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Revision of batfishes (Lophiiformes: Ogcocephalidae) of New Zealand and adjacent waters, with description of two new species of the genus *Malthopsis*

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Abstract

Examination and taxonomic review of the batfishes collected from New Zealand and adjacent waters reveals five nominal species: *Halieutopsis bathyoreos* and *Malthopsis mitrigera* are recorded from New Zealand for the first time; the synonymy of *Halieutaea maoria* with *H. stellata* is confirmed, and two new species are described. *Malthopsis asparata* **sp. nov.** is unique in having stout principal bucklers with prominent spines. *Malthopsis parva* **sp. nov.** differs from congeners in having a naked abdomen, a short rostral spine directed upward, and all principal bucklers blunt.

Key words: Taxonomy, batfishes, Ogcocephalidae, new species, new records, New Zealand, New Caledonia

Introduction

Batfishes are small, benthic fishes found in most tropical and subtropical seas, except the Mediterranean. They are unusual, highly modified lophiiform anglerfishes, having a distinctive circular to triangular, compressed body, comprising cranium and opercular apparatus which form the lateral margins; terminal or subterminal mouth; pelvic fins ventral, hidden and well in advance of large protruding pectoral fins, both paired fins modified into walking appendages; a conspicuous cavity (illicial trough) at front of head above mouth, containing a fleshy lure (comprising illicium completely embedded in esca), which is a modification of the first dorsal spine; and a body covered with spinous scales called tubercles, which in some genera are enlarged and modified into bucklers. The epidermis associated with these body scales may be extended into flaps and fringes.

Batfishes have been observed to walk slowly along the seafloor using their pectoral and pelvic fins, each pair moving forward together in tandem. Although capable of swimming off bottom with more rapid side to side movement of body and tail, supplemented by alternate paddling of pectorals, their movement is slow. As poor swimmers, batfishes probably rely on camouflage and their armoured prickly tubercles and bucklers to help avoid predation. Most species are found at depths of 100–1500 m, but some species in the tropics can occur as shallow as 1 m. Globally, ten genera and more than 70 species are known, including many undescribed species (Ho, unpublished data). While there is no commercial catch, most museum specimens have been taken among by-catch from trawls and dredges.

The first batfish from New Zealand waters, *Halieutaea maoria*, was described as new by Powell in 1937, and 45 years later it was still known from only the holotype (Ayling & Cox, 1982: 157). Subsequently, this species plus an unstated number of *Malthopsis* species were listed from New Zealand by Paulin & Stewart (1985: 27) and Paulin *et al.* (1989: 256), and as *Malthopsis*. sp. A and *M*. sp. B, by Roberts *et al.* (2009: 532), who also recorded an additional species, *Halieutopsis* sp. A. Clearly, over 70 years since the first voucher was captured the New Zealand ogcocephalids, comprising just one poorly understood nominal species and three other species, documented only as OTU's sp. A and sp. B, were badly in need of taxonomic revision.

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Ogcocephalids are now more common in collections, thanks to the efforts of museum and fisheries scientists, scientific observers, commercial fishers and even recreational anglers over the last 30 years. Based on over 70 specimens in over 40 lots registered in NMNZ and AIM collections, three genera and five species, including two species new to science and two new records for the area, have been discovered during the present study. Some of these species also occur in Australian seas. However, the main purpose of this paper is to present a taxonomic revision of the New Zealand batfishes, which includes a key, diagnoses, formal descriptions, and accurate scientific names of all species.

Methods and materials

The body length used throughout is the standard length (SL). Terminology for describing the angling apparatus follows Bradbury (1967). Methods and definitions of the characters used in this study followed Ho *et al.* (2009) and Ho & Shao (2010a). Proportional measurements are rounded to the nearest 0.1 mm. Morphometric values are expressed as percentages of standard length. Meristic values are counted on both sides when paired. Institutional abbreviations are as listed in Fricke & Eschmeyer (2011). Comparative materials as listed in Ho & Shao (2008, 2010a, b), Ho et al. (2009). Data for comparison are those taken from Ho & Shao (2010a).

Taxonomy

***Malthopsis asperata* sp. nov.**
New English name: Roughspine batfish
Figs. 1A–D, 2A–D; Tables 1

Malthopisis sp. A. Roberts *et al*., 2009: 532 (listed).

Holotype. NMNZ P.035177 (65.4 mm SL), R/V *Tangaroa* I, NZOI stn. K839, 30°15.4'S, 178°24'E, off McCauley Island, Kermadec Ridge, New Zealand, 290 m, Jul. 1974.

Paratypes. 6 specimens, 31.6–50.2 mm SL. CSIRO H7368-01 (former NMNZ P.029084, 1, 45.8), N.O. *Alis*, Beryx 11, stn. 24, 24°43.8'S, 168°7.525'E, Kaiyo Maru Seamount, New Caledonia, 260–280 m, beam trawl, 17 Oct. 1992, coll. C. Roberts & C. Paulin. MNHN 2012-0215 (former NMNZ P.029016, 1, 50.2) and NMMB-P10458 (1, 48.9, out of NMNZ P.029381), N.O. *Alis*, Beryx 11, stn. 17, 24°48.2'S, 168°8.85'E, Kaiyo Maru Seamount, New Caledonia, 250–270 m, beam trawl, 16 Oct. 1992, coll. C. Roberts & C. Paulin. NMNZ P.029020 (1, 58.4), N.O. *Alis*, Beryx 11, stn. 22, 24°44.7'S, 168°6.65'E, Kaiyo Maru Seamount, New Caledonia, 490–510 m, beam trawl, 17 Oct. 1992, coll. C. Roberts & C. Paulin. NMNZ P.029096 (1, 45.1), N.O. *Alis*, Beryx 11, stn. 16, 24°47.01'S, 168°8.755'E, Kaiyo Maru Seamount, New Caledonia, 240-250 m, beam trawl, 16 Oct. 1992, coll. C. Roberts & C. Paulin. NMNZ P.035195 (1, 31.2), R/V *Tangaroa* I, NZOI stn. K828, 28°35.4'S, 177°50.7'E, Kermadec Ridge, New Zealand, 440 m, Jul. 1974.

Diagnosis. A member of *Malthopsis* unique in having stout principal bucklers with prominent spines. It also differs from congeners in the combination of characters: 5–6 dorsal-fin rays; 12 pectoral-fin rays; ventral surface covered by small bucklers and minute prickles; subopercular buckler bearing 3 small spinelets, 1 directed forward, 1 directed outward and 1 directed backward, and a few blunt spinelets on its margin; interspaces of principal bucklers covered by small buckler and prickles; and rostral spine pointed, directed forward and upward.

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

Body depressed, disc markedly triangular in dorsal view, cranium elevated above the level of general surface of other part of disc (Fig. 2B); caudal peduncle semi-cylindrical, flattened on ventral surface, tapering posteriorly; rostral spine relatively long (7.1–9.8% SL, mean=8.0% SL), conical and pointed, directed rather upward than forward, usually more than 45° (Figs. 1B, 2B), overhanging illicial cavity and mouth; rostral spine longer than half of eye diameter; eye relatively large (11.0–13.1% SL, mean=12.0% SL), directed dorsolaterally; no pupillary operculum; interorbital space relatively narrow (4.9–6.8% SL, mean=5.8% SL), slightly concave, forming a groove (Fig. 2A); illicial cavity relatively large, forming a rounded cave, its width about equal to height; esca a single bulb,

bearing 2 small cirri on dorsal margin; mouth small, terminal; small villiform teeth on jaws forming narrow bands, those on 5th ceratobranchial forming 2 large and elongated patches close together, and teeth on vomer and palatines in quadrangular patches.

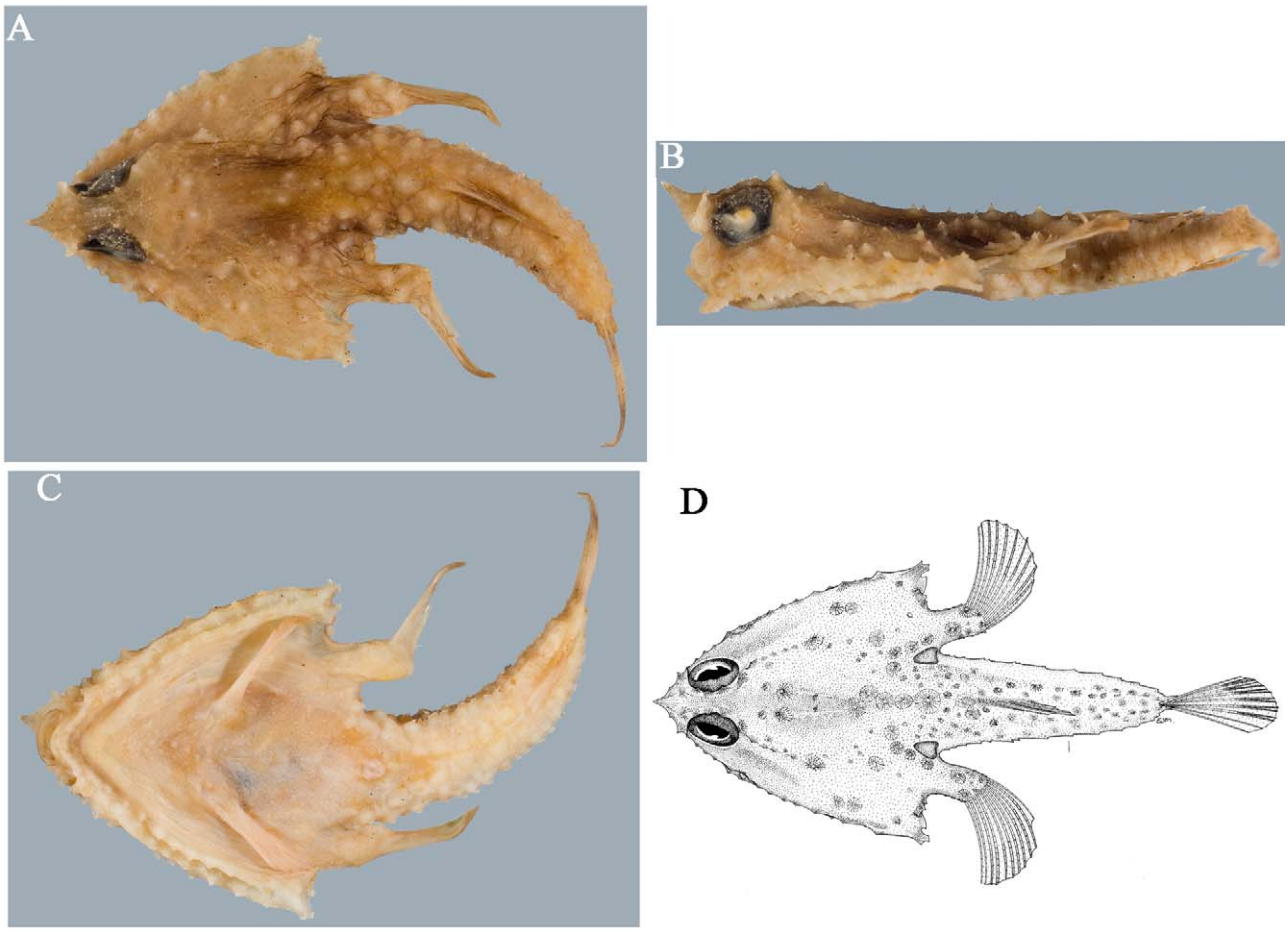

FIGURE 1. *Malthopsis asperata* **sp. nov.**, holotype, NMNZ P.035177, 65.4 mm SL. A. dorsal view. B. lateral view. C. ventral view. D. drawing of dorsal view, illustrated by E. Mackay. A–C. photo by C. Struthers.

TABLE 1. Morphometric and meristic data for two new species of *Malthopsis* from the study area.

	M. asperata sp. nov.			*M. parva* sp. nov.		
	Holotype	All types		Holotype	Types	
SL (mm)	65.4	31.2–65.4 (n=7)		46.4	28.3–46.4 (n=23)	
In %SL		Ave. (Range)	SD		Ave. (Range)	SD
Head length	26.8	28.2 (26.8–30.4)	1.5	28.7	30.0 (28.2–32.9)	1.4
Head width	19.3	20.6 (18.2–22.8)	1.5	23.3	21.9 (18.1–23.9)	1.4
Head depth	18.8	20.4 (18.8–23.4)	1.6	23.5	23.6 (21.5–25.5)	1.0
Orbital width	12.2	12.0 (11.0–13.1)	0.7	15.1	15.8 (14.3–17.5)	1.0
Interorbital width	4.9	5.8 (4.9–6.8)	0.7	5.6	5.4 (4.3–7.0)	0.8
Rostral length	7.2	8.0 (7.1–9.4)	0.9	5.2	4.2 (2.4–5.5)	0.8
Predorsal length	64.1	66.0 (64.1–67.6)	1.4	60.8	63.0 (58.8–66.4)	2.0
Preanus length	52.1	54.7 (52.1–56.5)	1.6	52.6	53.5 (51.8–66.4)	1.2
Preanal length	78.7	80.2 (78.7–82.1)	1.2	78.4	79.4 (75.9–82.5)	1.9

..... continued on next page

TABLE 1. (Continued)

	M. asperata sp. nov.			*M. parva* sp. nov.		
	Holotype	All types		Holotype	Types	
Disc-margin length	45.0	43.8 (41.0–46.2)	2.0	44.0	42.4 (38.2–47.9)	2.3
Mouth width	9.6	10.7 (9.6–11.3)	0.6	11.9	13.4 (11.6–15.7)	1.0
Dorsal-fin length	22.3	19.8 (18.3–20.1)	1.4	20.5	22.1 (18.6–25.4)	1.9
Anal-fin length	17.3	18.3 (16.6–20.1)	1.2	19.4	21.0 (18.2–23.6)	1.5
Pectoral-fin length	20.2	22.3 (20.2–24.0)	1.2	22.8	26.0 (22.8–32.0)	2.3
Caudal-fin length	24.8	26.6 (24.8–28.4)	1.4	28.7	28.6 (25.5–32.6)	1.9
Meristics		n=7			n=39	
		Value (frequency)			Value (frequency)	
Dorsal fin rays	6	5(2), 6(5)		6	5(8), 6(31)	
Pectoral fin rays	12/12	12/12 (7)		13/13	12/12(3), 13/13(36)	
Anal fin rays	4	4 (7)		4	4 (39)	

Scales on body surface in the form of bucklers, relatively sharp and scattered, mostly associated with lateral line, skeleton and body edge. Principal bucklers on dorsal surface pyramid-like, rough with prominent spinelets (Fig. 2D), and those on caudal peduncle are serrated with a slightly enlarged axial spine, directed backward. Interspaces of principal bucklers covered with small bucklers and minute prickles, except for eyes, gill openings and fins.

Six to seven principal bucklers along the upper orbital margin and frontal ridge, two at anterolateral corner of orbit, upper one larger, directed outward and upward; two to three small ones on frontal ridge, two at posterolateral corner, the anterior one larger (Fig. 2A). Skin above eye bears one irregular row of small bucklers and numerous prickles. Bucklers of dorsal surface of skull small, forming 3–4 irregular rows (Fig. 2A), followed by two large bucklers at post-cephalic region. An irregular series of principal bucklers along the central axil from middle part of dist to dorsal-fin origin. Subopercular buckler well developed, with one anteriorly directed spinelet and some small spinelets at its margin (Fig. 2C); central part of ventral surface covered by mixed small bucklers and prickles (Fig. 1B).

Ventral surface of gill cavity with a large naked area; caudal peduncle covered by large bucklers, those on dorsal surface forming 5 irregular rows, 1 median row behind dorsal fin, 2 rows on each side of dorsal fin, 2 equal size rows on each lateral side associated with lateral line neuromasts, 2 rows of 5–6 flattened bucklers on ventral surface of caudal peduncle between anus and anal fin; posterior margin of anus surrounded by 4–5 bucklers slightly larger than those neighboring ones.

All fins naked, without bucklers, except for some small ones and minute prickles running out along the bases of pectoral and caudal-fin rays; inter-radials of pectoral fins thin, transparent; dermal cirri flap-like, present on disc margin and lateral sides of tail associated with lateral line scales, sometimes hard to detected due to preservation.

Coloration. Preserved: Dorsal surface of body ground uniformly yellowish to brownish; some black patches on posterior part of disc and around the gill openings; black bars crossing the caudal peduncle at dorsal fin, base and posterior margin of caudal fin and outer part of the pectoral fin; ventral surface uniformly pale to yellowish. Peritoneum pale with small black dots in loose arrangement. Fresh: colour unknown.

Size. A moderately small species with adult size up to 65.4 mm SL.

Distribution. Known from the type series collected from New Zealand and New Caledonia at depths of 240–510 m.

Etymology. From the Latin “asper” – rough, a spine with many asperites (spinules) on each buckler.

Remarks. *Malthopsis asperata* **sp. nov.** is unique among its congeners in having the principal bucklers on the dorsal surface rough with prominent spinelets. It belongs to the species group with minute prickles on the ventral surface, which currently comprises three species, *M. kobayashii* Tanala, 1916 (northwestern Pacific, resurrected from *M. lutea* by Ho & Shao, 2010b), *M. gnoma* Bradbury, 1998 (western Atlantic) and *M. tiarella* Jordan, 1902 (northwestern Pacific). *Malthopsis asperata* **sp. nov.** can be further distinguished from these three species in

having black patches on the dorsal surface (vs. black rings or spots present), an anterior-directed spine on the subopercular buckler (vs. spine absent), and ventral surface covered by mixed small bucklers and minute prickles (vs. mainly minute prickles).

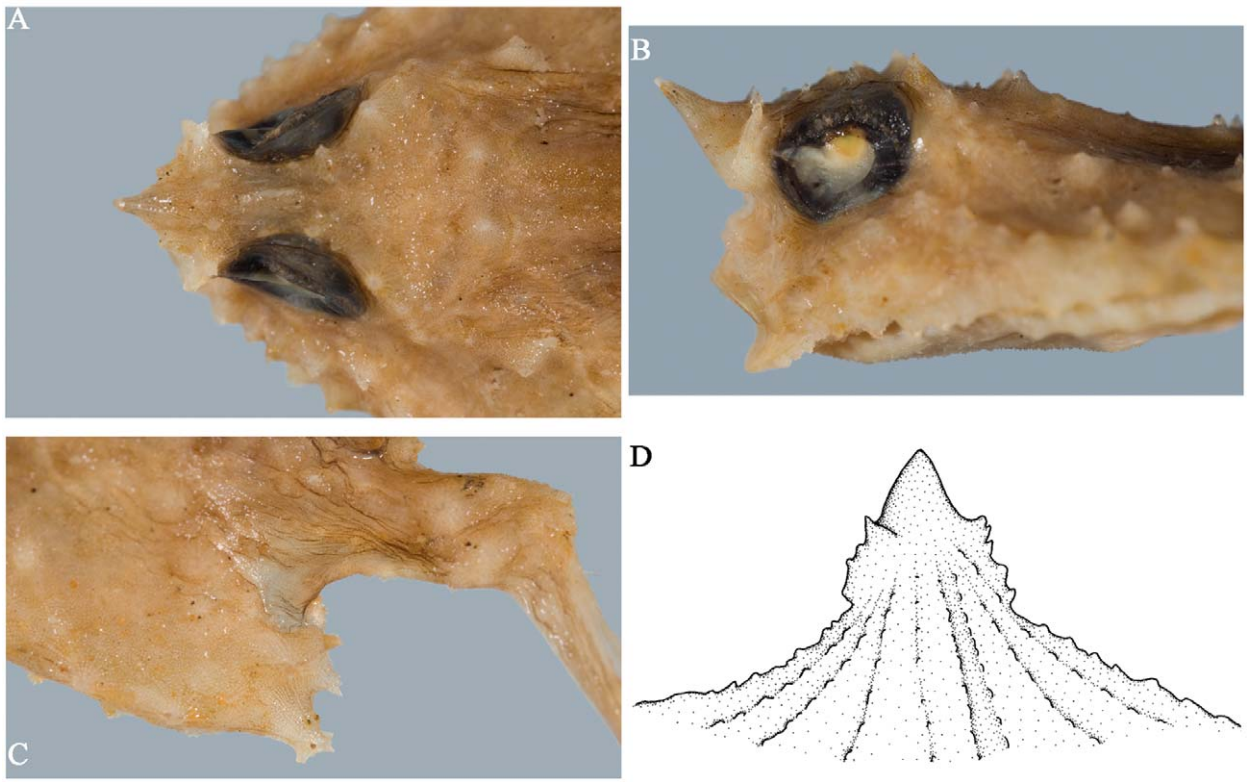

FIGURE 2. *Malthopsis asperata* **sp. nov.**, from the holotype. A. closed view of dorsal head. B. closed view of lateral haead. C. closed view of left subopercular region. D. lateral view of dorsal buckler, about 2 mm width, illustrated by M. Freebone. A–C. photo by C. Struthers.

***Malthopsis parva* sp. nov.**
New English name: Arrowhead batfish
Figs. 4A–E, 5A–D; Table 1

Holotype. NMNZ P.017180 (46.4 mm SL), RNZFA *Tui*, stn. AUZ 011, 30° 45.0' S 173° 57.0' E, Three Kings Ridge, extended continental shelf, outside NZ EEZ, beam trawl, 537–677 m, 06 Jul. 1962.

Paratypes. 39 specimens, 27.0-51.1 mm SL. CSIRO H6031-01(1, 51.1), NORFANZ cruise, R/V *Tangaroa*, TAN 0308, stn. 66, 3 1°45.33' S, 159°21.34' E, Tasman Sea, Lord Howe Rise, SE of Lord Howe Island, benthic sled, 565–960 m, 23 May 2003. NMNZ P.023916 (1, 41.5), NZOI K830, 29° 11.50' S–177° 53.50' W, Kermadec Ridge, New Zealand, 545 m, 26 Jul. 1984. NMNZ P.029067 (4, 22.2–35.5), CSIRO H.7367-01 (2, 32.0–34.0), MNHN 2012-0216 (2, 28.0–40.0), NMMB-P10459 (2, 25.6–28.8), USNM 406843 (2, 32.0–33.0), N.O. *Alis*, Beryx 11 stn. 8, 24°53.15'S, 168°21.55'E, 'Seamount B', northern Norfolk Ridge, south of New Caledonia, beam trawl, 540–570 m; 15 Oct 1992, coll. C. D. Roberts & C. D. Paulin. NMNZ P.029116 (6, 20.3–39.4) N.O. *Alis*, Beryx 11 stn. CP7, 24°55.50'S, 168°21.45'E,'Seamount B', northern Norfolk Ridge, south of New Caledonia; bottom trawl, 540–670 m, 15 Oct 1992, coll. C. D. Roberts & C. D. Paulin. NMNZ P.029203 (17, 27.0–37.2, 3 stained), N.O. *Alis*, Beryx 11 stn. CP7, 24°55.5'S, 168°21.45'E, 'Seamount B', northern Norfolk Ridge, south of New Caledonia, 15 Oct 1992, coll. C. D. Roberts & C. D. Paulin. NMNZ P.029294 (1, 34.5), N.O. *Alis*, Beryx 11 stn. 32, 23°38.20'S, 167°43.58'E, Stylaster Seamount, New Caledonia, beam trawl, 420–460 m, 18 Oct 1992, coll. C. D. Roberts & C. D. Paulin. NMNZ P.035192 (1, 32.0), R/V *Tangaroa* I, NZOI K804, 29° 14.80'S, 177°49.60'W, Kermadec Ridge, New Zealand, 590 m, Jul 1974. NMNZ P.035194 (2, 40.0–41.4); R/V *Tangaroa* I, NZOI K830, 29°11.5'S, 177°53'W, Kermadec Ridge, New Zealand, 545 m, Jul 1974.

Non-type: NMNZ P.027540 (1, 39.4, in poor condition), N.O. *Alis*, Beryx 2 stn. 2, 24°53’S, 168°22.3’E, 'Seamount B', northern Norfolk Ridge, south of New Caledonia, 23 Oct 1991, coll. C. D. Roberts.

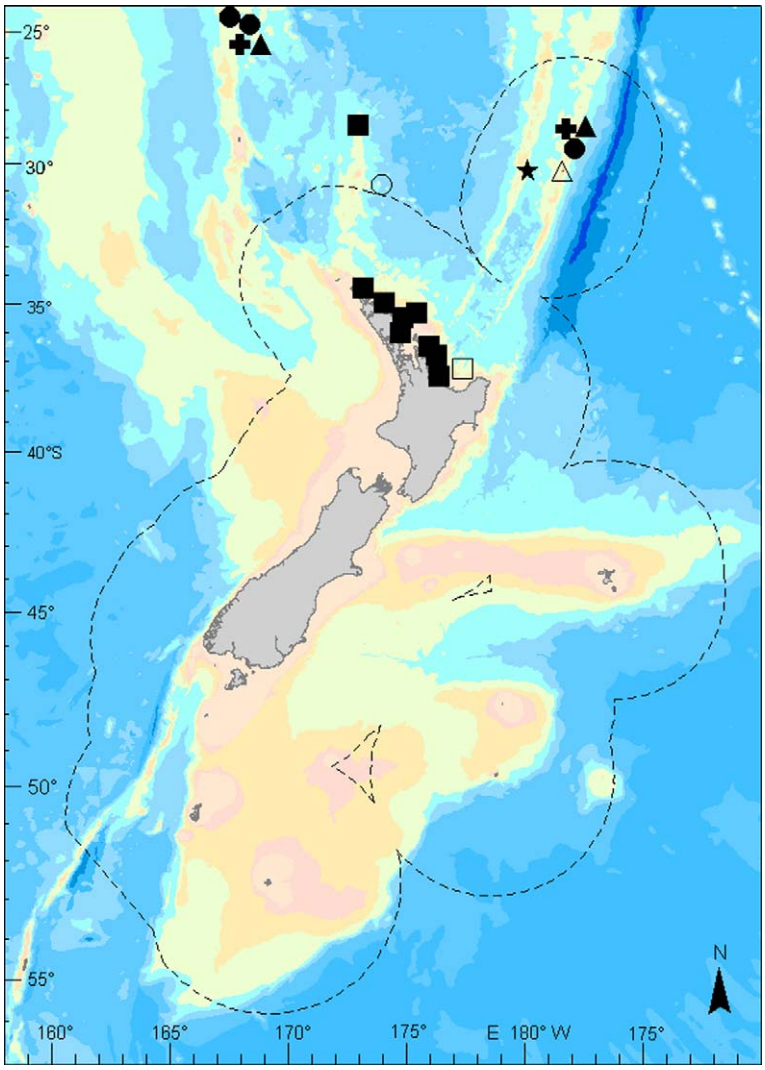

FIGURE 3. Distribution map of ogcocephalid species found in New Zealand waters. Square = *Halieutaea stellata*; star = *Halieutopsis bathyoreos*; triangle = *Malthopsis asperata*; cross = *Malthopsis mitrigera*; and circle = *Malthopsis parva*. One dot may represent more than one capture. Open dots indicate the holotype localities, including the holotype of *H. maoria* (open square).

Diagnosis. A member of *Malthopsis* with a fully naked ventral surface and interspaces of principal bucklers on dorsal surface lacking dermal spinules. It is distinguished from congeners by having 5–6 (mainly 6) dorsal-fin rays; 13 pectoral-fin rays; the subopercular buckler blunt, with a stout anterior-directed spinelet usually present; rostral spine directed rather more upward than forward; relatively few and loosely arranged bucklers; all bucklers blunt; appressed anal fin reaches caudal fin base. In addition, it is the smallest species of the genus reaching 51.1 mm SL in adults.

Description. Morphometric and meristic values are provided in Tables 1. Body depressed, disc markedly triangular in dorsal view, cranium elevated above surface of other parts of disc; caudal peduncle cylindrical, tapering posteriorly, ventral surface slightly flattened; rostral small and blunt, directed rather more upward than forward (Fig. 5B), its length much less than half of eye diameter; eye median in size (14.3–17.5% SL, mean=15.8% SL), directed dorsolaterally; no pupillary operculum; interorbital space relatively narrow (4.3–7.0% SL, mean=5.4% SL), slightly concave, forming a groove between frontals (Fig. 5A); illicial cavity a small triangular cave, its width equal to its height; esca a single medial bulb bearing two small cirri on dorsal margin; mouth small, terminal; small villiform teeth on jaws forming narrow bands, those on ceratobranchial V forming two large, closely spaced and elongated patches, and quadrangular tooth patches on vomer and palatines.

Scales on body surface in the form of relatively blunt bucklers (Figs. 4A, 5A–B), few in number, mostly associated with lateral line, skeleton and body margins; a few small bucklers may be present between principal

bucklers on dorsal surface of subopercle; center of disc usually with large naked area (Fig. 4C, 5D); 5–6 bucklers on each side of frontal ridge, the first two relatively small situated at anterolateral corner of orbit, the third and fifth or sixth bucklers relatively large in size (Fig. 5A); a row of a few small bucklers on the skin dorsal to eye; many small flat bucklers on dorsal surface of skull, two larger on posterior margin of skull, followed by a median row at post-cephalic region; a pair of bucklers at origin of dorsal fin. Ventral surface totally naked excluding a few rounded and flat bucklers without apical spines on pelvic fin base (Fig. 5D); buckler of subopercle relatively blunt, with a spine directed forward (Fig. 5C), some tiny spinelets may be present on lateral side in small individuals. Caudal peduncle covered with large bucklers, the interspaces densely covered by smaller bucklers, those on dorsal surface forming 2 irregular rows, those on lateral side forming 2 rows of about equal size associated with lateral-line, the lower row dense in arrangement, those on ventral surface of caudal peduncle forming two rows between anus and anal fin, 4–5 relatively flattened bucklers on each row; posterior portion of anus surrounded by 4–5 bucklers of larger size than neighouring bucklers.

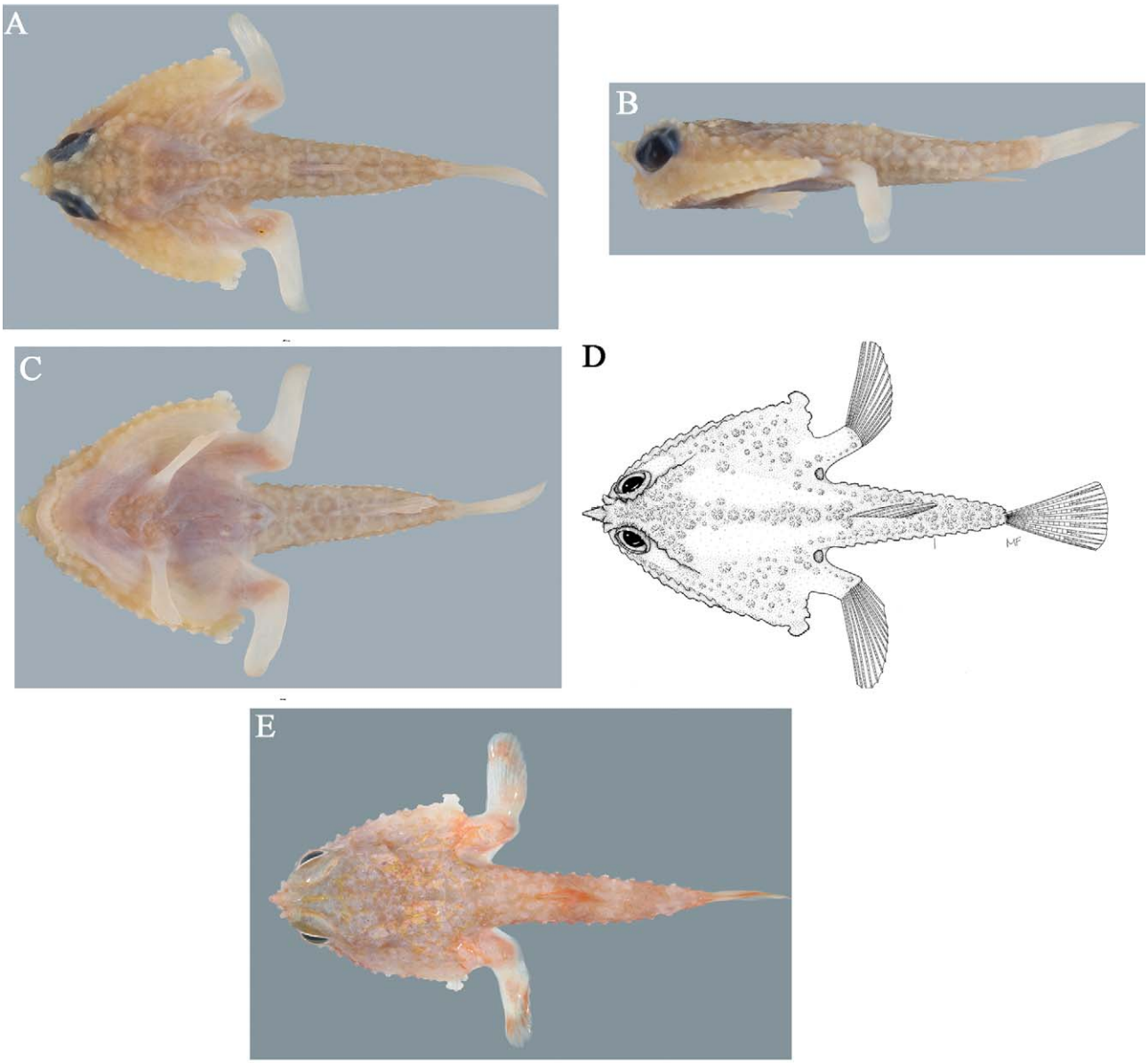

FIGURE 4. *Malthopsis parva* **sp. nov.**, holotype, NMNZ P.017180, 46.4 mm SL. A. dorsal view. B. lateral view. C. ventral view. D. drawing of dorsal view, illustrated by M. Freebone. E. CSIRO 6031-01, paratype, 51.2 mm, fresh, photo by CSIRO. A–C. photo by C. Struthers.

All fins naked, with small bucklers only on base of caudal fin rays; inter-radial of pectoral fins thin, transparent; dermal cirri present on disc margin, lateral sides of tail and in association with lateral line scales.

Coloration. Preserved specimen: Dorsal surface uniformly creamy-white to brown, all fins similar to background

color. Fresh specimen (from colour image of holotype): body pale brownish-grey, with bright yellow vermiculations between whitish bucklers on disc; tip of rostrum dark, patches of dusky pigment on posterior disc; caudal trunk crossed by two faint dusky bands; pectoral fins pale with narrow dusky tips; caudal fin pale with two dusky reddish bands, one basal and one broadly marginal.

Size. A small species with adult body size up to 51.1 mm SL.

Distribution. Known from the type series and a non-type from seamounts and oceanic ridges north of New Zealand and south of New Caledonia, at depths of 420–677 m (Fig. 3).

Etymology. From the Latin "parva"—small, in reference to the small adult size of the species; the largest (mature) specimen was 46.4 mm long.

Remarks. *Malthopsis parva* **sp. nov.** is most similar to *M. jordani* in having ventral surface usually naked, but different in having the rostral spine directed upward and forward (vs. nearly upward vertically); a relatively large eye (14.3–17.5% SL vs. 12.5–14.9%); an anterior-directed spine on subopercular buckler usually present. It is also similar to *M. annulifera* but different in having the rostral spine directed rather upward (vs. nearly forward horizontally); bucklers usually absent from abdomen (vs. usually present), no rings on dorsal surface (present and up to 20 in number), and a relatively small adult body size.

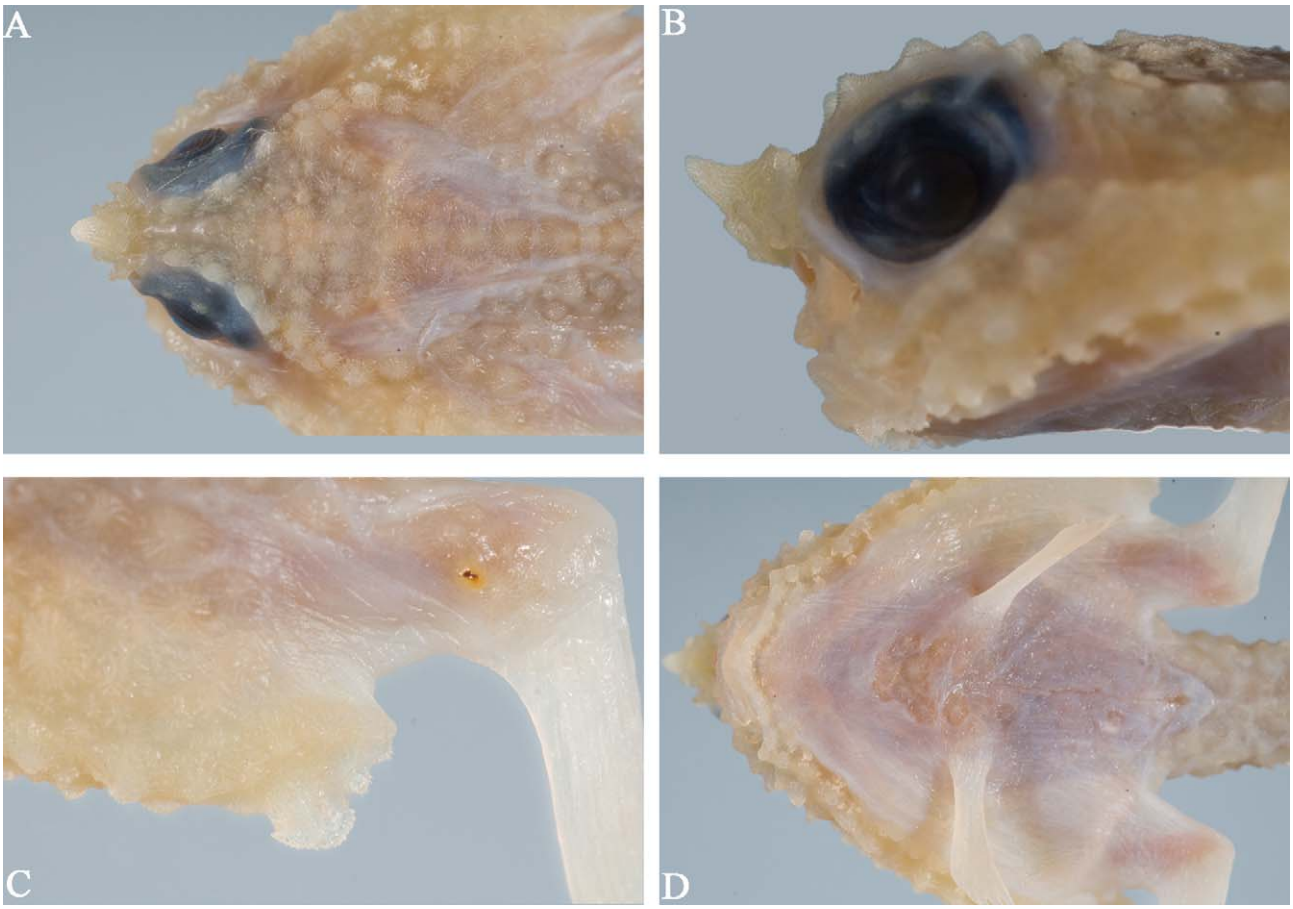

FIGURE 5. *Malthopsis parva* **sp. nov.**, holotype. A. closed view of dorsal head. B. closed view of lateral head. C. closed view of left subopercular region. D. ventral view of disc showing the naked area and some flattened bucklers at pelvic fin base area. Photo by C. Struthers.

Malthopsis mitrigera Gilbert & Cramer, 1896

Twospine batfish

Fig. 6

Malthopsis mitriger Gilbert & Cramer, 1897: 434, Pl. 48 (figs. 1–2). Syntypes: SU 4915 (2), USNM 47700 (2); type locality: off Hawaiian Islands, channel between Molokai and Lanai, central Pacific (21°N, 157°W), depth 295–310 fathoms.

Malthopsis sp. B: Roberts *et al.*, 2009: 532 (Checklist).

Material examined. NMNZ P.023915 (1, 45.0), NZOI stn. K804, 29º7'S, 177º47.3833'W, off Raoul Island, Kermadec Islands, 1142–1156 m, 22 Jul. 1984. NMNZ P.035193 (2, 39.8–40.4), stn. NZOI K804, 29º14.8'S, 177º49.6'W, Kermadec Ridge, Kermadec Islands, 590, Jul 1974. NMNZ P.047403 (ex. NMNZ P.29067, 2, 29.8–32.2), N.O. *Alis*, Beryx 11 stn. 8, 24°53.15'S, 168°21.55'E, 'Seamount B', northern Norfolk Ridge, south of New Caledonia; beam trawl, 540–570 m; 15 Oct 1992, coll. C. D. Roberts & C. D. Paulin.

Diagnosis. Large flat bucklers cover on ventral surface of disc and caudal peduncle; teeth on vomer forming a very wide band; subopercular buckler elongate, slightly curved, bears two forward-directed spines at tip; pectoral-fin rays 14–15 (mainly 15).

FIGURE 6. *Malthopsis mitrigera* Gilbert & Cramer 1897, CSIRO 6018-01, 55.5 mm SL, photo by CSIRO.

Description. D. 5–6; P. 14–15 (mainly 15); A. 4. Body triangular in outline, head well elevated. Illicial trough a small and triangle concavity, which is barely concealed by rostral spine from dorsal view. Rostral spine very blunt and short, directed upward. Two spines on subopercle directed forward, upper one larger than lower one. Dorsal fin relative small, on rear of body; anal fin small, its origin well behind dorsal fin; pectoral fins short, not well extend outside; pelvic fins well in advance of pectorals. Bucklers on dorsal surface enlarged, regularly arranged at edge of body and tail, those on ventral size as dorsal, some raised around anus, two rows of small bucklers above eye. Teeth villiform, in bands on jaws, on vomer a very broad band, on palatines small patch, about half of vomer. Gills 2. Tail slender and tapering posteriorly. Maximum size around 80 mm SL. Colour Yellowish brown dorsally, pale ventrally. Skin near transparent when preserved.

Morphometrics (based on 4 specimens, 29.8–45.0 mm): head length 27.8–30.4 % SL; head width 19.1–23.1; head depth 20.4–26.7; orbital diameter 13.4–17.1; interorbit width 9.6–12.1; mouth width 14.1–16.0; disk margin length 43.2–46.8; predorsal length 65.4–67.2, preanal length 80.8–83.0; dorsal fin length 9.1–10.2; pectoral fin length 19.0–21.6; anal fin length 13.4–15.6; tail length 48.5–52.2.

Distribution. Widespread in Indo-west Pacific Ocean.

***Halieutaea stellata* (Vahl, 1797)**

Minipizza batfish, round batfish

Fig. 7

Lophius stellatus Vahl, 1797: 214, Pl. 3, Figs. 3–4 (No types known; type locality: China).

Halieutaea maoria Powell, 1937: 81, Fig. 2. (Holotype: AIM Ps.427.1 [now AIM 435]; type locality: off White Island, Bay of Plenty, NZ, depth 55–73 m). Whitley, 1956: 413; Whitley, 1968: 89; Ayling & Cox, 1982: 157; Paulin & Stewart, 1985: 27; Paulin *et al.*, 1989: 256; Paulin *et al*., 1989: 136; Lindberg *et al*., 1997: 236 as *maoriae*; Roberts *et al*., 2009: 532

Material examined. AIM 435, holotype of *Halieutaea maoria* Powell, 1937, Off White Island, Bay of Plenty, New Zealand, depth 30–40 fathoms [54.9–73.2 m]. NMNZ P.005880 (1, 230), 37ºS, 176ºE, between Alderman Islands and Slipper Island, South Auckland, 110–128 m, 25 Apr. 1972, coll. C. Hart. NMNZ P.005983 (1, 180), 37º35'S,

176º50'E, between Plate Island and White Island, South Auckland, 128–229 m, May 1974, coll. F. V. *Normandy.* NMNZ P.031982 (1, 199), 37º35'S, 176º41'E, Motiti Ledge, Bay of Plenty, South Auckland, 238 m, May 1995, coll. S. Stevenson. NMNZ P.036918 (1, 220), 36º58'S, 176º5'E, off Alderman Islands, western Bay of Plenty, South Auckland, 165 m, Apr 1999, coll. C. Keith. NMNZ P.038477 (1, 174), 35º19.1333'S, 175º26.2833'E, SE of the Poor Knights Islands, North Auckland, 13 Jun. 2002, coll. T. Boyd. NMNZ P.038481 (1, 198), 37º2'S, 176º5'E, between Penguin Shoal and Putney Rocks, Bay of Plenty, South Auckland, 80 m, Aug. 2002, coll. N. Gwillam. NMNZ P.041210 (1, 163), 37ºS, 176º39.60'E, 30 miles NE off Mayor Island, Bay of Plenty, 450 m, 17 Dec. 2004, coll. R. McDonald. **Outside EEZ of NZ**: NMNZ P.040678 (1, 146), 28º32.2'S, 172º57.55'E, northern Three Kings Ridge, 390 m, 20 Jan. 2003, coll. F. V. *Clarabelle*, S. Beatson.

Diagnosis. Body dicc rounded, slightly wider than long; strongly pointed tubercles on dorsal surface and body margins; interspaces of entire body covered by tine spinules; body reddish with short vermiculate pattern on dorsal surface.

Description. D. 4–5; A. 4; P. 12–14. Disc shape rounded in outline; illicial trough an acute triangle, width less than eye; esca with tri-lobes, lower two fringed with cirri on margin, upper one tongue-like; a blunt blackish appendage on dorsal surface of illicium behind the esca; tail stout and slightly depressed, tapering posteriorly; tubercles present, on edge of body enlarged with 3–4 sharply spines, on dorsal surface simple and needle-like; ventral surface rough, entire body covered with tiny spinules except for eye and fins; teeth absent from vomer and palatines; gills 2 1/2 [holobranch on 2nd and 3rd gill arch and hemibranch on 4th gill arch]. Colour reddish orange with irregular mottled darker patches dorsally, pinkish ventrally in life. Olive gray to pale with the same dark mark dorsally, paler ventrally in preserved. Peritoneum dark brown. Maximum size of adults about 220 mm SL.

Morphometrics (based on 10 specimens, including holotype of *H. maoria*, 137–200 mm): skull length 29.1–30.3 % SL; head depth 17.0–19.4; eye diameter 10.2–12.3;interorbit width 9.4–11.0; mouth width 31.3–36.8; length from premaxillary symphysis to dorsal fin origin 70.6–75.6, to anal fin origin 40.4–47.6; dorsal fin length 8.4–14.4; pectoral fin length 22.0–25.3; anal fin length 10.1–14.6; caudal peduncle length (post anus) 36.0–39.8.

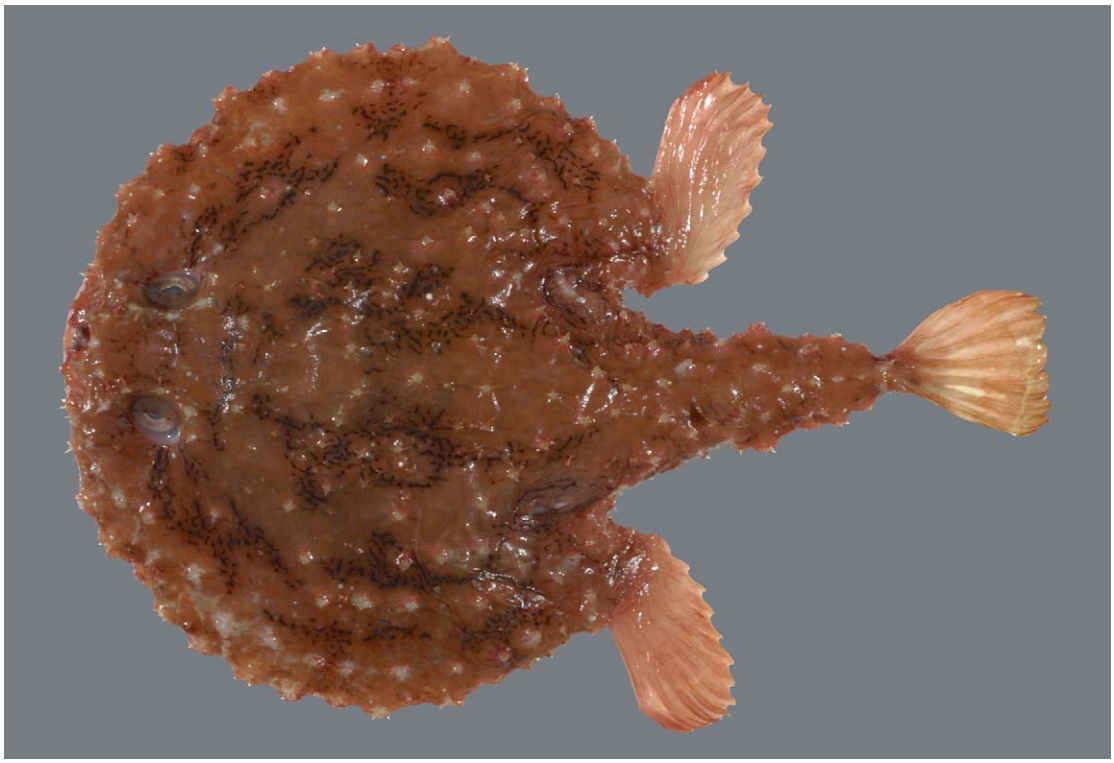

FIGURE 7. *Halieutaea stellata* (Vahl, 1797), NMNZ P.0, 198 mm SL, fresh, dorsal view, photo by C. Struthers.

Distribution. Known from Indo-west Pacific Ocean.

Remark. Eight or more species within this genus and most are uncertain. Lindberg et al. (1997) considered *H. maoria* a junior synonym of *H. stellata* which is confirmed by us. It differs from the Australian species, *H. brevicauda*, in having strong needle-like tubercles dorsally and ventral surface rough. Although *H. stellata* is recorded as widespread in the Indo-west Pacific Ocean, the record from the western Indian Ocean is represented by

an undescribed species (Ho, unpublished data). The confirmed range for *H. stellata* is from western Australia to French Polynesia and from southern Japan to northern New Zealand.

Halieutopsis bathyoreos Bradbury, 1988

Fig. 8

Halieutopsis bathyoreos Bradbury, 1988: 18, Figs. 2, 3B, 6. (Holotype: SIO 84–43; type locality: N of Johnston Atoll, central North Pacific, 19°14.3'N, 169°07.3'W, depth 1500 m).

Halieutopsis sp.: Roberts *et al*., 2009: 532 (Checklist).

Material examined. NMNZ P.017314 (1, 32.0), RNZFA *Tui*, stn. AUZ 098, 30° 11.5' S 179° 52.0' W, Colville Ridge, east of McCauley Island, New Zealand, midwater trawl, 960–1006 m, 26 Jul 1962.

Diagnosis. Disc subtriangular in outline; rostrum a broad shelf, extending well beyond mouth cavity; illicial trough and eaca fully visible in ventral view; ventral surface naked, except for 2–3 tubercles at base of ventral fin; tubercles on dorsal surface with 6–8 facets.

Description. D. 5; A. 4; P. 15. Disc subtrigular in outline. Illicial trough shallow and very broad; illicium embedded in esca; rostrum forming a bony plate well extend forward; esca completely visible from ventral view; esca tri-lobes, two lower ones globule without fringe on edge, upper lobe a flap with two small cirri on top. Dorsal fin on rear of body; anal fin very small, below dorsal fin base; pectoral fins leg-like. Body covered with tubercles scales, with 6–8 facets, those at edge of body large, with 2–3 spinules; ventral surface naked, except 1–2 tubercles at base of ventral fin. Teeth villiform, in bands on jaws, absent from vomer and palatines. Gills 2. Tail rather slender and tapering. Maximum size around 50 mm SL. Coloration in life: uniform gray to dark above and below. Colour preservative: olive gray, paler ventrally. Peritoneum dark.

Morphometrics (based on one specimen, 32.0 mm SL): Head depth 16.4 %SL; eye diameter 9.6; interorbit width 12.5; mouth width 20.7; length from premaxillary symphysis to dorsal fin origin 63.2, to anal fin origin 72.5; pectoral fin length 24.3; tail length (post-anus) 47.9.

Distribution. Known from western Pacific Ocean off Japan, Hawaiian Islands, and New Zealand.

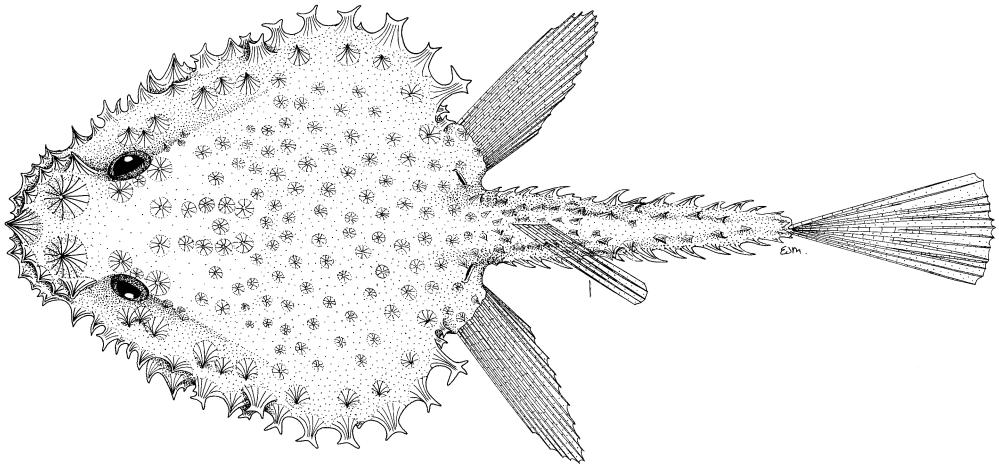

FIGURE 8. *Halieutopsis bathyoreos* Bradbury, 1988, NMNZ P.017314, 32.0 mm SL, dorsal view, illustrated E. Mackay.

Key to ogcocephalid batfishes from the New Zealand and adjacent area

1A. Body disc more-or-less circular or oval 2
1B. Body disc triangular 3
2A. Disc rounded, the margin densely fringed with elongated papillae and spines; a dark reticulation pattern on dorsal surface; rostrum a sharp spine, not projecting; esca not visible from ventral view. . . . . *Halieutaea stellata*
2B. Disc oval, no papillae on disc edge, dorsal surface uniform gray to dark; rostrum forming a bony plate strongly projecting anteriorly; esca visible from ventral view . . . . . *Halieutopsis bathyoreos*
3A. Rostral spine short, blunt, directed upward, not strongly projecting; 2 spines directed forward on subopercle, upper one larger

than lower; ventral bucklers equal in size to dorsal bucklers . . . . . *Malthopsis mitrigera*

3B. Rostral spine more-or-less sharp, strongly projecting, directed forward and slightly upward; 0–1 forward directed spines on subopercle; ventral bucklers smaller than dorsal bucklers 4

4A. Ventral surface widely covered with numerous minute bucklers; principal bucklers rough with prominent spines . . . . . *Malthopsis asperata* **sp. nov.**

4B. Ventral surface broadly naked, or only a few bucklers around anus; principal bucklers blunt. . . . . *Malthopsis parva* **sp. nov.**

Postscript. After this paper went to press, five additional specimens of our two new species (2 of *M. asperata* and 2 of *M. parva*) were discovered in the collection of NMNZ. These new materials are identical to the diagnoses and descriptions of the species as given above. These four specimens are recognized as additional paratypes for the new species. Paratypes of *M. asperata*: NMNZ P.054876, 37.2 mm SL, Colville Ridge, 30°10.608'S, 179°44.658'E, 400–420 m; NMNZ P.054880, 39.8 mm SL, Colville Ridge, 30°4.975'S, 179°49.483'E, 483–532 m. Paratype of *M. parva*: NMNZ P.054884, 2 spec., 36.0–37.6 mm SL, Colville Ridge, 30°11.258'S, 179°42.925'E, 372–430 m.

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