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THE EARLY STAGE OF *SCYLLARUS SORDIDUS* (STIMPSON) FROM THE INSHORE PLANKTON OFF VIZHINJAM TOGETHER WITH A NOTE ON THEIR DISTRIBUTION

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ABSTRACT

The regular occurrence of the phyllosoma (stage I) of the scyllarid lobster *Scyllarus sordidus* (Stimpson), a species whose adults are not yet reported from the southwest coast of India, in the inshore plankton off Vizhinjam is being reported. This is the first time that these larvae were collected regularly from the routine plankton samples; and their identity was possible by comparing them with the details of phyllosoma (stage I) hatched out in the laboratory from known adults by earlier workers. The larvae were present in the plankton throughout the year for a period of 8 years (1980 to '87). Interestingly, during this period no larvae of any of the panulirid species that are more common and commercially exploited occurred in the plankton samples collected. The presence of stage I phyllosoma in the plankton throughout the year indicates protracted breeding. The presence of these larvae in the inshore areas of Vizhinjam especially in more numbers in the Bay collections would indicate the occurrence of a population of the adults somewhere in the vicinity of Vizhinjam very near the shore.

INTRODUCTION

IT IS WELL known that the inshore areas extending from Vizhinjam to Cape Comorin harbour many productive lobster grounds. The present authors, while engaged in a regular study on the plankton off Vizhinjam, made special attempts to collect and rear the larval stages of lobsters and to correlate them with the known breeding period of atleast a few of the more common species of lobsters inhabiting this area. But, quite contrary to the expectation no larval stages of any of the commonly fished species could be collected, instead the phyllosoma (first stage) of *Scyllarus sordidus* (Stimpson), whose adults are not yet reported from the Southwest coast of India, could be collected regularly and in good numbers during the period of study (1980-'87). The total absence of the larvae of more common lobsters of this area and the regular occurrence of the early phyllosoma of another species which is unknown to this area are the two interesting aspects emerged during the present study. Since the larvae of *S.sordidus* are known only through laboratory rearing experiments and no record of the same from inshore plankton exists in literature, it is felt that the present observation is worth reporting.

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MATERIAL AND METHODS

The method of plankton collection, analyses of the samples etc. are the same as those reported earlier by Jacob *et al.,* (1987). The larvae that have been sorted out from the

plankton from time to time tally well with stage I phyllosoma of *S.sordidus* described by

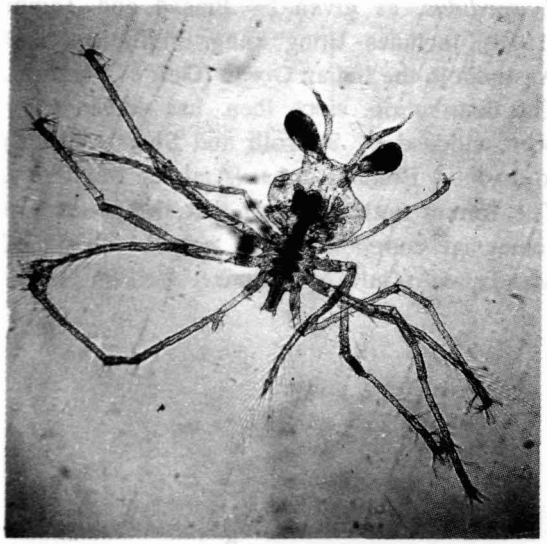

FIG. 1. Phyllosoma (stage I) of *Scyllarus sordidus*

earlier authors (Prasad and Tampi, 1960; Sankolli and Shenoy, 1973) from known adults.

OBSERVATIONS

The larvae measured from 1 mm to 1.3 mm (from the tip of abdomen to the tip of forebody) (Fig. 1) while those recorded by Prasad and Tampi (1960) and Sankolli and Shenoy (1973) measured 1.05 and 1.3 mm respectively.

A total of 361 larvae, all representing stage I, has been sorted out from the plankton samples collected during 1980-'87 period. The water column sieved out from the plankton was uniform throughout, ie. 100m^3 in both stations (Bay and open sea), and the plankton net was operated at both stations during every trip. When compared to the open sea Station, the number of larvae obtained from the Bay Station was more (135 and 226 numbers respectively). The number of occasions when the larvae were present in the plankton samples were also more in the Bay Station (29 times) as against that in the open sea Station (13 times) and the number per 100 m^3 fluctuated from 1-34 in the Bay while from 3-45 in the open sea Station. The larvae, besides being absent in the plankton during October in both stations, were absent during April, July and September from the open sea Station. The monthwise occurrence and the numerical abundance (pooled data) are furnished in Figure 2. A perusal of Figure 2 indicates that the larvae enjoyed more or less the same pattern of distribution in both the stations with some minor deviations in their numerical abundance from time to time. The dominant mode noted in the Bay was in March and was followed by 2 minor modes of equal intensity during May and November. The fourth mode noted in August was of a minor nature at this Station. In the open sea station also there were altogether four modes coinciding with those at the Bay Station but were of a lesser intensity numerically. Here the dominant mode noted was in November and was followed by another in August and this, in intensity, was similar to that which corresponded to the last mode noted at the Bay Sation. The other two modes of March and May were of a lesser intensity.

It is generally reported that the phyllosoma larvae are of rare occurrence in the plankton net collections. Examination of plankton samples collected during the period 1960-'65 by the various vessels participated in the International Indian Ocean Expedition (IIOE) revealed the presence of only 84 larvae for the entire period of collection (Tampi and George, 1975). However, Sarasu (1985) based on a collection made by R. V. *Skipjack* off Visakhapattinam, in 1983, could record comparatively larger number of phyllosoma larvae and attributed it to the operation of pelagic trawl instead of plankton net. Year round occurrence of the phyllosoma, especially stage 1 of *S. sordidus*, in the plankton net operated off Vizhinjam in large number (up to 45 nos/100 m^3) indicated that an adult population which breeds throughout the year exists in some areas off Vizhinjam.

The first phyllosoma stage collected off Vizhinjam shows some similarities with the same stage of *S. batei* described by Prasad *et al.* (1975). However, some differences noted with regard to various appendages are quite sufficient to distinguish the former from the latter. They are as follows:

1. Antennule (A1) has no endopod bud in *S. sordidus*, while in the other it is present.

2. Phyllosoma of *S. sordidus*, at this stage, has only 3 pairs of pereiopods of which the first two pairs have well developed exopod with natatory setae while the third has only rudimentary exopod. But in *S.batei*, at this stage, 4 pairs of pereiopods could be noted, of which the first 3 pairs have exopod with plumose setae and the 4th without any exopod. Although the presence of 4 pairs of pereiopods in stage 1 phyllosoma of *S. sordidus* has been mentioned by Sankolli and Shenoy (1974) in the text, only 3 pairs have been illustrated and this is in full agreement with the figures given by Prasad and Tampi (1960).

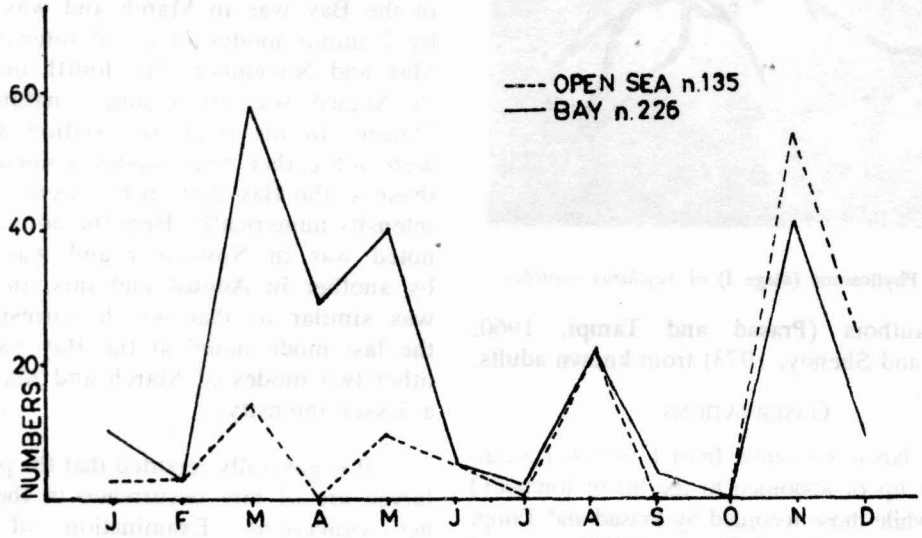

FIG. 2. Numerical abundance of phyllosoma larvae during the various months for the period 1980-'87, from pooled data.

DISTRIBUTION OF THE ADULT

The known distribution of the adult *S. sordidus*, as given by Prasad and Tampi (1968), includes Hong kong, Phillipines and Australia to the Indian Ocean (Gulf of Mannar). The distribution, since then, has considerably been widened by Sankolli and Shenoy (1973) to include Bombay area (Arabian Sea) also. The former authors found that the adults are somewhat common in the neighbourhood of Mandapam (Gulf of Mannar) but the larval stages were relatively rare in the routine plankton collections. The first record of *S. sordidus* from the Gulf of Mannar was that of De Man (1916) who remarked that the adult was found in shollow water inhabiting coral reefs in places where the bottom is composed of sand and shells. Sankolli and Shenoy (1973) could collect the adults from Danda Island, near Bombay, during October in low tides.

Breeding period

Prasad and Tampi (1960) obtained a few berried females from the Gulf of Mannar during

TABLE 1. Table showing number of phyllosoma larvae (No./100m^3), total displacement volume (ml/100m^3), temperature (°C) salinity (‰) and dissolved oxygen (ml/l) at Bay and open sea stations for the period 1980-'87

Year	Date	Station	Number/100m^3	Temperature (°C)	Salinity (‰)	Dissolved oxygen (ml/l)	Plankton volume (ml/100m^3)
1980	17/1/80	Open sea	3	27.5	34.60	—	14.2
	14/2/80	Bay	3	27.5	35.73	3.94	9.2
	27/2/80	Open sea	3	28.0	34.59	4.75	9.8
	27/3/80	Bay	11	29.8	34.58	4.94	23.5
	27/3/80	Open sea	11	29.8	34.90	4.92	11.7
	10/4/80	Bay	6	29.9	34.38	3.99	10.92
	25/4/80	Bay	6	28.0	34.12	4.20	9.8
	12/5/80	Bay	12	28.5	32.60	4.20	14.0
	12/6/80	Open sea	6	25.0	33.80	4.13	7.56
	7/8/80	Open sea	11	25.8	35.10	4.46	6.50
	5/11/80	Open sea	45	28.7	34.80	4.92	21.50
	18/12/80	Bay	6	27.0	35.00	5.22	7.07
1981	12/2/81	Bay	1	27.4	34.95	5.00	3.7
	12/3/81	Open sea	3	28.3	35.20	5.10	3.7
	14/5/81	Open sea	7	29.7	35.42	5.14	6.5
	19/4/82	Bay	11	29.5	34.00	4.05	14.7
	17/5/82	Bay	6	29.8	34.40	—	5.7
	13/8/82	Bay	11	27.4	34.50	4.05	11.31
1982	13/8/82	Bay	5	27.2	34.60	4.51	11.88
	15/11/82	Bay	23	27.0	34.50	4.64	9.9
	30/11/82	Bay	6	27.3	35.80	4.03	5.66
	30/11/82	Open sea	6	28.9	35.05	4.42	5.66
1983	11/5/83	Bay	5	30.80	34.44	4.42	6.51
	11/8/83	Bay	6	24.0	33.91	4.64	4.2
	29/9/83	Bay	3	25.3	34.75	3.78	2.83
	10/11/83	Open sea	3	27.0	34.96	4.19	1.42
	13/12/83	Bay	3	27.3	34.40	4.80	1.42
1984	28/1/84	Bay	6	27.8	35.10	4.90	2.83
	26/3/84	Bay	3	28.0	34.20	5.60	11.32
	1/5/84	Bay	6	28.0	33.50	5.02	2.83
	17/5/84	Bay	11	28.0	33.80	4.20	4.53
	6/6/84	*Bay*	*6*	—	*32.40*	*4.56*	7.4
	9/11/84	Bay	6	25.0	33.45	4.49	11.32
	20/12/84	Open sea	23	25.10	34.10	4.68	7.07
1985	12/3/85	Bay	11	29.5	34.05	4.96	2.26
	29/3/85	Bay	34	30.0	34.55	4.68	3.96
1986	1/7/86	Bay	2	24.0	33.30	4.59	1.64
1987	25/5/87	Open sea	3	30.0	34.95	4.89	2.83
	14/8/87	Open sea	11	27.0	34.50	4.86	6.51

January-February months. The eggs were hatched in the laboratory and the first stage could be traced out. Sankolli and Shenoy (1973) obtained a berried female in October from off Bombay and quoting an earlier work (Chhapgar and Deshmukh, 1964) concluded that the breeding season of this species is during winter months. Six stages of phyllosoma have been reared in the laboratory with an average of 5 days each for a stage. They also expected two more stages to ensue.

DISCUSSION

The planktonic larval stages of lobsters are well suited for their dispersal far and wide by currents. During these stages that last for several months, the larvae undergo several moults and then settle down in an advanced stage which looks almost like an adult except in the absence of lime in the shell. When this stage is attained their movements are considerably restricted and their further survival depend on the nature of the bottom and the protection it provides to the young lobster.

Along the west coast of India it is noted that the currents are mainly southwards during the monsoon and post monsoon months and mainly northwards from December-February months (Ramamirtham 1967). Hence, there is some ground to believe that these larvae might have migrated either from the Gulf of Mannar or off Bombay. But the presence of Stage I phyllosoma in the plankton throughout the year irrespective of the current patterns strongly suggest against this possibility. The short durations of 5 days in the case of each stage as given by Sankolli and Shenoy (1973), also suggest against this assumption. Experimental fishing by *R. V. Varuna* in the rocky offshore grounds at 75-100m depth (Silas 1965) has also not recorded addults of *S. sordidus* from S. W. Coast. The explanations which may appear more plausible are (1) their origin in some unknown bed either in the inshore or offshore areas. (2) The larvae might have been produced by an adult stock existing in some nearby grounds. Since Vizhinjam breakwaters are reinforced with granite boulders, concrete blocks etc. and the bottom appears rather muddy at places, there is every possibility that the adults might have got established in this area in the recent past, and this stock might have caused the liberation of newly hatched larvae throughout the year. But this point, in the absence of any record of their adult from this area, cannot be stressed as a plausible cause for the occurrence of the larvae.

Some interesting points, worth investigating in future that emerged during the present study may be outlined as follows: (1) The exact source of phyllosoma that frequent the Vizhinjam area may be traced out by further studies from different areas (2) A similar investigation may also be undertaken to study the presence of adult stages of *S. sordidus* in and around Vizhinjam. Attempts may be made to collect live larvae of *S. sordidus* from the plankton and to rear them through different stages in the laboratory.

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