

## Two new Scorpionfishes (Scorpaenidae) from the South Pacific

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*Scorpaenopsis eschmeyeri*, formerly tentatively identified as *S. possi*, is described as new from 17 specimens from Fiji, Chesterfield Islands in the Coral Sea, New Caledonia, and the southern Great Barrier Reef. It is separated from *S. possi* by the lack of the pretympnic spine that is unique to *S. possi*, by its smaller size (largest specimen, 142 mm SL, compared to 194 mm for *S. possi*), and by a longer head, snout, upper jaw, and predorsal length, compared to specimens of *possi* of the same size range. *Scorpaena lacrimatus* is described from a single specimen, 198 mm SL, taken in 400 m off Tahiti, Society Islands. It is distinct from other species of the genus by the combination of the following characters: deep body (depth 2.5 in SL), 17 pectoral rays, and 61 scales in longitudinal series.

Scorpionfishes, aptly named for their venomous fin spines, are not well represented at islands of the South Pacific, compared to the rest of the Pacific. Only 60 species of scorpaenids are known from the South Pacific from Lord Howe Island and New Caledonia to Easter Island (Solomon Islands and Vanuatu not included). By contrast, Poss in Carpenter and Niem (1999) listed 131 scorpaenids (12 with a question mark) for the central and western Pacific (Hawaiian Islands not included).

The Indo-Pacific scorpionfish genus *Scorpaenopsis* was revised by Randall and Eschmeyer (2001); 24 species were recognized, of which eight were described as new. One of these, the wide-ranging *S. possi*, included ten specimens from the southwest Pacific from Fiji to the southern Great Barrier Reef that lack the characteristic small spine (called the pretympnic spine) dorsally on the head before the tympanic spine. No typical *S. possi* were found at any of these localities. These ten specimens were not listed as paratypes of *S. possi*. Recent collections of shore fishes in Fiji by the authors and associates resulted in 12 additional specimens of the same form. Our study of these specimens, plus seven of the nontype “*possi*” (one CAS lot of three specimens from the Great Barrier Reef has been lost) has enabled us to determine that they represent a new species.

The Bishop Museum received a specimen of *Scorpaena* from Tahiti, caught at the unusual depth of 400 m. Four species of *Scorpaena* are reported from South Pacific islands of Oceania west to Australia: *S. thomsoni* Günther from Juan Fernandez Island, *S. orgila* Eschmeyer and Allen from Easter Island, *S. cookii* Günther from the Kermadec Islands to New South Wales, and *S. cardinalis* Richardson and *S. papillosa* (Forster) from New Zealand and southeastern Australia. In addition, *S. thomsoni* Günther was described from Juan Fernandez Island in the eastern Pacific. Comparison of the Tahitian specimen with these species, as well as others from the Indo-Pacific region, revealed that it represents an undescribed species.

The objective of the present paper is the description of these two new scorpionfishes.

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## MATERIALS AND METHODS

Type specimens of the new *Scorpaenopsis* have been deposited at the following institutions: Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Museum National d'Histoire Naturelle, Paris (MNHN); National Science Museum, Tokyo (NSMT); and the U.S. National Museum of Natural History, Washington, D.C. (USNM).

Lengths of specimens are given as standard length (SL), measured from the front of the upper lip to the base of the caudal fin (posterior end of the hypural plate); head length is measured from the same anterior point to the posterior end of the opercular membrane; body depth is the maximum depth from the base of the dorsal spines (as they emerge from the body), and body width the greatest width just posterior to the gill opening; orbit diameter is the greatest bony diameter, and interorbital width the least bony width; upper-jaw length is taken from the front of the upper lip to the posterior end of the maxilla; caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of fin spines and rays are measured to their extreme bases; length of base of dorsal fin is measured from the front of the base of the first dorsal spine to the rear base of the last dorsal ray (not to the end of the membrane connecting ray to caudal peduncle); pectoral-fin length is the length of the longest ray. Morphometric data presented in Tables 1 and 2 are given as percentages of the standard length. Proportional measurements in the text are rounded to the nearest 0.05. Pectoral-ray counts include the slender uppermost unbranched ray; counts were made of the rays on both sides. The scales in longitudinal series on the body were counted as oblique rows from the upper end of the gill opening to the base of the caudal fin. Counts of gill rakers were made on the first gill arch, the raker at the angle is contained in the lower-limb count.

***Scorpaenopsis eschmeyeri* Randall and Greenfield, sp. nov.**

Figs. 1–2; Table 1

**MATERIAL EXAMINED.**—HOLOTYPE: CAS 218804, female, 101.5 mm, Fiji, Vanua Levu, Rabi Island, northwest shore, 16°26.701'S, 179°56.261'W, 25 m from rocky shore, fringing reef, 1–2 m, rotenone, D.W. Greenfield, T.A. Greenfield, R.C. Langston, and J. Pilippoff, 20 May 2003. PARATYPES: CAS 214577, 115 mm SL, Australia, Queensland, Great Barrier Reef, Capricorn Group, One Tree Island, off reef crest on west side just above dropoff, rotenone, V.G. Springer, 7 December 1966; USNM 243332, 108.0 mm, Fiji, Malolo Island, south side of channel at northwest end of island barrier reef, sand channels and rock walls, 0–18 m, rotenone, V.G. Springer et al., 25 May 1982; USNM 259405, 84.0 mm, Fiji, Viwa Island, small islet on Viwa Reef (17°11'S, 176°54'E), rotenone, V.G. Springer et al., 27 May 1982; BPBM 33775, 75.5 mm, Coral Sea, Chesterfield Islands, lagoon, south end, patch reef, 2–4 m, rotenone, M. Kulbicki, J.E. Randall, P.J. Doherty, and C. Goiran, 29 August 1988; BPBM 34264, 2: 64.7–65.5 mm, New Caledonia, lagoon near southeast end of St. Vincent Pass, 22°2.1'S, 165°57.8'E, reef in 2–4 m, rotenone, M. Kulbicki, J.E. Randall et al., 21 March 1990; NSMT-P 67891, 101.0 mm SL, Fiji, Viti Levu, barrier reef off Suva, main channel between wreck and end of reef, 18°8.90'S, 178°23.91'E, spur and groove, 4.5–8 m, rotenone, D.W. Greenfield, K.R. Longnecker, and K.S. Cole, 31 May 1999; BPBM 39423, 63.0 mm SL, same locality as preceding, spur and groove, 12–18.5 m, rotenone, D.W. Greenfield, K.R. Longnecker, K.S. Cole, and R.C. Langston, 27 January 2002; CAS 219133, 2: 27.0–45.5 mm, Fiji, Viti Levu, barrier reef off Suva, fish patch, backside of dropoff towards reef, 18°9.59'S, 178°23.96'E, 7.5–10.5 m, rotenone, D.W. Greenfield, K.R. Longnecker, K.S. Cole, and

R.C. Langston, 2 February 2002; USNM 375892, 94.0 mm, Fiji, nearly the same locality as preceding, 18°9.545'S, 178°23.974'E, 8.5–15 m, same collectors, rotenone, 3 February 2002; AMS I.42980-001, 79.0 mm, Fiji, Viti Levu, off Suva, Makuluva Island, west side, 18°11.227'S, 178°31.040'E, edge of cut in reef, very silty, 3–5 m, same collectors, rotenone, 4 February 2002; BPBM 39424, 2: 38.5–95.5 mm, Fiji, Viti Levu, off Suva, outside barrier reef about 1 mile west of sand bank cut, 18°11.161'S, 178°26.757'E, spur and groove, but mostly coral, 12 m, rotenone, D.W. Greenfield and K.S. Cole, 9 February 2002; CAS 219135, 107 mm, same locality as BPBM 39424, 14–15 m, rotenone, K.R. Longenecker and R.C. Langston, 9 February 2002; CAS 219134, 28 mm, Fiji, Viti Levu, off Suva, outside barrier reef, about 1 mile west of sand bank cut, 18°11.163'S, 178°26.28'E, sandy hole in reef surrounded by coral (mostly dead), 23–24 m, rotenone, D.W. Greenfield, K.R. Longenecker, K.S. Cole, and R.C. Langston, 10 February 2002; MNHN 2004-01171, 97.0 mm, Fiji, Northern Lau Group, Vanua Balavu Island, north side of island at Balavu Harbor, 17°11.212'S, 179°0.095'W, outside barrier reef, sand under an overhang, 12–15 m, rotenone, D.W. Greenfield, K.R. Longenecker, R.C. Langston, and Bio Koroi Mataitini, 8 January 2003.

**DIAGNOSIS.**— Dorsal rays XII,9; anal rays III,5; pectoral rays 17–18 (rarely 18); longitudinal scale series 44–48 (modally 46); body depth 2.8–3.05 in SL; head length 2.2–2.3 in SL; snout length 3.0–3.15 in head length; orbit diameter 4.65–4.95 in head length; nearly one-half of orbit extending above dorsal profile of head; interorbital width 6.75–7.2 in head length; pair of interorbital ridges flaring posteriorly, then curving medially to join slight incurved ridge at front of occipital pit; median interorbital ridge extending half way back in interorbital space; occipital pit shallow and not flat; no coronal spines; no pretympanic spines; suborbital pit not well developed; suborbital ridge with four spines, the first on lacrimal; two ventral spines on lacrimal, one directed mainly anteriorly and the other curving posteriorly; first dorsal spine 1.9–2.4 in second spine; third dorsal spine longest, 2.2–2.7 in head length; eleventh dorsal spine 1.55–2.0 in twelfth spine; second anal spine 1.65–2.0 in head length; no supraoccipital tentacle; color variable, the darkest blotches usually above tip of upper opercular spine, two on lateral line, two obliquely above and forward of these, two in soft portion of dorsal fin, and one in anal fin. Largest type specimen, 115 mm.

**DESCRIPTION.**— Dorsal rays XII,9; anal rays III,5; all dorsal and anal soft rays branched, the last to base; pectoral rays 17 (17, two of 28 counts are 18), the second to fourth branched (second to fourth, fifth, or sixth branched in paratypes); pelvic rays I,5, all soft rays branched; principal caudal rays 13, the middle 11 branched; upper and lower procurrent caudal rays 7, the most posterior segmented; lateral-line scales 22 (22–23), plus two on base of caudal fin, the first at upper end of gill opening spinous, the next few progressively less so; longitudinal scale series 46 (44–48; one of 14 with 44, three with 45, six with 46, three with 47, and one with 48); scales above lateral line to middle of dorsal fin 8; scales below lateral line to origin of anal fin about 16; median predorsal scales about 9; circumpeduncular scales about 25; gill rakers 5 + 9; pseudobranchial filaments of holotype 31 (26 for 79-mm paratype); vertebrae 24.

Body depth 2.8 (2.55–3.05) in SL; body width 1.4 (1.25–1.6) in body depth; head length 2.2 (2.2–2.3) in SL; snout length 3.15 (3.0–3.05) in head length; orbit diameter 4.8 (4.65–5.2) in head length; nearly one-half of orbit extending above dorsal profile of head; interorbital space deeply concave, the least width 6.75 (6.8–7.35) in head length; caudal-peduncle depth 3.65 (3.7–3.95) in head length; caudal-peduncle length 3.1 (2.95–3.6) in head length.

Mouth moderately large, the maxilla extending to a vertical at posterior edge of pupil, the upper-jaw length 2.0 (1.9–1.95) in head length; lower jaw projecting; mouth oblique, forming an angle of about 25° to horizontal axis of body; upper jaw with a dense band of small, slender, con-



FIGURE 1. Holotype of *Scorpaenopsis eschmeyeri*, CAS 218804, female, 101.5 mm, Fiji (D.W. Greenfield).



FIGURE 2. Paratype of *Scorpaenopsis eschmeyeri*, BPBM 33775, male, 75.5 mm, Chesterfield Islands, Coral Sea (J.E. Randall).

ical, incurved, and inwardly depressible teeth in about six to seven rows, narrowing to two or three rows posteriorly, the symphyseal gap at front of jaw about one-third pupil diameter in width; lower jaw with a similar band of teeth in about five or six rows anteriorly, narrowing to one or two posteriorly; three irregular rows of small, slender, incurved, conical teeth forming a V on vomer; no teeth on palatines. Tongue short, very thick and broadly rounded, with a slender rod-like median anterior projection. Gill rakers short, with small spinules, the longest at angle, equal in length to longest gill filaments.

Head spination typical of the genus; no coronal spines; pair of interorbital ridges flaring posteriorly, then curving medially to join slight incurved ridge at front of occipital pit; median interorbital ridge extending half way back in interorbital space; occipital pit shallow and not flat; tympan-

ic spines about equal in length to postocular spines; parietal, and nuchal spines strongly recurved, sharing a broad base; three very small sphenotic spines, followed by the pterotic, lower posttemporal and supracleithral spines; upper posttemporal spine very small; no developed postocular spines; nasal spines small; suborbital pit between anterior part of orbit and large bony knob on lacrimal not deep; suborbital ridge with four spines, the first on lacrimal more erect; lacrimal with a dorsoanterior ridge, an anterior ridge (without a sharp anterior tip), and two ventral spines, one strongly directed anteriorly and the other curving posteriorly; two opercular spines, the upper flat, without a ridge, the lower preceded by a slightly curved ridge with a short ridge above and adjacent to its base; four preopercular spines, the uppermost with an anterior supplemental spine, the lowermost very short; clavicular spine strong, projecting dorsoposteriorly, without a median ridge.

No supraocular tentacle; a small tentacle associated with anterior ventral spine of lacrimal and two large flat fimbriate tentacles following posterior spine; a series of four small cutaneous flaps on lower jaw just below lower lip; a few small flaps on lower edge of preopercle and three slender ones posteriorly on upper part of maxilla; body with very small scattered cutaneous flaps; lateral line with flaps on fourth, sixth, ninth (largest), thirteenth, sixteenth (small), and twentieth scales.

Anterior nostril below base of nasal spine, with a posterior fimbriate flap about twice as long as spine; posterior nostril at edge of orbit below preocular spine, with a low fleshy rim.

Scales on body ctenoid, becoming cycloid ventrally on abdomen, chest, and prepectoral area, extending onto base of pectoral fins in a broad V-shape; cycloid scales basally on opercle, including a few embedded scales above base of ridge of lower spine; scales on opercular flap between opercular spines; no scales on fins except three vertical rows on base of caudal fin.

Origin of dorsal fin above supracleithral spine, the predorsal length 2.45 (2.3–2.5) in SL; first dorsal spine 2.2 (1.9–2.4) in second spine, 7.1 (6.2–7.35) in head length; third dorsal spine longest, 2.7 (2.2–2.65) in head length; eleventh dorsal spine 1.75 (1.55–2.0) in twelfth spine; last dorsal soft ray joined by membrane to dorsal edge of caudal peduncle above base of penultimate lateral-line scale; origin of anal fin below base of first dorsal soft ray, the preanal length 1.4 (1.35–1.4) in SL; first anal spine 4.1 (3.5–4.2) in head length; second anal spine much longer than third, 2.0 (1.65–1.9) in head length; first anal soft ray longest, 1.9 (1.5–2.0) in head length; caudal fin slightly rounded, 1.6 (1.55–1.65) in head length; sixth and seventh pectoral rays longest, 1.45 (1.35–1.6) in head length; origin of pelvic fins below base of third dorsal spine (hence distinctly posterior to base of pectoral fins), the prepelvic length 2.5 (2.5–2.6) in SL; pelvic spine 2.7 (2.4–2.8) in head length; pelvic fins approaching or extending slightly posterior to anus, the second ray longest, 1.6 (1.5–1.7) in head length.

*Color of holotype in alcohol:* body brownish gray, becoming white on abdomen and chest, with six irregular blackish blotches along back, progressively smaller posteriorly, a black spot above clavicular spine, and less distinct blackish blotches along or near lateral line; ventral part of body from above anus to base of caudal with irregular near-white blotches, the largest lightbulb-shape on lower half of caudal peduncle; head brownish gray, pale ventrally, with light gray-brown blotches; a black spot on opercular membrane above upper opercular spine, and another on lower part of opercle below level of upper preopercular spine; a large dark blotch above and posterior to upper corner of maxilla; maxilla blotched with white; lips crossed with dark gray-brown spots; spinous portion of dorsal fin mottled gray and whitish, the soft portion gray along about basal third, whitish on outer two-thirds, with two slightly oblique blackish cross bands, the more anterior the most distinct; anal fin white with four irregular oblique dark bands, the third darkest; caudal fin pale with four or five brownish gray spots forming irregular bars; pectoral fins pale gray-brown, whitish distally, with irregular dark brownish gray cross bands; pelvic fins whitish with a few faint gray blotches on outer part of first four soft rays.

TABLE 1. Proportional measurements of type specimens of *Scorpaenopsis eschmeyeri* expressed as percentages of the standard length.

	CAS	CAS	BPBM	BPBM	AMS I.	USNM	BPBM	NSMT-P	CAS
	218804	219133	34264	33775	42980	375892	39198	67891	214577
Sex	female	immature	male	male	female	female	female	female	female
Standard Length (mm)	101.5	45.5	65.5	75.5	79	94	95.5	101	115
Body depth	35.7	32.8	33.8	35.2	33.7	33.7	34.5	34.2	39.4
Body width	25.9	22	22.6	24.1	25.2	26.7	24.6	23.8	24.7
Head length	45.3	43.8	44	44.6	43.9	44.7	44.8	45.5	45.5
Snout length	14.3	14.5	14.6	15.2	14.3	14.6	14.6	14.8	15
Orbit diameter	9.3	9.2	9.2	9.3	8.9	9.6	9.6	9.5	8.8
Interorbital width	6.7	6.6	6.3	6.1	6.2	6.6	6.5	6.6	6.2
Caudal-peduncle depth	12.4	11.5	11.5	11.9	11.7	11.7	12.1	11.5	12.3
Caudal-peduncle length	14.7	14.5	13.5	13.9	14.9	14.3	12.6	12.9	12.7
Upper-jaw length	22.9	22.2	22.3	23.7	22.8	22.9	23.1	23.7	23.4
Predorsal length	41	40	39.9	40.4	40.2	40.5	41.5	41.7	40.5
Preanal length	72.5	72.2	71	70.8	71.3	72.6	72.8	73	72.7
Prepelvic length	40.1	39.2	38.3	39.7	38.8	39	39.3	39.7	41.1
Dorsal-fin base	57.2	56.4	55.2	57.6	58.6	57	55.1	55.2	57.9
First dorsal spine	6.4	7.1	7	6.8	6.8	6.9	7.2	6.2	7.1
Second dorsal spine	13.3	17.1	14.9	14.8	14	13.9	13.8	14	14.9
Longest dorsal spine	16.7	19.8	18.7	19.6	18.3	18.1	18.3	17.1	18.4
Eleventh dorsal spine	7.9	7.7	7.7	8	7.6	8.5	8.4	9	8.2
Twelfth dorsal spine	13.8	14.5	14.3	15.2	15.1	13.9	14.6	13.9	14.1
Longest dorsal soft ray	18.9	19.8	19.9	20.2	18	18.4	19.9	18.5	19.6
Anal-fin base	14.5	15.9	14.8	16.4	16.8	15.6	14.7	15	14.5
First anal spine	10.8	11.4	10.5	12.1	12.6	10.7	12	10.9	12.4
Second anal spine	22.6	24.8	26.7	27.1	25.9	24.2	25.2	23.8	25.3
Third anal spine	19.3	20.4	21.7	21.2	21.4	20.1	21.2	19.4	19.4
Longest anal soft ray	24.1	24.5	26.8	24.9	24.8	23.5	24	23	23.3
Caudal-fin length	27.8	28.7	29.3	29.2	27.8	27.7	27.6	27.6	28.4
Pectoral-fin length	31	32.6	30.7	31.8	31.4	30.9	30.7	28.7	29.6
Pelvic-spine length	16.7	17.3	17.5	18.7	16.7	15.6	16.9	16.4	17
Pelvic-fin length	27.8	28.3	28.1	27	29	28.2	27.2	26.5	27

*Color of holotype when fresh:* body above pectoral fin to below ninth dorsal spine mottled reddish brown, becoming mottled reddish gray posteriorly to caudal peduncle where irregularly marked with pale red and dark reddish brown; dark brown blotches more conspicuous than on preserved specimen; cutaneous flaps dorsally on body and on lateral line pale bluish gray, those on lower side pale tan with white edges; abdomen pale salmon; head mottled brownish red, pale orange-red ventrally and on chest and lower part of prepectoral area; head, body, median fins, and upper part of pectoral fins with numerous white dots, many grouping to form irregular markings;

areas of dorsal and anal fins indicated as pale in preservative were light red when fresh; caudal-fin membranes transparent, the rays banded with pale red and dark reddish brown; pectoral fins similar in color to caudal fin, the lower ten rays more banded in light red; pelvic fins with a large circular light red area covering most of outer three-fifths of fin, the margin white, the base pale salmon.

**ETYMOLOGY.**— Named in honor of William N. Eschmeyer in recognition of his research on the Scorpaenidae.

**REMARKS.**— In their revision of *Scorpaenopsis*, Randall and Eschmeyer (2001:59) listed seven lots of the genus from Fiji, New Caledonia, Chesterfield Islands in the Coral Sea, and One Tree Island of the Capricorn Group, southern Great Barrier Reef as nontype specimens of *S. possi*. These specimens lack the pretympanic spine that is unique to *S. possi*. No typical specimens of *S. possi* were found at any of these localities. Randall and Eschmeyer suggested that these specimens represent a southwestern population of *S. possi* in the Pacific. Our additional 12 specimens from Fiji, 27–108 mm SL, provided for more comparison with *S. possi* and the conclusion that this population represents a new species.

Our first suspicion that the specimens from the southwest Pacific represent a new species was noting their small size compared to *S. possi*, with mature females as small as 79 mm SL. Twenty specimens of *S. eschmeyeri* are 142 mm SL or less (these include the lot of three uncataloged CAS nontype specimens of *S. possi* listed by Randall and Eschmeyer, which have been lost). Nineteen of these are 117 mm SL or less. Seventy type specimens of *S. possi* are larger than 117 mm SL, and 18 range from 142–194 mm SL, the largest from Rarotonga, Cook Islands.

The 142-mm specimen of *S. eschmeyeri* is one of two specimens from the Capricorn Group of the southern Great Barrier Reef listed as nontypes of *S. possi* by Randall and Eschmeyer (then as CAS uncat.). The smaller specimen, 115 mm SL, is now CAS 214577. The larger specimen is tentatively identified as *S. eschmeyeri*, but it is not listed as a paratype because of its unusual large size compared to the other type specimens and because it was preserved with the mouth rigidly and fully open and the body curved, hence making accurate measurements difficult. It is cataloged separately as CAS 219194.

Although we found no meristic differences to separate *S. eschmeyeri* from *S. possi*, four measurements serve to differentiate the two species when comparing specimens of the same size range: head length, snout length, upper-jaw length, and predorsal length.

The head length of 10 Bishop Museum paratypes of *S. possi* from 59–121 mm SL is 42.5–43.4% SL, compared to 43.9–45.5% for 17 *S. eschmeyeri*. The snout length of *S. possi* is 13.4–14.2% SL (except BPBM 29332, 86 mm SL, from the Ryukyu Islands with 14.9%), compared to 14.3–15.9% for *S. eschmeyeri*. The upper-jaw length of *S. possi* is 20.6–22.5% SL, compared to 22.2–24.5% SL for *S. eschmeyeri*. The predorsal length of *S. possi* is 37.0–39.8% SL, compared to 39.9–42.1% SL for *S. eschmeyeri*.

The best character to separate the two species is the presence of pretympanic spines in *S. possi* (larger than about 60 mm SL) and their absence in *S. eschmeyeri*.

The two species are not known to coexist. *Scorpaenopsis possi* ranges from the Red Sea and east coast of Africa to the islands of French Polynesia except Rapa. The distribution in the western Pacific is from Taiwan to the Solomon Islands. *Scorpaenopsis eschmeyeri* is currently represented by specimens from Fiji, New Caledonia, the Chesterfield Islands in the Coral Sea, and the southern Great Barrier Reef.

***Scorpaena lacrimata* Randall and Greenfield, n. sp.**

Fig. 3; Table 2

**MATERIAL EXAMINED.**— Holotype: BPBM 31706, female, 198.0 mm, Society Islands, Tahiti, 400 m, hook and line, Michel Kung (via Louise Wrobel), 24 October 1990.

**DIAGNOSIS.**— Dorsal rays XII,9; anal rays III,5; pectoral rays 17; longitudinal scale series 61; body depth 2.5 in SL; head length 2.15 in SL; snout length 3.2 in head length; orbit diameter 4.6 in head length; about one-third of orbit extending above dorsal profile of head; interorbital width 7.35 in head length; pair of interorbital ridges curving at front of occipital pit to join tympanic spines; median interorbital ridge extending half way back in interorbital space; occipital pit quadrangular and moderately deep; no coronal spines; no suborbital pit; suborbital ridge with four spines, the first on lacrimal; first dorsal spine 1.8 in second spine; third and fourth dorsal spines longest, equal to second anal spine, 2.35 in head length; eleventh dorsal spine 1.65 in twelfth spine; supraoccipital tentacle present; small tentacles associated with ventral spines of lacrimal; no tentacles or cutaneous flaps on chin or on body; a row of small teeth on palatines; pale yellowish in alcohol, with scattered small dark brown spots on head, body, and dorsal fin; a short, narrow, dark brown bar extending ventrally from middle of edge of orbit.

**DESCRIPTION.**— Dorsal rays XII,9; anal rays III,5; all dorsal and anal soft rays branched, the last to base; pectoral rays 17, the second to eighth branched; pelvic rays I,5, all soft rays branched; principal caudal rays 14, the median 12 branched, the lower simple rays thickened; upper and lower procurrent caudal rays 7, the posterior two segmented lateral-line scales 22, the first two spinous; longitudinal scale series 61; scales above lateral line to middle of dorsal fin 10; scales below lateral line to origin of anal fin 19; median predorsal scales about 9; circumpeduncular scales about 25; gill rakers 4 + 10; pseudobranchial filaments 52; vertebrae 24.

Body deep for the genus, the depth 2.5 in SL; body width 1.6 in body depth; head length 2.15 in SL; snout length 3.2 in head length; orbit diameter 4.6 in head length; about one-third of orbit extending above dorsal profile of head; interorbital space deeply concave, the least width 7.35 in head length; caudal-peduncle depth 3.9 in head length; caudal-peduncle length 3.1 in head length. Mouth terminal and large, the maxilla extending to below posterior edge of orbit, the upper-jaw length 2.0 in head length; mouth oblique, forming an angle of about 25° to horizontal axis of body; upper jaw with a dense band of small, slender, conical, incurved, and inwardly depressible teeth in about eight rows, narrowing to two or three rows posteriorly, the symphyseal gap at front of jaw one-half pupil diameter in width; lower jaw with a similar band of teeth in about six or seven rows anteriorly, narrowing to two rows posteriorly; a single row of small, slender, incurved, conical teeth forming a 'V' on vomer; similar teeth in a single row on palatines. Tongue thick and triangular with a fleshy rounded tip, the upper surface coarsely plicate. Gill rakers short, with spinules, the longest at angle nearly as long as longest gill filaments.

Head with the usual complement of head spines, most prominent and retrorse; no coronal spines; pair of interorbital ridges flaring posteriorly, each curving laterally at anterior edge of occipital pit to join tympanic spine; median interorbital ridge extending half way back in interorbital space; occipital pit quadrangular, flat, and moderately deep; tympanic, parietal, and nuchal spines broad-based and of about equal size; two sphenotic spines, followed by the pterotic, lower posttemporal (upper posttemporal directly above), and supracleithral spines; two very small postocular spines (only as small bumps on right side); no suborbital pit; suborbital ridge with four spines, the first on lacrimal more erect; lacrimal with four other spines, the first mainly a forward-directed ridge with a very short free tip; second and third spines directed dorsoventrally (the third clearly shortest), the last spine curving ventroposteriorly; two opercular spines, slender and not

divided, each preceded by a prominent ridge, the upper curved, and the lower slightly curved; five preopercular spines, the uppermost with a strong anterior supplemental spine, the lower two very short; clavicular spine strong, projecting dorsoposteriorly, with a slight median ridge.

A fleshy supraorbital tentacle about three-fourths orbit diameter in length between supraocular and post-ocular spines; a small slender tentacle ventrally at front of lacrimal, another at base of second ventral spine of lacrimal, and one with last lacrimal spine, broad and as long as spine; a few small tentacles on lower edge of preopercle, the largest with the fifth preopercular spine; no flaps or tentacles detected on chin or elsewhere on head and body.

Anterior nostril below base of nasal spine, with a posterior fimbriate flap longer than spine; posterior nostril at edge of orbit below preocular spine, with a slight membranous rim, the posterior edge with a few cirri.

Scales on body ctenoid, becoming cycloid ventrally on abdomen and on chest; prepectoral scales embedded; cycloid scales dorsally on opercle above upper spine; no scales on opercular flap above upper spine or below lower spine, but many on flap between spines; no scales on fins except three vertical rows on base of caudal fin.

Origin of dorsal fin above upper posttemporal spine, the predorsal length 2.7 in SL; first dorsal spine 1.8 in second spine, 5.1 in head length; third and fourth dorsal spines longest, 2.35 in head length; eleventh dorsal spine 1.65 in twelfth spine; second and third dorsal soft rays longest, 2.8 in head length; last dorsal soft ray joined by membrane to dorsal edge of caudal peduncle above base of penultimate lateral-line scale; origin of anal fin below base of twelfth dorsal spine, the preanal length 1.35 in SL; first anal spine 4.7 in head length; second anal spine slightly longer than third, 2.35 in head length; first and second anal soft rays longest, 1.6 in head length; caudal fin rounded, 2.2 in head length; ninth pectoral ray longest, 1.65 in head length; origin of pelvic fins posterior to base of pectoral fins, the prepelvic length 2.3 in SL; pelvic spine 2.45 in head length; pelvic fins extending posterior to anus, the second ray longest, 1.8 in head length.

*Color in alcohol:* pale yellowish with scattered dark brown spots, most on body no larger than scales, the most prominent on body above clavicular spine, above lower posttemporal and supraclithral spines, and as a curved transverse band across scaled part of nape; a short, narrow, dark brown bar extending ventrally from middle of orbit in line with a spot below second suborbital spine; a dark brown spot at convergence of opercular ridges; postorbital, sphenotic, and pterotic spines each in a dark brown blotch; occipital pit dusky with two small dark brown spots posteriorly; fourth interspinous membrane with a dusky blotch containing a vertically elongate dark brown

TABLE 2. Proportional measurements of holotype of *Scorpaena lacrimata* as percentages of the standard length

	<i>BPBM</i> <i>31706</i>
Standard length (mm)	198.0
Body depth	40.3
Body width	25.3
Head length	46.4
Snout length	14.4
Orbit diameter	10.1
Interorbital width	6.3
Caudal-peduncle depth	11.6
Caudal-peduncle length	14.5
Upper-jaw length	22.5
Predorsal length	37.1
Preanal length	73.8
Prepelvic length	43.5
Dorsal-fin base	62.2
First dorsal spine	9.1
Second dorsal spine	16.3
Longest dorsal spine	19.7
Eleventh dorsal spine	9.6
Twelfth dorsal spine	15.6
Longest dorsal ray	16.4
Anal-fin base	16.1
First anal spine	9.9
Second anal spine	19.7
Third anal spine	18.2
Longest anal ray	28.7
Caudal-fin length	21.2
Pectoral-fin length	27.8
Pelvic-spine length	19.0
Pelvic-fin length	26.5



FIGURE 3. Holotype of *Scorpaena lacrimata*, BPBM 31706, 198 mm, Tahiti, 400 m (J.E. Randall).

spot; two dark blotches on fifth membrane and one on sixth, eighth, and ninth membranes; six small dark blotches on soft portion of dorsal fin, mainly on outer half; anal fin with two small dusky spots; caudal fin with dusky pigment on membranes forming a broad band across middle of fin; pectoral fins with two such transverse bands, one at base and one two-thirds out on fin; pelvic fin pale (one was removed).

**ETYMOLOGY.**— Named *lacrimata* from the Latin meaning to shed tears or weep, in reference to the short dark brown bar below the eye, reminiscent of a tear.

**REMARKS.**— No information was given on the color in life, but the fish was probably mainly red, in view of its capture in 400 m. The fins were pinned in erect position, and one pelvic fin was removed, suggesting that a photograph may have been taken, but none was provided.

Four other species of *Scorpaena* are known from islands of the South Pacific from Lord Howe Island to Easter Island. *Scorpaena lacrimata* differs from all in its greater body depth (2.5 in SL, compared to 2.7–3.1 for the mean depth of the four other species; data from Eschmeyer and Allen 1971 and Paulin 1982) and its count of 61 scales in longitudinal series. Paulin (1982) reported 48–50 scales for *S. cardinalis*, 64–67 for *S. cookii*, and 43–47 for *S. papillosa*. Eschmeyer and Allen (1971) counted 50–55 scales for *S. orgila*. The pectoral-ray count of 17 differentiates *lacrimata* further from *S. orgila* and *S. papillosa*, which have 15–16 pectoral rays. The chest of *S. lacrimata* is fully scaled, whereas that of *S. cookii* is naked and *S. cardinalis* has embedded scales.

Elsewhere in the Pacific, the genus *Scorpaena* is represented by two species in the Hawaiian Islands (Eschmeyer and Randall 1975), three in Japan (Nakabo 2002), two of which range to the south, and one in the Philippines (*S. hemilepidotus* Fowler). All are readily separated from *S. lacrimatus* by pectoral-ray counts except the two Hawaiian species, which differ in having 45 scales in longitudinal series, and *S. onaria* Jordan and Snyder from Japan, which has 17–19 (usually 17) pectoral rays (Motomura and Iwatsuki 1997); it is distinct in its low scale count and sharply descending anterior part of the lateral line.

Günther (1880:24, pl. 12) described *Scorpaena thomsoni* from the Juan Fernandez Island in the eastern Pacific off Chile. It seems to be the closest species to *S. lacrimata* from its color pat-

tern and general morphology. It differs in its lower count of scales in longitudinal series (Günther gave a count of 42, but his very good illustration shows 52), scaled prepectoral area (scales so embedded on *S. lacrimata* that scale outlines not readily seen), cutaneous flaps on body, a near-truncate caudal fin, and nine instead of ten lower pectoral rays unbranched.

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