Additions to Revisions of the Blenniid Fish Genera *Ecsenius* and *Entomacrodus*, with Descriptions of Three New Species of *Ecsenius*

VICTOR G. SPRINGER

SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 134

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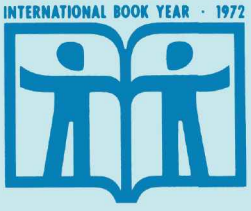

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ABSTRACT

Springer, Victor G. Additions to Revisions of the Blenniid Fish Genera *Ecsenius* and *Entomacrodus,* with Descriptions of Three New Species of *Ecsenius. Smithsonian Contributions to Zoology,* number 134, 13 pages, 3 figures, 1972.–New distribution records and supplemental data on species of *Ecsenius* and *Entomacrodus* are given with reference to recent revisions of these genera by Springer (1967, 1971). Three new species of *Ecsenius* are described and illustrated: *Ecsenius (Ecsenius) collettei,* from New Guinea, *Ecsenius (Ecsenius) fourmanoiri,* from New Caledonia, and *Ecsenius (Ecsenius) trilineatus* from the Banda Sea and New Guinea. A revised key to the species of *Ecsenius* is provided.

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Contents

Additions to Revisions of the Blenniid Fish Genera *Ecsenius* and *Entomacrodus*, with Descriptions of Three New Species of *Ecsenius*

Victor G. Springer

Introduction

The purpose of this paper is to describe three new species of *Ecsenius* McCulloch and to present significant new distributional records and information on species of *Ecsenius* and *Entomacrodus* Gill that have come to my attention since publication of my revisions of these two genera (Springer, 1967, 1971).

In reporting data I have followed the methods used in the two studies mentioned above.

ACKNOWLEDGMENTS.—I wish to extend my appreciation to P. Fourmanoir, New Caledonia, J. E. Randall, Bernice P. Bishop Museum (BPBM), C. R. Robins and W. F. Smith-Vaniz, University of Miami Rosenstiel School of Marine and Atmospheric Sciences (UMML), and J. C. Tyler, Academy of Natural Sciences of Philadelphia (ANSP), for calling my attention to new material and for the loan of specimens.

Other institutional abbreviations used herein are for the National Museum of Natural History, Smithsonian Institution (USNM), Australian Museum, Sydney (AMS), and Museum National d'Histoire Naturelle, Paris (MNHN).

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Genus *Ecsenius* McCulloch

Ecsenius (Anthiiblennius) midas Starck

Six specimens (BPBM 10866, 29.2–67.3 mm SL) collected by J. E. Randall at Ua Pou, Marquesas Islands, represent an eastward range extension of approximately 65° of longitude for this species over that reported by me (1971). The species now has the greatest range of any species of *Ecsenius*, and is the only one known to occur west of Tonga.

I (1971) reported the following caudal vertebral counts for *E. midas*: Red Sea, 27 (4 specimens); Indian Ocean 28–29 (6 specimens); Great Barrier Reef, 27–28 (2 specimens). The Marquesas specimens have 28–29 caudal vertebrae, similar to the Indian Ocean specimens. Apparently, caudal vertebral count is variable with population.

Ecsenius pulcher species group

In the graph showing the relationship between longest caudal fin-ray length as percent standard length against standard length (Springer, 1971: 26, fig. 11), the symbols for males and females were transposed (should be open symbols for females and solid symbols for males), and the open rectangle at coordinates 35 percent, 58 mm, should be solid.

Ecsenius (Ecsenius) yaeyamaensis (Aoyagi)

New locality records for this species are Madang Harbour, New Guinea (USNM 205706, 33.3 mm SL) and Ceylon (USNM 206381, 9 specimens, 21.9–33.4 mm SL; USNM 206382, 16 specimens, 28.5–47.0 mm SL; USNM 206383, 8 specimens, 24.6–31.4 mm SL; and several other uncataloged lots). Both the New Guinea and Ceylon specimens exhibit the most common color pattern for this species (Springer, 1971, fig. 27). Fin-ray, vertebral and tooth counts for these specimens are within the ranges of those I reported.

The Ceylon specimens are of interest because they represent the westernmost records of *E. yaeyamaensis* and the first records from the Indian Ocean. Ceylon is very near Addu Atoll, Maldive Islands, the easternmost known occurrence of the closely related *E. nalolo*. These two species are distinguishable only in that *E. nalolo* has a single dark stripe on the fleshy pectoral fin base and *E. yaeyamaensis* has a Y-shaped mark in the same area. There are no islands between Ceylon and the Maldives, where one might look for transitional populations. Inasmuch as only one specimen of *E. nalolo* is known from the Maldives, additional specimens from that area will be necessary to determine whether a transitional population exists. If so, *E. nalolo* should be recognized only as a subspecies of *E. yaeyamaensis*.

I (1971) reported a single specimen of *E. yaeyamaensis* from the Banda Sea. This specimen had a unique striped pattern (Springer, 1971, fig. 29) not found in the other specimens available to me. Additional material of this striped form from New Guinea, together with a sympatric specimen of *E. yaeyamaensis* with the typical color pattern, has caused me to re-examine the status of the striped form, which I describe below as a new species, *E. trilineatus*.

Ecsenius (Ecsenius) trilineatus, new species

FIGURE 1

Ecsenius yaeyamaensis (Aoyagi).—Springer, 1971:32 [in part].

DESCRIPTION.—Dorsal fin XII, 14–15 (only 1 of 7 specimens XII, 15); anal fin II, 16–17; pectoral fin 13 (1 of 7 specimens with 14 rays on 1 side only); segmented caudal fin rays 13; dorsal procurrent caudal fin rays 6–8; ventral procurrent caudal fin rays 7; total caudal fin elements 26–28; lower jaw incisor teeth 43–46; lower jaw posterior canines 1, each side; vertebrae 10+22–23; epipleural ribs 12–13; lateral line with no paired pores, extending posteriorly to below level of 10th–12th dorsal fin spine; dorsal fin notched eight-ninths to nine-ninths length first dorsal fin ray; third, innermost, pelvic fin ray obvious; one cirrus on rim of each anterior nostril. (For proportions see Table 1.)

COLOR PATTERN (males and females).—Most noticeable mark on head a dark stripe extending from midupper portion of opercle ventroanteriorly to underside of head, ceasing before meeting similar stripe from other side. Discontinuous dark spot may appear anterior to anterior end of stripe. Scattered dark spots present or absent on side of head, other markings on head diffuse, irregular. Three dark, longitudinal stripes on body; dorsalmost beginning

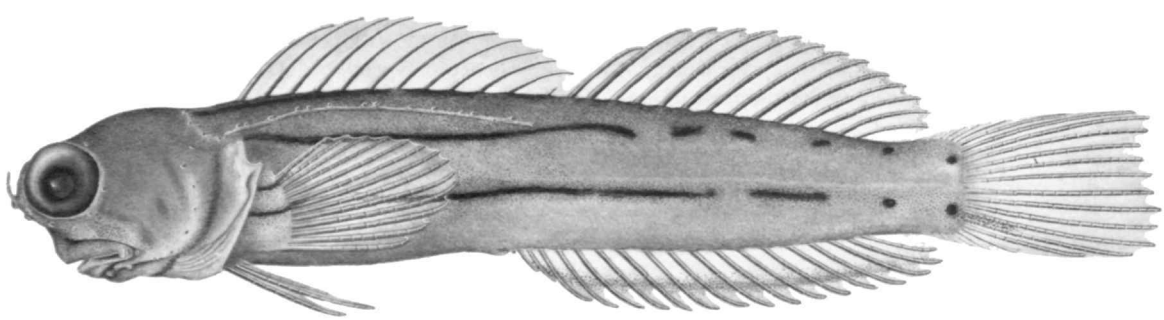


FIGURE 1.—*Ecsenius (Ecsenius) trilineatus*, USNM 202477, male, 26.6 mm SL, Banda Sea. [Drawn by S. L. Chambers.]

TABLE 1.—*Selected counts and measurements (percent SL) from specimens of* Ecsenius trilineatus, *new species*

Characters	*USNM 205705* [1]	*USNM 206378*	*USNM 206378*	*USNM 206378*	*USNM 205703*	*USNM 205704*	*USNM 202477*
Sex	male	male	male	female	male	female	male
Dorsal fin	XII, 14	XII, 14	XII, 14	XII, 15	XII,14	XII, 14	XII, 14
Anal fin	II, 16	II, 17	II, 16	II, 17	II, 16	II, 16	II, 16
Pectoral fins	14–13	13–13	13–13	13–13	13–13	13–13	13–13
Caudal fin rays							
Segmented	13	13	13	13	13	13	13
Dorsal procurrent	8	7	7	7	6	7	–
Ventral procurrent	7	7	7	7	7	7	–
Vertebrae	10+23	10+22	10+22	10+23	10+22	10+22	10+22
Epipleural ribs	13	12	13	13	13	13	–
Mandibular incisors	43	45	44	45	43	44	46
Dorsal fin notch [2]	0	–	9	9	9	–	8
Lateral line [3]	12	12	11	12	10	10	12
Standard length (mm)	25.6	26.2	27.2	26.9	25.9	27.0	26.6
3rd dorsal fin spine	12.9	13.4	13.2	12.4	12.4	11.9	13.2
Last dorsal fin spine	0.8	1.1	0.7	0.7	0.8	0.7	0.8
5th dorsal fin ray	15.6	–	15.1	14.5	–	12.2	13.9
Longest caudal fin ray	22.6	22.9	22.0	22.3	23.2	20.0	22.6
Nasal cirrus	3.1	3.4	2.9	3.0	3.9	2.2	2.3

[1] Holotype.
[2] Given as nearest ninth of first segmented dorsal fin ray length.
[3] Given as dorsal fin spine under which lateral line terminates.

just anterior to dorsal fin origin, continuing on dorsal body contour, ending in region of anterior third of rayed portion of dorsal fin; middle stripe beginning at dorsal end of gill opening, continuing to caudal fin base; posterior third of middle stripe usually appearing as series of dark dashes and spots with diffuse extension of posteriormost spot onto caudal fin rays; ventralmost stripe beginning in area covered by appressed pectoral fin, continuing posteriorly similarly to middle stripe. One specimen exhibited about nine diffusely dusky, vertical bands crossing stripes. Fleshy pectoral fin base with two short stripes, which may extend onto fin rays basally; stripes separate for entire length. Posterior portion of dorsal fin with dusky distal edging. Anal fin with narrow subterminal dark or dusky stripe over entire length; other fins, except as noted, immaculate or bearing diffusely dusky marks.

RELATIONSHIPS.—*E. trilineatus* is a member of the *E. yaeyamaensis* species group, and appears to belong to the *E. oculus* subgroup (see relationships under *Ecsenius fourmanoiri*). *E. trilineatus* keys closest to *E. oculus* and *E. yaeyamaensis* in my 1971 key (Springer, 1971:10–12). It can be differentiated from both of these species by the presence of two nonconverging stripes on the fleshly pectoral fin base. To determine that the two stripes are separate for their entire lengths may necessitate raising the gill cover, which overlaps the anterior end of the fin base.

REMARKS.—In the material list for *E. yaeyamaensis* (see Springer, 1971:33), I reported on a single poorly preserved specimen, now identifiable as *E. trilineatus*, from the Banda Sea. While I noted that the color pattern of this specimen was different from all other specimens of *E. yaeyamaensis* I believed that it probably represented only a variant population of that species. In one of the New Guinea collections made by B. B. Collette both *E. yaeyamaensis* and *E. trilineatus* were taken together, thus providing evidence that the two forms represent different species. The locality, Banda Sea, was tentatively assigned the specimen of *E. trilineatus* based on information provided in the appendix to my paper. The new material of *E. trilineatus* from the Trobriand Islands and Madang

Harbor, New Guinea, near the Banda Sea, provides evidence in support of the Banda Sea locality (on my 1971 distribution map, figure 2, the symbol for *E. yaeyamaensis* in the Banda Sea refers to the Banda Sea specimen of *E. trilineatus*).

HOLOTYPE.—USM 205705, male, 25.6 mm SL, New Guinea, Trobriand Islands, off Towai Pt., NW pt. Kiriwina Island, 0–7.6 m, collected by B. B. Collette, et al., 8 June 1970.

PARATYPES.—USNM 206378, 2 males and female, 26.2–27.2 mm SL, taken with the holotype; USNM 205703, male, 25.9 mm SL, Briwadi Island, Trobriand Islands, 1.5–7.6 m, collected by B. B. Collette, et al., 9 June 1970; USNM 205704, female, 27.0 mm SL, Massas Island, Madang Harbor, New Guinea, 10.7–13.7 m, collected by B. B. Collette, et al., 26 May 1970; USNM 202477, male, 26.6 mm, presumably Banda Sea (Banda or Amboina), collected by W. H. Longley.

ETYMOLOGY.—Named *trilineatus* in reference to the characteristic three longitudinal stripes on the body.

ADDITIONAL MATERIAL.—A single specimen, BPBM 12122, male, 26.2 mm SL, from Efate, New Hebrides, is tentatively identified as *E. trilineatus*. This specimen differs somewhat in color pattern from that described for the typical specimens. Dusky spots are present anteriorly in the position of the two ventral body stripes. The spots intensify posteriorly and are similar to those in typical specimens. The two stripes on the pectoral fin base and the stripe on the opercle are only diffusely represented, but are identifiable. There is a narrow dusky stripe running most of the length of the dorsal fin just distal to the base of the fin, and there is a distal dusky edging on the rayed portion of the fin. Other markings and characters (meristic, proportional, qualitative) are closely similar to those of the typical specimens. In view of the differences noted I hestitate to designate this specimen as a paratype of *E. trilineatus*.

Ecsenius (Ecsenius) oculus Springer

Recent collections from the Trobriand Islands, New Guinea (USNM 206431, 9 specimens, 26.6–37.1 mm SL), and Viti Levu, Fiji (BPBM 11270, 3 specimens, 34.2–44.5 mm SL) represent noteworthy new locality records for this species. Both localities are west of the Andesite Line, which I considered as the eastern distribution limit for the species. The localities are both from south of the equator, from where I had few specimens, and counts for segmented dorsal and anal fin rays, caudal vertebrae, and dentary incisor teeth fit well into the clinal pattern (see Springer, 1971:61, table 18). The counts for the recent material are as follows:

Locality	*Dorsal rays*		*Anal rays*		*Caudal vertebrae*			*Incisor teeth*				
	13	*14*	*15*	*16*	*21*	*22*	*23*	*50*	*51*	*52*	*53*	*54*
New Guinea	9	–	9	–	1	7	–	5	1	2	–	1
Fiji	–	3	–	3	–	–	3	–	2	–	–	1

Color pattern for the Fijian specimens is most similar to that which I reported for New Hebrides specimens: dorsal and ventral rows of dark spots are present on the body. The ventral row of spots is absent in the New Guinea specimens and the dorsal row is on the dorsal body contour, almost forming saddles as I described for the single Palau Island specimen.

Ecsenius (Ecsenius) opsifrontalis Chapman and Schultz

Three specimens, ANSP 114789, 25.5–39.1 mm SL, collected at a depth of 24.4–27.4 m, northern Escape Reef, Great Barrier Reef, represent an important range extension for this species. These specimens represent the first records of *E. opsifrontalis* from west of the Andesite Line, which I (1971:8) believed to be the western distribution limit of this species. The range of *E. opsifrontalis* is now known to overlap that of its closest relative, *E. oculus*, which is known only from areas west of the Andesite Line. All specimens of *E. opsifrontalis* reported by me (1971:37) were collected from shallow depths, less than 8 m.

The present specimens all have 14 segmented dorsal fin rays (an exceptional count for other specimens); two have 16 and one has 17 segmented anal fin rays (16 is an exceptional count for other specimens and none have as many as 17); and two have 10+22 and one has 10+23 vertebrae (10+22 is the modal count for the other specimens and none have as many as 10+23).

Ecsenius (Ecsenius) fourmanoiri, new species

FIGURE 2

DESCRIPTION.—Dorsal fin XII, 14–15; anal fin II, 17; pectoral fin 13; segmented caudal fin rays 13; dorsal procurrent caudal fin rays 7–8; ventral procurrent caudal fin rays 6–7; total caudal fin elements 26–28; lower jaw incisor teeth 47; lower jaw posterior canines 1, each side; vertebrae 10+23; epipleural ribs 12–13; lateral line with no paired pores, extending posteriorly to below level of 10th–12th dorsal fin spine; dorsal fin notched seven-ninths to eight-ninths length of first dorsal fin ray; third, innermost pelvic fin ray obvious; one cirrus on rim of each anterior nostril. (For proportions see Table 2).

COLOR PATTERN (males only known).—Dark stripe extending from posterior margin of eye along body to well out on caudal fin. Dark stripe beginning along anterior dorsal body contour, extending posteriorly into basal portion of rayed portion of dorsal fin. Dark stripe on lower side of body beginning in area below midspinous dorsal fin, extending posteriorly well out on caudal fin where it and stripe just dorsal to it coalesce. About 7–10 slender, vertical, dusky bars connecting longitudinal stripes on body, resulting in segregation of pale spots on side of body. Dark stripe on fleshy pectoral fin base extending onto basal portion of pectoral fin rays. Dark stripe margining opercle, continuing ventroanteriorly, meeting similar stripe from other side on ventral side of head. Dark spot anteriorly on underside of lower jaw. Anal fin with broad dark stripe extending entire fin length; anal fin immaculate basally.

RELATIONSHIPS.—*Ecsenius fourmanoiri* is a member of the *yaeyamaensis* species group (Springer, 1971:13). Within this group it appears to be most closely related to the species of the *oculus* subgroup comprising *E. oculus, E. opsifrontalis,* and *E. trilineatus. E. fourmanoiri* is somewhat intermediate between *E. oculus* and *E. opsifrontalis. E. oculus* has two dark spots on the body at the caudal fin base. The spots decrease in intensity as they extend out on the caudal fin (Springer, 1971, fig. 13). *E. fourmanoiri* has the two main body stripes intensifying slightly at the caudal fin base and decreasing in intensity as they extend onto the caudal fin. Because of this color pattern *E. fourmanoiri* could possibly key to *E. oculus* in my 1971 key. The spots on the caudal fin base and fin are at best faintly represented in *E. opsifrontalis* and are

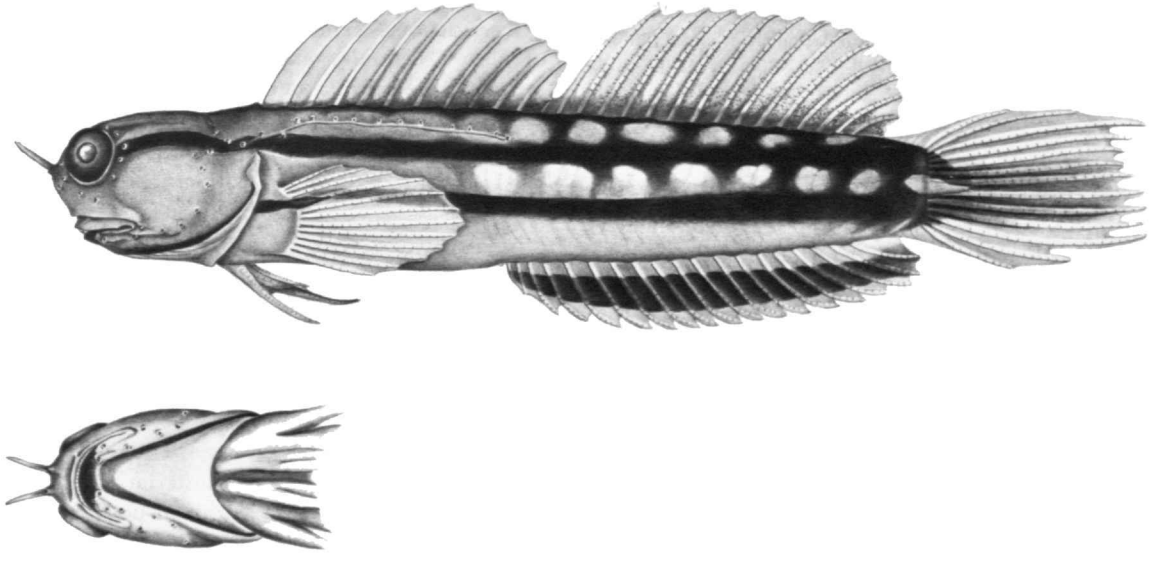


FIGURE 2.—*Ecsenius (Ecsenius) fourmanoiri*, BPBM 11416, holotype, male, 48.8 mm SL, New Caledonia (insert shows ventral view of head). [Drawn by J. R. Schroeder.]

TABLE 2.—*Selected counts and measurements (percent SL) from specimens of* Ecsenius fourmanoiri, *new species*

Characters	*BPBM 11416*[1]	*USNM 206456*	*MNHN 1971–134*	*MNHN 1971–134*
Sex	male	male	male	male
Dorsal fin	XII, 15	XII, 15	XII, 15	XII,15
Anal fin	II, 17	II, 17	II, 17	II, 17
Pectoral fins	12–13	13–13	13–13	13–13
Caudal fin rays				
Segmented	13	13	13	13
Dorsal procurrent	7	8	7	8
Ventral procurrent	6	7	6	7
Vertebrae	10+23	10+23	10+23	10+23
Epipleural ribs	12	13	13	13
Mandibular incissors	47	47	47	47
Dorsal fin notch[2]	8	8	8	7
Lateral line[3]	11	12	12	10
Standard length (mm)	48.8	39.4	44.3	39.8
3rd dorsal fin spine	13.5	15.2	15.8	15.6
Last dorsal fin spine	1.0	1.5	1.4	2.3
5th dorsal fin ray	16.0	16.0	16.9	16.8
Longest caudal fin ray	24.6	26.4	24.9	25.6
Nasal cirrus	4.9	5.6	4.7	4.0

[1] Holotype.

[2] Given as nearest ninth of first segmented dorsal fin ray length.

[3] Given as dorsal fin spine under which lateral line terminates.

faintly to well represented, but relatively smaller, in *E. trilineatus*. The striped and barred color pattern of *E. fourmanoiri* is different from the dark spotted pattern of *E. oculus* and the striped pattern of *E. trilineatus*, but is very similar to, although much more strongly emphasized than, that found in *E. opsifrontalis* (Springer, 1971, fig. 32). The discrete stripe on the fleshy pectoral fin base of *E. fourmanoiri* is absent in *E. opsifrontalis* and only diffusely represented in some specimens of *E. oculus*. *E. trilineatus* has two stripes on the fleshy pectoral fin base. The four species agree in having a deeply notched dorsal fin, greatly reduced 13th dorsal fin spine and a relatively far posterior termination of the lateral line.

Aside from color pattern, *E. fourmanoiri* differs from *E. oculus* and *E. trilineatus* in having fewer teeth (in 47 available specimens of *E. oculus*, mandibular tooth counts ranged from 47–64, with only one specimen having 47 teeth; tooth counts in *E. trilineatus* range from 43–46 and in *E. opsifrontalis* from 43–50). It differs from *E. opsifrontalis* in having 33 vertebrae (31–32, rarely 33, in *E. opsifrontalis*) and 17 anal fin rays (14–16, rarely 17, in *E. opsifrontalis*), and from *E. trilineatus* in having a longer nasal cirrus (2.2–3.9 percent SL in *E. trilineatus*). Although there are too few specimens of *E. trilineatus* available to conclude definitely, it appears that *E. trilineatus* and *E. opsifrontalis* attain a much smaller maximum size than do the other two species (*E. oculus*, 53.8 mm; *E. opsifrontalis*, 39.1 mm; *E. fourmanoiri*, 48.8 mm; *E. trilineatus*, 27.0 mm).

HOLOTYPE.—BPBM 11416, male, 48.8 mm SL, New Caledonia, outside barrier reef off Noumea, 1 km NW of Dumbea Pass, rotenone at 15.1–18.3 m, collected by J. E. Randall, et al., 14 August 1971.

PARATYPES.—USNM 206456, male, 39.4 mm SL, collected with the holotype; MNHN 1971–134, 2 males, 39.8–44.3 mm SL, near locality of holotype, but depth 5 m, collected by M. Michel, 22 May 1971.

ETYMOLOGY.—Named in honor of P. Fourmanoir of New Caledonia, who obtained the first specimens of the species and recognized that it was undescribed.

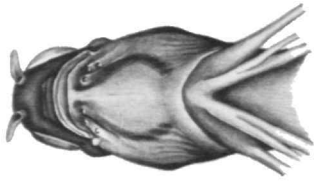
Ecsenius (Ecsenius) collettei, new species

FIGURE 3

DESCRIPTION.—Dorsal fin XII, 14–15; anal fin II, 16; pectoral fin 13; segmented caudal fin rays 13; dorsal procurrent caudal fin rays 7–8; ventral procurrent caudal fin rays 7–8; total caudal fin elements 27–28; lower jaw incisor teeth 45–50; lower jaw posterior canines 1, each side; vertebrae 10+21–22; epipleural ribs 12–14; lateral line with no paired pores, extending posteriorly to below 8th–10th dorsal fin spine; dorsal fin notched eight-ninths to nine-ninths length first dorsal fin ray; third, innermost, pelvic fin ray varying from obvious to reduced and obscured; one cirrus on each anterior nostril. (For proportions see Table 3.)

COLOR PATTERN (males and females).—Side of head with one or two small dark spots near posterior margin of orbit, larger spot on dorsal portion of opercle; underside of head plain dusky or with two elongate, curved dark marks, each with or without slightly disjunct dark spot just anterior. Sides of body with two longitudinal rows of dark spots, 10–11 spots in upper row, 6–9 in lower row; rows may continue to caudal base or terminate on caudal peduncle with dark spot at midcaudal base between rows. Fleshy pectoral fin base dusky dorsally, paler ventrally. Rayed portion of dorsal fin with suprabasal dusky stripe; other fins varying from immaculate to dusky.

RELATIONSHIPS.—*Ecsenius collettei* is a member of the *prooculis* subgroup of the *yaeyamaensis* species group (Springer, 1971:13). The four species of this subgroup *(E. prooculis, E. biamaculatus, E. bandanus, E. collettei)* differ from each other only in particulars of their strikingly different color patterns (see key; the three previously described species are illustrated in Springer, 1971, figs. 33–35).



REMARKS.—In my discussion of the species of the *prooculis* subgroup (Springer, 1971:39) I noted that the distribution of the three species then known correlated well with zoogeographic patterns exhibited by terrestrial organisms, based on the biogeographical subdivisions of the islands of the tropical western Pacific Ocean (Thorne, 1963:322). I predicted that additional species in the *prooculis* subgroup could be expected if the distributions of the three known species were indicative. The distribution of *E. collettei* furnishes additional support for Thorne's subdivisions. *E. collettei* occurs in the Papuan Province of the Papuan Subregion of the Oriental Region.

In breaking the Oriental (tropical) Region of the western Pacific into separate biotic areas, Thorne divided the region into subregions, provinces, and districts. Not all provinces were broken into districts. The four species of the *prooculis* subgroup occur in three different subregions. *E. bandanus* and *E. collettei* occur in different provinces of one subregion (no districts indicated for the provinces); *E. prooculis* occurs in both the districts of one province of another subregion; and *E. bimaculatus* occurs in one of the four districts of one of the provinces of the third subregion. Based on the fact that there remain other subregions, provinces and districts from which no member of the *prooculis* subgroup is known, one can continue to expect undescribed species of the subgroup to appear in the future.

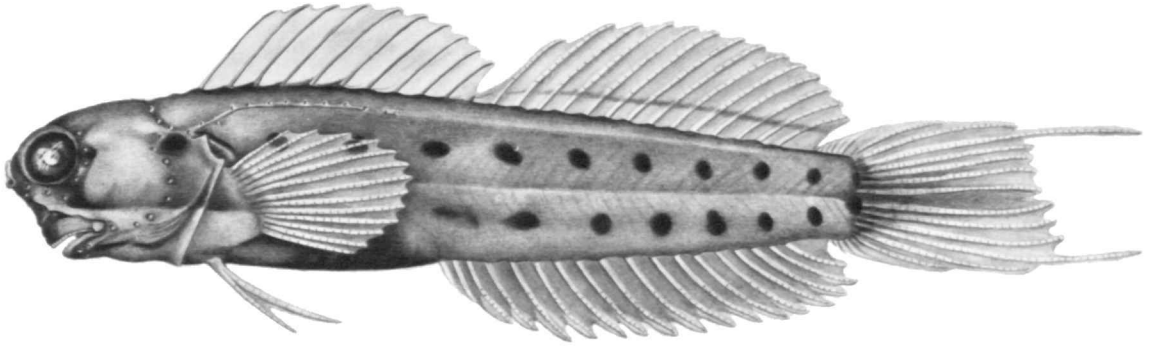


FIGURE 3.—*Ecsenius (Ecsenius) collettei*, USNM 206380, male, 33.0 mm SL, Krankett Island, Madang Harbour, New Guinea (insert shows ventral view of head). [Drawn by J. R. Schroeder.]

TABLE 3.—*Selected counts and measurements (percent SL) from specimens of* Ecsenius collettei, *new species*

Characters	*USNM 206379*[1]	*USNM 206380*	*USNM 205701*	*USNM 205702*	*USNM 205702*
Sex	male	male	male	female	male
Dorsal fin	XII, 14	XI, 14	XII, 15	XII, 14	XII, 14
Anal fin	II, 16	II, 16	II, 16	II, 16	II, 16
Pectoral fins	13–13	13–13	13–13	13–13	13–13
Caudal fin rays					
Segmented	13	13	13	13	13
Dorsal procurrent	7	8	7	8	7
Ventral procurrent	7	8	7	7	7
Vertebrae	10+22	10+21	10+22	10+22	10+21
Epipleural ribs	14	14	13	13	12
Mandibular incisors	49	48	45	46	50
Dorsal fin notch[2]	8	8	8	9	8
Lateral line[3]	8	8	8	8	10
Standard length (mm)	29.7	33.0	21.6	29.7	31.7
3rd dorsal fin spine	15.5	14.2	15.3	13.5	16.1
Last dorsal fin spine	2.0	1.2	3.2	1.3	1.9
5th dorsal fin ray	18.8	18.2	16.7	14.8	18.3
Longest caudal fin ray	47.0	37.6	25.6	20.5	29.3
Nasal cirrus	1.0	2.1	2.8	1.7	1.9

[1] Holotype.
[2] Given as nearest ninth of first segmented dorsal fin ray length.
[3] Given as dorsal fin spine under which lateral line terminates.

HOLOTYPE.—USNM 206379, male, 29.7 mm SL, New Guinea, bay in Krankett Island, Madang Harbour, 1.6–8.2 m, collected by B. B. Collette, et al., 30 May 1970.

PARATYPES.—USNM 206380, male, 30.0 mm SL, taken with the holotype; USNM 205701, male, 21.6 mm SL, New Guinea, south end of Beliau Island, Madang Harbour, New Guinea, 0–6.6 m, collected by B. B. Collette, et al., 22 May 1970; USNM 205702, male and female, 29.7–31.7 mm SL, New Guinea, inlet on harbor side of Krankett Island, 0–3.3 m, collected by B. B. Collette, et al., 23 May 1970.

ETYMOLOGY.—Named for Bruce B. Collette, whose New Guinea collections of fishes provided many important blenniid specimens, including those described above.

Revised Key to the Subgenera and Species of *Ecsenius*

1. Anterior canines in lower jaw obvious, more than twice size of adjacent incisoriform teeth; total incisoriform teeth + anterior canines in lower jaw 13–16; total teeth in upper jaw 26–34; caudal forked (Springer, 1971, fig. 12); mid-predorsal pore of supratemporal series in advance of level of posterior orbital margin; pseudobranchial filaments 6–12; dorsal + ventral procurrent caudal rays 18–20; epipleural ribs 22–25; postcleithra consisting of two well-separated ossifications, dorsalmost much reduced (subgenus *Anthiiblennius*) ..... ***E. midas*** (Red Sea, Indian Ocean, Pacific)

   Anterior canines in lower jaw rarely obvious, when obvious only slightly larger than adjacent incisoriform teeth; total incisoriform teeth + anterior canines in lower jaw 30–64; total teeth in upper jaw 97–148; caudal not forked, but often with produced rays on dorsal and ventral lobes (Springer, 1971, figs. 15, 19, 20); mid-predorsal pore of supratemporal series well posterior to level of posterior orbital margin; pseudobranchial filaments 5–8 (rarely 8); dorsal + ventral procurrent rays 10–18; epipleural ribs 11–17; postcleithra consisting of two subequal articulating ossifications (subgenus *Ecsenius*) 2

2. Total posterior canines in lower jaw 7-15 (2–8 on each side) ..... ***E. mandibularis*** (eastern Australia)
   Total posterior canines in lower jaw 0–3 (usually 1 on each side) 3
3. Segmented dorsal rays 12–15; segmented anal rays 13–17; vertebrae 29–33 4
   Segmented dorsal rays 15–20 (only 2 of 252 specimens of *bicolor* with 15); segmented anal rays 17–23 (only 1 of 258 specimens of *E. bicolor* with 17); vertebrae 33–39 (2 of 4 specimens of *stigmatura* and 9 of 234 specimens of *E. bicolor* with 33) 14
4. Dark spot extending well anteriorly from anus (Springer, 1971, fig 26); dorsal fin notched three-ninths to five-ninths length of first dorsal ray; last dorsal spine 6 to 10 percent SL; incisoriform teeth in lower jaw 30–37; segmented anal rays 13–14; caudal vertebrae 19–20; total vertebrae 29–30 ..... ***E. lividinalis*** (Pacific)
   No dark spot extending anteriorly from anus (occasionally black lining of gut protrudes slightly through anus giving appearance of dark ring); dorsal fin notched seven-ninths to nine-ninths length of first dorsal ray; last dorsal spine 0.4–3.1 percent SL (one specimen of 35 of *E. oculus* had length 4.6 percent); incisoriform teeth in lower jaw 41–64; segmented anal rays 14–17 (1 of 45 specimens of *E. opsifrontalis* with 14); caudal vertebrae 21–23; total vertebrae 31–33 5
5. Two dark spots, more than half orbital diameter, at caudal fin base extending with little, if any, decrease in intensity well out on caudal fin (Springer, 1971, fig 31) ..... ***E. oculus*** (Pacific)
   Dark spots at caudal fin base, if present, smaller than half orbital diameter, decreasing greatly in intensity if extending on caudal fin (two dark body stripes of *E. fourmanoiri* extend well out on caudal fin without decreasing in intensity) 6
6. Fleshy pectoral fin base marked with distinct dark bar, stripes or Y-shaped mark 7
   Fleshy pectoral fin base variably dusky, without distinct dark marks or stripes 10
7. Fleshy pectoral fin base with a single dark stripe 8
   Fleshy pectoral fin base with two dark stripes or dark Y-shaped mark 9
8. Segmented anal fin rays 17; color pattern on body consists of lengthwise dark stripes and vertical dark or dusky bars ..... ***E. fourmanoiri,*** new species (New Caledonia)
   Segmented anal fin rays 14–17 (17 in less than 2 percent of specimens); color pattern on body consists of pale spots on dusky background; some dark lengthwise marks on body in region of pectoral fin ..... ***E. nalolo*** (Red Sea, Indian Ocean)
9. Fleshy pectoral fin base with two more or less parallel, dark stripes; side of body with two parallel dark stripes anteriorly continuing as rows of spots or dashes posteriorly; third dark stripe variably present anteriorly on dorsal body contour; dorsal fin notched more than eight-ninths length of first dorsal segmented ray; last dorsal spine less than 1.2 percent SL ..... ***E. trilineatus,*** new species (Banda Sea, New Guinea)
   Fleshy pectoral fin base with Y-shaped dark mark; body marked variably, without distinct dark stripes; dark spots when present posteriorly not continuous from dark marks anteriorly on body; dorsal fin notched seven-ninths to eight-ninths length of first dorsal segmented ray; last dorsal spine usually more than 1.9 percent SL ..... ***E. yaeyamaensis*** (Indian Ocean, Pacific)
10. Lateral line extending posteriorly to below level of 11th–12th (usually 12th) dorsal fin spine; segmented dorsal fin rays 13–14; segmented anal fin rays 14–17 (usually 15 or 16); nasal cirrus 2.3–5.9 percent SL ..... ***E. opsifrontalis*** (Pacific)
    Lateral line extending posteriorly to below level of 8th–10th (rarely 10th) dorsal fin spine; segmented dorsal fin rays 14–15 (usually 14); segmented anal fin rays 15–16 (usually 16); nasal cirrus 1.1–1.9 percent SL 11
11. Body with two longitudinal rows of dark spots on each side ..... ***E. collettei,*** new species (New Guinea)
    Body variably marked; plain, with only two dark spots, or with alternating pale and dark stripes 12
12. Two dark spots on side of body in area covered by appressed pectoral fin ..... ***E. bimaculatus*** (Borneo)
    Body without dark spots 13
13. Body with alternating dark and pale stripes ..... ***E. prooculis*** (New Georgia, New Britain)
    Body without distinct marks ..... ***E. bandanus*** (Banda Sea)

14. Dark spot extending anteriorly from anus (Springer, 1971, figs. 24–25); dark stripe originating at ventral margin of orbit extending posteriorly across head ... ***E. stigmatura*** (Pacific)
No dark spot in region of anus; dark stripe extending posteriorly across head, if present, originating at mid-postorbital level ... 15
15. Anterior nostril with cirri on both anterior and posterior margins; segmented caudal rays 14 (rarely 13); lateral line usually with several vertical pairs of pores beginning anteriorly ... 16
Anterior nostril with cirrus on posterior margin only; segmented caudal rays 13 (rarely 14 in *E. frontalis* and in some juveniles of other species under 25 mm SL); lateral line of simple pores only (rarely with a vertical pair at origin) ... 17
16. Dorsal rays 15–18; dorsal fin notched two-ninths to seven-ninths length of first dorsal ray (usually four-ninths or more); last dorsal spine 2.5–6.9 percent SL; lateral line with vertical pairs of pores for one-third to all its length (rarely less than one-half); a dark spot on paler background on anterior dorsal fin; pseudobranchial filaments usually 6; upper nasal cirrus length usually more than 4.9 percent SL ... ***E. bicolor*** (Pacific and Indian Oceans)
Dorsal rays 18–20 (rarely 18); dorsal fin unnotched; last dorsal spine 11.0–15.9 percent SL; lateral line with vertical pairs of pores, if present, rarely occupying more than anterior two-fifths its length; dorsal fin entirely black, occasionally with some obscure longitudinal stripes anteriorly; pseudobranchial filaments usually 7; upper nasal cirrus length not more than 4.8 percent SL ... ***E. namiyei*** (Pacific)
17. Dorsal fin without a notch; last dorsal spine 10.7–20.8 percent SL; pectoral rays 14–16 (14 in 5 of 89 specimens) ... ***E. frontalis*** (Red Sea; Gulf of Tadjourah; see Springer, 1971:15–20, for distinct color pattern forms.)
Dorsal fin with a notch; last dorsal spine 2.2–7.0 percent SL; pectoral rays 13–15 (15 in 5 of 87 specimens) ... 18
18. Dorsal spines 12; pectoral rays 13 (14 in 1 of 12 specimens); body at about midlevel with a longitudinal dark stripe, either continuous or as a series of dark bars, extending length of body and entering caudal fin basally ... ***E. lineatus*** (Pacific and Indian Oceans)
Dorsal spines 12–14 (12 in 9 of 201 specimens); pectoral rays 13–15 (13 in 2 of 176 specimens); body without a broad dark stripe (occasionally with a slender stripe on dorsal fourth of body, ceasing well anterior to caudal base) ... 19
19. Mid-distal half of at least spinous dorsal fin black or with black spots in interradial membrane; dorsal and ventral lobes of caudal fin darker than remainder; usually several small dark spots on posterior third of body; usually a narrow, black longitudinal stripe on dorsoanterior portion of body ... ***E. gravieri*** (Red Sea; Bay of Tadjourah)
Mid-distal half of dorsal fin not noticeably marked; dorsal and ventral lobes of caudal not darker than remainder of caudal; no black spots or longitudinal stripes on body (body uniformly dark, with a dark spot at caudal base, or with posterior half pale with irregular, vertical dark bars) ... 20
20. Dorsal rays 17 or 18; anal rays 19 or 20; nasal cirrus 1.0–3.9 percent SL; dorsal fin notched seven-ninths to nine-ninths (usually eight-ninths) length of first dorsal ray, body uniformly dark with a darker spot at caudal base ... ***E. aroni*** (Red Sea)
Dorsal rays 18–20; anal rays 19–23 (rarely 19 or 20); nasal cirrus 3.0–7.9 percent SL; dorsal fin notched five-ninths to eight-ninths (rarely eight-ninths) length of first dorsal ray; body uniformly dark or posterior half pale with vertical dark bars ... ***E. pulcher*** (Persian Gulf and northern Arabian Sea)

Genus *Entomacrodus* Gill

Entomacrodus decussatus (Bleeker)

Salarias kikaiensis Aoyagi (1954) is a junior synonym of *E. decussatus* that I missed in my *Entomacrodus* revision (Springer, 1967). Although the location of the holotype is unknown, Aoyagi's illustration of the species is adequate for identification. The type-locality of *S. kikaiensis,* Kikai Island, Riu Kiu Islands, represents a northward range entension for *E. decussatus,* which I previously reported only from as far north as the Philippine Islands (Springer, 1967, fig. 5). There are also a considerable number of uncataloged USNM specimens of *E. decussatus* from Taiwan and Okinawa

(also Riu Kiu Islands, but south of Kikai).

Seven specimens of *E. decussatus* (AMS I.11810–12, 6 specimens, 46.5–96.0 mm SL; AMS I.11972, 129 mm SL) from Murray Island, Torres Strait, represent a new locality record of interest for the species. Murray Island is about midway in the wide distribution gap between the eastern and western populations of *E. decussatus* (Springer, 1967, fig. 5). The island also indicates the possible pathway by which the Pacific Ocean populations of *E. decussatus* invaded western Australia (Indian Ocean). *E. decussatus* is otherwise known only from the Pacific Ocean (but has not yet been reported from northern or eastern Australia).

Entomacrodus epalzeocheilus (Bleeker) *E. niuafoouensis* (Fowler) and *E. randalli* Springer

Springer (1967) considered *E. epalzeocheilus* to be an Indian Ocean species with an extralimital population at Samoa. Its closest relative, *E. niuafoouensis,* was considered to be a western Pacific, peripherally distributed species with an extralimital population at Madagascar. I proposed that the extralimital populations of both species were either relicts from when the species were more widespread or represented populations of the dominant species in each area (Pacific, Indian Ocean) that were convergent upon the species in the other area. Little alteration of either species would be necessary to confuse it with the other. The main character for separating the two species was the presence of palmate nuchal cirri in *E. epalzeocheilus* and simple nuchal cirri in *E. niuafoouensis.* Secondary characters, with broad overlap, were numbers of lip crenulae and gill-rakers.

In 1968, I collected in southwestern Taiwan, an island geographically intermediate between the areas from which I reported the main distributions of *E. epalzeocheilus* and *E. niuafoouensis.* In each of two collections I obtained specimens of both species, based on the nuchal cirrus characters (one *E. niuafoouensis,* USNM 206394, 88.7 mm SL, and two *E. epalzeocheilus,* USNM 206392, 75.0–85.8 mm SL in one collection, and three *E. niuafoouensis,* USNM 206391, 44.6–53.5 mm SL, and six *E. epalzeocheilus,* USNM 206390, 68.7–87.3 mm SL, in the other). Besides nuchal cirri and gill-rakers, there were no noticeable differences by which the specimens could be separated. The four specimens of *E. niuafoouensis* had 25, 22, 22, and 17 gill-rakers; of the eight *E. epalzeocheilus,* five had 18 gill-rakers and three had 19.

One might expect that two closely related species would be most distinct in areas where they occur together. Apparently this is not the case with these two species, which are no more distinguishable when their Taiwan populations are compared than when their allopatric populations are compared (except for the extralimital population of *E. niuafoouensis* at Madagascar, which has very long orbital cirri). It is quite possible that the two species are really one and that the nuchal cirri differences separating them are merely indications of simple genetic dominance where the homozygous dominant and heterozygous allelic conditions produce one type nuchal cirrus and the homozygous recessive condition, another. In this scheme the supposed extralimital population of each type would merely represent a simple mutant of the dominant population in each area that had become established at a highly restricted locality. The genes controlling the numbers of gill-rakers are possibly linked to those controlling the manifestation of the nuchal cirri.

Smith (1966) reported *Entomacrodus epalzeocheilos* (sic) from Zululand, the only record for the African coast.

Springer (1967) believed that the Marquesas Island endemic *Entomacrodus randalli* and *E. niuafoouensis* were derived from the same ancestral species. *E. randalli* was distinguished from *E. niuafoouensis* in having a single pore before each anterior nostril and spots on the upper lip, whereas *E. niuafoouensis* had two or more pores before each anterior nostril and stripes on the upper lip. Recent collections of *E. niuafoouensis* from Pitcairn Island (BPBM uncataloged, 7 adults, 32.2–91.0 mm SL, and several tentatively identified young, 18.5–22.8 mm SL) and Henderson Island (BPBM uncataloged, 2 adults 64.0–80.9 mm SL) indicate that specimens from these islands typically have only one pore before each nostril. Hence, only the color pattern of the upper lip serves to distinguish these two species at the easternmost extremity of their range.

The Pitcairn and Henderson island specimens of *E. niuafoouensis* will key to the couplet sepa-

rating *E. randalli* from *E. sealei* (see Springer, 1967:35). The lip stripes of *E. niuafoouensis* will serve to distinguish that species from both *E. randalli* and the few aberrant specimens of *E. sealei,* for which this couplet was meant to accommodate (see Note in Springer, 1967:35).

Entomacrodus rofeni Springer

Springer (1967:86) described *E. rofeni* from Raroia, Tuamotu Archipelago. Recent collections extend the range of this species eastward to Ducie Island (BPBM uncataloged, 9 specimens, 45.0–51.3 mm SL) and Henderson Island (BPBM uncataloged, 46.3 mm SL).

All the specimens have faint lip stripes; four lack vomerine teeth; five have a single tooth and one, two teeth on the vomer. The predorsal commissural pores range from 3–7. Two specimens have 34 vertebrae and eight have 35. Three specimens have 17 segmented anal fin rays (method A, Springer 1967:5) and seven have 18.

All specimens available to me in 1967 were smaller than those reported above, and all had only three predorsal commissural pores.

Entomacrodus vomerinus (Valenciennes), *E. textilis* (Quoy and Gaimard), *E. cadenati* Springer, and *E. nigricans* Gill

Springer (1967) differentiated *E. vomerinus* from the other Atlantic species of *Entomacrodus* on details of color pattern and its usually having more vertebrae and segmented dorsal and anal fin rays. The species was reported as occurring only along the coast of Brazil (from Natal to Bahia) and at Fernando de Noronja island (03°50'S,32°25'W). A recent collection of specimens was obtained by the University of Miami Rosenstiel School of Marine and Atmospheric Sciences (UMML) from St. Peter and St. Paul Rocks (00°56'N; 29°22'W). These specimens represent an interesting range extension for the species, as well as exhibiting differences in certain meristic characters from mainland Brazil specimens (Table 4). The Fernando de Noronja specimens also exhibit similar differences. Inasmuch as additional material to that which I reported for *E. textilis* (endemic to Ascension and St. Helena islands) is also available, and I gave no breakdown on the most important meristic characters for the Atlantic species of *Entomacrodus,* I report these frequencies in Table 4 (data from specimens of *E. nigricans* from the Caribbean and Florida, of *E. vomerinus* from Brazil, and *E. cadenati* from all localities are lumped, as sublocalities showed no noticeable variation on inspection).

NEW MATERIAL.—*E. vomerinus,* St. Peter and St. Paul, UMML 26523 (11 specimens, 21.0–42.0 mm SL); *E. textilis,* Ascension, USNM 205839–205841 (258 specimens, 16.6–66.2 mm SL); St. Helena, USNM 206388 (49 specimens, 23.2–80.4 mm SL).

TABLE 4.—*Frequency distributions for numbers of vertebrae and segmented dorsal and anal fin rays in the Atlantic Ocean species of* Entomacrodus

Species and locality	*Vertebrae*				*Dorsal Fin Rays*					*Anal Fin Rays*				
	33	34	35	36	13	14	15	16	17	14	15	16	17	18
E. nigricans														
Bermuda	1	11				12	40	1				47	6	
Caribbean & Florida	2	66	1		1	233	225			3	23	407	24	
E. vomerinus														
Brazil		5	57	5			12	96	9		1	2	89	25
Fernando Noronja		2	6				4	5				2	7	
St. Peter & St. Paul		1	11				9	3				5	7	
E. textilis														
Ascension	3	52	1			15	54				4	64		
St. Helena	1	41	1			17	83	1			11	70		
E. cadenati														
Eastern Atlantic		42				19	71	2			1	58	33	

Entomacrodus sealei Bryan and Herre

A specimen (USNM 206400, 38.0 mm SL) of this species from Madang Harbor, New Guinea, represents a new locality record for the species. The specimen is atypical in having several narrow, dusty stripes alternating with pale interspaces of about equal width on the upper lip. The typical pattern, which consists of broad, dusky bands alternating with pale pinstripes, is ordinarily diagnostic for the species. Additional specimens from New Guinea would be desirable in order to determine if the lip pattern is indicative of a distinct population.

Ten specimens from Pitcairn Island (BPBM uncataloged, 41.6–61.2 mm SL) represent a westward range extension for the species.

Entomacrodus caudofasciatus (Regan)

In my 1967 (pp. 134–135) revision I described five different color pattern types for this species. Each of the color pattern types, except number 4, was found to be restricted to a particular geographic area. No two color pattern types were found to occur sympatrically. Additional specimens of pattern number 3 (Waigeo, New Britain, New Georgia) are now available from New Guinea (USNM 206385, Trobriand Islands, 11 specimens 21.2–37.2 mm SL; USNM 206386, Madang, 7 specimens, 34.8–50.0 mm SL) and the New Hebrides (AMS I.14308, 2 specimens, ca. 41–45.8 mm SL). The New Hebrides specimens extend the number 3 pattern type considerably southward. In my description of the number 3 pattern I mentioned that there were no stripes on the upper lip. Several of the new specimens show traces of such stripes.

Several specimens with color pattern number 4 (South China Sea, McKean, Swains, Tutuila, Tau, and Tongatapu islands) from Taiwan represent a slightly northern range extension for this color pattern type (USNM 206384, 3 specimens, 42.8–43.9 mm SL; USNM 206387, 11 specimens, 35.6–58.4 mm SL; USNM 206398, 7 specimens, 44.5–61.4 mm SL).

Recent collections of *E. caudofasciatus* from Ducie Island (BPBM uncataloged, 2: 31.5–35.1 mm SL) and Pitcairn Island (BPBM uncataloged, 9: 40.5–55.0 mm SL) represent a westward range extension for color pattern number 5, formerly reported only for Tahiti, Makatea, Rarotonga and Raroia.

Entomacrodus thalassinus (Jordan and Seale)

The following specimens are range extensions for the subspecies of *E. thalassinus:*

E. t. thalassinus: Ceylon, USNM 206399 (12 specimens, 19.0–36.6 mm SL); One Tree Island, Great Barrier Reef, USNM 201366 (30.8 mm SL); Trobriand Islands, New Guinea, USNM 206406 (23.6 mm SL).

E. t. longicirrus Springer: Southwest tip of Taiwan, USNM 206393, 206395, 206396 (6 specimens 28.6–34.8 mm SL).

E. t. thalassinus and *E. t. longicirrus* were differentiated by me on the basis of relative supraorbital cirrus lengths. *E. t. longicirrus* was reported only from Thailand, Viet Nam, and Hong Kong. All specimens from outside these South China Sea localities belonged to the nominal subspecies. The specimens here reported from Taiwan, a locality somewhat intermediate between the South China Sea and the other areas, are of interest because they are also somewhat intermediate on the basis of relative supraorbital cirrus lengths: four of the specimens fall at the lower end of the range of *E. t. longicirrus* for relative cirrus lengths and two fall within the range of *E. t. thalassinus.*

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