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Enneapterygius viridicauda, a new triplefin (Teleostei: Tripterygiidae) from Flores, Indonesia, eastern Indian Ocean

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Abstract

A new species of triplefin, *Enneapterygius viridicauda* is described on the basis of two specimens from southwestern Flores, Indonesia, in the eastern Indian Ocean. The new species is characterized within the genus by 19 anal-fin soft rays, 7 median branched pectoral-fin rays, 15–16+19 lateral-line scales, a mandibular-pore formula of 4+1+4, eye diameter 100–119 (thousandths of SL), preorbital 69–72, body depth 211–225, preanal fin length 489–500. The preserved male has a black head-mask, a dark posterior half of the body, a pale third dorsal fin (only basally dusky), a plain black anal fin, no triangular black blotches above the anal-fin base, pale pelvic fins, and a dark caudal fin with a narrow pale margin. In life, male *E. viridicauda* have a distinctive green rear body and tail with the anterior body rose; a dark mask over the head, a black anal fin, and a row of dark spots along the anterior lateral line.

Key words: taxonomy, ichthyology, coral-reef fishes, Nusa Tenggara, Greentail Triplefin, blennioids.

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Introduction

Tripterygiid fishes (triplefins or threefin blennies) are a group of mostly benthic-living blenniiform fishes (Nelson et al. 2016), characterized by having scales on the sides of the body and three dorsal fins, inhabiting cold, temperate, subtropical and tropical sea shores and offshore islands. They are usually associated with hard substrates. Most species live subtidally on rocky or coral reefs or in intertidal rock pools; a few occur deeper, on the continental shelf and slopes, down to at least 550 m depth. The use of modern collecting techniques like rotenone collections has revealed that the Tripterygiidae is a large and abundant family: a total of 30 genera and at least 150 species is known worldwide. All species are small, the largest does not exceed 150 mm SL (*Blennodon dorsale* from New Zealand) and the smallest attains only about 20 mm SL (Fricke 1997). The western and central Pacific species of the family were revised by Fricke (1997), who also provided a worldwide checklist including 30 valid genera and 140 valid species.

The genus *Enneapterygius* was originally described by Rüppell (1835), with *Enneapterygius pusillus* Rüppell, 1835 as the type species. Fricke (1997: 142, 565) included 46 species in the genus, all distributed in the Indo-West Pacific. *Enneapterygius* is characterised within the family Tripterygiidae by a discontinuous lateral line with an anterior series of 6–22 tubular pored scales and a posterior series of 13–27 notched scales; the first dorsal fin with three spines; the anal fin with one spine; the pelvic fin with one spine and two soft rays; a scaleless head, operculum, pectoral fin base, and belly; and hypural 5 small or absent. Subsequently, Holleman (2005) revised the western Indian Ocean *Enneapterygius* and described 4 new species: *E. elaine* Holleman, 2005 from Rodrigues; *E. genamaculatus* Holleman, 2005 from Saint Brandon's Shoals; *E. gruschkai* Holleman, 2005 from the Comores, Seychelles, and Mascarenes to Chagos Archipelago; and *E. kosiensis* from South Africa. Other recent additions include *E. senoui* Motomura, Harazaki & Hardy, 2005 from the Izu Islands and Ogasawara Islands. Chiang & Chen (2008) revised the *Enneapterygius* of Taiwan, and described *E. shaoi* Chiang & Chen, 2008 and *E. sheni* Chiang & Shen, 2008, and reinstated *E. cheni* Wang, Shao & Chen, 1996 and *E. leucopunctatus* Shen, 1994. Holleman & Bogorodsky (2012) described *E. qirmiz* Holleman & Bogorodsky, 2012 from Yemen and the Red Sea, and reinstated *E. altipinnis* Clark, 1980 from the Red Sea. More recent additions include *E. phoenicosoma* Motomura, Ota & Meguro, 2015 from Japan, the Caroline Islands and Vanuatu; *E. niue* Fricke & Erdmann, 2017 from Niue and Samoa; and *E. velatus* Tashiro, Senou & Motomura, 2018 from the Ryukyu Islands, Japan.

During recent surveys of reef-fishes by authors MVE and AS in southwestern Flores, Indonesia, an undescribed species of *Enneapterygius* was photographed and collected and is described here. With the new species, the tripterygiid fish fauna of Indonesia now includes 28 species, with 18 known from East Nusa Tenggara Province. The genus *Enneapterygius* is presently composed of 12 Indonesian species, with 7 known from East Nusa Tenggara Province.

Materials and Methods

Comparative materials are those listed in Fricke (1994, 1997) and Fricke & Erdmann (2007). Type specimens are deposited at the Museum Zoologicum Bogoriense, Cibinong, Java, Indonesia (MZB) and Israeli National Natural History Collections at the Hebrew University of Jerusalem, Israel (HUJ).

Methods follow Fricke (1997), except fin-ray counts follow Fricke (1983). The starting point for length measurements is the middle of the upper lip. The standard length (measured from the tip of the upper lip to the middle of the urohyal/caudal fin base) is abbreviated SL. The predorsal (1) length is measured from the middle of the upper lip to the base of the first spine of the first dorsal fin; predorsal (2) length correspondingly to the base of the first spine of the second dorsal fin, and predorsal (3) length to the base of the first ray of the third dorsal fin. The last ray of the third dorsal and anal fins is always divided to the base and this divided ray is counted as one. In the description, the data for the holotype are presented first, followed by those of the paratype in parentheses. Proportional measurements are presented as thousandths of SL.

Species classification is based on Fricke (1997). Nomenclature follows Fricke et al. (2024). Reference and journal citations follow Fricke (2024) and Fricke & Eschmeyer (2024).

Enneapterygius viridicauda, n. sp.

Greentail Triplefin

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Figures 1–3, Table 1

Holotype. MZB 25200, 19.4 mm SL, male, Indonesia, East Nusa Tenggara Province, southwest Flores, Tanjung Nraulah, yellow wall, -8.7879°, 119.6706°, 1–4 m, site MVE-16-043, A. Sianipar, July 2016.

Paratype. HUJ 21028, 23.1 mm SL, male, Indonesia, southwest Flores, -8.8066°, 119.8333°, 5 m, site MVE-18-050, A. Sianipar & M. Erdmann, 20 July 2018.

Diagnosis. A species of *Enneapterygius* (*Enneapterygius flavoccipitis* species complex), with 19 anal-fin soft rays, 7 median branched rays in pectoral fin, 15–16 +19 lateral-line scales, a mandibular-pore formula of 4+1+4, eye diameter 100–119, preorbital 69–72, body depth 211–225, preanal-fin length 489–500., preserved male with a black head-mask, posterior half of body dark, third dorsal fin pale (only basally dusky), anal fin plain black, no triangular black blotches above anal-fin base, pelvic fins pale, and caudal fin dark with a narrow pale margin.

Description. D1 III (III); D2 XII (XIII); D3 ix,1 (viii,1); A I,xvii,1 & total 19 (I,xvii,1 & total 19); P1 ii,7,vii & total 16 (ii,7,vii & total 16); P2 I,ii (I,ii); C (viii),ii,9,ii,(vii) [(viii),ii,9,ii,(vii)]. Scale rows 34+1 (34+1); transverse scale rows 3+5 (3+5); lateral-line scales 15+19 (16+19). Mandibular pore formula 4+1+4 (4+1+4).

Body depth 211 (225). Body width 180 (152). Caudal-peduncle length 134 (143). Caudal-peduncle depth 93 (100).

Figure 1. *Enneapterygius viridicauda,* underwater photograph of male holotype, 19.4 mm SL, Flores, Indonesia (M.V. Erdmann).

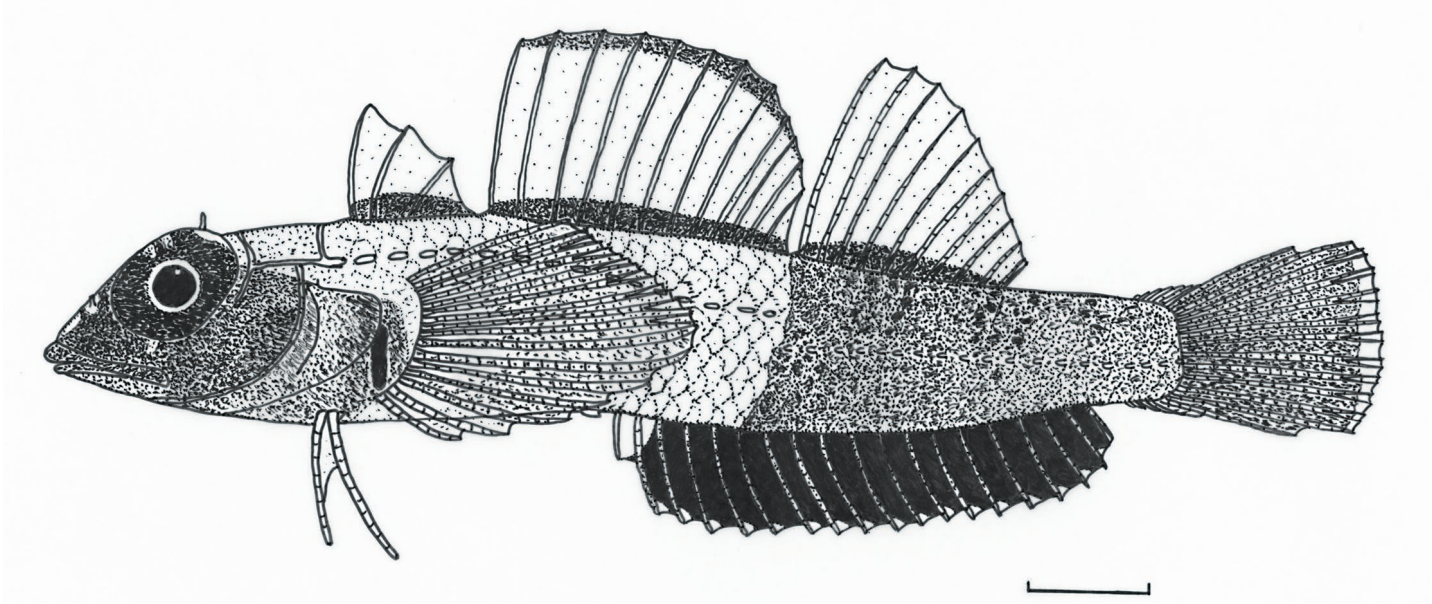

Figure 2. *Enneapterygius viridicauda,* drawing of lateral view of preserved male holotype (after two months), 19.4 mm SL, Flores, Indonesia (scale bar represents 2 mm).

Head length 247 (277). Eye diameter 119 (100). Supraorbital tentacle 5 (4). Interorbital distance 36 (39). Preorbital length 72 (69). Upper-jaw length 113 (121). Posttemporal lateral-line branch nearly I-shaped; head lateral-line system moderately complex.

Lateral line consisting of an anterior series of 15 (16) tubular pored scales, reaching to below posterior one-fourth of second-dorsal-fin base, continuing one row lower with a posterior series of 19 (19) notched scales.

First dorsal fin low; first spine 98 (108), second spine 82 (104), third spine 62 (74). Predorsal(1) length 284 (264). First spine of second dorsal fin 160 (156), 5th spine 170 (169). Predorsal(2) length 392 (381). First ray of third dorsal fin 191 (204), 5th ray 129 (130). Predorsal(3) length 675 (684). Anal fin beginning below vertical through 6th membrane of second dorsal fin (below 11th lateral line pore). Anal spine 41 (52), 1st anal ray 82 (91), 5th anal ray 93 (126). Preanal-fin length 500 (489). Pectoral fin reaching about to base of 4th anal-fin membrane. Pectoral-fin length 237 (268). Prepectoral-fin length 330 (338). First ray of pelvic fin 119 (69), 2nd ray 134 (156). Prepelvic-fin length 242 (273). Caudal-fin length 175 (164).

Color in life. (Figs. 1 & 2) Male with anterior half of body rose, with three irregular lighter bars, anterior section of pored lateral line with a series of 9 dark brown spots; posterior half of body olive green, anterior dorsal part bordered with a vertical white bar, then followed by a broad light green bar; region below third dorsal-fin base with another, narrow light green bar, caudal peduncle with two more narrow light green bars. Head in front of eyes to pectoral-fin base with a dark olive brown mask, cheeks densely covered with black melanophores, pectoral-fin base with a vertical blackish streak, occiput greenish yellow; dorsal part of snout with a median elongate white blotch, snout also with a few green spots; eye dark olive green, pupil rimmed with orange, anterior region below pupil with a green spot, supraorbital tentacle green. Anterior membrane of first dorsal fin white, other dorsal fin membranes translucent, basally densely covered with melanophores. Anal fin black, anteriorly white, tips of fin-rays also white; caudal fin dark olive green. Pectoral-fin rays dark red, basally white; pelvic fins white. Female colouration similar to male, but overall lighter and without dark head mask.

Color in preservative. (Fig. 6) Head in males with a black mask, bearing a short blue suborbital streak. Eye dark grey. Top of head red. Pectorsal-fin base with a vertical black streak. Sides of body anteriorly red (red part reaching to end of anterior lateral line), posterior parts dark grey. Dorsal fins basally black, membranes distally with a dark grey margin. Pectoral and pelvic fins brown. Anal fin black except first membrane which is white; tips of fin rays also white. Caudal fin dark grey, distal margin whitish.

Etymology. The specific epithet refers to the distinctive green tail: *viridis* (Latin) for green, and *cauda* (Latin) for tail. The name is treated as a compound feminine adjective.

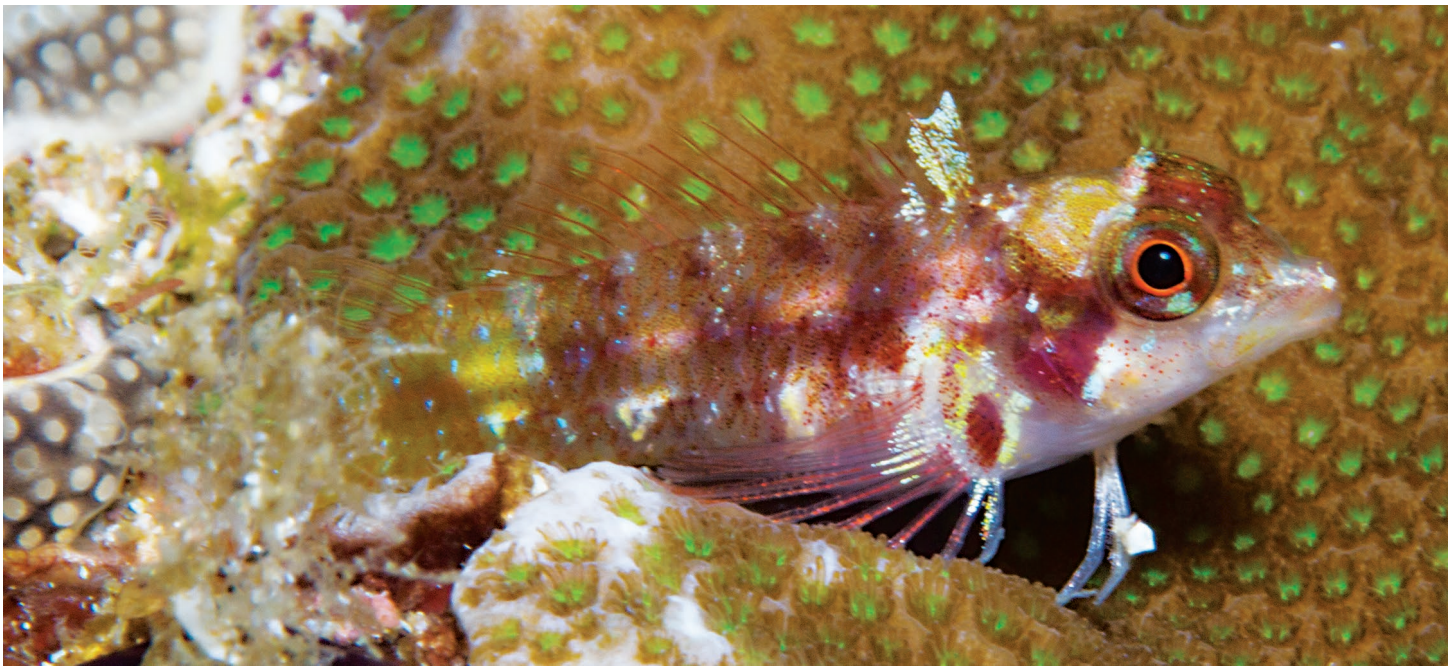

Figure 3. *Enneapterygius viridicauda,* underwater photograph of female, Flores, Indonesia (M.V. Erdmann).

TABLE 1

Enneapterygius viridicauda, n. sp., holotype MZB 25200 and paratype HUJ 21028 morphometrics (mm)

	MZB 25200 19.4 mm SL	HUJ 21028 23.1 mm SL		MZB 25200 19.4 mm SL	HUJ 21028 23.1 mm SL
Caudal-fin length	3.4	3.8	Length of 2nd spine of 1st dorsal fin	1.6	2.4
Predorsal (1) length	5.5	6.1	Length of 3rd spine of 1st dorsal fin	1.2	1.7
Predorsal (2) length	7.6	8.8	Length of 1st spine of 2nd dorsal fin	3.1	3.6
Predorsal (3) length	13.1	15.8	Length of 5th spine of 2nd dorsal fin	3.3	3.9
Preanal length	9.7	11.3	Length of 1st ray of 3rd dorsal fin	3.7	4.7
Prepelvic fin length	4.7	6.3	Length of 5th ray of 3rd dorsal fin	2.5	3.0
Prepectoral fin length	6.4	7.8	Length of anal-fin spine	0.8	1.2
Head length	4.8	6.4	Length of 1st anal-fin ray	1.6	2.1
Body depth	4.1	5.2	Length of 5th anal-fin ray	1.8	2.9
Body width	3.5	3.5	Pectoral-fin length	4.6	6.2
Orbit diameter	2.3	2.3	Length of 1st pelvic-fin ray	2.3	1.6
Preorbital length	1.4	1.6	Length of 2nd pelvic-fin ray	2.6	3.6
Bony interorbital	0.7	0.8	Length of 1st dorsal-fin base	1.9	2.0
Supraorbital tentacle length	0.1	0.1	Length of 2nd dorsal-fin base	5.6	7.7
Caudal peduncle length	2.6	3.3	Length of 3rd dorsal-fin base	3.5	4.3
Caudal peduncle depth	1.8	2.3	Length of anal-fin base	8.3	9.7
Upper-jaw length	2.2	2.8	Length of pectoral-fin base	2.2	2.9
Length of 1st spine of 1st dorsal fin	1.9	2.5	Length of pelvic-fin base	0.4	0.6

Distribution. This new species is described from the type locality, southwestern Flores, Indonesia; the species was also photographed on the south side of Rinca Island, Komodo, Indonesia, on coral, coralline rock and algae on a coral reef at 1–4 m depth.

Comparisons. *Enneapterygius viridicauda* is a member of the *E. flavoccipitis* species complex, which is characterized by a medium body size, a relatively long anterior lateral line series, a medium high first dorsal fin, males with a black anal fin and dark caudal fin with pale pelvic fins, and the absence of triangular black blotches along the anal-fin base. Other species of this group include *E. flavoccipitis, E. similis*, and *E. pallidoserialis*, all from the eastern Indian Ocean/western Pacific region. The new species differs from *E. flavoccipitis* by the body color pattern of the male, it has the posterior half dark (green in life) in preserved males (vs. the posterior two-thirds dark in *E. flavoccipitis*); the median branched pectoral-fin rays 7 (vs. 1-6); the caudal fin of the male dark with a light margin (vs. pale); and the mandibular pore formula 4+1+4 (vs. 3+1+3). The new species is distinguished from *E. similis* by the male anal fin being completely black (vs. only the posterior half black in *E. similis*); the third dorsal fin pale (vs. black); a single median mandibular pore (vs. two); and 15 or 16 pored lateral-line scales in the anterior series (vs. 17 or 18). The new species is distinguished from *E. pallidoserialis* by the body color pattern of the male, it has the posterior half dark (green in life) in preserved males (vs. the posterior three-fourths dark in *E. pallidoserialis*); the third dorsal fin pale (vs. black); and the presence of a dark head mask in males (vs. absent).

Enneapterygius viridicauda is known only from southwestern Flores, Indonesia. The species was observed in shallow water of 1–5 m depth, in a mixed coral, sponge and algae habitat exposed to waves and surge throughout

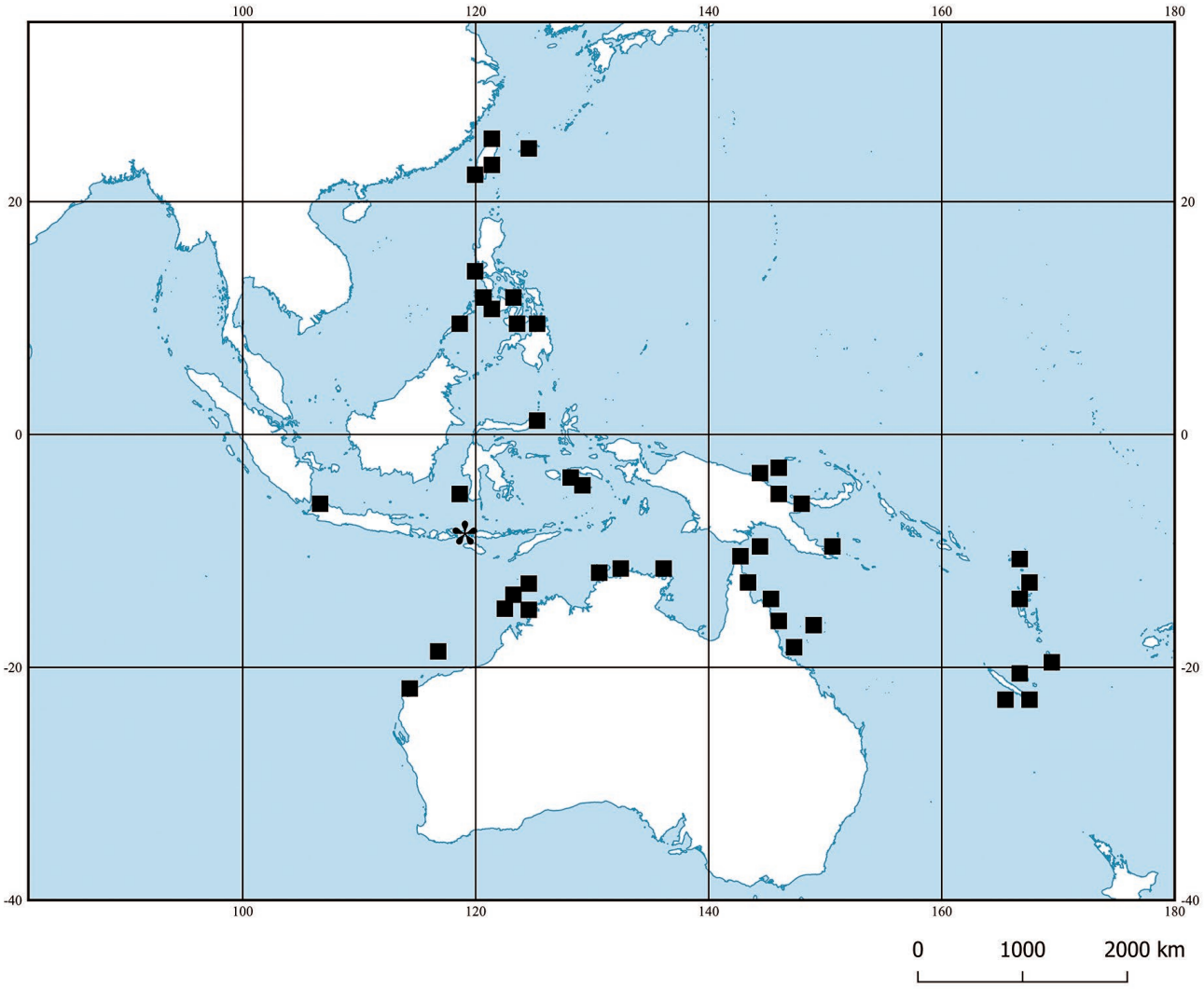

Figure 4. Geographical distribution of *Enneapterygius viridicauda* (asterisk) and *Enneapterygius flavoccipitis* (squares).

the year. Its unusual rose and green body coloration is used as a camouflage in this habitat; the body colors were observed to blend into the background (Figs. 2 & 3).

The most similar species, *E. flavoccipitis*, is widespread in the eastern Indian Ocean and western Pacific, but absent from Nusa Tenggara (Indonesia), where it is apparently replaced by *E. viridicauda* n. sp. The first author received divers' photographs of additional specimens of *E. viridicauda* n. sp. from Komodo region and eastern Sumbawa.

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References

Chiang, M.-C. & Chen, I-S. (2008) Taxonomic review and molecular phylogeny of the triplefin genus *Enneapterygius* (Teleostei: Tripterygiidae) from Taiwan, with descriptions of two new species. *Raffles Bulletin of Zoology*, *Supplement 19*, 183–201.

Fricke, R. (1983) A method of counting caudal fin rays of actinopterygian fishes. *Braunschweiger Naturkundliche Schriften*, 1, 729–733.

Fricke, R. (1994) *Tripterygiid fishes of Australia, New Zealand and the southwest Pacific Ocean, with descriptions of 2 new genera and 16 new species (Teleostei)*. [Theses Zoologicae v. 24]. Koeltz Scientific Books, Koenigstein, Germany, 585 pp.

Fricke, R. (1997) *Tripterygiid fishes of the western and central Pacific, with descriptions of 15 new species, including an annotated checklist of world Tripterygiidae (Teleostei)*. [Theses Zoologicae v. 31.] Koeltz Scientific Books, Königstein, Germany, 607 pp.

Fricke, R. (Ed.) (2024) *References in Eschmeyer's catalog of fishes, electronic version (11 May 2024)*. San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp (last accessed 24 May 2024).

Fricke, R. & Erdmann, M.V. (2017) *Enneapterygius niue*, a new species of triplefin from Niue and Samoa, southwestern Pacific Ocean (Teleostei: Tripterygiidae). *Journal of the Ocean Science Foundation*, 25, 14–32. https://doi.org/10.5281/zenodo.269464

Fricke, R. & Eschmeyer, W. N. (2024) *Journals in Eschmeyer's catalog of fishes, electronic version (11 May 2024).* San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/journals.asp (last accessed 24 May 2024).

Fricke, R., Eschmeyer, W. N. & van der Laan, R. (Eds.) (2024) *Eschmeyer's catalog of fishes, electronic version (11 May 2024)*. San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp (last accessed 24 May 2024).

Holleman, W. (2005) A review of the triplefin fish genus *Enneapterygius* (Blennioidei: Tripterygidae) in the western Indian Ocean, with descriptions of four new species. *Smithiana, Publications in Aquatic Biodiversity, Bulletin*, 5, 1–25.

Holleman, W. & Bogorodsky, S.V. (2012) A review of the blennioid fish family Tripterygiidae (Perciformes) in the Red Sea, with description of *Enneapterygius qirmiz*, and reinstatement of *Enneapterygius altipinnis* Clark, 1980. *Zootaxa*, 3152, 36–60.

Motomura, H., Harazaki, S. & Hardy, G.S. (2005) A new species of triplefin (Perciformes: Tripterygiidae), *Enneapterygius senoui*, from Japan with a discussion of its in situ colour pattern. *Aqua, Journal of Ichthyology and Aquatic Biology*, 10, 5–14.

Motomura, H., Ota, R., Meguro, M. & Tashiro, S. (2015) *Enneapterygius phoenicosoma*, a new species of triplefin (Tripterygiidae) from the western Pacific Ocean. *Species Diversity*, 20, 1–12.

Nelson, J.S., Grande, T.L. & Wilson, M.V.H. (2016) *Fishes of the world. Fifth edition*. John Wiley & Sons, Hoboken, NJ, USA,, xli + 707 pp.

Rüppell, W.P.E.S. (1835–1838) *Neue Wirbelthiere zu der Fauna von Abyssinien gehörig*. *Fische des Rothen Meeres*. Siegmund Schmerber, Frankfurt am Main, Germany, i–ii + 1–148, Pls. 1–33. [1835: 1–28, pls. 1–7; 1836: 29–52, pls. 8–14; 1837: 53–80, pls. 15–21; 1838: 81–148, pls. 22–33.]. [For dates see Sawyer 1952.]

Sawyer, F.C. (1952) The dates of publication of Wilhelm Peter Eduard Simon Rüppell's [1794–1884] "Neue Wirbelthiere zu der Fauna von Abyssinien gehörig" (fol., Frankfurt a. M., 1835–1840). *Journal of the Society for the Bibliography of Natural History*, 2 (9), 407.

Tashiro, S., Senou, H. & Motomura, H. (2018) *Enneapterygius velatus*, a new deepwater triplefin (Perciformes: Tripterygiidae) from the Ryukyu Islands, southern Japan. *Ichthyological Research*, 65 (3), [1–7] 346–352. [First published online, pp. 1–7, 8 Feb. 2018. Volume, issue, and pages added 19 June 2018.]