

ON THE OCCURRENCE OF THE PUERULUS LARVAE OF THE
INDIAN SPINY LOBSTER, *PANULIRUS HOMARUS* (LINN.),
IN COCHIN BACKWATER

M. KATHIRVEL

Central Marine Fisheries Research Institute, Cochin-18.

ABSTRACT

The occurrence of puerulus larvae of the Indian spiny lobster, *Panulirus homarus* (Linn.) in the Cochin backwater is reported. Being the first record of these larvae from Indian waters, brief notes on the puerulus, its metamorphosis to postpuerulus and the probable significance of their occurrence in the estuary are given.

Information on the larval stages of the spiny lobster, *Panulirus homarus* (Linn.) is limited to the works of Bouvier (1913), Von Bonde (1932), Gordon (1953), Prasad and Tampi (1959), Deshmukh (1968), Michel (1971), Berry (1974) and Tampi and George (1975). In the course of investigations on the prawn-fishery resources of Cochin backwater, three puerulus larvae of the spiny lobster, *P. homarus* were collected. Since this is the first record of the puerulus of *P. homarus* from Indian waters, a brief note on the puerulus, metamorphosed post-puerulus and the significance of its occurrence in these estuarine waters is given in this account.

While observing the abundance of postlarval and juvenile penaeid prawns in the Thoppumpady channel in Cochin backwater (Lat. 9° 58'N and Long. 76° 15'E), three pueruli of *P. homarus* were obtained on different occasions. The catch details and the length measurements of the specimens collected are given in Table 1. The total length and carapace length were measured from the anterior margin of carapace to the posterior margin of the telson and from anterior margin to posterior margin of carapace, respectively.

TABLE 1. *Details of catch and length measurements of pueruli of P. homarus from Cochin backwater.*

Date of collection	Gear	Depth in m	Salinity ‰ (at respective depths)	Temperature °C	Total length (mm)	Carapace length (mm)
20-12-1972	Stake net	9	29.2	28.2	18*	7
14-3-1973	Stake net	9	30.5	32.6	20	7
17-5-1973	Tow net	9	31.8	30.7	20	8

* Kept alive in the laboratory and metamorphosed to postpuerulus stage.

The pueruli of *P. homarus* (Fig. 1 A) in the present collection agree with the descriptions given by Gordon (1953), Michel (1971) and Berry (1974). The puerulus of *P. homarus* is glassy and resembles the puerulus larvae of other *Panulirus* spp. in general appearance. However, the pueruli of *P. homarus* can be readily distinguished from those of the allied form, *P. polyphagus*, which have been recorded earlier from Cochin backwater (Rao and Kathirvel 1971), by the following characters. In the antennal flagellum, there is a single brownish band in *P. homarus*, whereas alternate reddish bands are present in *P. polyphagus*. In *P. homarus* there are four pairs of spines on the carapace in addition to the supraorbital spines, but in the case of *P. polyphagus* there are only three pairs of spines excluding the supraorbital spines.

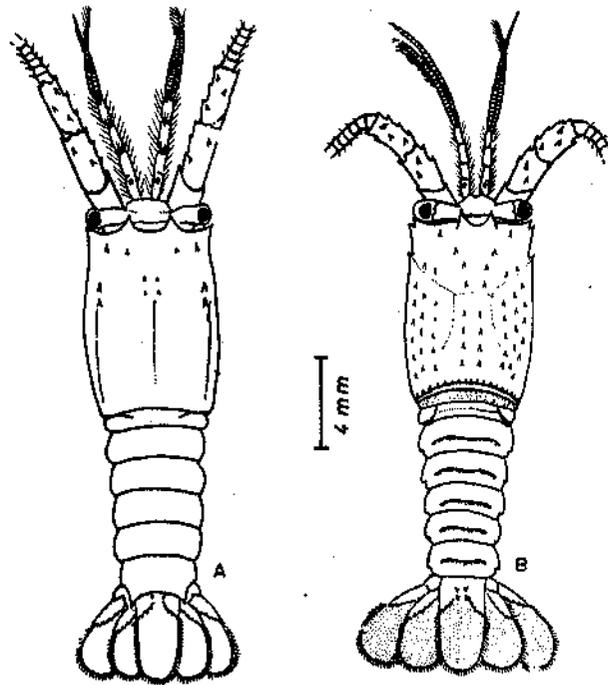


FIG. 1. *P. homarus*. A: Puerulus stage. B: Postpuerulus stage (limbs and flagella of antenna omitted).

A live puerulus obtained on 20th December 1972 was reared in the laboratory in a glass trough containing brackish water collected from the same area from where the larva was caught. The salinity of the rearing medium was 29.2‰. A few pieces of rocks were placed in the trough to provide shelter for the larva. The animal was fed daily with crushed freshwater gastropod and small bits of prawn meat. At the end of the fourth day, the puerulus moulted into post-puerulus stage (Fig. 1 B) which resembled the typical 'spiny lobster'.

Soon after the ecdysis, the postpuerulus acquired the characteristic pigmentation of the adult and after a day, the exoskeleton became hard. It measured 19 mm and 8 mm in total length and carapace length, respectively, showing an increase of 1 mm in both the measurements. The postpuerulus was seen clinging to the edge of the rock pieces or sometimes hiding in between the stones. It survived for 31 days under laboratory conditions but died on 24th January 1973, when it was about to moult for a second time.

In the metamorphosed postpuerulus stage, the antennae and antennules are with alternate brown and light-yellow bands. The carapace, spinose as in the adult, is having light-brown pigmentation in the middle of the cervical region while the pre- and post-cervical regions are with a dense patch of darker brown pigmentations. The abdomen is mottled with many reddish brown spots which are concentrated more towards the pleura of each segment. The pereopods are yellow in colour with scattered brownish yellow blotches. A continuous groove is present on each tergum fringed with small plumose setae. The characteristic crenulation on the posterior margin of the grooves in the adults is not yet developed at this stage. Gordon (1953) observed the crenulation on lateral portion of the grooves in the older postlarval forms of *P. homarus*. The soft portion of the telson is spinose. The pereopods have become stouter and the first three segments in the proximal end of each leg are with increased number of spine-like setae. The structure of the various mouth parts are similar to those of the puerulus stage, except for the increase of setae. The vestigial exopodite of third maxilliped has completely disappeared.

P. homarus generally inhabits rocky patches in the coastal waters, where it is found in large numbers up to a depth of 35 m. The present record of the puerulus of *P. homarus* from the low-saline backwater environment is of considerable interest, as both the adults and larvae are considered to be truly marine forms. It is well-known that after a rather lengthy pelagic life, the phyllosoma metamorphoses into puerulus and settles down and migrates shoreward in search of suitable grounds. It is possible that some of the larvae during this shoreward migration enter into the estuary probably with tide. A similar movement of puerulus of an allied species, *P. polyphagus* was also noticed in this area (Rao and Kathirvel 1971). George (1968) observed that, although the adults of *P. homarus* inhabit in cooler and clearer inshore waters, the juveniles show preference to muddy water — an environment by which Cochin backwater is characterised throughout the year. Witham *et al* (1964) suggested the possibility of Florida's spiny lobster, *P. setiferus*, utilising estuarine areas as nurseries for the postlarval stages. Nevertheless, it is not possible, as only a very small number of larvae were recorded from the region, to suggest whether the backwater plays any role in the life history of the spiny lobster, before a more detailed study is conducted.

The author is grateful to Shri K. H. Mohamed, Dr M. J. George and Dr P. Vedavyasa Rao for critically reading the manuscript. Thanks are also due to Dr M. M. Thomas for his help in procuring some of the literature.

- BERRY, P. F. 1974. *Invest. Rep. Oceanogr. Res. Inst.*, 34: 1-44.
- BONDE, W. VON. 1932. *Rep. Fish. mar. Biol. Surv. S. Africa*, 8 (1): 1-42.
- BOUVIER, E. L. 1913. *Trans. Intern. Congress Entomology, Oxford*, 2: 78-89.
- DESHMUKH, S. 1968. *Crustaceana*, (Suppl.) 2: 47-58.
- GEORGE, R. W. 1968. *J. Roy. Soc. West. Australia*, 51 (2): 33-38.
- GORDON, I. 1953. *Bull. Brit. Mus., (nat. Hist.) (Zool.)*, 2 (2): 17-42.
- MITCHEL, A. 1971. *Cah. ORSTOM, ser. Oceanogr.*, 9 (4): 459-473.
- PRASAD, R. R. AND P. R. S. TAMPL. 1959. *Proc. Indian Acad. Sci.*, 49 B: 397-401.
- RAO, P. VEDAVYASA AND M. KATHIRVEL. 1971. *Indian J. Fish.*, 18: 129-134.
- TAMPL, P. R. S. AND M. J. GEORGE. 1975. *Mahasagar — Bull. natn. Inst. Oceanogr.*, 8: 15-44.
- WITHAM, R., R. M. INGLE AND H. W. SIMS Jr. 1964. *Quart. Jour. Florida Acad. Sci.*, 27 (4): 289-297.