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SEX RATIO OF THE SOLE *EURYGLOSSA ORIENTALIS* (BL. & SCHN.) (FAMILY: SOLEIDAE) FROM THE KARACHI COAST

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Studies on sex ratio reveal segregation or aggregation of males and females in accordance with environmental conditions, the differential behaviour of sexes, and due to fishing. Although the ratio is expected to be 1:1 in nature, variations from this value are often observed (Bal and Rao, 1984). Different aspects of sex ratio of teleosts species have been documented by various workers (Kestevan, 1942; Silva and De Silva, 1981; Murty, 1979, 1980; Baragai and James, 1980; Murty and Ramalingam, 1986). Such information helps to assess the distribution and migratory behaviour of female to deeper waters for spawning (George and Rao, 1967).

There are no external characters by means of which the sexes in *Euryglossa orientalis* could be differentiated. The sexes are therefore observed directly after opening the body cavity. The apparent differences in the monthly sex ratio are due to sampling fluctuations or they do not follow the normal 1:1 ratio due to actual changes in the concentration of the sexes. The sex ratio of only a few species of teleosts fish from our coast is known (Hoda, 1976, 1986; Hoda and Qureshi, 1989). A study of overall or month-wise sex ratio in a population according to size of fish is essential.

The samples for present study were collected at random from commercial landings at two sites: Karachi Fish Harbour and Korangi Fish Harbour. A total of 757 specimens (466 males, 291 females) of *E. orientalis* were analysed for their sex ratio during the study period 1987 to 1988. Monthly sex ratio of the *E. orientalis* were tested for equality of sex distribution by the Chi-square (X^2) formula.

The overall male-female sex ratio was 0.615:0.385 showing a significant X^2-value in the sample of 757 *E. orientalis*.

Significant difference in sex ratio was mostly found in the sample of November to February and April (Table I). In these months the males outnumbered the females which may be due to differential fishing and breeding, whereas the data for other months i.e. May-June 1988 and April-October 1987 do not show any significant difference. Significant difference in the overall sex ratio may be attributable due to the data from November to February.

In respect to size, the sex ratio showed significant values for the size groups 170 - 200 mm total length. The males outnumber the females in all size groups except 260- 269 mm corresponding to the breeding size where females outnumbered the males (Table II).

Table I and II show that the total observed ratio of male-female 0.615:0.385 differs significantly from the theoretically expected ratio of 1:1. The overall sex ratio of females to males was 1.0:1.8 (Dwivedi and Menezes, 1974) in fishes of the Goa coast while in the present study it was found to be 1.0:1.6. The sex ratio 1:1 may also be

Table I. Sex ratio of *E. orientalis* in different months.

Months	Ratio M:F	Proportion of male	X^2 (Chi-square)
April, 87	15:05	0.750	5.000
May	23:18	0.561	0.609
June	32:22	0.592	1.851
July	19:23	0.452	0.381
August	04:07	0.363	0.818
September	37:26	0.587	1.920
October	30:20	0.577	1.230
November	38:17	0.691	8.018*
December	52:23	0.722	11.213*
January, 88	55:20	0.743	16.550*
February	52:16	0.765	19.058*
March	18:22	0.450	0.400
April	42:09	0.807	21.353*
May	31:29	0.516	0.066
June	18:32	0.360	3.920
Total	466:291	0.615	40.455*

* Significant at 95% confidence limit.

Table II. Sex ratio of *E. orientalis* at different size groups.

Size group mm	Ratio M:F	Proportion of male	X^2 (Chi-square)
80-99	01:00	-	-
90-99	-	-	-
100-109	03:01	0.750	01.000
110-119	01:00	-	-
120-129	01:01	0.500	00.000
130-139	09:03	0.750	03.000
140-149	03:03	0.500	00.000
150-159	10:02	0.833	05.333*
160-169	13:05	0.722	03.555
170-179	24:05	0.827	12.488*
180-189	40:06	0.870	25.130*
190-199	53:15	0.779	21.235*
200-209	65:25	0.722	17.777*
210-219	77:37	0.675	14.030*
220-229	54:48	0.529	00.352
230-239	52:33	0.612	04.247*
240-249	17:31	0.354	04.083*
250-259	15:19	0.441	00.470
260-269	08:25	0.242	08.757*
270-279	08:06	0.571	00.285
280-289	02:07	0.222	02.777
290-299	04:04	0.500	00.000
300-309	04:04	0.500	00.000
310-319	02:01	0.666	00.333
320-329	-	-	-
330-339	00:02	-	-
340-349	00:01	-	-
350-359	00:01	-	-
80-350	466:291	0.615	40.455*

* Significant at 95% confidence limit.

affected by selective fishing in different season and schooling behaviour in feeding and spawning grounds (Sarojini, 1957; Silva and De Silva, 1981; Lasiak, 1982). Furthermore the present samples from fish harbour may also be biased because of the selective size preference by fishermen.

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