WESTERN ATLANTIC SCORPIONFISHES OF THE GENUS *SCORPAENA*, INCLUDING FOUR NEW SPECIES[1]

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ABSTRACT

Western Atlantic species of *Scorpaena* are treated. Four new species are described and *S. isthmensis* Meek and Hildebrand is reinstated, bringing to sixteen the number of species in the western Atlantic Ocean, though one is of doubtful occurrence in the western Atlantic. Synonymies, descriptions of adults and juveniles, comparisons with other species, and distribution, are given for all species. A key is included, and both adults and juveniles of most species are figured. The known distributions of the species have been greatly enlarged and many new records are included. Habitat preferences are shown by many species.

INTRODUCTION

Approximately thirty species of scorpionfishes (Family Scorpaenidae) comprising eight genera occur in the western part of the Atlantic Ocean. About half of these are in the genus *Scorpaena,* a worldwide group containing some fifty species, most of which are confined to tropical seas. Ginsburg (1953) did much to clarify the systematic status of western Atlantic scorpionfishes, placing eighteen nominal species in synonymy for the first time. About half of these were in the genus *Scorpaena.* It was necessary to resurrect only one, *Scorpaena isthmensis* Meek and Hildebrand, on the basis of new material.

Four new species of *Scorpaena* are described, two from Brazil, one from Venezuela and one from Puerto Rico and the Dominican Republic. This brings to fifteen the number of species of *Scorpaena* in the western Atlantic Ocean. Also, one species which is common in the Mediterranean Sea and eastern Atlantic is treated as of doubtful occurrence in the western Atlantic Ocean.

Recent collections from the Atlantic coast of South America and the Caribbean Sea have extended the known ranges of many species in the genus. Species which were known from only a few localities have been found to be widely distributed through the West Indian region. Also, compilation of detailed synonymies has increased the known ranges of several species beyond that reported in the recent literature.

Juveniles of species of *Scorpaena* differ from adults in coloration, and

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they undergo certain morphological changes with growth. Information is presented to recognize both the juveniles and adults. The section of Ginsburg's key dealing with species of *Scorpaena* (1953: 20-26) has been modified by the addition of *Scorpaena isthmensis* and four new species, and other characters useful in identification.

ACKNOWLEDGMENTS

The scope of this study would have been limited without the important collections made by the United States Fish and Wildlife Service research vessel OREGON off the coast of South America. I express my gratitude to Harvey R. Bullis, Jr., Director of the Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, Pascagoula, Mississippi, for forwarding specimens collected by the OREGON, including four new species, and for the use of facilities and equipment during my employment in Pascagoula during the summers of 1962 and 1963. Also, I thank the following staff members at Pascagoula for their help: Tomio Iwamoto, James C. Carpenter, John R. Thompson, Francis J. Captiva and Richard A. Waller (now with the U.S. Fish and Wildlife Service Biological Laboratory, Washington, D.C.).

I thank Dr. Leonard P. Schultz and the staff of the U.S. National Museum for their generous aid during my visits and for the loan of material. Dr. Daniel M. Cohen of the Ichthyological Laboratory, U.S. Fish and Wildlife Service, Washington, D.C., suggested an important reference. Dr. P. H. Greenwood and the staff of the British Museum (Natural History) and Dr. Jean Cadenat of the Institut Français d'Afrique Noire were of valuable assistance during my visit to London and Dakar. Mr. Loren P. Woods and Mrs. Pearl Sonoda of the Chicago Natural History Museum generously loaned specimens. Dr. John E. Randall of the Institute of Marine Biology, University of Puerto Rico, loaned specimens collected at Curaçao and a color slide of a specimen of *S. albifimbria*. Dr. Reeve M. Bailey, University of Michigan, sent data on *S. microlepis*. Dr. James E. Böhlke, Academy of Natural Sciences of Philadelphia, provided information on species occurring in the Bahamas.

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Methods

Measurements and counts are as defined by Hubbs & Lagler (1958: 19-28) unless otherwise stated. Measurements were made with calipers calibrated in tenths of a millimeter. The left side of specimens was used for measurements and counts unless badly damaged. Figure 1 illustrates the counts and measurements taken.

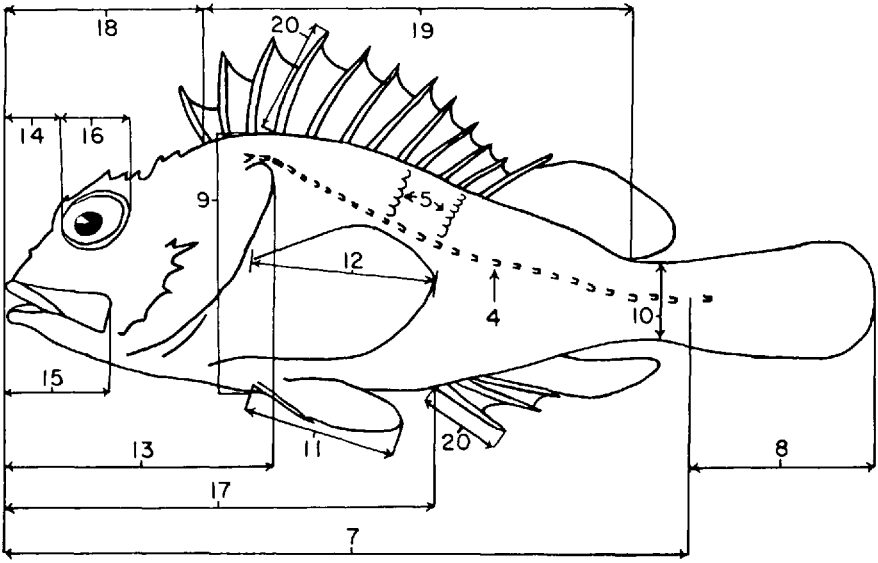

FIGURE 1. Diagram of a specimen of *Scorpaena* showing some of the counts and measurements taken. (Numbers refer to descriptions below.)

1. Dorsal and anal spines. Arabic numerals are used to designate dorsal and anal spines and soft rays. The last dorsal spine which is associated with the soft-rayed portion of the fin is separated by a plus sign in the fin formula. Dorsal and anal soft rays are separated from the spine counts by a comma. The last two soft rays of both the dorsal and anal fin comprise main branches of one ray which is split to its base; they are counted as one ray.

2. Pectoral rays.

3. Branched pectoral rays.

4. Lateral-line scales. Pored scales are counted beginning with the first scale following the supracleithral spine and are counted to the caudal base. Those beyond the caudal base are added to this count with a plus sign. There is usually a space between the last scale on the body and the one or two scales on the caudal fin.

5. Vertical scale rows. Following Ginsburg (1953: 14), the vertical

scale rows along the side of the body are counted just above the lateral line, beginning with the row which is partly or wholly just behind the supracleithral spine, and ending at the caudal base. Because of irregularly arranged scales and the changing direction of scale rows, this count is only approximate. The count is useful in separating several species.

6. Gill rakers. The combined number of gill rakers and tubercles on the outside of the first arch are included in the count. The gill raker at the angle is included in the count for the lower arm. Counts on the upper and lower arms are separated by a plus sign in the gill-raker formula.

7. Standard length. Since a well-developed notch is usually present at the junction of the left and right premaxillaries, the measurement is taken from the anteriormost point of the left premaxillary adjacent to the notch. This procedure applies to all measurements (13, 14, 17, 18) originating from the anterior margin of the upper jaw.

8. Caudal length.

9. Body depth. Body depth is measured from a point just in front of the ventral fin base.

10. Least depth of caudal peduncle.

11. Pelvic-fin length.

12. Pectoral-fin length. Measurements are made from the point of articulation of the uppermost ray to the posterior apical point of the fin (following Ginsburg, 1953: 20).

13. Head length. Head length is measured to the posteriormost point of the flexible margin.

14. Snout length.

15. Upper jaw length.

16. Orbit diameter. Orbit diameter refers to the greatest horizontal diameter of the ridge surrounding the eye.

17. Preanal-fin length.

18. Predorsal-fin length.

19. Length of dorsal base.

20. Height of dorsal and anal spines.

The nomenclature of head spines is as defined and figured by Ginsburg (1953: 5-9). Figure 2 is modified from Ginsburg and illustrates the position of spines. The term "spine" is used here in the same sense as by Ginsburg, i.e., all homologous projections, including blunt points, shelflike bony projections, and spinelike processes are termed spines.

Specimens examined are separated by major localities under the account of each species. The catalog number is followed in parentheses by the number of specimens examined and their range of standard length. This

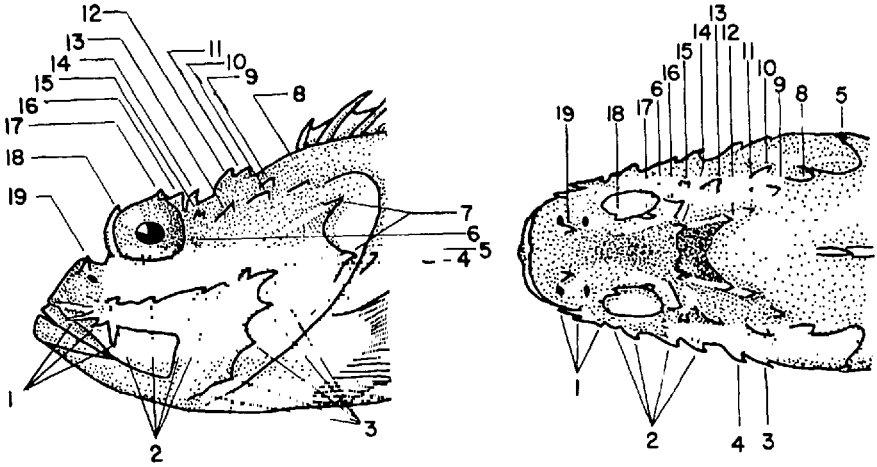

FIGURE 2. Diagram of head spines in *Scorpaena* (modified from Ginsburg, 1953: 6).

1. Preorbital
2. Suborbital
3. Preopercular
4. Supplemental preopercular
5. Cleithral
6. Postorbital
7. Opercular
8. Supracleithral
9. Upper posttemporal
10. Lower posttemporal
11. Posterior parietal
12. Anterior parietal
13. Pterotic
14. Frontal
15. Sphenotic
16. Postocular
17. Supraocular
18. Preocular
19. Nasal

in turn is followed by more detailed locality data, depth of capture, vessel station number or field number, the collector and the date of capture. Abbreviations indicating the depositories of specimens are as follows:

UMML—The Marine Laboratory of the University of Miami, Miami, Florida.

USNM—The United States National Museum, Washington, D.C.

CNHM—The Chicago Natural History Museum, Chicago, Illinois.

UPR—The Institute of Marine Science, University of Puerto Rico, Mayagüez, P.R.

BMNH—The British Museum (Natural History), London, England.

In this paper the descriptions of species which are treated fully by Ginsburg (1953) have been abbreviated. Some characters, for example, body tabs and tentacles, that are treated by Ginsburg have been omitted, for the most part, in the present study.

Genus *Scorpaena* Linnaeus

Scorpaena Linnaeus, 1758:266 (type-species *Scorpaena porcus* by subsequent designation, Bleeker, 1876:295).
Parascorpaena Bleeker, 1876:295 (type-species *Scorpaena picta* Kuhl & Van Hasselt, by monotypy).
Sebastapistes Gill *in* Streets, 1878:62, footnote (type-species *Sebastes strongia* Cuvier by subsequent designation, Jordan, 1919:397).

No definition of the genus *Scorpaena* on a worldwide basis is available, and recent descriptions have dealt only with species from limited geographical areas. Matsubara (1943b: 290) defines *Scorpaena* (including *Sebastapistes*) for Japanese species primarily on the basis of internal anatomy. Ginsburg (1953: 63-65) defines *Scorpaena* for western Atlantic species on the basis of external features only. J. L. B. Smith (1957) has not followed earlier workers and separates *Parascorpaena* and *Sebastapistes* from *Scorpaena* for species of the western Indian Ocean. Western Atlantic species of *Scorpaena* have cycloid scales, whereas most species from other areas have ctenoid scales, but the type of scales appears to be of little importance in the *Scorpaena* complex. At present, information is unavailable to delimit the generic characteristics on a worldwide basis.

Ginsburg's definition suffices for western Atlantic species and has been followed in the present treatment. *Scorpaena* can be separated from other scorpaenid genera in the western Atlantic by the following combination of characters: cycloid scales, 12 dorsal spines, channeled lateral-line scales, occipital pit present (except in *S. inermis* and *S. calcarata*), and air bladder absent. *Scorpaenodes,* the only genus other than *Scorpaena* in the tropical western Atlantic containing species living in water shallower than about fifty fathoms, is characterized by ctenoid scales and 13 dorsal spines. *Scorpaena* is the only genus in the western Atlantic Ocean containing species with an occipital pit.

Key to the Western Atlantic Species of *Scorpaena*
(Modified in part from Ginsburg, 1953: 23-25.)

1. Preorbital bone with 2 free spinous points (Fig. 3a) ..... 2.
1. Preorbital bone with 3 or 4 free spinous points (Fig. 3b and c) except in specimens of *S. plumieri* less than about 40 mm standard length and probably in specimens of *S. dispar* under 40 or 50 mm. (Juveniles of these two species may be separated on the basis of coloration and characteristics discussed under the individual accounts.) ..... 14.
2. First preopercular spine without a supplemental spine. Occiput without a definite pit, except in *S. melasma* ..... 3.
2. First preopercular spine with a supplemental spine (see Fig. 2). Occiput with a pit ..... 5.

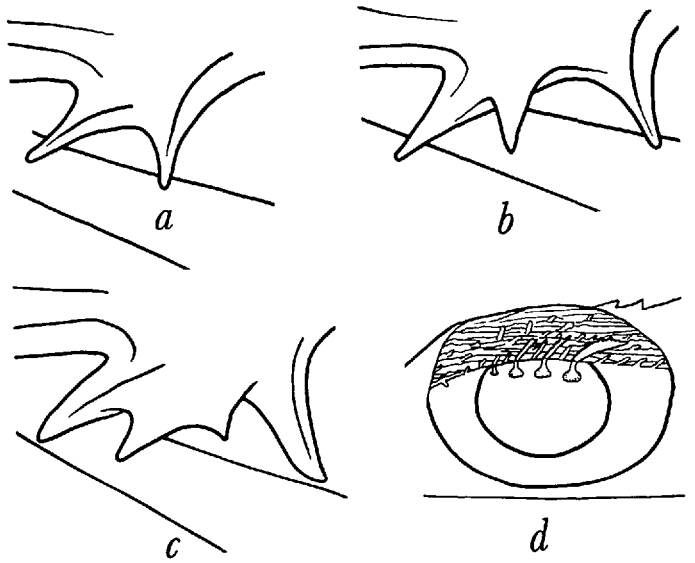

FIGURE 3. a, b and c; Diagram of 2, 3 and 4 preorbital spines in a specimen of *Scorpaena*.—d, Mushroomlike tabs on cornea of *Scorpaena inermis*.

3. Occiput broadly depressed, without a definite pit. . . . . 4.
3. Occiput with a well-developed pit (Fig. 6c) . . . . *S. melasma* (p. 109)

4. Inverted, mushroom-shaped, whitish figures extending down on cornea from base of ocular tabs at boundary between upper opaque and lower transparent parts of cornea (Fig. 3d) (slight magnification may be needed). Dorsal soft rays modally 8, infrequently 7 or 9; predorsal-fin length 40-44 per cent of S.L.; head length 46-50 per cent; upper jaw length 24-27 per cent (Fig. 11a and b) . . . . . *S. inermis* (p. 138)
4. Inverted, mushroom-shaped, whitish figures absent. Dorsal rays modally 9, infrequently 8 or 10; predorsal-fin length 34-40 per cent; head length 40-46 per cent; upper jaw length 19-23 per cent (Fig. 10b and c) . . . . . *S. calcarata* (p. 134)

5. Scales ctenoid; vertical scale rows more than 65 (a Mediterranean and eastern Atlantic species of doubtful occurrence in the western Atlantic region) . . . . . *S. porcus* (p. 145)
5. Scales cycloid; vertical scale rows fewer than 65. . . . . 6.

6. Vertical scale rows 50-63; upper posttemporal spine absent in large specimens; typically with brown spots (0.5-2 mm in diameter) against a pale background in axil of pectoral fin and alongside of body between pectoral and anal fins (Fig. 9c and 10a ..... *S. brasiliensis* (p. 127)
6. Vertical scale rows fewer than 50, except in *S. agassizi* which may have up to 53; upper posttemporal spine normally present; no brown spots in axil of pectoral fin.....7.

7. Eye large, snout 1.5-2.2 times in orbit; pectoral fin long, reaching to over posterior end of anal-fin base, except in juveniles (Fig. 11c and 12a) ..... *S. agassizi* (p. 141)
7. Eye moderate, snout 0.9-1.3 times in orbit; pectoral fin reaching to over third anal spine as a maximum.....8.

8. Spinous dorsal with a dark blotch between dorsal spine 3-5 anteriorly to dorsal spine 6-7 posteriorly.....9.
8. Spinous dorsal without a dark blotch.....10.

9. Pectoral rays 17, infrequently 16; caudal fin 27-30 per cent of S.L.; suborbital ridge with 1-3 spinous points (Fig. 6a) *S. bergi* (p. 101)
9. Pectoral rays modally 18, often 19, infrequently 17; caudal fin 29-34 per cent; suborbital ridge without spinous points (Fig. 5) *S. isthmensis* (p. 103)

10. Axil of pectoral fin with white specks less than 0.5 mm in diameter surrounded by brown or on a tan background; supraocular tentacle large and fleshy, length equal to or exceeding twice the orbit diameter; frontal spine reduced or absent (Fig. 9a and b) ..... *S. grandicornis* (p. 118)
10. Axil of pectoral fin not as above, usually axil pale-colored; length of supraocular tentacle usually less than orbit diameter; frontal spine present.....11.

11. Pectoral rays 16-18; one spine on suborbital ridge, infrequently 2..12.
11. Pectoral rays 19-20; suborbital ridge usually with 3 spinous points, infrequently 2.....13.

12. Pectoral rays usually 18, sometimes 17; second anal spine usually extending beyond third when fin is depressed; body depth 33-38 per cent; caudal-fin length less than 32 per cent (Fig. 6b) *S. petricola* (p. 107)
12. Pectoral rays 17 or 16; second anal spine usually not extending beyond third when fin is depressed; body depth 38-41 per cent; caudal-fin length greater than 32 per cent (Fig. 7c) *S. elachys* (p. 114)

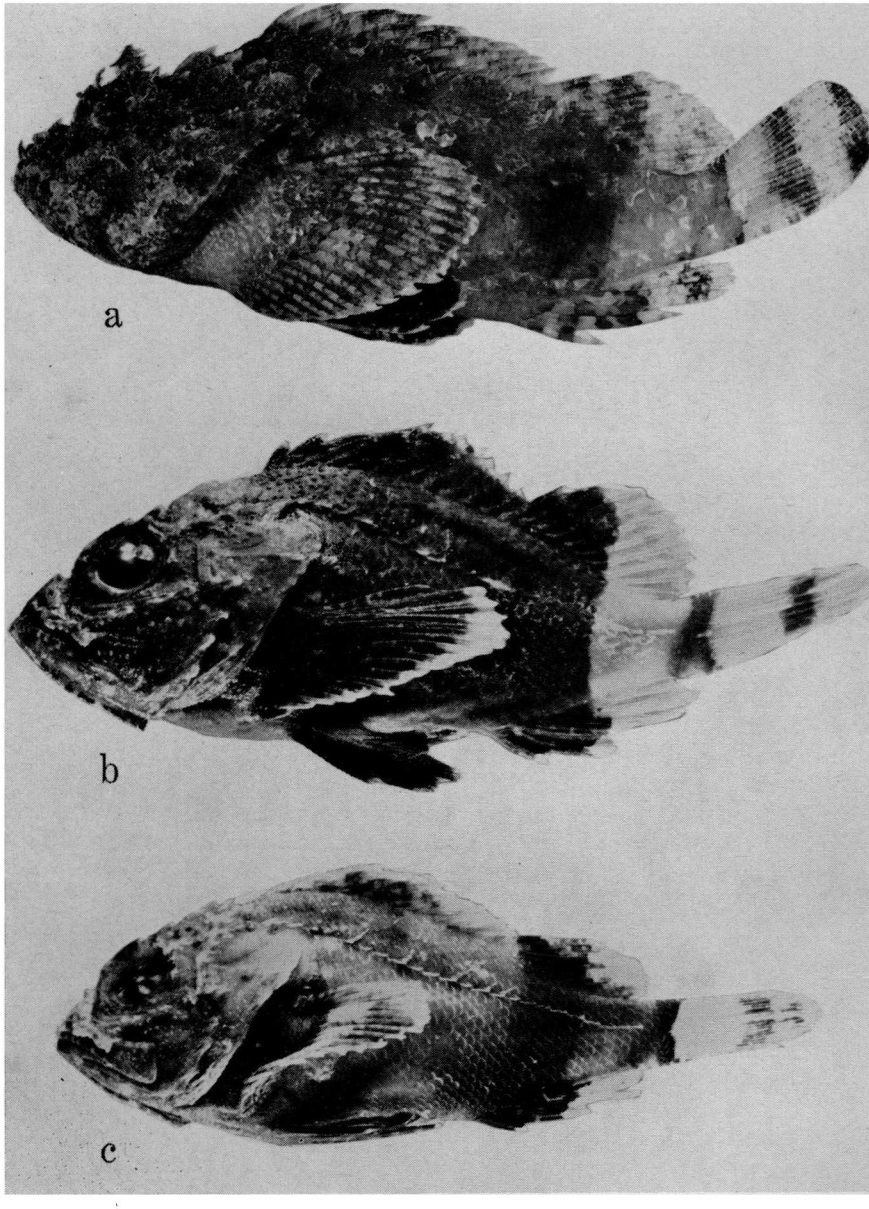

FIGURE 4. *Scorpaena plumieri*.—a, Adult, 95 mm S.L., UMML 2586, Bahamas.—b, Juvenile, 25 mm S.L., UMML 2190, Florida.—c, Juvenile, 21 mm S.L., ARGOSY sta. 13, Panama (Pacific).

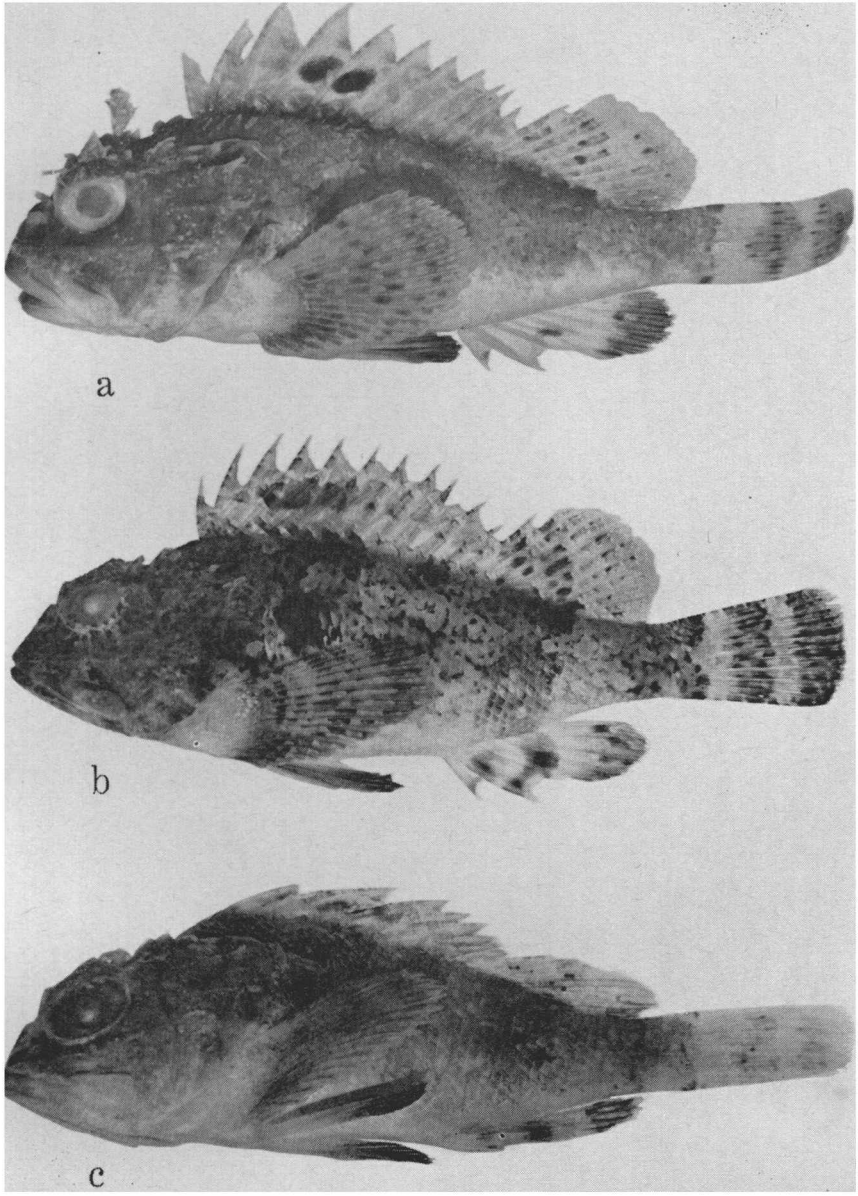

FIGURE 5. *Scorpaena isthmensis*.—a, Adult, 96 mm S.L., CNHM 66409, Brazil in 20 fms., showing color pattern in specimens from offshore.—b, Adult, 97 mm S.L., UPR 1172, Curaçao in 5 ft., showing color pattern in specimens from shallow water.—c, Sub-adult, 42 mm S.L., CNHM 66415, Brazil in 26 fms.

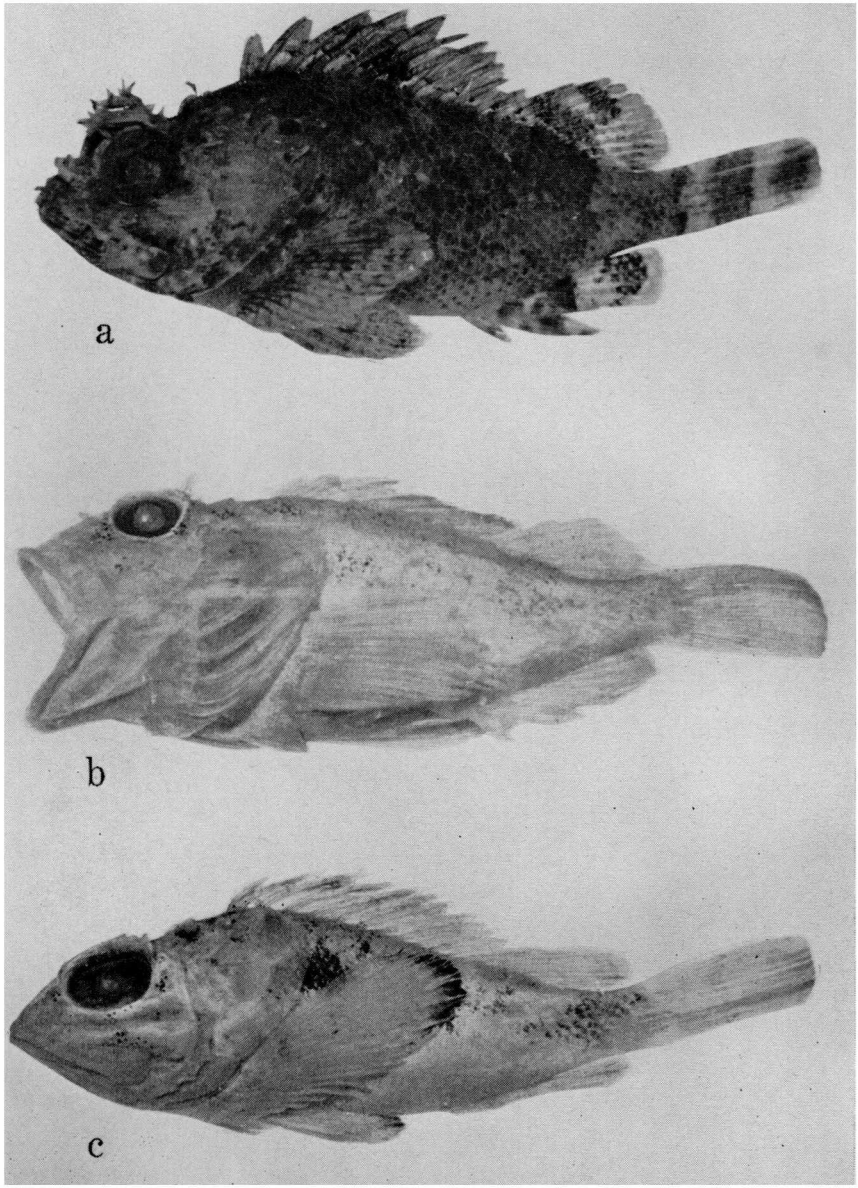

FIGURE 6. a, *Scorpaena bergi*, adult, 57 mm S.L., UMML 8948, Florida.—b, *Scorpaena petricola* (holotype), adult, 69 mm S.L., USNM 198150, off Brazil. —c, *Scorpaena melasma* (holotype), adult, 57 mm S.L., USNM 198154, off Brazil.

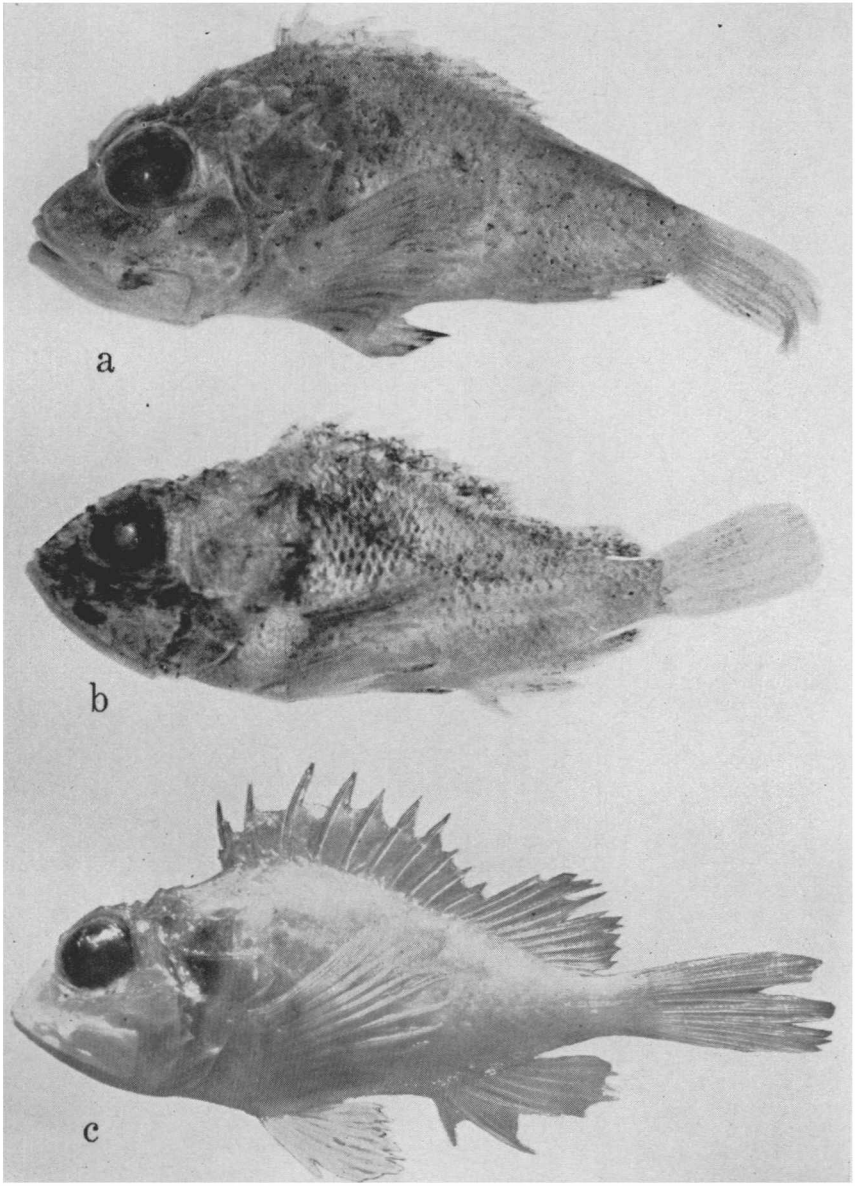

FIGURE 7. a, *Scorpaena brachyptera* (holotype), adult, 62 mm S.L., USNM 198153, off Venezuela.—b, *Scorpaena brachyptera* (paratype), sub-adult, 43.7 mm S.L., UMML 13335, off Venezuela.—c, *Scorpaena elachys* (holotype), adult, 46 mm S.L., USNM 198149, off Puerto Rico.

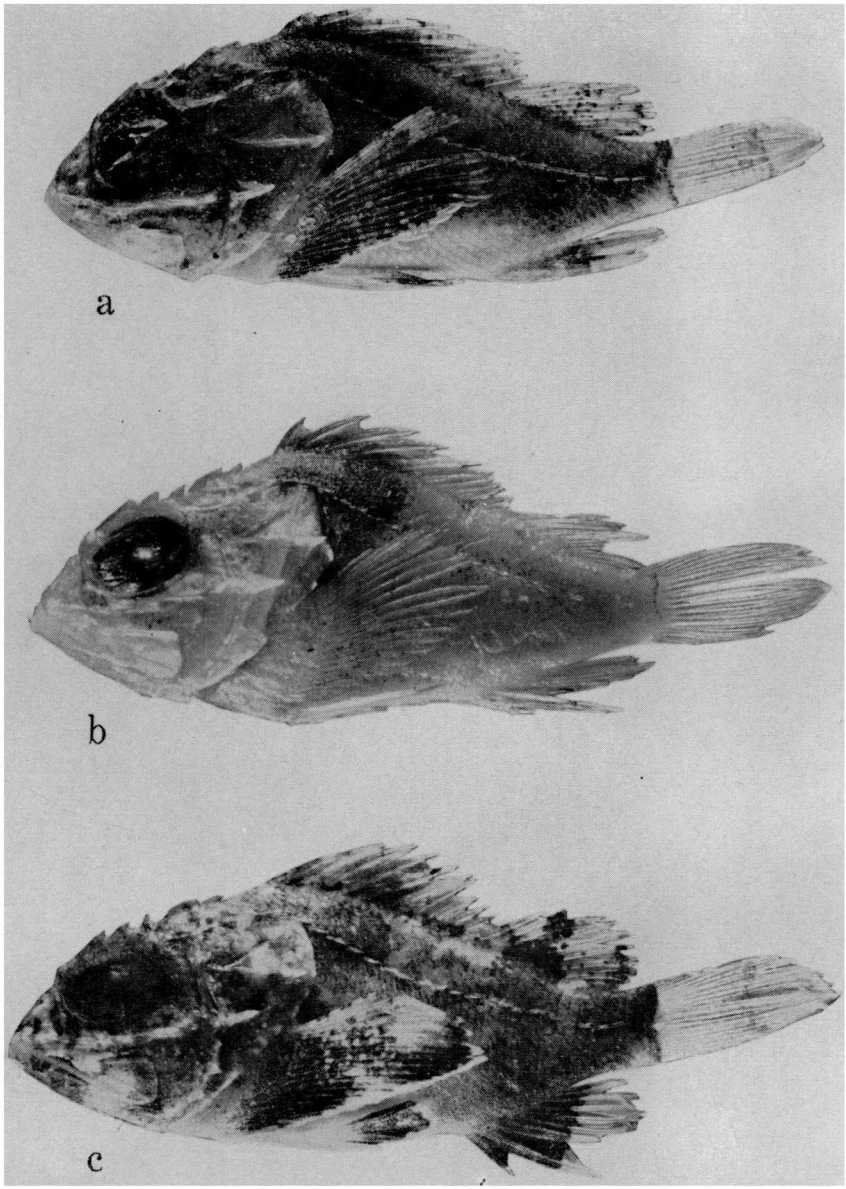

FIGURE 8. *Scorpaena albifimbria*.—a, Adult, 33 mm S.L., UMML 6171, Haiti. —b, Sub-adult, 28 mm S.L., UMML 8200, Virgin Islands, showing pigment retained when partially faded.—c, Juvenile, 23 mm S.L., UMML 12602, Bahamas.

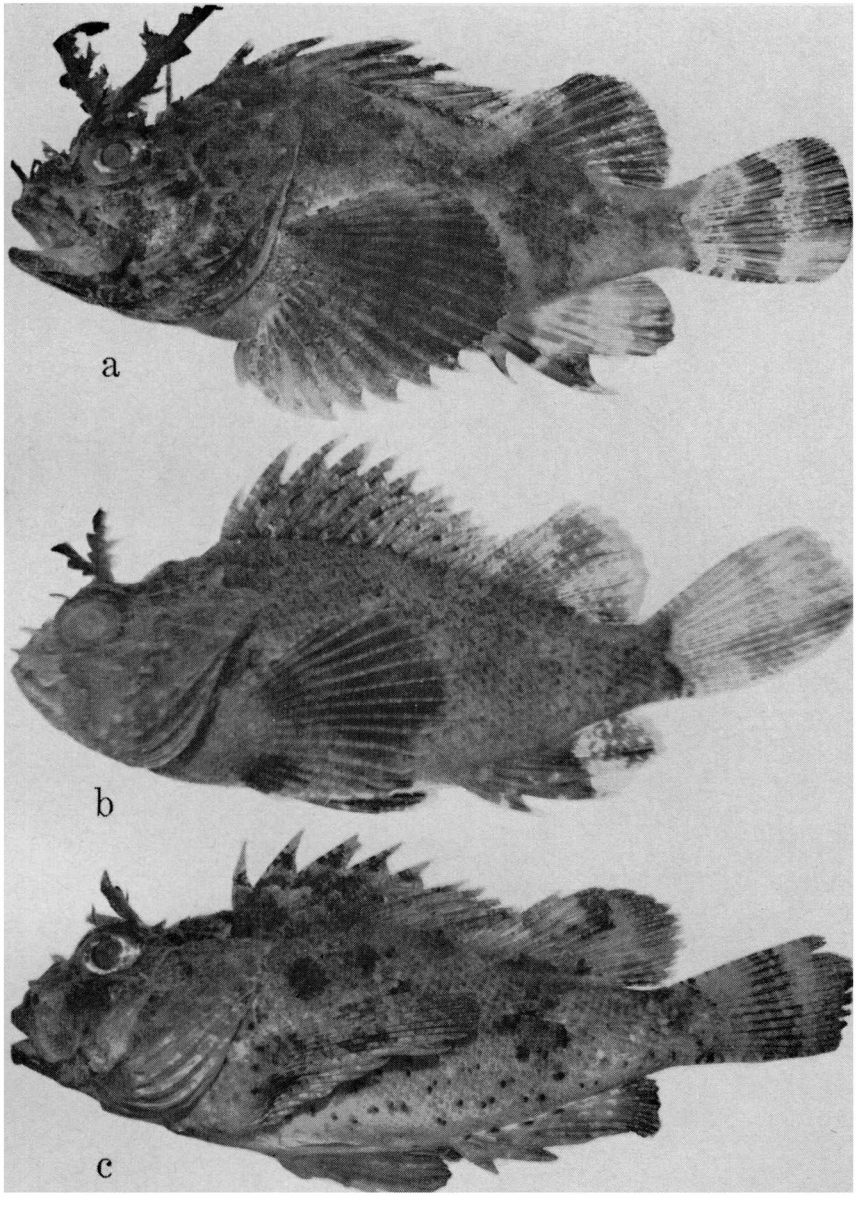

FIGURE 9. a, *Scorpaena grandicornis,* adult, 92 mm S.L., UMML 11338, Florida.—b, *Scorpaena grandicornis,* juvenile, 31 mm S.L., UMML 84, Florida. —c, *Scorpaena brasiliensis,* adult, 111 mm S.L., UMML 15660, Florida.

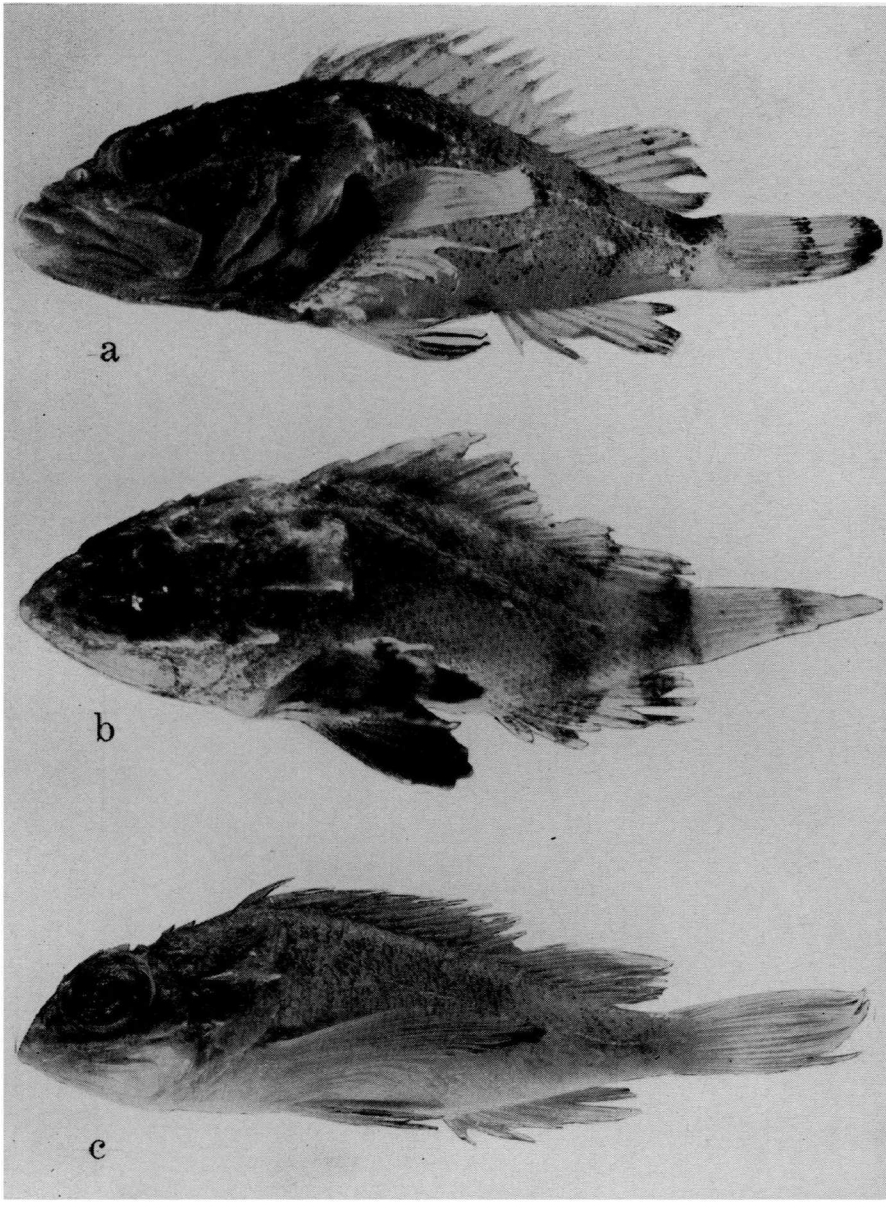

FIGURE 10. a, *Scorpaena brasiliensis*, juvenile, 29 mm S.L., UMML 12333, Florida.—b, *Scorpaena calcarata*, adult, 70 mm S.L., UMML 12347, French Guiana.—c, *Scorpaena calcarata*, juvenile, 22 mm S.L., UMML 8022, Florida.

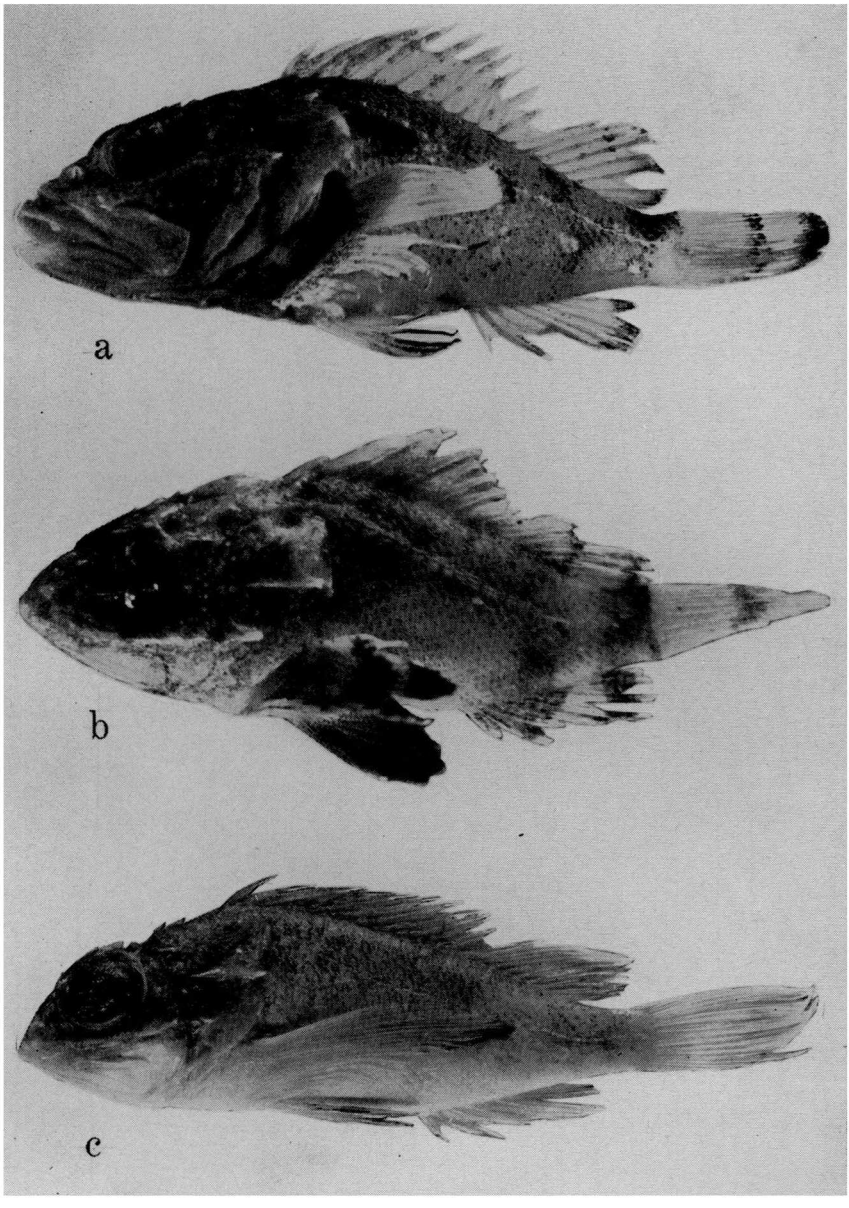

FIGURE 11. a, *Scorpaena inermis*, adult, 58 mm S.L., UMML 10160, Florida.—b, *Scorpaena inermis*, juvenile, 16 mm S.L., UMML 9222, Yucatan.—c, *Scorpaena agassizi*, adult, 101 mm S.L., UMML 13357, Venezuela.

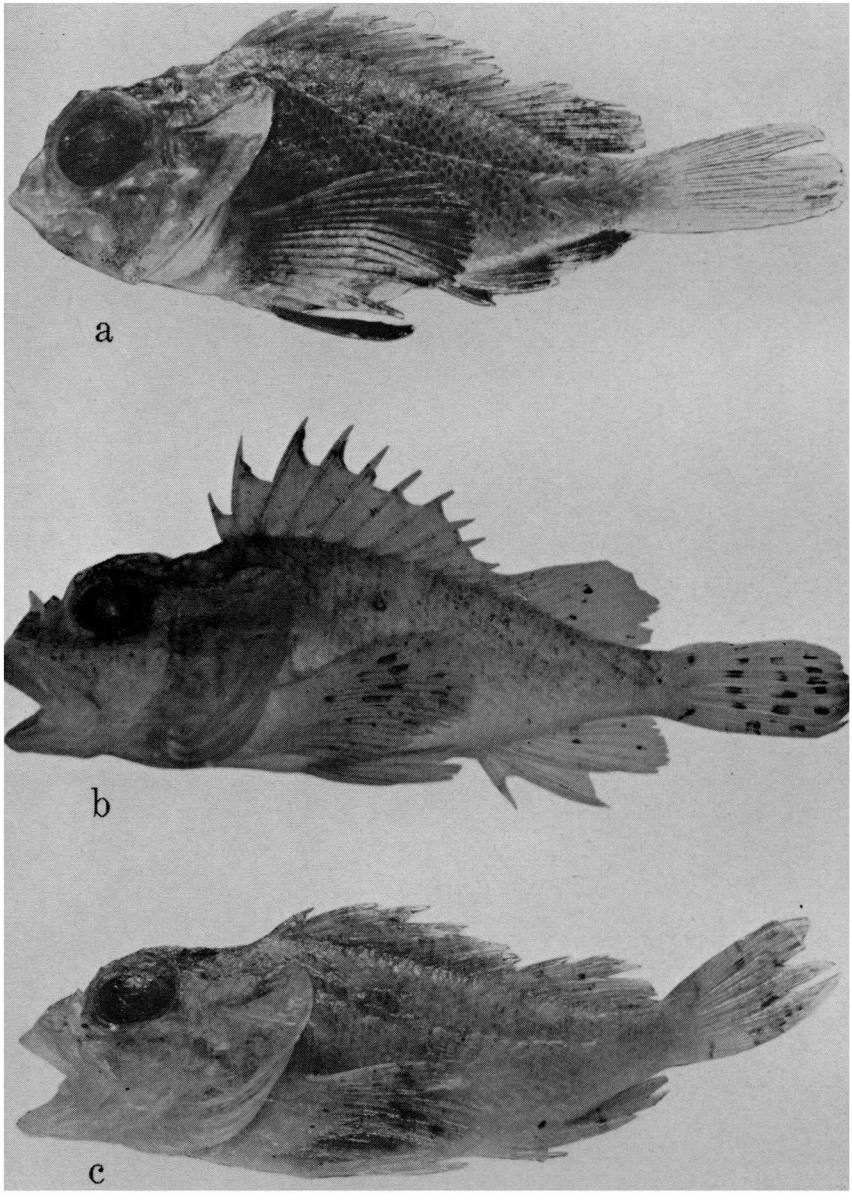

FIGURE 12. a, *Scorpaena agassizi,* juvenile, 31 mm S.L., UMML 10248, Florida.—b, *Scorpaena dispar,* adult, 95 mm S.L., UMML 13351, Venezuela. —c, *Scorpaena dispar,* juvenile, 42 mm S.L., UMML 13351, Venezuela.

13. Nasal spine absent; pectoral fin short, less than 27 per cent S.L. and not reaching first anal spine; 8 soft dorsal rays (last split to base) (Fig. 7a and b) ..... *S. brachyptera* (p. 111)
13. Nasal spine present; pectoral fin moderate, greater than 29 per cent, reaching at least to over base of first anal spine; 9 soft dorsal rays (last split to base) (Fig. 8) ..... *S. albifimbria* (p. 116)

14. Vertical scale rows more than 70 ..... *S. microlepis* (p. 145)
14. Vertical scale rows fewer than 50.....15.

15. Axil of pectoral fin with large white spots or irregular blotches (½-4 mm diameter) on a black background (in specimens over 30 mm S.L.); caudal peduncle paler than anterior portion of body; pectoral rays 19-21 (Fig. 4) ..... *S. plumieri* (p. 121)
15. Axil of pectoral fin unmarked; entire body pale except for scattered dark blotches; pectoral rays usually 17-18, sometimes 19 (Fig. 12b and c) ..... *S. dispar* (p. 132)

Scorpaena bergi Evermann & Marsh

Fig. 6a; Tables 1-13

Scorpaena bergii Evermann & Marsh, 1900: 276-277, Fig. 83 (type locality: Mayagüez, Puerto Rico, paratype from Culebra Is., Puerto Rico; figure incorrectly showed no branched pectoral rays; holotype USNM 49533, paratype USNM 126190).—Metzelaar, 1919: 143-144, Fig. 42 (Curaçao, Aruba; figure fair; description poor [May have included specimens of *S. isthmensis* Meek & Hildebrand.]).—Nichols, 1930: 352-353, Fig. (compiled in part; one specimen from Condado Bay, San Juan, Puerto Rico).—Longley & Hildebrand, 1941: 161, footnote (Longley recognized oversight in Fig. 83 of Evermann & Marsh [1900] showing no branched pectoral rays; color; Tortugas; Hildebrand compared specimens with type).—Duarte-Bello, 1959: 125 (compiled).

Pontinus bergii, Jordan, Evermann & Clark, 1930: 372 (compiled; questionably placed in genus *Pontinus* [probably on the basis of omission of branched pectoral rays in figure of type].)

Scorpaena bergi, Ginsburg, 1953: 79-82 (in part; wrongly included *S. isthmensis* Meek & Hildebrand; specimens of *S. bergi* from Puerto Rico; Cozumel Is., Mexico; Tortugas, Key West and Miami, Florida; Long Island, New York).—Briggs, 1958: 294 (compiled).

Material examined.—FLORIDA: UMML 8948 (2, 53-57) Dade County, S end of Long Reef, CRR-F-174, C. R. Robins and G. L. Voss, 25 Oct. 1958.—UMML 3006 (2, 34-47) Dade County, Long Reef, about 3½ mi. E of Elliot Key, CRR-F-150, C. R. Robins and W. Starck, 29 June 1958.—UMML 2702 (1, 29) Monroe County, Alligator Reef, 1200 ft. E of Alligator Reef Light on ballast stones of wreck of ALLIGATOR, CRR-F-144, W. Starck, 1 June 1958.—USNM 119119 (1, 49) Duck Key to Key West, FISH HAWK Fla. sta. 4, 20 Dec. 1912.—USNM 117137 (29, 32-68) Tortugas, W. H. Longley.—USNM 153128 (1, 25) off Palm Beach in 30-40 fms., sand and rock reef, McGinty.

HAITI: CNHM 66182 (1, 46) Lat. 20°52'N, Long. 73°40'W, in 4 fms., SILVER BAY sta. 3503, 5 Nov. 1961.

NEW YORK: USNM 108656 (1, 28) Long Island, Fire Is. Inlet, 23 Aug. 1938.

MEXICO: USNM 37103 (1, 44) Cozumel Is., Yucatan, ALBATROSS.

CAYMAN ISLANDS: BMNH 1939.5.12.223 (1, 31).

BAHAMAS: UMML 11376 (1, 26) Bimini, ½ mi. W of North Bimini opposite Lerner Laboratory, CRR-BWI-41, H. Feddern, H. Kumpf, W. Herrnkind, 4 March 1962.—UMML 13093 (1, 47) Andros, Morgan's Bluff, CRR-BWI-65, W. A. Starck, II, W. P. Davis, 28 Dec. 1961.

PUERTO RICO: USNM 49533 (1, 59, holotype of *S. bergi*) Mayagüez, FISH HAWK P.R. Expedition, 20 Jan. 1899.—USNM 126190 (1, 44, paratype of *S. bergi*) Culebra Is., FISH HAWK, 1899.—CNHM 72495 (1, 21) Guanica, Aeropuerto, D. S. Erdman and class.

ANTILLES: USNM 170295 (1, 45) Antigua, English Harbor, sta. 75-56, Schmitt, *et al.*

BRAZIL: BMNH 1903.10.16.3 (1, 44) Bahia, Lord Crawford.

Meristic formula.—Dorsal 11+1,9 (type with 10+1,9); anal 3,5; pectoral 16-17, usually 17; pored lateral-line scales 23+1; vertical scale rows 41-46; gill rakers 3-4+7-10.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital with 2 free spinous points. Suborbital ridge ending in a spine posteriorly. Supplemental preopercular spine present; first preopercular spine extending almost half the distance from its base to opercular margin; second longer than third and slightly nearer first. Cleithral spine well-developed; sphenotic spine single or double. Other spines present include the frontal, nasal, preocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic, and opercular.

Occipital pit well developed. Larger specimens with first pectoral ray unbranched, next 4-5 branched and lower 10-12 unbranched. Pyloric caeca 5 (2 specimens) or 4 (1). Snout about equal to orbit, usually a little shorter. Interorbital about half the orbit diameter. Second anal spine longer than third, about even or (usually) second extends beyond third when depressed.

Coloration of adults is shown in Figure 6a. A dark spot present on spinous dorsal between third, fourth or fifth to seventh or eighth dorsal spines, usually grading into a line of dark pigment both anteriorly and posteriorly from the spot. Ventral fin clear to slightly dusky at distal margin. Caudal fin with three dark bands, at base, middle and distal margin, with dark pigment confined to the rays. Soft dorsal and pectoral irregularly pigmented with brown. Anal fin with 2 or 3 transverse dark areas; first poorly defined on anterior third of fin and often grading into a second at the middle of the fin; a third band just before distal margin. Pigment on body brown against a pale background, less concentrated on caudal peduncle.

A species of moderate size, probably not exceeding 100 mm in standard length.

Juveniles.—The color pattern of juveniles is not figured. General coloration similar to adults, except caudal peduncle paler in juveniles than in adults, contrasting more sharply with the dark pigment anterior to the line joining the posterior base of the dorsal and anal fins. Branching of pectoral rays occurs at a size of about 30 mm standard length; a 26-mm and a 28-mm specimen with no branched rays, while one 29-mm specimen with the third and fourth rays slightly split. Occipital pit shallow in small specimens, reaching adult proportions in specimens of 35-40 mm in standard length.

Comparisons.—*S. bergi* is compared with *S. isthmensis* under the account of that species. The combination of a spot on the dorsal fin, one spine at the posterior end of the suborbital ridge, and a low pectoral-ray count (16-17) are sufficient to distinguish *S. bergi* from other western Atlantic species.

Distribution.—*S. bergi* ranges in shallow waters from Florida to South America. Specific records include New York (outside normal range), Florida, Cayman Islands, Mexico (Cozumel Is.), Bahamas, Puerto Rico, Haiti, Antigua, the Dutch West Indies (Curaçao and Aruba), and Bahia, Brazil. The species apparently prefers clear waters.

Remarks.—The specimens from the Bahamas, Haiti, Cayman Islands, Antigua, and Bahia, Brazil are apparently new records for those areas. Records from Panama are based on the type of *S. isthmensis* Meek & Hildebrand, a valid species.

Scorpaena isthmensis Meek & Hildebrand

Fig. 5a, b and c; Tables 1-13

Scorpaena isthmensis Meek & Hildebrand, 1928: 842-843, Pl. 80 (type locality: Porto Bello, Panama; holotype USNM 81617; distinguished from *S. bergi* Evermann & Marsh).—Fowler, 1944: 470 (compiled).

Scorpaena bergi, Delsman, 1941: 75 (4 specimens from Colombia in 8-10 fms.).—Ginsburg, 1953: 79-80 (in part; wrongly included type of *S. isthmensis*).

Scorpaena sp. (near *bergii*), Lowe, 1962: 696 (name only; British Guiana).

Material examined.—All specimens except the type, those from Rio de Janeiro, and the specimen collected by J. E. Randall and C. R. Robins at Curaçao were collected by the U.S. Fish and Wildlife Service research vessel OREGON, and the abbreviation "sta." refers to OREGON station numbers. Stations between 1973-2092 were made in October and November 1957; those between 2207-2356 in August and September 1958; and those between 4164-4306 in February and March of 1963, all off the Atlantic coast of South America. Stations between 4390 and 4495 were collected off the coast of Venezuela in September and October 1963.

PANAMA: USNM 81617 (1, 69, holotype of *S. isthmensis*) Porto Bello, 19 March 1912.

BRITISH GUIANA: USNM 185332 (1, 107) and CNHM 66416 (1, 77) Lat. 07°55′N, Long. 57°30′W, in 45 fms., sta. 2000.—CNHM 66422 (5, 78-119) Lat. 08°31′N, Long. 58°37′W, in 48/46 fms., sta. 2232.—CNHM 66406 (1, 88) Lat. 07°40′N, Long. 57°34′W, in 30/27 fms., sta. 2249.—CNHM 66417 (1, 100) Lat. 07°38′N, Long. 57°34′W, in 27/26 fms., sta. 2250.

SURINAM (DUTCH GUIANA): CNHM 66423 (3, 106-134) Lat. 07°20′N, Long. 56°49′W, in 33 fms., sta. 2261.—CNHM 66408 (1, 124) Lat. 06°56′N, Long. 54°05′W, in 30 fms., sta. 2019.—UMML 12354 (1, 132) Lat. 06°50′N, Long. 56°52′W, in 21 fms., sta. 4169.—UMML 12381 (1, 82) Lat. 06°43′N, Long. 54°47′W, in 25 fms., sta. 4178.

FRENCH GUIANA: UMML 12358 (2, 52-61) Lat. 05°26′N, Long. 51°25′W, in 40 fms., sta. 4200.—UMML 12375 (1, 59) Lat. 05°24′N, Long. 51°34′W, in 35 fms., sta. 4201.—UMML 12349 (1, 128) Lat. 05°57′N, Long. 52°18′W, in 38 fms., sta. 4193.—USNM 185038 (1, 59) and CNHM 66412 (1, 62) Lat. 05°46′N, Long. 53°00′W, in 15 fms., sta. 2038.—USNM 194849 (1, 71) Lat. 05°51′N, Long. 53°00′W, in 19 fms., sta. 2037.—USNM 185325 (3, 116-128) Lat. 05°52′N, Long. 52°03′W, in 40 fms., sta. 2044.—CNHM 66411 (1, 90) Lat. 06°39′N, Long. 52°53′W, in 50 fms., sta. 2032—CNHM 66404 (1, 76) Lat. 05°54′N, Long. 52°17′W, in 31/34 fms., sta. 2309.—CNHM 66421 (2, 117-122) Lat. 05°52′N, Long. 52°03′W, in 40 fms., sta. 2044.—CNHM 66419 (4, 110-139) Lat. 05°56′N, Long. 52°20′W, in 31 fms., sta. 2308.

BRAZIL (listed from North to South): CNHM 66413 (2, 38-62) Lat. 04°05′N, Long. 50°27′W, in 50 fms., sta. 2051.—USNM 185308 (4, 84-129) Lat. 04°04′N, Long. 50°32′W, in 40 fms., sta. 2050.—USNM 184929 (1, 44) Lat. 04°02′N, Long. 50°20′W, in 50 fms., sta. 2054.—CNHM 66410 (1, 127) Lat. 04°02′N, Long. 50°33′W, in 38 fms., sta. 2049.—CNHM 66414 (1, 67) Lat. 02°40′N, Long. 48°39′W, in 55 fms., sta. 2062.—CNHM 66415 (1, 42) Lat. 01°57′N, Long. 48°15′W, in 26 fms., sta. 2075.—CNHM 66420 (3, 92-103) Lat. 01°56′N, Long. 47°49′W, in 30 fms., sta. 2077.—CNHM 66409 (1, 96) Lat. 00°33′N, Long. 47°03′W, in 20 fms., sta. 2091.—UMML 12360 (1, 122) Lat. 01°59′S, Long. 42°05′W, in 40 fms., sta. 4239.—UMML 12356 (1, 95) Lat. 02°10′S, Long. 41°33′W, in 36 fms., sta. 4243.—UMML 12359 (2, 105-109) Lat. 02°23′S, Long. 40°31′W, in 18 fms., sta. 4250.—UMML 12376 (21, 59-121) Lat. 02°24′S, Long. 41°10′W, in 20 fms., sta. 4245.—UMML 12351 (1, 77) Lat. 02°37′S, Long. 41°03′W, in 16 fms., sta. 4246.—UMML 12353 (8, 58-84) Lat. 03°04′S, Long. 39°22′W, in 8 fms., sta. 4257.—BMNH 1855.4.18.25 (1, 89) Rio de Janeiro, A. Fry.—BMNH 1923.7.30.318-323 (4 specimens, plus 2 specimens of *S. brasiliensis*) Rio de Janeiro, Ternetz.

VENEZUELA: The following specimens were identified but no counts or measurements were taken: UMML 13342 (2 specimens) Lat. 12°33′N, Long. 71°03′W, in 40 fms., sta. 4391.—UMML 13362 (1) Lat. 11°14′N, Long. 64°13′W, in 30 fms., sta 4481.—UMML 13350 (7) Lat. 12°32′N, Long. 71°04′W, in 46 fms., sta. 4393.—Uncataloged (3, in color preservative) Lat. 10°44′N, Long. 66°09′W, in 40 fms., sta. 4466.

CURAÇAO: UPR 1172 (1, 97) Inner Piscadera Bay in about 5 ft., J. E. Randall and C. R. Robins, 19 Nov. 1962.

Meristic formula.—Dorsal 11+1,9 (one injured specimen with 5, scaled over area, 2+1,9; one with 3, scaled over area, 7+1,9; and one with

10+1,10); anal 3,5; pectoral rays 17-19, usually 18 (one with 16 on left and 18 on right); pored lateral-line scales 22-25+1; vertical scale rows 44-47; gill rakers 4-5+9-10.

Description.—Counts and measurements are summarized in Tables 1-13.

Preorbital with two free spinous points. Suborbital ridge prominent but with no spinous points. Supplemental preopercular spine small; first preopercular spine small, extending about one-third the distance from its base to the opercle margin; second closer to first than to third; fourth and fifth small. Cleithral spine well developed. Sphenotic spine single or double. Frontal, nasal, preocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic and opercular spines also present.

Occipital pit well developed. Larger specimens with first pectoral ray unbranched, next 5-7 branched, and lower 7-11 unbranched. Pyloric caeca 6-7 (based on four specimens). Snout length about equal to orbit diameter. Interorbital into orbit about 2.5 times. Second anal spine about equal to third, varying slightly both ways; third anal spine even or (usually) extending slightly beyond second when depressed.

The color pattern of adults is shown in Figure 5a and b. Dark spot present on membrane of spinous dorsal between third or fourth and sixth or seventh spines. A dark brown spot about 3-4 scale rows in diameter usually present behind head below the lateral line. Head brown, often with darker patches on opercular margin. Upper portion of body dark brown to tan, darkest in an area below the middle dorsal spines and in a poorly defined band between the soft dorsal and anal-fin base. This band followed on the caudal peduncle by a paler area extending to the caudal-fin base. Pelvic fin usually dusky, often only on distal half. Anal fin with posterior half dusky, a poorly defined transverse band across the center of fin and with some dark pigment on the anal spines. Caudal fin with three transverse dark bands; one poorly defined at base, one at middle of fin and a third just anterior to distal margin; bands on caudal fin composed of pigment usually concentrated in spots. Soft dorsal and pectoral variously pigmented with dark, usually appearing spotted. Ventral body surface pale in specimens from offshore, or with some brown in inshore specimens.

John E. Randall recorded the color in life (on the label in bottle) of the specimen collected in Curaçao as follows: "Not a colorful species. Light tan with greenish bars. Spot the size of eye above pectoral olive. Faint pink at base of pelvics and on front half of anal and hind margin of caudal. Iris yellow."

Three specimens collected by the OREGON (sta. 4466) off Venezuela from 40 fathoms and placed in a color preservative when captured have more red pigment than the specimen from shallow water as is commonly found in specimens of the genus *Scorpaena* from deeper water. In these

specimens all fins and the ventral body surface are various shades of red and pink.

S. isthmensis is a species of moderate size, probably not exceeding 150 mm in standard length.

Juveniles.—The color pattern is shown in Figure 5c. Smallest available specimen 38 mm in standard length. It and slightly larger specimens agree with the largest specimens in general coloration, except pigment on caudal, soft-dorsal and pectoral fins more evenly distributed in smaller specimens, without the typical spotted appearance. The 38-mm specimen with no branched pectoral rays, one 44-mm specimen with 4 rays slightly split. Spines and occipital pit in the smallest specimens developed as in the adults.

Comparisons.—*S. isthmensis* resembles *S. bergi* in coloration but may be separated from it by fin-ray counts and proportional measurements. *S. isthmensis* has 17-19 (usually 18 or 19) pectoral rays while *S. bergi* has 16-17 rays. The suborbital ridge in *S. isthmensis* lacks spinous points while specimens of *S. bergi* have one at the posterior end. The length of the third anal spine is slightly longer than the second in *S. isthmensis,* the third extending beyond the second when depressed; in *S. bergi* the second is longer than the third and usually extends beyond the third when depressed. Other differences are shown in Tables 1-13. In coloration the two are similar, both having a dark spot on the spinous dorsal fin and agreeing in general body coloration. The spot on the spinous dorsal is more sharply defined in *S. isthmensis.* Specimens of *S. isthmensis* usually have at least the posterior half of the pelvic fins dusky while they are normally clear in *S. bergi. S. isthmensis* is the larger of the two species.

Distribution.—*S. isthmensis* is known from Panama to Rio de Janeiro, Brazil. It appears to be a very common offshore species along the coast of South America, and was collected in depths from 8 to 55 fathoms by the OREGON. Based on the collection of one specimen in 5 feet of water at Curaçao, the species does occur in inshore waters. Its total bathymetric range is probably from the shore to about 60 fathoms.

Remarks.—Ginsburg (1953: 81) referred the type of *S. isthmensis* Meek & Hildebrand to *S. bergi* Evermann & Marsh, though as an extreme variant. The specimens from Curaçao, Venezuela, the Guianas and Brazil agree with the type of *S. isthmensis* in the four characters listed by Ginsburg as in variance, as well as in other characters. On the basis of the new material from the coast of South America described herein, the species is reinstated.

Delsman (1941) obviously was dealing with *S. isthmensis* Evermann & Marsh, as he refers to the conspicuous spot on the dorsal fin. The pectoral-

ray count of 18 and the large size of his specimens (87-142 mm T.L.) are sufficient to determine that he had specimens of *S. isthmensis.*

I briefly examined the specimens reported by Lowe (1962) as near *S. bergi;* these uncataloged specimens, now in the British Museum (Natural History), are *S. isthmensis.*

Scorpaena petricola, new species
Fig. 6b; Tables 1-13

Material examined. — HOLOTYPE: USNM 198150, formerly UMML 13336, (a specimen 69.0 mm in standard length, Fig. 6b), off Brazil, Lat. 01°59′S, Long. 42°05′W, in 40 fms., bottom temperature 75°F, taken in a six-foot tumbler dredge, OREGON sta. 4239, 11 March 1963.

PARATYPES: USNM 198152, formerly UMML 13337, (two specimens, 67.9 mm and 47.9 mm in standard length) from the same station as the holotype.—UMML 13328 (one specimen 41.5 mm in standard length) off Brazil, Lat. 01°50′S, Long. 42°43′W, in 36 fms., bottom temperature 74°F, six-foot tumbler dredge, OREGON sta. 4231, 10 March 1963.—UMML 13332 (seven specimens 19.6-48.0 mm in standard length) off Brazil, Lat. 02°10′S, Long. 39°52′W, in 75 fms., six-foot tumbler dredge, OREGON sta. 4252, 12 March 1963.—UMML 12311 (one specimen 39 mm in standard length) off Brazil, Lat. 01°24′S, Long. 43°11′W, in 40 fms., bottom temperature 74°F, six-foot tumbler dredge, OREGON sta. 4227, 10 March 1963.

A total of 12 specimens from 20-69 mm in standard length, all collected by the U.S. Fish and Wildlife Service research vessel OREGON off the coast of Brazil in from 36 to 75 fms.

Meristic formula.—Dorsal 11 + 1,9; anal 3,5; pectoral rays 17-18, usually 18; pored lateral-line scales about 23; vertical scale rows about 50; gill rakers 5-6 + 9-11.

Description.—Measurements and counts are summarized in Tables 1-13.

Dorsal fin with 12 spinous rays and 9 soft rays; first dorsal spine slightly less than half the length of third; longest dorsal spine the third or fourth (14-17 per cent of S.L.); penultimate spine 1/2 to 2/3 the length of last spine; last dorsal soft ray split to its base. Pectoral rays 18 (10 specimens) or 17 (2); larger specimens with first ray or first and second rays unbranched, next 4-6 branched and lower 11-13 unbranched; compound branching of pectoral rays occurring in larger specimens; lower arm of branched rays in turn branched. Pectoral fin reaching to over base of first or second anal spine. Anal fin with three spines and five soft rays; last soft ray split to its base. Second anal spine longer than third, about equal or second extending beyond third when depressed; first anal spine about half the length of second.

Scales cycloid. Pectoral base scaled; scales on check and opercle embedded. Vertical scale rows about 50; many scales on bodv missing apparently because of abrasion at time of capture. Small, closely-packed teeth on palatine, vomer, phryngeal, premaxillary and dentary bones.

Spines on head poorly developed. Preorbital spinous points 2; anterior one long, pointing directly forward; posterior spine smaller, pointing down and forming about a right angle with anterior preorbital spine. Nasal spine present. Suborbital ridge smooth except for a small spinous point at the posterior end. Supraocular rim with three spines, preocular, supraocular and postocular. Frontal spine moderate, slightly lateral to line formed by parietal spines. Anterior parietal spine longer and more prominent than posterior parietal spine. Sphenotic spine usually bifurcated. Pterotic spine moderate. Upper posttemporal well developed; lower posttemporal spine moderate, smaller than upper posttemporal spine. Supracleithral spine broad. Cleithral spine present, about equally developed in small and large specimens. Opercular bone with two prominent ridges ending in a spine; one specimen with an additional ridge on the left side below other two. Preopercular spines moderate; supplemental preopercular spine small; first preopercular spine reaching less than half the distance from its base to margin of opercle; second and third preopercular spines well developed, third sometimes larger and broader than second; fourth and fifth moderate, fourth points downward, fifth points down and slightly forward.

No slit behind the fourth gill arch. Pseudobranch well developed. First gill arch with 5-6 rakers on upper arm and 9-11 on lower arm; gill rakers on upper arm small, increasing in size to angle; longest gill raker on lower arch just below angle; gill rakers on lower arm decreasing in size downward with lowermost three or four rudimentary. Air bladder absent. Pyloric caeca fingerlike (4 in one specimen examined).

Occipital pit present, better developed in larger specimens; depression rectangular, about twice as wide (from side to side) as long. Snout length about equal to orbit diameter, snout length slightly less than orbit diameter in smaller specimens. Interorbital into orbit diameter about 2½-3 times, into head length about 10-11 times.

Body tabs and tentacles inconspicuous, pale colored, and poorly developed. Small tentacles associated with some of the lateral-line scales, and in larger specimens a few small tabs present on upper part of eye between opaque and transparent areas. Also, small tentacles or tabs associated with the following spines: preorbital, supplemental preopercular, fourth and fifth preopercular, parietals, preocular, and supraocular. Supraocular tentacle small, equal to less than half the orbit diameter. Other tentacles on head and body very sparse and small in size.

The color pattern of adults is shown in Figure 6b. Specimens almost entirely pale colored in alcohol. Some dark specks on head and body; pigment usually concentrated in small patches under the eye. All fins essentially clear, some specimens with small brown specks on soft dorsal and caudal fins. Dark pigment not arranged in any pattern on body or fins.

Color in life unknown; as in other more or less pale-colored offshore species, color in life probably bright red.

Juveniles.—All small specimens entirely pallid. Occipital pit virtually absent in smallest specimen, deepening with growth and best developed in two largest specimens. Pectoral rays unbranched in specimens below 32 mm in standard length; two specimens approximately 37 mm in standard length with two or three rays slightly branched. Pectoral rays split once, but at a size of about 45 mm the lower branches split again.

Comparisons.—*S. petricola* and *S. elachys* are the only species in the western Atlantic which are essentially pale colored in alcohol. Specimens of *S. albifimbria* often lose much of the dark pigment but retain some dusky pigment behind the head. The pectoral ray count is useful in separating *S. petricola* from many species. *S. petricola, S. bergi* and *S. elachys* are the only species which commonly have one spine on the suborbital ridge. *S. petricola* and *S. elachys* are compared under the account of the latter.

Distribution.—This species is known only from the type material; all were collected from 36-75 fathoms off Brazil between Latitude 01°24′S. and Latitude 02°10′S. Apparently the habitat is rough bottom, possibly in sponge beds (see "Remarks").

Remarks.—The holotype and three paratypes of *S. petricola* were taken at the same OREGON station as the paratype of *S. melasma.*

Field notes taken by William P. Davis, University of Miami Marine Laboratory, indicate that the bottom in the vicinity of the type locality was rough. Coral fragments and sponges were taken in most of the dredge hauls in this area. The tumbler dredges are used by the OREGON to sample rough bottom.

Etymology.—The name *petricola* is from the Latin word meaning to dwell in stone, alluding to the apparent offshore hard-bottom habitat of this species.

Scorpaena melasma, new species

Fig. 6c; Tables 1-13

Material examined.—HOLOTYPE: USNM 198154, formerly UMML 13331 (a specimen 56.8 mm in standard length, Fig. 6c), off Brazil, Lat. 02°10′S, Long. 41°33′W, in 36 fms., bottom temperature 74°F, taken in a six-foot tumbler dredge, OREGON sta. 4243, 11 March 1963.

PARATYPE: UMML 13330 (a specimen 69.2 mm in standard length), off Brazil, Lat. 01°59′S, Long. 42°05′W, in 40 fms., bottom temperature 75°F, taken in a six-foot tumbler dredge, OREGON sta. 4239, 11 March 1963.

Meristic formula.—(only two specimens known) Dorsal 11+1,9; anal 3,5; pored lateral-line scales 23 (holotype); vertical scale rows estimated to number in the low forties; gill rakers 4+7-8.

Description.—Some measurements and counts are presented in Tables 1-13.

Dorsal fin with 12 spinous rays and 9 soft rays; last soft ray split to base. First dorsal spine a little longer than half the length of the second; third dorsal spine longest (about 16-17 per cent of standard length); penultimate dorsal spine about three-fourths the length of last dorsal spine. Pectoral rays 21 in both specimens; both specimens with first pectoral ray unbranched, next 6 branched, and lower 14 unbranched. Pectoral fin extending to over base of second or third anal spine. Anal fin with 3 spines and 5 soft rays, last soft ray split to base. Length of second and third anal spines about equal, third extending slightly beyond second when depressed.

Scales cycloid. Scales on check, head and pectoral-fin base embedded. Many body scales missing in the two specimens; vertical scale rows in the holotype estimated to number in low forties; scales apparently not strongly adhering to body (may have been rubbed off by excessive abrasion in the dredge). Holotype with 23 lateral-line scales. Small teeth in patches on dentary, premaxillary, vomer, palatine and phryngeal bones.

Preorbital bone with 2 spinous points; nasal spine slender and small; suborbital ridge with 2 spinous points, one small spine at midpoint of ridge under the eye, a second at the posterior end. Supraocular rim with three spines, preocular, supraocular and postocular. Frontal spine not distinct, more or less the blunt extension of the ridge forming the anterior margin of occipital pit. Anterior and posterior parietal spines about equal in length. Sphenotic spine bifurcated in both specimens; pterotic spine present; upper and lower posttemporal spines equally developed. Supracleithral spine broad and low. Cleithral spine absent. Opercular bone with two ridges, each ending in a spine posteriorly. Preopercular spines moderate; supplemental spine absent; first short, extending less than halfway to margin of opercle; second smaller than third and slightly nearer first; third spine broad; fourth and fifth broad and well developed.

No slit behind fourth gill arch. Pseudobranch present. Outside of first gill arch with 11-12 gill rakers; 4 on upper arm, increasing in length toward angle; 1 at angle and 6-7 on lower arm, longest at angle and decreasing in length below angle with lower 3-4 rudimentary. Air bladder absent. Paratype with 5 finger-like pyloric caeca, and with gonads easily recognizable.

Occipital pit well developed. Snout length less than orbit diameter, snout into orbit 1.2-1.4 times. Interorbital very narrow; interorbital into orbit 4.5-5 times; interorbital into head 15-16 times.

Body tabs and tentacles pallid and inconspicuous. Small dermal flaps associated with some of the lateral-line scales. Several small tabs present on the upper part of the eye, arising from the line between the opaque and transparent part of cornea. Short tentacles or tabs associated with the following head spines: preorbital, preopercular, parietals, preocular, and

supraocular. Supraocular tentacle small, less than 1/3 orbit diameter. Other fleshy tabs on head and body small and sparse.

The color pattern is shown in Figure 6c. Some dark pigment on head and body against a pallid background. The dark pigment more concentrated in a spot, about 4-6 scale rows in diameter, behind head just below the lateral line. Dark pigment at distal margin of pectoral and pelvic fins. Pigment on caudal fin in two poorly defined transverse bands, at middle and distal end of fin. Spinous dorsal fin with faint trace of dark pigment on distal third of fin in the holotype. Some dark pigment present on the head around and in the occipital pit.

Comparisons.—*S. melasma* apparently is intermediate in several characters between the group of *S. calcarata* + *S. inermis* and the other species of *Scorpaena* in the western Atlantic Ocean. *S. melasma* agrees with *S. calcarata* and *S. inermis* in the absence of a supplemental preopercular spine, presence of a narrow interorbital bone and in the general shape of the opercular margin. It differs from *S. calcarata* and *S. inermis* in the presence of the well-developed occipital pit found in the other species of *Scorpaena* in the western Atlantic Ocean. The opercular bone and opercular flap are large in *S. melasma,* giving a longer head-length measurement than in other species at a similar size.

Distribution.—The species is known only from the holotype and paratype collected by the OREGON off Brazil in 36 and 40 fathoms.

Remarks.—The paratype of *S. melasma* and the holotype and three paratypes of *S. petricola* were taken at OREGON station 4239. The bottom over which these specimens were collected is apparently rather hard and covered with coral and sponges. Evidence for this is presented under "Remarks" in the account of *S. petricola.*

Etymology.—The name melasma is from the Greek *melasma,* meaning a black spot, alluding to the black spot behind the head.

Scorpaena brachyptera, new species

Fig. 7a and b; Tables 1-13

Material examined.—HOLOTYPE: USNM 198153, formerly UMML 13334 (a specimen 62.0 mm in standard length, Fig. 7a), off Venezuela, Lat. 10°50′N, Long. 66°55′W, in 53 fms., taken in a six-foot tumbler dredge, OREGON sta. 4461, 13 Oct. 1963.

PARATYPES: UMML 13335 (3 specimens, 43.7 mm, 43.5 mm, and 34.5 mm in standard length), off Venezuela, Lat. 10°44′N, Long. 66°09′W, in 40 fms., taken in a 40-foot flat trawl, OREGON sta. 4466, 17 Oct. 1963.—USNM 198148, formerly UMML 13333, (a specimen 40.7 mm in standard length), off Venezuela, Lat. 12°37′N, Long. 71°10′W, in 65 fms., taken in a 40-ft. flat trawl, OREGON sta. 4394, 25 Sept. 1963.

A total of five specimens from 34.5 to 62 mm in standard length from off Venezuela in 40-65 fathoms.

Meristic formula.—Dorsal 11 + 1,8; anal 3,5; pectoral rays 20 (one with 19 on left); pored lateral-line scales about 22-23 + 1 (some scales missing on all specimens); vertical scale rows about 40 (some scales missing); gill rakers 4 + 7 (4 specimens).

Description.—Measurements and counts are summarized in Tables 1-13.

Dorsal fin with 12 spinous rays and 8 soft rays, last soft ray composed of two main branches split to base; length of first dorsal spine about ¾ the length of second; all dorsal spines relatively short, longest the third or fourth (about 13-14 per cent of standard length); penultimate dorsal spine about ¾ length of last dorsal spine. Pectoral rays 20 (4 specimens) or 19 (left side of one specimen, other side with 20); branched pectoral rays 2-5 in smallest specimen, 2-6 or 2-7 in larger specimens; compound branching of the pectoral rays in larger specimens. Pectoral fin short, reaching to over base of first anal spine as a maximum. Anal fin with 3 spinous rays and 5 soft rays; last soft ray composed of two main branches split to the base. Third anal spine about equal to second; third extends beyond second when depressed.

Scales cycloid. Pectoral-fin base scaled. Scales on cheek and opercle partially embedded. About 40 vertical scale rows (all specimens are missing some scales on the body). Small, closely-packed teeth on dentary, premaxillary, vomer, palatine and phryngeal bones.

Spines on head moderately developed. Preorbital bone with 2 free spinous points; anterior one short and arched. Nasal spine absent. Suborbital ridge prominent, posterior half very broad and projecting out from side of head. Suborbital ridge usually with 3 spinous points, under center of eye, below posterior end of eye and at end of suborbital ridge; ridge at anterior portion of suborbital developed as a blunt spine in one specimen. Supraocular rim with 3 spines, preocular, supraocular and postocular. Frontal spines well developed. Anterior and posterior parietal spines about equal in length, or first a little longer. Sphenotic spine double. Pterotic spine well developed. Upper and lower posttemporal spines present. Cleithral spine small in largest specimen, virtually absent in smallest specimens. Supracleithral spine present. Opercular bone with two ridges, each ending in a spine. Preopercular spines moderate; supplemental preopercular spine moderate; first preopercular spine well developed, extending about half the distance from its base to the opercular margin; second slightly smaller than third and a little closer to first (holotype with second preopercular spine on left side double); fourth spine well developed and pointing posteriorly; fifth broad, pointing ventrally.

No slit behind the fourth gill arch. Pseudobranch present. First gill arch with 11 gill rakers (4 specimens) on outside of arch; 4 gill rakers on upper

arm, longer one just anterior to angle; longest gill raker at or just below angle, remaining 6 gill rakers on lower arm decreasing in size from angle, lower 2 or 3 rudimentary. Air bladder absent. Pyloric caeca finger-like, 4 in largest paratype, indeterminable in holotype.

Occipital pit present, shallow in all 5 specimens. Snout length shorter than orbit diameter, snout into orbit 1.1-1.4 times. Interorbital relatively wide and deep, about 2 times in orbit in larger specimens or 2.5 times in smallest specimen; interorbital into head about 7-8.5 times.

Body tabs and tentacles moderately or poorly developed. A well-developed tab present below the suborbital ridge and another associated with the posterior preorbital spine; other tabs on head and body relatively small; a few slender long tabs on some lateral-line scales; tabs on upper part of eye between opaque and transparent portions better developed in smaller specimens.

The color pattern is shown in Figures 7a and b. Holotype and one paratype (USNM 198148) pale with some dark pigment on distal part of pelvic fins and anal fin; some dusky markings on pectoral fin; a darkly pigmented tab associated with the posterior preorbital spine; paratype with a dark line at mid-height of spinous dorsal fin; some dusky pigment on head and body, without a definite color pattern. The three paratypes (UMML 13335) retain much of their original color. (A color preservative was added to the formalin at the time of capture by the scientific personnel on the OREGON.) Dark pigment distributed as in the holotype. Dorsal fin with dark pigment at midheight of fin, more or less forming a line along the center of the fin. Head and area just behind head slightly darker in paratypes. Paratypes (UMML 13335) with the pectoral, pelvic, soft dorsal, caudal, and anal fins red to orange; pigment on caudal fin in two poorly defined transverse bands, at middle and distal part of fin. Area below eye and including the suborbital ridge darker in all four paratypes than in the holotype.

Apparently a small species; the pectoral rays branch at a small size and the gonads are developed in the holotype.

Juveniles.—Smallest available specimen 34.5 mm in standard length. Second through the sixth pectoral rays branched. Development of spines about as in the larger specimens.

Comparisons.—This species is the only one in the western Atlantic Ocean which lacks a nasal spine; the nasal spine is often very small in *S. inermis.* Only one other species, *S. inermis,* in the western Atlantic Ocean commonly has eight dorsal soft rays (last split to base). The short pectoral fin and expanded suborbital ridge also characterize *S. brachyptera.*

Distribution.—*S. brachyptera* is known from the 5 specimens collected by the OREGON off Venezuela in 40-65 fathoms.

Remarks.—This species may prove to be common on rough bottom. The holotype was taken in a tumbler dredge used by the OREGON to sample rough bottom. The holotype also had small pieces of calcareous rubble in the intestine and gill chamber. The paratypes were collected in a 40-foot flat trawl in 40 to 65 fathoms.

Etymology.—The name is from the Greek *brachys,* short; and *pteron,* wing. It alludes to the short dorsal and pectoral fins of this species.

Scorpaena elachys, new species

Fig. 7c; Tables 1-13

Scorpaena albifimbria, Ginsburg, 1953: 83-84 (in part; wrongly included an "uncertain variant"; contrasted with type of *S. albifimbria*).

Material examined.—HOLOTYPE: USNM 198149 (a specimen 46 mm in standard length, Fig. 7c), North of Puerto Rico, Lat. 18°15'N, Long. 67°33'W, in 50 fms., taken in a six-foot tumbler dredge, SILVER BAY sta. 5192, 18 Oct. 1963.

PARATYPES: USNM 198151 (a specimen 38.5 mm in standard length), from same station as holotype.—UMML 14872 (a specimen 32 mm in standard length) North of the Dominican Republic, Lat. 19°48'N, Long. 70°30'W, in 25/50 fms., eight-foot tumbler dredge, SILVER BAY sta. 5164, 15 Oct. 1963.—UMML 14873 (a specimen 29 mm in standard length), East of the Dominican Republic, Lat. 18°35.5'N, Long. 68°13'W, in 48 fms., six-foot tumbler dredge, SILVER BAY sta. 5187, 17 Oct. 1963.

OTHER MATERIAL: USNM 153127 (a specimen 34 mm in standard length), Florida, off Palm Beach in 40 fms., rocky reef, Thompson-McGinty, Feb. 1950.

Meristic formula.—Dorsal 11+1,9 (8 in holotype); anal 3,5; pectoral rays 17 (16 on left side in 1 specimen); pored lateral-line scales 23+1; vertical scale rows about 40-45; gill rakers 4-5+10-11.

Description.—Measurements and counts are summarized in Tables 1-13.

Dorsal fin with 12 spinous rays and 9 (3 specimens) or 8 (1) soft rays; longest dorsal spine the fourth (17-20 per cent of S.L.); penultimate spine about half the length of the last spine; last dorsal soft ray split to its base. Pectoral rays 17 (16 on left side of specimen); all specimens with second or third through fifth or sixth rays branched. Pectoral fin reaching to over base of first or second anal spine. Anal fin with three spines and five soft rays, last soft ray split to base. Second anal spine slightly longer than third, about equal or third extending beyond second when depressed.

Scales cycloid. Pectoral base scaled; scales on cheek and opercle. Vertical scale rows in low forties; some scales missing on all specimens. Teeth on palatine, vomer, phryngeal, premaxillary and dentary bones.

Preorbital spinous points 2. Nasal spine present. Suborbital ridge smooth except for a small spinous point at the posterior end. Supracular rim with

three spines, preocular, supraocular and postocular. Frontal spine well developed. Anterior parietal spine longer than posterior parietal spine. Sphenotic spine single or double. Pterotic spine well developed. Upper and lower posttemporal spines about equally developed. Supraocular spine broad. Cleithral spine present, sharper in smaller specimens. Opercular bone with two prominent ridges ending in a spine. Preopercular spines moderate; supplemental spine small; first preopercular spine relatively short, extending less than halfway across margin of opercle; second preopercular spine smaller than third; fourth broad; fifth more slender and longer than fourth, fifth points down and slightly forward.

No slit behind the fourth gill arch. Pseudobranch well developed. Outside of first gill arch with 4 or 5 rakers on upper arm and 10-11 on lower arm, gill rakers on upper arm small; longest gill raker at angle; gill rakers on lower arm decreasing in size from angle with lowermost 2-3 rudimentary. Air bladder absent. Pyloric caeca fingerlike (5 in one specimen examined).

Occipital pit shallow in all specimens. Snout length less than orbit diameter, snout into orbit 1.2-1.3 times; interorbital into orbit diameter 2.5-3.5 times, into head 9-11 times.

Fleshy projections on body poorly developed. Small tentacles associated with the following spines; posterior preorbital, parietals, fourth and fifth preopercular, preocular and supraocular. Supraocular tentacle equal to about half the orbit diameter. Body tabs also present on eye and some lateral-line scales.

The color pattern is shown in Figure 7c. Specimens essentially pale colored in alcohol. A few specks of brown pigment present in occipital pit, under the eye, and on opercular bone. Gill rakers brownish in the larger specimens. One specimen with dark tumerous-looking patch of pigment in front of dorsal fin. Smaller two specimens with wavy lines of brown pigment on body under the scales extending ventrally for about a millimeter from the base of the dorsal fin. All fins are transparent. Color in life unknown; probably red as in other pale-colored offshore species.

Juveniles.—Smallest available specimen, 29 mm in standard length, similar to larger specimens. Pectoral rays branch at a size below 29 mm as all specimens have some branched rays.

Comparisons.—*S. elachys* and *S. petricola* are very similar in measurements and counts, pale color, and depth of capture. *S. elachys* tends to average a lower pectoral ray count (16-17, usually 17) than *S. petricola* (17-18, usually 18). The spines are similar, with the exception that the second preopercular spine is smaller in *S. elachys*. *S. petricola* is a more elongate species, with a shorter head and less deep body. The occipital pit appears more deep in *S. petricola* than in *S. elachys* when specimens of a similar size are compared. The second anal spine usually extends beyond the third

in *S. petricola* but usually falls short of the third in *S. elachys* when the anal fin is depressed. The caudal-fin length, when expressed as a per cent of S.L., is longer in *S. elachys*. The scales on the body are apparently smaller in *S. petricola*.

Distribution.—*S. elachys* is known from Puerto Rico and the Dominican Republic (type material) and from Florida (Ginsburg's uncertain variant of *S. albifimbria*). The habitat of this species is apparently coral rubble or rocky bottom in about 40 to 50 fathoms. All specimens have been taken in dredge hauls.

Remarks.—The specimen collected by Thompson and McGinty off Florida in 40 fathoms and referred by Ginsburg (1956: 83-84) to *S. albifimbria* as an uncertain variant appears to be *S. elachys*. The body depth of this specimen is about 42 per cent of S.L. rather than 46.5 per cent as reported by Ginsburg. Counts, measurements, color, spination and habitat agree with *S. elachys*.

Etymology.—The name is from the Greek *elachys,* meaning small, alluding to the small size of this species.

Scorpaena albifimbria Evermann & Marsh

Fig. 8a,b and c; Tables 1-13

Scorpaena albifimbria Evermann & Marsh, 1900: 275-276, Fig. 82 (type locality: off Culebra Is., Puerto Rico in 15 fathoms, FISH HAWK sta. 6093; holotype USNM 49532).—Jordan, Evermann & Clark, 1930: 371 (compiled).—Nichols, 1930: 352, Fig. 243 (compiled; figure copied).—Ginsburg, 1953: 82-84 (examined type; redescribed; incorrectly referred a variant to this species [see "Remarks" section]).—Briggs, 1958: 294 (compiled).—Duarte-Bello, 1959: 124 (compiled).

Material examined.—FLORIDA: UMML 10839 (1, 36) Monroe County, ½ mi. S of Crocker Reef "E" Marker in 50 ft., CRR-F-327, 26 Aug. 1961.

VIRGIN ISLANDS: UMML 8200 (2, 28-31) St. John, 6 mi. SE of Lameshur in 100 ft., J. Randall and R. Schroeder, V.I. sta. 210, 3 Feb. 1961.

HAITI: UMML 6171 (2, 22-23) St. Marc Bay, ¼ mi. N. of St. Marc in 10-30 ft., CRR-Car-2, J. Randall, H. Randall, T. Chess, and J. Durocher, 22 Dec. 1959.

CURAÇAO: UPR 1170 (1, 51) 300 yards N of lagoon in 12 ft., J. Randall, 31 Dec. 1961.—UPR, uncataloged (1, 32) Lagoon in 45 ft., J. Randall, 25 Nov. 1962.

PUERTO RICO: USNM 49532 (1, 32.5, holotype) Culebra Is., in 15 fms., FISH HAWK sta. 6093, 1899.

BAHAMAS: UMML 12602 (1, 23) Exuma Chain along E shore of Oyster Cay in 0-8 ft., CRR-BWI-46, 21 Aug. 1963.

Meristic formula.—Dorsal 11+1,8-9; anal 3,5; pectoral rays 19-20; pored lateral-line scales 21-23+0-1; vertical scale rows about 40; gill rakers 4-5+7-10.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points. Suborbital ridge usually with 3 spinous points; below center of eye, below posterior margin of orbit, and at posterior end; often first and second as a slight lump. Supplemental preopercular spine well developed; first preopercular spine long, extending about two-thirds the distance from its base to the opercular margin; second nearer first and smaller than third; fourth and fifth moderate. Cleithral spine small. Sphenotic spine single or double. Other spines present include the frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic and opercular.

Occipital pit relatively shallow. Larger specimens with first pectoral ray unbranched, next 4-6 branched, and lower 12-15 unbranched. Snout smaller than orbit, snout into orbit 1.4-1.7 times. Second anal spine longer than third, about equal or second slightly longer than third when depressed.

The coloration of adults is shown in Figures 8a and b. General body coloration dark above and pale on ventral surface. Pigment more concentrated in a triangular area behind the head, within the area defined by the line joining about the seventh dorsal spine, to pectoral axil to just in front of first dorsal spine; the pigment extends onto the dorsal fin. Dark pigment on body somewhat more concentrated below the soft dorsal fin. Pelvic fin dusky at distal margin. Pectoral generally dark; smaller specimens with pigment more concentrated in two bands, at base and on distal margin of fin. Soft dorsal with brown specks. Caudal fin nearly clear, usually with some brown specks in a poorly defined transverse band across the center of the fin. Anterior half of anal fin slightly dusky. (Only three specimens, UMML 6171 and UMML 12602, display much coloration; other specimens are faded to varying degrees, but they retain some dark pigment behind the head, as in Figure 8b.)

The specimen from Curaçao (UPR 1170) has the body dark brown, apparently because of a long stay in a rusty container during the shipment of specimens from Curaçao to the University of Puerto Rico, Institute of Marine Biology (personal communication from Dr. John E. Randall). Dr. Randall loaned a kodachrome slide which he took of this specimen upon capture. No information is available on the color in life of this little-known species; the following description is of the specimen depicted in the slide.

Specimen brightly colored with shades of pink to dark red on a pale background. Dark pigment discernible in area behind head, on pectoral fin, on the body between the soft dorsal and anal fin and on the head below the eye. Dorsal fin with a mottled appearance, the dark pigment present in patches on lower half of fin, remainder of dorsal fin with red, gold and brown pigment. Pectoral, pelvic, anal and soft dorsal fins variously colored

with red and pink without a definite pattern. Caudal fin pink, the pigment concentrated in a poorly defined band at center and just before the distal margin, rest of caudal transparent. Remainder of body and head more or less orangish or red on a pale background with some whitish patches on the head and body.

Juveniles.—The color pattern of a 23-mm specimen is shown in Figure 8c. Coloration essentially similar to larger specimens. Pectoral fin of small specimens with pigment more concentrated in two transverse bands, one on anterior half of fin and a second near distal margin; pectoral fin of larger specimens more uniformly pigmented, not in two distinct areas. (This pattern is commonly found in other species, for example *S. inermis.*) A 23-mm specimen and a 22-mm specimen with no branched pectoral rays; a 28-mm specimen with 5 branched rays.

Comparisons.—*S. albifimbria* is apparently one of the smallest species of *Scorpaena* in the western Atlantic Ocean, probably not exceeding 65 or 70 mm in standard length. The pectoral rays branch at a smaller size than in other western Atlantic species. (Small specimens of *S. brachyptera, S. melasma* and *S. elachys* are not available.) The dark area behind the head may prove to be a useful field character in distinguishing this species.

Distribution.—The species has been reported from Puerto Rico (holotype) and from the Dutch West Indies (see "Remarks"). Records from Florida are based on the specimen tentatively referred to this species by Ginsburg, but here referred to *S. elachys.* Specimens examined in this study extend the known range to Haiti, the Virgin Islands, Bahamas, and Florida. Apparently *S. albifimbria* is a shallow-water species; depths of capture range from the shore to 17 fathoms. The species apparently prefers clear waters.

Remarks.—Ginsburg's uncertain variant from Florida (USNM 153127), which he described as possibly belonging to this species, is referred to *S. elachys; S. albifimbria* and *S. elachys* are compared under the account of the latter species.

Apparently Metzelaar (1919: 144-145) had specimens of *S. inermis* rather than *S. albifimbria.* Though both species occur in the Dutch West Indies, Metzelaar's description fits *S. inermis* better than *S. albifimbria.* Also, one specimen in the British Museum labeled *S. albifimbria* and from the Metzelaar Expedition from St. Eustatius is *S. inermis.*

Scorpaena grandicornis Cuvier

Fig. 9a and b; Tables 1-13

Scorpaena plumieri Lacépède, 1802: 282-283 (not of Bloch; based on description of *Scorpius niger cornutus* in manuscript of Plumier deposited

at the National Library [no type locality given, may be Martinique].

Scorpaena grandicornis Cuvier *in* Cuvier & Valenciennes, 1829: 309 (type locality: Martinique and Puerto Rico; also reported specimens from Havana and San Domingo).—Günther, 1860: 114 (Jamaica).—Poey, 1861: 366 (compiled).—Poey, 1868a: 278 (rare in Havana).—Poey, 1868b: 8 (venom).—Poey, 1868c: 303 (Havana).—Poey, 1875: 114 (Havana).—Poey, 1881: 323 (reference; Puerto Rico).—Jordan, 1884b: 138-139 (Key West, Florida; reported as first specimen from the U.S. Coast).—Jordan, 1884c: 79 (name only; Florida Keys).—Jordan, 1885: 109 (compiled).—Meek & Newland, 1885: 396, 401-402 (synonymy; distinguishing characteristics; range).—Jordan, 1886: 50 (name only; Havana).—Jordan, 1887b: 596 (compiled).—Jordan, 1890a: 651 (name only; St. Lucia).—Henshall, 1891: 381 (Key West, Florida).—Henshall, 1895: 220 (Key West).—Jordan & Rutter, 1897: 132 (Kingston, Jamaica).—Jordan & Evermann, 1898: 1850-1851, Pl. 278 (compiled; Key West; figure good).—Evermann & Marsh, 1900: 277-278, Fig. 84 (Puerto Rico; color and habitat; poison; figure copied from Jordan & Evermann, 1900).—Evermann & Kendall, 1900: 88 (compiled; Florida records).—Bean, 1905: 317 (Abaco, Bahamas).—Sumner, Osburn & Coles, 1911: 764 (compiled).—Rosén, 1911: 65 (Abaco, Bahamas).—Ribeiro, 1915: 8-9 (Bahia, Brazil).—Ribeiro, 1918: 22, 156-157 (synonymy; Brazil).—Metzelaar, 1919: 142-143 (Curaçao).—Fowler, 1919: 145 (name only; St. Croix).—Nichols & Breder, 1926: 146, Fig. (accidental in Massachusetts; one specimen from Katama Bay; figure poor).—Borodin, 1928: 24 (name only; Cuba).—Meek & Hildebrand, 1928: 838-839 (Panama).—Beebe & Tee-Van, 1928: 187, Fig. (Haiti; San Juan, Puerto Rico; figure copied from Nichols & Breder, 1926).—Jordan, Evermann & Clark, 1930: 371 (compiled).—Beebe & Tee-Van, 1933: 183-184, Fig. (compiled).—Longley *in* Longley & Hildebrand, 1941: 161-162 (Long Key and Bird Key, Florida; color changes in individuals).—Fowler, 1941b: 171 (compiled).—Fowler, 1942a: 77 (museum specimens from Cuba).—Fowler, 1942b: 11 (Bonacca Is., Honduras).—Springer, 1946: 175 (as food of sharks).—Fowler, 1952: 110 (Haiti).—Ginsburg, 1953: 77-79 (description; specimens from Florida, Bermuda, Cuba, Haiti, Dominican Republic, Puerto Rico, Guadaloupe, St. Lucia, Panama, Colombia and Brazil).—Briggs, 1958: 294 (compiled range).—Duarte-Bello, 1959: 125 (compiled).—Springer & McErlean, 1962: 52 (Lower Matecumbe Key, Florida; seasonal occurrence).

Scorpaena plumieri, Lee, 1889: 669 (USNM 38387; Nassau).

?*Scorpaena bergii*, Fowler, 1915c: 542 (Trinidad).

Material examined.—BERMUDA: USNM 50949 (1, 57) Castle Harbor, Louis Mowbray, 23 Oct. 1903.

FLORIDA (ST. LUCIE COUNTY): UMML 11413 (2, 35-59) Ft. Pierce, North Bridge, Durbin Tabb, 19 July 1956—UMML 1544 (2, 60-67) Ft. Pierce Inlet, J. Galt, July 1957.—UMML 1015 (1, 53) White City, S of Ft. Pierce, CRR-F-70, April 1957.—UMML 5048 (3, 37-61) St. Lucie River in 2-4 ft., CRR-F-192, 11 Sept. 1957.

FLORIDA (BROWARD COUNTY): UMML 84 (3, 14-45) Port Everglades Beach, 24 July 1956.

FLORIDA (DADE COUNTY): Biscayne Bay: UMML 3060 (1, 25) SE side of bridge no. 2, Rickenbacker Causeway, 1 June 1956.—UMML 1538 (2, 71-92) Dinner Key, 24 Oct. 1957.—UMML 11338 (2, 62-92) Virginia Key, 9 March

1963.—UMML 45 (2, 49-86) Virginia Key. DdeS 28, 9 Aug. 1956.—UMML 3983 (1, 50) Virginia Key, Don de Sylva and Durbin Tabb, 9 Aug. 1956.—UMML 8127 (1, 67) Virginia Key, CRR-F-281, Dec. 1959.—UMML 1043 (4, 52-66) Virginia Key, Bear Cut, CRR-F-90, 11 Aug. 1957.—UMML 3543 (1, 35) Virginia Key, Bear Cut, CRR-F-168, 8 March 1958.—UMML 1520 (2, 46-53) Key Biscayne, CRR-F-112, 22 Oct. 1957.

CUBA: USNM 4689 (1, 104) collected by Poey.

HAITI: USNM 178347 (1, 98) collected by Beebe.

PUERTO RICO: CNHM 72497 (1, 41) Maguey Is., Parguera, mud and grass bottom in channel, between mangroves on island and mainland, D. S. Erdman and class, 23 June 1952.—USNM 63050 (1, 66) Palo Seco, FISH HAWK, 16 Jan. 1939.

ANTIGUA: USNM 170283 (1, 93) English Harbor, sta. 74-56, Schmitt, *et. al.*, 3 April 1956.

ST. LUCIA: USNM 142833 (1, 40) ALBATROSS sta. 1773, dated 1887.

GUADELOUPE: USNM 25284 (1, 104) L. Guesda, May 1880.

PANAMA: USNM 148675 (3, 23-76) Galta Pt., Ft. Randolph, seined in *Thalassia* beds, V. Walters, 31 Oct.-1 Dec. 1948.—USNM 81601 (6, 37-75) Porto Bello, Meek and Hildebrand.

COLOMBIA: USNM 1681 (1, 43) Rio Atrato, Schott.

BRAZIL: USNM 6944 (1, 93) J. C. Brevoort.

Meristic formula.—Dorsal 11+1, 9 (one with 8+1, 9); anal 3,5; pectoral rays 18-19, usually 18; pored lateral-line scales 23+0-1; vertical scale rows 42-47; gill rakers 4-7+7-10.

Description.—Counts and measurements are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points. Suborbital ridge usually with 2 or 3 spinous points. Supplemental preopercular spine present; first preopercular spine short, extending less than halfway across opercle; second about equal to or a little longer than third. Cleithral spine small in larger specimens, better developed in smaller specimens. Sphenotic spine double or single. Frontal spine absent in large specimens, very small in small specimens. Nasal, preocular, supraocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic and opercular spines also present.

Occipital pit well developed. Larger specimens with first pectoral ray unbranched, next 7-9 branched, and lower rays unbranched. Snout slightly smaller than orbit. Interorbital width 2/3-1/2 of orbit diameter. Second anal spine longer than third, ending at about the same point when depressed.

Coloration of adults is shown in Figure 9a. Upper part of pectoral-fin axil with a patch of small white specks usually less than ½ mm in diameter; sometimes each spot surrounded by darker pigment, or the white specks on a tan background. White spots often extending on inner side of pectoral fin and on body adjacent to pectoral axil. Similar whitish spots on head and anterior part of body, often imperceptible. Body and fins generally dark brown. Caudal fin with three transverse bands, one poorly defined at base; posterior two prominent, at middle and at distal end of

caudal. Pectoral fin mostly dark brown, often more concentrated in three poorly defined transverse bands.

A species of moderate size, probably not exceeding 150 mm in standard length.

Juveniles.—The color pattern is illustrated in Figure 9b. Small white specks in pectoral axil absent in very small specimens; a few white specks in pectoral axil of a 23-mm specimen, a 14-mm specimen with none. Frontal spine tiny in juveniles, disappearing with growth (usually by 40 mm) but may persist as a rudiment in larger specimens. Pectoral rays begin to branch in fish of about 45 mm S.L.; a 46-mm specimen with third and fourth slightly split; specimens below 45 mm with no branched rays. Occipital pit in juveniles about as in adults.

Comparisons.—The small white specks on pectoral axil, general color pattern, plus the absence of a frontal spine are sufficient to distinguish this species. The supraocular tentacle is usually better developed in *S. grandicornis* than in other species, being long and fleshy, about equal to two or three times the orbit diameter.

Distribution.—*S. grandicornis* has been reported from most areas in the West Indian region, from Florida to southern Brazil including Bermuda, the Bahamas, Cuba, Jamaica, Haiti, Dominican Republic, Puerto Rico, Guadaloupe, St. Lucia, Curaçao, Colombia, Honduras, and Panama. Apparently it does not occur in the northern Gulf of Mexico. *S. grandicornis* is an inshore species and is commonly found in grassy areas of channels and bays.

Remarks.—Records of this species in the eastern Atlantic Ocean are based on misidentifications (see Fowler, 1936: 926).

Scorpaena plumieri Bloch

Fig. 4a,b and c; Tables 1-13

(Atlantic references only)

"Rascacio" Parra, 1787: 34-35, Pl. 18, Fig. 1 (description and figure poor).
Scorpaena plumieri Bloch, 1789: 234 (type locality: Martinique).—Bloch & Schneider, 1801: 194 (Antilles).—Günther, 1860: 113-114 (compiled; synonymy; West Indies and Jamaica).—Kner, 1865: 115 (Rio de Janeiro, Brazil).—Goode, 1876: 75 (name only in list of fishes seen by J. M. Jones in Bermuda).—Günther, 1880: 9 (name only; Bermuda).—Günther, 1881: 430 (Ascension Is.).—Goode & Bean, 1882a: 236 (Gulf of Mexico.)—Jordan & Gilbert, 1883: 680 (description based on eastern Pacific specimens).—Bean & Dresel, 1884: 153 (Jamaica).—Jordan, 1884b: 137-138 (Key West, Florida; description).—Jordan, 1884c: 79 (name only; Florida Keys).—Jordan, 1885: 109 (reference).—Meek & Newland, 1885: 396, 400-401 (Havana, Cuba; Key West, Florida; synonymy; description; range).—Jordan, 1886: 50 (Havana, Cuba).—

Jordan, 1887b: 596 (compiled).—Bean, 1890: 196 (Cozumel Is., Yucatán).—Jordan, 1890a: 651 (name only; St. Lucia).—Henshall, 1895: 220 (Key West).—Goode & Bean, 1896: 245 (compiled).—?Garman, 1896: 79 (Key West in 60 fathoms [depth questionable]).—Jordan & Evermann, 1896: 433 (compiled).—Jordan & Rutter, 1897: 131-132 (Kingston, Jamaica).—Jordan & Evermann, 1898: 1848-49 (compiled).—?Smith, 1900: 310 (Katama Bay, Mass.).—Evermann & Kendall, 1900: 88 (compiled Florida records).—Evermann & Marsh, 1900: 277 (compiled; Puerto Rico).—Bean, 1905: 317 (Nassau, Bahamas).—Jordan & Thompson, 1905: 250 (reference).—Bean, 1906: 80 (Bermuda).—Smith, 1907: 355 (Beaufort, N.C.; seen in Mass.).—Kendall, 1908: 120 (compiled New England records).—Rosén, 1911: 65 (Nassau, Bahamas).—Sumner, *et al.*, 1911: 764 (compiled).—Nichols, 1912: 192 (Cuba; one seen in market).—Ribeiro, 1915: 7-8 (compiled).—Fowler, 1915a: 50 (name only; Santo Domingo; addition to fauna).—Fowler, 1915b: 251 (name only; Palm Beach, Florida).—Ribeiro, 1918: 16, 156-157 (Rio de Janeiro, Brazil; synonymy).—Fowler, 1919: 149 (name only; Jamaica).—Metzelaar, 1919: 142 (Curaçao; Bonaire; St. Eustatius and St. Martin; one specimen with 11 dorsal spines).—Nichols, 1921: 24 (name only; Turk Is., Bahamas).—Nichols & Breder, 1926: 145-146, Fig. (compiled; Haiti).—Meek & Hildebrand, 1928: 835-836 (synonymy; Panama; venom; habitat).—Jordan, Evermann & Clark, 1930: 370 (compiled).—Nichols, 1930: 353, Fig. 245 (compiled in part; seen in Ponce market; figure copied from Nichols & Breder, 1926).—Fowler, 1931: 400 (Brighton Pier, Trinidad).—Pearson, 1932: 18 (name only; North Carolina).—Beebe & Tee-Van, 1933: 182-183 (compiled).—Gregory, 1933: 323, Fig. 20a,b (osteology; figures from Allis, 1909).—Borodin, 1934: 117 (Fisher's Is., Miami, Florida).—Fowler, 1936: 924 (compiled eastern Atlantic records [misidentifications except for St. Helena and Ascension]; description based on specimens from Santo Domingo; mostly compiled).—Howell-Rivero, 1938: 206 (referred *S. rascacio* Poey to *S. plumieri;* cotypes of *S. rascasio* in MCZ).—Fowler, 1941b: 171 (compiled).—Longley *in* Longley & Hildebrand, 1941: 159, Pl. 23, Figs. 1 and 2 (Tortugas, Florida; behavior; food; color description).—Gunter, 1941: 119-120 (variation; compared to *Pontinus*).—Fowler, 1942a: 77 (Cuba).—Gunter, 1942: 105-110 (specimens from Florida, Bermuda, Jamaica, Puerto Rico, Panama, Venezuela, Brazil; compared with *S. ginsburgi* [=*S. plumieri*] and with *S. mystes* Jordan & Starks [=*S plumieri*]).—Fowler, 1944: 158 (synonymy; St. Andrews Is., questionable [correctly] included *S. nuttingi* Evermann & Seale).—Fowler, 1945: 214 (brief synonymy; Charleston, S.C.) 315 (Key West) 376 (Corpus Christi, Texas).—Fowler, 1946: 10 (Maquerope Bay, Trinidad).—Schultz, 1949: 188 (Venezuela).—Baughman, 1950: 252 (compiled).—Fowler, 1952: 110 (Haiti).—Fowler, 1953: 70 (mounted specimen from Cartagena, St. Andrews Is., Colombia).—Hoese, 1958: 343 (compiled).—Springer & McErlean, 1962: 52 (Florida Keys; seasonal occurrence).—Lowe, 1962: 696 (British Guiana).—Breder, 1963: 698-699, Figs. 1 and 2 (defense behavior).—Cadenat & Marchal, 1963: 1287-1288, Fig. 37 (Ascension Is.; description; figure good).

Scorpaena bufo Cuvier *in* Cuvier & Valenciennes, 1829: 306-309 (original description; type locality: Martinique).—Richardson, 1836: 300-301 (description; Newfoundland [apparently mistaken for Florida]).—Dekay, 1842: 59, Pl. 70, Fig. 227 (compiled; figure copied from Parra, 1787).—

Poey, 1868a: 278 (compared with *S. rascacio* Poey).—Poey, 1881: 323 (reference; Puerto Rico).

Scorpaena scrofina Valenciennes *in* Cuvier & Valenciennes, 1833: 465 (original description; type locality: Brazil).—Günther, 1868: 225 (St. Helena).—Melliss, 1875: 104 (St. Helena).—Cunningham, 1910: 115 (St. Helena).—?Clark, 1913: 386, 393 (Ascension, St. Helena).

Apistes exul Gosse, 1851: 207, footnote, 208 (original description; type locality: Jamaica).

Scorpaena rascacio, Castelnau, 1855: 7 (*nomen nudum;* incorrectly assumed Parra's "Rascacio" was acceptable; included *S. plumieri* Bloch [valid] and *S. bufo* in synonymy; incorrectly included *S. gibbosa* Bloch & Schneider, though with question; brief description).

Scorpaena rascacio Poey, 1860: 169-171 (original description; type locality: Cuba).—Poey, 1861: 366 (compiled).—Poey, 1863: 178 (referred Parra's figure and description to *S. rascacio* Poey).—Poey, 1868: 303 (Havana, Cuba).—Poey, 1875: 114 (compiled; corrected error in original description: p. 169, line 34, replace "plus" with "moins").

Scorpaena grandicornis, Bean & Dresel, 1884: 153 (USNM 30087; Jamaica).—? Smith, 1900: 310 (Katama Bay, Mass.).

Scorpaena albofasciata Metzelaar, 1919: 145, Fig. 43 (original description; type locality: Bonaire and Aruba; figure good showing color pattern of juveniles).—Beebe & Hollister, 1935: 217 (Union Is., Grenadines, BWI).

Scorpaena nuttingi Evermann & Seale, 1924: 39, Pl. (original description; type locality: Carlisle Bay, Barbados).—Jordan, Evermann & Clark, 1930: 373 (compiled).

Scorpaena colonensis Meek & Hildebrand, 1928: 844, Pl. 81, Fig. 1 (original description; type locality: Colon, Panama; figure good showing color pattern of juveniles).—Fowler, 1944: 470 (compiled).

Scorpaena scrofa, Fowler, 1936: 923 (in part; wrongly included *S. scrofina* Valenciennes [=*S. plumieri*] in synonymy).

Scorpaena ginsburgi Gunter, 1942: Fig. (original description; type locality: Texas, 10 mi. SW of Aransas Pass jetties in 10 fathoms; holotype USNM 119016 and 4 paratypes, USNM 119017, USNM 119015, USNM 119018, and AMNH 15202, all from Texas; compared with *S. plumieri* Bloch and with *S. mystes* Jordan & Starks [=*S. plumieri*]).—Gunter, 1948: 160-161 (described "subtopotype," a "topotype" and more specimens, all from Texas).—Baughman, 1950: 252 (compiled).

Scorpaena plumieri plumieri, Ginsburg, 1953: 88-92 (material from Massachusetts, North Carolina, Florida, Texas, Abaco, Cuba, Jamaica, Haiti, Puerto Rico, Dominica, St. Lucia, Old Providence Is., Panama, Venezuela and Brazil; examined cotypes of *S. rascacio,* holotype of *S. ginsburgi,* and holotype of *S. colonensis;* examined types and specimens of *S. mystes* and relegated to subspecific rank; correctly included *S. colonensis, S. scrofina, S. albofasciata, S. nuttingi* and *S. ginsburgi* in synonymy).—Briggs, 1958: 294 (compiled).—Duarte-Bello, 1959: 125 (compiled).

Material examined.—MASSACHUSETTS: USNM 58902 (1, 23) Katama Bay, Marthas Vineyard, 4 Oct. 1899.

FLORIDA: UMML 220 (2, 8-22) Key Largo, Atlantic side 6.7 mi. N of junction of U. S. 1 and N. Key Largo Rd., CRR-F-36, 7 Nov. 1956.—UMML 391 (1, 11) Long Key Bight, CRR-F-33, 27 Oct. 1956.—UMML 7170 (2, 96-140) Monroe County, E side of Indian Key along oölite formation, 1 mi. off Lower Matecumbe Key, CRR-F-203, 19 Sept. 1959.—UMML 2907

(1, 192) Dade County, Soldier Key, Atlantic side, CRR-F-139, 24 April 1958.—UMML 7283 (3, 114-175) Monroe County, small rock island about ¼ mi. S of E end of Bahia Honda Bridge in 1-8 ft., CRR-F-248, 11 Oct. 1959.—UMML 2190 (2, 19-25) Monroe County, Indian Key, about 1 mi. ENE of Lower Matecumbe Key in Lignumvitae Channel, CRR-F-128, 1 Feb. 1958.—UMML 11653 (1, 73) Monroe County, E shore of Long Key, finger coral bed, Oct. 1962.—UMML 2084 (1, 179) Dade County, flats off N end of Soldier Key, 7 Jan. 1947.—UMML 3693 (2, 131-158) and UMML 4594 (1, 29) Dade County, Bache Shoal, 1½ mi. due E of N end of Elliott Key, CRR-F-162, 9 Oct. 1958.—UMML 11747 (1, 73) Monroe County, Sands Kev Light, in coral rubble, CRR-F-342, 16 April 1961.—UMML 424 (2, 71-109) Grassy Key, bay side, 1 mi. S of Tom's Harbor Viaduct no. 4, CRR-F-34, 27 Oct. 1956.—UMML 2596 (1, 208) Monroe County, Alligator Reef off Lower Matecumbe Key, ¼ mi. S of Light, CRR-F-145, 8 June 1958.—UMML 5573 (2, 62-67) Dade County, Ragged Key No. 2, ocean side in tide pools, CRR-F-197, 23 May 1959.—UMML 9958 (3, 21-61) Dade County, Key Biscayne, shoreline along Cape Florida, CRR-F-297, 15 May 1961.—UMML 7976 (1, 71) Dade County, Ajax Reef, CRR-F-199, 1 July 1959.

TEXAS: USNM 119016 (1, 190, holotype of *S. ginsburgi*) 10 mi. SE of Aransas Pass jetties in 10 fms., 5 Dec. 1940.—USNM 119018 (1, 126, paratype 1 of *S. ginsburgi*) Gulf Beach off Mustang Is., Gunter, 24 Jan. 1940.—USNM 119017 (1, 145, paratype 2 of *S. ginsburgi*) and USNM 119015 (1, 128, paratype 3 of *S. ginsburgi*) Mustang Is., summer 1938.

BAHAMAS: UMML 1137 (1, 105) North Bimini, ocean side in rocks, V. Walters, week of 7 June 1957.—UMML 2027 (2, 102-118) North Bimini, harbor in 3-4 ft., 7 Feb. 1958.—UMML 2586 (2, 50-95) SW end of Cat Cay at West Dock, J. Randall and C. Limbaugh, 4 May 1958.—BMNH 1936.5.26.1 (1 specimen) Nassau Harbor, collected by Leiden Museum.

BERMUDA: BMNH 1874.10.31.16 (1 specimen) "Bermudas," collected by Matthews.

CUBA: USNM 153578 (1, 231, cotype of *S. rascacio* Poey) collected by Poey, 1861.—USNM 188158 (3, 62-151) Las Villas Province, cove near Trinidad by rotenone, Ricciolo, Hardy, *et al.*, Sept. 1956.—BMNH 1861.8.14. 12 (1 specimen) collected by Gerrard.

JAMAICA: CNHM 72498 (1, 20) Port Royal, lime cay, Lat. 17°55'N, Long. 76°49'W, D. S. Erdman, 6 July 1953.—UMML 13238 (1, 58) about 4 mi. E of Port Antonio at Wilkes Cove, DdeS 485, 26 Sept. 1963.

HAITI: CNHM 72499 (1, 17) Dame Marine Bay, N end, Lat. 18°36'N, Long. 74°25'W, D. S. Erdman, 27 Oct. 1953.

PANAMA: USNM 81606 (1, 32) Colon, tide pools, Meek & Hildebrand, 4 April 1912.

U.S. VIRGIN ISLANDS: UMML 5261 (1, 41) St. John, Greater Lameshur Bay, E side, V.I. sta. 46, C. R. Robins, T. McKenney, J. Randall, 28 April 1959.—UMML 8665 (1, 126) Reef Bay, by trap, V.I. sta. 222, L. Boynes, 2 March 1961.

PUERTO RICO: UMML 1970 (1, 64) Jobas Harbor, most SW Caribe Is., CRR-PR-3, D. S. Erdman, 2 Jan. 1958.—CNHM 72496 (1, 26) Guanica, Balneario, Aerupuerto, D. S. Erdman and class, 20 June 1952.

ANTILLES: UMML 5717 (1, 22) St. Martin, Little Bay, CRR-Car-1, J. Randall and C. P. Idyll, 7 July 1959.—UMML 6486 (2, 22) St. Martin, Little Bay, E end of sandy shore, CRR-Car-4, J. Randall, C. P. Idyll, and C. Feliciana, 2 July 1959.

TOBAGO: A series of five specimens was briefly examined and the identification

verified. No measurements or counts were taken. The five specimens are combined in one bottle and carry the following catalog numbers: BMNH 1920.12.22.7-9, BMNH 1922.6.22.113 and BMNH 1924.7.22.80.

TRINIDAD: BMNH 1931.12.5.85-86 (2, 113-126) Tetron Bay, RODNEY.—BMNH 1931.12.5.142-143 (2, 100-118) Port of Spain market.—BMNH 1932.2.8.37-38 (2, 125-131) and BMNH 1932.2.8.36 (1) Gulf of Paria, Guppy.

ST. VINCENT: BMNH 1931.12.5.320 (1, 240) Kingstown market, RODNEY.

ST. CROIX: BMNH 1863.8.6.10 (1) collected by Stevens.

BRAZIL: UMML 12357 (1, 82) Lat. 03°04'S, Long. 39°22'W in 8 fms., OREGON sta. 4257, 13 March 1963.—BMNH 1887.3.19.10 (1) Camamu Bay, J. C. Grant.—BMNH 1923.7.30.316-317 (2) Sasso São Francisco, Rio de Janeiro, Ternetz.

ASCENSION IS.: BMNH 1932.2.19.58 (1, 102) collected by S. T. Haley.

ST. HELENA: BMNH 1910.9.9.30 (1, 230) collected by J. T. Cunningham.—BMNH 1864.10.8.7-8 (2, 174-210) collected by J. B. Melliss.

The following specimens of *Scorpaena plumieri* from the eastern Pacific Ocean were examined. All are uncataloged specimens collected by the University of Miami ARGOSY Expedition in 1961.

PANAMA: ARGOSY sta. 13 (2, 21-138) Piñas Bay, cove in W part of harbor, 10 Sept. 1961.—ARGOSY sta. 16 (1, 137) just E of Marro de Piñas, mouth of Piñas Bay, 12-60 ft., 10 Sept. 1961.

COLOMBIA: ARGOSY sta. 27 (1, 320) Gorgona Is., NE tip of Island, 35 ft., 21 Sept. 1961.

ECUADOR: ARGOSY sta. 51 (1, 79) La Plata Is., along rocks at base of cliff, E side of Is. N of anchorage in 0-12 ft., 30 Sept. 1961.—ARGOSY sta. 68 (1, 275) La Plata Is., SE part along rocks, 8-20 ft., 6 Oct. 1961.

Meristic formula.—Dorsal 11+1,9; anal 3,5; pectoral rays 18-21; pored lateral-line scales 22-24+0-3; vertical scale rows 42-47; gill rakers 4-6+8-12.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 3 free spinous points in specimens greater than 55 or 60 mm in standard length; middle spine closer to anterior one. Suborbital ridge prominent, with 3 or 4 spinous points; one at anterior end in front of eye, a second under eye, third below posterior edge of orbit, a fourth at posterior end; often first and/or third slight or absent. Supplemental preopercular spine moderate; first preopercular spine short, extending less than halfway to margin of opercle; second longer than third; fourth and fifth variable, often blunt. Cleithral spine better developed in small specimens, blunt in larger specimens. Small postorbital spine present. Frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic, and opercular spines also present.

Occipital pit usually well developed. Large specimens with first pectoral ray unbranched, next 7-10 branched, lower 9-12 unbranched; specimens between 60-150 mm in standard length usually with 5-7 branched rays. Snout longer than orbit, snout into orbit about 0.9 in small specimens to

0.6 in larger specimens. Second anal spine slightly longer than third, about even or second slightly longer when depressed. A pit under anterior margin of orbit above the suborbital ridge, usually better marked in larger specimens.

Coloration of adults is shown in Figure 4a. Coloration variable, generally with dark on a pale background; dark pigment more concentrated between base of soft dorsal and anal-fin base; body posterior to this on caudal peduncle paler, better marked in smaller specimens. Fins variously banded or blotched with dark on a pale background. Caudal fin with three bars, one at base, middle and distal portion. Pectoral axil characteristically with large white spots or blotches, ½-4 or more mm in diameter, on a black background.

A large species, probably reaching 350 mm in standard length.

Juveniles.—The color pattern is shown in Figure 4b. (The color pattern of a juvenile specimen from the eastern Pacific is shown in Figure 4c.) Pale area on caudal peduncle better marked in juveniles; specimens under 40 mm in standard length with posterior half of soft dorsal and anal fins and body posterior to the line joining the posterior end of the dorsal base and anal base with no dark pigment. (Two small specimens [UMML 220, 8 mm S.L. and UMML 391, 11 mm] apparently belonging to this species have the body almost uniformly dark colored, without the pale caudal peduncle, suggesting that postlarvae of this species are uniformly dark colored.) Occipital pit shallow in small specimens, maximum development occurring by about 70 mm S.L. Branching of pectoral rays beginning at about 45-50 mm in S.L. Middle preorbital spine absent in small specimens, developing at about 40-50 mm and increasing in size with growth.

Comparisons.—Adults of *S. plumieri* may be distinguished by the characteristic white spots on a black background on the axillary region of the pectoral fin. Juveniles may be separated from other western Atlantic species by the absence of dark pigment on the caudal peduncle.

Distribution.—The species occurs in the eastern Pacific Ocean, the western Atlantic Ocean and St. Helena and Ascension in the South Atlantic. In the western Atlantic the species is very common and has been reported from Massachusetts to Rio de Janeiro, Brazil. *S. plumieri* occurs in rocky areas near shore and ranges offshore to about 30 fathoms.

Remarks.—Ginsburg (1953: 86-88) placed *S. mystes* Jordan & Starks, including *S. tierrae* Hildebrand (Hildebrand, 1946), in the synonymy of *S. plumieri* Bloch as the subspecies *S. p. mystes* of the eastern Pacific Ocean; with the subspecies *S. p. plumieri* representing the western Atlantic population, though he felt the differentiation between the two populations was at a level lower than normally applied to subspecies. Ginsburg did not consider the records of this species at St. Helena and Ascension.

Apparently no morphological differentiation has occurred between the populations of the South Atlantic, western Atlantic and eastern Pacific. The only reported difference which has not been shown to fall within normal variation involves pigmentation of small specimens. This difference is shown in Figure 4b and c. The 24-mm specimen collected at ARGOSY station 13 (Fig. 4c) lacks the unpigmented caudal peduncle which is found in western Atlantic specimens of a similar size (Fig. 4b). Instead, a dark bar is located between the soft dorsal and anal fins with the body a gray-brown anteriorly and posteriorly to the bar, rather than being devoid of dark pigment posterior to the dark as in juveniles from the western Atlantic. The color pattern found in the 24-mm specimen from the Pacific is similar to that of some 50- or 60-mm specimens from the western Atlantic. Ginsburg (1953: 92) stated that the caudal peduncle is somewhat more dusky in *S. p. mystes* than in *S. p. plumieri,* but the smallest specimen from the eastern Pacific available to him was one 80 mm in total length or about 55 mm in standard length, a size at which most specimens from the western Atlantic have some dusky pigment on the caudal peduncle.

If the suggestion that postlarvae of this species are uniformly dark colored [see "Juveniles" section] is confirmed then the difference between no dark pigment and the presence of some dark pigment on the anterior part of the caudal peduncle during a part of the juvenile stage may be a consistent though small difference. It could be interpreted that the juveniles of the eastern Pacific obtain the adult color pattern at a smaller size. Adults from the western Atlantic are variable in intensity of pigmentation: in some specimens the dark pigment is black while in others it is pale tan and suggests that dark coloration may be related to habitat.

Since it is impossible to separate the adults from the different areas and because the species also occurs at St. Helena and Ascension in the South Atlantic, all populations are considered one species and no subspecies are recognized. A thorough comparison of post larvae, juveniles and adults from the areas involved and from different habitats is needed.

Scorpaena brasiliensis Cuvier

Figs. 9c and 10a; Tables 1-13

Scorpaena brasiliensis Cuvier *in* Cuvier & Valenciennes, 1829: 305 (type locality: Brazil).—Castelnau, 1855: 7-8 (Rio de Janeiro, Brazil).—Günther, 1860: 112 (Bahia and Rio de Janeiro, Brazil).—Kner, 1865: 114-115 (Rio de Janeiro).—Poey, 1868b: 8 (venom).—Meek & Newland, 1885: 399 (synonymy; correctly included *S. stearnsi;* Key West and Pensacola, Florida).—Jordan, 1885: 109 (included *S. stearnsi,* reference).—Jordan, 1887a: 545 (type in Paris).—Jordan & Eigenmann, 1887: 270 (Charleston, South Carolina).—Jordan, 1887b: 596 (reference).—Jordan, 1890b: 328 (Bahia, Brazil).—Goode & Bean, 1896: 245 (compiled).—

Jordan & Evermann, 1896: 433 (compiled).—Jordan & Rutter, 1897: 131 (Kingston, Jamaica).—Jordan & Evermann, 1898: 1842-43; 1900: Pl. 227, Fig. 670 (Pensacola, Florida; figure incorrectly shows ninth soft-dorsal ray as single).—Jordan & Rutter, 1897: 131 (Kingston, Jamaica).—Evermann & Bean, 1898: 247 (Ft. Pierce and Indian River Inlet, Florida).—Evermann & Marsh, 1900: 274-275, Fig. 81 (figure and description copied from Jordan & Evermann, 1898).—Evermann & Kendall, 1900: 88 (compiled Florida records; Key West and Miami).—Ribeiro, 1903: 178 (Rio de Janeiro; range).—Jordan & Thompson, 1905 (name only; Tortugas).—? Bean, 1905: 317 (Bahamas).—Smith, 1907: 355, Fig. 161 (Beaufort, North Carolina; figure copied from Jordan & Evermann, 1898).—Kendall, 1908: 120 (compiled New England records).—Gudger, 1913: 107 (Beaufort, N.C.).—Ribeiro, 1915: 6-7 (Rio de Janeiro, Brazil; venom).—? Fowler, 1915b: 251 (Palm Beach, Florida).—? Fowler, 1915c: 542 (Trinidad).—Ribeiro, 1918: 16, 156 (brief synonymy; Ilha Grande, Ilha de Sao Sebastian, and Rio de Janeiro, Brazil).—Beebe & Tee-Van, 1928: 187, Fig. (mostly compiled; Haiti).—Meek & Hildebrand, 1928: 837-838 (Key West, Florida and Bahia, Brazil; not taken by them in Panama).—Borodin, 1928: 24 (name only; Cuba).—Jordan, Evermann & Clark, 1930: 371 (compiled).—Nichols, 1930: 351-352, Fig. 242 (compiled; figure copied from Beebe & Tee-Van, 1928).—Fowler, 1940a: 783 (one specimen from Rio de Janeiro).—Fowler, 1940b: 16 (West coast of Florida).—Delsman, 1941: 74 (Venezuela).—Longley & Hildebrand, 1941: 160 (Tortugas, Florida; color; habitat).—Fowler, 1941a: 87 (Sanibel, Johnson Key, Johnson Key to Key West, and Boca Chica, Florida).—Fowler, 1941b: 171 (compiled).—Fowler, 1945: 214 (Charleston, S.C.), 315 (Florida Keys).—Fowler, 1946: 10 (Port-of-Spain, Trinidad).—Gunter, 1948: 157-159 (Florida; Texas; South Carolina; Georgia; Bahia, Brazil; variation; coloration).—Baughman, 1950: 252 (compiled).—Buller, 1951: 17 (off SE coast of United States).—Fowler, 1952: 110 (Haiti).—Ginsburg, 1953: 74-76 (synonymy; good description; specimens from throughout the West Indian Region).—Fowler, 1953: 70 (seen in Cartagena, St. Andrews Is., Colombia; new record for Colombia).—Reid, 1954: 54-55 (compiled in part; Atsena Key and Otie Key, Florida; occurrence in low salinity water).—Hildebrand, 1955: 214 (Campeche Banks, Mexico).—Hutton, *et al.*, 1956: 54, 60 (name only; Boca Ciega Bay, Florida).—Hoese, 1958: 343 (compiled).—Briggs, 1958: 294 (compiled).—Duarte-Bello, 1959: 125 (compiled).—Springer & Woodburn, 1960: 83 (Boca Ciega Bay and Tampa Bay, Florida; venom).—Springer, 1960: 27, 32 (Caloosahatchee River area, Florida).—Tabb & Manning, 1961: 635 (Florida Bay, Florida).—Cervigón, 1961: 41 (Venezuela).—Springer & McErlean, 1962: 52 (Lower Matecumbe Key, Florida; seasonal occurrence).

Scorpaena stearnsii Goode & Bean, 1882a: 236 (*nomen nudum;* used name only in list of fishes recorded as occurring in the Gulf of Mexico).—Goode & Bean, 1882b: 421-422 (original description; type locality: Pensacola, Florida; holotype USNM 30169; paratype USNM 30185).—Bean & Dresel, 1884: 153 (Jamaica).

Scorpaena stearnsi, Jordan & Gilbert, 1883: 614 (Charleston, S.C.; suggested *S. stearnsi* may be *S. brasiliensis*) 620 (first specimen from U.S. coast north of Key West).—Jordan, 1884a: 38 (name only; Pensacola, Florida).—Jordan, 1884b: 138 (Key West).—Jordan, 1884c: 79 (name only;

Florida Keys).—Jordan, 1884d: 45 (Egmont Key, Florida).

Scorpaena grandicornis, Thompson *in* Jordan & Thompson, 1905: 250 (color description of small specimens of *S. brasiliensis*).

Scorpaena braziliensis, Borodin, 1914: 117 (Sombrero Light, Florida; incorrect spelling of *S. brasiliensis* Cuvier).

Scorpaena colesi Nichols, 1914: 537, Fig. 1 (original description; type locality: Cape Lookout, North Carolina; compared with *S. brasiliensis*).—? Breder, 1927: 83 (reported 1 specimen; no locality given but gave depth as 366 fms.; thought it might be *S. brasiliensis* [depth must be wrong if Breder had *S. brasiliensis*]).—Jordan, Evermann & Clark, 1930; 370 (compiled).—Hildebrand, 1941: 228 (North Carolina).

Scorpaena isthmensis, Beebe & Tee-Van, 1928: 188 (Port-au-Prince Bay, Haiti; one specimen, NYZS 7381, poorly described; [Ginsburg (1953: 75) identified as *S. brasiliensis*]).

Material examined.—NORTH CAROLINA: USNM 157561 (1, 40) Beaufort.

SOUTH CAROLINA: UMML 7438 (1, 149) Lat. 32°51′N, Long. 78°32′W, in 21/19 fms., SILVER BAY sta. 1360, 20 Oct. 1959.

GEORGIA: USNM 11504 (1, 48) Brunswick, off Jekyll Is., 2 Feb. 1931.—USNM 155328 (1, 41) off Cumberland Is., PELICAN sta. 200-1, 27 March 1940.

FLORIDA; EAST COAST: UMML 11412 (1, 24) Port Everglades Beach, 24 July 1956.—UMML 4216 (1, 192) Lat. 30°25′N, Long. 80°28′W, in 21 fms., BOWERS sta. 65, 18 March 1956.—UMML 8769 (1, 168) St. Augustine to Matanzas, in 3½-7 fms., CRR-F-298, 14-15 Sept. 1960.—UMML 4068 (1, 44) St. Lucie County, Ft. Pierce, North Bridge, 19 July 1956.—USNM 68424 (1, 39) Indian River Inlet, 23 Jan. 1896.—USNM 185320 (1, 156) Lat. 30°13′N, Long. 80°23′W, in 25 fms., COMBAT sta. 497, 20 Aug. 1957.

FLORIDA; DADE COUNTY: USNM 68445 (1, 36) Miami, Bureau of Fisheries, 29 Oct. 1896.—UMML 4284 (1, 62) McArthur Causeway, near Causeway Terminal Yacht Basin, 24 Nov. 1958.—UMML 2434 (20, 46-122) Lower Biscayne Bay over weed beds, CRR-F-143, 28-29 March 1958.—UMML 12333 (9, 20-39) Bear Cut, Virginia Key, DdeS 28, 9 Aug. 1956.—UMML 11414 (2, 26-33) Virginia Key, 9 Aug. 1956.—UMML 11915 (1, 70) Biscayne Bay at Marker 28, 28 May 1963.—UMML 11415 (2, 37-45) Bear Cut at Virginia Key, CRR-F-168, 8 March 1958.—UMML 6815 (1, 44) Biscayne Bay off Dinner Key, CRR-F-236, 2 April 1958.—UMML 797 (1, 87) Biscayne Bay off Dinner Key in 3 fms., 1946.—UMML 8125 (1, 48) Biscayne Bay at Virginia Key, CRR-F-281, Dec. 1959.—UMML 8097 (1, 26) NE end of Virginia Key at ocean, 12 Aug. 1959.—UMML 4001 (2, 36-80) Bear Cut at Virginia Key, 21 July 1958.

FLORIDA KEYS: USNM 57153 (1, 110) Broad Creek, Bean.—USNM 72970 (1, 68) North Key, FISH HAWK.—USNM 72971 (1, 75) Key West, FISH HAWK.—USNM 68439 (1, 27) Key West.—USNM 68451 (1, 57) Key West.

FLORIDA; TORTUGAS: UMML 1120 (1, 164) and UMML 1528 (1, 138) Lat. 24°45′-50′N, Long. 82°10′-30′W, CRR-F-52, 13-16 Jan. 1956.—UMML 830 (2, 89-105) Lat. 24°45′-50′N, Long. 82°10′-30′W, 19 Jan. 1956.—UMML 4606 (3, 91-118) Lat. 24°45′-50′N, Long. 82°10′-30′W, CRR-F-186, 6-7 May 1957.—UMML 3850 (1, 92) Lat. 25°12.5′N, Long. 82°57.5′W, in 28 fms., CRR-F-178, 6 Aug. 1958.—UMML 4691 (1, 163) Lat. 24°46′N, Long. 82° 58′W, in 24 fms., CRR-F-189, 10-12 March 1958.—USNM 117138 (2, 33-74) W. H. Longley.—USNM 188180 (1, 100) Lat. 24°54′N, Long. 83°25′W, in 38 fms., OREGON sta. 1201, 19 April 1954.

FLORIDA; WEST COAST: UMML 5214 (1, 96) Everglades Nat'l Park at Joe

Kemp Channel S of Flamingo, 13 May 1959.—UMML 8095 (1, 35) Everglades Nat'l Park, Sandy Key Basin, CRR-F-269, 11 March 1959.—UMML 12291 (1, 109) Lat. 25°59′N, Long. 82°17.5′W, in 12/10 fms., OREGON sta. 2448, 14 March 1959.—UMML 12352 (2, 38-41) Lat. 27°43′N, Long. 83°34′W, in 22 fms., OREGON sta. 4089, 4 Dec. 1962.—UMML 7480 (1, 135) 2 hours off Boca Grande in 6.5 fms., CRR-F-221, 24 May 1959.—UMML 5966 (1, 87) shrimp grounds off Sanibel Is., 27 March 1956.—UMML 4221 (1, 176) Charlotte Harbor, vicinity of Pine Is., 24 Feb. 1956.—UMML 4219 (1, 143) Charlotte County, off Sanibel Is., approximately 25 mi. SW of black can marker in 10 fms., 28 Dec. 1959.—UMML 12298 (1, 160) Lat. 29°58′N, Long. 87°11′W, in 25 fms., OREGON sta. 4068, 1 Dec. 1962.—UMML 12296 (1, 166) Lat. 27°41′N, Long. 83°14′W, in 14 fms., OREGON sta. 4091, 5 Dec. 1962.—UMML 12300 (2, 133-137) Lat. 27°47′N, Long. 84°18′W, in 34 fms., OREGON sta. 4085, 4 Dec. 1962.—USNM 188170 (1, 158) Lat. 29°39′N, Long. 87°31′W, in 32 fms., OREGON sta. 1636, 9 Jan. 1957.—USNM 148213 (1, 63) Boca Grande Pass, FISH HAWK, 21 March 1889.—USNM 30169 (1, 127, type of *S. stearnsi*) Pensacola, S. Stearns.—USNM 157563 (1, 101) Tampa, C. T. Reed.—USNM 188181 (1, 57) Lat. 26°40′N, Long. 82°20′W, in 6 fms., SILVER BAY sta. 63, 17 July 1957.—CNHM 66400 (1, 47) Lat. 25°17.5′N, Long. 82°17.5′W, in 10-12 fms., OREGON sta. 2448, 14 March 1959.

MISSISSIPPI: UMML 3329 (1, 113) Lat. 30°06.5′N, Long. 88°42′W, in 8½-9 fms., SILVER BAY sta. 5000, 22 June 1963.

TEXAS: BMNH 1948.8.6.1178 (1, 100) Aransas Bay, Baughman.

NICARAGUA: UMML 2338 (1, 98) Lat. 16°02′N, Long. 82°07′W, in 21 fms., OREGON sta. 1937, 23 Feb. 1957.

JAMAICA: USNM 188159 (3, 69-146) Lat. 17°45′N, Long. 77°38′W, in 19 fms., OREGON sta. 3546, 15 May 1962.—BMNH 1905.8.16.27 (1, 162) collected by C. A. Wray.

HAITI: USNM 179139 (7, 57-132) Beebe, NYZS 1952 [the seven specimens were in USNM 178347 labeled *S. grandicornis* (8 specimens), the eighth was *S. grandicornis*].

U.S. VIRGIN ISLANDS: UMML 6053 (1, 158) St. John, Lameshur Bay, due S of Yawzi Pt. in 65 ft., J. Randall, V.I. sta. 157, 26 Feb. 1960.

VENEZUELA: The following specimens were identified but no measurements or counts were taken. All were collected by the OREGON in September and October 1963. UMML 13348 (1 specimen) Lat. 12°32′N, Long. 71°04′W, in 46 fms., sta. 4393.—UMML 13355 (1) Lat. 12°19′N, Long. 70°34′W, in 40 fms., sta. 4402.—UMML 13356 (1) Lat. 12°17′N, Long. 70°34′W, in 40 fms., sta. 4403.—UMML 13358 (1) Lat. 10°13′N, Long. 65°23′W, in 18 fms., sta. 4472.—UMML 13363 (1) Lat. 11°14′N, Long. 64°13′W, in 30 fms., sta. 4481.

FRENCH GUIANA (The abbreviation "sta." refers to OREGON stations.): UMML 12293 (1, 130) Lat. 06°10′N, Long. 53°28′W, in 20 fms., sta. 4187, 21 Feb. 1963.—UMML 12290 (1, 149) Lat. 05°57′N, Long. 52°18′W, in 38 fms., sta. 4193, 22 Feb. 1963.—UMML 12299 (1, 163) Lat. 06°00′N, Long. 52°27′W, in 35 fms., sta. 4192, 22 Feb. 1963.—UMML 12301 (2, 152-170) and UMML 12374 (1, 149) Lat. 05°24′N, Long. 51°34′W, in 35 fms., sta. 4201, 23 Feb. 1963.—UMML 13312 (1, 106) Lat. 06°23′N, Long. 56°05′W, in 17 fms., sta. 4170, 19 Feb. 1963.

BRITISH GUIANA: BMNH 1950.5.15.44 (1, 52) off Georgetown, Graham.

BRAZIL: UMML 12294 (3, 77-139) Lat. 02°24′S, Long. 41°10′W, in 20 fms., OREGON sta. 4245, 12 March 1963.—UMML 12297 (4, 73-159) Lat. 03°04′S, Long. 39°22′W, in 8 fms., OREGON sta. 4257, 13 March 1963.—

USNM 83177 (1, 131) Rio de Janeiro, Wilkes Expl. Expedition.—BMNH 1923.7.30.318-323 (2 specimens plus 4 specimens of *S. isthmensis*) Rio de Janeiro, Ternetz.—BMNH 1844.5.14.50 (1, 138) Bahia, Parzlidaki Coll.

Meristic formula.—Dorsal 11+1,9 (one with 13, scaled over area +4; one with 11+1,8); anal 3,5 (one with 4,5); pectoral rays 18-20 (one with 16 on left side, 18 on right; one with 18,17; one with 19,21); pored lateral-line scales 23-24+0-2; vertical scale rows 50-58, gill rakers 4-5+8-10.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points. Suborbital ridge usually with 3 spinous points; first 2 often blunt. Supplemental preopercular spine usually small; first preopercular spine reaching to middle of opercle or a little beyond; second about equal to third or a little smaller; fourth and fifth moderate to slight. Cleithral spine small in small specimens, virtually absent in larger specimens. Sphenotic spine single or double. Upper posttemporal spine usually absent, or much reduced. Other spines include the frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, lower posttemporal, supracleithral, pterotic and opercular.

Occipital pit well developed. Specimens greater than 50 mm in standard length with first pectoral ray unbranched, next 7-10 branched, lower 8-11 unbranched. Snout usually smaller than orbit, averaging 1.1-1.4 times in orbit. Interorbital width about 2 times in orbit diameter. Second anal spine about equal to third in smaller specimens; second shorter than third in large specimens; when depressed the tip of third extends beyond second.

The color pattern of adults is shown in Figure 9c. Body generally brown above and pale below. Typically with two brown spots on body in a line behind the head, 4-6 scale-rows in diameter; first below lateral line, second usually below or just touching the lateral line; sometimes a third spot present posterior to second. This species normally characterized by dark brown spots, ½-2 mm in diameter, on pectoral axil and along body surface between the pectoral and anal fins; spots better marked in smaller specimens, often poorly defined in specimens long preserved, and usually better marked in specimens from shallow water.

Juveniles.—The color pattern is shown in Figure 10a. Body generally brown on a tan or pale background. Caudal peduncle somewhat paler than rest of body. Small brown spots usually present in pectoral axil in specimens larger than 25 mm in S.L. Branching of pectoral rays begins at a length of about 45 mm; two 44-mm specimens with 2 rays slightly split, one 45-mm specimen with no branched rays, smaller specimens with no branched rays. Occipital pit shallow, becoming deeper with growth.

Comparisons.—*S. brasiliensis* may be distinguished from other species by the following combination of characters: 50-60 scale rows, brown spots

against a pallid pectoral-fin axil, usually two or three large brown spots behind the head, and upper posttemporal spine reduced or absent.

Distribution.—*S. brasiliensis* appears to be one of the most common inshore species of *Scorpaena* in the western Atlantic Ocean, occurring from Virginia south to Brazil, including the Gulf of Mexico and Caribbean Sea. The species seems to be more common in waters adjacent to continental land masses; apparently it has not been reported from Bermuda. It is found in shallow waters of bays and harbors, is common on the shrimp grounds off Tortugas, and ranges offshore to about 50 fathoms.

Scorpaena dispar Longley & Hildebrand
Fig. 12b and c; Tables 1-13

Scorpaena dispar Longley & Hildebrand, 1940: 246 Fig. 12 (type locality: Tortugas, Florida; holotype USNM 108867).—Longley & Hildebrand, 1941: 160 (name only; Tortugas).—? Fowler, 1941a: 81, 87 (off Boynton, Florida, in 9 fms. [on p. 81 data given for station off Boynton is 19 fms.]).—Fowler, 1945: 315, Fig. 305 (Sanibel Is.; figure poor).—Ginsburg, 1953: 84-86 (examined type of *S. dispar* and *S. similis;* correctly placed *S. similis* in synonymy; specimens from Florida, Mississippi Delta, and Cabo Catoche, Mexico).—Hildebrand, 1954: 314 (off northern Mexico).—Briggs, 1958: 294 (compiled).—Hoese, 1958: 343 (compiled).

Scorpaena similis Gunter, 1948: 161-164, Pl. 1 (original description; type locality: PELICAN sta. 74-3, Lat. 29°04′N, Long. 88°44.5′W, in 60 fms., off Mississippi Delta, Louisiana; USNM 124332).

Material examined.—FLORIDA; ATLANTIC COAST: UMML 11091 (1, 85) Lat. 28°30′N, Long. 80°02′W, in 41-37 fms., SILVER BAY sta. 3704, 25 Jan. 1962.—UMML 10245 (1, 53) Monroe County, in 40 fms., DdeS 360.—USNM 124304 (1, 45) off Cape Florida, 2⅛ mi. SSE of Fowey Rocks Light, FISH HAWK sta. 7511.

FLORIDA KEYS: UMML 6881 (1, 53) 2½ mi. SSW of Alligator Reef Light in 150 ft., CRR-F-129, 22 May 1960.

FLORIDA; TORTUGAS: USNM 188169 (1, 90) Lat. 24°24′N, Long. 82°55′W, in 37 fms., OREGON sta. 1004, 13 April 1954.—UMML 3849 (1, 66) Lat. 25°12.5′N, Long. 82°57.5′W, in 28 fms., CRR-F-178, 6 Aug. 1958.—USNM 108867 (1, 85, holotype of *S. dispar*) S of Tortugas in 40 fms., W. H. Longley.

FLORIDA; WEST COAST: CNHM 45596 (2, 112-130) Lat. 28°44′N, Long. 85°01′W, in 25-30 fms., OREGON sta. 727-728, 16 Dec. 1952.

LOUISIANA: USNM 124332 (1, 146, holotype of *S. similis*) Lat. 29°04′N, Long. 88°44.5′W, a few miles E of mouth of Mississippi River, PELICAN sta. 74-3.—USNM 155332 (1, 131) off Mississippi Delta, PELICAN sta. 12

TEXAS: CNHM 65874 (1, 165) Lat. 27°45′N, Long. 95°46′W, in 40 fms., SILVER BAY sta. 281, 2 Feb. 1958.

YUCATAN, MEXICO: USNM 185309 (15, 59-124) Lat. 21°50′N, Long. 86°34′W, in 30 fms., OREGON sta. 3640, 12 June 1962.—USNM 119768 (1, 38) off Cabo Catoche, Lat. 22°07′30″N, Long. 87°06′00″W.—USNM 101537 and USNM 134220 (11, 80-159) off Cabo Catoche, a combined lot with at least part from ALBATROSS sta. 2365, Lat. 22°18′N, Long. 87°04′W, 30 Jan. 1885.

BRAZIL: UMML 12371 (1, 120) Lat. 00°16′N, Long. 44°28′W, in 50 fms., OREGON sta. 4223, 9 March 1963.—USNM 185489 (1, 181), USNM 185309 (2, 95-121) and CNHM 65875 (4, 47-156) all from Lat. 02°40′N, Long. 47°56′W, in 63 fms., OREGON sta. 2065, 15 Nov. 1957.

VENEZUELA: The following specimens were identified but no counts or measurements were taken: UMML 3351 (6 specimens) Lat. 12°37′N, Long. 71°10′W, in 65 fms., OREGON sta. 4394, 25 Sept. 1963.

Meristic formula.—Dorsal 11 + 1,9, sometimes 8; anal 3,5; pectoral rays 17-19 (one with 20, one with 14 on left and 18 on right side); pored lateral-line scales 22-23 + 0-1; vertical scale rows 42-47; gill rakers 5 + 10-12.

Description.—Counts and measurements are summarized in Tables 1-13.

Preorbital bone with 3 free spinous points, infrequently middle one double giving a total of four. Suborbital ridge usually with 3 spinous points, infrequently 2 or 4. Supplemental preopercular spine present; first preopercular spine short, extending less than halfway across opercle; second, third and fourth spines moderate, fifth slight. Cleithral spine present. Sphenotic spine single or double. Frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, pterotic, and opercular spines also present.

Occipital pit well developed. Larger specimens with first pectoral ray unbranched, next 6-8 branched, lower 8-12 unbranched. Snout about equal to orbit, snout slightly longer than orbit in large specimens but usually shorter than orbit in smaller specimens; range of snout into orbit for 29 specimens 0.8-1.3. Interorbital into orbit 2-2.5 times. Second anal spine longer than third when depressed.

The color pattern of adults is shown in Figure 12b. Freshly preserved specimens with some dark pigment, those long in preservative generally pallid. Two dark spots sometimes present on body behind head; first above lateral line under middle of spinous dorsal fin, second below lateral line under about the 10-12th dorsal spines. Pectoral, dorsal, and caudal fins often pale colored or transparent but usually with some dark spots. Dark spots on mesial side of pectoral fin but showing through; pigment of spots on and adjacent to pectoral rays. Spots on caudal fin in two poorly defined bands, at center and distal end of fin. Some dark pigment usually present under eye, on the body below the soft dorsal fin and on the caudal peduncle. Color in life bright orange or red.

A large species, possibly exceeding 200 mm in S.L.; largest available specimen 181 mm.

Juveniles.—Smallest available specimen 38 mm in standard length (Figure 12c). Coloration similar to adults, except pelvic fin and anal fin with dusky pigment. Middle preorbital spine small. (Though no specimens below this size are available or described in the literature, the middle preorbital spine

probably is absent in small specimens and develops with growth. For example, in a 59-mm specimen (UMML 10245) the middle preorbital spine is small on the left side and virtually absent on the right side. In some smaller specimens the middle preorbital spine is well developed, but in nearly all specimens examined the larger specimens have the middle spine better developed. In *S. plumieri,* a species similar to *S. dispar* in counts, measurements, and general body shape, the middle preorbital spine usually develops at a size of 50 mm or more.)

Occipital pit well developed in smallest specimens examined. Branching of pectoral rays occurring in specimens below a size of 40 mm in S.L. Available specimens of about this size with at least a couple of rays slightly split.

Comparisons.—*S. plumieri* and *S. microlepis* also have 3 free spinous points on the preorbital bone. The high number of vertical scale rows in *S. microlepis* distinguishes this species. Specimens of *S. plumieri* have a characteristic color pattern.

Distribution.—The species occurs from Florida south to the central Atlantic coast of Brazil, though reported from only a few areas within this range. It is apparently a fairly common offshore species of the Gulf of Mexico. Further experimental trawling in offshore waters may show it to be widely distributed in the western Atlantic Ocean. *S. dispar* has been collected in depths from about 20 to 65 fathoms.

Remarks.—The specimens collected by the OREGON off Venezuela are the first reported from the Caribbean Sea. The specimens collected by the OREGON off Brazil are the first from the Atlantic coast of South America.

Ginsburg (1953: 86) distinguishes two populations, one off the United States and the other off Cabo Catoche, Yucatan. Specimens from South America and more specimens from the two areas involved do not support Ginsburg's suggestion of distinct populations.

Scorpaena calcarata Goode & Bean

Fig. 10b and c; Tables 1-13

Scorpaena sp. Goode & Bean, 1880: 338 (described a specimen [USNM 23556] from Clear Water Harbor, Florida; thought it agreed with description of *S. plumieri.* This specimen is the type of *S. calcarata* Goode & Bean, 1882).

Scorpaena calcarata Goode & Bean, 1882b: 422-423 (original description; type locality: Clear Water Harbor, Florida; wrongly stated all pectoral rays simple; type USNM 23556).—Jordan & Gilbert, 1882: 952 (compiled).—Longley, 1935: 284 (synonymized *S. atlantica*=*S. russula atlantica* Nichols & Breder).—Longley *in* Longley & Hildebrand, 1941: 164-165 (examined type; corrected mistake in original description; distinguished from *S. inermis;* habitat notes; Tortugas, Florida).—Gunter, 1948:

159-160 (Louisiana, Texas, Florida, South Carolina, North Carolina, Georgia; in 8-35 fms.).—Baughman, 1950: 252 (Port Aransas, Texas).—Ginsburg, 1953: 68-71 (examined type of *S. calcarata* and paratype of *S. russula atlantica* Nichols & Breder=*S. calcarata;* tentatively placed *S. mercatoris* Delsman in synonymy [see "Remarks" section]; description good).—Hildebrand, 1954: 314 (shrimp grounds off Texas, Louisiana and Mexico).—Hildebrand, 1955: 214 (Campeche Banks, Mexico).—Briggs, 1958: 294 (compiled).—Duarte-Bello, 1959: 125 (compiled).—Hoese, 1958: 343 (compiled).—Springer & Woodburn, 1960: 83 (compiled).

Scorpaena occipitalis, Jordan, 1885: 109 (in part; wrongly included *S. calcarata* in synonymy of *S. occipitalis* Poey=*S. inermis* Cuvier).—Meek & Newland, 1885: 397, 402 (in part; wrongly included *S. calcarata* in synonymy of *occipitalis*).

Scorpaena inermis, Jordan & Evermann, 1898: 1853-54, and footnote on 1853 (in part; wrongly included *S. calcarata* in synonymy).—Evermann & Kendall, 1900: 88 (in part; wrongly included *S. calcarata* in synonymy; compiled Florida records).—Jordan, Evermann & Clark, 1930: 371 (in part; wrongly included *S. calcarata*).

Scorpaena russula atlantica Nichols & Breder, 1924: 21, Pl. 7 (described as subspecies of *Scorpaena russula* Jordan & Bollman [eastern Pacific]; type locality: off Galveston, Texas).—Delsman, 1941: 75 (six specimens from off Miami and Jacksonville, Florida, in 20-30 fms.).

Scorpaena atlantica, Jordan, Evermann & Clark, 1930: 370.

Material examined.—SOUTH CAROLINA: USNM 188168 (4, 93-120) Lat. 32°22′N, Long. 79°06′W, in 25 fms., COMBAT sta. 166, 1 Nov. 1956.

GEORGIA: UMML 2035 (2, 101-119) Lat. 30°42′N, Long. 80°38′W, in 18 fms., COMBAT sta. 158, 31 Oct. 1956.—UMML 2921 (1, 124) from point N of Jacksonville, Florida, to point S of Brunswick, Georgia, along 20-50 fm. contour, CRR-F-50, Jan. 1956.

FLORIDA: UMML 10968 (1, 117) Lat. 29°11′N, Long. 80°22′W, in 17/18 fms., SILVER BAY sta. 2771, 5 Feb. 1961.—UMML 11083 (1, 72) Lat. 28°26′N, Long. 80°12′W, in 20 fms., SILVER BAY sta. 2032, 27 April 1960.—UMML 2416 (2, 32-38) Lower Biscayne Bay, CRR-F-143, 28-29 March 1958.—UMML 8022 (1, 20) Dade County, Key Biscayne at Matheson Estate, CRR-F-120, 30 Nov. 1957.—UMML 3544 (1, 39) Dade County, Bear Cut at Virginia Key in grass flats at Marine Laboratory, CRR-F-168, 8 March 1958.—UMML 12332 (1, 65) Monroe County, 4 mi. S.E. of Islamorada in 40 fms., DdeS-360, 20 Aug. 1961.—UMML 2355 (38, 58-89) Lat. 24°45′-50′N, Long. 82°10′-30′W, in 13 fms., CRR-F-74, 26 May 1957.—UMML 4609 (6, 74-87) Lat. 24°45′-50′N, Long. 82°10′-30′W, CRR-F-186, 6-7 July 1957.—UMML 1530 (1, 40) Lat. 24°45′-50′N, Long. 82°10′-30′W, CRR-F-52, 16 Jan. 1956.—UMML 2066 (2, 49-58) Lat. 24°45′-50′N, Long. 82°10′-30′W, CRR-F-136, 18-20 Feb. 1958.—UMML 5188 (1, 54) Dry Tortugas shrimp grounds, July 1956.—UMML 829 (1, 77) Dry Tortugas shrimp grounds, 17 Jan. 1956.—UMML 564 (2, 58-75) Lat. 24°45′-50′N, Long. 82°10′-30′W, 5 Oct. 1955.—UMML 7782 (2, 50-53) Dry Tortugas shrimp grounds, CRR-F-259, 23 May 1958.—UMML 12348 (1, 104) Lat. 27°41′N, Long. 83°14′W, in 14 fms., OREGON sta. 4091, 5 Dec. 1962.—UMML 1808 (2, 54-83) 70 mi. NW of Key West in 14 fms., CRR-F-132, 9-10 May 1956.—UMML 12675 (4, 37-105) Lat. 27°44′N, Long. 83°45′W, in 24 fms., OREGON sta. 4088, 4 Dec. 1962.—UMML 7485 (1, 75) 2 hours off Boca Grande in 6.5 fms.,

CRR-F-221, 24 May 1959.—USNM 190359 (1, 84) Lat. 29°01′N, Long. 80°42′W, in 9 fms., SILVER BAY sta. 1562, 21 Jan. 1960.—USNM 23556 (1, 44, type of *S. calcarata*) off Florida, collected by J. W. Velie.—BMNH 1933.10.12.100 (1, 70) Dry Tortugas, Longley.

MISSISSIPPI: UMML 12676 (4, 66-81) Lat. 29°41′N, Long 88°18′W, in 20 fms., SILVER BAY sta. 919, 13 Jan. 1959.—USNM 158202 (1, 88) Dolphin Is., Gulf Shores in 8-10 fms.—UMML 13339 (1, 72) Lat. 29°58′N, Long. 80°00′W, in 15/14 fms., SILVER BAY sta. 4971, 19 June 1963.—UMML 13341 (6, 50-68) Lat. 30°10′N, Long. 88°25′W, in 8 fms., SILVER BAY sta. 4975, 19 June 1963.—UMML 13340 (1, 67) Lat. 30°09′N, Long. 88°36′W, in 8½ fms., SILVER BAY sta. 4976, 19 June 1963.—UMML 13338 (2, 53-69) Lat. 30°11′N, Long. 88°37′W, in 7 fms., SILVER BAY sta. 4986, 20 June 1963.—UMML 13365 (7, 60-82) Lat. 30°09′N, Long. 88°41′W, in 8½ fms., SILVER BAY sta. 5004, 22 June 1963.

TEXAS: USNM 86167 (1, 77, "subspecific type" of *S. russula atlantica*) Lat. 28°56′N, Long. 94°48′W, GRAMPUS sta. 10479, 16 March 1917.—USNM 86150 (1, 77, paratype of *S. russula atlantica*) off St. Joseph Is., GRAMPUS sta. 10472.—USNM 86151 (6, 56-67, paratypes of *S. russula atlantica*) Lat. 28°56′N, Long. 94°48′W, in 10½ fms., GRAMPUS sta. 10479, 16 March 1917.—CNHM 66398 (1, 78) Lat. 28°28.5′N, Long. 94°53.5′W, in 20/21 fms., OREGON sta. 3851, 19 Sept. 1962.—BMNH 1948.8.6.1179 (1, 73) Aransas Bay, Baughman.

VIRGIN ISLANDS: UMML 7428 (2, 52-57) Lat. 18°35′N. Long, 65°03′W, in 42 fms., OREGON sta. 2607 [corrected list], 26 Sept. 1959.

MEXICO: USNM 188111 (1, 105) Lat. 21°17′N, Long. 91°18′W, in 20 fms., OREGON sta. 1048, 13 May 1954.—USNM 188112 (4, 51-62) 10 mi. N of Huts Bayon, try net hauls 7-12, PELICAN, 17 March 1947.

FRENCH GUIANA: UMML 12347 (3, 62-70) Lat. 05°26′N, Long. 51°25′W, in 40 fms., OREGON sta. 4200, 23 Feb. 1963.—UMML 12380 (1, 66) Lat. 05°32′N, Long. 51°47′W, in 40 fms., OREGON sta. 4197, 23 Feb. 1963.—UMML 12295 (6, 61-81) Lat. 05°24′N, Long. 51°34′W, in 35 fms., OREGON sta. 4201, 23 Feb. 1963.—USNM 185044 (2, 55-84) Lat. 05°39′N, Long. 51°56′W, in 37 fms., OREGON sta. 2046, 12 Nov. 1957.

BRAZIL: UMML 12355 (2, 62-65) Lat. 02°29′S, Long. 40°44′W, in 15 fms., OREGON sta. 4248, 12 March 1963.—UMML 12382 (1, 80) Lat. 02°15′S, Long. 42°02′W, in 20 fms., OREGON sta. 4241, 11 March 1963.—UMML 12292 (9, 63-79) Lat. 02°24′S, Long. 41°10′W, in 20 fms., OREGON sta. 4245, 12 March 1963.

VENEZUELA: The following specimens were identified but no counts or measurements were taken. UMML 13343 (31 specimens) Lat. 12°33′N, Long. 71°09′W, in 40 fms., OREGON sta. 4391, 25 Sept. 1963.—UMML 13345 (21) Lat. 12°32′N, Long. 71°05′W, in 40 fms., OREGON sta. 4392, 25 Sept. 1963.—UMML 13347 (36) Lat. 12°32′N, Long. 71°04′W, in 46 fms., OREGON sta. 4393, 25 Sept. 1963.—UMML 13354 (1) Lat. 12°19′N, Long. 70°34′W, in 40 fms., OREGON sta. 4402, 27 Sept. 1963.—UMML 13359 (1) Lat. 11°12′N, Long. 64°29′W, in 32 fms., OREGON sta. 4476, 20 Oct. 1963.—UMML 13364 (1) Lat. 11°14′N, Long. 64°13′W, in 30 fms., OREGON sta. 4481, 22 Oct. 1963.

Meristic formula.—Dorsal 11+1, 9 (one with 11+1, 7; three with 11+1, 8; one with 11+1, 10); anal 3, 5 (one with 4, 4); pectoral rays 19-21; pored lateral-line scales 22-24+0-1; vertical scale rows 42-49: gill rakers 4-5+7-11.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points. Suborbital ridge usually with 2 or 3 spinous points, one under center of eye, under posterior margin of eye, and at posterior end; middle spine often absent, anterior spine occasionally absent. Supplemental preopercular spine absent. First preopercular spine usually reaching about half the distance from its base to margin of opercular flap; second spine smaller than third and closer to first, second often minute or absent; fourth and fifth spines broad, fifth sometimes curved downward. Margin of preopercular bone above preopercular spines variously serrated, often developed as blunt knobs or points. Cleithral spine absent. Sphenotic with one to several spinules appearing as a small cluster. Upper posttemporal spine often reduced or blunt. Other spines present include the frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, lower posttemporal, supracleithral, pterotic and opercular.

Occipital pit virtually absent. Larger specimens with first pectoral ray unbranched, next 5-7 branched, and lower 11-15 unbranched. Orbit larger than snout, snout into orbit 1.1-1.5 times. Interorbital narrow, 2-3 times in orbit. Second anal spine about equal to third; when depressed, the third extends beyond the second.

Coloration of adults is shown in Figure 10b. Color variable, usually dark on a pale background, with ventral surface pale. Pigment usually concentrated in a spot behind head on or just below lateral line, better marked in fresh specimens. Upper body surface variously shaded with brown; often more concentrated in patches below the beginning, middle and end of spinous dorsal, and below center and end of the soft dorsal base. Spinous dorsal fin commonly with dark pigment at midheight of fin, appearing as a line extending the length of the fin. Soft dorsal with a speckled appearance. Pectoral with dark pigment in patches on the rays. Pelvic fin entirely dusky in smaller specimens, with distal half dusky in larger specimens. Anal fin clear or slightly dusky. Caudal fin clear or with two faintly marked broad transverse bands, at center and distal margin. Maxillary, cheek, ventral surface of head, and ventral half of body with little or no dark pigment, cream colored or white in recently preserved specimens, or pale tan in specimens long in preservative.

A species of moderate size, probably not exceeding 125 mm in standard length.

Juveniles.—The color pattern is illustrated in Figure 10c. Pelvic fins uniformly pigmented with dark brown. General coloration as in adults. The pectoral rays begin branching in fish of about 30 mm in standard length; one 32-mm specimen with 2 rays slightly split, a 38-mm specimen with 4 branched rays. Occipital pit slightly developed in specimens less

than 30 mm in S.L.; larger specimens with pit scarcely developed or entirely absent.

Comparisons.—*S. calcarata* and *S. inermis* are the only two species of *Scorpaena* in the western Atlantic Ocean which lack an occipital pit as adults. The two are compared under the account of *S. inermis* (p. 140). *S. calcarata, S. inermis* and *S. melasma* are the only species in the western Atlantic Ocean which lack a supplemental preopercular spine.

Distribution.—*S. calcarata* is found from North Carolina south to Florida, throughout the Gulf of Mexico, in the western and southern Caribbean, and to Fortaleza, Brazil. It has been reported from the Virgin Islands (Ginsburg, 1953: 69-70). With the exception of the Virgin Islands, this species apparently has been reported only from areas adjacent to continental land masses. The species is unrecorded from the Bahamas or Bermuda. *S. calcarata* is the most common species of the genus in the Gulf of Mexico; it is commonly taken on the shrimp grounds off Tortugas, the northern Gulf, and off Campeche. It has been collected in waters near shore (small specimens) to a depth of about 50 fathoms.

Remarks.—Specimens collected by the OREGON off Venezuela, French Guiana and Brazil are apparently the first reported from the coast of South America.

Scorpaena inermis Cuvier

Fig. 11a and b; Tables 1-13

Scorpaena inermis Cuvier *in* Cuvier & Valenciennes, 1829: 311-312 (type locality: Martinique).—Jordan, 1887a: 545 (type in Paris; brief description; stated that *S. inermis* probably equals *S. calcarata* and *S. occipitalis*).—Jordan, 1887b: 596 (in part; incorrectly included *S. calcarata* Goode & Bean, though with question).—Jordan & Evermann, 1896: 433 (compiled).—Evermann & Marsh, 1900: 273 (name only in key).—Evermann & Kendall, 1900: 88 (in part; wrongly included *S. calcarata*).—Longley, 1935: 284 (synonymized *S. occipitalis* Poey; asterisk indicated correction of earlier mistake).—Howell-Rivero, 1938: 206 (correctly referred *S. occipitalis* Poey to *S. inermis;* 5 types of *S. occipitalis* in MCZ, largest is holotype, Poey No. 474).—Longley *in* Longley & Hildebrand, 1941: 162-163 (examined type; redescribed; tentatively included *S. occipitalis* Poey; Tortugas, Florida).—Ginsburg, 1953: 65-67, Fig. 6 (examined type of *S. luckei* Fowler and two cotypes of *S. occipitalis* Poey; correctly synonymized *S. luckei* and substantiated *S. occipitalis* as a synonym; specimens from Florida, Cuba, Puerto Rico and Curaçao).—Briggs, 1958: 294 (compiled).—Duarte-Bello, 1959: 125 (compiled).

Scorpaena occipitalis Poey, 1860: 171-172 (original description; type locality: Havana, Cuba).—Poey, 1861: 366 (compiled).—Poey, 1868c: 303 (Havana).—Poey, 1875: 115 (compiled).—Jordan, 1885: 109 (reference; incorrectly stated that *S. occipitalis* is probably identical with *S. calcarata* Goode & Bean).—Meek & Newland, 1885: 397 (in part; wrongly included

S. calcarata Goode & Bean).—Jordan & Evermann, 1886; 475 (name only; Gulf of Mexico).

Scorpaena albifimbria, Metzelaar, 1919: 144-145 (description brief; Curaçao and Aruba). [See "Remarks" under *S. albifimbria*.]

?*Scorpaena grandicornis*, Breder, 1927: 82 (probably misidentified; Royal Is., Bahamas).

Scorpaena luckei Fowler, 1941a: 87, Figs. 1 and 2 (original description; type locality: Tortugas, Florida; ANSP 69716).

?*Scorpaena mercatoris* Delsman, 1941: 74, Fig. 11 (original description; type locality: Cay Sal Bank). [See "Remarks" section.]

Material examined.—FLORIDA: UMML 10160 (2, 58-60) Monroe County, 3 mi. ENE of Crocker Reef in 150 ft., CRR-F-320, 22 Aug. 1961.—UMML 13074 (1, 13) Monroe County, about ⅓ mi. SSW of Alligator Reef Light in 20 ft. at ledge, CRR-F-358, 7 Jan. 1963.

BAHAMAS: UMML 9001 (2, 36-49) 10 mi. NE of Green Cay, GERDA, 23 Feb. 1961.—UMML 11223 (1, 46) Bimini, 1 mi. W of Lerner Marine Laboratory, in 65 ft., CRR-BWI-42, 4 March 1962.—UMML 10900 (1, 36) ¾ mi. W of Riding Rock Light, CRR-BWI-34, 4 Jan. 1962.—UMML 1437 (1, 41) Andros, North Cholostown, E. C. Jones, June 1951.—UMML 11378 (1, 29) Bimini, ½ mi. W of North Bimini opposite Lerner Marine Laboratory, CRR-BWI-41, 4 March 1962.

CUBA: USNM 153576 (1, 53) and USNM 153577 (1, 35) both cotypes of *S. occipitalis* Poey, collected by Poey.

CAYMAN ISLANDS: BMNH 1939.5.12.224-225 (2, 59-77) Oxford Univ. Cayman Expedition, 25 May 1938.

JAMAICA: USNM 188176 (1 specimen in poor condition) Lat. 17°07′N, Long 78°44′W, in 19 fms., OREGON sta. 3556, 17 May 1962.

U.S. VIRGIN ISLANDS: UMML 5382 (1, 19) St. John, beach at Greater Salt Pond Bay, V.I. sta. 47, C. R. Robins, 29 April 1959.—USNM 183597 (1, 32) Peter Is., dredging off Peter Is. landing, Bredin Exp. 18-58, Waldo L. Schmidt, 29 March 1958.—CNHM 66999 (3, 32-33) off Anegada Is., Lat. 18°50.5′N, Long. 64°37′W, in 40 fms., OREGON sta. 2615, 27 Sept. 1959.

MEXICO: UMML 9222 (1, 15) Cozumel Is., San Miquel in 0-10 ft., WAS-Carib-1, 19 June 1961.

DUTCH WEST INDIES: BMNH 1920.1.8.17 (1 specimen) St. Eustatius, Metzelaar Expedition.

Meristic formula.—Dorsal 11 + 1, 7-8, usually 8; anal 3, 5; pectoral rays 19-21, usually 20; pored lateral-line scales 22-24 + 0-1; vertical scale rows 44-49; gill rakers 3-5 + 6-8.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points; suborbital ridge usually with 2 spinous points, infrequently 1. Supplemental preopercular spine absent; first preopercular spine short, extending less than halfway across opercular margin; second usually smaller than third. Cleithral spine absent. Nasal spine blunt. Frontal, preocular, supraocular, posttemporal, supracleithral, pterotic and opercular spines also present but generally not well developed.

Occipital pit virtually absent. Larger specimens with first pectoral ray unbranched, next 5-6 branched, and lower 13-14 (12-15) unbranched.

Snout shorter than orbit, snout into orbit 1.1-1.6 times. Interorbital narrow and shallow; interorbital into orbit 2-2.5 times in smallest specimens, 3-4 or more times in larger specimens. Second anal spine longer than third, second and third ending at about the same point when depressed.

The color pattern of adults is shown in Figure 11a. General body coloration brown on a pale background. Dark pigment usually more concentrated below the middle dorsal spines, below the soft dorsal fin, and on the dorsal part of the caudal peduncle. Often a brown spot behind the head below the lateral line. Pelvic fins dusky or with dark pigment at distal margin of fin. Distal margin of pectoral usually dusky; smaller specimens with transverse dark bands on pectoral fin. Dorsal and anal fins variously marked with brown specks. Caudal fin with two poorly defined transverse bands, one at center and one at distal margin of fin.

A characteristic feature of this species is the presence of mushroomlike figures on the cornea (Fig. 3d). Ginsburg (1953: 66) describes them as follows: "Opaque, usually whitish, rather narrow columns descending from the line marking the boundary between the upper opaque and the lower transparent parts of the eye, the columns expanding in rounded areas at their lower ends, altogether producing effect of inverted mushroomlike figures on transparent part of eye . . ."

Juveniles.—The color pattern of juveniles is shown in Figure 11b. Pelvic fins uniformly brown; pectoral fin with two or three dark transverse bands. Branching of pectoral rays occurs at about 20-25 mm in standard length. All specimens examined with the characteristic mushroomlike figures on the eye.

Comparisons.—*S. inermis* closely resembles *S. calcarata* and agrees with *S. melasma* and *S. calcarata* in lacking a supplemental preopercular spine and in having a narrow interorbital bone. *S. inermis* and *S. calcarata* are the only two species in the genus which lack an occipital pit. Specimens of *S. melasma* may be separated from the other two species on the basis of its long head length and occipital pit. Specimens of *S. inermis* may be separated from *S. calcarata* by the presence of mushroomlike figures on the eye in *S. inermis*. Additional characters useful in distinguishing *S. inermis* from *S. calcarata* include the lower number of soft dorsal rays (8), longer jaw length, usually longer predorsal length and a longer head length in specimens of *S. inermis*.

Distribution.—*S. inermis* has been reported from Florida, Cuba, Puerto Rico, and Curaçao. The specimens here reported extend the known range to the Cayman Islands, the Bahamas, Cozumel Island, Jamaica, and the Virgin Islands. Apparently this species prefers clear water, being most abundant in the Bahamas and islands of the eastern Caribbean Sea. It is

infrequently taken in Florida waters. Available depth information shows a vertical distribution from the shore to 40 fathoms.

S. calcarata, a closely related species and one often confused with *S. inermis,* appears to be most common off continental land masses. *S. calcarata* has not been reported from the Bahamas or Bermuda and is most common on the shrimp grounds off the Tortugas, northern Gulf of Mexico and Campeche.

Remarks.—Ginsburg (1953: 66) states that the mushroomlike figures on the eye are few or undeveloped in specimens shorter than 55 mm (or about 40 mm in standard length). This is incorrect; specimens of 13 and 15 mm in standard length as well as all other specimens examined had the mushroomlike figures well developed.

Scorpaena mercatoris Delsman was tentatively placed in the synonymy of *S. calcarata* by Ginsburg (1953: 68, 71) although he suggested it could be *S. inermis.* From the known distribution of the two species, *S. mercatoris* is more likely *S. inermis.* Delsman's brief description does not include adequate treatment of the features that distinguish *S. calcarata* and *S. inermis.*

Scorpaena agassizi Goode & Bean
Figs. 11c and 12a; Tables 1-13

Scorpaena agassizii Goode & Bean, 1896: 247-248, Pl. 67, Fig. 243 (type locality in error [see "Remarks" section]).—Jordan & Evermann, 1896: 433 (compiled).—Jordan & Evermann, 1898: 1840-41 (compiled).—Evermann & Marsh, 1900: 273 (name only in key).—Barbour, 1905: 129 (Challenger Bank, Bermuda).—Bean, 1906: 80 (Bermuda, S of Castle Inlet).—Longley *in* Longley & Hildebrand, 1941: 159-160 (Tortugas, Florida; color; habitat).—Gunter, 1948: 157 (off NW Florida).—Lowe, 1962: 696 (British Guiana).—Cervigón, 1963: 127-128 (off Delta de Orinoco, Venezuela).

Scorpaena agassizi, Jordan, Evermann & Clark, 1930: 371 (compiled).—Beebe & Tee-Van, 1933: 182, Fig. (compiled description, figure poor).—Ginsburg, 1953: 71-73 (description good; specimens from North Carolina, Florida, and same station as type [see "Remarks"]).—Briggs, 1958: 294 (compiled range).

Material examined.—NORTH CAROLINA: USNM 152042 (3, 89-102) ALBATROSS III sta. 31-B, Jan.-Feb., 1950.—USNM 101545 (1, 89) Lat. 34°39′30″ N, Long. 75°35′30″W, in 87 fms., ALBATROSS sta. 2600, 18 Oct. 1885.—USNM 91430 (10, 84-112) off Cape Fear in 116 fms., ALBATROSS.

GEORGIA: USNM 185337 (1, 133) Lat. 31°29′N, Long. 79°33′W, in 60 fms., COMBAT sta. 512, 30 Oct. 1957.—UMML 7442 (1, 99) Lat. 32°32′N, Long. 78°40′W, in 40/50 fms., SILVER BAY sta. 1393, 26 Oct. 1959.

FLORIDA; EAST COAST: USNM 157549 (8, 102-116) off Cape San Blas, Lat. 28°48′N, Long. 85°40′W, in 104 fms., OREGON sta. 277, 23 Feb. 1951.—USNM 161359 (3, 23-28) off Palm Beach, Thompson and McGinty.—UMML 4309 (3, 54-93) Lat. 26°12′N, Long. 80°02′W, in 75-85 fms., PELICAN sta. 16, 25 March 1956.

FLORIDA KEYS: USNM 74093 (1, 42) Sand Key, J. B. Henderson, Jr.—USNM 72980 (1, 38) off Cape Florida in 50 fms., FISH HAWK sta. 7516, 30 March 1903.—UMML 10127 (4, 63-88) Monroe County, 5 mi. E of Alligator Reef Light in 50 fms., CRR-F-317, 28 Aug. 1961.—UMML 10248 (6, 31-71) Monroe County, 4 mi. SE of Islamorada in 40 fms., DdeS 360, 25 March 1961.—UMML 1540 (1, 65) Monroe County, off American Shoal in 100-125 fms., Burry, summer 1949.—USNM 131612 (7, 20-35) Lat. 24°25′45″N, Long. 81°46′45″W, in 45 fms., ALBATROSS sta. 2317, 15 Jan. 1885.

FLORIDA; TORTUGAS: USNM 144570 (6, 48-98) W. H. Longley.— USNM 117128 (3, 66-86) W. H. Longley.—USNM 161359 (3, 23-28) S of Tortugas in 60 fms., W. H. Longley.—USNM 117126 (3, 75-127) S of Tortugas in 60 fms., W. H. Longley.—USNM 117127 (3, 65-110) W. H. Longley.

FLORIDA; WEST COAST: UMML 12373 (3, 75-125) Lat. 27°45′N, Long. 84°27′W, in 50 fms., OREGON sta. 4084, 4 Dec. 1962.—USNM 157696 (2, 96-104) Lat. 30°03′N, Long. 86°56′W, in 60 fms., OREGON sta. 331, 4 May 1951.—USNM 188117 (4, 39-87) Lat. 25°13′N, Long. 83°55′W, in 65 fms., OREGON sta. 1024, 19 April 1954.—USNM 188161 (1, 63) Lat. 24°59′N, Long. 83°35′W, in 39 fms., OREGON sta. 1022, 19 April 1954.—USNM 188114 (4, 34-48) Lat. 27°36′N, Long. 84°26′W, in 58 fms., OREGON sta. 938, 18 March 1954.—CNHM 45598 (1, 158) Lat. 28°44′N, Long. 85°01′W, in 25-30 fms., OREGON sta. 727-728, 16 Dec. 1952.—USNM 155404 (1, 89) off Santa Rosa Is., Lat. 29°44′30″N, Long. 86°34′30″W, in 65 fms., PELICAN sta. 143-4, 22 July 1952.

MISSISSIPPI: USNM 157550 (1, 86) Lat. 29°38′N, Long. 89°16′05″W, in 112 fms., 25 Feb. 1951.

NICARAGUA: UMML 2715 (2, 108-120) Lat. 16°38′N, Long. 81°39′W, in 150 fms., OREGON sta. 1879, 22 Aug. 1957.—CNHM 66436 (11, 72-116) Lat. 16°40′N, Long. 81°47′W, in 100 fms., OREGON sta. 1877, 22 Aug. 1957.

HONDURAS: USNM 188163 (1, 126) Lat. 14°11′N, Long. 81°59′W, in 100 fms., OREGON sta. 3576, 21 May 1962.

PANAMA: USNM 188160 (3, 53-66) Lat. 12°32′N, Long. 82°25′W, in 85 fms., OREGON sta. 3577, 23 May 1962.

VENEZUELA: The following specimens collected by the OREGON were identified but no measurements or counts were taken.—UMML 13344 (15 specimens) Lat. 12°33′N, Long. 71°09′W, in 40 fms., sta. 4391, 25 Sept. 1963.—UMML 13346 (18) Lat. 12°32′N, Long. 71°05′W, in 46 fms., sta. 4392, 25 Sept. 1963.—UMML 13352 (2) Lat. 12°37′N, Long. 71°04′W, in 46 fms., sta. 4393, 25 Sept. 1963.—UMML 13353 (2) Lat. 12°19′N, Long. 70°48′W, in 45 fms., sta. 4401, 26 Sept. 1963.—UMML 13357 (2) Lat. 10°25′N, Long. 65°42′W, in 50 fms., sta. 4467, 17 Oct. 1963.—UMML 13361 (3) Lat. 11° 14′N, Long. 64° 13′W, in 30 fms., 22 Oct. 1963.—Uncataloged: sta. 4466 (2) Lat. 10°44′N, Long. 66°09′W, in 40 fms., 17 Oct. 1963.

BRITISH GUIANA: (The abbreviation "sta." refers to OREGON stations.) USNM 188113 (2, 68-105) and CNHM 66434 (1, 47) Lat. 09°22′N, Long. 59°43′W, in 50 fms., sta. 2221, 28 Aug. 1958.—USNM 185298 (1, 118) Lat. 09°03′N, Long. 59°00′W, in 75 fms., sta. 1993, 4 Nov. 1957.—CNHM 66425 (4, 71-90) Lat. 08°32′N, Long. 58°42′W, in 45/48 fms., sta. 2231, 29 Aug. 1958.—CNHM 66433 (14, 56-120) Lat. 08°31′N, Long. 58°37′W, in 48/46 fms., sta. 2232, 29 Aug. 1958.—USNM 188115 (9, 33-45) Lat. 08°12′N, Long. 58°25′W, in 35/34 fms., sta. 2345, 19 Sept. 1958.—CNHM 66426 (2, 77-108) Lat. 08°12′N, Long. 58°21′W, in 31/39 fms., sta. 2244, 31 Aug. 1958.—CNHM 66430 (2, 82-107) Lat. 08°10′N, Long. 58°18′W, in 33/35 fms., sta. 2344, 19 Sept. 1958.—CNHM 66424 (1, 89) Lat. 08°04′N,

Long. 57°50'W, in 40 fms., sta. 1992, 5 Nov. 1957.—USNM 184939 (1, 47) and CNHM 66403 (1, 47) Lat. 07°55'N, Long. 57°48'W, in 34 fms., sta. 1997, 5 Nov. 1957.—CNHM 66427 (1, 81) and CNHM 66432 (2, 100-105) Lat. 07°55'N, Long. 57°27'W, in 44/37 fms., sta. 2247, 31 Aug. 1958.—USNM 184959 (1, 107) Lat. 07°55'N, Long. 57°38'W, in 34 fms., sta. 1998, 5 Nov. 1957.—USNM 185344 (7, 83-109) and CNHM 66435 (8, 77-101) Lat. 07°55'N, Long. 57°30'W, in 45 fms., sta. 2000, 5 Nov. 1957.—CNHM 66428 (3, 34-90) Lat. 07°45'N, Long. 57°34'W, in 35/30 fms., sta. 2248, 31 Aug. 1958.—CNHM 66429 (2, 50-86) Lat. 07°40'N, Long. 57°34'W, in 30/27 fms., sta. 2249, 31 Aug. 1958.—CNHM 66401 (4, 28-45) and CNHM 66431 (5, 74-120) Lat. 07°20'N, Long. 56°49'W, in 33 fms., sta. 2261, 1 Sept. 1958.—UMML 3987 (1, 22) Lat. 07°18'N, Long. 56°49'W, in 30/33 fms., sta. 2262, 1 Sept. 1958.

SURINAM (DUTCH GUIANA): USNM 185278 (1, 102) and USNM 185209 (2, 28-36) Lat. 06°52'N, Long. 54°53'W, in 28 fms., COQUETTE sta. 33, 12 May 1957.—USNM 185193 (1, 45) Lat. 06°50'N, Long. 55°22'W, in 29 fms., COQUETTE sta. 334, 20 July 1957.—USNM 185287 (1, 117) Lat. 06°49'-47'N, Long. 55°21'-18'W, in 29/27 fms., COQUETTE sta. 337, 21 July 1957.

FRENCH GUIANA: USNM 185029 (1, 75) and CNHM 66402 (1, 88) Lat. 06°39'N, Long. 52°21'W, in 50 fms., OREGON sta. 2032, 10 Nov. 1957.—UMML 12372 (1, 108) Lat. 05°26'N, Long. 51°25'W, in 40 fms., OREGON sta. 4200, 23 Feb. 1963.

Not included above: USNM 153583 (1, 107) from same station as type [see "Remarks"].

Meristic formula.—Dorsal 11+1, 9 (one with 10+1, 9; one with 11+1, 8); anal 3, 5; pectoral rays 18-21, usually 20 (one with 20 on left and 15 on right); pored lateral-line scales 23-25+0-1; vertical scale rows 43-54, usually 45-48; gill rakers 4-6+8-11.

Description.—Measurements and counts are summarized in Tables 1-13.

Preorbital bone with 2 free spinous points, posterior spine long and curved toward posterior in larger specimens. Suborbital ridge with 3 spines, occasionally 4. Supplemental preopercular spine present; first preopercular spine reaching about half the distance from its base to opercle margin; second smaller than third, often minute. Cleithral spine small or absent. Sphenotic spine usually double, sometimes single. Frontal, nasal, preocular, supraocular, postocular, anterior and posterior parietal, upper and lower posttemporal, supracleithral, postorbital, and opercular spines also present and usually well developed.

Occipital pit moderate. Larger specimens with first pectoral ray unbranched, next 6-9 branched, and lower 10-14 unbranched. Pectoral fin reaching to over posterior end of anal-fin base in adults. Eye relatively large and snout relatively short yielding a high snout into orbit value, 1.5-2.2. Interorbital width into orbit diameter 2-2.5 times. Second anal spine equal or shorter than third, third extending beyond second when depressed.

The color pattern of adults is shown in Figure 11c. Preserved specimens

uniformly pale colored or nearly so. Upper part of body and head brownish in recently preserved specimens; pigment often more concentrated behind head in a poorly defined spot 4-6 scale rows in diameter. Pelvic fin dusky or with distal margin dusky, often with no dark pigment. Pectoral fin dusky or clear.

Juveniles.—The color pattern of juveniles is illustrated in Figure 12a. Color similar to adults, but usually with pelvic fins uniformly dusky, and with some dark pigment on soft dorsal and anal fin. Occipital pit moderate in juveniles. Branching of pectoral rays begins at about 30-35 mm in standard length. Pectoral fin shorter in juvenile specimens than in adults, reaching over about the second or third anal spine in 30-mm specimens to over the posterior end of anal base in adults.

Comparisons.—The long pectoral fin, large eye in relation to snout length, a curved and long posterior preorbital spine in adults, and body coloration are sufficient to distinguish *S. agassizi* from other western Atlantic species. This species occurs in waters of a greater depth than inhabited by other species in the genus in the western Atlantic Ocean.

Distribution.—*S. agassizi* is an offshore species reported from depths between 25 and 150 fathoms. The species occurs from North Carolina south to Florida, in the Gulf of Mexico, the Caribbean Sea, and off the Atlantic coast of South America. It has been reported from off Bermuda.

Remarks.—This species has recently been reported from the Caribbean (Cervigón, 1963, Venezuela) and the Atlantic coast of South America (Lowe, 1962, British Guiana). Specimens examined in this study enlarge the range to Honduras, Nicaragua, Panama, Surinam and French Guiana.

The type locality of *S. agassizi* has been incorrectly recorded in the literature. Goode and Bean (1896: 247) report the type locality as BLAKE station CCLIX, N. Lat. 23°13′, W. Long. 39°10′. Subsequent authors have used this same locality. As pointed out by Eschmeyer (in press) the Roman numerals given by Goode and Bean (1886 and 1896) for BLAKE stations below 301 do not represent BLAKE stations; however, the locality data accompanying the Roman numerals may be assumed to be correct in most cases. For the type of *S. agassizi* the locality data is also incorrect, at least in part, and the longitude should read 89°10′W instead of 39°10′W. The correct BLAKE station number is 36. The locality data was entered correctly in the Museum of Comparative Zoology Catalog (MCZ 27996).

One specimen in the National Museum (USNM 153583) was originally with the type but was not used in the original description. It is also from BLAKE station 36, Lat. 23°13′N, Long. 89°10′W, in 84 fathoms.

Scorpaena microlepis Gunter

Scorpaena microlepis Gunter, 1948: 162, 164-165, Pl. 2 (type locality: off Englewood, Florida; holotype UMMZ 110161).—Ginsburg, 1953: 95-97 redescribed from holotype).—Briggs, 1958: 294 (compiled).

Remarks.—This species is known only from the type specimen. The type description and figure (Gunter, 1948: 162, Pl. 2) or Ginsburg's description (1953: 95-97) may be consulted. *S. microlepis* is easily distinguished from the other species in the genus in the western Atlantic Ocean by the characters presented in the key. *S. porcus,* an eastern Atlantic and Mediterranean species of doubtful occurrence in the western Atlantic, agrees with *S. microlepis* in having small scales; the two are contrasted in the key.

Scorpaena porcus Linnaeus

Citations to this species and an adequate description may be found in Fowler (1936: 919-920), and Cadenat (1945: 543-545).

Material examined.—USNM 8051 (one specimen in poor condition, about 140 mm in standard length), Jamaica, collected by C. B. Adams. Also, 10 specimens, ranging from 39 mm to 100 mm in standard length, collected by Walter Starck II in the Mediterranean Sea in the Fall of 1960 from the following stations: WAS-Med-1 (1 specimen), WAS-Med-3 (2), WAS-Med-5 (3), WAS-Med-7 (1), WAS-Med-11 (3). With the exception of one specimen (UMML 8509) all are uncatalogued specimens in the fish collection of the University of Miami Marine Laboratory.

Remarks.—The specimen from Jamaica is apparently *S. porcus,* a species occurring in the Mediterranean and eastern Atlantic. *S. porcus* differs markedly from western Atlantic species of *Scorpaena* in having smaller scales than all species except *S. microlepis,* and in having ctenoid scales on the body. Western Atlantic species of *Scorpaena* are characterized by having cycloid scales.

The specimen from Jamaica was recorded in the catalog at the U.S. National Museum (8051) as *S. grandicornis.* Other specimens recorded in the catalog at about the same time were also listed as from Jamaica, collected by Adams. There are no accession papers available for the specimen. Perhaps a mistake was made in transcribing the locality data when the specimen was cataloged, or the labels may have become mixed.

In view of the lack of other specimens of *S. porcus* from the western Atlantic Ocean, occurrence of this species in the western Atlantic Ocean can not be confirmed. Cuvier (in Cuvier & Valenciennes, 1829: 303) reported receiving from Milbert a specimen of *S porcus* from New York. Cadenat (1945: 545) examined that specimen in the Paris Museum and concluded that the data were in error. Jordan & Evermann (1898: 1839-40) also suspected an error. Perhaps the specimen was sent from New York but not collected in the western Atlantic.

SUMARIO

RASCACIOS DEL GENERO *Scorpaena* DEL ATLÁNTICO OCCIDENTAL, INCLUYENDO DESCRIPCIONES DE CUATRO NUEVAS ESPECIES

Se tratan las especies del género *Scorpaena* del Atlántico Occidental. Para cada especie se dan: la sinonimia, descripciones de los adultos y de los jóvenes y la distribución. Se da a conocer una clave en la que se presentan un adulto y un joven de la mayoría de las especies. Se incluyen 16 especies, una de las cuales es de dudosa ocurrencia en el Atlántico Occidental. Cuatro nuevas especies son descritas y *Scorpaena isthmensis* Meek y Hildebrand es restablecida.

La distribución conocida de las especies es aumentada por colecciones recientes. Algunas se presentan desde las Carolinas hasta Brasil, mientras otras parecen restringidas a ciertas áreas dentro de esta región. Otras especies aparentemente prefieren agua clara y son más abundantes en las Bahamas e islas del Caribe Oriental; algunas son más comunes en las inmediaciones de las masas de tierra continentales. La distribución geográfica de cada especie se sumariza en la siguiente Tabla. Se enumeran las áreas para especies conocidas sólo en algunas localidades, mientras se generaliza la distribución de aquellas conocidas en muchas áreas. Los nuevos reportes son marcados con un asterisco (*).

SUMARIO DE LA DISTRIBUCIÓN DE LAS ESPECIES DE *Scorpaena* EN EL ATLÁNTICO OCCIDENTAL

Especie	Distribución	Observaciones
S. petrosa, n. sp.	Frente a Brasil entre Lat. 01° 24′ S y 02° 10′ S en 36-37 brazas.	Los 12 ejemplares fueron cogidos dragando; el habitat puede ser el fondo duro, fuera de la costa.
S. melasma, n. sp.	Frente a Brasil entre Lat. 01° 59′ S y 02° 10′ S en 36 y 40 brazas.	Ambos ejemplares fueron cogidos dragando; el habitat puede ser el fondo duro fuera de la costa.
S. brachyptera, n. sp.	Frente a Venezuela entre Long. 66° 09′ O y 71° 10′ O en 40-65 brazas.	Puede que esté limitada a áreas fuera de la costa.
S. elachys, n. sp	Puerto Rico, la República Dominicana y la Florida en 25/50, 40, 48 y 50 brazas.	Todos los ejemplares fueron cogidos dragando; puede que esté limitada a áreas fuera de la costa.
S. microlepis	Frente a Englewood, Florida; profundidad desconocida.	De ésta solo se conoce la especie tipo.

S. inermis	Florida, Bahamas*, Cuba, Martinica, Puerto Rico, Indias Occidentales Holandesas, Isla de Cozumel*, Jamaica*, Islas Vírgenes*, e Islas Caimán, desde la costa hasta 40 brazas.	Aparentemente prefiere aguas claras.
S. agassizi	Desde Carolina del Norte hasta la Florida, Bermuda, por todo el Golfo de México, Honduras*, Nicaragua*, Panamá*, Venezuela, Guayana Británica, Surinam*, y Guayana Francesa, desde 25-150 brazas.	Es la especie de más afuera de la costa; aparentemente común en fondos blandos del declive superior; localidad del tipo rectificada.
S. dispar	Florida, Golfo de México, Yucatán, Venezuela*, y Brasil*, desde 20-65 brazas.	Especie de mar afuera.
S. calcarata	Desde Carolina del Norte a la Florida, por todo el Golfo de México, Islas Vírgenes hasta Venezuela, Guayana Francesa* y Brasil*, desde la costa hasta 50 brazas.	No es corriente cerca de la costa; excepto por las Islas Vírgenes, es sólo conocida a lo largo de los continentes; común en los fondos camaroneros del Golfo de México.
S. albifimbria	Puerto Rico, Florida*, Islas Vírgenes*, Haití*, Curazao* y las Bahamas*, desde la costa hasta 17 brazas.	La variante de Ginsburg de la Florida es referida a *S. elachys;* los ejemplares de Metzelaar de las Indias Occidentales Holandesas son referidos a *S. inermis.*
S. brasiliensis	Común desde Virginia hasta Brasil, incluyendo el Golfo de México y el Caribe, desde la costa hasta 50 brazas.	Una forma común encontrada en aguas poco profundas de puertos y bahías y se extiende hasta fuera de la costa.
S. plumieri	Pacífico Oriental, Sta. Elena y Ascensión, y el Atlántico Occidental. Desde (New York) Carolinas hasta Río de Janeiro, incluyendo Bermuda, Golfo de México, el Caribe oriental y occidental, desde la costa hasta 30 brazas.	Encontrada en gran variedad de lugares, común alrededor de áreas rocosas.

S. grandicornis	En la mayoría de las áreas del Atlántico Occidental incluyendo Bermuda, desde la Florida a Brasil; no en el Golfo de México Septentrional; en aguas bajas desde la costa hasta 10 brazas.	Especie de aguas interiores comunmente encontrada en áreas herbáceas de los canales y bahías. Más común en Islas del Caribe Oriental.
S. isthmensis	Panamá, Venezuela*, Indias Occidentales Holandesas*, Guayanas* y Brasil* desde la costa hasta 60 brazas.	Esta especie es restablecida.
S. bergi	(New York) Florida hasta América del Sur incluyendo las Islas Caimán*, Cozumel, las Bahamas*, Puerto Rico, Haiti*, Antigua, Indias Occidentales Holandesas y Brasil.	Aparentemente prefiere agua clara; los reportes de Panamá están basados en el tipo de *S. isthmensis*.

TABLE 1

FREQUENCY DISTRIBUTIONS OF NUMBER OF DORSAL RAYS IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	Dorsal spines						Dorsal soft rays[1]				
	8	9	10	11	12	13	7	8	9	10	11
S. petricola	—	—	—	—	12*	—	—	—	12*	—	—
S. melasma	—	—	—	—	2*	—	—	—	2*	—	—
S. brachyptera	—	—	—	—	5*	—	—	5*	—	—	—
S. elachys	—	—	—	—	4*	—	—	1*	3	—	—
S. grandicornis	—	1	—	—	37	—	—	—	38	—	—
S. brasiliensis[2]	—	—	—	—	32	3	—	1	32	—	—
S. bergi	—	—	—	—	21	—	—	—	21	—	—
S. isthmensis	1†	—	—	2†	48*	—	—	—	50*	—	1
S. albifimbria	—	—	—	—	9*	—	—	2	7*	—	—
S. inermis	—	—	—	—	16	—	3	13	—	—	—
S. calcarata	—	—	—	—	53	—	1	3	48	1	—
S. dispar	—	—	—	—	43	—	—	2	41	—	—
S. plumieri	—	—	—	—	28	—	—	—	28	—	—
S. agassizi	—	—	—	1	50	—	—	1	50	—	—

[1]Last element split to base.
[2]One specimen with 13 spines, scaled over area, 4 soft rays.
†Scaled over area in place of some dorsal spines.
*Includes holotype.

TABLE 2

FREQUENCY DISTRIBUTIONS OF NUMBER OF RAYS IN LEFT PECTORAL FIN IN WESTERN ATLANTIC SPECIES OF *Scorpaena*[1]

	14	15	16	17	18	19	20	21
S. petricola	— —	— —	— —	— 2	— 10*	— —	— —	— —
S. melasma	— —	— —	— —	— —	— —	— —	— —	— 2*
S. brachyptera	— —	— —	— —	— —	— —	— 1	— 4*	— —
S. elachys	— —	— —	— 1‡	— 3*	— —	— —	— —	— —
S. grandicornis	— —	— —	— —	(4)—	(56)20	(7) 4	— —	— —
S. brasiliensis	— —	— —	— 1†	(1)—	(13) 3	(95)27	(19)—	— —
S. bergi	— —	— —	(5) 1	(32)12	— —	— —	— —	— —
S. isthmensis	— —	— —	— 1	— 2	(1)§44*	— 3	— —	— —
S. albifimbria	— —	— —	— —	— —	— —	(1)*4*	— 5	— —
S. inermis	— —	— —	— —	— —	— —	(4) 1	(13) 9	(1)—
S. calcarata	— —	— —	— —	— —	(1)—	(23) 8	(152)19	(29) 3
S. dispar	— 1†	— —	— —	(2)11	(9)21	(4) 7	— —	— —
S. plumieri	— —	— —	— —	— —	(2)—	(38) 7	(26)18	(3) 2
S. agassizi	— —	— —	— —	— —	— 1	(10) 2	(84)36	(10) 3

[1]Counts in parentheses are from Ginsburg, 1953: 15.
*Includes holotype.
§Included holotype of *S. isthmensis* with *S. bergi*.
†Eighteen rays on right side.
‡Seventeen rays on right side.

TABLE 3

FREQUENCY DISTRIBUTIONS OF HEAD LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*[1]

	39	40	41	42	43	44	45	46	47	48	49	50	51	52
S. petricola	—	—	—	—	—	—	—	3	7	2*	—	—	—	—
S. melasma	—	—	—	—	—	—	—	—	—	—	1*	—	1	—
S. brachyptera	—	—	—	—	—	—	—	—	1*	1	2	—	1	—
S. elachys	—	—	—	—	—	—	—	—	—	—	1*	2	1	—
S. grandicornis	—	2	4	11	3	—	—	—	—	—	—	—	—	—
S. brasiliensis	1	—	4	9	4	8	2	2	1	—	—	—	—	—
S. bergi	1	—	—	2	3	1	3	3	—	—	—	—	—	—
S. isthmensis	—	—	2	3	1	16	13	5	2	1	—	—	—	—
S. albifimbria	—	—	—	—	—	—	—	—	1	2*	2	1	1	1
S. inermis	—	—	—	—	—	—	—	1	3	3	1	1	—	—
S. calcarata	—	1	1	3	2	16	8	8	—	—	—	—	—	—
S. dispar	—	—	—	—	3	8	8	13	4	2	—	—	—	—
S. plumieri	—	—	—	—	2	1	8	7	1	—	—	—	—	—
S. agassizi	—	—	—	—	1	9	8	10	5	7	2	—	—	—

*Includes holotype.
[1]Smaller specimens usually average a larger head length.

TABLE 4

FREQUENCY DISTRIBUTIONS OF UPPER JAW LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	18	19	20	21	22	23	24	25	26	27
S. petricola	—	—	—	—	—	1	4	3	2	2
S. melasma	—	—	—	—	—	—	1*	—	1	—
S. brachyptera	—	—	—	—	—	—	2*	2	1	—
S. elachys	—	—	—	—	—	—	1	—	—	3*
S. grandicornis	1	4	6	5	1	—	—	—	—	—
S. brasiliensis	—	—	4	7	5	4	1	—	—	—
S. bergi	—	1	1	2	7	—	2	—	—	—
S. isthmensis	—	—	10	17*	8	4	3	—	—	—
S. albifimbria	—	—	—	—	—	—	1	2	4*	—
S. inermis	—	—	—	—	—	—	2	5	3	—
S. calcarata	—	1	2	5	10	4	—	—	—	—
S. dispar	—	—	2	7	11	4	1	—	—	—
S. plumieri	—	—	—	4	7	3	1	1	—	—
S. agassizi	—	—	1	4	18	5	5	1	—	—

*Includes holotype.

TABLE 5

FREQUENCY DISTRIBUTIONS OF ORBIT DIAMETER EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	8	9	10	11	12	13	14	15	16	17	18	19	20
S. petricola	—	—	—	—	1	2*	2	6	—	1	—	—	—
S. melasma	—	—	—	—	—	—	1	1*	—	—	—	—	—
S. brachyptera	—	—	—	—	—	1*	1	3	—	—	—	—	—
S. elachys	—	—	—	—	—	—	1*	2	1	—	—	—	—
S. grandicornis	—	—	2	5	4	1	—	—	—	—	—	—	—
S. brasiliensis	—	—	1	4	12	3	8	—	—	—	—	—	—
S. bergi	—	—	—	—	3	2	6	—	1	—	—	—	—
S. isthmensis	—	—	1	10	21*	9	1	—	—	—	—	—	—
S. albifimbria	—	—	—	—	—	—	—	2	3*	1	2	—	—
S. inermis	—	—	—	—	—	—	3	2	3	1	1	—	—
S. calcarata	—	—	—	—	5	12	13	44	1	—	—	—	—
S. dispar	—	—	—	1	11	8	6	—	—	—	—	—	—
S. plumieri	3	3	5	3	—	—	—	—	—	—	—	—	—
S. agassizi	—	—	—	—	—	—	1	4	27	8	12	2	1

*Includes holotype.

TABLE 6

FREQUENCY DISTRIBUTIONS OF SNOUT LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	8	9	10	11	12	13	14	15
S. petricola	—	—	1	3	6	2*	—	—
S. melasma	—	—	1*	—	1	—	—	—
S. brachyptera	—	—	1	2	2*	—	—	—
S. elachys	—	—	—	1	2*	1	—	—
S. grandicornis	1	6	5	—	—	—	—	—
S. brasiliensis	—	5	18	5	—	—	—	—
S. bergi	1	2	6	2	1	1	—	—
S. isthmensis	—	2	15	18	7*	1	—	—
S. albifimbria	—	—	3	2*	2	1	—	—
S. inermis	—	—	2	1	7	—	—	—
S. calcarata	—	1	18	14	2	—	—	—
S. dispar	—	—	—	6	16	2	1	1
S. plumieri	—	—	—	1	11	5	1	—
S. agassizi	3	34	18	—	—	—	—	—

*Includes holotype.

TABLE 7

FREQUENCY DISTRIBUTIONS OF THE LENGTH OF THE THIRD DORSAL SPINE EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	11	12	13	14	15	16	17	18	19	20	21	22	23	24
S. petricola	—	—	—	2	3*	4	2	—	—	—	—	—	—	—
S. melasma	—	—	—	—	—	1*	1	—	—	—	—	—	—	—
S. brachyptera	1*	—	1	1	2	—	—	—	—	—	—	—	—	—
S. elachys	—	—	—	—	1	1*	1	1	—	—	—	—	—	—
S. grandicornis	—	—	—	—	—	—	—	1	1	3	1	2	—	—
S. brasiliensis	—	—	—	—	2	3	3	4	—	2	—	—	—	—
S. bergi	—	—	—	—	—	1	8	—	—	—	—	—	—	—
S. isthmensis	—	—	—	—	1	6*	1	1	—	—	—	—	—	—
S. albifimbria	—	—	—	—	—	3	3	—	—	—	—	—	—	—
S. inermis	—	2	1	2	1	—	—	—	—	—	—	—	—	—
S. calcarata	—	3	5	5	2	1	—	—	—	—	—	—	—	—
S. dispar	—	—	—	—	—	2	—	3	2	2	3	1	1	2
S. plumieri	—	—	1	1	3	4	1	—	—	—	—	—	—	—
S. agassizi	—	—	—	—	1	2	1	1	—	1	—	1	—	—

*Includes holotype.

TABLE 8

FREQUENCY DISTRIBUTIONS OF THE RATIO ORBIT DIAMETER DIVIDED BY SNOUT LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
S. petricola	—	—	—	—	2*	3	1	3	2	1	—	—	—	—	—	—	—
S. melasma	—	—	—	—	—	—	1	—	1*	—	—	—	—	—	—	—	—
S. brachyptera	—	—	—	—	—	1*	—	2	2	—	—	—	—	—	—	—	—
S. elachys	—	—	—	—	—	—	2*	2	—	—	—	—	—	—	—	—	—
S. grandicornis	—	—	—	—	—	2	6	2	2	—	—	—	—	—	—	—	—
S. brasiliensis	—	—	—	—	1	4	11	4	7	1	—	—	—	—	—	—	—
S. bergi	—	—	—	—	1	2	2	4	2	2	—	—	—	—	—	—	—
S. isthmensis	—	—	—	4	9*	12	11	3	2	1	—	—	—	—	—	—	—
S. albifimbria	—	—	—	—	—	—	1	—	3	3*	—	1	—	—	—	—	—
S. inermis	—	—	—	—	—	1	2	3	1	1	2	—	—	—	—	—	—
S. calcarata	—	—	—	—	—	4	14	3	9	5	—	—	—	—	—	—	—
S. dispar	—	—	2	4	6	8	7	2	—	—	—	—	—	—	—	—	—
S. plumieri	1	5	4	8	—	—	—	—	—	—	—	—	—	—	—	—	—
S. agassizi	—	—	—	—	—	—	—	—	—	2	5	10	20	8	5	2	2

*Includes holotype.

TABLE 9

FREQUENCY DISTRIBUTIONS OF PECTORAL-FIN LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*[1]

	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
S. petricola	—	—	—	2	1	2	3	3*	1	—	—	—	—	—	—	—	—	—	—	—	—	—
S. melasma	—	—	—	—	—	—	—	—	—	1	—	—	1*	—	—	—	—	—	—	—	—	—
S. brachyptera	—	2*	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S. elachys	—	—	—	—	—	1	1*	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—
S. grandicornis	—	—	—	—	—	1	—	1	2	4	4	3	1	2	—	—	—	—	—	—	—	—
S. brasiliensis	—	—	—	—	—	1	—	1	3	9	4	1	6	1	1	1	—	—	—	—	—	—
S. bergi	2	1	1	2	2	2	—	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—
S. isthmensis	—	—	—	—	—	5	3	14	6*	9	1	3	—	—	—	—	—	—	—	—	—	—
S. albifimbria	—	—	—	—	2	3	2*	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S. inermis	—	—	—	—	1	1	2	1	2	3	—	—	—	—	—	—	—	—	—	—	—	—
S. calcarata	—	—	—	1	1	3	9	9	3	6	3	1	—	1	—	—	—	—	—	—	—	—
S. dispar	—	—	—	—	1	4	4	8	4	2	2	—	—	—	—	—	—	—	—	—	—	—
S. plumieri	—	—	—	2	1	5	1	2	—	2	2	—	—	1	—	—	—	—	—	—	—	—
S. agassizi	—	—	—	—	—	—	—	—	—	—	2	—	4	4	10	8	2	4	3	2	3	2

*Includes holotype.
[1]Larger specimens tend to average a proportionally longer pectoral-fin length.

TABLE 10

FREQUENCY DISTRIBUTIONS OF PREDORSAL-FIN LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
S. petricola	—	—	—	1	1	2*	—	2	4	2	—	—	—	—	—	—	—
S. melasma	—	—	—	—	—	—	—	—	1*	1	—	—	—	—	—	—	—
S. brachyptera	—	—	—	—	—	—	—	—	—	1	1	3*	—	—	—	—	—
S. elachys	—	—	—	—	—	—	—	—	1	1*	—	2	—	—	—	—	—
S. grandicornis	—	3	4	1	—	2	—	—	—	—	—	—	—	—	—	—	—
S. brasiliensis	—	—	2	7	5	6	4	4	—	—	—	—	—	—	—	—	—
S. bergi	—	2	2	5	3	—	1	—	—	—	—	—	—	—	—	—	—
S. isthmensis	1	5	2	14*	13	3	4	—	—	—	—	—	—	—	—	—	—
S. albifimbria	—	—	—	—	—	—	—	—	—	—	1	2	2	1	—	2	—
S. inermis	—	—	—	—	—	—	—	3	1	3	—	3	—	—	1	—	—
S. calcarata	—	1	—	2	5	8	7	4	—	—	—	—	—	—	—	—	—
S. dispar	—	—	—	3	2	8	5	5	2	1	—	—	—	—	—	—	—
S. plumieri	—	—	—	—	1	2	2	8	—	—	1	1	—	—	—	—	—
S. agassizi	—	—	—	—	1	1	3	2	4	3	1	2	—	—	—	—	—

*Includes holotype.

TABLE 11

FREQUENCY DISTRIBUTIONS OF INTERORBITAL WIDTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	3	4	5	6	7	8	9	10	11
S. petricola	—	7	4*	1	—	—	—	—	—
S. melasma	2*	—	—	—	—	—	—	—	—
S. brachyptera	—	—	1	2	2*	—	—	—	—
S. elachys	—	—	4*	—	—	—	—	—	—
S. grandicornis	—	—	—	5	4	1	—	—	—
S. brasiliensis	—	1	3	11	6	—	—	—	—
S. bergi	—	—	6	7	—	—	—	—	—
S. isthmensis	—	3	35	4	—	—	—	—	—
S. albifimbria	—	—	—	5*	2	—	—	—	—
S. inermis	4	3	—	—	—	—	—	—	—
S. calcarata	—	7	16	4	—	—	—	—	—
S. dispar	—	—	13	12	—	—	—	—	—
S. plumieri	—	—	—	—	—	2	8	5	—
S. agassizi	—	—	—	—	5	6	2	—	1

*Includes holotype.

TABLE 12

FREQUENCY DISTRIBUTIONS OF BODY DEPTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	31	32	33	34	35	36	37	38	39	40	41	42	43	44
S. petricola	—	—	2	—	3	4*	1	2	—	—	—	—	—	—
S. melasma	—	—	—	1*	—	—	—	1	—	—	—	—	—	—
S. brachyptera	—	—	—	—	—	—	—	1	—	1	3*	—	—	—
S. elachys	—	—	—	—	—	—	—	1	1	1*	1	—	—	—
S. grandicornis	—	—	—	—	—	—	—	1	4	4	2	—	—	—
S. brasiliensis	—	1	1	2	3	8	5	6	2	1	—	—	—	—
S. bergi	—	—	—	—	2	3	4	1	1	1	—	—	—	—
S. isthmensis	3	5	10	10	8*	4	1	1	—	—	—	—	—	—
S. albifimbria	—	—	—	—	—	—	—	—	2	3	—	1	1	1*
S. inermis	2	1	2	2	1	2	1	—	—	—	—	—	—	—
S. calcarata	—	3	3	4	8	9	3	1	—	—	—	—	—	—
S. dispar	—	5	5	8	9	7	2	2	—	—	—	—	—	—
S. plumieri	—	—	—	—	1	4	3	3	4	1	1	1	—	—
S. agassizi	—	—	3	8	7	4	4	4	5	—	—	—	—	—

*Includes holotype.

TABLE 13

FREQUENCY DISTRIBUTIONS OF CAUDAL-FIN LENGTH EXPRESSED AS PERCENTAGE OF STANDARD LENGTH IN WESTERN ATLANTIC SPECIES OF *Scorpaena*

	26	27	28	29	30	31	32	33	34	35	36	37	38
S. petricola	—	1	6*	2	2	1	—	—	—	—	—	—	—
S. melasma	—	—	—	—	1*	—	1	—	—	—	—	—	—
S. brachyptera	—	—	—	1	1	3*	—	—	—	—	—	—	—
S. elachys	—	—	—	—	—	—	—	2	2*	—	—	—	—
S. grandicornis	—	—	—	—	—	—	6	5	5	2	2	—	—
S. brasiliensis	—	—	—	—	3	5	7	4	3	4	2	1	—
S. bergi	—	5	3	3	5	—	—	—	—	—	—	—	—
S. isthmensis	—	—	—	3	9	8	16*	3	4	—	—	—	—
S. albifimbria	—	—	—	2	—	2	2	1*	—	—	—	—	—
S. inermis	—	—	1	2	2	2	4	—	—	—	—	—	—
S. calcarata	—	4	6	8	5	4	2	2	1	—	—	—	—
S. dispar	1	—	—	4	7	9	11	4	3	—	—	—	—
S. plumieri	—	—	1	4	8	5	1	—	—	—	—	—	—
S. agassizi	—	—	—	—	3	4	8	13	11	4	5	—	2

*Includes holotype.

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