

Descriptions of six new Caribbean fish species in the genus *Starksia* (Labrisomidae)

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Abstract

Extensive collecting efforts using rotenone sampling throughout the Caribbean over the past four decades have vastly increased the numbers of specimens of cryptic fishes in museum collections. Among these specimens, we discovered representatives of six new cryptic fish species belonging in the *Starksia fasciata* and *S. sluiteri* species complexes. Descriptions are provided herein for the following new species: *S. leucovitta* from Navassa Island; *S. melasma* from Mona Island, Puerto Rico, and Buck Island Reef National Monument, St. Croix; *S. multilepis* from Fernando de Noronha Island and Atol das Rocas, Brazil; *S. rava* from Tobago, Trinidad and Tobago; *S. sella* from Tobago, Trinidad and Tobago, all in the *S. sluiteri* complex; and in the *S. fasciata* complex, *S. smithvanizi* from Buck Island Reef National Monument (St. Croix), Navassa Island, St. Barthelemy, and Dominica. *Starksia fasciata* is restricted in distribution to the Bahamas and northern Cuba. We provide an identification key and diagnostic characters for the 21 western Atlantic species (those species in the *S. ocellata* complex are diagnosed only in the key). The descriptions herein bring the total number of recognized western Atlantic species of *Starksia* to 21.

Zusammenfassung

Ausgedehnter Fischfang in der Karibik während der vergangenen Vierjahrzehnten unter Anwendung von Rotenon hat zu erheblicher Erhöhung der Anzahl kryptischer Fischexemplare in Museumsammlungen geführt. Unter diesen entdeckten wir Vertreter von sechs neuen kryptischen Fischarten, die zu den *Starksia fasciata*- und *S. sluiteri*-Artenkomplexen gehören. Hier werden Beschreibungen folgender Arten gegeben: *S. leucovitta* von Navassa Island; *S. melasma* von Mona Island, Puerto Rico und von Buck Island Reef National Monument, St. Croix; *S. multilepis* von Fernando de Noronha und von Atol das Rocas, Brasilien; *S. rava* von Tobago, Trinidad und Tobago; *S. sella* von Tobago, Trinidad und Tobago, die alle zu

dem *S. sluiteri*-Komplex gehören; und im *S. fasciata*-Komplex, *S. smithvanizi* von Buck Island Reef National Monument (St. Croix), Navassa Island, St. Barthelemy und Dominica. *Starksia fasciata* ist nur auf den Bahamas im nördlichen Kuba zu finden. Wir fügen auch einen Bestimmungsschlüssel mit diagnostischen Kennzeichen für die 21 Arten aus dem westlichen Atlantik bei (Arten im *S. ocellata*-Komplex werden nur im Schlüssel bestimmt). Die hier enthaltenen Beschreibungen bringt nun die Gesamtzahl der anerkannten *Starksia* Arten im westlichen Atlantik auf 21.

Résumé

Des efforts considérables de collectes à l'aide de rotenone dans toutes les Caraïbes, ces quarante dernières années, ont sérieusement augmenté le nombre de spécimens de poissons cryptiques dans les collections des musées. Parmi ces spécimens, nous avons découvert six nouvelles espèces de poissons cryptiques appartenant aux complexes de *Starksia fasciata* et de *S. sluiteri*. Figurent ici les descriptions des six espèces nouvelles suivantes: *S. leucovitta* de l'île Navassa; *S. melasma* de l'île Mona, de Porto-Rico et de Buck Island Reef National Monument, St Croix; *S. multilepis* de l'île Fernando de Noronha et de l'Atoll das Rocas, Brésil; *S. rava* de Tobago, Trinidad et Tobago; *S. sella* de Tobago, Trinidad et Tobago, qui font partie du complexe *S. sluiteri*. Dans le complexe *Starksia fasciata*, *S. smithvanizi* de Buck Island Reef National Monument (St Croix), de l'île Navassa, de St Barthélémy et de Dominique. *S. fasciata* voit sa distribution réduite aux Bahamas et au nord de Cuba. Nous fournissons une clé de détermination et une liste de caractères diagnostiques pour les 21 espèces de l'Atlantique ouest (les espèces du complexe *S. ocellata* ne sont diagnostiquées que dans la clé). Ces descriptions portent à 21 le nombre total d'espèces reconnues de *Starksia* de l'Atlantique occidental.

Sommario

Un'intensa attività di raccolta con la tecnica del rotenone condotta nei Caraibi negli ultimi quattro decenni ha notevolmente incrementato il numero di esemplari di pesci criptici nelle collezioni dei musei. Tra queste abbiamo individuato individui appartenenti a sei nuove specie facenti parte dei complessi di specie

Starksia fasciata e *S. sluiteri*. Vengono qui fornite le descrizioni delle seguenti nuove specie: *S. leucovitta* dell'Isola Navassa; *S. melasma* dell'Isola Mona, Puerto Rico e Buck Island Reef National Monument (St. Croix); *S. multilepis* dell'Isola Fernando de Noronha e l'Atollo das Rocas, Brazil; *S. rava* e *S. sella* da Tobago, Trinidad e Tobago, tutte del complesso *S. sluiteri*, mentre del complesso *Starksia fasciata*, viene descritta *S. smithvanizi* raccolta a Buck Island Reef National Monument (St. Croix), Isola Navassa, St. Barthelemy e Dominica. La distribuzione di *S. fasciata* è limitata alle Bahamas e a Cuba settentrionale. Viene fornita una chiave d'identificazione e le caratteristiche diagnostiche per tutte le 21 specie di *Starksia* dell'Atlantico occidentale (le specie del complesso *S. ocellata* sono diagnosticate solo nella chiave dicotomica).

Introduction

The labrisomid fishes of the genus *Starksia* occur on shallow rock and coral reefs in the Eastern Pacific and the western central Atlantic. These are cryptic fishes, but males and females exhibit brilliant red coloration in life. Cryptic fishes comprise a major component of the shallow tropical marine shorefish fauna around the world. Most of our knowledge of the existence of cryptic fishes is based on specimens obtained through rotenone sampling. Collecting efforts using rotenone in the western central Atlantic over about the past four decades have increased the numbers of specimens of cryptic fishes in museum collections. The genus *Starksia* is an example of a group for which there has been significant growth in the number of preserved specimens available for study from shallow rocky and coralline surge zones.

Böhlke and Springer (1961) reviewed the Atlantic species* of *Starksia*, recognizing eight valid species, two of which were described as new. Five additional species of *Starksia* have been described from the western central Atlantic since 1961. Gilbert (1965, 1971) described three of the five new species and Greenfield (1979) described the other two and recognized *S. culebrae* (Fig. 1) and *S. brasiliensis* as valid. There are currently fifteen western Atlantic *Starksia* species recognized as valid.

Collecting stations occupied by the first author at Tobago and Navassa Island contained specimens of *Starksia* that were unidentifiable as any of the fifteen



Fig. 1. *Starksia culebrae*, 29.4 mm SL male, St. Croix. Photo by W. F. Smith-Vaniz and L. Rocha.

recognized western Atlantic species. Our efforts to determine their specific identity led to the conclusion that the specimens from these localities represented three undescribed taxa in the *S. sluiteri* complex and one undescribed species in the *S. fasciata* complex. Our examination of comparative specimens from other Caribbean localities and the south-western Atlantic revealed two additional new species among specimens previously identified as *S. sluiteri*.

We describe six species as new, bringing the total number of valid western Atlantic species of *Starksia* to 21. We provide a key to the identification of and diagnostic characters for the 21 western Atlantic species (those species in the *S. ocellata* complex, which were treated by Greenfield, 1979, are diagnosed only in the key). An analysis of the phylogenetic relationships among the species of *Starksia* must await a comprehensive study of all *Starksia* taxa, including the eastern Pacific species.

Methods

Counts and measurements generally follow Böhlke and Springer (1961). Counts of vertebrae and associated elements and median fin rays were taken from radiographs. The first caudal vertebral centrum is the anteriormost centrum with a hemal spine.

The elements of the two dorsal fins are presented as a formula: number of spines, number of segmented rays. Lateral line scales are presented as arched portion + straight portion (including transitional scale) = total. Male genital papilla length (character) is presented as a number that represents the anal fin element (including the two spines) which the distal tip reaches when the papilla is pressed against the anal fin base (e.g., a papilla reaching the base of segmented ray 4 is recorded as 6). Head length (HL) and measured male genital papilla length are given as % SL (standard length). Institutional abbreviations: AMNH, American Museum of Natural History; ANSP, Academy of Natural Sciences of Philadelphia; UF, Florida Museum of Natural History, University of Florida; USNM, National Museum of Natural History, Smithsonian Institution.

The identification key is based primarily on formalin-preserved specimens, which, after initial fixation, were transferred into 75% ethanol for permanent archival storage. Specimens examined from UF are maintained in 55% isopropanol (most of these specimens exhibit an overall "straw colour" as a result of the degradation of the dark pigment components of the pattern; this is characteristic of specimens stored in isopropanol for long periods of time).

Diagnostic characters for each taxon are provided in the identification key and are not repeated as a separate section in the individual species accounts for new species described herein. Key characters used in the following key are taken in part from Böhlke and Springer (1961), Gilbert (1971), and Greenfield (1979).

Diagnostic key to western Atlantic *Starksia*

- 1a. No orbital cirrus; prominent dark spot, about three-fourths eye diameter, covering bases of posterior segmented dorsal fin rays and extending onto dorsal profile of body
.....*S. atlantica* (Fig. 11)
- 1b. A simple cirrus present above each eye; dark spot, if present at bases of posterior segmented dorsal fin rays, smaller than half eye diameter 2
- 2a. Pelvic fin with three externally obvious segmented rays (inner ray is reduced and difficult to discern, its length three to four times in length of longest ray); body with alternating dark and pale bars, pale bars narrow with line of small melanophores down the center
.....*S. hassi*
- 2b. Pelvic fin with two externally obvious segmented rays; body coloration variable, if dark and pale bars present, pale bars lack narrow line of small melanophores down the centre3
- 3a. Belly completely scaled or with at least posterior half scaled4
- 3b. Belly naked or with less than posterior third scaled5
- 4a. Body with eight or nine irregular dark bars (often appearing as dark blotches), mid-lateral portion of dark bars may coalesce into broad, broken lateral stripe; anal fin usually 11,19; segmented dorsal fin rays usually 9; blotches on cheeks never present*S. starcki*
- 4b. Body usually pale, when bars present, pale bars narrow and not contrasting markedly with dark bars; anal fin usually 11,17; segmented dorsal fin rays usually 8; males with large black blotch on cheek, females without black blotch on cheek ...
.....*S. lepicoelia* (Figs. 14,15)
- 5a. Arched lateral line scales usually 13; pair of broad, hypural-shaped dark blotches at base of caudal fin (narrower blotches present on *S. elongata*)*S. nanodes* (Fig. 16)
- 5b. Arched lateral line scales usually 15 or more; pair of broad, hypural-shaped dark blotches not present at base of caudal fin6
- 6a. Pectoral fin rays usually 13; dorsal fin spines usually 19 or 20; arched lateral line scales usually 15, scales in straight portion of lateral line usually 197
- 6b. Pectoral fin rays usually 14; dorsal fin spines usually 21; arched lateral line scales usually 17-18, scales in straight portion of lateral line usually 20-2210
- 7a. Body with seven dark bars separated by broad, pale interspaces8
- 7b. Colour pattern variable, but not as above9
- 8a. Penultimate body bar on caudal peduncle incomplete, usually with two distinct, small spots dorsally and sometimes with ventral portion of bar breaking up to form separate spots
..... *S. smithvanizi*
- 8a. Penultimate body bar on caudal peduncle complete*S. fasciata* (Fig. 13)
- 9a. Body with series of narrow, pale Y-shaped markings on dark background, on upper two-thirds of body*S. y-lineata*
- 9b. Body without series of narrow, pale Y-shaped markings on dark background, on upper two-thirds of body16
- 10a. Body pale with seven narrow, dark bars (each dark bar about half as large as adjacent pale interspace)*S. elongata* (Fig. 12)
- 10b. Body generally brownish with darker spots, blotches or broken bars11
- 11a. Lips uniformly pigmented with scattered melanophores12
- 11b. Lips with one or more distinct black vertical bars14
- 12a. Infraorbital pores in a single series; narrow Y-shaped pale bar extending from orbit posteriorly to preopercular margin *S. brasiliensis*
- 12b. Infraorbital pores in two rows: no Y-shaped bar on side of head or, if bar present, its width equal to or greater than one-half pupil diameter; distinct black vertical bars on lips either present or absent13
- 13a. Sides of head with small, darkly outlined, pale spots, most overlying a broad, pale area extending from posterior edge of orbit to preopercle
.....*S. ocellata*
- 13b. Sides of head with or without small, dark spots; broad, pale area extending posteriorly from edge of orbit, usually branching into a Y shape over preopercle*S. guttata*
- 14a. Side of head without spots; broad, unbranched, pale area extending from posterior edge of orbit onto preopercle*S. culebrae* (Fig. 1)
- 14b. Side of head spotted; broad, pale area posterior to orbit either reticulated or branched over preopercle15
- 15a. Side of head with pale, Y-shaped bar
.....*S. occidentalis*
- 15b. Side of head with pale area forming a reticulated pattern over preopercle*S. variabilis*
- 16a. Dorsal fin spines usually XX17
- 16b. Dorsal fin spines usually XVIII or XIX18
- 17a. Anterior arched lateral line scales 17 (one male with 16); upper lip without distinct bars; males with black spot between dorsal spines one and three*S. multilepis*
- 17b. Anterior arched lateral line scales usually 15 (16 of 43 with 16); upper lip usually with distinct bars (6 of 49 without bars); no black spot between dorsal spines one and three*S. rava*
- 18a. Body with two or three horizontal rows of sharply contrasting, eye-sized dark blotches along sides of body*S. sluiteri*

- 18b. Body without horizontal rows of eye-sized dark blotches along sides of body, weakly contrasting tan blotches present in some species.....19
- 19a. Lateral line scales in straight portion 18 or 19; posterior portion of body without scale-sized dark spots; males with black blotch between dorsal spines one and four.....*S. melasma*
- 19b. Lateral line scales in straight portion 20 or more (2 of 14 *S. leucovitta* with 19); posterior quarter to third of body usually peppered with scale-sized dark spots; males without black blotch between dorsal spines one and four.....20
- 20a. Cheeks with reticulate pattern of pale spots on dark background; lateral line scales in straight portion 21 (3 of 9 with 20)*S. sella*
- 20b. Cheeks without reticulate pattern; lateral line scales in straight portion 19 or 20 (2 of 14 with 21).....*S. leucovitta*

***Starksia leucovitta* n. sp.**

Whitesaddle blenny (Figs. 2, 3a)

Holotype: USNM 361112, male (24.1 mm SL); Caribbean, Navassa Island, Lulu Bay, 18°24' N, 75° 02' W ca.; undercut rock shore to 3 m, coral slope to 9 m, sponge and algae encrusted wall to rubble flat at 17 m; ecological habitat: coral rock wall; depth: 0 – 16.5 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number NAV 99-21; 04 May 1999; collected by J. T. Williams, B. B. Collette, C. Thacker, M. Miller, L. Micheletti, J. Cox, W. Merritt; rotenone and hand nets.

Paratypes: USNM 359445 (6, 12.5-22.9 mm SL); 18°24' 11" N, 075°01' 40" W; Caribbean, Navassa Island, just north of Lulu Bay on west side of island, diving from the "Quest" at anchorage; depth: 28 - 30 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number NAV 99-29; 8 May 1999; J. T. Williams,



Fig. 2. *Starksia leucovitta* n. sp.: top, USNM 361112, holotype, 24.1 mm SL male (preserved specimen); middle, USNM 361057, paratype, 22.5 mm SL female; bottom, 10.5 mm SL juvenile, all from Navassa Island. Photos by J. T. Williams and J. H. Mounts.



Fig. 3a. Lateral views of male genital papillae in the *Starksia stuiteri* complex. *S. leucovitta*, USNM 361112.

B. B. Collette, C. Thacker. USNM 359663 (3, 17.0-21.1 mm SL); taken with holotype. USNM 360980 (1, 14.2 mm SL); photographed; Caribbean, Navassa Island, off north-west point on rocky reef at vertical wall dropping from 9 to 18 m; ecological habitat: rock wall with encrusting bryozoans, algae, and sea fans; depth: 9 to 18 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number: NAV 99-2; 29 April 1999: 1530 to 1630; J. T. Williams, B. B. Collette, C. Thacker, L. Micheletti. USNM 361055 (1, 13.0 mm SL); Latitude-Longitude: 18°24'41" N, 075°00' 38" W; Caribbean, Navassa Island, just west of north-east point on rocky wall and sand-rubble flat at base; ecological habitat: rocky area at base of vertical wall with algae and sponges, sand and rubble flat at base; depth: 24.4 - 28.4 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number NAV 99-20; 4 May 1999: 0925 to 1025; J. T. Williams, B. B. Collette, L. Micheletti. USNM 361056 (5, 14.8-24.9 mm SL) Caribbean, Navassa Island, just south of north-west point on shelf off west side of island, ridges of rock

with sea fans, sponges and sand/rubble at base; ecological habitat: rocky reef on sand/rubble flat; depth: 24.4 - 30 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number NAV 99-25; 06 May 1999; J. T. Williams, B. B. Collette, C. Thacker, M. Miller, L. Micheletti. USNM 361057 (3, 11.4-21.0 mm SL); Caribbean, Navassa Island, just south of north-east point on east side of island, small cove with vertical wall, on large boulders on sand flat at base of wall; ecological habitat: boulders, algae, some brain coral, rubble around base of boulders; depth: 15.2 - 24.4 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number NAV 99-23; 5 May 1999: 1700 to 1800; J. T. Williams, B. B. Collette, C. Thacker, A. Wright.

Description

See Tables I, II; dorsal rays XVIII-XIX, 8-9 (mode XIX, 8); total dorsal rays 27-28 (mode 27); anal rays II, 15-17 (mode II, 16); dorsal procurrent caudal fin rays 5-6; ventral procurrent caudal fin rays 4-5 (usually 5); male genital papilla reaching anal fin element 6-8; pectoral rays 13; vertebrae 10+22-23 = 32-33; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 19-23; lateral line scales 15-16 +19-21 = 34-37 (bimodal at 35 and 36); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined range from 11.4 to 24.9 mm SL; HL 31.0% to 42.4% SL; male genital papilla length 13.3% to 21.3% SL.

Table I. Fin ray and vertebral counts for selected species of western Atlantic *Starksia*.

Species	Dorsal spines				Segmented dorsal rays			Total dorsal elements					Segmented anal rays					Abdominal vertebrae				Total vertebrae				Pectoral fin rays				
	18	19	20	21	7	8	9	26	27	28	29	30	14	15	16	17	18	21	22	23	24	31	32	33	34	12	13	14		
<i>S. multilepis</i>	-	-	3	-	-	3	-	-	-	3	-	-	-	-	1	2	-	-	-	3	-	-	-	3	-	-	3	-	-	-
<i>S. rava</i>	-	8	40	2	2	39	9	-	4	41	5	-	-	-	7	41	2	-	-	29	21	-	-	29	21	-	-	48	1	-
<i>S. sella</i>	1	12	-	-	1	7	5	1	8	4	-	-	-	-	9	4	-	-	1	11	1	-	1	11	1	-	13	-	-	-
<i>S. melasma</i>	1	7	1	-	1	6	2	-	8	1	-	-	-	2	7	-	-	1	8	-	-	1	8	-	-	-	13	-	-	-
<i>S. leucovitta</i>	2	18	-	-	-	16	4	-	18	2	-	-	-	1	17	2	-	-	10	10	-	-	10	10	-	-	20	-	-	-
<i>S. stuiteri</i>	2	13	-	-	4	9	2	5	9	1	-	-	-	6	9	-	-	2	12	1	-	2	12	1	-	-	14	-	-	-
<i>S. atlantica</i>	1	8	3	-	5	7	-	3	8	1	-	-	1	9	1	1	-	4	8	-	-	4	8	-	-	-	11	-	-	-
<i>S. elongata</i>	-	-	2	7	3	5	1	-	-	5	3	1	-	-	-	9	1	-	-	4	7	-	-	4	7	-	-	11	-	-
<i>S. fasciata*</i>	-	16	22	-	19	19	-	3	29	6	-	-	-	13	25	-	-	1	-	-	-	1	-	-	-	-	3	72	1	-
<i>S. smithvanizi</i>	-	21	1	-	8	14	-	7	15	-	-	-	-	20	2	-	-	5	16	1	-	5	16	1	-	-	21	1	-	-
<i>S. hassi</i>	-	4	1	1	-	5	1	-	3	2	1	-	-	-	-	6	-	2	2	2	-	2	2	2	-	-	6	-	-	-
<i>S. lepicoelia</i>	-	6	14	-	5	14	1	1	8	11	-	-	-	-	7	12	1	2	12	6	-	2	12	6	-	-	20	-	-	-
<i>S. nanodes*</i>	-	1	13	1	14	1	-	1	12	2	-	-	-	-	8	7	-	-	-	1	-	-	-	1	-	-	3	25	-	-
<i>S. y-lineata</i>	-	4	-	-	2	2	-	2	2	-	-	-	-	4	-	-	-	2	2	-	-	2	2	-	-	-	4	-	-	-
<i>S. starcki+</i>	-	-	2	6	-	8	-	-	-	2	6	-	-	-	-	1	7	-	-	-	-	-	-	-	-	-	-	-	-	-

* Counts taken from Böhlke and Springer (1961); vertebral counts from our study
 + Counts taken from Gilbert (1971)

Table II. Scale counts and lengths of male genital papilla relative to anal fin elements for selected species of western Atlantic *Starksia*.

Species	Lateral line scales																Male genital papilla to anal fin element															
	Arched							Straight									Total lateral line															
	12	13	14	15	16	17	18	18	19	20	21	22	23	24	25	33	34	35	36	37	38	39	40	1	2	3	4	5	6	7	8	9
<i>S. multilepis</i>	-	-	-	-	1	2	-	-	3	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	1	1	-	-	-
<i>S. rava</i>	-	-	-	27	16	-	-	-	8	17	10	6	1	-	-	-	8	11	13	6	4	-	-	-	-	-	2	7	7	3	-	-
<i>S. sella</i>	-	-	-	2	7	-	-	-	-	3	6	-	-	-	-	-	-	2	1	6	-	-	-	-	-	2	1	-	-	-	1	-
<i>S. melasma</i>	-	-	1	9	1	-	-	3	8	-	-	-	-	-	-	3	8	-	-	-	-	-	-	-	-	-	-	-	1	6	1	1
<i>S. leucovitta</i>	-	-	-	9	5	-	-	-	2	10	2	-	-	-	-	-	2	6	5	1	-	-	-	-	-	-	-	-	1	1	2	-
<i>S. sluiteri</i>	-	-	1	5	5	-	-	-	7	3	1	-	-	-	-	1	4	3	2	1	-	-	-	-	-	1	-	-	-	-	1	-
<i>S. atlantica</i>	-	-	1	11	-	-	-	-	8	4	-	-	-	-	-	1	7	4	-	-	-	-	-	1	3	1	-	-	-	-	-	-
<i>S. elongata</i>	-	-	-	4	4	3	-	-	1	6	4	-	-	-	-	-	-	-	3	4	3	1	-	-	-	-	4	4	-	-	-	-
<i>S. fasciata*</i>	-	-	1	8	1	-	-	-	10	1	-	-	-	-	-	-	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>S. smithvanizi</i>	-	-	-	12	4	-	-	6	4	5	-	-	-	-	-	6	3	4	2	-	-	-	-	-	-	1	1	4	4	-	-	-
<i>S. hassi</i>	-	-	1	4	1	-	-	-	-	-	4	-	-	2	-	-	-	1	2	1	-	2	-	2	1	-	-	-	-	-	-	-
<i>S. lepicoelia</i>	-	-	3	6	1	-	-	-	7	3	-	-	-	-	-	-	2	5	3	-	-	-	-	2	2	5	1	-	-	-	-	-
<i>S. nanodes*</i>	1	7	2	-	-	-	-	-	2	7	2	-	-	-	-	2	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>S. y-lineata</i>	-	-	-	4	-	-	-	2	2	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
<i>S. starcki</i>	-	-	-	-	7	1	-	-	1	7	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-

* Counts taken from Böhle and Springer (1961)

+ Counts taken from Gilbert (1971)

Colour when collected: Life colours of males not recorded as being different from females in field collections by JTW. Female head red with about four white bars across upper and lower lips. Short white bar extending posteroventrally from posterior margin of eye. Preopercular margin white; underside of head white with red spot near tip of lower jaw, red spot at tip, black band with red central spot crossing underside of head at level of posterior end of maxilla, black band crossing base of branchiostegals rays. Nasal, supraorbital, and nuchal cirri pinkish red. Two diagonal reddish bars extending from dorsal part of opercle, ventrally to edge and continuing across pectoral fin base, pale bar separating these two reddish bars. Body with reddish zigzag pattern of bars on a paler background. Body bars extend onto dorsal fin as dark red spot at base of each dorsal spine above bar. Dorsal spines and rays above intervening paler bars with orangeish tan spot basally. Dorsal, caudal, anal, and pectoral fins with red spots on shafts of elements, sometimes connected across membranes to form irregular diagonal bars. Pelvic rays with faint reddish spots scattered along shafts. Iris of eye red with yellow ring around pupil.

Colour in alcohol: Male holotype with head brown with irregular dusky spots and streaks on cheek and opercle. Lips uniform brown (lip pigment varies from uniform to barred). Underside of head brown with dusky spots and streaks. Pectoral base brown with dusky spots at base of rays. Body brown with about nine dark brown saddles dorsally alternating with narrow whitish bars. Pin-sized spot located midlaterally

on caudal peduncle (often lacking). Alternating dark saddles and whitish bars extending onto proximal half of dorsal fin. Remainder of spinous dorsal dusky with narrow pale distal margin, segmented rayed portion with pale areas over interradial membranes. Small dark spot at base of posteriormost dorsal ray darker than other markings. Anal fin brown with pale spots proximally, tips of rays pale, small pale spots in posterior quarter of fin. Caudal fin with about seven vertical rows of dark spots.

Females pigmentation same as males.

Affinities

Starksia leucovitta belongs to the *S. sluiteri* species complex. It resembles *S. rava* and *S. sella* in that males lack a black spot in the spinous dorsal fin (*S. multilepis*, *S. sluiteri*, and *S. melasma* all have the spot). *S. leucovitta* and *S. sella* differ from *S. rava* in having fewer dorsal fin spines (usually 19 vs. usually 20). *S. leucovitta* is distinguished from *S. sella* by lacking the reticulate pattern on the cheeks exhibited by *S. sella*.

Etymology

The species name is a combination of the Greek *leukos*, meaning white, and the Latin *vitta*, meaning ribbon, referring to the ribbon-like white bars along the dorsum.

Distribution

Starksia leucovitta is only known to occur at Navassa Island (Fig. 8).

***Starksia melasma* n. sp.**

Black spot blenny (Figs. 3b, 4)

Holotype: ANSP 143033, male (17.2 mm SL); 18° 23' N, 67°29' W; Caribbean, Puerto Rico, Desecheo Island; ecological habitat: large cave with sandy bottom; Mona Station 12; 9 October 1978; W. Smith-Vaniz, P. Colin; rotenone and hand nets.

Paratypes: ANSP 178470 (8, 10.01-21.1 mm SL) and USNM 368721 (4, 16.5-19.8 mm SL); all taken with holotype.

Additional material: UF 122115 (17.6 mm SL); Buck Island Reef National Monument, St. Croix, US Virgin Islands; BUIS 2001-44 OUT; W Smith-Vaniz, L. Rocha. UF 122116 (18.4 mm SL); Buck Island Reef National Monument, St. Croix, US Virgin Islands; BUIS 2001-44 IN; Smith-Vaniz, Rocha.

Description

See Tables I, II; Dorsal rays XVIII - XX, 7-9 (mode XIX, 8); total dorsal rays 26-28 (mode 27); anal rays II, 15-16 (mode II, 16); dorsal procurrent caudal fin rays 5-6 (usually 5); ventral procurrent caudal fin rays 4-6 (usually 5); male genital papilla reaching anal fin element 6-9 (mode 7); pectoral rays 13; vertebrae 10 + 21-22 = 31-32 (mode 32) last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 19-21; lateral line scales 14-16 + 18-19 = 33-34 (mode 34); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined range from 10.0 to 21.1 mm SL; HL 30.1% to 33.3% SL; male genital papilla length 16.7% to 22.4% SL.

Colour in alcohol: Colour in life unknown. Male holotype head is uniformly brown. Lips dark brown anteriorly with a narrow pale bar beneath anterior margin of eye, posterior two thirds of lip dusky (lip pigmentation varying from uniform to distinct barring pattern). Underside of head with dark and dusky bars. Body colour brown with scale centers pale (body pattern varying from brown to faintly barred). About nine dark dorsal saddles restricted to dorsal portion of body. Dorsal fin with large black spot between first and fourth spines. Dark saddles extending onto proximal quarter of fin, remainder of fin dusky. Anal fin dusky with brown submarginal stripe, tips of rays pale. Caudal fin dusky. Pectoral fin with pale spots at base of rays, dusky area extending over proximal third of fin. Pelvics pale. Female colour pattern similar to males but lacking black spot on dorsal fin. One or two rows of faint scale-sized brown spots laterally on body.

Etymology

The species name is based on the Greek noun *melasma*, meaning black spot, and refers to the black spot in the dorsal fin of males. The name is treated as a noun in apposition.



Fig. 3b. Lateral views of male genital papillae in the *Starksia sluiteri* complex. *S. melasma*, USNM 143033.



Fig. 4. *Starksia melasma* n. sp.: top, ANSP 143033, holotype 17.2 mm SL male; bottom, USNM 368721, paratype, 19.0 mm SL female, both from Desecheo Island, Puerto Rico (preserved specimens). Photo by J. T. Williams and J. H. Mounts.

Distribution

Starksia melasma is only known to occur at Desecheo Island, Puerto Rico, and Buck Island Reef National Monument, St. Croix, US Virgin Islands. (Fig. 8).

Affinities

Starksia melasma is a member of the *S. sluiteri* species complex. It resembles *S. multilepis* and *S. sluiteri* in that males have a well-developed black spot in the spinous dorsal fin. *S. melasma* and *S. sluiteri* differ from *S. multilepis* in having fewer dorsal fin spines (usually 19 vs. usually 20). *S. melasma* can be distinguished from *S. sluiteri* based on colour pattern, with *S. sluiteri* having two or three horizontal rows of persistent, well-defined dark blotches along body (blotches, if present, faint in *S. melasma*).

Starksia multilepis n. sp.

Manyscaled blenny (Figs. 3c, 5)

Holotype: MZUSP 82361, male (21.6 mm SL); Sacode Atalaia, Fernando de Noronha Island, South Atlantic Ocean (200 miles east of tip of Brazil); 03°51' S, 032°25' W ca; ecological habitat: part sand bottom, part coral reef, collected at low tide; depth: 1 m; 23 July 1973; 1500 to 1800; S. L. Olson, I. A. Cruz, O. A. Roppa,

Paratypes: USNM 304961 (2, 18.2 and 18.5 mm

SL); taken with the holotype. UF 19251 (5, 10.4-16.6 mm SL) Atol das Rocas, Brazil, February 1972; N. Menezes. ca. 03°52' S, 033° 49' W.

Description

See Tables I, II; dorsal rays XX, 8; total dorsal rays 28; anal rays II, 16-17; dorsal procurrent caudal fin rays 6; ventral procurrent caudal fin rays 5; male genital papilla reaching anal fin element 5-6; pectoral rays 13; vertebrae 10 + 23 = 33; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 20-21; lateral line scales 16-17 + 19 = 35-36; orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined range from 18.2 to 21.6 mm SL; HL 31.3% to 32.4% SL; male genital papilla length 16.2% to 18.9% SL.

Colour in alcohol: Head of male holotype with fine



Fig. 3c. Lateral views of male genital papillae in the *Starksia sluiteri* complex. *S. multilepis*, USNM 361113.



Fig. 5. *Starksia multilepis* n. sp.: top, MZUSP 82361, holotype 21.6 mm SL male; bottom, paratype, 18.2 mm SL female, both from Fernando de Noronha Island, Brazil (preserved specimens). Photo by J. T. Williams and J. H. Mounts.

melanophores evenly distributed over cheeks onto nape. Upper lip dark anteriorly with melanophores less dense beneath eye and two or three pale, spot-like areas beneath eye. Pectoral fin base uniformly pigmented. Body straw coloured with about nine faint dark saddles. Dorsal fin dusky with pupil-size black spot over second dorsal spine. Anal fin with dusky distal margin, proximal portion of fin pale. Other fins pale. Female coloration similar to male except dark spot over second dorsal spine reduced to a small smudge; body with about three rows of brown blotches in checkerboard pattern, dorsal row forming saddles across top of body, ventral row beginning above anus and continuing to caudal fin base. Interspinal membrane pale centrally with scattered melanophores at its base and distally, remainder of fin with scattered small melanophores. Small dark spot at base of posteriormost dorsal fin ray.

Etymology

The species name is a combination of the Latin *multus*, meaning many, and the Greek *lepis*, meaning scale, and refers to the high number of arched lateral line scales characteristic of the species.

Distribution

Starksia multilepis is known to occur only at Atol das Rocas and Fernando de Noronha Island, Brazil (Fig. 8).

Affinities

Starksia multilepis is a member of the *S. sluiteri* species complex. It resembles *S. melasma* and *S. sluiteri* in that males have a well-developed black spot on the spinous dorsal fin. *S. multilepis* and *S. rava* differ from *S. melasma* and *S. sluiteri* in having more dorsal fin spines (usually 20 vs. usually 19) and more abdominal vertebrae (23 vs. 21 to 22). *S. multilepis* differs from *S. rava* in having more anterior arched lateral line scales (17 vs. 15).

Starksia rava n. sp.

Tawny blenny (Fig. 3d, 6)

Holotype: USNM 361110, male (20.2 mm SL); 11°21' 22" N, 060°31' 46" W ca; Caribbean; Tobago, Saint Giles Islands, Saint Giles Island; rocky bottom shelf with some coral; bottom: rock, rubble, live & dead coral; depth: 6- 10.7 m; field number: JTW 90-15; 12 September 1990; rotenone and hand nets; Tobago



Fig. 3d. Lateral views of male genital papillae in the *Starksia sluiteri* complex. *S. rava*, USNM 361110.



Fig. 6. *Starksia rava* n. sp.: top, USNM 361110, holotype 20.2 mm SL male; bottom, USNM 329540 paratype, 22.2 mm SL female, both from Tobago, Trinidad and Tobago (preserved specimens). Photo by J. T. Williams and J. H. Mounts.

1990 Expedition; J. T. Williams, J. Howe, D. Johnson, S. Blum, M. Nizinski, T. Munroe.

Paratypes: USNM 329526 (7, 11.5-24.9 mm SL); 11°19' 08" N, 060°33' 06" W ca; Caribbean, Tobago, just north of Charlotteville on east side of north point; ecological habitat: rock, coral, gorgonian, rubble, large vertical wall; depth: 4.6 - 12 m; field number: JTW 90-9; 08 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, S. Love, M. Schotte. USNM 329527 (7, 15.3-25.3 mm SL); 11°20' 07" N, 060°33' 03" W ca; Caribbean, Tobago, cove just east of Charlotteville; ecological habitat: rock wall to rubble flat at 21 m, crevice in wall; depth: 21 m; field number: JTW 90-7; 08 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, S. Blum, J. Howe. USNM 329528 (3, 16.5-18.3 mm SL); 11°18' 14" N, 060°37' 46" W ca; Caribbean, Tobago, Bloody Bay at mouth of bloody bay river and adjacent rock point; ecological habitat: bottom: sandy to a rocky wall; depth: 0 - 3 m; field number: JTW 90-16; 13 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, M. Schotte, M. Nizinski, T. Munroe. USNM 329529 (3, 15.9-23.2 mm SL); 11°20' 00" N, 060°38' 24" W ca; Caribbean, Tobago, Sisters Rocks, vertical wall to slope at 18 m; ecological habitat: rock wall, dead coral, some alive, rocky; depth: 18 - 26 m; field number: JTW 90-17; 14 September 1990; Tobago 1990 Expedition; J. T. Williams, J. Howe, S. Blum, M. Nizinski. USNM 329535 (4, 10.5-24.3 mm SL); 11°21' 22" N, 060°32' 00" W ca; Caribbean, Tobago, Saint Giles Islands, London bridge rock, vertical wall to ledge at about 24.4 m; ecological habitat: bottom, rock wall; depth: 12 - 26 m; field number: JTW 90-14; 12 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, M. Nizinski. USNM 329536 (1, 10.5 mm SL); 11°12' N, 060°49' 30" W ca; Caribbean; Tobago, Buccoo reef, reef crest and just into the lagoon side of reef; bottom, coral, sand, rubble; depth: 1 - 3 m; field number: JTW 90-11; 10 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum. USNM 329537 (4, 12.7-22.3 mm SL); 11° 19' 14" N, 060° 33' 27" W ca; Caribbean, Tobago, Booby Island in Man-of-War Bay; ecological habitat: bottom, coral, rock, sand + rubble; depth: 1.5 - 10.7 m; field number: JTW 90-18; 14 September 1990; Tobago 1990 Expedition; J. T. Williams, M. Nizinski, J. Howe, S. Blum. USNM 329538 (15, 15.7-24.5 mm SL); taken with the holotype. USNM 329539 (4, 20.3-24.5 mm SL); 11°18' 20" N, 060° 30' 06" W ca; Atlantic, Tobago, windward side of Little Tobago Island; bottom rocky, some coral; depth: 18 m; field number: JTW 90-5; 07 September 1990; Tobago 1990 Expedition; J. T. Williams, M. Nizinski, J. Howe, S. Blum, D. Johnson. USNM 329540 (1, 22.2 mm SL); 11°18' 52" N, 060°31' 12" W ca; Atlantic, Tobago, approximately 1 mile north of Speyside, Brisant Bay; ecological habi-

tat: rocky bottom & rock wall; bottom with rubble, rock, coral; depth: 12 m; JTW 90-6; 07 September 1990; Tobago 1990 Expedition; J. T. Williams, M. Nizinski, J. Howe, S. Blum, S. Love, I. Augustine.

Description

See Tables I, II; dorsal rays XIX-XXI, 7-9 (XX,8); total dorsal rays 27-29 (mode 28); anal rays II,16-18 (mode II,17); dorsal procurrent caudal fin rays 4-6 (usually 5); ventral procurrent caudal fin rays 4-5 (usually 4); male genital papilla reaching anal fin element 4-7 (typically 5 or 6); pectoral rays 13-14 (one of 50 with 14); vertebrae 10+23-24 = 33-34; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 18-22; lateral line scales 15-16+19-23=34-38 (one specimen with 23 in straight portion); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined range from 10.2 to 25.3 mm SL; HL 29.3% to 41.9% SL; male genital papilla length 7.4% to 19.8% SL.

Colour in alcohol: Male holotype top of head brown, cheeks with brown spots surrounded by pale reticulations. Lips with alternating dark and pale bars (other males with lip pigmentation ranging from uniform to four or more bars). Underside of head with three or four rows of small dark spots. Posteriormost row with four spots extending across bases of branchiostegals. Pectoral fin base with two to three pupil size pale spots on a tan background. Body straw coloured with about eight to nine brown dorsal saddles converging midlaterally to form irregular V-shaped bars. Posterior half of body laterally with scattered scale-sized dark spots. Dorsal fin dusky with darker distal margin. Dark body saddles extending onto basal quarter of fin. Small dark spot at base of posteriormost dorsal ray slightly darker than preceding markings. Anal fin with dark spots at bases of every second or third ray. Central portion of fin pale, flanked by dark stripe with tips of rays pale. Caudal fin pale centrally with scattered melanophores over distal third. Pectoral fin pale with scattered melanophores distally. Pelvic fins pale. Females similar to male except spotting on cheek extending to base of pelvic fin. Dorsal fin with small spots positioned centrally on spines. Spot at base of posteriormost dorsal and anal rays distinctly darker than other markings. Juveniles similar but head and body markings fainter.

Etymology

The specific epithet is based on the Latin *ravus*, meaning tawny or greyish yellow, referring to the tawny yellow colour of the body in preservative.

Distribution

Starksia rava is known to occur only at Tobago (Fig. 8).

Affinities

Starksia rava belongs to the *S. sluiteri* species complex. It resembles *S. leucovitta* and *S. sella* in that males lack a black spot in the spinous dorsal fin. *S. rava* differs from *S. leucovitta* and *S. sella* in having more dorsal fin spines (usually 20 vs. usually 19).

***Starksia sella* n. sp.**

Darksaddle blenny (Figs. 3e, 7)

Holotype: USNM 361111, male (24.3 mm SL); 11°21' 22" N, 060°32' 00" W ca; Caribbean, Tobago, Saint Giles Islands, London Bridge rock, vertical wall to ledge at about 24.4 m; bottom: rock wall; depth: 12 – 26 m; field number: JTW 90-14; 12 September 1990; rotenone and hand nets; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, M. Nizinski.

Paratypes: USNM 329530 (1, 25.6 mm SL); 11°20' 00" N, 060° 38' 24" W ca; Caribbean, Tobago, Sisters Rocks, vertical wall to slope at 18 m.; ecological habitat: rock wall, dead coral, some alive, rocky; depth: 18 - 26 m; field number: JTW 90-17; 14 September 1990; rotenone and hand nets; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, M. Nizinski. USNM 329531 (1, 15.2); 11°19' 08" N, 060°33' 06" W ca; Caribbean, Tobago, just north of Charlotteville on east side of north point; ecological habitat: rock, coral, gorgonian, rubble, large vertical wall; depth: 4.6

– 12 m; field number: JTW 90-9; 08 September 1990; Tobago 1990 Expedition; J. T. Williams, D. Johnson, J. Howe, S. Blum, S. Love, M. Schotte. USNM 329533 (2, 16.5 and 16.6 mm SL); 11°17' 24" N, 060° 30' 06" W ca; Atlantic, Tobago, north-east rock, just S. of Little Tobago Island; ecological habitat: bottom, rock, coral, sponge; depth: 18 – 29 m; field number: JTW 90-19; 15 September 1990; rotenone and hand nets; Tobago 1990 Expedition; J. T. Williams, J. Howe, S. Blum, M. Nizinski. USNM 329534 (8, 13.7-27.2 mm SL); taken with holotype.

Description

See Tables I, II; dorsal rays XVIII-XIX, 7-9 (mode XIX, bimodal at 8 and 9); total dorsal rays 26-28 (mode 27); anal rays II, 16-17 (mode II, 16); dorsal procurrent caudal fin rays 5-6; ventral procurrent caudal fin rays 5-6; male genital papilla reaching anal fin element 3-4 and 7-8 (two males were immature); pectoral rays 13; vertebrae 10+22-24 = 32-34 (mode 33);



Fig. 3e. Lateral views of male genital papillae in the *Starksia sluiteri* complex. I, USNM 361111.



Fig. 7. *Starksia sella* n. sp.: top USNM 361111, holotype 24.3 mm SL male; bottom, USNM 329534 paratype, 27.7 mm SL female, both from Tobago, Trinidad and Tobago (preserved specimens). Photo by J. T. Williams and J. H. Mounts.

last pleural ribs on vertebral centrum 11; last epi-neurals on vertebral centrum 19-22 (usually 21); lateral line scales 15-16 (mode 16) + 20-21 = 35-37 (mode 37); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 13.7 to 27.7 mm SL; HL 29.7% to 40.1% SL; male genital papilla length 4.2% to 17.6% SL.

Colour in alcohol. Male holotype with top of head brown with small pale spots on snout and interorbital region. Cheek and opercle brown with small pale spots. Lips with alternating dark and pale bars extending ventrally and crossing underside of head. Pectoral fin base brown with pale diagonal bar, sometimes breaking into pale spots, from gill opening to base of ventralmost pectoral ray. Body with about nine brown

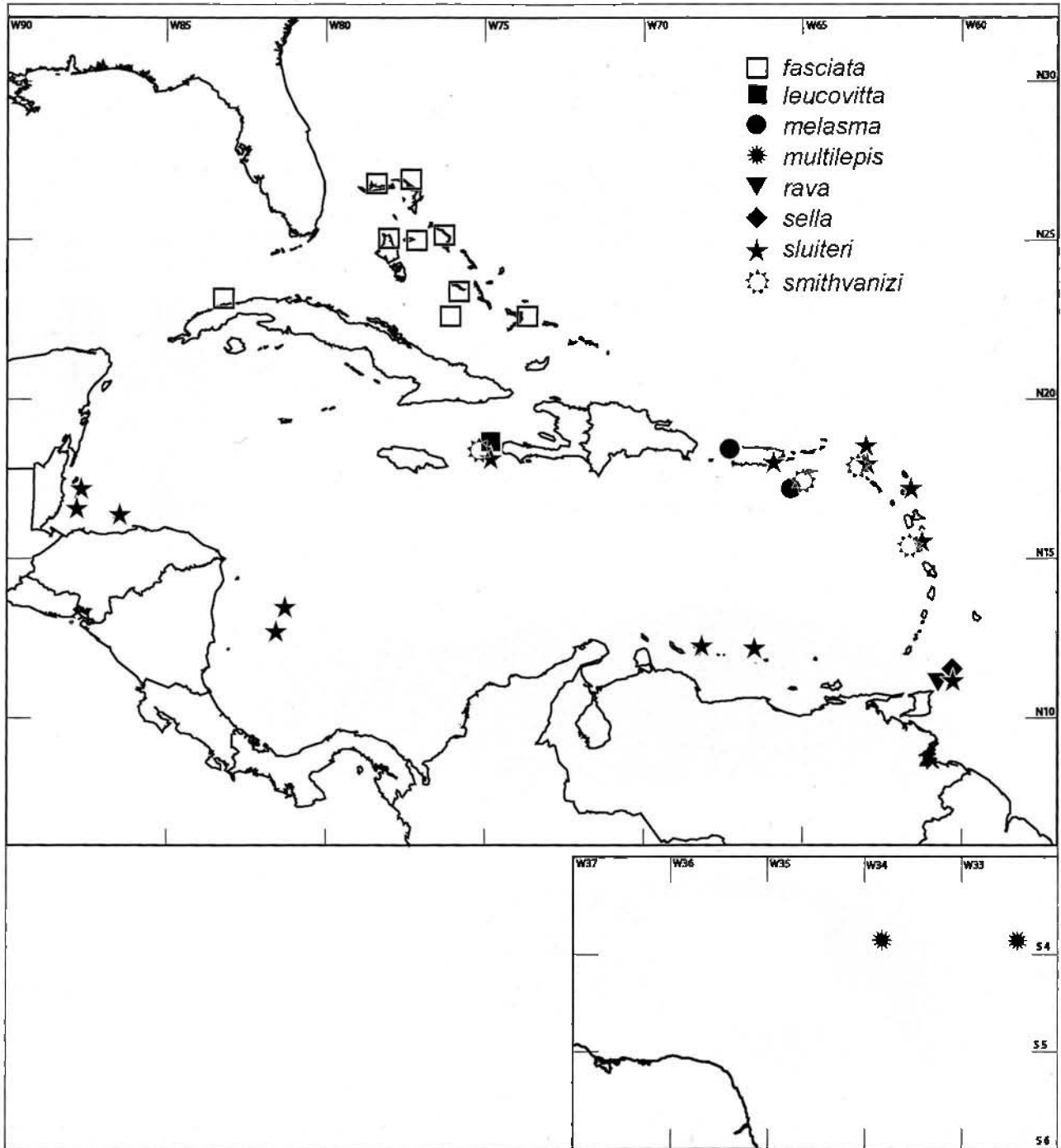


Fig. 8. Distribution records for the species recognized in the *Starksia sluiteri* and *S. fasciata* complexes.

dorsal saddles extending laterally to or almost to base of anal fin (bars sometimes broken into irregular blotches). Posterior third of body laterally with about one to six scale-sized dark brown spots (sometimes absent). Dorsal fin with dark saddles extending onto proximal half of fin. Distal portion with dusky and darker brown spotting. Small dark spot at base of posteriormost dorsal and anal rays slightly darker than preceding markings. Anal fin brown with dusky reticulations. Caudal fin dusky with irregular dark bars. Pectoral fins dusky. Pelvic fins pale. Female similar to male except underside of head with pale spots and dark reticulations. Body bars less distinct and more irregular.

Etymology

The species name is based on the Latin *sella*, meaning saddle, referring to the dark bars saddling the dorsal profile. The name is treated as a noun in apposition.

Distribution

Starksia sella is known to occur only at Tobago (Fig. 8).

Affinities

Starksia sella belongs to the *S. sluiteri* species complex. It resembles *S. rava* and *S. leucovitta* in that males lack a black spot in the spinous dorsal fin. *S. leucovitta* and *S. sella* differ from *S. rava* in having fewer dorsal fin spines (usually 19 vs. usually 20).

S. sella is distinguished from *S. leucovitta* by having a reticulate pattern on the cheeks.

***Starksia sluiteri* (Metzelaar, 1919)**

Chessboard blenny (Figs. 3f, 9)

Material examined

Total number of specimens = 16, range 9.8-20.9 mm SL (USNM 231955 (1), Tobago; USNM 320822 (6), Tobago; USNM 320823 (5), Tobago, USNM 320824 (5 examined of 13), Tobago; USNM 361058 (2), Navassa; USNM 361059 (2), Navassa).

Description

See Tables I, II; dorsal rays XVIII-XIX, 7-9 (mode XIX, 8); total dorsal rays 26-28 (mode 27); anal rays II, 15-16 (bimodal); dorsal procurrent caudal fin rays 4-6 (usually 5 or 6); ventral procurrent caudal fin rays 4-6 (usually 5); male genital papilla reaching anal fin



Fig. 3f. Lateral views of male genital papillae in the *Starksia sluiteri* complex. *S. sluiteri*, USNM 320824.



Fig. 9. *Starksia sluiteri*: top, USNM 320824, 16.6 mm SL male; bottom, USNM 320824, 20.9 mm SL female, both from Tobago, Trinidad and Tobago (preserved specimens). Photo by J. T. Williams and J. H. Mounts.

element 3 and 8; pectoral rays 13; vertebrae 10 + 21-23 (mode 22) = 31-33 (mode 32); last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 15-23; lateral line scales 14-16 + 19-21 = 33-37; orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 9.8 to 20.9 mm SL; HL 29.2% to 42.9% SL; male genital papilla length 11.4% to 18.1% SL.

Distribution

Starksia sluiteri is known to occur from Tobago through the Lesser Antilles to Navassa Island and in the western Caribbean, with confirmed collections of specimens from Antigua, Dominica, Bonaire, Los Roques, Curacao, Old Providence Island, Nicaragua, and Belize (Fig. 8).

Starksia smithvanizi n. sp.

Brokenbar blenny (Fig. 10)

Holotype: USNM 359136, male (16.6 mm SL); Caribbean, Navassa Island, shore at undercut of island at Northwest Point, surf zone at undercut and adjacent wall to a depth of about 3 m; 18° 24' 48" N,

75° 01' 13" W; ecological habitat: rock with encrusting bryozoans; depth: 0 - 5 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number: NAV 99-5; 30 April 1999; rotenone and hand nets; J.T. Williams, B.B. Collette, C. Thacker, L. Micheletti, and M. Smith. Caribbean.

Paratypes: USNM 368830 (10, 11.4-17.8 mm SL); collected with holotype. UF 122114 (13, 11.6-21.0 mm SL); Buck Island Reef National Monument, St. Croix, US Virgin Islands; field number: BUIS 2001-31 IN; W. F. Smith-Vaniz, L. A. Rocha. USNM 359454 (15, 9.8-19.4 mm SL); Caribbean, Navassa Island, shore at undercut of island at north-west point, surf zone at undercut and adjacent wall to a depth of about 3 m; ecological habitat: rock with encrusting bryozoans; depth: 0 - 6 m; Navassa Island 1999 Expedition; Vessel: "Quest"; field number: NAV 99-1; 29 Apr 1999; J. T. Williams, B. B. Collette, C. Thacker, L. Micheletti, and M. Miller. ANSP 124688, male (18.0 mm SL) Caribbean, St. Barthelemy, Isle Syndare, Port de Gustavia, W. edge of smaller of two islets of Syndares, from boulders and seagrass; 17° 55' N, 062° 50' W ca; 0-1.5m; 17°55'N 62°54'W; field number: TE-53; 13 July 1965; J.C. Tyler, W.N. Eschmeyer.

Additional Material: UF 123313 (4, 16.0-16.8 mm



Fig. 10. *Starksia smithvanizi* n. sp.: top, USNM 359136, holotype, 17.2 mm SL male, Navassa Island. Photo by J. T. Williams; bottom, UF 122114, 21.7 mm SL female, St. Croix. Photo by W. F. Smith-Vaniz and L. A. Rocha.

SL); Buck Island Reef National Monument, St. Croix, US Virgin Islands; field number: BUIS 2001-19 OUT. UF 123314 (3, 14.3-18.0 mm SL), Buck Island Reef National Monument, St. Croix, US Virgin Islands; field number: BUIS 2001-31 OUT; UF 123315 (5, 15.0-16.0 mm SL), Buck Island Reef National Monument, St. Croix, US Virgin Islands; field number: BUIS 2001-19 IN. Navassa Island: USNM 359167 (4), USNM 359454 (15), USNM 359539 (22), USNM 359659 (27), USNM 360211 (1), USNM 360226 (2), USNM 360342 (25). Dominica: USNM 297504 (1), USNM 297493 (1).

Description

See Tables I, II; dorsal rays XIX-XX (one specimen with XX), 7-8- (mode XIX, 8); total dorsal rays 26-27 (mode 27); anal rays II, 15-16 (mode II, 15); dorsal procurent caudal fin rays 4-6 (usually 5 or 6); ventral procurent caudal fin rays 3-6 (usually 5 or 6); male genital papilla reaching anal fin element 3-6 (bimodal at 5 and 6); pectoral rays 13-14 (one specimen with 14); vertebrae 10 + 21-23 (one specimen with 23) = 31-33 (mode 32, one specimen with 33); last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 19-24; lateral line scales 15-16 (mode 15) + 18-20 = 33-36 (typically 33); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 9.5 to 19.5 mm SL; HL 29.5% to 37.9% SL; male genital papilla length 9.9% to 19.7% SL.

Colour when collected: Life colours based on photographs of fresh specimens taken at Navassa Island by JTW and at Buck Island Reef National Monument by W. F. Smith-Vaniz and L. Rocha.

Head of male brown with small bluish white spots peppering top and sides of head; ventral half of head with small brown spots on pale background extending onto branchiostegal membranes, ring of five small black spots positioned behind eye from top of head to beneath middle of eye. Upper and lower lips with alternating brown and white bars (about five of each between symphysis and gape) sometimes breaking up into a pattern of dark and pale spots; iris of eye with alternating reddish brown and whitish spokes around black pupil. Nuchal, supraorbital, and nasal cirri orangeish yellow (see picture). Body brownish with small bluish white spots continuing from head onto at least anterior half of body; about seven dark brown bars alternating with tan interspaces, all bars of about equal width, dark brown bars extending dorsally onto basal quarter of dorsal fin above bar, bars becoming diffuse on lower half of body with posterior bars sometimes reaching onto bases of anal fin elements as narrow clusters of melanophores, posteriormost bar at base of caudal fin; penultimate body bar beneath segmented rayed dorsal fin with two distinct, small black spots dorsally, sometimes with ven-

tral portion of bar breaking up to form separate spots. Most body scales outlined with brown surrounding paler central region. Dorsal fin with first spine orangeish yellow followed by black pupil size spot centered on middle of second spine, remainder of fin with densely scattered melanophores, distal margin of fin and tips of all elements orangeish yellow. Segmented ray portion with scattered small yellow spots. Caudal fin orangeish yellow with band of melanophores extending across membranes between dorsal most and ventral most three rays from their bases to distal membrane margins. Anal fin dusky ventrally with black submarginal stripe, distal tips of rays orangeish yellow, first anal spine yellowish, genital papilla whitish with scattered melanophores. Pectoral fin translucent with orangeish yellow rays. Pelvic fins whitish. Females (based on fresh specimens photographed at Navassa Island) similar to males except as follows: spots on ventral half of head red all head cirri reddish. Dark body saddles terminate dorsally on basal portion of dorsal fin as red spots, ventral half of body crimson red with scale centers pinkish. Dorsal fin with small red spots scattered over entire fin, spinous portion with narrow submarginal black stripe. Caudal fin covered with small red spots. Anal fin covered with small red spots, narrow black submarginal stripe extends from tips of anal spines for about three fourths of fin. Pectoral fin with two pupil-sized red spots on basal fifth of fin, red rays. Pelvic fins with reddish pink rays.

Colour in alcohol. Life colour pattern of males and females generally retained in preservative with reds, yellows, and bluish whites becoming pale, bars remaining dark brown.

Etymology

The species is named in honour of William F. Smith-Vaniz in recognition of his many contributions to our knowledge of the taxonomy of marine shorefishes and for collecting and photographing representatives of the new species at St. Croix.

Affinities

Starksia smithvanizi belongs to the *S. fasciata* species complex. *S. smithvanizi* is distinguished from *S. fasciata* by having an incomplete penultimate body bar on the caudal peduncle, bar usually with two distinct, small spots dorsally, and sometimes with ventral portion of bar breaking up to form separate spots (versus penultimate bar complete and resembling other body bars shown in Fig. 13).

Distribution

Starksia smithvanizi is known to occur from Navassa Island, St. Croix, St. Barthelemy, and Dominica (Fig. 8).

***Starksia atlantica* Longley, 1934**

Smootheye blenny (Fig. 11)

Material examined

Total number of specimens = 12, range 11.2 to 19.5 mm SL (USNM 218255, British Honduras; USNM 274892, Belize; USNM 276147, Belize; USNM 276065, Belize; USNM 276068, Belize; USNM 321066, Belize; USNM 359543, Navassa; USNM 321073, Belize).

Description

See Tables I, II; dorsal rays XVIII-XX, 7-8; total dorsal rays 26-28 (mode 27); anal rays II, 14-17 (mode II, 15); dorsal procurrent caudal fin rays 5-6; ventral

procurrent caudal fin rays 4-6 (usually 5); male genital papilla reaching anal fin element 1-3 (typically 2); pectoral rays 13-14 (one specimen with 13); vertebrae 10 + 21-22 = 31-32; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 19-22 (usually 22); lateral line scales 14-15 (one specimen with 14) + 19-20 = 33-35 (mode 34); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 11.2 to 19.5 mm SL; HL 26.0% to 37.7% SL; male genital papilla length 3.7% to 12.3% SL.

***Starksia elongata* Gilbert, 1971**

Elongate blenny (Fig. 12)

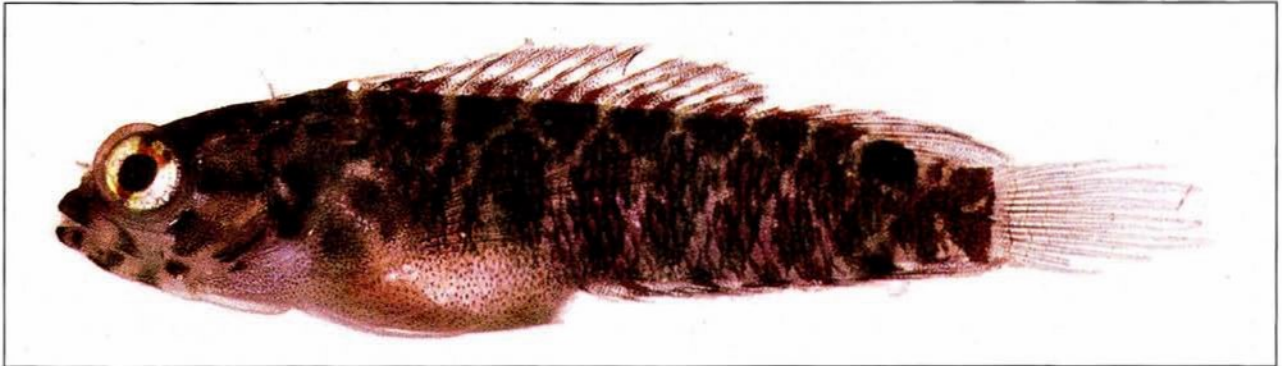


Fig. 11. *Starksia atlantica*, 14.1 mm SL female, St. Croix. Photo by W. F. Smith-Vaniz and L. A. Rocha.



Fig. 12. *Starksia elongata*, 20.7 mm SL male above, 19.7 mm SL female below, St. Croix. Photo by W. F. Smith-Vaniz and L. Rocha.

Material examined

Total number of specimens = 11, range 10.6-22.7 mm SL (USNM 320840, USNM 320841, USNM 320843, USNM 320844, USNM 320839, USNM 320848, USNM 320846; all lots from Tobago).

Description

See Tables I, II; dorsal rays XX-XXI, 7-9 (mode, XXI, 8); total dorsal rays 28-30 (typically 28); anal rays II, 17-18 (one specimen with 18); dorsal procurrent caudal fin rays 2-6; ventral procurrent caudal fin rays 1-5; male genital papilla reaching anal fin element 5-6 (bimodal); pectoral rays 14; vertebrae 10 + 23-24 = 33-34; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 17-22; lateral line scales 15-17 + 20-22 = 36-39 (one specimen with 39); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 10.6 to 22.7 mm SL; HL 29.1% to 38.7% SL; male genital papilla length 10.6% to 16.3% SL.

Starksia fasciata (Longley, 1934)

Blackbar blenny (Fig. 13)

Material examined

Total number of specimens = 5, range 19.0 to 20.9 mm SL (USNM 82548, Cuba; ANSP 153165, Bahamas, Plana Cays, East Plana Cay).

Description

See Tables I, II; dorsal rays XIX-XX, 7 or 8; total dorsal rays 26-28 (mode 27); anal rays II, 15 or 16; pectoral rays 12-14 (mode 13; one specimen with 14); lateral line scales 14-16 (mode 15) + 19-20 = 34-35 (typically 34); orbital cirri present; nape cirri present; anterior nasal cirri present; belly and pectoral fin base naked, body with seven well-developed dark bars, the penultimate and other bars complete.

Distribution

Known only from the Bahamas and Cuba.

Starksia hassi Klausewitz, 1958

Ringed blenny

Material examined

Total number of specimens = 6, range 14.1 to 29.6 mm SL (USNM 297515, Puerto Rico; AMNH 225180, St. Johns, Virgin Islands; AMNH 33184, Mayaguana, Bahamas; AMNH 33318, Mayaguana, Bahamas; AMNH 33563, St. Johns, Virgin Islands)

Description

See Tables I, II; dorsal rays XIX-XXI (one specimen each with XX and XXI, 8-9 (one specimen with 9) (mode XIX, 8); total dorsal rays 27-29; anal rays II, 17; dorsal procurrent caudal fin rays 5; ventral procurrent caudal fin rays 4-5 (one specimen with 4); male genital papilla reaching anal fin element 1-2; pectoral rays 13; vertebrae 10 + 21-23 = 31-33; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 17-27; lateral line scales 14-16 + 22 and 25 = 36-38 and 40; orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 14.1 to 29.6 mm SL; HL 29.9% to 36.2% SL; male genital papilla length 2.7% to 4.4% SL.

Starksia lepicoelia Böhlke and Springer, 1961

Blackcheek blenny (Figs. 14, 15)

Material examined

Total number of specimens = 20, range 15.1 to 24.9 mm SL (USNM 359465, Navassa).

Description

See Tables I, II; dorsal rays XIX-XX, 7-9 (mode XX, 8); total dorsal rays 26-28 (bimodal at 27 and 28); anal rays II, 16-18 (one specimen with 18) (mode II, 17); dorsal procurrent caudal fin rays 4-6 (usually 5); ventral procurrent caudal fin rays 4-6 (usually 5); male genital papilla reaching anal fin element 1-4 (typically 4); pectoral rays 13; vertebrae 10 + 21-23 = 31-33;

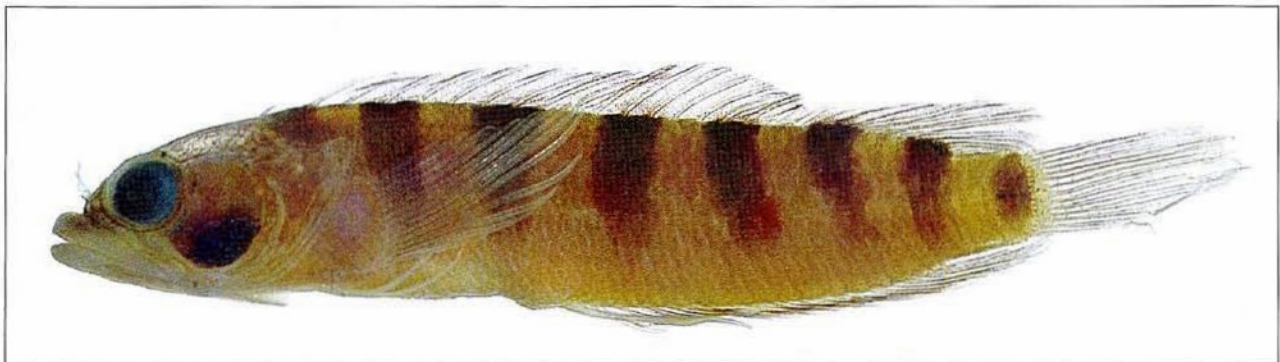


Fig. 13. *Starksia fasciata*, ANSP 153165, 20.0 mm SL male (preserved specimen), Bahamas, East Plana Cay. Photo by J. T. Williams.



Fig. 14. *Starksia lepicoelia*, USNM 359508, 22.3 mm SL male, Navassa Island. Photo by J. T. Williams.



Fig. 15. *Starksia lepicoelia*, Turneffe, Belize. Photo by J. E. Randall.



Fig. 16. *Starksia nanodes*, USNM 359471, 16.1 mm SL female, Navassa Island. Photo by J. T. Williams.

last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 20-25; lateral line scales 14-16 + 20-21 = 34-36 (typically 35); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 15.1 to 24.9 mm SL; HL 30.2% to 38.3% SL; male genital papilla length 1.2% to 10.3% SL.

Starksia nanodes Böhlke and Springer, 1961
Dwarf blenny (Fig. 16)

Material examined

Total number of specimens = 2, 14.8 and 16.1 mm SL (USNM 359471 (1 of 3), Navassa Island; UF, Buck Island National Monument, St. Croix).

Description

See Tables I, II (some data taken from Böhlke and Springer, 1961); dorsal rays XIX-XXI, 7 or 8 (mode XX, 7); total dorsal rays 26-28 (mode 27); anal rays II, 16 or 17; male genital papilla reaching anal fin element 9; pectoral rays 12 or 13 (mode 13); lateral line scales 12 or 13 + 20-22 = 33-35 (mode 13+21=34); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined (including those of Böhlke and Springer) ranged from 11.0 to 17.0 mm SL.

Starksia starcki Gilbert, 1971

Key blenny

Description

(Data from Gilbert, 1971); dorsal rays XX-XXI, 8 or 9 (mode, XXI, 9); total dorsal rays 29 or 30 (mode 29); anal rays II, 18-19 (mode 19); pectoral rays 13; lateral line scales 13 or 14 + 22 or 23 = 36 or 37 (one specimen with 37); orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimen size ranges from 20.3 to 27.3 mm SL.

Starksia y-lineata Gilbert, 1965

Forked bar blenny

Material examined

Total number of specimens = 4, range 12.1 to 18.6 mm SL (USNM 209095 (2) and 208572 (2), both from Cayman Islands).

Description

See Tables I, II; dorsal rays XIX, 7-8; total dorsal rays 26-27; anal rays II, 15; dorsal procurrent caudal fin rays 4-6; ventral procurrent caudal fin rays 4-5 (usually 5); male genital papilla reaching anal fin element 5; pectoral rays 13; vertebrae 10 + 21-22 = 31-32; last pleural ribs on vertebral centrum 11; last epineurals on vertebral centrum 14-17; lateral line

scales 15 + 18-19 = 32-33; orbital cirri present; nape cirri present; anterior nostril cirri present; belly and pectoral fin base naked.

Specimens examined ranged from 12.1 to 18.6 mm SL; HL 30.6% to 41.3% SL; male genital papilla length 14.7% SL.

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ERRATA

aqua 6 (1): **Description of *Arius neogranatensis*, a new species of sea catfish from Colombia, with an identification key for Caribbean ariid fishes**

P. 9, column 2, paragraph 1, line 17: for "imagined" read "vicariant".

P. 10, the Kailola & Bussing reference should read as follows:

Kailola, P. J. & W. A. Bussing. 1995. Ariidae. In: *Guía FAO para Identificación de Especies para los Fines de la Pesca. Pacífico Centro-Oriental*. Vol. II, Part 1. (Eds. W. Fischer, F. Krupp, W. Schneider, C. Sommer, K. E. Carpenter and V. Niem): 860-886. FAO, Rome.