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A NEW HOGFISH OF THE GENUS *Bodianus* (TELEOSTEI: LABRIDAE) FROM ISLANDS OF THE MID-ATLANTIC RIDGE

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ABSTRACT: A new species of hogfish, *Bodianus insularis*, is described from Ascension, St. Helena and St. Paul's Rocks in the South Atlantic. The species is the only member of the genus occurring at these islands. It is distinguished from Atlantic and eastern Pacific species of *Bodianus*, especially *B. diplotaenia* and *B. rufus* with which it has been confused in the past.

The Spanish hogfish, *Bodianus rufus* (Linnaeus, 1758), is a widely ranging species of the tropical western Atlantic distributed from the southeastern coast of Brazil north to southern Florida, the Bahamas and Bermuda. The species has also been recorded from Ascension Island (Cuvier and Valenciennes, 1839; Cadenat and Marchal, 1963), St. Helena (Günther, 1862) and St. Paul's Rocks (Günther, 1880). While examining material for a revision of the genus *Bodianus*, it became apparent that all specimens from Ascension, St. Helena and St. Paul's Rocks reported as *B. rufus* are examples of an undescribed species. Ascension, St. Helena and St. Paul's Rocks are tropical islands associated with the Mid-Atlantic Ridge in the South Atlantic Ocean.

Recent collections and observations of this species made at Ascension have enabled us to present the following description.

METHODS

Type specimens are deposited in fish collections of the following institutions:

British Museum, Natural History, London (BMNH); Museum National d'Histoire Naturelle, Paris (MNHN); U.S. National Museum of Natural History, Washington, D.C. (USNM).

Terminology follows that of Hubbs and Lagler (1947) except: caudal-ray count includes dorsal unbranched rays + branched rays + ventral unbranched rays; numbers of pectoral-fin rays are indicated with unbranched rays in lower case Roman numerals and branched rays in Arabic; lateral-line scale count includes scales anterior to posterior edge of hypurals + scales posterior to hypural edges; predorsal scales are those scales intersecting the dorsal midline of the head and nape anterior to the dorsal-fin origin; body depth is taken at the level of the dorsal-fin origin; orbital length is the horizontal measurement. Lengths of posterior lobes of dorsal and anal fins are measured from the posterior end of each fin base to the posterior tip of that fin. Length of the dorsal lobe of the caudal fin is the horizontal distance from the posterior edge of the hypurals to the posterior tip of the lobe.

Figure 1. *Bodianus insularis* paratypes, juveniles, BMNH 1979.6.19.11-17, upper specimen 60.0 mm SL, lower specimen 24.1 mm SL, Ascension I.

Figure 2. *Bodianus insularis*, holotype, primary phase adult. BMNH 1979.6.19.10. 210 mm SL, Ascension I.

Figure 3. *Bodianus insularis*, secondary phase adult, Ascension I.

Numbers in parentheses following meristic values indicate number of specimens or structures (e.g., pectoral fins, lateral lines) exhibiting counts. Meristic values for the holotype are indicated by asterisks. Body dimensions were recorded in millimeters (mm) using needlepoint dial calipers; morphometric values are expressed as ranges in percent of standard length (SL). Numbers in parentheses following catalogue numbers in the list of types and material examined refer to the number and size range (mm SL) of specimens.

***Bodianus insularis*, new species**

Figures 1 - 3

Description: Dorsal-fin rays XII* (21) or XIII (1), 9 (1) or 10* (21); anal-fin rays III, 11 (2) or 12* (20); caudal-fin rays 10* (5) or 11 (12) + 12 + 10* (7) or 11 (10); pectoral-fin rays ii, 14* (29) or 15 (2); pelvic-fin rays I, 5; vertebrae 11 + 17 = 28; lateral-line scales 31* (29) or 32 (1) + 2; scales above lateral line 5 1/2 to 6 1/2 (usually 5 1/2); scales below lateral line approximately 13 to 16 (usually 14 or 15); predorsal scales approximately 19 to 25; total rakers on first gill arch 15 (1), 16 (13) or 17* (2). (See table 1 for morphometric values.)

Head, body and caudal peduncle of moderate depth, body moderately deep in adults; head and snout rather pointed; dorsal outline of head mostly straight, though slightly curved in juveniles; profile of nape with slight convex curve in adults, almost straight in juveniles; interorbital rather wide.

Scales large, cycloid. Dorsal and anal fins with well developed scaly basal sheaths, scales forming sheaths in about 3 1/2 to 4 rows, sheath on anal fin usually about 1/2 scale higher than that of dorsal fin; distal outline of each scaly sheath slightly curved, though mostly

parallel with axis of body, curving abruptly toward body near posterior end of fin base. Scales extending anteriorly well onto head. Predorsal scales reaching forward to above centre of eye on dorsal midline of head. Scales on cheeks reaching forward slightly in advance of corner of mouth on upperside of jaws, extending nearly to posterior and ventral margins of preopercle with at most only a very narrow naked edge remaining along free preopercular edge. Opercle and interopercle completely covered with large scales except for naked membranous opercular flap dorsoposteriorly; scales on subopercle reaching anteriorly beyond forward extent of ventral preopercular edge, usually extending onto lower jaw in advance of posterior corner of mouth. Lateral-line scales without branched sensory canal tubes, tubes rarely with accessory pores. Preopercle minutely serrate ventrally along posterior edge or smooth. Mount mostly horizontal, posterior corner situated below anterior 1/4 of eye. Gill rakers on upper limb of first arch distinctly shorter than those on lower limb; rakers on upper limb simple, distinctly forked at tip or extremely branched distally; those on lower limb usually simple.

Both sides of upper jaw with 2 prominent canines of similar size anteriorly, the first directed anteroventrally, the second angled ventrally and somewhat laterally; prominent anterior canines based on exterior surface of bone forming margin of gape so that bony edge appears as a distinct dental ridge along mesial sides of anterior canines; dental ridge smooth or with only a few tiny teeth anteriorly in juveniles, with approximately 9 - 11 small to moderately sized canines in large adults, teeth largest posteriorly; usually a single moderately large, slightly curved canine present at posterior end of upper jaw,

directed anteroventrally and somewhat laterally. Both sides of lower jaw with 2 prominent canines anteriorly, first approximately $1/2 - 4/5$ length of second, the first directed anterodorsally and slightly mesially, the second anterodorsally, the tips usually curved slightly laterally; bone forming margin of gape appearing as dental ridge along mesial sides of prominent anterior canines as in upper jaw; teeth on dental ridge in a single row divisible into about 3 or 4 series; anteriormost series represented as a smooth to slightly uneven dental ridge on anterior $2/5 - 1/2$ of jaw in juveniles, developing 4-9 more or less distinct short canines (slightly longer posteriorly) in adults; second series more or less confluent with first, usually slightly longer; about 1-4 in number; third series moderately long, oriented vertically in juveniles, slanted anterodorsally in adults, 1-3 (infrequently 3) in number; fourth series uniformly short, closely set, 1-6 in number.

Dorsal fin continuous; spines pungent, each with a membranous fleshy flag at tip; rays subequal anterior to sixth segmented ray; posterior end of fin rounded in small juveniles, pointed in larger specimens, sixth segmented ray prolonged into a filamentous extension of fin in adults; posterior tip of fin reaching just short of posterior edge of hypurals in small juveniles (less than about 50-60 mm SL), extending past hypural edge in larger specimens (just beyond posterior margin of scaly caudal-fin base in a 268 mm SL specimen). Anal-fin spines pungent, progressively longer posteriorly; segmented rays subequal anterior to eighth ray; posterior end of fin rounded in small juveniles, pointed in larger specimens, eighth and ninth segmented rays prolonged to form a filamentous extension of fin in adults; posterior tip of fin reaching just short of

posterior edge of hypurals in small adults, extending little past hypural edge in most larger specimens (well beyond posterior margin of scaly caudal-fin base in a 268 mm SL specimen). Caudal fin truncate to very slightly rounded, especially in juveniles, the uppermost and lowermost rays elongate and filamentous in large adults, forming filamentous rays reaching 1.5 times length of middle rays in some specimens. Pectoral fin with upper rays longest, posteroventral margin of fin broadly rounded, dorsoposterior corner of fin with slight falcate-like projection in largest individuals. Tip of pelvic fin reaching to near anus (extending to base of first anal-fin spine in a 258 mm SL specimen); fin tip somewhat filamentous in very large specimens.

A moderately sized species, largest specimen examined 270 mm SL.

Pigmentation in alcohol: Juveniles — specimens smaller than about 16 mm SL pale except for few scattered tiny dark melanophores and a black spot between first and fourth dorsal-fin spine (fin membrane slightly dusky between fourth and fifth spine as well). Head of larger specimens with 2 dusky stripes radiating posteriorly from eye and a third extending forward from eye; anterior portion of body often slightly dusky; a narrow dusky band present on fleshy pectoral-fin base outlining proximal ends of rays; fins pale except for a dusky distal stripe along tips of dorsal-fin spines and a dark dusky spot at anterior end of anal fin. Largest juveniles with slightly dusky pigment on anterior half to two-thirds of anal fin replacing dark dusky spot; dark spot anteriorly on dorsal fin not extending past third spine; dusky stripes posterior to eye usually prominent.

Primary phase adults (typically

females) — body mostly dusky, posterior margin of each scale usually distinctly darker than centre; 2 dusky stripes present posterior to eye on head, though sometimes faint; dorsal-fin spines dusky with intervening membranes pale, a dark spot spanning first 3 spines; segmented rays of dorsal fin pale, membranes between first 7 rays dusky, those posteriorly pale; anal fin mostly dusky, paler posterior to ninth ray; caudal fin slightly dusky to pale with darker upper and lower edges; pectoral fin hyaline to slightly dusky with a distinct dusky smudge near dorsoposterior corner; pelvic fin dusky with somewhat paler spine. Some specimens with horizontal rows of small dusky spots faintly visible on sides.

Secondary phase adults (typically males) — pigmentation as in primary phase adults except pigment darker on head, dorsally on body, and on fins.

Color in life: Life colors are shown in figures 1 (juveniles), 2 (primary phase adult) and 3 (secondary phase adult).

Distribution: This species is known only from Ascension, St. Helena and St. Paul's Rocks and appears to be the sole representative of the genus from these islands. An extensive search of museum material housed in the United States and in Europe failed to uncover specimens of *B. insularis* from continental waters of Africa or the Americas. It is therefore unlikely that the species occurs far from the Mid-Atlantic Ridge.

At Ascension, *B. insularis* is common in rocky areas from shallow water to at least 50 m depth. The bright yellow juveniles were occasionally observed removing ectoparasites from other fishes including adults of *B. insularis*, *Holocentrus adscensionis* and *Lycodontis moringa*.

TABLE 1. Ranges of selected morphometric values expressed as percent of standard length for the type series of *Bodianus insularis*. Arrows indicate increase (↓) or decrease (↑) in relative measurement with increase in standard length of individuals. MNHN specimens and three specimens from BMNH 1979.6.19.11-17 omitted from table.

Number of specimens: Standard length (mm)	Holotype 1 210	Paratypes 16 24.1 - 270
Greatest depth of body	35.5	30.8 - 40.1
Least depth of caudal peduncle	17.5	14.8 - 18.7
Head length	34.8	32.8 - 38.6
Snout length	13.7	9.0 - 14.5 ↑
Diameter of orbit	5.8	5.2 - 9.8 ↓
Bony interorbital distance	8.7	7.7 - 9.9 ↑
Length of dorsal-fin base	50.0	47.4 - 54.4
Length of posterior lobe of dorsal fin	17.8	12.0 - 24.2 ↑
Length of first dorsal-fin spine	4.1	4.7 - 6.5
Length of second dorsal-fin spine	5.8	5.1 - 8.9 ↓
Length of last dorsal-fin spine	10.6	9.1 - 16.4 ↓
Length of anal-fin base	21.9	18.9 - 25.7
Length of posterior lobe of anal fin	15.5	11.6 - 29.6 ↑
Length of first anal-fin spine	4.3	4.2 - 6.6
Length of last anal-fin spine	9.2	8.6 - 15.9 ↓
Length of upper rays of caudal fin	22.6	22.9 - 37.0 ↑
Length of middle rays of caudal fin	20.3	19.8 - 26.6 ↓
Length of pectoral fin	21.3	20.3 - 24.5
Length of pelvic fin	22.7	19.6 - 30.6 ↑

Etymology: *insularis*, a Latin adjective meaning "of an island", in reference to the apparent restriction of this species to islands associated with the Mid-Atlantic Ridge.

DISCUSSION

B. insularis had not been previously recognized as a distinct species due, at least in part, to the singularly large size of specimens present in museum collections and the similarity to *B. rufus* (Linnaeus, 1758) at that size. On the other hand, many of the specimens in the British Museum were initially identified as *Bodianus pectoralis* (Gill, 1862) or *Harpe pectoralis*, a junior synonym of the eastern Pacific *B. diplotaenia* (Gill, 1862). These specimens were confused with *B. diplotaenia* as they resemble that species in possessing dark tips on the pectoral fins and two dark stripes emanating from the posterior margin of the orbit. Both of these characters are usually absent in individuals of *B. rufus* of similar size.

B. insularis resembles four of the other six species of *Bodianus* occurring in the Atlantic and eastern Pacific in general morphology and in developing a filamentous projection at the posterior corners of the dorsal and anal fins. The four species *B. rufus*, *B. pulchellus* (Poey, 1860), *B. diplotaenia* and *B. eclancheri* (Valenciennes, 1846) are further aligned with *B. insularis* in sharing a unique pattern of lower jaw dentition with a series of one to three moderately long anterodorsally slanted canines midway along the jaw. These teeth immediately precede a final row of equally short canines located at the posterior end of the jaw. A sixth species, *B. macrognathos* (Morris, 1974), occurring in the northwestern corner of the Indian Ocean, also develops filaments on the dorsal and anal fins, but differs consider-

ably from the first five in head morphology and in number of body scales. *B. macrognathos* has a rounded head in lateral aspect (at least in the adult form) and possesses many more lateral-line scales (40-41+2). The two other species of *Bodianus* occurring in the Atlantic, *B. scrofa* (Valenciennes, in Cuvier and Valenciennes, 1839) from Madeira and the nearby offshore islands of the eastern Atlantic and *B. speciosus* (Bowdich, 1825) of the tropical coastal waters of western Africa and offshore islands, appear to be more distantly related. *B. scrofa* has rather numerous body scales with 44-48+2 scales in the lateral line, no fin filaments, a lower scaly sheath on the bases of the dorsal and anal fins, and a quite different color pattern. *B. speciosus* lacks posterior filaments on the dorsal and anal fins at all sizes, lacks anterodorsally slanted canines posteriorly in the lower jaw, and has a prominent black band dorsally on the side of the body below the centre of the dorsal fin in large juveniles and adults (a prominent large black spot just posterior to the centre of the dorsal fin is present in place of the band in smaller juveniles).

B. insularis differs from the two eastern Pacific species, *B. diplotaenia* and *B. eclancheri* in having modally fewer pectoral-fin rays (ii, 14, rarely ii, 15, versus ii, 15, rarely ii, 16), in never developing prominent stripes on the body posterior to the head (versus having two prominent dark stripes on the back and sides of juveniles and primary phase adults of *B. diplotaenia*, though only in juveniles of *B. eclancheri*), and never developing a gibbous process on the forehead (a fleshy hump present on the forehead of secondary phase adults of both of the other species). In addition, individuals of *B. eclancheri* have incisiform teeth at the

anterior end of the jaws, instead of the typically prominent caniniform teeth of *B. insularis* and other members of the genus, and have somewhat deeper bodies, at least in large specimens.

B. insularis differs from *B. pulchellus* and *B. rufus* in having a more pointed snout and head in lateral aspect (bluntly pointed in adults of the last two, a rather subtle difference) and having a uniform color pattern in all three stages of development rather than a bicolored or tricolored pattern (juveniles mostly yellow, adults red and secondary phase adults reddish to blackish in *B. insularis*, versus juveniles and adults blue to purple and yellow in *B. rufus* and red, yellow and white in *B. pulchellus*). Very small juveniles of *B. pulchellus* resemble *B. insularis* at that size in having a completely yellow body and a prominent black spot at the anterior end of the dorsal fin. The two are separable on the basis of the size of the dorsal-fin spot, the spot reaching posteriorly to or nearly to the eighth spine in *B. pulchellus* and little past the fourth spine in *B. insularis*. Secondary phase adults of *B. rufus* resemble those of *B. insularis* in developing an overall reddish or dark blue to nearly black coloration. *B. rufus* differs, however, in rarely having a dark dorsoposterior tip to the pectoral fin (when present only appearing as a slightly dark smudge and not a prominent marking as in *B. insularis*).

Holotype: BMNH 1979.6.19.10 (1, 210) Ascension I., English Bay, depth 15 m, rocks on calcareous algal rubble, collected by R. Lubbock, B. McDowell and M. McDowell, 21 December 1977.

Paratypes: BMNH 1867.10.8.17-18 (2, 216-238) St. Helena; BMNH 1879.5.14.29 (1, 268) St. Paul's Rocks, collected by H. M. S. Challenger; BMNH 1910.9.9.16 (1, 193) St. Helena, collected by J. T. Cun-

ningham; BMNH 1927.12.7.72 (1, 253) Ascension I., collected by Simpson; BMNH 1932.2.19.47-49 (3, 213-235) Ascension I., collected by Haley; BMNH 1965.12.1.96 (1, 270) St. Helena, off Egg I., collected by A. Loveridge, 19 April 1964; BMNH 1965.12.1.97 (1, 258) St. Helena, Thompson's I. Bay, collected by A. Loveridge, 14 June 1961; BMNH 1979.6.19.11-17 (7, 15.2-63.2) Ascension I., Southwest Bay, Pan Am Beach, depth 12 m, rocks on sand, collected by R. Lubbock and K. Jourdan, 20 December 1977; MNHN A. 7413 (1, 218) St. Helena; MNHN 63-224 (1, 248) Ascension I.; USNM 218891 (1, 55.5) same collection data as holotype; USNM 218885 (1, 215) Ascension I., Northeast Bay, collected by Storrs Olson, 11 July 1970.

Additional material examined: BMNH 1946.5.23.7 (1, 244) St. Helena; BMNH 1979.6.19.18-19 (2, 25.3-30.4) Ascension I.

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