composition of female ranged between 57.1% and 94.3% during 1991-'92 and between 60.0% and 94.0% during 1992-'93. Ovigerous females were not recorded in the catches during 1991-'92. On the otherhand, ovigerous females were observed during the subsequent year forming on an average 3.9% of the female population. The maximum proportion of berried female was observed in June. However, it was totally absent in the catches in July. The proportion of berried female was 8.6% in August. It declined to 5.7% in September and then to 2.6% in October. The minimum proportion of 1.7% was recorded in December. (Table 4).

The fishery of *P. pelagicus* from Tuticorin bay is of low magnitude as revealed by the estimated catch landed during the period 1991-'93. It contributed to the commercial fishery only during two months *viz.* July and August during 1991-'92 and June and September during the subsequent year. During the rest of the months its contribution to the fishery was almost negligible. Nevertheless, it may be mentioned here that the fishermen operated *thallumadi* in the bay area mainly for exploiting the prawn resources and the landing of the crab alongwith prawn catches was only incidental, which at times landed in large numbers and supported the commercial fishery.

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A STUDY ON PINNOTHERES CRABS ASSOCIATED WITH NEWLY RECORDED *SOLETELLINA VIOLACEA* (Lam.) AND *PLACUNA PLACENTA* (Linn.)

ABSTRACT

The present paper deals with association of *Pinnotheres* crabs as commensalist in *Soletellina violacea* and *Placuna placenta*. The sex-wise percentage composition of *Pinnotheres maculatus* (Say) varies in *Soletellina*. Both the sexes of *Pinnotheres maculatus* were highest in the month of July (16.12%) and highest percentage of female crabs noticed (63-70%) during January to March. In *Placuna placenta* the percentage of female crab was highest in December (70.0%) and lowest in July (25.0%).

COMMENSALISM means 'eating of the same table'. It is thus a loose type of relationship and is not an obligatory one. The relationship between the hermit crab *Eupagurus prideauxi* and the anemone *Adomisia palliata* is an obligatory one, since neither of the partners will survive alone. It is more or less an intimate relationship during which the commensal

generally derives physical shelter from the host, is nourished on goods that are associated but not a part of the host and never remain metabolically dependent on the host.

A number of paper have been published on the heterospecific associations, it few workers have attempted to study the relationship of pea crab with the molluscan specimens. Among these, the report of Baer (1952), Caullery (1952), Cameron (1956), Hopkins (1957) and Pearse (1964) are important.

During the present investigations on *Placuna placenta* and *Soletellina violacea* such commensalistic relationship between these bivalves and same crabs was invariably observed. In the case of *P.placenta*, the pea crab, *Pinnotheres placunae* was invariably found in its mantle cavity near the anal region.

The pinnotheriols crabs have been known since very ancient times to be associated with other marine animals. More recently they have been recognised as commensals. Both males and females were found this as commensals within the mantle cavity.

For the study, *Soletellina violacea* and *Placuna placenta* were collected of every week for a period of 15 months from Mithbav creek and Vashi (Lat. 16° 20'N; Long. 73° 25'E) during 1989-90.

During the present investigations on *Soletellina violacea* and *Placuna placenta*, the commensalistic relationship between these bivalves and pea crabs were invariably observed.

Taxonomical position

Class	:	Crustacea
Sub-class	:	Malacostraca
Order	:	Decapoda
Sub-order	:	Reptantia
Section	:	Brachyura
Sub-section	:	Brachygnatha
Super family	:	Brachyrhyncha
Family	:	Pinnotheridae
Sub-family	:	Pinnotherinae

Pinnotheres placunae were found living as commensals within the mantle cavity of the bivalve *Placuna placenta* (Fig. 1A, B). The majority were found near the anus. The observations on hundreds of *P.placenta*, it was found that the presence of this crab in the mantle cavity has no ill effect on the host. The various morphometric measurements (maximum) are given below:

Male : Length of carapace : 5.75 mm.
Breadth of carapace : 6.25 mm.
Ratio of length breadth of carapace : 0.92 mm.

Female : Length of carapace : 7.25 mm.
Breadth of carapace : 11.25 mm.
Ratio of length breadth of carapace : 0.644 mm.

The oviparous females were found in the month of January to March but ovulated females were observed from April onwards.

In the female, the body is soft and membranous. The carapace is broader than long, circular, smooth and flat.

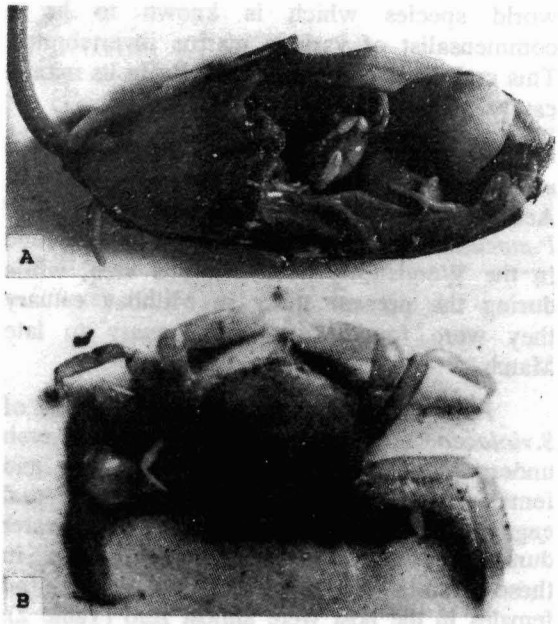

FIG. 1 A. *Soletelline violacea* with female *Pinnotheres* crab
B. *Pinnotheres* male crab

In the male, the carapace is smooth, and harder than that of the female. The smoothness and softness gives less disturbances to their host.

The food of the commensal crab was somewhat similar to that of its host. The feeding times appears to be at high tides. Its feeding activity within the mantle cavity of the host, does not cause any damage to the host.

The percentage of prevalence of *pinnotheric* crabs in *Placuna* in different months of year (Table 1) were high. Percentage of mature female crabs was noticed in January to March, November and December. A few matured ones were also noticed in May to July - out of the total number of *Placuna* examined during 15 months, 53.07% were associated with female crabs, 19.463% with male crabs and 9.57% with both male and female crabs together, only a few specimens, of *Placuna* were found to be without the crab.

The commensalism of *Soletellina violacea* : The pinnotherid crab, *Pinnotheres maculatus* (say), is almost invariably associated with the bivalve, *Soletellina violacea*. Its systematic position is similar to *Pinnotheres placuna, Pinnotheres maculatus*, the mussel crab, is the second new world species which is known to be a commensalist of various marine invertebrates. This crab lives commensalistically in its mantle cavity. (Fig. 1A, B).

Account of the life-cycle of *Pinnotheres maculatus* has been given by Pearce (1964). According to Pearce origenous female of *P.maculatus* occur from late May to Mid-June in the Woodshole, Massachusetts area, while during the present study in Mithbav estuary they were found from mid-January to late March.

Pinnotheres maculatus, the gill lamina of *S.violacea* (L) within the host, the crab undergoes several molts. Mature, males and females were seen to leave their host and engage in copulatory swimming in open water during October to December and hence, in these months the percentage of males and females in the host were almost zero (Table 2). After copulation, males do not seem to reenter the mantle cavity of these bivalves.

The mature female shows the following characters : Suborbicular carapace, 8.5 mm long, 9.2 mm wide, thick and firm but not hard, convex, surface uneven, orbits small subcircular, walking legs slender hairy above and below. Young females were dark-pink in colour while more mature females were light coloured.

The mature male shows the following features : Flat subcircular carapace 7.5 mm long and 6.7 mm wide, always harder than that of females.

Table 2 shows the percentage of the bivalves associated with either males or females both. It was seen that a greater number of *Soletellina* were commensalistic with female crabs than those associated with male crabs which when full grown spend more time outside the shells, in the open water. For most of the time, the crabs remain within the gill lamellae of the bivalve. At the time of feeding of the bivalve, they remain at the base of the inhalent siphon. The movements of these active crabs were likely to cause damage to the delicate gill lamellae of the host. This is taken care of by the growth of tumour like tissue of the junction of the two lamellae of the gill.

Food of *Pinnotheres maculatus* was similar to that of their host. Feeding takes place at high tide. During feeding time the commensalist remains at the base of the siphons of the bivalve.

The pea crabs and muscle crabs have been recognised as commensals. They are associated with marine animals. *Pinnotheres placunae* were found within the mantle cavity of *Placuna placenta*. It was found that this crab has no serious effect on the host. Both the sexes were found in the host body. The matured crabs were found in March to May. The percentage composition, 53.07% was with female crabs, 19.46% with male crabs and 9.57% with both male and female crabs together.

Pinnotheres maculatus was associated with the bivalve *Soletellina violacea*. It was known to be a commensalist of many invertebrate. They lived in the mantle cavity. It was seen

TABLE 1. Showing the percentage of prevalence of *Pinnotheres placuna* in *Placuna placenta* in different months of year

Month	Total No. of specimens observed	*Placuna* with female crab	*Placuna* with male crab	*Placuna* with male and female crabs	*Placuna* without crab
Nov., 1988	21	11	5	2	3
		52.380%	23.805%	9.523%	14.285%
December	28	14	8	4	2
		50.00%	28.571%	14.285%	7.142%
Jan., 1989	23	12	6	1	4
		52.173%	26.086%	4.347%	17.391%
February	34	16	10	5	3
		47.058%	29.411%	14.705%	8.823%
March	9	6	2	1	—
		66.666%	22.222%	11.111%	—
April	15	9	3	2	1
		60.00%	20.00%	13.333%	6.666%
May	11	4	1	—	6
		36.363%	9.090%	—	54.545%
June	18	7	2	—	9
		38.888%	11.111%	—	50.00%
July	20	5	1	2	12
		25.00%	5.00%	10.00%	60.00%
August	24	12	5	3	4
		50.00%	20.833%	12.50%	16.666%
September	12	8	2	1	1
		66.666%	16.666%	8.333%	8.333%
October	11	7	2	2	—
		63.636%	18.181%	18.181%	—
November	30	17	6	3	4
		56.660%	20.00%	10.00%	13.333%
December	16	12	3	1	—
		75.00%	18.75%	6.25%	—
Jan., 1990	18	10	4	2	2
		55.555%	22.222%	11.111%	11.111%

TABLE 2. Showing the percentage composition of *Pinnotheres maculatus* (Say) attained in *Soletallina violacea* in different months of year

Month	Total No.of specimens observed	*Soletellina* with female crab	*Soletellina* with male crab	*Soletellina* with male and female crabs	*Soletellina* without crab
March, 1988	21	10	2	—	9
		47.619%	9.523%	—	42.857%
April	19	7	1	—	11
		36.842%	5.263%	—	57.894%
May	21	5	1	—	15
		23.805%	4.761%	—	71.428%
June	20	12	3	2	3
		60.00%	15.00%	10.00%	15.00%
July	31	17	5	5	4
		54.838%	16.129%	16.129%	12.903%
August	17	8	2	2	5
		47.058%	11.764%	11.764%	29.411%
September	16	6	2	1	7
		37.50%	12.5%	6.25%	43.75%
October	7	4	—	—	3
		57.142%	—	—	42.857%
November	14	2	—	—	12
		14.285%	—	—	85.714%
December	14	1	—	—	13
		7.142%	—	—	92.857%
Jan., 1990	11	7	—	—	4
		63.636%	—	—	36.363%
February	17	12	1	1	3
		70.588%	5.882%	5.882%	17.64%
March	26	17	3	—	6
		65.384%	11.538%	—	23.076%
April	21	11	1	—	9
		52.380%	4.761%	—	42.857%
May	24	6	1	—	17
		25.00%	4.166%	—	70.833%

that a greater number of female crabs usually spend more time outside the hosts than the females. The space between the gill lamellae shows tumer like outgrowth to avoid the mechanical injury during active feeding, but remains clear, when there was no association of crab with the host. The food items were generally similar to that of their hosts.

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FOOD AND FEEDING OF NEWLY RECORDED JUVENILES *SOLETELLINA VIOLACEA* (Lam.)

ABSTRACT

The present paper deals with the food and feeding of juveniles *Soletellina violacea* (Lam.). It is the first time recorded in India at Mithbav Creek (Lat. 16°.20'N, Long 73°.25'E) at Sindhudurg district on west coast of India. It is observed that the rate of feeding was increased along with increase of salinity. The animals spend more time in feeding during post-monsoon than monsoon to avoid self dilution. The juveniles mostly feed on detritus, diatoms, ciliates, crustaceans remains etc. Detritus and diatoms constitute the major components of the food items. The percentage composition of diatoms varies from 9.52% to 42.00%.

IT IS a well-known biological and ecological fact that the food of an animal may be directly associated with its feeding habits and habitats. The animals exhibit such an ability to adopt themselves to life in so many different types of habitats. They have learned how to feed in variety of different ways.

The author wish to express their grateful thanks to Mr. Solen Whybrow of the British Museum for the exact identification of the specimen.

Soletellina violacea (Lam.) is a burrowing giant edible bivalve. It inhabits in pure soft sandy-muddy bottom upto a depth of few feet below the surface but maintains connection with the surface water through extra large siphons. In Mithbav creek, the animals are found only in selected grounds, where the environmental conditions are suitable for survival.

Indian contributions on food and feeding of molluscs are by Durve (1960), on *Crassostrea cuculatta*, Joshi (1963) on *Katelysia mormorata*, Ranade (1964) on *Meretrix meretrix*. However, since this species has been recorded for the first time, nothing is known about its biology.

The samples of *S.violacea* (Lam.) were collected from the Mithbav creek for a period of fifteen months (1991-92) separately for morning, noon and evening. About 300 specimens were analysed for the study. As per