New Records of the Dwarf Scorpionfish, Sebastapistes fowleri (Actinopterygii: Scorpaeniformes: Scorpaenidae), from East Asia, and Notes on Australian Records of the Species

Species Diversity, 2009, **14**, 1–8

New Records of the Dwarf Scorpionfish, *Sebastapistes fowleri* (Actinopterygii: Scorpaeniformes: Scorpaenidae), from East Asia, and Notes on Australian Records of the Species

Hiroyuki Motomura[1] and Hiroshi Senou[2]

[1] The Kagoshima University Museum, 1-21-30 Korimoto, Kagoshima, 890-0065 Japan
E-mail: motomura@kaum.kagoshima-u.ac.jp
[2] Kanagawa Prefectural Museum of Natural History,
499 Iryuda, Odawara, Kanagawa, 250-0031 Japan

(Received 7 October 2008; Accepted 8 January 2009)

Twenty specimens of the smallest known scorpionfish, *Sebastapistes fowleri* (Pietschmann, 1934), collected from Taiwan and the Ryukyu Islands and recently found in museum collections, represent the first records of *S. fowleri* from East Asia. The Philippines and Guam were previously regarded as the northernmost records of the species. In addition, 15 specimens of *S. fowleri* from the Timor, Coral, and Tasman Seas are also reported, these being the first records from Australian waters. The Tasman Sea represents a new southernmost range extension.
Key Words: Teleostei, Scorpaenidae, *Sebastapistes fowleri*, Japan, Taiwan, Australia, first records.

Introduction

The smallest Indo-Pacific scorpionfish, *Sebastapistes fowleri*, was originally described as *Scorpaena fowleri* by Pietschmann (1934) on the basis of three specimens from the Hawaiian Islands. Since its subsequent redescription by Pietschmann (1938), who changed the generic allocation to *Scorpaenodes* Bleeker, 1857, the species was not regarded as a valid species until Randall (1973) listed it (as a member of *Scorpaenopsis* Heckel, 1840) from Tahiti. Eschmeyer and Randall (1975) also regarded the species as a valid member of *Scorpaenopsis* and designated a lectotype for *Scorpaena fowleri*.

The species has been treated as *Scorpaenopsis fowleri* by many subsequent authors (e.g., Myers 1988; Winterbottom *et al*. 1989; Poss 1999; Randall 1999) because it lacks palatine teeth and this lack is a diagnostic character of that genus; however, several authors (e.g., Kosaki *et al*. 1991; Randall and Anderson 1993; Kulbicki *et al*. 1994; Randall 1996) have questioned this generic allocation. Recently, Randall and Poss (2002) redescribed the species in detail, on the basis of specimens representing a wide distributional range, and reassigned it to *Sebastapistes* Gill in Streets, 1877. Since all other known species of *Sebastapistes* possess palatine teeth, Randall and Poss (2002) considered that loss of palatine teeth in *S. fowleri* had occurred independently from that in *Scorpaenopsis*. They suggested that *S. fowleri* is closest to *Sebastapistes strongia* (Cuvier in Cuvier and Valenciennes, 1829), the type species of *Sebastapistes*.

Randall and Poss (2002) reviewed the distribution of *S. fowleri* on the basis of specimens collected from both tropical and subtropical Indo-Pacific waters, from the Comoro Islands east to Pitcairn and the Hawaiian Islands. The northernmost records of the species in the western Pacific were from the Philippines and Guam. Our examination of numerous scorpionfish specimens in museums in Japan and Taiwan revealed that *S. fowleri* also occurs off the Ryukyu Islands and Taiwan. These specimens are described herein as the first records of *S. fowleri* from East Asia and the northernmost records for the species.

Although Yearsley *et al*. (2006) and Allen *et al*. (2007) published extensive lists of scorpionfishes from Australia, *S. fowleri* was excluded. Similarly, Randall and Poss (2002) were apparently unaware of the existence of Australian specimens. During our examination of scorpionfish specimens deposited in Australian museums, 15 specimens of *S. fowleri* from the Tasman, Coral, and Timor Seas were found. These specimens are the first confirmed records of *S. fowleri* from Australia and the Tasman Sea represents a new southernmost locality for the species.

Material and Methods

Measurements follow Motomura (2004a, b), with additional measurements (i.e., head width) following Motomura *et al*. (2005b, 2006a) and maxillary depth following Motomura *et al*. (2006b). Counts follow Motomura *et al*. (2005a–c) and Motomura and Johnson (2006), with predorsal scale 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. 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); and the coronal and pretympanic (as an extra spine) spines are as figured in Chen (1981, fig. 1) and Motomura *et al*. (2004, fig. 14b) respectively. The diagnosis of *S. fowleri* given here is based on specimens from East Asia (this study) and the Indo-Pacific [comparative material in this study and Randall and Poss (2002)], and the description is based on specimens from East Asia.

Specimens examined in this study have been deposited in Australian Museum, Sydney (AMS), Biodiversity Research Center, Academia Sinica, Taipei (ASIZP), Biological Laboratory, Imperial Household, Tokyo (BLIH), Field Museum of Natural History, Chicago (FMNH), Kagoshima University Museum, Kagoshima (KAUM), Kanagawa Prefectural Museum of Natural History, Odawara (KPM), Museum of Comparative Zoology, Harvard University, Cambridge (MCZ), Museum of New Zealand Te Papa Tongarewa (NMNZ), National Museum of Nature and Science, Tokyo (NSMT), Museum and Art Gallery of the Northern Territory, Darwin (NTM), Smithsonian Institution Museum Support Center, Suitland (USNM), and Yokosuka City Museum, Yokosuka (YCM).

For comparison, the following specimens of *S. fowleri* were examined: AMS I. 19472-042, 2 specimens, 24.9 and 25.0 mm SL, Lizard Island, Coral Sea, Australia, AMS party, Nov. 1975; AMS I. 21646-032, 6 specimens, 15.3–21.5 mm SL, Moorea Is-

land, Society Islands, 17°S, 149°W, 15–20 m depth, B. Goldman, 18 June 1976; AMS I. 26742-025, 18.5 mm SL, Ashmore Reef, Timor Sea, Australia, 12°10′S, 123°04′E, G. Allen and C. Bryce, 16 Sept. 1986; AMS I. 26746-036, 22.2 mm SL, Ashmore Reef, Timor Sea, Australia, 12°12′S, 122°58′E, 15–18 m depth, G. Allen and T. Knight, 18 Sept. 1986; AMS I. 27144-003, 4 specimens, 17.0–26.0 mm SL, off "Fuku Maru" wreck, Middleton Reef, Tasman Sea, Australia, 29°29′06″S, 159°08′06″E, 18–20 m depth, S. Reader *et al*., 7 Dec. 1987; AMS I. 27149-028, 15.0 mm SL, outer northeast slope of Elizabeth Reef, Tasman Sea, Australia, 29°54′48″S, 159°02′48″E, 10 m depth, S. Reader *et al*., 10 Dec. 1987; AMS I. 27152-040, 14.0 mm SL, outer southwest slope of Elizabeth Reef, Tasman Sea, Australia, 29°57′42″S, 159°02′48″E, 15–18 m depth, A. Gill and S. Reader, 10 Dec. 1987; AMS I. 33747-026, 18.0 mm SL, northeast of Boot Reef, Coral Sea, Australia, 09°58′42″S, 144°42′31″E, 23–30 m depth, FNQ team, 27 Jan. 1993; FMNH 17337, holotype of *Sebastapistes badiorufus*, 23.7 mm SL, Takaroa Island, Tuamotu Islands, Crane Pacific Expedition, 12 Feb. 1929; FMNH 90660, 2 specimens, 26.1 and 27.0 mm SL, Tahiti, Society Islands, 10.5–13.5 m depth, A. Watkins, 27 Feb. 1962; MCZ 168354, 2 specimens, 20.2 and 22.8 mm SL, Padodo, Davao, Mindanao, Philippines, G. Oesch, before Nov. 1938; NMNZ P. 35873, 17.6 mm SL, 750 m north of Alofi, Anono, Niue Island, Niue, 19°03′S, 169°56′W, 5–14 m depth, C. Roberts and T. Coe, 7 Oct. 1998; NTM S.12328-044, 18.0 mm SL, north of West Islet, Ashmore Reef, Timor Sea, Australia, 12°10′00″S, 123°01′00″E, 19 m depth, H. Larson and B. Russell, 24 Sept. 1987; NTM S.13408-014, 26.0 mm SL, Cartier Reef, Timor Sea, Australia, 12°31′24″S, 123°33′18″E, 14–16 m depth, B. Russell, 6 May 1992; NTM S.13410-002, 24.0 mm SL, Cartier Reef, Timor Sea, Australia, 12°31′24″S, 123°33′18″E, 12–23 m depth, J. Short, 7 May 1992; NTM S.13600-030, 24.0 mm SL, southeast corner of Ashmore Reef, Coral Sea, Australia, 10°22′52″S, 143°31′37″E, 11–32 m depth, FNQ team, 19 Jan. 1993; NTM S.13615-017, 22.0 mm SL, southeast corner of Boot Reef, Coral Sea, Australia, 10°02′52″S, 144°41′53″E, 14–17 m depth, FNQ team, 29 Jan. 1993; USNM 349973, 2 specimens, 12.0 and 22.1 mm SL, Baie de la Petite Rivière, Mauritius, 20°12′30″S, 57°23′20″E, 30 m depth, P. Heemstra *et al*., 26 May 1995.

Taxonomy

Sebastapistes fowleri (Pietschmann, 1934)
[New standard Japanese name: Puchi-fusakasago]
[English name: Dwarf Scorpionfish]
(Fig. 1)

Scorpaena fowleri Pietschmann, 1934: 100. [Type locality: Makaua, Oahu, Hawaiian Islands. Lectotype designated by Eschmeyer and Randall (1975)]

Sebastapistes badiorufus Herre, 1935: 409. [Type locality: Takaroa Atoll, Tuamotu Archipelago]

Sebastapistes hassi Klausewitz, 1970: 72, fig. 1. [Type locality: Addu Atoll, Maldive Islands]

Material examined. 20 specimens, 13.4–29.4 mm SL, from Taiwan and Japan: ASIZP 62420, 25.7 mm SL, Wan-li-tung, Ping-tung, Taiwan, J.-P. Chen, 20 Dec. 1989; ASIZP 62421, 4 specimens, 15.5–21.1 mm SL, Wan-li-tung, Ping-tung, Taiwan, J.-P.

Fig. 1. *Sebastapistes fowleri*, KPM-NI 8527, 16.4 mm SL, Ie Island, Ryukyu Islands, Japan.

Chen, 6 Mar. 1989; ASIZP 62429, 6 specimens, 13.4–26.4 mm SL, same data as ASIZP 62420; BLIH 36670069, 36670070, 21.1 and 29.4 mm SL, respectively, off Isso, Yaku Island, Osumi Islands, Ryukyu Islands, Japan, 30°27′26″N, 130°29′26″E, 10–12 m depth, M. Aizawa, 29 Sept. 2008; KPM-NI 4045, 21.5 mm SL, Ie Island, Okinawa Islands, Ryukyu Islands, Japan, 7 m depth, T. Nomura, 13 June 1997; KPM-NI 8403, 24.6 mm SL, Ie Island, Okinawa Islands, Ryukyu Islands, Japan, 20 m depth, T. Nomura, 15 Sept. 2001; KPM-NI 8527, 8528, 16.4 and 15.9 mm SL, respectively, Ie Island, Okinawa Islands, Ryukyu Islands, Japan, 9 m depth, T. Nomura, 19 Sept. 2001; NSMT-P 61961, 23.5 mm SL, Urazoko Bay, Ishigaki Island, Ryukyu Islands, Japan, 23°28′N, 124°12′E, 15 m depth, K. Matsuura and K. Shibukawa, 23 Aug. 1996; YCM-P. 38092, 13.9 mm SL, Saneku, Kakeroma Island, Amami Islands, Ryukyu Islands, Japan, 28°11′01″N, 129°15′32″E, 10–23 m depth, Sagami Bay Marine Biological Research Club, 24 Aug. 1998; YCM-P. 38125, 26.0 mm SL, Hamazaki, Kakeroma Island, Amami Islands, Ryukyu Islands, Japan, 28°09′31″N, 129°11′00″E, 6–15 m depth, Sagami Bay Marine Biological Research Club, 25 Aug. 1998.

Diagnosis. A species of *Sebastapistes* with the following combination of characters: 16 pectoral-fin rays; 30–34 scale rows in longitudinal series; no palatine teeth; posterior lacrimal spine directed ventrally or anteroventrally; two suborbital spines; no coronal spine; lower opercular spine with median ridge, not covering by scales; ctenoid scales on dorsal and lateral surface of body; largest specimen recorded 37 mm SL.

Description. *Meristics*. Dorsal-fin rays XII 9. Anal-fin rays III 5. Pectoral-fin rays 16 (one specimen with 15 rays on left side of body), all rays unbranched (largest specimen with branched fifth ray). Scale rows in longitudinal series 30–34. Pored lateral-line scales 11–20. Scales above lateral line 4 or 5, below 9–11. Scale

rows between sixth dorsal-fin spine base and lateral line 4–6. Scale rows between last dorsal-fin spine base and lateral line 3–5. Predorsal scale rows 3–5. Gill rakers on upper limb 4–6, lower limb 8–10 (7–9 and 0–2 rakers on ceratohyal and hypobranchial respectively), total rakers 12–15.

Morphometrics (% of SL). Body depth at pelvic-fin base 38.8–43.9 (mean 40.3); body width 18.7–20.7 (19.5); head length 42.7–46.3 (45.1); snout length 10.6–11.6 (11.1); orbit diameter 11.8–15.9 (13.8); interorbital width at vertical midline of eye 6.5–7.4 (7.0); interorbital width at posterior end of preocular spine base 6.3–7.1 (6.7); head width 15.4–17.1 (16.2); upper-jaw length 24.2–26.7 (25.5); maxillary depth 6.5–7.9 (7.3); postorbital length 20.4–22.0 (21.3); predorsal-fin length 40.0–43.3 (41.0); preanal-fin length 69.8–73.2 (71.0); prepelvic-fin length 39.2–42.8 (41.1); first dorsal-fin spine length 4.7–7.2 (5.8); second dorsal-fin spine length 8.8–10.8 (9.9); third dorsal-fin spine length 14.0–15.9 (14.5); fourth dorsal-fin spine length 16.3–17.5 (16.9); fifth dorsal-fin spine length 15.8–20.0 (17.6); eleventh dorsal-fin spine length 11.8–12.8 (12.2); twelfth dorsal-fin spine length 11.8–12.8 (12.2); longest dorsal-fin ray length (first or second ray) 18.1–19.5 (18.7); first anal-fin spine length 7.9–8.4 (8.2); second anal-fin spine length 17.2–19.1 (18.1); third anal-fin spine length 12.6–15.2 (14.2); longest anal-fin ray length (first ray) 18.9–19.2 (19.1); pectoral-fin ray length (ninth ray longest) 28.9–32.9 (31.3); pelvic-fin spine length 16.3–18.0 (17.2); longest pelvic-fin ray length (second ray) 20.7–26.5 (23.4); caudal-fin length 26.0–26.5 (26.3); caudal-peduncle length 15.2–17.7 (16.4); caudal-peduncle depth 11.8–12.8 (12.2).

Morphology. Ctenoid scales covering lateral surface of body, becoming cycloid ventrally. Embedded cycloid scales covering ventral surface of body and pectoral-fin base (several scales exposed). Vomerine tooth plate distinct, forming V-shaped patch. No palatine teeth. Median interorbital ridge, interorbital spine, and coronal spine absent. Interorbital ridges poorly developed; interorbital space shallow; occipital region flat. Tips of nasal and preocular spines sometimes embedded in skin. Supraocular and postocular spines simple, poorly developed, smaller than tympanic spine. Parietal and nuchal spines not joined at base. Sphenotic with small spine. Pterotic, upper and lower posttemporal, and supracleithral spines simple, poorly developed. Lateral lacrimal spine absent; ventral surface of lacrimal with 3 pointed spines, first spine directed anteriorly, second directed ventroanteriorly, third directed ventrally. Suborbital ridge with 2 tiny spines, first spine below eye and second at end of ridge. Preopercular margin with 5 spines; supplemental spine occurring at base of uppermost spine. Upper and lower opercular spines simple, each with median ridge. Posterior tip of pectoral fin extending slightly beyond that of depressed pelvic fin.

Color when fresh (based on photographs of KPM-NI 8527–8528 and NSMT-P 61961). Head and body reddish, mottled with white or pink. Spinous portion and basal soft-rayed portion of dorsal fin, and basal parts of pectoral, pelvic, anal, and caudal fins reddish.

Color in alcohol. Head and body entirely pale yellow, except for dusky basal parts of pectoral and pelvic fins and anteroventral surface of body.

Remarks. *Sebastapistes fowleri* was redescribed and compared in detail with congeners by Randall and Poss (2002), and the characters of the East Asian specimens described here agree with those of their specimens of *S. fowleri* from the Indo-Pacific. The 11 Taiwanese and nine Japanese specimens of *S. fowleri* represent the first reliable records of this species from East Asia, and the northernmost

records for the species. The previously recognized northernmost records were from the Philippines and Guam (Randall and Poss 2002).

Sebastapistes fowleri is similar to *S. taeniophrys* (Fowler, 1943) and *S. strongia* in having a median ridge on the lower opercular spine, ctenoid body scales, and 15 or 16 pectoral-fin rays, and in lacking coronal spines (Randall and Poss 2002; Motomura 2009; this study). It differs, however, from the latter two species in lacking palatine teeth (vs teeth present), having the posterior lacrimal spine directed ventrally or anteroventrally (vs strongly directed posteroventrally), and possessing 30–34 scale rows in longitudinal series (40–44 scale rows in *S. strongia*, based on 43 specimens examined; Motomura 2009).

Notes on Australian records. Randall and Poss (2002) reviewed the distribution of *S. fowleri* in the Indo-Pacific. They recorded four specimens (BPBM 33810, 23–26.5 mm SL) from the Chesterfield Islands, Coral Sea (New Caledonian territorial waters), but none from Australian waters (cf. Yearsley *et al*. 2006; Allen *et al*. 2007). During our examination of Australian scorpionfish specimens, 15 from the Tasman Sea, Coral Sea, and Timor Sea were identified as *S. fowleri* (all specimens listed in Material and Methods section), and these represent the first confirmed records of *S. fowleri* from Australia. One Tasman Sea specimen (AMS I. 27152-040, 29°57′42″S) represents the southernmost record for the species.

Acknowledgments

The first author is especially grateful to M. McGrouther and all staff of the Fish Section of the AMS, K.-T. Shao, Y.-C. Liao, and H.-C. Ho of the ASIZP, A. M. Rogers and K. Swagel of the FMNH, K. Hartel and A. Williston of the MCZ, C. Roberts, A. Stewart, and C. Struthers of the NMNZ, and J. Williams, S. Raredon, and all staff of the USNM for their kind hospitality during his stay at their museums. The first author's visits to AMS, ASIZP, and NMNZ were supported by a Visiting Collection Fellowship grant from AMS, a Grant-in-Aid for Scientific Research (A) from the Japan Society for the Promotion of Science, Tokyo, Japan (19208019), and the Biosystematics of New Zealand Exclusive Economic Zone Fishes Programme (New Zealand Foundation for Research Science and Technology contract MNZX0203), respectively. We thank M. Aizawa (BLIH), K. Matsuura and G. Shinohara (NSMT), H. Larson, G. Dally, and S. Gregg (NTM), and K. Hagiwara (YCM) for specimen loans, Y. Haraguchi, M. Matsunuma, G. Ogihara, and M. Meguro (KAUM) for their curatorial assistance, and G. Hardy (Ngunguru, New Zealand) for reviewing the manuscript. This study was supported in part by a Grant-in-Aid for Young Scientists (B) from the Ministry of Education, Science, Sports and Culture, Japan (19770067).

References

Allen, G. R., Cross, N. J., Bray, D. J. and Hoese, D. F. 2007. Scorpaenidae. Lionfishes, rockfishes, scorpionfishes, stingfishes, stonefishes, waspfishes. Pp. 876–906. *In*: Hoese, D. F., Bray, D. J., Paxton, J. R. and Allen, G. R. (Eds) *Zoological Catalogue of Australia 35. Parts 1–3*. CSIRO Publishing and the Australian Biological Resources Study, Collingwood.

Chen, L.-C. 1981. Scorpaenid fishes of Taiwan. Quarterly Journal of the Taiwan Museum 34: 1–60.

Eschmeyer, W. N. 1965. Western Atlantic scorpionfishes of the genus *Scorpaena*, including four new species. Bulletin of Marine Science 15: 84–164.

Eschmeyer, W. N. and Randall, J. E. 1975. The scorpaenid fishes of the Hawaiian Islands, including new species and new records (Pisces: Scorpaenidae). Proceedings of the California Academy of Sciences, Series 4 40: 265–334.

Herre, A. W. C. T. 1935. New fishes obtained by the Crane Pacific Expedition. Zoölogical Series, Field Museum of Natural History 18: 383–438.

Klausewitz, W. 1970. *Sebastapistes hassi* n. sp. von den Maldiven (Pisces, Scleropareiformes, Scorpaenidae). Senckenbergiana Biologica 51: 73–75.

Kosaki, R. S., Pyle, R. L., Randall, J. E. and Irons, D. 1991. New records of fishes from Johnston Atoll, with notes on biogeography. Pacific Science 45: 186–203.

Kulbicki, M., Randall, J. E. and Rivaton, J. 1994. Checklist of the fishes of the Chesterfield Islands (Coral Sea). Micronesica 27: 1–43.

Motomura, H. 2004a. New species of scorpionfish, *Scorpaena cocosensis* (Scorpaeniformes: Scorpaenidae) from the Cocos Islands, Costa Rica, eastern Pacific Ocean. Copeia 2004: 818–824.

Motomura, H. 2004b. Revision of the scorpionfish genus *Neosebastes* (Scorpaeniformes: Neosebastidae) with descriptions of five new species. Indo-Pacific Fishes 37: 1–76.

Motomura, H. 2009. *Sebastapistes taeniophrys* (Fowler, 1943): a valid scorpionfish (Scorpaenidae) from the Philippines. Ichthyological Research 56: 62–68.

Motomura, H., Fricke, R. and Eschmeyer, W. N. 2005a. Redescription of a poorly known scorpionfish, *Scorpaena canariensis* (Sauvage), and a first record of *Pontinus leda* Eschmeyer from the Northern Hemisphere (Scorpaeniformes: Scorpaenidae). Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 674: 1–15.

Motomura, H. and Johnson, J. W. 2006. Validity of the poorly known scorpionfish, *Rhinopias eschmeyeri*, with redescriptions of *R. frondosa* and *R. aphanes* (Scorpaeniformes: Scorpaenidae). Copeia 2006: 500–515.

Motomura, H., Last, P. R. and Gomon, M. F. 2006a. A new species of the scorpionfish genus *Maxillicosta* from the southeast coast of Australia, with a redescription of *M. whitleyi* (Scorpaeniformes: Neosebastidae). Copeia 2006: 445–459.

Motomura, H., Last, P. R. and Yearsley, G. K. 2005b. *Scorpaena bulacephala*, a new species of scorpionfish (Scorpaeniformes: Scorpaenidae) from the northern Tasman Sea. Zootaxa 1043: 17–32.

Motomura, H., Last, P. R. and Yearsley, G. K. 2006b. New species of shallow water scorpionfish (Scorpaenidae: *Scorpaena*) from the central coast of Western Australia. Copeia 2006: 360–369.

Motomura, H., Paulin, C. D. and Stewart, A. L. 2005c. First records of *Scorpaena onaria* (Scorpaeniformes: Scorpaenidae) from the southwestern Pacific Ocean, and comparisons with the Northern Hemisphere population. New Zealand Journal of Marine and Freshwater Research 39: 865–880.

Motomura, H. and Senou, H. 2008. A new species of the scorpionfish genus *Scorpaena* (Scorpaenidae) from Izu Peninsula, Pacific coast of Japan. Journal of Fish Biology 72: 1761–1772.

Motomura, H., Yoshino, T. and Takamura, N. 2004. Review of the scorpionfish genus *Scorpaenopsis* (Scorpaeniformes: Scorpaenidae) in Japanese waters with three new records and an assessment of standard Japanese names. Japanese Journal of Ichthyology 51:

89–115.

Myers, R. F. 1988. An annotated checklist of the fishes of the Mariana Islands. Micronesica 21: 115–180.

Pietschmann, V. 1934. Drei neue Fische aus den hawaiischen Küstengewässern. Anzeiger der Akademie der Wissenschaften in Wien 71: 99–100.

Pietschmann, V. 1938. Hawaiian shore fishes. Bernice P. Bishop Museum Bulletin 156: 1–55.

Poss, S. G. 1999. Scorpaenidae. Pp. 2659–2756. *In*: Carpenter, K. E. and Niem, V. H. (Eds) *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific. Vol. 4. Bony Fishes Part 2 (Mugilidae to Carangidae)*. FAO, Rome.

Randall, J. E. 1973. Tahitian fish names and a preliminary checklist of the fishes of the Society Islands. Occasional Papers of Bernice P. Bishop Museum 24: 167–214.

Randall, J. E. 1996. *Shore Fishes of Hawaii*. Natural World Press, Vida, Oregon, 216 pp.

Randall, J. E. 1999. Report on fish collections from the Pitcairn Islands. Atoll Research Bulletin 461: 1–36.

Randall, J. E. and Anderson, R. C. 1993. Annotated checklist of the epipelagic and shore fishes of the Maldive Islands. Ichthyological Bulletin of the J. L. B. Smith Institute of Ichthyology 59: 1–47.

Randall, J. E. and Eschmeyer, W. N. 2002 (dated 2001). Revision of the Indo-Pacific scorpionfish genus *Scorpaenopsis*, with descriptions of eight new species. Indo-Pacific Fishes 34: 1–79.

Randall, J. E. and Poss, S. G. 2002. Redescription of the Indo-Pacific scorpionfish *Scorpaenopsis fowleri* and reallocation to the genus *Sebastapistes*. Pacific Science 56: 57–64.

Winterbottom, R., Emery, A. R. and Holm, E. 1989. An annotated checklist of the fishes of the Chagos Archipelago, central Indian Ocean. Royal Ontario Museum Life Science Contributions 145: i–vi+1–226.

Yearsley, G. K., Last, P. R. and Hoese, D. F. 2006. Standard names of Australian fishes. CSIRO Marine and Atmospheric Research Paper 9: i–iv+1–65.