

DESCRIPTION OF POSTLARVAE OF *PENAEUS CANALICULATUS*  
OLIVIER WITH NOTES ON THEIR SEASONAL ABUNDANCE  
IN COCHIN BACKWATERS

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Three postlarval stages of *Penaeus canaliculatus* Olivier collected from Cochin backwaters are described and illustrated. These postlarvae closely resemble those of *P. japonicus* in all essential characters except for some variation in the distribution of chromatophores. Their occurrence in this environment has been found to be strictly seasonal (January-May) and is correlated with periods of higher temperature and salinity.

INTRODUCTION

*Penaeus canaliculatus* Olivier is a rare penaeid prawn recorded from the marine as well as estuarine environments of the southwest coast of India by George (1969) and Mohamed and Rao (1971). Practically no information is available on its life-history or biology. Recently juveniles of this species (65-88 mm), locally known as "Pookaara", were encountered very often in the commercial catches of Cochin backwaters, some times forming a minor fishery in stake nets and cast nets during the postmonsoon period. During the course of routine examination of prawn samples collected from the shallow areas of these backwaters several specimens of postlarvae which were distinctly different in morphological features as well as pigmentation from those of the common penaeids occurring in this area were obtained. As juveniles of *P. canaliculatus* are also common in this environment at this time the post larval stages obtained are assigned to this species and described in this paper, with some observations on their seasonal abundance.

DESCRIPTION OF POSTLARVAE

The postlarval collections contained three well defined stages and they are designated as Postlarva-A, B and C. The important characters of these stages are as follows:

*Postlarva-A.* (Fig. 1, a-e)

Total length*	: 9.42-10.63 mm
Carapace length**	: 2.21-2.32 mm
Carapace length with rostrum	: 2.63-2.79 mm

Carapace with well developed antennal and hepatic spines; rostrum shorter than eye, bearing six teeth on the upper margin, the 2nd in front of the epigastric

\* Measured from the tip of rostrum to the tip of telson.

\*\* From orbital angle to the posterior mid-dorsal margin of carapace.

being the largest, no ventral tooth; the sixth abdominal segment bears a prominent posteromedian dorsal spine and a row of 15-20 minute movable spinules on either side of the dorsal carina; telson with 8+8 spines, the four pairs of lateral spines being longer and stouter than those on the slightly convex posterior margin.

Both the upper and lower antennular flagella six segmented. Antennal scale reaching 4th segment of the lower antennular flagellum.

**Colouration:** In live condition the postlarvae are brilliantly pigmented with a streak of reddish brown chromatophores on the ventral side extending from tip of telson to mandible. On the midventral portion of the sixth abdominal segment there are 7-9 (usually 8) chromatophores; the entire telson pigmented with 8-10 chromatophores arranged more or less in a row centrally; the endopod of the uropod with a row of 4-5 chromatophores placed towards the inner border leaving some unpigmented portion at the tip, the exopod lacks chromatophores.

*Postlarva-B.* (1, f & g)

Total length	:	10.53-10.74 mm
Carapace length	:	2.21- 2.33 mm
Carapace length with rostrum	:	2.74- 2.79 mm

The characters are more or less the same as described above except for the following developments:

1. The rostrum develops an additional 7th tooth dorsally towards the tip.
2. The posterior margin of telson is gradually tapering with a small posteromedian spine besides the regular 8+8 spines.
3. The upper antennular flagellum is seven segmented.

*Postlarva-C.* (Fig. 1, h & i)

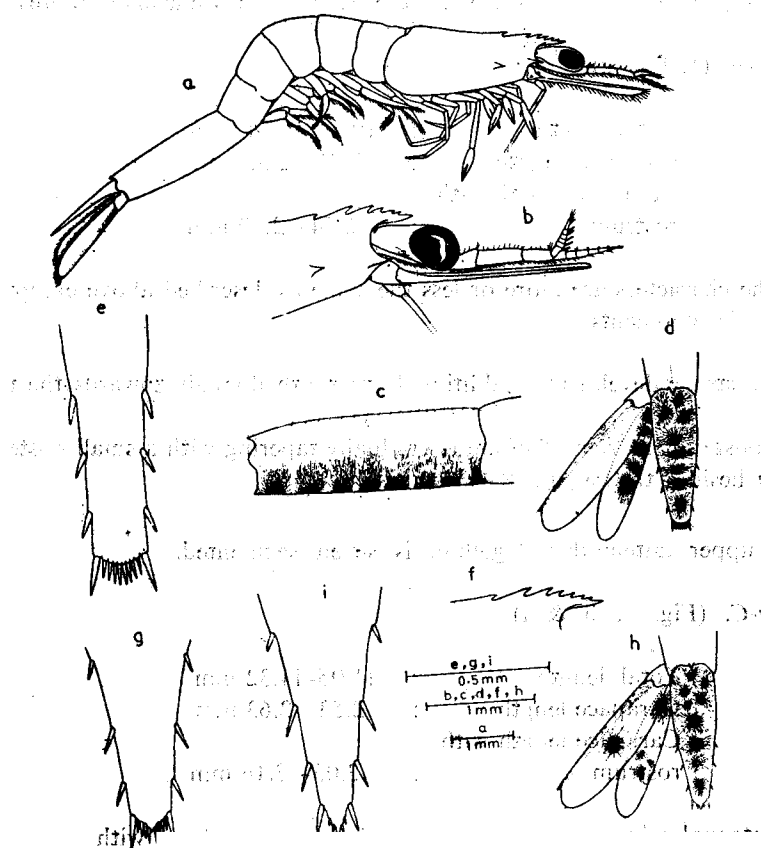
Total length	:	11.05-11.32 mm
Carapace length	:	2.53- 2.63 mm
Carapace length with rostrum	:	3.05- 3.16 mm

Antennal spine on carapace very prominent; rostrum with 7 teeth on the dorsal margin, no ventral tooth; the posterior margin of telson acutely tapering with the posteromedian spine stouter, some of the distolateral spines of the telson atrophied leaving only one or two spines on either side of the postero-median spine; both the lower and upper antennular flagella seven segmented.

More pigmentation develops all over the body. In the uropod a very prominent chromatophore is developed at the middle of the exopod, while on the

endopod the most proximal chromatophore becomes more conspicuous and the others less prominent.

**Remarks:** The postlarvae of *P. canaliculatus* closely resemble those of *P. japonicus* in all essential characters. Considering the number of teeth on the rostrum and the structure of telson, Postlarva-A described above is comparable to P4 or P5, Postlarva-B to P6 and Postlarva-C to P8 stages of *P. japonicus* described by Hudinaga (1942). The lesser number of spines on the telson of Postlarva-C of the present species (Fig. 1, i) when compared to the 7+7 spine formula of P8 stage in *P. japonicus* may not be significant as their disappearance during metamorphosis has been found to be not regular in the case of the latter species. (Hudinaga, 1942). In colouration, these postlarvae can be distinguished from those of *P. japonicus* described by Muthu (1978) only on the basis of the distribution of chromatophores on the uropod; in *P. japonicus* the endopod has only a single proximal



**Fig. 1.** *Penaeus canaliculatus* Olivier; Postlarva-A: a, lateral view; b, anterior part showing rostrum, antennal spine and antennule; c, sixth abdominal segment showing spinules and chromatophore pattern; d, chromatophore pattern on uropod and telson; e, telson. *P. canaliculatus*, Postlarva-B: f, rostrum; g, telson. *P. canaliculatus*, Postlarva-C: h, chromatophore pattern on uropod and telson; i, telson.

chromatophore while in *P. canaliculatus* there are 4–5 chromatophores along the inner margin of the endopod.

The short rostrum which falls short of the anterior margin of the eye, the prominent antennal spine on the carapace and the row of minute spinules on either side of the dorsal carina of the 6th abdominal segment are features which these two species share with the other species of "grooved shrimps" belonging to the sub-genus *Melicertus* as defined by Perez Farfante (1969). By these three important characters the postlarvae of *P. canaliculatus* can be easily distinguished from those of the coexisting species, *P. indicus*, *P. monodon* and *P. semisulcatus*.

#### SEASONAL ABUNDANCE

Regular monitoring of the recruitment of postlarval penaeid prawns in the shallow near shore areas of the Cochin backwaters has made it possible to make an year-round study on the occurrence of *P. canaliculatus*. Collections were made in the morning hours once a week with a velon screen drag net operated near the shore for two minutes at a fixed centre namely Ramanthuruthu (Fig. 2). Salinity and temperature of the collection centre were also recorded.

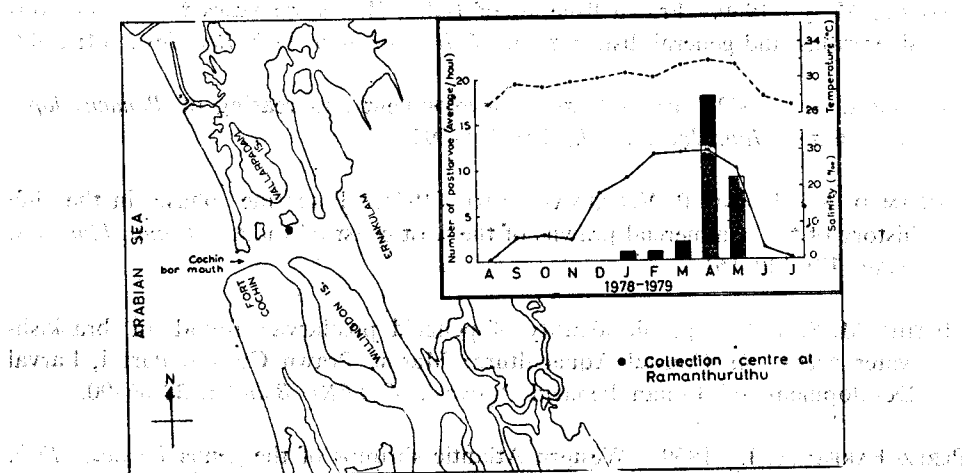


Fig. 2. Location of collection centre and seasonal distribution of the postlarvae of *P. canaliculatus*.

The postlarval stages of *P. canaliculatus* were first noticed in the samples during January and thereafter occurred regularly till the end of May, with peak abundance during April. They were obtained along with *P. indicus*, *P. monodon*, *P. semisulcatus*, *Metapenaeus dobsoni* and *M. monoceros* and formed about 0.2 to 1.5% of the catch. The species totally disappeared from the catches after the onset of monsoon in June. As could be seen from Fig. 2, the occurrence of this species is closely associated with periods of high salinity and temperature. In the back-water fishery also juveniles of this species are met with only during the high saline period of summer months. Such a seasonal pattern of occurrence strictly

coinciding with the peak period of salinity and the total absence during the low salinity regime would suggest that this species is relatively less euryhaline when compared with the other coexisting species of penaeid prawns which are able to survive even during the low salinity period in this ecosystem (Mohamed and Rao, 1971). The minimum salinity at which the postlarvae of *P. canaliculatus* were collected was 23.91‰ and this may perhaps be the minimum salinity required for normal life activities of the species at this developmental stage. In the related species, *P. japonicus*, Hudinaga (1942) observed that the most suitable salinity for the postlarval stages range from 23 to 41‰.

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#### REFERENCES

- GEORGE, M. J. 1969. Prawn fisheries of India, II. Systematics-taxonomic considerations and general distribution. *Bull. centr. mar. Fish. Res. Inst.*, 14: 5-48.
- HUDINAGA, M. 1942. Reproduction, development and rearing of *Penaeus japonicus* Bate. *Jap. Jour. Zool.*, 10: 305-393.
- MOHAMED, K. H. AND P. VEDAVYASA RAO. 1971. Estuarine phase in the life history of the commercial prawns of the west coast of India. *J. mar. biol. Ass. India*, 13: 149-161.
- MUTHU, M. S. 1978. Specific identity of penaeid postlarvae found in brackish-water areas. In 'Coastal Aquaculture: Marine Prawn Culture Part-I, Larval Development of Indian Penaeid Prawns'. *CMFRI Bulletin*, 28:86-90.
- PEREZ-FARFANTE, I. 1969. Western Atlantic shrimps of the genus *Penaeus*. *Fish. Bull. U. S. Fish. Wildl. Serv.*, 67: 461-591.