

ADDITIONS TO A REVISION OF ARGENTININE FISHES

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ABSTRACT

Four new species of the genus *Argentina* are described, three from the western Atlantic and one from Peru. Range extensions are presented for *A. euchus* from the western Indian Ocean and *A. sialis* from the northeastern Pacific. Speciation in the genus is discussed, and a key is presented to the 12 species recognized.

Argentinine fishes are taken in commercial quantities in the temperate western North Atlantic (Emery and McCracken, 1966) and are forage fishes in Australia (Fairbridge, 1951). Species found in tropical waters are usually associated with shrimp grounds and are available to shrimp fishing gear. This paper supplements the revision of argentinine fishes published by Cohen in 1958. Since then, additional material has accumulated comprising undescribed species, additional material of poorly known forms, and range extensions. In this paper we reassess the status of populations in the genus *Argentina*. We discuss speciation, comment on swimbladders, and describe one new species from Peru and three from the tropical western Atlantic. Range extensions are recorded for *A. euchus* from the western Indian Ocean and *A. sialis* from the northeastern Pacific. A new species of *Glossanodon* from the western Indian Ocean is described, and additional material of *G. polli* from tropical West Africa is noted.

MATERIALS AND ACKNOWLEDGMENTS

We have received material from the Smithsonian Oceanographic Sorting Center; the U.S. Program in Biology of the International Indian Ocean Expedition; the Guinean Trawling Survey; the

Pigmentation of the swimbladder and its significance as a systematic character are discussed.

A new species of *Glossanodon* from the western Indian Ocean is described, and additional material of *G. polli* from the tropical eastern Atlantic is noted.

Southeastern Pacific Biological and Oceanographic Program; the Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Bases at Pascagoula, Miss., and Seattle, Wash.; and Scripps Institution of Oceanography.

Specimens stored in the following collections have been examined: U.S. National Museum, Wash., D.C. (USNM); Harvard Museum of Comparative Zoology, Cambridge, Mass. (MCZ); Field Museum of Natural History, Chicago, Ill. (FMNH); Stanford University Division of Systematic Biology, Stanford, Calif. (SU); Scripps Institution of Oceanography, La Jolla, Calif. (SIO); British Museum, Natural History, London (BMNH); Museum National d'Histoire Naturelle, Paris (MNHN); Universitetets Zoologiske Museum, Copenhagen (UZMC); University of Miami Marine Laboratory, Miami, Fla. (UMML); Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory, Miami, Fla. (TABL); Academy of Natural Sciences, Philadelphia, Pa. (ANSP); Tulane University, New Orleans, La. (TU); University of Florida, Gainesville, Fla. (UF); Gulf Coast Research Laboratory, Ocean Springs, Miss. (GCRL); and California Academy of Sciences, San Francisco, Calif. (CAS).

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METHODS

Methods and definitions follow Cohen (1958). We note in particular that the split posterior ray of the dorsal and anal fins is counted as two rays and that the vertebral count does not include the urostyle or the hypural fan. The method of counting gill rakers is shown in figure 1. Meristic characters are given as the mode followed by the range in parentheses. Where the range includes data for more than one species, no mode is given. Measurements are given as the mean followed by the range in parentheses.

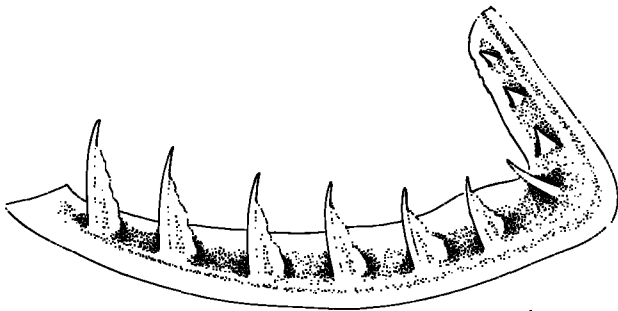


FIGURE 1.—*Argentina striata*, USNM 203001. First gill arch from left side; rakers on lower arm are counted as six. Gill filaments are not shown. Drawn by Mildred H. Carrington.

GENUS ARGENTINA LINNAEUS

For this genus, we divide the species into two groups and discuss sympatry and its significance, taxonomic significance of the swimbladder, and present a key to the species of *Argentina*.

SPECIES GROUPS

The 12 species of *Argentina* are divided into two groups.

Species Group 1

Four species are in this group. They are *silus* and *sphyraena* from the North Atlantic and Mediterranean and *sialis* and *aliceae* from the eastern Pacific. This group is distinguished by its larger jaw, almost always greater than 21.5 percent of head length (fig. 2), and usually more gill rakers (7–21 on the lower arm of the first gill arch; one

species, *A. sphyraena*, has few gill rakers, 7–10, but the other three species have 11–21; see table 1). The species in this group are allopatric (although the gross geographical ranges of *sphyraena* and *silus* overlap, they are ecologically separate, mainly living and certainly spawning at different depths), and are very distinct morphologically.

Species Group 2

Eight species are in this group. They are *striata*, *brucei*, *georgei*, and *stewarti*, all from the western Atlantic; *euchus*, from the western Indian Ocean; and *elongata*, *australiae*, and *kagoshimae* from the western Pacific. This group is distinguished by its shorter jaw, almost always less than 20 percent of head length, and generally fewer gill rakers (5–10, but one species, *A. elongata*, has more gill rakers, 8–10; the other species have 5–8). At least some of the species in this group are sympatric.

SYMPATRY AND ITS SIGNIFICANCE

Cohen (1958) treated the forms (then three, a fourth is described in this paper) constituting the *silus* group as full species. However, the three western Pacific forms of the *striata* group, *australiae*, *elongata*, and *kagoshimae*, were recognized as subspecies because these disjunct populations (Australia, New Zealand, and Japan, respectively) are very similar to each other, far more so than are the species in the *silus* group (see key). *A. striata* was recognized as a full species, but could just as easily have been ranked as a subspecies. *A. euchus* (Cohen, 1961) was given full species rank because it was described from only two specimens.

Subsequent study of hundreds of specimens from the western Atlantic has shown that what was formerly considered to be a single species, *A. striata*, clearly comprises four forms. These forms are similar to each other and separated by few characters. In fact, they are distinguished, one from the other, by characters which both qualitatively and quantitatively resemble those that separate the western Pacific forms.

We recognize the four closely related western Atlantic forms as full species because at least some of them are sympatric. *A. striata* and *brucei* have been taken together in trawl hauls off Venezuela (*Atlantis* sta. 2700; *Oregon* sta. 1989, 4410, and 4465). *A. brucei* and *stewarti* were taken together off Nicaragua (*Oregon* sta. 3574 and 3610). *A.*

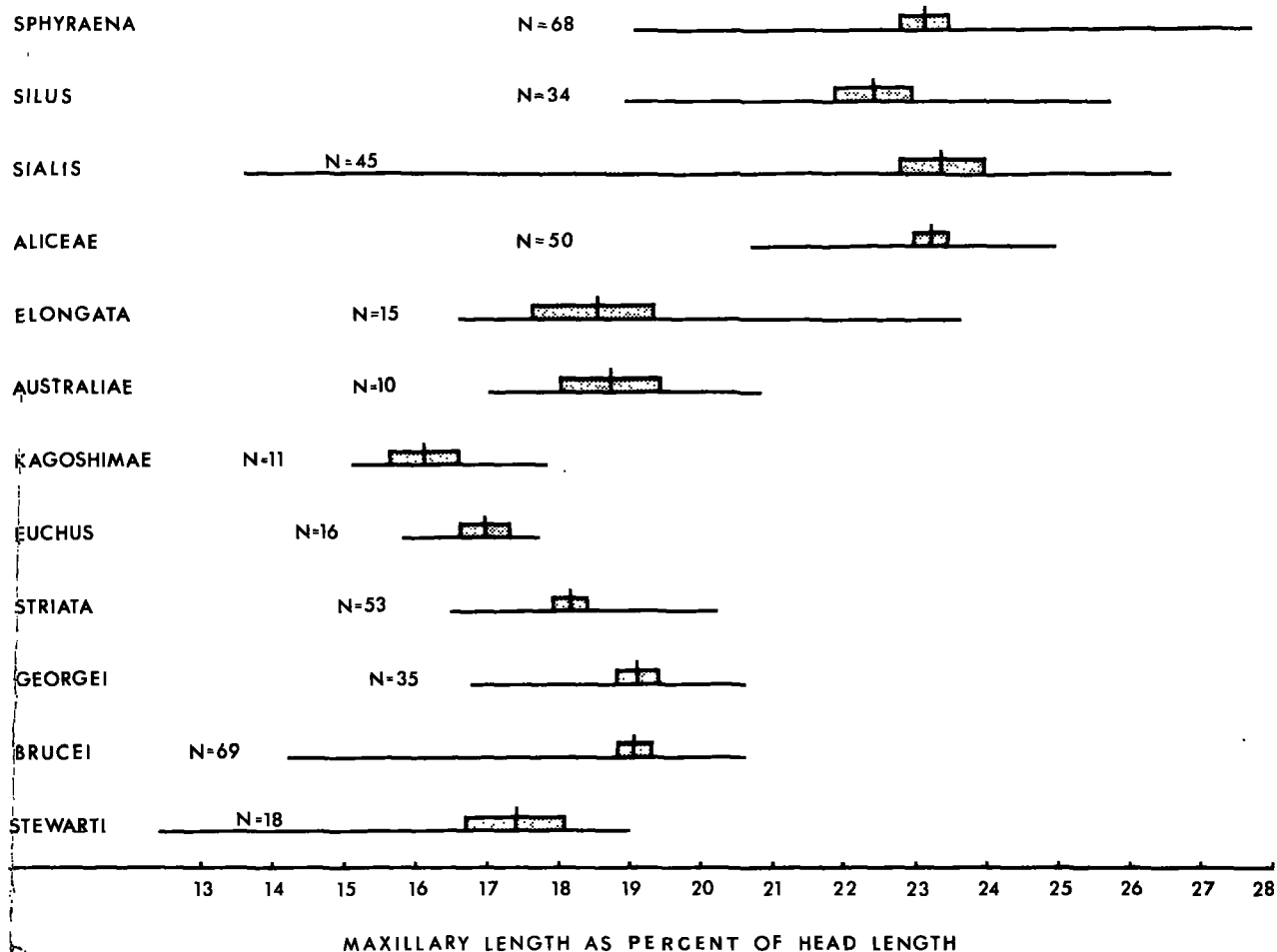


FIGURE 2.—Two species groups of *Argentina* as shown by maxillary length as percent of head length. Horizontal lines are ranges; bars are two standard errors on each side of means; vertical lines are means.

georgei and *brucei* have been taken together off Honduras (Oregon 3626) and at closely adjacent localities at similar depths off the south coast of Jamaica (Oregon 3549 and 3548). *A. georgei* and *stewarti* were caught in the same trawl off the Virgin Islands (Oregon sta. 2606). *A. striata* and *georgei* were caught at approximate localities and depths off the east coast of Florida, south of Dry Tortugas, and on the north coast of Cuba.

Figure 3 shows the distribution and figure 4 summarizes the co-occurrence of the four species. *A. brucei* and *georgei* each live with three other western Atlantic species; *striata* and *stewarti* each with two others. Only *A. striata* and *stewarti* are not so far known to co-occur.

We treat the four tropical western Atlantic forms as full species because they are sympatric, even though the magnitude of differences between

them is less than the magnitude of differences separating species of the *silus* group. Although the western Pacific forms are not known to be sympatric, we recognize them also as full species. It is obvious that in the genus *Argentina*, characters of the magnitude of those separating *elongata*, *australiae*, and *kagoshimae* can signal the existence of full species.

SWIMBLADDER

The occurrence of silvery pigment in the outer layers of the swimbladder of some species of *Argentina* has been noted many times in the literature. Cohen (1958) added the observation that some species of *Argentina* lack this silvery pigment. He commented that presence or absence of silvery pigment did not seem to be a function of age, size, time of year, or method of preservation,

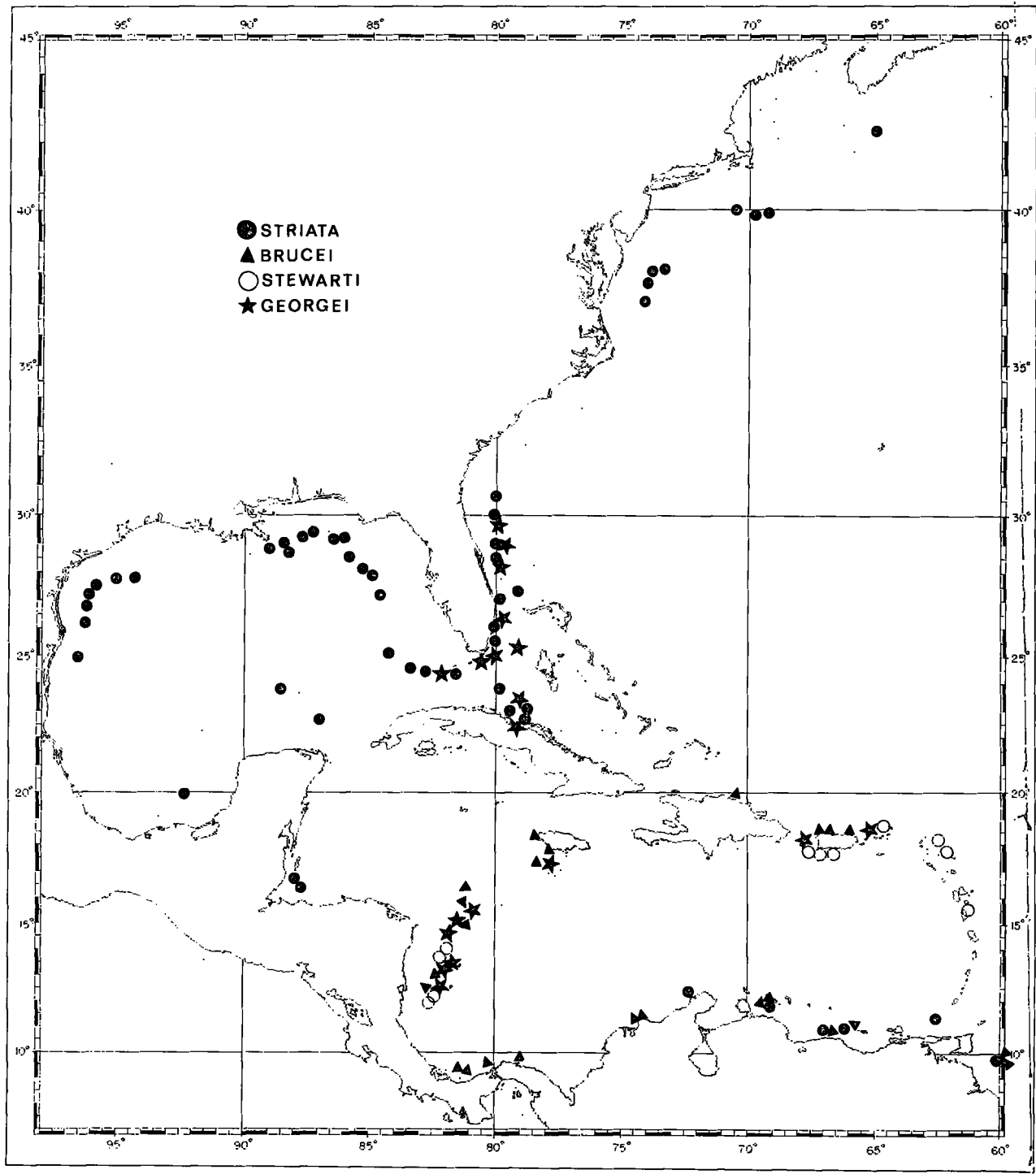


FIGURE 3.—Distribution of four species of *Argentina* in the western Atlantic.

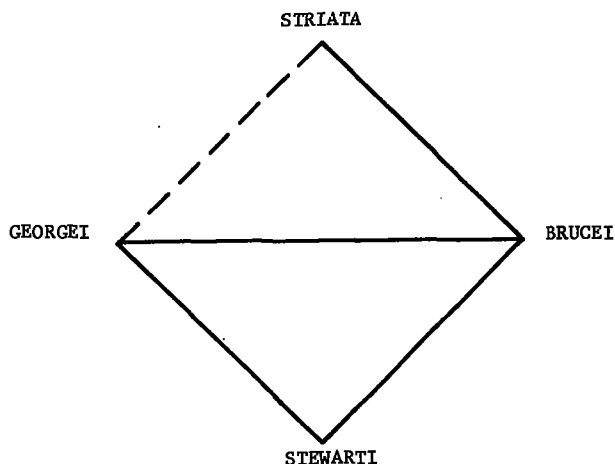


FIGURE 4.—Co-occurrence of four species of *Argentina* in the western Atlantic. Solid lines connect species taken from the same trawl. A dotted line connects species taken in different trawls at the same or closely adjacent localities.

and he, therefore, used the character taxonomically, although always in company with other characters. We here point out errors in Cohen's observations and comment on the variability of this character. In his key to the species of *Argentina* and in his diagnosis of *A. striata* Cohen stated that *A. striata* lacked a silvery-pigmented swimbladder. We have examined the swimbladders of 150 specimens of *A. striata* from throughout the range of the species and find that most, though not all of them, have definite silvery pigment. Cohen probably based his 1958 statement on examples of one or more of the other three species of *Argentina* from the western Atlantic.

The swimbladder of *A. striata* may have any one of four patterns of pigmentation. In one, the entire outer part of the organ is heavily coated with guanine (fig. 5); in the second, the anterior and posterior quarters of the bladders are pigmented with guanine, but the intervening segment lacks silvery pigment (fig. 5); in the third, only the posterior segment is pigmented with guanine; in the fourth and rarest type, the outer layer is

faintly iridescent or appears to lack any impregnation of guanine.

In all but two instances, all specimens of *A. brucei* lack silvery pigment on the swimbladder (fig. 5). In a collection of six specimens from Venezuela (UF 5237), five individuals have iridescent to silvery pigment on each swimbladder, and a single individual lacks pigment completely. Also, one of three specimens from Honduras (FMNH 74571) has a silvery swimbladder.

All specimens examined of *A. stewarti* lack definite silvery pigment (fig. 5); however, one had a slightly iridescent swimbladder. A few examples of *A. georgei* have slightly iridescent swimbladders.

The specimens of *A. australiae*, *elongata*, and *kagoshimae* listed by Cohen (1958) were reexamined. The bladders were iridescent in *australiae*; pigment was lacking in the other two species.

The swimbladder pigmentation patterns discussed in this paper are valid only in preserved specimens.

Fänge (1958) has suggested that guanine might help to keep gases in the bladder. It would be interesting to test the diffusion rate of gases through the swimbladder walls of pigmented and unpigmented species of *Argentina*. In this respect we note that the small posterior chamber of the *Argentina* swimbladder, first described by Cohen (1958) and shown by Fahlén (1965) to have a resorbent function, invariably lacks silvery pigment.

According to Cohen (1958), argentinine fishes are physoclists that lack a rete mirabile. Such a condition is, of course, highly improbable unless there is some unknown method of gas being secreted into and maintained in the swimbladder. *Argentina* does in fact have a rete, which has been described for *A. silus* by Fänge (1958). He noted that it is a unique structure, different from the rete of other kinds of fishes. Marshall (1960) named it a micro-rete and described it in several other genera of argentinoid fishes.

KEY TO SPECIES OF ARGENTINA

- 1a. Branchiostegal rays 6, scales with spines..... 2.
- 1b. Branchiostegal rays 5, scales lacking spines..... 3.
- 2a. Lateral line scales 52 (50-54); gill rakers on lower arm of first arch 8 (7-10).... *A. sphyraena*.
- 2b. Lateral line scales 67 (64-69); gill rakers on lower arm of first arch 13 (11-17)... *A. silus*.
- 3a. Gill rakers on lower arm of first arch 14-21; jaw relatively large, snout to maxillary tip distance usually less than 5 in head..... 4.

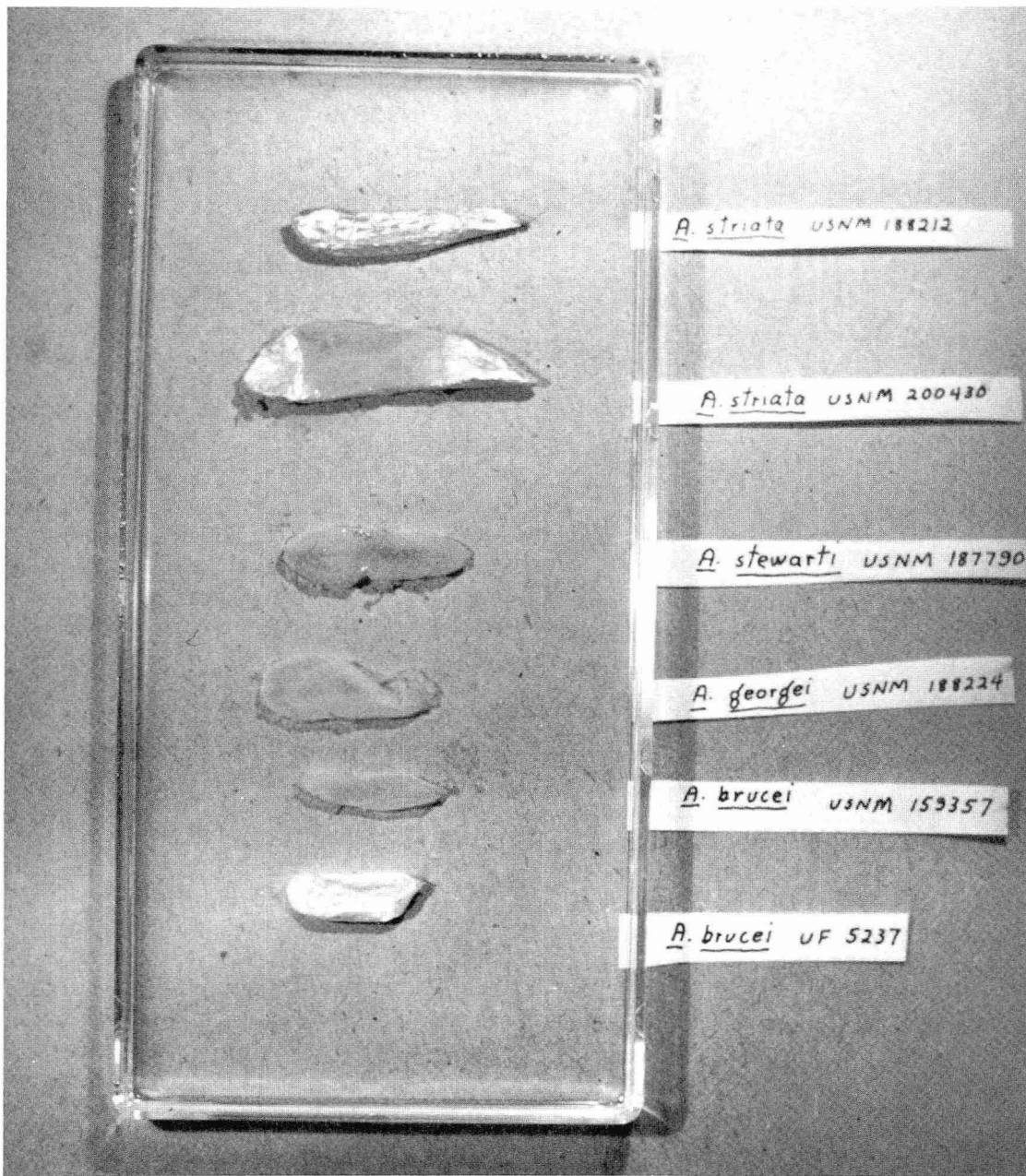


FIGURE 5.—Swimbladders from four species of western Atlantic *Argentina*. See text for explanation.

- 3b. Gill rakers on lower arm of first arch 5-10; jaw relatively small, snout to maxillary tip distance usually more than 5 in head..... 5.
- 4a. Head 3.0 (2.7-3.1) in standard length; eye 11.5 (10.5-12.7) in standard length; vertebrae 44 (43-45); lateral line scales 47 (45-48)..... *A. aliciae* p. 19.
- 4b. Head 3.5 (3.2-3.7) in standard length; eye 14.3 (12.7-16.4) in standard length; vertebrae 48 (47-50); lateral line scales 49 (48-51)..... *A. sialis* p. 22.
- 5a. Gill rakers on lower arm of first arch 9 (8-10)..... *A. elongata*.
- 5b. Gill rakers on lower arm of first arch 5-7..... 6.
- 6a. Pectoral fin rays 13-14..... *A. australiae*.

6b. Pectoral fin rays 15 or more.....	7.
7a. Ventral fin rays 10-12.....	8.
7b. Ventral fin rays 12-15, usually 13 or more.....	9.
8a. Lateral line scale rows 54 (51-54); ventral fin rays 11-12, usually 12; anal fin rays 11-13, usually 12 or fewer; vertebrae 50-51.....	<i>A. kagoshimae</i> .
8b. Lateral line scale rows 49 (47-50); ventral fin rays 10-11, usually 10; anal fin rays 13 or more; vertebrae 47-48.....	<i>A. euchus</i> p. 33.
9a. Gill rakers on lower arm of first arch usually 7; vertebrae 45 (44-46).....	<i>A. brucei</i> p. 31.
9b. Gill rakers on lower arm of first arch usually 6; vertebrae 47-54.....	10.
10a. Swimbladder usually with definite silvery pigment or iridescence; pectoral fin rays 19 (18-21); body depth in standard length 8.2 (6.4-10.3); caudal peduncle depth in head length 5.2 (4.4-6.0); vertebrae 49 (47-51).....	<i>A. striata</i> p. 22.
10b. Swimbladder lacking silvery pigment, sometimes iridescent; pectoral fin rays 17 (16-19); body depth in standard length 9.5 (7.4-12.0); caudal peduncle depth in head length 6.4 (5.6-7.3); vertebrae 48 (47-50).....	<i>A. georgei</i> p. 27.
10c. Swimbladder lacking silvery pigment, sometimes iridescent; pectoral fin rays 20 (19-21); body depth in standard length 11.8 (9.1-13.6); caudal peduncle length in head length 6.0 (5.5-7.1); vertebrae 52-53.....	<i>A. stewarti</i> p. 29.

ARGENTINA ALICEAE, NEW SPECIES

Figures 2, 6

Diagnosis

This species can be separated from *A. sphyraena* and *silus* by its smooth instead of spiny scales and by its five instead of six branchiostegals. *A. alicae* differs from *sialis* in having a longer head, 33.7 (32.3-36.7) percent of standard length, in *sialis* 28.8 (27.3-31.2); a larger eye, 8.7 (7.9-9.5), in *sialis* 7.0 (6.1-7.9); fewer vertebrae, 44 (43-45), in *sialis* 48 (47-50); and fewer lateral line scales, 47 (45-48), in *sialis* 49 (48-51). It differs from all other species of *Argentina* in having 16 to 21 gill rakers on the lower arm of the first arch rather than 5 to 10.

Counts

See tables 1 to 7.

Measurements

Based on about 100 specimens, 83.2 to 143 mm. standard length, given as percent of standard length. Predorsal 48.6 (46.0-50.6); head length 33.7 (32.3-36.7); snout 10.5 (9.7-11.6); eye 8.7 (7.9-9.5); maxillary length 7.8 (7.0-9.1); depth at dorsal fin 17.3 (15.1-20.0); depth caudal peduncle 7.5 (6.9-8.7).

Description

Greatest depth at dorsal origin, tapering to caudal peduncle. Body in cross section deeper than wide; belly rounded. The head, when viewed laterally, has its dorsal profile slightly broken by the margin of the eye; the ventral profile rises to

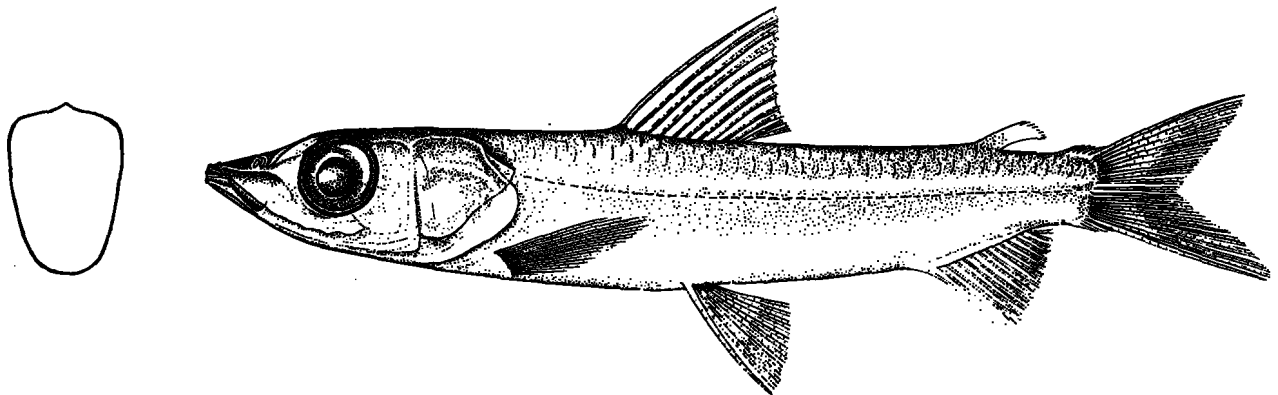


FIGURE 6.—*Argentina alicae*, USNM 202462, holotype, 147 mm. standard length. All scales not shown. Cross section from in front of dorsal fin. Drawn by Mildred H. Carrington.

TABLE 1.—Gill rakers on lower arm of first arch in species of Argentina

Species	Gill rakers																				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21				
	Number of fish																				
<i>sphyraena</i>			2	27	17	4															
<i>situs</i>							3	13	23	10	1										
<i>stalis</i>										1	2	9	22	6	4	1					
<i>aliceae</i>												1	8	29	13	3	1				
<i>elongata</i>				5	13	12															
<i>australiae</i>		9	1																		
<i>kagoshimae</i>	2	14																			
<i>euchus</i>		17																			
<i>striata</i>		76	2																		
<i>georgei</i>		41	1																		
<i>brucei</i>		1	87																		
<i>stewarti</i>		21	1																		

TABLE 2.—Vertebral counts in species of Argentina

Species	Number of vertebrae																
	43	44	45	46	47	48	49	50	51	52	53	54	—	64	65	66	67
	Number of fish																
<i>sphyraena</i>			1		1	3	1				1	5	4				
<i>situs</i>						4	67	13	1					2	2	2	1
<i>stalis</i>	1	47	27														
<i>aliceae</i>										1	6	10	1				
<i>elongata</i>																	
<i>australiae</i>							2	2	3	1							
<i>kagoshimae</i>								2	5								
<i>euchus</i>					11	5											
<i>striata</i>					3	22	111	13	2								
<i>georgei</i>					4	31	8	4									
<i>brucei</i>		12	101	6													
<i>stewarti</i>										17	5						

TABLE 3.—Dorsal fin ray counts in species of Argentina

Species	Dorsal fin rays								
	9	10	11	12	13	14	15	16	17
	Number of fish								
<i>sphyraena</i>		13	46	3					
<i>situs</i>			2	43	23				
<i>stalis</i>			5	35	8				
<i>aliceae</i>			11	85	5				
<i>elongata</i>		3	12	4					
<i>australiae</i>		5	6	1					
<i>kagoshimae</i>		4	10	2					
<i>euchus</i>				15					
<i>striata</i>		1	39	18					
<i>georgei</i>		1	38	1					
<i>brucei</i>		1	67	5					
<i>stewarti</i>		1	14	6					

TABLE 5.—Pectoral fin ray counts in species of Argentina

Species	Pectoral fin rays										
	11	12	13	14	15	16	17	18	19	20	21
	Number of fish										
<i>sphyraena</i>			5	24	42	2					
<i>situs</i>					5	13	28	11			
<i>stalis</i>			5	35	8						
<i>aliceae</i>						1	20	14			
<i>elongata</i>				1	9	9	1				
<i>australiae</i>											
<i>kagoshimae</i>						6	9	2			
<i>euchus</i>						5	10	1			
<i>striata</i>								3	26	24	2
<i>georgei</i>						1	23	13	4		
<i>brucei</i>								30	80	4	
<i>stewarti</i>								1	7	8	6

TABLE 4.—Anal fin ray counts in species of Argentina

Species	Anal fin rays								
	9	10	11	12	13	14	15	16	17
	Number of fish								
<i>sphyraena</i>			1	12	33	23	1		
<i>situs</i>					1	4	32	12	3
<i>stalis</i>						9	26	6	
<i>aliceae</i>						23	33	3	
<i>elongata</i>				4	5	7	4		
<i>australiae</i>					3	8			
<i>kagoshimae</i>					6	6	1		
<i>euchus</i>						9			
<i>striata</i>				3	20	34			
<i>georgei</i>				12	20	8			
<i>brucei</i>					9	36	27		
<i>stewarti</i>					11	10			

TABLE 6.—Ventral fin ray counts in species of Argentina

Species	Ventral fin rays					
	10	11	12	13	14	15
	Number of fish					
<i>sphyraena</i>		6	40	6		
<i>situs</i>				44	13	
<i>stalis</i>			3	40	5	
<i>aliceae</i>			4	84	7	
<i>elongata</i>				13	6	
<i>australiae</i>				6	5	13
<i>kagoshimae</i>				3	14	
<i>euchus</i>			14	2		
<i>striata</i>					4	9
<i>georgei</i>					4	22
<i>brucei</i>						43
<i>stewarti</i>					9	9

TABLE 7.—Lateral line scales in three species of Argentina

Species	Lateral line scales						
	45	46	47	48	49	50	51
	Number of fish						
<i>sigalis</i>				7	20	18	1
<i>aliceae</i>	1	21	58	16			
<i>euchus</i>			1	4	11	1	

the snout in a gentle curve; the interorbital space between the supraocular canals is broadly concave. The frontals laterad to the canals arch upward slightly. The dorsal portion of the maxillary is hidden under the lacrimal and the jugal bones. The distal end of the maxillary is closer to the anterior margin of the eye than to the snout. Some specimens have a slight, bony knob at the symphysis of the lower jaw. The jaws are subequal; the upper broadly rounded, the lower less so. The palatine and the head of the vomer bear a continuous band 2 to 4 teeth wide composed of small, closely spaced, conical teeth; about 50 on the vomer and 25 to 30 on each palatine; dentary teeth are lacking. The ceratobranchial of the fifth gill arch bears 7 to 10 small, conical teeth; two patches of similar teeth, 5 to 10 on the anterior patch and 10 to 15 on the posterior patch, are found at the anterior end of the fourth suprabranchial. The tongue bears 6 strong recurved teeth (description of dentition based on a single alizarin-stained specimen). The gill rakers are elongate, compressed, and relatively widely spaced; the longest gill rakers are equal to about one-third of the interorbital distance.

The pectoral fin originates slightly ahead of a vertical through the posterior tip of the opercle. The anterior end of the pectoral fin base is elevated from the horizontal by an angle of 30 to 45 degrees. The distance between the bases of the innermost rays of the pectoral fins is less than the least depth of the caudal peduncle. The greatest height of the dorsal fin is usually greater than the maximum depth of the body. The greatest height of the anal fin is greater than the least depth of the caudal peduncle. The pectoral fins extend more than one-half the distance between the bases of the pectoral and ventral fins; the ventral fins are slightly shorter.

The scales lack spines. The lateral line scale count is summarized in table 7.

The peritoneum is colored with large, dark chromatophores, which are most densely distributed in the antero-dorsal section of the body cavity; the gut is immaculate. Ten to 14 pyloric caeca are present in 12 specimens. The body cavities of all specimens examined contained considerable amounts of fat.

The elongate swimbladder extends from about the level of the curve of the stomach to about the midlength of the ventral fin. The anterior tip of the swimbladder bears some silvery pigment, and the posterior one-third to one-half of the organ is strongly impregnated with silvery pigment.

Pigmentation in alcohol of adult specimens is light straw-colored on the lower two-thirds of the fish; the dorsum is darker; the muzzle is dusky, as are the nape and the upper portion of the opercle. Many specimens have the remnants of an iridescent band along the midline. In fishes less than about 95 mm. standard length, there is a series of 8 to 10 dusky blotches along the upper third of the body. In life the fish is a bright silvery color (H. A. Fehlmann, Smithsonian Oceanographic Sorting Center, personal communication).

Teratology

A single specimen from *Anton Bruun* sta. 640-B (USNM 202472) lacks pectoral fins. An X-ray photograph shows that a pectoral girdle is present.

Distribution

A. aliceae is known from nine localities along the northern coast of Peru, where it has been trawled at depths of 50 to 54 fm. (91–99 m.) to 105 to 170 fm. (192–311 m.); most specimens were taken between 55 and 88 fm. (100–161 m.).

Habits

This species has been taken only in bottom trawls and like most other *Argentina* apparently travels in schools a short distance above the bottom. The largest catch recorded was from *Anton Bruun* sta. 641-A, where 1,440 individuals weighing 44 kg. were taken. Several specimens examined had their stomachs tightly packed with partially digested crustaceans. Annotated station data from *Anton Bruun* cruise 16, which collected most of the study material, are presented by Chin (1966).

Name

Named for Alice Holland, former Secretary of this Laboratory, in recognition of her devoted services to ichthyology.

Study Material

All study material from Peru. Holotype: USNM 202462, 147 mm. standard length; R.V. *Anton Bruun* cruise 16, station 641-A, 6°54' S., 80°44' W., 97 to 110 m.; 6 June 1966; otter trawl. Paratypes: USNM 202459 (84 specimens, 1 cleared and stained); data as for holotype; from the same station MCZ (5); SIO (5). Paratypes: USNM 202460 (97); *Bruun* 640-B, 7°01' S., 80°44' W., 105 m.; otter trawl; from the same station USNM 202472 (1 lacking pectoral fins); FMNH (5); CAS (3). USNM 202463 (18); *Bruun* 639-A, 6°47' S., 80°43' W., 100 to 91 m.; otter trawl. USNM 202465 (1); *Bruun* 635-A, 6°27' S., 80°56' W., 160 m.; otter trawl. USNM 202464 (3); *Bruun* 631-A, 5°59' S., 81°12' W., 100 m.; otter trawl. USNM 202461 (320), *Bruun* 630-A, 6°02' S., 81°12' W., 160 m.; otter trawl; from the same station BMNH (5); UZMC (4); MNHN (3); ANSP (3). USNM 202466 (4); *Bruun* 627-A, 5°02' S., 81°24' W., 192 to 311 m.; otter trawl. USNM 202467 (2); *Bruun* 625-A, 4°57' S., 81°23' W., 118 to 133 m.; otter trawl. USNM 199802 (4); SW. of Lobos de Afuera Islands, Peru, 110 m.; trawl.

ARGENTINA SIALIS GILBERT

Figure 2

The heretofore northernmost locality for *A. sialis* is Monterey Bay, Calif. (Follett, 1945). An extension of the known range of about 1,120 km. is provided by a single specimen (147 mm. standard length) taken by the *John N. Cobb* off the coast of Oregon on 3 March 1962: USNM 188126, 46°04' N., 124°39' W., 100 to 102 fm. (183-187 m.), otter trawl, bottom temperature 8.3° C. The specimen agrees well with the description given by Cohen (1958).

Additional vertebral counts based on specimens from southern California listed by Cohen (1958) are presented in table 2.

ARGENTINA STRIATA GOODE AND BEAN

Figures 1, 2, 3, 4, 5, 7, 8, 9, 10A

Argentina striata Goode and Bean, 1896, p. 52, pl. 17, fig. 62 (original description; type-locality: Albatross station 2402, 28°36' N. 85°33' W., Gulf of Mexico, 111 fm. Holotype: USNM 43858, not designated in text of original description, but on p. 4 of the Atlas in the caption for pl. 17, fig. 62).

Diagnosis

This species can be separated from *A. sphyraena* and *silus* by its smooth instead of spiny scales and by its five instead of six branchiostegals. It differs from *silus*, *sialis*, *aliceae*, and *elongata* in having 6 (occasionally 7) gill rakers on the lower arm of the first arch, whereas the four species listed above have 8 to 21. It also differs in gill raker count from *A. brucei*, which has 7 (occasionally 6) rakers; also *striata* has 47 to 51 vertebrae; *brucei* has 44 to 46. It differs from *euchus* in having 12 to 15 ventral rays rather than 10 or 11. It differs from *kagoshimae*, *australiae*, *elongata*, *sialis*, and *sphyraena* in having 18 to 21 rather than 11 to 17 pectoral rays. It differs from *georgei* and *stewarti* in usually having silvery pigment on the swim-bladder, whereas the others lack it; from *stewarti* in having 47 to 51 vertebrae rather than 52 or 53; from *georgei* in having caudal peduncle depth in head length usually less than 5.7 rather than usually more than 5.7.

Counts

See tables 1 to 6.

Measurements

Based on about 55 specimens, 88.0 to 173 mm. standard length, given as percent of standard

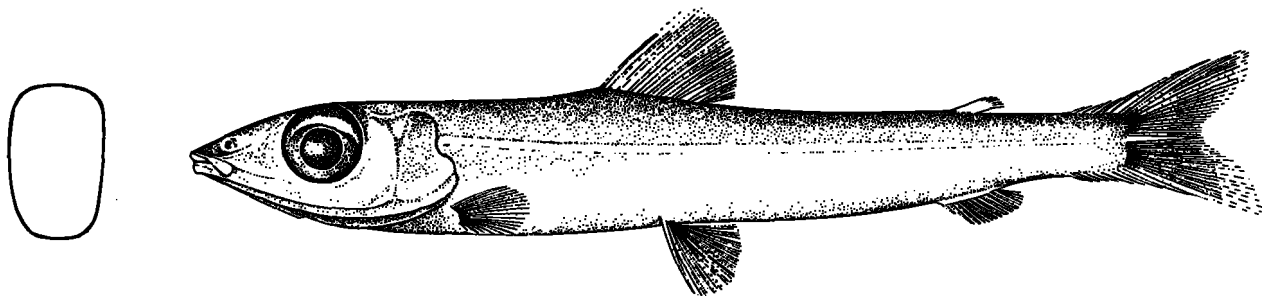


FIGURE 7.—*Argentina striata*, USNM 203003, 154 mm. standard length. Cross section from in front of dorsal fin. Scales not drawn. Drawn by Mildred H. Carrington.

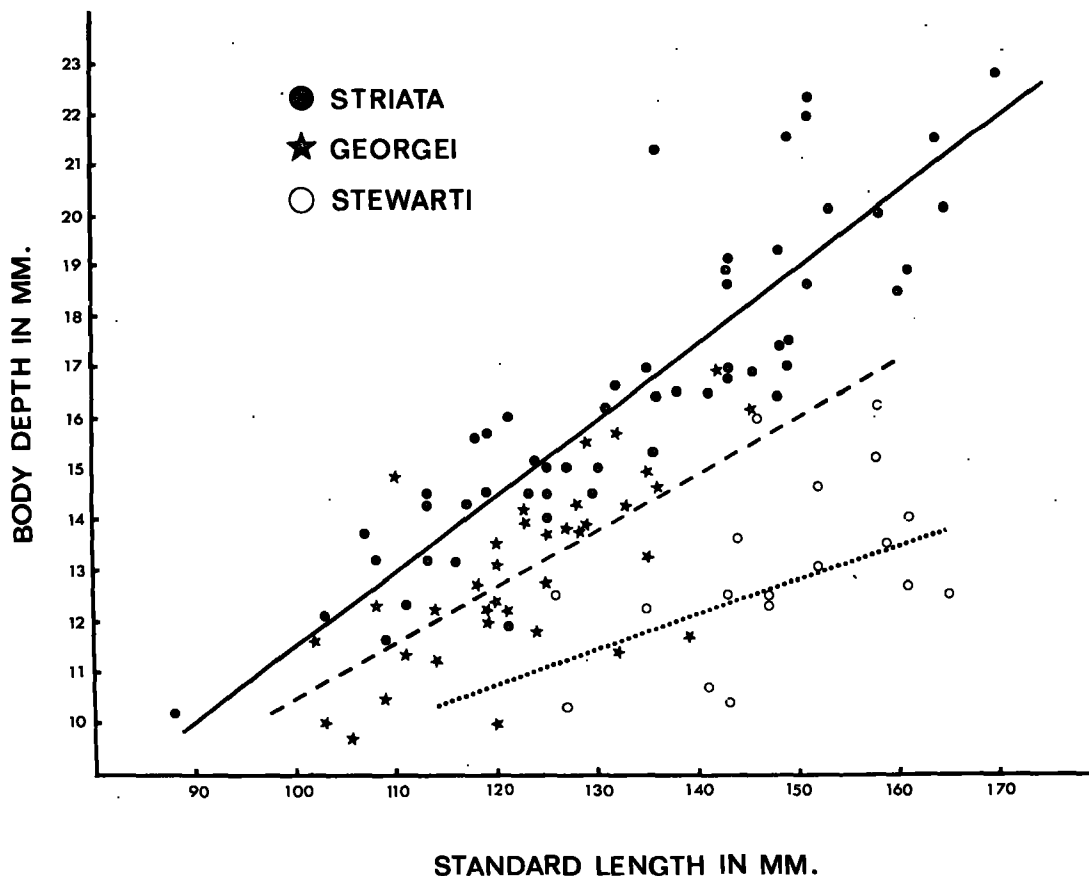


FIGURE 8.—Regressions of body depth (mm.) on standard length (mm.) for three closely related species of *Argentina*. See text for equations.

length. Preanal 83.5 (80.8–85.9); preventral 55.5 (52.2–58.0); predorsal 46.6 (44.2–48.6); head length 30.1 (26.1–32.0); snout 9.6 (8.5–10.6); eye 9.8 (7.8–10.9); maxillary length 5.4 (4.2–6.1); depth at dorsal fin 12.3 (9.7–15.7); depth caudal peduncle 5.8 (5.2–6.5).

Description

Body not very elongate. Greatest depth at dorsal origin, tapering to caudal peduncle. Figure 8 shows a regression of body depth on standard length ($Y = .150X - 3.50$) compared with two closely related species. The caudal peduncle is also relatively deep. Figure 9 shows a regression of caudal peduncle depth on head length ($Y = .180X + .524$) compared with two closely related species. Body in cross section deeper than wide, dorsum and venter broadly rounded. The head, when viewed laterally, has its dorsal profile barely if at all broken by the upper margin of the eye; the ventral profile rises to the snout in a gentle curve;

many specimens are preserved with the mouth open and the basibranchial projecting into the ventral profile. The interorbital space between the supraocular canals is flat or only slightly concave. The dorsal portion of the maxillary lies under the lachrymal. The distal end of the maxillary is usually about midway between the tip of the snout and the anterior margin of the eye. The jaws are broadly rounded, the lower slightly included. The palatine and the head of the vomer bear small, closely spaced, needlelike teeth in a continuous band from 2 to 5 teeth wide, about 30 on the vomer and 40 on each palatine; dentary teeth are lacking. The ceratobranchial of the fifth gill arch bears 9 small, conical teeth; two patches of similar teeth, 10 on the anterior patch and 14 on the posterior patch are at the anterior end of the fourth supra-branchial; there are also a few teeth on the third supra-branchial. The tongue bears eight strong recurved teeth (description of dentition based on a

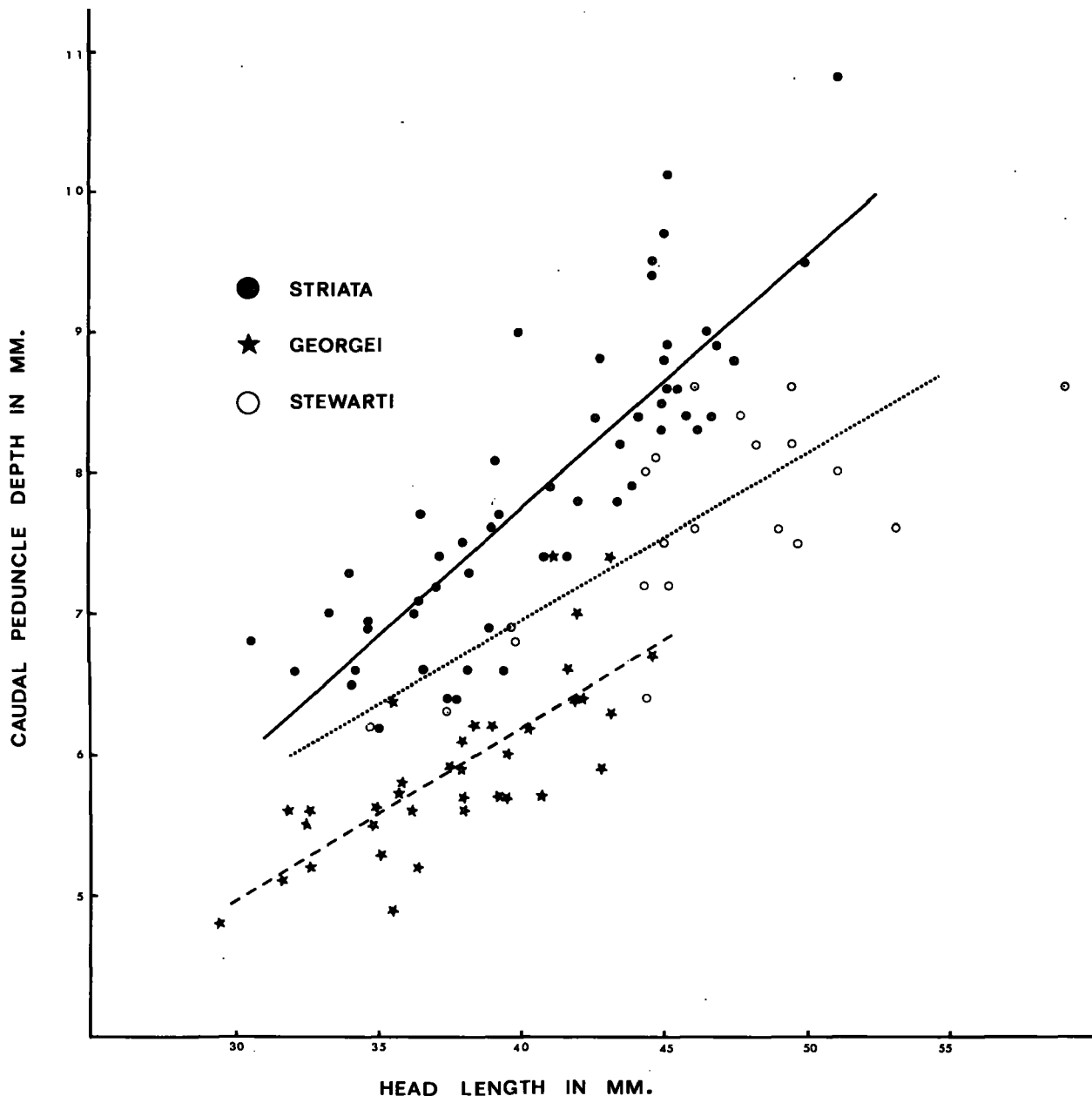


FIGURE 9.—Regressions of caudal peduncle depth (mm.) on head length (mm.) for three closely related species of *Argentina*. See text for equations.

single alizarin specimen). The gill rakers (fig. 1) are medium-sized, compressed, and widely spaced. The longest gill rakers are equal to one-fifth to one-sixth of the interorbital distance.

The pectoral fin originates close to the posterior margin of the opercle. The anterior end of the pectoral fin base is elevated from the horizontal by an angle of about 45 degrees; the distance be-

tween the innermost rays of the pectoral fins is about equal to or slightly less than the least depth of the caudal peduncle. In almost all of our specimens the pectoral and ventral fins are broken off short; however, in a few specimens, the pectorals appear to extend at least half the distance from the pectoral base to the ventral base. The ventral fins are probably shorter.

Scales and scale pockets are deciduous; however, the few scales we have seen lack spines. Lateral line counts of scale pockets in several specimens are about 50.

The peritoneum is black or almost so ventrally, grading to a less dense distribution of chromatophores laterally, then a darker band along the kidneys. The gut is immaculate. Nine to 14 pyloric caeca are present in 12 specimens. Most specimens have considerable fat in the body cavity. The swimbladder begins slightly anterior to the hind curve of the stomach and extends posteriorly to about the tip of the ventral fin. In 137 swimbladders examined, only 6 lacked any silvery pigment and several of these were iridescent. About one-half of the specimens having swimbladders that were completely impregnated with silvery guanine also had silvery pigment on the head, suggesting that strong formaldehyde solution that dissolves the silvery pigment on the body may also dissolve away pigment from the middle part of the swimbladder.

Pigmentation of adult specimens preserved in formaldehyde solution is variable, but in general the ventral two-thirds of the body is light. There is often a brown band above the lateral line; in some examples the band is barely discernible (fig. 7), in others quite distinct. Although the dark pigment of the peritoneum may show through the thin belly musculature, there is no externally pigmented band along the midventral line. Some specimens have the throat peppered with brown chromatophores (fig. 10A); in many, however, this region is immaculate. Specimens less than about 100 mm. standard length may have a row of eight or nine dusky blotches along the upper third of the body, but not all do. Alcohol-preserved specimens are silvery below the lateral line and on most of the head.

Distribution

A. striata is widely distributed in the western Atlantic, ranging from the offing of Nova Scotia (Schroeder, 1955), along the east coast of the United States, the north coast of Cuba, around the Gulf of Mexico, in the northwestern and southern Caribbean, and off the mouths of the Orinoco. There are two records, however, from much farther south off Brazil. Carvalho (1950) described specimens from Banco Sao Tomé at about lat. 22° S., and Miranda Ribeiro (1961) described and

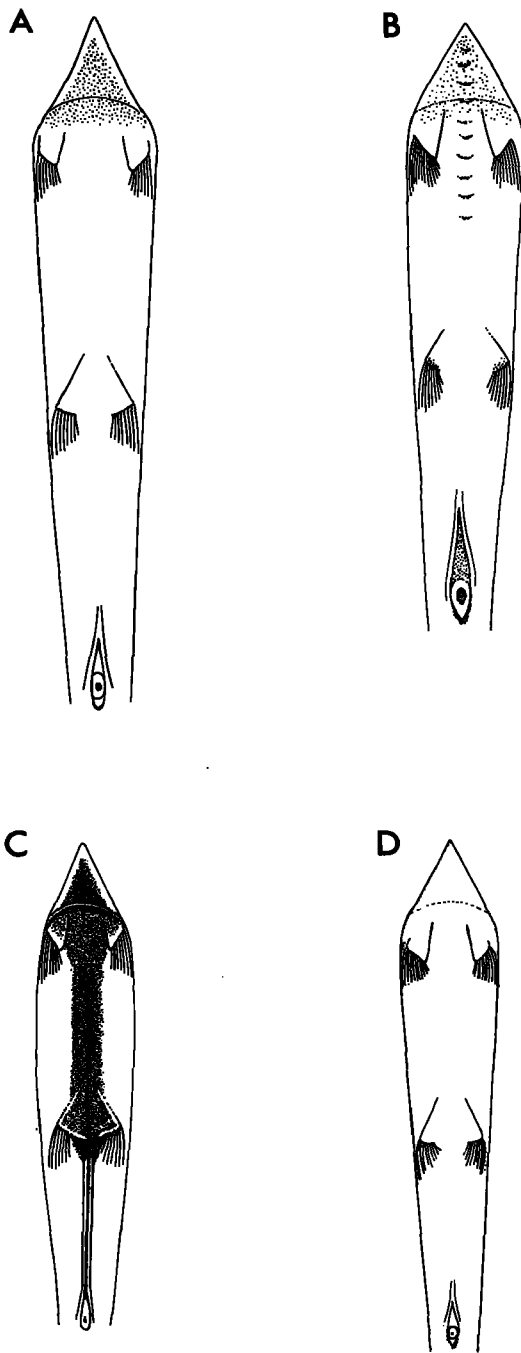


FIGURE 10.—Pigmentation on venters of four western Atlantic species of *Argentina*: A. *striata*, USNM 203001; B. *stewarti*, USNM 187834; C. *georget*, USNM 186356; D. *brucei*, USNM 187798. Drawn by Mildred H. Carrington.

figured specimens from 24°14' S., 44°49' W. We have not examined material from either locality, but the descriptions fit our material of *A. striata*.

In the West Indies, *A. striata* has been taken only off the northern coast of Cuba and around the southern end of the Lesser Antilles; the records of *striata* given by Cohen (1958, 1964), Springer and Bullis (1956), and Bullis and Thompson (1965) from Hispaniola and the Lesser Antilles are of *striata*, *stewarti*, *georgei*, or *brucei*, or of combinations of these four.

Depth distribution ranges from 80 to 260 fm. (146–476 m.), but most records are from between 100 and 240 fm. (183–439 m.).

Habits

A. striata is taken with a bottom trawl, usually over a mud bottom at bottom temperatures ranging from 48° to 59° F. (8.9–15° C.). Specimens are caught singly and also in aggregations of as many as 100 individuals. Mixed collections of *A. striata* and *A. brucei* have been taken in the same haul.

Study Material

All from the Atlantic.

Bahama Banks.—MCZ 38476 (1 specimen), 22°45' N., 78°45' W., 150 to 180 fm. (274–329 m.). MCZ 40614 (1), 22°46' N., 78°45' W., 195 to 225 fm. (357–412 m.). UMML 11689 (10), 27°08' N., 79°53' W., 110 fm. (201 m.).

U.S. Atlantic.—UMML 12127 (21), 27°10' N., 79°55' W., 100 fm. (183 m.). MCZ 39817 (2), 27°17' N., 79°49' W., 200 fm. (366 m.). USNM 158082 (1), *Pelican* 25, 28°03' N., 79°52' W., 150 to 175 fm. (274–320 m.). TU 14774 (1), *Pelican* 60, 28°29' N., 79°54' W., 160 to 190 fm. (293–348 m.). TABL 100559 (1), *Combat* 319, 28°31' N., 79°52' W., 180 fm. (329 m.). USNM 156659 (1), *Pelican* 204–4, 28°59' N., 80°01.5' W., 100 fm. (183 m.). USNM 188905 (1), *Oregon* 5094, 29°31' N., 80°09' W., 210 fm. (384 m.). TABL 100564 (11); *Silver Bay* 217, 29°41' N., 80°08' W., 180 to 200 fm. (329–366 m.). SU 49755 (1), 29°47' N., 80°12' W. TABL 100558 (1), *Silver Bay* 212, 29°59' N., 80°07' W., 200 fm. (366 m.). UMML 1461 (2) and UMML 529 (1), NE. coast of Florida, ESE. St. John's River Entrance, 105 fm. (192 m.). MCZ 38305 (4), 37°00' N., 74°00' W., 150 fm. (274 m.). MCZ 34568 (1), 37°36' N., 74°17' W., 100 fm. (183 m.). MCZ 38213 (9), 37°38' N., 74°15' W., 120 to 130 fm. (220–238 m.). USNM 186300 (1), *Delaware* 15–B, 37°42' N., 74°12' W., 150 to 225 fm. (274–412 m.). MCZ 39778 (6), 38°36' N., 73°10' W. MCZ 38341 (1), 38°38' N., 73°10' W., 190 to 200 fm. (348–366 m.). MCZ

37947 (1), 39°58' N., 69°28' W., 105 to 140 fm. (192–256 m.). MCZ 39973 (1), 39°59' N., 69°35' W., 82 to 85 fm. (150–155 m.). MCZ 37419 (1), *Captain Bill II* 35, 40°02' N., 70°24' W., 105 to 110 fm. (192–201 m.).

U.S. Gulf of Mexico.—UMML 16905 (1); 24°18' N. 82°52' W., 190 fm. (348 m.). UMML 16651 (1); 24°19' N., 82°29' W., 103 fm. (188 m.). TU 10901 (5); *Oregon* 1005, 24°20' N., 83°20' W., 190 fm. (348 m.). TU 12695 (12); *Oregon* 1548, 24°25' N., 83°00' W., 210 fm. (384 m.). TU 10917 (4); *Oregon* 1007, 24°26' N., 83°24' W., 180 fm. (329 m.). FMNH 66231 (1); *Oregon* 2671, 24°26' N., 83°24' W., 212 fm. (388 m.). FMNH 66230 (10); *Oregon* 2670, 24°27' N., 83°26' W., 210 fm. (384 m.). UMML 13289 (5); *Oregon* 4362, 24°30' N., 83°33' W., 190 fm. (348 m.). SU 49753 (1); *Oregon* 1009, 24°34' N., 83°34' W., 200 fm. (366 m.). SU 49726 (1); FMNH 59880 (19); *Oregon* 1026, 25°08' N., 84°19' W., 163 fm. (298 m.). TU 12669 (9); *Oregon* 1556, 26°24' N., 98°45' W., 210 fm. (384 m.). UMML 4441 (1); 28°07' N., 85°13' W., 150 fm. (274 m.). USNM 158687 (1); *Oregon* 953, 28°23' N., 85°51' W., 180 fm. (329 m.). SU 49724 (1); *Oregon* 1276, 28°30' N., 86°11' W., 240 fm. (439 m.). USNM 158686 (2); GCRL V60:119 (6); *Oregon* 36, 28°30' N., 85°36' W., 120 fm. (220 m.). USNM 43858, *holotype* and USNM 83864, *paratype* (1); *Albatross* 2402, 28°36' N., 85°33' W., 111 fm. (203 m.). FMNH 46270 (12); *Oregon* 277, 28°48' N., 85°40' W., 104 fm. (190 m.). TU 11698 (2); *Oregon* 1520–30, 29°00' N., 88°00' W., 200 to 250 fm. (366–457 m.). GCRL V62:731 (1); *Oregon* 3697, 29°00' N., 88°36.5' W., 190 to 200 fm. (348–366). USNM 203086 (1); *Oregon* 3725, 29°00.5' N., 88°35.5' W., 220 fm. (402 m.). USNM 156658 (2); *Pelican* 9, 29°02' N., 88°41.5' W., 120 to 169 1/2 fm. (220–310 m.). USNM 203087 (1); *Oregon* 3763, 29°03' N., 88°34' W., 190 fm. (348 m.). USNM 159349 (7); *Silver Bay* 156, 29°04' N., 85°49' W., 100 to 102 fm. (183–187 m.). USNM 188212 (18), TABL 100557 (2) and USNM 187836 (3); *Oregon* 3646, 29°07' N., 88°34' W., 125 fm. (229 m.). SU 49725 (1); *Oregon* 273, 29°09' N., 85°59' W., 110 fm. (201 m.). GCRL V63:933 (1); *Oregon* 60, 29°09' N., 88°33' W., 110 fm. (201 m.). GCRL V63: 932 (2); *Oregon* 32, 29°10' N., 85°55' W., 95 fm. (174 m.). USNM 188387 (1); GCRL V62: 730 (1); *Oregon* 3676,

29°10' N., 88°10' W., 200 fm. (366 m.). UMML 1508 (1); 29°10' N., 88°20' W., 150 fm. (274 m.). USNM 188389 (3); *Oregon* 3677, 29°11' N., 88°06' W., 200 fm. (366 m.). USNM 158127 (1); SU 49727 (1); *Oregon* 1246, 29°15' N., 88°11' W., 200 to 210 fm. (366–384 m.). SU 17441 (1); 29°15.5' N., 87°53' W. FMNH 45932 (2); *Oregon* 864, 29°19' N., 86°04' W., 82 fm. (150 m.). FMNH 46269 (5); *Oregon* 265, 29°20' N., 87°42' W., 101 fm. (185 m.). USNM 159013 (1); *Oregon* 1260, 29°23' N., 86°48' W., 250 fm. (457 m.). SU 49723 (1) and FMNH 46268 (2); *Oregon* 269, 29°27.5' N., 87°26.5' W., 150 fm. (274 m.). USNM 158842 (1); *Oregon* 1400, 29°30' N., 87°08' W., 210 fm. (384 m.). TU 11761 (2); *Oregon* 946, 29°41' N., 86°44' W., 100 fm. (183 m.). TU 2716 (7); *Oregon* 278, 29°49' N., 85°45' W., 112 fm. (205 m.).

Mexico.—SU 49721 (1); *Oregon* 1054, 19°37' N., 92°40' W., 200 fm. (366 m.). FMNH 45728 (1); *Oregon* 726, 22°41.9' N., 86°41.2' W., 225 fm. (412 m.). USNM 186068 (2); *Silver Bay* 1184, 23°56' N., 87°32' W., 150 fm. (274 m.). TU 12939 (7); UF 1316 (2); *Oregon* 1091, 26°46' N., 96°20' W., 200 to 210 fm. (366–384 m.). FMNH 46266 (2); *Oregon* 550, 26°55' N., 96°25.5' W., 125 fm. (229 m.). TU 10998 (4); *Oregon* 1094, 27°10' N., 96°20' W., 150 fm. (274 m.). FMNH 45050 (1); 27°15' N., 96°15' W., 200 fm. (366 m.). TU 2770 (4); *Oregon* 164, 27°21' N., 96°06' W., 160 fm. (293 m.). USNM 203000 (1); *Oregon* 4617, 27°48' N., 94°37' W., 200 fm. (366 m.).

Central America.—USNM 187835 (1); *Oregon* 3634, 16°44' N., 87°55' W., 190 fm. (348 m.).

South America.—UF 8026 (2); FMNH 66223 (11); *Oregon* 1989, 9°45' N., 59°45' W. USNM 203046 (1); *Oregon* 4465, 10°45' N., 66°37' W., 125 fm. (229 m.). USNM 203003 (5); *Albatross* 2700, 10°59' N., 66°00' W., 140 fm. (256 m.).

TABL 100556 (4); *Oregon* 5037, 11°36' N., 62°46' W., 200 to 240 fm. (366–439 m.). USNM 203002 (1); *Oregon* 4410, 11°52' N., 69°27' W., 230 fm. (421 m.). USNM 200430 (1); *Oregon* 5690, 12°30' N., 72°08' W., 257 fm. (470 m.).

Antilles.—MCZ 40617 (1); *Albatross* 3422, 22°48' N., 79°09' W., 235 fm. (430 m.). MCZ 40010 (1); 22°49' N., 79°07' W., 235 fm. (430 m.). MCZ 40618 (1); 22°52' N., 79°22' W., 240 fm. (439 m.).

ARGENTINA GEORGEI, NEW SPECIES

Figures 2, 3, 4, 5, 8, 9, 10C, 11

Diagnosis

This species can be separated from *A. sphyraena* and *silus* by its smooth instead of spiny scales and by its five rather than six branchiostegals. It differs from *silus*, *sialis*, *aliceae*, and *elongata* in having 6 (occasionally 7) gill rakers on the lower arm of the first arch—the four species listed above have 8 to 21. It differs in gill raker count from *A. brucei*, which has 7 (occasionally 6) rakers; also *georgei* has 47 to 50 vertebrae, *brucei* has 44 to 46. It differs from *euchus* in having 12 to 14 ventral rays rather than 10 or 11. It differs from *sphyraena*, *sialis*, *elongata*, and *australiae* in having 16 to 19 pectoral rays rather than 11 to 16. It differs from *kagoshimae* in having vertebrae usually less than 50 rather than usually more than 50; pectoral rays 16 to 19 rather than usually less than 17; ventral rays usually 13 or 14 rather than 11 or 12. It differs from *striata* in lacking silvery pigment on the swimbladder; in having anal rays usually 10 or 11 rather than 12 or 13, pectoral rays usually 17 or 18 rather than 19 or 20, and caudal peduncle depth in head length usually more than 6 rather than 6 or less. It differs from *stewarti* in having 47 to 50 vertebrae rather than 52 or 53, in

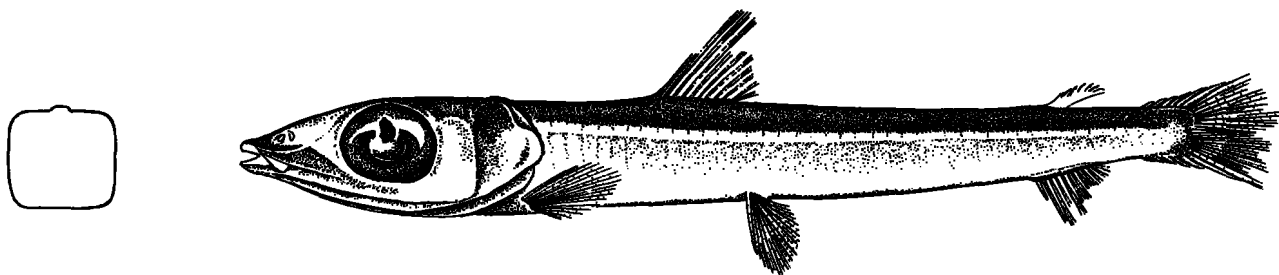


FIGURE 11.—*Argentina georgei*, USNM 188224, paratype, 109 mm. standard length. Scales not shown. Cross section from in front of dorsal fin. Drawn by Mildred H. Carrington.

having usually 10 or 11 anal rays rather than 12 or 13, and in having pectoral rays usually 17 or 18 rather than 19 to 21.

Counts

See tables 1 to 6.

Measurements

Based on 37 specimens, 102 to 146 mm. standard length given as percent of standard length. Preanal 85.1 (83.3-86.3); preventral 55.6 (53.7-58.6); predorsal 46.4 (44.9-48.6); head length 30.6 (28.5-32.4); snout 10.0 (8.7-11.2); eye 9.4 (8.2-10.9); maxillary length 5.8 (5.2-6.6); depth at dorsal fin 10.6 (8.3-13.4); depth caudal peduncle 4.8 (4.3-5.6).

Description

Body of medium length. Figure 8 shows a regression of body depth on standard length ($Y = .120X - .504$) compared with two closely related species. Greatest depth behind head, tapering to the relatively narrow caudal peduncle. Figure 9 shows a regression of caudal peduncle depth on head length ($Y = .123X + 1.28$) compared with two closely related species. Body in front of dorsal fin almost square in cross section or somewhat wider than deep; compressed posteriorly. Dorsum and venter flat, not rounded. The head, when viewed laterally, as deep or deeper than the body, its dorsal profile barely or not at all broken by the upper margin of the eye; the dorsal and ventral profiles of the head converge at about equal angles on the snout. The interorbital space between the supraocular canals is broadly concave. The dorsal portion of the maxillary lies under the lachrymal. The distal end of the maxillary reaches to at least the midpoint of the distance from the tip of the snout to the anterior margin of the orbit and usually farther. The jaws are broadly rounded, the lower included; there is a slight, bony protuberance behind the symphysis of the lower jaw. The palatine and the head of the vomer bear small, closely spaced, needlelike teeth in a continuous band 2 to 5 teeth wide, about 40 on the vomer and 50 on each palatine; no dentary teeth. The ceratobranchial of the fifth gill arch bears 8 small, conical teeth; two patches of similar teeth, 5 on the anterior patch and 15 on the posterior patch, are at the anterior end of the fourth suprabranchial. The third suprabranchial lacks teeth. The tongue bears eight strong, recurved teeth (description of dentition

based on a single alizarin-stained specimen). The gill rakers are medium-sized, compressed, and widely spaced. The longest rakers equal one-seventh to one-eighth of the interorbital distance.

The pectoral fin originates on the ventral surface of the fish anterior to a vertical through the rear margin of the opercle; the distance between the innermost rays of the pectoral fins is equal to or, more often, greater than the least depth of the caudal peduncle. The fin rays of all specimens are broken off short.

Scales deciduous, the few we have seen lack spines. Lateral counts of scale pockets in several specimens are about 50.

The peritoneum is dark. The gut is immaculate. Eight or nine pyloric caeca are present in eight specimens. The swimbladder begins close to the hind curve of the stomach and extends posteriorly to slightly beyond the origin of the ventral fin. Swimbladder lacking silvery pigment (fig. 5), however, we have seen several specimens with slightly iridescent bladders.

Pigmentation of adult specimens preserved in formaldehyde is distinctive and consists of a dark brown band extending along the upper quarter of the side; it is not continuous over the dorsum; however, there is a dark, middorsal streak. The venter and throat of most specimens are pigmented with large, dark chromatophores which form a wide dark band extending to the pelvis (fig. 10C), and in many specimens all the way to the vent. In some specimens the superficial pigmentation of the belly is poorly developed, and in these the darkly pigmented peritoneum shows through the thin ventral musculature.

Distribution

A. georgei is found off the east coast of Florida and barely enters the Gulf of Mexico south of Dry Tortugas. It has also been taken at several localities along the western side of the Bahama Banks and on the north coast of Cuba. In the Caribbean and along the Antilles, *A. georgei* has been trawled off Honduras, Nicaragua, and Jamaica and near Puerto Rico and the Virgin Islands (fig. 4).

Depth distribution ranges from 120 to 250 fm. (220-457 m.), but the fish has been most often caught between 150 and 220 fm. (274-402 m.).

Habits

A. georgei has been taken only in bottom trawls over mud and shell bottoms at bottom tempera-

tures of 48, 58, 61, and 62° F. (8.9, 14.4, 16.1, and 16.7° C.). Specimens are most often taken singly. Our largest sample has six individuals. *A. georgei* has been taken with *brucei* and with *stewarti*.

Name

Named for George Clipper, to whom we are indebted for efficient assistance in this Laboratory.

Study Material

All from the Atlantic. Holotype: USNM 203016, 125 mm. standard length, *Oregon* 3622, 16°01' N., 81°08' W., 145 to 150 fm. (265–274 m.), June 6, 1962. Paratypes:

Bahama Banks.—FMNH 65791 (1 specimen), *Oregon* 1343, 22°59' N., 79°17' W., 250 fm. (457 m.). TABL 100575 (1), *Silver Bay* 2457, 23°43' N., 79°07' W., 250 fm. (457 m.). FMNH 66217, *Combat* 446, 25°10' N., 79°13' W., 250 fm. (457 m.). UF 1350 (1), *Combat* 235, 27°27' N., 78°58' W., 180 fm. (329 m.). USNM 158689 (1), *Combat* 237, 27°28' N., 78°44' W., 215 fm. (393 m.).

U.S. Atlantic.—TABL 100563 (4), *Combat* 441, 25°16' N., 80°00' W., 185 fm. (338 m.). TABL 100569 (1), *Silver Bay* 2482, 26°07' N., 79°12' W., 200 fm. (366 m.). TABL 100567 (1), *Silver Bay* 218, 29°38' N., 80°11' W., 220 fm. (402 m.). TABL 100573 (5), *Combat* 491, 29°30' N., 80°10' W., 125 fm. (229 m.).

U.S. Gulf of Mexico.—UMML 2882 and 2545 (1 each); *Combat* 281, 24°17' N., 82°47' W., 215 fm. (393 m.).

Central America.—USNM 187841 (5), *Oregon* 3579, 12°26' N., 82°26' W., 125 fm. (229 m.). USNM 203017 (4) and MCZ (2), *Oregon* 6423, 13°28' N., 82°01' W., 150 to 158 fm. (274–289 m.). USNM 187839 (6), *Oregon* 3566, 14°10' N., 81°58' W., 150 to 160 fm. (274–293 m.). USNM 188224 (4), *Oregon* 3622, data as for holotype. USNM 187834 (3, 1 cleared and stained), *Oregon* 3625, 16°26' N., 81°35' W., 120 fm. (220 m.). ANSP 98604 (4), *Oregon* 3626, 16°45' N., 81°27' W., 150 fm. (274 m.).

Antillas.—USNM 187816 (2); *Oregon* 3548, 17°53' N., 77°56' W., 150 fm. (274 m.). TABL 100572 (3); *Silver Bay* 5193, 18°16' N., 67°22' W., 150 fm. (274 m.). FMNH 66224 (1); *Oregon* 2606, 18°37.5' N., 65°04' W., 210 fm. (384 m.). USNM 157980 (1); *Oregon* 1344, 22°50' N., 79°08' W., 200 to 225 fm. (366–412 m.). USNM 157976 (1); *Oregon* 1343, 22°59' N., 79°17' W., 250 fm. (457 m.).

ARGENTINA STEWARTI, NEW SPECIES

Figures 2, 3, 4, 5, 8, 9, 10B, 12

Diagnosis

This species can be separated from *A. sphyraena* and *silus* by its smooth instead of spiny scales and by its five instead of six branchiostegal rays. It differs from *silus*, *sialis*, *aliceae*, and *elongata* in having 6 (occasionally 7) gill rakers on the lower arm of the first arch—the four species listed above have 8 to 21. It differs in gill raker count from *A. brucei* which has 7 (occasionally 6) rakers. *A. stewarti* differs from *sialis*, *aliceae*, *kagoshimae*, *euchus*, *striata*, *georgei*, and *brucei* in having 52 or 53 vertebrae—the others have 43 to 51. It differs from *sphyraena*, *sialis*, *elongata*, *australiae*, and *kagoshimae* in having 18 to 21 pectoral rays rather than 11 to 17. It differs from *sphyraena*, *sialis*, *aliceae*, *elongata*, *kagoshimae*, and *euchus* in having 13 to 15 ventral rays rather than 10 to 12. It differs from *striata* in lacking silvery pigment on the swimbladder (occasionally lacking in *striata*) and in its more slender body, depth usually 10 or more times in standard length rather than usually less than 9 in standard length in *striata*. It differs from *georgei* in having anal rays 12 or 13 rather than usually 10 or 11 and in having pectoral rays usually 19 or more, rather than usually 18 or fewer.

Counts

See tables 1 to 6.

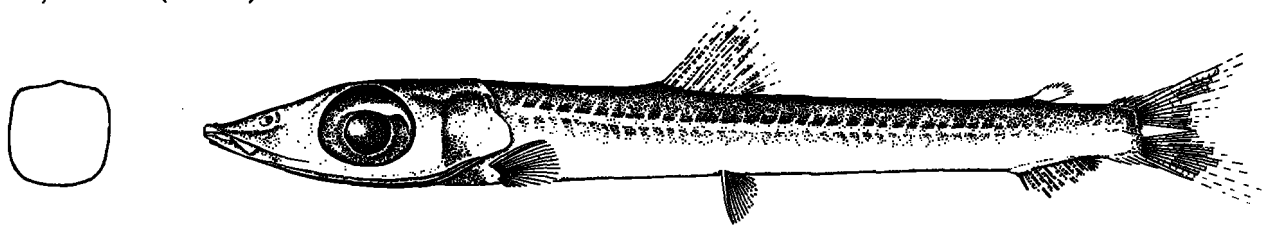


FIGURE 12.—*Argentina stewarti*, USNM 202998, paratype, 148 mm. standard length. Scales not shown. Cross section from in front of dorsal fin. Drawn by Mildred H. Carrington.

Measurements

Based on 18 specimens, 121 to 166 mm. standard length, given as percent of standard length. Preanal 85.0 (83.5–86.7); preventral 55.8 (53.8–57.3); predorsal 47.7 (46.4–49.1); head length 30.6 (28.8–33.0); snout 10.3 (10.1–10.5); eye 9.7 (8.7–10.7); maxillary length 5.3 (3.8–5.9); depth at dorsal fin 8.6 (7.3–11.0); depth caudal peduncle 5.1 (4.5–5.5).

Description

Body elongate. Figure 8 shows a regression of body depth on standard length ($Y = .069X + 2.43$) compared with two closely related species. Greatest depth behind head, tapering little to the caudal peduncle. Figure 9 shows a regression of caudal peduncle depth on head length ($Y = .112X + 2.44$) compared with two closely related species. Body in cross section in front of dorsal fin usually wider than deep, approximately rectangular. The head, when viewed laterally, has its dorsal profile slightly interrupted by the upper margin of the eye; the ventral profile of the head rises gently to the snout. The interorbital space between the supraocular canals flat or barely concave. The dorsal portion of the maxillary lies under the lachrymal. The distal end of the maxillary is midway between the tip of the snout and the anterior margin of the orbit. The jaws are broadly rounded, the lower included. The palatine and the head of the vomer bear small, closely spaced, needlelike teeth in a continuous band 2 to 5 teeth wide, about 30 on the vomer and 45 on each palatine; no dentary teeth. The ceratobranchial of the fifth gill arch bears 14 small, conical teeth; two patches of similar teeth, with about 18 on each are found at the anterior end of the fourth suprabranchial. The tongue bears eight strong recurved teeth (description of dentition based on a single alizarin specimen). The gill rakers are widely spaced triangular flaps; the longest ones are equal to one-seventh to one-eighth of the interorbital distance.

The pectoral fin originates on the ventral surface of the body anterior to a line through the hind margin of the opercle. The distance between the inner rays of the pectoral fins is equal to or greater than the least depth of the caudal peduncle. The rays of all fins are broken off short.

Scales deciduous; the few we have seen lack spines. Lateral scale pockets about 55.

The peritoneum is densely punctulate with small

dark chromatophores. Several specimens have the gut lightly peppered with chromatophores. Seven to nine pyloric caeca are present in eight specimens. The swimbladder begins close to the hind curve of the stomach and extends posteriorly to beyond the origin of the ventral fin. Swimbladder lacking silvery pigment (fig. 5); however, we have seen one specimen with an iridescent swimbladder.

Pigmentation of adult specimens preserved in formaldehyde solution consists of a dark brown band extending along the upper one-fourth of the body; ventral and parallel to the band is a less darkly pigmented area. These two pigment bands color the entire upper one-half of the body. The dorsum is unpigmented with the exception of a narrow middorsal streak. The throat and breast are peppered with chromatophores, which in some specimens are also scattered at the bases of the ventral fins (fig. 10B). In some specimens the peritoneum shows through the belly as a dark, mid-ventral streak. Some specimens also have some of the scale pockets of the venter outlined in dark pigment.

Distribution

A. stewarti has been taken off Nicaragua in the western Caribbean and from Mona Island to Dominica in the Antilles (fig. 4). It seems likely that it is widespread in the southern Caribbean.

Depth distribution ranges from 200 to 310 fm. (366–567 m.)—deeper than the other three Gulf and Caribbean species. *A. stewarti* does overlap the lower half of the depth distributions of the other three; however, it is the only species that has not been taken shoaler than 200 fm. (366 m.).

Habits

We have little information on this species. It has been taken only with a bottom trawl; however, we have no information on bottom type or temperature. Specimens are most often taken singly; however, we have one collection with six fishes. *A. stewarti* has been taken with *georgei* and *brucei*.

Name

Named for Stewart Springer in recognition of his numerous contributions to the ichthyology of the tropical western Atlantic.

Study Material

All from the Atlantic. Holotype; USNM 202996, 144 mm. standard length; Oregon 3565, 14°10' N.,

81°55' W., 240 to 250 fm. (439–457 m.), May 21, 1962. Paratypes:

Central America.—USNM 203572 (1 specimen); *Oregon* 3610, 12°23' N., 82°29' W., 200 fm. (366 m.). USNM 202998 (4); *Oregon* 3574, 12°31' N., 82°21' W., 200 fm. (366 m.). USNM 188223 (1); *Oregon* 3614, 14°00' N., 81°50' W., 200 fm. (366 m.). USNM 202997 (1); USNM 187790 (6); *Oregon* 3565, data as for holotype.

Antilles.—MCZ (1); *Oregon* 5925, 15°38' N., 81°15' W., 245 fm. (448 m.). FMNH 66225 (1); *Oregon* 2636, 17°37' N., 63°36' W., 280 fm. (512 m.). USNM 202999 (2, 1 cleared and stained); *Oregon* 6695, 17°41' N., 62°50.5' W., 300 to 320 fm. (549–585 m.). USNM 186356 (1); *Oregon* 2645, 18°12' N., 67°42' W., 260 fm. (476 m.). FMNH 66226 (1); *Oregon* 2651, 18°16.5' N., 67°17' W., 250 fm. (457 m.). USNM 108374 (1); *Caroline*, 18°32' N., 68°21' W., 260 fm. (476 m.). FMNH 66224 (2); *Oregon* 2606, 18°37.5' N., 65°04' W., 210 fm. (384 m.).

ARGENTINA BRUCEI, NEW SPECIES

Figures 2, 3, 4, 5, 8, 9, 10D, 13

Argentina striata not of Goode and Bean, 1896; Cohen, 1964 (fig. 5).

Diagnosis

A. brucei differs from *sphyraena* and *silus* in having smooth instead of spiny scales and five instead of six branchiostegal rays. It differs from *silus*, *sialis*, *aliceae*, and *elongata* in having seven (sometimes six) gill rakers on the lower arm of the first arch rather than eight or more. It differs from all *Argentina* except *sphyraena* and *aliceae*

in its low vertebral count, 44 to 46 rather than 47 or more. It differs from *sphyraena*, *sialis*, *elongata*, *australiae*, and *kagoshimae* in having 18 to 20 pectoral rays rather than 19 or fewer. It differs from *elongata*, *kagoshimae*, and *euchus* in having 13 or 14 ventral rays rather than 12 or fewer. It differs from *australiae*, *kagoshimae*, *euchus*, *striata*, *georgei*, and *stewarti* in having usually seven gill rakers rather than usually six gill rakers. It differs from *striata* in usually lacking silvery pigment on the swimbladder.

Counts

See tables 1 to 6.

Measurements

Based on about 72 specimens, 68.4 to 132 mm. standard length, given as percent of standard length: Preanal 84.5 (74.6–87.9); preventral 56.2 (52.9–58.8); predorsal 48.3 (44.4–50.7); head length 31.2 (27.7–33.1); snout 10.1 (8.7–11.2); eye 10.0 (7.9–11.6); maxillary length 5.9 (4.6–6.6); depth at dorsal fin 13.0 (10.9–15.4); depth at caudal peduncle 5.9 (5.0–6.5).

Description

A relatively short-bodied species with greatest depth at dorsal origin tapering to caudal peduncle. Body in cross section deeper than wide, the venter broadly rounded. Body in preserved specimens notably soft. The head, when viewed laterally, usually has its dorsal profile broken by the upper margin of the eye. The dorsal and ventral profiles of the head converge on the snout at about equal angles. The interorbital space between the supraocular canals is flat. The dorsal portion of the

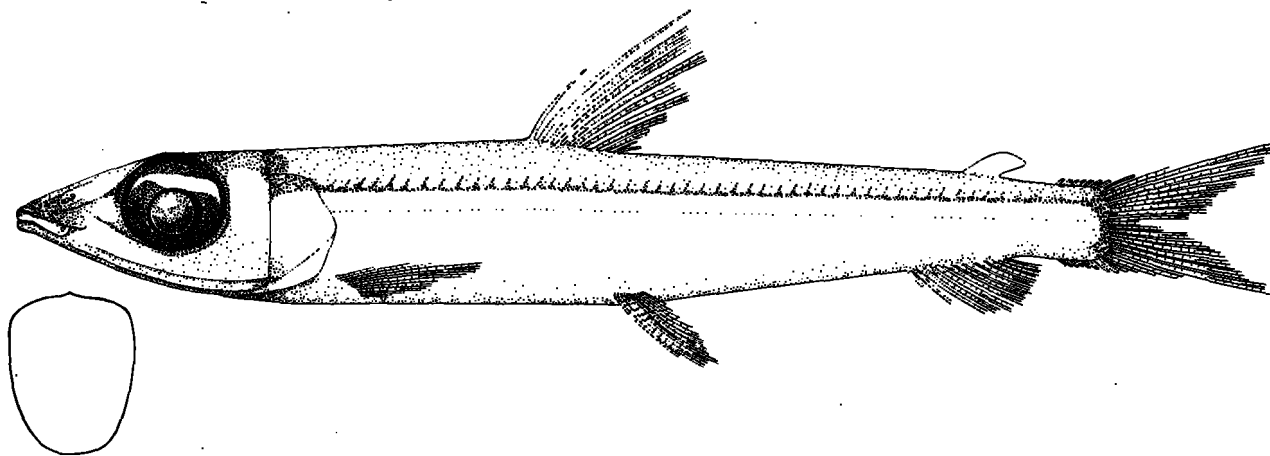


FIGURE 13.—*Argentina brucei*, USNM 159357, paratype, 128 mm. standard length. Scales not shown. Cross section from in front of dorsal fin. From Cohen, 1964, as *A. striata*.

maxillary lies under the lachrymal. The distal end of the maxillary extends at least to the midpoint of the snout and in some specimens farther. The jaws are broadly rounded; the lower, which often has a slightly bony protuberance at the symphysis, is included. The palatine and the head of the vomer bear small, closely spaced, needlelike teeth, in a continuous band 2 to 5 teeth wide, about 55 on the head of the vomer and 70 on each palatine; no dentary teeth. The ceratobranchial of the fifth gill arch bears 8 small, conical teeth; two patches of similar teeth, 10 on the anterior patch and 14 on the posterior patch, are found at the anterior end of the fourth suprabranchial. The tongue bears eight strong, recurved teeth (description of dentition based on a single alizarin specimen). The gill rakers are medium-sized, widely spaced, and compressed at the base. The longest gill rakers are equal to one-seventh to one-eighth of the interorbital distance.

The pectoral fin originates on the dorso-lateral curve of the body close to the level of the posterior margin of the opercle. The distance between the innermost rays of the pectoral fins is generally less than the least depth of the caudal peduncle. The pectoral fin extends at least half the distance from the pectoral origin to the ventral fin origin.

The scales are deciduous and lack spines. Scale pocket counts are difficult on this soft-bodied fish; however, we estimate about 48 lateral line scales.

The peritoneum is peppered with large, dark chromatophores; however, they are not so densely distributed that they give the peritoneum a completely black appearance. The gut is immaculate. Eight to 10 pyloric caeca are present in 12 specimens; many body cavities are heavily invested with fat. The swimbladder usually begins slightly anterior to the hind curve of the stomach and terminates slightly beyond the origin of the ventral fins. Six specimens of about one hundred had silvery swimbladders; otherwise, bladders lack pigment.

Pigmentation of adult specimens preserved in formaldehyde solution is a light straw color below the lateral line, somewhat darker along the upper third of the body. The duskiess is not continuous over the dorsum. Many examples carry 8 to 12 indistinct dusky blotches on the upper part of the body. The throat, breast, and belly are unpigmented (fig. 10), although a few specimens have

a light sprinkling of chromatophores at the bases of the pectoral and ventral fins. The peritoneum shows through the midventral line in some specimens.

Distribution

A. brucei has been taken on the north coasts of Hispaniola and Puerto Rico; off Jamaica, Honduras, Nicaragua, Costa Rica, and Panama; and along the north coast of South America. It has also been trawled at several localities off the mouths of the Orinoco.

Depth distribution ranges from 100 to 300 fm. (183–549 m.); however, the fish has been most often caught between 100 and 230 fm. (183–421 m.).

Habits

A. brucei has been taken only with a bottom trawl, over a mud bottom, at bottom temperatures ranging from 50° to 64° F. (10°–17.8° C.). The fish is caught more often in aggregations than singly. *A. brucei* has been taken in mixed collections with all three of the other tropical western Atlantic species, *striata*, *georgei*, and *stewarti*, though with only one at a time.

Name

Named for the well-known ichthyologist Bruce B. Collette, who helped collect many of the specimens upon which this description is based.

Study Material

All from the Atlantic. Holotype: USNM 203029, 117 mm. standard length; *Oregon* 3584, 9°13' N., 81°30' W., 200 fm. (366 m.), May 25, 1962. Paratypes:

Central America.—USNM 187817 (3 specimens), *Oregon* 3595, 9°02' N., 81°26' W., 100 fm. (183 m.). USNM 187789 (16) and TABL 100571 (6); *Oregon* 3598, 9°03' N., 81°22' W., 200 to 220 fm. (366–402 m.). USNM 203047 (5); *Oregon* 3597, 9°04' N., 81°25' W., 150 to 160 fm. (274–293 m.). USNM 187833 (7); *Oregon* 3585, 9°12' N., 81°30' W., 135 to 140 fm. (247–256 m.). USNM 187837 (1); *Oregon* 3584, data as for holotype. USNM 187753 (1); *Oregon* 3590, 9°18' N., 80°22' W., 125 fm. (229 m.). USNM 200429 (5, 1 cleared and stained); *Oregon* 5738, 9°14' N., 79°07' W., 120 fm. (220 m.). USNM 188016 (5); *Oregon* 3610, 12°23' N., 82°29' W., 200 fm. (366 m.). USNM 203031 (4); *Oregon* 3574, 12°31' N., 82°21' W., 200 fm. (366 m.). USNM 187793 (7); *Oregon* 3570, 14°08' N.,

81°55' W., 200 to 240 fm. (366–439 m.). TABL 100566 (1); *Oregon* 3615, 14°16' N., 81°55' W., 200 fm. (366 m.). USNM 185093 (1) and FMNH 74571 (3); *Oregon* 1868, 16°36' N., 82°37' W., 175 fm. (320 m.). USNM 159353 (1); *Oregon* 1871, 16°39' N., 82°26' W., 250 fm. (457 m.). ANSP 98604 (14); *Oregon* 3626, 16°45' N., 81°27' W., 150 fm. (274 m.). TABL 100562 (3); *Oregon* 3627, 16°50' N., 81°21' W., 200 fm. (366 m.). FMNH 66218 (2); *Oregon* 1883, 16°52' N., 81°30' W., 200 fm. (366 m.).

South America.—USNM 159356 (3); FMNH 66222 (2); *Oregon* 1985, 9°41' N., 59°47' W., 150 fm. (274 m.). USNM 159357 (9) and UF 8026 (4); *Oregon* 1989, 9°45' N., 59°45' W. UF 5237 (6) and FMNH 66221 (6); *Oregon* 1983, 9°43' N., 59°53' W., 125 fm. (229 m.). USNM 203049 (1); *Oregon* 4465, 10°45' N., 66°37' W., 125 fm. (229 m.). USNM 203032 (1); *Albatross* 2700, 10°59' N., 66°00' W., 140+ fm. (256+ m.). MCZ 45937 (6); *Oregon* 4838, 11°09.5' N., 74°24.5' W., 170 to 180 fm. (311–329 m.). TABL 100568 (1); *Oregon* 4858, 11°09' N., 74°25' W., 160 fm. (293 m.). USNM 188973 (2); *Oregon* 4860, 11°09' N., 74°26' W., 155 to 160 fm. (284–293 m.). USNM 203033 (1); *Oregon* 4410, 11°52' N., 69°27' W., 230 fm. (421 m.). USNM 203048 (2); *Oregon* 4408, 11°53' N., 69°28' W., 230 fm. (421 m.). USNM 203030 (2); *Oregon* 4407, 11°59' N., 69°30' W., 230 fm. (421 m.).

Antilles.—TABL 100570 (4); USNM 187838 (14); *Oregon* 3549, 17°50' N., 77°52' W., 170 fm. (311 m.). USNM 186355 (1) and FMNH 66227 (1); *Oregon* 2653, 18°18' N., 67°18.5' W., 300 fm. (549 m.). USNM 186354 (1); *Oregon* 2656, 18°24' N., 67°15' W., 100 fm. (183 m.). MCZ 40588 (4); FMNH 66228 (5); *Oregon* 2658, 18°26' N., 67°11.5' W., 175 fm. (320 m.). USNM 186352 (2); *Oregon* 2664, 18°31.5' N., 66°46.5' W., 160 fm. (293 m.). USNM 186353 (1); *Oregon* 2665, 18°31.5' N., 66°50' W., 180 fm. (329 m.). USNM 186357 (1) and FMNH 66229 (1); *Oregon* 2666, 18°32' N., 66°46.5' W., 200 fm. (366 m.). TABL 100565 (2); *Silver Bay* 5161, 19°57' N., 71°05' W., 190 fm. (348 m.).

ARGENTINA EUCHUS COHEN

Figure 2

A. euchus was originally described from only two specimens (Cohen, 1961). On the basis of an additional 15, we here present a new diagnosis and

counts and measurements as well as a range extension.

Diagnosis

A. euchus differs from *sphyraena* and *silus* in its smooth instead of spiny scales and by its five instead of six branchiostegals. It differs from *sphyraena*, *silus*, *sialis*, *aliceae*, *elongata*, and *brucei* in having six gill rakers on the lower arm of the first arch rather than seven or more. It has 47 or 48 vertebrae, more than *aliceae* and *brucei*, which have 43 to 46; and fewer than *silus*, *elongata*, *australiae*, *kagoshimae*, and *stewarti*, which have 49 to 67. It differs from *sialis* and *australiae* in having 16 to 18 pectoral rays rather than 11 to 14. It differs from *silus*, *striata*, *georgei*, *brucei*, and *stewarti* in having 10 or 11 ventral rays rather than 12 or more.

Counts

See tables 1 to 7.

Measurements

Based on 14 specimens, 123 to 154 mm. standard length, given as percent of standard length. Preanal 82.4 (81.2–83.6); maxillary width 1.6 (1.4–1.8); depth at dorsal fin 13.5 (11.9–15.3); head depth 12.9 (11.7–13.8).

Discussion

The measurements given above were used, on the basis of the two types, to help separate *A. euchus* from *A. elongata*, *australiae*, and *kagoshimae* (Cohen, 1961). The additional material herein reported upon shows that with the exception of body depth and head depth in separating *euchus* from *australiae*, morphometric data are unsatisfactory in diagnosing *A. euchus*.

Four specimens examined lacked silvery pigment or iridescence on their swimbladders.

Distribution

A. euchus has been taken off Natal, southern Mozambique, and Kenya at depths ranging from 131 to 322 fm. (240–589 m.).

Study Material

All from the western Indian Ocean. USNM 203160 (1 specimen), *Anton Bruun* cruise 8, sta. 421 G, 02°56' S., 40°28' E. 240 m. USNM 203159 (11), MCZ (1), FMNH (1), and BMNH (1); *Anton Bruun* cruise 8, sta. 396 B, 25°32' S., 33°24' E., 450 to 455 m.

GENUS *GLOSSANODON* GUICHENOT

We have received material of *Glossanodon polli* from West Africa and five small fishes from the Arabian Sea that represent a species close to but distinct from *G. polli*.

GLOSSANODON MILDREDAE, NEW SPECIES

Figure 14

Diagnosis

G. mildredae differs from *pygmaeus* in having its vent immediately anterior to the anal fin base rather than farther forward, in having teeth on the dentary, and in having 23 rather than 12 to 14 pectoral rays. It differs from *leioglossus* and *semi-fasciatus* in having dentary teeth along more than half the distance from the symphysis to the angle of the gape. It differs from *lineatus* in having 5 instead of 4 branchiostegal rays, 13 instead of 15 anal rays, and 23 instead of 20 pectoral rays. It differs from *polli* in having at least 55 lateral line scales rather than 48 to 51. Also, *G. mildredae* has dusky blotches mainly above the midline of the body; in similar-sized *polli*, the ventral half of the side bears continuations of the dorsal blotches.

Counts and Measurements

See table 8.

Description

Greatest depth behind head, tapering little to caudal peduncle. The dorsal profile of the head is slightly interrupted by the dorsal rim of the orbit. The ventral profile of the head rises more abruptly from a point below the anterior margin of the eye. The interorbital space between the supraocular canals is flat.

The dorsal margin of the maxillary lies under

the lachrymal and extends to the joint between the lachrymal and the jugal; its distal end is closer to the anterior margin of the orbit than to the snout. Lower jaw projecting slightly; both jaws are rounded, the lower less broadly.

TABLE 8.—Counts and measurements in millimeters on type specimens of *Glossanodon mildredae*

	Holo- type USNM 203235	Para- type USNM 203234	Para- type USNM 203234	Para- type USNM 203234	Para- type USNM 203233
<i>Measurements:</i>					
Standard length.....	64.9	69.8	58.1	65.7	41.6
Prenal.....	54.1	-----	48.6	53.6	32.2
Preventral.....	33.5	-----	29.5	34.1	22.7
Predorsal.....	30.7	-----	28.4	31.3	20.7
Head length.....	20.8	-----	18.6	19.2	13.7
Snout.....	6.2	-----	5.1	4.7	4.1
Eye.....	6.2	-----	5.4	6.4	3.9
Maxillary length.....	5.3	-----	4.0	4.6	3.1
Maxillary width.....	1.2	-----	1.0	1.2	-----
Body depth at dorsal head.....	7.1	-----	6.2	7.7	5.4
Body width behind head.....	7.0	-----	5.3	6.5	4.2
Caudal peduncle depth.....	4.1	4.3	3.8	4.2	3.1
<i>Counts:</i>					
Dorsal fin rays.....	13	-----	13	13	-----
Anal fin rays.....	13	13	13	13	-----
Pectoral fin rays.....	23	-----	-----	23	23
Ventral fin rays.....	13	12	12	12	13
Vertebrae.....	51	50	50	51	49
Gill rakers on lower arm first arch.....	-----	23	23	-----	-----
Lateral line scales.....	55+	-----	-----	-----	-----
Branchiostegal rays.....	-----	5	5	5	-----

Each palatine bears 15 to 20 short, conical, widely spaced teeth, arranged in an irregular series. The head of the vomer has 10 to 12 similar teeth. The tongue lacks teeth. About 10 teeth are widely spaced in a single irregular row on each dentary, extending from the symphysis to the angle of the gape. The gill rakers are elongate, lathlike structures and are closely spaced on the gill arch. The longest rakers equal about one-half the interorbital distance.

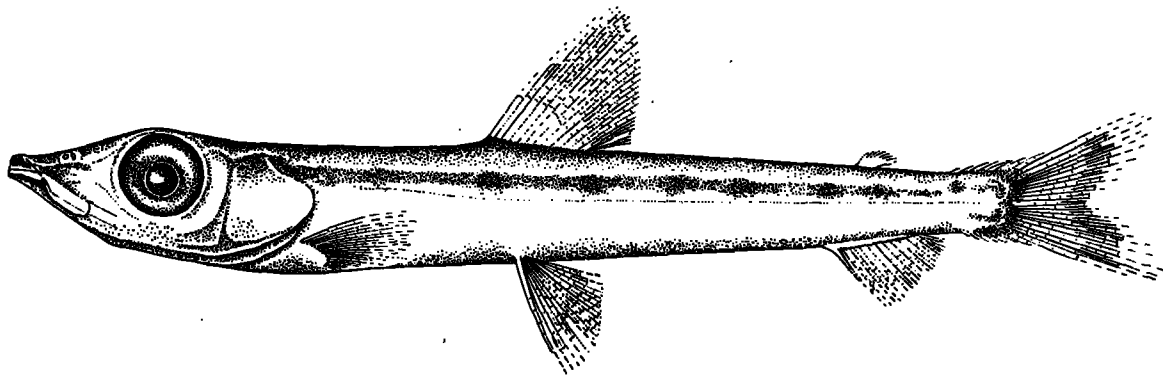


FIGURE 14.—*Glossanodon mildredae*, USNM 203235, holotype, 64.9 mm. standard length. Scales not shown. Drawn by Mildred H. Carrington.

The posterior end of the pectoral fin base forms an angle of 35 to 40 degrees with the horizontal. The tip of the pectoral fin extends at least one-third of the distance from the pectoral fin origin to the ventral fin origin. The ventral may be somewhat longer. The longest rays of the dorsal fin are longer than body depth.

Scales are lost from all four specimens; however, on the holotype we have been able to count at least 55 scale pockets along the lateral line and there are possibly 4 or 5 more.

The peritoneum is dusky. The gut is immaculate. The swimbladder lacks silvery pigment. Nine pyloric caeca are present in a single specimen.

The largest paratype (69.8 mm. standard length) has gonads containing minute, transparent eggs. We cannot say whether this fish is an immature female or a mature female with unripe gonads. If the latter, then *G. mildredae* matures at a smaller size than does *G. polli*.

The body is straw-colored, with a narrow brown band extending along the side above the midline. Spaced along the band, and broader but less well defined is a series of 8 to 10 dusky blotches, which are less distinct anteriorly. The blotches extend barely below the midline of the body. In our smallest specimen (41.6 mm. s.l.) the blotches are made of large, widely spaced chromatophores and the lateral band is very indistinct. *G. polli* of sizes comparable with our *mildredae* specimens (See fig. 8 in Cohen, 1958, taken from Poll, 1953, of a specimen 8.3 cm., probably fork length. Also USNM 203244, 61.5 mm. standard length and USNM 203243, 65.8 mm. standard length) have blotches or bands over the ventral as well as the dorsal half of the side.

Discussion

G. mildredae is closest to *G. polli*, from which it is not easily distinguished. Unfortunately, our material of *G. mildredae* is limited in quantity, size, and quality, and we have but few specimens of *G. polli* of comparable size. We doubt that one and the same species of *Glossanodon* lives in the tropical western Indian Ocean and off tropical West Africa, and we believe that at least the characters in our diagnosis serve to indicate the existence of two distinct populations.

Distribution

Known only from two localities in the tropical western Indian Ocean.

Name

Named for Mildred H. Carrington, whose tasteful and accurate drawings have contributed greatly to the progress of ichthyology.

Study Material

Holotype: USNM 203235, 64.9 mm. standard length, *Anton Bruun* cruise 9, sta. 422, 6°51' S., 39°54' E., 54 fm. (99 m.); 19 Nov. 1964; bottom trawl. Paratypes: USNM 203234 (3 specimens); data as for holotype. USNM 203233 (1); *Anton Bruun* cruise 9, sta. 463, 11°24' N., 51°35' E., 41 to 95 fm. (75-174 m.), 17 Dec. 1964, bottom trawl.

GLOSSANODON POLLI COHEN

G. polli has not been recorded since its original description (Cohen, 1958). We have examined the 18 recently collected specimens listed below and find that they agree well with the description. The two *Geronimo* specimens listed below are juveniles of 61.5 and 65.8 mm. standard lengths and show the barred pattern illustrated in the original description.

Study Material

USNM 203236 (12 specimens), MNHN (2), MCZ (1), and FMNH (1); Guinean Trawling Survey, *La Rafale*, transect 8, sta. 6, 8°28' N., 14°21' W., 55 fm. (100 m.). USNM 203244 (1), *Geronimo* cruise 2, sta. 213, 2°31' S., 8°51' E., 110 fm. (201 m.). USNM 203243 (1), *Geronimo* cruise 2, sta. 214, 2°01' S., 8°50.5' E., 110 fm. (201 m.).

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