NOTE

Some aspects of the reproductive biology of the mud crab *Scylla tranquebarica* of Ashtamudi Lake in Kerala

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Abstract

A study on the maturity stages revealed that the mud crab *Scylla tranquebarica* is a continuous breeder. Mature and spent stages were found to occur almost throughout the year. The berried females were encountered throughout the year with peak availability during December – February. The male matures on attaining a carapace width of 110-120mm and female 120-130 mm. The breeding cycle has been studied for one year (August 2000 to July 2001). Sex ratio indicated that the females out numbered the males.

Ever since the export of live crabs to Southeast Asian countries in 1982, there has been increasing demand for the mud crab Scylla tranquebarica (Raj, 1992). Presently, the stocks of various species are subjected to high fishing pressure due to indiscriminate hunting for trade and fattening the juveniles. Out of eight commercially important portunid crabs found in India, the mud crabs of genus Scylla are highly preferred due to their large size and better nutritive value (Rao et al., 1973). Though the reproductive cycles of crustaceans have been extensively studied by many workers (Paul, 1992; Paul et al., 1995; Kennelly and Watkin, 1994), very little information is available on the reproductive biology of species of the genus Scylla. As these crabs are ideal candidates for culture, the main aim of the present investigation is to provide information on the sexual maturity, sex ratio and annual breeding cycle of mud crab S. tranquebarica.

Material and methods

Adult mud crabs were collected from Ashtamudi Lake in Kerala for a period of one year from August 2000 to July 2001. For studying the breeding cycle, the specimens were fixed in 10% formalin. The sex ratio and various stages of maturity were noted.

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Results

Stages of maturity

In males the following stages were observed. *Immature-* the posterior extension of testes is small and translucent., *Maturing* - testes are slight pinkish in colour., *Mature-* testes are opaque and swollen with stored spermatozoa., and *Spent* - testes considerably reduced in size.

In females the various stages can be distinguished as: *Immature*- ovaries transparent, yellow, occupy 1/6th of body cavity, without a prominent seminal

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receptacle., *Maturing* - pink in colour, occupying 1/3rd of the body cavity., *Mature* - orange red in colour, with a prominent seminal receptacle, occupying full body cavity., and *Spent*- ovaries are considerably reduced in size.

Breeding cycle and maturity

For observing the breeding cycle of the crab, the berried females were counted every month in the sample collected for a period of one year (August 2000 to July 2001). The monthly percentage distribution of various maturity stages of males and females is given in Tables 1 and 2. The minimum size range at maturity for males and females was observed to be 110 – 120mm and 120-130mm respectively (Table 3). During non-breeding season the ovary is narrow and transparent or whitish strand, whereas in mature specimen, it is thick and bulky in appearance, and

yellow or reddish orange in colour. From Table 4 it is clear that a large number of berried females were found during December- February. Just before the extrusion of the eggs the mature individuals were recognizable by their bulging abdominal pleopods and the development of the feathery hairs on the exopodite of the pleopode. The eggs when extruded get attached to the exopodite with the help of a sticky substance. The testes are also well developed in most of the specimens during the breeding season. Sex ratio indicated that throughout the period the females out numbered the males (Table 4)

Discussion

Stephenson (1934) observed that several species of crabs inhabiting the tropical seas exhibited different types of breeding cycles such as 1) continuous around the year; 2) discontinuous; 3) two spawn-

Month	Sample size	Immature	Maturing	Mature	Spent
Aug.	6	33.3	33.3	33.3	-
Sep.	10	-	40.0	40.0	20.0
Oct.	14	12.3	42.9	28.6	12.3
Nov.	6			66.7	33.3
Dec.	10		20.0	40.0	40.0
Jan.	12	-	16.7	41.7	41.7
Feb.	13	-	-	38.5	61.5
Mar.	6	-	-	66.7	33.3
Apr.	9	22.2	33.3	22.2	22.2
May	3	-	33.3	66.7	-
Jun.	9	11.1	66.7	11.1	11.1
Jul.	9	66.7	11.1	11.1	11.1

Table 1. Percentage distribution of maturity stages of male S. tranquebarica (Aug. 2000 - Jul. 2001)

Month	Sample size	Immature	Maturing	Mature	Spent
Aug.	19	10.5	21.0	63.2	5.3
Sep.	12	8.3	16.7	41.7	33.3
Oct.	18		27.8	27.8	44.4
Nov.	15	20.0	20.0	20.0	40.0
Dec.	22	9.1	18.2	36.4	36.4
Jan.	16	-	25.0	37.5	37.5
Feb.	19	-	21.1	26.3	52.6
Mar.	10	-	10.0	30.0	60.0
Apr.	10	20.0	20.0	40.0	20.0
May	7	28.6	42.9	14.3	14.3
Jun.	14	28.6	42.9	28.6	-
Jul.	15	46.7	40.0	6.7	6.7

Table 3. Carapace width (mm) and maturity of S. tranquebarica

Table 4. Percentage of males, females and berried stagein S. tranquebarica (Aug. 2000-Jul. 2001)

CW	Males		Females		Month	Sample	Males	Females	Berried
mm	Immature	Mature	Immature	Mature		size	Sty Bay		stage
	No.(%)	No.(%)	No.(%)	No.(%)	Aug.	25	24.0	76.0	68.4
50	-			-					
60	4(100)	-	2(100)	- 3	Sep.	22	45.5	54.5	75.0
70	8(100)	-	5(100)	-	Oct.	32	43.8	56.2	72.2
80	10(100)	-	20(100)	-	Nov.	21	28.6	71.4	73.3
90	4(100)	-	21(100)		Dec.	32	31.3	68.7	81.9
100	5(100)	-	8(100)	-	Jan.	28	42.9	57.1	81.3
110	2(11)	17(89)	8(100)	A	Feb.	32	40.6	59.4	89.5
120	-	18(100)	-	25(100)					
130		20(100)	-	28(100)	Mar.	16	37.5	62.5	60.0
140		12(100)		16(100)	Apr.	19	47.4	52.6	60.0
150		-	-	21(100)	May	10	30.0	70.0	28.6
160	S	-	-	5(100)	Jun.	23	39.1	60.9	21.4
170	-	-	-	5(100)	Jul.	24	37.5	62.5	20.0

ing periods and 4) some showed only single spawning. It is reported that size at first maturity for female *S. tranquebarica* and *S.* serrata is about 120mm and 80mm carapace width (C.W) respectively (Anon., 1997). It is also reported that size range at first maturity of S. tranquebarica is 125 - 133mm and 129 - 135mm carapace width for males and females respectively. Whereas for S. serrata it is 80 -89mm and 85 –96mm CW for males and females (Anon., 2000). Anil (1997) observed that the minimum size at first maturity is 84mm and 122mm for S. serrata and S. tranquebarica respectively. Compared to above findings the present study on S. tranquebarica revealed that the female attained first sexual maturity at 120-130 mm CW and reached a maximum size of 170mm CW. The male was mature at 110-120 mm CW and attained maximum size of 140 mm CW.

Krishnapillai and N.B. Nair (1976) observed that in the reticulate crab Portunus pelagicus, the berried specimens are found throughout the year, abundant from September-March with peaks in September- December and February, suggesting that spawning takes place during these period. For the spotted crab P. sanguinolentus also berried stage is found throughout the year with abundance from October/November and February-May with peak in February. And for S. serrata, berried females are found during November-April with peak in December-February. Anil (1997) observed that berried Scylla spp. are observed in the marine catch throughout the year but their frequency was very low during monsoon. They were also seen in backwaters throughout the year except during June to August in the case of *S. tranquebarica*. Peak occurrence of berried *S. tranquebarica* was noticed during February-March. In the present investigation, the berried stage in *S. tranquebarica* was found throughout the year with a peak occurrence during December-February. It may be inferred that this species breeds throughout the year with slight monthly variation.

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