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A new species of the shortnose batfish genus *Halicmetus* from Madagascar (Family Ogcocephalidae)

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Abstract

A new species of the batfish genus *Halicmetus* is herein described as unique, having a body densely covered with variously sized bucklers. It is also distinguished from congeners by the following combination of characters: body disk relatively small, disk width 59.7% SL; orbit small, its diameter 8.3% SL; interorbital moderately wide, 7.4% SL; tail length 47.7% SL; illicial trough opening wide and high; dorsal fin absent; pectoral-fin rays 13; uniformly creamy white when preserved; peritoneal membrane pale with dense melanophores and scattered black dots.

Key words: Biodiversity, taxonomy, Lophiiformes, deep-sea, western Indian Ocean

Introduction

The batfish genus *Halicmetus* Alcock, 1891 is represented by seven species known from the Indo-West Pacific Ocean. All of these species are well diagnosed and described (Ho *et al.* 2008; Ho & Last 2018; Prokofiev 2020). Although the diversity is not likely very high, there are many unidentified specimens in collections (Ho, pers. obs.), which may result in the discovery of additional new species when detailed investigations are completed. Among unidentified specimens deposited in the Muséum national d'Histoire naturelle (MNHN), Paris, there is a single very distinct specimen collected from off northern Madagascar in 1979, that represents an undescribed species distinct from all congeners currently known.

The author recognized this specimen as a new form in about 2008. However, it was not described until now, to allow for a thorough search for more specimens from the Western Indian Ocean in the collections of the MNHN, South African Institute for Aquatic Biodiversity (SAIAB), and Smithsonian Institution National Museum of Natural History (USNM). This search has revealed the existence of only a single specimen representing this new form. A detailed description is provided to name this new species which is presumably endemic in the region.

Materials and methods

The holotype is deposited in the ichthyology collection of the Muséum National d'Histoire Naturelle (MNHN-IC). Terminology follows Bradbury (1967, 1980). Standard length (SL) is used throughout. Methods for taking meristic and morphological data follows Ho *et al.* (2008) and Ho & Last (2018), with two additional measurements: illicial trough height is the vertical distance between the anterior margin of the rostrum and the lower margin of the cavity, and tail length is measured from the genital papilla to the caudal-fin base (equal to SL minus precloacal length). Comparative materials are listed in Ho *et al.* (2008) and Ho & Last (2018), with additional specimens deposited at MNHN.

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Results

Family Ogcocephalidae

***Halicmetus granulosus* sp. nov.**
New English name: Rough Shortnose Seabat
Figures 1–3; Table 1
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Material examined. MNHN IC.1986-0015, R/V *Vauban*, sta. ch030, 12°40.2'S, 48°9.6' E, northern Madagascar, Mozambique Channel, Western Indian Ocean, 595–605 m, 13 Sep. 1979.

Diagnosis. A species of *Halicmetus* which is unique in having various-sized bucklers densely covering the body surfaces and that is further distinguished from congeners by the following combination of characters: body disk relatively small, disk width 59.7% SL; orbit small, its diameter 8.3% SL; interorbital moderately wide 7.4% SL; tail length 47.7% SL; illicial trough opening wide and high; dorsal fin absent in adult; pectoral-fin rays 13; uniformly creamy white when preserved; peritoneal membrane pale with dense melanophores and scattered black dots.

Description. Proportional measurements expressed as percentages of SL and meristic data of the holotype are given in Table 1.

TABLE 1. Meristic and morphometric data of *Halicmetus granulosus* **sp. nov.**

	MNHN 1986-0015 (Holotype)				
Standard length	69.0 mm			mm	%SL
Dorsal-fin rays	0		Head width	13.9	20.1
Pectoral-fin rays	13;13		Disk width	41.2	59.7
Anal-fin rays	4		Disk length	37.1	53.8
	mm	%SL	Precloacal length	36.1	52.3
Predorsal length	-	-	Preanal length	51.0	73.9
Skull length	17.9	25.9	Tail length	32.9	47.7
Orbital diameter	5.7	8.3	Disk-margin length	31.9	46.2
Interorbital width	5.1	7.4	Mouth width	8.9	12.9
Illicial cavity width	4.8	7.0	Pectoral-fin length	12.4	18.0
Illicial cavity height	4.1	5.9	Anal-fin length	9.3	13.5
Head depth	18.8	27.2	Caudal-fin length	~14	~20.3

Dorsal-fin rays 0 (no trace of dorsal fin externally); anal-fin rays 4; pectoral-fin rays 13. Body disk depressed, relatively small, its width 1.7 and length 1.9 in SL; disk subtriangular, slightly broader than long, truncated anteriorly (Fig. 1A); skull slightly elevated anteriorly when viewed in lateral profile, its length 3.9 in SL; orbit small, directed dorsolaterally, diameter 3.1 in skull length (HL).

Rostrum slightly upturned, a small bony plate consisting of several large bucklers, extending beyond mouth (Figs. 1B, 2A, B); interorbital space moderately wide, its width slightly smaller than eye diameter, 3.5 in HL; illicial cavity situated entirely beneath rostrum, relatively broad and high (Fig. 2B), its width 3.7 and width 4.4 in HL; nostrils located on each side of lateroventral margins of illicial cavity, a narrow naked membrane on the border of illicial cavity and nostrils (Fig. 2C); esca trilobed, two fleshy, oval ventral lobes on each side, and a flap-like dorsal lobe with two short filaments on tip (Fig. 3A). Lateral-line canals deep and clear on ventral surface of disk; lateral-line neuromasts on dorsal surface of disk and tail small and not easy to detect, whereas neuromasts on anterior margin of head and disk margin well-defined.

Mouth small, curved and forming an arch (Fig. 2C); lower jaw slightly beyond upper jaw anteriorly; teeth villiform, small, in wide band on both jaws; quadrangular tooth patches on vomer and palatines. Fifth ceratobranchials bearing large and elongated tooth plates (tongue teeth, *sensu* Bradbury 1967, 1980).

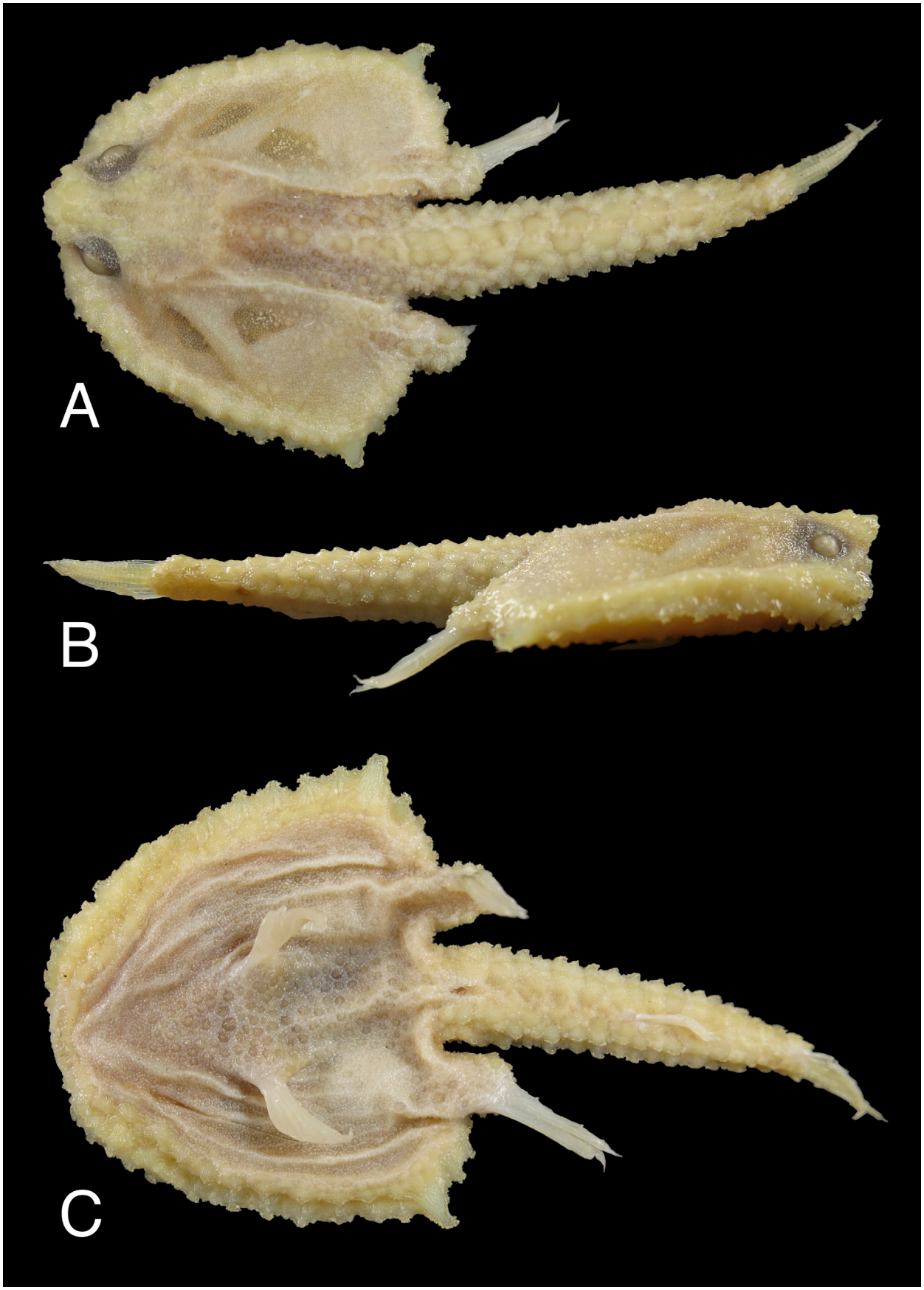

FIGURE 1. *Halicmetus granulosus* **sp. nov.**, MNHN 1986-0015, holotype, 69.0 mm SL, preserved condition. A. dorsal view. B. lateral view. C. ventral view.

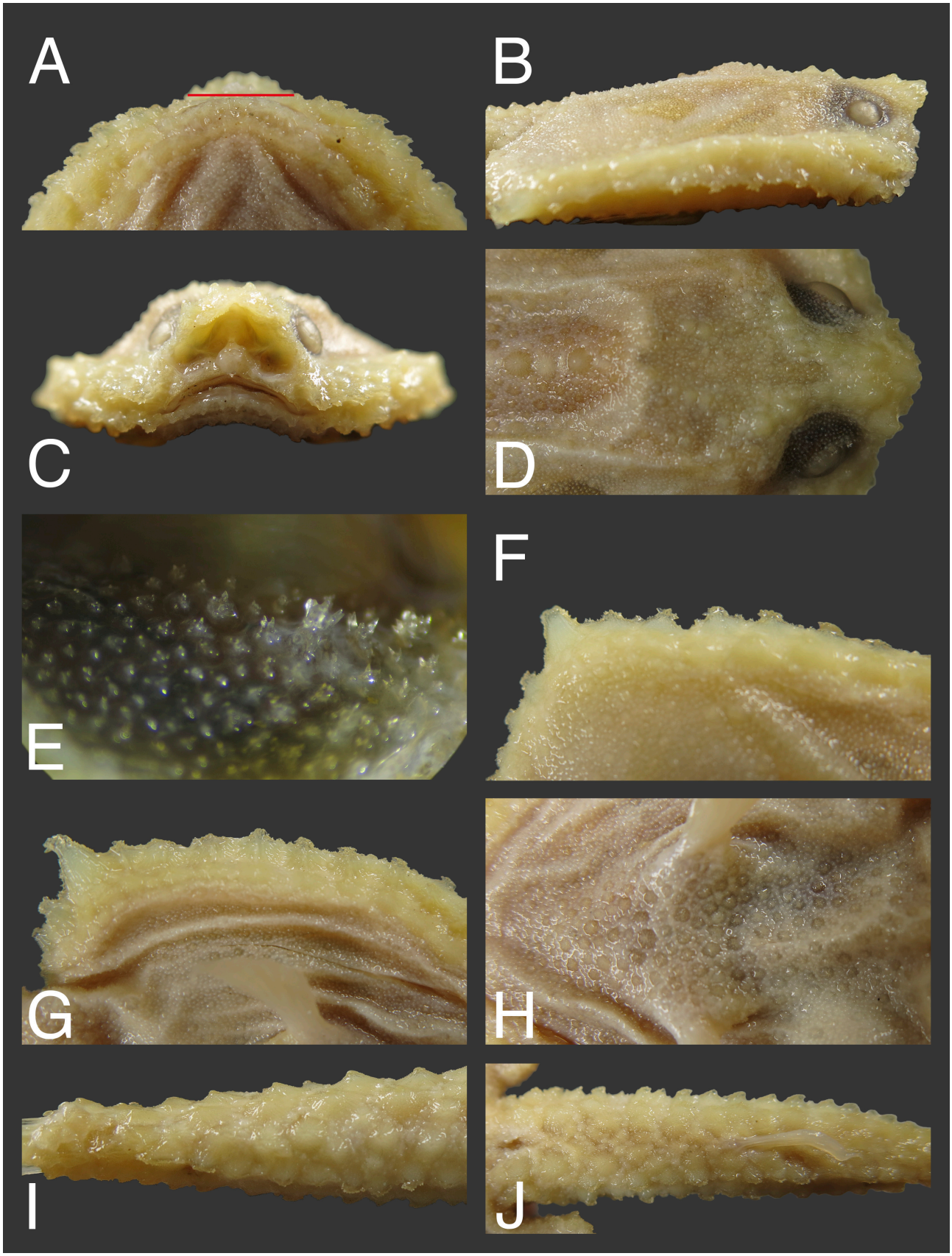

FIGURE 2. Close-ups of *Halicemtus granulosus* **sp. nov.**, MNHN 1986-0015, holotype. A. ventral view of anterior head. B. lateral view of body disk. C. front view. D. dorsal view of mid-body disk. E. close-up of membrane above left eye, with magnification. F. dorsal view of left disk margin. G. ventral view of right disk margin. H. ventral view of mid-disk. I. lateral of right tail. J. ventral view of tail. Not to scale.

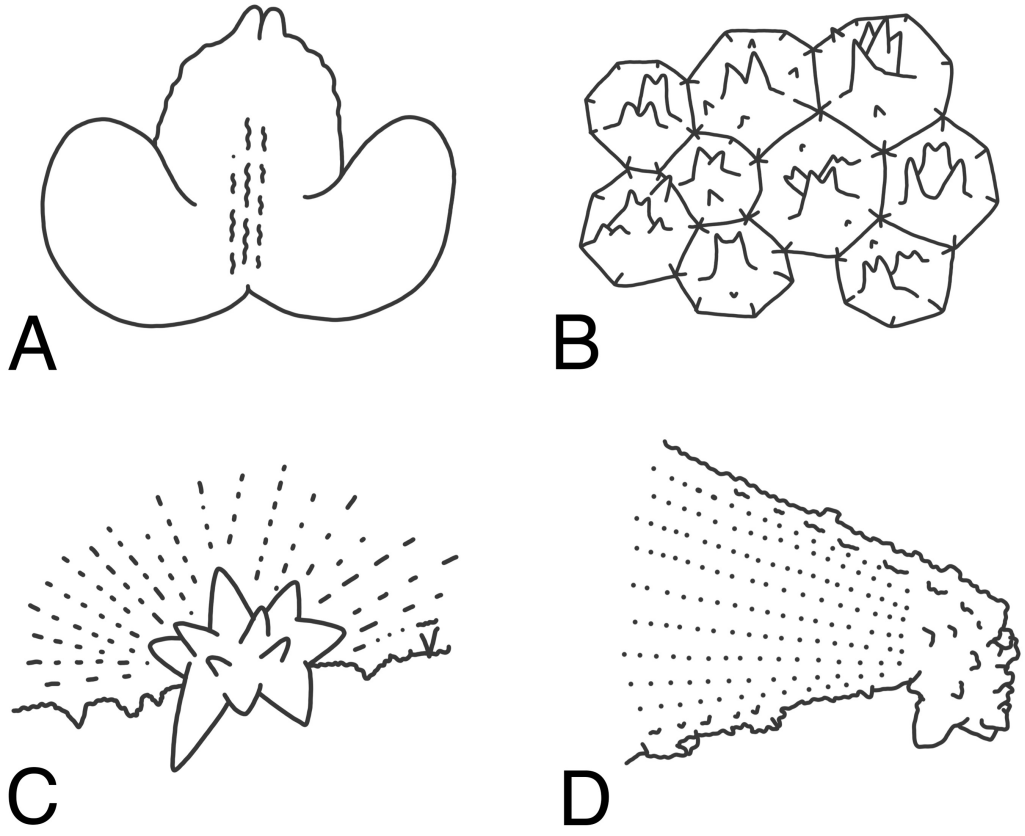

FIGURE 3. Drawings of esca and squamation of *H. granulosus* **sp. nov.**, from holotype. A. esca, front view. B. bucklers on supraocular membranes, dorsolateral view. C. buckler on disk margin, lateral view. D. bucklers on supraocular membrane, dorsal view. Not to scale.

Gill filaments present only on second and third gill arches; three gill rakers on outer side of second gill arch, four rakers on outer side of third gill arch; gill opening small, at inner portion of pectoral elbow. Dermal cirri present, associated with lateral line system on disk margin and tail. Pectoral fins at outer portion of posterior margin of disk; pelvic fins on ventral surface, slightly closer to mouth than anus; anal fin on ventromedial surface at mid-length of tail.

Squamation agreeing well with definition of *Ogcocephalus* by Bradbury (1980), consisting of close-set of various-sized bucklers, their bases overlapping and forming heavy armor. Bucklers, with sizes ranging from mini to large, covering entire body except for eyes, lips, fins, and anus; large conical bucklers along disk margins, tail, and associated with lateral-line canals and skeleton beneath skin on dorsal surface. Frontal ridge with row of bucklers, anterior two bucklers enlarged, overlapping dorsoanterior border of orbit, fused together with three large bucklers on rostrum and forming a flat bony plate; followed by two smaller bucklers and then two (right) and three (left) slightly taller bucklers along upper margin of orbit (Fig. 2D). Interorbital space densely covered with many small bucklers, except for a slightly larger one anteriorly. Supraocular membranes with three (right) and two (left) slightly enlarged bucklers, each with few spinules on top, right above the margin of eye, elsewhere covered with small, broad-based bucklers (Figs. 2E, 3B). Posterior portion of dorsal surface of skull densely covered with mid-sized bucklers, mixed with small spiny bucklers (Fig. 2D). Shoulder evenly covered with mid- and small-sized bucklers (Fig. 1A), mixed with mini spiny bucklers; a row of large bucklers on midline of posterior portion of disk.

Disk margin with three well-defined rows of bucklers (Figs. 2F, G). Uppermost row of bucklers elevated, large, conical with broad base anteriorly, becoming gradually smaller posteriorly; middle and lower rows associated with lateral line. Those in middle row directed laterally, each with a broad, compressed base; tips multifid, each with five or six blunt spinules, which are somewhat arranged in a radiating pattern in lateral view (Fig. 3C), and row ending with an enlarged, moderately long subopercle buckler extending well beyond disk margin laterally, its tip rather dull, bearing several tiny blunt spines (Fig. 3D). Bucklers in lower row directed ventrally, relatively small and conical. Four small bucklers along posterior margin of disk between subopercular buckler and pectoral-fin base; outer

two large and mutilfid and inner two smaller. Dorsal surface of pectoral-fin base covered with several mid-sized bucklers.

Many mid-sized bucklers on chest, pelvic-fin base, and belly (Fig. 2H), with the remaining areas densely covered by tiny bucklers, each with a few spinules on top. Tail heavily covered by 12 rows of conical bucklers, with interspaces entirely covered with mini bucklers (Fig. 2I, J): two rows on dorsal surface, continuing from the middle row of posterior body disk; two irregular rows on each side above the lateral line; two rows on ventrolateral side associated with lateral line, each with a serrate top which slightly curves backward, and two irregular rows of enlarged bucklers on ventral surface of tail.

Lateral-line canal system with well-developed, lateral-line neuromasts: supraorbital series four; body series eight; premaxillary series one; cheek series eight; preopercular series two; subopercular series seven; dorsolateral branch of subopercular series three; ventral series one (beside anus); tail series nine.

Color. Fresh color unknown. Body uniformly creamy white in preservation; all fins pale without pigment. Oral cavity and gill chamber pale. Peritoneum membrane pale with numerous brown melanophores and scattered black dots.

Distribution. Known only from the holotype collected from off northern Madagascar, Western Indian Ocean, at depth of 595–605 m.

Etymology. The specific name of *granulosus* derived from the Latin *granulis*, which means granular, referring to the rough body surface with various-sized bucklers.

Discussion

Halicmetus granulosus is quite distinct in having the body heavily covered with various-sized bucklers and a combination of other diagnostic characters (see above). The morphology of squamation agrees with the description of *Halicmetus* by Bradbury (1980). All other congeners have bucklers mixed with tiny simple and/or bifurcated tubercles on the body, except for *H. odysseus* Prokofiev, 2020, which has only simple and bifurcated tubercles on most parts of body. Ho & Last (2018) divided the species in *Halicmetus* into two groups: the *H. ruber* species group has relatively large eyes, usually bifurcated tubercles on the body, and a light brown peritoneum (except for *H. drypus* Ho and Last, 2018, which has a pale peritoneum with dense melanophores); and the *H. reticulatus* species group has relatively small eyes, usually simple tubercles on the body, and a pale peritoneum with melanophores and scattered dots. However, with the discovery of *H. odysseus* and *H. granulosus*, which represent two intermediate forms with extreme squamation morphology, the division of the two species groups may need a reevaluation. Both *H. odysseus* and *H. granulosus* are tentatively included in the *H. ruber* species group.

Among congeners, only *H. ruber* Alcock, 1891 (Fig. 4), from the Indo-West Pacific Ocean, is sympatric with the new species in the western Indian Ocean, including off Madagascar. Beside the very distinct squamation on the body (Figs. 2, 3), *H. granulosus* differs from *H. ruber* in having the rostrum extending slightly forward beyond the mouth (Figs. 1B, 2A; vs. short, not reaching or just reaching the mouth, Fig. 4B), a smaller orbital diameter (8.3% SL, vs. 8.8–10.5% SL), a pale peritoneum with melanophores and dots (vs. a uniformly light brown peritoneum), the pectoral and pelvic fins are uniformly pale (vs. black on distal half), and a relatively tall illicial cavity (Fig. 2B) (vs. rather short, Fig. 4B).

Comparative materials. *Halicmetus ruber*: listed in Ho *et al.* (2008); MNHN 1988-0378, 3, 42.6–96.0 mm SL, MUSORSTOM 2, R/V *Coriolis*, sta. 56cp4, 13°25’58.8”N, 122°16’58.8’’E, 445–520 m, 26 Nov 1980; MNHN 1988-0379, 71.9 mm SL, MUSORSTOM 2, R/V *Coriolis*, sta. 55cp4, 13°54’0”N, 119°58’1.2’’E, 865–866 m, 27 Nov. 1980.

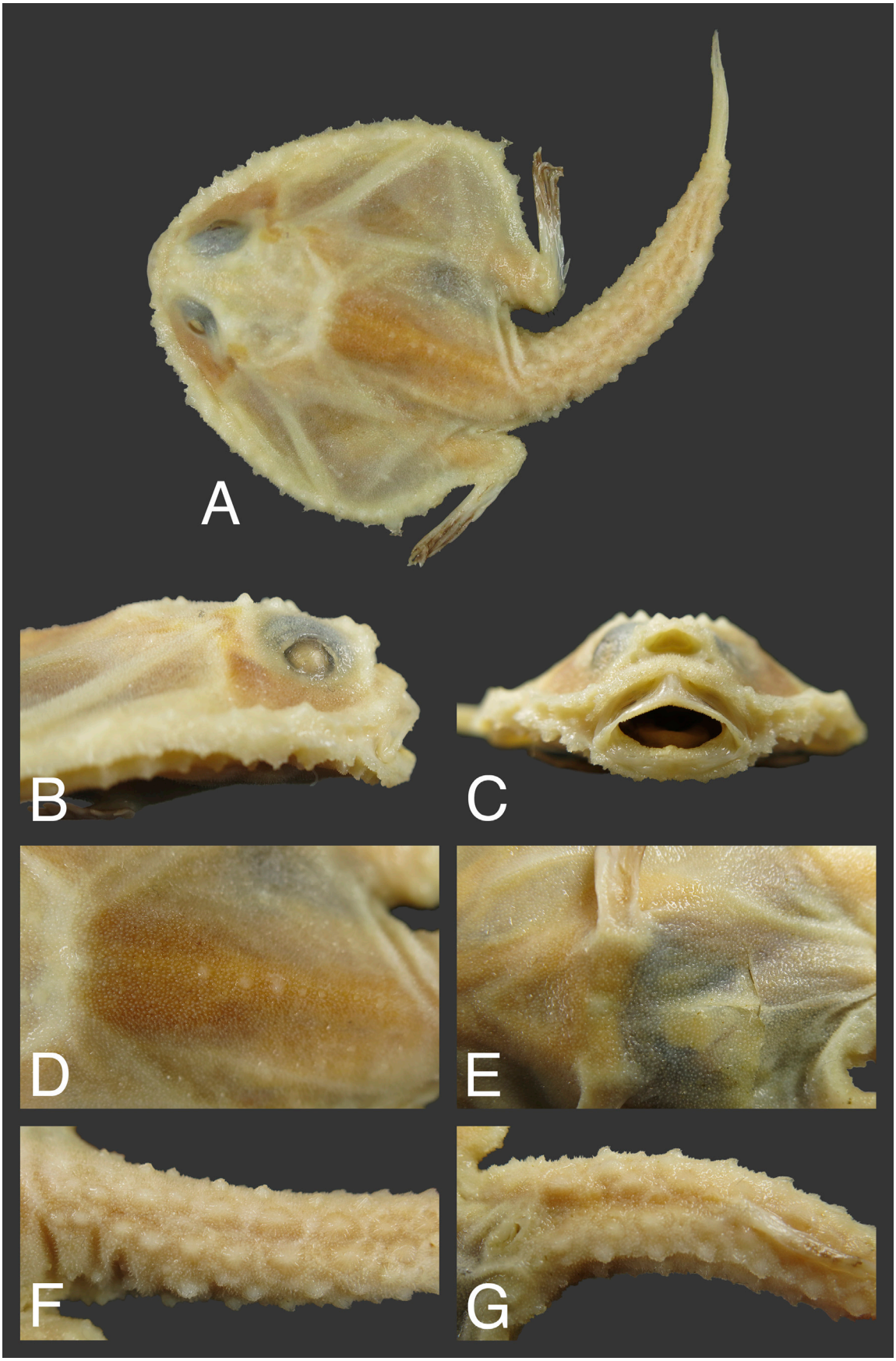

FIGURE 4. *Halicmetus ruber* Alcock, MNHN 1988-0379, 71.9 mm SL. A. dorsal view. B. lateral view of head. C. front view of head. D. dorsal view of mid-disk. E. ventral view of chest and abdomen. F. dorsolateral view of tail. G. ventral view of tail. Not to scale.

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References

Alcock, A.W. (1891) Class Pisces. II. Natural history notes from H. M. Indian marine survey steamer `Investigator,' Commander R. F. Hoskyn, R. N., commanding.—Series II., No. 1. 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. https://doi.org/10.1080/00222939109460385

Bradbury, M.G. (1967) The genera of batfishes. *Copeia*, 1967 (2), 399–422. https://doi.org/10.2307/1442130

Bradbury, M.G. (1980) A revision of the fish genus *Ogcocephalus* with descriptions of new species from the western Atlantic Ocean (Ogcocephalidae; Lophiiformes). *Proceedings of the California Academy of Sciences*, Series 4, 42 (7), 229–285.

Ho, H.-C. & Last, P.R. (2018) Review of the batfish genus *Halicmetus* Alcock, 1891 from Australian waters, with descriptions of two new species (Lophiiformes: Ogcocephalidae). *Zootaxa*, 4508 (2), 179–196. https://doi.org/10.11646/zootaxa.4508.2.2

Ho, H.-C., Endo, H. & Sakamaki, K. (2008) A new species of *Halicmetus* (Lophiiformes: Ogcocephalidae) from the western Pacific, with comments on congeners. *Zoological Studies*, 47 (6), 767–773.

Prokofiev, A.M. (2020) A new species of batfish of the genus *Halicmetus* from Vietnam and new morphological data for *H. ruber* (Ogcocephalidae). *Voprosy Ikhtiologii*, 60 (6), 624–635. https://doi.org/10.1134/S0032945220060077