

Northeast Gulf Science

Volume 6
Number 2 *Number 2*

Article 14

10-1983

Additional Information on the Gobiid Fish *Varicus imswe*, with Comments on the Nominal Species of *Varicus*

Jeffrey T. Williams
University of Florida

Carter R. Gilbert
University of Florida

DOI: 10.18785/negs.0602.14

Follow this and additional works at: <https://aquila.usm.edu/goms>

Recommended Citation

Williams, J. T. and C. R. Gilbert. 1983. Additional Information on the Gobiid Fish *Varicus imswe*, with Comments on the Nominal Species of *Varicus*. *Northeast Gulf Science* 6 (2).
Retrieved from <https://aquila.usm.edu/goms/vol6/iss2/14>

This Article is brought to you for free and open access by The Aquila Digital Community. It has been accepted for inclusion in *Gulf of Mexico Science* by an authorized editor of The Aquila Digital Community. For more information, please contact Joshua.Cromwell@usm.edu.

ADDITIONAL INFORMATION ON THE GOBIID FISH *Varicus imswae*, WITH COMMENTS ON THE NOMINAL SPECIES OF *Varicus*

Two additional specimens of the gobiid fish *Varicus imswae* were recently discovered in the fish collection of the Florida State Museum, University of Florida. In addition to representing a significant geographic range extension of this species, the specimens led us to review and reevaluate the nominal species of *Varicus*.

Varicus bucca was described as a new genus and species by Robins and Böhlke (1961) based on material from the Greater and Lesser Antilles. Since this original description, two additional species have been described in the genus: *V. marilynae* Gilmore, 1979, from Florida, and *V. imswae* Greenfield, 1981, from Belize. Material of these three species has been extremely limited. A total of only eight specimens (all types) have been reported previously: four of *V. bucca*, two of *V. marilynae*, and two of *V. imswae*. The scarcity of material probably results from a combination of small size and deep depth preference of these gobies (particularly *V. marilynae* and *V. bucca*). *V. bucca* specimens seem to reach greater lengths than specimens of the other species, with one adult reported to be 46.3 mm standard length (Robins and Böhlke, 1961), whereas the largest known *V. marilynae* is 18.0 mm SL (Gilmore 1979) and the largest *V. imswae* only 13.5 mm SL (Greenfield 1981). The relatively small size of *V. bucca* and *V. marilynae* has almost certainly resulted in their being missed during most deep-water collecting, as they could easily escape most trawl mesh sizes routinely used, and could be easily overlooked in a dredge haul. *Varicus imswae* poses

another problem, as it is found at depths frequently sampled with ichthyocides. During such operations, trained ichthyologists routinely pick up the tiniest fish specimens (which incidently are magnified by about one-third underwater), and areas in which this species might occur have frequently been sampled using this technique. It seems likely that the rarity of *V. imswae*, at least, is real and not a collecting artifact; however, it might be more common at greater depths.

The validity of the genus *Varicus* was recently questioned by Hastings and Bortone (1981), and is currently being studied by P.A. Hastings (pers. comm.) and R.G. Gilmore (pers. comm.).

METHODS AND MATERIALS

Counts and measurements follow Greenfield (1981). Standard Length (SL) is given for all specimens. Vertebral counts were made from radiographs and are presented in the following format: precaudal (those vertebrae without a developed hemal spine) + caudal (those vertebrae with a developed hemal spine to and including the hypural complex) = total number of vertebrae. Procurent caudal rays are those with less than two segments and are located dorsally and ventrally immediately in front of the caudal fin. Principal caudal-fin rays are those with two or more segments and are presented as follows: rays on dorsal hypural plate + rays on ventral hypural plate = total caudal-fin rays. All fin-element counts were made from radiographs and checked on the specimens. Most scales are missing on the Bahaman specimens; thus the number of lateral scale rows were counted from scale pockets. As scale pockets are sometimes difficult to discern, these counts should be con-

sidered close estimates.

Abbreviations for institutions housing specimens referred to herein are: ANSP-Academy of Natural Sciences of Philadelphia; FMNH-Field Museum of Natural History; UF-Florida State Museum, University of Florida; UMML-University of Miami, Rosenstiel School of Marine and Atmospheric Sciences (formerly University of Miami Marine Laboratory); USNM-National Museum of Natural History, Smithsonian Institution.

In material examined, an asterisk following SL indicates examination of a radiograph rather than the listed specimen.

Material Examined

Varicus imswae: UF 13433, 1 female (9.0 mm SL), Bahamas: Eleuthera Island, 3.2 km S of Powell's Point lighthouse, SW end of island, 30-32 m, 10 Sept. 1966, C.R. Gilbert and P.C. Heemstra. UF 13923, 1 male (8.0 mm SL), Bahamas: Eleuthera Island, 4.8 km S of Powell's Point lighthouse, SW end of island, 15-17 m, 10 Sept. 1966, collected by C.R. Gilbert and P.C. Heemstra. FMNH 83894, male holotype (13.5 mm SL*), and FMNH 83898, male paratype (13.0 mm SL*), both from east of Carrie-Bow Cay, Belize, 21-25 m, 13 May 1977, D.W. and T.A. Greenfield.

Varicus bucca: ANSP 93083, female holotype (25.8 mm SL*), Virgin Islands: Saba Bank, 17°33' N, 63°35' W, 225-238 m, 25 Sept. 1958, M/V Oregon station 2356. FMNH 65608, 1 female (40.2 mm SL), north of Culebra Island, 18°29' N, 65°13.5' W, 50 m, 29 Sept. 1959, M/V Oregon station 2677. UMML 7114, paratype (partially cleared and stained), 18°29' N, 65°13.5' W, 50.5 m, 29 Sept. 1959, M/V Oregon station 2727. USNM 143022, 1 juvenile (19.2 mm SL*), off Havana, Cuba, 23°10'54" N, 82°17'45" W, 207 m, 17 January 1885; steamer

Albatross station 2322.

Varicus marilynnae: USNM 218406, male holotype (18.0 mm SL*), Atlantic Ocean, off Sebastian Inlet, Brevard and Indian River Counties, Florida, 27°50.3' N, 79°57.0' W, 61-79 m, 3 Sept. 1974, R/V Gosnold cruise 246 station 702. UF 24757, female paratype (18.0 mm SL), Gulf of Mexico, 28°26' N, 84°56' W, 88-91 m, 26 July 1975, R/V Bellows Cruise BLM 15, station III-B.

DISCUSSION OF *Varicus imswae* GREENFIELD, 1981

Selected counts and measurements are presented in Table 1.

Counts for the Bahaman specimens are essentially the same as those given by Greenfield (1981) in the description of the species. Vertebral counts for the types of *Varicus imswae* (Table 2) were found to differ from those of Greenfield (1981). Examination of a radiograph of the types revealed a fusion of the third and fourth centra in one of the specimens. Although the fusion is almost complete, there are 11 neural spines associated with the "10" precaudal centra. This makes the vertebral count for all known *V. imswae* $11 + 16 = 27$. All specimens of *Varicus imswae* and of *V. bucca* examined have the last pair of pleural ribs on vertebra 11. *V. marilynnae* differs, however, in having the last pair on vertebra 9.

The Bahaman *Varicus imswae* have the anterior edge of the tongue similar to that described for *V. marilynnae* (Gilmore, 1979). Anteriorly the tongue has three swellings, one on each side and one located medially on the tongue where a small longitudinal ridge on the underside of the tongue reaches the tip. There are slight indentations on either side of the medial swelling that give the tongue tip an overall appearance of being almost

Table 1. Selected counts and measurements for Bahaman *Varicus imswae*.

	UF 13433	UF 13923
Sex	Female	Male
SL in mm	9.0	8.0
Dorsal-fin elements	VII-1,7	VII-1,7
Anal-fin elements	1,7	1,7
Procurent dorsal caudal elements	3	3
Procurent ventral caudal elements	3?	4
Segmented caudal-fin rays	9 + 8 = 17	9 + 8 = 17
Pectoral-fin rays	15-15	15-15
Branchiostegal rays	5	5
Vertebrae	11 + 16 = 27	11 + 16 = 27
Lateral scale rows	ca. 24	ca. 24
Last pleural ribs on vertebra	11	11

trilobed, but the lateral swellings are slightly larger, and this approximates the typical bilobed condition.

The Bahaman specimens have more scales remaining on the body than the Belize specimens and yield the following information: one enlarged basicaudal scale with 4 long ctenii present on right side of one specimen at upper caudal base (similar scales probably occur on both sides at top and bottom of caudal fin base); scales with 3-5 ctenii cover sides to at least the beginning of soft dorsal fin and probably farther forward; belly covered with cycloid scales from base of pelvic fins to anus.

Despite their extremely small size, both Bahaman specimens of *Varicus imswae* are sexually mature. The female has a well-developed genital opening and immature eggs in two small ovaries, and the male has a long, distinct genital papilla.

The fact that these specimens are 9.0 and 8.0 mm SL, and the two males from Belize are 13.5 and 13.0 mm SL, ranks this species among the smallest known fishes in the world. It should be noted that one of the type specimens of *V. bucca* was described as being a juvenile at 19.2 mm SL (Robins and Böhlke, 1961), but *V. marilynnae* is ap-

parently mature at 18.0 mm SL (Gilmore, 1979). The ecological significance of these size differences at maturity is not known.

The pigmentation pattern on the Bahaman male and female, although somewhat faded, is essentially the same as that described by Greenfield (1981) for the Belize males.

Distribution

The specimens reported herein constitute a significant geographic range extension for *Varicus imswae*. This species is now known from Belize (Central America) and Eleuthera Island, in the Bahamas. In addition, the original depth distribution, 21-25 m, can now be expanded to 15-32 m.

Comments

Variation exists in pectoral-fin ray counts for the three species of *Varicus* (Table 2), as well as for second dorsal and vertebral counts in *V. bucca*. Böhlke and Robins (1960a, 1960b, 1968) demonstrated the value of fin ray counts in goby taxonomy, but also showed variation of four pectoral-fin rays in five species and as many as six in *Gobiosoma oceanops*. Although they found slightly less variation in numbers of anal- and second dorsal-fin rays, these counts often varied by three and occasionally four rays. Vertebral counts, with a few notable exceptions (Böhlke 1969; Böhlke and Robins 1969), are extremely stable in gobiids; Birdsong (1975:180), for example, found only five of 250 individuals examined in the genus *Microgobius* to have other than 11 + 16 = 27 vertebrae. In the present study, some variation is noted for one or more species of *Varicus* in all the above counts (Table 2), except for number of anal rays, which is consistently 1,7. Considering these data in combination with

188 Short papers and notes

Table 2. Frequency distributions of selected counts for the nominal species of *Varicus* (information based on this study, Gilmore 1979, Greenfield 1981, Robins and Böhlke 1961).

	Segmented dorsal rays			Pectoral-fin rays (left/right)					Lateral scales in horizontal series								Caudal Vertebrae				
	7	8	9	14/14	15/15	16/17	17/16	18/18	18/19	18	19	20	21	22	23	24	25	26	27	16	17
<i>V. bucca</i>		2*	2*+			1		2	1+										3+	3+	1
<i>V. imswae</i>																					
Belize		2+		1		1+									2+						2*+
Bahamas		2				2															2
<i>V. marilynae</i>			2*+					1	1+		1+	1			2						2+

*Counts modified from original descriptions discussed in text.

+ Holotype

small sample size, the variation noted within individual members of this genus does not appear unusual, with the possible exception of number of caudal vertebrae in *V. bucca*.

There are two discrepancies between the accounts of Greenfield (1981) and those of Robins and Böhlke (1961) and Gilmore (1979) that warrant comment. The first concerns the number of spines and rays in the second dorsal fin. Robins and Böhlke (1961) and Gilmore (1979) gave the total number of elements in this fin, with the understanding that the first element was a spine. Greenfield (1981) chose to distinguish the spines and rays in presenting this count, and his method is followed herein.

In the second dorsal fin counts for one of the paratypes of *Varicus bucca* (FMNH 65608), there is a discrepancy between the 1,8 count of Greenfield (1981), and the 10 (= 1,9) count of Robins and Böhlke (1961). Greenfield (1981) did not comment on this, but he later said (in litt.) that a radiograph of the specimen showed that the last two rays shared a common pterygiophore and were counted as one. Although Robins and Böhlke (1961) used this same method, our examination of the FMNH paratype confirms that it has 1,8 second dorsal-fin elements, 18-18 pectoral-fin rays, and 11 + 16 = 27 vertebrae. Our analysis reveals that the ANSP holotype has 1,9 second dorsal-fin elements, and

11 + 16 = 27 vertebrae; the USNM paratype has 1,9 second dorsal-fin elements and 11 + 17 = 28 vertebrae; and the UMML paratype has 1,8 second dorsal-fin elements and 11 + 16 = 27 vertebrae. Pectoral-fin ray counts, as determined from the original description (ANSP and USNM types) or from direct examination (UMML type), are 18-19, 16-17 and 18-18, respectively.

The second discrepancy concerns the belly squamation. Greenfield (1981) stated that *Varicus imswae* and *V. marilynae* have scales on the belly, and that they are lacking in *V. bucca*. These statements were based on the examination of one paratype of *V. bucca* (FMNH 65608) and one paratype of *V. marilynae* (UF 24757). Greenfield's (1981) findings differ significantly from those of Robins and Böhlke (1961), who stated that the belly of *V. bucca* was scaled with cycloid scales. Gilmore (1979) did not specifically state whether or not the belly of *V. marilynae* was scaled, but implied that it was not, in contrast to a scaled condition in the *V. bucca* paratype (UMML 7114) he examined. Our examination of the UF paratype of *V. marilynae*, confirms that the belly is naked. Belly squamation in *V. bucca* presents a problem. William F. Smith-Vaniz examined the holotype and has informed us (in litt.) that "the mid ventral area of the belly lacks scales." The FMNH and UMML paratypes have their bellies scaled except for a very

small area immediately in front of the anus. It can now be stated that the belly of *V. imswae* is completely scaled, that of *V. marilynae* is naked, and that of *V. bucca* is variously scaled and/or naked.

ACKNOWLEDGMENTS

David W. Greenfield of Northern Illinois University, William F. Smith-Vaniz and Eugenie Böhke (ANSP), and Victor G. Springer (USNM) provided radiographs of types. Robert K. Johnson kindly allowed the loan of type material from FMNH. Raymond Dee, James A. McGrath, and Imelda Echavarría assisted in x-raying specimens at UF.

R. Grant Gilmore and David W. Greenfield provided information on material they had examined.

LITERATURE CITED

- Birdsong, R.S. 1975. The osteology of *Microgobius signatus* Poey (Pisces: Gobiidae), with comments on other gobiid fishes. *Bull. Florida St. Mus. Biol. Sci.* 19(3): 135-186.
- Böhke, J.E. 1969. A new sponge-dwelling gobiid fish from the Bahamas. *Notulae Naturae* 421:1-7.
- _____, and C.R. Robins. 1960a. Western Atlantic gobiid fishes of the genus *Lythrypnus*, with notes on *Quisquilius hipoliti* and *Garmannia pallens*. *Proc. Acad. Nat. Sci. Phila.* 112(4):73-101.
- _____. 1960b. A revision of the gobioid fish genus *Coryphopterus*. *Proc. Acad. Nat. Sci. Phila.* 112(5):103-128.
- _____. 1968. Western Atlantic seven-spined gobies, with descriptions of ten new species and a new genus, and comments on Pacific relatives. *Proc. Acad. Nat. Sci. Phila.* 120:45-174.
- _____. 1969. Western Atlantic sponge-dwelling gobies of the genus *Evermannichthys*: their taxonomy, habits and relationships. *Proc. Acad. Nat. Sci. Phila.* 121(1):1-24.
- Gilmore, R.G. 1979. *Varicus marilynae*, a new gobiid fish from Florida. *Copeia* 1979 (1):126-128.
- Greenfield, D.W. 1981. *Varicus imswae*, a new species of gobiid fish from Belize. *Copeia* 1981 (2):269-272.
- Hastings, P.A., and S.A. Bortone. 1981. *Chriolepis vespa*, a new species of gobiid fish from the northeastern Gulf of Mexico. *Proc. Biol. Soc. Wash.* 94(2):427-436.
- Robins, C.R., and J.E. Böhke. 1961. A new gobiid fish from the Antilles and comment on *Ctenogobius fasciatus* and *C. curtisi*. *Copeia* 1961 (1):46-50.
- Jeffrey T. Williams and Carter R. Gilbert, *Zoology Department and the Florida State Museum, University of Florida, Gainesville, FL 32611. Present address (J.T.W.): Division of Fishes, National Museum of Natural History, WG-12, Smithsonian Institution, Washington, D.C. 20560.*