

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN

TWO NEW CLINID BLENNIES (*MALACOCTENUS*)
FROM PUERTO RICO

BY C. LAVETT SMITH

INTENSIVE collecting at the mouth of the Condado Lagoon within the city limits of San Juan, Puerto Rico, has revealed two undescribed species of *Malacoctenus*. Using face mask and snorkle the author was able to work among the coral and rock debris in much the same manner that one would collect in terrestrial situations. In this way it was often possible to collect good series of fishes that are otherwise difficult to obtain even by the use of rotenone. Once discovered, the blennies were maneuvered into glass test tubes, imprisoned by placing a thumb over the opening, and brought to the surface, there to be transferred to the collecting jar.

Counts were made in accordance with standard methods (Hubbs and Lagler, 1947:8-15) except that every dorsal element was counted. The last anal ray was regarded as branched to the base. The reason for this apparent inconsistency is that in most specimens the last two anal elements are closely associated, whereas the last two dorsal rays are only slightly or not at all closer together than the preceding ones. Longitudinal scale rows were counted from the anal origin obliquely upward and forward to the dorsal fin. Caudal rays were counted from the longest upper ray to the longest lower ray inclusive. The measurements were made with a dial caliper, and proportional measurements are expressed as thousandths of the standard length, which is given in millimeters. All vertebral counts include the urostyle.

It is likely that when blennies are adequately studied throughout the western Atlantic they will throw considerable light upon the faunal relationships of the various parts of that region. Blennies are remarkably well suited for zoogeographic studies. They are rather sedentary shore fishes with numerous well-marked species showing highly adaptive specializations of form and habit.

I would like to express my gratitude to Donald S. Erdman, who has contributed advice and encouragement throughout this study

and has kindly turned over to me specimens of blennies from the western end of Puerto Rico for comparative study. Mr. John Mickham, an enthusiastic aquarist, accompanied me on many collecting trips as did Mr. Perry Montanye. For their aid I am grateful. Dr. Reeve M. Bailey and Dr. Robert R. Miller have reviewed the manuscript and made helpful suggestions. The photographs were taken by William L. Brudon.

Malacoctenus aurolineatus, new species

Goldenlined Blenny

(Pl. I, Fig. 1)

MATERIAL.—The holotype, UMMZ 171179, an adult male 34.8 mm. in standard length, was collected at the mouth of the Condado Lagoon, San Juan, Puerto Rico, on October 15, 1955. Eight additional specimens were taken from the same area, as follows: UMMZ 171185 (5), 22–32 mm., taken with the holotype; UMMZ 171162, 12 mm., September 17, 1955; UMMZ 171163, 25 mm., September 19, 1955; UMMZ 171190, 21 mm., October 16, 1955. Two specimens, UMMZ 171214, 12 and 24 mm., were caught along the north shore of San Juan Island near the insular capitol building on November 12, 1955.

DIAGNOSIS.—A medium-sized species of *Malacoctenus* (as defined by Jordan and Evermann, 1898:2356) with 19 (18 to 20) dorsal spines and 11 (10) dorsal soft rays. The anal fin has two spines and 17 to 19 soft rays. There are 42 to 50 scales in the lateral line. The pectoral fin is composed of 14 rays. When fully developed the nuchal comb has 10 to 13 filaments on each side. The color pattern is dominated by six vertical bars on the body, and in life there are four narrow golden-orange horizontal lines along the sides. There are no large spots on the spinous part of the dorsal fin.

DESCRIPTION.—The eleven specimens now available range in standard length from 12 mm. to 38.2 mm. and include one female with large eggs, two spent or immature females, six males, and two fish in which the sex was not determined. Examination of larger series of fresh material may reveal subtle sexual differences in color which have been overlooked in this study, during which no sex dimorphism was noted except in the structure of the external genitalia. There is a pointed papilla in the male and a rugose knob in the female.

Proportional measurements of six specimens are given in Table I. Frequency distributions of the meristic characters are as follows: lateral-line scales 42(1), 45(1), 47(1), 48(4), 50(2); vertebrae 35(2), 36(5),

37(1); longitudinal scale rows 16(1), 17(2), 18(5), 21(1); caudal-peduncle scales (including the lateral-line scales) 12(3), 13(2), 14(3), 15(1); branchiostegal rays 6-6(11); dorsal spines 18(2), 19(7), 20(2); dorsal soft rays 10(3), 11(8); caudal rays 11(11); anal spines 2(11); anal soft rays 17(2), 18(8), 19(1); pectoral rays 13-14 (1), 14-14(10); pelvic rays I, 3-I, 3(11). The holotype has the following counts: branchiostegal rays 6-6, lateral-line scales 48, longitudinal scale rows 18, vertebrae 36, caudal peduncle scales 12 (5 above and 5 below the lateral lines), dorsal XIX, 11, anal II, 18, caudal 11, pectoral 13-14, pelvic I, 3-I, 3.

The complete lateral line is abruptly decurved below the middle of the spinous dorsal, running very high anteriorly and along the mid-side posteriorly. All scales are cycloid. The body is scaled except for the nape, prepectoral area, breast, and the anterior part of the belly, which are naked; the head is entirely naked. The nasal cirrus is bifid, arising from the posterior border of the short tube of the anterior nostril. The ocular cirrus is usually double. There are 10 to 13 filaments in each fully developed nuchal comb. In the two smallest specimens, however, each 12 mm. in length, there are only six filaments in each comb. Moreover, these small specimens do not have the scales on the body developed; there are only 10 lateral-line pores in one and 15 in the other. Although the number of filaments in the nuchal comb is a good taxonomic character, it must be used with caution since the comb apparently is not fully formed in young individuals.

The forehead has a steep profile but the muzzle is pointed. The jaws are subequal in length, and the upper lip is separated from the snout by a deep groove. There are about 12 pairs of pointed, slightly curved teeth in the upper jaw and about the same number in the lower jaw. There is a crescent-shaped patch of villiform teeth on the vomer; there are no teeth on the palatines. The posterior end of the maxilla does not quite reach to a vertical through the front of the pupil.

The dorsal fin border forms a "serpentine" curve. The first three spines diminish in length; the fourth to the eighth exhibit progressive increase in length; behind this, the spines become successively shorter as far as the antepenultimate or the penultimate spine, the last spine or two being considerably longer. Usually the last spine is slightly more than half the length of the first (longest) soft ray. The soft rays decrease progressively in length, with the last ray joined to the body by membrane for most of its length.

TABLE I

Proportional Measurements of Six Specimens of *Malacoctenus aurolineatus*

Measurements are expressed in thousandths of the standard length.

Measurement	Holotype UMMZ 171179	Paratopotypes UMMZ 171185				
	♂	♂	♂	♀	♀	♂
Standard length (in mm.)	34.8	32.2	31.7	31.1	30.5	21.9
Dorsal origin to tip of snout	267	252	259	273	259	292
Dorsal origin to caudal base	807	795	801	784	771	740
Anal origin to caudal base	569	562	574	559	557	566
Dorsal origin to occiput	46	43	38	42	36	37
Pelvic insertion to tip of snout	213	224	224	225	220	242
Body depth	247	270	246	264	230	242
Body width	149	152	145	151	141	142
Least depth caudal peduncle	86	87	82	87	79	91
Length caudal peduncle	109	112	101	103	105	114
Head length	293	301	293	293	292	320
Head depth	198	208	189	203	197	215
Head width	175	186	174	190	171	178
Interorbital least fleshy width	34	34	28	35	30	37
Length orbit	80	84	79	80	79	91
Snout length	89	84	82	84	82	82

TABLE I (Cont.)

Measurement	Holotype UMMZ 171179	Paratopotypes UMMZ 171185				
	♂	♂	♂	♀	♀	♂
Least fleshy sub-orbital width	40	34	32	32	30	27
Length upper jaw	89	87	82	84	82	87
Tip of lower jaw to end maxillary	80	81	76	77	79	82
Length pectoral fin	302	301	293	305	295	297
Length pelvic fin	270	242	240	235	239	247
Caudal base to tip of longest ray	236	239	233	228	233	251
Caudal base to tip of shortest ray	210	221	224	222	220	228
Length depressed dorsal	776	749	776	743	734	699
Length depressed anal	598	572	565	550	571	562
Dorsal spine I . .	98	102	107	100	89	91
Dorsal spine III	75	71	79	80	72	82
Dorsal spine VIII	126	134	132	125	115	132
Penultimate spine	52	50	41	51	59	64
Longest dorsal soft ray	201	205	196	206	216	201

The caudal fin is only slightly emarginate, with 11 unbranched rays counting from the longest upper ray to the longest lower ray. Above and below these are single, articulated rays about one-half as long as the longest and several rudimentary procurrent rays. Examination of X rays has revealed that usually only the 11 principal rays are articulated with the hypural bones; hence, only these were counted. Following the method of Hubbs (1952:44) this count is recorded as

13 (11 + 2). The absence of branched rays in the caudal fin is the basis of the subtribe Labrisomini Hubbs (1952:102), which includes the two genera *Malaccoctenus* and *Labrisomus*.

The first anal spine is about two-thirds the length of the second, which in turn is about two-thirds that of the first articulated ray. The interradi al membranes are deeply notched, each joining the ray in front at the tip and the ray behind well below the tip. The last anal ray is not joined to the body by membrane. The pectoral is rounded, the sixth from the lowest ray usually being the longest. Rays below the longest become increasingly stout, with the next to the lowest ray the heaviest. The interradi al membranes below the longest ray are somewhat notched; they are attached to the ray below at the tip and to the ray above at a point slightly proximal to the tip. There are three pelvic rays; the third is only a little more than half as long as the second.

COLOR PATTERN.—There are six vertical dark bars on the body. The first three are more regular and distinct than the last three, and the widest interspace is between the third and the fourth. The first three bars are widest and darkest at the level of the lateral line, becoming almost confluent at that point and narrower above and below. These first three bars end almost in points on the lower sides, leaving the belly an immaculate white. The fourth, fifth, and sixth bars are less regular, each with darker spots superimposed upon it. In life some of these spots are connected by about four narrow golden-orange lines which run longitudinally along the posterior ventral part of the body. Between the last four bars are three somewhat triangular spots with the apices pointing downward. Just above the anal fin and the mid-ventral line anterior to the fin, still another series of spots is interposed between the triangles and the vertical bars. In some individuals there is a spot between the dorsal ends of the fourth and fifth bars. Behind the last vertical bar there are two brown spots on the base of the caudal separated by a white area at the mid-line.

The prepectoral area is white with two parallel dark lines, the first beginning in front of the base of the uppermost ray and extending obliquely downward and forward to the base of the pelvic fin, the second extending from the base of the middle pectoral rays to the base of the lowest pectoral rays. The upper part of the head including the lips is unevenly dark; the lower part is whitish with four dark bands. The first band crosses the chin just in front of the corner of the mouth; the next starts at the orbit and crosses the chin just behind the angle of the mouth; the third bar extends

from below the preopercular angle to meet its fellow on the front of the branchiostegal membrane; the fourth runs just behind the edge of the preopercle and crosses the middle of the branchiostegal membranes, where it widens and fuses with the third bar so that the anterior and middle parts of these membranes are dark.

The entire membrane of the spinal dorsal is dusky, with the melanophores concentrated along the spines and especially at a point just above the base where they form a row of spots. The most pronounced spot is on the third membrane; it is only about one-half the width of the membrane and is separated from the fin base by about two-thirds the width of the membrane. Sometimes the first three body bars encroach slightly upon the fin. A faint row of spots is sometimes present from the sixth to the fifteenth spine about midway between the lower row of spots and the fin margin. The lower row of spots extends back to the last spine in the holotype, but in some other specimens it extends onto the anterior soft rays.

The soft part of the dorsal fin is clear except for the dusky first interradiial membrane and dusky melanophores along each ray. The central parts of all but the first membrane are clear. In some, the pigment along the rays is concentrated into two or three spots. These spots form more or less distinct rows running the length of the fin.

The caudal fin is unspotted but the outer membranes are dusky, and there is a dusting of melanophores along the rest of the rays.

In life the anal fin is orange anteriorly, unspotted, but dusted with melanophores, their density increasing posteriorly and outward to the level of the notch in the membrane, beyond which the membrane is clear white in the first nine or more rays, dusky in the remainder. The ventral end of the fifth vertical body bar and the spot just anterior to it extend onto the base of the anal fin as ill-defined dusky areas.

The pectoral fins are immaculate but are dusted by melanophores on the lower interradiial membranes and on the bases of all the interradiial membranes. The pelvic fins are clear white in preserved material, yellow-orange in life.

COMPARISONS.—Of the previously described species of *Malacoctenus*, *aurolineatus* appears closest to *delalandei* (Valenciennes)¹, from which it differs in color pattern, in scale count, and in the form of the ocular cirrus. The lateral-line scales are 42–50 in *aurolineatus*, 49–56 in

¹Since this paper was prepared I have learned from Mr. Victor Springer of the need for a change in the nomenclature of the two species here called *delalandei* and *puertoricensis*. However, I do not anticipate his findings.

delalandei. The prepectoral area is scaled in *delalandei*, naked in *aurolineatus*. The dorsal fin of *delalandei* has dark flecks on the spinous as well as on the soft parts and lacks the dusky line of spots along the base. Also in *delalandei* there is a distinct spot on the bases of the second and third interspinous membranes which is lacking in *aurolineatus*. The vertical bars on the body of *delalandei* are red rather than blackish brown in preserved specimens. In specimens of *delalandei* taken from the same locality (but not the same microhabitat) as *aurolineatus*, the body bars narrow abruptly in the midline. The distinction between the three anterior and three posterior body bars is very characteristic for *aurolineatus*. In *aurolineatus* the ocular cirrus is double; in *delalandei* there are three or four branches.

Malacoctenus aurolineatus differs from *versicolor* (Poey) and *macropus* (Poey) in not having the vertical bars extending onto the dorsal fin as well-defined bars. It differs from *varius* (Poey), *bimaculatus* (Steindachner), *gilli* (Steindachner), and *puertoricensis* Evermann and Marsh¹ in its lack of pronounced spots at the base of the front and back of the spinous part of the dorsal fin. *M. lugubris* (Poey) and *M. biguttatus* Cope are also said to have a pronounced spot at the front of the dorsal fin and thus differ from *aurolineatus*.

HABITAT.—All specimens of *Malacoctenus aurolineatus* were collected in water less than one meter deep. They were taken from the channels of the rock-boring sea urchins, but the relationship is not so close as that between the urchin and *Gobiosoma multifasciatum* since size prevents at least the adult of *aurolineatus* from hiding among the spines of the sea urchin. Other blennies, notably *Labrisomus nuchipinnis*, *Salarichthys textilis*, *Blennius cristatus*, and *Rupiscartes atlanticus* also utilize the sea urchin channels but are less restricted to them than is *M. aurolineatus*. The female containing large eggs was taken on October 15, indicating that at least some of these blennies spawn during the fall months.

ETYMOLOGY.—The specific name, *aurolineatus*, refers to the reddish gold lines on the lower side.

Malacoctenus erdmani, new species

Graygreen Blenny

(Pl. I, Fig. 2)

MATERIAL.—The holotype, UMMZ 171175, a male 26.5 mm. in standard length, was collected at the mouth of the Condado Lagoon, San

¹ See footnote on page 7.

Juan, Puerto Rico, on October 9, 1955. UMMZ 171176, 17.0 mm., was collected with the holotype. Additional material from the same locality is as follows: UMMZ 171157, 19 mm., September 9, 1955; UMMZ 171173, 20.5 mm., October 3, 1955; UMMZ 171183 (4), 19–24 mm., October 15, 1955; UMMZ 171187, 23.5 mm., October 16, 1955; UMMZ 171192, 17 mm., October 22, 1955; UMMZ 171204, 18 mm., October 30, 1955; UMMZ 171207, 19.5 mm., November 4, 1955; UMMZ 171217, 25 mm., November 19, 1955; UMMZ 171226, 24 mm., December 3, 1955; UMMZ 171231 (2), 13.5–22 mm., December 11, 1955. Two other specimens, UMMZ 171211, 14–21 mm., were obtained along the north shore of San Juan Island, near the insular capitol building on November 12, 1955.

DIAGNOSIS.—A small species of *Malacoctenus* distinguished by color pattern, high pectoral-ray count (16–16), and low lateral-line count (39–42). The spinous part of the dorsal fin has the first and second interradiation membranes dusky and a faint dusky line of spots above the base but is otherwise unspotted. The soft part of the dorsal and all other fins are unspotted. There is a dark spot at the base of the posterior dorsal spines which does not extend onto the fin. This spot is surrounded by a darker ring, the dorsal part of which is brilliant iridescent blue in life.

DESCRIPTION.—Meristic characters in 18 specimens of *Malacoctenus erdmani* have the following frequency distributions: lateral-line scales 39(1), 40(6), 41(6), 42(5); caudal-peduncle scales 10(1), 11(17) (usually 4 above and 5 below the lateral lines); longitudinal scale rows 11(4), 12(9), 13(4), 14(1); branchiostegal rays 6–6(18); dorsal spines 20(1), 21(14), 22(3); dorsal soft rays 8(5), 9(12), 10(1); caudal rays 11(18); anal spines 2(18); anal soft rays 17(9), 18(9); pectoral rays 15–15(4), 16–16(12), 16–17(1); pelvic rays I, 3–I, 3(18). The holotype has the following counts: lateral-line scales 40, caudal-peduncle scales 11, longitudinal scale rows 12, branchiostegal rays 6–6, dorsal XXI, 8, caudal 11, anal II, 17, pectoral 16–16, pelvic I, 3–I, 3. Proportional measurements of six specimens are given in Table II. The general form of the body and fins is essentially as in *M. aurolineatus*.

The body is completely scaled except the prepectoral region, nape, breast, and anterior part of the belly, which are naked. The head is elongate and entirely scaleless. The jaws are subequal, with the upper lip separated from the snout by a deep groove. The vomer has a crescent-shaped patch of teeth; the palatines are toothless. The ocular cirrus is double; the nasal cirrus is a bifid tentacle arising from the

TABLE II

Proportional Measurements of Six Specimens of *Malacoctenus erdmani*

Measurements are expressed in thousandths of the standard length.

Measurement	Holotype UMMZ 171175	Paratopotypes				
		UMMZ 171183				UMMZ 171176
Sex	♂	♂	♂	♂	♂	♂
Standard length (in mm.)	26.5	24.2	23.1	22.4	19.2	17.0
Dorsal origin to tip of snout ..	272	273	273	277	292	282
Dorsal origin to caudal base ..	755	802	784	790	771	747
Anal origin to caudal base ..	543	517	541	531	531	529
Dorsal origin to occiput ...	26	29	30	31	31	29
Pelvic insertion to tip of snout	249	260	242	250	240	253
Body depth	253	264	264	268	286	235
Body width	128	132	143	143	130	153
Least depth caudal peduncle	75	83	95	85	89	82
Length caudal peduncle	91	87	91	94	99	106
Head length	291	302	303	304	333	329
Head depth	208	211	212	219	219	229
Head width	185	190	177	187	193	176
Interorbital least fleshy width ..	38	41	30	36	36	35
Length orbit	83	87	91	89	99	100

TABLE II (Cont.)

Measurement	Holotype UMMZ 171175	Paratopotypes				
		UMMZ 171183				UMMZ 171176
Sex	♂	♂	♂	♂	♂	♂
Snout length.....	91	83	82	80	83	76
Least fleshy sub-orbital width	34	25	30	31	20	24
Length upper jaw	83	87	87	85	94	88
Tip of lower jaw to end maxillary	79	79	78	80	83	76
Length pectoral fin	253	256	264	272	281	276
Length pelvic fin	253	244	251	268	245	241
Caudal base to tip of longest upper ray	268	264	260	272	271	...
Caudal base to tip of shortest ray	...	240	247	259	245	...
Length depressed dorsal.....	759	777	766	808	766	753
Length depressed anal.....	547	541	550	562	516	518
Dorsal spine I ..	113	107	121	112	109	...
Dorsal spine III .	83	91	95	94	94	88
Dorsal spine VIII	125	128	126	125	125	124
Antepenultimate dorsal spine .	72	71	69	76	62	65
Longest dorsal soft ray	185	...	195	201	208	...

posterior side of the low tube of the anterior nostril. The nuchal comb consists of only three or four filaments even in fully adult individuals. The dorsal fin is slightly emarginate between spines 1 and 5, with the antepenultimate spine usually the shortest. The second dorsal soft ray is the longest with the following rays decreasing regularly in length. The last dorsal ray is joined to the back by membrane for its entire length. As in *M. aurolineatus* the caudal fin is slightly emarginate and consists of 11 unbranched rays. The first anal spine is about two-thirds the length of the second, which is in turn about two-thirds the length of the first anal soft ray. The anal interradiation membranes are notched except between the last few rays.

The sixth from the lowest pectoral ray is the longest; the next to the lowest is the thickest. The lower pectoral membranes are notched. The pelvic fin is like that of *M. aurolineatus*, with the first and second rays nearly equal and the third much shorter. The pelvic fin reaches beyond the anus to the first or second anal spine.

COLOR PATTERN.—The body is crossed by seven vertical dark bars, the first just above and behind the pectoral fin, the last just in front of the caudal base. These bars, which are quite irregular and often interrupted, are about as wide as the interspaces, becoming only slightly narrower ventrally. The interspaces are mottled with brownish spots, with a few more or less well-developed spots between the ventral ends of the cross bars. The top of the fourth bar is differentiated as a distinctive dark spot surrounded by a narrow, very dark ring. The dorsal part of this ring is brilliant iridescent blue in life. There are small red spots along the base of the dorsal fin before and behind this dark spot. The sides of the body are distinctly darker above the mid-line than below; the area around the base of the pelvic fin is dusky. The over-all color is rather greenish gray washed with brown in marked contrast to other Puerto Rican species of *Malacoctenus*, in which reddish or brown predominates.

The head pattern is the same as that of *M. aurolineatus* with four dark lines crossing the underside. These lines anastomose in various ways in different individuals but usually are like the corresponding area in *M. aurolineatus*. The prepectoral pattern also varies, most often consisting of two spots in front of the base of the central pectoral rays with a vertical bar anterior to these spots.

All of the fins are unspotted except the spinous part of the dorsal, which is unspotted except for the dusky first and second interradiation

membranes and a faint dusky line of spots above the fin base. The anal fin is dusted with melanophores along the rays, these melanophores becoming more numerous toward the fin margin and the bases of the posterior rays.

Sexual dimorphism, except for the genitalia, is not evident.

COMPARISONS.—The lateral-line scale count is lower than that for any other species of West Indian *Malacoctenus* for which counts have been recorded, although *M. puertoricensis* and *M. macropus* overlap with it (39–42 in *erdmani*, 41–46 in *puertoricensis*, and 41–47 in *macropus* from Puerto Rico). The clear fins distinguish *erdmani* from most other species, as does the high pectoral ray count.

HABITAT.—This species was often collected with *M. puertoricensis* from among broken coral debris and rocks in water less than one meter deep; however, individuals of *erdmani* seemed more inclined to be out on the surfaces of the rocks, in depressions and among clumps of algae, than did those of *puertoricensis*, which were usually under rocks. The generally gray or greenish gray coloration simulates the bottom and the algae and is in distinct contrast to the reddish coloration of the secretive *M. puertoricensis*. A 25 mm. female with large eggs was found on November 19, indicating that the spawning season includes the late fall months.

ETYMOLOGY.—I take pleasure in naming this species for Donald S. Erdman, who in recent years has added much to our knowledge of the fishes of Puerto Rico.

DISCUSSION

By use of the technique mentioned above, six species of *Malacoctenus* were collected in the San Juan area. These are *aurolineatus*, *erdmani*, *versicolor* (Poey), *delalandei* (Valenciennes), *macropus* (Poey), and *puertoricensis* Evermann and Marsh. *M. versicolor* was taken only once, from a splash pool in the beach rock in the company of *Blennius cristatus* and *Salarichthys textilis*. The remaining five species were all collected repeatedly and most show small differences in habitat; *delalandei* and *aurolineatus* inhabit sea urchin channels, *macropus* and *puertoricensis* dwell beneath rocks and coral debris with *macropus* much the less numerous, and *erdmani* lives in depressions and among algae on exposed surfaces of the rocky bottom.

Among these six species, there is considerable variation in the degree of squamation of the anterior part of the body. In *Malacoctenus versi-*

color, *macropus*, and *delalandei* the prepectoral area and the belly are fully scaled (although the anterior mid-ventral region lacks scales in some individuals of *delalandei*); in *puertoricensis* the prepectoral is naked but the belly is fully scaled; and in *erdmani* and *aurolineatus* both the prepectoral area and the anterior part of the belly are naked. In view of the fact that those species of blennies that live in the wave zone (e.g., *Blennius cristatus*, *Salarichthys textilis*) are scaleless, one might surmise that the loss of squamation is an adaptation for withstanding violent wave action. In the Puerto Rican *Malacoctenus*, however, this is not borne out since the highly scaled *macropus* is perhaps the most secretive, living under rocks and well away from the wave zone, whereas the equally scaled *versicolor* was found in wave pools with *Blennius* and *Salarichthys*. Among the scaleless blennies, some (e.g., *Acanthemblemaria*) live in holes well away from the wave zone. If, then, the loss of scales is adaptive at all, it must be correlated with some factor other than water movement in the environment of the adult.

These six species of *Malacoctenus* are distinguished in the following key:

- A. First 3 vertical dark bars on body extend out to edge of dorsal fin. Lateral-line scales about 61. Nasal cirrus with more than 2 branches *M. versicolor*
- A'. Vertical dark bars on body extend only slightly if at all onto dorsal fin. Lateral-line scales 39 to 56. Nasal cirrus with only 2 branches.
 - B. First 2 vertical bars more or less fused, making anterior part of body appear darker than the rest. Scales 42 to 56.
 - C. Vertical bars narrowing gradually and evenly from dorsal to ventral ends, black in preservative. First 3 bars closer together and separated from the last 3 bars by a noticeably wide interspace. Four or 5 golden-orange lines along ventrolateral surface of body in life. No distinct spot at base of anterior dorsal spines. Scales 42 to 50. Prepectoral area naked *M. aurolineatus*
 - C'. Vertical bars narrowing abruptly at mid-line, red in preservative. Third interspace not wider than others. No golden lines on body. A distinct spot at base of anterior dorsal spines. Scales 49 to 56. Prepectoral area scaled *M. delalandei*¹
 - B'. Body color uniform from front to rear; the first two vertical bars not fused at the level of the lateral line. Scales 39 to 46.
 - D. A dark spot or ocellus at base of last dorsal spines. Nuchal filaments 5 or more on each side. Prepectoral area naked.
 - E. General color reddish. Spot at base of dorsal extending onto fin. Pectoral rays typically 14. Vertical fins heavily marked with black. A dark spot on the first 3 dorsal interspinous membranes. Nuchal filaments 5 or 6 *M. puertoricensis*¹

¹ See footnote on page 7.

- E'. General color greenish gray. Spot at base of dorsal not extending onto fin. Pectoral rays typically 16 (apparently unique in this genus). Vertical fins almost unspotted. No spot at anterior base of dorsal. Nuchal filaments 3 or 4. *M. erdmani*
- D'. No dark spot at base of last dorsal spines. Nuchal filaments reduced to 1 or 2. Prepectoral area scaled. *M. macropus*

Detailed consideration of the relationships within this genus must await study of the remaining nominal West Indian forms.

LITERATURE CITED

- HUBBS, CARL L., and KARL F. LAGLER
1947 (and 2d printing, 1949). Fishes of the Great Lakes Region. Bull. Cranbrook Instit. Sci., 26: i-xi+1-186, many figs.
- HUBBS, CLARK
1952 A Contribution to the Classification of the Blennioid Fishes of the Family Clinidae, with a Partial Revision of the Eastern Pacific Forms. Stanford Ichthyol. Bull., 4(2): 41-165, Figs. 1-64, Graphs 1-79, Maps 1-2.
- JORDAN, DAVID S., and BARTON W. EVERMANN
1898 The Fishes of North and Middle America. U.S. Nat. Mus. Bull., 47(3): i-xxiv+2183a-3136.

Submitted for publication November 19, 1956

C. Lavett Smith

PLATE I

Fig. 1: Holotype of *Malacoctenus aurolineatus*; UMMZ 171179, a male 34.8 mm. in standard length.

Fig. 2: Holotype of *Malacoctenus erdmani*; UMMZ 171175, a male 26.5 mm. in standard length.

PLATE I

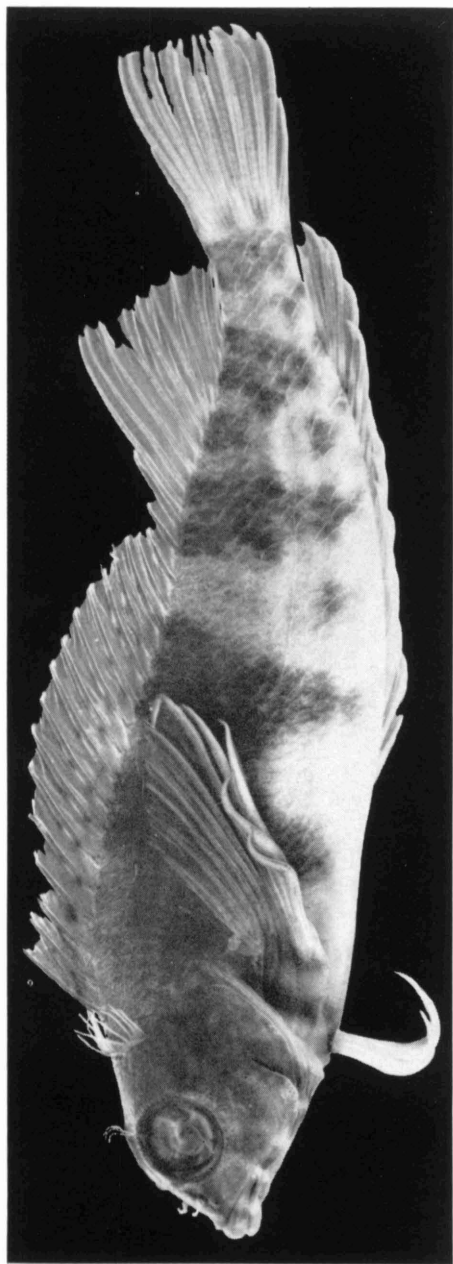


FIG. 1

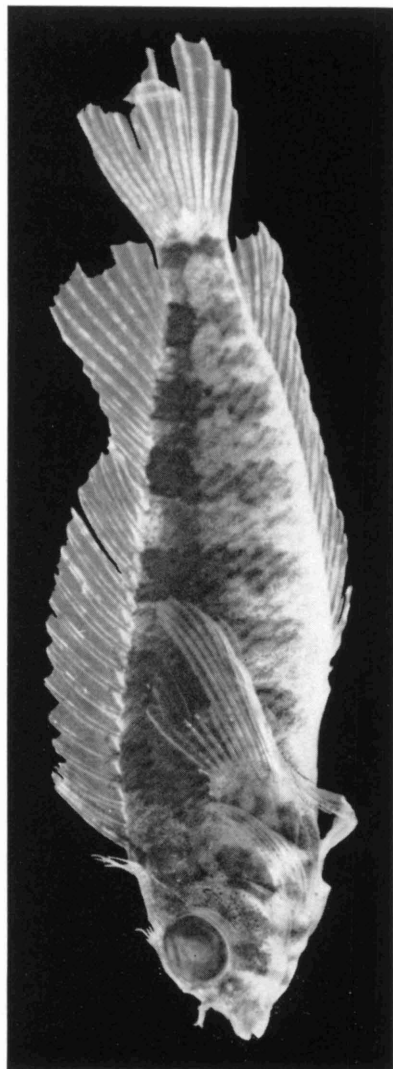


FIG. 2

