular darker patches on dorsal surface of head and central disk; short dark marks on dorsal surface; indistinct broad bands across dorsal-fin base and space between dorsal and caudal fins; dorsal fin blackish; thin black bands on posterior third of pectoral fin and base and posterior third of caudal fin; ventral surface uniformly pale. Peritoneal membrane white with many black dots.

Size. Apparently a small species with adult size slightly over 50 mm SL.

Distribution. Known from Japan (type locality) and Taiwan. Rarely seen in collections; specimens from other localities may represent different species.

Remarks. At first sight of the larger specimen (50.9 mm SL), we thought it to be an undescribed species because of the special reticulate pattern. However, after a detailed examination of that specimen and one additional specimen (33.3 mm SL), we recognized both as *M. tiarella.* A searched for the holotype in the USNM collection by HCH was not successful. Thus, data of the holotype are currently unavailable.

In the original description, Jordan (1902) reported 7 dorsal-fin rays and 10 (but with a question mark) pectoral-fin rays. However, the drawing of the same specimen showed clearly 7 dorsal-fin rays and 14 pectoral-fin rays. It is rare to see such a combination of fin-ray numbers in *Malthopsis* because most members have 5 or 6 (mostly 5) and 12–13, respectively. Our specimens process 6 or 7 dorsal-fin rays and 13 or 14 pectoral-fin rays which are similar to those of *M. tiarella*. Although we were not able to examine the holotype, our specimen matches the original description well, especially the number of fin rays and coloration, which are clearly different from *M. kobayashii* and *M. formosa*. Accordingly, additional diagnostic characters are provided for present species above.

From the only x-radiograph film of the holotype taken long time ago, there are one forward-directed and one backward-directed spinules on the subopercular buckler. In some cases, the small specimens (<40 mm SL) of *M. kobayashii* have some forward-directed and one backward-directed spinules on the subopercular buckler. However, all specimens larger than 40 mm SL have these spinules reduced. The 33.3 mm specimen also has the spinules, whereas the 50.9 mm does not.

Ochiai & Mitani (1956) reported two specimens of *M. tiarella*. A search for these two specimens in the FAKU (Kyoto University, Department of Bioresource Science, Faculty of Agriculture: presently housed at Maizuru Fishery Station) collection was unsuccessful. The authors provided a count of 12 pectoral-fin rays and a drawing of their specimens, which are likely to be *M. kobayashii*. HCH examined many specimens in FAKU and found that all specimens appeared to be the same species (viz., *Malthopsis kobayashii*) with variation in their squamation.

Ho & Shao (2008) provided a photo of *M. tiarella*, which we reidentified as *M. formosa* described above.

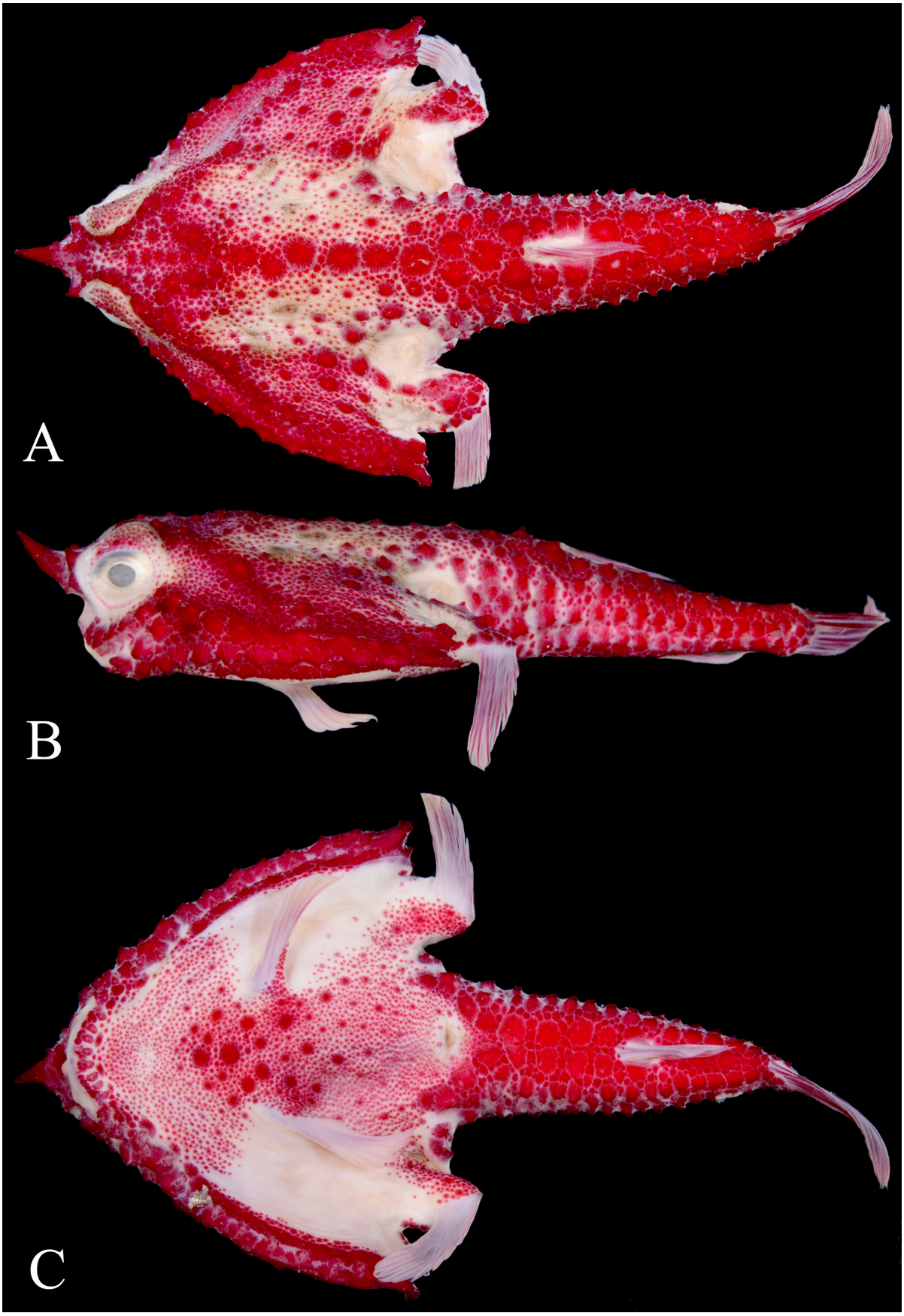

FIGURE 8. *Malthopsis kobayashii* Tanaka, 1916, NMMB-P11264, 55.1 mm SL, stained with red color. A. dorsal view. B. lateral view. C. ventral view.

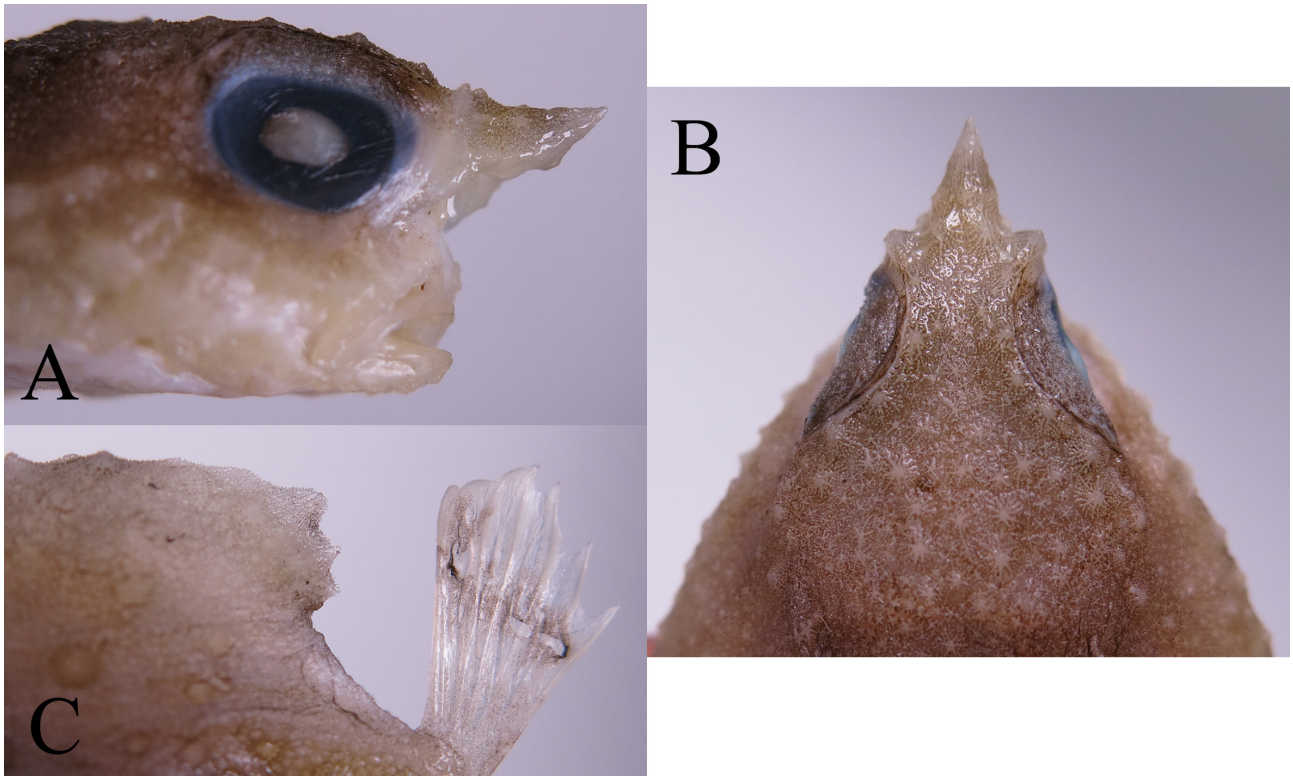

FIGURE 9. *Malthopsis kobayashii* Tanaka, 1916, NMMB-P17171, 63.0 mm SL. A. lateral view of head. B. dorsal view of head. C. dorsal view of right subopercular region.

Discussion

There are seven species currently recognized in the species group with small prickle-like bucklers on body surface, including *Malthopsis austrafricana* Ho 2013 (western Indian Ocean), *Malthopsis asperata* Ho, Roberts & Shao 2013 (Tropical Pacific Ocean), *Malthopsis bradburyae* Ho 2013 (Tanzania), *M. formosa*, *Malthopsis gnoma* Bradbury 1998 (Western Atlantic), *M. kobayashii*, and *M. tiarella*.

In addition to the detailed comparison provided above, *M. formosa* differs from *M. gnoma* in lacking gill filaments on fourth gill arch (vs. filaments present on fourth gill arch); from *M. bradburyae* in having principal bucklers moderately tall and pointed (vs. principal bucklers rounded and low); from *M. austrafricana* in having small prickle-like bucklers covering most parts of ventral surface (vs. large naked areas on throat and outer surface of gill chamber; see Ho, 2013:fig. 3); and from *M. asperata* in having principal bucklers moderately tall (vs. very tall with prominent spinulets), ventral surface mostly covered with small prickle-like bucklers (vs. large naked areas on outer surface of gill chamber), and subopercular buckler without enlarged spinelets (vs. at least 3 slightly enlarged spinelets on subopercular buckler).

In the present study, we confirm that the numbers of fin rays and squamation on skin above the eye, throat, and outer surface of gill chamber can be used to distinguish *M. tiarella* from other congeners, as well as other members occurring in the northwestern Pacific Ocean.

Individuals of *M. tiarella* and *M. formosa* are small, the largest adults examined are slightly greater than 50 mm SL, whereas those of *M. kobayashii* attain 82.8 mm SL (MNHN 1986-0019). Although most of the other congeners are mostly smaller than 70 mm SL, *M. tiarella* and *M. formosa* appear to be smaller in general.

Comparative materials

Malthopsis kobayashii: NMMB-P11264 (1, stained, 55.1), off Dong-gang, 16 Jan. 2011. NMMB-P12138 (1, 58.6),

NMMB-P12139 (1, 62.8), off Nan-fang-ao, Yilan, northeastern Taiwan, 11 Mar. 2011. NMMB-P17171 (1, 63.0), off Daxi, Yilan, northeastern Taiwan, 17 Jul. 2012. NMMB-P24830 (1, 53.0), off Dong-gang, 9 Aug. 2016.

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References

Alcock, A.W. (1891) On the results of deep-sea dredging during the season 1890–91. *Annals and Magazine of Natural History*, Series 6, 8 (43/44), 16–34, 119–138, pls. 7–8.
https://doi.org/10.1080/00222939109460407

Gilbert, C.H. (1905) The deep-sea fishes of the Hawaiian Islands. In: The aquatic resources of the Hawaiian Islands. *Bulletin of the U. S. Fish Commission*, 23 (Pt2), 577–713, pls. 66–101.

Ho, H.-C. (2013) Two new species of the batfish genus *Malthopsis* (Lophiiformes: Ogcocephalidae) from the Western Indian Ocean. *Zootaxa*, 3716 (2), 289–300.
https://doi.org/10.11646/zootaxa.3716.2.9

Ho, H.-C., Prokofiev, A.M. & Shao, K.-T. (2009) A new species of the batfish genus *Malthopsis* (Lophiiformes: Ogcocephalidae) from the northwestern Indian Ocean. *Zoological Studies*, 48 (3), 394–401.

Ho, H.-C., Roberts, C.D. & Shao, K.-T. (2013) Revision of batfishes (Lophiiformes: Ogcocephalidae) of New Zealand and adjacent waters, with description of two new species of the genus *Malthopsis*. *Zootaxa*, 3626 (1), 188–200.
https://doi.org/10.11646/zootaxa.3626.1.8

Ho, H.-C. & Shao, K.-T. (2008) The batfishes (Lophiiformes Ogcocephalidae) of Taiwan, with descriptions of eight new records. *Journal of the Fisheries Society of Taiwan*, 35 (4), 289–313.

Ho, H.-C. & Shao, K.-T. (2010a) A review of *Malthopsis jordani* Gilbert, 1905, with description of a new batfish from the Indo-Pacific Ocean (Lophiiformes: Ogcocephalidae). *Bulletin of the National Museum of Nature and Science (Ser. A)*, 4 (Supplement), 9–19.

Ho, H.-C. & Shao, K.-T. (2010b) Redescription of *Malthopsis lutea* Alcock, 1891 and resurrection of *M. kobayashii* Tanaka, 1916 (Lophiiformes: Ogcocephalidae). *Journal of the National Taiwan Museum*, 63 (3), 1–18.

Jordan, D.S. (1902) A review of the pediculate fishes or anglers of Japan. *Proceedings of the United States National Museum*, 24 (1261), 361–381.
https://doi.org/10.5479/si.00963801.24-1261.361

Ochiai, A & Mitani, F. (1956) A revision of the pediculate fishes of genus *Malthopsis* found in the waters of Japan (Family Ogcocephalidae). *Pacific Science*, 10 (3), 271–285.

Tanaka, S. (1916) A new species of Japanese fish. *Zoological Magazine, Tokyo*, 28 (335), 348.