

**REPRODUCTIVE BIOLOGY OF THE BLUE SPOT MULLET *VALAMUGIL SEHELI* (FORSKAL) FROM MANGALORE REGION, SOUTHWEST COAST OF INDIA**

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**ABSTRACT**

The blue spot mullet *Valamugil sehelii* spawns once a year between August and February with peak spawning during October - November. Males attain maturity at 250.5 mm and females at 256.5 mm total length. Males outnumbered females in the commercial catches, although the sex-ratio (M:F = 1:0.90) in the population showed no significant deviation. The fecundity of this species varied from 108378 to 910350 eggs with an average of 327944. Linear relationships were found between fish length, gonad weight and fecundity; and between fish length, fish weight and ovary weight.

**Keywords :** spawning size at first maturity, sex ratio, fecundity

The mullets form one of the important fisheries of the estuaries and coastal waters of India and constitute less than 0.3% of the total marine landings. *Valamugil sehelii* being the largest species among mullets has many desirable features, which make them suitable for aquaculture. There are only few reports (Sarojini, 1957 1958; Luther, 1963; Natarajan and Patnaik, 1972; Das, 1977; Reddy, 1985; Baburaj, 1987) on the reproductive biology of mullet inhabiting Indian waters. Therefore, the objective of the present investigation was to study in detail the reproductive biology of *V. sehelii* from Mangalore region.

A total of 1392 (731 males and 661 females) specimens collected at weekly intervals from the landing centres were examined during the study period (April 1998 - March 1999). The total length,

weight, sex and maturity stage were recorded in the laboratory, and the ovaries were removed and preserved in 5% formalin for further analysis. Seven stages of maturity were recognised based on both macroscopic and microscopic observations. Frequency of spawning, gonado-somatic index, size at first maturity, sex-ratio and fecundity were determined following standard procedures.

Ova diameter frequency polygons of *V. sehelii* belonging to seven maturity stages are given in Fig.1. The ova diameter studies indicated two distinct groups of ova, viz., immature and mature, in a mature ovary. The immature ova (0.032 to 0.160 mm diameter) were present in ovaries irrespective of the stages of maturity. An extended single spawning in mullet has been reported from the east coast (Sarojini,

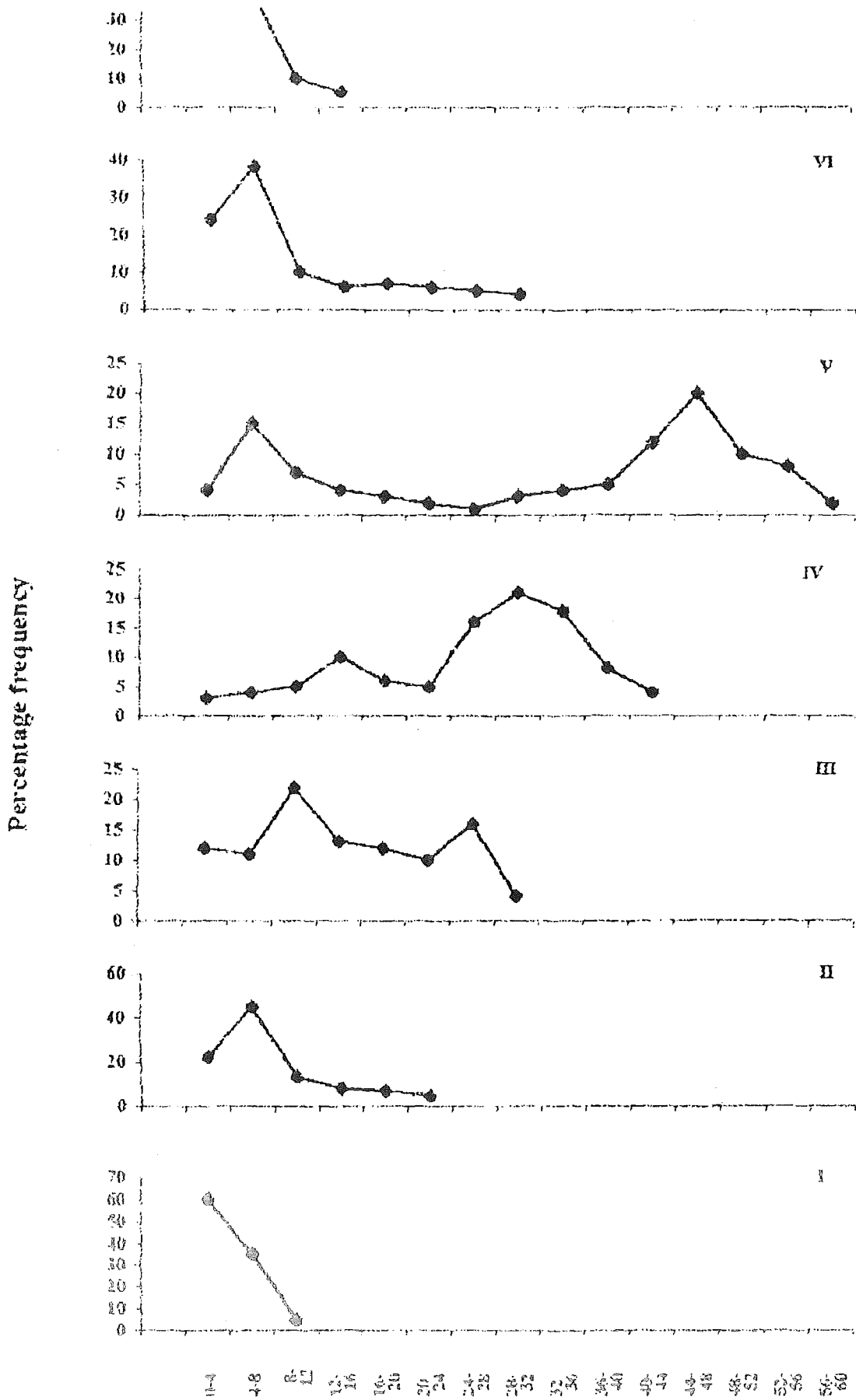


Fig. 1 : Ova diameter frequency polygons in different maturity stages

1957; Luther, 1963) and the west coast (Reddy, 1985; Baburaj, 1987) of India. The mullets exhibit non-intermittent and single spawning per season because of the production of only one set of ova a year (Alvarez - Lajonchere, 1979).

The seasonal variation in the occurrence of gonads in different stages of maturity indicated that *V. sehili* spawns during August - January, with a peak spawning during October - November along Mangalore region. The higher gonadosomatic indices (Fig. 2) recorded during August - January with peaks in October - November also confirm the spawning season of *V. sehili*. The spawning seasons of *Liza tade* (Reddy, 1985) and *V. spleigleri* (Baburaj, 1987) in Mangalore waters are from February to July and from October to March respectively. In *L. khozingeri*, a single breeding season from October to March has been reported from Karachi-Sind waters (Hoda and Qureshi, 1989).

Cumulative percentage of fishes belonging to mature, spawning, spent and spent-recovering stages in various size groups (Fig. 3) indicated that males attain maturity at a length of 250.5 mm and the females at 256.5 mm total length. The size at which mullets reach sexual maturity is highly variable and is related to the rate of growth which may vary depending on the ecological factors, food supply and local geographical conditions (Brusle, 1981). In *V. spleigleri*, males attain maturity at 192 mm and females at 203 mm total length in the estuarine waters of Mangalore (Baburaj, 1987). The male and female *V. cunnesius* attain sexual maturity at 169 mm and 160 mm, respectively, in Negombo Lagoon, Srilanka (Wijeyaratne and Costa, 1988).

The sex ratio of males : females is 1 : 0.90. The dominance of female population of *L. tade* (Reddy, 1985) and *V. spleigleri* (Baburaj, 1987) was reported in Mangalore waters. The variation in sex ratio is

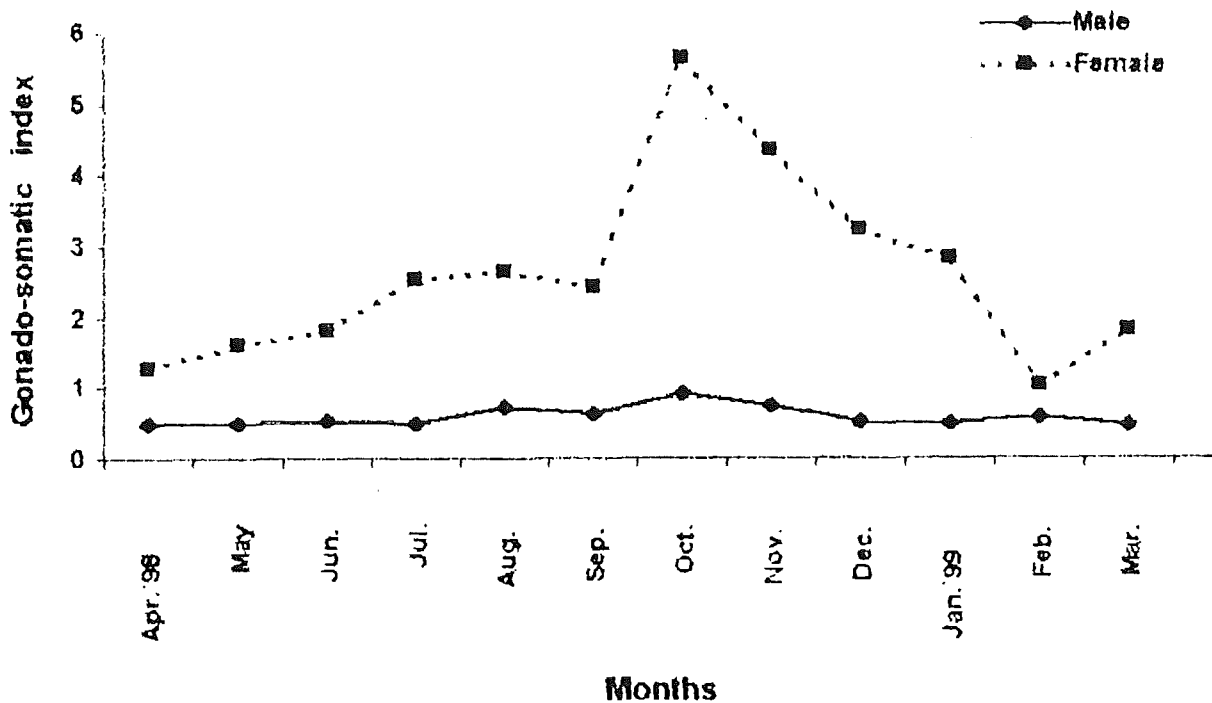


Fig. 2 : Seasonal changes in gonado-somatic index

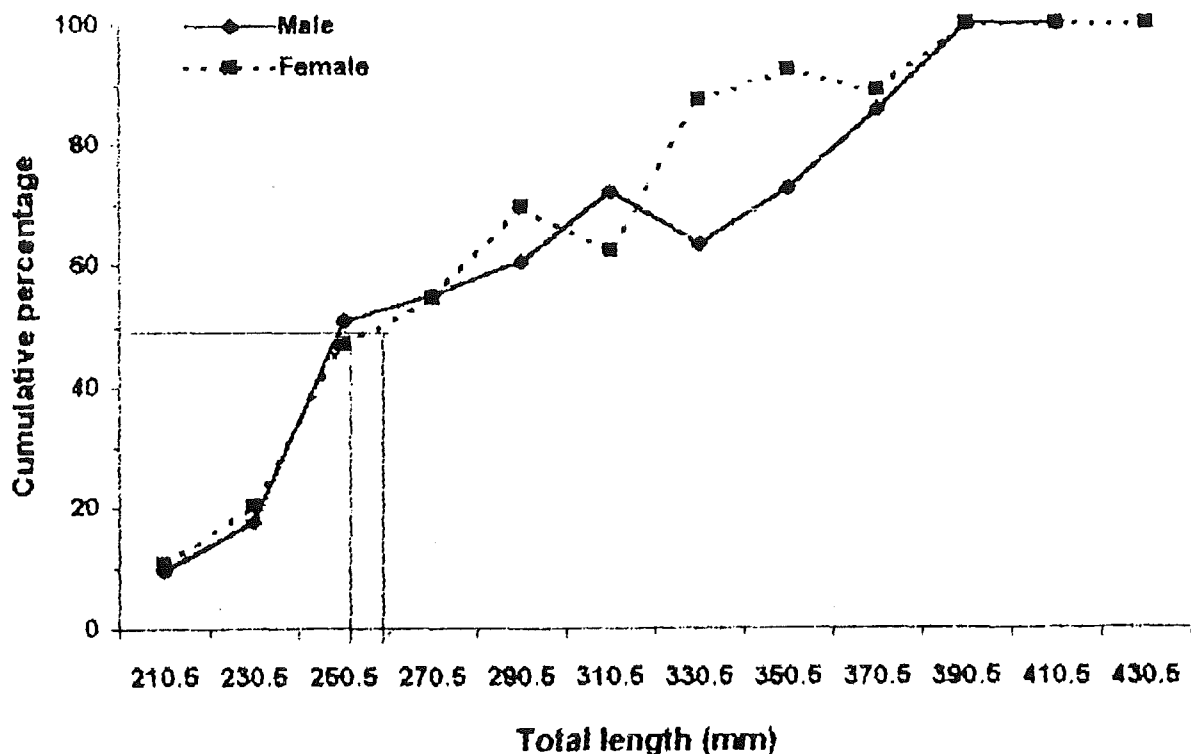
probably due to differences in age and size at maturity, gear selectivity in relation to sex differences and also due to differences in natural and fishing mortality between the two sexes (Del-Zarka and El-Sedfy, 1970).

Estimates of fecundity ranged from 108,378 to 910,350 with an average of 327,944 eggs. The fecundity varied considerably between the individuals irrespective of the length and weight of the

gonad. The least-square regressions for fecundity and body size data are presented in Table 1. A high degree of correlation was observed between fecundity and total length; fecundity and ovary weight; total length and ovary weight and body weight and ovary weight; The fecundity of *Mugil parsia* varied between 200,000 and 600,000 in Bengal waters (Sarojini, 1957). The fecundity estimations were 132,000 for *M.* and and 70,000 for *M. bunchanani* from

**Table 1 : Summary of least square regressions for fecundity and body size data**

Variables	Regression equation	Correlation co-efficient
Fecundity (F) and total length (L)	$\text{Log } F = -2.9743 + 3.4175 \text{ Log } L$	0.9029
Fecundity (F) and body weight (W)	$\text{Log } F = 1.7031 + 1.5733 \text{ Log } W$	0.5958
Fecundity (F) and ovary weight (OW)	$\text{Log } F = 4.3254 + 0.9851 \text{ Log } OW$	0.9626
Relative fecundity (RF) and body weight (W)	$\text{Log } RF = 1.6803 + 0.5813 \text{ Log } W$	0.7188
Gonad index (GSI) and body weight (W)	$\text{Log } GSI = 4.5457 + 0.4003 \text{ Log } W$	0.7127
Ovary weight (OW) and total length (L)	$\text{Log } OW = -7.1259 + 3.3534 \text{ Log } L$	0.9105
Ovary weight (OW) and body weight (W)	$\text{Log } OW = -2.5561 + 1.5520 \text{ Log } W$	0.9246



*Fig. 3 : Size at first maturity using data on cumulative percentage of mature fish*

Ennore Creek (Jacob and Krishnamurthy, 1948). The fecundity of *V. speigleri* in the size range of 150 to 415 mm total length varied from 134,327 to 839,492 in Mangalore waters (Baburaj, 1987). The number of eggs produced by females of Mugilidae varies generally according to species, region and spawning period.

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