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STUDIES ON THE FECUNDITY AND SEX RATIO OF SARDINELLA LONGICEPS (FAMILY:CLUPEIDAE) FROM KARACHI COAST

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ABSTRACT

The fecundity and sex ratio of *Sardinella longiceps* has been described. The occurrence of mature specimen of *S. Longiceps* was found in different size group. The minimum and maximum size of maturity was found 191 m.m. and 206 m.m. in length which is supported by the results obtained from the study of mature ovaries. The size of fish, weight and length were directly related to the size of ovary. The frequency distribution of ova suggests that the spawning periodis January to December 2000. The number of males and females was determined.

Key Words: Fecundity, sex ratio, *Sardinella longiceps*, Karachi coast

INTRODUCTION

The S*ardinella longiceps* (sardine oil) belongs to family Clupeidae, commonly known as "luar" whch is widely used by poor and middle class men. The studies pertaining to the fecundity revealed useful information about the reproductive potential of the fish species. Fecundity is an adaptation to varying environmental condition, which works through the food supply is basic means of regulating the rate of reproduction to changing condition (Nikolsky, 1969). The fecundity aspects of reproduction is deeply associated with the study of population dynamics and fishery management practice (Agarwal, 1996). Different aspects of sex ratio and fecundity of teleost species have been documented by various workers (Khan and Imtyaz, 2004; Khan and Hoda, 1993, 1994; Blaxter and Hunter, 1982; Dex, 1980; Dan, 1980; Hodder, 1963; Dharmaea, 1959). The fecundity and sex composition of *Sardinella longiceps* and the fecundity of pacific sardine has been investigated earlier (Balan, 1965; Mac Gregor, 1957). The present investigation is under taken to collect and determine the number of ova in mature samples from Karachi coast.

MATERIALS AND METHODS

The material was collected during the period between January and December, 2000 from the commercial landing at West Wharf, Karachi. The specimen were measured, weighed and sexed and then frozen for further studies. The ovaries and testes removed out, the colour of gonad observed and the gonads measured. Finally preserved in 10% formaline., Fecundity was estimated by the method described by Mac Gregor (1957). All eggs were weighed and counted and relativity found as number of eggs/g of fish.

RESULTS AND DISCUSSION

The ovaries having VI maturity stages, taken from 15 mature specimens ranging 191 to 206 mm in total length and 97.7 to 82.2 g in weight were used to estimate the fecundity. It was estimated in relation to several variable size.i.e., total length (T.L), body weight and ovary weight of fish. Three samples of ova from each lobe of known weight were taken from the anterior, middle and posterior parts for estimating fecundity (Table 1).Mean fecundity of dorsal and ventral lobe of *S. longiceps* are given in Table 2, on the basis of this detail the total ova for an ovary weighing 10.9 g was estimated as 103595. The total ova mean average were 89290.13.

The left ovary which is slightly larger than the right produces eggs. The number depending on the difference in size. The fecundity of *S. longiceps* was estimated as 78 eggs by Nair (1952). Therefore it may be mentioned here that the fecundity is generally proportional to the size of the ovary which inturn is related to the size of the fish. The mean fecundity calculated to be 357160.3 The minimum and maximum being 68287.00 and 103595.5 from the fish measuring 191 - 206 mm total length, respectively. According to Bagenal (1971) fish length is more suitable for prediction of fecundity in the field with large sample and time limitations. The number of ova / g body weight and ovary weight is determines to be 1045.64 and 10612.00 respectively (Table 1).The gonads are two lobe the dorsal (smaller) and the ventral lobe (larger). The dorsal lobe is less fecundity than ventral lobe. According to Hoda and

Khan (1994), Khan and Imtyaz (2004), gonads were bilobed ,the rigt lobe a bit larger than the left, increasing in size with the size of the fish at different maturity stage.

Table 1. Average fecundity counts at various length ranges in *Sardinella longiceps*.

Freq.	Length rang (mm)	Average length of fish (mm)	Average wt. of fish (g)	Average wt. of ovary	Average No. of ova	No. of ova / g. wt. of body	No. of ova / g wt. of ovary
4	191-194	192.5	76.57	5.75	68287.00	891.6	11876.00
4	195-198	196.00	85.72	7.95	85584.25	998.416	1076.314
5	199-202	200.4	85.24	9.76	99693.8	1169.565	10214.528
2	203-206	205.4	92.25	10.9	103595.5	1122.986	9592.175

Table 2. Mean fecundity of dorsal and ventral lobe of *Sardinella longiceps.*

Size of range	No.	Dorsal lobe	Ventral lobe	Total Eggs
191-194	4	33079.25	35207.75	68287.00
195-198	4	41138.25	44446.0	85584.25
199-202	5	4715.2	52178.6	99693.8
203.206	2	49883	53712.5	103595.5
191-206	15	171615.7	185544.6	357160.3

Table 3. Number of males and females in the monthly samples.

Month	Number of Males	Number of Females	Sex Ratio
January	10	10	1 : 1
February	10	10	1 :1
March	10	12	1 : 1.2
April	17	15	1 : 0.88
May	18	23	1 : 1.27
June	21	24	1 : 1.14
July	15	12	1 : 0.8
August	17	11	1 : 0.64
September	18	23	1 : 27
October	18	20	1 : 11
November	17	22	1 : 1.29
December	22	20	1 : 0.90
	193	202	1 : 1.04

Table 4. Number of males and females in different size class.

Size class (m.m)	Number of Males	Number of Females	Sex Ratio
100	1	-	1 : 0
110	-	-	0 : 0
120	9	3	1 : 0.33
130	7	4	1 : 0.57
140	20	14	1 : 0.7
150	10	19	1 : 1.9
160	03	08	1 : 2.66
170	19	12	1 : 0.63
180	18	17	1 : 0.94
190	34	31	1 : 0.91
200	69	74	1 : 1.07
210	03	20	1 : 6.66
	193	202	1 : 1.04

Sex ratio

The female were found slightly more numerous than male and a sex ratio of 1:1.04 between female 202 and 193 males were obtained. The same sex ratio was found in different months (Table 3) and different size classes (Table 4) of the fish. Based on size groups the males were predominant up to 190 mm accept 150 and 160 mm in the range of 190 mm and in the range of 190 to 210 mm the females were predominant. The monthly results show that the number of females were largely distributed in the month of May, June, September to November and the males were abundant in the month of April, August and December but overall number of females were slightly more than males. Table 3 and 4 show that total observed ratio of male and female differs significantly from the theoretically expected ratio of 1:1which was observed. Dwivedi and Menezes (1974) in fishes of the Goa Coast and Khan and Hoda (1993) from the Karachi coast ,while in the present study it is found to be 1.0:1.04.

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