

## LOBSTER RESOURCES AND CULTURE POTENTIAL

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## INTRODUCTION

In India, the average annual lobster landings during 1975-1981 were 1,620 t forming 0.8% in the total crustacean landings. The average foreign exchange earned by exporting the frozen lobster tails (av. 584 t) during that period is Rs. 54 million. The major species contributing to the exploited fishery are the shallow water spiny lobsters *Panulirus homarus* (Linnaeus), *P. polyphagus* (Herbst) and *P. ornatus* (Fabricius). Prasad and Tampi (1968) reported 18 palinurid and 20 scyllarid lobsters in the Indian Ocean, out of which 8 species of palinurids *Panulirus homarus*, *P. ornatus*, *P. polyphagus*, *P. versicolor*, *P. penicillatus*, *P. longipes*, *Puerulus sewelli* and *Palinustus mossambicus* and 5 species of scyllarids *Thenus orientalis*, *Scyllarus batei*, *S. rugosus*, *S. rubens* and *S. sordidus* are known to occur along the Indian coast. The lobsters reported from the Andaman and Nicobar Islands include 3 species belonging to the family Nephropsidae and 7 species of Eryonidae (Alcock, 1901) and 2 species of Palinuridae (Balss, 1925; Chekunova, 1971). During the present survey conducted in January-April 1978, data were collected on the occurrence and exploitation of lobsters which are presented here. The potential for lobster culture is indicated.

## SPECIES RESOURCES

1. *Panulirus homarus* (Linnaeus, 1793)

*Locality*: East Bay in Katchall; complete exuvia of a male specimen washed ashore; 244 mm TL (total length); 83 mm CL (carapace length).

*Remarks*: This species is considered to be a continental species, growing to maximum size of 320 mm in TL and it forms a seasonal lucrative fishery along the Kanyakumari District coast, Tamilnadu on the mainland. The habitat of the species is the sand-stone reefs

with moderate turbid conditions. Though it enjoys a wide distribution in the Indo-West Pacific, it has not been reported from the present study area. This is the first record of the species from Andaman and Nicobar Islands.

2. *Panulirus ornatus* (Fabricius, 1798) (Pl. I, B)

*Locality*: (i) Janglighthat in Port Blair; 2 females from the bottom set gill net collections; 163 & 189 mm TL; 58 & 67 mm CL. (ii) East Bay in Katchall; complete exuvia of one male; 182 mm TL; 66 mm CL. (iii) Spiteful Bay in Camorta; 1 female from the bottom set gill net collections; 162 mm TL; 58 mm CL. (iv) Kakana in Camorta; complete exuvia of one female; 178 mm TL; 64 mm CL.

*Remarks*: This continental species attains a maximum size of 460 mm TL and forms a major portion of the lobster landings at Mandapam in the Gulf of Mannar area. The preferred habitat of the species is a substratum of living corals with moderate turbid water conditions. Menon (1976) has mentioned availability of the species, along with *P. polyphagus*, from Andaman and Nicobar Islands.

3. *Panulirus penicillatus* (Olivier, 1791)

*Locality*: (i) South Point in Port Blair; 1 male from rocky crevices; 305 mm TL; 110 mm CL. (ii) Malacca and Sawai in Car Nicobar; partial exuviae of 1 female and 3 males (carapace portion only) washed ashore; 90 mm CL for female; 35, 72 and 83 mm CL for males. (iii) Campbell Bay in Great Nicobar; partial exuvia carapace portion only washed ashore; 90 mm in CL.

*Remarks*: This species is considered to be an oceanic species, commonly found in the oceanic islands and grows to a maximum size of 450 mm TL.

4. *Panulirus versicolor* (Latreille, 1804) (Pl. I, A)

*Locality*: (i) South Point in Port Blair; 1 male from rocky crevices; 257 mm TL; 95 mm CL. (ii)

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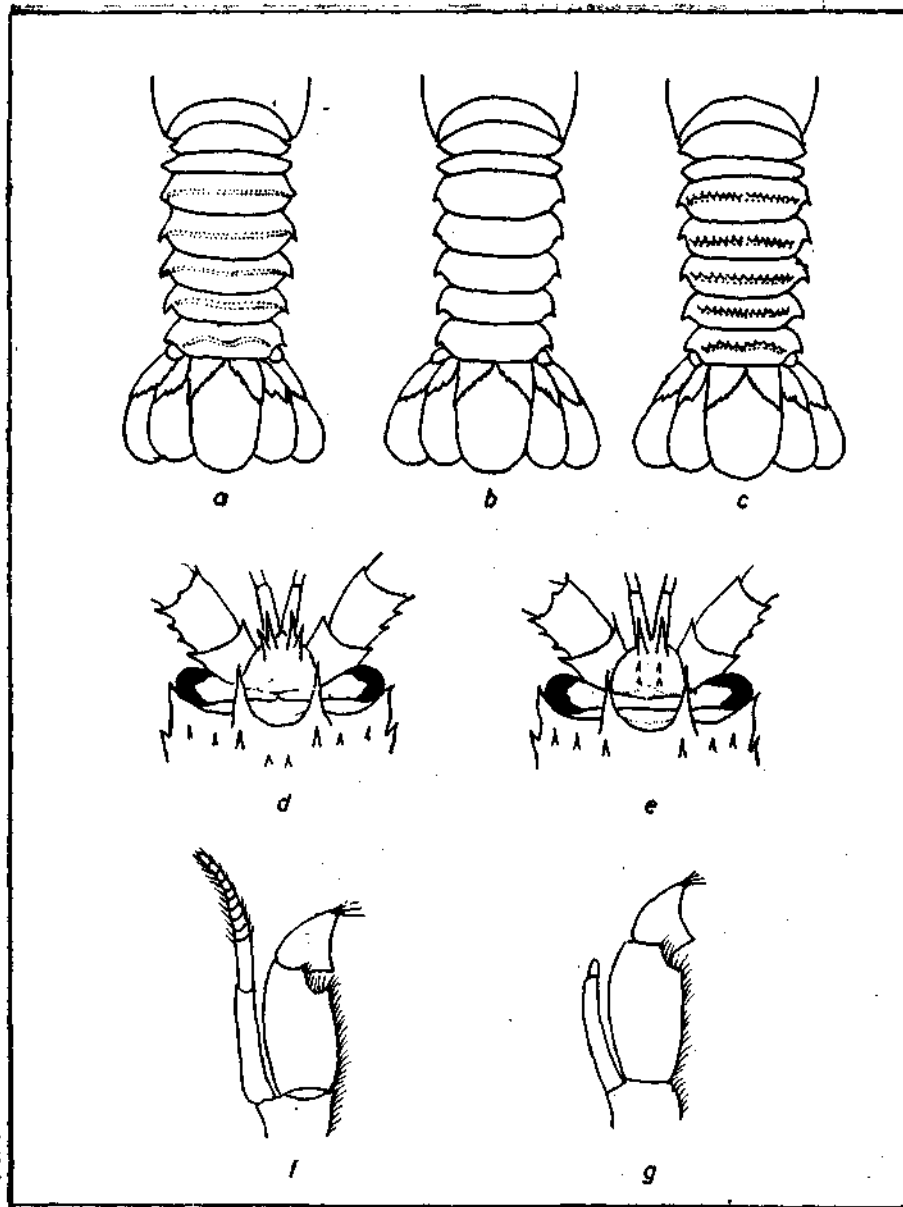


Fig. 1. A diagrammatic illustration for the identification of adults of *Panulirus* spp. occurring in Andaman and Nicobar Islands. (Explanations given in Appendix 1).

Sawai in Car Nicobar ; partial exuviae washed ashore ; 57 & 58 mm CL.

*Remarks* : This species is known for colonising among the live corals and also feeding on them. It attains a size similar to that of *P. ornatus*. It enjoys a wide distribution in the Indo-West Pacific. This is the first record of the species from Andaman and Nicobar Islands.

##### 5. *Thenus orientalis* (Lund, 1793)

*Locality* : Shoal Bay in South Andaman ; 1 female trawled from a depth of 45 m ; 127 mm TL ; 54 mm CL.

*Remarks* : This species is known as the sand lobster inhabiting sandy bottom and attains a size of 270 mm TL. It is distributed in the Indo-Pacific region. Now it is reported for the first time from Andaman and Nicobar Islands.

Apart from the five species of lobsters mentioned above, moults of *Panulirus polyphagus* (Herbst, 1793) and *Panulirus longipes longipes* (A. Milne Edwards, 1868) (Pl. I, C) were seen at Port Blair. To facilitate the identification of the six species of *Panulirus* a key on morphological characters is given in Appendix 1. Based on the published accounts, a key for the identi-



PLATE I. Some species of lobsters from Andaman and Nicobar Islands : A. *P. versicolor* ; B. *P. ornatus* ; C. *P. longipes*.

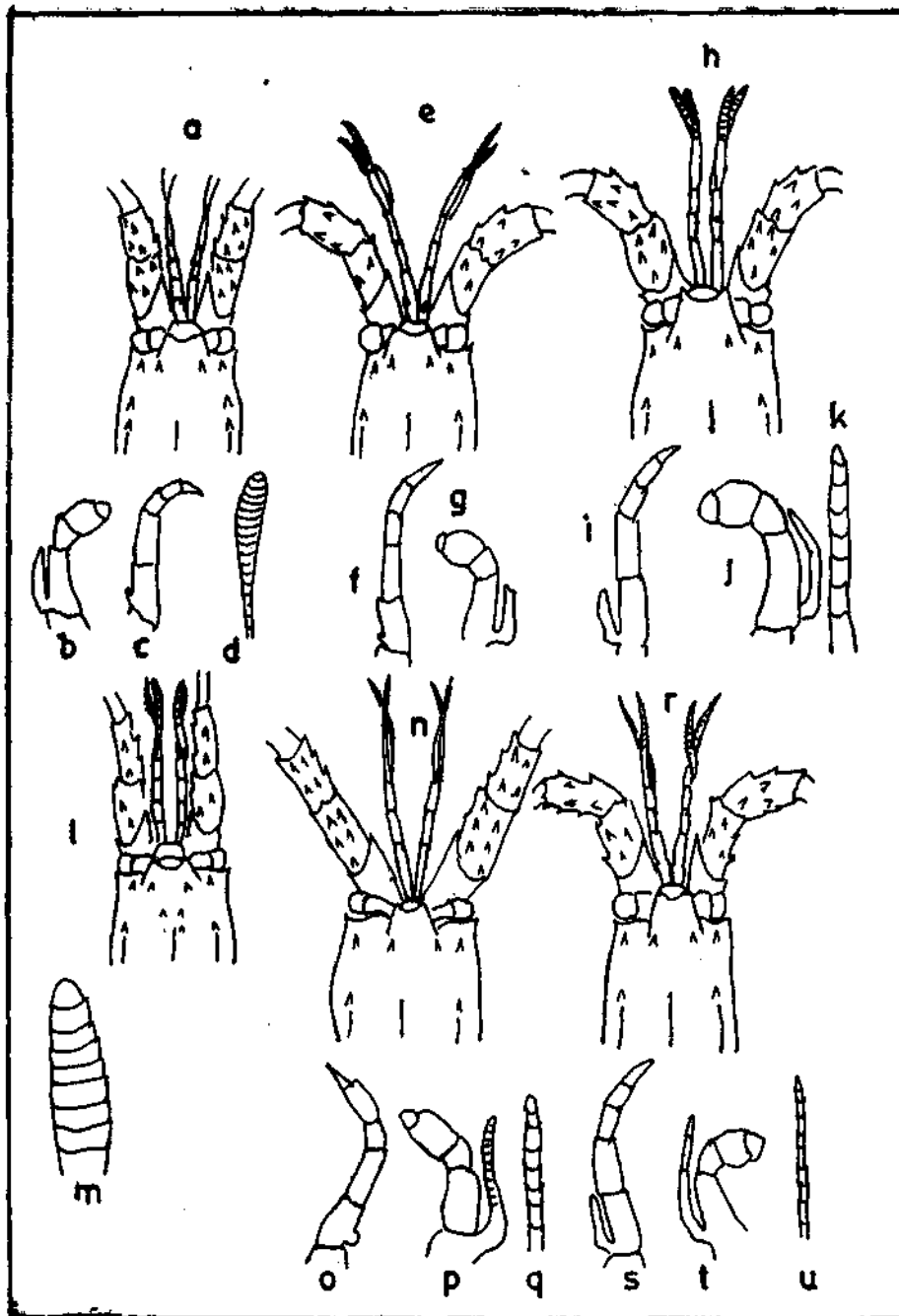


Fig. 2. Illustrations of puerulus stage (carapace portion alone) of *Panulirus* spp. *P. homarus* (a to d) : a—Anterior portion of carapace, b—Second maxilliped, c—Third maxilliped, d—Tip of antennal flagellum ; *P. versicolor* (e to g) : e—Anterior portion of carapace, f—Third maxilliped, g—Second maxilliped ; *P. penicillatus* (h to k) : h—Anterior portion of carapace, i—Third maxilliped, j—Second maxilliped, k—Tip of antennal flagellum ; *P. ornatus* (l to m) : l—Anterior portion of carapace, m—Tip of antennal flagellum ; *P. polyphagus* (n to q) : n—Anterior portion of carapace, o—Third maxilliped, p—Second maxilliped, q—Tip of antennal flagellum ; *P. longipes* (r to u) : r—Anterior portion of carapace, s—Third maxilliped, t—Second maxilliped, u—tip of antennal flagellum.

fication of puerulus of *Panulirus* spp. is provided in Appendix 2.

#### PRESENT STATUS OF EXPLOITATION

At present, there is no organised fishing for lobsters in these islands. Stray numbers of *P. homarus*, *P. ornatus* and *P. penicillatus* are caught along with the fishes and prawns in the bottom set gill nets operated by the fishermen at Port Blair in South Andaman and Camorta Island in the Nicobar group. The number of units operated at these two centres are 4 in Camorta and 10 in Port Blair. The lobsters caught are disposed off locally by selling mostly to the passenger ships visiting Port Blair. The only record of fishing for lobsters is by the aborigines, who caught them using bow and arrows or by shooting a small net or wading through the reef areas (Radcliffe-Brown, 1922).

The production of lobsters could be improved by increasing the number of gill net units. Simultaneously, experimental trials of fishing by lobster trap could be taken up first in Port Blair and later in Camorta and Great Nicobar Islands.

#### POTENTIAL FOR LOBSTER CULTURE

Culture of the palinurid and scyllarid lobsters is done generally by rearing postlarval (puerulus or post-juvenile stage) and juvenile lobsters to marketable size (Kensler, 1967; Chittleborough, 1974; Serfling and Ford, 1975; Philips *et al.*, 1977; Radhakrishnan and Devarajan, 1980) or by spawning, hatching and rearing of phyllosoma larvae under controlled conditions (Saisho, 1966; Ong, 1967; Robertson, 1968; Provenzano, 1968; Dexter, 1972; Inoue, 1978; E.V. Radhakrishnan, per. com.).

In the case of the Australian lobster, *P. cygnus*, it took 5 years for pueruli to attain matured stage in captivity (Chittleborough, 1974). It was possible to rear the first phyllosoma larvae of *P. interruptus* upto

sixth stage in 114 days (Dexter, 1972), *P. japonicus* upto last phyllosoma stage in 253 days (Inoue, 1978), *Scyllarus americanus* upto juvenile stage in 32-40 days (Robertson, 1968) and *P. homarus* upto sixth stage in 60 days (E.V. Radhakrishnan, per. com.). The food offered to the reared phyllosoma larvae was the freshly hatched out nauplii of the brine shrimp, *Artemia*, which were more readily accepted by the earlier phyllosoma stages than later stages, perhaps because of the small size of the *Artemia* nauplii. For larger phyllosoma larvae, larger prey such as fish larvae, hydromedusae and ctenophores were offered as food, which met with considerable success. For holding and rearing pueruli or early juveniles, trash fish, clam and mussel meat were used.

The recent major breakthrough in the spiny lobster culture in India is the enhancement of growth by ablating both eyes of the lobster, which accelerates the growth in a shorter period as reported by Silas (1982) and Radhakrishnan and Vijayakumaran (1982). According to them, ablated *P. homarus* moults frequently, since the Moulting Inhibiting Hormone present in the eye is removed completely after ablation. The ablated lobsters have shown an increase of 340% in weight in 88 days of rearing, whereas the control lobsters registered an increase of only 136% in the same period. By this technology developed in India, it will be possible to cultivate puerulus or early juvenile stage lobsters to marketable size of 200 grams in 5-6 months.

There is a good potential for lobster culture in Andaman and Nicobar Islands. The technology to be involved is the holding and rearing of early juvenile and puerulus stage of lobsters of the genus *Panulirus* and applying eye ablation techniques for acceleration of growth. The main source of food for reared lobsters will be the trash fish available locally. Different types of collectors such as tiles, coir and hemp fibres may be suspended from floating rafts for collection of pueruli. The key at Appendix 2 would help in the identification of pueruli of different species.

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## APPENDIX 1

### A KEY TO THE IDENTIFICATION OF *PANULIRUS* SPP. OCCURRING IN ANDAMAN AND NICOBAR ISLANDS

- |  |                        |
|--|------------------------|
| 1. Each abdominal segment with a transverse groove (Fig. 1 a) .....  | 2                      |
| Abdominal segment without a transverse groove (Fig. 1 b) .....   | 4                      |
| 2. Anterior margin of abdominal grooves scalloped (Fig. 1 c) .....   | <i>P. homarus</i>      |
| Anterior margin of abdominal grooves not scalloped (Fig. 1 a) .....  | 3                      |
| 3. Antennular plate with 4 equal principal spines fused at base (Fig. 1 d) .....   | <i>P. penicillatus</i> |
| Antennular plate with 2 principal spines and some smaller spines behind (Fig. 1 c) .....   | <i>P. longipes</i>     |
| 4. Flagellum of exopod of second maxilliped well developed, multiarticulate (Fig. 1 f) .....   | <i>P. polyphagus</i>   |
| Flagellum of exopod of second maxilliped small or absent (Fig. 1 g) .....  | 5                      |
| 5. Conspicuous transverse white band posteriorly on each abdominal segment ; Legs with longitudinal white lines (Pl. I, A) .....                                   | <i>P. versicolor</i>   |
| No transverse white band on abdominal segments but a conspicuous white spot on lateral portion ; Legs with alternative yellow and black mottlings (Pl. I, B) ..... | <i>P. ornatus</i>      |

## APPENDIX 2

### A KEY FOR THE IDENTIFICATION OF PUERULUS STAGE OF *PANULIRUS* SPP.

Modified from the earlier key given by Gordon (1950) and Deshmukh (1966) and illustrations adopted from Michell (1971)

- |  |                        |
|--|------------------------|
| 1. Exopodite of third maxilliped bud-like vestige .....  | 2                      |
| Exopodite of third maxilliped finger-like stump .....  | 5                      |
| 2. Two spines at the anterior end of each lateral carina on carapace ; exopodite of second maxilliped about the length of merus of endopodite ; antennae about twice the body length and with a spatulate apex ..... | <i>P. homarus</i>      |
| Only one spine at anterior end of each lateral carina on carapace .....  | 3                      |
| 3. Exopodite of second maxilliped extends a little beyond the carpus of endopodite ; antennae about four times body length and without a spatulate apex .....  | <i>P. polyphagus</i>   |
| Exopodite of second maxilliped reaching three-fourths the merus of endopodite .....  | 4                      |
| 4. Antennae about twice the body length and with spatulate apex .....  | <i>P. ornatus</i>      |
| Antennae about thrice the body length and without spatulate apex .....   | <i>P. versicolor</i>   |
| 5. Exopodite of second maxilliped as long as the endopodite and that of third maxilliped surpasses the ischium of endopodite .....   | <i>P. longipes</i>     |
| Exopodite of second maxilliped reaching the middle of carpus of endopodite and that of third maxilliped falls short of the ischium of endopodite .....   | <i>P. penicillatus</i> |