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NOTES ON INDO-PACIFIC PIPEFISHES
(PISCES: SYNGNATHIDAE) WITH DESCRIPTION
OF TWO NEW SPECIES

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Among Indo-Pacific pipefishes recently received for study are two undescribed species and several specimens that provide important additions to our knowledge of five poorly known species. The new species are described here and descriptive notes and comment are included for other material. Measurements are in millimeters (mm); body proportions are referred to standard length (SL) or head length (HL); unless otherwise stated, coloration is described from specimens preserved in alcohol; depths are reported in meters (m), distances in kilometers (km). Study materials are deposited in collections of the Academy of Natural Sciences of Philadelphia (ANSP), Bernice P. Bishop Museum (BPBM), California Academy of Sciences (CAS), Gulf Coast Research Laboratory Museum (GCRL), Museo Storia Natural, Genoa (MSNG), Rijksmuseum van Natuurlijke Historie (RMNH), University of Guam (UG) and National Museum of Natural History, Smithsonian Institution (USNM).

Appreciation is expressed to S. S. Amesbury (UG), M. Boeseman (RMNH), J. E. Böhlke and W. F. Smith-Vaniz (ANSP), B. A. Carlson (Univ. S. Pacific, Fiji), W. E. Eschmeyer and Pearl Sonoda (CAS), L. W. Knapp (Smithsonian Oceanographic Sorting Center), M. McCoy, E. Tortonese (MSNG) and V. G. Springer (USNM) for making materials available for study. The holotype of *Micrognathus boothae*

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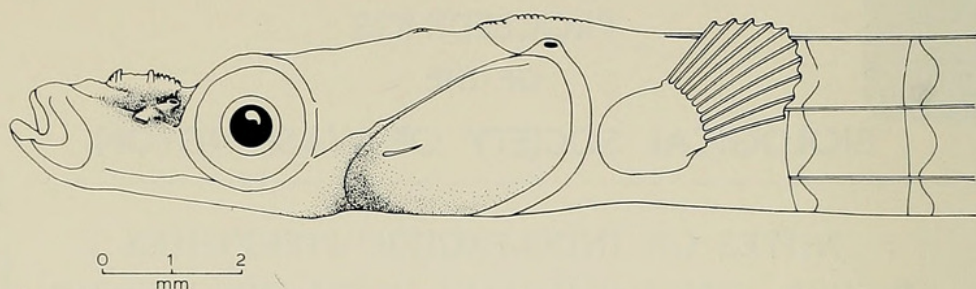


FIG. 1. Delineation of head of *Micrognathus boothae* USNM 213481.

was reexamined by J. R. Paxton, Australian Museum. Data on the holotype of *Halicampus macrorhynchus* were provided by A. C. Wheeler (BMNH), British Museum (Natural History). Dr. Springer's Indonesian material was collected during Rumphius Expedition I of the Indonesian Institute of Oceanology. Seychelles and Amirantes collections were by J. E. Böhlke and associates during The International Indian Ocean Expedition-Seychelles Island Program 1964 (IIOE). Specimens of *Corythoichthys amplexus* from the Solomon Islands collected by the junior author and G. R. Allen were obtained during an expedition supported by the National Geographic Society. Drawings are by Anne Langenfeld (GCRL). This study was in part supported by National Science Foundation Grant GB-31053X to the senior author.

Micrognathus boothae Whitley

Figure 1

Material examined: USNM 213481 (1, 130 mm SL); Fiji Is., Wailangilala Is., 16°45'S, 179°02'E, coral reef, 0.3–6.4 m, TE VEGA Cr. 7, Sta. 295, 26 May 1965.

Counts and measurements: Dorsal fin rays 20; caudal rays 10; pectoral rays 10–11; anal rays 4; rings 14 + 41; subdorsal rings 0.5 + 4 = 4.5; brood pouch occupies anterior 13 tail rings, contains eggs over 11 rings. Head length 7.8 mm (16.1 in SL); snout length 2.3 (3.4 in HL); eye diameter 1.7 (4.6 in HL); dorsal fin base 10.0 (0.8 in HL); caudal fin length 2.9.

Descriptive notes: Median frontal and nuchal ridges slightly developed, prenuchal ridge obsolete. A rudimentary opercular ridge crosses anterior $\frac{1}{4}$ of opercle; distinct ridges absent from pectoral cover plate but both opercle and cover plate crossed by striae so as to impart a pocked or waffle-like surface configuration. Lateral tail ridge terminates below dorsal fin origin; scutellar width about equals $\frac{1}{3}$ distance between

proximal margins of adjacent scutella. Brood pouch contains single layer of eggs arranged in four transverse rows, with outermost row containing 29–30 eggs. Pouch folds voluminous, will meet on ventral midline but margins not thickened and there is nothing to indicate that folds overlap in life. Ground color dark brown, venter and distal $\frac{2}{3}$ of brood pouch folds lighter. Snout tip tan; with indications of widely spaced narrow pale bars crossing dorsum: three on trunk, five behind dorsal fin. Pectoral and anal fins pale; dorsal fin with narrow shading of melanophores proximad, elsewhere pale.

Discussion: Whitley (1964) described *M. boothae* from a single specimen (presumably female) from Lord Howe Island. Meristic data were given as: D 21, A 2, P 11, C 7, rings 14 + 42 and subdorsal 1 + 5. Dr. J. R. Paxton has reexamined this fish at our request and finds 22 dorsal, 10 caudal and 4 anal rays. Whitley (p. 163) described the dorsal fin base as "extending over almost six tail-rings" and it appears that relative dorsal fin lengths and positions are very similar in these specimens.

The Fiji specimen represents the second known specimen, and only known male, of *M. boothae*, and extends the species range more than 2200 km to the northeast of the type-locality. A month of intensive collecting of fishes at Lord Howe Island in 1973 by Randall and nine other ichthyologists resulted in 278 species of fishes (189 were new records), but failed to produce additional specimens of *M. boothae*.

Micrognathus brocki Herald

Material examined: Indonesia: USNM 209722 (1, 64 mm SL), Tandjung Suli, 11 Jan. 1973. Mariana Is.: UG 5776 (+ 58, tail damaged), Guam, 22.9 m, 27 Dec. 1971.

Counts and measurements: (USNM 209722): Dorsal fin rays 21; pectoral rays 12–11; caudal rays 10; anal rays 4; rings 14 + 35; subdorsal rings 0.5 + 4.5 = 5.0. Head length 6.1 mm (10.5 in SL); snout length 2.2 (2.8 in HL); eye diameter 1.3 (4.7 in HL); dorsal fin base 5.6 (1.1 in HL); caudal fin length 2.1.

Descriptive notes: Median snout ridge tripartite (see Herald 1953: 259, fig. 39g); 5 spinules on anterior, 4 on middle and 2 on posterior segments (8, 3 and 2 in Guam specimen). Supraorbital cirri branched, right cirrus about 2.4 mm in length, left somewhat shorter; suborbital cirri shorter than eye diameter, distally branched; eye with about 12, equally spaced, fleshy flaps or cirri; cirrus on frontal crest about 3.5 mm long, profusely branched proximad but distal half simple; prenuchal crest with short, broad, leaflike cirrus; single branched cirrus near middle of each opercle. Most trunk rings bear minute cirri near dorsal and ventral margins; 4th, 8th, 12th and 16th rings with expanded, leaflike cirri on each lateral and dorsal ridge (4 per ring). Ground color white; lower half of opercle brownish; two brown bands pass ventrad between lateral midlines of snout; dorsum and sides of body crossed by about 9

indistinct brownish bands (3–4 rings wide) each alternating with 1–2 pale rings; venter with brownish shading on pectoral ring followed by narrow brown bars between each of next 12–13 rings.

Discussion: *Micrognathus brocki* was described from a 110 mm SL female (?) taken at Bikini Atoll, Marshall Islands. A second specimen (82 mm SL) was subsequently reported from the Ryukyu Islands (Herald and Randall, 1972), but egg bearing males are yet to be recognized. The present Indonesian juvenile extends the known range more than 5500 km west southwest of the type-locality and suggests widespread distribution in central Pacific waters.

Micrognathus edmonsoni (Pietschmann)

Material examined: ANSP 128417 (1, 62 mm SL); Fiji Is., Viti Levu, E side Mbengga Is., ca. 37 km SW of Suva harbor, 24.4 m, 14 Apr. 1974.

Counts and Measurements: Dorsal fin rays 19; caudal rays 10; pectoral rays 12; anal rays 4; rings 14 + 38; subdorsal rings $0.25 + 3.75 = 4.00$ Head length 5.4 mm (11.5 in SL); snout length 2.3 (2.4 in HL); eye diameter 1.1 (4.9 in HL); dorsal fin base 4.4 (1.2 in HL); caudal fin length 2.4.

Descriptive notes: Median snout ridge low, entire, more or less bipartite, the shorter anterior portion slightly notched behind; opercular ridge indistinct, extends across $\frac{2}{3}$ of opercle; remaining head ridges low, with entire margins; one ridge on pectoral cover plate. Superior trunk and tail ridges prominent, margins minutely serrate over all but last 10–12 tail rings; other trunk and tail ridges entire. Ground color pale; sides with traces of about 13 widely spaced brownish blotches; ventral part of head lightly shaded with brown; venter elsewhere with brown shading on 1st and 2nd trunk rings and indications of narrow brown bars between remaining trunk rings.

Discussion: Compared with a 65 mm SL fish from the Marquesas Is. (CAS 13977), the present specimen has more prominent superior trunk and tail ridges with somewhat more pronounced serrations; pectoral fin rays are 12 in both. Herald (1953) reported *M. edmonsoni* to have rounded body ridges without serrations and 10 pectoral rays. Our observations show pectoral rays to range from 10 to 12 and that superior trunk and tail ridges are serrate in juveniles. Originally described from Hawaii, *Micrognathus edmonsoni* was recently reported from the Marquesas Is. (Herald and Randall, 1972). The present record extends the known range some 5144 km southwest of the type-locality.

Syngnathus banneri Herald and Randall

Figures 2 and 3

Material examined: Amirante Isles: ANSP 128817 (1, 36 mm SL), Remire Reef, NE of Eagle Is., ca. 9.1 m, 4 Mar. 1964, IIOE Sta. F-82; ANSP 128818 (1, 43), off E side D'Arros Is., 15.2–27.4 m, 5 Mar.

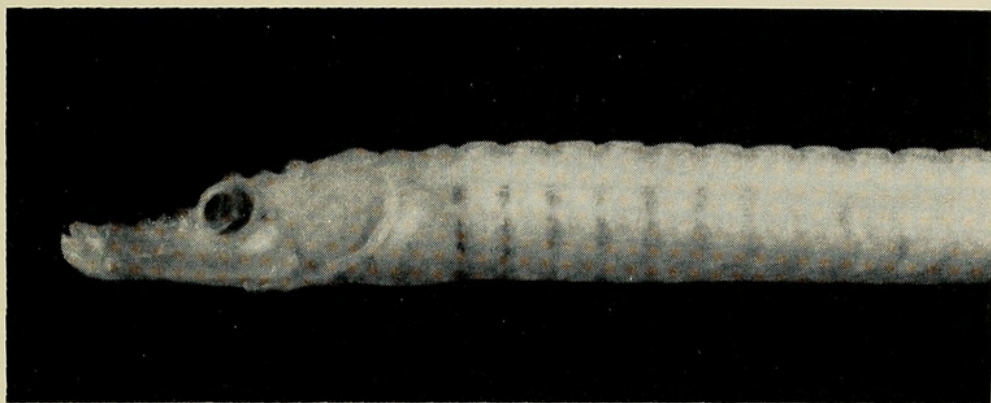


FIG. 2. Head and anterior body of *Syngnathus banneri* GCRL 13350; 52 mm SL male.

1964, IIOE Sta. F-87. Seychelles: ANSP 128819 (1, 58), GCRL 13350 (1, 52), off S shore of Faon Is., 10.7–13.7 m, 22 Jan. 1964, IIOE Sta. F-11; ANSP 128816 (1, 52), vicinity of Praslin Is., S of Round Is., 12.2–15.2 m, 22 Feb. 1964, IIOE Sta. F-61. Mauritius: BPBM 16343 (2, 41–46), W coast, cave in 30 m, 20 Nov. 1972. Indonesia: USNM 213482 (1, 35), Saparua, S of Kampungmahu, 9.1 m, 18 Jan. 1973. Taiwan: USNM 213810 (1, 44), SW shore off Ch'uan-fan-shih, 21°55'48"N, 120°48'48"E, 7.6–8.5 m, 2 May 1968.

Counts and measurements: Dorsal fin rays 17–20; pectoral rays 12–14; anal rays 3–4 (usually 4); caudal rays 10; trunk rings 15; tail rings 27–29; subdorsal rings $0.5-1 + 3.25 = 4-4.75$; head in SL 7.1–8.2; snout in HL 2.2–2.5; dorsal fin base in HL 1.4–1.7. Male brood pouch on anterior 11–14 tail rings.

Descriptive notes: Median snout ridge (Fig. 3) well developed, begins at rear of upper jaw, deeply incised to form 3 or 4 distinct, semi-isolated, subtriangular sections; broadly truncate lateral projection located below level of nares and near middle of snout length; most specimens with small lateral spine just behind angle of gape. Orbital ridge expanded dorsad to form a broadly rounded or truncate dorsolateral projection; postorbital ridge with a rather broad lateral projection just behind eye; median frontal, prenuchal and nuchal ridges elevated; supra-orbital ridge represented by a short knob-like projection; opercular ridge crosses about $\frac{1}{3}$ – $\frac{1}{2}$ of opercle; remaining opercular surface pocked between radiating striae; upper and lower pectoral cover plate ridges distinct in most specimens. Lateral trunk and tail ridges overlap on anal ring in one specimen, fail to overlap in other material; superior and inferior trunk and tail ridges somewhat elevated, well indented between rings of trunk and anterior $\frac{1}{3}$ of tail, distinctly notched between remaining tail rings; body surfaces concave between ridges; head and body ridges rough to minutely serrate in all specimens. Scutella rather broad, greatest width about $\frac{1}{2}$ distance between proximal margins of

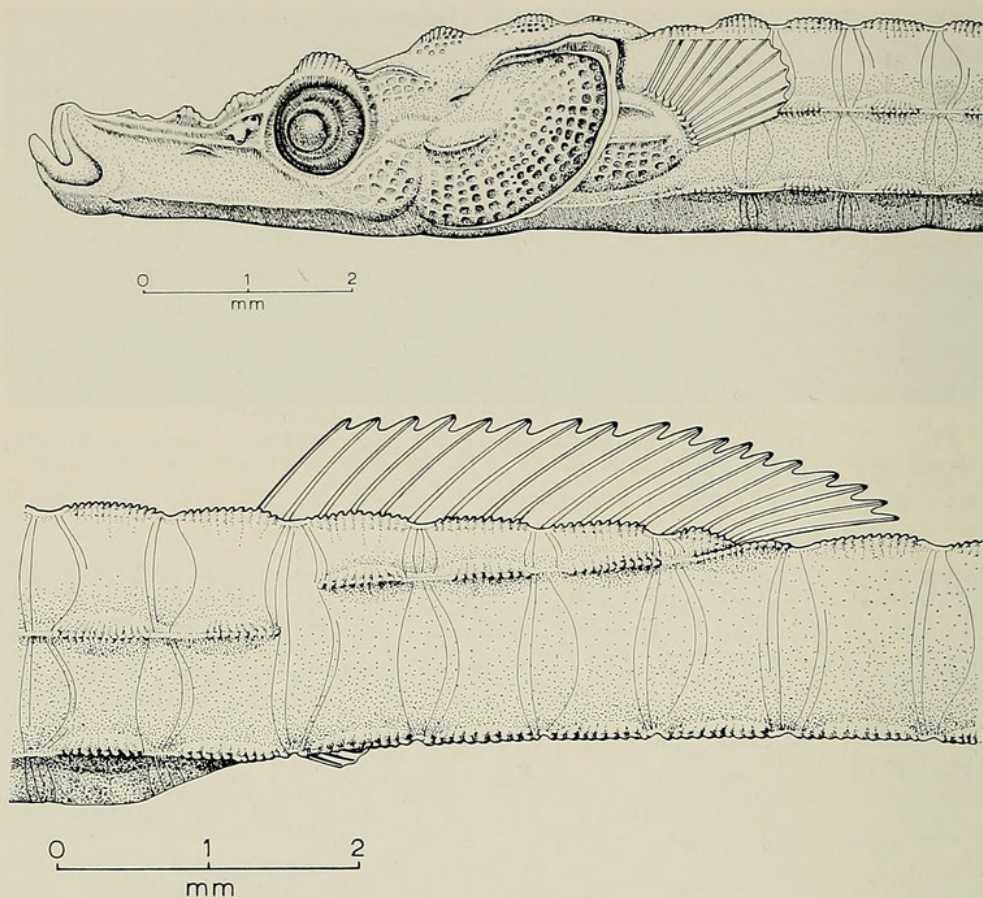


FIG. 3. *Syngnathus banneri*. Top: lateral aspect of head and anterior trunk rings. Bottom: Section of body illustrating ridges, dorsal and anal fins. Drawn from 43 mm SL female, ANSP 128818.

adjacent scutella; neuromasts indistinct but apparently present on tail rings. Eye with ring of 10–12, equally spaced, minute flaps; cirri otherwise absent.

Brood pouch folds of egg bearing males do not meet on ventral midline, and margins appear to be neither thickened nor otherwise modified. A 46 mm SL fish (BPBM 16343) has the pouch extending over 12 rings and about 29 eggs in two longitudinal rows. A 52 mm specimen (GCRL 13350) has two (occasionally three) transverse rows of eggs over 11 rings, about 17 in outer row and 41 in pouch.

Most specimens are mainly pale; well marked individuals have faint indications of a narrow bar from posteroventral margin of eye across anterior portion of opercle; dorsum crossed by faint dark blotches (bars) on about every 4th ring behind pectoral ring; ventral portion of pectoral ring crossed by dusky bar; sides below lateral trunk ridges and venter crossed by indications of narrow bars on trunk rings 2 through 10; body and head without other markings; fins pale. In some specimens, bars on lower sides and venter interrupted, forming a series of vertically-

oriented, oblong spots on each lateral trunk ridge, each inferior trunk ridge and on ventral ridge. One 41 mm SL fish (BPBM 16343) is mainly brownish, the dorsum crossed by 9–10 broad bars (bars to about 5 rings in length) separated by mottled pale areas (0.5–1 ring in length) and lower sides and venter ringed by narrow brown bars on each trunk ring.

Discussion: Herald and Randall (1972) described *S. banneri* from two specimens (26.5–39 mm SL) from the Ryukyu and Marshall Islands. Reexamination shows 4 anal rays in each (rather than 2 as described) and 12 rather than 11 rays in the left pectoral fin of the paratype. Although omitted from the original description and figure, the 39 mm holotype bears a minute lateral spine behind angle of gape and a larger lateral projection near middle of snout length; both processes are reduced but definitely present in the paratype. The condition of the holotype precludes observation of eye flaps, but some are present on the paratype.

Pectoral rays are modally 13 in our material but meristic and morphometric characters fall within expected variation of *banneri*. Among Indian Ocean specimens, larger fish have shorter opercular ridges and greatest development of other head and body ridges. Herald and Randall speculated that *banneri* would have an overlapping brood pouch closure and thereby fall within the subgenus *Microsyngnathus* Herald. Our material shows that *Syngnathus banneri* has the "semi-brood-pouch closure" of Herald (1959) wherein eggs are arranged in one layer and margins of pouch folds do not meet on ventral midline. Pouch closure and egg arrangement suggest that *banneri* is intermediate between two of the four nominal subgenera of *Syngnathus*: *Microsyngnathus* (overlapping pouch folds, anal fin present) and *Bryx* Herald (non-overlapping folds, anal fin absent).

Our specimens extend the known distribution to Indonesia and the western Indian Ocean. All specimens, including type material, have been taken in coral habitats within the 6.1–30 m depth range.

***Syngnathus darrosanus*, new species**

Figures 4 and 5

Holotype: ANSP 128815 (47.4 mm SL); Amirante Isles, off E side of D'Arros Island (Admiralty Chart No. 724), 0–2.1 m, 6 Mar. 1964, IIOE Sta. F-91.

Paratype: GCRL 13302 (43.3 mm SL), collected with holotype.

Diagnosis: Dorsal fin rays 23; pectoral rays 12; anal rays 3; caudal rays 10 (in holotype); trunk rings 16; tail rings 29–30; subdorsal rings 6.25 (2 trunk + 4.25 tail rings); head in SL 7.9; snout in HL 2.8–2.9; dorsal fin base in HL 1.1. Body ridges indented between rings; all ridges smooth, neither serrate nor spinulose. Ridge pattern typical of *Syngnathus*, i.e., lateral trunk ridge discontinuous with lateral tail ridge near anal ring, inferior trunk and tail ridges continuous and superior

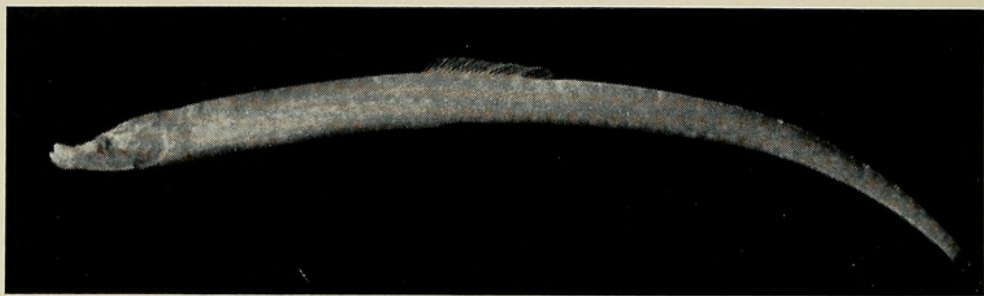


FIG. 4. *Syngnathus darrosanus* ANSP 128815; holotype; 47 mm SL.

trunk and tail ridges discontinuous near rear of dorsal fin. Trunk V-shaped ventrad; brood pouch unknown.

Description: Measurements (mm) are as follows: head length 6.0 (5.5 in paratype); snout length 2.1 (2.0); eye diameter 1.1 (1.0); length of dorsal fin base 5.5 (5.2); pectoral fin length 1.2 (1.1); length of pectoral fin base 0.9 (0.8); caudal fin length 1.1 (damaged in paratype).

Median snout ridge (Fig. 5) smooth, begins near middle of snout length with two well separated, subtriangular, dorsal expansions, not deeply incised; snout without lateral spines; orbital ridge low, not expanded dorsolaterad; median frontal, prenuchal and nuchal ridges low, indistinct. Opercular ridge extends over $\frac{1}{3}$ to $\frac{1}{2}$ of opercle, opercle elsewhere crossed by radiating striae imparting a waffle-like surface configuration; upper and lower pectoral cover plate ridges present. Trunk and anterior $\frac{1}{3}$ of tail with slightly elevated, rounded ridges, only slightly indented between rings. Ridges on remainder of tail deeply incised between rings, margins elevated, tail surface concave between; head and body ridges entire. Lateral trunk and tail ridges overlap on 2nd tail ring in holotype; lateral trunk ridge ends on 1st tail ring in paratype and falls short of lateral tail ridge, which ends near middle of 2nd tail ring. Eye bears circle of 17–18 minute, equally-spaced, pale flaps or cirri; head and body elsewhere devoid of cirri; scutella oval, rather broad, width about $\frac{1}{2}$ distance between proximal margins of adjacent scutella; neuromasts in short series on posterior half of each tail ring.

Predominantly brown with faint mottling of tan; upper half of snout and tip of lower jaw pale; dorsum of trunk and tail with indications of several pale bars of irregular width and spacing; dorsal and pectoral rays streaked with brown, membranes mainly pale; caudal fin dark brown with narrow pale margin.

Etymology: Named *darrosanus*, in reference to the type-locality, D'Arros Island.

Discussion: Both specimens are assumed to be adult or subadult females and future collections of egg bearing males will probably show this species to be a member of the poorly defined *Bryx-Microsyngnathus* group of subgenera. *Syngnathus darrosanus* seems most closely related

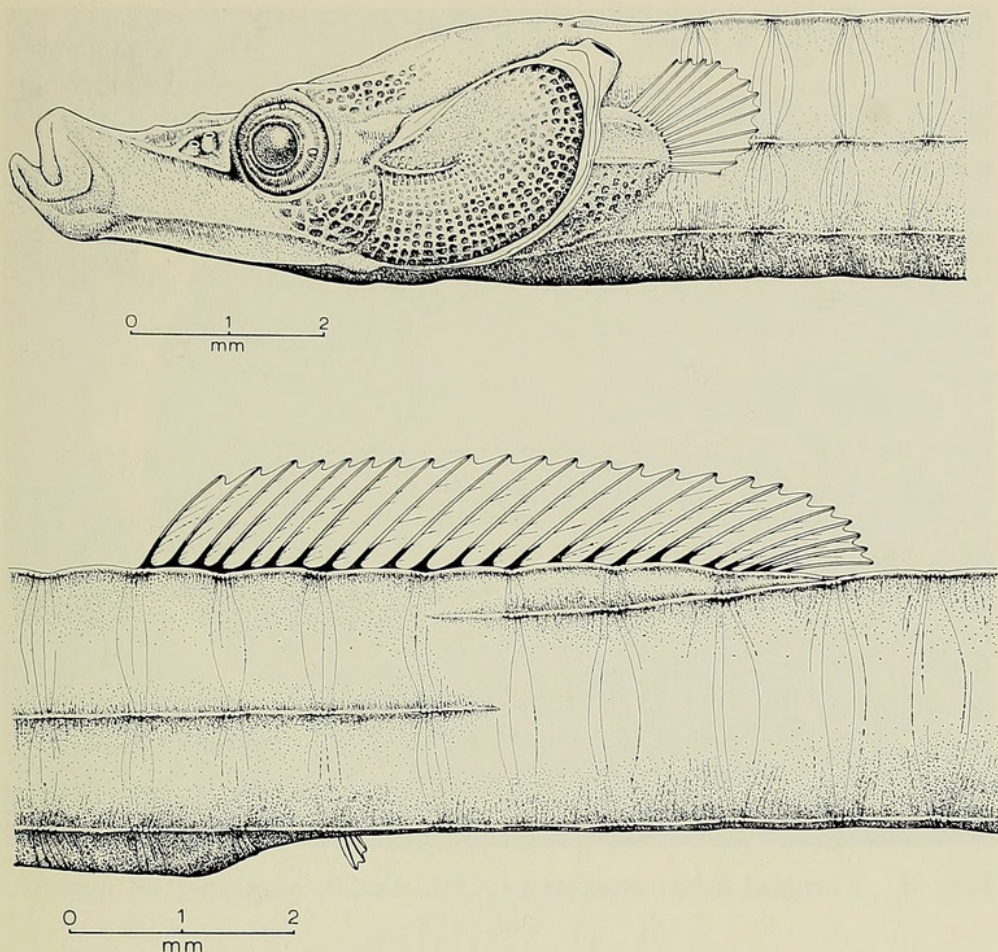


FIG. 5. *Syngnathus darrosanus*. Top: Lateral aspect of head and anterior trunk rings. Bottom: Section of body illustrating ridges, dorsal and anal fins. Drawn from holotype.

to such small forms as *S. balli* (Fowler) and *S. banneri* Herald and Randall. The combination of 16 trunk rings, 29–30 tail rings, 23 dorsal fin rays, smooth ridges, and short snout clearly separates *S. darrosanus* from congeners.

***Corythoichthys amplexus*, new species**

Figures 6 and 7

Holotype: USNM 213479 (66 mm SL, male), Fiji Islands, Beqa Lagoon, patch reef between Stuart and Yanuca Islands, 6.1 m, rotenone, 16 Jan. 1974, B. Carlson and B. Goldman.

Paratypes: Fiji Is.: BPBM 17949 (2, 44–54), GCRL 13337 (5, 44–62), USNM 213480 (2, 45–54), taken with holotype. Solomon Is.: BPBM 15614 (2, 59–71), GCRL 13336 (1, 68), Alite Reef off Malaita, lagoon coral head, 3 m, 24 July 1974, J. E. Randall and G. R. Allen. Celebes Is.: USNM 213510 (8, 49–69), GCRL 13358 (2, 54–64), Kabena Is.,

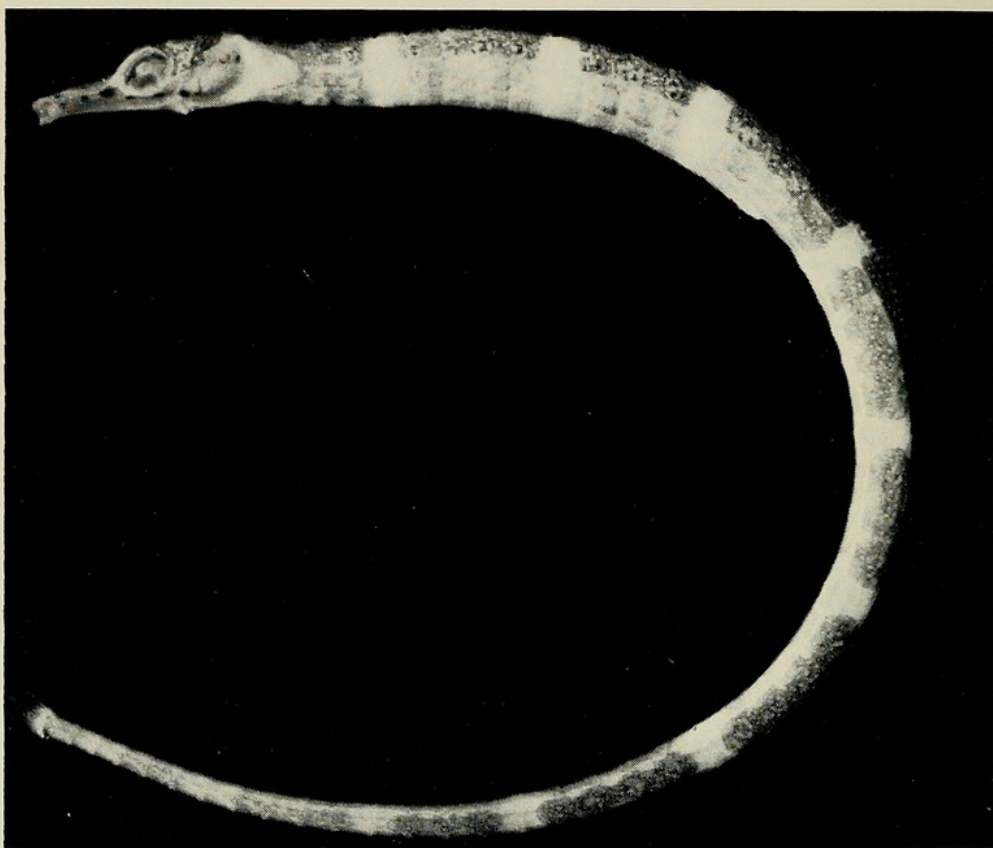


FIG. 6. *Corythoichthys amplexus* GCRL 13336; paratype; 68 mm SL.

Tallabassi Bay, off NE tip of Big Damalawa Is., ca. 05°17'20"S, 122°04'00"E, 2–15 m, 25 Feb. 1974, V. G. Springer. New Guinea: USNM 213511 (1, 66), Madang harbor, inside S tip of Paeowai Is., 9.1–10.7 m, 26 May 1970, B. B. Collette. Seychelles: ANSP 110058 (8, 55–70), Mahé Is., NW end Beau Vallon Bay, isolated coral outcrop in sand, 6.1–7.5 m, 15 Mar. 1964, IIOE Sta. F-114; ANSP 110017 (1, 59), Beau Vallon Bay, NNW of Hotel des Seychelles, 12.2–15.2 m, 19 Mar. 1964, IIOE Sta. F-119; ANSP 108993 (1, 68), Mahé Is., W side of N islet, 7.6–18.3 m, 16 Mar. 1964, IIOE Sta. F-115; ANSP 110053 (5, 68–88), vicinity Praslin Is., S of Round Is., to 15.2 m, 22 Feb. 1964, IIOE Sta. F-61; ANSP 108972 (63, 50–89), BPBM 18033 (4, 65–70), GCRL 13463 (6, 70–88), Curieuse Is., S end Laraie Bay, to 9.1 m, 23 Feb. 1964, IIOE Sta. F-64. Amirante Isles: ANSP 110050 (5, 49–64), off E end D'Arros Is., 21.3–30.5 m, 6 Mar. 1964, IIOE Sta. F-89; ANSP 110036 (4, 55–76), African Is., SW of North Is., to 3.7 m, 3 Mar. 1964, IIOE Sta. F-80.

Other material: GCRL 13338 (2, with regenerated tails), taken with holotype. ANSP 110052 (1, anomalous), Seychelles, off N tip of Mahé Is., ca. 18.3 m, 14 Feb. 1964, IIOE Sta. F-50.

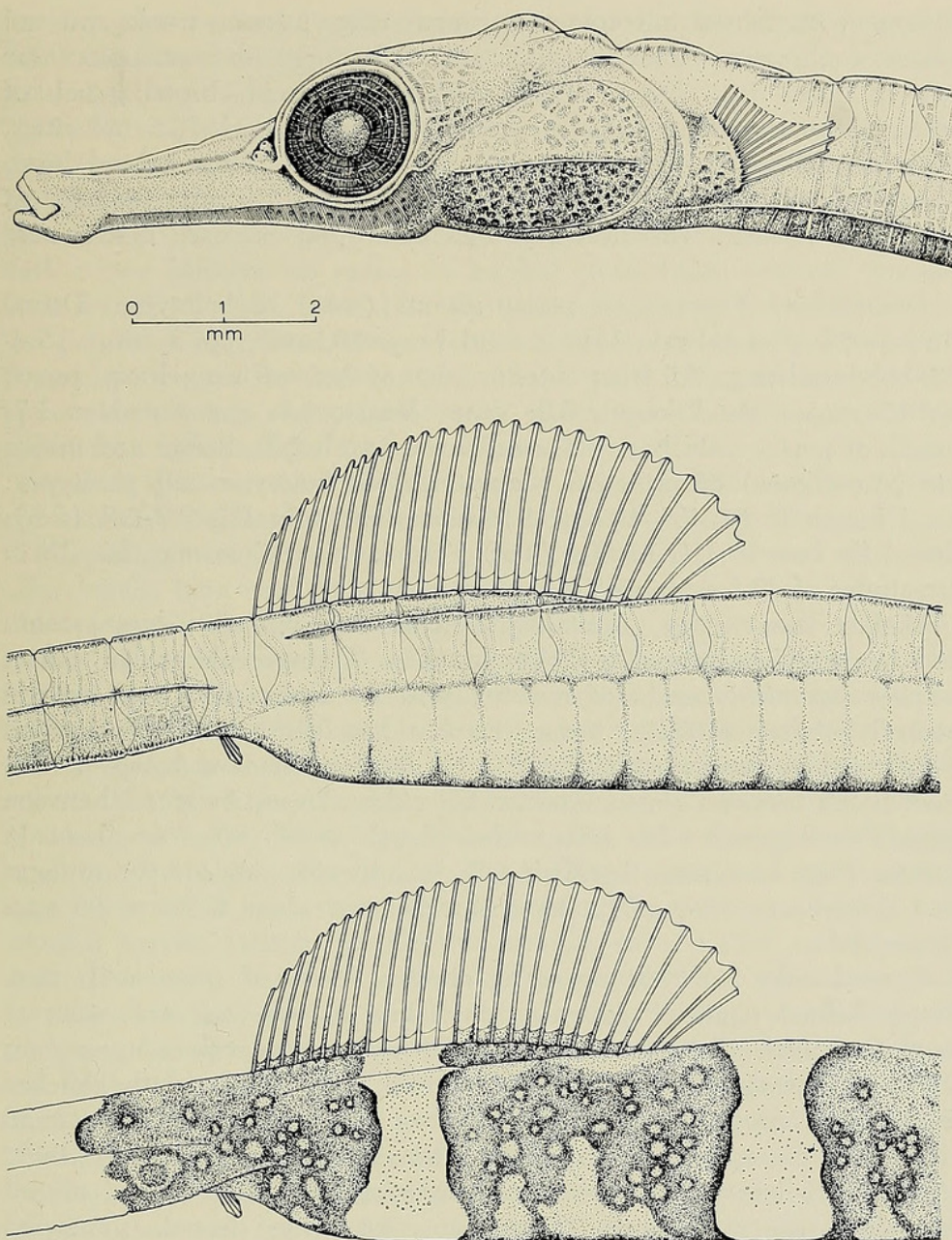


FIG. 7. *Corythoichthys amplexus*. Top: Lateral aspect of head and anterior trunk rings. Middle: Section of body illustrating ridges, dorsal and anal fins and portion of brood pouch. Bottom: Same section showing color pattern. Drawn from holotype.

Diagnosis: Dorsal fin rays 24–29 (modally 26); pectoral fin rays 12–15 (14); caudal rays 10; anal rays 4; trunk rings 15–16 (15); tail rings 35–39 (37); subdorsal rings 4.5–6.25 (average 5.2); dorsal fin origin on 1st or 2nd tail ring; snout short, averages 2.5 in head length. Ridge pattern typical of *Corythoichthys*, i.e., lateral trunk ridge discon-

tinuous with lateral tail ridge near anal ring, inferior trunk and tail ridges continuous, superior trunk and tail ridges discontinuous near rear of dorsal fin. Trunk slightly V-shaped ventrad; brood pouch of males without protective plates, located on anterior 11–13.5 tail rings. Body ringed by 11–13 (usually 12) broad brown bands behind head, 4 bands from pectoral ring to 2nd–4th tail ring, 7–9 on remainder of tail; sides of head without wavy lines or stripes; no dark blotch near anus.

Description: Counts and measurements (mm) of holotype: Dorsal fin rays 27; pectoral rays 14(2); caudal rays 10; anal rays 4; rings 15 + 38; subdorsal rings 5.5 from anterior edge of 2nd tail ring; brood pouch on 13 rings. Head length 6.9; snout length 2.8; eye diameter 1.7; length of pectoral fin base 0.9; caudal fin length 2.5. Range and means (in parentheses) of principal proportions for holotype and paratypes: head length in SL 7.9–12.0 (9.5); snout length in HL 2.2–2.8 (2.5); dorsal fin base in HL 1.0–1.4 (1.1). Trunk rings 16 in one fish, 15 in remainder of 124 examined.

Median snout ridge, frontal, prenuchal and nuchal ridges smooth and moderately elevated in holotype (Fig. 7); opercular ridge almost reaches posterior margin of opercle; pectoral cover plate and opercle pocked between radiating striae; trunk ridges distinct, superior ridges mainly entire, somewhat elevated with dorsum concave between, distinct notch between rings; superior tail ridges lower, indented between rings; brood pouch folds broad, their depth at 8th tail ring about $\frac{1}{3}$ greater than remaining depth of tail; pouch with single layer of eggs in 4 transverse rows over 12 rings; egg diameter about 0.6 mm, 65 eggs in pouch.

Ground color light tan, markings brown. Side of snout with dark blotch behind angle of gape, another close to eye; top and sides of head from interorbital to rear of frontal crest and between upper, anterior part of opercles capped with brown; two narrow, dark blotches near ventral margin of opercle, another on gill membranes below; head elsewhere immaculate or peppered with dark chromatophores. Body circled by 4 brown bands from pectoral ring to middle or end of 3rd tail ring, pale interspaces about one ring wide dorsad, somewhat wider below; 7 bands on remainder of tail, last 3 with pigmentation faint and largely restricted to localized concentrations of dark chromatophores in irregular circlets; color bands continue to margins of brood pouch folds but supramarginal pale areas included within 2nd and 3rd color bands crossing brood pouch (Fig. 7). Pectoral rays with scattering of basal chromatophores, the fin otherwise pale; dorsal rays above color bands lined proximad with chromatophores, remainder of fin pale; caudal fin pale, with a single narrow dark bar near base.

Dorsal fin origin between anterior margins of 1st and 2nd tail rings, most frequently near middle of 1st ring. Scutella rather broad, maximum width more than half distance between proximal margins of adjacent scutella. Head crests and body ridges most prominent in Solomons,

Celebes and western Pacific material; superior trunk ridges minutely denticulate in most specimens examined; median snout ridge usually with slight dorsal emargination (Fig. 7).

Details of coloration vary but basic broadly banded pattern is constant; snout lightly shaded with chromatophores in some fish, 1–2 lateral rows of up to 6 small brown spots in others; body bands usually less distinct across venter. Males usually have 2–4 moderately large, dark brown blotches on venter of 1st–3rd trunk rings, whereas females most frequently have several small, tan spots arranged in 2, more or less parallel, longitudinal rows. A color transparency of a fresh Solomon Islands specimen shows pale areas as bluish-white, the markings reddish-brown; dark bands are sprinkled with white and all bands are distinct rather than faded caudad as in most preserved material.

A small species, which probably seldom exceeds 100 mm SL; among our material, the smallest male with brood pouch eggs is 55 mm SL.

Etymology: *amplexus*, encircling, in reference to the broad encircling color bands; here used as a noun in apposition.

Discussion: Herald (1953) recognized five species and two subspecies within Indo-Pacific populations of *Corythoichthys*. Subsequently, Smith (1963) showed *C. intestinalis* Ramsay to be a junior synonym of *C. haematopterus* (Bleeker), and both Smith (1963) and Klauswitz (1972) questioned the validity of Herald's subspecies: *C. intestinalis intestinalis* (E. Africa to New Hebrides) and *C. intestinalis waitei* (Jordan and Seale) from New Hebrides, Fiji and other central Pacific localities. With the exception of *C. ocellatus* Herald, a long-snouted form with 30–31 tail rings described from the Solomon Islands, all nominal species exhibit considerable overlap in meristics and identification is largely based on differences in proportional characters and coloration. *Corythoichthys amplexus* is readily distinguished from all congeners by the combination of short snout, modally 15 trunk rings and broadly banded color pattern. Trunk rings are modally 16–18 in other Pacific species and counts of 15 have occurred in only 20 of 570 specimens examined (Herald, 1953 and our unpublished data). Frequency of trunk rings is one of the most stable meristic features of pipefishes and the modal count of 15 in *amplexus* is distinctive. The number of pectoral fin rays (13 or 14 in 92% of 235 counts) also differs from that of Pacific congeners wherein modal values are 15 or 16 (detailed meristic comparisons will be provided in a review of the genus now in preparation by Dawson). Other short-snouted species, *C. flavofasciatus* Rüppell and *C. haematopterus*, also have banded coloration but this is rather poorly defined; the bands and pale interspaces are often about equal in length and there are either distinctive stripes or wavy lines on the head (absent in *amplexus*). In addition, males of *flavofasciatus* have a dark, perianal blotch and males (and some females) of *haematopterus* usually have prominent, dark bars crossing venter of the anterior 3–5 trunk rings. Available

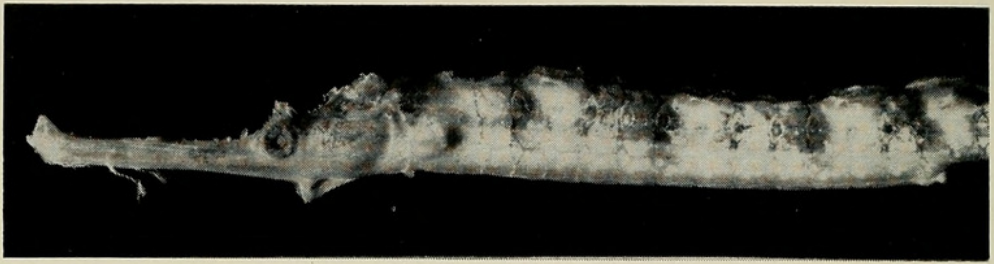


FIG. 8. Head and anterior body of *Halicampus macrorhynchus* BPBM 17354; 149 mm SL.

data suggest that *C. amplexus* prefers protected coral habitats within the 2–31 m depth range.

Halicampus macrorhynchus Bamber
Figures 8 and 9

Material examined: BPBM 17354 (1, 149 mm SL), Solomon Is., Guadalcanal, Point Cruz, Honiara, among “algae” covered rocks, 25 m, Jan. 1974.

Counts and measurements: Dorsal fin rays 18; pectoral fin rays 19–18; caudal rays 10; anal rays 4; rings 14 + 25; subdorsal rings 2.75 (1.5 trunk + 1.25 tail rings). Head length 30.0 mm (5.0 in SL); snout length 18.5 (1.6 in HL); eye diameter 3.0; length of dorsal fin base 7.6 (4.0 in HL); pectoral fin length 2.5; length of pectoral base 3.6; caudal fin length 6.1.

Description: Median snout ridge (Fig. 9) low, represented mainly by a series of distinct spines and short elevated ridges; additional spines laterad on snout; orbital ridge spiny anteriorly, expanded above eye to form a large subtruncate, dorsolateral projection; suborbital ridge produced into a large, somewhat spiny, knoblike, lateral protrusion; opercular ridge anteriorly expanded to form a flat, medially-notched, lateral projection, ridge low behind, directed dorsad, crossing entire opercle; supraopercular ridge low in front, expanded into a broad, flat projection behind; pectoral cover plate with broad, distally curved, shelflike projection near lower pectoral angle and a small, flat, spinelike projection just before upper angle of fin; a strong ridge runs ventrad from anterior edge of cover plate, terminating in a substantial, recurved, hooklike knob at anterolateral margin of pectoral ring. Median frontal ridge rather low and denticulate in front, higher behind; pre-nuchal and nuchal ridges lower, more or less subconical; interorbital deep between supraorbital ridges.

All body ridges distinct, their margins granular, clearly notched or indented between rings; dorsum and sides concave between ridges; trunk V-shaped ventrad. Inferior trunk and tail ridges discontinuous; lateral trunk ridge continuous with inferior tail ridge; superior trunk and tail ridges discontinuous below dorsal fin. Lateral trunk ridge produced

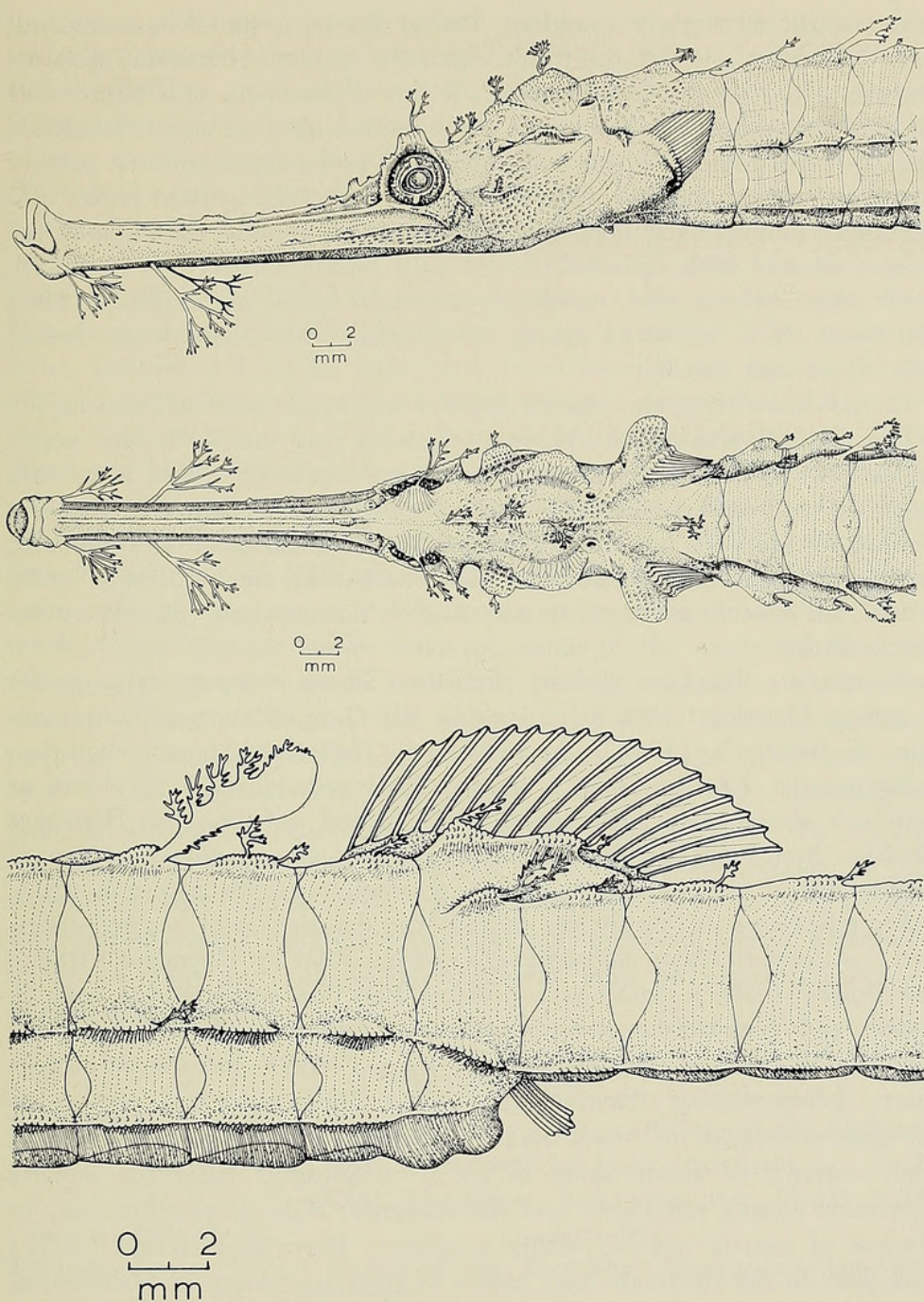


FIG. 9. *Halicampus macrorhynchus* BPBM 17354. Top and middle: Lateral and dorsal aspect of head and anterior trunk rings. Bottom: Section of body illustrating ridges, cirri, dorsal and anal fins.

on each ring to form strong, recurved, hooklike projection. Superior trunk and tail ridges produced laterad, margins of rings 3-4, 7-8, 11, 13, 18 and 23 produced as retrorse hooks, remaining rings rounded or bluntly pointed; inferior trunk and tail ridges produced laterad, mar-

gins straight or slightly rounded. Dorsal fin base somewhat elevated; scutella suboval, width on trunk about $\frac{5}{6}$ distance between proximal margins of adjacent scutella, about $\frac{2}{3}$ this distance on tail; neuromasts present but indistinct. Two pairs of branched cirri on snout; branched cirri also present on: supra and suborbital projections, anterior part of opercular ridge, median frontal ridge; large feather-like cirrus immediately behind each hook like projection on superior trunk and tail ridges; dorsum with rounded, fleshy pads on scutella of 7th and 11th trunk rings, which may represent persistent bases of additional cirri; eye bears circle of 10–12 small, white tabs, with single large, brown flap above and below.

Ground color light tan. Snout, dorsum and upper sides of head lightly and irregularly shaded with brown; pectoral ring mainly brown across upper sides and dorsum; about 4 indistinct bands on trunk, 6 on tail, bands most prominent across dorsum between lateral trunk ridges, less distinct or obsolete on lower sides; interspaces variously flecked with brown; pectoral and dorsal fin bases brownish, fins otherwise pale; caudal fin brown at base, traces of two narrow bars distad; venter immaculate.

Discussion: Duncker (1940) described *Phanerotokeus* (type-species *P. gohari* Duncker) from Ghardaqa in the Gulf of Suez without mention of Bamber's (1915) description of *Halicampus macrorhynchus*. Subsequently, Fowler (1956) erected *Halicampoides* on the basis of Bamber's description and figure, but omitted reference to Duncker (1940). Smith (1963) treated *Halicampoides* as a junior synonym of *Phanerotokeus* and placed *P. gohari* in synonymy with *macrorhynchus*. Other references to this species include the description of a dried specimen (as *Phanerotokeus macrorhynchus*) from Eilat by Tortonese (1968), and Botros' (1971) listing as a possible Red Sea endemic (as both *P. gohari* and *Halicampus macrorhynchus*). Duncker (1940) failed to compare his material with *Halicampus* Kaup (1856), and the only characters differentiating *Phanerotokeus* (and *Halicampoides*) appear to be relative lengths of snout and the presence or absence of dermal cirri. Length of snout alone is not a meaningful basis for generic separation among pipefishes and the presence, state of development, or absence of cirri is variable within a species. Herre and Herald (1951) remarked on the relatively long snouts of their specimens of *Halicampus grayi* Kaup [= *H. koilomatodon* (Bleeker)] compared with the specimen figured by Weber and DeBeaufort (1922:103, fig. 43). Snout length is about 2.7 in head length in the figured specimen whereas Herre and Herald reported this ratio as 2.0 for their material. Our examination of *H. koilomatodon* (9, 66–94 mm SL; including two Bleeker specimens, RMNH 7226) shows a 2.1–2.5 range for this character. In addition, there are hooklike protrusions on lateral trunk ridges, ventrolateral projections on the pectoral ring and projections on pectoral cover plate and dorsum of head, which are essentially similar

to those on the fish described here. Body ridge configurations agree in both nominal genera; dorsal fin bases are elevated and the male brood pouch is subcaudal in both, with eggs deposited in cutaneous cells protected by short, lateral folds and poorly developed, protective plates. In the absence of substantial differentiating characters we place *Phanerotokeus* in synonymy with *Halicampus* Kaup.

The Guadalcanal specimen is more robust and deeper bodied than examined Red Sea material [USNM 166931 (8, 120–145 mm SL); MSNH 40551 (1, 155)]. Compared with a 145 mm SL male from Ghardaqa, minimum snout depth is 2.4 mm (against 1.6), minimum snout breadth 1.8 (1.3), maximum head breadth at opercular ridge 8.2 (5.9), maximum breadth at lower pectoral ridge 10.5 (8.6), maximum trunk depth 9.2 (7.3) and maximum trunk breadth 9.0 (7.6). Head and body ridges are much larger and more prominent in the Pacific fish and there are no cirri on the snout of any Red Sea specimens although body cirri are variously present or absent. Mr. Wheeler advises that the holotype of *Halicampus macrorhynchus* (BMNH 1915.10.25.2) lacks cirri on the snout and has somewhat reduced hooklike lateral trunk ridges. Similar hooks occur on some of the examined Red Sea fish, but lateral trunk ridges are mostly straight with but a slight notch near the posterior margins. The holotype and other Red Sea specimens have 26–27 tail rings (25 in Pacific specimen) and subdorsal rings total 3–3.25 (against 2.75), but other meristics of the Pacific specimen fall within the range of examined Red Sea material. We consider the Guadalcanal specimen conspecific with *H. macrorhynchus*; it constitutes the first Pacific record of a species previously thought to be a Red Sea endemic. Additional material may prove observed differences to be constant and subspecific treatment may be warranted for the Pacific population.

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