Journal of the
Ocean Science Foundation

2024, Volume 41

Enneapterygius rubrimarginatus, a new triplefin (Teleostei: Tripterygiidae) from northern Sulawesi, Indonesia, western Pacific Ocean

RONALD FRICKE
Staatliches Museum für Naturkunde Stuttgart,
Rosenstein 1, Gewann Rosenstein, 70191 Stuttgart, Germany
https://orcid.org/0000-0003-1476-6990 Email: ronfricke@web.de, ronald.fricke@smns-bw.de

MARK V. ERDMANN
Conservation International New Zealand, University of Auckland,
23 Symonds St., Auckland 1020 New Zealand
California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA
https://orcid.org/0000-0002-3644-8347 E-mail: mverdmann@gmail.com

NESHA K. ICHIDA
Thrive Conservation
Jl. Subak Sari No. 13, Kuta Utara, Badung, Bali 80361, Indonesia
Email: nesha@thriveconservation.org

Abstract

A new species of triplefin, *Enneapterygius rubrimarginatus* is described on the basis of a single male specimen. The new species is characterized within the genus by having the first dorsal fin higher than the second dorsal fin, 15 anal-fin soft rays, the pectoral-fin with 14 soft rays, 14+17 lateral-line scales, a mandibular pore formula of 3+2+3, the pelvic-fin length about equal to the length of the longest spine of the second dorsal fin, a preanal black blotch present, the anal-fin base with 8 black spots, the pelvic fin pale, and the scales in life with red margins. The new species is compared with similar species of the *Enneapterygius tutuilae* species group.

Key words: taxonomy, ichthyology, coral-reef fishes, Redmargin Triplefin, blennioids, new species.

Citation: Fricke, R., Erdmann, M.V. & Ichida, N.K. (2024) *Enneapterygius rubrimarginatus*, a new triplefin (Teleostei: Tripterygiidae) from northern Sulawesi, Indonesia, western Pacific Ocean. *Journal of the Ocean Science Foundation*, 41, 30–36.

doi: https://doi.org/10.5281/zenodo.12509792
urn:lsid:zoobank.org:pub:A0409392-A6E8-4C7D-A645-7F7561412C2A

Date of publication of this version of record: 23 June 2024

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, and 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 group. A total of 30 genera and at least 150 species are known worldwide. All species are small; the largest does not exceed 150 mm SL (*Blennodon dorsalis* (Clarke, 1879) from New Zealand), while the smallest attains an adult length of only 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 which comprised 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) revised the western and central Pacific species, provided a worldwide checklist and distinguished 46 species in the genus that are 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; the head, operculum, pectoral-fin base and belly scaleless; and the hypural 5 small or absent. Subsequently, Holleman (2005) revised the genus *Enneapterygius* of the western Indian Ocean, 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* Holleman, 2005 from South Africa. Motomura et al. (2005) described *E. senoui* Motomura, Harazaki & Hardy, 2005 from the Izu Islands and Ogasawara Islands. Chiang & Chen (2008) revised the genus *Enneapterygius* of Taiwan, described *E. shaoi* Chiang & Chen, 2008 and *E. sheni* Chiang & Chen, 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. Motomura et al. (2015) described *E. phoenicosoma* Motomura, Ota & Meguro, 2015 from Japan, the Caroline Islands and Vanuatu; Fricke & Erdmann (2017) described *E. niue* Fricke & Erdmann, 2017 from Niue and Samoa. Tashiro et al. (2018) described *E. velatus* Tashiro, Senou & Motomura, 2018 from the Ryukyu Islands. Allen & Erdmann (2024) described *E. fricke* Allen & Erdmann, 2024 from Milne Bay Province, Papua New Guinea, and Fricke et al. (2024) described *E. viridicauda* Fricke, Erdmann & Sianipar, 2024 from Flores, Indonesia.

During recent fieldwork in northern Sulawesi, Indonesia, an undescribed species of *Enneapterygius* was discovered, which is described in the present paper.

Materials and Methods

Comparative materials are those listed in Fricke (1994, 1997) and Fricke & Erdmann (2017). The holotype is deposited at the Museum Zoologicum Bogoriense, Cibinong, Java, Indonesia (MZB). Abbreviations of museum collections (see below) follow Fricke & Eschmeyer (2024a).

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, proportional measurements are presented as thousandths of standard length (SL).

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

Enneapterygius rubrimarginatus, n. sp.

Redmargin Triplefin

urn:lsid:zoobank.org:act:FA7B3FB6-4972-4DBC-A7E7-83382783FAD0

Figures 1–3

Holotype. MZB 26965, 17.4 mm SL, male, Indonesia, northern Sulawesi, northeastern Lembeh Strait, Angel's Window, off northwest coast of Lembeh Island, ca. 1.5075°, 125.2681°, 3 m, site MVE-18-045, N. Ichida, 12 July 2018.

Diagnosis. A medium-sized species of *Enneapterygius tutuilae* species complex with first dorsal fin higher than second dorsal fin, 15 anal-fin soft rays, pectoral-fin with 14 soft rays, 14+17 lateral-line scales, mandibular pore formula 3+2+3, pelvic-fin length about equal to length of longest spine of second dorsal fin, a preanal black blotch present, anal-fin base with 8 black spots, pelvic fins pale, and scales in life with red margins.

Description. D1 III; D2 XI; D3 viii,1; A I,xiv,1 (total 16); P1 ii,11,i, (total 14); P2 I,ii; C (vi),ii,9,ii,(v). Scale rows 34+1. Transverse scale rows 3+4. Lateral-line scales 14+15. Mandibular pore formula 3+2+3.

Head large, head length 299. Eye diameter 121. Supraorbital tentacle spoon-shaped, its length 17. Interorbital distance 23. Preorbital length 75. Upper jaw length 126. Posttemporal lateral line branch nearly I-shaped. Head lateral line system moderately complex. Body depth 224. Body width 172. Lateral line consisting of an anterior series of 14 tubular pored scales, reaching to below middle of second dorsal fin base; continuing one row lower with a posterior series of 17 notched scales. Caudal-peduncle length 132. Caudal-peduncle depth 86.

Base of first dorsal fin 86, first dorsal fin slightly higher than longest spine of second dorsal fin; first spine 167, second spine 126, third spine 97. Predorsal(1) length 247. Base of second dorsal fin 310, first spine of second dorsal fin 132, fifth spine 149. Predorsal(2) length 362. Base of third dorsal fin 230, first ray of third dorsal fin 213, fifth ray 126. Predorsal(3) length 632. Base of anal fin 391, anal fin beginning below vertical through seventh membrane of second dorsal fin (below thirteenth lateral line pore). Anal-fin spine 69, first anal-fin ray 109, fifth anal-fin ray 132. Preanal fin length 500. Pectoral fin reaching about to base of third anal-fin membrane. Base of pectoral fin 98. Pectoral-fin length 270. Prepectoral fin length 310. Base of pelvic fin 29, first ray of pelvic fin 172, second ray 230. Prepelvic-fin length 264. Caudal-fin length 213.

Color in life. (Fig 1) Head and body whitish translucent, head with numerous reddish brown and white spots, eye greenish brown, surrounded with brown streaks on whitish ground; iris black, surrounded by reddish brown. Orbital tentacle white. Scales with brown margins interspersed by bright red spots. Vertebral column white, shining through. First dorsal fin white, with 4 oblique brown bars, and a distal black spot each on first and second

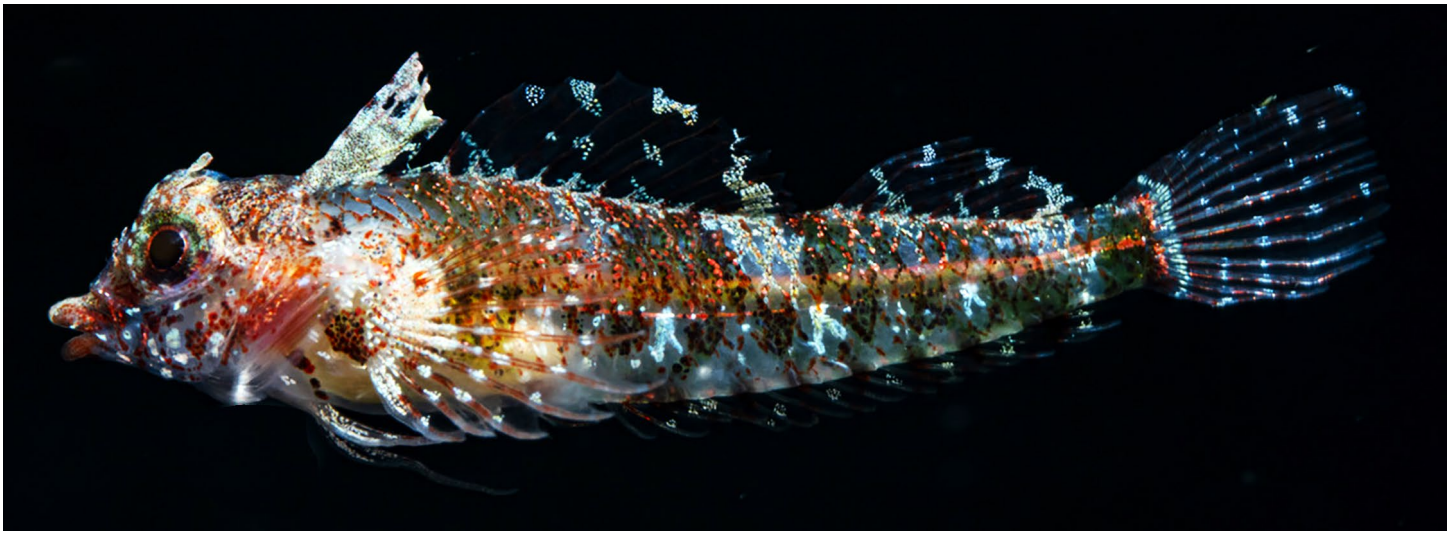

Figure 1. *Enneapterygius rubrimarginatus,* MZB 26965, freshly anesthetized male holotype, 17.4 mm SL, North Sulawesi, Indonesia (M.V. Erdmann).

membranes; second dorsal fin translucent, with 5 oblique bands consisting of white blotches, with dark reddish brown bands in between; third dorsal fin similar, with 4 oblique bands of white spots and interrupted dark reddish brown bands in between; anal fin translucent, with 8 oblique bands consisting of reddish brown spots, and 7 bands consisting of white spots in between; caudal fin translucent, basally mottled with reddish brown, fin with 5 interrupted bands of white spots, most basal band most complete, and numerous reddish brown spots between bands; pectoral fins with alternating bands of white and reddish brown; pelvic fins white.

Color in preservative. (Fig. 2) Head and body pale yellowish, eyes dark grey, cheeks with brown pigment spots, body with brown scale margins and irregular brown bars; belly white, with a bean-shaped black blotch before anus, and 8 black blotches along anal-fin base; vertical fins translucent, with irregular brown bars, first dorsal fin with darker, oblique, brown streaks; pectoral and pelvic fins white.

Figure 2. *Enneapterygius rubrimarginatus,* MZB 26965, male holotype, 17.4 mm SL, ventral view of preserved specimen, 3 years after preservation (R. Fricke).

Etymology. The specific epithet refers to the distinctive red margin on the scales: *ruber* (Latin) for red, and *marginatus* (Latin) for margined. The name is treated as a masculine compound adjective.

Distribution. This new species is described from the type locality, Lembeh Strait, northeastern Sulawesi, Indonesia, at 3 m depth (Fig. 3). At the present time, it has not been documented outside of the type locality, although it is likely that future surveys will extend its known range.

Comparisons. (Table 1) *Enneapterygius rubrimarginatus* is a member of the *E. tutuilae* species complex that is widely distributed in the Indo-West Pacific (Fig. 4). The complex is characterized by the first dorsal fin higher than the second dorsal fin vs. equal or lower in other species of the genus. Other species of this complex include *E. altipinnis*, *E. kosiensis*, *E. mirabilis*, *E. pusillus*, *E. tutuilae*, *E. velatus,* and *E. ventermaculus*. It is most similar to *E. ventermaculus* from the western Indian Ocean, but differs from it and the other members of the complex in the following characters: XI dorsal-fin spines in the second dorsal fin (vs. XII or XIII in *E. altipinnis*, XII in *E. kosiensis*, and XII–XIV in *E. pusillus*); 9 rays in the third dorsal fin (vs. 10 or 11 in *E. pusillus*), 15 anal-fin soft rays (vs. 16 or 17 in *E. kosiensis*, 16–20 in *E. mirabilis*, 20 or 21 in *E. pusillus*, 16 or 17 in *E. velatus*, and 17–20 in *E. ventermaculus*), all pectoral-fin rays unbranched (vs. some middle rays branched in *E. mirabilis*, *E. pusillus*, *E. tutuilae*, and *E. ventermaculus*); 14 pored scales in the anterior lateral line (vs. 10–12 in *E. altipinnis*, 12 in *E. kosiensis*, 5–12 in *E. mirabilis*, 9–12 in *E. pusillus*, 7–13 in *E. tutuilae*, and 10 in *E. velatus*); 17 notched scales in the posterior lateral line (vs. 21–23 in *E. altipinnis*, 21 or 22 in *E. kosiensis*, 20–29 in *E. mirabilis*, 25–28 in *E. pusillus*, 18–25 in *E. tutuilae*, 21–23 in *E. velatus*, and 21–25 in *E. ventermaculus*); two median mandibular pores (vs. one in *E. mirabilis* and *E. ventermaculus*); preanal black blotch present (vs. absent in *E. mirabilis* and *E. velatus*); 8 black spots at the anal-fin base (vs. 6 or 7 in *E. altipinnis*, 6 in *E. kosiensis*, one in *E. mirabilis*, absent in *E. pusillus*, 6 or 7 in *E. tutuilae*, and 4 in *E. velatus*); the pelvic-fin length about equal to the longest spine of the second dorsal fin (vs. longer in *E. mirabilis*, *E. pusillus*, *E. velatus*, and *E. ventermaculus*); and the pelvic fin pale (vs. black in *E. pusillus* and *E. tutuilae*).

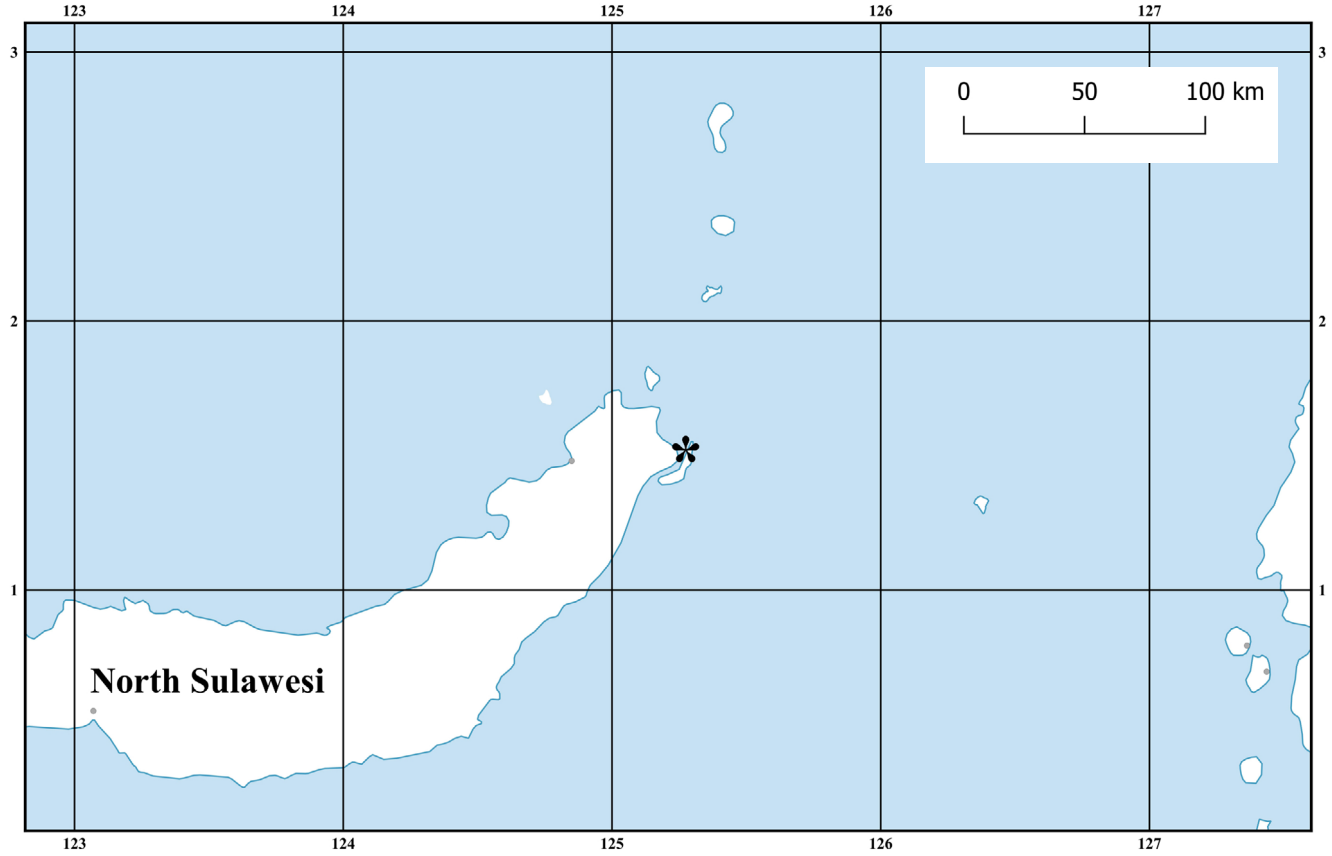

Figure 3. Geographical distribution of the *Enneapterygius rubrimarginatus* n. sp. in northern Sulawesi, Indonesia. The type locality is indicated by a star.

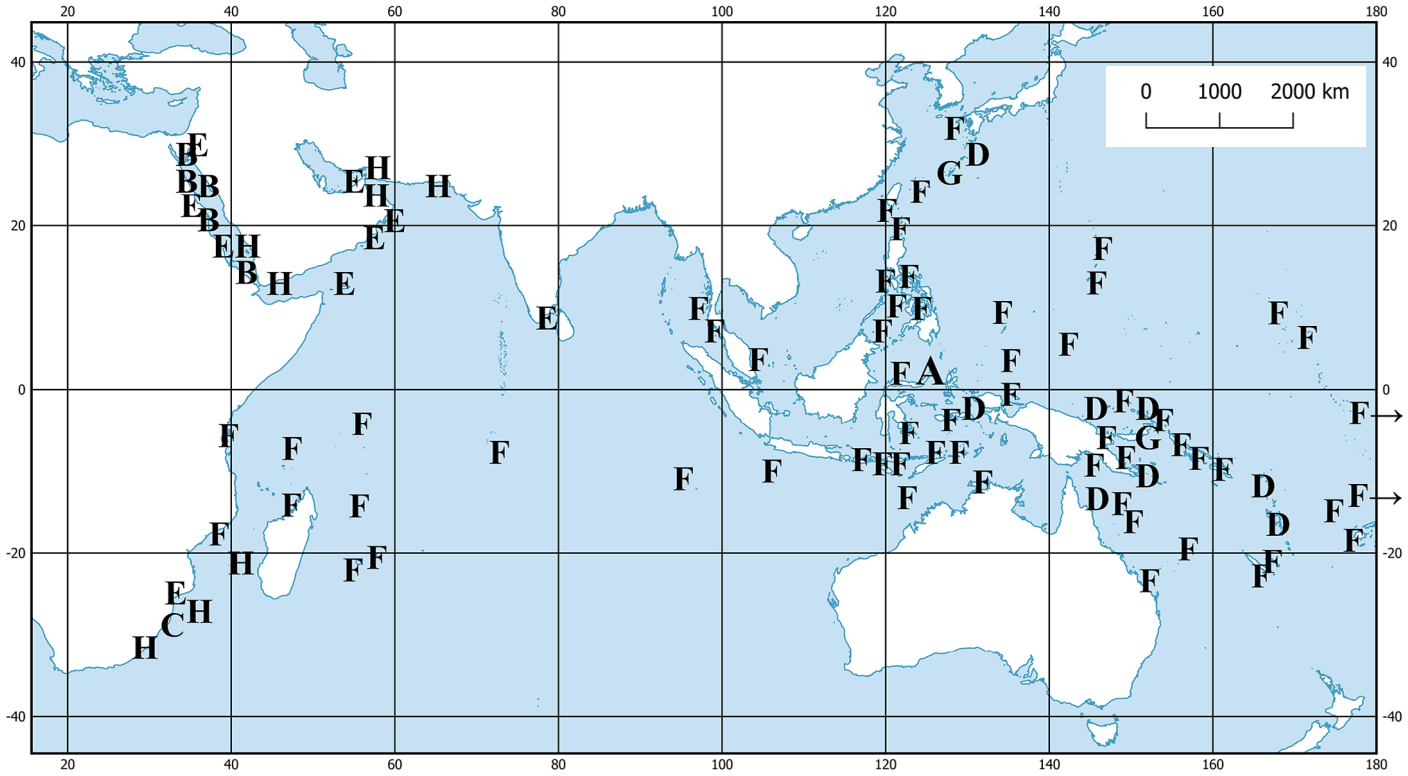

Figure 4. Geographical distribution of the *Enneapterygius tutuila*e species group, A) *E. rubrimarginatus* n. sp.; B) *E. altipinnis*; C) *E. kosiensis*; D) *E. mirabilis*; E) *E. pusillus*; F) *E. tutuilae*; G) *E. velatus*; H) *E. ventermaculus*.

TABLE 1

Comparison of the species of the *Enneapterygius tutuilae* species group

(characters differing from *E. rubrimarginatus* n. sp. in bold)

	E. rubrimarginatus	*E. altipinnis*	*E. kosiensis*	*E. mirabilis*	*E. pusillus*	*E. tutuilae*	*E. velatus*	*E. ventermaculus*
D2 spines	XI	**XII–XIII**	**XII**	X–XIII	**XII–XIV**	X–XIII	XI	XI–XIII
D3 rays	viii,1	vii–ix,1	viii,1	vii–x,1	**ix–x,1**	vi–ix,1	viii,1	vii–ix,1
A spines/rays	I,xiv,1	**I,xiv–xvii,1**	**I,xv–xvi,1**	**I,xv–xix,1**	**I,xix–xx,1**	I,xiv–xix,1	**I,xv–xvi,1**	**I,xvi–xix,1**
Pectoral-fin rays	14 all unbranched	13–15 all unbranched	13 all unbranched	13–14 **some branched**	13–15 **some branched**	13–18 **some branched**	13 all un-branched	14 **some branched**
Lateral-line scales (anterior series)	14	**10–12**	**12**	**5–12**	**9–12**	**7–13**	**10**	13–16
Lateral-line scales (posterior series)	17	**21–23**	**21–22**	**20–29**	**25–28**	**18–25**	**21–23**	**21–25**
Mandibular pores	3 + 2 + 3	**2 + 1–2 + 2**	**2 + 1–2 + 2**	**3 + 1 + 3**	**2 + 2 + 2**	2–4 + 2 + 2–4	**2 + 2 + 2**	3 + **1** + 3
Preanal black blotch	present	present	present or absent	**absent**	usually present	often present	**absent**	present
Black spots at anal-fin base	8	**6–7**	**6**	**1**	**absent**	**6–7**	**4**	7–8
Pelvic-fin length/ longest D2 spine	equal	equal	equal	**longer**	**longer**	equal	**longer**	**longer**
Pelvic-fin coloration	pale, with white spots	pale	pale	pale, base black, rays spotted	**membranes black**	**black**	pale	pale
Distribution	Sulawesi (Indonesia)	Red Sea	KwaZulu-Natal (South Africa)	Queensland (Australia) & Papua New Guinea, Vanuatu	Red Sea & western Indian Ocean	Indo-West Pacific	West Pacific Ocean	Western Indian Ocean

Acknowledgments

We thank the following persons for information, loan of specimens, or permission to examine specimens under their care: D.F. Hoese, J. Leis, M. McGrouther, J. Paxton (AMS), D.A. Didier, W.F. Smith-Vaniz (ANSP), O. Crimmen, J. Maclaine (BMNH), J.E. Randall, A. Suzumoto (BPBM), W.N. Eschmeyer, T. Iwamoto (CAS), D. Golani (HUJ), P. Kailola (KFRS), P. Pruvost (MNHN), C.D. Roberts, A.L. Stewart (NMNZ), K. Matsuura (NSMT), H.K. Larson (NTM), W.-J. Chen (NTUM), M.J.P. van Oijen (RMNH), R. Winterbottom (ROM), E. Heemstra, P.C. Heemstra (SAIAB), R. Rosenblatt (SIO), T. Alpermann, F. Krupp, W. Klausewitz, H. Zetzsche (SMF), R.F. Myers (UG), S. Smith, J.T. Williams (USNM), G.R. Allen, M. Allen, J.B. Hutchins, G. Moore, S. Morrison (WAM), H.-J. Paepke (ZMB), J.G. Nielsen (ZMUC), K. Mochizuki (ZUMT). We would like to thank Sopian Sauri and Ilham Vemendra Utama (MZB) for providing the catalog number for the holotype. Finally, we thank Angelique Batuna and Danny Charlton and the team at Lembeh Resort/Critters@Lembeh for hosting our fish survey in Lembeh Strait. The manuscript was reviewed by two anonymous referees.

References

Allen, G.R. & Erdmann, M.V. (2024) *Reef fishes of the East Indies. Second Edition. Volumes I–III.* Tropical Reef Research, Perth, Australia, pp. v. I: xii+1–470; v. II: 471–945; v. III: 946–1466 including Appendix (new species descriptions), glossary, references, index of common names and index of scientific names.

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., Erdmann, M.V. & Sianipar, A. (2024) *Enneapterygius viridicauda*, a new triplefin (Teleostei: Tripterygiidae) from Flores, Indonesia, eastern Indian Ocean. *Journal of the Ocean Science Foundation*, 41, 22–29. https://doi.org/10.5281/zenodo.11269947

Fricke, R. & Eschmeyer, W. N. (2024a) *Guide to fish collections, electronic version (11 May 2024)*. San Francisco (California Academy of Sciences). Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/collections.asp (last accessed 24 May 2024).

Fricke, R. & Eschmeyer, W. N. (2024b) *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. https://doi.org/10.5281/zenodo.279573

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. https://doi.org/10.12782/sd.20.1.001

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.]

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.]