Coelorinchus posteromaculatus (Actinopterygii, Gadiformes, Macrouridae), a new species of grenadier from the eastern Indian Ocean

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Abstract A new species of grenadier, *Coelorinchus posteromaculatus*, is described from nine specimens collected from the tropical eastern Indian Ocean at depths of 100–323 m. This species belongs to the *Coelorinchus argentatus* group (defined here to include 13 species), but differs from other members of that group in its unique body markings consisting of a single, prominent, lateral, dark blotch on the anterior part of the tail, and a slightly diagonal, narrow, dark stripe extending from the upper margin of the gill opening to below the first dorsal-fin midbase or beyond. *Coelorinchus posteromaculatus* is most similar to *C. gaesorhynchus* Iwamoto and Williams 1999 and *C. longissimus* Matsubara 1943, but further differs from the former in its much shorter snout (74–91% of postrostral length vs. 93–100% in *C. gaesorhynchus*), and from the latter in its relatively small mouth (upper-jaw length 38–43% of postrostral length vs. 42–49%).

Keywords Taxonomy · Description · Pisces · *Quincuncia* · *Coelorinchus argentatus* group

Introduction

Coelorinchus Giorna 1809 is the largest genus among the order Gadiformes, with about 120 valid species worldwide (Iwamoto and Williams 1999; Iwamoto et al. 2006, 2015; Nakayama and Endo 2017). The species of the genus are typically found on continental shelves and slopes in tropical and temperate waters of the world's oceans (Merrett and Iwamoto 2000; Iwamoto and Graham 2008; Nakayama and Endo 2017). Although its highest diversity lies in Southeast Asia, only a few recent works have attempted to establish the inventory of the deep-sea fish fauna in the region (e.g., Gloerfelt-Tarp and Kailola 1984; White et al. 2013).

In their book on the demersal fishes trawled from eastern Indian Ocean between southern Indonesia and northwestern Australia, Gloerfelt-Tarp and Kailola (1984) provided a color photograph of a unique *Coelorinchus* with a prominent dark blotch on the anterior part of the tail (unnumbered fig. on p. 82), so as to show the general appearance of macrourids (it is most likely to represent their "*Coelorinchus* sp. 3" collected from the south of Lombok Island, Indonesia). Unfortunately, they did not indicate any other information on the species, including the whereabouts of the photographed specimen. While this species appeared to belong to the subgenus *Quincuncia* Gilbert and Hubbs 1920 in having the combination of a long, attenuated snout and silvery reflections on the head and body, no described species of *Quincuncia* had been reported to have such a unique blotch on the tail.

During an ongoing review of *Coelorinchus* by the first author, the specimen illustrated by Gloerfelt-Tarp and Kailola (1984) was rediscovered at the Australian Museum, Sydney (AMS), and eight additional specimens of the same species were also found among several ichthyological collections in the world. A subsequent examination confirmed that they represent a new species, and we provide here a formal description of this species.

Materials and methods

Methods for counts and measurements follow Iwamoto (1970), Iwamoto and Sazonov (1988), Iwamoto and Williams (1999), Nakayama et al. (2015), and Nakayama and Endo (2017). Head, postrostral, and total lengths are expressed as HL, PRL, and TL respectively. The terminology of the head ridges is that redefined by Nakayama et al. (2015). Occipital scales refer to scales between the parietal ridges. Description of the body scales is based on scales on the dorsum below the interdorsal space, unless otherwise stated. In addition to a standard binocular microscope, a scanning electron microscope (SEM) was used to examine the fine structure of the body scales. Methods for SEM preparation follow Roberts (1993). Institutional codes follow Sabaj (2019). Type specimens of the new species are deposited in ichthyological collections of the Australian Museum, Sydney (AMS), Laboratory of Marine Biology, Faculty of Science and Technology, Kochi University, Kochi (BSKU), Institute of Oceanology, Russian Academy of Science, Moscow (IORAS), and Hokkaido University Museum, Hokkaido University, Hakodate (HUMZ).

***Coelorinchus posteromaculatus* sp. nov.**

(New English name: Tailspotted grenadier)
(Figs. 1, 2; Table 1)

Unidentified macrourid: Gloerfelt-Tarp and Kailola 1984: unnumbered color fig. on p. 82 (second from right top of page) (northwestern Australia and southern Indonesia; AMS I.44527-001).

Coelorinchus sp. 3: Gloerfelt-Tarp and Kailola 1984: 85, unnumbered fig. on p. 84 (third from top of page) (2 spec. from south of Lombok Island, NSMT-P22052, missing).

Holotype. AMS I.44527-001 (66.4 mm HL, 211+ mm TL, mature female), south of Lombok Island, eastern Indian Ocean, 8.97ºS, 116.08ºE, 314 m depth, trawl, coll. by T. Gloerfelt-Tarp, 1 Aug. 1981.

Paratypes. AMS I.44527-002 (2, 57.8–65.3 mm HL, 165+–187+ TL), collected with holotype; HUMZ 190722 (1, 58.2 mm HL, 197+ mm TL), HUMZ 190723 (61.0 mm HL, 197+ mm TL), HUMZ 190724 (1, 59.1 mm HL, 192+ mm TL), west of Sumatra 1º07.37′S, 98º27.54′E–1º08.18′S, 98º28.24′E, 100–170 m depth, R/V Baruna Jaya IV, bottom trawl, coll. by K. Odani, 3 Oct. 2004; IORAS 001-22 (2, 62.3–70.0 mm HL, 203+–220+ mm TL), Andaman Sea, 11º46′03″N, 96º51′04″E, 315–323 m depth, FRV Akademik Knipovich, trawl no. 455, 11 Mar. 1966; BSKU 106747 (1, 63.3 mm HL, 196+ mm TL), Thailand, coll. by T. Senta (no further reliable information).

Diagnosis. Species of *Coelorinchus* with small, but intense, longitudinally elongate, lateral, dark blotch on anterior part of tail. Light organ tubular, externally represented by long black streak covered with scales, extending from immediately in front of anus to chest just posterior to isthmus. Underside of head completely naked except for overlapping scales behind lateral nasal ridges; dorsal surface of snout broadly naked along each side of median rostral ridge. Snout long, sharply pointed, length 74–91% PRL, its dorsal profile gently concave in lateral view; terminal scute long, spearhead-shaped, dorsoventrally flattened, length 16–24% PRL when complete. Lateral nasal ridge incompletely supported by nasal bone. Anus abutting anal-fin origin. Premaxillary teeth small, slender, conical in long, narrow, tapered band, and none distinctly enlarged; posterior margin of tooth band almost reaching lateral corner of mouth. Body scales covered with short, erect, slender spinules in widely divergent rows; spinules in each row completely free from one another, forming comb-like ridge; buttresses of spinules poorly developed. Second dorsal fin distinctly lower than anal fin. Upper-jaw length 38–43% PRL; preoral length 65–82% PRL; length of gill slit 21–24% PRL; barbel length 9–14% PRL. Slightly diagonal, narrow, dark stripe extending from upper margin of gill opening to below first dorsal-fin midbase or beyond; faint, diagonal, dark stripe extending from pectoral-fin base to above anal-fin origin; median nasal

bone blackish; underside of head generally pale, without small, blackish, hair-like papillae; lips pale to dusky; front of premaxillary ascending process dusky to dark; oral cavity immaculate; gular and branchiostegal membranes heavily peppered; chest dark; first dorsal fin dusky to dark, but second spinous ray prominently blackish; pelvic fin dusky; pelvic fin heavily peppered.

Description. General features of the fish are shown in Fig. 1. Counts and measurements are given in Table 1.

Body elongate, tapering gradually to long, laterally compressed tail. Trunk shallow (width over pectoral-fin bases 1.3–1.5 in depth below first dorsal-fin origin in well-preserved paratypes). Head large, HL about 3.2 (2.9–3.4) in TL. Snout long, sharply pointed, protruding greatly beyond upper jaw; snout length 2.0 (1.6–2.0) times as long as orbit diameter; when viewed laterally, dorsal contour of snout gently convex, with slight hump-like rise above posterior nostril; lateral nasal ridge incompletely supported by nasal bone, slightly convex in dorsal view. Orbit large, oval, greatest diameter 1.2 (1.1–1.3) in postorbital length. Interorbital space slightly concave in preserved condition, width 1.1 (1.0–1.2) in orbit diameter. Mouth moderate in size, inferior, upper-jaw length 1.0 (1.1–1.2) in orbit diameter; posterior margin of maxilla extending to vertical through midorbit or beyond; lateral corner of mouth barely restricted by folds of skin; lips thin, not papillose near tooth bands. Suborbital region divided by longitudinal bony ridge passing from tip of snout to posteroventral angle of opercle; its upper half almost vertical, lower half sharply inclined mesially. Preopercle large, posterior margin inclined at about 60º angle, forming moderately angular lobe posteroventrally. Subopercle prolonged ventrally into short, slender flap; posterior margin deeply concave. Gill membranes narrowly connected across, and attached mesially to isthmus, with slight posterior free fold; gill opening extending anteriorly to below posterior margin of lower jaw. Outer gill slit moderately restricted by folds of skin, length 1.9 (1.9–2.2) in orbit diameter. Gill rakers small, low, tubercular, armed with short, fine spines; no rakers on outer side of first arch and inner side of fourth arch; gill filaments moderately long. Chin

barbel short, slender, tapering into hairline distal tip; length 3.8 (usually 3.5–4.5; 5.1 in AMS paratype, 65.3 mm HL) in orbit diameter.

Anus abutting anal-fin origin, without scales in their interspace. Light organ long, tubular, externally represented by long black streak, extending from immediately in front of anus to chest just behind isthmus; both ends of light organ slightly expanded, teardrop-shaped.

Teeth small, slender, conical, sharp, gently incurved, in long, narrow, tapered bands in both jaws. In holotype, premaxillary teeth with about 6 tooth rows near symphysis, posterior margin of tooth band almost reaching lateral corner of mouth; teeth becoming progressively smaller inwardly, and none distinctly enlarged; mandibular teeth with about 4 tooth rows across widest point near symphysis; posterior end of tooth band extending to lateral corner of mouth; all teeth uniformly small.

Body scales large, deciduous; those on dorsum below interdorsal space covered with short, erect, slender spinules in widely divergent rows; spinules in each row entirely free from one another, forming comb-like ridge; middle row not especially high or enlarged compared with adjacent rows, and every row complete throughout; spinules forming angle of about 70–80º to scale surface, giving somewhat velvety appearance to body; spinules increasing in height posteriorly, and tip of last spinule in each row barely reaching or extending only slightly beyond posterior scale margin; buttresses of spinules poorly developed; no reticulate structures on unexposed potion of scale surface. Body fully scaled except for fins.

Scales on head ridges modified and thickened; those on median rostral ridge covered with radiating rows of spinules. Terminal scute long, spearhead-shaped, dorsoventrally flattened. Three supraoccipital scutes between parietal ridges, but not especially enlarged; posttemporal scutes absent. Other scales on head (except those on head ridges) variable in size, generally similar to those on body, but spinules more erect; those on opercle, preopercle, and postorbital and temporal canals largest. Nasal fossa entirely naked. Dorsal surface of snout broadly naked along each side of median rostral ridge. Underside of

head completely naked, except narrow areas of characteristic overlapping scales immediately behind lateral nasal ridges.

No open pores along cephalic sensory canals. Free neuromasts small, not modified into prominent flaps or knob-like projections. Anterior nostril small, circular; posterior nostril large, oval in shape. Grooved lateral line complete, not interrupted (at least in trunk where scales are well-preserved).

Origins of first dorsal, pectoral, and pelvic fins about on same vertical; first dorsal fin moderately high (its height 2.3–2.7 times as long as its base length in well-preserved paratypes); second spinous ray not elongated, smooth along leading edge (small rudimentary denticle present near distal tip in HUMZ 190724); its tip extending posteriorly to base of 2nd–4th ray of second dorsal fin when laid back. Interdorsal space 1.0 (0.9–1.3) times as long as first dorsal-fin base length. Origin of second dorsal fin above that of anal fin or slightly behind. Tip of pelvic fin extending to anal-fin origin or slightly beyond; outer pelvic-fin ray slightly prolonged, hairline at tip.

Color in alcohol. Short, prominent, narrow, slightly diagonal, dark stripe of about 1–2 scales deep, extending from upper margin of gill opening to below first dorsal-fin midbase or beyond; faint, arched, diagonal, dark stripe of about 2 scales deep, extending from pectoral-fin base to above anal-fin origin; small, but intense, lateral, longitudinally elongate, dark blotch on anterior part of tail, extending about 3–5 scale rows horizontally, about 2–3 rows vertically; head and body slightly darker dorsally, paler laterally and ventrally; abdomen dark, with somewhat purplish tinge; breast abruptly dark in front of pelvic-fin bases; median nasal bone blackish; underside of head generally pale, but mandibular rami and ventral surfaces of preopercles slightly dusky; short, black, hair-like papillae absent on head surfaces; cephalic free neuromasts marked with 2 small black dots; lips pale to dusky; front of premaxillary ascending process dusky to dark; oral cavity immaculate; gill cavity paler anteriorly, darker posteriorly; gular and branchiostegal membranes heavily peppered; gill arches, rakers, and filaments pale; first dorsal fin dusky to dark, but second spinous ray prominently blackish; pelvic fin dusky; pelvic fin heavily peppered; second dorsal and anal

fins dark.

Color when fresh. Based on the color photograph provided by Gloerfelt-Tarp and Kailola (1984: unnumbered fig. on p. 82; second from the right top of the page): dorsal surfaces of head and body slightly dark, but lateral and ventral surfaces pale with ivory to silvery reflections; diagonal stripe on trunk dorsum and blotch on anterior part of tail grayish.

Etymology. The specific epithet *posteromaculatus* is derived from the Latin adjectives *posterior*, meaning "further back" or "hinder", and *maculatus*, meaning "spotted", in reference to the species' characteristic dark blotch on the anterior part of the tail.

Distribution. Known from the tropical eastern Indian Ocean at depths of 100–323 m.

Remarks. Data used in the following comparisons are from Iwamoto (1990), Iwamoto and Merrett (1997), Iwamoto and Williams (1999) and this study. *Coelorinchus posteromaculatus* belongs to a group of species characterized by the following combination of features: light organ long, extending from anus to chest just posterior to isthmus; no interspace between anus and anal-fin origin; lateral nasal ridge incompletely supported by nasal bone; premaxillary teeth in long tapered band, with posterior margin of tooth band almost reaching lateral corner of mouth; body scales covered with short, erect spinules in quincunx order or subparallel rows; modified scales on head ridges not prominently spinulated; dorsal surfaces of snout broadly naked along each side of median rostral ridge; second dorsal fin poorly developed, its height distinctly lower than that of anal fin; lower half of body overlain with silvery reflections (often indistinct in preserved specimens); dark spots, blotches, and vermiculations present dorsally on trunk and tail in some species. Apart from the new species, this group includes the following 12 valid species: *Coelorinchus argentatus* Smith and Radcliffe *in* Radcliffe 1912 from the Philippines, New Caledonia, and northern Australia; *Coelorinchus denticulatus* Regan 1921 from the western Indian Ocean; *Coelorinchus formosanus* Okamura 1963, *Coelorinchus kamoharai* Matsubara 1943, and *Coelorinchus longissimus* Matsubara 1943 from Japan to Taiwan; *Coelorinchus gaesorhynchus* Iwamoto and Williams 1999 from Western Australia; *Coelorinchus mayiae*

Iwamoto and Williams 1999 and *Coelorinchus pardus* Iwamoto and Williams 1999 from the Arafura Sea; *Coelorinchus multispinulosus* Katayama 1942 from Japan to the South China Sea; *Coelorinchus quincunciatus* Gilbert and Hubbs 1920 and *Coelorinchus thompsoni* Gilbert and Hubbs 1920 from the Philippines; and *Coelorinchus semaphoreus* Iwamoto and Merrett 1997 from New Caledonia and Queensland, Australia. This group is called here the *Coelorinchus argentatus* group.

The most important feature characterizing *C. posteromaculatus* is its unique body markings consisting a single, prominent, lateral, dark blotch on the anterior part of the tail, combined with a slightly diagonal, narrow, dark stripe extending from the upper margin of the gill opening to below the first dorsal-fin midbase or beyond. The pattern is quite distinctive among the group, as the other species have neither such a posterior blotch nor a diagonal stripe on the trunk dorsum. Namely, *C. formosanus*, *C. gaesorhynchus*, *C. longissimus*, *C. quincunciatus*, *C. semaphoreus*, and *C. thompsoni* lack any prominent body markings; *C. argentatus*, *C. denticulatus*, *C. kamoharai*, *C. mayiae*, and *C. pardus* have only a series of spots or blotches of irregular shape; and *C. multispinulosus* has many dark spots often forming fine vermiculations.

Despite their pronounced differences in the body markings, *C. posteromaculatus* is otherwise closely similar to *C. gaesorhynchus* and *C. longissimus*. In fact, the three species can be distinguished from other members of the *C. argentatus* group by having the following combination of features: body scales covered with needle-like spinules in subparallel to widely divergent rows (Fig. 2); underside of head almost completely naked, except for characteristic overlapping scales immediately behind lateral nasal ridges; smaller mouth (upper-jaw length 38–43%, 42–44%, 42–49% PRL in *C. posteromaculatus*, *C. gaesorhynchus*, and *C. longissimus* respectively); and shorter barbel (9–14%, 14–15%, 11–18% PRL respectively) (see also Table 1). However, it further differs from *C. gaesorhynchus* in its much shorter snout (74–91% PRL vs. 93–100% in *C. gaesorhynchus*), and from *C. longissimus* in its relatively larger mouth (upper-jaw length 38–43% PRL vs. 42–49%).

The above definition of the *C. argentatus* group generally agrees with the original

concept of the subgenus *Quincuncia*, within which Gilbert and Hubbs (1920) included only *C. argentatus* (type species), *C. quincunciatus*, and *C. thompsoni*. Currently, this taxon is diagnosed primarily by the combination of a well-developed light organ extending from the anus to the chest just posterior to the isthmus and an incomplete bony support of the lateral nasal ridge (Okamura 1970a, 1970b, 1988). Based on this brief definition, the subgenus comprises not only the species of the *C. argentatus* group, but also *Coelorinchus melanobranchus* Iwamoto and Merrett 1997 known from New Caledonia and those of the *Coelorinchus hubbsi* complex as defined by Okamura (in Okamura and Kitajima 1984) and further refined by Iwamoto et al. (2009) to include the following 10 species: *Coelorinchus brevirostris* Okamura in Okamura and Kitajima 1984, *Coelorinchus fuscigulus* Iwamoto, Ho and Shao 2009, and *Coelorinchus hubbsi* Matsubara 1936 from Japan to Taiwan; *Coelorinchus cingulatus* Gilbert and Hubbs 1920 from Japan to the South China Sea; *Coelorinchus cylindricus* Iwamoto and Merrett 1997 from the Norfolk Ridge and New Zealand; *Coelorinchus gladius* Gilbert and Cramer 1897 from Hawaii; *Coelorinchus matsubarai* Okamura in Okamura et al. 1982 from the Kyushu-Palau Ridge and the Emperor Seamounts; *Coelorinchus melanosagmatus* Iwamoto and Anderson 1999 from the Indian Ocean; *Coelorinchus multifasciatus* Sazonov and Iwamoto 1992 from the Sala-y-Gomez Ridge; and *Coelorinchus spilonotus* Sazonov and Iwamoto 1992 from the Nazca and Sala-y-Gomez ridges and Hawaii. The *C. argentatus* group readily differs from *C. melanobranchus* in having a long attenuated snout tipped with a spear-like terminal scute (vs. short bluntly pointed snout with three tubercular scutes), and also from the *C. hubbsi* complex in having a poorly developed second dorsal fin distinctly lower than (vs. as high as) the anal fin and a pair of broad naked areas along each side of the median rostral ridge (vs. rudimentary or only narrowly developed). It is apparent that *Quincuncia* needs a systematic revision, due to the lack of phylogenetic analysis and the presence of taxonomic problems, both at the subgeneric and species levels.

Comparative materials examined. ***Coelorinchus gaesorhynchus***—2 specimens from

Western Australia: CSIRO H2548-13 (holotype, 75.8 mm HL, 254+ mm TL); west of North West Cape, 21º44.7′S, 113º52.3′E, 290–320 m, FRV Southern Surveyor, sta. SS1/91/08 (H2548), 24 Jan. 1991; SS1/91/08; CSIRO H2548-16 (paratype, 70.0 mm HL, 236+ mm TL), collected with holotype. ***Coelorinchus longissimus***—29 specimens from Japan: BSKU 19077 (1, 73.0 mm HL, 256 mm TL), off Satsuma Peninsula, Okinawa Trough, 31.2267ºN, 129.9750ºE, 310 m, FRV Soyo-maru, sta. 72d, beam trawl, 12 Feb. 1959; BSKU 106767 (1, 68.2 mm HL, 240+ mm TL), southeast of Shimokoshiki-jima Island, East China Sea, 31.5658ºN, 129.8915ºE, 380 m, F/V Maruko-maru, tr. 1, bottom trawl, coll. N. Nakayama et al., 24 Apr. 2012; BSKU 109052 (1, 48.7 mm HL, 185 mm TL), east of Kasayama Bank, 32.3884ºN, 129.0505ºE, 304–312 m, T/V Nagasaki-maru, cr. N365, sta. A3, 3-m ORE beam trawl, coll. N. Nakayama, 19 Nov. 2012; BSKU 113743 (1, 86.1 mm HL, 313+ mm TL), off Katsurahama, Tosa Bay, 230 m, F/V Kosei-maru, bottom trawl, coll. N. Nakayama et al., 9 Apr. 2014; BSKU 99262 (1, 88.4 mm HL, 314+ mm TL), Mimase fish market, bottom trawl, 1 Mar. 2006; BSKU 40440 (1, 91.4 mm HL, 327+ mm TL), BSKU 40441 (1, 92.4 mm HL, 345+ mm TL), BSKU 40442 (1, 92.9 mm HL, 339 mm TL), BSKU 40445 (1, 96.2 mm HL, 342+ mm TL), BSKU 40447 (1, 92.6 mm HL, 341+ mm TL), BSKU 40448 (1, 95.9 mm HL, 277+ mm TL), BSKU 40451 (1, 96.6 mm HL, 338+ mm TL), BSKU 40457 (1, 81.0 mm HL, 304 mm TL), Mimase fish market, bottom trawl, 8 Mar. 1985; BSKU 99346 (1, 93.0 mm HL, 314+ mm TL), Mimase fish market, bottom trawl, coll. N. Nakayama, 23 Apr. 2008; BSKU 99235 (1, 81.5 mm HL, 303+ mm TL), BSKU 99237 (1, 58.9 mm HL, 219+ mm TL), Mimase fish market, bottom trawl, coll. N. Nakayama, 31 Oct. 2007; BSKU 55 (1, 76.4 mm HL, 302 mm TL), Mimase fish market, bottom trawl, coll. T. Kamohara, 5 Mar. 1951; BSKU 100497 (1, 78.7 mm HL, 287+ mm TL), Mimase fish market, F/V Kosei-maru, bottom trawl, 15 Oct. 2009; BSKU 108871 (1, 77.5 mm HL, 278+ mm TL), Mimase fish market, F/V Kosei-maru, bottom trawl, 22 Oct. 2012; BSKU 94450 (1, 71.6 mm HL, 251+ mm TL), Mimase fish market, F/V Kosei-maru, bottom trawl, coll. N. Nakayama, 14 Apr. 2008; BSKU 93088 (1, 63.4 mm HL, 237 mm TL), BSKU 93090 (1, 89.9 mm HL, 321+ mm TL), Mimase fish market, F/V Seiryo-maru, bottom trawl, coll. N. Nakayama, 24 Dec. 2007; BSKU 94387

(1, 51.5 mm HL, 203+ mm TL), Mimase fish market, F/V Seiryo-maru, bottom trawl, coll. N. Nakayama, 4 Apr. 2008; BSKU 69291 (1, 56.1 mm HL, 198+ mm TL), BSKU 69295 (1, 55.7 mm HL, 187+ mm TL), Tosa Bay, 33.1450ºN, 133.5150ºE, 240–249 m, FRV Kotaka-maru, otter trawl, coll. H. Endo, 20 Aug. 1997; BSKU 112928 (1, 98.7 mm HL, 342+ mm TL), off Okitsu, Tosa Bay, 280–320 m, F/V Kosei-maru, bottom trawl, coll. N. Nakayama et al., 24 Jan. 2014; BSKU 110426 (1, 29.8 mm HL, 113+ mm TL), Suruga Bay, 34.7651ºN, 138.4880ºE, 200–450 m, F/V Hinode-maru, sta. 4, bottom trawl, coll. N. Nakayama and R. Misawa, 23 Apr. 2013; BSKU 110081 (1, 40.7 mm HL, 154 mm TL), BSKU 110082 (1, 38.3 mm HL, 132+ mm TL), Suruga Bay, 34.7489ºN, 138.4664ºE, 200–450 m, F/V Hinode-maru, sta. 6, bottom trawl, coll. N. Nakayama and R. Misawa, 23 Apr. 2013.

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437 **Figure legends**

438

439 **Fig. 1** *Coelorinchus posteromaculatus* sp. nov. AMS I.44527-001, holotype, 66.4 mm HL,
440 211+ mm TL, eastern Indian Ocean, 314 m depth. **a** Lateral view; **b** lateral, **c** ventral,
441 and **d** dorsal views of head and trunk; preserved condition

442

443 **Fig. 2** Scanning electron micrograph showing a scale from the dorsum below the interdorsal
444 space of *Coelorinchus posteromaculatus* sp. nov. HUMZ 190724, paratype, 59.1 mm
445 HL, 192+ mm TL

446

447 **Table 1** Measurements and counts for three species of *Coelorinchus*

Species	*C. posteromaculatus*		*C. gaesorhynchus*	*C. longissimus*
Type status	HT	PT	HT + PT	NT
Number of specimens	1	8	2	29
Measurements (mm)				
Total length (TL)	211+	165+–220+	236+–254+	113+–345+
Head length (HL)	66.4	57.8–70.0	70.0–75.8	29.8–98.7
% of HL (% of PRL)				
Snout length	48 (90)	43–48 (74–91)	49–51 (93–100)	44–48 (77–90)
Orbit diameter	24 (45)	23–27 (43–48)	23–24 (46–47)	23–29 (43–51)
Postorbital length	30 (56)	29–33 (52–56)	27–28 (53–54)	28–31 (51–58)
Postrostral length (PRL)	54 (—)	53–58 (—)	51–52 (—)	53–57 (—)
Orbit–preopercle distance	34 (64)	32–35 (58–64)	32–34 (62–65)	31–37 (57–68)
Suborbital width	11 (21)	10–12 (17–22)	11–11 (21–22)	10–12 (19–22)
Upper-jaw length	23 (43)	21–24 (38–43)	21–23 (42–44)	23–27 (42–49)
Preoral length	41 (77)	38–43 (65–82)	44–46 (85–92)	38–45 (66–81)
Internasal width	18 (34)	18–20 (31–35)	19–19 (36–37)	17–22 (32–41)
Interorbital width	23 (42)	22–23 (38–44)	21–23 (42–44)	21–24 (38–43)
Body width over P. bases	29 (55)	27–34 (50–59)	32–33 (62–65)	28–44 (50–80)
Body depth at 1D. origin	— (—)	42–47 (73–86)	42–46 (80–91)	37–54 (70–99)
Body depth at A. origin	34 (64)	30–39 (53–69)	38–39 (74–74)	32–45 (56–82)
Pre-V. length	106 (197)	101–104 (172–194)	107–112 (211–214)	101–115 (183–207)
Pre-anus length	138 (258)	128–136 (225–257)	137–147 (271–282)	130–152 (234–275)
Pre-A. length	139 (260)	132–141 (231–265)	139–149 (275–286)	133–155 (236–281)
Isthmus–V. distance	28 (52)	27–31 (48–53)	29–30 (57–58)	27–36 (50–65)
Isthmus–anus distance	60 (113)	60–63 (109–114)	57–66 (112–125)	55–71 (99–128)
Isthmus–A. distance	62 (115)	63–66 (113–120)	60–68 (118–131)	56–79 (103–143)
V.–A. distance	36 (67)	37–40 (65–75)	37–40 (73–76)	31–47 (56–88)
Anus–A. distance	2 (4)	2–5 (4–10)	2–3 (5–5)	1–4 (2–8)
V. length	23 (42)	26–36 (46–63)	26–28 (50–56)	20–32 (36–59)
P. length	38 (71)	31–42 (53–80)	— (—)	30–34 (55–64)
Pre-1D. length	105 (196)	100–109 (175–195)	105–107 (205–207)	103–109 (184–200)
Height of 1D.	— (—)	35–40 (62–73)	— (—)	32–37 (58–70)
Length of 1D. base	17 (31)	14–17 (25–32)	15–18 (30–34)	15–19 (28–35)
Interdorsal length	16 (30)	16–23 (30–40)	15–20 (29–39)	15–26 (27–47)
Length of gill slit	13 (24)	12–13 (21–24)	12–12 (22–23)	11–14 (20–25)
Length of posterior nostril	7 (12)	7–10 (12–18)	6–8 (11–15)	6–9 (10–16)
Barbel length	6 (12)	5–8 (9–14)	7–8 (14–15)	6–10 (11–18)
Counts				
1D. rays	II,10	II,8–10	II,9	II,9–10
P. rays	i17	i14–i18	i15–i16	i15–i18
V. rays	7	7	7	7
Outer GR on first arch	0	0	0	0
Inner GR on first arch	8	7–9	8	7–8
Outer GR on second arch	6	5–6	6	5–6
Inner GR on second arch	8	7–8	8	7–9
Lateral line scales	45	37–42	44–45	36–45
Scales below 1D. origin	6	5–6	4.5–5	4.5–7
Scales below 1D. midbase	5	3–4.5	4	3.5–5.5

Scales below 2D. origin	4.5	3.5–4.5	4	3.5–5.5

1D. first dorsal fin, *2D.* second dorsal fin, *A.* anal fin, *GR* gill rakers, *HT* holotype, *NT* non-type, *P.* pectoral fin, *PT* paratype, *V.* pelvic fin

Fig. 1

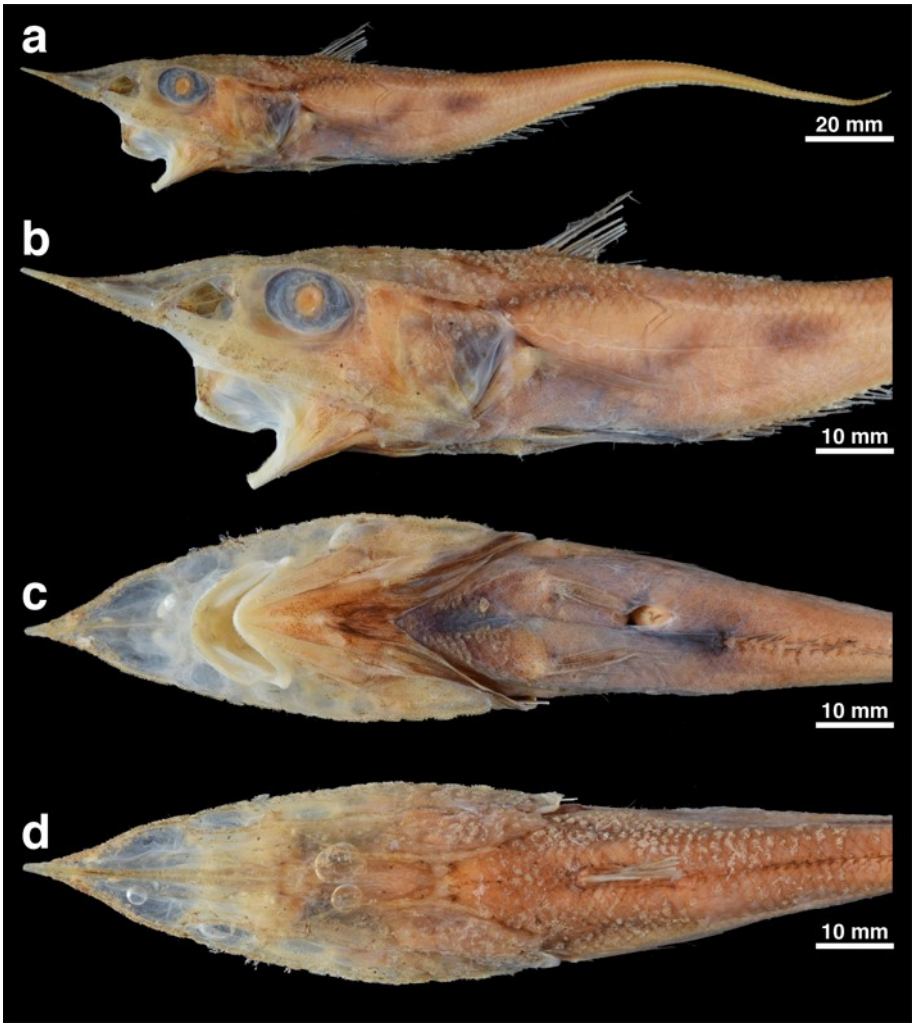

Fig. 2