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Chaunax multilepis sp. nov., a new species of *Chaunax* (Lophiiformes: Chaunacidae) from the northern Indian Ocean

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Abstract

A new species of *Chaunax* is described on the basis of eight type and five non-type specimens. This species belongs to the *Chaunax abei* species group and can be distinguished from congeners in the group by having a continuous tooth patch on the vomer, not divided into two patches, and four or five neuromasts in the lower preopercular series. It can be further separated by the following combination of characters: large green spots on dorsal surface; simple spinules on dorsal surface; 12 pectoral-fin rays; 13–16 neuromasts in pectoral series; 30–37 neuromasts in lateral-line proper; typically four neuromasts on caudal-fin base; typically 7 neuromasts in mandible; typically 12 gill rakers on second gill arch; gill chamber and buccal cavity pale; and peritoneum black.

Key words: Pisces, Teleostei, *Chaunax multilepis*, new species, India

Introduction

The first *Chaunax* species recorded from India was *Chaunax pictus* (Lowe, 1846), more than a century ago (Alcock, 1899). However, the species has been subsequently shown to be restricted to Atlantic waters (Caruso, 1989). Lloyd (1909) described a second species, *Chaunax apus*, collected from the Bay of Bengal, and he stated that this species is commonly collected in that region. Le Danios (1979) erroneously treated *Chaunax apus* as a junior synonym of *Chaunax endeavouri* Whitley, 1929, which was described subsequent to *C. apus*. Caruso (1989) recognized *C. apus* as an *nomen dubium* in *Chaunax*. Le Danios (1979) described *Chaunax umbrinus flammeus* (= *Chaunax flammeus*) based on one specimen collected from off Madagascar. Smith *in* Smith & Heemstra (1986) recorded *C. penicillatus* McCulloch, 1915 and *C. pictus* from South Africa, the latter most likely a misidentification. Ho & Last (2013) recognized six species of *Chaunax* from the Indian Ocean, including two new species from the eastern and western Indian Ocean, respectively. They also suggested that *C. apus* should be treated as a valid species.

During our recent examination of specimens of *Chaunax* collected from Indian waters, two different forms were typically found in collections, one with a uniformly pink color (uniformly creamy white in preservation) and one with many green spots on the body (turned into gray or brown spots in preservation).

Comparing these specimens with the original description and the holotype, we recognized the pink form as *C. apus*, based on the similar morphology and lateral-line neuromast counts, body proportions, and squamation. Moreover, Lloyd (1909) did not mention any spots on the body surface, an obvious character that could not be overlooked, even in most long-preserved specimens.

The green-spotted specimens lack cirri on the dorsal surface of head and appear to belong in the *Chaunax abei* species groups (*sensu* Ho *et al*., 2013). However, there are several diagnostic characters that distinguish these specimens from all known species in this group, so these specimens are recognized as a new species. A formal description is provided herein.

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Methods and materials

Standard length (SL) is used throughout. Methods for taking morphometric and meristic data follow Ho *et al.* (2013). Terminology followed Caruso (1989). Specimens are deposited in the museum of the Department of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences of Cochin University of Science and Technology, Kochi National Bureau of Fish Genetic Resources, Kochi Unit, CMFRI Campus, Kochi (NBFGR) and the Centre for Marine Living Resources & Ecology, Kochi (CMLRE). Comparative data are those taken from Ho & Shao (2009), Ho *et al*. (2013), and unpublished data collected by the first author.

Chaunax multilepis sp. nov.

New English name: Indian spotted coffinfish
Figs. 1A–C, 2A–B; Table 1

Holotype. CMLRE 2923417A (130 mm SL), 13.26°N, 93.17°E; off North Andaman I., Andaman Sea, Bay of Bengal, northeastern India Ocean; 295−323 m, FORVSS, Nov. 2011.

Paratypes. CMLRE 2923417B (1, 107 mm SL) and CMLRE 2923417C (1, 105 mm SL), collected with the holotype. CMLRE 2923812A (1, 140 mm SL) and 2923812B (1, 126 mm SL), 13.00°N, 93.10°E; Andaman Sea, 325–350 m, FORVSS, Nov. 2011. NBFGR-CH-1143 (1, 134 mm SL), Sakthikulangara fishing harbour, Kerala State, trawl off Kollam, southwestern India, Arabian Sea, 340 m, coll. K. K. Bineesh & K. V. Akhilesh, 24 Oct. 2011, GenBank Accession number KR231793. NBFGR-CH-1144 (1, 119 mm SL) and NBFGR-CH-1145 (1, 152 mm SL), collected together with NBFGR-CH-1143.

Non-types. Five specimens (81.2–123 mm SL) collected from off Kochi, west coast of India, specimens examined in the Department of Oceanography, University of Kerala.

Diagnosis. A species of *Chaunax abei* species group that is distinguished from congeners in the species group by having a continuous tooth patch on vomer, not divided into two patches, and four or five neuromasts in the lower preopercular series. It can be further separated by the following combination of characters: large green spots on dorsal surface; simple spinules on dorsal surface; 12 pectoral-fin rays; 13–16 neuromasts in pectoral series; 30–37 neuromasts in lateral-line proper; typically four neuromasts on caudal-fin base; typically 7 neuromasts in mandible; typically 12 gill rakers on second gill arch; gill chamber and buccal cavity pale; and peritoneum black.

Description. Morphometric and meristic data are given in Table 1; data for holotype are provided below followed by the range for paratypes in parentheses. Head length 2.3 (2.3–2.5) in SL; head width 6.5 (6.5–7.0) in SL, 2.8 (2.7–3.0) in HL; predorsal length 1.9 (1.9–2.1) in SL; pre-gill opening length 1.6 (1.5–1.7); pre-preopercular length 3.4 (3.4–3.8) in SL, 1.5 (1.5–1.7) in HL; upper jaw 4.8 (4.6–5.5) in SL, 2.1 (1.9–2.4) in HL; illicial length 10.0 (9.4–12.9) in HL; illicial trough length 6.1 (5.8–7.9) in HL; eye diameter 5.3 (4.6–6.0) in HL; post-dorsal fin length 5.3 (4.9–5.6) in SL, 2.3 (2.0–2.3) in HL; post-anus length 3.1 (2.8–3.4) in SL, 1.4 (1.2–1.5) in HL; post-anal fin length 6.2 (4.8–6.6) in SL, 2.7 (2.0–2.9) in HL; caudal peduncle depth 5.7 (5.3–5.9) in HL; caudal fin length 3.7 (3.4–3.8) in SL, 1.6 (1.5–1.6) in HL.

Head globular, skull slightly elevated posteriorly; trunk cylindrical, slightly compressed, tapering posteriorly; skin thin, loose and flaccid; interorbital space broad; caudal peduncle relatively long and slender, slightly compressed, tapering posteriorly. Eyes rounded, directed dorsolaterally, covered by dermal membrane broadly connected to adjoining skin, forming clear "window".

Illicium short and stout; esca with large central tongue bearing many thin brownish cirri; second dorsal-fin spine close to illicium, embedded under skin; third dorsal-fin spine situated at about mid-point of pre-dorsal distance, embedded under skin. Illicial trough oval-shaped, flat, relatively short and narrow, smaller than pupil, and longer than wide.

Two nostrils anterior to eye, anterior nostril surrounded by fleshy membrane, posterior part higher than anterior part, posterior nostril a simple round hole; mouth relatively wide, terminal, opening nearly vertical; lower jaw slightly protruding in front of upper jaw; maxilla tapering above, broad below; blunt symphyseal spine on lower jaw symphysis.

Broad transparent membrane on first gill arch; first ceratobranchial broadly connected to opercular wall; gill filaments on second to fourth gill arches, two rows of gill filaments on second and third gill arches, single row of gill filaments on fourth gill arch; those on inner row of third and fourth gill arch subequal to those of other arches;

inner surface of fourth gill arch completely connected to body. Single row of 16 (15–17) rakers on first gill arch, 4 (3 or 4) on upper limb and 12 (12 or 14) on lower limb, 12 (11–13) paired rakers on second arch, 11 (11 or 12) paired rakers on third arch and single row of 9 (9 or 10) rakers on fourth arch.

TABLE 1. Morphometric and meristic data of *Chaunax multilepis* **sp. nov.** Lateral-line neuromasts are counted for non-types. Values are counted in both sides when paired.

	Holotype	Types	
Standard length (mm)	130	105–152 (n=8)	
		Mean (Range)	SD
Head length	43.9	42.4 (40.7–44.0)	1.2
Prepreocular length	29.3	27.8 (26.2–29.5)	1.4
Intersphenotic width	15.5	15.1 (14.2–15.5)	0.5
Eye diameter	8.3	8.5 (7.1–9.4)	0.7
Upper jaw	20.7	20.1 (18.3–21.9)	1.1
Illicial length	4.4	3.8 (2.7–4.5)	0.7
Illicial trough length	7.2	6.7 (5.5–7.3)	0.7
Predorsal length	52.4	50.4 (46.9–52.4)	2.0
Pre-gill opening length	61.5	60.5 (57.2–65.4)	3.0
Post-dorsal length (TL1)	18.7	19.3 (18.0–20.3)	0.8
Post-anus length (TL2)	31.9	31.7 (29.3–35.1)	1.7
Post-anal length (TL3)	16.1	17.3 (15.3–20.9)	2.1
Caudal-peduncle length	7.7	7.6 (7.4–8.0)	0.2
Caudal-fin length	26.9	27.7 (26.2–29.8)	1.6
Meristics		Types + non-types (n=13)	
Pectoral-fin rays	12/12	10 (1), 11 (1), 12 (24)	
Lateral-line neuromasts		Types + non-types (n=13)	
AB	12/12	10 (2), 11 (14), 12(10)	
AC	8/8	8 (26)	
BD	3/3	3 (23), 4 (3)	
CD	6/6	5 (1), 6 (19), 7 (6)	
DG	4/4	3 (1), 4 (20), 5 (5)	
EF	6/7	6 (10), 7 (15), 5 (1)	
FG	3/3	3 (22), 4 (4)	
GH	14/14	13 (6), 14 (14), 15 (5), 16 (1)	
BB'	5/5	4 (12), 5 (14)	
BI	36/37	30 (2), 31 (3), 32 (1), 33 (6), 34 (3), 35 (3), 36 (5), 37 (3)	
Gill rakers		Types (n=8)	
GRi	4+12=16	15 (2), 16 (4), 17 (2)	
GRii	12	11 (3), 12 (2) ,13 (1)	
GRiii	11	11 (4), 12 (2), 13 (1)	
GRiv	9	9 (3), 10 (5)	

Interspaces of lateral-line neuromasts complex, slightly longer than wide; 1−3 (typically 1) pairs of slender spines bridging neuromasts. Skin thin, tips of pectoral-fin and pelvic-fin rays free. Dermal spinules short, all simple, covering entire body, except eye window, distal half of pectoral fins, entire anal fin and membranes of other fins. Wide band comprising about 10 (9–12) rows of spinules in front of illicial trough.

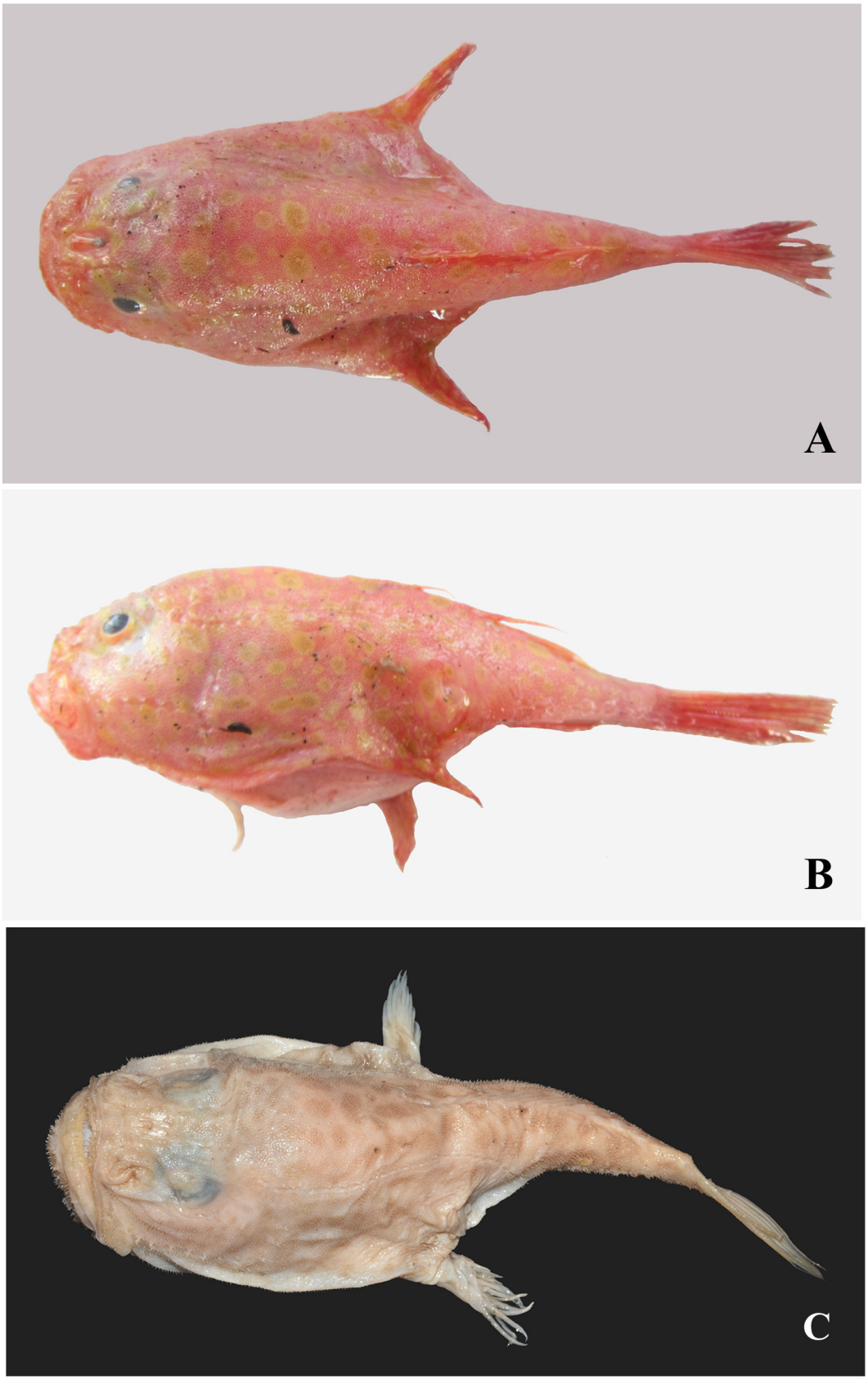

FIGURE 1. *Chaunax multilepis* **sp. nov.**, holotype, CMLRE 2923417A, 130 mm SL, Andaman Sea. A. Dorsal view. B. Lateral view. C. After preservation, dorsal view.

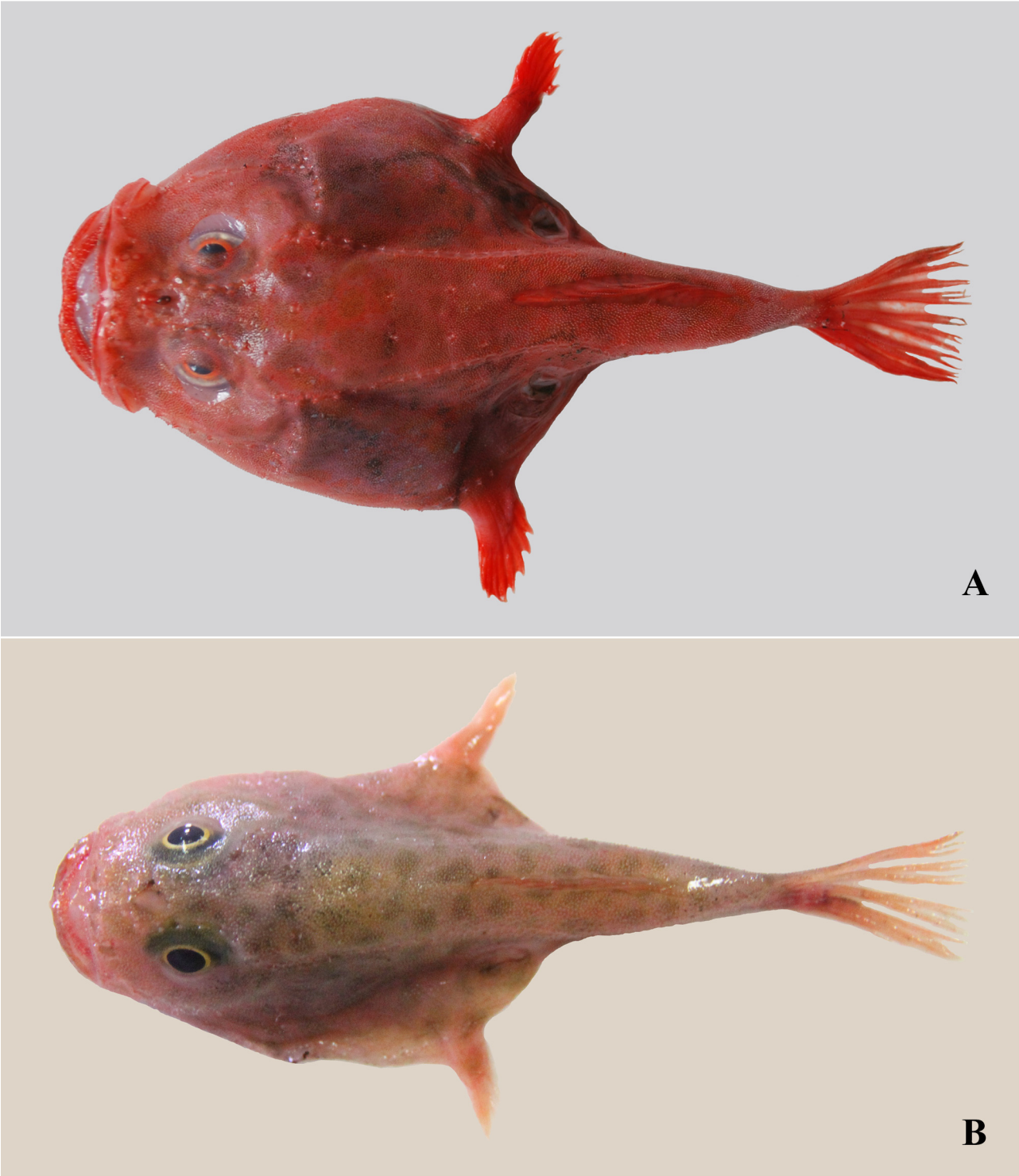

FIGURE 2. Fresh caught specimens of *Chaunax multilepis* **sp. nov.** A. NBFGR-CH-1145, paratype, 152 mm SL, SW India. B. CMLRE uncat., ca. 70 mm SL, from Arabian Sea.

Teeth in both jaws slender, fang-like; 6–7 irregular rows in upper jaw, tooth length gradually increasing from outer to inner row, those in inner row longest; 3–4 irregular teeth in lower jaw, in same arrangement as those on upper jaw. Teeth on vomer small, in approximately 3 rows, continuous, without middle space; teeth on palatine small, in elongate patch, close to outer end of vomerine patch.

Dorsal-fin rays III, 12, first soft ray shortest, about half length of second; last two rays branched. Pectoral fin fan-shaped, with 12 rays (one non-type specimens with 10/11 rays), 4th or 5th ray longest, those below 6th ray

gradually shorter. Anal fin with 7 rays, first shortest, first and second simple, 3rd or 4th to the last branched. Caudal fin truncate, with 9 rays, second to seventh rays branched, other 3 simple, lowermost ray shortest, attached to adjacent one.

Lateral-line neuromast network as described by Caruso (1989). Lateral-line neuromast counts: supraorbital (AB) 12 (10–12, typically 11); premaxillary (AC) 8 (8); upper preopercular (BD) 3 (3 or 4, typically 3); infraorbital (CD) (5–7, typically 6); lower preopercular (DG) 4 (4 or 5, typically 4, one non-type with 3 in one side); mandibular (EF) 6/7 (6–8, typically 7); hyomandibular (FG) 3 (3, rarely 4); pectoral (GH) (13–16, typically 14); anterior lateral-line proper (BB') 5 (4 or 5); lateral-line proper (BI) 36/37 (30–37), including 5 (3–5, mainly 4) on caudal-fin base.

Coloration. When fresh (Figs. 1A–B, 2 A–B), specimens with many large, irregular green spots on pale brown or red background on dorsal surface; pale on ventral surface; cirri on both anterior and posterior surfaces of esca brown; cirri on lateral body bright white. When preserved (Fig. 1C) specimens with many large irregular grayish spots on pale brownish background on dorsal surface; pale on ventral surface; cirri on both anterior and posterior surfaces of esca dark brown; buccal cavity and gill chamber pale, peritoneum black; all fins pale.

Size. The largest specimen examined 152 mm SL.

Distribution. Known from the type series collected in the Andaman Sea at depths of 295–350 m, and off the southwestern coast of India, Arabian Sea, between Mangalore and Kollam at depth of 200–350 m, based on field observation of KKB.

Etymology. The specific name *multilepis* means many scales, in reference to the diagnostic character of four neuromasts on lower preopercular series of lateral line, compared with typically three neuromasts in all other members of this species group.

Discussion

Chaunax mutilepis **sp. nov.** is a typical member of the *C. abei*-species group, whose species are characterized by lacking cirri on the dorsal surface of head, typically with 1 to 3 pairs of spinules bridging the lateral-line neuromasts, and spots on body surface. It has several characters that consistently separate it from its congeners, including the long, continuous tooth patch on vomer (vs. divided into two patches in congeners), typically 4 (vs. 3) lower preopercular neuromasts and typically 7 (vs. mainly 6) mandibular neuromasts.

The evidence suggests that the new species is allopatric with all know members of the *C. abei* species group except for *C. apus*, a widespread species in the Indo-west Pacific Ocean. The new species can be further distinguished from *C. apus* in having large spots on body surface (vs. uniformly pinkish when fresh, creamy white when preserved); dermal spinules stout and straight (vs. slender and curved); mainly 1 spine on each side of neuromast (vs. mainly 3 spines); cirri on esca brown to black (vs. cirri usually pinkish or pale, sometimes with brown tips); 30–37 neuromasts on the lateral-line proper (vs. 34–42).

The new species is most similar to *C. endeavouri* from eastern Australia because they share large spots on the dorsal surface. These two species differ in having simple spinules on body (vs. numerous bifurcated spinules mixed with simple ones); mainly 1 spine on each side of the neuromast (vs. 3 spines); typically 3 neuromasts in upper preopercular (vs. 2); and typically 4 neuromasts in lower preopercular (vs. 3).

Chaunax mutilepis **sp. nov.** is also similar to *C. nudiventer* Ho & Shao, 2010 of the tropical Pacific. Both species share large spots on the dorsal surface and simple dermal spinules on body, but *C. nudiventer* differs in having dermal spinules stout and straight (vs. slender and curved); spinules densely covered on ventral surface (vs. large naked area on ventral surface); typically 3 neuromasts in upper preopercular (vs. typically 4); 4 or 5 neuromasts in lower preopercular (vs. 3); 13–16 neuromasts in pectoral (vs. 15–19); and 30–36 neuromasts in lateral-line proper (vs. 39–50).

Chaunax suttkusi Caruso, 1989 from the Atlantic Ocean shares brown or black cirri on the esca and comparatively more neuromasts in both the upper and lower preopercular series, mainly 3 and 4, respectively. However, *C. suttkusi* can be distinguished from *C. multilepis* **sp. nov.** in that *C. suttkusi* typically 4 (vs. typically 3) neuromasts in hyomandibular series, 6 (vs. 7) neuromasts in mandibular series, and typically 3 (vs. typically 1) spines on each side of neuromasts.

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