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Scorpaenopsis insperatus: A New Species of Scorpionfish from Sydney Harbour, New South Wales, Australia (Scorpaeniformes: Scorpaenidae)

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A new species of small-sized Scorpionfish, *Scorpaenopsis insperatus*, is described on the basis of two specimens collected from Chowder Bay, Sydney Harbour, New South Wales, Australia. The new species is distinguished from other species of *Scorpaenopsis* by the following combination of characters: a single upper opercular spine (tip not divided) and 30–34 longitudinal scale rows. *Scorpaenopsis insperatus* is the only member of the genus found in Australian temperate waters.

CHOWDER Bay, located in Sydney Harbor approximately 5 km northeast of Sydney City, has long been a restricted area, the Royal Australian Navy prohibiting any activities, including fishing, diving, and swimming, in the bay. Recently, the Sydney Ports Corporation, with support from the north-southwest Department of Transport and the Royal Australian Navy, commissioned Australian Museum Business Services to collect baseline data on the occurrence of exotic marine species in the ports of Sydney Harbour. The survey was carried out at 57 sites, including Chowder Bay, from 30 March to 6 June 2001.

Two examples of an unidentified Scorpionfish were collected from Chowder Bay during the survey (the first ichthyological survey in the bay). Subsequently, the specimens were identified as belonging to the genus *Scorpaenopsis* Heckel, having 12 dorsal-fin spines and lacking the following characters: palatine teeth, black pigment between the first and third dorsal-fin spines, and a strongly compressed head. The specimens were readily distinguished from other species of *Scorpaenopsis*, revised by Randall and Eschmeyer (2002), in several aspects including numbers of pectoral-fin rays and longitudinal scale rows, structures of head spines and ridges, and some proportional measurements. The new species is described herein and comparisons made with all species of the genus.

Materials and Methods

Counts and measurements follow Randall and Eschmeyer (2002). Standard and head lengths are expressed as SL and HL, respectively. Osteological characters were confirmed from radiographs. Sex for the holotype was established by dissection of the abdomen on the right side. Comparisons made in this study are based on the description by Randall and Eschmeyer (2002) and comparative material examined listed below. Institutional codes follow Leviton et al. (1985), with additional institutional abbreviations as follows: Division of Fisheries Sciences, Faculty of Agriculture, Miyazaki University, Japan (MUFS); and South African Institute for Aquatic Biodiversity, Grahamstown, South Africa (SAIAB, formerly RUSI).

Scorpaenopsis insperatus n. sp.

New English Name: Sydney Scorpionfish
Figures 1–2

Holotype.—AMS I. 40868–011, mature male, 48.9 mm SL, near end of fuel wharf, east side of Chowder Bay, Sydney Harbour, New South Wales, Australia (33°50′48″S, 151°15′35″E), 14.4 m depth, sandy bottom, rotenone, coll. by K. Parkinson, M. Lockett and J. Pogonoski, 24 May 2001.

Paratype.—AMS I. 40868–030, sex undetermined, 34.8 mm SL, collected with holotype.

Diagnosis.—A species of *Scorpaenopsis* with the following combination of characters: 16 pectoral fin rays; 30–34 longitudinal scale rows; 23 pored lateral-line scales; no median interorbital ridge; well-developed interorbital ridges conjoined at anterior edge of occipital pit; upper opercular and posterior lacrimal spines simple, not divided; 3 suborbital spines; fifth dorsal-fin spine longest; large orbit diameter (5.4–5.6 in HL); short snout length (3.7–3.9 in HL) less than orbit diameter; narrow interorbital width (5.4–5.6 in HL) less than orbit diameter; narrow space between ventral margin of eye and suborbital ridge.

Description.—Features for the holotype are presented first, followed by paratype data (if different) in parentheses. Dorsal fin with 12 spines and 9 soft rays; anal fin with 3 spines and 5 soft rays; pectoral fin with 16 rays, upper 2 (1) and lower 10 (11) rays unbranched, remaining rays branched; pelvic fin with 1 spine and 5 soft rays;

Fig. 1. *Scorpaenopsis insperatus*, AMS I. 40868-011, holotype, 48.9 mm SL, Chowder Bay, Sydney Harbour, Australia. Opercle and pectoral fin slightly flared.

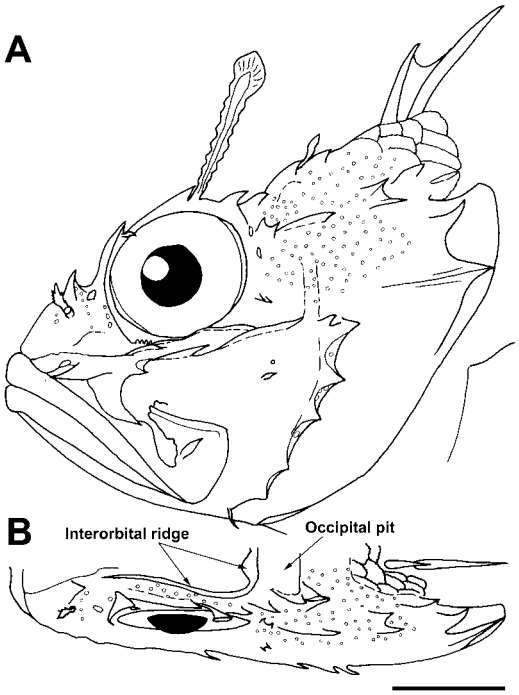

Fig. 2. Head of *Scorpaenopsis insperatus*, AMS I. 40868–011, holotype, 48.9 mm SL. (A) lateral view; (B) dorsal view. Small circles indicate sensory pores; numerous small papillae on head are not illustrated. Scale bar = 5 mm.

caudal fin with 13 principal rays. Longitudinal scale rows 30 (34); pored lateral-line scales damaged in holotype (23); scales above lateral line 4, below 10; scales above lateral line at midbody 5 (6); predorsal scale rows 2. Gill rakers on upper limb 3, lower limb (including a raker at angle) 9, rudimentary rakers on ventroanterior lower limb 3. Branchiostegal rays 7; vertebrae 24.

Morphometrics as measured as times in SL: body depth 2.6 (2.4); body width 4.8 (5.4); head length 2.3; predorsal length 2.7; preanal length 1.5 (1.6); prepelvic length 2.5 (2.6); first dorsal-fin spine length 14.8 (14.5); second dorsal-fin spine length 8.4 (8.7); longest dorsal-fin spine (fifth) length 5.7 (5.4); eleventh dorsal-fin spine length 10.6 (12.0); twelfth dorsal-fin spine length 6.8 (7.4); longest dorsal-fin soft ray (second) length 5.4; first anal-fin spine length 11.4 (14.5); second anal-fin spine length 5.4 (5.5); third anal-fin spine length 6.0 (6.3); longest anal-fin soft ray (second in holotype, first in paratype) length 4.7 (5.4); longest pectoral-fin (seventh) length 3.3 (3.4); pelvic-fin spine length 6.1; longest pelvic-fin soft ray (second) length 4.4 (4.8); caudal-fin length 3.6; caudal-peduncle length 5.5 (5.4); caudal-peduncle depth 9.4 (8.7). Morphometrics as measured as times in HL: snout length 3.7 (3.9); orbit diameter 3.5 (3.2); interorbital width 5.6 (5.4); upper-jaw length 1.8 (2.0); postorbital length 2.0 (2.2).

Body moderately compressed anteriorly, progressively more compressed posteriorly; nape

and anterior body not highly arched. Numerous small papillae on head, especially dorsal surface, most papillae smaller than sensory pores; head not covered with scales; numerous small sensory pores on head, especially between nasal spine and orbit (indistinct in paratype), between interorbital ridges and supraocular spines, and on head dorsal to upper opercular spines. Mouth large, slightly oblique, forming an angle of about 20° to horizontal axis of head and body; maxilla not covered with scales; posterior part of maxilla with a small tentacle centrally; posterior margin of maxilla extending slightly beyond (just reaching) level of posterior margin of orbit; upper edge of posterior maxilla swollen laterally, forming a low ridge; lower jaw somewhat nodular medially. Width of symphyseal gap separating premaxillary teeth bands approximately equal to (slightly greater than) width of each band; upper jaw with a band of slender, incurved, conical teeth; about seven tooth rows at front of upper jaw, tooth band narrowing posteriorly; tooth band of upper jaw slightly wider than that of lower jaw; about 6 tooth rows at front of lower jaw, most teeth longer than teeth of upper jaw; small teeth in 2–4 rows forming a V-shaped patch on vomer; no palatine teeth. Underside of dentary with four sensory pores and two (3) minute tentacles on each side; a distinct pore behind nodular portion of lower jaw.

Dorsal profile of snout steep, forming an angle of about 60 degrees to horizontal axis of head and body. Nasal spine simple, flattened anteriorly and posteriorly, directed upward, its length greater than anterior nostril diameter; anterior nostril with a long tentacle, its length greater than anterior nostril diameter; ascending process of premaxilla not intruding into interorbital space, its posterior margin extending slightly beyond (just reaching) level of posterior margin of posterior nostril. No median interorbital ridge. Interorbital ridges well developed posteriorly, separated by a deep channel, initially diverging posteriorly and then conjoined level with and between origins of tympanic spines, forming a distinct ridge to anterior angular edge of occipital pit. Interorbital space deep, about one-fourth (one-fifth) of orbit extending above dorsal profile of head. Preocular spine simple with a minute tentacle, canted posteriorly; supraocular spine simple with a large tentacle, approximately equal to (slightly less than) orbit diameter; postocular spines simple, slender, slightly longer than preocular and supraocular spines; tympanic spine simple, surrounding occipital pit laterally; base of tympanic spine not joined with other spine or ridge bases; no coronal or extra spines. A distinct transverse ridge (formed from posterior parts of interorbital ridges) in front of deep occipital pit curved posteriorly in dorsal view. Parietal spine simple, flat laterally, with a short tentacle; base of parietal spine curving strongly into occipital pit; origin of parietal spine approximately level with posterior end of base of tympanic spine in dorsal view; nuchal spine simple, flattened anteriorly and posteriorly; nuchal and parietal spines joined at base. Sphenotic with two small spines; postorbital with two small spines, smaller than sphenotic spines; upper and lower posttemporal, and supracleithral spines simple.

Lacrimal ridge somewhat uneven (nearly smooth); anterior lacrimal spine simple, directed forward, its tip just reaching dorsal margin of upper jaw lip; posterior lacrimal spine simple, directed ventroposteriorly, its tip not reaching upper jaw lip; posterior lacrimal spine associated with a short fimbriate flap, linked posteriorly to head by fringed skin; posterior lacrimal spine larger than anterior spine; suborbital with 2 parallel ridges; upper suborbital ridge, without spines, in line with lacrimal ridge, ending level with (slightly anterior to) posterior margin of orbit; lower suborbital ridge with 3 spines, in line with anterior lacrimal spine; first suborbital spine on base of posterior lacrimal spine, second spine (largest) on lower suborbital ridge below middle of eye, third spine on end of lower suborbital ridge; narrow space between ventral margin of eye and upper suborbital ridge; small, deep suborbital pit. Preopercular with five spines, uppermost spine largest with a second spine on its base, lower four spines simple. Upper opercular spine simple, no median ridge; lower opercular spine simple with a median ridge; no scales between upper and lower opercular spines. A pored lateral-line scale (4 scales, seventh to 10th) associated with a small, slender tentacle.

Origin of first dorsal-fin spine above base of supracleithral spine; posterior margin of opercular membrane extending slightly beyond level of origin of third dorsal-fin spine; posterior tip of pectoral fin not reaching level with origin of last dorsal-fin spine; posterior tip of pelvic fin extending well beyond anus when depressed; origin of first anal-fin spine slightly anterior to origin of last dorsal-fin spine.

Color of preserved specimens.—Body grayish dorsally, mottled with gray blotches and spots, becoming white ventrally; head mottled gray; lips and underside of mandible white with a series of short irregular gray bars; dorsal fin pale gray with indistinct gray blotches; pectoral fin white

with indistinct broad black bands basally and distally; no distinct marks on inner surface or axil of pectoral fin; pelvic and anal fins white, mottled with gray blotches; lower caudal peduncle with a large distinct white blotch; caudal fin white with a broad black band basally and a broad gray band distally (except distal margin). Life colors unknown.

Distribution.—Known only from Chowder Bay, Sydney Harbour, Australia.

Etymology.—The specific name *insperatus* is derived from Latin meaning ''unexpected,'' in reference to the unexpected discovery of this new species from Sydney Harbour, a populated harbor adjacent to the Sydney metropolitan area.

Remarks.—The genus *Scorpaenopsis* was revised by Randall and Eschmeyer (2002); 24 species were recognized in the genus, including eight described as new. Randall and Eschmeyer (2002) and Randall and Poss (2002) defined three major lineages within the genus: the humpback species complex (five species), the large, long-snouted species complex (12 species), and the small, short-snouted species complex (seven species). The present new species, *S. insperatus,* can be easily distinguished from the first species complex by lacking both a highly arched back (humpback) below the spinous part of the dorsal fin and a striking color pattern on the inner surface or axil of the pectoral fin. The new species also has a narrow interorbital space, its width (5.4–5.6 in HL) less than the orbit diameter (vs 3.9–4.55 in HL, greater than or approximately equal to orbit diameter in the humpback complex) and a single upper opercular spine (vs divided into two or more points).

Scorpaenopsis insperatus has a relatively short snout, its length (3.7–3.9 in HL) less than the orbit diameter, whereas all species belonging to the second species complex have a relatively long snout, with the length (2.7–3.45 in HL) greater than the orbit diameter. Furthermore, *S. insperatus* differs from that species complex in having lower counts of longitudinal scale rows (30–34 vs 43–67 in the latter) and pectoral-fin rays (16 vs modes 17–20 in the 12 species of the complex).

The expanded gonad, full of spermatozoa, in the holotype (48.9 mm SL) of *S. insperatus* indicates that it represents a small species of *Scorpaenopsis*. The seven species, viz. *Scorpaenopsis altirostris, Scorpaenopsis brevifrons, Scorpaenopsis cotticeps, Scorpaenopsis gilchristi, Scorpaenopsis pluralis, Scorpaenopsis pusilla,* and *Scorpaenopsis vittapinna,* belonging to the above third short-snouted species complex are also small (Randall and Eschmeyer, 2002). Although *S. insperatus* is similar to them in overall body appearance, it is distinguished from all seven species by having a single upper opercular spine (vs divided into two or more points in the latter). In addition, *S. insperatus* further differs from the complex in having a single posterior lacrimal spine (vs divided into two or three points in *S. brevifrons, S. pluralis,* and *S. vittapinna*), the second anal-fin spine, of approximately equal length to the third spine, not reaching the tip of the third spine when depressed (vs second spine clearly longer than third spine, extending beyond tip of third spine in *S. altirostris*), a narrow space between the ventral margin of the eye and the suborbital ridge (vs a broad space in all species of the complex, except *S. gilchristi*), 16 pectoral-fin rays (vs 17 in *S. pluralis* and *S. pusilla,* 17–18 in *S. altirostris,* 17–19 in *S. vittapinna* and 18–20 in *S. brevifrons*), 30–34 longitudinal scale rows (vs 33–37 in *Scorpaenopsis cotticeps,* 39 in *S. pluralis,* 40–44 in *S. vittapinna,* 42–45 in *S. brevifrons,* 43 in *S. pusilla* and 45 in *S. altirostris*), 23 pored lateral-line scales (vs 17–19 in *S. cotticeps,* 20 or 21 in *S. vittapinna,* 21 in *S. pusilla* and 24 or 25 in *S. altirostris*), the greatest orbit diameter among the complex (5.4–5.6 in HL vs 5.7–8.8 in HL based on all seven species), the fifth dorsal spine longest (vs fourth in all species, except *S. brevifrons* with subequal fourth to seventh spines and *S. vittapinna* with subequal fifth to seventh spines). In conclusion, *S. insperatus* is distinguished from all of the remaining 24 congeners by having the following combination of characters: a single upper opercular spine and 30–34 longitudinal scale rows.

Apart from species of *Scorpaenopsis,* only one other scorpaenid species, *Sebastapistes fowleri* (Pietschmann), has 12 dorsal-fin spines and lacks palatine teeth, black pigment between the first and third dorsal-fin spines, and a strongly compressed head, the absence of the palatine teeth possibly having occurred independently of *Scorpaenopsis* (Randall and Poss, 2002). *Scorpaenopsis insperatus* is distinct from *Sebastapistes fowleri* in several characters: such as, the preocular spine well developed (usually embedded in the latter), the sphenotic and postorbital spines present (absent or embedded) and the posterior lacrimal spine directed ventroposteriorly (slightly anteriorly). A detailed comparison of *S. fowleri* with species of *Scorpaenopsis* was given by Randall and Poss (2002).

Although *S. insperatus* was collected from Sydney Harbour, no other species of *Scorpaenopsis* have been reported from that locality or south-

ward, the southernmost record of other congeners (*Scorpaenopsis macrochir*: AMS I. 41846-027, two specimens, 47–61 mm SL) along the east coast of Australia being approximately adjacent to the border between Queensland and New South Wales states. This indicates that *S. insperatus* may be better adapted to temperate waters than other congeners, which are primarily tropical and subtropical species.

Comparative material examined.—*Scorpaenopsis altirostris* Gilbert: USNM 51636 (holotype of *S. altirostris*), 47 mm SL, Molokai, Hawaii. *Scorpaenopsis barbata* (Rüppell): WAM-P 25977-003, 115 mm SL, Bahrain Island, Persian Gulf. *Scorpaenopsis cotticeps* Fowler: USNM 98891 (holotype of *S. cotticeps*), 27 mm SL, Tinatka Island, Philippines. *Scorpaenopsis diabolus* (Cuvier): NMV A. 21854, 130 mm SL, off Cairns, Queensland, Australia. *Scorpaenopsis furneauxi* Whitley: AMS E. 2896 (holotype of *Scorpaenopsis palmeri furneauxi*), 92 mm SL, northwest of Pine Peak Island, Queensland, Australia. *Scorpaenopsis gilchristi* Smith: SAIAB 39732, 39 mm SL, off Kosi Bay, KwaZulu-Natal, South Africa; SAM 11851 (holotype of *S. gilchristi*), 57 mm SL, off Tugela River, Natal, South Africa. *Scorpaenopsis macrochir* Ogilby: AMS I. 28518-001, 68 mm SL, Osprey Reef, North Horn, Coral Sea; AMS I. 41846-027 (two specimens), 47–61 mm SL, mouth of Cudgera Creek, New South Wales, Australia. *Scorpaenopsis oxycephala* (Bleeker): WAM-P 31522-001, 132 mm SL, Pulauweh, Sumatra, Indonesia. *Scorpaenopsis papuensis* (Cuvier): WAM-P 30350-012, 72 mm SL, Madang, Papua New Guinea. *Scorpaenopsis possi* Randall and Eschmeyer: WAM-P 21086-001, 104 mm SL, Christmas Island. *Scorpaenopsis ramaraoi* Randall and Eschmeyer: CSIRO 4533-01, 145 mm SL, estuary of Ajkwa River, Irian Jaya. Other specimens examined were listed in Motomura (2002) [*S. ramaraoi* (1 specimen)]; and Motomura et al. (2004) [*Scorpaenopsis cirrosa* (Thunberg) (45, including neotype of *Perca cirrosa*); *S. cotticeps* (7, including holotype and 4 paratypes of *S. iop*); *S. diabolus* (29); *S. macrochir* (6); *Scorpaenopsis neglecta* Heckel (49); *S. orientalis* Randall and Eschmeyer (12, including holotype and 11 paratypes); *Scorpaenopsis oxycephala* (1); *S. papuensis* (24); *S. possi* (35, including a paratype); *S. ramaraoi* (18); *Scorpaenopsis venosa* (Cuvier) (29); and *S. vittapinna* Randall and Eschmeyer (2)].

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