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THE CARIBBEAN ATLANTIC BLENNY *LUPINOBLENNIUS DISPAR* (TRIBE: BLENNIINI), WITH OBSERVATIONS ON A PACIFIC POPULATION

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The tropical American monotypic blenniid genus *Lupinoblennius* has apparently been unrecognized in collections since its description (Herre, 1942), and subsequent literature citations are confined to listings by Böhlke (1953) and Springer (1968). Herre's description, based on a single unfigured female, is hardly diagnostic and it is not surprising that this fish has received scant attention. I was first apprised of *Lupinoblennius* by Dr. V. G. Springer while attempting to identify three very similar and troublesome blennies I had collected from Campeche, México and the Pacific coast of Panamá in 1968. These fish generally agreed with much of Herre's description but identification remained doubtful.

In a continuing attempt to identify these specimens and to investigate the status of *Lupinoblennius*, efforts were made to obtain additional material. Search of unidentified blennies in the Smithsonian Institution (USNM) produced several examples from the Caribbean, additional Pacific material was obtained from the University of Miami, Institute of Marine and Atmospheric Sciences (UMML) and I later collected a series of specimens from the Atlantic coast of Guatemala in 1969. Study of this material shows that my original specimens represent a widely distributed Caribbean Atlantic blenny that also occurs, in at least a restricted habitat, on the Pacific coast of Panamá. This sexually dimorphic species exhibits considerable variation in coloration and body proportions but I consider it

FIG. 1. *Lupinoblennius dispar* Herre (GCRL 4278), Atlantic coast of Guatemala. Upper: 27.4 mm SL, male. Lower: 21.8 mm SL, female.

to be conspecific with *Lupinoblennius dispar* Herre. The holotype of *L. dispar* is damaged and in poor condition but it appears to fall within the range of variation observed in present material. The purpose of this report is to redefine and illustrate *L. dispar* and to comment on the Pacific population.

Fin-ray and cirri lengths are measured from the anterior angle of insertion to their distal extremity. Vertebral counts are from radiographs; measurements are in millimeters (mm).

Lupinoblennius dispar Herre

(Figs. 1 and 2)

Blennius sp. Hildebrand, 1939: 30 (Gatun Locks, Atlantic Panamá).
Lupinoblennius dispar Herre, 1942: 302–303 (type locality: English Harbor, Antigua).

Description: Dorsal fin rays XII, 13–14; without prolonged anterior

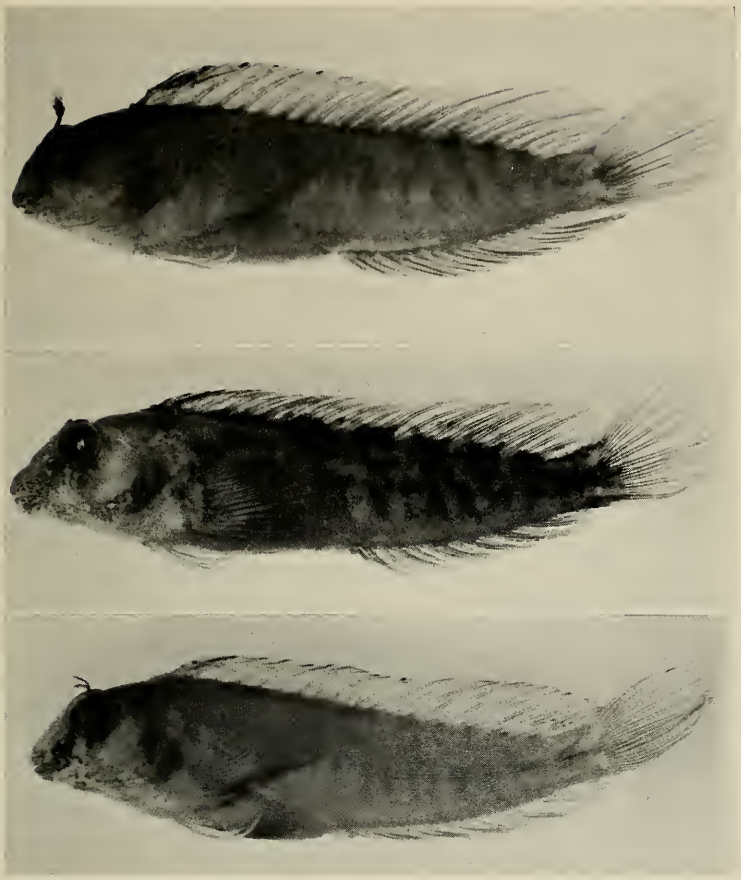


Fig. 2. *Lupinoblennius dispar*, Miraflores Third Lock, Pacific Panamá. Top: 27.2 mm SL, male (UMML 24678). Middle: 32.0 mm SL, female (UMML 24678). Bottom: 21.9 mm SL, female (GCRL 4277).

spines; 1st dorsal spine up to three percent longer than depth of caudal peduncle, 3rd spine slightly longer than the 1st, the 12th spine about equal in length to the 1st but averages 3–5 percent shorter than the 1st segmented ray, the 9th segmented ray is 3–5 percent longer than the 1st; anal fin rays II, 14–16; the 1st segmented ray slightly shorter than the 1st dorsal spine; the posteriormost ray the shortest in both dorsal and anal fins, not divided to base, bound to caudal peduncle by moderately broad membranes, which terminate at or near caudal fin base; pectoral fin rays 12–14 (usually 13); pelvic rays I, 4; segmented caudal rays predom-

TABLE 1. Frequency distribution of dorsal, anal and right pectoral fin rays of Atlantic and Pacific *Lupinoblennius dispar* (*marks holotype).

	Segmented Dorsal Rays		Segmented Anal Rays			Right Pectoral Rays		
Locality	13	14	14	15	16	12	13	14
Atlantic	7*	19	1	12*	12	1	23*	2
Pacific	5	4	1	6	2		9	

inately 13 (14 in two, 15 in one), usually with the middle seven branched, occasionally with one or two middle rays simple and with branched rays above and below, all rays may be simple in 10–14 mm SL juveniles; pseudobranchial filaments 5 (in two); gill rakers on 1st arch 8 (in two); vertebrae $10 + 21 - 22 = 31 - 32$. See Tables 1 and 2 for additional counts and proportional measurements.

Body deep anteriad (averages 24–25 percent of SL at pelvic fin insertion), tapering posteriad to about 9 percent of SL at caudal peduncle; moderately compressed, head breadth at opercle 12–18 percent of SL, breadth at posterior angle of gape about 5–8 percent of SL; mouth small, posterior angle of gape may reach vertical from middle of eye, frequently fails to reach anterior margin of orbit; lips distinct but hardly conspicuous, without free posterior margins across symphyses; anterior naris with a short fragile tube, usually with a small posterior marginal filament; posterior naris a large simple pore with a slightly elevated margin, its diameter about a third greater than that of anterior naris and about 10 in eye diameter; without nuchal cirri; with a single leaflike, simple, supraorbital cirrus over each eye, much the longer and broader in males. Gill opening originates beneath interspace between 2nd and 3rd dorsal spines, above and in advance of the upper pectoral angle; gill membranes united across the isthmus, forming a broad fold with a free posterior margin. Caudal fin subtruncate to broadly rounded; pectoral fin rounded, the 7th–9th rays from the dorsalmost the longest, reaches to or slightly beyond anal fin origin; pelvic spine minute and closely bound to the outer ray, 1st and 3rd rays about 20 percent shorter than the 2nd which is 30–50 percent longer than the 4th.

Lateral line (Fig. 3) somewhat variable both bilaterally and between individuals; usually with a high anterior portion from upper opercular angle to below the 9th or 10th dorsal spine and a separate midlateral portion beginning at or near anal fin origin; anteriorly with a moderately long, pored but unbranched, tubiform segment followed by a series of about four short two-pored tubes; midlateral line usually represented by 5–8 separated, short, two-pored segments, occasionally with one or two short segments between upper and lower portions of lateral line. Head pores single at all positions, distributed as shown in Fig. 3, the paired interorbital pores are slightly offset in some specimens.

TABLE 2. Ranges and means ($\bar{x}$) of selected proportional measurements of the holotype and male and female *Lupinoblennius dispar* from Atlantic and Pacific localities in percent of standard length or head length (*).

	Atlantic					Pacific			
	Holotype	Range	$\bar{x}$	Range	$\bar{x}$	Range	$\bar{x}$	Range	$\bar{x}$
Sex	Female	Male		Female		Male		Female	
Number of specimens		8		11		5		4	
Standard length (mm)	28.2	20.2–35.7	27.3	20.0–30.2	23.3	24.5–31.0	27.3	20.9–32.0	26.4
Caudal fin length	20.9	18.2–23.0	20.6	19.7–22.0	20.7	21.6–24.7	23.5	21.6–23.0	22.1
Caudal peduncle depth	8.5	8.4–9.7	8.9	7.8–9.6	8.7	8.3–9.2	8.9	8.1–9.1	8.6
Depth at anal fin origin	19.5	19.3–21.3	20.7	17.5–22.5	19.8	16.8–20.1	19.2	17.8–20.6	19.5
Depth at pelvic fin insertion	25.9	22.8–28.7	24.8	22.7–25.5	24.2	21.9–24.5	23.0	21.6–23.0	22.5
Predorsal length	28.7	24.0–27.9	25.3	24.0–29.8	27.1	24.2–27.2	25.5	27.2–28.3	27.9
Preanal length	56.0	51.6–59.5	54.5	55.3–60.2	57.1	50.3–54.0	52.0	51.6–55.3	53.0
Pectoral fin length	22.0	20.1–24.4	23.2	19.8–25.1	23.2	23.6–25.4	24.8	23.4–24.9	24.4
Pelvic fin length	–	15.1–19.4	16.8	16.3–19.8	18.1	17.1–19.1	18.1	18.1–18.8	18.6
Length of 1st dorsal spine	–	10.2–11.7	10.9	6.5–10.2	9.1	9.8–13.4	11.6	9.1–10.5	9.8
Length of 3rd dorsal spine	–	11.8–13.1	12.4	10.2–11.9	10.8	12.2–16.1	14.1	11.4–12.5	11.8
Length of 12th dorsal spine	–	8.9–12.3	10.6	7.7–9.3	8.5	10.2–15.2	12.9	9.6–10.9	10.0
Length of 1st dorsal ray	–	12.8–16.0	14.1	11.3–14.6	13.3	14.3–20.5	16.7	13.2–14.4	13.9
Length of 9th dorsal ray	–	14.6–19.9	17.5	15.7–19.2	17.0	18.4–21.9	20.0	17.4–21.4	18.8
Length of 1st anal ray	–	6.3–11.0	9.1	7.6–9.6	8.3	7.6–9.6	8.3	5.2–9.6	7.4
Head length	34.8	29.1–36.5	31.3	28.6–35.5	32.7	29.4–30.4	29.9	31.5–33.0	32.0
Eye diameter*	23.5	20.0–25.7	23.2	21.2–29.8	23.8	23.1–27.3	25.4	21.4–27.3	23.7
Snout length*	30.6	20.0–28.7	23.0	22.4–31.3	24.7	19.8–20.9	20.4	27.5–31.8	29.4
Length of gape*	–	26.2–30.5	27.8	22.0–31.0	27.0	28.6–29.7	29.2	27.3–30.1	28.3
Longest supraorbital cirrus*	13.3	28.6–44.8	35.7	9.0–25.3	12.4	20.9–31.9	26.1	8.7–17.4	14.2

TABLE 3. Comparison of standard length and total number of teeth on premaxillaries and dentaries of Atlantic and Pacific *Lupinoblennius dispar*.

	ATLANTIC			PACIFIC		
Standard length class (mm)	Total teeth on premaxillary	Total teeth on dentary	N	Total teeth on premaxillary	Total teeth on dentary	N
10–14	16–18	16–19	4			
15–19	18	16	1			
20–24	19–24	18–20	9	22–24	19–20	3
25–29	19–24	18–23	6	23–24	18–21	3
30–34	30	24	1	24–29	18–26	3

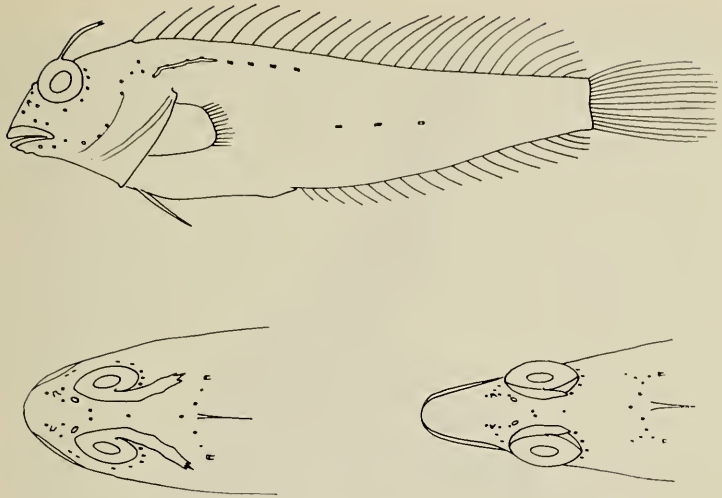


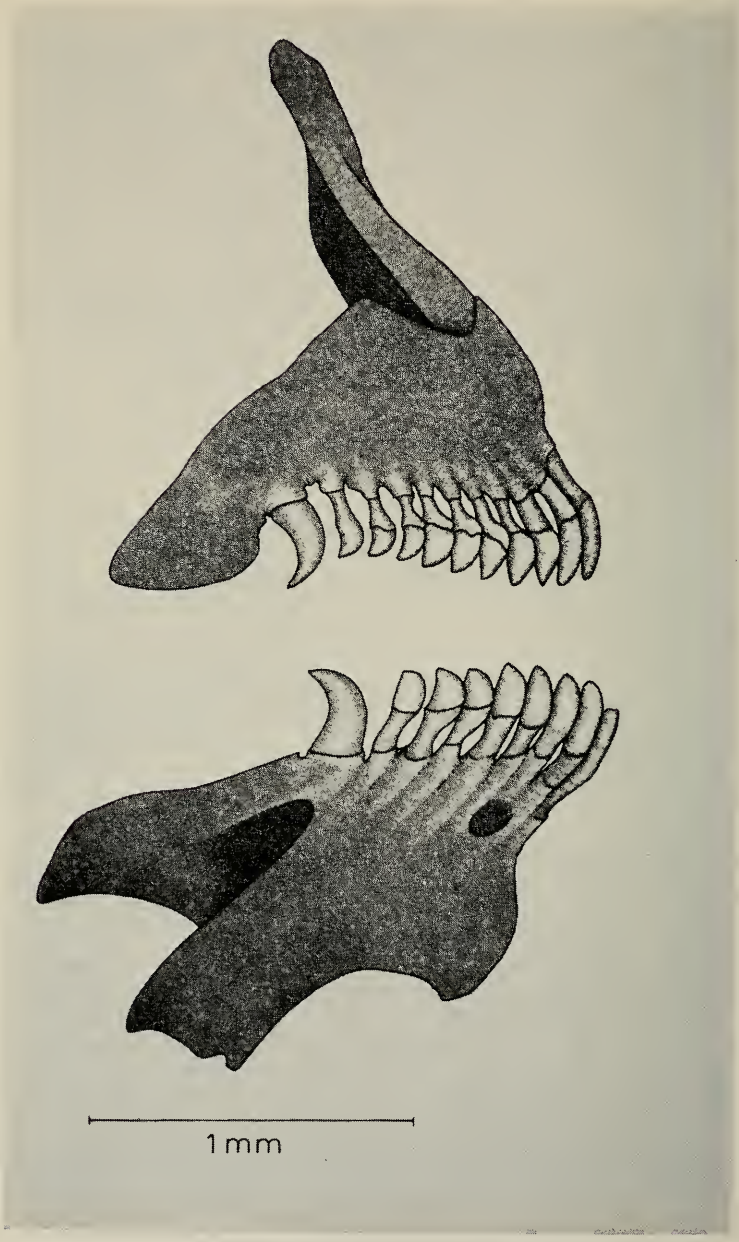
Fig. 3. Semidiagrammatic delineation of lateral line, head pore distribution and head configuration of adult *Lupinoblennius dispar*. Upper: lateral aspect. Lower left: dorsal view of head of 27 mm SL male. Lower right: dorsal view of head of 32 mm SL female.

Snout length averages slightly longer in 20 mm SL and larger females, and the anterior profile of the largest females is somewhat pointed (Figs. 2 and 3), whereas it is generally obtuse in adult males; this is an allometric character that varies considerably with size and between individuals of the same size and sex; no definite difference was noted in snout lengths of males and females less than 16 mm SL.

Teeth in a single series in each jaw, with 16–30 premaxillary teeth and 16–24 teeth on dentary, the number apparently increasing with size (Table 3); males, in some cases at 12 mm SL, with enlarged, recurved, posterior canines in both jaws (Fig. 4); females with smaller but distinct posterior canines on dentary, without enlarged premaxillary canines but frequently with the posteriormost tooth slightly isolated from its fellows; other teeth incisoriform, firmly fixed in jaws, not distinctly depressable.

Circumorbitals 5; vomer edentate; dentaries unsutured at symphysis; epipleurals on 1st through 12th vertebrae, pleural rips on 3rd through 10th; posteriormost dorsal and anal pterygiophores support single fin rays; hypural 5 absent; one epural; ventral hypural plate not fused to urostyle. These observations are from a cleared and stained 20 mm SL female.

Two males, 27 and 36 mm SL, have distinctly enlarged distal fleshy knobs on the anal spines, all but the last two or three anal rays with slightly swollen fleshy knobs which extend well beyond the distal tip


1 mm

of the fin support, the interradial membranes of the anal fin are deeply incised and the dorsal fin membrane, anteriad of the 1st dorsal spine, is broadened and has a distinct basal notch (Figs. 1 and 5). When depressed, the longest supraorbital cirrus of the larger fish just reaches the dorsal fin insertion, its breadth about four in length (4.7 mm) and it is slightly V-shaped in cross section. A 25 mm male has distal modifications of the anal rays but there is no distinct anal spine enlargement and the dorsal membrane modification is just developing. A 36 mm male from Trinidad has a broadened dorsal membrane but lacks anal fin modifications. In juvenile and adult females the 1st anal spine is included within the genital papilla; anal fin rays and anterior dorsal fin membrane are not modified females. Supraorbital cirri lengths of 20 mm SL and larger females are usually about 30–50 percent of that observed in males of similar size; no distinct difference observed in cirri lengths of males and females less than 16 mm SL.

Ground color in alcohol light tan to brown, body shaded with varying concentrations of darker micromelanophores; usually with a dusky bar from anteroventral margin of orbit to upper lip and another, a short distance behind, extending across posterior suborbital; lips and anterior lower jaw with an irregular scattering of small dark brown blotches; frequently with irregular dusky shading on cheek, opercle and predorsal; supraorbital cirri dusky with pale tips in females, dusky with darker margins or black marginal points in males. Lateral body with about eight or nine irregular, frequently interrupted, dark bars; often with pale blotches superimposed on bars so as to form a series of O or U-shaped markings; lateral bars continue a short distance on proximal dorsal fin in some specimens; abdomen, chest and ventral gill membrane dusky to pale, membrane dark spotted in some; micromelanophores on chest continued well forward beneath gill membrane. A dark blotch on membrane between 1st and 2nd dorsal spines, this may extend to the 3rd spine in largest males; membrane on anterior margin of 1st dorsal spine with 1–4 dark brown or black spots; some specimens with interrupted dark streaks edging margin of fin; remainder of dorsal fin light to dusky, shaded with micromelanophores. Anal fin dusky to rather dark brown, tips of fin rays lighter; caudal fin occasionally pale, usually with dusky streaks on interradial membranes; pectoral and pelvic fins pale to dusky, occasionally tipped with dark brown. Large males usually exhibit the darkest overall coloration. Holotype and most other specimens preserved for a number of years are badly faded but spots on the anterior dorsal spine and the blotch on 1st interradial membrane usually persist.

Except where noted, the foregoing description is based on 20–36 mm

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Fig. 4. Right side dentition of 24.2 mm SL *Lupinoblennius dispar* (USNM 44198).

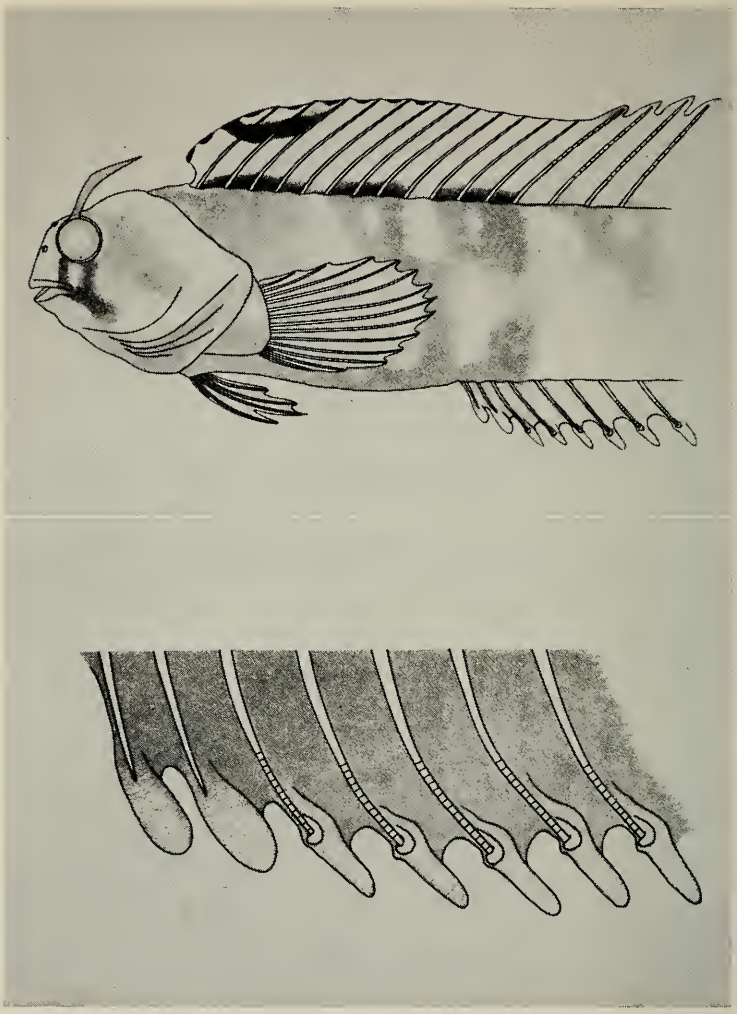

Fig. 5. Semidiagrammatic delineation of adult male *Lupinoblennius dispar*. Upper: Anterior body illustrating basal notch and broadening of anterior dorsal fin membrane, together with general pattern of most distinctive markings. Lower: Detail of anal fin modification.

SL specimens from the Atlantic (Caribbean) coast of Guatemala (GCRL 4278, 4279; USNM 204926).

Pacific Panamanian population.—Dorsal, anal and pectoral rays (Table 1), as well as numbers of vertebrae and principal caudal rays fall within the

observed range of Atlantic material. There are not significant differences in the number of teeth at a given standard length (Table 3) and the shape of both incisoriform and canine teeth agrees with that of Atlantic fish. Proportional measurements (Table 2) suggest that the dorsal fin is slightly higher in Pacific fish and there may be some tendency toward a longer snout in females and shorter supraorbital cirri in males. Pacific specimens are slightly darker in ground coloration but pale individuals occur (Fig. 2) and variations in color pattern are within the range noted for Atlantic fish.

Remarks: The holotype of *Lupinoblennius* has four segmented rays in each pelvic fin rather than two as described, and two anal spines (the 1st included within the genital papilla) rather than one. Due to the poor condition of this specimen, I was unable to satisfactorily confirm the reported absence of canine teeth. The mouth is damaged and a number of teeth, particularly in the lower jaw, are obviously missing. There appear to be about 14 teeth on the left side of the upper jaw and there is no posterior canine. Unilateral absence of the posterior canine was noted on dentaries of four females from both Atlantic and Pacific localities during this study, and it is not unlikely that both canines may be lost or fail to develop in some individuals. The posterior canine in females is not exceptionally enlarged and it may have been present and overlooked in the undamaged holotype. Proportional measurements of the holotype (Table 2) generally fall within the range observed here for Atlantic females and compare favorably with those of similar Pacific specimens. There appears little doubt that present material is conspecific with *L. dispar*, and I find no morphological basis for subspecific separation of Atlantic and Pacific Panamanian populations.

Comparisons: This species is similar to *Blennius nicholsi* Tavolga, 1954 (= *Semablennius gallowayi* Fowler, 1954) in general body configuration, lateral line development, head pore distribution and in having large posterior nares. Snout length is a sexually dimorphic character in each and both inhabit protected estuarine environments. *Lupinoblennius dispar* usually has one less segmented dorsal and anal ray, the supraorbital cirri are larger in both sexes and the 1st dorsal spine of females is about half as long as in female *Blennius nicholsi*. There is no prominent barred color pattern in *B. nicholsi* and mature males develop a very distinctive prolongation of the anterior dorsal fin. These closely related forms are most likely congeneric but, pending revision of the tribe Blenniini, it seems inappropriate to comment further on the systematic status of *Lupinoblennius*.

Atlantic (Caribbean) distribution: This species is now known from Campeche and Yucatan, México, Guatemala, Nicaragua and Panamá as well as from the islands of Jamaica, Antigua and Trinidad.

Discussion of Pacific population: Despite numerous collections by myself and others in likely localities from México to Panamá, *Lupinoblennius dispar* has been found in only one Pacific habitat: the unused

Miraflores Third Lock near the western terminus of the Panama Canal. This unique artificial environment was described by Rubinoff and Rubinoff (1968) in discussing a breeding population of the typically Atlantic euryhaline goby *Lophogobius cyprinoides*. Breeding has not been observed in *Lupinoblennius dispar* but collection of young fish at this locality in both 1967 and 1968 suggests either local breeding or annual recruitment from Atlantic stocks.

Although many of the Blenniini are stenohaline, *L. dispar* is evidently well adapted to low salinity habitats. I have collected specimens from estuarine environments in México and Guatemala and I recorded a surface salinity of 9.7 ‰ in the Third Lock on 6 August 1968. There have apparently been no recent collections from Atlantic Panamá but Hildebrand's specimens (USNM 144798) show that this fish occurred as far inland as the Gatun Locks in 1935. Approximate salinities in the two lower chambers at Gatun ranged from 10–16 ‰ on 10 June 1935 (Hildebrand, 1939).

Rubinoff and Rubinoff (1969) have shown that eggs of the Pacific *Gobiosoma nudum* could survive transport through the freshwater lakes of the Canal and subsequently hatch in Atlantic waters. It is not known whether adult *Lupinoblennius dispar* have traversed the Canal but it is not unlikely that eggs of this species could pass through as ship's fouling and hatch on the Pacific side. As postulated for *Lophogobius cyprinoides* (Rubinoff and Rubinoff, 1968), widespread Pacific distribution of *Lupinoblennius dispar* is probably restricted by the absence of an acceptable unoccupied niche.

Present collections and general observations on the fishes of the Third Lock by Rubinoff and Rubinoff (1968) would indicate a small Pacific population of *L. dispar* but further collecting may eventually prove otherwise. If breeding does not occur in or near the Third Lock, the present collections may represent a significant component of small Atlantic to Pacific recruitments during 1967 and 1968.

Material examined: México: Campeche; GCRL 4276 (2, 21.6–24.7), mangrove slough, about 13 mi E of Champoton, approx. 19°33′30″N, 90°42′W; 13 June 1968; C. E. Dawson. Yucatan; USNM 192398 (1, 25.9), Ascension Bay; 16 April 1960. Guatemala: GCRL 4278 (6, 9.6–27.4), Izabal, Bahia de Matias de Calvez, approx. 15°43′46″N, 88°38′05″W; 28 May 1969; C. E. Dawson. GCRL 4279 (1, 20.4, cleared and stained); USNM 204926 (5, 10.6–35.7), other data as for GCRL 4278. Nicaragua: USNM 44198 (3, 20.2–25.4), Greytown; 3 April 1892; C. W. Richmond. USNM 44198 (1, 24.2, cleared and stained). Jamaica: USNM 131302 (1, 21.7), 1–11 March 1884; ALBATROSS. Antigua: SU 37288 (holotype, 28.2), English Harbor; July 1918; Col. W. K. Fisher. Panamá: USNM 144798 (4, 20.6–30.2), Gatun, lowest chamber of locks; 24 Feb. 1935; S. F. Hildebrand. Trinidad: USNM 163129 (1, 35.6), no other data; 1949; Wm. Beebe.

Pacific.—Panamá: UMML 24678 (8, 20.9–32.0), E of Cocoli, Mira-

flores Third Lock; 17 May 1967; R. S. Birdsong and party. GCRL 4277 (1, 21.9), locality as above; 6 Aug. 1968; C. E. Dawson.

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