

Phenacoscorpius longilineatus, a New Species of Deepwater Scorpionfish from the Southwestern Pacific Ocean and the First Records of *Phenacoscorpius adenensis* from the Pacific Ocean (Teleostei: Scorpaenidae)

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A new scorpionfish, *Phenacoscorpius longilineatus* n. sp., is described on the basis of 94 specimens from New Caledonia and New Zealand in the southwestern Pacific Ocean, at depths of 345–1089 m. The new species is distinguished from its congeners by the following combination of characters: 8–18 (mode 12) pored lateral-line scales, last of which is situated from below base of seventh spine to below base of fourth dorsal-fin soft ray; no slit behind fourth gill arch; palatine teeth present; second preopercular spine always absent; nuchal and parietal spines distinct; nape and anterior body strongly arched in adults of over ca. 80 mm standard length (SL); post-nuchal-spine length 5.0–9.7% (mean 7.2%) of SL; caudal fin length 21.4–26.7% (mean 23.4%) of SL; 1–5 (mode 2) black spots on posterior half of caudal peduncle; and body usually uniformly whitish without distinct dark saddles in preserved specimens. In addition, *P. adenensis* Norman, 1939, which is similar to *P. longilineatus* morphologically, is redescribed on the basis of 3 specimens from the western Indian Ocean and 52 specimens from the southwestern Pacific. The latter represent the first records of this species outside the western Indian Ocean.

Key Words: Teleostei, Actinopterygii, morphology, redescription, comparison, distribution.

Introduction

The scorpionfish genus *Phenacoscorpius* Fowler, 1938 (Scorpaenidae) is characterized by an incomplete lateral line, with only a few pored lateral-line scales present anteriorly (Eschmeyer 1965b; Mandrytsa 1992; Poss 1999; Motomura 2008; Motomura and Last 2009). Recently, *Phenacoscorpius longirostris* Motomura and Last, 2009 was described as a new species from the Tasman Sea, and Motomura *et al.* (2012) redescribed a poorly known species, *Phenacoscorpius eschmeyeri* Parin and Mandrytsa in Mandrytsa, 1992, as a valid species on the basis of the holotype and two newly collected specimens. Including these two species, five species are currently regarded as valid in the genus.

While inspecting scorpionfish specimens deposited at the Muséum national d’Histoire naturelle in Paris (Motomura *et al.* 2011a) and the Museum of New Zealand Te Papa Tongarewa in Wellington (Motomura *et al.* 2011b), we found unidentified specimens of *Phenacoscorpius* that had been collected from the southwestern Pacific Ocean. These specimens were reported as *Phenacoscorpius* sp. 1 and *P.* sp. 2 by Motomura *et al.* (2011a), but in the present study, the first

is described as a new species and the second is identified as *Phenacoscorpius adenensis* Norman, 1939, a species that had been recorded before only from the western Indian Ocean.

Material and Methods

Measurements generally follow Motomura (2004a, b), except for head width (Motomura *et al.* 2005b, 2006a), maxillary depth (Motomura *et al.* 2006b), and body depth, second body depth, and post-nuchal-spine length (Motomura *et al.* 2012). Counts follow Motomura *et al.* (2005a–c) and Motomura and Johnson (2006), with predorsal scale row counts following Motomura *et al.* (2006b). The last two soft rays of both the dorsal and anal fins are counted as single rays, each pair being associated with a single pterygiophore. Counts of preopercular spines begin with the uppermost spine. Standard length is expressed as SL. Terminology of head spines follows Randall and Eschmeyer (2002: fig. 1) and Motomura (2004b: fig. 1) with the following additions: the spine at the base of the uppermost preopercular spine is referred to as the supplemental preopercular spine (Eschmeyer 1965a); the spine on the lateral surface of the lacrimal

bone is referred to as the lateral lacrimal spine (Motomura and Senou 2008: fig. 2; Motomura *et al.* 2011b: fig. 1); and the coronal and pretympenic spines (the latter as an extra spine) are as figured in Chen (1981: fig. 1) and Motomura *et al.* (2004: fig. 14b), respectively. Vertebrae of the new species were counted from radiographs of the holotype and three paratypes. The specimens examined in this study are deposited in the Australian Museum, Sydney, Australia (AMS); the Australian National Fish Collection at the Commonwealth Scientific and Industrial Research Organisation's Marine and Atmospheric Research laboratories in Hobart, Tasmania, Australia (CSIRO); the Kagoshima University Museum, Kagoshima, Japan (KAUM); the Muséum national d'Histoire naturelle, Paris, France (MNHN); and the Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand (NMNZ).

Phenacoscorpius longilineatus n. sp.

[New English name: Southern No-line Scorpionfish]

(Fig. 1)

Phenacoscorpius sp. 1: Motomura *et al.* 2011a: 64 (New Caledonia).

Holotype. MNHN 2010-0942, 83.7 mm SL, New Caledonia, Norfolk Ridge, 23°39'00"S, 168°01'01"E, 345 m, Aztèque cruise, Station no. 3, RV *Alis*, bottom trawl, 13 February 1990.

Paratypes. 93 specimens, 30.5–104.9 mm SL. **NEW CALEDONIA:** MNHN 2000-1471, 53.1 mm SL, 23°40'00"S, 167°45'00"E, 470 m, RV *Coriolis*, 30 October 1986; MNHN 2003-1524, 2, 70.4–88.1 mm SL, Norfolk Ridge, 23°42'00"S, 168°15'00"E, 378–402 m, RV *Alis*, 12 August 1999; MNHN 2003-1531, 2, 61.6–93.2 mm SL, 23°43'01"S, 168°16'01"E, 379–391 m, RV *Alis*, 12 August 1999; MNHN 2003-1543, 10, 30.5–66.1 mm SL, Norfolk Ridge, 24°52'08"S, 168°21'07"E, 518–540 m, RV *Alis*, 11 August 1999; MNHN 2004-2559, 102.1 mm SL, Norfolk Ridge, 23°44'10"S, 168°17'20"E, 377–401 m, RV *Alis*, 31 October 2003; MNHN 2004-2578, 87.4 mm SL, Norfolk Ridge, 23°43'08"S, 168°16'23"E, 380–389 m, RV *Alis*, 23 October 2003; MNHN 2004-2680, 16, 33.5–91.2 mm SL, Norfolk Ridge, 24°57'47"S, 168°21'07"E, 627–1089 m, RV *Alis*, 28 October 2003; MNHN 2004-2790, 5, 70.4–97.5 mm SL, Norfolk Ridge, 23°48'54"S, 168°16'01"E, 500–1074 m, RV *Alis*, 31 October 2003; MNHN 2004-2841, 91.6 mm SL, Norfolk Ridge, 23°44'06"S, 168°16'08"E, 390–398 m, RV *Alis*, 31 October 2003; MNHN 2005-2593, 3, 34.5–35.9 mm SL, 24°55'59"S, 168°21'00"E, 560 m, RV *Alis*, 7 March 1989; MNHN 2005-2659, 9, 72.0–94.7 mm SL, 23°37'59"S, 167°42'00"E, 463 m, RV *Alis*, 14 February 1990; MNHN 2005-2660, 2, 69.9–85.1 mm SL, 24°54'S, 168°21'E, 530 m, RV *Vauban*, 20 May 1987; MNHN 2010-0941, 89.5 mm SL, 23°39'00"S, 168°01'01"E, 345 m, RV *Alis*, 13 February 1990; MNHN 2011-0089, 14, 39.6–71.4 mm SL, 22°58'59"S, 168°22'01"E, 490–515 m, RV *Vauban*, 29 September 1985; MNHN 2011-0165, 49.3 mm SL, same data as MNHN 2003-1524; MNHN 2011-0166, 2, 56.0–71.6 mm SL, same data as MNHN

2005-2659; MNHN 2011-0167, 5, 45.2–58.6 mm SL, same data as MNHN 2005-2660; NMNZ P. 029073, 57.0 mm SL, Aztèque Seamount, 23°19'24"S, 168°00'20"E, 580–600 m, C. Roberts and C. Paulin, 22 October 1992; NMNZ P. 029210, 3, 43.8–66.3 mm SL, a seamount, 24°55'30"S, 168°21'27"E, 540–670 m, C. Roberts and C. Paulin, 15 October 1992; NMNZ P. 029337, 3, 69.5–74.2 mm SL, Jumeaux Seamount, 23°48'45"S, 168°17'06"E, 540–950 m, C. Roberts and C. Paulin, 21 October 1992; NMNZ P. 029350, 2, 86.9–90.2 mm SL, Jumeaux Seamount, 23°44'54"S, 168°16'45"E, 390–400 m, C. Roberts and C. Paulin, 21 October 1992; NMNZ P. 029380, 95.6 mm SL, Jumeaux Seamount, 23°42'39"S, 168°16'10"E, 390–420 m, C. Roberts and C. Paulin, 21 October 1992; KAUM-I. 48325, 104.9 mm SL, KAUM-I. 48326, 84.7 mm SL, KAUM-I. 48327, 76.1 mm SL, KAUM-I. 48328, 39.3 mm SL, Bellona Reef, Chesterfield Islands, 22°10'59"S, 159°24'00"E, 350–370 m, RV *Coriolis*, 16 July 1984; KAUM-I. 48362, 72.3 mm SL, same data as MNHN 2003-1543. **NEW ZEALAND:** NMNZ P.038308, 62.7 mm SL, Rumble 5 Submarine Volcano, North Island, 36°08'24"S, 178°11'24"E, 360–755 m, RV *Tangaroa*, 24 May 2001; NMNZ P. 039610, 70.1 mm SL, southern Norfolk Ridge, 34°37'26"S, 168°57'34"E, 521–539 m, RV *Tangaroa*, 3 June 2003.

Diagnosis. A species of Indo-Pacific *Phenacoscorpius* with the following combination of characters: 16–18 (mode 17) pectoral fin rays, middle rays branched in young and adults; 8–18 (mode 12) pored lateral-line scales, with last pored scale situated from below base of seventh spine to below base of fourth dorsal-fin soft ray; 50–52 scale rows in longitudinal series; 18–21 (mode 20) gill rakers; no slit behind fourth gill arch; palatine teeth present; second preopercular spine always absent; nuchal and parietal spines distinct; 4–6 (mode 5) suborbital spines in young and adults, 6–7 in larger adults; nape and anterior part of body strongly arched in adults of over *ca.* 80 mm SL; relatively long post-nuchal-spine length, 5.0–9.7% (mean 7.2%) of SL; relatively short caudal fin length, 21.4–26.7% (mean 23.4%) of SL; 1–5 (mode 2) black spots on posterior half of caudal peduncle; body usually uniformly whitish without distinct dark saddles in preserved specimens; largest recorded specimen 105 mm SL.

Description. Counts and measurements (as percentages of SL) of *P. longilineatus* are given in Table 1. Frequency distributions of selected meristics are presented in Table 2. In the description below (including the colour description of preserved specimens), the data and description of the holotype are presented first, followed by data for paratypes in parentheses when different.

Body moderately compressed anteriorly, progressively more compressed posteriorly. Nape and anterior part of body strongly arched (moderately arched in young and juveniles). Body moderately deep, but body depth less than head length. Uppermost ray (upper 2 rays in juveniles) and lower 9 (7–10) rays of pectoral fin unbranched, remaining rays branched (all rays of smallest paratype, 30.5 mm SL, unbranched); 10th (10th to 12th) ray longest. Third (or second) soft ray longest among dorsal fin rays. Second soft

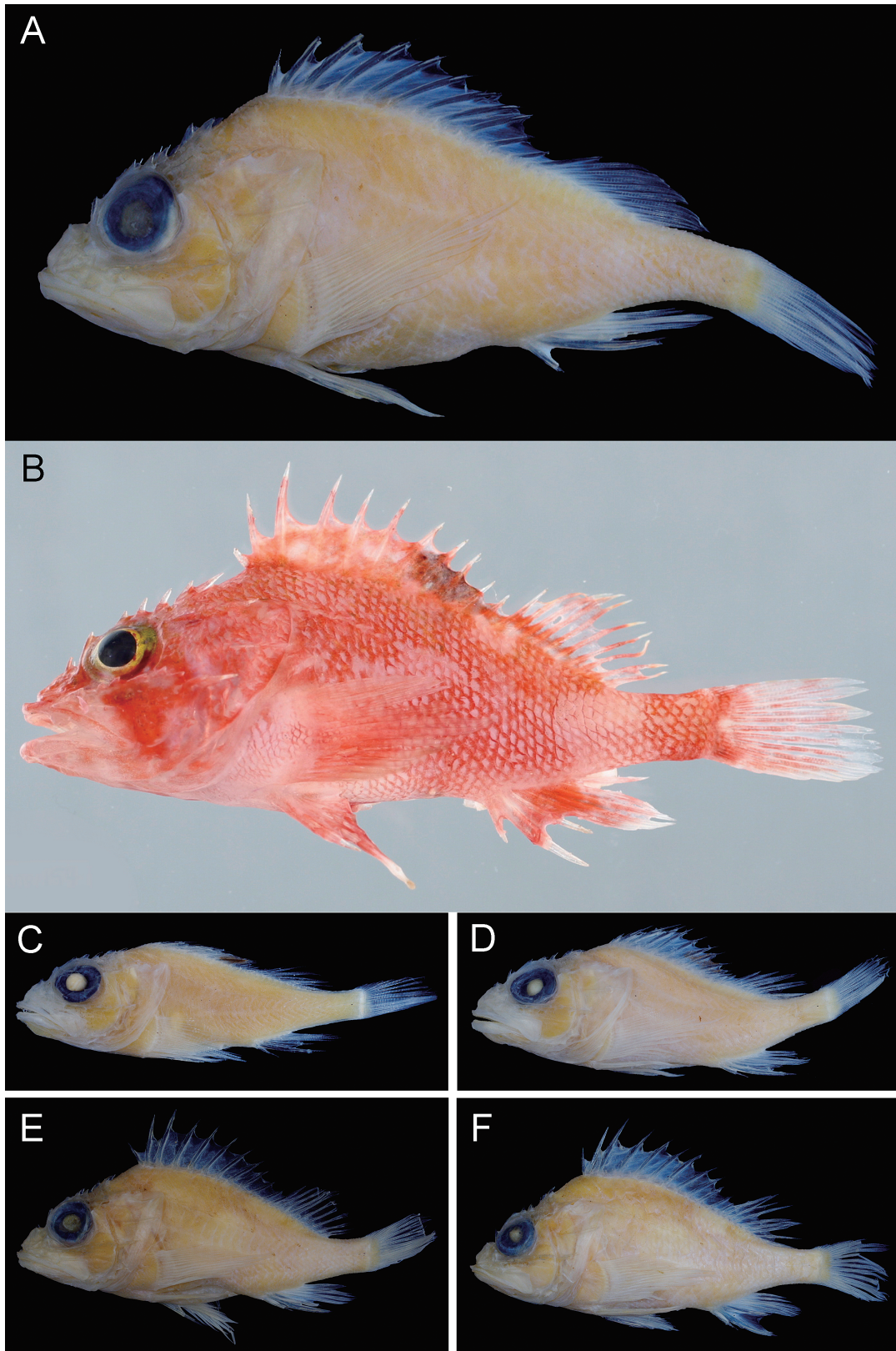


Fig. 1. *Phenacoscorpius longilineatus* n. sp. from the southwestern Pacific Ocean. A, MNHN 2010-0942, holotype, 83.7 mm SL, New Caledonia; B, NMNZ P. 039610, paratype, fresh specimen, 70.1 mm SL, New Zealand; C, NMNZ P. 029210, paratype, 43.8 mm SL, New Caledonia; D, NMNZ P. 029210, paratype, 66.3 mm SL, New Caledonia; E, NMNZ P. 029350, paratype, 86.9 mm SL, New Caledonia; F, NMNZ P. 029380, paratype, 95.6 mm SL, New Caledonia. The nape and anterior body are strongly arched in adults of over 80 mm SL, *i.e.*, A, E, F.

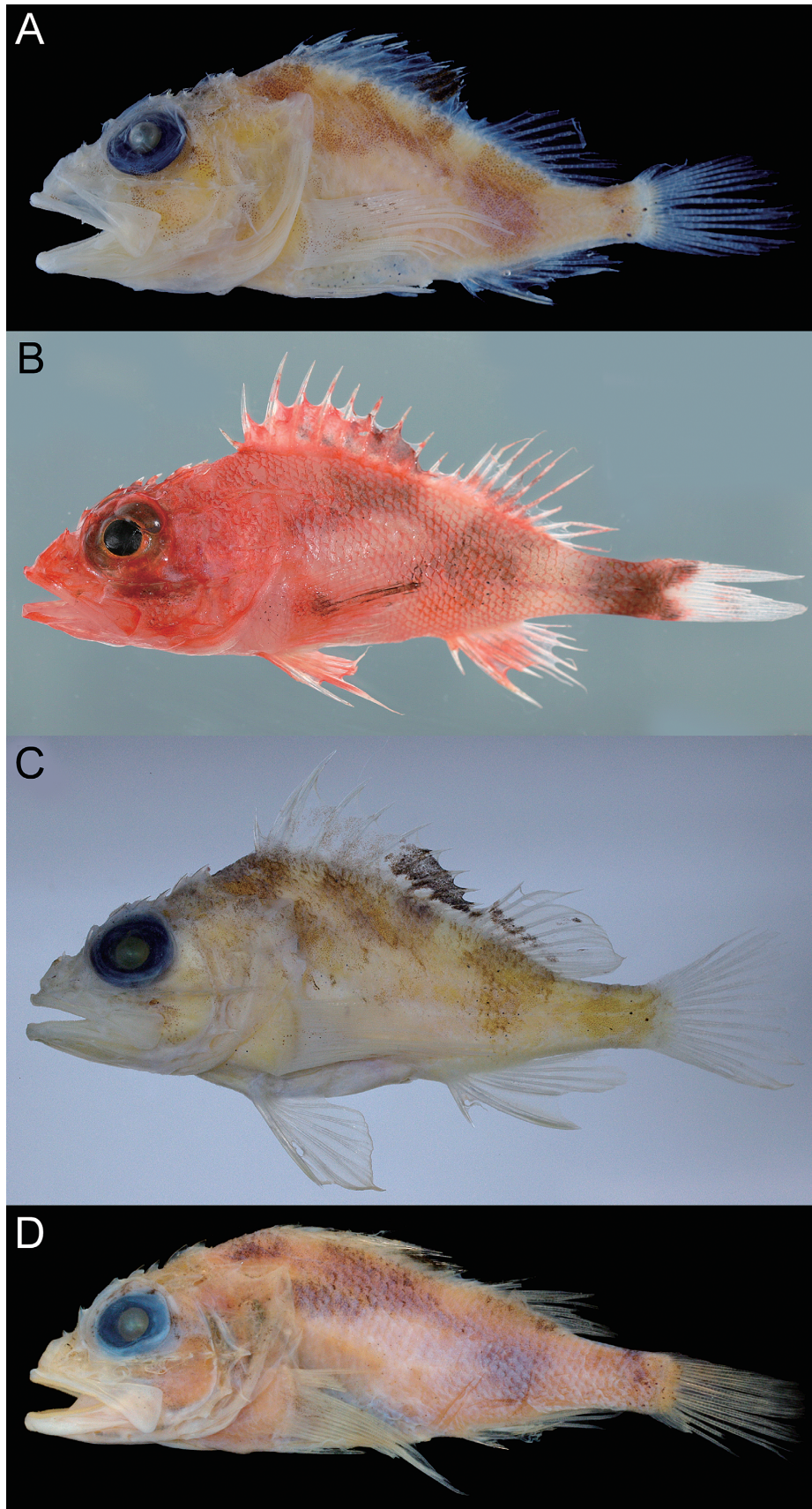


Fig. 2. *Phenacoscorpius adenensis* from the southwestern Pacific Ocean. A, MNHN 2001-2855, 34.3 mm SL, Vanuatu; B, CSIRO H 6047-01, fresh specimen, 51.7 mm SL, Australia; C, NMNZ P. 041914, 53.1 mm SL, New Zealand; D, MNHN 2010-0827, 65.0 mm SL, Vanuatu.

ray longest among pelvic and anal fin rays. Supraocular tentacle slender and short (but often absent); no other distinct tentacles on body. No distinct papillae on body. No fimbriate flap on posterior lacrimal spine. Pectoral fin axil without skin flap. Cycloid and ctenoid scales covering opercle, cheek, area surrounded by orbit, suborbital ridge, ascending ramus of preopercle, nuchal spine, and lower posttemporal spine. Ctenoid scales covering interorbital and occiput regions; other parts of head not covered with scales. Well-exposed ctenoid scales covering lateral surface of body; exposed cycloid scales on anteroventral surface of body. Exposed cycloid and ctenoid scales covering pectoral fin base. Body scales not extending onto rays or membranes of fins, except for bases of pectoral and caudal fins. Lateral line incomplete; last pored lateral-line scale situated from below base of ninth dorsal-fin spine (from below base of seventh spine to base of fourth dorsal-fin soft ray).

Mouth large, slightly oblique, forming angle of about 20 degrees to longitudinal axis of head and body. Posterior margin of maxilla extending beyond vertical drawn through posterior margin of pupil, but not reaching to vertical drawn through posterior margin of orbit. Lateral surface of maxilla smooth, without ridges, tentacles, or scales. Lower jaw with symphyseal knob. Width of symphyseal gap separating premaxillary teeth bands subequal to width of each band. Upper jaw with band of villiform teeth. Tooth band of upper jaw wider than that of lower jaw. Lower jaw with band of villiform teeth, length of most teeth equal to those of upper jaw. Vomer and palatines with villiform teeth; maximum width of vomerine tooth plate subequal to maximum length of palatine tooth plate. Underside of dentary with 3 sensory pores on each side, first pore below anterior lacrimal ridge, second pore below posterior lacrimal spine, third pore located on posterior margin of dentary. Pore behind symphyseal knob of lower jaw on each side. Underside of lower jaw smooth, without ridges or tentacles. No slit behind fourth gill arch. Swimbladder present. Vertebrae 25.

Dorsal profile of snout steep, forming angle of about 60 (50–60) degrees to longitudinal axis of head and body. Nasal spine simple, somewhat conical, directed upward. Anterior nostril with low membranous tube, latter bearing slender, short tentacle. Ascending process of premaxilla not intruding into interorbital space, its posterior margin extending slightly beyond level of posterior margin of posterior nostril. Median interorbital ridge absent. Interorbital ridges poorly developed, separated by shallow channel, beginning posterior to nasal spines and not conjoined. No distinct ridge on anterior edge of occiput. Interorbital ridges diverging anteriorly and posteriorly in dorsal view, space between them narrowest at level of anterior margin of pupil. Interorbital space shallow, only about one-tenth of orbit extending above dorsal profile of head. Preocular spine simple, directed nearly upward. Supraocular spine simple, its tip located above middle of eye. Postocular spine simple, slightly longer than tympanic spine. Tympanic spine simple; bases of tympanic spines barely joined with interorbital ridges. Coronal, interorbital, and pretympanic spines absent. Occiput nearly flat. No distinct transverse ridge at rear of occiput.

Occiput bordered laterally by tympanic and parietal spines. Nuchal and parietal spines joined to each other at bases, but still two distinct spines. Sphenotic with small spines. Pterotic spine simple. Upper posttemporal spine and ridge absent. Lower posttemporal spine simple, its base longer (often shorter) than that of pterotic spine. Supracleithral and cleithral spines flattened and rounded with pointed tips.

Lateral lacrimal spine present (but absent on left side of head in MNHN 2004-2804; absent on both sides of head in MNHN 2004-2790, 1 of 5 specimens, 71.5 mm SL). Anterior lacrimal spine indistinct, not pointed but rounded; no additional spines at anterior base of lacrimal spine. Posterior lacrimal spine simple, not strongly pointed, triangular, its tip not reaching upper jaw lip. Posterior lacrimal spine smaller than anterior spine. Suborbital ridge with 7 spines on both sides of head (4–7 spines), first spine below middle of eye. Preopercle with 4 spines, uppermost spine largest with supplemental preopercular spine on its base, second spine absent, third to fifth spines without median ridge. Preopercle without serrae or spines between uppermost preopercular spine and its own upper end. Upper opercular spine simple without median ridge. Lower opercular spine simple with distinct median ridge. Space between upper and lower opercular spines not covered with fleshy skin. Posterior tips of upper and lower opercular spines not reaching opercular margin.

Origin of first dorsal fin spine above supraclithral spine base. Posterior margin of opercular membrane extending beyond vertical drawn through origin of fourth (often third) dorsal fin spine. Posterior tip of pectoral fin reaching vertical drawn through anterior base of soft-rayed portion of dorsal fin. Posterior tip of depressed pelvic fin extending beyond anus. Origin of pelvic fin spine slightly anterior to origin of pectoral fin. Origin of first anal fin spine just below origin of last dorsal fin spine.

Colour of preserved specimens. Body uniformly white, except for black eyes and spots on caudal peduncle (rarely with 4 pale black saddles on body; first above opercle, second below posterior part of spinous portion of dorsal fin, third below soft-rayed portion of dorsal fin, and fourth on caudal peduncle). Three tiny black spots (1–5 spots) on posterior half of caudal peduncle. Pale black blotch (usually distinct but absent in presumed females) on spinous portion of dorsal fin between seventh and eleventh spines.

Colour when fresh. Colour of holotype unknown. In one paratype, body and fins pale red, mottled with poorly defined white or pinkish blotches (based on colour photograph of NMNZ P. 039610, paratype, 70.1 mm SL: Fig. 1B).

Distribution. This species is known from the southwestern Pacific Ocean where it ranges from New Caledonia south to northern New Zealand. The type series was collected in depths of 345–1089 m. The Muséum national d'Histoire naturelle in Paris holds an enormous collection of deepwater trawled fishes, including scorpionfishes, from the Pacific Ocean, which we have examined (Motomura *et al.* 2011a), but no specimens of *P. longilineatus* were collected in surveys in the Philippines (surveyed in 1976, 1980, 1985), Indonesia (1991), the Marquesas Islands (1997, 2002), the

Solomon Islands (2000, 2004), Taiwan (2000, 2001), French Polynesia (2002, 2009), and the Austral Islands (2002). This indicates that the species is restricted to the southwestern Pacific Ocean.

Etymology. The specific name *longilineatus* is derived from Latin meaning “long line”, in reference to the long lateral line of the new species associated with the greatest number of pored lateral-line scales in the genus.

Remarks. *Phenacoscorpius longilineatus* can be distinguished easily from all of its congeners, including the Atlantic species *Phenacoscorpius nebris* Eschmeyer, 1965, by having a higher number of pored lateral-line scales [8–18 (mode 12)], the last pored scale being located from below the seventh spine base to below the fourth dorsal-fin soft ray base [*vs* 2–8 (mode 3), with the last located from below the second to fifth dorsal-fin spine base; Mandrytsa 1992; Motomura 2008; Motomura and Last 2009; Motomura *et al.* 2012]. In the Indo-Pacific, *P. longilineatus* further differs from *P. megalops* Fowler, 1938 and *P. longirostris* Motomura and Last, 2009 by having teeth on the palatines (*vs* no such teeth in the latter two species; Motomura 2008; Motomura and Last 2009) and from *P. eschmeyeri* in having the nuchal and parietal spines distinct (*vs* fused to each other to form a single large spine; Motomura *et al.* 2012).

Phenacoscorpius longilineatus is most similar to *P. adenensis*, co-occurring in the southwestern Pacific Ocean. In addition to the number of pored lateral-line scales, *P. longilineatus* differs from *P. adenensis* in having a lower number of black spots on the posterior half of the caudal peduncle [1–5 (mode 2) *vs* 5–37 (8) in the latter: Table 2], a relatively longer post-nuchal-spine length [5.0–9.7% (mean 7.2%) of SL *vs* 3.2–9.5% (mean 5.7%): Table 1], a relatively shorter caudal fin length [21.4–26.7% (mean 23.4%) of SL *vs* 23.4–30.7% (mean 26.7%): Table 1], the body usually uniformly whitish without distinct dark saddles in preserved specimens (Fig. 1A, C–F) *vs* usually with four dark saddles (Fig. 2A–D), and the nape and anterior body strongly arched in adults of over *ca.* 80 mm SL (Fig. 1A, E, F) *vs* not strongly arched throughout life (Fig. 2A–D).

Phenacoscorpius longilineatus has a black blotch on the posterior part of the spinous portion of the dorsal fin only in presumed males whereas *P. adenensis* has the blotch in both sexes (variation of blotch size and shape in *P. adenensis* is discussed below).

Phenacoscorpius longilineatus grows larger than *P. adenensis* (largest recorded size, 104.9 mm *vs* 79.6 mm SL). Although the number of the suborbital spines in both species is modally five, larger specimens of *P. longilineatus* tends to have more spines; three specimens with seven spines on both sides of the head, or asymmetrically six and seven spines, were of more than 90 mm SL (Tables 1–2).

Phenacoscorpius adenensis Norman, 1939
[New English name: Toothed No-line Scorpionfish]
(Fig. 2)

Phenacoscorpius adenensis Norman, 1939: 94, fig. 29 (type locality: Gulf of Aden, Somalia, northwestern Indian

Ocean); Smith 1957: 69 (Gulf of Aden); Eschmeyer 1986: 470, fig. 149.17 (off Buffalo River, South Africa); Mandrytsa 1992: 13 (Socotra Island, Yemen; Walters Shoal, southern Madagascar); Motomura *et al.* 2011a: 64 (Gulf of Aden; northwestern Madagascar).

Phenacoscorpius sp. 2: Motomura *et al.* 2011a: 64 (New Caledonia; Vanuatu).

Holotype. BMNH 1939.5.24.1545, 79.4 mm SL, Gulf of Aden, Somalia, 274–366 m, John Murray Expedition 1933–34.

Other material examined. 54 specimens, 17.8–66.2 mm SL. **SOUTH AFRICA:** SAIAB 10592, 58.9 mm SL, off Mbashe Point, South Africa, 32°16'12"S, 29°07'26"E, 25 June 1979. **MADAGASCAR:** MNHN 1988-1522, 66.2 mm SL, 12°46'05"S, 48°10'05"E, 495–500 m, RV *Vauban*, 15 September 1972. **AUSTRALIA:** AMS I. 34465-001, 32.7 mm SL, off entrance to Curalo Lagoon, Twofold Bay, New South Wales, 37°03'12"S, 149°55'24"E, 200 m, J. Lowry and S. Keable, 26 November, 1988; CSIRO H 630-22, 2, 40.9–43.4 mm SL, south of Saumarez Reef, Queensland, 22°36'S, 153°50'E, 350 m, FRV *Soela*, 17 November 1985; CSIRO H 4453-11, 2, 24.8–27.6 mm SL, east of Bermagui, New South Wales, 36°30'S, 150°18'E, 214–225 m, FRV *Southern Surveyor*, 1 December 1996; CSIRO H 4456-01, 38.6 mm SL, south of Gabo Island, Victoria, 37°52'S, 150°02'E, 213 m, FRV *Southern Surveyor*, 27 November 1996; CSIRO H 4456-02, 3, 30.6–40.5 mm SL, same data as CSIRO H 4456-01; CSIRO H 5329-03, 2, 20.0–23.4 mm SL, south-southeast of Cape Everard, Victoria, 38°10'S, 149°41'E, 259–262 m, FRV *Southern Surveyor*, 23 April 2000; CSIRO H 5331-04, 36.2 mm SL, south of Cape Everard, Victoria, 359 m, FRV *Southern Surveyor*, 22 April 2000; CSIRO H 6047-01, 51.7 mm SL, Lord Howe Rise, 34°07'58"S, 162°24'25"E, 700 m, RV *Tangaroa*, 26 May 2003; CSIRO H 6779-01, 3, 28.3–40.8 mm SL, south of Gabo Island, Victoria, 37°45'S, 150°00'E, 108–109 m, FRV *Southern Surveyor*, 12 December 1996. **NEW CALEDONIA:** MNHN 2004-1626, 35.1 mm SL, Lifou Island, Loyalty Islands, 20°41'10"S, 167°07'44"E, 380 m, RV *Alis*, 15 February 1989. **VANUATU:** MNHN 1998-0034, 52.9 mm SL, 15°01'01"S, 166°55'59"E, 532–599 m, RV *Alis*, 9 October 1994; MNHN 1998-0054, 53.8 mm SL, 16°39'00"S, 168°01'59"E, 469–525 m, RV *Alis*, 1 October 1994; MNHN 1998-0081, 26.6 mm SL, 17°46'59"S, 168°48'00"E, 321 m, RV *Alis*, 28 September 1994; MNHN 2001-2855, 34.3 mm SL, 17°52'01"S, 168°25'01"E, 300–301 m, RV *Alis*, 27 September 1994; MNHN 2008-1539, 56.2 mm SL, 15°42'14"S, 167°02'38"E, 441 m, RV *Alis*, 17 October 2006; MNHN 2010-0827, 2, 59.3–65.0 mm SL, 15°44'17"S, 167°03'00"E, 603–736 m, RV *Alis*, 7 October 2006. **FIJI:** MNHN 2000-5678, 52.1 mm SL, 19°03'S, 178°29'W, 680–723 m, RV *Alis*, 10 May 1999. **NEW ZEALAND:** NMNZ P. 007797, 9, 24.0–43.3 mm SL, *ca.* 17 km east of Mayor Island, Bay of Plenty, North Island, 37°20'36"S, 176°28'33"E, 482–550 m, RV *Tangaroa*, 22 January 1979; NMNZ P. 007832, 2, 39.8–44.3 mm SL, 19 km east-southeast of Mayor Island, Bay of Plenty, North Island, 37°21'18"S, 176°28'51"E, 388–448 m, RV *Tangaroa*, 22 January 1979; NMNZ P. 007840, 52.5 mm

Table 1. Counts and measurements of *Phenacoscorpius longilineatus* n. sp. and *P. adenensis*. Modes for meristics and means for morphometrics are in parentheses.

	<i>Phenacoscorpius longilineatus</i> n. sp.		<i>Phenacoscorpius adenensis</i>	
	Holotype New Caledonia MNHN 2010-0942	Paratypes Southwestern Pacific n=93	Holotype Somalia BMNH 1939.5.24.1545	Non-types Indo-West Pacific n=54
Standard length (SL, mm)	83.7	30.5–104.9	79.4	17.8–66.2
Dorsal fin rays	XII, 9	XII, 8–9 (9)	XII, 9	XII, 8–10 (9)
Pectoral fin rays ¹	17, 17	16–18 (17)	17/17	16–18 (17)
Pelvic fin rays	I, 5	I, 5	I, 5	I, 5
Anal fin rays	III, 5	III, 5	III, 5	III, 5
Scale rows in longitudinal series ²	50	50–52 (50)	51	—
Pored lateral-line scales ¹	9, 10	8–18 (12)	5, 5	2–8 (3)
Scale rows above lateral line	5	5–6 (5)	6	5–6 (6)
Predorsal scale rows	9	8–12 (9)	11	8–11 (9)
Gill rakers	20	18–21 (20)	19	17–21 (19)
Suborbital spines ¹	7, 7	4–7 (5)	5, 5	5–7 (5)
% of SL				
Body depth	38.4	32.2–39.0 (36.2)	41.6	31.4–41.6 (35.2)
2nd body depth	25.3	20.7–27.3 (24.3)	—	21.9–26.1 (24.3)
Body width	21.0	11.6–23.2 (18.8)	22.7	12.5–22.7 (17.0)
Head length	44.8	40.8–46.8 (44.1)	46.1	41.0–46.1 (43.6)
Snout length	11.8	9.3–12.5 (10.9)	11.7	9.4–12.0 (10.6)
Orbit diameter	14.1	13.5–16.5 (15.0)	14.4	13.7–15.6 (14.4)
Interorbital width ³	6.0	4.7–6.5 (5.6)	5.9	4.6–6.7 (5.6)
Interorbital width ⁴	5.1	4.1–5.9 (4.9)	4.7	4.1–6.1 (4.9)
Head width	15.9	13.6–17.1 (15.6)	16.4	13.3–16.6 (14.6)
Upper-jaw length	22.8	20.2–23.5 (21.8)	21.8	19.4–22.6 (20.9)
Maxillary depth	7.5	6.0–8.1 (6.7)	7.7	5.9–7.7 (6.4)
Post-nuchal-spine length	7.5	5.0–9.7 (7.2)	—	3.2–9.5 (5.7)
Between tips of opercular spines	5.3	4.9–8.3 (6.4)	6.0	5.7–6.9 (6.1)
Postorbital length	21.6	17.7–22.9 (20.0)	23.0	18.2–23.0 (19.6)
Pre-dorsal-fin length	41.9	36.3–45.2 (41.5)	41.3	36.6–43.1 (40.1)
Pre-anal-fin length	69.7	64.4–73.5 (68.7)	75.9	64.7–75.9 (68.5)
Pre-pelvic-fin length	36.3	34.1–41.0 (37.3)	46.7	35.8–46.7 (38.4)
1st dorsal-fin spine length	7.2	5.9–9.2 (7.7)	3.8	3.8–8.7 (7.0)
2nd dorsal-fin spine length	—	11.1–16.1 (13.6)	13.4	10.8–15.7 (13.3)
3rd dorsal-fin spine length	—	16.5–20.6 (18.5)	18.4	16.3–20.7 (18.9)
4th dorsal-fin spine length	—	14.7–19.5 (16.8)	16.4	16.0–17.7 (17.1)
5th dorsal-fin spine length	14.9	13.5–17.5 (15.5)	—	13.1–17.1 (15.1)
11th dorsal-fin spine length	6.6	5.4–8.0 (6.9)	7.7	5.8–8.1 (6.9)
12th dorsal-fin spine length	11.7	10.3–13.4 (12.1)	10.8	10.7–12.6 (11.8)
Longest dorsal fin soft ray length	17.2	15.7–20.3 (18.3)	—	15.7–19.9 (17.8)
1st anal-fin spine length	—	7.0–11.4 (9.3)	10.3	7.4–10.3 (8.5)
2nd anal-fin spine length	20.3	18.6–23.7 (20.7)	19.3	16.1–23.4 (19.9)
3rd anal-fin spine length	16.1	14.0–17.7 (15.5)	14.5	13.6–17.0 (15.1)
Longest anal fin soft ray length	20.5	18.9–23.8 (20.8)	—	19.0–23.2 (20.9)
Pectoral fin length	35.1	27.5–36.6 (32.1)	31.0	28.9–37.5 (31.7)
Pelvic fin spine length	17.8	16.3–19.9 (18.3)	17.5	13.5–20.5 (17.1)
Longest pelvic fin soft ray length	25.2	23.6–28.7 (25.4)	24.7	24.2–28.8 (26.2)
Caudal fin length	22.6	21.4–26.7 (23.4)	—	23.4–30.7 (26.7)
Caudal peduncle length	20.3	18.3–25.4 (21.2)	18.4	18.2–23.7 (21.1)
Caudal peduncle depth	9.0	7.7–10.3 (8.6)	9.2	7.7–9.8 (8.9)

¹ Counted on both sides of body; ² based on 4 paratypes of *P. longilineatus* (most body scales of other paratypes of *P. longilineatus* and all non-types of *P. adenensis* were lost in the trawl); ³ at vertical midline of eye; ⁴ at posterior end of preocular spine base.

Table 2. Frequency distribution of selected meristic characters in *Phenacoscorpius longilineatus* n. sp. and *P. adenensis*.

	Pectoral fin rays (one side/other side)							2nd preopercular spine (one side/other side)				Suborbital spines (one side/other side)										
	16/16	16/17	17/17	17/18	18/18	present/present	present/absent	absent/absent	4/5	5/5	5/6	6/6	6/7	7/7								
<i>P. longilineatus</i> n. sp.	9	9	73	1	1			94	1	50	23	32	2	2								
<i>P. adenensis</i>	6	7	31	4	2	13	10	27	1	34	12	1	2									
Pored lateral-line scales ¹																						
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
<i>P. longilineatus</i> n. sp.							1	7	26	20	27	20	2	1	1	1	1					
<i>P. adenensis</i>	20	36	20	16	5	1	1															
Total gill rakers																						
	Gill rakers on upper limb							Gill rakers on hypobranchial							Total gill rakers							
	5	6	7	/	9	8	9	10	11	2	3	4	5	17	18	19	20	21				
<i>P. longilineatus</i> n. sp.	9	81	4		1	5	84	4		26	66	2		6	25	58	5					
<i>P. adenensis</i>	10	39	2	1		10	37	5	3	31	16	2		2	9	25	12	4				
Black spots on posterior half of caudal peduncle																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	20	22	24	30	37
<i>P. longilineatus</i> n. sp.	17	29	27	14	6																	
<i>P. adenensis</i>				3	6	6	6	10	3	3	2	2	2	2	1	1	1	1	1	1	1	1

¹ Counted on both sides of body; ² except for rakers on hypobranchial.

SL, same data as NMNZ P. 7832; NMNZ P. 007882, 29.1 mm SL, 28 km north of Motuhora Island, Bay of Plenty, North Island, 37°36'45"S, 176°59'39"E, 139–179 m, RV *Tangaroa*, 20 January 1979; NMNZ P. 034493, 2, 17.8–27.3 mm SL, ca. 14 km northeast of Cavalli Island, North Island, 34°46'00"S, 174°05'48"E, 492 m, New Zealand Oceanographic Institute, 10 November 1977; NMNZ P. 038314, 38.3 mm SL, Rumble 3 Submarine Volcano, outer Bay of Plenty, North Island, 35°44'09"S, 178°29'45"E, 202–365 m, RV *Tangaroa*, 23 May 2001; NMNZ P. 039615, 2, 21.1–24.2 mm SL, southern Norfolk Ridge, 34°37'26"S, 168°57'34"E, 521–539 m, RV *Tangaroa*, 3 June 2003; NMNZ P. 041324, 44.8 mm SL, Bay of Plenty, North Island, 37°27'47"S, 176°54'50"E, 247–294 m, RV *Tangaroa*, 16 November 2004; NMNZ P. 041853, 54.1 mm SL, southeast of Colville Ridge, Bay of Plenty, North Island, 37°21'17"S, 177°06'05"E, 259–294 m, RV *Tangaroa*, 14 November 2004; NMNZ P. 041854, 48.1 mm SL, same data as NMNZ P. 041853; NMNZ P. 041855, 32.4 mm SL, southeast of Colville Ridge, Bay of Plenty, North Island, 37°28'26"S, 176°54'35"E, 248–256 m, RV *Tangaroa*, 15 November 2004; NMNZ P. 041857, 30.4 mm SL, Bay of Plenty, North Island, 37°28'04"S, 176°54'53"E, 210–225 m, RV *Tangaroa*, 15 November 2004; NMNZ P. 041914, 53.1 mm SL, east of Colville Ridge, Bay of Plenty, North Island, 37°28'55"S, 177°12'29"E, 259 m, RV *Tangaroa*, 11 November 2004; NMNZ P. 041928, 36.7 mm SL, southeast of Colville Ridge, Bay of Plenty, North Island, 37°18'50"S, 177°04'29"E, 466–495 m, RV *Tangaroa*, 14 November 2004; NMNZ P. 048204, 33.6 mm SL, southern Norfolk Ridge, 34°37'26"S, 168°57'34"E, 521–539 m, RV *Tangaroa*, 3 June 2003.

Diagnosis. A species of Indo-Pacific *Phenacoscorpius* with the following combination of characters: 16–18 (mode 17) pectoral fin rays, middle rays branched in young and adults; 2–8 (mode 3) pored lateral-line scales, last pored scale situated from below second to fifth dorsal-fin spine base; about 50 scale rows in longitudinal series; 17–21 (mode 19) gill rakers; palatine teeth present; nuchal and parietal spines distinct; 3–5 (mode 5) suborbital spines; nape and anterior part of body moderately arched throughout life; relatively short post-nuchal-spine length, 3.2–9.5% (mean 5.7%) of SL; relatively long caudal fin length, 23.4–30.7% (mean 26.7%) of SL; 5–37 (mode 8) black spots on posterior half of caudal peduncle; 4 distinct saddles on body in preserved specimens; largest recorded specimen 79 mm SL.

Distribution. This species has previously been recorded from the western Indian Ocean: the Gulf of Aden, Somalia (Norman 1939; Smith 1957); Socotra Island, Yemen (Mandrytsa 1992); off Buffalo River, South Africa (Eschmeyer 1986); Walters Shoal, southern Madagascar (Mandrytsa 1992); and northwestern Madagascar (Motomura *et al.* 2011a). An additional Indian Ocean specimen (SAIAB 10592, 58.9 mm SL, off Mbashe Point, South Africa) was recorded in this study. Fifty-two specimens examined in this study were collected from the southwestern Pacific Ocean: Australia (from Queensland to Victoria, including the Lord Howe Rise), New Caledonia (Loyalty Islands), Vanuatu, Fiji, and northern New Zealand (including the Norfolk Ridge

and North Island). They represent the first records of *P. adenensis* from outside the Indian Ocean. The southwestern Pacific Ocean specimens were collected in depths of 139–736 m.

Remarks. The southwestern Pacific specimens are here identified as *P. adenensis*, a species previously known only from the western Indian Ocean. However, they differ from Indian Ocean specimens in lacking a slit behind the fourth gill arch, but no other differences between the two populations were found during this study. Because the available western Indian Ocean specimens of *P. adenensis*, including the holotype, were in very poor condition, and all the southwestern Pacific specimens were damaged during capture in deepwater trawls (*e.g.*, the number of scale rows in longitudinal series could not be counted in any specimen), more detailed comparisons between these populations, based on specimens in good condition, are required to elucidate their taxonomic status.

The second preopercular spine is usually absent on both sides of the head in *P. adenensis*. About 26% and 20% of specimens, however, have the second spine on both sides or on only one side of the head, respectively (Table 2). When present it is reduced, being shorter than the third spine. This condition is also found in *P. megalops* (see Motomura and Last 2009), but has not been known from any other Indo-Pacific congener: *P. eschmeyeri* and *P. longilineatus* always lack the second preopercular spines on both sides of the head (Motomura 2008; Motomura *et al.* 2012; this study) whereas *P. longirostris* always has them (Motomura and Last 2009).

The black blotch on the spinous portion of dorsal fin is rounded in most specimens of *P. adenensis*, its size being less than the orbit diameter (Fig. 2A, D). A few specimens, though, have an elongate blotch that is wider than the orbit diameter, as well as a narrow black band on the basal soft-rayed portion of the dorsal fin (Fig. 2C). These differences may be secondary sexual characteristics, but additional specimens and histological study of the gonads are required to confirm this.

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