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ON THE FISHES OF THE GENUS *SCHINDLERIA* GILTAY FROM THE INDIAN OCEAN

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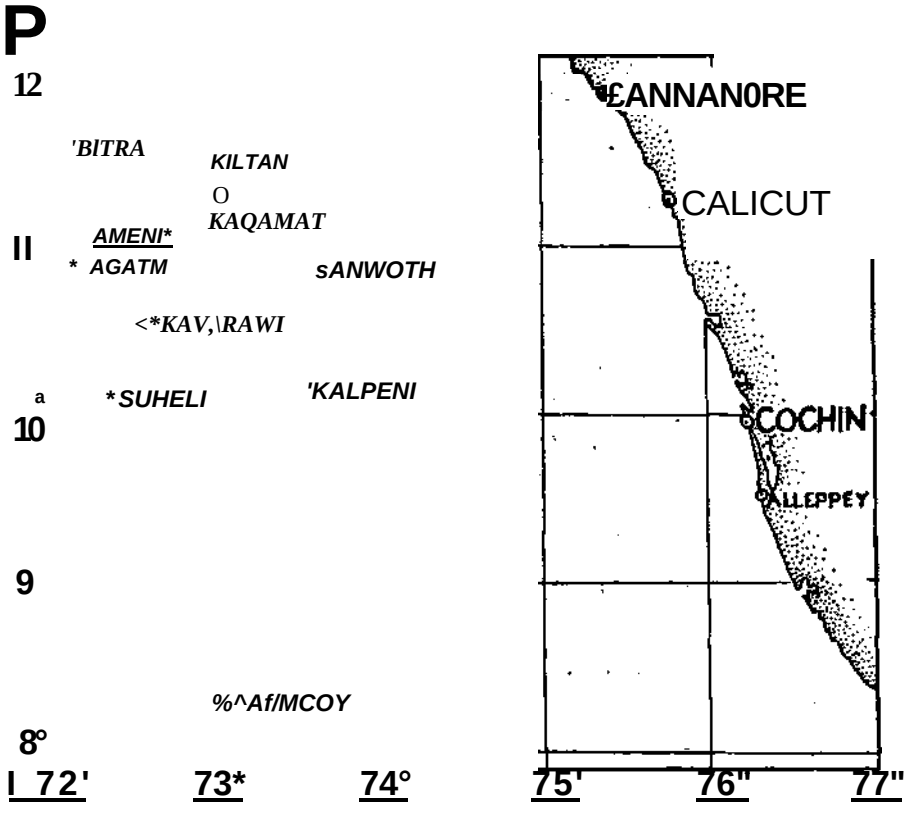
RECENTLY we have recorded (Jones and Kumaran, 1964) the occurrence of the fishes of the family Schindleriidae in the Indian Ocean for the first time based on the collections made from the Laccadive Archipelago. Most of the specimens were collected from small country crafts while a few were collected on board the Research Vessel *KALAVA* during her cruises in the Laccadive Sea. All specimens were obtained during night time with the help of plankton nets and close meshed dip nets from the surface along with larval fishes, crustaceans etc., which were attracted by light. Of the 81 specimens of *Schindleria praematura* all were in good state of preservation except 23 and of the 8 specimens of *S.pietschmanni* 5 were in good condition. A brief account of the studies on the collection is given in this paper.

The specimens are dull white in formalin but presumably transparent in live condition as stated by Bruun (1940) and Schultz (1960). The details of collection, size range etc., are given in Table I. The localities of capture are shown in Fig. 1.

TABLE I

Details of collection of* Schindleria *from the Laccadive Sea

Date	Locality	Species	Number of specimens		Length range in mm.	
			Male	Female	Male	Female
13-10-56	Minicoy lagoon	*S. praematura*	—	3	—	13-16.2
21-2-58	Do.	Do.	1	1	17.3	19.8
5-12-58	Do.	Do.	16	52	16.5-19.0	15.8-20.5
25-4-59	*iywE*. 11'19'N.	Do.	—	1	—	11.7
26-4-59	Chetlat	Do.	1	—	15.9	—
27-4-59	72'28'E. 11'46'N.	Do.	—	5	'⁄~	15.4 (4 specimens damaged)
29-4-59	72'42'E. 10'39'N.	Do.	1	—	15.3	—
13-10-56	Minicoy lagoon	*S.pietschmanni*		4 (3 specimeiis of indetisimulate sex. 8.2-f .4 mm. danlaged)		8.6-11.3
29-4-59	72*26'E. 10M6*N.	Do.	—	1		15.1



FIG^ L__Localities of capture of *Schindleria* from the Laccadive Sea. O *Schindleria praematura,* **A *Schindleria*** *pietschmann'.*

Schindleria pracmatura (Schindler).

Fig. 2, a & b.

40 females and 18 males were examined in detail in regard to the variation in number of fin rays, vertebrae etc. Males can be distinguished by the presence of a rather long urogenital papilla with two projections.

The body is elongated and compressed. The average length of head is about 10.5 % of total length. Eye diameter is about equal to length of snout, 25 % in head length. The average pre-anal length is about 62 % of total length. Two or three rows of small teeth are present in the jaws. The number of dorsal fin rays varied from 18-22 but the most frequent counts were 19 and 20. The number of dorsal rays anterior to a vertical from the anal varied from 7-11 but the usual counts were 8 and 9. Anal fin which originates immediately behind the urogenital opening has rays varying from 11-14, but 12 and 13 were more common and no distinction could be drawn with regard to this character between the male and the female. The variations in dorsal, anal and dorsal fin rays anterior to a vertical from the anal are given in Table II. Pectoral rays varied from 15-17. Caudal has 13 segmented rays of which all except the outer two are branched. Ventral

fins are absent. Myomeres are fairly discernible excepting the anterior two or three. The position of the air bladder is indicated by a lightly pigmented area which varied from 15th to 17th vertebra.

TABLE n

Fin ray counts in Schindleria praematura

Sex	Dorsal fin rays						Anal fin rays					Dorsal fin rays anterior to a vertical from the anal					
	18	19	20	21	22	Average	11	12	13	14	Average	7	8	9	10	11	Average
Male	2	7	6	3		19.55	3	6	7	2	12.44	1	10	5	2	—	8.44
Female	4	8	19	7	2	19.87	4	23	12	1	12.25	4	17	13	5	1	8.55

TABLE III

Variation in vertebral counts in Schindleria praematura

Sex	Total number of vertebrae						Number of pre-anal vertebrae					Number of post-anal vertebrae				
	35	36	37	38	39	Average	21	22	23	24	Average	13	14	15	16	Average
Male	1	9	7	1	—	36.44	2	6	10		22.44	6	9	2	1	13.98
Female		11	18	10	1	37.03	1	6	21	12	23.10	11	25	3	1	13.95

The tip of the vertebral column is somewhat curved upwards as generally seen in larval fishes. The total number of vertebrae varied between 36-39 for females and 35-38 for males but by far the most frequent counts were 36 and 37 for both sexes. In Table III variation in vertebral counts are given. In females the number of pre-anal vertebrae ranged from 21 to 24 and in males from 21 to 23. The number of pre-anal vertebrae of females is higher on an average by 0.66 than males and this difference between the two sexes is almost in agreement with that observed in the Tahitian and Samoan material studied by Bruun *{op. cit.)*.

Females varied between 11.7-20.5 mm. in total length but specimens between 18 and 19 mm. were more common. Males varied between 15.3-19 mm. but most of the specimens were about 17 mm. Normally about 27-35 large sized, irregular shaped or ellipsoid eggs are present in a series in the ovary together with several small, relatively much less developed eggs lying lateral and ventral to the large eggs. As has been reported by Schindler (1932) no definite relation exists between the size of the female and that of the ovarian eggs. Large sized eggs considered to be in an advanced stage of maturity measured about 0.42 mm.

Schindleria pietschmanni (Schindler)

Fig. 3

In general appearance this species is similar to *S. praematura.* Body is slender but appears to be slightly broader in relation to standard length when compared to its congener. There are only 8 specimens in the collection ranging from 8.2-15.1 mm. of which 3 are badly damaged. Schindler (1932) observed that this species is somewhat smaller than *S. praematura.*

Head is about 11.2% in total length and hence it follows that the head is slightly longer than in *S. praematura*. Eye is about 26.6% in head length and is equal to or slightly more than the length of snout. Pre-anal length on an average is about 53% of total length and the body anterior to the anal fin is shorter in comparison to *S. praematura,* the pre-anal length of which is about 62% of total length. Two or three rows of fine teeth, somewhat curved backward are present in each jaw. Dorsal fin which originates opposite to the anal fin or just anterior to it by one vertebra has 17-18 rays. Anal has 17 rays in 4 specimens and 16 in one specimen. Pectoral has 15-16 rays and the caudal has always 13 segmented rays. Ventrals are absent.. The dorsal side of the air bladder is pigmented and its position is below fourteenth or fifteenth vertebra.

Spinal column is continued posteriorly as a cartilaginous rod and its caudal end is bent upwards. Vertebrae in five specimens varied from 35-37. The last two vertebrae are shorter than others. Pre-anal vertebrae varied from 16-18 and post-anal vertebrae varied from 19-20. The sex of the 3 damaged specimens varying in length from 8.2-8.4 mm. could not be determined. According to Schindler (1932) the urogenital papilla in males of this species is not so prominent as in the males of *S. praematura*. The body of the female measuring 15.1 mm. is significantly broader in comparison to other specimens evidently on account of the presence of 9 obliquely placed well developed oblong eggs measuring 0.65 x 0.3 mm. in each lobe of the ovary.

S. pietschmanni could be distinguished from *S. praematura* on account of the higher number of rays in the anal fin (16-17 rays) and the difference in the number

of pre-anal and post-anal vertebrae, *S. pietschmanni* having fewer pre-anal and more post-anal (16-18 and 19-20 respectively) and as such the body anterior to the anal fin is conspicuously shorter than in *S. praematura.*

GENERAL REMARKS

The exact taxonomic position of these fishes is not certain. Schindler (1930 and 1931) who discovered the two species considered them as sexually mature larval *Hemirhamphus.* It was, however, Giltay (1934) who showed that these fishes have nothing to do with hemirhamphids and created the genus *Schindkria* and the family Schindleriidae to accommodate them. Schindleriidae is considered taxonomically close to the Blennoidea.

Bruun *(op. cit.)* observed that the number of vertebrae in *S. praematura* from Tahiti and Samoa were on an average 37.13 and 35.69 respectively. The higher number of vertebrae found in specimens from Tahiti has been attributed by him to the relatively colder conditions prevailing there. The number of vertebrae on an average in our specimens is 36.73. However, it may be mentioned in this connection that in spite of the fact that the Laccadives lie in a lower latitudinal area (Lat. 8°6'N—11°8' N) than Samoa (Lat. 13° 5' S) specimens from the former area have a higher vertebral count than those from Samoa. Schindler (1932) and Bruun *(op. cit.)* have mentioned that there is difference in size between males and females of *S.praematura,* the females being generally larger. The above appears to hold good of the Laccadive specimens as the longest female and male measured 20.5 and 19.0 mm. respectively. In Fig. 2 of Bruun *(op. cit.)* the neural spines are shown as originating just at the anterior end of the vertebrae in the anal region whereas in our specimens it is from the anterior third and shifts still posteriorly in the post-anal region (Fig. 4).

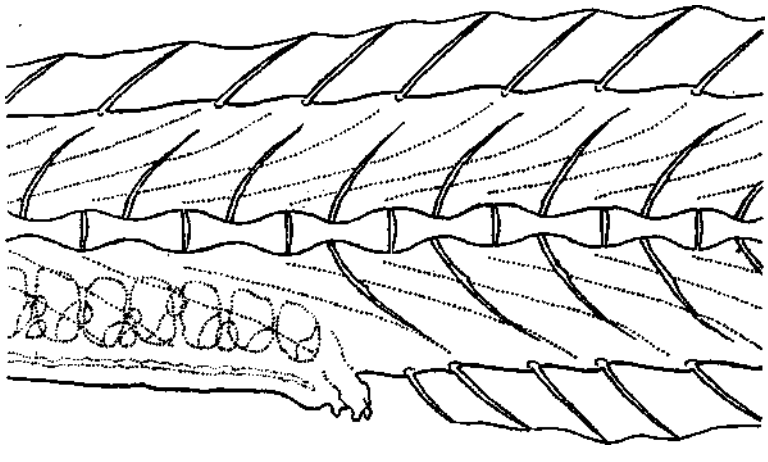


FIG. 4. Anal region of *S. praematura,* £ showing pre-anal and post-anal vertebrae. Dotted lines indicate myomeres.

Even though collections from the Laccadive Sea are not regularly made, specimens were obtained from different areas from Minicoy, the southernmost island to Cbetlat, the northernmost inhabited island in the Laccadive group. Thus far *Schindkria praematura* has been recorded from comparatively widely separated

areas in the Pacific viz., Hawaiian Islands ; New Guinea ; Tahiti; Samoa ; Tasman Sea, off Sydney and Grafton (Australia) and Bikini whereas *S. pietschmanni* has been known only from the Hawaiian Islands. The occurrence of the two species in the Laccadive Sea extends their distribution to the central Indian Ocean. As in the Pacific *S. praematura* appears to be comparatively ^more abundant and widely distributed in the Laccadive Sea than its congener. The known distribution of these fishes is plotted in Fig. 5. It was stated by Bruun *(op. cit.)* that a preliminary search of the material from the Indian Ocean and the Malayo-AustraUan Seas collected

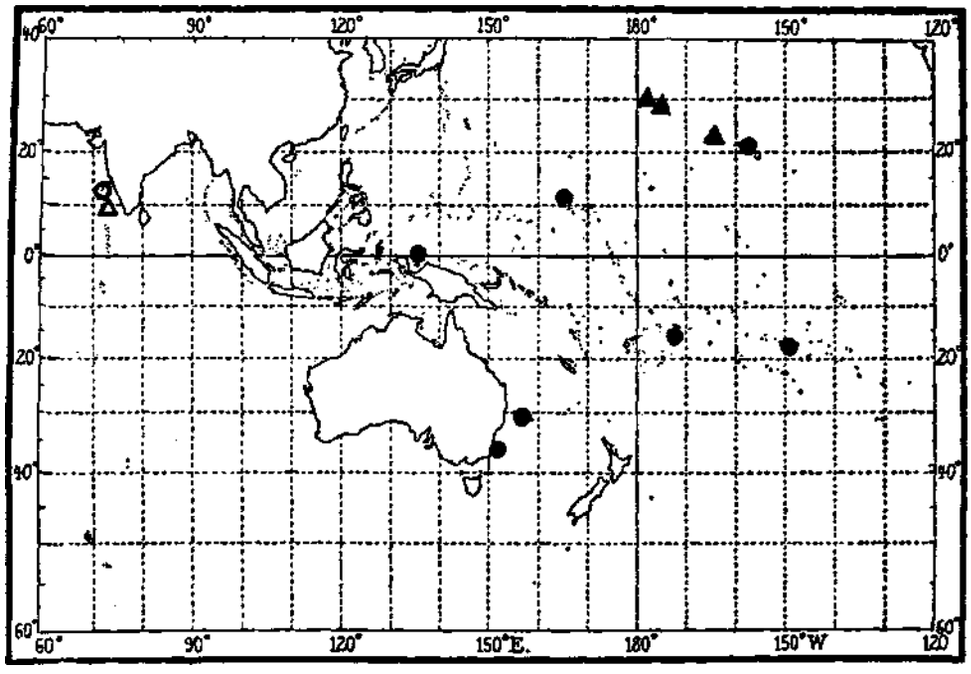


FIG. 5. Known distribution of fishes of the family Schindleriidae. *% S. praematura,* from Schindler, Giltay, Bruun and Schultz., Q S. *praematura,* Indian collections, *AS. pietschmanni,* from Schindler, A *S. pietschmanni,* Indian collections.

by the *Dana* Expedition (1928-30) did not show the presence of these two species. It is most likely that these fishes should have a wider distribution in the Indo-Pacific than known hitherto but their small size and casual resemblance to the clupeiform larvae, might have prevented their detection from among larval fishes. All specimens were obtained from lagoons and from areas very close to the islands as in the case of material collected from the Pacific and since only 89 specimens were collected near the surface with the help of light we are constrained to presume that *Schindleria* is essentially a neritic pelagic form.

The weights of 30 specimens of *S. praematura* ranging from 10.5-20.5 mm., 14 of *Mistichthys luzonensis* from 9.0-13.5 mm., and 9 of *Pandaka pygmaea* from 8.0-11.5 mm., were found to vary between 2.0-8.0 mg., 7.0-19.8 mg. and 6.0-22.0 mg. respectively by Bruun *(pp. cit.).* On the above basis he concluded that *Pandaka pygmaea* is the shortest and *S.praematura* is the lightest among living vertebrates.

SUMMARY

Schindleria praematura and *S. pietschmanni* collected
are described in detail. The points of similarities and diffu~~„ „w- rrvwil IX1V IYTU species are discussed briefly. A note is also given on the known distribution of these species.

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