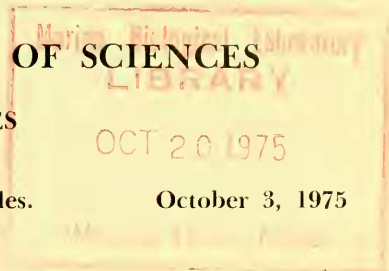


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THE SCORPAENID FISHES OF THE HAWAIIAN ISLANDS, INCLUDING NEW SPECIES AND NEW RECORDS (PISCES: SCORPAENIDAE)

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ABSTRACT: The number of species of the fish family Scorpaenidae now known from the Hawaiian Islands totals 26. This includes two new species (*Scorpaenopsis brevifrons* and *Scorpaena pcle*), and four new records (*Phenacoscorpius nebris*, *Scorpaenodes corallinus*, *Scorpaenodes hirsutus*, and *Scorpaenodes littoralis*). In addition, the following are treated as valid Hawaiian species: *Dendrochirus barberi*, *Ectreposebastes imus*, *Iracundus signifer*, *Neomerinthe rufescens*, *Plectrogenium nanum*, *Pontinus macrocephalus*, *Pterois sphex*, *Rhinopias xenops*, *Scorpaena balliui*, *S. colorata*, *S. coniorta*, *S. galactacma*, *Scorpaenodes kelloggi*, *S. parvipinnis*, *Scorpaenopsis altirostris*, *S. cacopsis*, *S. diabolus*, *S. fowleri*, *Setarches guentheri*, and *Taenianotus triacanthus*. All species are at least briefly described, all are figured, and a key is provided. Synonymies based on Hawaiian references are included for all species; non-Hawaiian references and new Indo-Pacific records are given for a few species.

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INTRODUCTION

The shallow-water fish fauna of the Hawaiian Islands is of particular interest because of the high level of endemism associated with its isolated geographic location. The family Scorpaenidae is representative, for nine of a

total of 26 species presently are known only from Hawaiian waters. Two species are known only from Hawaii and Japan. The remaining species of scorpaenids occur elsewhere in the Indo-Pacific region and two of these also occur in the Atlantic. Certain groups of scorpionfishes are absent from the Hawaiian Islands but are present in the central and western Pacific; for example, no stonefishes (Synanceiinae) occur in Hawaii.

The scorpionfishes of Oceania are not well known except at the Hawaiian Islands. This is particularly true of those occurring in depths below about 30 meters. We suspect that at least some of the deeper-living species known only from Hawaii will be found at other localities in the Pacific as appropriate depths are sampled.

Many of the scorpaenids which live at depths below about 50 meters were described from specimens collected by the United States Fish Commission steamer *Albatross* in 1901-1902. In the last few years, new material has been taken by the National Marine Fisheries Service vessel *Townsend Cromwell*, and these specimens have been made available to us. Extensive recent collecting in inshore waters to depths of about 200 feet using scuba gear has resulted in additional valuable material. Rather than report solely on the new species and new records of Hawaiian scorpionfishes, we have provided a synopsis of all Hawaiian species. Also, for some species, we have presented new records from other Indo-Pacific localities, as well as comments on possible synonyms or close relatives.

ACKNOWLEDGMENTS

Persons aiding the study were many. We especially thank Paul J. Struhaker, National Marine Fisheries Service (NMFS), Honolulu, for making available specimens collected by the *Townsend Cromwell*. John Fowler (NMFS) provided fresh specimens of 2 offshore species collected by the *Townsend Cromwell*. William D. Madden provided information on *Iracundus signifer* and provided the specimens of *Phenacoscorpius megalops*. We wish to thank the following persons for assistance during visits to museums: Alwyne C. Wheeler, British Museum of Natural History (BM (NH)); James E. Böhlke, Academy of Natural Sciences of Philadelphia (ANSP); M. L. Bauchot, Museum National d'Histoire Naturelle (MNHN), Paris; the staff of the United States National Museum of Natural History (USNM); William A. Gosline and George Losey, University of Hawaii (UH); Paul Kausbauer, Naturhistorisches Museum, Wien (NMW); and John R. Paxton, Australian Museum, Sydney (AMS). R. J. McKay, Queensland Museum, Brisbane (QMB), generously loaned the type of *Scorpaenopsis macrochir*. Margaret M. Smith, Rhodes University (RU), Grahamstown, loaned a specimen of *Scorpaenodes littoralis*. Richard Rosenblatt, Scripps Institution (SIO), provided a specimen of *Ectreposcbastes niger*. Bruce B. Collette, Systematics Laboratory,

National Marine Fisheries Service, arranged for a loan of a specimen of *E. niger* and supplied data on the holotype of that species. We are indebted to various persons for aiding in scuba collections with Randall, particularly Gerald R. Allen, Deetsie Neil Chave, and Paul M. Allen. David T. Anderson assisted in analysis of the humpbacked species of the genus *Scorpaenopsis*. Melissa Barbour, Lillian Dempster, W. I. Follett, Warren Freihofer, Maurice Giles, James Gordon, Tomio Iwamoto, John McCosker, Cherryl Pape, Stuart Poss, Katherine Smith, Pearl Sonoda, and Beverly Wesemann of the California Academy of Sciences (CAS) aided the study as did Helen Randall from the Bernice P. Bishop Museum (BPBM). W. I. Follett and Lillian Dempster provided advice on nomenclatural problems. Kaza V. Rama Rao, Zoological Survey of India, provided comments on the manuscript. We especially thank Lillian Dempster for assistance with literature and for reviewing the manuscript.

Funds from a National Science Foundation grant (NSF 15811) allowed Eschmeyer to visit museums. Many of the shallow-water specimens were collected with grant support from the National Geographic Society and National Science Foundation to Randall for studies on other fishes.

METHODS

Measurements, counts, and terminology of head spines follow Eschmeyer (1969b) with a few modifications. Preorbital spines are here termed lachrymal spines. The last soft ray in the dorsal and anal fins in all Hawaiian species is a double ray, often appearing as two close-set rays. The fraction $\frac{1}{2}$, as in anal rays $5\frac{1}{2}$, is used to draw attention to the fact that the last ray is double and should not be counted as 2 rays.

In MATERIAL EXAMINED sections we list representative specimens from typical habitats and more briefly indicate additional material. The number of specimens followed by the range in standard length is given in parentheses. If only the number of specimens is given, then no fin-ray counts were made on any of the specimens in that lot.

Abbreviations of depositories of specimens are given in the INTRODUCTION with the following exceptions: SU (Stanford University) and GVF (George Vanderbilt Foundation), these specimens now being housed at the California Academy of Sciences. Specimens listed as NMFS uncat. are now at the National Marine Fisheries Service Laboratory, Honolulu, but most of this material eventually will be deposited at the United States National Museum of Natural History. Much of the University of Hawaii collection has been transferred to the Bernice P. Bishop Museum; the specimens reported with both UH and BPBM numbers were transferred, while those with only a UH number remain at the University of Hawaii.

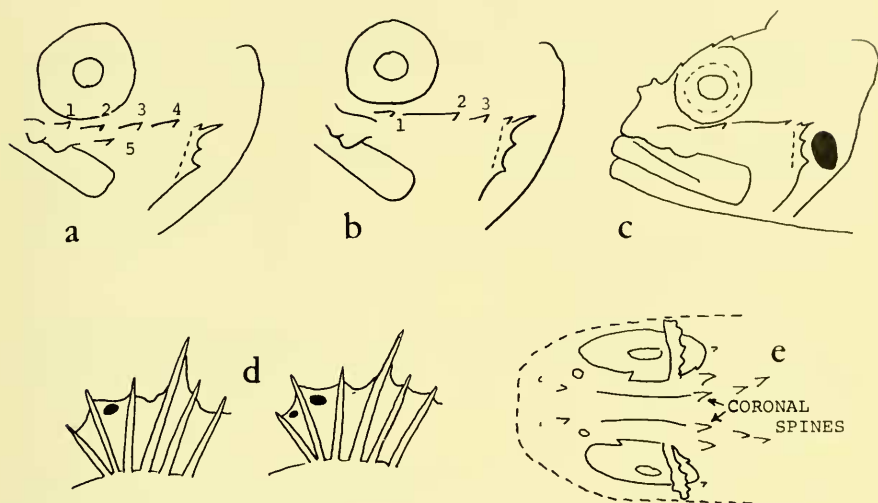


FIGURE 1. Selected features used in key.

KEY TO SCORPIONFISHES OF THE HAWAIIAN ISLANDS

NOTE. Consult figure 1 for diagrams accompanying key. "Deepwater" means that the species occurs deeper than about 50 meters. The coloration for most species is diagnostic and the reader should consult the appropriate figures.

1a. Dorsal spines 13	2
1b. Dorsal spines 12	8
2a. Pectoral rays unbranched; $6\frac{1}{2}$ anal soft rays	<i>Pterois sphex</i> (figure 2a)
2b. Some pectoral rays branched; $5\frac{1}{2}$ anal soft rays	3
3a. Dorsal spines long, longest nearly as long as or longer than depth of body	<i>Dendrochirus barberi</i> (figure 2b)
3b. Dorsal soft rays short, the longest less than $\frac{1}{2}$ depth of body	4
4a. Vertical scale rows (counted 2 or 3 rows above lateral line from above first lateral line scale to end of hypural) fewer than 32; dorsal soft rays usually $8\frac{1}{2}$	5
4b. Vertical scale rows more than 40; dorsal soft rays usually $9\frac{1}{2}$ (except <i>Scorpaenodes corallinus</i> with $8\frac{1}{2}$)	6
5a. Pectoral rays 17-18; suborbital ridge with 4 spines plus extra spine below main ridge (figure 1a)	<i>Scorpaenodes hirsutus</i> (figure 3)
5b. Pectoral rays 18-20, usually 18-19; suborbital ridge usually with 3 spines (figure 1b)	<i>Scorpaenodes kelloggi</i> (figure 4)
6a. Suborbital ridge with more than 5 spinous points (frequently 10 or even 20 or more)	<i>Scorpaenodes parvipinnis</i> (figure 5a)
6b. Suborbital ridge with 3 or fewer spinous points	7

- 7a. Dorsal soft rays $9\frac{1}{2}$; dusky spot on subopercle behind preopercular spines (figure 1c) *Scorpaenodes littoralis* (figure 5b)
- 7b. Dorsal soft rays $8\frac{1}{2}$; dark spot not present on subopercle behind preopercular spines *Scorpaenodes corallinus* (figure 5c)
- 8a. Pectoral rays 22-23; dorsal soft rays $7\frac{1}{2}$; tenth dorsal spine very short, nearly separated from ninth and eleventh; a deepwater species *Plectrogenium nanum* (figure 6)
- 8b. Pectoral rays fewer than 20; dorsal soft rays $9\frac{1}{2}$ or more; tenth dorsal spine joined by membrane to ninth and eleventh spines 9
- 9a. Pectoral rays 14-15, usually 14; body strongly compressed, width usually about one-fourth of body depth; body covered with rough papillae instead of normal scales *Taenianotus triacanthus* (figure 7)
- 9b. Pectoral rays 16 or more; body not greatly compressed; body covered with normal scales 10
- 10a. Fourth dorsal spine especially elongate in specimens over about 60 mm. S.L. (smaller specimens may be identified solely by the next character); black pigment between spines 1-3 or 2-3 (figure 1d) *Iracundus signifer* (figure 8)
- 10b. Fourth dorsal spine not especially elongate; no black spot between spines 1-3 11
- 11a. Lateral line a more or less continuous trough (covered by thin membranous scales which are usually lost on capture); head cavernous, with ossification weak; scales tiny and cycloid 12
- 11b. Lateral line normal, scales tubed; head not cavernous, ossification normal; scales cycloid or ctenoid 13
- 12a. Orbit diameter subequal to interorbital width; pectoral rays 20-22; anal soft rays usually $5\frac{1}{2}$; a deepwater species *Setarches guentheri* (figure 9)
- 12b. Orbit diameter about one-half of interorbital width; pectoral rays 19-20; anal soft rays usually $6\frac{1}{2}$; a deepwater species *Ectreposebastes imus* (figure 10)
- 13a. Enlarged, black melanophores on caudal peduncle as in figure 11; lateral line incomplete, only 4 or 5 tubed scales present anteriorly; a deepwater species *Phenacoscorpius megalops* (figure 11)
- 13b. No enlarged black melanophores on caudal peduncle; lateral line complete 14
- 14a. Pectoral fin rays unbranched; a deepwater species *Pontinus macrocephalus* (figure 12)
- 14b. Upper pectoral fin rays branched (look carefully at tips) 15
- 15a. Palatine teeth absent genus *Scorpaenopsis* 16
- 15b. Palatine teeth present 20
- 16a. Pectoral rays 16 (15 or 17 should be expected occasionally); (a tiny species not exceeding about 30 mm. S.L.) *Scorpaenopsis fowleri* (figure 13)
- 16b. Pectoral rays 17-19, mostly 18 or 19 17
- 17a. Pectoral rays usually 19; dark spot frequently present at midheight of spinous

- portion of dorsal fin between spines 3 or 4 to 6 or 7 *Scorpaenopsis brevifrons* new species (figures 14-15)
- 17b. Pectoral rays usually 17 or 18, rarely 19; no dark spot present on spinous portion of dorsal fin 18
- 18a. A hump behind head (as in figure 16); (see also figure 17b for coloration inside of pectoral fin) *Scorpaenopsis diabolus* (figures 16-17)
- 18b. Not humpbacked 19
- 19a. Eye diameter smaller than snout length; numerous tentacles present on lower jaw *Scorpaenopsis eacopsis* (figure 18)
- 19b. Eye large, nearly $1\frac{1}{2}$ times snout; 1 or 2 tentacles present on lower jaw; a deepwater species *Scorpaenopsis altirostris* (figure 19)
- 20a. Head compressed and orbit elevated; vertical scale rows about 70; a deepwater species *Rhinopias xenops* (figure 20)
- 20b. Head normal; vertical scale rows usually fewer than 50 21
- 21a. Pectoral rays 18-19; a deepwater species *Neomerinthe rufescens* (figure 21)
- 21b. Pectoral rays 17 or fewer, very rarely 18; most species in shallow water genus *Scorpaena* 22
- 22a. Scales on sides cycloid *Scorpaena galactacma* (figure 22a)
- 22b. Scales on sides ctenoid 23
- 23a. Pectoral rays usually 16; shallow water 24
- 23b. Pectoral rays usually 17; deep water 25
- 24a. Body and fins with conspicuous dark spots; coronal spines absent (not as in figure 1e) *Scorpaena coniorta* (figure 22b)
- 24b. Body and fins without conspicuous dark spots; coronal spines present (figure 1e) *Scorpaena ballieui* (figure 23)
- 25a. Scales on breast buried (area appears unscaled); 4 spines on suborbital ridge, the first on lateral face of lachrymal bone *Scorpaena pele* new species (figures 24, 25a)
- 25b. Breast with obvious scales; 3 spines on suborbital ridge *Scorpaena colorata* (figure 25b)

Genus *Pterois* Oken

Pterois OKEN, 1817, p. 1182 [misprinted as p. 1782] (type-species *Scorpaena volitans* Linnaeus by monotypy; based on Cuvier's 'Les Pterois').

REMARKS. Generic synonyms are not included. The genus *Pterois* is very closely related to the genus *Dendrochirus*; the 2 genera are separated on the basis of long unbranched pectoral rays (a juvenile feature) in adults of the genus *Pterois*; some rays are branched in adults of the genus *Dendrochirus*. Juveniles are very similar in all features, and separate genera possibly may not be warranted. We do not recognize the genus *Pteropterus* Swainson as

distinct from *Pterois* as does Smith (1957b). Only one species occurs in Hawaiian waters.

***Pterois sphex* Jordan and Evermann.**

(Figure 2a.)

Pterois sphex JORDAN & EVERMANN, 1903a, p. 201 (original description; type locality Hawaiian Islands, one specimen from Honolulu; holotype USNM 50650); JORDAN & EVERMANN, 1905, pp. 464-465, fig. 203 (description from Jordan and Evermann, 1903a; figure of holotype); JORDAN & SEALE, 1906, p. 379 (name only; Hawaiian Islands); JORDAN & JORDAN, 1922, p. 56 (listed); FOWLER, 1925, p. 27 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 294, pl. 35A (synonymy; description; photograph of colored cast); TINKER, 1944, pp. 270-271, fig. (brief diagnosis; figure from Jordan and Evermann, 1905); SMITH, 1957b, pp. 78, 81 (compared with *P. russelli* and *P. mombasae*); GOSLINE & BROCK, 1960, pp. 284-286, 341, fig. 262 (brief mention; in key; line drawing); GOSLINE, 1965, p. 825 (depth distribution).

MATERIAL EXAMINED. USNM 50650 (1, 112 mm. S.L., holotype of *Pterois sphex*), Oahu, Honolulu, D. S. Jordan and B. W. Evermann, 19 Jan. 1904. BPBM 7812 (1, 36.8), Hawaii, Kona Coast, off Puako, coral bottom in 15 meters, J. E. Randall, 7 Aug. 1969. BPBM 7813 (4, 37.1-68.5), Oahu, Pupakea and Waimea Bay, in 15 meters, rock ledge, J. E. Randall *et al.*, 24 Aug. 1969. BPBM 7814 (1, 148), Oahu, off Makua, at base of ledge in 30 meters, G. R. Allen, 20 March 1969. BPBM 7882 (3, 16.8-27.7), Oahu, Waimea Bay, in 3.5-5.5 meters, G. R. Allen, 30 May 1968. BPBM 7883 (1, 30.0), Oahu, Kaneohe Bay, ledge, J. E. Randall and E. Chave, 10 Oct. 1969. BPBM 9771 (1, 70.0), Oahu, off Makaha Shores Condominium, small caves in reef in 14 meters, J. E. Randall and A. R. Emery, 26 Apr. 1970. BPBM 10625 (1, 44.8), Oahu, Waimea Bay, G. R. Allen, Sept. 1966. CAS 15721 (1, 23.5), Oahu, Waimea Bay, W. P. Davis, 15 July 1967. Additional material is available in the BPBM and CAS collections, and specimens collected by the *Townsend Cromwell* are present in the NMFS collection.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, 10½ (sometimes XIII, 11½). Anal fin rays III, 6½. Pectoral fin rays 15-16, usually 16. Pectoral rays all unbranched, very long, and free from membrane distally. Dorsal spines very long, some about as long as body depth. Scales ctenoid, about 50-55 vertical scale rows. Coronal spines present. Most head spines become multiple with growth. Lachrymal and suborbital bones densely covered with spines at specimen length of 100 mm. S. L. Supraocular tentacles banded with black, frequently tentacles absent in large specimens. Coloration (fig. 2a) is also diagnostic (small specimens have fewer bars on pectoral and pelvic fins).

DISTRIBUTION. This species is known only from the Hawaiian Islands. It has been collected by scuba diving in depths from about 3 to 30 meters. These collections were made during daytime hours, and the specimens were found

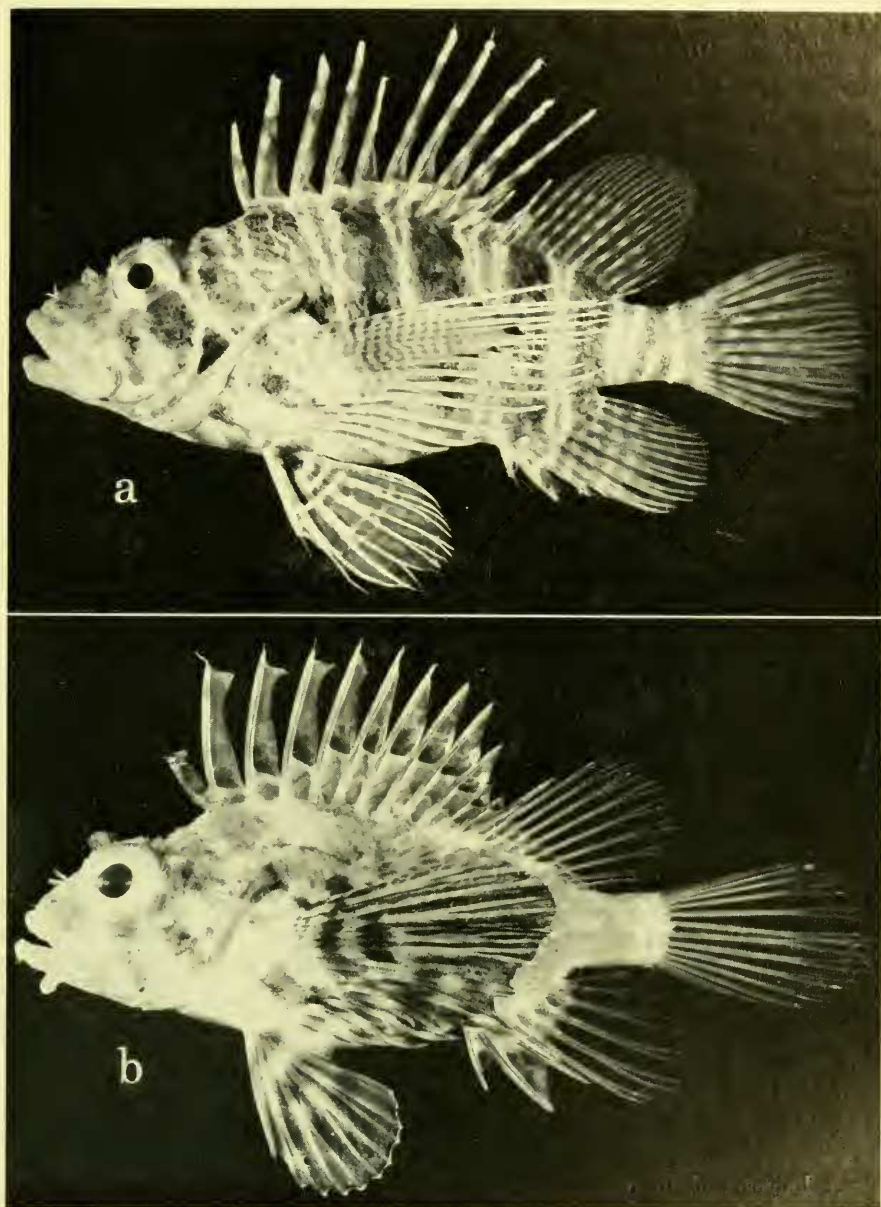


FIGURE 2. a: *Pterois sphex*, BPBM 7814, 154 mm. S. L., Oahu. (Photograph of fresh specimen.) b: *Dendrochirus barberi*, BPBM 6540, Oahu. (Photograph of preserved specimen.)

TABLE 1. Counts of dorsal and anal fin rays in Hawaiian scorpionfishes (based only on Hawaiian specimens).

	Dorsal spines		Dorsal soft rays					Anal spines	Anal soft rays		
	12	13	7½	8½	9½	10½	11½	3	5½	6½	7½
<i>Pterois sphex</i>	—	13	—	—	—	12	1	12	—	13	—
<i>Dendrochirus barberi</i>	—	23	—	1	21	1	—	23	23	—	—
<i>Scorpaenodes hirsutus</i>	—	12	—	11	1	—	—	12	12	—	—
<i>Scorpaenodes kelloggi</i>	—	15	1	14	—	—	—	15	15	—	—
<i>Scorpaenodes parvipinnis</i> ¹	1	15	—	—	16	—	—	16	15	—	—
<i>Scorpaenodes littoralis</i>	—	10	—	—	10	—	—	10	9	1	—
<i>Scorpaenodes corallinus</i>	—	4	—	4	—	—	—	4	4	—	—
<i>Plectrogenium nanum</i> ²	14	—	13	—	—	—	—	14	14	—	—
<i>Taenianotus triacanthus</i> ³	12	—	—	1	1	10	—	12	1	10	—
<i>Iracundus signifer</i>	13	—	—	—	12	1	—	13	13	—	—
<i>Setarches guentheri</i>	32	—	—	—	1	31	—	32	31	1	—
<i>Ectreposebastes imus</i>	19	—	—	—	—	18	1	19	—	17	2
<i>Phenacoscorpius megalops</i>	2	—	—	—	2	—	—	2	2	—	—
<i>Pontinus macrocephalus</i>	15	—	—	—	2	13	—	15	15	—	—
<i>Scorpaenopsis diabolus</i> ⁴	24	—	—	1	20	2	—	24	23	1	—
<i>Scorpaenopsis cacopsis</i>	11	—	—	1	10	—	—	11	11	—	—
<i>Scorpaenopsis brevifrons</i> ⁵	12	—	—	—	13	—	—	13	13	—	—
<i>Scorpaenopsis fowleri</i>	4	—	—	—	4	—	—	4	4	—	—
<i>Scorpaenopsis altirostris</i>	4	—	—	—	4	—	—	4	4	—	—
<i>Rhinopias xenops</i>	4	—	—	—	4	—	—	4	4	—	—
<i>Neomerinthe rufescens</i>	15	1	—	1	14	1	—	16	16	—	—
<i>Scorpaena coniorta</i>	11	—	—	—	10	1	—	11	11	—	—
<i>Scorpaena ballieui</i>	10	—	—	—	10	—	—	10	10	—	—
<i>Scorpaena galactacma</i> ¹	14	—	—	—	12	1	—	14	14	—	—
<i>Scorpaena pele</i>	19	—	—	1	18	—	—	19	19	—	—
<i>Scorpaena colorata</i>	17	—	—	—	17	—	—	17	17	—	—

¹ One with 5 soft anal rays.² Holotype with 6½ soft dorsal rays.³ One with 6 soft anal rays.⁴ One with 9 soft dorsal rays.⁵ One with 6 + scaled area + 1 dorsal spines.

under ledges and in or near caves. If the behavior of this species is similar to that of the other members of the genus *Pterois* as observed by G. R. Allen and by us, then the species tends to stay in concealed areas during daylight hours but ranges over adjacent areas while feeding at night. The *Townsend Cromwell* trawled 6 specimens from 5 stations off Molokai in 119–124 meters. These specimens, with one exception, were all taken at night.

Genus *Dendrochirus* Swainson

Brachirus SWAINSON, 1839, p. 71 (see Remarks).

Dendrochirus SWAINSON, 1839, p. 180 (see Remarks).

Brachyrus SWAINSON, 1839, p. 264 (see Remarks; type-species *Pterois zebra* Cuvier by subsequent designation of Swain, 1883, p. 277).

Nemapterois FOWLER, 1938a, p. 73 (type-species *Nemapterois biocellatus* Fowler by original designation, monotypic).

REMARKS. Swainson (1839) first used the spelling *Brachirus* on p. 71; then on p. 180 he substituted the name *Dendrochirus*, but on p. 264, where species were included, he used the name and spelling *Brachyrus*. Moreover, on p. 303 he used the name *Brachirus* for a genus of sole. We treat *Brachirus* (of p. 71) as an inadvertent spelling error. Bleeker (1876b, p. 42) serves as the first revisor selecting *Dendrochirus* over *Brachyrus*.

Dendrochirus barberi (Steindachner).

(Figure 2b.)

Pterois barberi STEINDACHNER, 1900a, p. 175 (original description; type locality South Pacific [one small specimen found by Captain Barber in the plankton during the trip from Honolulu to Cape Horn, 1896-1897]); STEINDACHNER, 1900b, pp. 491-492, pl. 3, fig. 2 (more complete description including the figure).

Dendrochirus hudsoni JORDAN & EVERMANN, 1903a [April 11], pp. 202-203 (original description; type locality Hawaiian Islands, Oahu, Waikiki; holotype USNM 50652); SNYDER, 1904, p. 536 (listed, Honolulu); BÖHLKE, 1953, p. 120 (location of types).

Dendrochirus chloreus JENKINS, 1903 [July 23], pp. 498-499 fig. 41 (original description; type locality Hawaiian Islands, Honolulu; holotype USNM 50701); JORDAN & SNYDER, 1904b, p. 126 (one from Honolulu market); JORDAN & EVERMANN, 1905, pp. 465-466, fig. 204 (mostly compiled from Jenkins, 1903; figure of type of *D. chloreus* from Jenkins, 1903); JORDAN & SEALE, 1906, p. 379 (name only, Hawaiian Islands); JORDAN & JORDAN, 1922, p. 55 (listed); BÖHLKE, 1953, p. 120 (location of types).

Dendrochirus barberi: JORDAN & SNYDER, 1904b, p. 126 (*hudsoni* a synonym of *barberi*); JORDAN & EVERMANN, 1905, p. 465, color pl. 73 (description mostly from Jordan and Evermann, 1903; *hudsoni* as a synonym of *barberi*); JORDAN & SEALE, 1906, p. 379 (listed, Hawaii; *hudsoni* as a synonym); JORDAN & JORDAN, 1922, p. 56 (listed).

Brachirus chloreus: FOWLER, 1925, p. 27 (listed, Hawaiian Islands).

Dendrochirus zebra (not of Quoy and Gaimard): FOWLER, 1928, pp. 294-295 (in part; *barberi* wrongly as young of *zebra*); WAHLERT, 1955, p. 326 (type of *barberi* in Übersee Museum, Bremen).

Dendrochirus brachypterus (not of Cuvier): FOWLER, 1928, p. 295 (in part; *hudsoni* and *chloreus* included in synonymy); PIETSCHMANN, 1930, p. 18 (Kaneohe Bay, Oahu); FOWLER, 1931, p. 349 (in part; two specimens from Kona, Hawaii); FOWLER, 1934, p. 430 (in part; one specimen from Kewalo Bay, Oahu); PIETSCHMANN, 1938, pp. 5, 30-31 (brief description; color like *chloreus*; one from French Frigate Shoal); TINKER, 1944, p. 271, fig. 9 on pl. 6, text fig. (brief description; figure of type of *chloreus* from Jenkins, 1903); GOSLINE & BROCK, 1960, p. 341 (wrongly included *barberi* in synonymy).

REMARKS. The type specimen of *D. barberi* is in the Übersee Museum in Bremen, West Germany (Wahlert, 1955). It has not been examined by us.

TABLE 2. Counts of left pectoral fin rays in Hawaiian scorpionfishes (specimens from Hawaii only; footnotes are used when the left or right fin-ray count differed such that the count for one side was unusual for the species).

	14	15	16	17	18	19	20	21	22	23	24
<i>Pterois sphex</i>	—	1	12	—	—	—	—	—	—	—	—
<i>Dendrochirus barberi</i>	—	—	—	2	21	—	—	—	—	—	—
<i>Scorpaenodes hirsutus</i>	—	—	—	4	8	—	—	—	—	—	—
<i>Scorpaenodes kelloggi</i>	—	—	—	—	5	9	1 ^a	—	—	—	—
<i>Scorpaenodes parvipinnis</i>	—	—	—	—	13 ^b	3	—	—	—	—	—
<i>Scorpaenodes littoralis</i>	—	—	—	3	4	3	—	—	—	—	—
<i>Scorpaenodes corallinus</i>	—	—	—	1	3 ^b	—	—	—	—	—	—
<i>Plectrogenium nanum</i>	—	—	—	—	—	—	—	—	4	9	1
<i>Tacnianotus triacanthus</i>	11	1	—	—	—	—	—	—	—	—	—
<i>Iracundus signifer</i>	—	—	—	4 ^c	9	—	—	—	—	—	—
<i>Setarches guentheri</i>	—	—	—	—	—	—	4	23	5 ^d	—	—
<i>Ectreposebastes imus</i>	—	—	—	—	—	10	8	1 ^e	—	—	—
<i>Phenacoscorpius megalops</i>	—	—	—	2	—	—	—	—	—	—	—
<i>Pontinus macrocephalus</i>	—	—	2	13	—	—	—	—	—	—	—
<i>Scorpaenopsis diabolus</i>	—	—	—	2 ^c	22	—	—	—	—	—	—
<i>Scorpaenopsis cacopsis</i>	—	—	—	1 ^c	10 ^{ab}	—	—	—	—	—	—
<i>Scorpaenopsis brevifrons</i>	—	—	—	—	1	10	2 ^a	—	—	—	—
<i>Scorpaenopsis fowleri</i>	—	—	4	—	—	—	—	—	—	—	—
<i>Scorpaenopsis altirostris</i>	—	—	—	1	3	—	—	—	—	—	—
<i>Rhinopias xenops</i>	—	—	—	—	3	1	—	—	—	—	—
<i>Ncomerithe rufescens</i>	—	—	—	—	12 ^a	4 ^c	—	—	—	—	—
<i>Scorpaena coniota</i>	—	1	10	—	—	—	—	—	—	—	—
<i>Scorpaena ballieui</i>	—	—	9	1	—	—	—	—	—	—	—
<i>Scorpaena galactacma</i>	—	1 ^f	11	2	—	—	—	—	—	—	—
<i>Scorpaena ptele</i>	—	—	1 ^b	18	—	—	—	—	—	—	—
<i>Scorpaena colorata</i> ¹	—	—	1 ^b	13 ^g	2 ^b	—	—	—	—	—	—

^a One with 19 on right.

^b One with 17 on right.

^c One with 18 on right.

^d 23 on right in one specimen.

^e 20 on right.

^f 16 on right.

^g Two with 18 on right.

¹ One abnormal specimen with 15 + 16.

The type was reported as 31 mm. in standard length and was reportedly taken in the plankton during the trip from Hawaii to Cape Horn. A 61-mm. S. L. specimen came to a nightlight station and was captured by G. R. Allen at Hanalei Bay, Kauai, so we know that small specimens can be found in surface waters. Because of this and because the species is otherwise known only from the Hawaiian Islands, we suspect the small holotype was collected very soon after leaving port in the Hawaiian Islands.

MATERIAL EXAMINED. USNM 50652 (1, 33.4, holotype of *Dendrochirus hudsoni*), Oahu, Waikiki Beach, U. S. Bureau of Fisheries, 1901. USNM 50701 (1, 97.4, holotype of *Dendrochirus chloreus*), Oahu, Honolulu, O. P. Jenkins,

1889. SU 23294 (5, about 35–55.3, paratypes of *D. chlorcus*) and SU 23315 (1, 72.8, paratype of *D. chlorcus*), Oahu, Honolulu, O. P. Jenkins, 1889. USNM 126089 (1, 43.5), Oahu, Honolulu, *Albatross*, 1902. SU 7467 (2, 33.8–37.5, paratypes of *D. hudsoni*), Oahu, Honolulu, U. S. Fish Commission, 1901. ANSP 87600 (1, 62.9), Honolulu, J. W. Thompson, 1910. ANSP 104663 (1, 72.7), Honolulu, C. M. Cooke, 16 Oct. 1923. BPBM 6540 (1, 50.3), Oahu, Moku Manu, north side in 49 meters, base of vertical dropoff, J. E. Randall *et al.*, 9 Oct. 1968. BPBM 7975 (1, 66.7), Oahu, Pokai Bay, in 9 meters, J. E. Randall *et al.*, 29 July 1969. CAS 15690 (2), Oahu, west side of Waimea Bay, in 6–9 meters, J. E. Randall *et al.*, 25 Aug. 1969. CAS 15693 (9, 36.8–54.2), Oahu, off rocky islet at SW. end of Waimea Bay, in 1–10.5 meters, J. E. and L. A. Randall and P. M. Allen, 27 July 1970. CAS 15714 (1, 80.8), Hawaiian Leeward Islands, reef on NW. side of Laysan, 25°46'27"N., 171°44'37"W., GVF Reg. no. 26, V. E. Brock, R. R. Harry *et al.*, 3 July 1951. SU 7846 (2, 40.0–114), Oahu, Honolulu, U. S. Fish Commission, 1901. SU 8420 (2, 98.5–116), Honolulu, E. L. Berndt, 1902. Additional material is available in the ANSP, BPBM, CAS, and USNM collections.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, 9½. Anal fin rays normally III, 5½. Pectoral fin rays 17–18, mostly 18. Pectoral fin large, upper rays branched distally. Dorsal fin spines longer than ½ body depth, membranes deeply incised. Scales ctenoid, about 50–55 vertical scale rows. Coronal spines present. Some branching of head spines in large specimens. Suborbital ridge a single row of spines, not as broad patch of tiny spinules. Supraocular tentacle when present short, less than orbit diameter, and usually absent; not banded with black.

DISTRIBUTION. *Dendrochirus barberi* is known only from the Hawaiian Islands. It has been collected in depths from near shore to about 50 meters.

Genus *Scorpaenodes* Bleeker

Scorpaenodes BLEEKER, 1857, p. 371 (type-species by monotypy, *Scorpaena polylepis* Bleeker, 1851).

Generic synonyms and a discussion of the limits of the genus *Scorpaenodes* are given by Eschmeyer (1969a, pp. 2–3).

Five species of *Scorpaenodes* occur in Hawaiian waters; all are widespread Indo-Pacific species.

Scorpaenodes hirsutus (Smith).

(Figure 3.)

Parascorpaenodes hirsutus SMITH, 1957a, p. 63, fig. 5, pl. 1E (original description; as type of new genus; type locality western Indian Ocean, Bazaruto, 21°30'S., 35°30'E.; four paratypes, from Pinda, Bazaruto, and Aldabra; comparisons with *S. kelloggi*).

No Hawaiian references apply to this species.

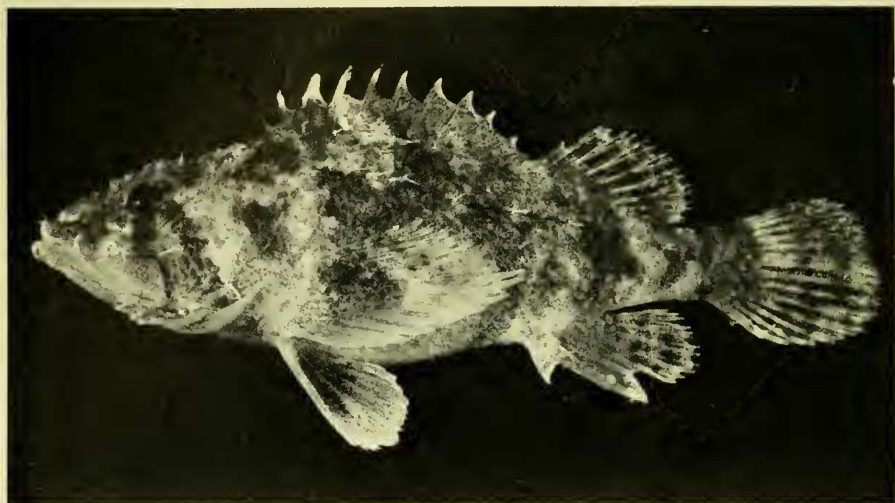


FIGURE 3. *Scorpaenodes hirsutus*, BPBM 13913, 39 mm. S. L., Rarotonga. (Photograph of fresh specimen.)

MATERIAL EXAMINED. BPBM 13742 (12, 30.6–41.8), Oahu, Kahe Point, E. Chave, 9 March 1968. CAS 13473, formerly UH 1644 (1, 33.3), Oahu, Hauula Park, W. A. Gosline *et al.*, 11 May 1952.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, $8\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral rays 17–18, usually 17. Vertical scale rows about 30 (as in *S. kelloggi*; see key couplet 5 to separate *hirsutus* and *kelloggi*). Sub-orbital ridge usually with 4 spines, first on lateral face of lachrymal bone; usually 1 additional spine below suborbital ridge at level between second and third spines. Interorbital spines present. No small spines at midline between tympanic spines.

DISTRIBUTION. Until now this species has been known only from the type specimens from the western Indian Ocean and a recent listing from Tahiti (Randall, 1973), but it appears that *Scorpaenodes hirsutus* is a widespread Indo-Pacific species. We can report it from the following localities besides Hawaii: Johnston Island (BPBM 13740), Palmyra (BPBM 7787) and Fanning (BPBM 7548) in the Line Islands, Tahiti (BPBM 7809), the Ryukyu Islands (BPBM 8703), Rarotonga (BPBM 13913), and Mauritius (BPBM 16384). CAS specimens are from Ifaluk and Kapingamarangi in the Caroline Islands, Comoro Islands, Chagos Archipelago, Red Sea, and Taiwan. Depths of capture where available are from near shore to 40 meters, and the habitat of this species appears to be coral reef areas.

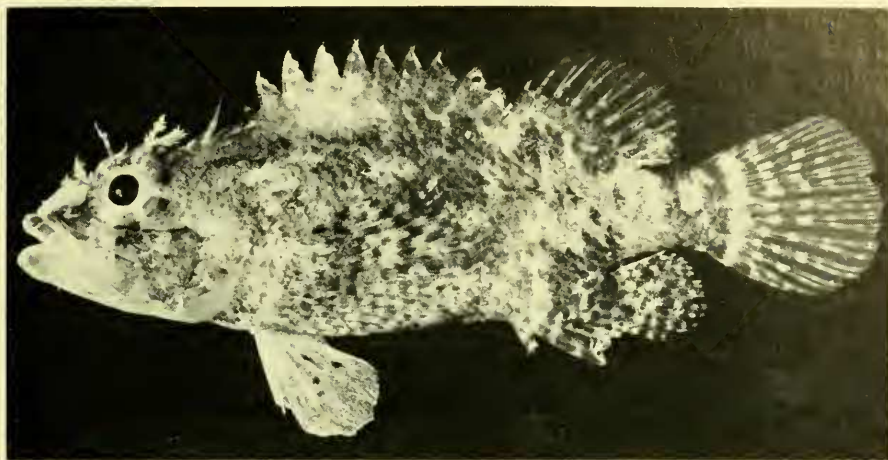


FIGURE 4. *Scorpaenodes kelloggi*, BPBM 8593, 39 mm. S. L., Oahu. (Photograph of fresh specimen.)

Scorpaenodes kelloggi (Jenkins).

(Figure 4.)

(Synonymy based only on Hawaiian references.)

Sebastopsis kelloggi JENKINS, 1903, pp. 492–493, fig. 37 (original description; type locality coral rocks on reef at Honolulu, Hawaii; holotype USNM 50694); SNYDER, 1904, p. 535 (listed, Honolulu); JORDAN & EVERMANN, 1905, pp. 462–463, fig. 202 (description; additional Hawaiian specimens; figure from Jenkins, 1903); JORDAN & SEALE, 1906, p. 374 (abundant at Hawaii; compared with *S. guamensis* and *S. scaber*); BÖHLLKE, 1953, p. 124 (location of types).

Scorpaenodes kelloggi: JORDAN & JORDAN, 1922, p. 54 (listed; common on reefs); JORDAN & EVERMANN, 1926, p. 10 (listed); BORODIN, 1930, p. 59 (listed, Pearl Harbor); FOWLER, 1928, p. 290 (synonymy; brief description); FOWLER, 1934, p. 430 (listed); PIETSCHMANN, 1938, pp. 5, 30, pl. 18 (brief description; one specimen from Kaneohe Bay [second specimen and figure possibly *S. hirsutus*]); TINKER, 1944, pp. 266–267, fig. (brief diagnosis; figure of type from Jenkins, 1903); FOWLER, 1949, p. 107 (compiled synonymy); SMITH, 1957a, p. 63 (compared with *S. hirsutus*); SCHULTZ, 1966, pp. 35–36, fig. 142 (figure of type from Jenkins, 1903; remainder of account deals with Marshall and Marianas Islands specimens).

Scorpaenodes guamensis (not of Quoy and Gaimard): TANAKA, 1928, p. 826 (*S. kelloggi* in synonymy).

Scorpaenodes parvipinnis (not of Garrett): GOSLINE & BROCK, 1960, p. 340 (*S. kelloggi* in synonymy).

MATERIAL EXAMINED. USNM 50694 (1, 37.7, holotype of *Sebastopsis kelloggi*) and SU 23306 (1, about 24, paratype of *S. kelloggi*), Oahu, coral rocks at Honolulu, O. P. Jenkins, 1889. BPBM 8593 (9, 21.0–37.5), Oahu, Waimea Bay, in 6–9 meters, J. E. Randall *et al.*, 25 Aug. 1969. BPBM 8594 (1, 32.9), Oahu, Kahe Point, E. Chave, 9 Mar. 1968. BPBM 9787 (5, 19.2–31.9),

Oahu, off Makaha Shores Condominium, in 14 meters, small caves in reef, J. E. Randall and A. R. Emery, 26 Apr. 1970. BPBM 10967 (5), Oahu, off Waikiki, in 7.5 meters, sand and small coral head and coral rubble, J. E. Randall, E. Chave, and students, 30 Mar. 1969. BPBM 12288 (4), Oahu, off Pokai Bay in 24 meters, J. E. Randall *et al.*, 29 July 1969. CAS 15689 (3), Oahu, artificial reef off Aina Haina, in 23 meters, J. E. Randall *et al.*, 12 Sept. 1969. Additional Hawaiian material is present in the BPBM and CAS collections.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, $8\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays usually 18–19, rarely 20. Vertical scale rows about 30 (as in *S. hirsutus*; see key couplet 5). Suborbital ridge with 3 or 4 spines in a single row. Interorbital spines present. No small spines at midline between tympanic spines.

DISTRIBUTION. *Scorpaenodes kelloggi* is a small species inhabiting coralline areas in depths from near shore to at least 24 meters. It appears to be widespread in the Indo-Pacific. We can report this species from Tahiti (BPBM 8650, 8368), and localities represented by CAS specimens include Palmyra, Raiatea, Palau Islands, Gilbert Islands, Caroline Islands, and Taiwan.

Scorpaenodes parvipinnis (Garrett).

(Figure 5a.)

(Synonymy based only on Hawaiian references.)

Scorpaena parvipinnis GARRETT, 1864, pp. 105–106 (original description; type locality Sandwich Islands [Hawaii]); GÜNTHER, 1873, p. 75, fig. D on pl. 52 (description; Hawaii and Raiatea).

Sebastopsis guamensis (not of Quoy and Gaimard): FOWLER, 1900, p. 535 (one specimen, ANSP 12207).

Sebastopsis parvipennis: SEALE, 1902, p. 20 (specific name misspelled; listed).

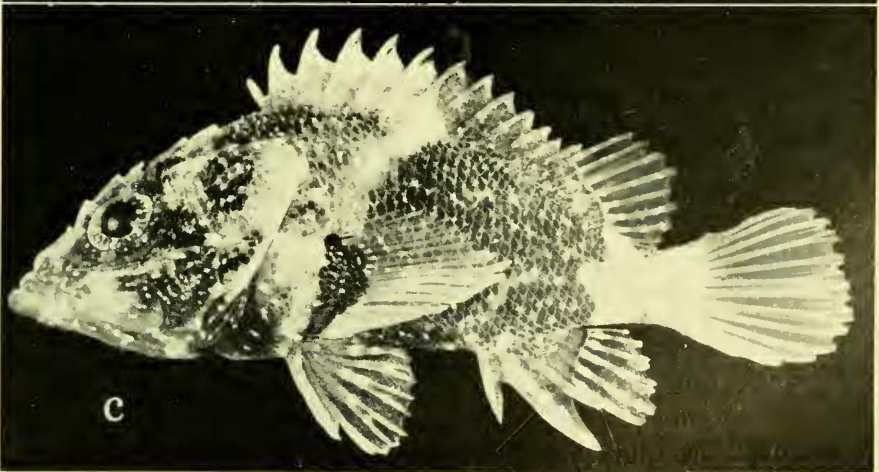
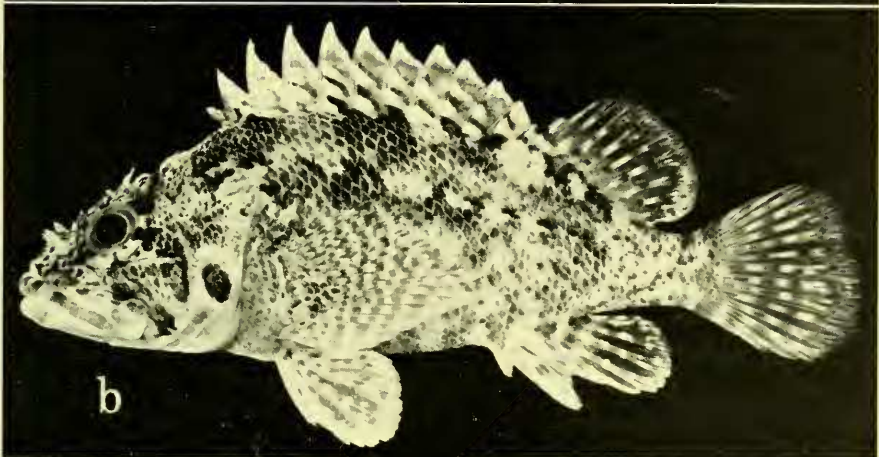
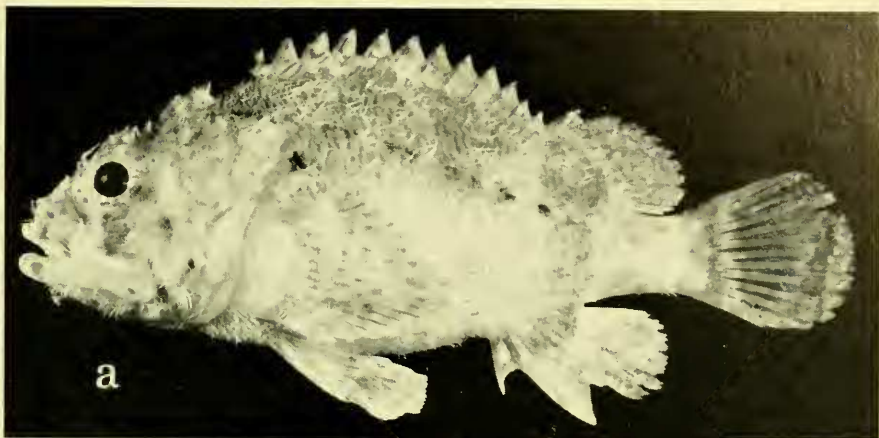
Sebastopsis parvipinnis: SNYDER, 1904, p. 535 (listed, Honolulu); JORDAN & EVERMANN, 1905, pp. 462–463 (description; brief synonymy; one specimen taken by the *Albatross*); JORDAN & SEALE, 1906, p. 374 (compiled).

Scorpaenodes parvipinnis: JORDAN & JORDAN, 1922, p. 54 (listed; very rare); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 290 (synonymy; description; Hawaiian specimens); FOWLER, 1941, p. 257 (one from Hawaii); TINKER, 1944, p. 266 (compiled); FOWLER, 1949, p. 107 (synonymy); GOSLINE & BROCK, 1960, pp. 284, 287, 341, fig. 264 (brief description; in key; line drawing; *S. kelloggi* included in synonymy); GOSLINE, 1965, p. 825 (depth distribution).

MATERIAL EXAMINED. BPBM 7818 (1, 50.8), Oahu, off Waikiki, in 24 meters in coral, J. E. Randall and S. Swerdloff, 3 Sept. 1969. BPBM 7822 (1, 45.0), Oahu, Moku Manu, in 26 meters, J. E. Randall and W. J. Baldwin, 6

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FIGURE 5. a. *Scorpaenodes parvipinnis*, BPBM 7823, 69 mm. S. L., Hawaii. b. *Scorpaenodes littoralis*, BPBM 13732, 80 mm. S. L., Oahu. c. *Scorpaenodes corallinus*, BPBM 13730, 36 mm. S. L., Oahu. (Photographs of fresh specimens.)



Oct. 1969. BPBM 7823 (1, 66.5), Hawaii, Kona Coast, off point at north end of Honaunau Bay, in 43–49 meters, J. E. Randall *et al.*, 16 Aug. 1969. BPBM 7892 (1, 91.3), Oahu, Diamond Head Park, in 2 meters, G. R. Allen, 6 Mar. 1966. BPBM 9859 (3, 48.8–63.6), Oahu, off Lahilahi Point, in 27 meters, J. E. Randall and P. M. Allen, 11 July 1970. BPBM 13741 (1, 94.3), Hawaii, Mauna Loa, lava flow kill, H. Moore on *O'Malley*, 3 June 1950. CAS 13478, formerly UH 1644 (8, 50.4–92.5), Oahu, Hauula Park, W. A. Gosline *et al.*, 11 May 1952. CAS 15696 (2), Oahu, off rocky islet at SW. end of Waimea Bay, 1–10.5 meters J. E. and L. A. Randall and P. M. Allen, 27 July 1970. CAS 15712 (2), Oahu, Waikiki, $\frac{1}{2}$ mi. off Niumalu Hotel, in 7.5–9 meters, W. A. Gosline *et al.*, GVF Reg. no. 54, 7 Sept. 1951. Additional Hawaiian material is available in the BPBM collection.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, $9\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays 17–19, usually 18. Scales very strongly ctenoid; vertical scale rows 45–55; interorbital area and snout scaled. Small spines at midline between tympanic spines frequently present. Interorbital spines present. Extra spines usually present on upper rear margin of eye after supraocular spine. Dorsal spines short, usually none longer than orbit diameter. Body often covered with small skin flaps (as in fig. 5a).

This species is distinguished from other species of *Scorpaenodes* by having the suborbital ridge with more than 5 spinous points, usually with 10 or more in adults.

DISTRIBUTION. *Scorpaenodes parvipinnis* has been taken in depths from near shore to about 45 meters in Hawaii. This species occurs widely in the Indo-Pacific from Africa and the Red Sea to the central Pacific.

Scorpaenodes littoralis (Tanaka).

(Figure 5b.)

Sebastea littoralis TANAKA, 1917, p. 10 (original description; type locality Misaki, Japan).
Hawaiian reference:

?*Scorpaenodes guamensis* (not of Quoy and Gaimard): GOSLINE & BROCK, 1960, pp. 284, 287, 341 (brief description; Hawaii).

Scorpaenodes guamensis was reported from Hawaii by Gosline and Brock (1960), but this species does not occur in Hawaiian waters. At least some specimens in the University of Hawaii collection available to Gosline and Brock and labeled *S. guamensis* are specimens which appear to be referable to *S. littoralis* (Tanaka), the type locality of which is Japan.

MATERIAL EXAMINED. BPBM 10059 (2, 41.8–69.0), Oahu, off Pupukea on north shore, in 21 meters, rock and sand bottom, from small cave, J. E. Randall, 9 Aug. 1970. BPBM 10174 (4, 50.0–73.6), Oahu, off Kahana Bay, west side, $\frac{1}{4}$ mi. out, cave in 26 meters, J. E. Randall, 27 Sept. 1970. BPBM 13731 (2, 55.8–60.9), Oahu, artificial reef off Pokai Bay, in 26 meters, J. E. Randall *et*

al., 21 June 1969. BPBM 13732 (2, 67.7–76.5), Oahu, Waimea Bay, west side, large boulders and some sand, J. E. Randall *et al.*, 25 Aug. 1969. CAS 13476, formerly UH 360 (2, 61.3–63.9), Oahu, Hauula Park, W. A. Gosline and class, 28 June 1949. CAS 13477 (1, 73.0), Oahu, Kaena Point, W. A. Gosline and class, 4 Mar. 1950.

DISTINGUISHING FEATURES. Dorsal fin rays normally XIII, $9\frac{1}{2}$. Anal fin rays normally III, $5\frac{1}{2}$. Pectoral rays 17–19, usually 18–19. Vertical scale rows about 45. Suborbital ridge with single row of 3 spines. Interorbital spines usually present, sometimes not well marked; small spines at midline between tympanic spines sometimes present.

This species is distinguished from other Hawaiian species of *Scorpaenodes* by the dark spot on the subopercle behind the preopercular spines. General body coloration also is diagnostic.

DISTRIBUTION. *Scorpaenodes littoralis* has been collected at Hawaii in depths to 26 meters. Habitat appears to be rocky or coral areas and caves. *S. englerii* Eschmeyer and Allen, 1971 (Easter Island) is closely related. We also can report *littoralis*-like specimens from a variety of localities in the Indo-Pacific: Rapa (BPBM 11242, 11247, 11249, 11251, 11255) in depths from about 3 to 27 meters, the Marquesas (BPBM 11111, 11134, 11147) in depths from 4.5–9 to 35–41 meters, Taiwan (USNM uncat.), One Tree Island off Australia (CAS 13855), and Africa (RU 970–142). This complex needs additional study.

Scorpaenodes corallinus Smith.

(Figure 5c.)

Scorpaenodes corallinus SMITH, 1957a, pp. 64–65, 68, fig. 5, pl. 3E (original description; type locality western Indian Ocean, Baixo Pinda; paratypes from Mozambique, Matemo, Tekomazi, Zanzibar, Pemba, Kenya, Aldabra, and Assumption).

No Hawaiian references apply to this species.

MATERIAL EXAMINED. BPBM 6451 (2, 38.2–53.6), Oahu, Moku Manu, west side, cave in 18 meters, rocky bottom, J. E. Randall, E. Reese, G. S. Losey, and L. Harris, 30 Sept. 1968. BPBM 13730 (1, 34.5), Oahu, Kahe Point, Waianae Coast, in 12 meters, G. R. Allen, 7 Sept. 1969. CAS 15724 (1, 34.8), Hawaii, Keahuolu Point, N. of Kailua, $19^{\circ}38'45''N.$, $156^{\circ}01'30''W.$, in 7.5–12 meters, *Te-Vega* cruise 8, station 366, R. L. Bolin *et al.*, 15 Aug. 1965. Additional BPBM lots from Oahu are available.

DISTINGUISHING FEATURES. Dorsal fin rays XIII, $8\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays 17–18. Vertical scale rows in low 40's. Suborbital ridge with 3 spinous points in a single row. Interorbital spines absent or present as a lump; small spines at midline between tympanic spines present.

Body coloration (see figure 5c and Smith, 1957a, pl. 3E) is sufficient to distinguish this species from all other species of *Scorpaenodes*.

DISTRIBUTION. *Scorpaenodes corallinus* was previously known only from the type specimens from the western Indian Ocean and a recent listing from Tahiti (Randall, 1973). Besides the Hawaiian specimens reported above we also can report this species from Moorea in the Society Islands (CAS 15804) at a depth of 9–12 meters, and from the Mentawai Islands in Indonesia (CAS 15805) in .5–2 meters. Depths of capture for the Hawaiian examples are 7.5–12 to 18 meters. Little is known of its habitat or habits. Smith (1957a, p. 64) reported that the species was rather rare, occurred only in coral, and normally was found well below the low tide mark, usually in 1–5 fathoms (2–9 meters).

Genus *Plectrogenium* Gilbert

Plectrogenium GILBERT, 1905, p. 634 (type-species by original designation, *Plectrogenium nanum* Gilbert, 1905).

Plectrogenium is a monotypic genus which Matsubara (1934) treats in a separate subfamily, Plectrogeniinae.

Plectrogenium nanum Gilbert.

(Figure 6.)

Synonymy based only on Hawaiian references:

Plectrogenium nanum GILBERT, 1905, pp. 634–635, fig. 248 (original description; type locality Hawaiian Islands, off north coast of Maui, *Albatross* station 4082, in 220–238 fathoms [435 meters]; holotype USNM 51598; paratypes from *Albatross* stations 3952, 4079–82, 4132); JORDAN & SEALE, 1906, p. 378 (listed); JORDAN & JORDAN, 1922, p. 55 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 291 (compiled from Gilbert, 1905); TINKER, 1944, p. 269, fig. (compiled; figure of type from Gilbert, 1905); FOWLER, 1949, p. 107 (compiled); BÖHLKE, 1953, pp. 120–121 (location of types); GOSLINE & BROCK, 1960, pp. 285, 288, 341 (in key; compiled); CLARKE, 1972, p. 313 (submarine observation in 380 meters, off Barbers Point, Oahu).

MATERIAL EXAMINED. USNM 51598 (1, 56.3, holotype of *Plectrogenium nanum*), Maui, north coast off Puniawa Point, in 402–445 meters, bottom of gray sand, 10-ft. Blake trawl, *Albatross* station 4082, 21 July 1902. SU 8652 (4, paratypes of *P. nanum*), Hawaiian Islands, *Albatross*, no other data. BPBM 13738 (10, 46.3–55.4), CAS 15704 (18) and CAS 31300 (2, cleared and stained), Lanai, Kealaikahiki Channel, 20°38.1'–41.3'N., 155°41.1'–41.0'W., in 292 meters, shrimp trawl, *Townsend Cromwell* cruise 33, station 38, 9 Nov. 1967. CAS 15700 (3, 49.1–52.3) and CAS 15702 (1, cleared and stained), Hamakua, off coast of Hawaii, 19°54'–57'N., 155°03.1'–04.8'W, in 280 meters, shrimp trawl, *Townsend Cromwell* cruise 35, station 8, 29 Mar. 1968. Additional paratypes are present in the USNM collection. Additional *Townsend Cromwell* specimens are in the NMFS collection.

DISTINGUISHING FEATURES. Dorsal fin rays normally XII, 7½. Anal fin rays III, 5½. Pectoral fin rays 22–24. Scales ctenoid, about 30–35 vertical scale rows. Suborbital ridge with very well developed flat spines (somewhat

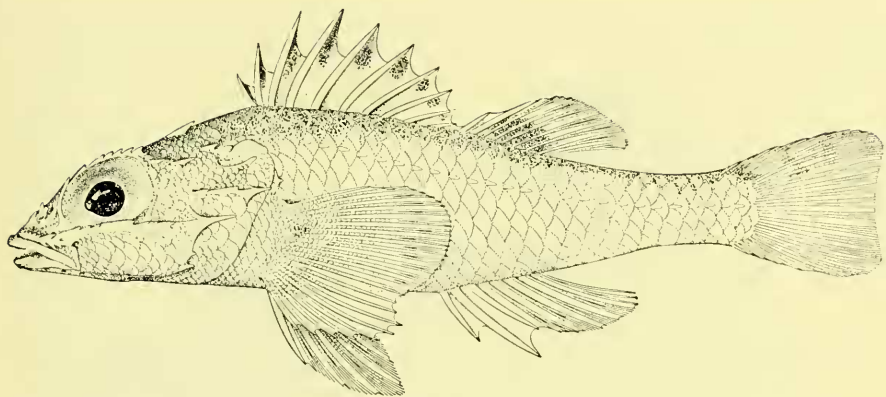


FIGURE 6. *Plectrogenium nanum*, USNM 51598, off north coast of Maui. (Figure from Gilbert, 1905, fig. 248, but modified by addition of more dusky pigment.)

as in platycephalids). A number of extra spines on head, particularly on lachrymal bone and above orbits. Dorsal fin divided into 2 fins, second fin headed by 2 spines. Mouth somewhat ventral in location.

Body shape is diagnostic for this species. The normal presence of $7\frac{1}{2}$ soft dorsal rays together with the high pectoral ray count characterizes this species.

DISTRIBUTION. *Plectrogenium nanum* is a small species and apparently is very common in the Hawaiian Islands in the depth range of 274 to 640 meters; Struhsaker (1973) indicates a peak in abundance at depths of 300 to 450 meters based on *Townsend Cromwell* trawling operations. This species is also known from Japan (Matsubara, 1943, pp. 330–335).

Genus *Taenianotus* Lacépède

Taenianotus LACÉPÈDE, 1802, p. 304 (type-species *Taenianotus triacanthus* Lacépède, by subsequent designation of Cuvier in Cuvier & Valenciennes, 1829, p. 371).

Taenianotus triacanthus Lacépède.

(Figure 7.)

Taenianotus triacanthus LACÉPÈDE, 1802, pp. 305, 308 (original description; no type locality).
Hawaiian references:

Taenianotus garretti GÜNTHER, 1873, p. 83, fig. C on pl. 57 (original description; type locality Hawaiian Islands); JORDAN & EVERMANN, 1905, p. 471 (compiled from Günther, 1873); JORDAN & SEALE, 1906, p. 378 (name only); JORDAN & JORDAN, 1922, p. 55 (listed); SCHULTZ, 1938, p. 206 (suggested *garretti* may be distinct from *triacanthus* if Günther's figure were accurate).

Taenianotus citrinellus GILBERT, 1905, pp. 636–637, pl. 81 (original description; type locality Hawaiian Islands, south of Molokai, in 43–73 fathoms, *Albatross* station 3849; holotype USNM 51634); JORDAN & SEALE, 1906, p. 378 (name only); JORDAN & JORDAN, 1922, p. 55 (listed; compiled locality data); BORODIN, 1930, p. 59 (Pearl Harbor record; reference to Fowler).

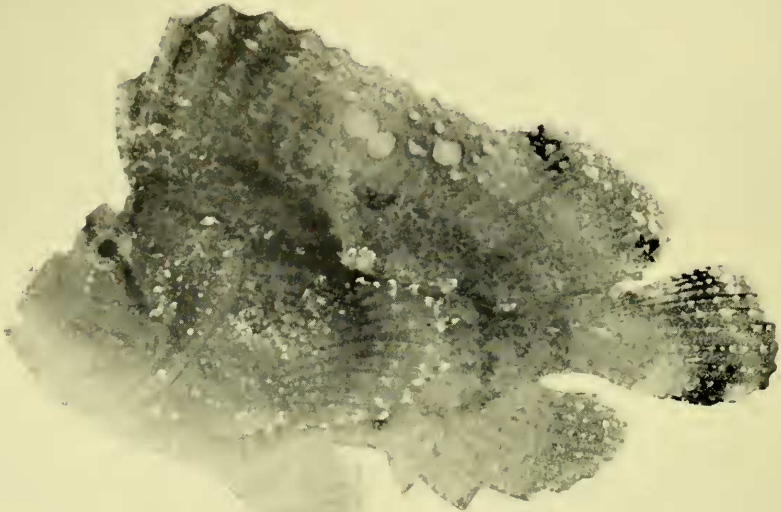


FIGURE 7. *Taenianotus triacanthus*, BPBM 6205, 47 mm. S. L., Oahu. (Photograph of fresh specimen.)

Taenianotus triacanthus: FOWLER, 1923, p. 387 (listed; Honolulu); FOWLER, 1925, p. 27 (listed); JORDAN, 1925, p. 21 (listed); FOWLER, 1928, pp. 296-297 (synonymy; *garretti* and *citrinellus* in synonymy; Hawaiian specimens); FOWLER, 1934, p. 431 (reference to Borodin, 1930); SCHULTZ, 1938, p. 206 (brief description; color phases; *citrinellus* a synonym); TINKER, 1944, p. 272, fig. (brief description; figure from Gilbert, 1905); GOSLINE & BROCK, 1960, pp. 284, 285, 341 (in key; brief description; synonymy); GOSLINE, 1965, p. 825 (depth distribution).

The type localities of *garretti* and *citrinellus* are Hawaii. They have been recognized as color phases of *Taenianotus triacanthus* for a number of years.

MATERIAL EXAMINED. USNM 51634 (1, 35.8, holotype of *Taenianotus citrinellus*), south coast of Molokai, N. 71° and W. 21.9' from Lae-o Ka Laau Light, 10-ft. Blake trawl in 134-79 meters, bottom of coarse sand, broken shells and coral, *Albatross* station 3849, 8 April 1902. BPBM 4405 (1, 60.5), Oahu, Kahala, C. M. Cooke, Jr., 17 March 1919. BPBM 4406 (2, 51.2-56.6), Oahu, C. M. Cooke, Jr., 3 Dec. 1923. BPBM 4891 (1, 59.4), Oahu, Laie, C. M. Cooke III, 15 Jan. 1939. BPBM 6203 (1, 45.3), Oahu, Ala Moana Reef, 200 feet from shore in .5 meters, S. M. Trefz, 17 April 1966. BPBM 6984 (1, 38.2), Oahu, Diamond Head Park, in 2 meters, G. R. Allen, March 1968. BPBM 8821 (1, 37.9), Oahu, Makua, in 12 meters, G. R. Allen, March 1968. BPBM 9777 (1, 41.0), Oahu, off Makaha Shores Condominium, small caves

in reef, in 14 meters, J. E. Randall and A. R. Emery, 26 April 1970. BPBM 10628 (2, 56.5–59.7), Oahu, Hanauma Bay, G. R. Allen, June 1965. BPBM 10950 (1, 29.0), Oahu, Waimea Bay, in 3–6 meters, G. R. Allen, July 1970. CAS 15691 (2, 35.7–52.8), Oahu, Waimea Bay, among large boulders with some sand, at west side of Waimea Bay, in 6–9 meters, J. E. Randall *et al.*, 25 Aug. 1969. Additional Hawaiian material is available in the BPBM and NMFS collections.

DISTINGUISHING FEATURES. Dorsal fin rays usually XII, $10\frac{1}{2}$. Anal fin rays III, $6\frac{1}{2}$ (sometimes III, $5\frac{1}{2}$). Pectoral rays usually 14 (sometimes 15), all rays unbranched. Dorsal fin high, 3rd or 4th spine longest. Scales as small spiny papillae. Suborbital ridge without spines, or with lump at end of ridge. Preopercle with 2 indistinct spines only.

This species is characterized by having the body extremely compressed, the soft dorsal fin attached to the caudal fin, and the fewest pectoral rays (usually 14) of any Hawaiian scorpionfish.

DISTRIBUTION. *Tacnianotus triacanthus* is a widespread, shallow water Indo-Pacific species occurring from Africa to the central Pacific. Depths of capture in Hawaii ranged from .5 to 14 meters, with one trawled from 79–134 meters.

REMARKS. The coloration of this species is variable, from nearly all yellow, to red, brown, or nearly black, and variously mottled with darker pigment. Coloration evidently is related partly to shedding of a cuticular layer containing algae (see Wickler and Nowak, 1969).

Genus *Iracundus* Jordan and Evermann

Iracundus JORDAN & EVERMANN, 1903b, pp. 209–210 (type-species *Iracundus signifer* Jordan and Evermann, 1903b, by original designation, monotypic).

Iracundus signifer Jordan and Evermann.

(Figure 8.)

Iracundus signifer JORDAN & EVERMANN, 1903b, p. 210 (original description; type locality Hawaiian Islands; one specimen from coral reef at Honolulu; holotype USNM 50886); JORDAN & SNYDER, 1904b, p. 126 (one specimen from Honolulu market); JORDAN & EVERMANN, 1905, pp. 470–471, fig. 207 (mostly compiled from Jordan and Evermann, 1903b, additional Hawaiian specimens; figure of holotype); JORDAN & SEALE, 1906, p. 374 (name only; Hawaii); JORDAN & JORDAN, 1922, p. 55 (listed); FOWLER, 1923, p. 387 (listed; Honolulu); FOWLER, 1925, p. 27 (listed); JORDAN, 1925, p. 20 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 292 (synonymy; description; Hawaiian specimens); TINKER, 1944, p. 269, fig. (compiled; figure of type from Jordan and Evermann, 1905); FOWLER, 1949, p. 107 (compiled); GOSLINE & BROCK, 1960, pp. 284, 286, 341 (in key; compiled); GOSLINE, 1965, p. 825 (listed); MADDEN, 1973, p. 145 (from salvaged vessel; luring behavior); SHALLENBERGER & MADDEN, 1973, pp. 33–47, figs. 1–6 (luring behavior; aspects of biology).

Non-Hawaiian reference:

Iracundus signifer rarotongae WHITLEY, 1965, pp. 113–114 (original subspecies description; type locality Cook Islands, Rarotonga; holotype AMS IA5226).

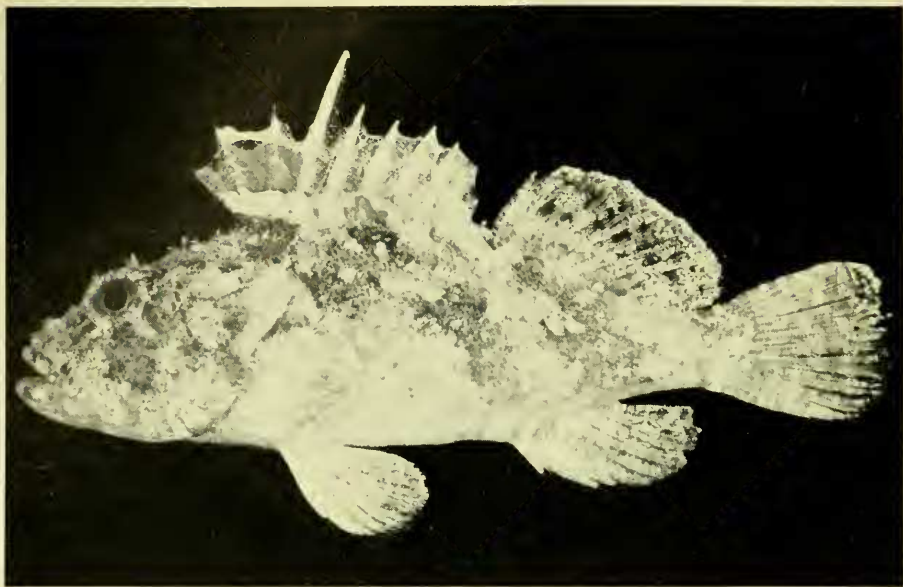


FIGURE 8. *Iracundus signifer*, BPBM 6354, 91 mm. S. L., Oahu. (Photograph of fresh specimen.)

REMARKS. Whitley (1965, pp. 113–114) described *Iracundus signifer rarotongae* from Rarotonga Island in the Cook Islands. The type (AMS IA5226) was examined by Eschmeyer. The differences reported by Whitley between *I. s. rarotongae* and *I. s. signifer* do not appear to be valid ones. Whitley reported that his subspecies had one more pectoral ray (18), but we find many Hawaiian examples with 18 pectoral rays. Whitley reported 39 scale rows above the lateral line but Eschmeyer counts about 70 vertical scale rows for Whitley's type. Whitley gives the gill rakers as 6 + 10, but the type has 6 or 7 + 11, including rudiments. Other differences reported by Whitley seem to result from incorrect interpretation of Jordan and Evermann's account of this species. At the time of Whitley's description of *I. signifer rarotongae*, *I. signifer* was known only in Hawaiian waters; we now know that the species is widespread in the Indo-Pacific (see below). We feel that the Cook Island population is not subspecifically distinct.

MATERIAL EXAMINED. USNM 50886 (1, 77.8, holotype of *Iracundus signifer*), Oahu, reef at Honolulu, U. S. Fish Commission. BPBM 6354 (3, 86.9–97.4), Oahu, Kahe Point Beach State Park, reef in 10.5 meters, J. E. Randall, G. R. Allen, *et al.*, 30 March 1968. BPBM 7319 (2, 45.2–53.4), Oahu, off Lahilahi Point, near cave in 27–30 meters, coral rubble, J. E. Randall and University of Hawaii students, 10 Aug. 1968. BPBM 7924 (6, 54.8–78.3),

Oahu, Moku Manu, in 49 meters, J. E. Randall, W. J. Baldwin, and A. Stark, 9 Oct. 1968. CAS 24990 (18), Oahu, SE. of Poka Bay, Waianae coast, caves adjacent to coral rubble and sand in 21–30 meters, J. E. Randall *et al.*, 20 July 1969. SU 8602 (1), Oahu, Honolulu, E. L. Berndt. Additional Hawaiian material is available in the BPBM collection.

DISTINGUISHING FEATURES. Dorsal fin rays usually XII, $9\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral rays usually 18 (sometimes 17; 19 should be expected). Palatine teeth absent. Scales ctenoid; about 65–75 vertical scale rows. Lachrymal bone with 2 spines over maxillary; first points forward; second broad, pointing out and to rear. Suborbital ridge without spines except one at rear before preopercle. Preopercular spines short, usually only 3 developed; no supplemental preopercular spine at base of first spine.

This species is characterized by a dark spot on the spinous dorsal fin between spines 1 or 2 and 3, and vertical scale rows of about 70. The fourth dorsal spine is characteristically elongate in specimens over about 50 or 60 mm. S. L.

DISTRIBUTION. *Iracundus signifer* occurs in Hawaiian waters in coral rubble areas, particularly in or near concealed locations beneath ledges or in caves, in depths from about 10.5 to 61 meters. William D. Madden (1973, p. 141, and pers. comm.) reports capture of specimens inside a sunken hull raised from 67 meters. Although this species is known in the literature only from the Hawaiian Islands and from the Cook Islands (type of *I. s. rarotongae*), we suspect it is widely distributed in the Indo-Pacific. Randall has taken specimens from several localities in French Polynesia and from Mauritius.

Genus *Setarches* Johnson

Setarches JOHNSON, 1862, p. 177 (type-species *Setarches güntheri* Johnson, 1862, by monotypy).

This genus has been treated on a world basis by Eschmeyer and Collette (1966, pp. 355–356).

Setarches guentheri Johnson.

(Figure 9.)

Setarches güntheri JOHNSON, 1862, pp. 177–179, pl. 23 (original description; type locality Madeira).

Synonymy of Hawaiian references only:

Scorpaena remigera GILBERT & CRAMER, 1897, pp. 404, 418–419, pl. 40 (original description; type locality off Hawaiian Islands, in 298 fathoms, *Albatross* station 3476, holotype USNM 47726); BÖHLKE, 1953, p. 121 (location of types).

Setarches remiger: GILBERT, 1905, p. 634 (brief description; new combination; additional specimens from Hawaii); JORDAN & SEALE, 1906, p. 377 (name only, Hawaii); JORDAN & JORDAN, 1922, p. 55 (listed; common in deepwater); FOWLER, 1928, pp. 291–292 (synonymy; description from Gilbert and Cramer); TINKER, 1944, p. 270, text fig. (compiled; figure from Gilbert and Cramer, 1897); FOWLER, 1949, p. 107 (compiled);

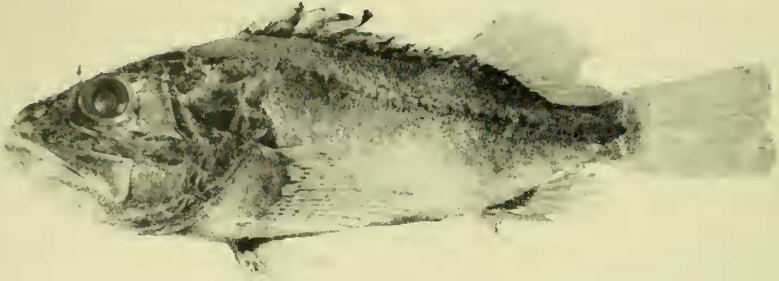


FIGURE 9. *Setarches guentheri*, BPBM 29322, 109 mm. S. L., north of Maui. (Photograph of preserved specimen.)

GOSLINE & BROCK, 1960, pp. 285, 341 (in key; compiled); CLARKE, 1972, p. 313 (submarine observation in 310 meters, off Barbers Point, Oahu).

Setarches guentheri: ESCHMEYER & COLLETTE, 1966, pp. 358-360 (*remigera* in synonymy; description; distribution; remarks).

The reader is referred to Eschmeyer and Collette (1966) for a thorough treatment of this species.

MATERIAL EXAMINED. USNM 47726 (1, 83.2, holotype of *Scorpaena remigera*), south of Oahu, 21°09'N., 157°53'W., in 545 meters *Albatross* station 3476, 6 Dec. 1891. BPBM 14109 (16, 66.3-88.0) and CAS 29322 (16, 68.6-92.5), north of Maui, 21°10.1'-10.6'N., 156°25.8'-33.2'W., 41-ft. shrimp trawl in 494-512 meters, *Townsend Cromwell* cruise 35, station 17, 1 April 1968. Additional specimens are available in the BPBM, USNM, and NMFS collections; paratypes of *S. remigera* are present in the USNM and SU collections. (Counts in tables 1 and 2 based on BPBM 14109 and CAS 29322, not from Eschmeyer and Collette, 1966.)

DISTINGUISHING FEATURES. Dorsal fin rays normally XII, 10½. Anal fin rays III, 5½. Pectoral fin rays in Hawaiian specimens 20-22, mostly 21. Body covered by tiny cycloid scales. Lateral line more or less a continuous trough covered by thin membranous scales (these covering scales usually lost during capture) as in *E. imus*. Body grayish or pinkish in coloration. Distinguishable from *E. imus* by having 5½ rather than 6½ anal soft rays, higher average number of pectoral rays, and orbit diameter about equal to interorbital width rather than about ½ interorbital width.

DISTRIBUTION. *Setarches guentheri* occurs in offshore areas from Hawaii circumtropically west to the western Atlantic (Eschmeyer and Collette, 1966). In Hawaiian waters the *Albatross* took specimens at 14 stations (see Gilbert, 1905) between about 350 and 550 meters (with one station in 177–364 and one in 351–644 meters). The *Townsend Cromwell* captured a total of 184 specimens from 21 stations in the depth range 238–686 meters (Struhsaker, 1973). *Setarches guentheri* is a bottom or near-bottom species which may feed only on pelagic organisms (Eschmeyer and Collette, 1966).

Genus *Ectreposebastes* Garman

Ectreposebastes GARMAN, 1899, p. 53 (type-species *Ectreposebastes imus* Garman, 1899, by monotypy).

This genus has been treated on a world basis by Eschmeyer and Collette (1966, pp. 366–367).

Ectreposebastes imus Garman.

(Figure 10.)

Ectreposebastes imus GARMAN, 1899, pp. 53–55, pls. 7, 9, fig. 1 on pl. 71 (original description; type locality Galapagos Islands, *Albatross* station 3403, 702 meters).

Hawaiian references:

Ectreposebastes imus: ESCHMEYER, 1969b, p. 104 (new record for Hawaii based on personal communication from P. Struhsaker); COLLETTE & UYENO, 1972, pp. 26–28, fig. 1 (*Pontinus niger* Fourmanoir, 1970, as a synonym; range including Hawaii; first record for Japan; various comments; good figure).

The reader is referred to Eschmeyer and Collette (1966) for a more thorough treatment of this species, and to Collette and Uyeno (1972) for recent range extensions and references.

Pontinus niger Fourmanoir, type locality near the Marquesas Islands, was placed in the genus *Ectreposebastes* and synonymized with *E. imus* by Collette and Uyeno (1972). Examination by Eschmeyer of a specimen from the south central Pacific at 10°51'–29'S., 123°28'–48'W. (SIO 73–43), the specimen reported by Collette and Uyeno from near New Caledonia at 22°02'S., 167°57'E. (USNM 206500), along with notes made by Collette on the holotype of *P. niger*, indicate that *E. niger* possibly is a valid species differing most notably in having scales noticeably larger than in specimens of *E. imus* from other areas. There also may be differences in depth of the caudal peduncle, pectoral fin length, and length of lachrymal and preopercular spines. A detailed comparison of specimens from different populations is needed.

MATERIAL EXAMINED. BPBM 14110 (18, 82.5–140) and CAS 29321 (33, 76.3–135), Kaiwi Channel between Oahu and Molokai, 21°08.8'–07.4'N., 157°42.2'–49.6'W., in 585–640 meters, 41-ft. shrimp trawl, *Townsend Cromwell*

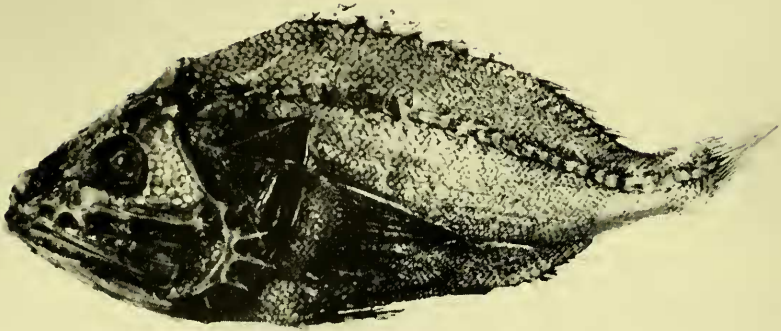


FIGURE 10. *Ectreposebastes imus*, CAS 29321, 88.7 mm. S. L., between Oahu and Molokai. (Photograph of preserved specimen.)

cruise 36, station 31, 6 May 1968. Additional Hawaiian specimens are available in the NMFS collection.

DISTINGUISHING FEATURES. Dorsal fin rays usually XII, $10\frac{1}{2}$. Anal fin rays III, $6\frac{1}{2}$. Pectoral fin rays usually 19 or 20. Body delicate, flabby, with weak fin spines and poor ossification. Scales tiny and cycloid. Lateral line more or less a continuous trough covered by thin membranous scales (these covering scales usually lost during capture) as in *S. guentheri*. Juveniles black, adults maroon and black.

This species may be distinguished from all species except *Setarches guentheri* on the basis of its characteristic lateral line. It differs from *Setarches guentheri* in having $6\frac{1}{2}$ rather than $5\frac{1}{2}$ anal rays, 3 rather than 2 prominent lachrymal spines, and interorbital width about twice orbit rather than about equal to orbit.

DISTRIBUTION. *Ectreposebastes imus* is known from the eastern and western Atlantic, the southeastern Pacific off the Galapagos Islands and Peru, Hawaii, and Japan.

It is an offshore, near-bottom species occurring in depths of about 150 to about 850 meters, excluding those depths deeper than 850 meters where the specimens may have been captured during retrieval of nets. Some captures have been made by midwater trawl hauls well off the bottom, and Eschmeyer and Collette (1966) suggest that this fish is the most modified of scorpionfishes for life in midwater. Struhsaker (1973) states that the species may occur near bottom during the day and undertake vertical feeding migrations into mid-

water areas at night. In Hawaiian waters the *Townsend Cromwell* took specimens at five bottom trawl stations in depths between 567 and 686 meters. Two hundred twenty-one specimens were taken on cruise 36 at station 31 (see Material examined) in 622 meters during daytime hours while a repeat tow in the same area at night resulted in only 2 specimens (Struhsaker, 1973).

Genus *Phenacoscorpius* Fowler

Phenacoscorpius FOWLER, 1938a, pp. 69-70 (type-species *Phenacoscorpius megalops* Fowler, 1938a, by original designation).

This genus has been discussed by Eschmeyer (1965b, pp. 522-523).

Phenacoscorpius megalops Fowler.

(Figure 11.)

No Hawaiian literature applies to this species.

Phenacoscorpius megalops FOWLER, 1938a, pp. 70-71, fig. 30 (original description; type locality Philippine Islands, *Albatross* station 5387, in 209 fathoms, 11 March 1909; plus a series of paratypes from the Philippines and East Indies); Böhlke, 1953, p. 120 (location of types); ESCHMEYER, 1965b, pp. 522-523 (compared with an Atlantic species).

MATERIAL EXAMINED. BPBM 13761 (1, 29.3), Oahu, 6 miles off Makapuu Point in direction of Molokai, depth of 366 meters, collected with pink coral, W. D. Madden, 5 May 1972. BPBM 16416 (1, about 51, poor condition), Oahu, Kaiwi Channel off Makapuu Pt., depth 366 meters, collected with pink coral from submarine, presented by W. D. Madden, 11 Feb. 1974. (The holotype, USNM 98903, and some paratypes, SU 40198-40200, of *Phenacoscorpius megalops* were examined.)

DISTINGUISHING FEATURES. (Based also on specimens from the Philippines.) Dorsal fin rays XII, $9\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays usually 17. Palatine teeth absent. Scales on sides weakly ctenoid; about 55 (?) vertical scale rows. Lachrymal bone with 2 spines over maxillary; first as a broad lobe, second as a broad spine pointing down. Suborbital ridge well marked, with 5 or 6 or more spines. Second preopercle spine small or absent.

This species is easily distinguished from other Hawaiian scorpionfishes by having only the anterior 4 or 5 tubed lateral line scales present, with the remainder of the lateral line absent. The large melanophores on the caudal peduncle are also characteristic.

Coloration in life is mostly red.

DISTRIBUTION. *Phenacoscorpius megalops* is known from the Philippine Islands and the East Indies and now from Hawaii in reported depths of 68-622 meters. A wider distribution in the central Pacific Ocean is expected when these depths are sampled more thoroughly.

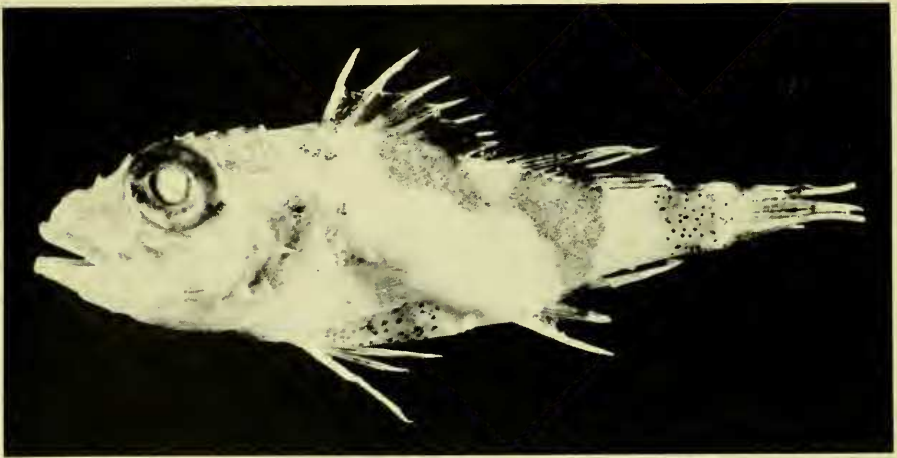


FIGURE 11. *Phenacoscorpis nebris*, BPBM 13761, 29.3 mm. S. L., Oahu. (Photograph of preserved specimen.)

Genus *Pontinus* Poey

Pontinus POEY, 1860, p. 172 (type-species *Pontinus castor* by inference from text (see Eschmeyer, 1965b, p. 527) or by subsequent designation of Jordan and Gilbert, 1883, p. 669).

Generic synonyms and nomenclatural problems are discussed by Eschmeyer (1965b, pp. 526–528).

Pontinus macrocephalus (Sauvage).

(Figure 12.)

Sebastes macrocephalus SAUVAGE, 1882, pp. 169–170 (original description; type locality Hawaiian Islands, collected by Ballieu).

Merinthe macrocephala: SNYDER, 1904, p. 535 (brief description; 2 specimens from Honolulu); JORDAN & EVERMANN, 1905, p. 461, pl. 55 (description; two specimens from Hawaii); JORDAN & SNYDER, 1907, p. 217 (common in winter market; brilliant orange with sparse dots and mottlings); JORDAN & JORDAN, 1922, p. 55 (name; size; deep-water); JORDAN, 1925, p. 20 (variation in skin appendages; color description); FOWLER, 1925, p. 27 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 291 (synonymy; description); FOWLER, 1931, p. 349 (description of 2 specimens from Honolulu market); TINKER, 1944, p. 267, fig. (compiled brief description; figure from Jordan and Evermann, 1905); FOWLER, 1949, p. 107 (compiled literature reference); GOSLINE & BROCK, 1960, pp. 285, 288, 341, fig. 266 (in key; brief characterization; figure from Jordan and Evermann, 1905); GOSLINE, 1965, p. 825 (depth distribution).

Pontinus spilistius GILBERT, 1905, pp. 633–634, fig. 247 (original description; type locality Hawaiian Islands, off Maui, in 174–238 meters, *Albatross* station 4077; Holotype USNM 51644); JORDAN & SEALE, 1906, p. 377 (listed); JORDAN & JORDAN, 1922, p. 55 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 291 (compiled from Gilbert, 1905); BORODIN, 1930, p. 59 (listed, Oahu); TINKER, 1944, p. 268, fig. (brief

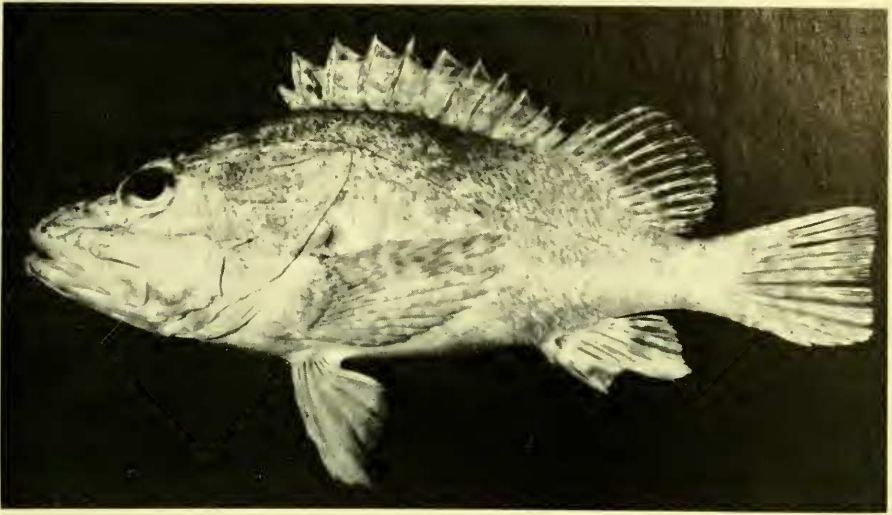


FIGURE 12. *Pontinus macrocephalus*, BPBM 10573, 285 mm. S. L., Honolulu fish market. (Photograph of fresh specimen.)

description compiled; figure of type from Gilbert, 1905); FOWLER, 1949, p. 107 (compiled literature reference); BÖHLKE, 1953, p. 121 (location of types); GOSLINE & BROCK, 1960, pp. 285, 289, 342 (in key; compiled).

Pontinus macrocephalus: ESCHMEYER, 1969b, p. 24 (*spilistius* a synonym; *macrocephalus* restricted to Hawaii); CLARKE, 1972, p. 313 (submarine observations and gill-net capture, off Oahu, in 120–300 meters).

REMARKS. *Pontinus spilistius* appears to be based on juveniles of *Pontinus macrocephalus*. Specimens under about 100 mm. S. L. have a dark spot on the spinous dorsal fin but this is absent or not well marked in large specimens. Small specimens have the eye almost as large as the snout while the eye is proportionally smaller in large specimens. The supraocular tentacle often is absent; when present it may be two or more times the size of the eye.

MATERIAL EXAMINED. MNHN A. 4165 (1, about 365, holotype of *Sebastes macrocephalus*), Hawaii, collected by Ballieu, no other data. USNM 51644 (1, 67.7, holotype of *Pontinus spilistius*), Maui, off north coast, Puniawa Point, S. 45°45', E. 6.1', in 181–194 meters, bottom of fine coral sand and foraminifera, 10-ft. Blake trawl, *Albatross* station 4077, 21 July 1902. USNM 51663 (1, 47.1, paratype of *P. spilistius*) and SU 8638 (1, 44.3, paratype of *P. spilistius*), Maui, off north coast, Puniawa Point, S. 52°30', E. 6.5', in 174–238 meters bottom of coral, sand and foraminifera and rock, 10-ft. Blake Trawl, *Albatross* station 4098. ANSP 66366–67 (2, 192–210), Oahu, Honolulu, R. Wehrl, 1929. BPBM 4386 (2, 270–360), Oahu, Honolulu, J. W. Thompson. BPBM 7944 (1, 340), Oahu, Campbell Park, Waianae, in 183 meters, gill net, T. A.

Clarke, and P. Struhsaker, 11 Dec. 1968. BPBM 8150 (1, 127), Oahu, off Campbell Industrial Park, Barber's Point, in 183–219 meters, T. A. Clarke, 14–15 Dec. 1968. BPBM 10573 (1, 285), Oahu, Honolulu fish market, J. E. and H. A. Randall, 7 Oct. 1969. BPBM 13736 (2, 67.2–99.5), CAS 15703 (2, 67.3–103) and USNM 214048 (3, 60.0–82.5), off Hawaii, Hamakua coast, 20°07.2–08.3'N., 155°24.7–28.2'W., in 238–252 meters, shrimp trawl, *Townsend Cromwell* cruise 35, station 12, 30 Mar. 1968. USNM 88259 (2, 205–206), Oahu, Honolulu, H. W. Fowler. USNM 151639 (1, 196), Oahu, Honolulu, E. K. Jordan.

DISTINGUISHING FEATURES. Dorsal fin rays normally XII, 10½, sometimes XII, 9½. Anal fin rays III, 5½. Pectoral fin rays 16–17, usually 17. Scales ctenoid; about 45–50 vertical scale rows. Lachrymal bone with 2 spines over maxillary, first points out and back, second points mostly back. Sub-orbital ridge with 3 or 4 spines. Second preopercular spine usually absent in large specimens. Mostly red in life.

The pectoral rays are unbranched in adults of this species (as in *Taenianotus* and *Pterois*). *Pterois* differs in having 13 dorsal spines and *Taenianotus* in having 15 or fewer pectoral rays, among other features. Most difficulty comes in separating small specimens of *Pontinus* from *Scorpaena* or *Scorpaena*-like specimens, such as ones of *Neomerinthe rufescens*, when the specimens are at a size at which their pectoral rays are still unbranched (usually under 30 or 40 mm. S. L.). Useful characters for separating small specimens include counts (tables 1–2), presence or absence of a dark spot on the spinous dorsal fin (present in juveniles of *P. macrocephalus* and a few other species), as well as general coloration, depth of capture, and lachrymal and suborbital spination. See also the account of *Neomerinthe rufescens*.

DISTRIBUTION. *Pontinus macrocephalus* is an upper slope species. Depths of capture range from about 180 to 250 meters, with one collection from the range 174–278 meters. We know this species only from the Hawaiian Islands (see Eschmeyer, 1969b, p. 24).

Genus *Scorpaenopsis* Heckel

Scorpaenopsis HECKEL, 1837, p. 159 (type-species *Scorpaena gibbosa* Schneider in Bloch and Schneider, 1801, by subsequent designation of Bleeker, 1876, p. 4; not an originally included species but Bleeker synonymized it with *nesogallica* Cuvier in Cuvier and Valenciennes on p. 28 of the same work; see Article 69(a)(iv), International Code of Zoological Nomenclature, 1964).

Scorpaenichthys BLEEKER, 1856, pp. 388, 402 (type-species *Scorpaena gibbosa* Schneider in Bloch and Schneider, 1801, by subsequent designation of Jordan, 1919, p. 267; pre-occupied by *Scorpaenichthys* Girard, 1854, p. 161, a genus of cottid fishes).

Dendroscorpaena SMITH, 1957a, pp. 51, 60 (replacement name for *Scorpaenichthys* Bleeker, 1856; therefore taking the same type-species as *Scorpaenichthys* Bleeker, despite the statement by Smith on p. 60 "Genotype *Perca cirrhosa* Thunberg, 1793"; see Article 67(i), International Code of Zoological Nomenclature, 1964).

The genus *Scorpaenopsis* consists of two groups of species: humpbacked ones and non-humpbacked ones. Smith (1957a) recognized each group as a separate genus, *Scorpaenopsis* for the former and *Dendroscorpaena* for the latter. As discussed in the synonymy above, Smith wrongly thought the type-species of *Dendroscorpaena* was the non-humpbacked species *cirrrosa* when in fact the type-species was the humpbacked species *gibbosa*. We agree, however, with Matsubara (1943) that all species should be placed in one genus. Of the four humpbacked species, one has only a slight hump (*S. neglecta*).

The differences between *Scorpaenopsis* and *Scorpaena* are few, the major difference being that species of *Scorpaena* have palatine teeth while species of *Scorpaenopsis* lack palatine teeth. We suspect that palatine teeth have been lost more than once in different *Scorpaena*-like species. Most of the species usually referred to *Scorpaenopsis* seem more closely related to each other than to the species in various subgroups of *Scorpaena*, but there are a few species which stand apart. They are usually placed in *Scorpaenopsis* because they lack palatine teeth. Among these are *S. fowleri* and *S. altirostris* from Hawaii. On the other hand, there are a few species of the genus *Scorpaena* which seem perhaps more closely related to species of *Scorpaenopsis* than to subgroups of *Scorpaena*, for example, *Scorpaena orgila* from Easter Island. So the limits of *Scorpaenopsis* and *Scorpaena* are unclear, as are the differences between them. We have allocated the Hawaiian species for now solely on the basis of presence or absence of palatine teeth.

The non-humpbacked species are poorly known. For example, there are several species which are usually confused under the name *Scorpaenopsis cirrhosa*. Among the humpbacked ones, there are four species as discussed under the account of *Scorpaenopsis diabolus*.

***Scorpaenopsis fowleri* (Pietschmann).**

(Figure 13.)

Scorpaenodes fowleri PIETSCHMANN, 1934, pp. 99-100 (original description; type locality Hawaiian Islands, Makaua, Oahu [see lectotype designation below]); PIETSCHMANN, 1938, pp. 5-6, 30, pl. 9 (redescription; figure of one type); FOWLER, 1949, p. 107 (compiled synonymy; no specimens; questioned Pietschmann's generic placement, thought related to *asperella*).

Scorpaena ballietii (not of Sauvage): GOSLINE & BROCK, 1960, p. 342 (in part; questionably included *fowleri* in synonymy).

REMARKS. Pietschmann described this species from 3 small specimens (NMW 6341-6343); these specimens were examined briefly by Eschmeyer and one (NMW 6341) was loaned to him for more detailed study. We designate NMW 6341 as the lectotype of *S. fowleri*. We are unable to determine if this was the specimen figured by Pietschmann (1938, pl. 9).

Placement of this species in the genus *Scorpaenopsis*, rather than in *Scorpaena*, is based on the absence of palatine teeth, but the limits of the

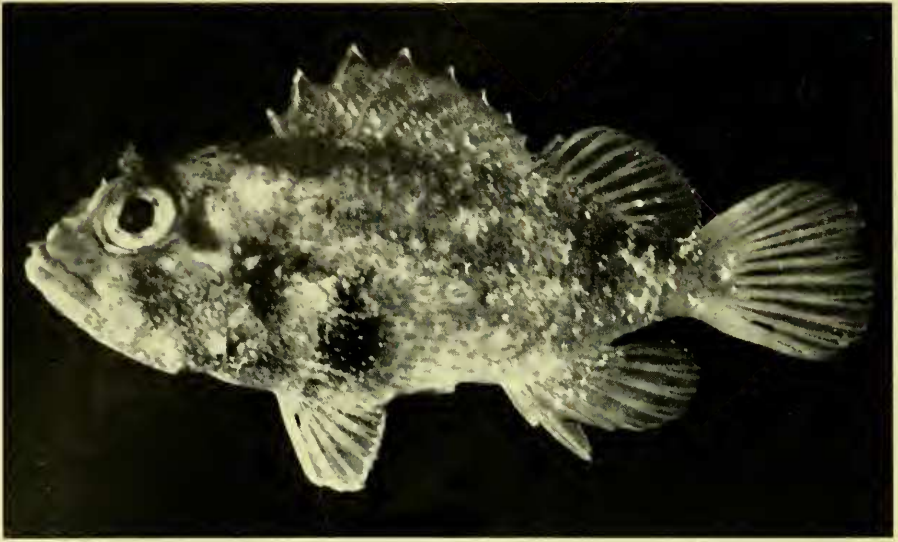


FIGURE 13. *Scorpaenopsis fowleri*, BPBM 14968, 24 mm. S. L., Society Islands. (Photograph of fresh specimen.)

genera *Scorpaenopsis* and *Scorpaena* are uncertain as was discussed under the account of *Scorpaenopsis*. (This species does not belong in *Scorpaenodes* as placed by Pietschmann.)

Except for a recent listing from Tahiti (Randall, 1973), *Scorpaenopsis fowleri* (Pietschmann) has not been recognized as a valid species since its description in 1938. The three types and subsequent specimens reported here are all less than 30 millimeters in standard length. Attempts by us to identify this species with the young stages of other species failed. Dissection showed that two of our specimens were egg-laden mature females, and this left no doubt that the species is a valid one. This species almost certainly matures at the smallest size (about 25 mm. S. L.) of any scorpaenid now known. As discussed in the distribution section, collections by Randall have resulted in capture of specimens from areas outside the Hawaiian Islands.

MATERIAL EXAMINED. NMW 6341 (1, 28.1, lectotype of *Scorpaenodes fowleri*), Oahu, Makaua, collected by T. T. Dranga, Dec. 1927. NMW 6342-43 (2, paralectotypes of *S. fowleri*), same data as lectotype (not examined in detail). BPBM 7853 (1, 24.6), Oahu, Moku Manu, off north side in 23 meters at entrance to cave, bottom of sand and coral rubble, J. E. Randall, W. J. Baldwin, and G. S. Losey, 3 Oct. 1968. BPBM 7854 (1, 25.8), Oahu, Moku Manu, in 26 meters, bottom of sand, coral rubble, and reef, J. E. Randall and W. J. Baldwin, 6 Oct. 1968. CAS 30738 (1, 27.0), Hawaii, Kona coast at

south end of Kailua Airport, between Keahole and Puhili Points, in 14 meters, coral and rocky bottom, J. E. Randall, 7 Nov. 1972.

DISTINGUISHING FEATURES. A very small species, probably not exceeding 30 or perhaps 35 mm. in standard length (about 40–45 mm. total length). Dorsal fin rays XII, $9\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays 16, unbranched in available specimens. Vertical scale rows about 35; scales on sides ctenoid. Palatine teeth absent. Lachrymal bone with 2 spines over maxillary, first points forward, second points down and slightly forward. Suborbital ridge without spines or with a low spine at rear end. Nasal spine small, sometimes absent.

This species differs from other species of *Scorpaenopsis* by having only 16 pectoral rays rather than 17 or more. It differs from species of *Scorpaena* by lacking palatine teeth. The posterior lachrymal spine over the maxillary points forward, a feature characteristic for the species and rare in scorpionfishes generally.

Preserved specimens are mostly pallid; frequently one or two small dark bars radiate back from rear of orbit. In life, body and fins mottled with red and white.

DISTRIBUTION. No data on depth of capture are available for Pietschmann's types. Subsequent collections of this species in Hawaii have been in depths from 14 to 26 meters. We also can report this species from the Tuamotu Archipelago at Mangareva Island (BPBM 13576) in 12 meters and Takaroa Island (BPBM 11159) in 9 to 15 meters, Tetiaroa in the Society Islands (BPBM 14968), from American Samoa at Tutuila (BPBM 17246) in 27 meters, and from Enewetak (formerly Eniwetok) in the Marshall Islands (CAS 31807, 31808, collected by R. S. Nolan). A wider distribution in the central Pacific is expected.

***Scorpaenopsis brevifrons* Eschmeyer and Randall, new species.**

(Figures 14–15.)

Sebastapistes asperella (not of Bennett): PIETSCHMANN, 1938, pp. 27–28 (five specimens from French Frigate Shoal in the Hawaiian Islands; brief description); FOWLER, 1949, p. 106 (in part; reference to Pietschmann, 1938).

Scorpaenopsis cacopsis (not of Jenkins): EDMONDSON, 1946, pp. 344–345, fig. 211b (color notes; fairly good figure).

MATERIAL EXAMINED. *Holotype*: BPBM 10958 (103 mm. S. L.), Oahu, reef in Kaneohe Bay, in 1 meter, J. E. Randall, A. H. and D. Banner, R. E. and J. Brock, 14 July 1971.

Paratypes: ANSP 84921 (1, 98.6), Honolulu, collected by J. W. Thompson. BPBM 4350 (1, 119), Honolulu, J. W. Thompson. BPBM 7816 (3, 27.4–53.8), Oahu, Waimea Bay, in 6–9 meters, rock with some sand, J. E. Randall *et al.*, 25 Aug. 1969. BPBM 10182 (1, 108), Oahu, off channel to Kaneohe Bay, in 30 meters, cave at base of small dropoff, J. E. Randall and

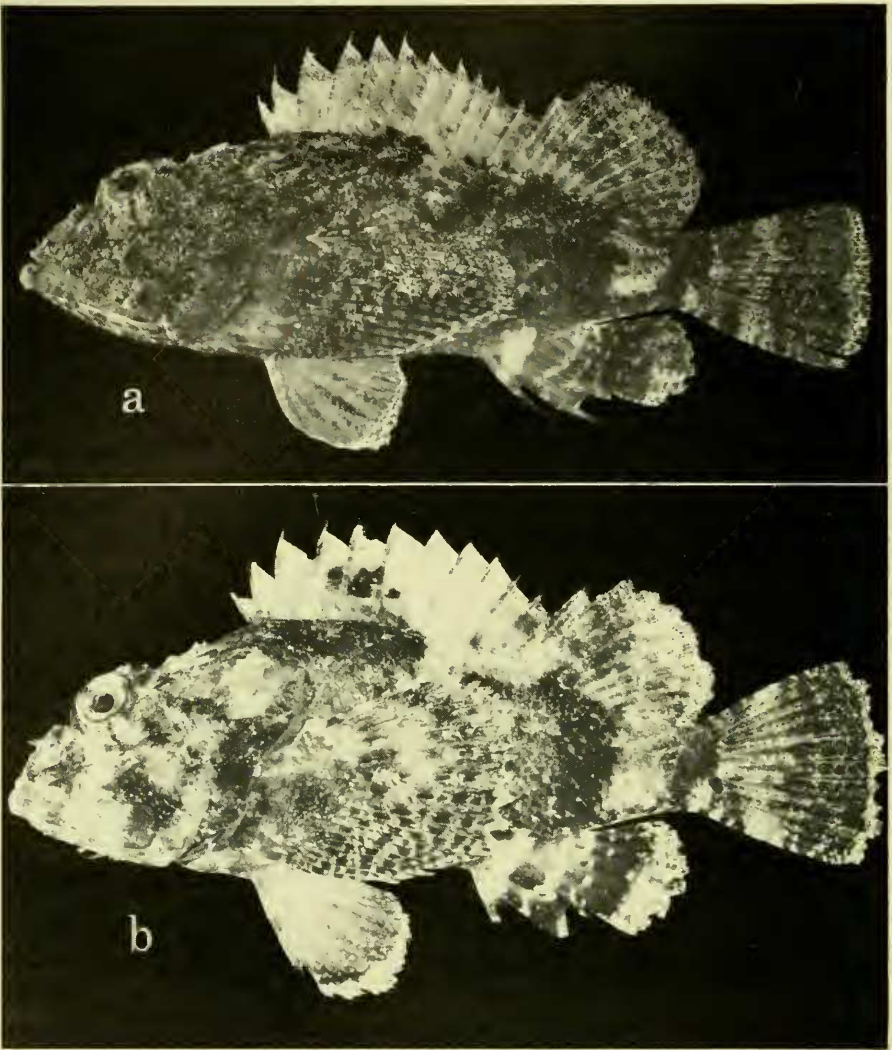


FIGURE 14. *Scorpaenopsis brevifrons*. a. BPBM 6491, paratype, 95.5 mm. S. L., lacking dark spot on spinous dorsal fin, Oahu. b. BPBM 10958, holotype, with dark spot on dorsal fin, Oahu. (Photographs of fresh specimens.)

E. Chave, 29 Sept. 1970. BPBM 11985 (1, 81.3), Oahu, $\frac{1}{2}$ mile off Niumalu Hotel, Waikiki, E. S. Herald, R. R. Rofen, V. E. Brock, W. A. Gosline, *et al.*, 7 Sept. 1951. BPBM 13350 (1, 116), Oahu, off Makua, in 18 meters, bottom mostly of coral rock and rubble, J. E. Randall, 9 Sept. 1972. BPBM 13351 (1, 57.8), Oahu, Makua, rocky shore in 6 meters, J. E. Randall, G. S. Losey

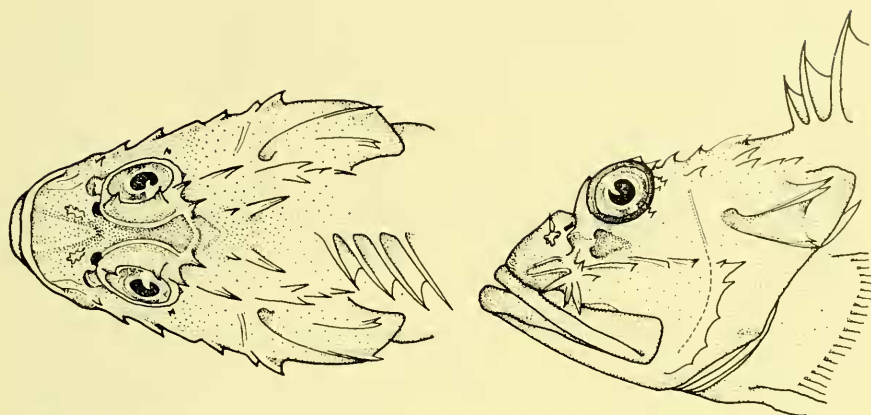


FIGURE 15. *Scorpaenopsis brevifrons*, diagram of head spines, based mostly on BPBM 6491.

and class, 9 Sept. 1972. CAS 30231, formerly BPBM 6491 (2, 54.4–95.5), Oahu, off Lahilahi Point, near cave in 27–30 meters, coral rubble and rock, J. E. Randall and University of Hawaii students, 10 Aug. 1968. USNM 214047 (1, 89.5), Pokai Bay, 60 meters seaward from deep dropsite, ledge in 24 meters, W. A. Gosline *et al.*, Aug. 1969.

ADDITIONAL MATERIAL. NMW 4996–5000 (5, 87.5–99.5), French Frigate Shoal [no other data: these specimens reported as *Sebastapistes asperella* by Pietschmann, 1938].

DIAGNOSIS. A species of *Scorpaenopsis* with pectoral fin rays usually 19 (18–20), a blunt head profile, long jaw (21–27% S. L.), no hump behind head, longest dorsal spines 4–6, and normally 5 spines on the suborbital ridge and 3 on the lachrymal bone overlying the maxillary. (See also Comparisons below.)

DESCRIPTION. Measurements and counts summarized in table 3; body shape and coloration as in figures 14–15.

Dorsal fin rays XII, $9\frac{1}{2}$, longest spines the third through sixth. Anal fin rays III, $5\frac{1}{2}$, third anal spine extends beyond second when depressed. Pectoral fin rays usually 19 (18–20), rays 1 or 2 through 6 or 7 branched in larger specimens, branching begins at specimen length of just under 30 mm S. L. Gill rakers, including rudiments, on outside of first arch 14–16, 4–6 on upper arch, 8 plus 2 or 3 indistinct rudiments on lower arch.

Head spination as in figure 15. Lachrymal bone usually with 3 spines over maxillary, first points forward, posterior two close set and point mostly down (specimens under about 50 mm. S. L. usually with only 2 spines). Suborbital ridge usually with 5 spines, first 2 on lachrymal. Preopercle with supplemental and 5 preopercular spines. Other spines include nasal, pre-

TABLE 3. Counts and measurements for type specimens of *Scorpaenopsis brevifrons* (percent standard length in parentheses).

	BPBM 7816	CAS	BPBM	BPBM	USNM
		30231	13351	11985	214047
Standard length	27.4	53.8	57.8	81.3	89.5
Dorsal rays	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½
Anal rays	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½
Pectoral rays	19+19	18+18	19+19	19+19	19+19
Gill rakers (upper, lower; r=rudiments)	4, 8+r	5, 8+r	3, 8+r	5, 8+3	4, 10
Head length	12.8(47)	23.4(43)	25.0(43)	36.3(45)	42.2(47)
Snout length	3.3(12)	6.7(12)	6.8(12)	10.0(12)	11.8(13)
Orbit diameter	3.0(11)	4.4(10)	5.5(10)	7.5(09)	8.5(09)
Interorbital width	1.8(07)	2.2(04)	2.7(05)	4.8(06)	4.8(05)
Upper jaw length	6.0(22)	11.4(21)	12.6(22)	19.1(23)	22.3(24)
Predorsal-fin length	11.9(44)	21.6(40)	22.3(39)	32.9(40)	36.9(41)
Body depth	9.6(35)	13.6(31)	18.1(31)	27.7(34)	31.8(35)
Pectoral fin length	8.9(32)	17.2(31)	18.0(32)	25.8(32)	28.7(32)
Pelvic fin length	7.0(26)	14.9(28)	15.4(27)	21.4(26)	25.2(28)
Caudal fin length	8.9(32)	16.1(30)	17.4(30)	23.1(28)	26.4(29)
Length 3rd dorsal spine	4.1(15)	8.4(16)	8.8(15)	10.7(13)	11.8(13)
Length 11th dorsal spine	2.9(11)	5.9(11)	5.9(10)	8.3(10)	8.9(10)
Length 12th dorsal spine	4.3(16)	7.9(15)	8.7(15)	11.2(14)	13.8(15)
Length 1st anal spine	3.0(11)	5.1(12)	6.4(11)	8.6(11)	9.6(11)
Length 2nd anal spine	5.5(20)	11.4(21)	11.3(20)	15.8(19)	19.1(21)
Length 3rd anal spine	5.2(19)	10.5(20)	10.7(19)	15.0(18)	17.8(20)

TABLE 3 (continued)

	CAS	ANSP	BPBM	BPBM	ANSP	BPBM
	30231	84921	10958	10182	130800	4350
Standard length	95.5	98.6	103	108	116	119
Dorsal rays	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½
Anal rays	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½
Pectoral rays	19+19	19+19	19+19	19+19	20+20	20+19
Gill rakers (upper, lower; r=rudiments)	4, 8+r	3, 8+r	5, 11	4, 8+r	4, 10	4, 10
Head length	44.5(47)	46.0(47)	46.5(45)	49.0(45)	53.8(46)	53.8(45)
Snout length	12.8(13)	14.1(14)	14.3(14)	15.0(14)	16.6(14)	16.8(14)
Orbit diameter	8.0(08)	8.9(09)	9.2(09)	9.4(09)	10.5(09)	10.3(09)
Interorbital width	4.9(05)	5.7(06)	6.1(06)	6.6(06)	8.4(07)	5.4(04)
Upper jaw length	22.7(23)	24.2(24)	25.0(24)	28.1(26)	31.1(27)	29.7(24)
Predorsal-fin length	39.0(40)	40.3(41)	42.8(41)	44.4(41)	45.9(40)	47.2(40)
Body depth	32.6(34)	35.8(36)	38.7(36)	40.0(37)	44.1(38)	39.3(33)
Pectoral fin length	32.7(34)	—	37.3(36)	37.5(35)	35.0(30)	39.5(33)
Pelvic fin length	26.4(28)	—	28.3(27)	30.4(28)	30.7(26)	30.5(26)
Caudal fin length	27.2(28)	—	29.5(28)	32.4(30)	33.8(29)	33.3(28)
Length 3rd dorsal spine	14.5(15)	—	13.9(13)	13.9(13)	14.6(13)	14.8(12)
Length 11th dorsal spine	12.1(13)	—	12.0(12)	12.0(11)	12.8(11)	11.3(09)
Length 12th dorsal spine	15.0(16)	—	16.1(16)	16.5(15)	16.9(15)	14.9(12)
Length 1st anal spine	12.4(13)	—	10.0(10)	11.8(11)	13.5(12)	11.6(10)
Length 2nd anal spine	18.6(19)	—	18.2(18)	20.7(19)	21.8(19)	19.5(16)
Length 3rd anal spine	18.5(19)	—	18.3(18)	19.2(18)	20.1(17)	19.4(16)

supra-, and postocular, tympanic, nuchal, parietal, upper and lower post-temporal, opercular (2, sometimes double), sphenotic (multiple), pterotic, supracleithral, and cleithral. Also small spines (postorbital) behind eye. Occiput with a shallow pit.

Scales on sides ctenoid; head before eye unscaled, otherwise with cycloid scales. Vertical scale rows about 45; lateral-line scales 23 + 1 on caudal fin. Vertebrae 24. Head and body with skin appendages. Supraocular tentacle variable, about equal to eye as maximum, frequently absent. Small flaps present on most head spines, pectoral fin, some body scales, a few on eye, and on the lower jaw and underside of head.

Measurements are summarized in table 3. Orbit smaller than snout, orbit into snout 1.1–1.6, large specimens with proportionally smaller orbits; orbit into head 3.9–5.6, large specimens with lower values.

Color in alcohol similar to that in figure 14 taken of fresh specimen. Body and head marked with dark patches on a pale background, darkest usually below middle of spinous dorsal fin, below soft dorsal fin, and at base of caudal fin. Fins usually with some dark pigment, especially at center of anal fin and as a broad bar across the caudal fin. Dark spot on spinous dorsal fin present or absent, when present usually between spines 4 through 7 at about midheight of fin. Color in life variable. Upper part of body and most of head brownish to gray with bluish-green to green areas and some yellow, mottled with white. Lower parts with more red and orange. Pelvic fin red, streaked with white, mostly white distally. Anal fin with prominent white bar across anterior base, greenish in middle, otherwise red streaked with white. Dorsal fin mostly pale, mottled with brown, orange, and green.

COMPARISONS. This species is rather typical for a *Scorpaenopsis*: of moderate size, robust, well colored, with a large mouth and strong spination. It lacks the humpback found in some species (see account of *S. diabolus*). It has a smaller eye, a longer maxillary, and a blunter head profile than most species of *Scorpaenopsis* of the Indo-Pacific.

In Hawaiian waters, *S. brevifrons* most likely would be confused with *S. cacopsis* and *S. diabolus*—all brightly colored, moderate to large species. *S. diabolus* has a characteristic color pattern on the inside of the pectoral fin (fig. 17b), is humpbacked, and has the interorbital width greater than the eye diameter. *S. cacopsis* has a more pointed snout and usually 18 rather than 19 pectoral rays; the longest dorsal spine in *S. cacopsis* usually is the third while the longest dorsal spines in *S. brevifrons* are near the middle of the fin (4–6).

DISTRIBUTION. This species is known only from Hawaii in depths from 1 to 30 meters, usually in coral or rocks.

NAME. The species name is a noun in apposition formed by the combination of the Latin words 'brevis' (short) plus 'frons' (brow, forehead), re-

ferring to the steep head profile in this species as compared to the more pointed, longer snout found in most species of *Scorpaenopsis*.

Scorpaenopsis diabolus Cuvier.

(Figures 16-17.)

Scorpaenopsis diabolus CUVIER in Cuvier and Valenciennes, 1829, p. 312 (original description; type locality "le grand Océan oriental").

Hawaiian references:

Scorpaenenopsis diabolus: FOWLER, 1900, p. 515 (generic name misspelled; dried skin from Hawaii [could be *cacopsis*]).

Scorpaena gibbosa (not of Schneider): STEINDACHNER, 1900b, p. 491 (one from Honolulu).

Scorpaenopsus gibbosa (not of Schneider): SEALE, 1902, p. 18 (generic name misspelled; Honolulu).

Scorpaenopsis catocala JORDAN & EVERMANN, 1903a, pp. 201-202, pl. 56 (original description; type locality Hawaiian Islands, holotype (USNM 50651) from Honolulu, paratypes from Honolulu and Hilo); SNYDER, 1904, p. 536 (listed; Hawaii); JORDAN & SNYDER, 1904a, p. 946 (coloration; Honolulu); JORDAN & EVERMANN, 1926, p. 10 (listed; Hawaii).

Scorpaenopsis gibbosa (not of Schneider): JORDAN & EVERMANN, 1905, pp. 468-470, pl. 56, fig. 206 (description; good figures, pl. 56 wrongly with *catocala* as caption; synonymy); JORDAN & SEALE, 1906, pp. 178, 375 (in part; *catocala* in synonymy; common about Hawaii); JORDAN & JORDAN, 1922, p. 55 (synonymy; abundant); FOWLER, 1925, p. 27 (listed); GOSLINE & BROCK, 1960, pp. 284, 287, 341 (in key; brief description); GOSLINE, 1965, p. 825 (depth distribution).

Scorpaenopsis gibbosus: FOWLER, 1925, p. 27 (listed; Hawaii); FOWLER, 1928, pp. 286-287 (in part; *diabolus* and *catocala* in synonymy; Hawaiian specimens listed); TINKER, 1944, p. 264, fig. (brief description; figure from Jordan & Evermann, 1905); EDMONDSON, 1946, p. 344 (brief description; coloration; reefs of Hawaiian Islands); FOWLER, 1949, p. 106 (in part; reference to Fowler, 1938; record from Hawaii).

REMARKS. The species of *Scorpaenopsis* which have a humpback have at times been recognized as a separate genus as discussed by us under the genus *Scorpaenopsis*. We follow a broader interpretation of the genus. Within the humpbacked subgroup, there are four species: *Scorpaenopsis diabolus*, *S. gibbosa* (Schneider in Bloch and Schneider, 1801), *S. macrochir* Ogilby, 1910, and *S. neglecta* Heckel, 1837. *Scorpaenopsis diabolus* and *S. gibbosa* frequently are confused, and *S. macrochir*, type locality northeastern Australia, is widespread in the central Pacific based on CAS and BPBM specimens, but has not been reported from there (so far only reported from Australia). *Scorpaenopsis neglecta* is an Oriental species characterized by serrated ocular spines and the inside of the pectoral fin marked about as in figure 17d. *Scorpaenopsis macrochir* also has the pectoral fin markings as in figure 17d, but *macrochir* has unserrated ocular spines among other differences. *Scorpaenopsis gibbosa* (with *S. nesogallica* (Cuvier) a synonym) apparently is restricted to the Indian Ocean and *S. diabolus*, the only humpbacked species occurring in Hawaii, is widespread in the Indo-Pacific faunal region. *Scorpaenopsis diabolus* and *S. gibbosa* may be separated easily on the basis of

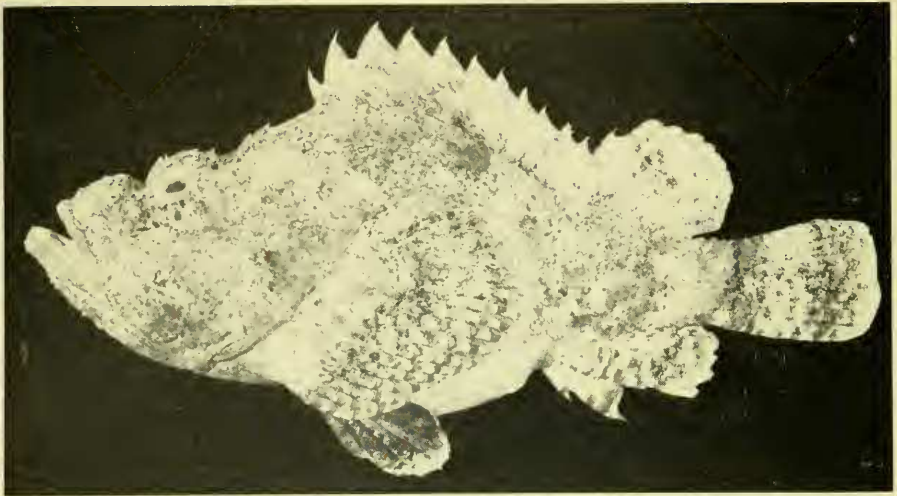


FIGURE 16. *Scorpaenopsis diabolus*, BPBM 7815, 175 mm. S. L., Oahu. (Photograph of fresh specimen.)

pectoral fin coloration (see figure 17a-c); *S. diabolus* also has a longer snout and wider interorbit than *S. gibbosa*, and usually 18 rather than 17 pectoral rays.

MATERIAL EXAMINED. USNM 50651, formerly SU 7754 in part (1, 185, holotype of *Scorpaenopsis catocala*), Oahu, Honolulu, U. S. Fish Commission. SU 7754 (5, 56.3–152) and SU 7466 (5, 115–181), paratypes of *S. catocala*, Oahu, U. S. Fish Commission. CAS 17488 (1, 58), Leeward Is., Laysan Is., 25°46'27"N., 171°44'37"W., in depths to 3.5 meters. SU 19344 (1, 150), Oahu, Honolulu, D. S. Jordan. SU 23393 (2, 95.2–101), Oahu, Honolulu, E. K. Jordan. Counts are also included for the following Hawaiian specimens: CAS 389 (1), CAS 996 (1), CAS 11073 (1), CAS 11088 (1), CAS 17485 (1), CAS 17486 (1), CAS 17487 (1), CAS 31393 (1) and SU 8406 (1). Much additional Hawaiian material is available in the BPBM collection.

NOTE. The type specimens of *S. catocala* were to be distributed to a number of museums (Jordan and Evermann, 1903a, p. 202) but they were not sent and are now found in SU 7466 and 7754. The specimens bear separate field numbers so it will be possible to distribute them as originally intended, and this will be done at the time of publication of this paper.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays usually 18. Back arched (see figure 16). Scales ctenoid; about 45 vertical scale rows. Lachrymal bone with 2 or 3 spines over maxillary, first points forward, followed by 1 or by 2 closeset spines which point down and back. Suborbital ridge with 4 or more spinous points, usually

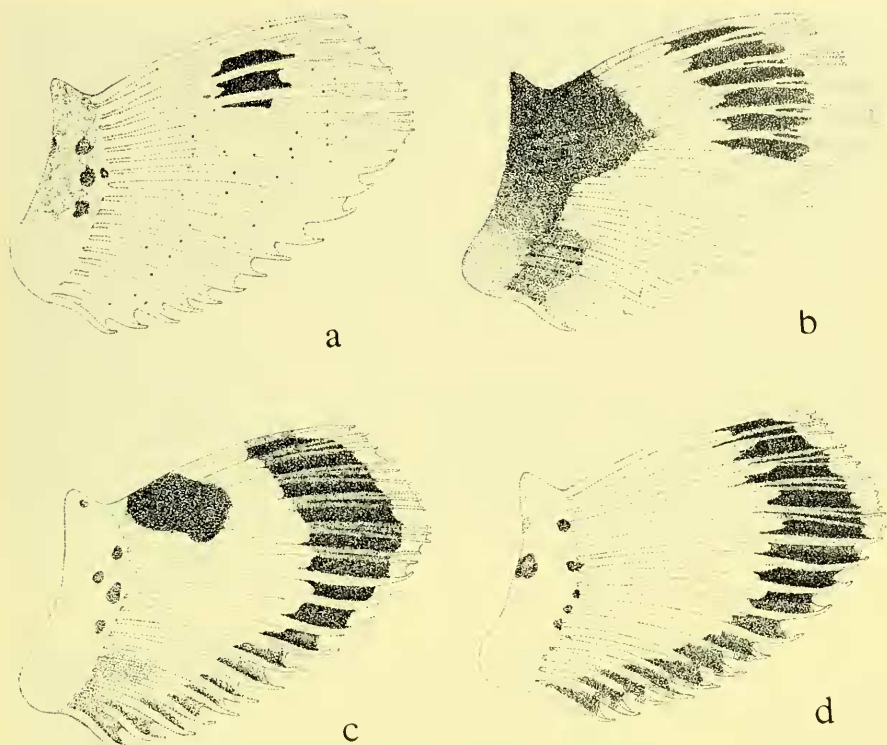


FIGURE 17. Coloration on inside of pectoral fin in humpbacked species of the genus *Scorpaenopsis*. a. *S. diabolus* (restricted dark patch distally); b. *S. diabolus*, Hawaiian island populations (dark patch distally, note dark pigment at base of fin); c. *S. gibbosa*; d. *S. macrochir* and *S. neglecta* (band complete, no black patch as in c).

more than 8 or 10 points, not in a row and of various sizes. A shallow pit below front corner of eye.

This species is most likely to be confused with *Scorpaenopsis cacopsis* and *S. brevifrons*. The arched back distinguishes *S. diabolus* (fig. 16) along with the characteristic coloration on the inside of the pectoral fin (fig. 17b). *Scorpaenopsis brevifrons* usually has 19 instead of 18 pectoral rays, while *S. diabolus* and *S. cacopsis* usually have 18 pectoral rays. The interorbital width is greater than the orbit diameter in *S. diabolus* but smaller than the orbit diameter in *S. brevifrons* and *S. cacopsis* (in very large specimens, over 200 mm S. L., of *cacopsis* the interorbital width is about equal to the orbit diameter).

DISTRIBUTION. *Scorpaenopsis diabolus* is the most widespread species in the genus, occurring from the Red Sea and eastern Africa to the central Pacific as far east as the Society Islands. Specimens from Hawaii seem to

represent a distinct and recognizable population based on the pectoral fin coloration (fig. 17c). In Hawaii, specimens of the species have been taken in depths from .5 to 10.5 meters.

Scorpaenopsis cacopsis Jenkins.

(Figure 18.)

Scorpaena cookii GÜNTHER, 1873, pl. LV (in part; plate only; plate based on a Hawaiian specimen).

Scorpaenopsis cacopsis JENKINS, 1901, pp. 400–402, figs. 13–14 (original description; type locality Hawaiian Islands, Honolulu; holotype USNM 49690); SEALE, 1901, p. 11, fig. 5 (description; good figure; two specimens from Honolulu); JENKINS, 1903, p. 497 (one specimen from Hawaii); JORDAN & EVERMANN, 1905, pp. 467–468, figs. 205, 205a, color pl. 71 (description; 14 specimens from Hawaii; figs. 205 and 205a copied from Jenkins, 1901); JORDAN & SEALE, 1906, p. 375 (listed, Hawaii and Tahiti); JORDAN & JORDAN, 1922, p. 55 (listed); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 286, pl. 34B (synonymy; Hawaiian specimens; *altirostris* wrongly in synonymy); TINKER, 1944, pp. 263–264, fig. (brief description; compiled range as Society Islands and Hawaii; figure copied from Jenkins, 1901); FOWLER, 1949, p. 106 (reference); GOSLINE & BROCK, 1960, pp. 284, 288, 341 (brief description and synonymy); GOSLINE, 1965, p. 825 (depth distribution).

Scorpaenopus cacopsis: SEALF, 1902, p. 22 (generic name misspelled; listed).

MATERIAL EXAMINED. USNM 49690 (1, 330, holotype of *Scorpaenopsis cacopsis*), Hawaiian Islands, collected by T. D. Wood, no other data. BPBM 4387 (1, about 330), Oahu, Haleiwa Bay, Waialua, in 3.5 meters, E. Y. Hosaka, 2 Aug. 1932. BPBM 7852 (2, about 300–360), Oahu, Honolulu, J. W. Thompson, no other data. BPBM 10527 (1, 222), Oahu, Moku Manu, in 26 meters, J. E. Randall and W. J. Baldwin, 6 Oct. 1969. BPBM 13352 (2, 74.3–143), Oahu, Makua, rocky shore in 6 meters, J. E. Randall, G. S. Losey and class, 9 Sept. 1972. BPBM 13733 (1, 41.1), Oahu, Waimea Bay, in 4.5 meters, G. R. Allen, 2 July 1967. BPBM 13739, formerly UH 2095 (1, 22.5), Maui, Baldwin Packer's property, about 3 miles W. of Lahaina, W. A. Gosline and E. Hunter, 5 Aug. 1955. BPBM 13744 (1, 227), Oahu, off Pakai Bay, in 9 meters, J. E. Randall, S. N. Swerdloff and D. Chave, 29 July 1969. SU 23263 (1, 220), Honolulu, *Albatross*.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays normally 18 (17–19). Scales ctenoid; about 50–55 vertical scale rows. Lachrymal bone with 2 spines over maxillary; first points down and forward, second points down and back, sometimes second split distally into 2 points. Suborbital ridge usually with 5 spines, sometimes some spines split in larger specimens. See also the distinguishing features sections of *Scorpaenopsis brevifrons* and *S. diabolus*.

DISTRIBUTION. This species is confined to the Hawaiian Islands. Available depths of capture are from near shore to 26 meters.

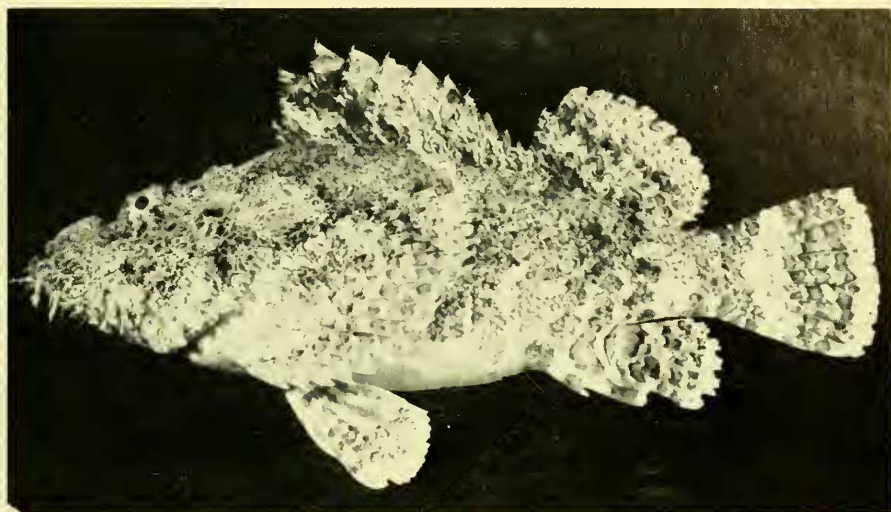


FIGURE 18. *Scorpaenopsis cacopsis*, BPBM 13744, 243 mm. S. L., Oahu. (Photograph of fresh specimen.)

Scorpaenopsis altirostris Gilbert.

(Figure 19.)

Scorpaenopsis altirostris GILBERT, 1905, pp. 628-630, fig. 244 (original description; type locality Hawaiian Islands, off Molokai, *Albatross* station 3849; holotype USNM 51636); JORDAN & SEALE, 1906, p. 376 (name only); JORDAN & JORDAN, 1922, p. 55 (name; suggested may belong in a genus separate from *Scorpaenopsis*); JORDAN & EVERMANN, 1926, p. 10 (listed); BÖHLKE, 1953, p. 121 (location of types); GOSLINE & BROCK, 1960, pp. 285, 289, 342 (compiled); GOSLINE, 1965, p. 825 (compiled depth distribution).

Remarks: See Remarks under the genus *Scorpaenopsis* regarding generic placement of this species.

MATERIAL EXAMINED. USNM 51636 (1, 45.6, holotype of *Scorpaenopsis altirostris*), USNM 51671 (3, 32.0-39.9, paratypes of *S. altirostris*, poor condition) and SU 8620 (2, 33.0-39.2, paratypes of *S. altirostris*), off south coast of Molokai, N. at 71°, W. 21.9' from Lae-o Ka Laau Light, in 134-79 meters, 10-ft. Blake trawl, bottom of coarse sand, broken shells, and coral, *Albatross* station 3849, 8 April 1902.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays 17-18, mostly 18. Scales ctenoid; about 45 vertical scale rows. Lachrymal bone with 2 spines over maxillary; anterior spine points forward and down, posterior spine points down and back. Suborbital ridge usually with 4 spines, first on lachrymal below main suborbital ridge,

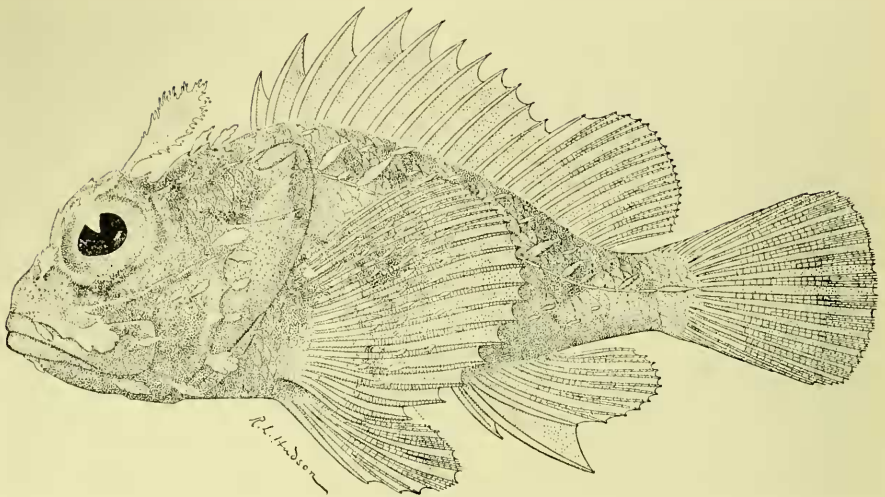


FIGURE 19. *Scorpaenopsis altirostris*, USNM 51636, holotype, 45.6 mm. S. L. (Figure from Gilbert, 1905, fig. 244.)

second under eye and below main ridge, third and fourth to rear. A slight occipital pit present.

This species and *S. fowleri* resemble species of *Scorpaena* more than species of *Scorpaenopsis* but they lack palatine teeth (see Remarks under the genus *Scorpaenopsis*). *Scorpaenopsis fowleri* has only 16 pectoral rays as opposed to 17–18 in *altirostris*, and *S. fowleri* is a near-shore species while *S. altirostris* occurs in deeper water.

DISTRIBUTION. *Scorpaenopsis altirostris* is an upper slope species known only from the type specimens listed in the material examined section. Depth of capture was between 79–134 meters.

REMARKS. *Scorpaenopsis cotticeps* Fowler, 1938, from the Philippines might prove to be the same species. Fowler wrongly described it as having 14 pectoral fin rays but the type (USNM 98891) has 17. The type specimen is only 27.4 mm. S. L.

Genus *Rhinopias* Gill

Rhinopias GILL, 1905, p. 225 (type-species *Scorpaena frondosa* Günther, 1891, by original designation).

Peloropsis GILBERT, 1905, p. 630 (type-species *Peloropsis xenops* Gilbert, 1905, by original designation).

The genus *Rhinopias* has been treated in detail by Eschmeyer, Hirotsuki, and Abe (1973).

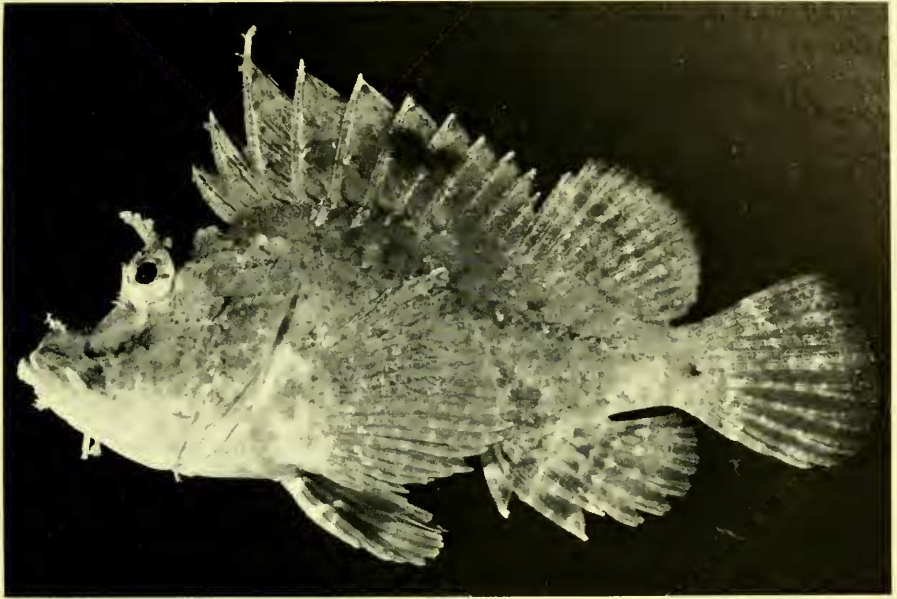


FIGURE 20. *Rhinopias xenops*, BPBM 13988, 116 mm. S. L., Oahu. (Photograph of fresh specimen which had been kept in an aquarium for 2 months.)

***Rhinopias xenops* (Gilbert).**

(Figure 20.)

Synonymy based only on Hawaiian references:

Peloropsis xenops GILBERT, 1905, pp. 630-631, fig. 245 (original description; type locality Hawaiian Islands, between Maui and Lanai, *Albatross* station 3872; holotype USNM 51604); JORDAN & SEALE, 1906, p. 379 (listed); JORDAN & JORDAN, 1922, p. 55 (listed; compiled locality data); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 287 (compiled); TINKER, 1944, pp. 262-263, fig. (compiled; figure of type copied from Gilbert, 1905); GOSLINE & BROCK, 1960, pp. 284, 286, 341 (in key; compiled); GOSLINE, 1965, p. 825 (depth distribution compiled).

Rhinopias xenops: ESCHMEYER, HIROSAKI, & ABE, 1973, pp. 288, 292-295, figs. 3-4 (synonymy; additional Hawaiian specimen and Japanese material; description; comparisons; shedding of cuticle; figure of holotype copied from Gilbert, 1905; second Hawaiian specimen figured).

MATERIAL EXAMINED. USNM 51604 (1, 110 mm. S. L., holotype), Auau Channel, between Maui and Lanai islands, in 59 to 79 meters, *Albatross* station 3872, 12 Apr. 1902. BPBM 13988 (1, 115), Oahu, off Haleiwa, in 110 meters, shrimp trawl, *Robert May*, Oct. 1972 [kept alive in an aquarium for 2 months]. UH 3102 (1, 153), Oahu, off Waikiki, otter trawl in 73 meters, P. S. Lobel, 9 Feb. 1974. USNM 209415 (1, 107), Hawaii, Haleiwa,

21°39.6'–42'N., 158°07.3'–05'W., shrimp trawl, in 95–110 meters, *Townsend Cromwell* cruise 36, station 19, 3 May 1968.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays 18. Scales cycloid; vertical scale rows about 70–75. Palatine teeth absent. Lachrymal bone with 2 rounded lobes over maxillary. Suborbital ridge with 3 or 4 spines, not well marked and sometimes split, first spine on lateral face of lachrymal bone.

This species is distinguished from other Hawaiian species by its compressed head and body, somewhat elevated rostrum, long snout, and coloration. A complete description is given by Gilbert (1905) and by Eschmeyer, Hirosaki, and Abe (1973).

The specimen figured differs from previously known specimens in having a dark spot on the spinous dorsal fin and it lacks dusky pigment at the base of the soft dorsal fin. When fresh it was reddish with large areas of light purple. In other features it agrees with other specimens of *R. xenops*. UH 3102 differs from previously known specimens by having 19 pectoral rays and the third dorsal spine is not elongate.

DISTRIBUTION. We know this offshore species at Hawaii only from the holotype and 3 additional specimens as given in our "Materials examined" section. One additional specimen was taken off Molokai in 124 meters by the *Townsend Cromwell* (Paul Struhsaker, pers. comm.) but this specimen was lost. Depths of capture were 59–79, 73, 95–110, and 124 meters. *Rhinopias xenops* is known also from Japan (see Eschmeyer, Hirosaki, and Abe, 1973).

REMARKS. William D. Madden and Randall observed the feeding of the specimen shown in figure 20 when it was maintained in an aquarium. Live *Gambusia* were introduced into the tank as food. The *Rhinopias* moved very slowly and intermittently towards its prey by "creeping" on its lower pectoral rays which were in contact with the bottom. The dorsal fin was held fully erect. Occasionally the *Rhinopias* moved a little to and fro, reminiscent of the rocking of *Taenianotus*. When it came to within about 2.5 cm. of the prey, it engulfed the small fish with incredible rapidity. Just prior to striking the prey, the dorsal fin was slowly folded back.

Genus *Neomerinthe* Fowler

Neomerinthe FOWLER, 1935, pp. 41–42 (type-species *Neomerinthe hemingwayi* Fowler, 1935, by original designation).

Eschmeyer (1969b, p. 93) remarked that the Hawaiian species described as *Helicolenus rufescens* Gilbert did not belong in the genus *Helicolenus* of the subfamily Sebastinae but should be classified instead in the subfamily Scorpaeninae. The species *rufescens* seems to be referable to the genus *Neomerinthe* Fowler. *Neomerinthe* is a genus which contains *Pontinus*-like species, but unlike species of *Pontinus* those of *Neomerinthe* have some



FIGURE 21. *Neomerinthe rufescens*, BPBM 13737, 93 mm. S. L., off Kauai. (Photograph of preserved specimen.)

branched pectoral rays. Previously, only two Atlantic species have composed the genus *Neomerinthe*.

Neomerinthe rufescens (Gilbert).

(Figure 21.)

Helicolenus rufescens GILBERT, 1905, pp. 631-633, fig. 246 (original description; type locality Hawaiian Islands, holotype (USNM 51628) from near Kauai at *Albatross* station 4133, paratype from off Maui at *Albatross* station 4074); JORDAN & SEALE, 1906, p. 378 (listed); JORDAN & JORDAN, 1922, p. 54 (name; locality data compiled); JORDAN & EVERMANN, 1926, p. 10 (listed); FOWLER, 1928, p. 291 (synonymy; brief description compiled from Gilbert, 1905); TINKER, 1944, pp. 267-268, fig. (compiled; figure of type from Gilbert, 1905); BÖHLKE, 1953, p. 120 (location of types); GOSLINE & BROCK, 1960, pp. 285, 289, 342 (in key; compiled); GOSLINE, 1965, p. 825 (depth distribution).

MATERIAL EXAMINED. USNM 51628 (1, 83.4, holotype of *Helicolenus rufescens*), off Kauai, S. at 40° and W. 4.4' from Hanamaulu warehouse, in 75-302 meters, bottom of fine gray sand and rubble, 8-ft. *Albatross-Blake* trawl, station D. 4133, 1 Aug. 1902. BPBM 13737 (5, 59.1-90.8), CAS 15697 (9, 61.3-92.4) and CAS 15689 (3, 75.0-100, cleared and stained), all off Molokai, 21°14.4'-15.6'N., 157°07.8'-13.5'W., shrimp trawl in 124 meters, *Townsend Cromwell* cruise 40, station 106, 28 Nov. 1968. SU 8619 (1, 59.5, paratype of *Helicolenus rufescens*), north coast of Maui, S. at 70° and E. 8.5' from Puniawa Point, in 143-155 meters, bottom of coral, sand, and foraminifera, 8-ft. Tanner beam trawl, station D. 4074, 19 July 1902. Additional Hawaiian material is available in the NMFS collection.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays usually 18, sometimes 19. Palatine teeth present. Scales ctenoid; about 50 vertical scale rows. Lachrymal bone with 2 spines over maxillary, both point back and down. Suborbital ridge with 2-4, usually 3, spines; one on lateral face of lachrymal bone usually absent. No occipital pit.

This species is most likely to be confused with species of *Scorpaena* or *Pontinus*. *Neomcrinthe rufescens* has 18 or 19 pectoral rays while all Hawaiian species of *Scorpaena* and *Pontinus* usually have 17 or fewer pectoral rays (*S. colorata* sometimes with 18). Upper pectoral rays in *N. rufescens* branch when specimens reach about 70 mm. S. L., but in *Pontinus macrocephalus* they never branch; specimens of *rufescens* usually have 9½ soft dorsal rays and *macrocephalus* usually 10½. Species of *Scorpaenopsis* differ in lacking palatine teeth.

DISTRIBUTION. *Neomcrinthe rufescens* is an offshore species known only from the Hawaiian Islands. *Townsend Cromwell* operations captured a total of 63 specimens from 18 stations in depths between 108 and 124 meters (Struhsaker, 1973). The holotype was taken somewhere between 75 and 302 meters and the paratype between 143 and 155 meters by the *Albatross*.

Genus *Scorpaena* Linnaeus

Scorpaena LINNAEUS, 1758, p. 266 (type-species *Scorpaena porcus* Linnaeus, 1758, by subsequent designation of Bleeker, 1876; see Opinion 77 and "Official List of Generic Names").

Problems of the limits of this genus and generic synonyms have been mentioned by Eschmeyer (1965a, p. 89; 1969b, p. 54) and Eschmeyer and Allen (1971, p. 521). Some of the Hawaiian species are referable to *Sebastapistes*, but we follow Matsubara (1943) in treating *Sebastapistes* as a synonym of *Scorpaena*. It is likely that the genus *Scorpaena* is a 'catch-basket' genus, and a more thorough treatment on a world basis is needed. See also our remarks under the genus *Scorpaenopsis*.

Scorpaena galactacma (Jenkins).

(Figure 22a.)

Sebastapistes galactacma JENKINS, 1903, pp. 496-497, fig. 40 (original description; type locality Hawaiian Islands, coral reef at Honolulu; holotype USNM 50692); JORDAN & EVERMANN, 1905, pp. 455, 459-460, fig. 201 (description mostly from Jenkins, 1903; figure of type from Jenkins, 1903); JORDAN & JORDAN, 1922, p. 54 (listed; common on reefs).

Sebastapistes galactacme: JORDAN & SEALE, 1906, p. 377 (species name misspelled; listed). *Sebastapistes albobrunneus* (not of Günther): FOWLER, 1928, p. 287 (in part; *galactacma* in synonymy).

?*Sebastopsis galactacma*: BORODIN, 1930, p. 59 (species name misspelled; specimens from Oahu; compared with type).

Scorpaena ballicui (not of Sauvage): GOSLINE & BROCK, 1960, p. 342 (in part; *galactacma* in synonymy).

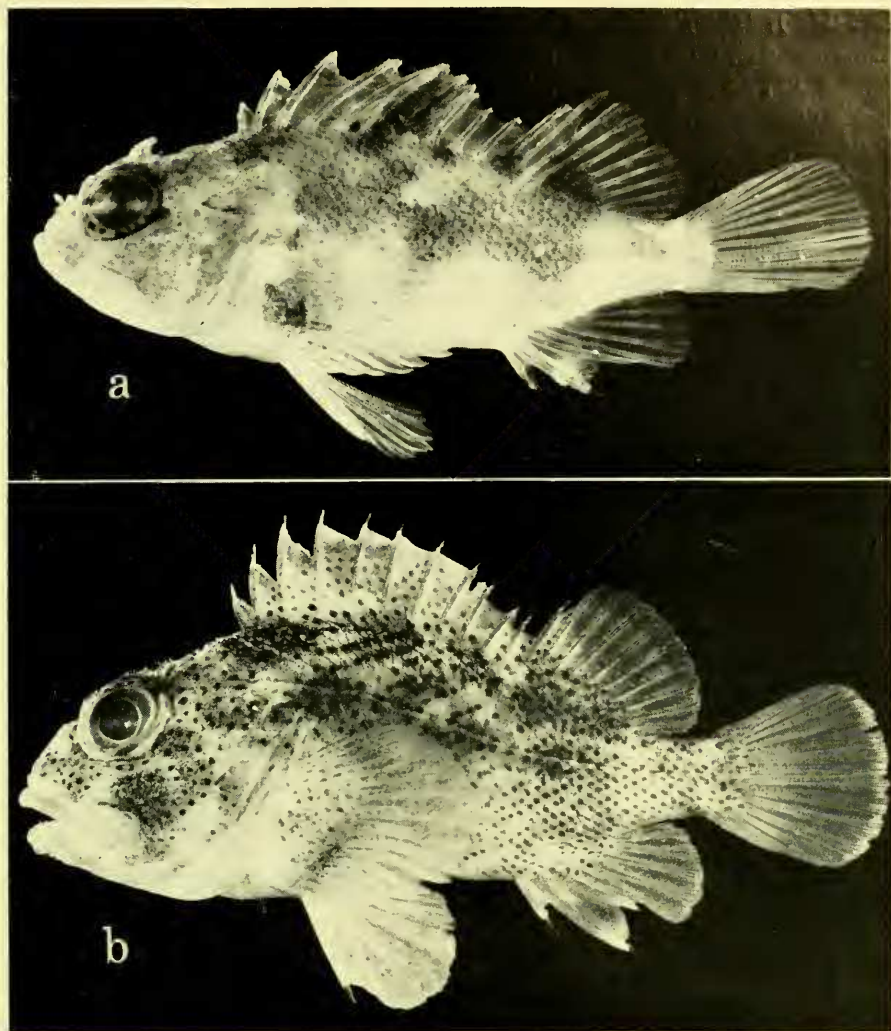


FIGURE 22. a. *Scorpaena galactama*, BPBM 7925, 33 mm. S. L., Oahu (Photograph of a preserved specimen). b. *Scorpaena conioarta*, BPBM 6464, 47 mm. S. L., Oahu. (Photograph of fresh specimen.)

MATERIAL EXAMINED. USNM 50692 (1, 49.3 mm. S. L., holotype of *Sebastapistes galactama*), and USNM uncat. (2, about 36–40, paratypes of *S. galactama*), Oahu, Honolulu, O. P. Jenkins, 1889. BPBM 7835 (7, 33.4–47.8), Oahu, off Waikiki, in 7.5 meters, J. E. Randall, E. Niel, and students, 30 Mar. 1969. BPBM 7925 (1, 32.8), Oahu, Waimea Bay, in 6–9 meters, J. E. Randall, W. F. Smith-Vaniz, *et al.*, 25 Aug. 1969. BPBM 13470 (3,

33.5–36.4), Oahu, off Waikiki in 29 meters, from vicinity of small ledge, J. E. Randall, 30 Sept. 1972. CAS 13471, formerly UH 2484 (10), Kauai, Port Allen, in 24–29 meters, *Miss Honolulu*, 10 Sept. 1959. CAS 13472, formerly UH 2481 (40), Kauai, Port Allen, in 10.5–24.5 meters, *Miss Honolulu*, 12 Sept. 1959. CAS 15725 (2), Maui, dredged off Lahaina, in 18–64 meters, E. M. Ehrhorn. SU 7615 (6), Oahu, Honolulu, U. S. Fish Commission, 1901. Additional material is present in the BPBM collection.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays 15–17, usually 16. Coronal spines absent. Virtually no occipital pit. Vertical scale rows about 45. Lachrymal bone with 2 widely diverging spines over maxillary, first points forward, second back. Suborbital ridge with 2 or 3 poorly marked spines, usually one under eye below main ridge, one at end, and sometimes one on lachrymal bone below main ridge. A dark smudge sometimes present between dorsal spines 6–7 to 9.

This species differs from other Hawaiian species of the genus *Scorpaena* by having cycloid to emarginate scales; the other species have ctenoid scales at least on their flanks.

DISTRIBUTION. This small species appears to inhabit coral and rubble areas in depths from near shore to 29 meters (one collection from 18 to 64 meters).

Scorpaena coniora (Jenkins).

(Figure 22b.)

Sebastapistes strongia (not of Cuvier): STREETS, 1877, pp. 62–63 (description; Honolulu); FOWLER, 1900, p. 515 (one from Hawaii; fin formula).

Sebastapistes coniora JENKINS, 1903, pp. 495–496, fig. 39 (original description; type locality Hawaiian Islands, coral rocks on reef at Honolulu; holotype USNM 50693); SNYDER, 1904, p. 536 (listed; Honolulu); JORDAN & EVERMANN, 1905, pp. 455, 458–459, fig. 200 (description; brief synonymy; figure from Jenkins, 1903); JORDAN & SEALE, 1906, p. 376 (listed); JORDAN & JORDAN, 1922, p. 54 (listed; common on reefs); FOWLER & BALL, 1925, p. 20 (Pearl and Hermes Reef); JORDAN & EVERMANN, 1926, p. 10 (listed); BÖHLKE, 1953, p. 122 (location of types); SCHULTZ, 1966, p. 28 (*coniora* distinct from *albobrunneus*).

Sebastapistes albobrunneus (not of Günther): FOWLER & BALL, 1925, p. 20 (Pearl and Hermes Reef); FOWLER, 1928, p. 287 (in part; *S. coniora* in synonymy; listed some Hawaiian specimens); PIETSMANN, 1938, pp. 28–29, pl. 3 (description; specimens from Pearl and Hermes Reef [some misidentified]; photograph of 7 specimens; year-groups by length frequencies [based on misidentifications]); TINKER, 1944, pp. 264–265, fig. (brief description; figure of type of *coniora* from Jenkins, 1903); EDMONDSON, 1946, p. 344, fig. 211a (brief description).

Sebastapistes albo-brunneus: FOWLER, 1941, p. 257 (one specimen from Mogua Reef).

Scorpaena coniora: GOSLINE, 1955, pp. 461–462 (described in key, Johnston Island); GOSLINE & BROCK, 1960, pp. 285, 288, 341 (brief diagnosis; in key; brief synonymy); GOSLINE, 1965, p. 825 (vertical zonation).

MATERIAL EXAMINED. USNM 50693 (1, 49.8 mm. S. L., holotype of *Sebastapistes coniora*), Oahu, off Honolulu, reefs, O. P. Jenkins, 1889. SU 23589

(57, paratypes of *S. coniorta*) and SU 23330 (122, paratypes of *S. coniorta*), Oahu, reefs off Honolulu, O. P. Jenkins. BPBM 6464 (4, 40.5–45.8), Oahu, western end of Waimea Bay, in 6 meters, all from head of *Pocillopora meandrina*, J. E. Randall, 28 Sept. 1968. BPBM 9987 (1, 35.3) and CAS 15695 (4), Oahu, off rocky islet at SW. end of Waimea Bay, in 1–10.5 meters, J. E. Randall, L. A. Randall and P. M. Allen, 27 July 1970. CAS 13480, formerly UH 809 (10), Oahu, Diamond Head, W. A. Gosline and class, 16 May 1950. CAS 15710 (16) and CAS 15711 (3, 28.5–47.8, cleared and stained), Oahu, Waikiki Beach, about $\frac{1}{2}$ mi. off Niumalu Hotel, in 7.5–9 meters, W. A. Gosline *et al.*, GVF Reg. no. 54, 7 Sept. 1971. UH uncat. (5, 30.2–53.7), Wake Island, near wreck, 0–6 meters, W. A. Gosline and J. E. Randall, 9 June 1953. Additional material is available in the BPBM and CAS collections.

DISTINGUISHING FEATURES. Dorsal fin rays normally XII, $9\frac{1}{2}$. Anal fin rays III, $5\frac{1}{2}$. Pectoral fin rays usually 16 (15–17). Coronal spines absent. No occipital pit. Scales ctenoid; about 50–55 vertical scale rows. Lachrymal bone with 4 spines; two spines lie over the maxillary, first points forward, second points back; a spine above each of these. A small spine sometimes present at base of first spine over maxillary in large specimens. Suborbital ridge more or less a double ridge; a spine at end; sometimes a spine under eye; fourth spine on lachrymal bone is far below level of suborbital ridge and not counted as part of suborbital ridge. Supplemental preopercular spine well above first preopercular spine. Well-marked spines at upper rear of orbit in area of sphenotic.

The coloration of this species is diagnostic: body and fins with scattered small dark spots, no dark spot on spinous portion of dorsal fin; see figure 22b.

DISTRIBUTION. This species is known from the Hawaiian Islands and from Johnston Island and the Line Islands (e.g., CAS 13479). Other *coniorta*-like species occur in the Indo-West Pacific area as discussed below. In Hawaii the species occurs in shallow water in depths from near shore to about 24.5 meters.

REMARKS. *Scorpaena coniorta* belongs in the subgroup *Sebastapistes* within *Scorpaena*. Within this subgroup, it appears to be related to the widespread Indo-Pacific *Scorpaena albobrunnea* Günther. *Scorpaena coniorta* also seems closely related to the little-known Asian *S. tinkhami* Fowler (1946), and to BPBM specimens of a similar species taken by Randall in French Oceania. A more thorough study is needed of this complex.

***Scorpaena ballieui* Sauvage.**

(Figure 23.)

Scorpaena ballieui SAUVAGE in Vaillant and Sauvage, 1875, pp. 278–279 (original description; type locality Iles Sandwich [Hawaiian Islands]; generic name misspelled).

Scorpaena ballieui: SAUVAGE, 1878, pp. 123–124, fig. 4 on pl. 2 (description; good figure); JORDAN & SEALE, 1906, p. 376 (listed); GOSLINE & BROCK, 1960, pp. 285, 289, 341–342

(in key; brief description; *galactacma* and *fowleri* included in synonymy); GOSLINE, 1965, p. 825 (depth distribution).

Sebastapistes corallicola JENKINS, 1903, pp. 493-495, fig. 38 (original description; type locality Hawaiian Islands, Honolulu; holotype USNM 50691); SNYDER, 1904, p. 535 (listed from Honolulu and Hilo); JORDAN & EVERMANN, 1905, pp. 455-458, fig. 199 (mostly after Jenkins, 1903; figure from Jenkins, 1903); JORDAN & SEALE, 1906, p. 376 (thought might be same as *asperella*); JORDAN & JORDAN, 1922, p. 54 (compiled); FOWLER & BALL, 1925, p. 19 (Pearl and Hermes Reef, Ocean Island, and Laysan); PIETSCHMANN, 1938, pp. 5, 29-30 (brief description; Pearl and Hermes Reef); BÖHLKE, 1953, p. 122 (location of types); SCHULTZ, 1966, pp. 29-32, figs. 138b, 140 (name used for Marshall and Marianas specimens; figure of holotype of *corallicola* from Jenkins, 1903).

Sebastapistes ballieui: JORDAN & EVERMANN, 1905, pp. 455-456, color pl. 72 (lengthy description; Honolulu, Waikiki, Hilo); JORDAN & JORDAN, 1922, p. 54 (name; rather common); FOWLER & BALL, 1925, p. 19 (Pearl and Hermes Reef).

Sebastapistes albobrunneus (not of Günther): FOWLER, 1928, p. 287 (in part; *coniorta* and *galactacma* wrongly in synonymy; Hawaiian specimens among others listed).

Sebastapistes asperella (not of Bennett): FOWLER, 1931, pp. 348-349 (color description of Honolulu specimens); FOWLER, 1949, p. 106 (in part; references).

Sebastapistes nuchalus (not of Günther): SCHULTZ, 1943, p. 174 (in part; type of *corallicola* only); FOWLER, 1949, p. 107 (in part; *corallicola* wrongly included in synonymy).

Scorpaena peruana HILDEBRAND, 1946, pp. 445-448, fig. 86 (original description; type locality Peru [in error, see remarks below]).

MATERIAL EXAMINED. MNHN 6883 (2, about 32 and 86.0), MNHN 8993 (1, 79.5), and MNHN 9557 (2, 62.4-74.3), all syntypes of *Scorpaena ballieui*, Hawaii, collected by Ballieu. USNM 50691 (1, about 95, holotype of *Sebastapistes corallicola*), Oahu, Honolulu. SU 7729 (1, paratype of *Sebastapistes corallicola*), Oahu, Honolulu. O. P. Jenkins. BPBM 4369 (1, 64.5), Oahu, C. M. Cooke, Jr., 5 May 1923. BPBM 7817 (2, 47.3-61.5), Oahu, off Waikiki, in 7.5 meters, J. E. Randall, E. Niel, and students, 30 Mar. 1969. BPBM 9338 (1, about 67), Oahu, off Kewalo Basin, in about 1 meter, P. M. Allen, 20 Mar. 1970. CAS 13470, formerly UH 264 (15), Oahu, Waianae coast, W. A. Gosline and class, 22 Feb. 1949. CAS 15692 (8), Oahu, large boulders and some sand at west side of Waimea Bay, in 6-9 meters, J. E. Randall *et al.*, 25 Aug. 1969. CAS 15694 (8), Oahu, off rocky islet at SW. end of Waimea Bay, 1-10.5 meters, J. E. and L. A. Randall and P. M. Allen, 27 July 1970. CAS 15709 (2), Oahu, ½ mi. off Waikiki Beach, in 7.5-9 meters, GVF Reg. no. 54, W. A. Gosline *et al.*, 7 Sept. 1951. CAS 22841 (44) and CAS 15688 (3, 40.9-79.8, cleared and stained), Kauai, Kapaa, P. R. Needham and J. P. Walsh, 8 Aug. 1949. Additional material is present in the BPBM and CAS collections.

DISTINGUISHING FEATURES. Dorsal fin rays normally XII, 9½. Anal fin rays III, 5½. Pectoral fin rays 16. Coronal spines present. Virtually no occipital pit. Scales ctenoid; about 40-45 vertical scale rows. Lachrymal bone with 3 spines over maxillary, posterior 2 closeset and pointing down

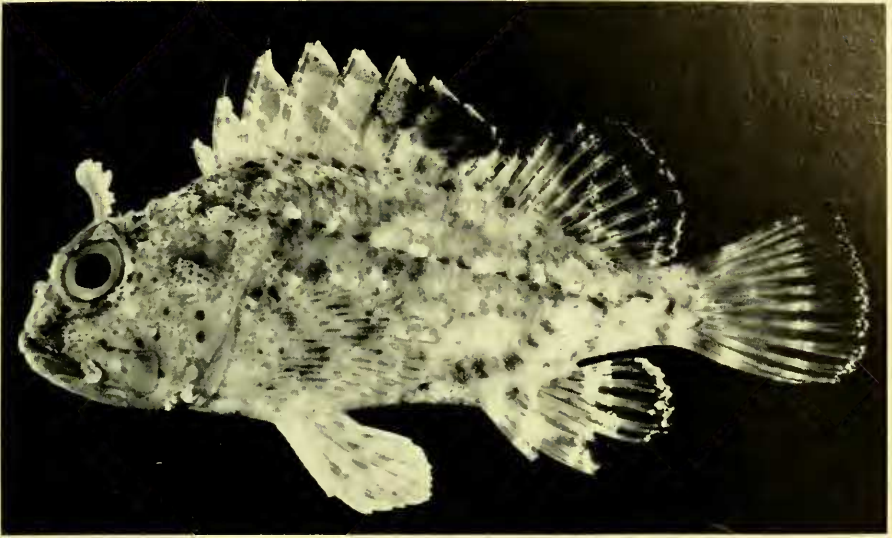


FIGURE 23. *Scorpaena ballieui*, BPBM 7817, 64 mm. S. L., Oahu. (Photograph of fresh specimen.)

and to rear, first points mostly forward. Suborbital ridge with one spine at posterior end of ridge.

This is the only Hawaiian species which has coronal spines (fig. 1e). A dark spot frequently is present on the spinous dorsal fin between about spines 7-10.

DISTRIBUTION. *Scorpaena ballieui* occurs in or near coral at depths from near shore to about 10.5 meters. We know it definitely only from Hawaii but similar species occur in the Pacific and need study.

REMARKS. *Scorpaena asperella* Bennett (1829) was the first scorpaenid described from the Hawaiian Islands, but it still remains unidentifiable in our opinion. The type specimen is lost. This problem has been discussed by Gosline (1955) and mentioned by Springer (1967). No Hawaiian species fits Bennett's description well. The capture site of a blenny described by Bennett from Hawaii actually was off South America (see Springer, 1967), and this adds doubt to the provenance of the specimen described as *asperella* by Bennett. The collections used by Bennett originated from a cruise of the *Blonde*, which stopped at Madeira, several areas on the Pacific coast of South America, Hawaii, and other ports in the Pacific. We have been unable to link Bennett's brief description of *asperella* with any scorpaenid from the localities visited by the *Blonde* and we retain it for now as an unidentifiable species.

Scorpaena peruana Hildebrand (1946) is a synonym of *S. ballieui*; the

type specimens of *peruana* had incorrect locality data accompanying them (see Greenfield, MS).

Scorpaena pele Eschmeyer and Randall, new species.

(Figures 24, 25a.)

No literature applies to this species.

MATERIAL EXAMINED. Except for the specimen from the Honolulu market, all specimens were collected by the *Townsend Cromwell* using shrimp trawls.

Holotype: USNM 214046 (124 mm. S. L.), north coast of Oahu, 21°40'N., 158°08'W., 176–202 meters, cruise 59, station 3, 7 July 1972.

Paratypes: ANSP 130800 (1, 116), off Maui, Pailolo Channel, 21°02.3'–20°58.9'N., 156°44.4'–49.3'W., in 229–238 meters, cruise 40, station 56, 18 Nov. 1968. BPBM 4350 (1, about 134, soft), Honolulu market, J. W. Thompson, no other data. BPBM 13635 (1, 76.5), off Molokai, Penguin Bank, 21°09.7'N., 157°25'–29.8'W., in 177–188 meters, cruise 35, station 33, 7 April 1968. BPBM 17247 (2, 88.5–99.0), off Maui, 21°02.1'–20°59.0'N., 156°44.4'–44.0'W., in 238 meters, cruise 40, station 61, 18 Nov. 1968. CAS 15707 (1, 81.4), off Maui, Pailolo Channel, 21°01.2'–20°57.2'N., 156°44.1'–47.1'W., in 210 meters, cruise 40, station 47, 16 Nov. 1968. CAS 30236 (1, 88.7), Pailolo Channel, in 219 meters, no other data. CAS 30237 (2, 110–112), off Maui, 21°01.7'–20°58.8'N., 156°43.1'–45.1'W., in 185–232 meters, cruise 35, station 4, 28 Mar. 1968. CAS 30238 (3, 84.8, 98.9, 117), off Maui, 21°01.7'–20°57.3'N., 156°43.1'–47.4'W., in 221 meters, cruise 40, station 51, 17 Nov. 1968. CAS 30239 (1, 118), taken with the holotype. USNM 214045 (1, 90.8), off Maui, Pailolo Channel, 21°01.6'–20°57.3'N., 156°43.0'–47.4'W., in 223 meters, cruise 40, station 54, 18 Nov. 1968. USNM 214043 (1, 87.1), off Maui, 21°02.5'–20°58.9'N., 156°44.0'–49.0'W., in 229–243 meters, cruise 40, station 55, 18 Nov. 1968. USNM 214044 (2, 75.9–110), off Maui, 21°03.0'–01.2'N., 156°45.4'–50.2'W., in 199–230 meters, cruise 40, station 67, 19 Nov. 1968. USNM 214042 (1, 135), off Maui, 21°03.1'–01.4'N., 156°45.5'–50.8'W., in 198–223 meters, cruise 40, station 68, 20 Nov. 1968.

Additional material is available in the NMFS collections, but was not used in the description of the species.

DIAGNOSIS. A species of *Scorpaena* with 9½ dorsal soft rays, 16–17 pectoral rays, and 15–17 gill rakers. Scales on sides ctenoid. Occiput with a shallow pit. Lachrymal bone with 3 spines over maxillary; suborbital ridge with 4 spines. Coronal spines absent. Color mostly red, marbled and spotted with white.

DESCRIPTION. Measurements and counts summarized in table 4; body shape and coloration as in figures 24, 25a.

Dorsal fin rays normally XII, 9½, third spine usually the longest. Anal fin rays III, 5½, second spine usually extending beyond third when depressed.

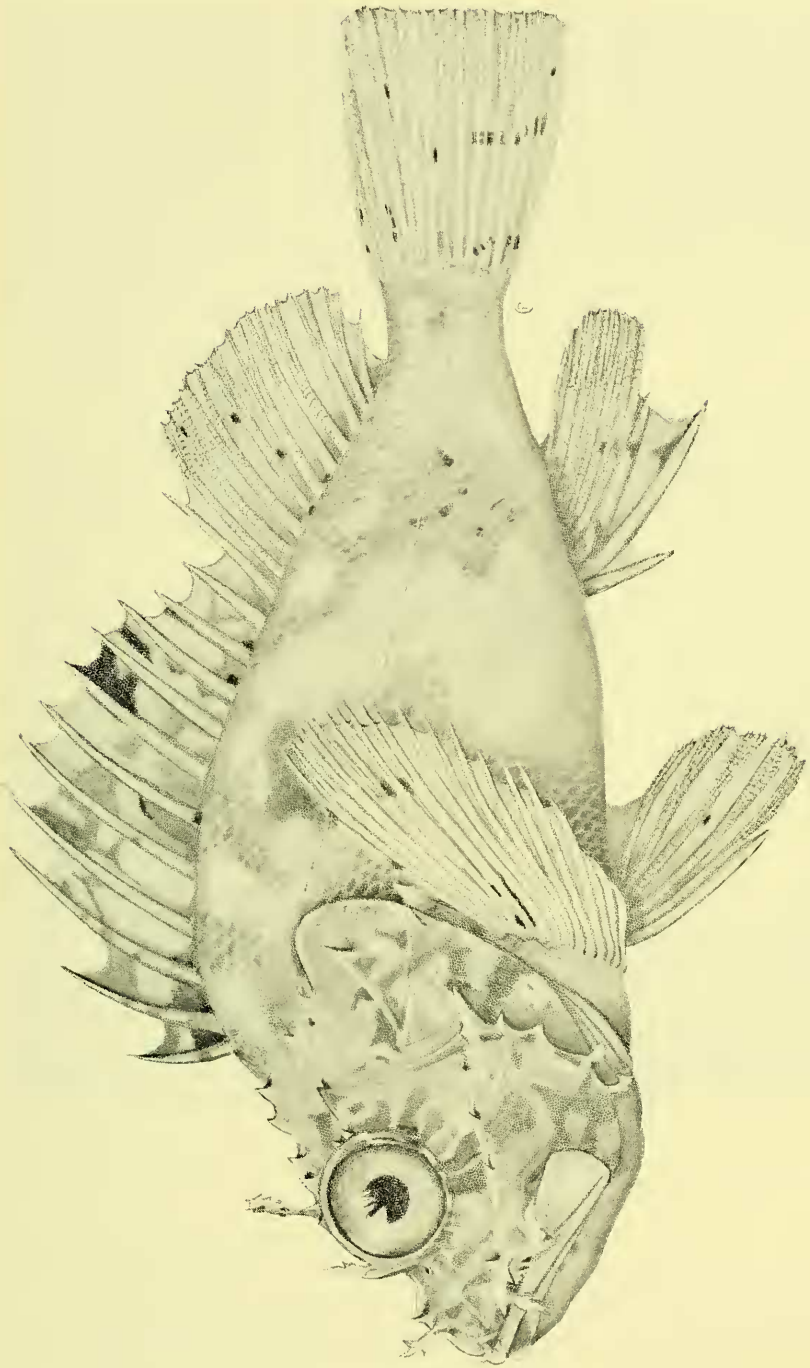


FIGURE 24. *Scorpaena pele*, USNM 214046, holotype, 124 mm. S. L., north coast of Oahu. (Drawn by Cheryl Pape.)

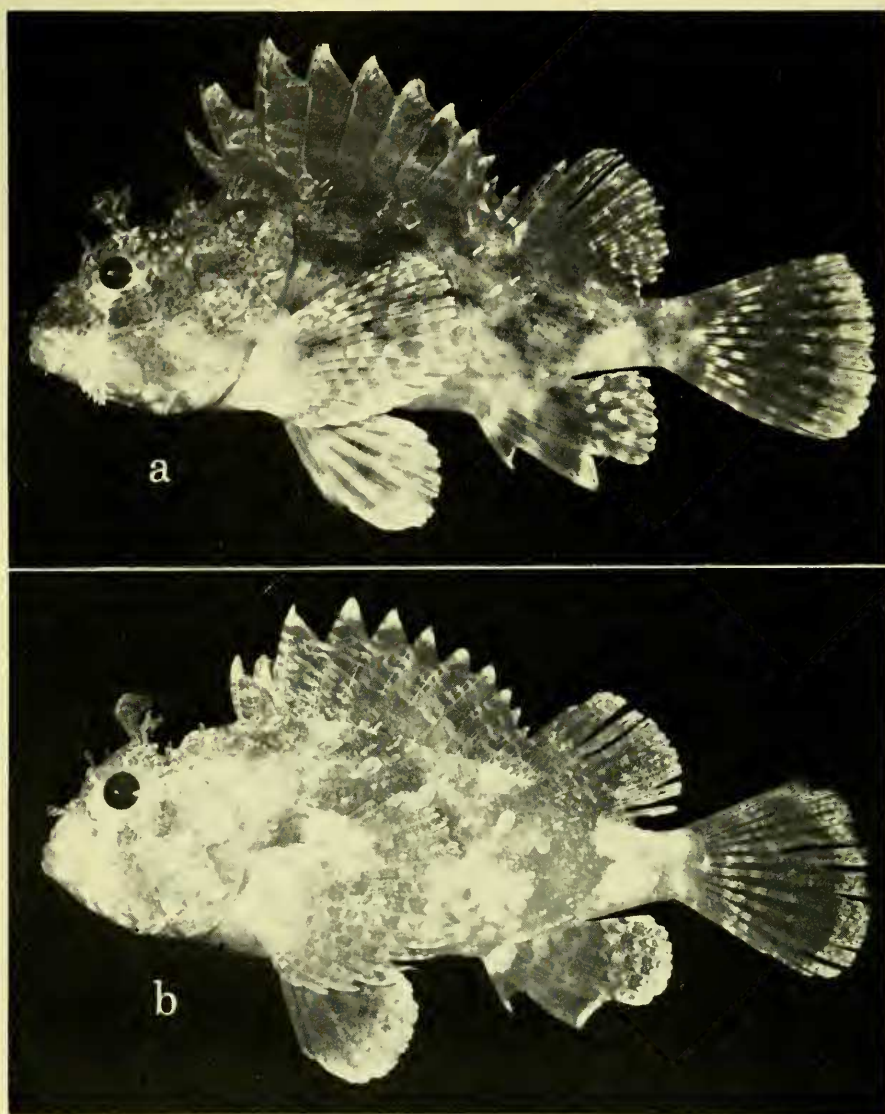


FIGURE 25. a: *Scorpaena pele*, CAS 30236, paratype, 88.7 mm. S. L., Pailolo Channel. b: *Scorpaena colorata*, BPBM 14130, 63.0 mm. S. L., Pailolo Channel (second dorsal spine abnormally short). (Photographs of fresh specimens.)

Pectoral fin rays 16–17, almost always 17, rays 2 through 7 or 8 branched in adults. Gill rakers, on outside of first arch including rudiments total 15–17, 4–6 on upper arch, 10–12 on lower arch, usually 5 + 11.

Head spination as in figure 24. Lachrymal bone with 3 spines over

maxillary, first points forward, second near base of or on first and points forward, third points down and slightly to rear. Suborbital ridge with four spines, first on lateral face of lachrymal bone. Preopercle with supplemental and 5 preopercular spines, fifth preopercular spine sometimes tiny. Other spines include nasal, pre-, supra-, and postocular, tympanic, nuchal, parietal, upper and lower posttemporal, opercular, sphenotic (multiple), pterotic, supra-cleithral, and cleithral. Interorbital ridges moderate, ending at or near base of tympanic spines. Occiput with a shallow to moderate pit, usually poorly defined.

Scales on sides ctenoid; scales on belly and pectoral fin base cycloid. Head before eyes unscaled. Buried scales present behind eye and on cheek. Breast with buried scales. Vertical scale rows about 45; lateral-line scales usually 23 plus 1 on caudal fin. Vertebrae 24. Head and body with small skin appendages. Supraocular tentacle somewhat frilly distally, flattened, its length usually about one-half of orbit diameter. Lachrymal, preopercular, and preorbital spines with small skin flaps; small flaps on eye, on anterior nostril, and a few small ones at other locations on head.

Measurements are summarized in table 4. Orbit diameter about equal to snout length (orbit into snout .9–1.1); orbit into head 3.3–3.8; larger specimens tend to have proportionally smaller orbit diameters.

Color in alcohol as in figure 24. Body and head marbled and spotted with brown on a pale background. Dark spot on dorsal fin between spines 6–10, sometimes this spot reduced or absent. Large dark patches on flanks under scales (these prominent, purplish in some specimens). Smaller, scattered black spots present on body and on caudal fin and usually also on other fins. Broad lines radiate from eye, two ventral ones most noticeable. Color in life mostly red, marbled and spotted with white. All dark areas in figure 25a red in life.

COMPARISONS. *Scorpaena pele* is very similar to *Scorpaena colorata* in shape, live coloration, and spination. Both are upper slope species. They differ in that *S. colorata* lacks roundish black spots on the caudal fin, and usually on other fins, which are present in *S. pele*. The tooth patch on the palatine of *S. colorata* is wider and the palatine teeth are scattered, while in *S. pele* the teeth are in a narrow band of not more than two rows. The scales on the breast of *S. pele* are buried so the area appears unscaled, while they are readily apparent in *S. colorata*. *Scorpaena pele* invariably has a spine on the lateral face of the lachrymal bone, yielding a total of 4 on the "suborbital ridge"; *S. colorata* lacks a spine on the lateral face of the lachrymal bone and has 3 spines on the suborbital ridge. These two species are distinguished from other species by the characters presented in the key.

DISTRIBUTION. Known only from the Hawaiian Islands; all specimens were trawled in depths from about 180–240 meters.

TABLE 4. Counts and measurements for eleven type specimens of *Scorpaena* pele. (See tables 1-2 for summary of fin-ray counts; part as percent of standard length in parentheses).

	USNM	BPBM	CAS	CAS	CAS
	214044	13735	15707	30238	30236
Standard length	75.9	76.5	81.4	84.8	88.7
Dorsal rays	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½
Anal rays	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½
Pectoral rays	17+17	17+17	17+17	17+17	17+17
Gill rakers (upper, lower)	4, 11	6, 11	5, 11	5, 12	5, 11
Head length	35.2(46)	36.1(46)	37.6(46)	39.7(47)	40.4(46)
Snout length	9.1(12)	9.4(12)	9.2(11)	10.8(13)	10.3(12)
Orbit diameter	10.3(14)	11.0(14)	10.6(13)	11.3(13)	10.7(12)
Interorbital width	4.0(05)	3.6(05)	4.5(06)	4.7(05)	4.7(05)
Upper jaw length	16.8(22)	17.4(23)	17.6(22)	19.0(22)	19.0(21)
Predorsal-fin length	30.1(40)	30.1(40)	31.9(39)	33.5(40)	33.6(38)
Body depth	29.6(39)	27.8(36)	30.8(38)	33.5(40)	33.7(38)
Pectoral fin length	23.7(31)	24.2(32)	25.9(32)	23.9(28)	27.0(30)
Pelvic fin length	23.0(30)	23.0(30)	23.7(29)	23.5(28)	25.8(29)
Caudal fin length	25.3(33)	23.8(31)	26.6(33)	26.7(31)	27.0(30)
Length 3rd dorsal spine	18.8(25)	18.6(24)	20.4(25)	21.0(25)	18.9*(21)
Length 11th dorsal spine	7.0(09)	6.4(08)	6.7(08)	7.4(09)	7.7(09)
Length 12th dorsal spine	13.5(18)	12.5(16)	13.0(16)	13.8(16)	14.7(17)
Length 1st anal spine	8.3(11)	8.0(10)	9.2(11)	9.6(11)	11.2(13)
Length 2nd anal spine	18.3(24)	18.4(24)	19.6(24)	18.6(22)	19.8(22)
Length 3rd anal spine	15.4(20)	14.7(19)	15.7(19)	15.4(18)	16.5(19)

* Broken at tip

TABLE 4. (continued)

	USNM 214044	CAS 30237	CAS 30237	CAS 30239	USNM 214046	USNM 214042
Standard length	110	110	112	118	124	135
Dorsal rays	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½	XII, 9½
Anal rays	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½	III, 5½
Pectoral rays	17+17	17+17	17+17	17+17	17+17	17+17
Gill rakers (upper, lower)	5, 11	5, 11	5, 11	5, 11	5, 11	5, 11
Head length	50.7(46)	54.1(49)	53.2(48)	54.1(46)	56.2(45)	62.1(46)
Snout length	13.0(12)	13.5(12)	13.7(12)	14.3(12)	15.6(13)	15.7(12)
Orbit diameter	15.2(14)	15.4(14)	14.3(13)	16.5(14)	15.3(12)	17.9(13)
Interorbital width	5.2(05)	6.2(06)	6.2(06)	6.0(05)	6.7(05)	7.2(05)
Upper jaw length	24.6(22)	25.2(23)	25.3(23)	26.0(22)	27.9(22)	31.0(23)
Predorsal-fin length	42.6(38)	44.5(40)	45.6(41)	45.8(39)	48.0(39)	51.8(38)
Body depth	40.3(37)	43.1(39)	44.1(39)	44.5(38)	47.7(38)	50.8(38)
Pectoral fin length	31.8(29)	32.4(29)	33.3(30)	33.3(28)	35.7(29)	39.5(29)
Pelvic fin length	30.5(28)	31.0(28)	31.3(28)	31.6(27)	35.0(28)	37.5(28)
Caudal fin length	34.0(31)	34.3(31)	35.7(32)	36.7(31)	37.5(30)	42.1(31)
Length 3rd dorsal spine	24.7(22)	25.8(23)	24.3(22)	25.9(22)	28.9(23)	28.8(21)
Length 11th dorsal spine	8.6(08)	10.1(09)	8.6(08)	10.3(09)	11.3(09)	10.2(08)
Length 12th dorsal spine	17.3(16)	18.4(17)	17.3(15)	18.5(15)	19.5(16)	20.8(15)
Length 1st anal spine	11.2(10)	11.9(11)	11.2(10)	14.4(12)	14.8(12)	13.3(10)
Length 2nd anal spine	23.0(21)	23.8(22)	23.6(21)	25.2(21)	26.6(21)	25.9(19)
Length 3rd anal spine	19.4(18)	20.7(19)	19.5(17)	21.7(18)	23.2(19)	25.6(19)

NAME. The specific name is based on Pele, the Hawaiian goddess of volcanoes and volcanic fires, alluding to the red coloration of the species. It is to be treated as a noun in apposition.

Scorpaena colorata (Gilbert).

(Figure 25b.)

Sebastapistes coloratus GILBERT, 1905, pp. 627–628, fig. 243 (original description; type locality Hawaiian Islands, off Molokai, *Albatross* station 3849, holotype USNM 51631, plus paratypes from *Albatross* stations 3849 and 3850); JORDAN & SEALE, 1906, p. 376 (listed from Hawaii); JORDAN & JORDAN, 1922, p. 54 (compiled); JORDAN & EVERMANN, 1926, p. 10 (listed); BÖHLKE, 1953, p. 122 (location of types).

Sebastapistes bynoensis (not of Richardson): TINKER, 1944, p. 266 (compiled; figure of type of *colorata* copied from Gilbert, 1905).

Scorpaena coloratus: GOSLINE & BROCK, 1960, pp. 285, 288, 289, 341 (in key; compiled brief description; synonymy); GOSLINE, 1965, p. 825 (compiled depth distribution).

MATERIAL EXAMINED. USNM 51631 (1, 57.2 mm. S. L., holotype of *Sebastapistes coloratus*), and USNM 51667 (2, 44.0–50.8, paratypes of *Sebastapistes coloratus*), south coast of Molokai, N. at 71°, W. 21.9' from Lae-o Ka Laau Light, in 133.5–78.5 meters, coarse sand, broken shells and coral, 10-ft. Blake trawl, *Albatross* station 3849, 8 Apr. 1902. SU 8618 (1, paratype of *Sebastapistes coloratus*), south coast of Molokai, N. at 74°15', W. 22.2' from Lae-o Ka Laau Light, in 78.5–121 meters, coarse sand, broken shells, and coral, 10-ft. Blake trawl, *Albatross* station 3850, 8 Apr. 1902. BPBM 8808 (2, 43.8–63.3), Oahu, off Haleiwa, 21°40'N., 158°07'W., *Townsend Cromwell*, 3 Mar. 1968. BPBM 14130 (1), off Pailolo Channel, in 219 meters, *Townsend Cromwell* (no other data). BPBM 13734 (4, 61.2–70.3), CAS 15705 (8, 43.9–88.0), and CAS 15706 (3, 75–95, cleared and stained), off Oahu, Haleiwa, 21°39.4'–42.5'N., 158°07.1'W., shrimp trawl in 102 meters, *Townsend Cromwell* cruise 40, station 112, 30 Nov. 1968. CAS 15699 (1), off Molokai, 21°14.4'–15.7'N., 157°08.2'–14.5'W., shrimp trawl in 119 meters, *Townsend Cromwell* cruise 40, station 41, 13 Nov. 1968. Additional material is present in the NMFS and CAS collections.

DISTINGUISHING FEATURES. Dorsal fin rays XII, 9½. Anal fin rays III, 5½. Pectoral fin rays usually 17 (16–18). Coronal spines absent. Shallow to moderate occipital pit. Scales on sides ctenoid; about 45 vertical scale rows. Lachrymal bone usually with 3 spines, second small and at base of first and both of these directed mostly forward, posterior spine points out and slightly back; middle spine develops when fish is about 40 mm. S. L. Suborbital ridge usually with 3 spines, first under eye, second under rear of eye, third at end of ridge. Often a dark blotch on distal part of spinous dorsal between about spines 7–9.

Scorpaena colorata closely resembles *Scorpaena pele* in live coloration and in most features, but *S. colorata* has a scaled breast, while the area before

the pelvic fins is unscaled or with only a few buried scales in *S. pele* (see also the account of *S. pele*).

DISTRIBUTION. *Scorpaena colorata* is known only from the Hawaiian Islands in depths of about 100–219 meters, with some from uncertain depths between 79–133 meters.

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