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THE OCCURRENCE OF *Muraena robusta* OSORIO (ANGUILLIFORMES; MURAENIDAE) IN THE WEST ATLANTIC

The moray *Muraena robusta* Osorio (1909: 75, pl. 2, Cape Verde), recorded from off the west coast of Africa and from the East Atlantic islands of Cape Verde and the Bay of Biafra, was redescribed and figured by Blache (1967: 206-216). Later (1971: 244) he suggested that *Gymnothorax galeatae* Rubinoff (1966: 1) from the Atlantic coast of Panama might be a juvenile specimen of *M. robusta*. Re-examination of the type of *galeatae* shows this to be true, and recent collection and observation of additional specimens off the east coast of the United States establishes the presence of *Muraena robusta* in the West Atlantic.

Three specimens taken in the West Atlantic were studied: MCZ 44035 (1, 128 mm TL, holotype of *Gymnothorax galeatae*); Panamá, Galeta Island, 09° 24' 20" N, 79° 52' 18" W; depth of capture 6 inches, pronoxfish; 25 May 1962; I. Rubinoff. ANSP 138767 (1, 459 mm TL); North Carolina, "30 mile rocks", 34° 14.5' N, 76° 35.5' W; depth 30 m; 6 July 1977; Steve W. Ross, Alan R. Emery, SWR-SCUBA-77-14. UF 2797 (1, 1353 mm TL); Florida, off

Ponce de Leon Inlet, ca. 13 mi SSE of Daytona Beach; [1980]. Measurements were taken and proportions calculated and compared with those given by Blache (1967: 212-213) (Table 1). Most fall within the range given by Blache; the exceptions (head length and depth of body) can be attributed to the small size of MCZ 44035 and the large size of UF 2797 (the smallest and largest specimens recorded to date), both of which are outside the range of Blache's specimens. Tooth patterns of the West Atlantic specimens are similar to that illustrated in Blache (1967: 210), differences noted again attributable to age of the specimens.

Radiographs were compared with those of two East Atlantic *Muraena robusta*: BMNH 1938.12.15.3; Accra, Gold Coast; Irvine; and USNM 221162 (1, incomplete); Sénégal, rocky coast in vicinity of Dakar; 21 September 1950; M. Delais, J. Cadenat; from Marine Station de Gorée, no. 50.988 (see Table 2). The number of vertebrae are within the range of 151 to 158 (mean of 155) given by Blache (1967: 211) for 22 specimens. The number of vertebrae anterior to the origin of the dorsal fin and the anal fin are similar for East Atlantic and West Atlantic individuals except for the pre-dorsal count for ANSP 138767. The dorsal fin of

TABLE 1. Comparison of measurements and proportions of West Atlantic specimens of *Muraena robusta* with ranges given by Blache (as published) for East Atlantic specimens.

	MCZ 44035	ANSP 138767	UF 2797	Blache (1967)
Total length (mm)	128	459	1353	532-1245
In total length:				
Preanus distance	2.2	2.1	2.0	2.04-2.23
Head length	7.8	8.3	7.2	7.40-10.27
Predorsal distance	11.2	8.2 ¹	10.0	9.38-12.53
Depth at gill opening	22.1	15.0	10.2	10.51-16.00
Depth at anus	29.8	19.7	17.4	18.04-25.35
In head length:				
Depth at gill opening	2.8	1.8	1.4	1.29-1.90
Depth at anus	3.8	2.4	2.4	2.17-3.023
Snout length	5.5	6.0	6.0	4.54-6.19
Eye diameter	10.3	12.0	20.3	9.28-22.50
Interorbital width	9.2	8.0	6.8	6.38-9.50
Upper jaw length	2.6	2.6	2.3	1.82-2.61
Predorsal distance	1.4	1.0 ¹	1.4	1.12-1.58

¹ Abnormal dorsal-fin origin.

TABLE 2. Vertebrae and fin-ray counts of East and West Atlantic specimens of *Muraena robusta*.

	West Atlantic			East Atlantic	
	MCZ 44035	ANSP 138767	UF 2797	BMNH 1938.12.15.3	USNM 221162
Vertebrae:					
Total	156 ¹	153	151	153	Incomplete
Before anal fin	65	65	62	64	63
Before dorsal fin	4	10 ²	3	3	4
Dorsal-fin rays:	388	369 ²	396	375	—
Anal-fin rays:	250	255	289	246	—

¹ Our radiographs show 156 vertebrae rather than the 158 reported by Rubinoff.

² Abnormal dorsal-fin origin.

this specimen originates abruptly just posterior to the gill opening; careful comparison of the x-rays indicates that it is an aberrant or injured specimen with the anterior pterygiophores and beginning dorsal-fin rays missing (Fig. 1).

The color pattern of the 459 mm specimen from North Carolina (ANSP 138767) is bold and highly contrasting, similar to that illustrated by Rubinoff for his small specimen. Additional notes from personal observation and color slides taken soon after it was collected are as follows: Large round dark-brown spots of varying sizes on body and fins posterior to gill opening, size and intensity of color similar throughout length of fish, slightly paler on belly; background color grayish-blue anteriorly to grayish-tan posteriorly with dark reticulations throughout. Head golden brown dorsally, dark brown area from snout tip to interorbit with darker longitudinal folds; pale and grayish ventrally with some yellow invading background color; reticulations present but no spots. Inner edges of lips and interior of mouth pale orange-gold; mouth angle dark. Gill opening in conspicuous large dark blotch; eye and inside of gill opening slightly bluish. Distal edge of posterior third of dorsal fin and of anal fin pale gray. Small golden patch on tip of tail.

The 1353 mm specimen from off Florida is darker overall with the spotted pattern subdued and less prominent. Just after capture, dirty gold background color visible on head, inside of mouth, and on

body anterior to anus; after preservation head and anterior half of the body dark brown, mouth angle dark, gill opening in a large dark patch. Spotted pattern on body barely visible before anus, posteriorly dark brown spots on a lighter gray-brown background. Pale margin on fins at end of tail.

Additional specimens of *Muraena robusta* were observed during submersible dives on offshore North Carolina reefs by the junior author. Four or five large (estimated one to two m TL) morays, not immediately identifiable, were seen and photographed on 31 August 1979 (33°42'N, 76°44'W; depth 76 m) and 1 September 1979 (33°29'N, 76°59.5'W; depth 58 m). They appeared to be a uniform dark brown color with a dark blotch including the gill opening; however, a transparency of the head and anterior portion of the body showed the dark spots on the body characteristic of *M. robusta*.

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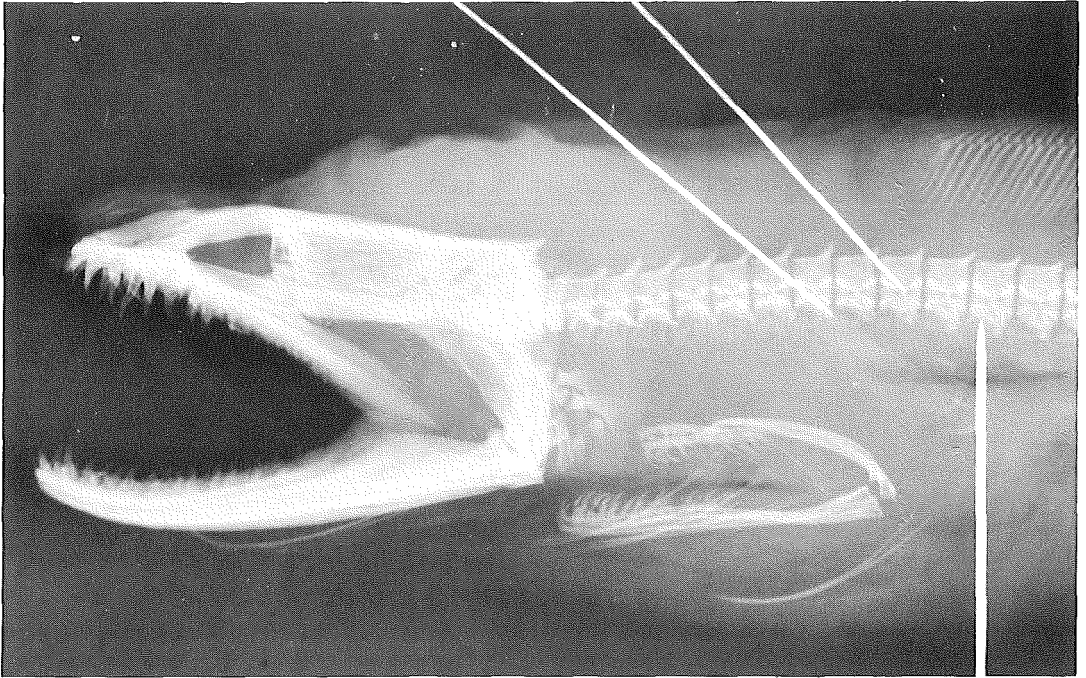


Figure 1. Radiograph of ANSP 138767, *Muraena robusta*, showing abnormal dorsal-fin origin; pins mark the two branchial pores and gill opening.

specimens and x-ray facilities at their institutions; R.O. Parker, Jr. of the National Marine Fisheries Service, Beaufort Laboratory for making available to the junior author submersible time in the *Nekton Gamma*; G.W. Link, Jr. of the University of North Carolina - Institute of Marine Sciences and N. Paul, North Carolina Division of Marine Fisheries for assisting in photography and x-ray techniques; Alan R. Emery of the Royal Ontario Museum and Richard B. Searles of the Botany Department, Duke University for aid in collecting the North Carolina specimen; and Franklin F. Snelson, Florida Technological University for making available the specimen deposited at Florida State Museum, University of Florida (UF).

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