

NOTES ON ANIMAL ASSOCIATIONS. 5. THE PEA CRAB  
*PINNOTHERES DECCANENSIS* CHOPRA INSIDE THE RESPIRATORY  
 TREE OF THE SEA CUCUMBER, *HOLOTHURIA SCABRA* JAGER.

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THE sluggish and comparatively defenceless nature of the holothurians make them convenient hosts to many commensals and parasites. A variety of commensals, from protozoans to fish, have been reported from them of which the most interesting and classical example is the pearl fish, *Carapus* formerly known under *Fierasfer*.

Holothurians collected from the Gulf of Mannar and Palk Bay in the neighbourhood of Mandapam were examined especially for the pearl fish but the only internal commensal of interest found was the pea crab, *Pinnotheres deccanensis* Chopra from *Holothuria scabra* Jager. The crab was found to remain inside the lower part of the respiratory tree above the cloaca (Fig. 1). The wall of the respiratory tree where the commensal remains is distended and the pinkish colour of the crab can be seen through. In some instances the wall of the respiratory tree has been pierced and the chelipeds of the crab protrude into the body cavity. The width of the carapace of the crabs measured from about 8 mm to 12 mm. Very small specimens were not seen. All were females and some of them were ovigerous. All holothurians did not harbour the crab and more than one was not present in any examined by us. The following table gives details about the incidence of the commensal.

Place	Month	Depth	<i>H. scabra</i> examined	No. of crabs (♀)
Mandapam pier (Palk Bay)	August 1960	2 m.	2	—
Manakad (Palk Bay)	August 1960	1 m.	3	—
Fisheries pier (Gulf of Mannar)	October 1960	2 m.	4	3
Vedalai (Gulf of Mannar)	October 1960	2 m.	3	2
Seenivappa Darga (Gulf of Mannar)	October 1960	4 m.	2	—
Athankarai (Palk Bay)	October 1960	1 m.	1	1
Rameswaram (Palk Bay)	October 1960	2 m.	3	3
Mandapam dock (Gulf of Mannar)	November 1960	2 m.	6	—
Pudumadam (Gulf of Mannar)	April 1961	4 m.	1	1
Total			25	10

Subsequently also quite a large number of specimens of *Holothuria scabra* collected from Mandapam area were examined for the commensal crab and their incidence was found erratic. It may be mentioned in this connection that the crab

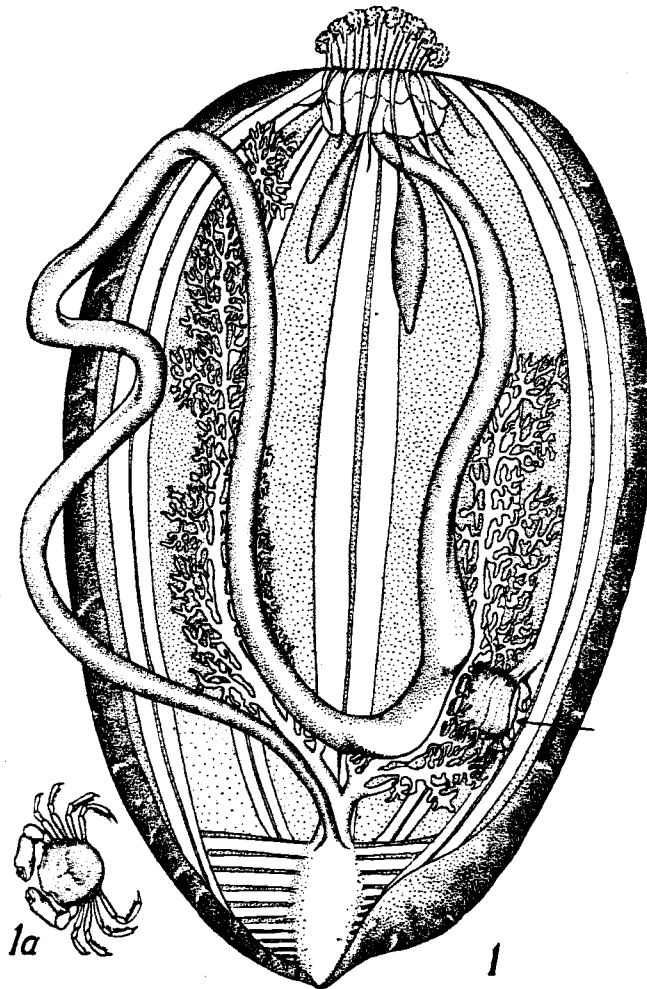


FIG. 1. *Holothuria scabra* (dissected) showing *Pinnotheres deccanensis* in the main respiratory stem. The position of the crab is indicated by the arrow. 1a. *Pinnotheres deccanensis* Chopra (By K. L. K. Kesavan).

was specifically found only inside *H. scabra* and not in any other holothurian including *H. atra* the other common species in the area and *Stichopus* sp. which though not abundant as the above two species occurs in fair numbers in some localities. Chopra (1931) who first described the crab from the holothurian collected 11 females and 1 male. As already mentioned all specimens collected by us were females and we are informed by Dr. C. Sankarankutty who was working on crabs and Mr. D. B. James who is working on echinoderms (personal communications) in this Institute that they could get only female crabs. The former has come across two crabs inside the same holothurian. Several other holothurians found in the area were examined for males

of this pinnotherid but without success. It is evident that the males are very much fewer in number than the females. They might even be free living and may only be occasional visitors inside the holothurians in search of mates.

A crab extracted from a holothurian if let in a vessel containing another holothurian would move about till it gets on to the body of the prospective host. It would gradually move towards the posterior end and then work its way into the cloaca. As the holothurian ejects the water taken into the respiratory tree in the form of a stream the cloaca opens out giving a chance for the crab to enter. The contraction that follows the intake of water appears to facilitate the progression of the crab into the respiratory tree. Dr. C. Sankarankutty (personal communication) has reported their penetrating the wall of the respiratory tree and remaining inside the body cavity when two of them occur in the same host.

Apart from *Pinnotheres deccanensis* a number of commensal crabs mostly belonging to the family Pinnotheridae are known from holothurians. Hyman (1955) refers to the association between *Pinnixa timida* in the cloaca of *Paracaudina chilensis*, *P. barnharti* in *Caudina arenicola* and *Ophisthopus transversus* in *Parastichopus californicus*. From the Indian seas Chopra (*op. cit.*) has recorded *Pinnotheres villosissimus* and *P. setnai* from holothurians, presumably *Actinopyga mauritiana*, collected from the Andamans. He has also recorded from a holothurian the caridean shrimp *Conchodytes tridacnae* which is normally a commensal in the giant clam, *Tridacna*. A portunid crab, *Lissocarcinus ornatus* and two oxyrhynchid crabs, *Achaeus affinis* and *Menaethius monoceros* have also been collected from the cloaca of holothurians but these are presumed to be casual visitors rather than regular commensals as the carapace and other parts of the body have tubercles and ridges comparable to the free living forms. However, another portunid, *Lissocarcinus holothuricola* as the specific name implies is known from *Holothuria* and hence the possibility of some members of the portunid genus *Lissocarcinus* living as commensals cannot be ruled out. In this connection the fact that very small specimens have not been found inside holothurians probably shows that the crabs are free living during their early juvenile life and become commensals only subsequently. It would however be interesting to find out if commensalism is obligatory for the completion of their life cycle.

In most of the commensal crabs females out-number the males and in a number of instances the males are unknown. This is however not the case always. It is reported that *Pinnotheres setnai* was mostly found in pairs, a male and female in each holothurian (Chopra, *op. cit.*).

It is difficult to say if the association between holothurians and crabs is of mutual benefit. It is no doubt beneficial to the crabs by way of shelter and protection. Unless something happens to the holothurians—they seem to have very few enemies—the safety of the crabs is assured. They have to be contented with whatever food is brought in through the respiratory current. Whether the holothurians derive any benefit from the crabs is doubtful. As stated earlier there are instances of the chelipeds piercing the respiratory tree and when two crabs are present they were found to remain in the body cavity. These show that the crabs can occasionally inflict some sort of injury to the host but in view of the capacity of holothurians for regeneration this may not prove serious.

## REFERENCES

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