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**ACANTHURUS RANDALLI,
A NEW SURGEON FISH FROM THE
GULF OF MEXICO**

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ACANTHURUS RANDALLI, A NEW SURGEON FISH
FROM THE GULF OF MEXICO

JOHN C. BRIGGS AND DAVID K. CALDWELL¹

Our collections from the vicinity of Panama City, Florida, on the northeastern coast of the Gulf of Mexico, have revealed the presence of a marine fauna well differentiated from the fauna of the rest of the northern Gulf region. Among the several tropical species previously unknown in the Gulf from north of the Florida Keys, we discovered three kinds of surgeon fishes belonging to the genus *Acanthurus*. *A. chirurgus* (Bloch) and *A. coeruleus* Bloch and Schneider were readily identified and were recorded in our first paper dealing with this fauna (Caldwell and Briggs, 1957). However, individuals of the third type could not be definitely recognized as representative of a known species so were put aside until a proper amount of comparative material could be assembled.

After comparison with 154 specimens of *A. bahianus* Castelnau, kindly loaned by James E. Böhlke of the Philadelphia Academy of Natural Sciences, we concluded that we were dealing with a new species which apparently replaces *A. bahianus* in at least part of the northeastern Gulf area. It is described as follows:

ACANTHURUS RANDALLI, new species
Figure 1

DIAGNOSIS.—An *Acanthurus* with the caudal fin emarginate but not strongly lunate. The pectoral fin is short, 4.0 (3.8-4.4) in the standard length. Dorsal fin count is IX, 24 (22-26); anal fin III, 22 (21-24); and pectoral fin 16 (15-16).

DESCRIPTION.—In the following paragraphs the first number indicates the mean, and those in parentheses indicate the range. Sample size varies but can be determined for each measurement from table 1.

Anterior gill rakers number 21 (18-24); posterior gill rakers number 21 (19-23); scales from gill opening to posterior end of caudal spine number 115 (101-121); upper teeth number 14 (12-16); lower teeth number 16 (14-17).

¹Until recently John C. Briggs was curator of fishes, University of Florida Collections, and Assistant Professor of Biological Sciences. Currently he is a Research Associate at the School of Medicine, University of Florida, Gainesville. David K. Caldwell recently completed the doctoral program in biology at the University of Florida and is now in the employ of the U.S. Fish and Wildlife Service, Brunswick, Georgia. Manuscript submitted 20 November 1956.—Ed.

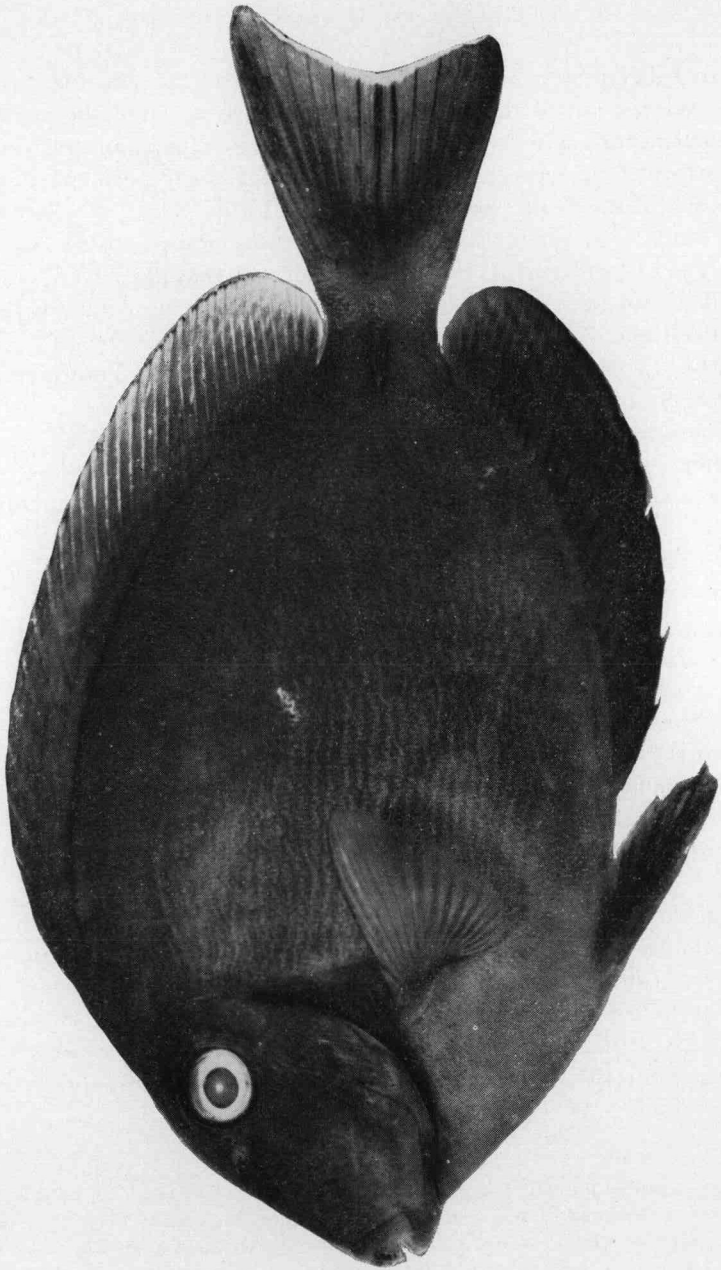


Figure 1.—Holotype of *Acanthurus randalli*, new species. UF 5394, 106 mm. in standard length.

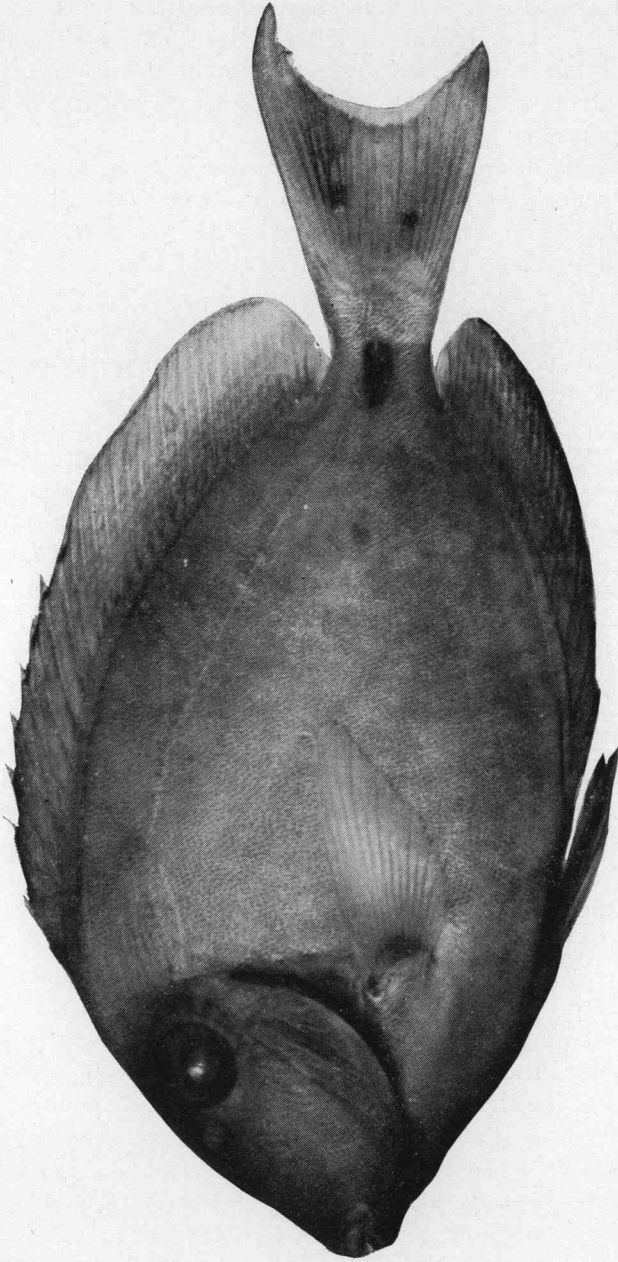


Figure 2.—*Acanthurus bahianus* Castelnau. Academy of Natural Sciences, Philadelphia 74630, 105 mm. in standard length. The conspicuous dots on the center of the caudal fin are not part of the natural coloration.

The following measurements are proportions of the standard length: depth of body, 2.1 (1.9-2.2); length of head, 3.2 (3.0-3.4); length of snout, 4.8 (4.5-5.1); length of pelvic fin, 4.9 (4.6-5.2); pelvic spine, 7.8 (7.1-8.5); ninth dorsal spine, 6.8 (5.8-7.1); eleventh dorsal ray, 6.3 (5.7-6.8); third anal spine, 7.6 (6.9-8.1); twelfth anal ray 6.6 (6.2-7.2); and caudal concavity, 18.0 (11.4-23.3).

The following measurements are proportions of the head length: greatest diameter of eye, 3.3 (3.0-3.7); width of interorbital space, 3.2 (2.8-3.5); least depth of caudal peduncle, 2.8 (2.6-3.0); length of caudal peduncle spine, 4.9 (3.7-6.7); and caudal concavity, 6.1 (3.4-7.7).

COLORATION.—In alcohol the body is a uniform brown, becoming lighter on the ventral side in front of the pelvic fins. The front of the head between the eyes and the tip of the snout is a little darker than the rest of the head. The edges of the gill membranes are blackish, and the caudal spine is surrounded by a narrow blackish border. A faint, broad, whitish band extends vertically across the caudal peduncle behind the posterior end of the caudal spine. A series of faint, light, irregular, and longitudinal lines cover broad areas of the sides.

The dorsal fin is light brown toward the front, becoming darker posteriorly. Five, ill-defined, dark, longitudinal lines are present on the anterior portion of this fin, while a series of faint light lines are present toward the posterior tip. In addition, the dorsal fin has a narrow black border on its distal edge. The caudal fin is dark brown with a transparent margin on the posterior edge. The anal fin is dark brown with a narrow black border similar to that on the dorsal fin. A series of faint, light, longitudinal lines can be seen toward the posterior tip. The ventral fins are blackish. The pectoral fins are almost transparent, the only color being a slight yellowish on the dorsal edges.

In life a distinctive feature is a pearly white saddle on the caudal peduncle. It is located mostly behind the caudal spine, becoming broad at the top of the peduncle where it extends out on the base of the upper caudal fin. Another characteristic which is lost in alcohol is a yellowish color on the distal third of the caudal fin which contrasts with a narrow white margin on the posterior border of the fin.

HOLOTYPE.—University of Florida Collections 5394; 106 millimeters in standard length; taken by John C. Briggs and David K. Caldwell, at the jetties on the west side of the inlet, St. Andrews State Park, near Panama City, Bay County, Florida, on 8 October 1955.

PARATYPES.—UF 5416; 18 individuals, 62 to 87 millimeters in standard length, taken by Caldwell and Winfield Brady at the type locality on 30 July 1956. UF 5400; 2 individuals, 86 and 91 millimeters in standard length, taken by Brady at the same location sometime in October 1956. One specimen from lot 5416 will be deposited in each of the following collections: Stanford University, U.S. National Museum, Chicago Natural History Museum, and the Philadelphia Academy of Natural Sciences.

RELATIONSHIP.—Thanks to the revisionary work of Randall (1956), the systematics of the genus *Acanthurus*, the largest genus in the family Acanthuridae, now has a solid foundation. When Randall's key to the Atlantic species is utilized (1956:172), our new form will be identified as *A. bahianus*, and, indeed, this species is its closest relative. However, there are clear-cut differences in the shape of the caudal concavity, the length of the pectoral fin, and, to some extent, the diameter of the eye.

As can be seen in figure 3, the caudal fin in *A. randalli* undergoes but a slight ontogenetic metamorphosis compared to *A. bahianus*. In the latter the lunate shape becomes obvious at a relatively small size. Two poorly preserved specimens of *A. randalli* show more of a lunate shape to the tail than the largest specimen—the holotype, 106 millimeters in standard length—in the series illustrated in figure 3. Even so, the concavity is much less marked than in specimens of *A. bahianus* of comparable size. As is shown in figure 4, the caudal concavity when measured into the head length is dependable for distinguishing between the species, at least medium-sized individuals—about 60 to 106 millimeters—and probably other sizes as well.

All of the specimens of *A. randalli* can be separated from *A. bahianus* by comparing the ratio of the pectoral fin length measured into the standard length. The length of the pectoral fin is taken by placing one tip of the dividers at the upper axis, with the other tip at the extreme distal end while the fin is lying flat against the body. The difference in this ratio is illustrated in figure 5.

A difference of less magnitude between *A. randalli* and *A. bahianus* is the eye diameter as measured into the head length. The former species tends to have the smaller eye. Although considerable overlap in variation is present in this ratio between the species, the character may be useful at times.

In order to facilitate comparison between the new species and *A. bahianus*, a photograph of a specimen of the latter is provided (fig. 2).

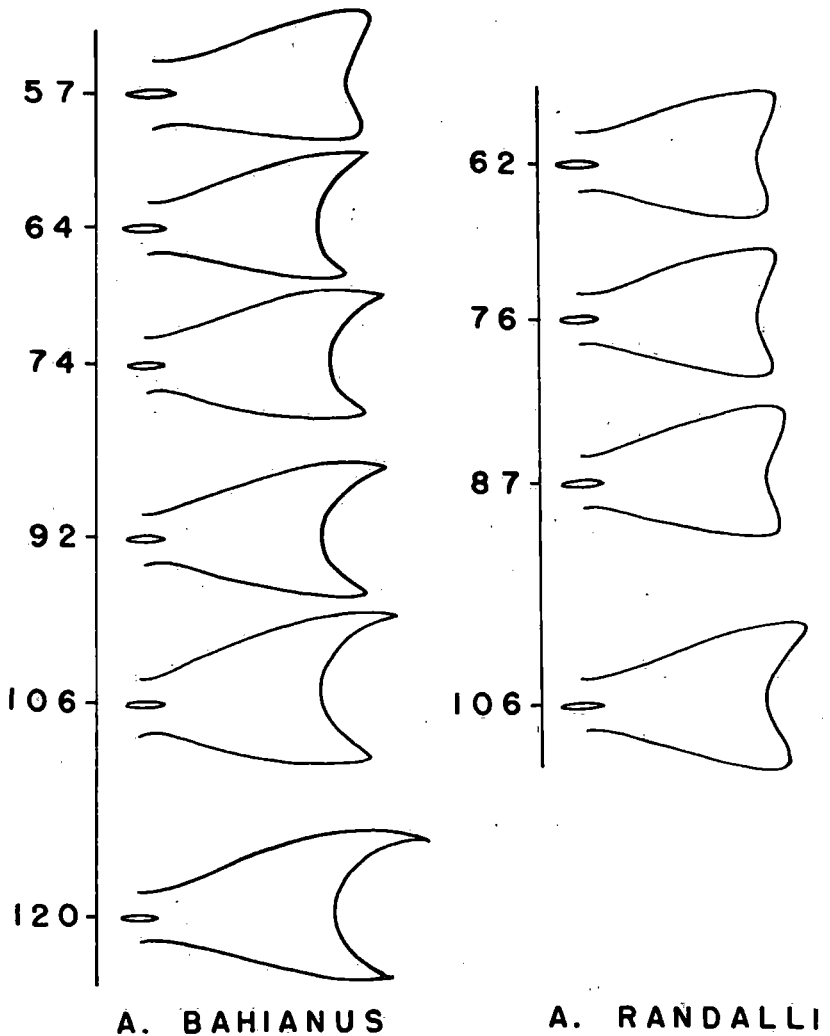


Figure 3.—Caudal fin metamorphosis in *A. bahianus* and *A. randalli*. The standard length in millimeters for each specimen is listed to the left of the figure.

The individual illustrated (Philadelphia Academy of Natural Sciences 74630) was taken in the Bahama Islands and is approximately the same size as the holotype of *A. randalli*. In addition, a table is provided in which various counts and measurements for the two species are directly compared.

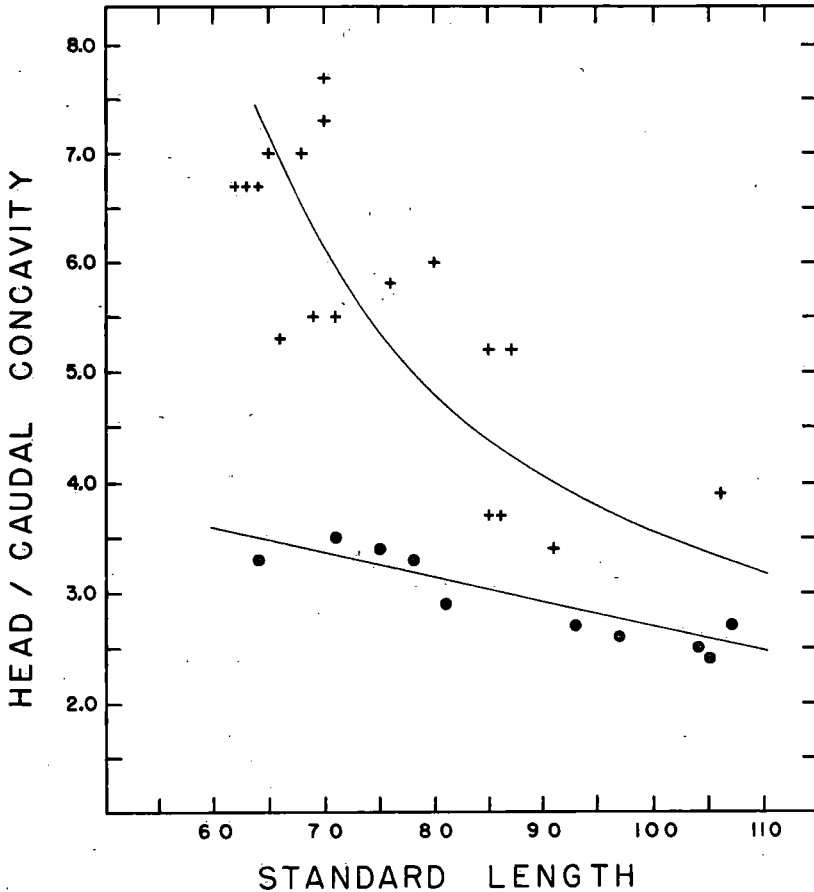


Figure 4.—Caudal concavity measured into head length in relation to standard length in millimeters. Crosses represent *A. randalli* and spots, *A. bahianus*.

REMARKS.—One of us (Caldwell) has had the opportunity of observing *A. randalli* in the large tanks of Florida's Gulfarium located at Fort Walton. In this environment, apparently similar to the usual habitat of the species, individuals readily schooled with *A. chirurgus*. Since both Longley and Hildebrand (1941:156), and Randall (1956:225) observed *A. bahianus* schooling with the latter, *A. randalli* can be said to be similar to *A. bahianus* in this respect.

Apparently *A. randalli* is an allopatric replacement for *A. bahianus* in the Panama City area, and probably in the whole northeastern Gulf region. *A. bahianus* has not been reported in the Gulf north of Key

TABLE I
COMPARISON OF TWO SPECIES OF *Acanthurus*

CHARACTER	A. RANDALLI	A. BAHIANUS
Dorsal fin count	IX, 22-26. (20)	IX, 23-25 (10)
Anal fin count	III, 21-24 (20)	III, 22-23 (10)
Pectoral fin rays	15-16 (20)	16 (10)
Anterior gill rakers	18-24 (19)	18-24 (8)
Posterior gill rakers	19-23 (21)	21-23 (8)
Teeth in upper jaw	12-16 (12)	13-17 (10)
Teeth in lower jaw	14-17 (12)	14-18 (10)
Scales on side	101-121 (12)	106-129 (10)
Standard length in millimeters	62-106 (21)	64-107 (10)
Standard length/depth	1.9-2.2 (21)	2.0-2.2 (10)
Standard length/head length	3.0-3.4 (21)	3.1-3.5 (10)
Standard length/snout length	4.5-5.1 (13)	4.5-5.1 (10)
Standard length/pectoral fin length	3.8-4.4 (21)	3.4-3.7 (10)
Standard length/pelvic fin length	4.6-5.2 (12)	4.3-5.2 (10)
Standard length/pelvic spine length	7.1-8.5 (12)	6.9-8.2 (10)
Standard length/ninth dorsal spine length	5.8-7.1 (12)	5.7-6.7 (10)
Standard length/eleventh dorsal ray length	5.7-6.8 (12)	5.5-6.4 (10)
Standard length/third anal spine length	6.9-8.1 (12)	6.4-7.5 (10)
Standard length/twelfth anal ray length	6.2-7.2 (12)	5.8-6.9 (10)
Standard length/caudal concavity depth	11.4-23.3 (21)	8.1-11.8 (10)
Head length/eye diameter	3.0-3.7 (21)	2.9-3.4 (10)
Head length/interorbital distance	2.8-3.5 (12)	2.9-3.4 (10)
Head length/least depth of caudal peduncle	2.6-3.0 (12)	2.7-3.3 (10)
Head length/caudal spine length	3.7-6.7 (21)	3.6-5.4 (10)
Head length/caudal concavity depth	3.4-7.7 (21)	2.4-3.5 (10)

The range of variation is followed, in parentheses, by the number of specimens examined. All specimens listed are between 62 and 107 millimeters in standard length.

West, so the zone of contact for the two species may lie anywhere between this point and Panama City. It is interesting to find that the Panama City representatives of *A. coeruleus* and *A. chirurgus* seemed to be typical in all respects. It is difficult to explain why these two relatives do not also show some sign of speciation.

In consulting the key provided by Randall (1956:172), the reader should be aware that the last item listed in couplet 3b is evidently in error and should read, *anterior gill rakers 16 to 22*, not 16 to 19.

This new species is named for John E. Randall of the University of Hawaii, in recognition for his excellent work upon this group of fishes. The determination of our specimens would have been difficult without his revision of the genus *Acanthurus*.

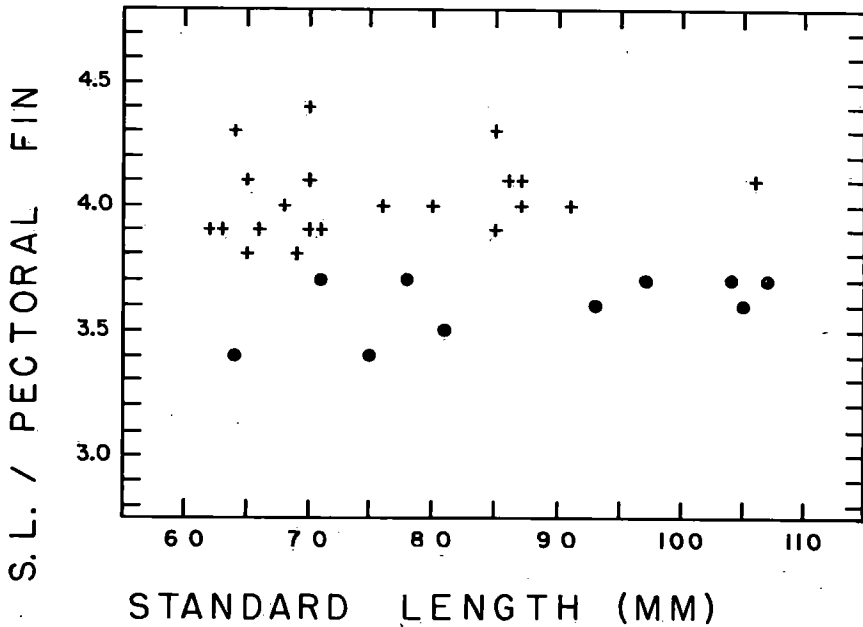


Figure 5.—Pectoral fin length measured into standard length in relation to standard length. Crosses represent *A. randalli* and spots, *A. bahianus*.

The various counts and measurements listed in this paper were made in accordance with the methods described by Randall (1956:165). The technique for making the pectoral length measurement was given in an earlier paragraph of this paper.

We wish to extend our appreciation to J. C. Dickinson, Jr. and A. Gilbert Wright for their technical assistance in the preparation of the photographs.

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