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Contribution
No. 19

Notes on the Flatfish *Engyophrys sentus* Ginsburg¹

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GINSBURG (1933) describes *Engyophrys sentus* from a single specimen taken by the "Albatross" off Dry Tortugas, Florida, in 50 fathoms. As far as is known no other specimens have been recorded. The purpose of these notes is to make available more information concerning this relatively uncommon species than could be secured from the type.

During the operations of the U. S. Bureau of Fisheries' Ship "Pelican" in the littoral waters of the Northern Gulf of Mexico, 28 specimens of *Engyophrys sentus* have been taken with a small otter trawl.²

The 19 males, one of which was badly damaged, ranged in standard lengths from 40.5 mm. to 70.0 mm; the 9 females varied from 41.6 mm. to 70.8 mm. Two of the females were gravid; one from Station 42, taken on April 22, 1938, measured 53.7 mm. in standard length and the other from Station 143-2, taken on March 5, 1939, measured 70.8 mm. Spawning apparently occurs during the spring.

As described by Ginsburg, the teeth are in a single series in each jaw and there are no teeth on the colored side.

A number of our specimens of *E. sentus* possess a gradually tapering black papilla originating from the pigmented membrane above the pupil of each eye; that of the lower eye is generally longer and stronger than that of the upper. In 15 specimens in which one or both of the papillae exceeded 0.1 mm., the average length of the lower one was 3.1 mm. and that of the upper 2.0 mm; the longest papilla measured was 6.6 mm. An examination of Ginsburg's type disclosed the presence of a short stub of a broken papilla

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²1 female, Station 42; 27°38'N, 96°32'W, 27 fathoms; 1 male, Station 93-9; 28°27'N, 92°16'W, 29 fathoms; 1 male, Station 94-1; 28°27'N, 92°13'W, 30 fathoms; 2 males and 1 female, Station 101-3; 28°30'N, 93°30'W, 25 fathoms; 2 males, Station 105-7; 28°17'N, 94°40'W, 25 fathoms; 1 male, Station 107-4; 28°05'N, 95°41'W, 27 fathoms; 7 males and 2 females, Station 113-8; 27°05'N, 96°51'W, 22 fathoms; 3 males and 3 females, Station 113-9; 27°05'N, 96°48'W, 29 fathoms; 2 males, Station 115-5; 26°42'N, 96°53'W, 25 fathoms; 1 female, Station 143-2; 29°49'N, 86°30'W, 40 fathoms; and 1 female for which there is no locality record.

on the upper eye and a trace of where the papilla had been broken from the lower eye. Seven specimens of *E. sancti-laurentii* (U. S. N. M. No. 41255, from "Albatross" Station 2805, 5 specimens; U. S. N. M. No. 94040, one specimen and U. S. N. M. No. 41269, one specimen) examined by us failed to reveal any trace of papillae.

All females of *E. sentus* had longer papillae than did the males. The shortest upper eye papilla was 2.7 mm. long in the females, and the longest corresponding papilla was 2.3 mm. long in the males. The average length of the upper papillae was 3.7 mm. in the females and 0.8 mm. in the males. The presence of these papillae appears to be a juvenile character that persists in the females and tends to disappear in the males. Of the 7 females and 18 males with unbroken upper papilla, 2 females and 10 males had standard body lengths greater than 60 mm. For fish smaller than 60 mm., the upper papilla averaged 3.4 mm. in the females, 1.5 mm. in the males; for fish larger than that size, it averaged 4.6 mm. in the females, 0.2 mm. in the males. Only

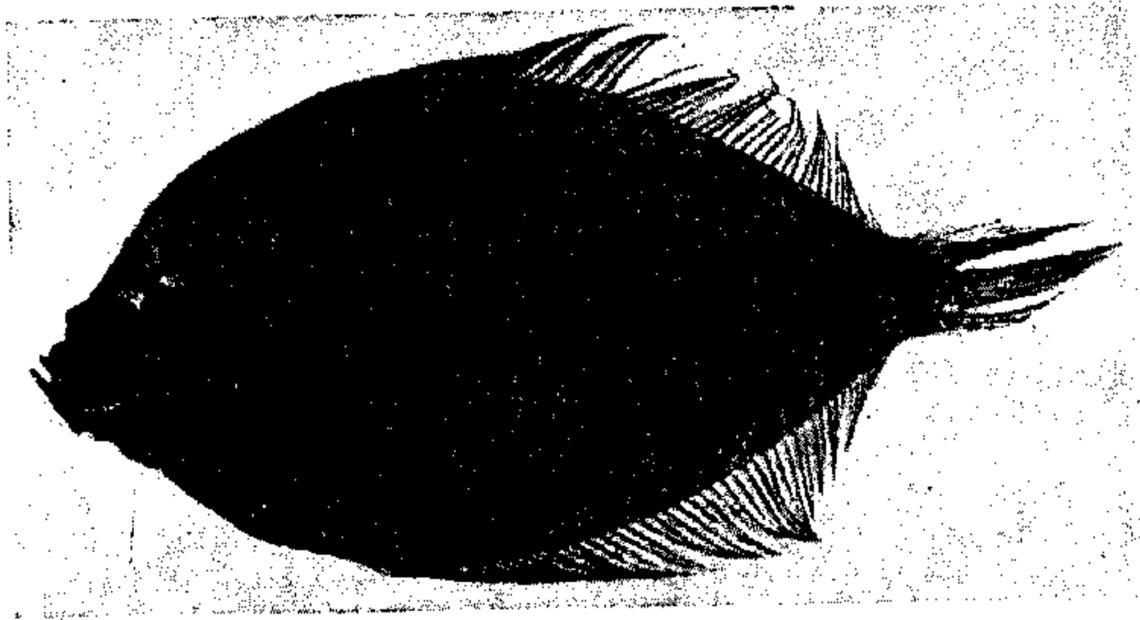


Fig. 1. Dorsal view of male *Engyophrys sentus* of standard length 62.8 mm.

one male above 60 mm. in standard length had a papilla longer than 0.1 mm. and no males under 60 mm. in standard length had a papilla shorter than 0.3 mm. Of the males longer than 60 mm., 2 had no trace of papillae on either eye and 2 had no trace of a papilla on the upper eye and only a minute stub on the lower.

We further find that the lengths of the papillae in the male of *E. sentus* are definitely related to the degree of coloration present on the blind side. The 18 males on which observations were possible were divided into two classes as follows: Class I, blind side immaculate or with faint coloration; and Class II, blind side definitely dusky. Class I, with 7 specimens, had an average upper papilla length of 1.6 mm., whereas in Class II, with 11 specimens, it averaged 0.2 mm.

Using the same color classifications, the average standard lengths of the males in Class I was 52.1 mm. and in Class II it was 62.3 mm. Only one

male (the smallest specimen with standard length of 40.5 mm.) and all of the females were immaculate on the blind side.

In specimens that are not immaculate on the blind side, there are from 3 to 7, usually 5 or 6, dark, diffuse, posteriorly curved transverse parallel bands on the anterior third of the blind side of the body. Similar but more pronounced bands occur in *E. sancti-laurentii*.

It appears probable from the above relationships that in *E. sentus*, ocular papillae and the absence of coloration on the blind side characterize the young of both sexes. These characters apparently remain unchanged in the mature female. The mature male, on the other hand, evidently nearly or quite completely loses the ocular papillae and develops coloration on the blind side. Since the only specimens of *E. sancti-laurentii* available were rather large, it is conceivable that during some stage of the development of this species there also may exist a period when the ocular papillae are present and the coloration on the blind side is absent.

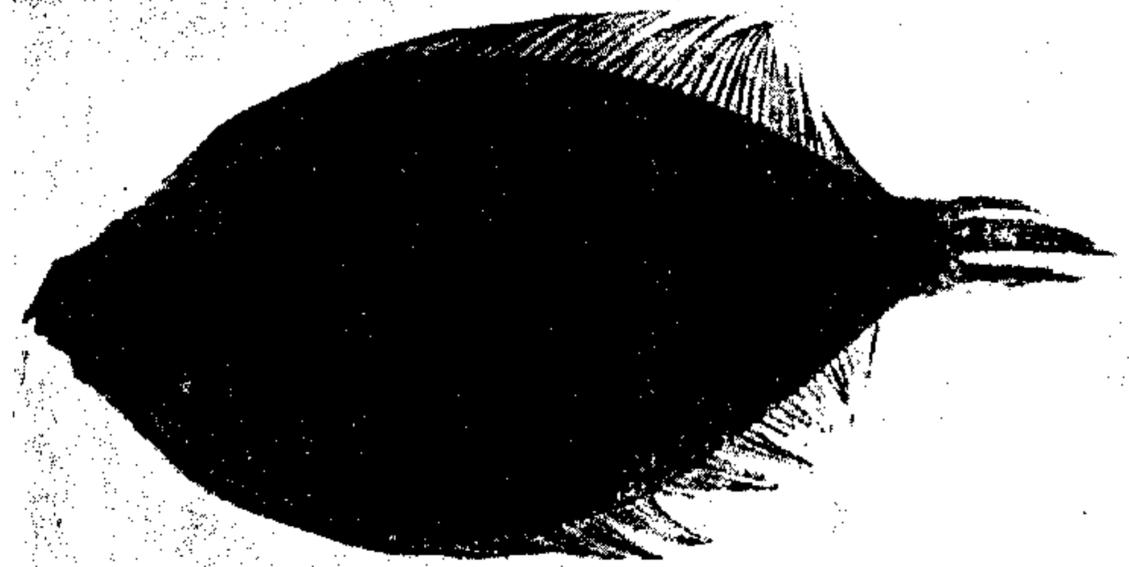


Fig. 2. Ventral view of male *Engyophrys sentus* of standard length 62.8 mm.

The color of the eyed side of *E. sentus* consists of a brownish background blotched with darker. Along the midline there are three rather large dark blotches as described by Ginsburg. Unpaired fins are lightish, irregularly speckled with darker.

The profile before the eyes in *E. sentus* is definitely concave, whereas in *E. sancti-laurentii* it is almost straight.

The dorsal fin rays vary from 74 to 83, the modal number being from 76 to 79. The anal fin rays vary from 60 to 67, with modal number from 62 to 64. There is a positive relationship ($r = +.80$; $P. < .01$) between the number of dorsal and anal rays. Those specimens having the greater number of dorsal rays also possess the greater number of anals.

The interorbital spines range from 3 to 5 with the mode at 4. The spines above the upper eye range from 1 to 4 with the mode at 2. The spines in front of the lower eye vary from 1 to 3 with the mode at 2. The variation in the spines is not due to sexual difference.

MEASUREMENTS AND COUNTS OF *Engyophrys scotus*

Sex	♂	♂	♂	♀	♀	♀	♀	♂	♂	♂	♀
Total length mm.	76.0	79.4	59.4	73.5	48.5	71.3	67.1	47.6	(2)	63.3	80.8
Standard length mm.	64.5	66.0	51.4	61.7	41.6	59.4	55.2	40.5	(2)	53.5	70.8
Depth mm.	34.4	35.3	24.5	31.4	20.0	29.2	30.3	19.8	(2)	26.9	40.0
Head length mm.	13.4	12.8	10.9	12.7	8.8	11.6	13.1	9.4	(2)	12.7	13.8
Maxillary length mm.	3.1	2.9	2.1	3.1	2.3	3.1	2.9	2.3	(2)	3.0	2.7
Length of papilla on upper eye mm.	1.7	(3)	1.3	4.4	4.6	(2)	2.9	1.7	(2)	2.2	4.7
Length of papilla on lower eye mm.	2.0	0.3	1.7	6.6	(2)	(2)	3.2	3.8	(2)	5.0	(2)
Diam. of lower eye mm.	3.8	4.7	4.0	4.7	3.8	4.4	4.2	3.2	(2)	4.5	5.0
Diam of upper eye mm.	4.4	4.7	4.0	4.7	3.6	4.3	4.3	3.4	(2)	4.4	4.5
Dorsal fin rays	80	79	79	81	76	81	82	80	(2)	75	77
Anal fin rays	64	63	64	64	63	65	65	65	(2)	61	62
Interorbital spines	4	5	4	3	3	3	4	3	4	4	4
Spines above upper eye	3	3	2	3	2	4	3	2	3	2	2
Spines in front of lower eye	2	2	2	2	2	2	2	1	2	2	
Gillrakers lower limb (1)	5	6	6	6	6	7	6	(2)	5	6	5
Gillrakers upper limb (1)	3	3	2	2	3	2	3	(2)	3	3	3

(1) First arch of eyed side.

(2) Damaged.

In our series, which ranges in standard length from 40.5 mm. to 70.8 mm., as the specimens increase in size the depth increases more rapidly than the standard length. The coefficient of correlation between the two measures +.53. The probability is less than one chance in one hundred of such a correlation occurring fortuitously. The slope of the regression line is of sufficient magnitude to make depth an unreliable diagnostic character unless it is considered in conjunction with the length. No difference was found, in this relation, between the two sexes.

The maxillary in proportion to the standard length shows a significant negative correlation of -.56. The slope of the regression line is so slight, however, that throughout the range of specimens at hand the proportional decrease in maxillary length as the standard length increases can, for all practical taxonomic purposes, be disregarded. The males do not differ from the females.

The correlations of head length and diameter of the upper eye in proportion to the standard length show slight negative correlations of -.23 and -.33, respectively. Although one would normally expect such negative relationships to exist, these are not statistically significant due to the excessive variations in the small number of specimens available. Here again there is

MEASUREMENTS AND COUNTS OF *Engyophrys scotus* (Continued)

♀	♀	♂	♂	♂	♂	♂	♂	♂	♀	♂	♂	♂	♀	♂	♂	♂
64.0	65.0	76.6	79.0	82.0	70.8	81.3	60.3	71.4	61.0	56.8	56.2	74.4	58.1	66.3	77.1	73.3
53.7	57.2	62.8	66.2	70.0	61.0	69.4	50.5	58.7	50.1	46.6	46.7	61.2	46.7	56.0	62.3	62.3
27.8	26.6	33.2	35.9	40.0	31.1	34.4	25.9	32.4	27.2	23.3	23.9	33.7	23.3	29.2	33.7	37.7
10.6	11.3	13.4	15.6	15.6	13.1	13.8	11.3	12.8	12.3	9.4	9.9	13.3	9.8	12.2	12.8	13.8
2.9	2.5	2.8	3.1	3.2	2.9	3.2	3.2	3.6	2.9	2.6	2.7	3.4	2.5	3.0	3.4	2.9
3.1	(2)	(4)	(3)	(3)	(4)	(3)	2.1	0.3	3.7	1.7	0.4	(4)	2.7	2.3	(3)	(4)
3.1	(2)	(4)	(3)	(3)	(3)	(3)	2.5	0.8	5.9	3.3	0.7	(4)	4.6	3.4	0.8	(3)
4.5	4.3	5.3	5.0	6.1	4.9	5.4	4.2	4.9	4.9	3.6	3.9	5.3	3.7	4.5	4.8	5.2
4.2	4.2	4.8	5.0	6.3	4.7	5.3	4.2	5.0	4.2	3.4	3.5	5.1	3.5	4.4	4.9	5.1
78	78	79	78	75	83	75	76	78	74	79	76	79	76	76	78	(2)
64	63	61	62	62	67	61	61	62	60	64	62	66	63	63	62	62
4	4	3-5	3	4	3	4	4	4	4	4	3	4	3	4	4	4
2	2	2	2	2	3	4	2	2	3	2	1	2	2	3	4	2
2	2	2	2	1	2	2	2	2	2	2	1	2	2	2	2	2
5	5	5	(2)	6	4	5	6	6	7	5	4	6	4	5	4	4
3	0	3	(2)	0	0	2	3	3	2	1	3	0	0	2	0	0

(3) Small knob less than 0.1 mm. in length.

(4) No trace of papilla.

no sexual difference and the slopes of the regression lines are so slight that they can be disregarded for taxonomic comparison through this range of standard lengths.

The gillrakers on the lower limb of the first arch of the eyed side range from 4 to 7 with 5 and 6 the most prevalent. Those on the upper limb of the same arch vary from 0 to 3 with 0 and 3 being the most frequent numbers encountered.

One specimen was found to have been feeding upon copepods.

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