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Dr. P.S.B.R. JAMES

DIRECTOR

Central Marine Fisheries Research Institute

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Edited by

Dr. K.J. MATHEW

Central Marine Fisheries Research Institute

COCHIN - 682 031

THE PHYLLOSOMA LARVAE FROM ANDAMAN AND NICOBAR WATERS

M. KATHIRVEL* AND D.B. JAMES**

Central Marine Fisheries Research Institute, Cochin - 682 031

ABSTRACT

The Isaacs-Kidd Midwater Trawl, Bongo net and pelagic trawl collections from Andaman and Nicobar waters during April, 1986 contained 80 palinurid, 15 synaxid and 70 scyllarid lobster larvae. Night hauls were better than that of day time operations. The depth-wise hauls from Isaacs-Kidd Midwater Trawl has indicated that greater number of palinurid larvae came from 26-50 m deep and that of scyllarid from 76-100 m. Among the palinurids, larvae belonging to *Panulirus homarus* and *P. Penicillatus* dominated, while larvae of *Scyllarus martensii* and *S. rugosus* were more in number. Some of the larval stages of *Puerulus sewelli*, *P. angulatus* and *Palinustus mossambicus* are described in detail.

INTRODUCTION

The occurrence of commercially important lobsters, namely, *Panulirus homarus* (Linnaeus), *P. ornatus* (Fabricius), *P. versicolor* (Latreille), *P. penicillatus* (Olivier), *P. longipes* (A. Milne-Edwards), *Puerulus angulatus* (Bate), *P. sewelli* Ramadan, *Linuparus trigonus* (Von Siebold) and *Thenus orientalis* (Lund) in the waters around Andaman and Nicobar Islands, is reported by Balss (1925), Chekunova (1973), Menon (1976), Premkumar and Daniel (1980) and Shanmugham and Kathirvel (1983). However, no biological information is available on these species, except the remarks on the deep water lobster *P. sewelli* by Chekunova (1973) and the record of a few larvae of *P. penicillatus*, *Scyllarus cultifer* and *S. rugosus* from this region by Tampi and George (1975). The present account provides more information on the phyllosoma larvae obtained during the fourteenth cruise of FORV Sagar Sampada.

MATERIALS EXAMINED

The phyllosoma larvae were collected from a wider area lying between Lat. 5° to 15°N and Long. 90° to 95°E in the eastern part of Bay of Bengal and the western part of Andaman Sea during 1st to 23rd April, 1986. The larvae were obtained from the operation of Isaacs-Kidd Midwater Trawl (IKMT - 30 minutes horizontal haul), pelagic trawl (PTR - 1 hour horizontal haul), and Bongo net (15 minutes oblique haul). The depth of operation for IKMT was 33 to 125 m, while it was 50 to 100 m and 150 to 0 m for PTR and Bongo net respectively. The position of station from where the larvae were obtained and the number of

larvae caught either in a single gear or more gears are marked in Fig. 1. The total number of larvae from IKMT and PTR hauls came from the entire sample analysed and those of Bongo net were the estimated number raised from the sub-sample to the total volume of each plankton sample.

OBSERVATIONS

Numerical abundance

The number of larvae obtained in different gears are given in Table 1.

Among the three gears, the maximum number of larvae came from IKMT, followed by Bongo net and the least in PTR, which could have been due to the varying mesh of the net. In the combined figures for three gears, the palinurid larvae dominated (48.5%), followed by scyllarids (42.4%) and synaxid (9.1%).

Diurnal variations

The phyllosoma larvae caught during the day and night hours in the three gears are given in Table 2.

It has been observed that night hauls yielded more larvae than that of day times. A maximum catch rate of 7.4 larvae/haul was recorded in the night hauls, whereas only 4.5 larvae/haul was seen in day time. Among the three groups of larvae, those of palinurids were more in number in the night time IKMT and Bongo net collections. However, maximum number of scyllarids came from the day time IKMT hauls. These larvae appeared to congregate in the upper columnar waters during night times.

Present address : * Central Institute of Brackishwater Aquaculture, 12, Leithcastle Street, Santhome, Madras - 600 028.

** Tuticorin Research Centre of CMFRI, 90, North Beach Road, Tuticorin - 628 001.

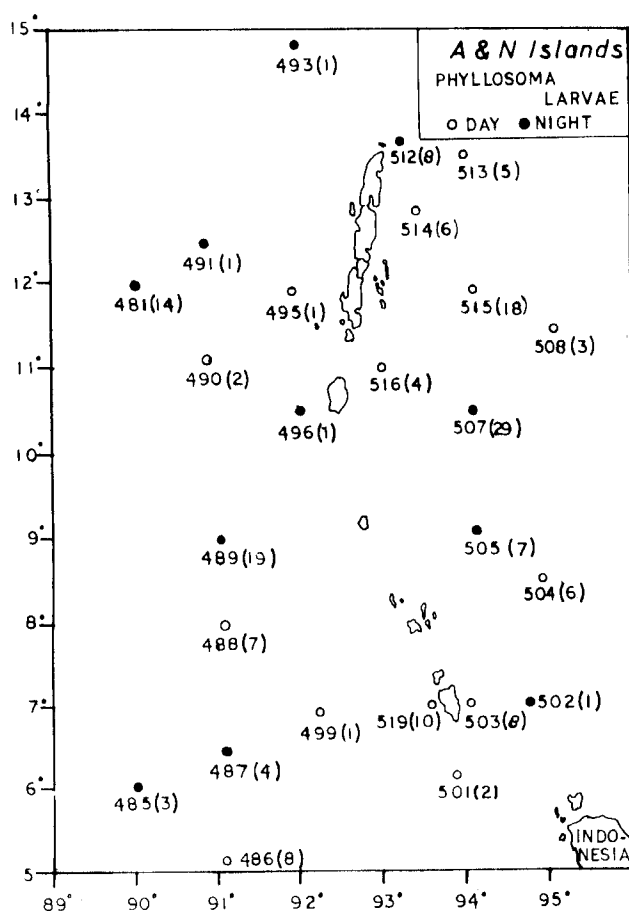


Fig. 1. Map showing the location of stations and numerical occurrence (in brackets) of phyllosoma larvae.

Depth-wise distribution

Among the three gears studied, the IKMT alone was operated from different depths, ranging from 26 to 125 m. The larvae caught from different depths are summarized in Table 3.

TABLE 1. Gear-wise number of phyllosoma larvae

Gear	Total No. of hauls made	No. of positive hauls	Number of larvae			
			Palinurid	Synaxid	Scyllarid	Total
IKMT	40	23	51	5	67	123
PTR	31	3	1	—	3	4
Bongo	40	6	28	10	—	38
Total			80	15	70	165
% by number			(48.5)	(9.1)	(42.4)	

Among the different depth zones, both day and night hauls from 26 to 75 m yielded greater number of larvae (5.4 to 9.0 per haul) than those from 76 to 125 m (1.0 to 4.0 per haul) indicating the concentration of larvae in the upper layer of the water mass.

Dispersal of larvae

Depending upon the location of stations, the distance from the nearer shore was calculated and plotted against the number of larvae caught in different stages in Fig. 2. It has been observed that early stages (I to VI) were caught in considerable number beyond 150 km and were recorded upto 450 km from the shore whereas, the advanced stages (VII to XII) were found in more number upto 300 km distance.

Species composition

In the IKMT collections, *Panulirus homarus* was the dominant species (47.1% by number), followed by *P. penicillatus* (33.3%), *Puerulus angulatus* (5.9%), *Palinustus mossambicus* (5.9%), *P. sewelli* (3.9%), *P. versicolor* (1.9%) and *P. longipes* (1.9%). The synaxid larvae were represented by *Palinurellus wienckii*. In the case of scyllarids, *Scyllarus martensii* formed 32.8%, followed by *S. rugosus* (25.4%), *S. batei* (19.4%), *Scyllarus* sp. 1 (17.9%) and *S. cultifer* (4.5%). In the Bongo net collections, only palinurid and synaxid larvae were present, of which, *P. homarus* dominated (34.1%). The other larvae included were *P. wienckii* (26.3%), *P. versicolor* (13.2%), *P. sewelli* (13.2%) and *Panulirus* sp. (13.2%). Among the four larvae caught in the PTR, 3 belonged to *Scyllarus* sp. 1 and 1 to *P. Penicillatus*.

Description of larvae

Some of the stages of *Puerulus sewelli*, *P. angulatus* and *Palinustus mossambicus* which were not known earlier are briefly described here. Two larvae

ON PHYLLOSOMA LARVAE FROM ANDAMAN & NICOBAR WATERS

TABLE 2. Number of phyllosoma larvae in day and night collections

Gear	Day Time						Night Time					
	No. of hauls	Number of larvae					No. of hauls	Number of larvae				
		P.	Sy.	Sc.	Total No./ haul			P.	Sy.	Sc.	Total No./haul	
IKMT	12	18	2	34	54	4.5	11	33	3	33	69	6.2
PTR	3	1	—	3	4	1.3	—	—	No operation— —			
Bongo	1	—	1	—	1	1.0	5	28	9	—	37	7.4

P. = Palinurid; Sy. = Synaxid; Sc. = Scyllarid

TABLE 3. Depth-wise distribution of phyllosoma larvae in the IKMT collections

Depth range (m)	No. of hauls made		No. of larvae caught		Number/haul	
	Day	Night	Day	Night	Day	Night
26 - 50	1	5	6	27	6.0	5.4
51 - 75	4	4	23	36	5.7	9.0
76 - 100	4	1	14	1	3.5	1.0
101 - 125	4	—	16	—	4.0	—

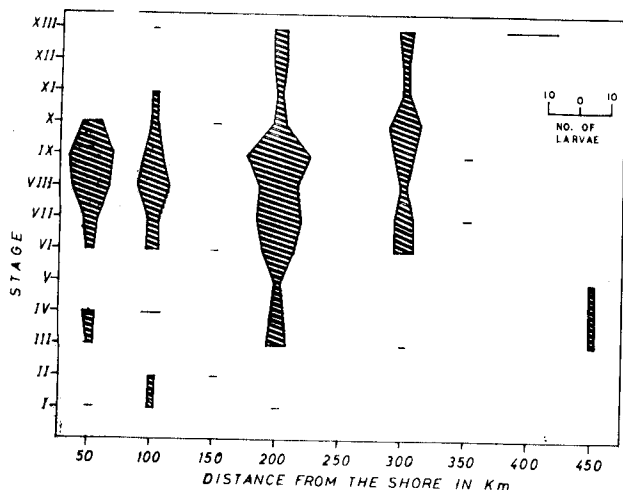


Fig. 2. Dispersal of phyllosoma larvae in the inshore and offshore waters.

of *P. sewelli* measuring 15.5 and 15.8 mm in total length were obtained from Station No. 515 by IKMT collection. In both the specimens, cephalic shield overlapped the thorax including the coxa of fifth walking legs. First and second antenna was 5 and 7 segmented. The first maxilliped was bilobed, while the exopod of second maxilliped was 2-segmented and setose. Considering the size and development of characters, these two larvae were placed in stage IX. Among the three specimens of *P. angulatus* obtained from station No. 519 by IKMT, the one measuring 10.0 mm in TL belonged to stage VIII, while the other

two were in VII. The notable developments in stage VIII were 4-segmented antenna 1, 5-segmented antenna 2, cephalic shield overlapping 5th abdominal segment and pleopod long and biramous. First maxilliped bilobed, exopod of second maxilliped long and setose and fifth leg uniramous. All the three specimens of *Palinustus mossambicus* came from PTR hauls made at stations 481 and 504. These specimens were larger in size measuring 33.0, 36.0 and 51.0 mm in TL. The first two belonged to stage X and the largest to stage XII. The most striking character of these larvae was the presence of one outer and one inner spine at the distal part of third segment of second antenna.

GENERAL REMARKS

The present collection of phyllosoma larvae from the eastern part of Bay of Bengal and western part of Andaman Sea around Andaman and Nicobar Islands has indicated the dominance of larvae of *Panulirus homarus* among the palinurids and those of *Scyllarus martensii* among scyllarids, which might have been due to the presence of larger adult population of these two species in the region, as suggested by Prasad and Tampi (1965). Though the adults of *P. wienckii*, *P. mossambicus*, *S. martensii* and *S. batei* are not recorded so far from this area, the collection of their larvae indicates their availability in these oceanic islands.

Among the 165 larvae collected, 80 belonged to palinurids. Such dominance of palinurids over the other groups is reported by Prasad *et al.* (1975) from the Indian Ocean. The greater abundance of larvae in the IKMT hauls made during the night in the depth range of 26 to 75 m has indicated the resultant of the upward migration, as observed in the earlier studies on the distribution of phyllosoma larvae (Johnson, 1960; Saisho, 1966; Chittleborough and Thomas, 1969; Prasad, 1978; Rimmer and Phillips, 1979). Moreover, Prasad (1978) has opined that the concentration of larvae in the upper 100 m zone is related to the distribution of pycnocline values. The record of early larval stages in the distant waters and those of advanced stages in the nearshore waters (see Fig. 2) suggests the possible emigration and immigration of larval forms through the offshore/onshore currents. However, more oceanographical data is required to confirm this view.

The larval stages of *P. sewelli*, *P. angulatus* and *P. mossambicus* described here have shown the salient characters noted for early stages of respective species by Tampi and George (1975) and Prasad *et al.* (1975).

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