

**COPEPODS ASSOCIATED WITH INDIAN MOLLUSCS
(D). COPEPODS IN *MERETRIX CASTA* (CHEMINITZ)**

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WHILE studying the biology of *Meretrix casta* (Chemnitz) in the Adyar estuary near Madras, attention has been given to the study on the life-history of the two *Conchylurus* species, namely *C. bombasticus* Reddiah and *C. fragilis* Reddiah (Reddiah, 1962) present in the mantle cavity of the host.

The Adyar estuary, fed largely with non-saline water by the river Adyar, is separated from sea by a sand bar of about 15 meters in width for about 6 months (June to November). It is connected with the sea for the remaining 6 months, December to May. The formation of the sand bar is by natural drift of sand by wave action, while its opening is made artificially when the water level in the estuary reaches its maximum during the rainy season. The host inhabits the sandy mud flats at varying depths from 0.5 to 3 meters but more abundant at the lowest depth.

Monthly collections of the host have been made from the estuary for over 18 months. The host species was abundant throughout the year 1963 and samples have been collected each time by hand-picking. These were transported without water to the laboratory and opened by breaking the shells. The bodies were washed with water in a petri dish and the live copepods were collected with a dropper individually. When the hosts are collected in large numbers in a container of water, the water is filtered for copepods.

In addition to the two *Conchylurus* species mentioned above, a third copepod species *Ostrincola portonoviensis* Reddiah (Reddiah, 1962) also inhabits the host. This has been found more or less a straggler and is, therefore, not considered in the present study. Since no marked differences have been observed in the behaviour of the two *Conchylurus* species, collections of both have been combined in one lot. The copepods begin to appear when the host reaches 22 mm. in shell length (about a year old). About 75% of the hosts have been infected during peak periods from January to May and the percentage of monthly incidence in various months is shown in Fig. 1. The highest incidence recorded in one host is 16 in the month of May, 1963.

On the collection made for one year from January 1963 (see Table 1), the two copepod species appeared in large numbers upto May and in small numbers upto November. The copepods are absent from August to September in their hosts and begin to appear in small numbers in December. The increase in numbers is noticed when the sand-bar is open and decrease after the closing. It is, therefore, probable that the copepods reach the estuary from sea and enter the host. The percentage of ovigerous females (Fig. 2) and males with spermatophores is higher in January and February when they arrive from sea and gradually disappear from June onwards when the bar was closed. The eggs begin to hatch in May and June as shown by the transparent nature of egg sacs and eggs followed by appearance of embryos and by

TABLE I

Data on the hosts and copepods collected from January 1963 to January 1964

Months	Host		Parasites					Remarks
	No. examined	% infected	No. obtained	Male	Female	Ovigerous ♀	Copepodids	
January 1963 ..	20	85	51	14	37	34	8	Opened Estuary
February ..	14	71	24	8	16	16	Nil	-do-
March ..	18	88	32	17	15	14	Nil	-do-
April ..	75	93	98	42	56	42	7	-do-
May ..	100	90	182	80	102	76	34	-do-
June ..	40	62	36	20	16	6	Nil	Closed Estuary
July ..	45	33	20	8	12	3	2	-do-
August ..	80	12	14	5	9	Nil	1	-do-
September ..	80	Nil	Nil	Nil	Nil	Nil	Nil	-do-
October ..	100	Nil	Nil	Nil	Nil	Nil	Nil	-do-
November ..	60	Nil	Nil	Nil	Nil	Nil	Nil	-do-
December ..	65	7	6	2	4	Nil	1	Opened Estuary
January 1964 ..	33	30	30	13	17	3	1	-do-

the absence of spermatophores on the male genital segments. Stage IV & V Copepodids only appear mostly in May but there is no evidence to suggest that these are

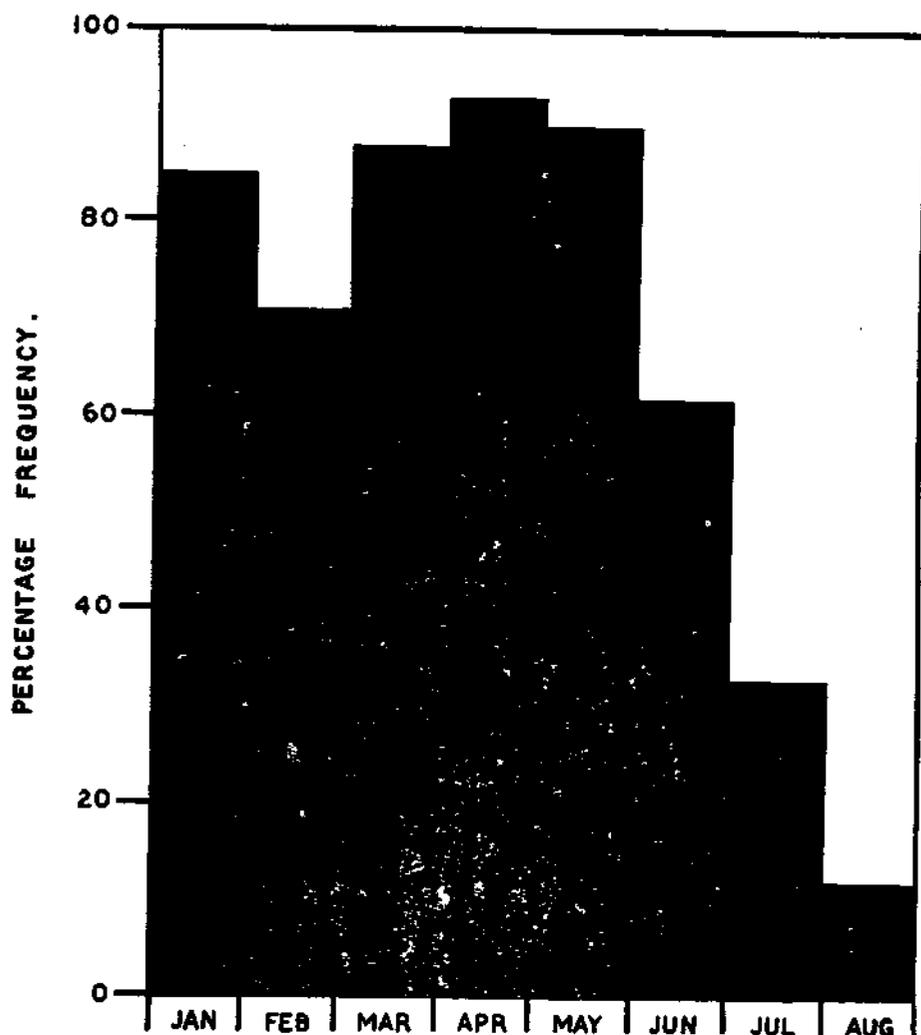


FIG. 1. Percentage of incidence of infection.

developed from the hatched eggs in May, for the remaining stages are absent in the host as well as in plankton. These, therefore, are the second batch of copepods entering from sea and reaching the host in a short period. From June onwards when the sand-bar is formed disconnecting the sea from the estuary, no copepodids are seen and the numbers of adult copepods have been gradually diminished, though the host species is still abundant. Again in January of the following year, after the opening of the bar in December, the ovigerous as well as the copepodid stages appear in large numbers.

It may be mentioned that the host species has its peak spawning from May to June, the time at which the bar is closed, resulting in the gradual disappearance of

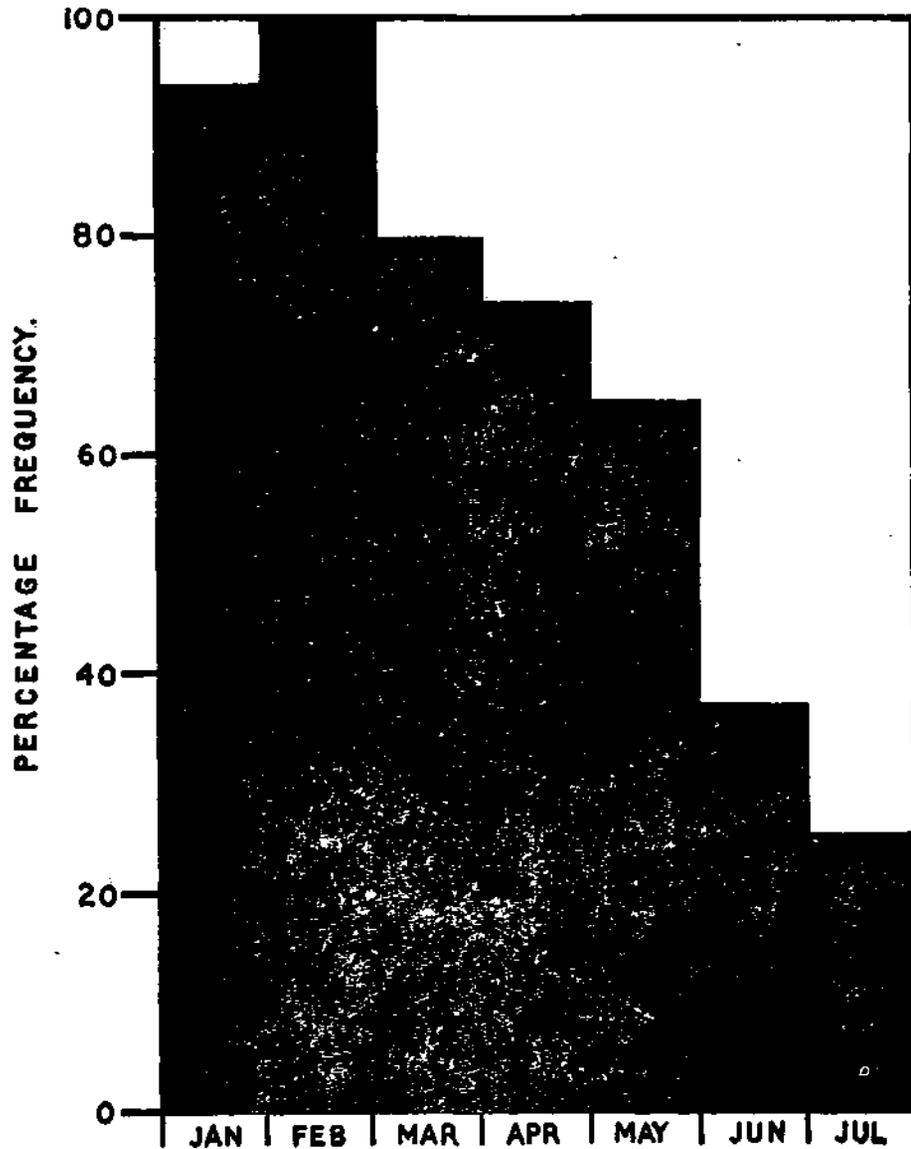


FIG. 2. Percentage of ovigerous females.

the copepods ever since. Though it is doubtful that the spawning of the host has any effect on the disappearance of the copepods, it has been observed that even the smallest percentage of copepods present in the host after spawning acquire a light greenish yellow colour for 2 months (July and August). The acquisition of this colour may be attributed to the increased phytoplankton production noticed during these

months caused by accumulation of rain water and sewage at the onset of North East Monsoon. Therefore the suggestion by Reddiah (1962 p. 310) to look for the possible presence of sub-specific or infra subspecific taxa in them may be abandoned. The copepodids have been completely absent in the hosts or in plankton during September, October and November. Most of these apparently die during these months since the conditions have changed with the accumulations of dense phytoplankton and subsequent fowling.

Remarks : As pointed out by Humes and Cressey (1960), Studies on the seasonal variations in the populations of copepods associated with invertebrates have been very few. So far no work has been attempted on the estuarine forms.

In the purely marine forms, which are largely free from environmental changes, Humes and Cressey (1960) traced 3 generations of *Myocheeres major* in its molluscan host ; yet, the naupliar stages could not be found and the nature of infestation could not be studied. In the estuarine forms, added to the variable salinities, the physical and biological conditions are so different and abruptly changeable that the copepodids upto stage III and also adults during certain draught periods, do not survive, but these may have been periodically recouped from sea. It may be that the copepods possess an unknown preferred host in sea but only periodically infect *Meretrix casta* secondarily, otherwise it is difficult to account for the sudden appearance of the ovigerous females and copepodid stages in the host soon after the sand-bar is open and when the copepods are absent in the hosts or in plankton.

SUMMARY

The behaviour of the two copepod parasites *Conchylurus bombasticus* Reddiah and *C. fragilis* Reddiah, inhabiting *Meretrix casta* (Chemnitz) in the Adyar Estuary, Madras, has been studied. It has been observed that the copepods do not complete their life-cycle in their host or in the estuary but are recouped in large numbers from sea from January for about 6 months in a year. During the remaining period from June, when the bar is closed, these gradually disappear and die. A fresh recoupe-ment of copepods appear again in December and January soon after the sand-bar is open.

REFERENCES

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- . 1962. Copepods associated with Indian molluscs. (C) *Ostrincola portonoviensis* from the commercial bivalves at Porto Novo. *Ibid.*, 4(1) : 1-6.