

Sebastapistes perplexa, a New Species of Scorpionfish (Teleostei: Scorpaenidae) from Japan

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A new scorpionfish, *Sebastapistes perplexa*, is described on the basis of 43 specimens from the Pacific coast of Japan, where it ranges from the Boso Peninsula to Shikoku, including the Izu Islands, in depths of 2–48 m. The new species is characterized by having 12–15 (mode 14) pectoral-fin rays; 33–42 (37) scale rows in longitudinal series; 4 or 5 (5) scale rows above the lateral line, 9–13 (10) scale rows below the lateral line; 3 or 4 (4) scale rows between the sixth dorsal-fin spine base and the lateral line; 3–5 (4) scale rows between the last dorsal-fin spine base and the lateral line; 2–4 (3) predorsal scale rows; 11–17 (15) gill rakers; palatine teeth present; ctenoid body scales; simple anterior and posterior lacrimal spines; no lateral lacrimal spine or ridge; the first and second suborbital ridges fused to form a single ridge with one suborbital spine at its end; a median ridge on lower opercular spine; the opercular spines not covered by scales; and a dark blotch usually visible on the subopercle and pectoral-fin base (distinct in preserved specimens). *Sebastapistes perplexa* appears to be restricted to temperate waters whereas its congeners are primarily tropical and subtropical species. The new species is compared in detail to two congeneric species that share some diagnostic features with it, and to the sympatric *S. strongia* (Cuvier in Cuvier and Valenciennes, 1829).

Key Words: Actinopterygii, morphology, *Sebastapistes strongia*, *Sebastapistes ballieui*, *Sebastapistes mauritiana*.

Introduction

The Indo-Pacific scorpionfish genus *Sebastapistes* Gill in Streets, 1877 is characterized by having 12 dorsal-fin spines, teeth on the palatines, the posterior lacrimal spine directed posteroventrally, and pored lateral-line scales continuing onto the caudal-fin base, and by the lack of a deep occipital pit (Poss 1999; Motomura 2009). Some species of the deep-water scorpionfish genus *Neomerinthe* Fowler, 1935 share these characters with *Sebastapistes*, but can be distinguished from the latter by the head squamation and spines, some meristics, and habitat depths. The species of *Sebastapistes* are usually distributed in shallow coastal waters of the tropics (Motomura *et al.* 2006b), but one species, *Sebastapistes strongia* (Cuvier in Cuvier and Valenciennes, 1829), extends to inshore waters of temperate regions (Nakabo 2002).

During revisionary studies of the genus *Sebastapistes*, unidentified specimens of this genus from shallow temperate waters off the Pacific coast of Japan were found in fish collections of Japanese museums, and additional specimens were collected from the Boso Peninsula, which forms the eastern edge of Tokyo Bay. These specimens are described herein in detail as a new species endemic to Japanese temperate waters. *Sebastapistes strongia*, a primarily tropical and subtropical species, co-occurs with the new species at similar habitats and depths in temperate Japanese waters, but

S. strongia is clearly distinguished from the new species in several aspects, including coloration, head spine structure, and meristics. In this paper, the new species is compared with the other nominal species of *Sebastapistes*, including *S. strongia*.

Materials 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 (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 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 1965); 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 pretemporal spines (the latter

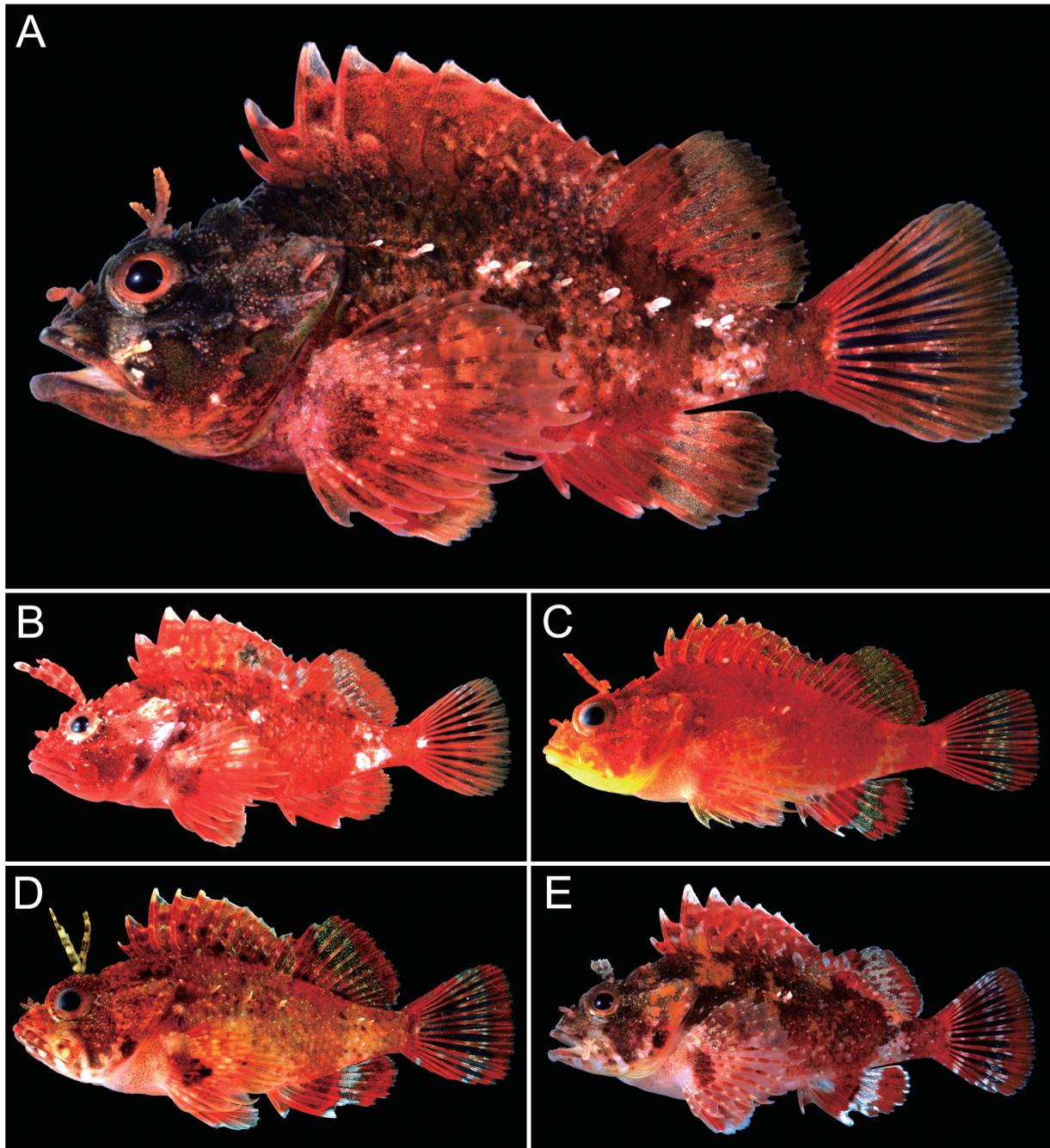


Fig. 1. Color photographs of *Sebastapistes perplexa*, showing variations of fresh coloration and supraocular tentacle lengths, and sexual dichromatism. A, CMNH-ZF 15719, female holotype, 48.8 mm SL; B, KAUM-I. 65652, male paratype, 38.2 mm SL; C, KAUM-I. 20724, male paratype, 35.4 mm SL; D, KAUM-I. 20716, female paratype, 33.1 mm SL; E, CMNH-ZF 15718, female paratype, 46.6 mm SL.

as an extra spine) are as figured in Chen (1981: fig. 1) and Motomura *et al.* (2004: fig. 14b) respectively. The specimens examined in this study are deposited in the Laboratory of Marine Biology, Faculty of Science, Kochi University, Kochi (BSKU); Coastal Branch of Natural History Museum and Institute, Chiba, Katsuura (CMNH); Kyoto University Museum, Kyoto (FAKU); Kagoshima University Museum, Kagoshima (KAUM); Kanagawa Prefectural Museum of Natural History, Odawara (KPM); Muséum National d'Histoire Naturelle, Paris (MNHN); National Museum of Nature and Science, Tsukuba (NSMT); Museum Support Center, Smithsonian Institution National Museum of Natural History,

Suitland (USNM); and Yokosuka City Museum, Yokosuka (YCM). Underwater photographs of the new species referred to in this study are registered at the Image Database of Fishes in KPM (KPM-NR) and the color description of live individuals is based on the KPM-NR photographs. Comparative material of *Sebastapistes* was listed in Motomura (2009), Motomura and Senou (2009), and Motomura *et al.* (2011a). Type specimens of nominal species mentioned in this paper are as follows: MNHN 6883, 2 syntypes of *Scorpaena ballieui* Sauvage *in* Vaillant and Sauvage, 1875, 31.9–85.7 mm SL, Hawaii; MNHN 8993, syntype of *S. ballieui*, 79.2 mm SL, Hawaii; MNHN 9557, 2 syntypes of *S.*

ballieui, 63.1–74.2 mm SL, Hawaii; USNM 50691, holotype of *Sebastapistes corallicola* Jenkins, 1903, 85.9 mm SL, Honolulu, Oahu Island, Hawaii; MNHN 5711, holotype of *Scorpaena mauritiana* Cuvier in Cuvier and Valenciennes, 1829, 61.8 mm SL, Mauritius; MNHN 4069, holotype of *Scorpaena megastoma* Sauvage, 1878, 65.9 mm SL, Réunion; FAKU 6083, holotype of *Scorpaena hatizyoensis* Matsubara, 1943, 62.9 mm SL, Hachijo Island, Izu Islands, Japan.

***Sebastapistes perplexa* n. sp.**

[New standard Japanese name: Akamadara-fusakasago]

[New English name: Temperate Scorpionfish]

(Figs 1–2)

Holotype. CMNH-ZF 15719, female, 48.8 mm SL, Hirane off Hasama, Tateyama, Chiba Prefecture, Japan, 34°58'42"N, 139°47'33"E, 15 m, M. Aizawa, hand net, 28 July 2006.

Paratypes. 42 specimens, 19.6–50.7 mm SL, all from Pacific coast of Japan. **BOSO PENINSULA:** CMNH-ZF 7049, female, 40.2 mm SL, Hatto-ne off Isomura, Kamogawa, 35°05'20"N, 140°07'15"E, 22 m, H. Tachikawa, hand net, 1 October, 2003; CMNH-ZF 7050, female, 30.4 mm SL, Isomuradashi off Ubara, Katsuura, 35°07'00"N, 140°16'58"E, 20 m, M. Aizawa, hand net, 3 October 2003; CMNH-ZF 7620, female, 30.4 mm SL, CMNH-ZF 7621, female, 50.7 mm SL, Mankurou off Ishomura, Kamogawa, 35°05'22"N, 140°07'17"E, 15 m, M. Aizawa, hand net, 5 March 2004; CMNH-ZF 12096, female, 38.2 mm SL, CMNH-ZF 12097, female, 42.8 mm SL, Igaijima off Ishomura, Kamogawa, 35°05'18"N, 140°07'13"E, 15 m, M. Aizawa, hand net, 4 December 2004; CMNH-ZF 15717, female, 49.4 mm SL, CMNH-ZF 15718, female, 46.6 mm SL, collected with holotype; KAUM-I. 17390, female, 30.1 mm SL, KAUM-I. 17595, male, 30.8 mm SL, Takane off Hasama, Tateyama, 34°58'38"N, 139°47'19"E, 20 m, M. Aizawa, hand net, 10 December 2008; KAUM-I. 20716, female, 33.1 mm SL, Hirane off Hasama, Tateyama, 34°58'42"N, 139°47'33"E, 15 m, M. Aizawa, hand net, 2 December 2008; KAUM-I. 20724, male, 35.4 mm SL, Takane off Hasama, Tateyama, 34°58'38"N, 139°47'19"E, 20 m, M. Aizawa, hand net, 2 December 2008; KAUM-I. 24764, female, 48.3 mm SL, off Field Science Center of Tateyama Station (Tokyo University of Marine Science and Technology), Sakata, Tateyama, 34°58'37"N, 139°46'10"E, 7 m, M. Watai, hand net, 17 June 2009; KAUM-I. 24765, female, 43.1 mm SL, KAUM-I. 24766, female, 42.2 mm SL, off Field Science Center of Tateyama Station (Tokyo University of Marine Science and Technology), Sakata, Tateyama, 34°58'37"N, 139°46'10"E, 7 m, M. Watai, hand net, 18 June 2009; KAUM-I. 25864, female, 34.7 mm SL, off Field Science Center of Tateyama Station (Tokyo University of Marine Science and Technology), Sakata, Tateyama, 34°58'37"N, 139°46'10"E, 7 m, M. Watai, hand net, 10 November 2009; KAUM-I. 65652, male, 38.2 mm SL, Takane off Hasama, Tateyama, 34°58'38"N, 139°47'19"E, 20 m, M. Aizawa, hand net, 25 September 2007; KPM-NI 22993, female, 35.8 mm SL, Banda, Tateyama Bay, 7 m, A. Murase, hand net, 9 September 2007;

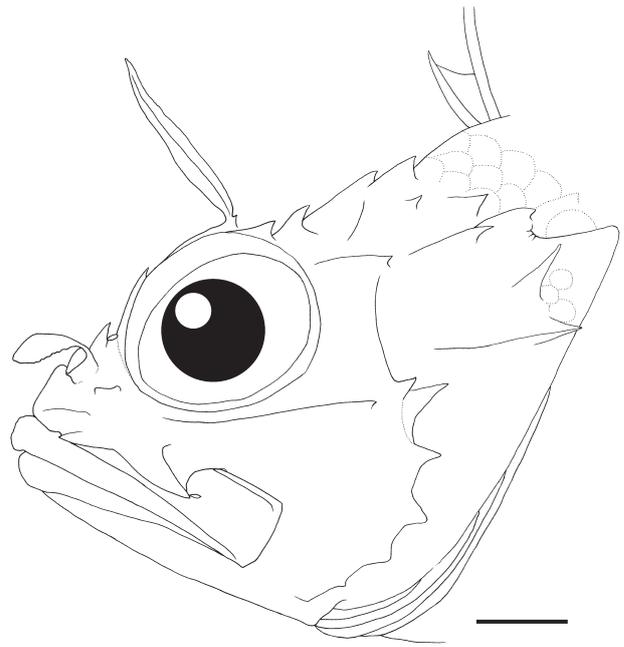


Fig. 2. Lateral view of head of *Sebastapistes perplexa*. KAUM-I. 17595, male paratype, 30.8 mm SL. Numerous small papillae and sensory pores on head not illustrated. Scale bar: 2 mm.

NSMT-P 18962, male, 23.8 mm SL, southwest off Kamogawa, 34°58'N, 140°01'E, 48 m, 13 November 1973; NSMT-P 57904, 3 females, 42.1–49.2 mm SL, Kominato, Awa, 3 July 1973; NSMT-P 72660, female, 48.6 mm SL, off Kominato, Kamogawa, 25 June 1981; YCM-P 42102, female, 34.2 mm SL, Hirane off Hasama, Tateyama, 34°58'42"N, 139°47'33"E, Sagami Bay Marine Biological Research Club, hand net, 14 December 2002. **IZU PENINSULA (SAGAMI BAY):** FAKU 59112, female, 47.0 mm SL, Izu Oceanic Park, Futo, Ito, 20–25 m, T. Murai, hand net, 22 June 1992; FAKU 59211, female, 20.3 mm SL, Izu Oceanic Park, Futo, Ito, 20 m, T. Murai, hand net, 14 July 1992; FAKU 59221, male, 23.2 mm SL, FAKU 59222, male, 19.6 mm SL, Izu Oceanic Park, Futo, Ito, 26 m, T. Murai, hand net, 15 July 1992; KPM-NI 21838, female, 47.1 mm SL, Izu Oceanic Park, Futo, Ito, K. Suzuki, hand net, 13 June 1994; KPM-NI 34456, male, 28.0 mm SL, Izu Oceanic Park, Futo, Ito, 5 m, K. Okamoto, hand net, 2 July 1993; KPM-NI 34457, male, 23.4 mm SL, Izu Oceanic Park, Futo, Ito, 5 m, K. Suzuki, hand net, July 1993; KPM-NI 34462, female, 28.5 mm SL, Izu Oceanic Park, Futo, Ito, 5 m, 29 July 1993; KPM-NI 34465, male, 31.5 mm SL, off Futo Port, Ito, 6 m, K. Suzuki, hand net, 10 August 1993. **IZU ISLANDS:** KPM-NI 24975, 24.0 mm SL, KPM-NI 24976, 25.3 mm SL, Nazumado, Hachijo Island, 18 m, S. Kato, hand net, 17 July 2007; NSMT-P 30818, female, 35.3 mm SL, Chotaro-ike tide-pool, southern Miyake Island, 34°03'N, 139°32'E, 2 m, J. Shepard, 6 May 1976. **SHIKOKU (KOCHI PREFECTURE):** BSKU 91169, female, 24.9 mm SL, BSKU 91170, male, 27.2 mm SL, Kuboura, Okinoshima island, Sukumo, 32°44'N, 132°33'E, 5–15 m, T. Hirata, hand net, 24 July 2007; BSKU 95359, female, 25.8 mm SL, Himeshima island, Sukumo, 32°44'N, 132°29'E, 5–15 m, H. Endo *et al.*, hand net, 23 July 2003; NSMT-P 77472, 25.0 mm

SL, NSMT-P 77473, 27.2 mm SL, Akazaki, Moshima Port, Okinoshima island, Sukumo, 3 m, E. Katayama, hand net, 23 July 2007; NSMT-P 90812, male, 27.0 mm SL, north of Moshima Port, Okinoshima island, Sukumo, BSKU members, hand net, 23 July 2008.

Underwater photographs. 48 photographs, all from Japan. **IZU PENINSULA (SURUGA BAY):** KPM-NR 1446, Ose, 16 m, KPM-NR 4898, Ose, 13 m; KPM-NR 7881, 7884, 7885, Ose, 5 m; KPM-NR 11677, Toda, 3 m; KPM-NR 16022, Ose, 18 m; KPM-NR 22886, Ose; KPM-NR 27444–27445, Matsuzaki, 10 m; KPM-NR 34360, Ose; KPM-NR 40649, Ose; KPM-NR 63834, Koganezaki; KPM-NR 84849, Ose, 12 m; KPM-NR 94114, Ose, 10 m; KPM-NR 97355, Ose, 20 m. **IZU PENINSULA (SAGAMI BAY):** KPM-NR 6875, 6876, Futo, 24 m; KPM-NR 6877–6882, Futo, 5 m; KPM-NR 11775, Atami, 10 m; KPM-NR 13628, Futo, 5 m; KPM-NR 14837, Atami, 6 m; KPM-NR 14854, Atami, 13 m; KPM-NR 15084, Atami; KPM-NR 15092, Atami, 12 m; KPM-NR 15107, Atami, 15 m; KPM-NR 15108, Atami, 12 m; KPM-NR 15180, Futo, 5 m; KPM-NR 22887, Futo; KPM-NR 29333, Futo; KPM-NR 36060, Izu Peninsula, detailed locality unknown; KPM-NR 80038, Futo, 9 m; KPM-NR 80329, Futo, 5 m; KPM-NR 88092, Kawana, 12 m; KPM-NR 88788, Kawana, 16 m; KPM-NR 89187, Kawana, 10 m; KPM-NR 95616, Futo, 15 m; KPM-NR 95617, Futo, 10 m. **IZU ISLANDS:** KPM-NR 7149, Hachijo Island, 32 m; KPM-NR 39023, Izu-oshima island. **KII PENINSULA (WAKAYAMA PREFECTURE):** KPM-NR 33259, Kushi-moto, 16 m; KPM-NI 84635, Kumano, 15 m; KPM-NR 96045, Shirahama, 20 m.

Diagnosis. A species of *Sebastapistes* with the following combination of characters: 12–15 (mode 14) pectoral-fin rays; 33–42 (37) scale rows in longitudinal series; 4 or 5 (5) scale rows above lateral line, 9–13 (10) scale rows below lateral line; 3 or 4 (4) scale rows between sixth dorsal-fin spine base and lateral line; 3–5 (4) scale rows between last dorsal-fin spine base and lateral line; 2–4 (3) predorsal scale rows; 11–17 (15) gill rakers; palatine teeth present; ctenoid body scales; anterior and posterior lacrimal spines simple; lateral lacrimal spine and ridge absent; first and second suborbital ridges fused to form single ridge with one suborbital spine at its end; lower opercular spine with median ridge; opercular spines not covered by scales; interorbital ridges poorly developed, with shallow channel between ridges; coronal spines usually absent, but poorly developed spines rarely present; dark blotch usually on subopercle and pectoral-fin base (distinct in preserved specimens); indistinct dark blotch on spinous portion of dorsal fin in males; largest recorded specimen 50.7 mm SL.

Description. In the description below (including the color description of preserved specimens and specimens when fresh), the data and description of the holotype are presented first, followed by data for paratypes in parentheses (range and mode for counts, range and mean for proportional measurements) when different.

Dorsal-fin rays XII, 9 (XI, 10 in one paratype; XII, 10 in one paratype); anal-fin rays III, 5 (III, 4 in 2 paratypes; III, 6 in 2 paratypes); pectoral-fin rays 14 on each side (13 on

each side in 2 paratypes; 15 on each side in 5 paratypes; asymmetrically 14 and 15 in 3 paratypes; asymmetrically 12 and 14 in one paratype); scale rows in longitudinal series 38 (33–42, mode 37); pored lateral-line scales 23 (20–23, 22); scale rows above lateral line 4 (4 or 5, 5); scale rows below lateral line 11 (9–13, 10); scale rows between sixth dorsal-fin spine base and lateral line 4 (3 or 4, 4); scale rows between last dorsal-fin spine base and lateral line 4 (3–5, 4); predorsal scale rows 3 (2–4, 3); gill rakers on upper limb 5 (4–6, 4); gill rakers on lower limb 10 (7–11, 10), including 2 (0–3, 2) rakers on hypobranchial; total gill rakers 15 (11–17, 15). Following morphometrics expressed as percentage of SL: body depth 40.2 (33.6–41.1, mean 36.8); body width 24.0 (15.9–24.8, 20.4); head length 42.0 (38.5–44.2, 40.9); snout length 11.3 (10.3–12.7, 11.3); orbit diameter 11.9 (10.9–14.5, 12.9); interorbital width at middle of eye 7.2 (5.6–7.7, 6.8); interorbital width between preocular spine bases 6.4 (4.7–6.8, 5.7); head width 15.6 (12.6–16.4, 14.7); upper-jaw length 20.9 (19.5–22.5, 20.9); maxillary depth 5.5 (5.5–7.0, 6.1); suborbital space 1.8 (1.1–2.6, 1.8); postorbital length 20.1 (15.9–20.3, 18.8); distance between tips of opercular spines 5.7 (4.5–7.4, 6.0); pre-dorsal-fin length 38.1 (32.7–38.5, 35.8); pre-anal-fin length 65.0 (61.3–67.9, 65.5); pre-pelvic-fin length 39.1 (36.8–42.9, 39.7); first dorsal-fin spine length 6.4 (5.6–7.9, 6.6); second dorsal-fin spine length 12.3 (10.2–14.7, 12.8); third dorsal-fin spine length 17.8 (16.4–20.4, 18.2); fourth dorsal-fin spine length 17.4 (14.8–21.0, 18.2); fifth dorsal-fin spine length 17.0 (14.9–19.4, 17.2); eleventh dorsal-fin spine length 11.5 (9.5–12.6, 10.9); twelfth dorsal-fin spine length 15.8 (12.0–16.3, 14.7); longest dorsal-fin soft ray length 24.0 (18.1–23.0, 21.2); first anal-fin spine length 8.0 (6.4–9.6, 8.1); second anal-fin spine length 16.6 (15.5–19.4, 17.5); third anal-fin spine length 15.6 (13.4–17.5, 15.5); longest anal-fin soft ray length 22.5 (18.7–23.0, 21.2); pectoral-fin length 37.9 (31.0–37.9, 35.0); pelvic-fin spine length 16.2 (14.2–18.8, 16.1); longest pelvic-fin soft ray length 25.6 (20.6–27.2, 24.3); caudal-fin length 27.9 (21.8–32.3, 28.3); caudal-peduncle length 20.9 (17.5–22.3, 19.6); caudal-peduncle depth 10.5 (9.6–11.8, 10.6).

Body moderately compressed anteriorly, progressively more compressed posteriorly. Nape and anterior part of body moderately arched (less arched in young and juveniles). Body moderately deep, but body depth less than head length. All pectoral-fin rays unbranched (1–3 middle rays branched in some adults); seventh (sixth to eighth) ray longest. Second (or third) soft ray longest among dorsal-fin rays. Second soft ray longest among pelvic- and anal-fin rays. On head (Fig. 2), supraocular tentacle slender and short, its length less than orbit diameter (length variable, from absent to three times greater than orbit diameter; see Fig. 1). Posterior lacrimal spine associated with short, fleshy tentacle, length of latter less than (or subequal to) that of supraocular tentacle; posterior lacrimal spine tentacle linked posteriorly to head by skin. Distinct tentacle on posterior edge of low membranous tube associated with anterior nostril; this tentacle reaching to anterior margin of orbit when laid back. Pectoral-fin axil without skin flaps. Swimbladder absent.

Well-exposed, weakly ctenoid scales covering surface of

body; exposed cycloid scales (some scales with weak ctenii) on base of pectoral fin; embedded cycloid scales (some scales exposed) on anteroventral surface of body; exposed cycloid scales on opercle between tips of opercular spines. Body scales not extending onto rays or membranes of fins, except on base of caudal fin. Embedded cycloid scales on cheek. Lateral line sloping downward from second pored scale. Underside of dentary with three well-developed sensory pores on each side, first pore below anterior margin of orbit, second pore below anterior end of posterior lacrimal spine base, third pore located on posterior margin of dentary. Pair of small pores behind symphyseal knob of lower jaw in ventral view.

Mouth large, oblique, forming angle of about 15 (15–30) degrees to horizontal axis of head and body (Fig. 2). Posterior margin of maxilla just short of vertical drawn through posterior margin of orbit. No distinct longitudinal ridge on lateral surface of maxilla. Lower jaw with symphyseal knob. Width of symphyseal gap separating premaxillary teeth bands less than width of each band. Villiform teeth on upper and lower jaws, but no canine teeth; tooth band narrowing posteriorly. Tooth bands of upper and lower jaws subequal in width. Four (4–5) rows of small teeth at front of vomer, becoming 3 (1–3) rows posteriorly, forming V-shaped patch on vomer. About 2–4 rows of small teeth on each palatine. Underside of lower jaw without ridges.

Dorsal profile of snout steep, forming angle of about 60 (50–60) degrees to horizontal axis of head and body. Nasal spine simple, directed dorsally, its tip extending well beyond top of ascending process of premaxilla in lateral view. Ascending process of premaxilla not quite intruding into interorbital space, its posterior margin not extending beyond vertical drawn from anterior margin of posterior nostril in dorsal view when mouth completely closed. Median interorbital ridge absent. Interorbital ridges poorly developed anteriorly, separated by shallow channel, beginning posterior to nasal spines and then conjoined at level of origins of tympanic spines, forming indistinct low ridge (forming lump in young and juveniles) at front of occiput; diverging anteriorly and posteriorly in dorsal view, distance between ridges narrowest at level of vertical drawn through middle of pupil. Interorbital space shallow, about one-tenth of orbit extending above dorsal profile of head. Preocular spine simple, directed dorsally; tip of spine extending well above level of upper margin of pupil in lateral view; flattened anteriorly and posteriorly; anterior surface of spine without distinct ridge. Supraocular spine simple, not canted laterally; its length less than that of postocular spines. Postocular spine simple, slightly canted laterally; its basal width subequal to width of tympanic spine base. Tympanic spine simple, slightly canted laterally, located posterior to postocular spine; posterior end of tympanic spine base not reaching (extending beyond in some juveniles) level of origin of parietal spine base in dorsal view. Interorbital and pretympanic spines absent. Coronal spines absent (poorly developed spines present in three paratypes). Occipital region slightly concave (nearly flat or slightly convex in young and juveniles), without distinct transverse ridges at rear of occiput. Occiput sur-

rounded laterally by bases of tympanic and parietal spines. Parietal spine simple. Nuchal spine simple; nuchal and parietal spines joined at base. Sphenotic with 2 minute spines. Postorbital without spines. Pterotic spine simple; length of spine base less than (or subequal to) that of parietal spine base. No spine (or single small spine) in area surrounded by parietal, pterotic, and posttemporal spines. Upper posttemporal spine simple. Lower posttemporal spine simple, its basal length subequal to that of pterotic spine. Supracleithral spine simple. Cleithral spine flattened, pointed.

Lateral lacrimal spine and ridge absent. Anterior tip of anteriorly directed lacrimal ridge embedded within skin. Anterior lacrimal spine simple, directed ventroanteriorly, its tip reaching dorsal margin of upper lip. Posterior lacrimal spine simple, directed ventroposteriorly; posterior lacrimal spines larger than anterior lacrimal spine. Suborbital ridge single, with spine at end of ridge. Space between ventral margin of eye and suborbital ridge remarkably narrow. Suborbital pit absent. Preopercle with five spines; uppermost spine largest, with supplemental preopercular spine on its base. Preopercle, between its upper end and uppermost preopercular spine, without serrae or spines. Upper opercular spine simple with indistinct low ridge along its upper edge. Lower opercular spine simple with distinct median ridge. Space between upper and lower opercular spines without ridges. Posterior tips of upper and lower opercular spines not reaching opercular margin (tip of lower spine sometimes reaching to opercular margin).

Origin of first dorsal-fin spine above supraclithral spine. Posterior tip of pectoral fin extending beyond vertical drawn through base of third anal-fin spine. Origin of pelvic-fin spine slightly posterior to vertical drawn through origin of first pectoral-fin ray. Posterior tip of depressed pelvic fin just reaching to anal-fin origin (extending beyond anus, but not reaching to anal-fin origin, in most specimens). Origin of first anal-fin spine anterior to vertical drawn through last dorsal-fin spine base.

Color of preserved specimens—Body white, mottled with brown blotches. Subopercle with single indistinct (distinct in most specimens) dark brown blotch, its size subequal to pupil diameter. No distinct marking on opercle. Unpaired fins semi-transparent, with poorly defined pale brown blotches. No distinct dark brown blotch on spinous portion of dorsal fin (distinct blotch present between sixth and tenth spines in males). Pectoral fin semi-transparent, with distinct dark brown blotch, its size greater than pupil diameter, basally between seventh and twelfth rays.

Color when fresh (Fig. 1)—Body reddish, mottled with dark red blotches; anterior part of caudal peduncle chalky red. Underside of head pale red (or chalky red). Subopercle with black blotch, its size subequal to pupil diameter. Spinous portion of dorsal fin reddish, with white membranes distally; no black blotch (black blotch on membranes between sixth and tenth spines in males). Soft-rayed portion of dorsal fin and anal fin reddish, with broad white band obliquely across middle of each fin. Pelvic fin red, with white margin. Pectoral fin semi-transparent red, with poorly defined black blotch, its size greater than pupil diameter, ba-

sally between seventh and twelfth rays. Caudal fin reddish, with irregular vertical broad white band.

Color of live individuals—Based on underwater photographs listed above. Body and fin coloration variegated from whitish, yellowish, and reddish to brownish and blackish. Many individuals with broad white saddle, its anterior edge posterior to eye and posterior edge at opercular margin. Other coloration very similar to that of fresh specimens described above.

Distribution and habitats. This species is known only from the Pacific coast of Japan, where it ranges from the Boso Peninsula (Chiba Prefecture) to Shikoku (Kochi Prefecture), including the Izu Islands. The type series was collected from the Boso Peninsula, Izu Peninsula, Hachijo Island, Miyake Island, and Shikoku in depths of 2–48 m. Underwater photographs of *S. perplexa* were taken off the Izu Peninsula, at Izu-oshima and Hachijo islands in the Izu Islands, and off the Kii Peninsula in depths of 3–32 m. This species mainly inhabits rocky reefs and also occurs on sandy bottoms scattered among rocky reefs.

Although the ichthyofauna of the Ryukyu Islands and Kyushu, southern Japan, has been well surveyed (*e.g.*, Motomura and Matsuura 2010, 2014; Motomura *et al.* 2013), no examples of *S. perplexa* have been collected there. In addition, the first author has examined numerous specimens of *Sebastapistes* from the Indo-Pacific Ocean but found no specimens of *S. perplexa* from tropical waters. These facts indicate that *S. perplexa* is restricted to temperate waters of Japan.

Etymology. Derived from the Latin *perplexa* meaning “confused”, in reference to the confused taxonomic status of the species. The species is well known by local scuba divers and frequently photographed by them; it is often seen motionless on rocky surfaces in shallow waters and therefore presents a fine subject for photography. However, this species has been regarded to date as juveniles of *Scorpaena* or *Parascorpaena*, or as *Sebastapistes strongia*.

Remarks. One female specimen (BSKU 91169, 24.9 mm SL) from Kochi possessed expanded gonads with well-developed ova, and some eggs were released when the individual was captured, indicating that *S. perplexa* is a small species among its congeners. Although the smallest mature female was 24.9 mm SL, the species reaches at least 50.7 mm SL (CMNH-ZF 7621, female, Chiba).

The males of some species of Scorpaenidae, *e.g.*, *Parascorpaena moultoni* (Whitley, 1961) and several species of *Scorpaenopsis*, are known to possess a large black blotch on the membrane of the spinous portion of the dorsal fin (*e.g.*, Poss 1999; Randall and Eschmeyer 2002; Motomura *et al.* 2005c). Some species, *e.g.*, *Scorpaena bergi* Evermann and Marsh, 1900 and *Scorpaenodes varipinnis* Smith, 1957, have a black blotch in both sexes whereas others, *e.g.*, *Parascorpaena mossambica* (Peters, 1855) and *Sebastapistes strongia*, lack a blotch in either sex (Eschmeyer 1965; Poss 1999; Motomura 2009). In *Sebastapistes perplexa*, only males have a dark blotch on the membranes between the sixth and tenth spines of the dorsal fin. Although some scorpaenids develop a black blotch on the spinous portion of the dorsal fin of

“mature” males only (*e.g.*, Randall and Eschmeyer 2002), a blotch was present in all sizes of male *S. perplexa* available in this study (23.2 to 38.2 mm SL), indicating that its presence may not be associated with the onset of sexual maturity.

Sebastapistes perplexa differs from all except five of its available nominal congeners in having the first and second suborbital ridges fused, forming a single ridge with a single suborbital spine at its end, and a single posterior lacrimal spine (Fig. 2). The other five nominal species are *S. mauritiana* (type locality: Mauritius), *S. ballieui* (Hawaiian Islands), *S. megastoma* (Réunion Island), *S. corallicola* (Hawaiian Islands), and *S. hatizyoensis* (Izu Islands). Motomura *et al.* (2011a) regarded *S. mauritiana* as a senior synonym of *S. megastoma*. *Sebastapistes corallicola* and *S. hatizyoensis* were regarded as junior synonyms of *Scorpaena ballieui* by Eschmeyer and Randall (1975) and Randall (2007), and of *S. mauritiana* by Nakabo (2002), respectively. The validity of these synonymies was confirmed in the present study on the basis of examination of type specimens (listed in Material and methods).

Sebastapistes perplexa differs from the two valid species, *S. ballieui* and *S. mauritiana*, in having a simple posterior lacrimal spine (*vs* a spine with two spinous points in the latter two species), modally 14 pectoral-fin rays (*vs* 16 rays), poorly developed interorbital ridges with a shallow channel between the ridge (*vs* well-developed ridges with a deep channel between them), and in lacking a lateral lacrimal ridge or spine (*vs* spine usually present; if absent, a well-developed ridge present) and coronal spines (only three of 38 type specimens with poorly developed coronal spines *vs* well-developed spines always present). The poorly defined blackish blotch on the subopercle and pectoral-fin base found in most specimens of *S. perplexa* (distinct in preserved specimens) is lacking in *S. ballieui* and *S. mauritiana*.

The Indo-Pacific species *S. strongia* co-occurs with *S. perplexa* in the latter's entire distributional range, and is similar to *S. perplexa* in overall body appearance. However, in addition to the above-mentioned suborbital ridge feature, *S. perplexa* can be easily distinguished from *S. strongia* by its having one suborbital spine (*vs* usually two, rarely three spines in *S. strongia*) and modally 14 pectoral-fin rays (*vs* 15 rays; see Motomura 2009: table 2). While the nape between the anterior four dorsal-fin spine bases and the upper opercular margin of *S. strongia* usually has a poorly defined blackish blotch (Motomura 2009), *S. perplexa* lacks such a blotch. The blackish blotch on the subopercle and pectoral-fin base of *S. perplexa* is not found in *S. strongia*. Scale numbers on various parts of the body in *S. perplexa* tend to be lower than those in *S. strongia*: *e.g.*, 33–42 (mode 37) scale rows in longitudinal series in *S. perplexa* *vs* 40–44 (43) in *S. strongia*; 4 or 5 (5) scale rows above the lateral line *vs* 5 or 6 (6); 9–13 (10) scale rows below the lateral line *vs* 11–13 (12); 3 or 4 (4) scale rows between the sixth dorsal-fin spine base and the lateral line *vs* 5–7 (6); 3–5 (4) scale rows between the last dorsal-fin spine base and the lateral line *vs* 5 or 6 (5); and 2–4 (3) predorsal scale rows *vs* 4–6 (5) (Motomura 2009: table 2).

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