AMERICAN MUSEUM NOVITATES

Number 294 | Published by THE AMERICAN MUSEUM OF NATURAL HISTORY New York City | Jan. 28, 1928

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THE SMALLEST KNOWN SPECIMENS OF THE SUCKING-FISHES, *REMORA BRACHYPTERA* AND *RHOMBOCHIRUS OSTEOCHIR*

BY E. W. GUDGER

In a previous paper,[1] based on an exceptional collection of young Echeneididæ, I brought together all the data, both new and previously published, descriptive of the smallest known specimens of these most interesting fishes. This paper was illustrated with figures (three of them never before published) of four of the eight species enumerated in Jordan and Evermann's 'Fishes of North and Middle America.' While this paper was in press, I received from the Danish investigator, A. Vedel Tåning, a paper[2] in which he described post-larval stages of *Remora remora* as small as 5.6 mm., and of *Echeneis lineata* as short as 14 mm.—specimens much smaller than mine.

My smallest *Rhombochirus osteochir* was 68 mm. over all and 61 mm. from tip of snout to base of caudal fin. Two other specimens measured in total length 73 and 105 mm. respectively. The smallest fish was taken from the gills of a sailfish (*Tetrapturus* sp.?) at Long Key, Florida, and was presented to the Museum by Mr. Hamilton M. Wright of this city. Mr. Wright, knowing my great interest in and desire for small shark-suckers, later enlisted the kind co-operation of Mr. H. W. Mittag, Secretary of the Miami Anglers' Club of Miami, Florida, and he in turn secured the help of the boatmen having boats for charter to anglers. The results of this were that Captain A. Hutter of the yacht 'Tramp' secured from sailfish (*Tetrapturus* sp.) taken in the Gulf Stream just outside Miami between June 15 and July 20, 1927, eight specimens of sucking-fishes. Examination of this material showed that there were one *Remora brachyptera* and seven specimens of *Rhombochirus osteochir*, of which three are smaller than any previously recorded.[3]

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[1]Gudger, E. W. 'A Study of the Smallest Shark-suckers (Echeneididæ) on Record, with Special Reference to Metamorphosis.' American Museum Novitates, 1926, No. 234, 26 pp., 6 figs.

[2]Tåning, A. Vedel, 'Position du Disque Céphalique chez les Echeneides au Cours de l'Ontogenese.' Comptes Rendus Académie Sciences, Paris, 1926, 182, pp. 1293–1295, 2 figs.

[3]To Mr. Wright, Secretary Mittag, and Captain Hutter I make my best thanks. It is kindness such as theirs that makes possible the collection and study of such rare and unusual specimens of fishes as these on which this article is based.

Remora brachyptera

This fish is the smallest on record. Its total "over all" length is 88 mm., to base of caudal fin 77 mm. Depth behind disk 12 mm. Width between upper edges of bases of pectorals 11 mm. Length of base of dorsal fin 27 mm., of base of anal 25 mm.

It has 15 segments in its sucking disk, which is 24 mm. long by 13 wide. The soft dorsal has 26 or 27 rays, and the anal 24 or 25—the count is very difficult. The pectoral has about 20 rays, the pelvic 5, and the caudal has 19 rays. The caudal is very blunt, without a notch, almost squarely truncate. The color (formol specimen) is a light ashen, and of about the same shade above, laterally, and below. The lower jaw is very bluntly rounded and projects beyond the upper by 2 mm. Dis-

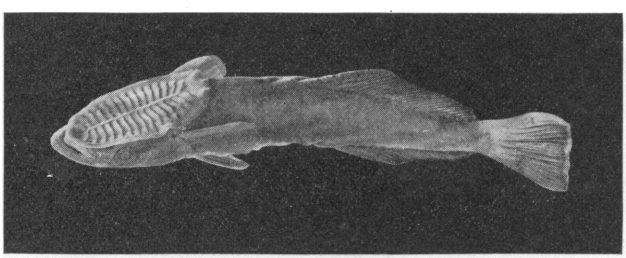

Fig. 1.—*Remora brachyptera*, the smallest known specimen, 77 mm. in standard length.

tance between eye and angle of mouth ⅕ the distance from angle to tip of upper jaw.

The smallest fish of this species, recorded in my earlier paper, are two described by Lütken in 1875 from the rich collections in the Copenhagen Museum. These were about 4 inches (101 mm. long) and interesting to state were like mine taken from the gills of a round-billed sailfish (*Tetrapturus*). This fish, however, came from the south Atlantic—about 300 miles east of Cape San Roque, Brazil.

My specimen—the smallest known (77 mm., 3 in., in standard length)—shows absolutely no trace whatever of larval characters, is adult in every respect save in size. In other words, it gives no indication of any post-larval metamorphosis whatever, as may be seen by reference to Figure 1. Unfortunately no data is at hand for the maximum or for even the average adult size.

Rhombochirus osteochir

The smallest specimen of this fish recorded in my previous paper was 68 mm. "over all" and 61 mm. to the base of the caudal, while the next smallest gave measurements of 73 and 62 mm. for these respective lengths. This smaller fish, which had 17 lamellæ in its disk, and which was figured in my previous paper, was also the gift of Mr. Hamilton M. Wright as noted in the introduction to this article. However, the three specimens before me are much smaller than it, are probably the smallest ever studied by any investigator. Their dimensions are recorded in the accompanying table—all measurements being in millimeters.

Rhombochirus osteochir, juvenile forms from Miami, Florida

	No. 1	No. 2	No. 3
Length, tip of snout to tip of caudal	36	46	55
Length, tip of snout to base of caudal	32	41	49
Length of disk	11	15	19
Width of disk (greatest)	5	7	8
Number of lamellæ	16	17	18
Length of head	9	11	13
Length of base of soft dorsal fin	12	14	18
Length of base of anal fin	11	14	17.5

If the figures for any one character noted in the table be compared, a regular gradation will be perceived. We even have a gradation in the number of segments in the sucking disk, and just here it may be noted that at the hinder end of the disk of fish number 2 there is what appears to be the rudiment of another lamella.

Fishes Nos. 1 and 2 are so small and their dorsal and anal fins are so fleshy and dark colored that I have not been able to count the rays. Fish No. 3 has about 22 rays in the soft dorsal, about 21 in the anal, 19 or 20 in the pectoral, 5 in the pelvic, and 16 in the caudal. The pectoral is thick, broad and rounded with the first two rays very broad, stiff, and strong. The caudal is deeply emarginate with the points bluntly rounded, whereas in the two small fish previously reported on the tips were pointed.

However, in a third small (105 mm.) specimen studied along with these two, the points were rounded. Evidently there is considerable variation here. These structures are clearly shown in Figure 2 wherein are portrayed all three of the fish listed above.

In color all three of my present specimens are ashen with a blue-gray sheen, about equal in shade above and below. Their dorsal and anal

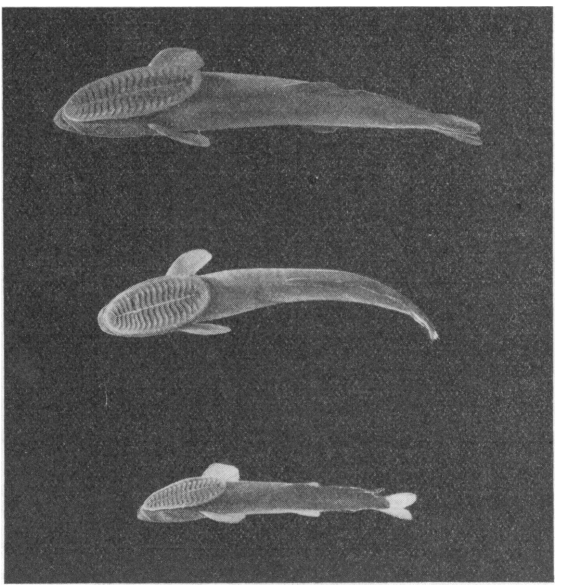

Fig. 2.—The three smallest known specimens of *Rhombochirus osteochir*. These are 55, 46, and 36 mm. standard length respectively, and are shown in natural size.

fins are a blue-black. Their pectorals are transparent as are the pelvics of the smallest, but these fins in Nos. 2 and 3 are very dark—about the color of their respective anals. The caudal fin of No. 1 is transparent, of No. 2 quite black, while that of No. 3 is intensely so.

There can be no doubt that these three little "suckers" are correctly identified as *Rhombochirus osteochir*. They and the three specimens previously studied form a well-graded series of small forms extending in length from 36 mm. to 105 mm. These, together with the six or eight

larger specimens from Florida and California, give the American Museum a rather complete series of this interesting sucking-fish.

Finally, emphasis should be laid on the fact that in this genus of the remorine division of the Echeneididæ in specimens down as small as 36 mm. in total length there is not the faintest trace of any metamorphosis in any organ, not even in the caudal fin. And in this these specimens agree absolutely with the small forms previously studied of the other genera and species of the Remora group. On the contrary, it was clearly shown in my previous paper that in both genera of the Echeneis group the post-larval young have the central fin rays greatly prolonged to form a tri-lobed caudal fin, in which the central lobe becomes progressively reduced with growth and age. Here then we have added evidence that this matter of the caudal fin is of positive value in separating the Echeneididæ into two well-marked divisions or groups.