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Chelidoperca tandstadae, a new species of perchlet (Perciformes: Serranidae) from the southwestern Indian Ocean

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Abstract

A new species of perchlet of the genus *Chelidoperca* is described based on 21 specimens, 72.8–111.8 mm SL, collected off Madagascar, Mozambique, and Tanzania at depths of 130–271 m. Thirteen specimens were collected during bottom-trawl surveys conducted by the R/V *Dr. Fridtjof Nansen* in 2007, 2010, 2023, and 2025, and 8 additional specimens, collected off Madagascar in 1973 and 2009, were found in the collections of the Muséum national d'Histoire naturelle (MNHN), Paris, France. *Chelidoperca tandstadae* n. sp. is distinguished from all

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congeners by the following combination of characters: three (two full-sized plus one about half-sized) scale rows between the lateral line and middle of the spinous-dorsal-fin base; 40–43 pored lateral-line scales; 15–16 pectoral-fin rays; 16–18 total gill rakers on the first gill arch, including 9–11 developed gill rakers; the posterior margin of caudal fin truncate; the scale rows on the interorbital area extending anteriorly to the level of the mid-orbit; scales on the lower jaw restricted to angular; a faint, sometimes indistinct, discontinuous, longitudinal series of small, irregular, dark, blotch-like segments mid-laterally on body; the dorsal-fin with irregular, yellowish-brown and white spots along the basal three-fourths of the spines and the basal half of the rays; alternating yellowish-brown and white, short bands along the proximal half of the dorsal margin of the caudal fin; a few scattered yellow streaks along the central caudal-fin rays; and an orange-red, blotch-like marking on the lower caudal-fin lobe. The validity of the new species is further supported by a minimum interspecific COI sequence divergence of 8.91% Kimura two-parameter (K2P) distance from the congeners included in the analysis. *Chelidoperca occipitalis* is the morphologically most similar species to *C. tandstadae* and was recovered as its sister lineage in the phylogenetic analysis. Previous records of *C. occipitalis* from the southwestern Indian Ocean are herein attributed to the new species, making *C. tandstadae* the only species of the genus currently known from the region.

Key words: ichthyology, coral reef fishes, morphology, taxonomy, DNA barcoding, R/V *Dr. Fridtjof Nansen*, phylogenetics, trawl surveys

Introduction

Chelidoperca Boulenger, 1895, commonly known as perchlets, is a genus of small-sized, bottom-dwelling fishes occurring on continental shelves and slopes in coastal and offshore areas, including remote seamounts at depths between 40–400 m, mostly in the tropical Indo-West Pacific (Matsunuma & Motomura 2016, Lee et al. 2019, Ogino et al. 2020, Psomadakis et al. 2021). Members of this genus are characterized by a slender elongate body, mostly pale-pink coloration, a notched dorsal fin with X,9–10 rays, anal-fin rays III,6, large scales, 40–44 tubed scales in the lateral line, and no supramaxilla (Akazaki 1972, Lee et al. 2019, Heemstra 2022). The genus contains 21 valid species, 20 of them occurring in the Indo-Pacific and a single species in the Atlantic Ocean (Matsunuma et al. 2024, Fricke et al. 2026). Among these, only three species have been reported in the Western Indian Ocean (Matsunuma & Tashiro 2020, Heemstra 2022): *Chelidoperca investigatoris* (Alcock, 1890) known from the west coast of India east to Myanmar; *Chelidoperca maculicauda* Bineesh & Akhilesh, 2013 known from Somalia east to western Indonesia; and *Chelidoperca occipitalis* Kotthaus, 1973, known from the Red Sea (as *Chelidoperca pleurospilus* (Günther, 1880), Arabian Sea, western India, and Madagascar. However, the previous record of *C. occipitalis* from Madagascar is shown herein to be based on a misidentification.

In 2007, 2010, 2023, and 2025 surveys were conducted off Mozambique, Tanzania, and Madagascar under the EAF-Nansen Programme of the Food and Agriculture Organization of the United Nations (FAO), using the Norwegian R/V *Dr. Fridtjof Nansen*. During these surveys 13 specimens of *Chelidoperca* resembling *C. occipitalis* were collected that could not be confidently assigned to any currently recognized species of the genus. Detailed examination of these specimens, together with 8 additional specimens collected off Madagascar in 1973 and 2009, and deposited in the MNHN collections, some of which had previously been identified as *C. occipitalis*, revealed that all represent the same undescribed species. The new species is herein described based on morphological and molecular evidence. This study was undertaken as part of a post-survey fish-taxonomy research workshop organized by FAO to strengthen the capacity of scientists from East African coastal states to undertake taxonomic research and publish the resulting findings.

The present study describes a new species of *Chelidoperca* from the southwestern Indian Ocean, increasing the number of valid species in the genus to 22. Re-examination of previous records of *C. occipitalis* from the region indicates that they are referable to the new species, which is currently the only species of *Chelidoperca* known from the southwestern Indian Ocean.

Materials and Methods

Methods for counts and measurements follow Psomadakis et al. (2021) and Matsunuma et al. (2024). Eye diameter, head length, and standard length, are abbreviated as ED, HL, and SL respectively. Measurements were taken point-to-point with a digital caliper and recorded to the nearest 0.1 mm. Measurements and counts were taken from the left side whenever possible, except for counts of head serrae and pectoral-fin rays, which were recorded on both sides. Bilateral counts are presented as left /right. The approach of Matsunuma et al. (2018) was used to classify the smaller (about half-size) scales in the uppermost row along the dorsal-fin base as full-size scales. Tiny irregularly arranged scales at the bases of the dorsal-fin spines were excluded from the counts. When scales were missing, counts were determined from the corresponding scale pockets. The formula for the configuration of supraneural bones, neural spines, and dorsal pterygiophores follows Ahlstrom et al. (1976). Osteological characters were examined from radiographs of all specimens included in the study. Accounts from the literature are used as a major basis for comparisons with related species. Type specimens of the new species are deposited in the National Research Foundation - South African Institute for Aquatic Biodiversity (NRF-SAIAB) National Fish Collection in Makhanda (South Africa) and the Muséum national d'Histoire naturelle (MNHN), Paris, France.

Genomic DNA was extracted at NRF-SAIAB Aquatic Genomics Research Platform using the salting-out method (Sunnucks & Hales 1996). A partial fragment of the mitochondrial DNA cytochrome c oxidase subunit I (COI) gene was amplified by polymerase chain reaction (PCR) using the fish universal primers FishF2 (5' - TCG ACT AAT CAT AAA GAT ATC GGC AC - 3') (Ward et al. 2005) and FR1_t1 (5' - ACT TCA GGG TGA CCG AAG AAT CAG AA - 3') (Ivanova et al. 2007). Each 25 µL PCR mixture contained 100–150 ng DNA template, 0.5 µL each of forward and reverse primer (10 µM), 12.5 µL, Taq DNA Polymerase Master Mix (Ampliqon), and molecular-grade water to a final volume of 25 µL. Thermal cycling consisted of an initial denaturation at 98°C for 5 min, followed by 35 cycles of denaturation at 98°C for 1 min, annealing at 50°C for 1 min, and extension at 72°C for 1 min, with a final extension at 72°C for 5 min. PCR products were electrophoresed on a 1% agarose gel and visualized using a FireReader v.4 Gel Documentation System (UVItec, United Kingdom) to confirm successful amplification. Successfully amplified products were purified using Exonuclease I and Fast Alkaline Phosphatase (FastAP) (Thermo Fisher Scientific, USA) following Werle et al. (1994), precipitated using the ethanol-EDTA precipitation method of Sambrook & Russell (2001), resuspended in Hi-Di™ formamide (Applied Biosystems, USA), and sequenced on an ABI 3500 Genetic Analyzer (Applied Biosystems, USA) at NRF-SAIAB.

The resulting processed sequences were deposited in the Barcode of Life Data Systems (BOLD) database (Ratnasingham et al. 2024) with accession numbers EAF072-24, EAF116-25, and EAF240-26. Additional COI sequences of *Chelidoperca* species and the outgroup, *Xenanthias flammeus* (Williams, Delrieu-Trottin & Planes, 2013) were retrieved from the Barcode of Life (BOLD) database (which includes NCBI Genbank mined data) (see Appendix). Sequences were aligned using MAFFTpy (v0.1, May 2022) (Katoh et al. 2002, Katoh & Toh 2008) and inspected and edited in AliView (v1.28) (Larsson 2014). The best fitting nucleotide-substitution model was selected using ModelFinder (Kalyaanamoorthy et al. 2017) implemented in IQTree (version 2.3.6) (Trifinopoulos et al. 2016, Minh et al. 2020).

The Maximum-likelihood (ML) phylogenetic analysis was built over 494 columns using the model HKY+F+I+G4 where the base substitution model HKY, empirical base frequency (F), rate heterogeneity allowing for a proportion of invariable sites (I) and Gamma-rate heterogeneity (G4) (Yang 1994) with bootstrap support over 100,000 iterations. The resulting phylogenetic tree was visualised in FigTree (v1.4.4). Species delimitation was assessed using the Automatic Barcode Gap Discovery (ABGD) (Kimura Distance, X=1) (Puillandre et al. 2011) in iTaxoTools (Vences et al. 2021), ASAP (Puillandre et al. 2021) in iTaxoTools (Vences et al. 2021), and the Bayesian implementation of the Poisson Tree Process model (bPTP) (Zhang et al. 2013). Mean estimates of evolutionary distances between species/lineages were calculated in MEGA11 (Tamura et al. 2021) using the Kimura two-parameter (K2P) model (Kimura 1980) with uniform rate variation among sites.

Chelidoperca tandstadae, n. sp.

Tandstad's perchlet

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Figures 1–6, Tables 1 & 2

Chelidoperca pleurospilus [*non* Günther, 1880] Fricke et al. 2018: 147 (Madagascar, listed).
Chelidoperca occipitalis [*non* Kotthaus, 1973] (in part) Matsunuma & Tashiro 2020: 156 (Madagascar, listed).
Chelidoperca sp. Heemstra 2022: plate 5 (Mozambique, photograph).

Holotype. SAIAB 213713 (tissue SPR25-477), 91.1 mm SL (Fig. 1A), Madagascar, -14.25°, 47.467°, R/V *Dr. Fridtjof Nansen*, station 5745, bottom trawl, 238–271 m depth, 25 July 2025, coll. S.V. Bogorodsky & S.A. Bruck.



Figure 1. *Chelidoperca tandstadae* n. sp., A: fresh holotype, SAIAB 213713, 91.1 mm SL, Madagascar (S.V. Bogorodsky); B: fresh paratype, SAIAB 237151, 83.9 mm SL, Mozambique (P.N. Psomadakis); C: fresh paratype, SAIAB 246445, 72.8 mm SL, Tanzania (S.V. Bogorodsky).

Paratypes. Madagascar: MNHN 2004-040, 3 specimens, 85.8–88.6 mm SL, -15.583°, 46.250°, 180–200 m depth, 23 June 1973; MNHN 2014-1132, 5 specimens, 86.6–91.7 mm SL, -15.983°, 46.167°, 197–217 m depth, 10 July 2009; SAIAB 189559, 3 specimens, 89.7–99.4 mm SL, -25.783°, 44.700°, R/V *Dr. Fridtjof Nansen*, bottom trawl, 203–208 m depth, 10 May 2010; SAIAB 213970, 2 specimens, 96.0 & 98.0 mm SL, -19.550°, 43.917°, R/V *Dr. Fridtjof Nansen*, station 5773, bottom trawl, 230–233 m depth, 31 July 2025, coll. S.V. Bogorodsky & S.A. Bruck; SAIAB 213772, 73.3 mm SL, -15.317°, 46.417°, R/V *Dr. Fridtjof Nansen*, station 5747, bottom trawl, 233–260 m depth, 25 July 2025, coll. S.V. Bogorodsky & S.A. Bruck. Mozambique: SAIAB 82026, 2 specimens, 74.3 & 111.8 mm SL, -24.602°, 35.420°, R/V *Dr. Fridtjof Nansen*, station 47, bottom trawl, 159–161 m depth, 12 October 2007, coll. P.C. Heemstra & E. Heemstra; SAIAB 237151 (tissue 460), 83.9 mm SL (Fig. 1 B), -20.008°, 36.320°, R/V *Dr. Fridtjof Nansen*, station 5586, bottom trawl, 130–135 m depth, 13 June 2023, coll. P.N. Psomadakis. Tanzania: SAIAB 246445 (ex. SAIAB 90232, tissue SPR22-908), 72.8 mm SL (Fig. 1 C), -6.050°, 39.800°, R/V *Dr. Fridtjof Nansen*, station 430, bottom trawl, 198–221 m depth, 23 July 2023, coll. S.V. Bogorodsky & S.A. Bruck; SAIAB 246446 (ex. SAIAB 90232), 2 specimens, 81.0 & 92.0 mm SL, same data as for SAIAB 246445.

Diagnosis. A species of *Chelidoperca* distinguished from congeners by a combination of three (two full-sized plus one about half-sized) scale rows between lateral line and middle of spinous dorsal-fin base; posterior margin of caudal fin truncate; 40–43 tubed lateral-line scales; 15–16 pectoral-fin rays; 16–18 total gill rakers on first gill arch, including 9–11 developed gill rakers; scales on ventral surface of lower jaw restricted to angular, not extending onto dentary; scales rows on interorbital region extending anteriorly to level of mid-orbit; body with faint, sometimes indistinct, discontinuous, longitudinal series of small, irregular, dark, blotch-like segments mid-laterally; dorsal fin with irregular yellowish-brown and white spots along basal three-fourths of spines and basal half of rays; caudal fin with alternating yellowish-brown and white short bands along proximal half of dorsal margin, a few scattered yellow streaks along central rays, and an irregular, orange-red, blotch-like marking on lower lobe.

Description. (proportional measurements and counts are presented in Table 1; proportions and counts are given first for the holotype, followed in parentheses by the range for paratypes, when different). Dorsal-fin rays X,10; anal-fin rays III,6; pectoral-fin rays 15 (15–16, usually 15); tubed lateral-line scales 41 (40–43); scale rows between lateral line and middle of spinous dorsal-fin base three (two full-sized plus one about half-sized) (Fig. 2);



Figure 2. *Chelidoperca tandstadae* n. sp., preserved holotype, SAIAB 213713, 91.1 mm SL, dorsolateral view of body showing scale rows between the lateral line and the base of the spinous dorsal fin (Z. Somana).

total gill rakers on first arch, including rudiments 5+11 (5–6+11–12), 16–18 in total.

Body fusiform, slightly elongate, moderately compressed; body depth at pelvic-fin origin 4.6 (4.3–4.8) in SL; body depth at anal-fin origin 5.0 (4.7–5.3) in SL; body width 6.0 (5.5–6.5) in SL. Caudal peduncle relatively shallow, its depth 1.9 (1.9–2.1) in its length. Head moderately large, its length 2.7 (2.5–2.8) in SL. Snout somewhat conical in lateral view, shorter than orbit diameter, its length 5.2 (4.2–5.4) in HL. Orbit moderately small, its diameter 3.3 (3.2–3.7) in HL; dorsal margin of orbit approximately level with dorsal profile of head. Interorbital width narrow, its width 13.1 (11.0–15.5) in HL; suborbital very narrow, its depth 24.3 (15.7–23.4) in HL. Anterior nostril tubular, with a relatively long posterior triangular flap, its tip nearly reaching posterior nostril when laid back, nostril positioned anterior to middle of eye and closer to orbit than to anterior margin of preorbital. Posterior nostril a slightly ovate opening, positioned at level of dorsal margin of pupil.

Mouth large, posterior margin of maxilla reaching a vertical between posterior margin of pupil and posterior margin of orbit, length of upper jaw 2.2 (2.2–2.5) in HL. Posterior portion of maxilla expanded and slightly

TABLE 1

Morphometrics (as percent of SL and percent of HL) and meristic values of type specimens of *Chelidoperca tandstadae* n. sp.

	holotype	paratypes n=20	mean		holotype	paratypes n=20	mean/mode
SL, mm	91.1	72.8–111.8		Base of anal fin length	15.3	15.4–19.5	17.8
% SL				First anal-fin spine length	3.7	3.2–4.6	4.0
Body depth at dorsal-fin origin	21.5	20.6–23.1	22.2	Second anal-fin spine length	7.5	6.4–7.4	6.9
Body depth at anal-fin origin	20.2	19.0–21.4	20.5	Third anal-fin spine length	8.8	8.0–8.9	8.4
Head length	37.3	36.1–39.8	38.1	(Third anal-fin spine, times in 2nd)	1.2	1.1–1.3	1.2
Postorbital length	19.5	18.3–21.2	19.7	Longest anal-fin ray length	15.4	14.5–17.4	15.6
Body width	16.8	15.5–18.2	16.8	Caudal-fin length	23.6	21.4–28.8	24.2
Snout length	7.1	6.4–9.0	7.7	Pectoral-fin length	25.9	22.0–26.0	24.7
Orbit diameter	11.4	10.1–11.7	11.1	Pelvic-spine length	13.2	11.5–13.0	12.2
Interorbital width, bony	2.9	2.4–3.5	3.0	Pelvic-fin length	24.7	21.9–26.4	23.3
Suborbital depth	1.5	1.6–2.5	2.0	Gill raker length (at angle)	3.6	3.2–3.8	3.5
Upper jaw length	17.1	15.4–18.2	16.3	Gill filament length (at angle)	2.2	2.2–3.0	2.7
Caudal peduncle depth	11.3	10.5–12.1	11.4	**% HL**			
Caudal peduncle length	22.0	21.0–24.7	23.0	Snout length	19.1	18.4–23.7	20.2
Predorsal length	36.6	33.9–37.7	35.7	Eye diameter	30.6	27.2–31.2	29.5
Preanal-fin length	57.1	56.1–65.4	61.6	Interorbital width	7.6	6.5–9.1	8.0
Prepelvic length	31.5	29.3–33.8	32.3	Suborbital depth	4.1	4.3–6.4	5.3
Dorsal-fin base length	45.8	45.7–50.1	48.0	Pectoral-fin length	69.4	57.5–70.3	65.4
First dorsal-fin spine length	4.1	3.6–5.5	4.7	**Meristic characters**			
Second dorsal-fin spine	7.9	6.6–8.7	7.9	Dorsal-fin rays	X,10	X,10	X,10
Third dorsal-fin spine	13.2	11.1–13.7	12.5	Anal-fin rays	III,6	III,6	III,6
Fourth dorsal-fin spine	14.5	13.2–15.9	14.4	Pectoral-fin rays	15	15–16	15
Fifth dorsal-fin spine	14.5	12.7–15.5	13.9	Tubed scales in LL	41	40–43	42
Last dorsal-fin spine	8.8	8.0–9.2	8.8	Scales above LL	3	3	3
Longest dorsal-fin ray length	14.3	15.3–18.8	16.8	Gill rakers, developed	2 + 8	2 + 7–9	2 + 8
Last dorsal-fin ray length	13.8	13.0–15.8	14.4	Gill rakers, including rudiments	5 + 11	5–6 + 11–12	5 + 11

inclined anteriorly, with a straight posterior margin and a dorsal margin slightly swollen laterally, forming a weak ridge. Lower jaw projecting beyond tip of upper jaw. Preopercular margin serrated, except on anterior half of ventral margin, with 30 (25–31) small, subequal serrae. Ventral margin of subopercle and dorsal margin of interopercle weakly serrated, with 8 (8–10) and 11 (6–10) serrae on each, respectively. Opercle with two strong, flattened spines, upper spine directed dorsoposteriorly and about 1.5 times longer than lower spine; tips of both spines not extending beyond opercular margin. Posttemporal with a small exposed bony crest at origin of lateral line, bearing three (three or 4) distinct spines.

Upper jaw anteriorly with a broad band of sharp-tipped conical teeth, comprising 6 rows at widest portion, posterior 5 or 6 teeth on each side of this broad anterior band enlarged and distinctly recurved; tooth band narrowing posteriorly to two or three irregular rows, with teeth of outer row conical, forward directed, and larger than small conical teeth of inner row. Lower jaw anteriorly with a band of three or 4 irregular rows of sharp-tipped, curved, conical teeth, narrowing posteriorly to two rows; teeth of outer row anteriorly and anterolaterally larger than those of inner rows; teeth of inner row on posterior half of jaw enlarged and recurved; anterior teeth of lower jaw exposed when mouth closed. Narrow symphyseal gap present between tooth bands of both jaws. Vomerine tooth patch chevron-shaped, with three rows of small conical teeth anteriorly and posteriorly and several enlarged, recurved teeth posteriorly. Palatine teeth small, conical, and sharp-tipped, arranged in three rows, inner tooth row slightly larger.

Lateral line curved upward above pectoral fin, then continuing posteriorly alongside of body to caudal-fin base; tubed lateral-line scales 41 (40–43). Scale rows between lateral line and base of sixth dorsal-fin spine three (two full-sized plus one about half-sized) (Fig. 2); scale rows between lateral line and anal-fin origin 7.5. Scales along dorsal-fin base small and slightly elongate. Body covered with ctenoid scales, except for cycloid scales on isthmus. Cheek, preopercle, and opercle scaled, predominantly with ctenoid scales; interopercle with two rows of cycloid to weakly ctenoid scales. Scales on dorsal surface of head cycloid, extending anteriorly to level of middle of orbit. Scales on ventral surface of lower jaw restricted to angular, not extending onto dentary (Fig. 3); no scales on maxilla. Dorsal and anal fins without basal scales. Pectoral-fin base scaled, scales extending onto basal portion of fin. Small ctenoid scales extending over basal one-fourth of caudal fin. Lower jaw with 4 pairs of pores: a pair of small pores on each side of dentary symphysis, followed by two pairs of larger pores, fourth pair represented by two closely spaced small openings situated at angular-dentary junction.

Dorsal-fin origin above pectoral-fin base, with a distinct notch between spinous and soft-rayed portions;



Figure 3. *Chelidoperca tandstadae* n. sp., preserved holotype, SAIAB 213713, 91.1 mm SL, ventral view of head showing scalation (Z. Somana).

membranes of spinous portion of dorsal fin deeply incised, spinous and soft portions connected by membrane. First dorsal-fin spine shortest, third to sixth spines subequal, fourth spine longest, its length 6.9 (6.3–7.6) in SL. All dorsal-fin soft rays branched, eighth ray longest, its length 7.0 (5.3–6.5) in SL. Last dorsal-fin ray just reaching posterior dorsal end of caudal peduncle in holotype, variably reaching or not reaching this point in paratypes, its length 7.2 (6.3–7.7) in SL. Anal-fin origin below second dorsal-fin soft ray; anal-fin base short, 3.0 (2.4–3.0) in dorsal-fin base. First anal-fin spine shortest, third spine longest, its length 11.4 (11.2–12.5) in SL; second spine length 1.2 (1.1–1.3) in length of third spine. All anal-fin soft rays branched; fifth ray longest, its length 6.5 (5.7–6.9) in SL. Pectoral-fin rays 15 (15–16); all except upper two rays branched; pectoral fin extending posteriorly beyond tip of pelvic fin but not reaching vertical through anus, its length 3.9 (3.9–4.6) in SL. Pelvic fin slightly shorter than pectoral fin, not reaching anus, its length 4.0 (3.8–4.6) in SL. Caudal fin truncate, its length 4.2 (3.5–4.7) in SL, upper lobe slightly elongate (not elongate in holotype and some paratypes). Developed gill rakers 2 + 8 (2 + 7–9); rakers narrowly triangular except for slender raker at angle; first three rudimentary rakers on upper limb represented by raised bumps; total gill rakers, including rudiments 5 + 11 (5–6 +11–12). Formula for configuration of supraneural bones, neural spines, and dorsal pterygiophores 0/0/0+1/1+1/1/1/1/1/1/1/1/1+1/1/1/1/1+1/1/; vertebrae 10+13.

Fresh color. (Fig. 1) Body overall reddish to pale pink, with about 10 whitish subtriangular bars on lower half of body from about middle of belly to above rear anal-fin base; anterior belly, chest, and prepectoral area shiny white; body with faint, sometimes indistinct, discontinuous, longitudinal series of small, irregular, dark, blotch-like segments mid-laterally. Head reddish orange, whitish ventrally; iris yellowish with dark radial marks and red pigment sometimes visible on dorsal and ventral part, pupil black; maxilla paler posteriorly. Dorsal-fin membranes mostly semitranslucent; irregular yellowish-brown and white markings along basal three-fourths of spines and basal half of rays; distal half of soft-rayed portion with a yellowish tinge; anal fin whitish with yellow submarginal band, faint reddish tinge variably present on fin. Pectoral fins semitranslucent with pale yellowish tinge and a small, faint, reddish blotch on base; pelvic fins semitranslucent with yellowish tinge, anterodistal portion with faint reddish tinge. Caudal fin semitranslucent with orange-red pigment along rays on basal half, more obvious ventrally, forming an orange-red, blotch-like marking on lower lobe, lower 6 rays at base of fin unpigmented; a few scattered, small, yellow streaks in middle of caudal fin; alternating yellowish-brown and white short bands along proximal half of dorsal margin, distal half yellowish.



Figure 4. *Chelidoperca tandstadae* n. sp., A: preserved holotype, SAIAB 213713, 91.1 mm SL, Madagascar (S.Mcelele); B: preserved paratype, SAIAB 237151, 83.9 mm SL, Mozambique (S.Mcelele).

Preserved color. (Fig. 4) Body creamy white without markings except faint remnants of dark, longitudinal, dashed stripe along mid-lateral body; dorsal part of body with posterior margin of scales slightly dark tinged Head slightly darker than body; dorsal and lateral surface of snout with numerous minute melanophores, anterior portion of both jaws with numerous melanophores but not forming defined markings; premaxilla with cluster of melanophores forming an irregular rectangle shape. Dorsal fin translucent with several melanophores along base of spines and rays; anal, pectoral, and pelvic fins translucent, without pigmentation or distinct markings; caudal-fin rays with numerous melanophores, middle of fin dark distally, three dark bands visible along proximal half of upper lobe margin.

Etymology. The specific epithet *tandstadae* is a noun in the genitive case, named in honour of Merete Tandstad, Coordinator of the EAF-Nansen Programme at the Food and Agriculture Organization of the United Nations (FAO), in recognition of her longstanding commitment to advancing marine science and capacity development, and particularly her support for taxonomic and biodiversity research in countries participating in the Programme.

Distribution and habitat. The new species is currently known from Madagascar, Mozambique, and Tanzania (off Zanzibar) in the southwestern Indian Ocean (Fig. 5). Specimens were collected by bottom trawl on the upper continental slope at depths of 130–271 m.

Comparisons. This species differs from *Chelidoperca africana* Cadenat, 1960; *Chelidoperca cerasina* Ogino, Lee, Chen & Matsunuma, 2019; *Chelidoperca flavolineata* Matsunuma, Tan & Peristiwady, 2020; *Chelidoperca formosa* Tang & Ho, 2021; *Chelidoperca hirundinacea* (Valenciennes, 1831); *Chelidoperca lecromi* Fourmanoir, 1982; and *Chelidoperca pleurospilus* in having three (two full-sized plus one about half-sized) vs. 4 (three full-sized plus one about half-sized) scale rows between the lateral line and the middle of the spinous-dorsal-fin base.

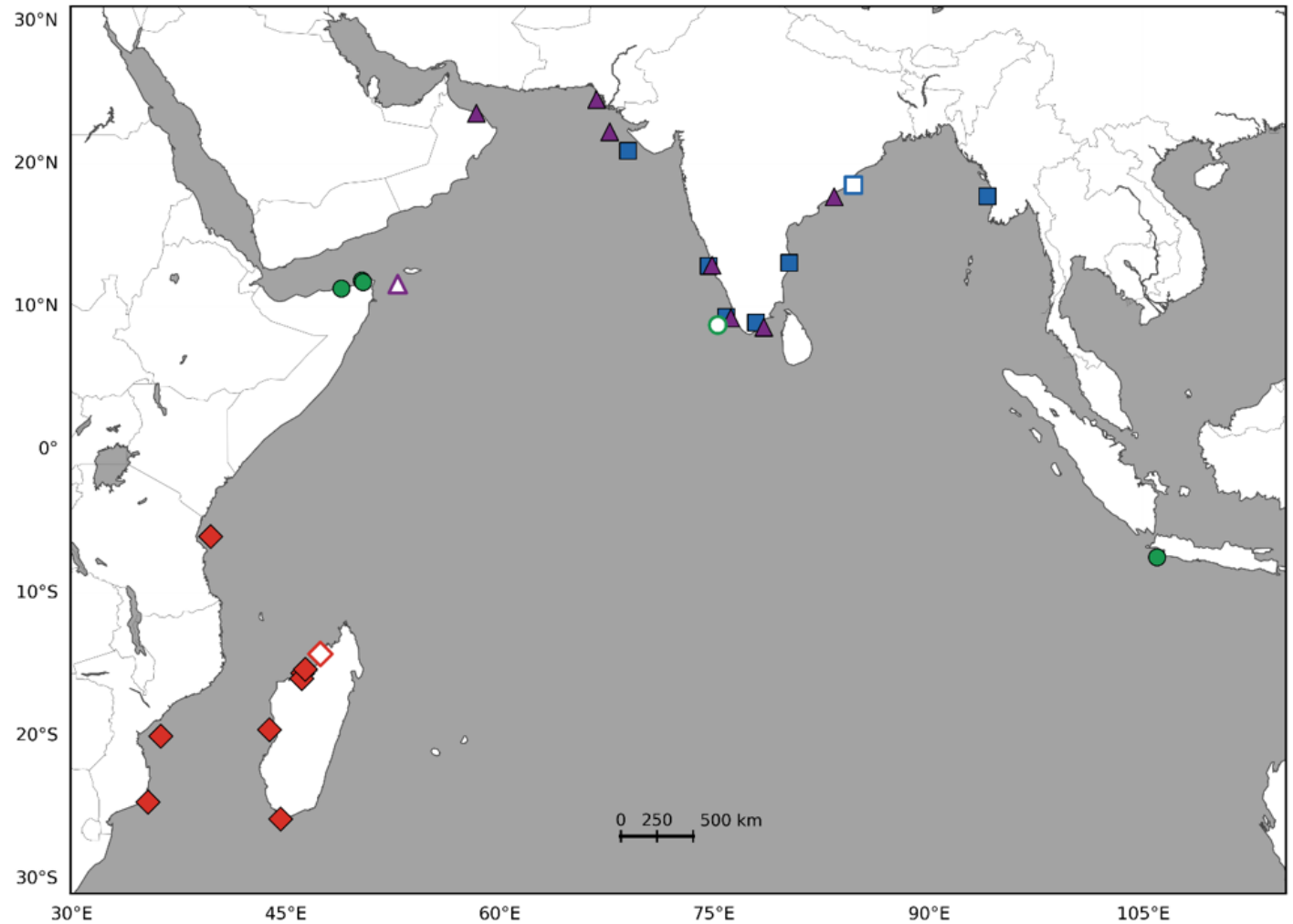


Figure 5. Map showing the geographical distribution of *Chelidoperca tandstadae* n. sp. (red diamonds); *C. investigatoris* (blue squares); *C. maculicauda* (green circles); and *C. occipitalis* (purple triangles). Open symbols indicate type localities; solid symbols indicate other records.

Among congeners with three (two full-sized plus one about half-sized) scale rows between the lateral line and the middle of the spinous dorsal-fin base, *C. tandstadae* differs from *C. investigatoris*; *Chelidoperca leucostigmata* Lee, Lee, Matsunuma & Chen, 2019; *C. maculicauda*; *Chelidoperca pollux* Matsunuma & Hoang, 2024; *Chelidoperca pulchella* Matsunuma, Tachihara, Hirasaka & Motomura, 2024; *Chelidoperca santosi* Williams & Carpenter, 2015; and *Chelidoperca stella* Matsunuma & Motomura, 2016 in having scales on the ventral surface of the lower jaw restricted to the angular, not extending onto the dentary (vs. scales extending anteriorly onto posterior portion of the dentary) (Matsunuma et al. 2024). It is further distinguished from *Chelidoperca flavimacula* Psomadakis, Gon & Htut, 2021; *C. leucostigmata*; *C. pollux*; *C. pulchella*; *C. santosi*; and *Chelidoperca tosaensis* Matsunuma, Yamakawa & Williams, 2017 by the mostly uniformly pigmented anal fin (vs. anal fin with yellow spots) (Bineesh et al. 2014, Williams & Carpenter 2015, Matsunuma et al. 2018, Lee et al. 2019, Psomadakis et al. 2021, Matsunuma et al. 2024). *Chelidoperca tandstadae* differs from *C. investigatoris*; *C. leucostigmata*; *C. maculicauda*; *Chelidoperca margaritifera* Weber, 1913; *Chelidoperca microdon* Lee, Lee, Matsunuma & Chen, 2019; and *C. pulchella* by the scales on the dorsal surface of the head extending anteriorly only to level of the mid-orbit (vs. extending anteriorly beyond the mid-orbit) (Bineesh et al. 2013, 2014, Lee et al. 2019, Matsunuma 2016, Matsunuma et al. 2018, 2024). *Chelidoperca tandstadae* has more lateral-line scales, 40–43, compared to 34–37 in *Chelidoperca barazeri* Lee, Lee, Matsunuma & Chen, 2019 and 33–38 in *C. stella* (Tang & Matsunuma 2022). In coloration, *C. tandstadae* differs from *C. investigatoris*; *Chelidoperca myathantuni* Psomadakis, Gon & Htut, 2021; and *C. stella* in having alternating yellowish-brown and white short bands along the proximal half of the dorsal margin of the caudal fin (vs. such bands absent) (Matsunuma & Motomura 2016, Bineesh et al. 2014, Psomadakis et al. 2021), and from *C. barazeri* and *C. microdon* in lacking a distinct red ocellus on the opercular membrane when fresh (Lee et al. 2019, Tang & Matsunuma 2022).

Chelidoperca tandstadae is most similar to *C. occipitalis* in having three (two full-sized plus one about half-sized) scale rows between the lateral line and the middle of the spinous dorsal-fin base; a truncate posterior margin of the caudal fin; scales on the dorsal surface of the head not extending anteriorly beyond the level of mid-orbit; and scales on the ventral surface of the lower jaw restricted to the angular, not extending onto the dentary. The two species are also similar in coloration, both having a dark, longitudinal, dashed stripe (indistinct in one paratype of *C. tandstadae*) mid-laterally on body; dark and white spots along soft dorsal-fin rays; and an orange-red, blotch-like marking on the proximal part of the lower caudal-fin lobe. *Chelidoperca tandstadae* differs from *C. occipitalis* in having a shorter head (36.1–39.8% SL vs. 41.3–44.7% SL) and a shorter postorbital distance (18.3–21.2% SL vs. 22.3–24.9% SL); spots along the dorsal-fin spines (vs. no spots along the dorsal-fin spines); no red spots on the membrane between the last dorsal-fin spine and first soft ray (vs. two or three red spots present); the last anal-fin ray pale (vs. the last anal-fin ray with alternating yellow and white short bands); the banding along the dorsal edge of the caudal fin restricted to the proximal half (vs. extending along the entire dorsal margin); an orange-red, blotch-like marking on the lower caudal-fin lobe preceded by an unpigmented area at the base of the fin (vs. an orange-red blotch covering the entire basal half of the lower caudal-fin lobe); and the caudal fin with yellow streaks mostly restricted to the central caudal-fin rays (vs. yellow streaks on the caudal fin forming 4 or 5 bars). Gill-raker counts do not appear to provide a reliable distinction between the two species: *C. tandstadae* has 16–18 total gill rakers on the first gill arch, whereas published counts for *C. occipitalis* differ, with 16–19 reported by Matsunuma (2016) and 19–21 by Bineesh et al. (2014). Matsunuma (2016) also considered the presence of a silvery streak along the posteroventral margin of the orbit diagnostic for *C. occipitalis*. However, this marking is not clearly discernable in most available specimens we have examined.

Genetics. Pairwise K2P distances based on COI sequences between *C. tandstadae* and other *Chelidoperca* species and lineages included in the analysis ranged from 8.91 to 20.37% (Table 2). These values substantially exceed some interspecific divergences observed among other congeners included in the analysis, such as 2.87% between *C. margaritifera* and *C. stella*, and 4.77% between *C. lecromi*, and *C. cerasina* (Table 2). The Maximum-likelihood (ML) phylogenetic analysis of the available COI sequences recovered *C. tandstadae* as a distinct, well-supported lineage (bootstrap= 97%) comprising specimens from Madagascar, Mozambique, and Tanzania (Fig. 6). *Chelidoperca tandstadae* was recovered as the sister lineage of *C. occipitalis*, the species to which it is most similar morphologically, with 84% bootstrap support. The two species exhibit a K2P genetic distance of 9.51%, further supporting the distinction based on morphological differentiation.

TABLE 2

Pairwise genetic distances (K2P) based on COI sequences between *Chelidoperca tandstadae* n. sp. and other *Chelidoperca* species or lineages included in the analysis

(the lowest and highest genetic distances from *C. tandstadae* are highlighted)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	***C. tandstadae*, n. sp.**																
2	***C. barazeri***	12.52															
3	***C. cerasina***	13.21	14.51														
4	***C. formosa***	**20.37**	20.37	23.07													
5	***C. hirundinacea***	11.09	13.34	15.90	20.61												
6	***C. investigatoris***	9.74	11.50	12.36	21.59	8.55											
7	***C. lecromi***	15.81	15.67	4.77	25.28	16.70	14.22										
8	***C. leucostigmata***	14.38	12.28	16.73	22.61	15.36	13.29	18.40									
9	***C. maculicauda***	16.54	17.40	19.39	25.45	16.55	16.34	18.85	20.01								
10	***C. margaritifera***	12.07	13.52	16.58	19.60	12.55	14.75	18.00	13.67	19.34							
11	***C. microdon***	17.42	17.90	17.82	18.65	18.69	18.90	18.67	19.92	22.44	15.72						
12	***C. occipitalis***	**9.51**	14.52	14.51	20.79	12.34	12.60	17.68	15.72	16.03	14.24	18.02					
13	***C. pleurospilus***	8.91	14.29	14.62	23.98	12.58	10.16	17.43	13.40	16.00	14.31	16.62	9.03				
14	***C. santosi***	14.64	12.23	16.70	22.95	13.96	14.75	16.89	6.67	19.20	14.34	18.54	14.24	12.36			
15	***C.* sp. 6**	15.02	15.88	16.67	20.75	16.85	14.92	19.47	13.32	21.53	16.22	21.01	17.51	15.46	15.28		
16	***C. stella***	12.52	12.72	16.74	19.35	14.08	14.51	18.23	13.79	20.18	2.87	16.86	14.63	14.51	14.43	16.48	
17	***C. tosaensis***	13.04	10.53	12.72	21.82	11.87	13.36	14.95	16.70	19.63	12.68	15.76	13.60	13.89	14.51	15.61	12.59

The mean intraspecific K2P distance within *C. tandstadae* was 2.66%, with no divergence between the Mozambique and Tanzania specimens and a divergence of 3.99% between the single Madagascar specimen and those from Mozambique and Tanzania. Species delimitation analysis using ASAP, bPTP, and ABGD consistently recovered *C. tandstadae* as a distinct operational taxonomic unit (OTU) from other species within the genus. However, whereas ASAP and ABGD recovered *C. tandstadae* as a single operational taxonomic unit (OTU), bPTP subdivided it into two OTUs, separating the Madagascar specimen from those collected in Mozambique and Tanzania. Although the relatively high mitochondrial-sequence divergence suggests possible geographic genetic structuring, no corresponding morphological differentiation was observed among the few specimens examined. We therefore provisionally regard them as conspecific, pending further investigation based on broader geographic sampling and additional genetic markers.

Remarks. Three species of *Chelidoperca* have previously been reported from the Western Indian Ocean: *C. investigatoris*, *C. maculicauda*, and *C. occipitalis*. Of these, only *C. occipitalis* has been reported from the southwestern Indian Ocean, based on specimens from Madagascar (Matsunuma & Tashiro 2020). Three specimens examined by those authors (MNHN 2004-040) collected off Madagascar on 23 June 1973, are herein re-identified as *C. tandstadae*. Matsunuma & Tashiro (2020) reported these specimens as 83.2–86.1 mm SL, collected at -15.35°, 46.15°, at 180–200 m depth. Re-examination of the same specimens for the present study resulted in slightly greater standard lengths (85.8–88.6 mm SL), whereas the MNHN online database gives the collection locality as -15.583°, 46.25°. The reasons for the discrepancies in standard lengths and geographical coordinates between the data reported by Matsunuma & Tashiro (2020) and those obtained from the specimens and MNHN online database, respectively, are unknown. The specimen of MNHN 2004-040 figured as *C. occipitalis* by

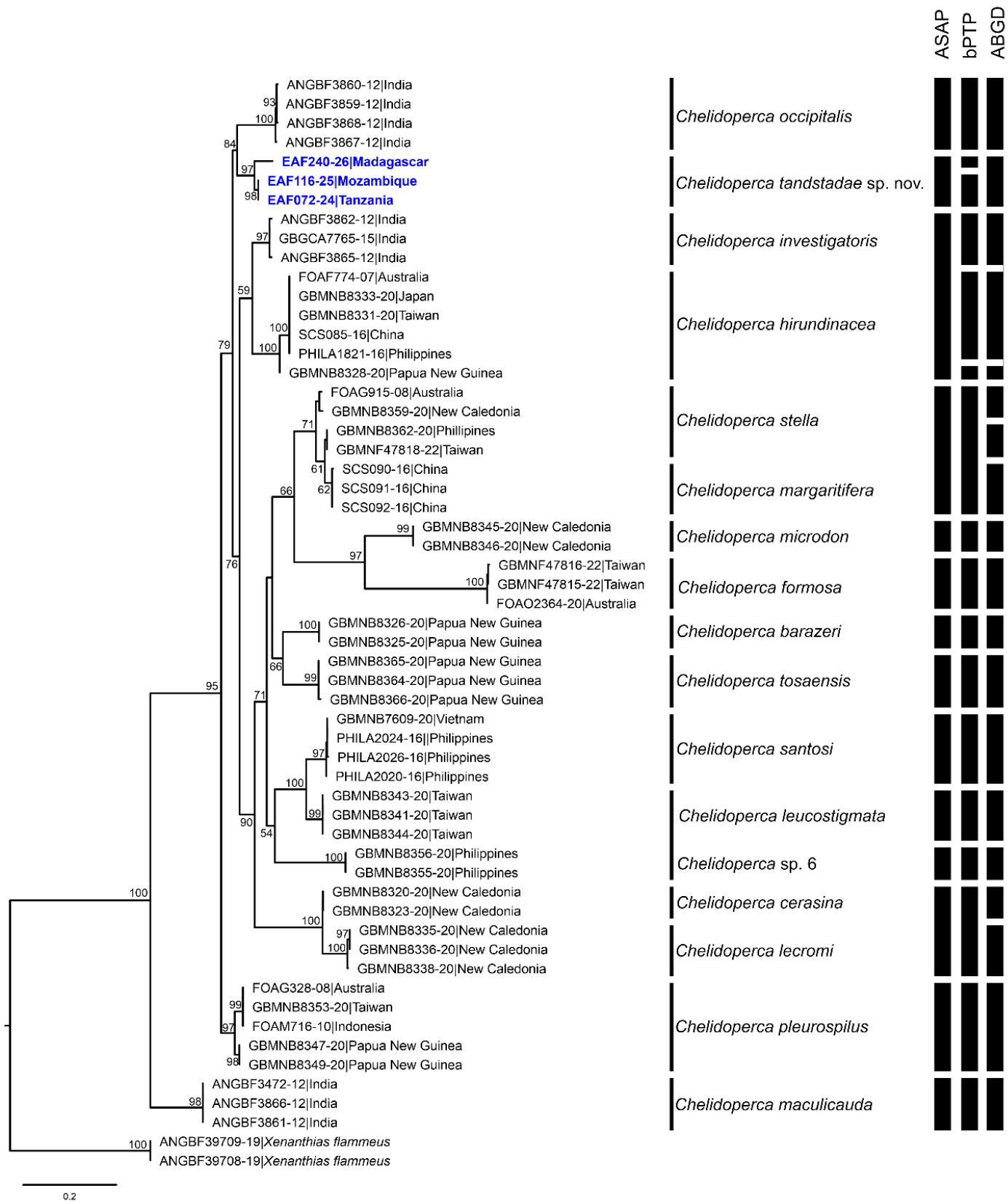


Figure 6. Maximum likelihood phylogenetic tree inferred from COI sequences of *Chelidoperca* species and the outgroup *Xenanthias flammeus* (originally labeled in BOLD as *Plectranthias flammeus*). Numbers on branches are bootstrap values (values <50 % not shown); black bars indicate operational taxonomic units (OTUs) derived from ASAP, bPTP and ABGD species delimitation methods.

Matsunuma & Tashiro (2020: fig. 5A, B, C) is likewise referable to *C. tandstadae*. Accordingly, the record of *C. occipitalis* from Madagascar reported by Matsunuma & Tashiro (2020), as well as the previous records based on the same material, are referable to the new species. *Chelidoperca occipitalis* is therefore currently known from the northern part of the Indian Ocean, including Gulf of Aden, Gulf of Oman, Pakistan, and both coasts of India (Kotthaus 1973, Bineesh et al. 2014, 2015, Matsunuma 2016, Rao & Krishna 2016, Paul et al. 2026).

Prior to the present study, the most recently described species of *Chelidoperca* from the Western Indian Ocean was *C. maculicauda*, described from southwestern India by Bineesh et al. (2013). *Chelidoperca tandstadae* represents the first species of the genus described from material collected in the southwestern Indian Ocean, adding to the known species diversity of *Chelidoperca* in the region. Its recognition from material collected during surveys conducted by the R/V *Dr. Fridtjof Nansen* demonstrates the value of systematic taxonomic examination of survey collections and the importance of retaining voucher specimens for biodiversity research. Concordant differences in morphology and fresh coloration, together with molecular evidence, support the recognition of *C. tandstadae* as a distinct evolutionary lineage with species status. These findings also demonstrate the value of integrating morphological and molecular evidence for resolving species boundaries within groups such as *Chelidoperca*, in which external morphology is relatively conservative. The loss of many diagnostic color-pattern features after preservation further emphasizes the importance of documenting fresh coloration and retaining high-quality color photographs alongside voucher specimens in taxonomic studies of *Chelidoperca*.

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APPENDIX

Details of *Chelidoperca* sequences used in this study

(plus two outgroup sequences, originally labeled on BOLD as *Plectranthias flammeus*)

Species	BOLD Accession number	Genbank Accession number	Sample ID	Voucher number	Location	Reference
C. barazeri	GBMNB8325-20	MK988040	PNG1830	NTUM 15639	Papua New Guinea	Lee et al. 2019
C. barazeri	GBMNB8326-20	MK988041	PNG1831	NTUM 15635	Papua New Guinea	Lee et al. 2019
C. cerasina	GBMNB8320-20	MK988035	EXB123	NTUM 15633	New Caledonia	Lee et al. 2019
C. cerasina	GBMNB8323-20	MK988038	NC1115	NTUM 13737	New Caledonia	Lee et al. 2019
C. formosa	GBMNF47815-22	MW448365	HO-4851	NMMB-P34815	Taiwan	Tang & Ho 2021
C. formosa	GBMNF47816-22	MW448366	HO-48512	NMMB-P34816	Taiwan	Tang & Ho 2021
C. formosa	FOAO2364-20	n/a	BW-A15434	CSIRO uncat	Western Australia	Appleyard et al. 2025
C. hirundinacea	GBMNB8328-20	MK988043	n/a	ASIZP 0073871	Papua New Guinea	Lee et al. 2019
C. hirundinacea	GBMNB8331-20	MK988046	WJC6963	NTUM 15630	Taiwan	Lee et al. 2019
C. hirundinacea	GBMNB8333-20	MK988048	WJC7317	NTUM 14469	Japan	Lee et al. 2019
C. hirundinacea	PHILA1821-16	n/a	PHIL-184	USNM 437794	Philippines	BOLD
C. hirundinacea	SCS085-16	KY371325	n/a	BBW2195	China	BOLD
C. hirundinacea	FOAF774-07	n/a	BW-A3646	CSIRO H 6412-17	Australia	BOLD
C. investigatoris	ANGBF3862-12	JX185307	n/a	NBFGR CHN-H29	India	Williams & Carpenter 2015
C. investigatoris	ANGBF3865-12	JX185310	n/a	NBFGR CHN-R21	India	Williams & Carpenter 2015
C. investigatoris	GBGCA7765-15	KP009557	TK29	NBFGR CHN 3014	India	Bineesh et al. 2015
C. lecromi	GBMNB8335-20	MK988050	NC1449	NTUM 13739	New Caledonia	Lee et al. 2019
C. lecromi	GBMNB8336-20	MK988051	NC1450	NTUM 13739	New Caledonia	Lee et al. 2019
C. lecromi	GBMNB8338-20	MK988053	NC243	NTUM 15631	New Caledonia	Lee et al. 2019
C. leucostigmata	GBMNB8341-20	MK988056	WJC5844	NTUM 15355	Taiwan	Lee et al. 2019
C. leucostigmata	GBMNB8343-20	MK988058	WJC5910	NTUM 15634	Taiwan	Lee et al. 2019
C. leucostigmata	GBMNB8344-20	MK988059	WJC5911	NTUM 15634	Taiwan	Lee et al. 2019
C. maculicauda	ANGBF3472-12	JX262929	n/a	NBFGR CHN-K24	India	Bineesh et al. 2015
C. maculicauda	ANGBF3861-12	JX185309	n/a	NBFGR CHN-K23	India	Bineesh et al. 2015
C. maculicauda	ANGBF3866-12	JX185308	n/a	NBFGR CHN-K22	India	Bineesh et al. 2015
C. margaritifera	SCS090-16	KY371337	n/a	BBWC430	China	BOLD
C. margaritifera	SCS091-16	KY371338	n/a	GDC311	China	BOLD
C. margaritifera	SCS092-16	KY371336	n/a	GDC312	China	BOLD
C. microdon	GBMNB8345-20	MK988060	NC1451	NTUM 15636	New Caledonia	Lee et al. 2019
C. microdon	GBMNB8346-20	MK988061	NC577	MNHN 2019-0020	New Caledonia	Lee et al. 2019
C. occipitalis	ANGBF3859-12	JX185313	n/a	NBFGR CHN-3001	India	Williams & Carpenter 2015
C. occipitalis	ANGBF3860-12	JX185311	n/a	NBFGR CHN-R22	India	Williams & Carpenter 2015
C. occipitalis	ANGBF3867-12	JX185306	n/a	NBFGR CHN-F25	India	Williams & Carpenter 2015
C. occipitalis	ANGBF3868-12	JX185304	n/a	NBFGR CHN-D18	India	Williams & Carpenter 2015
C. pleurospilus	FOAG328-08	n/a	BW-A4205	CSIRO H 6570-15	Western Australia	Appleyard et al. 2025
C. pleurospilus	GBMNB8347-20	MK988062	PNG1690	n/a	Papua New Guinea	Lee et al. 2019

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Species	BOLD Accession number	Genbank Accession number	Sample ID	Voucher number	Location	Reference
C. pleurospilus	GBMNB8349-20	MK988064	PNG1691	NTUM 12347	Papua New Guinea	Lee et al. 2019
C. pleurospilus	GBMNB8353-20	MK988068	WJC6160	NTUM 15638	Taiwan	Lee et al. 2019
C. pleurospilus	FOAM716-10	n/a	BW-A10679	CSIRO uncat	Indonesia	BOLD
C. santosi	GBMNB7609-20	MK777599	n/a	DOS05069	Vietnam	Thu et al. 2019
C. santosi	PHILA2020-16	MF597710	PHIL-383	USNM 437993	Philippines	BOLD
C. santosi	PHILA2024-16	MF597709	PHIL-387	USNM 437997	Philippines	BOLD
C. santosi	PHILA2026-16	MF597708	PHIL-389	USNM 437999	Philippines	BOLD
C. stella	FOAG915-08	n/a	BW-A4792	CSIRO H 6404-09	Western Australia	Appleyard et al. 2025
C. stella	GBMNB8359-20	MK988074	NC21	NTUM 15640	New Caledonia	Lee et al. 2019
C. stella	GBMNB8362-20	MK988077	n/a	ASIZP 0067743	Philippines	Lee et al. 2019
C. stella	GBMNF47818-22	MW448364	HO-4850	NMMB-P34812.2	Taiwan	Tang & Matsunuma 2022
C. tandstadae n. sp.	EAF072-24	n/a	SPR22-908	SAIAB 246445	Tanzania	present study
C. tandstadae n. sp.	EAF116-25	n/a	460_PN	SAIAB 237151	Mozambique	present study
C. tandstadae n. sp.	EAF240-26	n/a	SPR25-477	SAIAB 213713	Madagascar	present study
C. tosaensis	GBMNB8364-20	MK988079	PNG3206	NTUM 13059	Papua New Guinea	Lee et al. 2019
C. tosaensis	GBMNB8365-20	MK988080	PNG3471	NTUM 12346	Papua New Guinea	Lee et al. 2019
C. tosaensis	GBMNB8366-20	MK988081	PNG3579	NTUM 11364	Papua New Guinea	Lee et al. 2019
C. sp. 6	GBMNB8355-20	MK988070	n/a	ASIZP 0068129	Philippines	Tang & Ho 2021
C. sp. 6	GBMNB8356-20	MK988071	n/a	ASIZP 0068247	Philippines	Tang & Ho 2021
Outgroup						
Xenanthias flammeus	ANGBF39708-19	KC565477	n/a	n/a	French Polynesia	Williams et al. 2013
Xenanthias flammeus	ANGBF39709-19	KC565478	n/a	n/a	French Polynesia	Williams et al. 2013