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**A REVIEW OF THE ATLANTIC SPECIES OF THE
CLINID FISH GENUS STARKSIA**

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ABSTRACT.—Diagnoses and figures are presented for the eight West Atlantic species of *Starksia* recognized. Two of the eight are described as new, based largely on material from the Bahamas.

This paper is the outgrowth of an attempt to properly place two new species encountered during a survey of the shore fishes of the Bahamas, a program of the Department of Ichthyology and Herpetology at the Academy which is sponsored by Mr. Charles C. G. Chaplin. For the privilege of examining specimens in their care, we wish to thank the following: Wolfgang Klausewitz of the Senckenberg Museum, C. Richard Robins, University of Miami Marine Laboratory, Leonard P. Schultz, Ernest A. Lachner and Daniel M. Cohen, U. S. National Museum, George S. Myers and the late Margaret H. Storey, Natural History Museum of Stanford University, Loren P. Woods, Chicago Natural History Museum, the curator of fishes at the Lunds University Museum, Paul Kähnsbauer of the Vienna Museum. We thank C. Richard Robins for commenting on the manuscript and Harvey R. Bullis, Jr. for making a special effort to obtain for us fresh material of *Starksia hassi*.

In enumerating the segmented rays in the dorsal and anal fins, we count all of the elements, rather than tallying the last two as a single ray. The length of the lower caudal lobe is measured from the mid-base of the fin to the tip of the longest lower caudal ray (with the fin roughly normally ex-

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panded). The diameter of the eye is the dimension of the eyeball. In separating the counts of scales in the arched and straight portions of the lateral line, we at first occasionally experienced difficulty deciding in which group to include the scale at the junction of these two segments (particularly in *ocellata*); it was decided to include it in the posterior, straight series if in that row, regardless of whether its tube were horizontal or nearly vertical.

The following abbreviations of collections are used in listing material examined: ANSP—Academy of Natural Sciences of Philadelphia, CNHM—Chicago Natural History Museum, SMF—Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt am Main, SU—Natural History Museum of Stanford University, UF—University of Florida, UMML—University of Miami Marine Laboratory, USNM—United States National Museum. Collections having field numbers prefixed by VGS are otherwise uncatalogued, and are at the Florida State Board of Conservation's Marine Laboratory in St. Petersburg, Florida.

STARKSIA Jordan and Evermann

Starksia Jordan and Evermann, in Jordan 1896, Proc. California Acad. Sci. (2) 6: 231 (Type: *Labrosomus cremnobates* Gilbert 1890, by original designation).

Brannerella Gilbert 1900, Proc. Washington Acad. Sci., 2: 180 [Type: *Brannerella brasiliensis* Gilbert 1900, by original designation, = *Starksia ocellata* (Steindachner)].

Andracanthus Longley 1927, Carnegie Inst. Washington, Year Book 26: 222 (Type: *Clinus ocellatus* Steindachner 1876, by original designation).

Diagnosis.—A genus of small (to 42 mm. S.L. in Atlantic species; Al-Uthman (1960) gave no sizes for the Pacific forms he discussed) clinid blennies apparently confined to warm waters on the two sides of the Americas. Body scaled. Head naked, as is a triangular wedge above the anterior portion of the arched part of the lateral line. Belly completely scaled, completely naked, or with a few rows of scales just in advance of the anus.

A single simple cirrus present from the rear edge of the anterior nostril, one from the upper surface of each eyeball (except in *atlantica*) and one on either side of the nape. Dentition on jaws consisting of a single row of somewhat enlarged teeth which encloses a patch of smaller teeth anteriorly. Teeth always present on vomer, present or absent on palatines (no species is characterized by the absence of palatine teeth; it is in general the smaller individuals of the smaller species which may lack them). Pores from the circumorbital ossifications either uniserial or paired. Gill membranes broadly united, free from isthmus. No opercular spine. Branchiostegal rays almost invariably 6.

No branched ray in any fin. Membranes behind final dorsal and anal rays attaching to peduncle in advance of the accessory caudal rays. Ventral fin formula I,3, though in Atlantic species (except *hassii*) only the first two segmented rays are obvious; ventral spine short, closely attached to first segmented ray; third ventral ray thin and rather short but readily seen in

hassi, reduced to a minute basal element and only obvious on stained material in the other species. Anal spines of females interconnected by membrane, the first shorter than the second. In mature males the two anal spines are completely separated; the anterior spine may be united to the genital papilla for its entire length, the two may be completely separated, or the basal half of the papilla may be united with the spine and its distal half free; in most species the two spines are subequal in length or the first slightly longer, but in one (*nanodes*) the first is twice the length of the second (in the genotype, the Pacific species *cremnobates*, the first spine is decidedly shorter than the second, as in females; the two spines are, however, not connected by membrane).

The genus *Starksia* has been considered viviparous (Hubbs 1952: 95; Al-Uthman 1960: 163), though it is not known whether this was based on observations or deduced from the evident habit of internal fertilization. We have found no evidence of viviparity in these fishes, either from literature or specimens.

There are 43 or fewer scales in the lateral line. Anterior lateral line scales tubed. Scales in posterior portion of lateral line with tubes and pores, simple pores only, or undifferentiated.

D. XVIII to XXII (usually XIX to XXI), 7 to 9. A. II or I-I, 15 to 20. P. 11 to 15 (almost always either 13 or 14). Segmented C. 13, with rare variants of 12. Lateral line scales 12 to 19 + 18 to 23 = 33 to 41 (in Atlantic species; to a total count of 43 in a Pacific species).

Remarks.—We feel that Longley was correct in synonymizing *Branerella* with *Starksia*. The genotype of *Starksia* (*S. cremnobates*) has a male intromittent organ which consists of the completely united first anal spine and genital papilla; this structure is separate from the second anal spine. It, thus, has the same essential structure as that found in males of all Atlantic species except *lepicoelia*, *hassi* and *atlantica*. Males of *Starksia cremnobates* do have relatively shorter anal spines than are found in any of the Atlantic species, the first spine much shorter than the second and the second shorter than the first segmented ray. There is, however, so much variation in relative spine lengths in the Atlantic species that this difference does not seem impressive. The males of most Atlantic species have the two anal spines subequal in length or the first a bit longer than the second, but in *nanodes* the first is twice as long as the second. Large males of *cremnobates* develop heavy rugose fleshy folds and furrows adjacent to the anterior portion of the anal fin, a situation we have not observed in males of any of the Atlantic forms; however, old males of many animals develop analogous minor structural modifications and we would hesitate to maintain *cremnobates* in a separate genus solely on the basis of such a feature. Particularly pertinent to our decision to maintain the combination of the two nominal genera is the fact that the two genotypes are structurally close forms, most other species differing more than they. These two species agree in being

large forms and in having dark coloration, a high number of pectoral rays, a dark spot at the anterior end of the spinous dorsal fin, essentially similar intromittent organs (though in *ocellata* of the Atlantic the organ is much longer) and smaller scales than most other forms.

Al-Uthman (1960) has recently discussed eastern Pacific starksiids. He recognized two species in the area, one of which he placed in *Starksia* and the other in *Brannerella*. All his supposed distinctions between the two break down with Atlantic species, except the male anal spine character in *cremnobates* discussed above. However, if this character were considered sufficient to merit generic distinction, *S. nanodes*, with the first spine in males twice the length of the second, could as well be placed in a separate genus. *Starksia atlantica*, which lacks the orbital cirrus, or *S. lepicoelia* and *S. hassi*, which both possess a particular type of intromittent organ might further be separated as distinct genera. Rather than recognize a separate genus for each one-character difference, we prefer to retain all the species in *Starksia*.

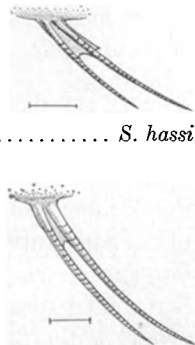
Within his new species *spinipenis*, Al-Uthman found three "morphologic types." We feel that Al-Uthman's material should be reexamined to determine if there are not perhaps several forms involved which require names as species or subspecies.

In the absence of time and material of eastern Pacific *Starksia*, we have confined our study to the Atlantic forms. For this reason, our generic diagnosis is based primarily on the Atlantic species and it may require modification to cover the eastern Pacific forms.

Most of the species we recognize are well-defined units, others (*guttata* and perhaps *sluiteri*) less satisfactory because of the material of these available to us.

KEY TO WESTERN ATLANTIC SPECIES OF *STARKSIA*

- A. No orbital cirri; genital papilla in adult male attached to first anal spine proximally for a distance about half its length *S. atlantica*
- AA. A simple cirrus present above each eye; genital papilla of adult male either completely free or attached to first anal spine for the entire length of the spine (and often projecting beyond its tip).
 - B. Obvious ventral rays three (see inset drawing); body with alternating light and dark bands, each of the former usually with a fine line of melanophores down its center (on well preserved specimens) *S. hassi*
 - BB. Obvious ventral rays two (see inset drawing), the third represented by a minute basal element which is readily seen only on stained specimens; body coloration various, when banded, the light bands without a fine center line of melanophores.
 - C. Venter entirely and closely scaled; genital papilla of adult male completely free from first anal spine, which is in turn completely free from second anal spine ... *S. lepicoelia*



- CC. Venter either completely naked or with less than its posterior one-third scaled; genital papilla of adult male united with first anal spine for the entire length of the spine and most often projecting beyond it.
- D. A pair of hypural-shaped black markings present at base of caudal fin; first anal spine of mature male about twice the length of the second *S. nanodes*
- DD. No such markings at base of caudal fin; anal spines of adult male subequal in length.
- E. Pectoral rays modally 13; dorsal spines XIX or XX; scales in the straight portion of the lateral line modally 18 or 19; species small (to 22.2 mm. S.L.), with highly contrasting coloration (black bars or 3 rows of dark blotches on a light background).
- F. Color pattern consisting of seven solid dark bands separated by light interspaces *S. fasciata*
- FF. Color pattern consisting of three horizontal rows of dark blotches on a lighter background—the middle series of round blotches, the upper and lower of squarish ones (the lowest least intense) *S. shuiteri*
- EE. Pectoral rays modally 14; dorsal spines modally XXI; scales in the straight portion of the lateral line modally 21 or 22; species large (to 41.1 mm. S.L.), and less contrasting coloration (no obvious pattern, indistinct and irregular blotches over the entire body, or numerous small black dots unevenly sprinkled over body).
- G. Color pattern consisting of numerous randomly distributed round black dots, sharply defined, on lighter background; head .328–.351 S.L.; upper jaw .147–.168 S.L. *S. guttata*
- GG. Color pattern variably developed, from nearly uniform to rows of irregular and variously distinct blotches; when blotched, the dark markings are much larger than in *guttata* and the difference between blotches and background less abrupt; head .280–.314 S.L.; upper jaw .133–.144 S.L. *S. ocellata*

***Starksia atlantica* Longley**

Tables 1 and 2, Figures 1 and 2.

Malaccoctenus culebrae (not of Evermann and Marsh 1900), Rosén 1911, Lunds Univ.

Arsskrift, N. F., (2) 7(5): 67 (a specimen from Mastic on Andros Island, Bahamas; dentition).

Starksia atlantica Longley 1934, Carnegie Inst. Washington, Year Book 33: 258 (Type locality: Mastic, Andros, Bahamas).

Diagnosis.—Narrow simple cirri present at nape and from rear edge of anterior nostril; none present on top of eye; cirri subequal or the nasal longer. Several subocular pores from the circumorbital ossifications paired. Teeth present on vomer; some specimens with a few teeth on the palatines, most without. Venter varying from scaleless to having its posterior one-third scaled. Few scales in the posterior portion of the lateral line with tubes, but most with simple pores. Membrane between two principal ventral rays deeply incised, to a point about one-fourth the way out on the

shorter ray. Third ventral ray minute, not evident on unstained specimens. In females the second anal spine longer than the first; in males the two subequal. Male intromittent organ consisting of the first anal spine and genital papilla, the shorter papilla attached for half its length to the anterior face of the spine; first and second anal spines completely separated (this is the adult condition, the papilla less developed in younger males). The color pattern is of fine light lines which break up the darker background into blocks of irregular size and shape, usually in about three horizontal tiers. On some specimens the three tiers of block-like segments are rather regularly arranged, while on other specimens the coloration is nearly uniform with little or no evidence of this block-like break-up. A prominent round dark spot encloses the bases of the last dorsal rays and another, smaller, encloses the bases of the last several anal rays, the latter spot frequently missing. Size to 19.8 mm. standard length.

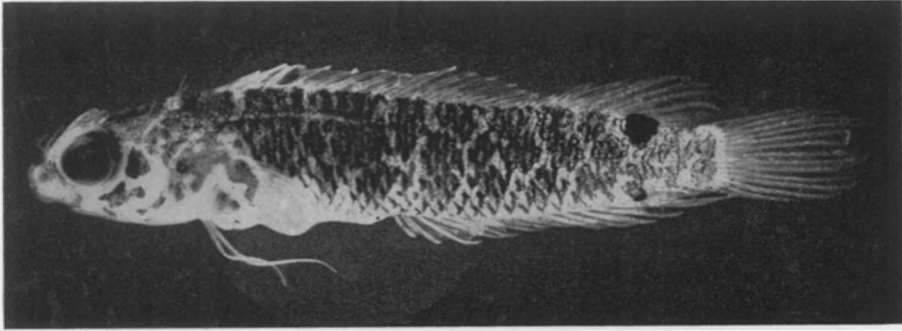
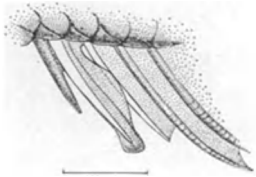


Figure 1. *Starksia atlantica* Longley: a female, 17.5 mm. S.L., from sta. 496, Bahamas, ANSP 94137.

Figure 2. *Starksia atlantica* Longley: anterior portion of anal fin of a mature male, 19.8 mm. S.L., from sta. 496, Bahamas, ANSP 94136. Base line equals 1 mm.



D. XVIII to XX (usually XIX), 7 or 8. A. rays 15 or 16 (usually 16). P. 13 to 15 (usually 14). Segmented C. 13. Lateral line scales 15 or 16 + 19 or 20 = 34 to 36.

Habitat.—This species appears to be a coral dweller in water of moderate depths—5 to 50 ft. (average depth on bottom at nine stations where *atlantica* was collected, 22 ft.). All collections which included *atlantica* for which we have data were position stations on coral. The temperature on the bottom at five of the stations ranged from 75–80° F.

Range.—Known only from the Bahamas—the Great and Little Bahama Banks.

Material examined.—

NEW PROVIDENCE AREA

ANSP 94132 (1, 17.3), sta. 198, coral head off N shore of Rose Id., Mar. 25, 1955, the C. C. G. Chaplin family, H. R. and H. Roberts. ANSP 94133 (1, 17.9, illustrated), sta. 212, coral head W of Delaporte Pt., New Providence, Apr. 11, 1955, C. C. G. Chaplin, J. E. Böhlke. ANSP 94134 (1, 17.3, photographed) and ANSP 94135 (7, 14.6–19.1), sta. 259, reef off Delaporte Pt., New Providence, Sept. 5, 1955, C. C. G. Chaplin, H. R. and R. B. Roberts. ANSP 75233 (1, 18.3, photographed) and ANSP 94306 (3, 10.4–18.4), sta. 295, coral head ca. $\frac{1}{4}$ mi. N of Green Cay (N of Rose Id.), May 7, 1956, C. C. G. Chaplin, E. Brownrigg, S. A. Waterman, J. E. Böhlke. ANSP 94136 (1, 19.8, intromittent organ illustrated), ANSP 94137 (1, female, 17.5, photographed for publication) and ANSP 94138 (2, 16.2–18.6), sta. 496, coral head N of Green Cay (N of Rose Id.), May 14, 1959, C. C. G. and G. W. Chaplin, R. B. Roberts, J. E. Böhlke, B. Parker. ANSP 94139 (7, 14.6–19.6), sta. 513, coral head ca. $\frac{1}{4}$ mi. N of Green Cay (N of Rose Id.), Nov. 14, 1959, C. C. G. Chaplin, C. R. Robins, J. E. Böhlke, B. Parker.

ELEUTHERA AREA

VGS 59-121 (1, 18.1), reef just N of Goulding Cay, Aug. 27, 1959, V. G. Springer, R. T. Kirk.

LITTLE BAHAMA BANK

UMML 5841 (1, 17.1), WAS-BWI-18, 1 mi. NE of the S end of Green Turtle Cay on Little Bahama Cay, July 24, 1959, W. A. Starck, II.

ANDROS

ANSP 94140 (3, 14.2–16.5), sta. 400, coral head in sound between Grassy Creek and Grassy Creek Cays, July 14, 1957, C. C. G. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke, Capt. Lightbourn. UMML 1726 (4, 15.5–16.3), CRR-BWI-21, S side of Pigeon Cay, 11 mi. SE of Andros, Dec. 11, 1957, J. E. Randall, G. L. Voss, T. W. McKenney.

EXUMAS

ANSP 94141 (3, 10.9–17.0), sta. 412, E side of the larger cay below Oyster Cay, July 19, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke, A. Kemp, Capt. Lightbourn.

Starksia hassi Klausewitz

Table 1, Figures 3 and 4.

Starksia hassi Klausewitz 1958, Senckenbergiana biol., 39(1/2): 76, fig. 5 (Type locality: Bonaire, Lesser Antilles).

Diagnosis.—Narrow simple cirri present on nape, on top of eyeball and from rear margin of anterior nostril, the nasal cirri longest. Pores from circumorbital ossifications uniserial in arrangement. Teeth present on vomer and palatines. Venter naked, or a few scale rows present immediately before the anus. Scales of posterior portion of lateral line with simple pores or not at all differentiated. Membrane between the two principal ventral rays incised to a point that is only slightly less than half way out on the shorter ray. Third ventral ray, while thin, well developed and easily seen on unstained specimens. In both sexes the first anal spine is shorter than the second. In mature males, the genital papilla is completely free from the first anal spine which is in turn completely free from the second anal

spine. The color pattern is essentially one of alternating light and dark vertical bands; on most well preserved specimens each light band has a fine line of melanophores down its center. Occasionally these bands are somewhat broken up dorsally. Males with a large dark blotch on cheek. Size to 31.0 mm. standard length.

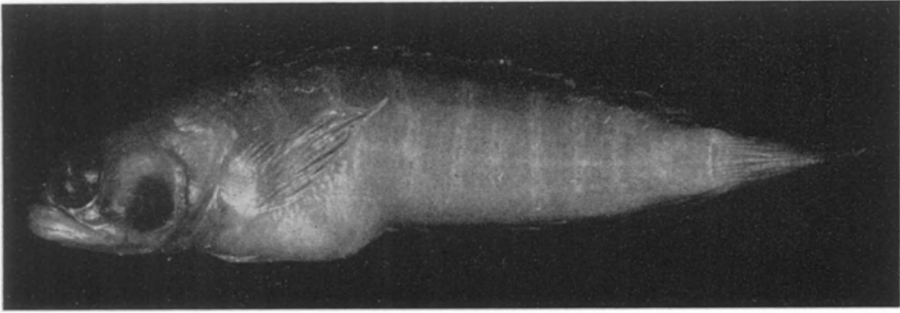
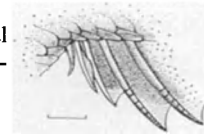


Figure 3. *Starksia hassi* Klausewitz: a male, 27.5 mm. S.L., from Oregon sta. 2624, Virgin Islands, part of CNHM 64815.

Figure 4. *Starksia hassi* Klausewitz: anterior portion of anal fin of a mature male, 27.5 mm. S.L., from Oregon sta. 2624, Virgin Islands, part of CNHM 64815. Base line equals 1 mm.



D. XIX or XX, 8. A. rays 17 or 18. P. 12 to 14. Segmented C. 13. Lateral line scales 15 or 16 + 22 to 25 = 38 to 41.

Remarks.—In the original description of *hassi*, Klausewitz wrote that there are only two ventral rays. As a matter of fact, *hassi* is the only species in the Atlantic which has a well developed (though thin) third ventral ray. The third ray in the other forms is a minute element visible only on stained material. The third ray of *hassi* is, however, easily overlooked, and any banded Atlantic *Starksia* with a naked belly should be examined closely for it. The third ray is thin and while distinctly separated from the second segmented ray, often lies against it.

The lateral line in this species is poorly marked over most of its extent and the scales are very thin. Except for the anteriormost 9 to 11 scales which are tubed, the remainder of the scales along what would be the course of the lateral line in other species either are simply pored or completely undifferentiated. Counting along the usual course of a starksiid lateral line on the better preserved paratype (SMF 4147) gave a count of 10 + 5 + 26 scales—10 the count of tubed scales, 5 the number necessary to complete the arch, 26 the number in the straight part. ANSP 94142 and the three CNHM specimens had either 10 or 11 tubed scales and total lateral line scale counts of 38 to 40. Klausewitz (1958: 76) gave a total lateral line

scale count of 42 for the holotype. This was not verified because we could not get a certain count from that specimen.

Habitat.—The types of *hassi* came from two collections, from coral, in depths of 8 and 20 meters. Since then the species has been collected twice by the M/V *Oregon*—once with a 40-foot flat trawl in 35 fathoms and once with a 40-foot semi-balloon trawl in 175 fathoms.

Range.—The two original collections were from Bonaire, off the coast of Venezuela, the two subsequent collections from off Puerto Rico and the Virgin Islands.

Material examined.—

SMF 4146 (holotype, 31.0), Bonaire, Lesser Antilles, 20 m., Apr., 1954, I. Eibl-Eibesfeldt. SMF 4147 (paratype, 26.1), taken with the holotype. ANSP 94142 (1, 25.1), *Oregon* sta. 2659, Mona Passage, off the NW corner of Puerto Rico, 18° 26' N, 67° 11.5' W, 175 fms., Oct. 7, 1959. ANSP 94143 (1, 23), Kralendijk, Bonaire, Lesser Antilles, 8 m., Apr. 5, 1954, G. Scheer (the paratype of *hassi* photographed for fig. 5, b in the original description). CNHM 64815 (3, 27.5–28.2, the 27.5 mm. male photographed for publication and its intromittent organ illustrated), *Oregon* sta. 2624, off the Virgin Islands, 18° 46' N, 64° 46' W, 35 fms., Sept. 28, 1959.

Starksia lepicoelia new species

Tables 1, 2 and 3, Figures 5 and 6.

Diagnosis.—Slender simple cirri present at the nape, on the upper surface of the eyeball and from the rear edge of the anterior nostril. The ocular and nasal cirri subequal and longer than the nuchal, or the ocular cirri notably the longest. Pores from circumorbital ossifications arranged uniserially. Teeth present on vomer and palatines. Venter of adults completely and densely scaled. Scales of posterior portion of lateral line without tubes, but most have simple pores. Membrane between two principal ventral rays deeply incised, to a point about one-fourth to one-third the way out on the shorter ray. Third ventral ray minute, not evident on unstained specimens. In females the second anal spine is longer than the first; in males the two spines are subequal in length. In mature males the genital papilla is completely free from the first anal spine and the first anal spine in turn completely free from the second. The coloration of the body is sometimes very pale in preservative, sometimes rather dark, but usually more or less uniform. Some specimens, notably large females, show a tendency toward irregular banding. Males have a large dark spot on the cheek, variously intense. Size to 29.2 mm. standard length.

D. XIX to XXI (usually XX), 7 to 9 (usually 8). A. rays 16 to 19 (most often 17). P. 11 to 14 (usually 13). Segmented C. 13 (14 in one of 20 specimens). Lateral line scales 14 to 17 (usually 15 or 16) + 19 to 22 (usually 20 or 21) = 35 to 38.

Description.—Proportions and counts of the type material are presented in Table 3. Premaxillaries greatly protractile, their posterior processes continued back to or beyond the narrowest point on the interorbital space, past the interorbital pore of the supraorbital series. Anterior nostril tubular,

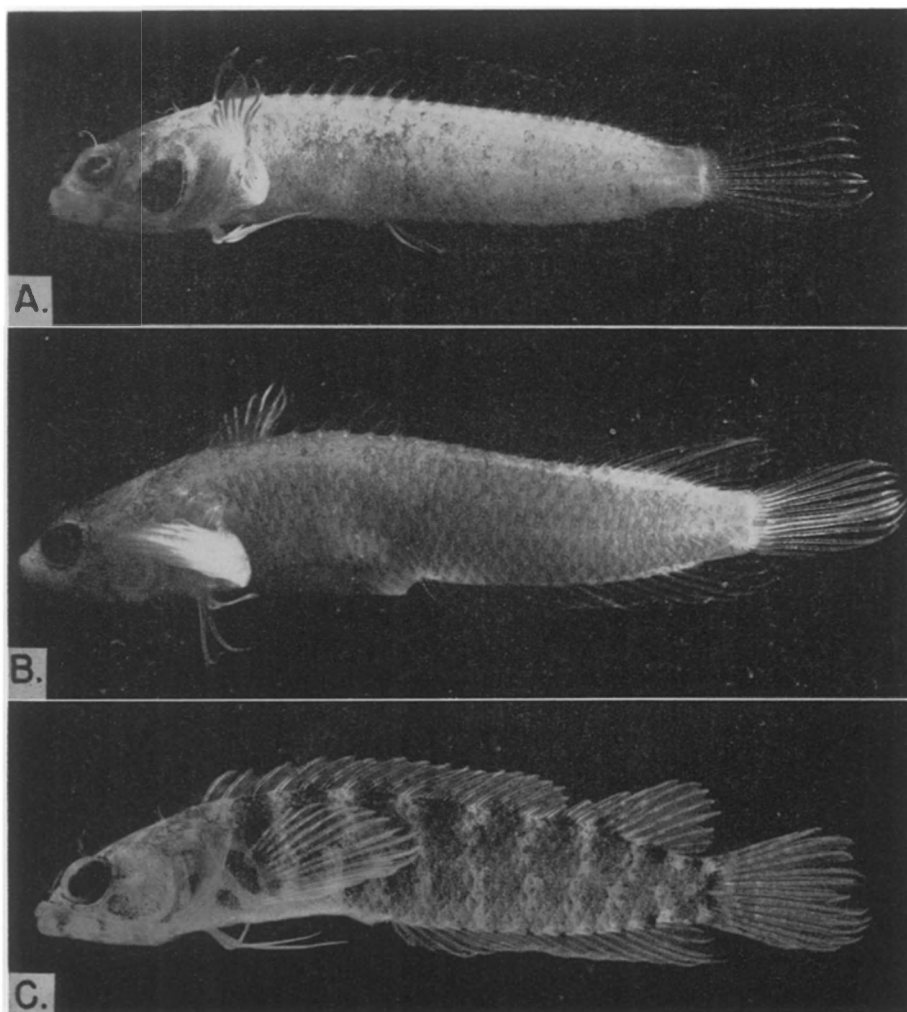
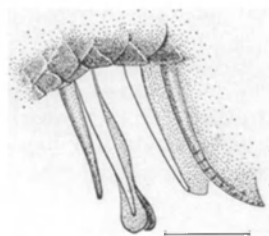


Figure 5. *Starksia lepicoelia* Böhlke and Springer. **A**, a male paratype, 24.8 mm. S.L., from sta. 303, Bahamas, ANSP 94152. **B**, a female (the allotype) with the more usual paler pattern, 28.4 mm. S.L., from sta. 303, Bahamas, ANSP 94153. **C**, a female showing both the less frequent banded type of pattern and the small black spots at the posterior ends of the dorsal and anal fins, in position like those of *S. atlantica*, 23.9 mm. S.L., from sta. 412, Bahamas, ANSP 94172.

Figure 6. *Starksia lepicoelia* Böhlke and Springer: anterior portion of anal fin of a mature male, 23.0 mm. S.L., from sta. 506, Bahamas, ANSP 94162. Base line equals 1 mm.



with a long cirrus about one-third to one-half eye diameter arising from its posterior margin. This cirrus usually shorter than the simple ocular cirrus and subequal to the simple nuchal cirrus. Posterior nostril a simple hole adjacent to the orbit, distinctly removed from the anterior nostril, with a subequal pore of the supraorbital series behind and scarcely separated from it. Upper jaw extending to or beyond the level of the posterior margin of the circumorbital ossifications. Circumorbital ossifications narrow with the pores unpaired. Branchiostegal rays 6. Gill membranes broadly united, forming a free fold across the isthmus. Opercle without a spine.

On the premaxillaries and dentaries there is a single outer row of enlarged pointed teeth, somewhat larger anteriorly on the premaxillaries and laterally on the dentaries (less pronounced in females). A small patch of much finer teeth anteriorly behind these enlarged teeth in each jaw. Vomerine teeth 11 to 15, palatine teeth 4 to 7. Teeth on vomer and palatines broader and heavier than those on jaws.

Anterior 13 or 14 (11 in one juvenile 13.7 mm.) scales of arched portion of lateral line with horizontal tubes, remaining scales of lateral line undifferentiated or with simple perforations only (rarely one or a few scales with tubes). The number of scales in the lateral line 35 to 38. Cycloid overlapping scales on body and completely covering venter (only covering about $\frac{1}{2}$ distance from anus to ventral bases in one juvenile 13.7 mm.), absent from head, nape, pectoral-fin base, and area above front part of arched portion of the lateral line.

Dorsal fin composed of many spines and few unbranched segmented rays, the longest rays longer than the longest spines. Dorsal spines of about equal thickness except for the last which is slightly thicker than the others. Second dorsal spine subequal to the third, slightly shorter than the first and fourth. Spines increasing in length from the fourth to about the eighth, remaining constant through about the fourteenth, thence decreasing to the third or fourth from the last (a distinct dip in the fin at this point); last two spines abruptly increasing in length, the last usually the longest.

A short broad flap extending from the interradi al membrane of the first dorsal spine, shorter ones occurring from the membranes of the next three or four spines. Pectoral fins long and pointed, rays unbranched, the longest ray ventral of mid-base and extending when laid back to a point about over the base of the second anal ray. Ventral fins inserted before the pectorals, below a point under to slightly in advance of the level of the base of the first dorsal spine. Each ventral composed of a spine and three simple rays. The ventral spine is minute and closely applied to the basal portion of the first ray; the third ray is greatly reduced and not visible without staining. The anal spines are of about the same thickness as the dorsal spines; in mature males, the first is somewhat longer and is free from the second, its tip enveloped by a fleshy protuberance. The genital papilla is an elongate tube, slightly shorter than the first anal spine and completely free from it. In females, the anal spines are connected and the first is the shorter. The genital papilla of females is minute.

Membranes from the final dorsal and anal rays are connected to the caudal peduncle distinctly in advance of the accessory caudal rays, the connection of the anal in advance of that of the dorsal. Caudal rays unbranched, segmented rays 13, seven above and six below; accessory rays 5 or 6 above and below, usually 5 above (13 of 15) and below (10 of 15). The caudal fin extends back further through its lower portion than its upper.

Coloration in alcohol.—The typical pattern is shown in figs. 1, A and B, which is the usual one for specimens from the Great Bahama Bank. Occasional females from that area and most specimens from Cay Sal Bank tend in general to have deeper pigmentation, with the pattern suggesting irregular bands (see fig. 1, C). Many males have the preopercular area covered by a dark blotch.

Habitat.—This species is a rather common form at moderate depths in the Bahamas. It has been taken at depths ranging between 6 and 84 feet (average depth on bottom at twenty-four stations, 36 feet). The species has only been taken with the aid of rotenone and is evidently a coral dweller—only one of twenty-six collections including this species does not mention coral in the station data. The bottom at this one station is given as a limestone slope with many basins, etc.; there were probably small corals growing even here. This is another species which has never been seen by us except lying dead after poisoning, so its specific niche is as yet unknown. The temperature on the bottom at eight of the stations ranged from 77–85° F.

Range.—This species has been taken numerous times in the Bahamas and once at St. John, Virgin Islands.

Name.—*lepicoelia*, Greek, "scale belly," in reference to the character of a fully and densely scaled belly, unique with this species.

Material examined.—

HOLOTYPE

ANSP 94144 (male, 23.6 mm. in standard length), sta. 496, isolated coral head ca. $\frac{1}{2}$ mi. NNW of Green Cay (N of Rose Id.), Bahamas, Lat. 25° 07' 07" N, Long. 77° 11' 38" W, May 14, 1959, C. C. G. and G. W. Chaplin, R. B. Roberts, J. E. Böhlke, B. Parker, from the *Satellite*.

PARATYPES

BAHAMAS

NEW PROVIDENCE AREA.—ANSP 94145 (17, 9.5–25.4), taken with the holotype. ANSP 94146 (1, 25.0), sta. 212, coral head W of Delaporte Pt., New Providence, Apr. 11, 1955, C. C. G. Chaplin, J. E. Böhlke. ANSP 94147 (2, 16.9–23.4), sta. 243, N edge of coral head between North Cay and the small cay just off Long Cay, Aug. 5, 1955, J. C. Briggs, M. Bradbury, E. B. and J. E. Böhlke. ANSP 94148 (4, 15.9–24.6), sta. 259, reef off Delaporte Pt., New Providence, Sept. 5, 1955, C. C. G. Chaplin, R. B. and H. R. Roberts. ANSP 94149 (4, 10.9–23.1), sta. 292, N of the E end of Rose Id., May 5, 1956, C. C. G. Chaplin, E. Brownrigg, S. A. Waterman, J. E. Böhlke. ANSP 94150 (12, 12.1–21.8), sta. 297, coral head W of tip of Lyford Cay, New Providence, May 8, 1956, C. C. G. Chaplin, S. A. Waterman, C. Limbaugh, J. E. Böhlke. ANSP 94151 (8, 13.9–24.8), ANSP 94152 (1, 24.8, male, photographed for publication) and ANSP 94153 (1, 28.4, female, allotype, photographed for publication), sta. 303, N side of the last of a series of rocks continued out E of Sandy Cay (N of Rose Id.), May 16, 1956, C. C. G. Chaplin, C. and N. Limbaugh, J. E. Böhlke. ANSP 94154 (1, 24.0, illustrated), ANSP 94155 (1, 24.0, photographed) and ANSP 94156 (12, 10.2–25.0), sta. 304, N of the E end of Sandy Cay, May 17, 1956, C. C. G. Chaplin, O. Russell, J. E. Böhlke. ANSP 94157 (1, 13.7), sta. 367, coral head ca. $\frac{1}{2}$ mi. N of Green Cay (N of Rose Id.), May 12, 1957, C. C. G. Chaplin, S. A. Waterman, J. E. Böhlke. ANSP 94158 (1, 27.1), sta. 483B, Nassau Harbour, S shore of Hog Id., first half of May, 1959, O. Thurston, C. C. G. Chaplin, J. E. Böhlke.

ANSP 94159 (35, 17.5–28.4), sta. 513, coral head ca. $\frac{1}{4}$ mi. N of Green Cay (N of Rose Id.), Nov. 14, 1959, C. C. G. Chaplin, C. R. Robins, J. E. Böhlke, B. Parker.

ELEUTHERA.—VGS 59-121 (1, 25.9), reef just N of Goulding Cay, Aug. 27, 1959, V. G. Springer, R. T. Kirk. VGS 59-122 (5, 14.2–25.0), South West Reef, between Current Rock and Little Egg Id., Aug. 28, 1959, V. G. Springer, R. Mason.

LITTLE BAHAMA BANK.—ANSP 94160 (3, 18.8–25.5), sta. 504, S shore of Grand Bahama Id., ca. 5 mi. E of West End, July 1, 1959, R. E. Schroeder, S. Gross. ANSP 94161 (3, 17.2–20.1), sta. 505, (200 yds. E of sta. 504, same collectors and date). ANSP 94162 (1, 23.0, intromittent organ illustrated), ANSP 94163 (2, 23.2–25.0, cleared and stained) and ANSP 94164 (21, 14.1–26.2), sta. 506, S shore Grand Bahama Id., ca. 6 mi. E of West End, July 2, 1959, R. E. Schroeder, S. Gross. ANSP 94165 (2, 15.8–21.6), sta. 508, Wood Cay, off Grand Bahama Id., July 10, 1959, R. E. Schroeder, S. Gross. ANSP 94166 (2, 20.8–21.2), sta. 509, Wood Cay, off Grand Bahama Id., July 13, 1959, R. E. Schroeder, S. Gross. ANSP 94167 (2, ca. 17–22.2), sta. 510, Indian Cay, off West End, Grand Bahama Id., July 16, 1959, R. E. Schroeder, S. Gross. ANSP 94168 (3, 13.2–22.3), sta. 511, W of Wood Cay, off Grand Bahama Id., July 19, 1959, R. E. Schroeder, S. Gross.

ANDROS.—ANSP 94169 (1, 26.1), sta. 400, coral head in sound between Grassy Creek and Grassy Creek Cays, July 14, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke, Capt. Lightbourn. UMML 1725 (1, 25.5), CRR-BWI-21, S side of Pigeon Cay, 11 mi. SE of Andros, Dec. 11, 1957, J. E. Randall, G. L. Voss, T. W. McKenney.

EXUMA CAYS.—ANSP 94170 (3, 16.7–19.4), sta. 408, W side of a cay ca. 2 mi. N of Stanniard Cay, July 17, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke. ANSP 94171 (3, 19.0–24.2) and ANSP 94172 (1, 23.9, female, photographed for publication), sta. 412, E side of the larger cay below Oyster Cay, July 19, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke, A. Kemp, Capt. Lightbourn.

CAY SAL BANK.—ANSP 94173 (13, 17.8–28.2), sta. 514, SE side of North Elbow Cay at lighthouse landing, Apr. 29, 1960, H. R. Roberts, D. K. Farquhar, J. E. Böhlke. ANSP 94174 (1, 23.4), sta. 516, N end of pass between the two Water Cays, Apr. 30, 1960, H. R. Roberts, J. E. Böhlke, J. M. Greeven. ANSP 94175 (1, 20.6), sta. 520, N of the second cay SW of Elbow Cay, May 1, 1960, H. P. Brown, D. K. Farquhar, H. R. Roberts, J. E. Böhlke, J. M. Greeven. ANSP 94176 (1, 22.5), sta. 525, off the Water Cays, May 22, 1960, H. P. Brown.

VIRGIN ISLANDS

UMML 4906 (4, 19.2–24.6), V. I. sta. 16, Yawzi Pt., Greater Lameshur Bay, St. John, Dec. 21, 1958, S. and L. P. Thomas, J. E. Randall.

Starksia nanodes new species

Tables 1, 2 and 4, Figures 7 and 8.

Diagnosis.—Slender simple cirri present at nape, on upper surface of eyeball and from rear margin of anterior nostril; the cirri all subequal in length in females, the orbital cirri notably the longest in males. Pores from circumorbital ossifications arranged uniserially. Teeth present on vomer and palatines. Venter without scales. Scales of posterior portion of lateral line undifferentiated or with simple pores only. Membrane between two principal ventral rays incised to points varying between one-fourth and one-half the way out on the shorter ray (less so than in the other species). Third ventral ray not evident on unstained specimens. In females, the second anal spine is longer than the first. In mature males, the first anal spine is about

twice the length of the second. Intromittent organ of mature male consisting of the first anal spine and genital papilla which are united for their entire extent, except that the extreme tip of the papilla is free; first anal spine completely separated from second. Color pattern of preserved material usually the palest in the genus. The most conspicuous element of the male color pattern is the pair of hypural-shaped dark spots lying over the hypurals. In females, there is additional pigment in the form of indistinct dark vertical bands farther forward on the body, this banding variously developed and usually irregular. Size to 17.0 mm. standard length.

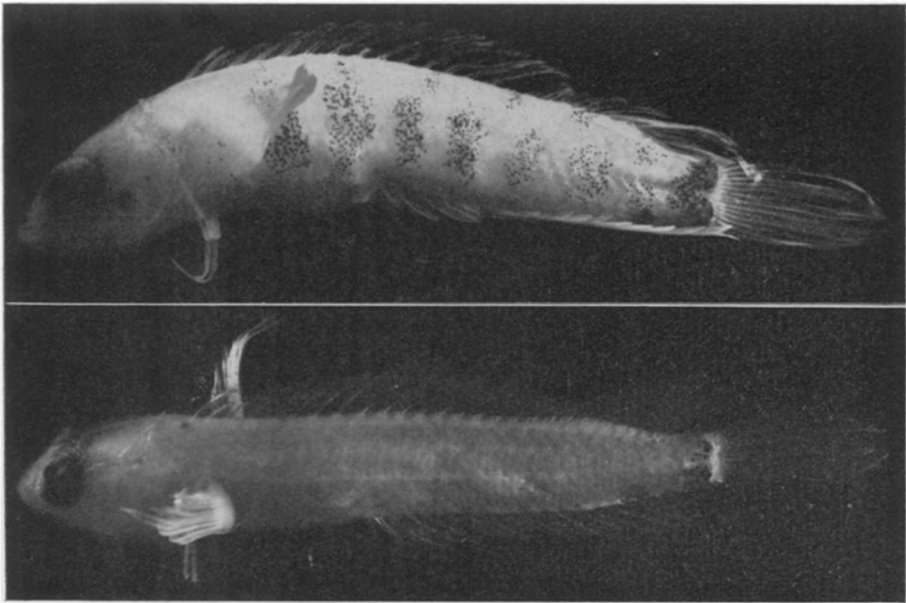
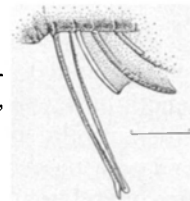


Figure 7. *Starksia nanodes* Böhlke and Springer: A, holotype, a female, 13.1 mm. S.L., from sta. 507, Bahamas, ANSP 94177. B, allotype-paratype, a male, 16.3 mm. S.L., from sta. 414, Bahamas, ANSP 94183.

Figure 8. *Starksia nanodes* Böhlke and Springer: anterior portion of anal fin of a mature male, 16.3 mm. S.L., from sta. 414, Bahamas, ANSP 94183. Base line equals 1 mm.



D. XIX to XXI (nearly always XX), 7 or 8 (nearly always 7). A. rays 16 or 17. P. 12 or 13 (usually 13). Segmented C. 13. Lateral line scales 12 to 14 + 20 to 22 = 33 to 35.

Description.—Proportions and counts of a series of types are presented in Table 4 and the counts are summarized in Table 1.

Premaxillaries greatly protractile, their posterior processes continued back nearly to or past the narrowest point on the interorbital space when mouth is closed. Anterior nostril tubular, with a long simple cirrus from the hind margin of the tube. Posterior nostril a simple hole adjacent to the orbit, distinctly removed from the anterior nostril. There is a slender orbital cirrus, longer than the pupil diameter in males, shorter than the pupil in females, and also a slender nuchal cirrus on either side. Upper jaw extending back to points ranging from below posterior portion of pupil to below posterior margin of eye. Circumorbital ossifications narrow, the pores from them uniserial. Gill rakers small and weak; on the stained paratype there are two on the upper limb and six on the lower limb of the first arch. Branchiostegal rays six. Gill membranes broadly united, forming a free fold across the isthmus very shortly in front of the ventral fin bases. Opercle without a spine.

On the premaxillaries and dentaries there is a single outer row of enlarged teeth, which encloses a patch of finer teeth anteriorly. Teeth on vomer and palatines proportionately shorter and broader than those on the jaws, uniserial. On the stained paratype, there are about nine teeth arranged in a semicircle on the vomer and only four teeth forming a short patch on each palatine. The stained paratype, a female with few rather large eggs, has thirty-two vertebrae.

Lateral line on body weakly developed, some of the scales along its course not perforated. On the stained paratype, only the anterior five scales have horizontal tubes; all of the others are simply pored with an occasional scale lacking even the pore. Further, the lateral line scales are not always equally spaced or imbricated and thus the counts vary greatly. Cycloid overlapping scales present on the body, absent from the head, nape, belly, pectoral-fin base and area above front part of the arched portion of the lateral line.

Dorsal fin composed of many spines and few segmented rays, the longest rays longer than the longest spines. Dorsal spines increasing in thickness from the first until the last. Contour of extended spinous dorsal sinuous, with a dip at the second and third spines and another at about spines sixteen through eighteen. First dorsal spine longer on males than on females. Pectoral fins long and pointed, the longest ray ventral of mid-base and extending, when laid back, to various points from the interspace between segmented anal rays two and three to the base of the fifth ray. Ventral fins inserted before the pectoral base, each composed of a spine and three rays. The ventral spine is short and closely applied to the basal portion of the first ray; the third ray is minute, only about one-third the length of the spine, its tip not free, the ray visible only on the stained specimen. The two anal spines are stronger than the anterior dorsal spines; in females the first spine is much shorter than the second, while in males the first is longer. In addition, males have the genital papilla and first anal spine united for nearly their entire extent (only the tip of the papilla free) to form an intro-mittent organ. There is no membrane between the two anal spines of adult males, though as in related forms there may be such a membrane in males smaller than those represented in the present collections. Females have the anal spines connected by membrane and the margin of the anal opening with folds and grooves in a sort of rosette pattern. Membranes from final dorsal

and anal rays connected to the peduncle far forward of the accessory caudal rays, so that the length of the peduncle is nearly or quite as great as its depth. Segmented caudal rays thirteen—seven above, six below. On the stained paratype, there are an additional five accessory rays both above and below. While the caudal fin is essentially rounded, it extends backward further through its lower portion than its upper; this is similar to the state in many emblemariids and labrisominids.

Coloration in alcohol.—The dark pigment pattern on the body is most noticeable on the two largest specimens which are also females, but is evident to a lesser degree on a number of the smaller ones, again notably on the females. On these there are eight very irregular and somewhat broken up cross bars on the body, the first at the level of the pectoral-fin base, the last on the caudal peduncle. Each of these bars, counting from the third on back, ends ventrally in both superficial and deep-lying pigment at the base of the anal fin. The last body bar, on the caudal peduncle, is composed of two hypural-shaped superficial blotches, one above and one below the lateral mid-line. These are the darkest markings on the body. Almost equally dark is the blotch which forms the ventral end of the penultimate body bar, and which surrounds the bases of the last four anal elements. The next darkest region lies at the dorsal end of the antepenultimate body bar, which surrounds the bases of the last two dorsal spines and first dorsal segmented ray. There are some marblings and markings on the sides of the head, bases of the pectoral fins and crossing the lips, but these do not form a distinct pattern. The larger males show only a small but very characteristic portion of this pattern. The two blotches which make up the final body band are the most evident. Aside from these, the markings consist of a dorsal and ventral blotch or a ventral blotch only, representing the penultimate body band, and a small scattering of melanophores, either dorsally or ventrally, representing the one or several bands just anterior to the penultimate one.

Habitat.—The species has invariably been taken by poison from isolated coral heads or coral reef situations at relatively deep stations (40 to 80'). The temperatures on the bottom at two of the 45' to 50' stations were 77° and 85° F.

Range.—*Starksia nanodes* is known from the Bahamas—from the Grand Bahama Island area of the Little Bahama Bank and from the Nassau region of the Great Bahama Bank—and from the Virgin Islands.

Name.—*nanodes*, Greek, dwarfish.

Material examined.—

HOLOTYPE

ANSP 94177 (female, 13.1 mm. in standard length, illustrated, photographed for publication), station 507, ca. Lat. 26° 44' 15" N, Long. 79° 02' 37" W, Wood Cay, off Grand Bahama Id., Little Bahama Bank, Bahamas, July 8, 1959, R. E. Schroeder, S. Gross.

PARATYPES

BAHAMAS

LITTLE BAHAMA BANK.—ANSP 94178 (1, 12.5), taken with the holotype. ANSP 94179 (1, 17.0) and ANSP 94180 (1, 16.9, cleared and stained), sta. 506, S shore of Grand

Bahama Id., ca. 6 mi. E of West End, July 2, 1959, R. E. Schroeder, S. Gross. ANSP 94181 (1, 10.5), sta. 508, Wood Cay, off Grand Bahama Id., July 10, 1959, R. E. Schroeder, S. Gross. ANSP 94182 (1, ca. 14.4), sta. 509, locality as for preceding, July 13, 1959, R. E. Schroeder, S. Gross.

NEW PROVIDENCE AREA.—ANSP 94183 (1, 16.3, male, allotype, intromittent organ illustrated, photographed for publication), sta. 414, coral head N of Green Cay (N of Rose Id.), July 21, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke. ANSP 94184 (2, 11.0–15.8), sta. 496, coral head NNW of Green Cay (N of Rose Id.), May 14, 1959, C. C. G. and G. W. Chaplin, R. B. Roberts, J. E. Böhlke, B. Parker. ANSP 94185 (6, 13.7–16.8), sta. 513, coral head N of Green Cay (N of Rose Id.), Nov. 14, 1959, C. C. G. Chaplin, C. R. Robins, J. E. Böhlke, B. Parker.

VIRGIN ISLANDS

UMML 8310 (1, 13.3 mm.), V. I. sta. 143, top of offshore ridge 6 mi. SE of Lameshur Bay, St. John, Feb. 5, 1960, J. E. Randall, J. R. Chess.

Starksia fasciata (Longley)

Tables 1 and 2, Figures 9 and 10.

Malacoctenus lugubris (not of Poey 1875), Rosén 1911, Lunds Univ. Arsskrift, N. F., (2) 7(5): 67, fig. 6 (description and figure of material from Mastie Pt., Andros).

Brannerella fasciata Longley 1934, Carnegie Inst. Washington, Year Book 33: 258 (Type locality: Mastie Pt., Andros Island, Bahamas).

Starksia fasciata, Longley and Hildebrand 1941, Papers Tortugas Lab., 34: 259 (descriptive notes on types).

Starksia fasciata (sic), Fowler 1944, Acad. Nat. Sci. Philadelphia, Monogr., 6: 452 (name in list of Bahama fishes).

? *Malacoctenus* sp. Herre 1942, Stanford Univ. Publ., Univ. Ser., Biol. Sci., 7(2): 17 (a specimen from Pelican Island, Barbados that "... is a duplicate of Rosen's figure of a little fish which he called *Malacoctenus lugubris* Poey").

Diagnosis.—Narrow simple cirri present at nape, on top of eyeball and from rear margin of anterior nostril, the nasal cirri longest. Pores from circumorbital ossifications arranged uniserially. Teeth present on the vomer; about half of the specimens examined had one or several teeth on the palatines (one had one tooth on one side only), the other half none. Venter without scales. Nearly all the scales in the posterior portion of the lateral line with tubes, all of them with pores. Membrane between two principal ventral rays incised to a point between one-third and one-half the way out on the shorter ray. Third ventral ray minute, not evident on unstained specimens. Females with the second anal spine longer than the first; mature males with the first anal spine a bit longer than the second. Male intromittent organ composed of first anal spine and genital papilla which are united for their entire length, the papilla of fully mature males extending a considerable distance beyond the tip of the spine. The color pattern is of seven definite dark vertical bars on a light background. Males have a dark blotch on the cheek. Size to 22.2 mm. standard length.

D. XIX or XX, 7 or 8. A. rays 15 or 16. P. 12 to 14 (nearly always 13). Segmented C. 13. Lateral-line scales 14 to 16 + 19 or 20 = 34 or 35.

Remarks.—Longley (1934: 258) and Longley and Hildebrand (1941: 259) erroneously give the anal count for the type as II,14. The holotype, a male, has the count I-I,16.

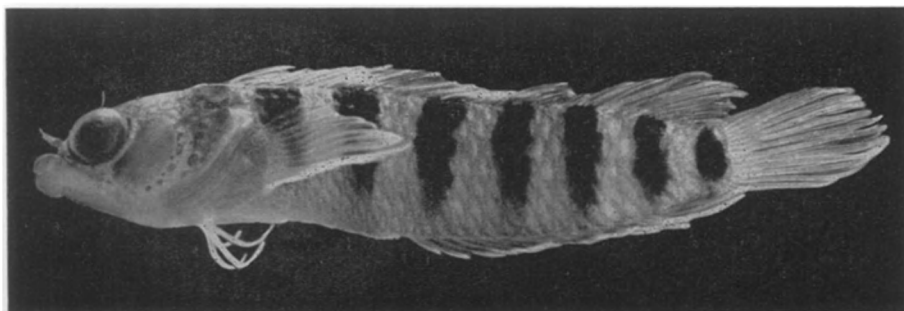


Figure 9. *Starksia fasciata* (Longley): a female, 17.3 mm. S.L., from sta. 476, Bahamas, ANSP 94195.

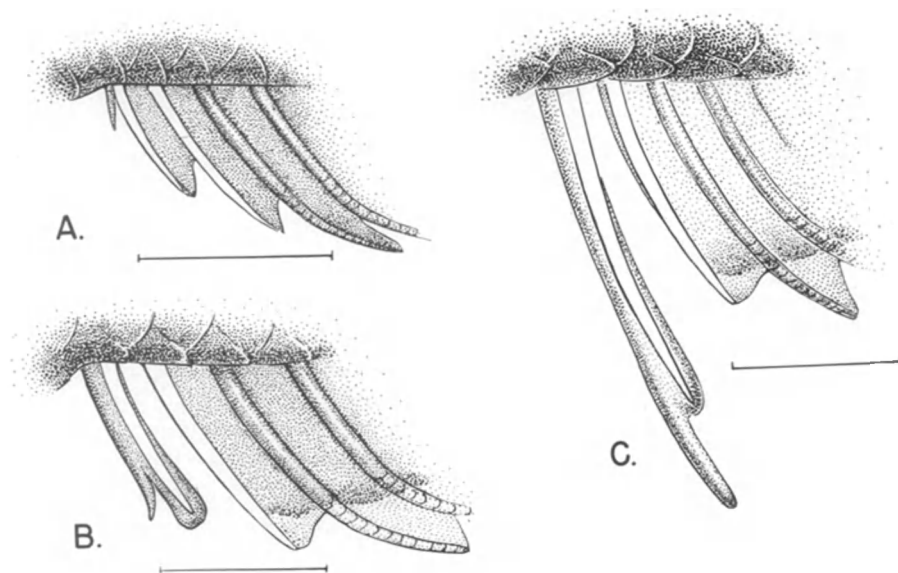


Figure 10. *Starksia fasciata* (Longley)—three stages in the development of the male intromittent organ: A, immature male, 15.5 mm. S.L., from sta. 304, Bahamas, ANSP 94194. B, older male, 18.8 mm. S.L., from sta. 250, Bahamas, ANSP 94190. C, mature male, 19.2 mm. S.L., from sta. 230, Bahamas, ANSP 94188. Base lines equal 1 mm.

Figure 10 shows several stages in the development of the male gonopodium, fig. 10,C being the fully mature state.

Habitat.—The species has only been taken in shallow water, at depths of 20 feet or less. The station data indicate this species to be an inhabitant of rocky (limestone) shallows rather than of isolated coral heads; the records for only three of fourteen collections fail to record limestone bottom, and only one of these was on an isolated head; the other two were part of

an extensive composite coral reef formation. On the other hand, many of the collections are listed as from eroded limestone situations, either completely without reference to any coral or mention of only scattered small individuals in the area. The average depth (low end of station—bottom) for 14 stations where *fasciata* was taken is 10 feet. The temperature at 8 of the stations ranged from 72–86° F.

Range.—Definitely known from the Bahamas and Cuba. Herre's "*Malacoctenus* sp." from Barbados is probably this species, as the color pattern is distinctive.

Material examined.—

BAHAMAS

NEW PROVIDENCE AREA.—ANSP 94186 (1, 21.1, illustrated), sta. 64, near Delaporte Pt., New Providence, Feb. 8, 1951. ANSP 94187 (1, 18.6), sta. 198, coral head off N shore of Rose Id., Mar. 25, 1955, the C. C. G. Chaplin family, H. R. and H. Roberts. ANSP 94188 (1, 19.2, intromittent organ illustrated, fig. 10, C), sta. 230, W of Delaporte Pt., New Providence, July 27, 1955, J. C. Briggs, E. B. and J. E. Böhlke. ANSP 94189 (1, 15.0), sta. 247, S shore of W tip of Treasure Id. (Salt Cay), Aug. 14, 1955, J. C. Briggs, M. Bradbury, E. B. and J. E. Böhlke. ANSP 94190 (1, 18.8, intromittent organ illustrated, fig. 10, B) and ANSP 94191 (3, 13.8–17.8), sta. 250, N shore of Hog Id., Aug. 18, 1955, J. C. Briggs, M. Bradbury, D. K. Caldwell, E. B. and J. E. Böhlke. ANSP 94192 (1, 16.3, photographed) and ANSP 94193 (1, 18.0), sta. 259, reef off Delaporte Pt., New Providence, Sept. 5, 1955, C. C. G. Chaplin, H. R. and R. B. Roberts. ANSP 94194 (1, 15.5, intromittent organ illustrated, fig. 10, A, photographed), sta. 304, N of the E end of Sandy Cay, May 17, 1956, C. C. G. Chaplin, O. Russell, J. E. Böhlke. ANSP 94195 (1, female, 17.3, photographed for publication), sta. 476, S side of W tip of Treasure Id. (Salt Cay), May 4, 1959, Mr. and Mrs. D. Hickman, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke. ANSP 94196 (2, 11.6–ca. 17), sta. 479, S side of easternmost rocky islet E of Sandy Cay, May 5, 1959, C. C. G. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke.

LITTLE BAHAMA BANK.—ANSP 94197 (3, 16.7–19.1), sta. 503, W shore of Wood Cay, off Grand Bahama Id., June 28, 1959, R. E. Schroeder, S. Gross.

ELEUTHERA AREA.—VGS 59-121 (1, 15.9), reef just N of Goulding Cay, Aug. 27, 1959, V. G. Springer, R. T. Kirk.

EXUMA CAYS.—ANSP 94198 (20, 10.0–21.4), sta. 412, E side of the larger cay below Oyster Cay, July 19, 1957, C. C. G. and G. W. Chaplin, H. R. and R. B. Roberts, J. E. Böhlke, A. Kemp, Capt. Lightbourn.

ANDROS AREA.—Lund University collection (male, ca. 17), Longley's holotype of *Brannerella fasciata* (the specimen recorded as *Malacoctenus lugubris* (Poey) ? by Rosén 1911: 67, fig. 6), Mastie Pt., Andros Id., Nils Rosén. UMML 1731 (3, 15.8–16.8), CRR-BWI-21, S side of Pigeon Cay, 11 mi. SE of Andros, Dec. 11, 1957, J. E. Randall, G. L. Voss, T. W. McKenney.

CAY SAL BANK.—ANSP 94199 (4, 19.6–22.2), sta. 514, SE side of North Elbow Cay, Double Headed Shot Cays, Apr. 29, 1960, H. R. Roberts, D. K. Farquhar, J. E. Böhlke. ANSP 94200 (7, 14.9–21.0), sta. 516, N side of pass between two Water Cays, Double Headed Shot Cays, Apr. 30, 1960, H. R. Roberts, J. E. Böhlke, J. M. Greeven. ANSP 94201 (2, 21.0–21.4), sta. 524, point forming NW tip of Cay Sal, May 2, 1960, H. R. Roberts, D. K. Farquhar, J. E. Böhlke, H. Thompson, C. Sears, R. Roole.

CUBA

USNM 82548 (1, 18.4), Cabañas Bay, June 8–9, 1914, Henderson and Bartsch on the Tomas Barreras Expedition.

Starksia sluiteri (Metzelaar)

Table 1, Figures 11 and 12.

Brannerella sluiteri Metzelaar 1919, Report on the fishes, collected by Dr. J. Boeke, in Dutch West Indies, 1904-1905, . . . , Rapp. Viss. Zeeprod. Kolonie Curaçao, Gravenhage: 155, fig. 49 (Type locality: "Bonaire (lac)." Jordan, Evermann and Clark 1930, Rept. U. S. Comm. Fish for 1928 (2): 464 (name in list of North American fishes).

Starksia ocellata (not of Steindachner 1876), Fowler 1950, Proc. Acad. Nat. Sci. Philadelphia, 102: 84, figs. 30-32 (a specimen from Old Providence Island; description, figure).

Diagnosis.—Narrow simple cirri present on nape, on top of eyeball and from rear margin of anterior nostril; none of them greatly longer than others. Pores from circumorbital ossifications uniserially arranged. Teeth present on vomer; present on palatines of a 20.5 mm. specimen, but apparently absent from two smaller ones (16.9 and 17.6 mm.). Venter without scales. Most or all scales of posterior portion of lateral line with tubes and pores. Membrane between two principal ventral rays deeply incised, to about one-third the way out on the shorter ray. Third ventral ray not evident on unstained material. In females the second anal spine is longer than the first; in males the first is somewhat longer than the second. The male intermittent organ is composed of the first anal ray and genital papilla which are united for their entire length; the papilla in the mature male extends a considerable distance beyond the tip of the spine. Essentially, the color pattern consists of three rows of large dark blotches on a light background, the lower of these rows least distinct. The spots of the middle row are round, those of the upper and lower rows squarish. Size to 20.5 mm. standard length.

D. XIX, 7 to 9. A. rays 15 or 16. P. 12 or 13 (usually 13). Segmented C. 13. Lateral line scales 15 or 16 + 18 or 19 = 33 or 34.

Remarks.—The counts of the specimens we have examined are a bit off from those listed by Metzelaar in his original description of *sluiteri*; were it not for the very distinctive color pattern of this species we might have some hesitation in identifying our specimens with that name. All three of the specimens we have examined look just like Metzelaar's illustration of his *Brannerella sluiteri*. Metzelaar gives a dorsal spine count of XX, whereas all three of the specimens we examined have XIX. He gives a count of 17 anal rays, whereas we count 15 on two specimens and 16 on one in our material. Metzelaar gives a lateral line scale count of 36, whereas we count either 33 or 34 on our specimens.

Habitat.—Nothing known.

Range.—This species has been taken from Bonaire, Los Roques and Old Providence—all in the southern Caribbean.

Material examined.—

ANSP 72687 (1, female, 17.6, photographed for publication), Old Providence Island, western Caribbean, Apr. 27-May 4, 1948, Catherwood-Chaplin West Indies Exped. (the

specimen recorded as *ocellata* by Fowler). USNM 195750 (2, 16.9–20.5, the smaller photographed for publication and its intromittent organ illustrated), SW2, U58-3, Los Canquises Cays, Los Roques Archipelago, off Venezuela, Aug. 31, 1960, Bottome and Wallis.

***Starksia guttata* (Fowler)**

Table 5, Figures 13 and 14.

Branmerella guttata Fowler 1931, Proc. Acad. Nat. Sci. Philadelphia, 83: 401, text-fig. 3 (Type locality: Monas Island, Trinidad).

Diagnosis.—Simple slender cirri present on nape, on top of eyeball and from rear margin of anterior nostril; these cirri all subequal, the orbital cirrus longest, or the orbital and nasal cirri subequal and longer than the nuchal cirrus. Pores from circumorbital ossifications mostly biserially arranged. Teeth present on vomer and palatines. Venter naked, except for a few rows of scales immediately preceding the anus. Most or all of the scales in the posterior portion of the lateral line with tubes and pores.

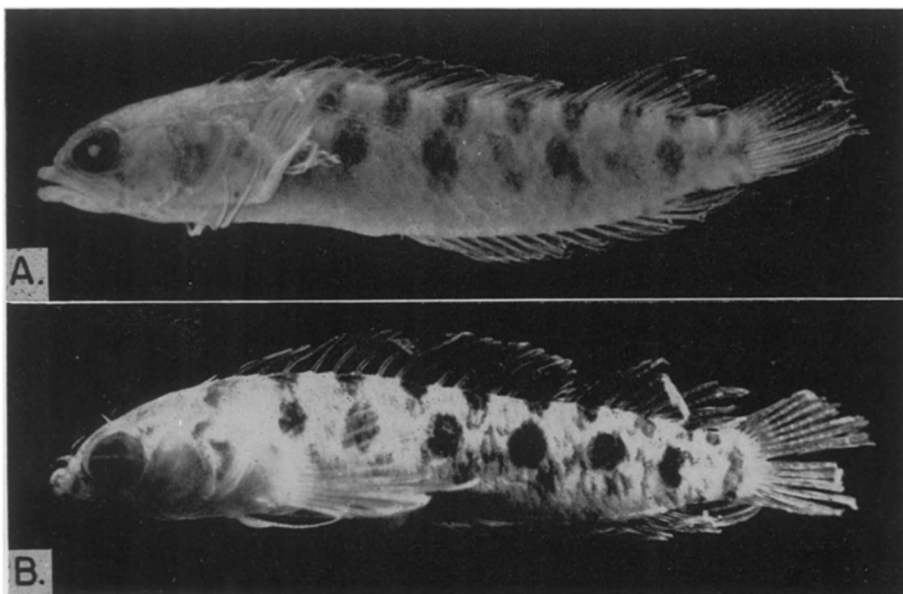


Figure 11. *Starksia shuiteri* (Metzelaar): **A**, a female, 17.6 mm. S.L., from Old Providence Id., ANSP 72687. **B**, a male, 16.9 mm. S.L., from Los Roques, part of USNM 195750.

Figure 12. *Starksia shuiteri* (Metzelaar): anterior portion of anal fin of a mature male, 16.9 mm. S.L., from Los Roques, part of USNM 195750. Base line equals 1 mm.



Membrane between the two principal ventral rays deeply incised, to a point one-third or less of the way out on the shorter ray. Third ventral ray minute, not obvious on unstained material. In females, the second anal spine is notably longer than the first. In males, the two anal spines are subequal or the first slightly the longer. The male intromittent organ is composed of the first anal spine and genital papilla which are united for their entire length, the papilla extending well beyond the tip of the spine. The color pattern is of small discrete dark dots on a pale background, these dots very numerous and irregularly placed, not in rows. Small ring-like markings present on side of head and base of pectoral fin. Size to 40.0 mm. standard length.

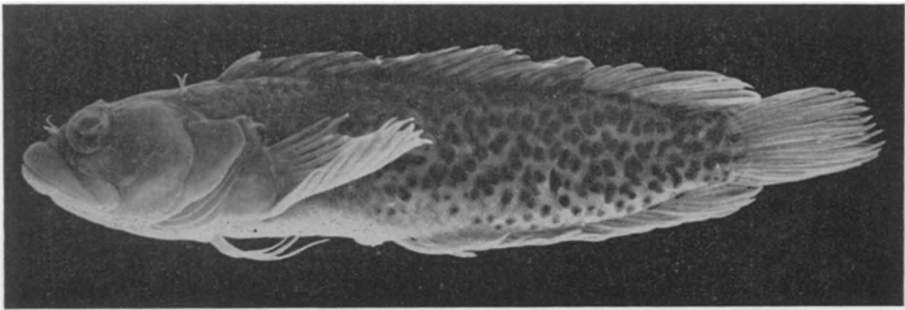


Figure 13. *Starksia guttata* (Fowler): a male paratype, 38.0 mm. S.L., from Trinidad, ANSP 53325.

Figure 14. *Starksia guttata* (Fowler): anterior portion of anal fin of a mature male paratype, 36.0 mm. S.L., from Trinidad, ANSP 53326. Base line equals 1 mm.



D. XXI, 8 or 9. A. rays 18. P. 14 or 15 (usually 14). Segmented C. 12 or 13 (12 in only 1 of 7). Lateral-line scales 17 or 18 (usually 17) + 20 or 21 (usually 21) = 38.

Remarks.—*S. guttata* is like *S. ocellata* in most regards and it is with some misgivings that we tentatively retain the two as distinct. We do this because of the difference in pigmentation and because of slight differences in several proportions. The color pattern of *guttata* is one of numerous randomly distributed round black spots on an abruptly lighter background; that of *ocellata* is variably developed, but when blotching occurs the blotches are much larger and the difference between their intensity and that of the background less abrupt. We have tabulated separately the proportions and counts for eleven specimens of *ocellata* and the seven types of *guttata* in

Table 5. From this table it can be seen that the two are similar in most regards, but that the specimens we call *guttata* have a larger head and longer upper jaw than do Florida *ocellata*.

Habitat.—Nothing known.

Range.—As yet known only from the type series, a single collection from Monas Id., Trinidad.

Material examined.—

ANSP 53324 (holotype, male, 40.0), ANSP 53325 (1, paratype, male, 38.0, photographed for publication), ANSP 53326 (1, paratype, 36.0, intromittent organ illustrated) and ANSP 53327–30 (4, paratypes, 24.5–37.9), Monas Id., Trinidad, June 27, 1930, L. Wehekind, Barber Asphalt Co.

***Starksia ocellata* (Steindachner)**

Tables 1, 5 and 6, Figures 15 and 16.

Clinus ocellatus Steindachner 1876, 'Ichthyologische Beiträge (V)', Sitzungsber. math.-nat. Classe k. Akad. Wiss. Wien, 74(1): 230, pl. 12, fig. 5 (Type locality: Bahama Islands).

Brannerella brasiliensis Gilbert 1900, Proc. Washington Acad. Sci., 2: 180, pl. 9, fig. 1 (Type locality: coral reef near Maceió, Brazil). Metzelaar 1919, Report on the fishes, collected by Dr. J. Boeke, in the Dutch West Indies, 1904–1905, . . . , Rapp. Viss. Zeeprod. Kolonie Curaçao, Gravenhage: 155 (three specimens from Fuikbay, Curaçao). Jordan, Evermann and Clark 1930, Rept. U. S. Comm. Fish for 1928 (2): 464 (name in list of North American fishes). Longley and Hildebrand 1941, Papers Tortugas Lab., 34: 258 (*brasiliensis* synonymized with *ocellata*).

Malacoctenus culebrae Evermann and Marsh 1900, Rept. Comm., U. S. Comm. Fish and Fish., 25 for 1899: 357 (Type locality: reefs outside the harbor of Culebra, Puerto Rico). Jordan and Evermann 1900, Bull. U. S. Nat. Mus., 47(4): 3187 (description of types, after Evermann and Marsh). Evermann and Marsh 1902, Bull. U. S. Fish Comm., 20 for 1900: 308, fig. 96 (republication of original description, figure). Schmitt and Schultz 1940, Smithsonian Misc. Coll., 98(25): 9 (Old Providence Island). Longley and Hildebrand 1941, Papers Tortugas Lab., 34: 258 (*culebrae* synonymized with *ocellata*). Joseph and Yerger 1956, Florida State Univ. Studies, 22: 141 (a specimen from Alligator Harbor, Florida).

Acteis ocellatus, Jordan 1904, Bull. U. S. Fish Comm., 22 for 1902: 543 (one of the species provisionally placed in the new genus *Acteis*).

Acteis culebrae, Jordan 1904, Bull. U. S. Fish Comm., 22 for 1902: 543 (one of the species provisionally placed in the new genus *Acteis*). Jordan, Evermann and Clark 1930, Rept. U. S. Comm. Fish. for 1928 (2): 460 (name in list of North American fishes).

Malacoctenus ocellatus, B. A. Bean 1905, in: Shattuck, The Bahama Islands, Macmillan, New York: 319 (name in list of Bahama fishes). Rosén 1911, Lunds Univ. Arsskrift, N. F., (2) 7(5): 67 (name in list of Bahama fishes). Jordan, Evermann and Clark 1930, Rept. U. S. Comm. Fish for 1928 (2): 459 (name in list of North American fishes). Delsman 1941, Mém. Mus. Royal Hist. Nat. Belgique, ser. 2, fasc. 21, Rés. Sci. Croisières Navire-École Belge "Mercator," 3(3): 76 (7–10 mi. off Dry Tortugas, 20–22 fms.).

?*Starksia cremnobates* (not of Gilbert 1890), Metzelaar 1922, Bijdragen tot de Dierkunde, Feest-nummer: 140 (one specimen from a sponge in Caracasbay).

Brannerella ocellata, Hildebrand and Ginsburg 1927, Bull. U. S. Bur. Fish., 42 for 1926: 211, fig. 3 (description, with figure, of material from Key West, Florida). Fowler, 1941, Proc. Acad. Nat. Sci. Philadelphia, 93: 98 (Sanibel, Florida; suggests that

Brannerella sluiteri Metzelaar appears to be the same as Steindachner's *ocellatus*. Bailey et al. 1960, 'A list of common and scientific names of fishes . . .,' American Fish. Soc., Spec. Publ., 2: 42 (the common name 'checkered blenny' given to this species).

Brannerella culebrae, Beebe and Tee-Van 1928, Zoologica, 10(1): 236, text-fig. (Sand Cay, Bizoton Reef, and Lamentin Reefs, Port-au-Prince Bay, Haiti; description, habits). Nichols 1930, Sci. Survey Porto Rico and the Virgin Islands (New York Acad. Sci.), 10(3): 375, fig. 279 (diagnosis, habits).

Starksia ocellata, Longley and Hildebrand 1941, Papers Tortugas Lab., 34: 258 (Tortugas; description, habits, *culebrae* synonymized with *ocellata*). Fowler 1944, Acad. Nat. Sci. Philadelphia, Monogr., 6: 472 (name in list of western Caribbean fishes). Fowler 1952, Mem. Soc. Cubana Hist. Nat., 21(1): 105 (name only in list of Hispaniola fishes). Dawson 1960, Copeia, 1960 (1): 75 (4 specimens taken from a sponge trawled in 13 fms., SE of the North Edisto R., South Carolina).

Starksia ocellatus, Fowler 1944, Acad. Nat. Sci. Philadelphia, Monogr., 6: 452 (name in list of Bahama fishes). Briggs 1958, Bull. Florida State Mus., Biol. Sci., 2(8): 291 (name in list of Florida fishes).

Brannerella sp., Springer and Woodburn 1960, Florida State Bd. of Conserv., Prof. Papers Ser., 1: 77 ("rocky reefs offshore [Tampa Bay area] at depths from 39-60 feet").

Diagnosis.—Long, narrow, simple cirri present on nape, on top of eye and from rear margin of anterior nostril, that on top of eye the longest. Pores from circumorbital ossifications mostly paired (biserial) in adults. Teeth present on vomer and palatines. Venter largely naked, the scaled portion varying from just a few rows immediately before the anus to almost the entire posterior one-third of the preanal area. Most or all scales of the posterior segment of the lateral line with tubes and pores. Membrane between the two principal ventral rays deeply incised, to a point one-third or less of the way out on the shorter ray. Third ventral ray minute, not in evidence on unstained material. In females the second anal spine is a bit longer than the first, in males the two are equal or the first somewhat longer than the second. The intromittent organ of the male is composed of the first anal spine and the genital papilla which are united for their entire length, the latter extends beyond the tip of the former in adult males; the second anal spine is completely separated from the first and continuous with the remainder of the anal fin. The coloration varies from a nearly even sprinkling of varying shades of brown to a situation where there are three rows of rather distinct irregularly-shaped dark blotches on a lighter background (the extreme in this direction tending toward the pattern of *sluiteri*, but the blocks not so discrete). Characteristically, this species has small ring-like markings on the cheek, opercle and pectoral base. Size to 41.1 mm. standard length (in material we examined).

D. XX to XXII (usually XXI), 7 to 9 (rarely 7). A. rays 16 to 19 (only 2 counts of 16 and one of 17). P. 12 to 15 (usually 14). Segmented C. 12 or 13 (12 in 4 of 41 counts). Lateral-line scales 15 to 19 (only 1 count each of 15 and 16) + 20 to 23 (usually 21 or 22) = 35 to 41 (nearly always 38 to 40).

Remarks.—We retain *brasiliensis* in the synonymy of *ocellata* as it was

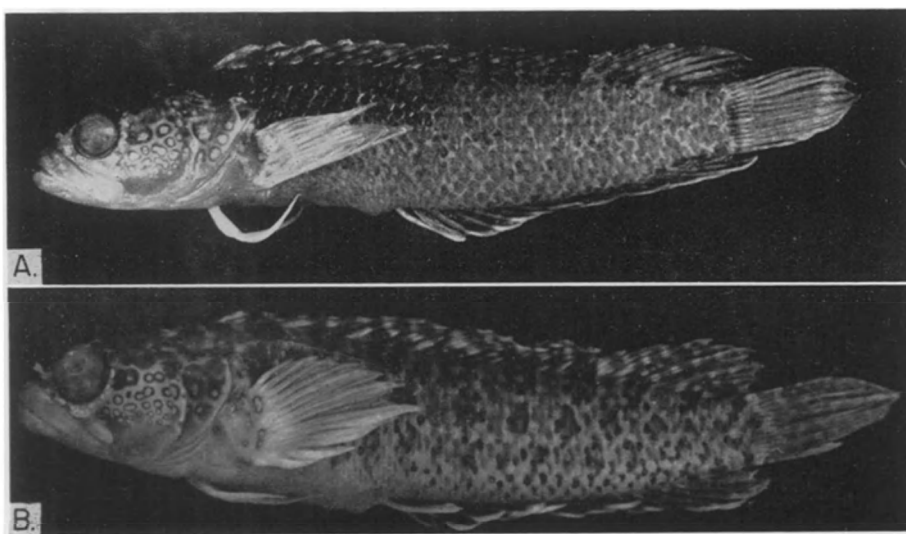


Figure 15. *Starksia ocellata* (Steindachner): **A**, a male, 33.4 mm. S.L., from VGS 58-272, West Florida, ANSP 94203. **B**, a male with a more contrasting color pattern, 37.1 mm. S.L., from CRR-F-203, Florida Keys, part of UMML 5485.

Figure 16. *Starksia ocellata* (Steindachner): anterior portion of anal fin of a mature male, 33.4 mm. S.L., from VGS 58-272, West Florida, ANSP 94203. Base line equals 1 mm.



placed by Longley and Hildebrand (1941: 258), in spite of the low anal-ray and scale counts of the paratype of *brasiliensis* which we have examined (SU 53510). This specimen has the following counts (included in Table 1): D. XXI, 7. A. rays 16. P. 14/14. Lateral line scales $15 + 20 = 35$.

In his original description of *brasiliensis*, Gilbert (1900: 180) gives for the type the counts of segmented dorsal and anal rays, respectively, as 7 and 16. From the illustration of the type (pl. 9, fig. 1), however, it would appear that in each instance Gilbert counted the last two elements as one; if 1 is added to each of his counts, the resulting 8 dorsal and 17 anal segmented rays agree more closely with others we have made, though they are still low. Since we did not examine it directly, the holotype counts are not in our tabulation.

Possibly the population around the "hump" of Brazil does average lower in ray and scale counts and it may eventually be shown separable at the subspecific level. At present, and in the absence of further information, we prefer to retain the nominal form where Dr. Longley placed it.

We offer no explanation for the low vertical fin-ray counts of one of the three specimens from South Carolina; it certainly stands in poor agreement with the other two specimens.

Habitat.—This species has been taken in rocky and coral reef situations at depths from about 5 to 60 feet off the Florida coast, and from unknown bottom off South Carolina at a depth of 78 feet. Evermann and Marsh (1900: 358) and Gilbert (1900: 180) state that their specimens came from reefs at Puerto Rico and Brazil, respectively. Beebe and Tee-Van (1928: 237) wrote "Found along shore and on the various shallower reefs, especially among low weeds and in broken coral." Longley wrote (Longley and Hildebrand 1941: 258) that the species was found in branching coral, *Porites porites*, from the inner margin of Bird Key reef, or at depths of 10 feet where it occurred under the sea urchin, *Centrechinus setosum*, and in eroded corals.

Starksia ocellata has been taken on at least several occasions as an inquiline in sponges. Metzelaar's (1922: 140) record of "*Starksia cremnobates*" from a sponge at Caracasbay is evidently based on a specimen of *ocellata*, as *cremnobates* is a Pacific form not otherwise reported from the Atlantic and Metzelaar's brief account would as well fit *ocellata*. The three specimens from Key West reported by Hildebrand and Ginsburg (1927: 211–212) were collected from sponges on three separate occasions. And finally, Dawson (1960: 75) reported, for what he thought to be the first time for the species, a specimen of *ocellata* from a sponge trawled off the North Edisto River, South Carolina.

Range.—On the southeast Atlantic coast of the U. S. from North Carolina southward; on the west coast of Florida, north to Alligator Harbor and Ochlochnee Shoal; the Bahamas; Cuba, Haiti, Puerto Rico and the Virgin Islands; the Grenadines and Curaçao; Old Providence Island, western Caribbean; the "hump" of Brazil (the types of *brasiliensis* and a specimen in British Museum from 34 fms. at 11° 50' S., 38° 47' W. [this obviously only approximate]—recorded in Longley and Hildebrand 1941: 258).

The only specimens recorded from the Bahamas are Steindachner's types of *ocellatus*. While this may truly be the case, subsequent work in the Bahamas has failed to turn up the species. The two syntypes of *ocellatus* examined by us look just like examples from the Florida Keys, and we feel that Steindachner's statement of type locality should at present be regarded somewhat doubtful. *Clinus ocellatus* is the only species in *Ichthyologische Beiträge* (V) which is said to be from "Bahama-Inseln," while there are several other species (the only others from the area) given as from "Kleine felsige Inseln nördlich von Cuba." The last-mentioned locality also may be variously interpreted—as islands truly near the Cuban coast, as Cay Sal Bank (Bahamas) or as Florida Keys (Springer 1954: 429).

Material examined.—

NORTH CAROLINA

USNM 120131 (1, 36.6), Onslow Bay, 34° 17' N, 76° 43' W, Feb. 16, 1940, *Pelican*.

SOUTH CAROLINA

UF 7270 (2, ca. 24–31), sea buoy, SE of North Edisto River, Feb. 25, 1958, C. E. Dawson.

FLORIDA

EAST COAST.—VGS 59-113 (5, 14.6–17.1), Atlantic side of Hutchinson Id., ca. 1 mi. N of St. Lucie River Inlet, Martin Co., July 25, 1959, V. G. Springer, R. H. Harrington, R. Mount, R. Pfister, E. Everett.

WEST COAST.—VGS 58-232 (1, 30.4), ca. 15 mi. offshore, 240° from John's Pass, Madeira Beach, Pinellas Co., Sept. 14, 1958, V. G. Springer, R. T. Kirk. VGS 58-249 (1, 31.3), ca. 20 mi. offshore, 240° from John's Pass, Oct. 5, 1958, V. G. Springer. ANSP 94202 (2, 35.5–38.5) and ANSP 94203 (1, 33.4, photographed for publication and intermittent organ illustrated), VGS 58-272, ca. 10 mi. offshore, 240° from John's Pass, Nov. 9, 1958, V. G. Springer, R. T. Kirk, P. McGarry. VGS 58-294 (3, 26.5–40.5), ca. 11 mi. offshore, 240° from John's Pass, Dec. 6, 1958, V. G. Springer. VGS 59-8 (3, 32.0–34.8), ca. 16–18 mi. offshore, 240° from John's Pass, Jan. 31, 1959, V. G. Springer. ANSP 71015 (1, 37.3), Sanibel, Jan., 1940, Mrs. F. R. Schwengel. ANSP 94204 (1, 35.2), *Silver Bay* sta. 71, Gulf of Mexico, W of S tip of Florida, 25° 26' N, 81° 40' W, 4.5 fms., July 18, 1957.

FLORIDA KEYS.—UMML 3645 (31.2), CRR-F-175, ca. ½ mi. E of middle of Lower Matecumbe Key, Aug. 23, 1958, W. A. Starck, II, T. Starck. UMML 5516 (1, 21.6), CRR-F-207, 3 mi. NE of Alligator Reef light, June 13, 1959, W. A. Starck, II. UMML 2645 (1, 21.2), CRR-F-146, top of Alligator Reef, 1000 ft. S of light, June 15, 1958, W. A. Starck, II, T. Starck. UMML 3590 (1, 29.8), CRR-F-158, Alligator Reef, ca. ½ mi. SW of light, Sept. 14, 1958, W. A. Starck, II. UMML 2597 (1, 16.2), CRR-F-146b, 200 ft. E of Alligator Reef light, June 14, 1958, W. A. Starck, II. UMML 4650 (1, 27.7), CRR-F-157, ca. ½ mi. SW of Alligator Reef light, Aug. 24, 1958, W. A. Starck, II. UMML 5485 (5, 19.4–37.1, largest photographed for publication), CRR-F-203, E side of Indian Key along oölite formation, 1 mi. off Lower Matecumbe Key, Sept. 19, 1959, W. R. Courtenay, W. A. Starck, II, T. W. McKenney. UMML 5487 (3, 37.5–38.4), CRR-F-206, 1 mi. E of Upper Matecumbe Key, Oct. 11, 1959, H. Feddern. UMML 5488 (1, 26.6), CRR-F-217, ½ mi. off SW end of Lower Matecumbe Key, Aug. 2, 1959, W. A. Starck, II. UMML 5489 (1, 23.9), WAS-Fla-4, Conch Reef, Aug. 30, 1959, W. A. Starck, II. USNM 116829 (8, 12.6–31.9), Bird Key Reef, Tortugas, July 21, 1932, W. H. Longley. USNM 116831 (5, 20.8–33.8), Tortugas, W. H. Longley.

BAHAMAS

ANSP 94205 (1, 40.2, syntype of *Clinus ocellatus* Steindachner, illustrated) and ANSP 93813 (1, 41.4, also a syntype), Bahama Islands, 1874, F. Steindachner.

CUBA

USNM 82548 (1, 18.7), Cabañas Bay, June 8–9, 1914, Henderson and Bartsch on the Tomas Barreras Expedition.

HAITI

USNM 178297 (7, 18.1–29.1), Haiti, Mar. 9, 1927, W. Beebe. USNM 178298 (3, 18.7–26.4), Haiti, Mar. 20, 1927, W. Beebe.

PUERTO RICO

USNM 49369 (1, 29.6, holotype of *Malacoctenus culebrae* Evermann and Marsh) and USNM 125973 (1, 25.5, paratype), reef outside Culebra Harbor, Feb. 9, 1899, *Fish Hawk*. USNM 50207 (1, ca. 26.5, paratype), "Culebra, probably," 1898-99, *Fish Hawk*. The original description of *culebrae* states "Three specimens of about the same size; . . . , from the reefs outside the harbor of Culebra, February 9, 1899." Thus, USNM 50207, if indeed a paratype, also came from this locality and at this date.

VIRGIN ISLANDS

UMML 7828 (1, 26.0), V. I. sta. 16, Yawzi Pt., Greater Lameshur Bay, St. John, Dec. 21, 1958, S. and L. P. Thomas, J. E. Randall.

LESSER ANTILLES

USNM 170202 (4, 19.3-24.8), W side of Baradal, Tobago Cays, Grenadines, Mar. 17, 1956, D. V. Nicholson.

WESTERN CARIBBEAN

USNM 107110 (2, 18.1-24.3), Old Providence Id., Aug. 6, 1938, Presidential Cruise.

BRAZIL

SU 53510 (1, 20.4, paratype of *Brannerella brasiliensis* Gilbert), coral reef near Maceió, summer of 1899, A. W. Greeley.

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TABLE 1. *Tabulation of fin-ray and scale counts for the Atlantic species of STARKSIA.*

XVIII	Dorsal Spines			Dorsal Rays			Total Dorsal				Anal Rays														
	XIX	XX	XXI	XXII	7	8	9	26	27	28	29	30	15	16	17	18	19								
<i>S. nanodes</i>																									
<i>S. atlantica</i>	2	1	18*	1	14*	1		1	12*	2				8*											
<i>S. fasciata</i>		25	4		7	24		6	24	1			6	25											
<i>S. leptocheila</i>		16*	22		10	19*		3	20*	6			13	25*											
<i>S. hassi</i>		13	126*	13	14	126*	14		15	126*	13			4	106	42*	1								
<i>S. stutleri</i>		2	5		1	7			2	5					5	2									
<i>S. ocellata</i>		3	8	36†	6	3	32†	15†	1	1	1	30†	13†	2	1	27	19†								
<i>S. guttata</i>				7*		6*	6*	1		1	6*	1				7*									
	Pectoral Rays				Dorsal Spines + Dorsal Rays + Anal Rays + Pectoral Rays																				
	11	12	13	14	15	66	67	68	69	70	71	72	73	74	75	76	77	78							
<i>S. nanodes</i>																									
<i>S. atlantica</i>		5	25*					1	10*	4															
<i>S. fasciata</i>			6	54	1		1	6	1	21	1														
<i>S. leptocheila</i>	1	3	72*	1			3	11	17*	7															
<i>S. hassi</i>		5	285*	19				1	4	14	78	38*	15	2											
<i>S. stutleri</i>		1	9	4					2	2	1	2													
<i>S. ocellata</i>		1	5			1		1	1	1	1	1	2		21	5†	13†	1							
<i>S. guttata</i>			6	87†	4										5	2*									
				13*	1*																				
	Arched				Lateral Line Scales																				
	12	13	14	15	16	17	18	19	Straight								Total								
<i>S. nanodes</i>	1	7	2*						20*	21	22	23	24	25	26	33	34	35	36	37	38	39	40	41	
<i>S. atlantica</i>									1	6	7	2				2	6*	3							
<i>S. fasciata</i>				9	1				1	6	3					4	5	1							
<i>S. leptocheila</i>			1	8	1				10	1						9	1								
<i>S. hassi</i>			1	6	6*	2			1	4	9	1*				4	5	4	2*						
<i>S. stutleri</i>				2	3						1	1	2		1										
<i>S. ocellata</i>				2	1			2	1							1	2	1				2	1	1	
<i>S. guttata</i>				1	13†	15†	5			19†	9†	2										9	14†	9	1
						6	1*		1*	6												7*			

* The counts exhibited by the holotype.
† The counts on the two Steindachner syntypes, now at the ANSP.

TABLE 2. Tabulation of frequency of mutual occurrence (collection) of the Bahaman species (except OCELLATA) of STARKSIA in our material. The figure at the intersection of the columns opposite the species selected indicates the number of times those two forms appeared in the same collection. The italicized numbers, where two lines intersect, are the total number of times that species appears in our Bahama collections. Example: of a total of 7 collections which included NANODES and 16 which included FASCIATA, 0 included material of both species.

	<i>S. nanodes</i>	<i>S. atlantica</i>	<i>S. fasciata</i>	<i>S. lepicoelia</i>
<i>S. nanodes</i>	7	2	0	5
<i>S. atlantica</i>	2	11	5	8
<i>S. fasciata</i>	0	5	16	7
<i>S. lepicoelia</i>	5	8	7	28

TABLE 3. STARKSIA LEPICOELIA: measurements as thousandths of standard length and counts of ten specimens from the Bahamas.

	387	516	496	212	514	513	CRR- BWI-21	513	514	303
Station number	13.7	23.4	28.6 ¹	25.0	25.1	25.5	25.7	26.4	26.7	28.4 ²
Greatest depth	234	235	199	200	231	208	202	204	270	222
Length ventral fin	255	231	233	224	211	196	218	227	217	222
Length lower caudal lobe	270	269	246	264	263	239	245	246	258	264
Length first dorsal spine	088	094	085	080	088	068	066	087	064	067
Head length	358	350	343	336	319	337	335	343	333	331
Diameter of eye	088	081	076	074	076	074	070	072	082	067
Length of snout	073	068	068	068	068	067	068	068	067	067
Length upper jaw	157	162	161	160	183	161	156	163	172	162
Lateral line scales	15+21	15+20	16+22	15+21	16+21	17+19	17+21	15+20	15+20	16+21
Counts:										
Dorsal fin	XX.8	XIX.9	XX.8	XX.8	XX.8	XX.8	XXI.7	XIX.9	XIX.8	XX.9
Anal fin	II.17	I.17	I.18	I.17	I.17	I.17	II.17	I.17	II.16	II.18
Pectoral fin	13/13	13/13	13/13	13/14	13/14	13/13	13/13	13/13	13/13	13/13
Caudal fin (segmented)	13	13	13	13	13	13	13	14	13	13
Sex	♀	♂	♂	♂	♂	♂	♀	♂	♀	♀

¹ Holotype.

² Allotype-paratype.

TABLE 6. STARKSIA OCELLATA: *fin-ray and scale counts separated by geographic areas.*

	Dorsal															
	Dorsal Spines			Rays			Total Dorsal				Anal Rays					
	XX	XXI	XXII	7	8	9	27	28	29	30	16	17	18	19		
South Carolina	1	2		1	2		1		2		1		2			
Florida (E coast)	1	4			4	1			5				4			
Florida Keys		9	1		6	4			5	5			3	7		
Florida (W coast)		10	2	1	9	2			9	3			8	4		
"Bahama Islands "		2			1	1			1	1				2		
Haiti	2	4	2		5	3			5	3			4	4		
Puerto Rico		2	1		2	1			1	2			1	2		
Grenadines	4				1	3		1	3			1	3			
Western Caribbean		2			2				2				2			
Brazil		1		1				1			1					
	Pectoral Rays				Dorsal Spines + Dorsal Rays + Anal Rays + Pectoral Rays											
	12	13	14	15	71	72	73	74	75	76	77	78				
South Carolina			6		1				2							
Florida (E coast)		2	8						4							
Florida Keys	1	2	17				2		1	2	5					
Florida (W coast)		2	19	2			1		4	3	3					
"Bahama Islands "			4								1					
Haiti			14	2					4		3	1				
Puerto Rico			6						1		2			1		
Grenadines			8													
Western Caribbean			4				1		3							
Brazil			2				1		2							
	Arch					Straight				Total						
	15	16	17	18	19	20	21	22	23	35	36	37	38	39	40	41
South Carolina			1				1						1			
Florida (E coast)			2		1		2	1					1	1	1	
Florida Keys			2	6	2		6	4						6	4	
Florida (W coast)			3	8	1	2	6	2	2				4	3	3	2
"Bahama Islands "			1	1			1	1						2		
Haiti			4				3	1					3	1		
Puerto Rico		1	2				2	1					3			
Grenadines			3			1	2					1	2			
Western Caribbean			1		1	1	1						1	1		
Brazil	1					1				1						