Pakistan Journal of Marine Sciences, Vol. 18(1&2), 77-81, 2009.

FIRST ZOEAL STAGE OF *MENIPPE RUMPHII* (FABRICIUS, 1798) (DECAPODA: BRACHYURA: MENIPPIDAE) COLLECTED FROM PLANKTONIC SAMPLES

Farhana S. Ghory
Marine Reference Collection and Resource Centre,
University of Karachi, Karachi-75270, Pakistan.
e-mail: farhanaghory@yahoo.com

ABSTRACT: The present paper is based on the description of the planktonic caught zoea I of *Menippe rumphii* (Fabricius, 1798). The planktonic materials have been obtained from Manora channel (Long. 66^{o} 59'E and Lat. 24^{o} 48'N) through the financial support of ONR (US Office of the Naval Research) project during 1993-1995.

KEY WORDS: *Menippe rumphii*, Brachyura, Menippidae.

INTRODUCTION

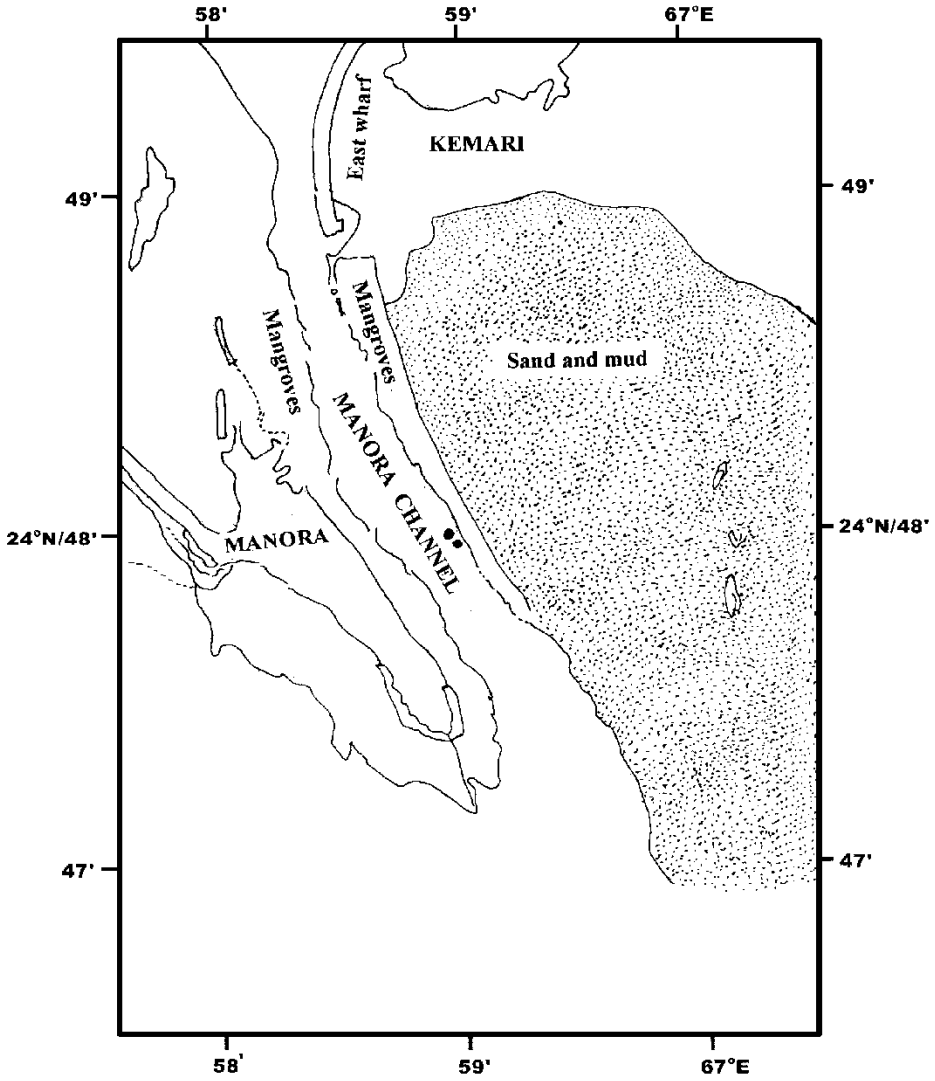
The genus *Menippe* Ortmann, 1893 contains 19 species: *Menippe adina* Williams and Felder, 1986; *Menippe frontalis* A. Milne-Edwards, 1879; *Menippe hirtipes* (Lucas, in Jacquinot and Lucas, 1853); *Menippe mercenaria* (Say, 1818); *Menippe nodifrons* Stimpson, 1859; *Menippe obtusa* Stimpson, 1859; *Menippe rumphii* (Fabricius, 1798); *Menippe convexa* Rathbun, 1894; *Menippe duplicidens* Hilgendorf, 1878; *Menippe fornasinii* Bianconi, 1851; *Menippe granulosa* A. Milne-Edwards, 1867; *Menippe granulosa* de Man, 1888; *Menippe leguillouii* A. Milne-Edwards, 1867; *Menippe martensii* Krauss, 1843; *Menippe nanus* A. Milne-Edwards and Bouvier, 1898; *Menippe ortmanni* de Man, 1899; *Menippe pagenstecheri* Neumann, 1878; *Menippe parvula* Krauss, 1843; *Menippe rudis* A. Milne-Edwards, 1879.

The present paper is based on the description of planktonic caught first zoeal stage of *Menippe rumphii*. The identifications of the present study was based on the previous work such as Prasad and Tampi (1957); Porter (1960); Kakati (1977); and Scotto (1979). The only species of the genus *Menippe rumphii* found in Pakistani waters.

MATERIALS AND METHODS

Planktonic sampling was carried out in Manora channel (Map 1) at fortnightly intervals during 1993-1995. Two stations, A and B, 5 kilometers apart were sampled. The samples included four 10 minute horizontal trawl using Bongo net of 300 micron mesh size equipped with a flow meter: AI (surface sample), AII (subsurface sample), BI (subsurface sample), BII (surface sample) at shallow depth 15'-20'.

The samples were preserved in 5% formalin. Brachyuran larvae were sorted under binocular microscope Ogawa Seiki and transferred to 70% alcohol. Identification of these larvae were made to species level where possible by comparison with previously laboratory reared larvae and available literature. The preserved larvae were deposited in the Marine Reference Collection and Resource Centre, University of Karachi.



Map 1. Map showing collection sites (solid circles).

RESULTS
DESCRIPTION OF THE LARVA

Zoea I (Fig. 1A - K):
Size.- TL = 1.28mm - 2.22mm
Diagnostic Features.-

Carapace (Figs. 1A, B).- Carapace smooth; rostral dorsal and lateral spines present; 1 pair of short setae present on either side of dorsal spine; eyes sessile.

Antennule (Fig. 1C).- Uniramous with 2 terminal aesthetascs and 2 terminal setae.

Antenna (Fig. 1D).- Protopod slender, half of distal end of either side decorated with rows of spinules; exopod with 1 long and 1 small terminal seta.

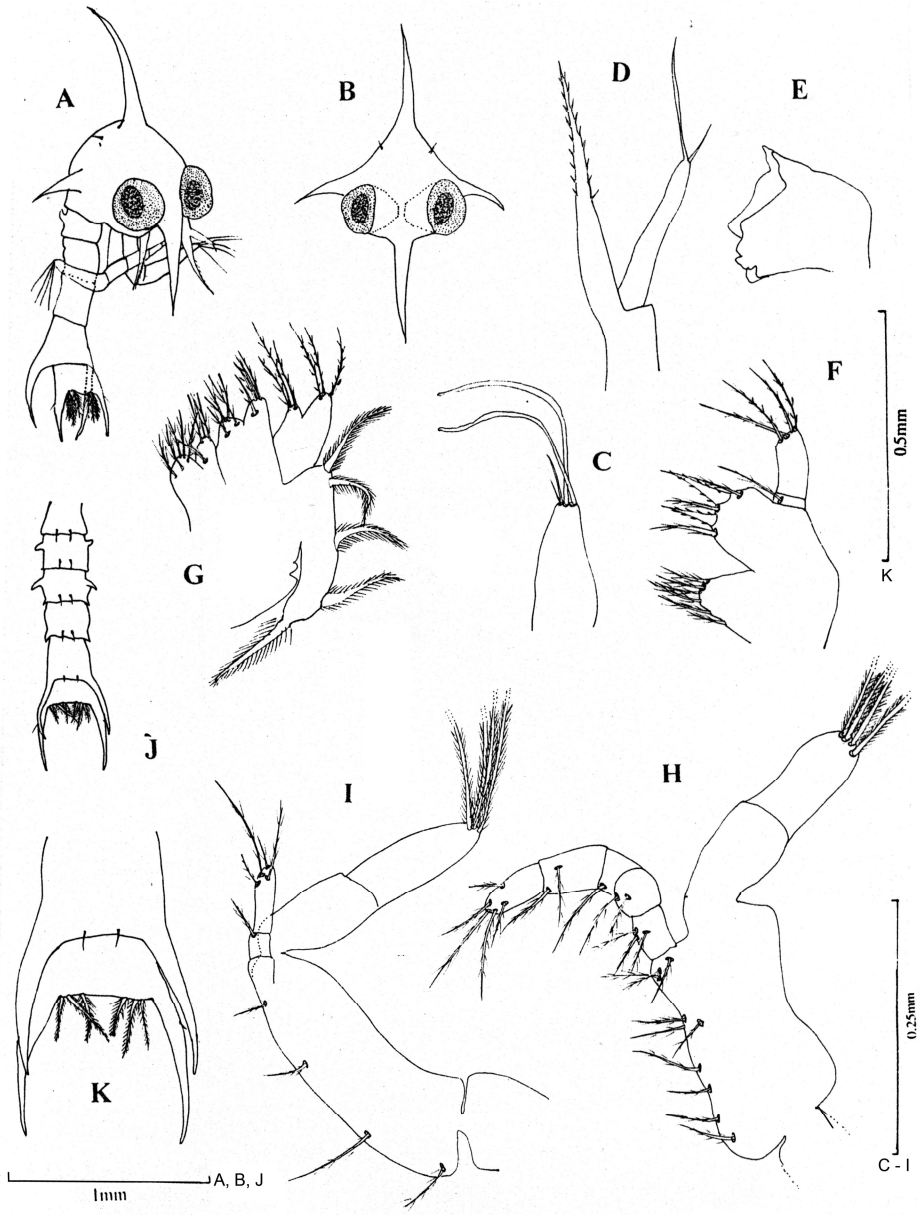


Fig. 1. *Menippe rumphii* (Fabricius, 1798) Zoea I: A, entire, lateral view; B, dorsofrontal view; C, antennule; D, antenna; E, mandible; F, maxillule; G, maxilla; H, I, maxillipeds I, II; J, abdomen , dorsal view; K, telson.

Mandible (Fig. 1E).- With well developed incisor and molar processes.

Maxillule (Fig. 1F).- Coxal endite with 6 plumodenticulate setae; basial endite with 2 cuspidate setae and 3 plumodenticulate setae; endopod 2-segmented with 1,4 plumodenticulate setae, respectively.

Maxilla (Fig. 1G).- Coxal endite bilobed with 5+4 plumodenticulate setae; basial endite bilobed with 5+4 plumodenticulate setae; endopod bilobed with 3+3 plumodenticulate setae on each proximal and distal lobes, respectively; exopod (scaphognathite) with 4 marginal plumose setae and 1 long stout plumose posterior process.

Maxilliped I (Fig. 1H).- Coxa naked; basis with 10 plumodenticulate setae arranged 2,2,3,3 on medial margin; endopod 5-segmented with 3,2,1,2, 5 (2 subterminal + 3 terminal) plumodenticulate setae, respectively; exopod 2-segmented, distal segment with 4 terminal plumose natatory setae.

Maxilliped II (Fig. 1I).- Coxa naked; basis with 4 plumodenticulate setae on medial margin; endopod 3-segmented with 0,1,4 (3 subterminal + 1 terminal) plumodenticulate setae, respectively; exopod 2- segmented, distal segment with 4 terminal plumose natatory setae.

Abdomen (Fig. 1J).- Five somites; somite 2 with 1 pair of dorsolateral processes directed laterally; somite 3 with 1 pair of dorsolateral processes directed posteriorly; somites 3 and 4 with slightly developed posteriolateral angle; somite 5 longer than other somites and its lateral angles drawn into long spine; somites 1-5 each with 1 pair of posteriodorsal setae.

Telson (Fig. 1K).- Bifurcated, each furca long, gradually curved inwards with a single pair of small lateral setae; posterior margin with 3 pairs of spinulate setae.

REMARKS

The taxonomy of *M. rumphii* is confused with *M. nodifrons*, a Caribbean Western Atlantic species. Investigation on larval morphology and development has helped to solve this issue. *M. rumphii* was earlier synonymized with *M. nodifrons*, descriptions of the zoeal stages of *M. rumphii* and *M. nodifrons* by Kakati (1977) and Scotto (1979), respectively, show that larvae of the 2 species differ considerably. In the first zoeal stage, *M. rumphii* exhibits elongated posterolateral processes on abdominal segment 5 that extend posteriorly to more than half the length of the telsonal furcae, which lack spines. The first zoea of *M. nodifrons* has similar posterolateral processes but these do not extend posteriorly beyond the fork of the telson; the telsonal furcae bear 1 dorsal and 2 lateral spines each. These differences are not apparent in later zoeal stages, but their presence in the first zoeal stage and the differences noted in the megalopa stage may be reason to question the synonymy of these 2 species (Martin, 1988).

Recent revisions in taxonomy split the Xanthidae into seven separate families. The only species of *Menippe* whose complete larval development has been described are *M. mercenaria* by Porter (1960) and *M. nodifrons* by Scotto (1979). Among other species of *Menippe* only the first zoeal stage of the Indo-Pacific *M. rumphii* has been described (Prasad and Tampi, 1957). As indicated by Scotto (1979), the three congeners have a similar first stage, but differ in antennular aesthetasc number, setation of the maxillary

coxal endite, setation of the basis and endopodite of the first maxilliped, and endopodite setation of the second maxilliped. However *M. mercenaria* is different having stout dorsal long abdominal spine.

Five zoeal stages are found in *M. rumphii.* Scotto (1979) attributed the prolonged development of *Menippe* species and "tardy" appearance of both pleopod bud and mandibular palp to a retained primitive feature of this species.

Table 1. Comparison between planktonic zoea I of *Menippe rumphii* (present study), earlier studied *M. rumphii* and its congeners larvae.

Zoea I:

Characters	***M. rumphii* present study**	***M. rumphii* Prasad and Tampi (1957)**	***M. rumphii* Kakati (1977)**	***M. mercenaria* Porter (1960)**	***M.nodifrons* Scotto (1979)**
Antennule: aesthetascs	2	4	2	6	4
setae	2 setae	no mention	1 seta	no mention	no mention
Maxillule: coxal endite	6 setae	6 setae	7 setae	6 setae	7 setae
Maxilla: basial endite	5+4 setae	5+4 setae	5+4 setae	5+4 setae	5+4 setae

ACKNOWLEDGMENTS

The planktonic samples of brachyuran larvae were obtained through the financial assistance of ONR (US Office of Naval Research) project.

REFERENCES

Kakati, V.S. 1977. Larval development of the crab, *Menippe rumphii* (Fabricus) as observed in the laboratory (Crustacea: Brachyura). Proceedings Symposium of warm water planktonic species. Publs. National Institute of Oceanography. Goa: 634-641.

Martin, J.W. 1988. Phylogenetic significance of the brachyuran megalopa: evidence from the Xanthidae. Symposium Zoological Society of London, 59: 69-102.

Prasad R.R. and P.R.S. Tampi, 1957. Notes on some decapods larvae. *Journal of Zoological Society of India*. 9: 22-39.

Porter, H.J. 1960. Zoeal stages of the stone crab, *Menippe mercenaria* Say. Chesapeake Science. 1: 168-177.

Scotto, L. E. 1979. Larval development of the Cuban stone crab, *Menippe nodifrons* (Brachyura: Xanthidae) under laboratory conditions with notes on the status of the family Menippidae. *Fish Bulletin*., U.S. 77: 359-386.