

## OCCURRENCE AND ABUNDANCE OF BRACHYURAN LARVAE IN THE MANORA CHANNEL (KARACHI, PAKISTAN) DURING 1993

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**ABSTRACT:** The present paper investigates the occurrence and abundance of brachyuran larvae in the Manora Channel during August- December 1993. The fortnightly planktonic sampling was carried out in Manora Channel which is bordered by mangroves, during day time from surface and subsurface waters at shallow depth using Bongo net of 300 micron mesh size.

Analysis of samples revealed presence of brachyuran larvae of 12 species belonging to 6 families. Of these 4 species are confirmed: *Serenella indica*, *Dotilla blanfordi*, *Metopograpsus thukuhar* and *Clistocoeloma lanatum*, 2 provisionally identified species are: *Pilumnus ?karachiensis* and *Pinnotheres ?pisum*, 2 species are identified upto generic level: *Philyra* sp. and *Pinnotheres* sp., and 1 Ocypodid species and 3 Xanthid species are identified upto family level.

This study based on identification, occurrence and abundance of brachyuran larvae in the area, also gives percentage composition of brachyuran larvae collected during 1993, in the Manora Channel.

**KEY WORDS:** Brachyuran larvae, occurrence, abundance, Manora Channel, Pakistan.

### INTRODUCTION

The Brachyura is the largest group of Crustacea, containing more than 4,500 species (Kaestner, 1970), of these 210 species of brachyuran crabs are reported by Tirmizi and Kazmi (1996) from Pakistani waters.

The brachyuran larvae spend their life as plankton in two forms: the zoeae and megalopae. The larvae from planktonic samples are not easily identified upto specific level. Their specific identification are made by comparing them with laboratory reared larvae of known parents and previous knowledge of work done mostly in this region on the brachyuran larvae which is based on the studies done by Gurney (1938); Atkins (1954); Chhapgar (1955); Raja Bai, (1960); Hashmi (1969, 1970a,b); Baba and Miyata (1971); Kakati and Sankolli (1975); Lim and Tan (1981); Amir, (1989, M.Phil thesis, unpublished); Ingle (1992); Siddiqui and Tirmizi (1992); Bano, (1999, M.Phil thesis, unpublished), Mustaquim *et al.*, (2001), Ghory, (2002, M.Phil thesis, unpublished).

The present study deals with identification, occurrence and abundance and percentage composition of brachyuran larvae which were obtained through monthly collections of zooplankton taken from surface water and subsurface water in the Manora Channel.

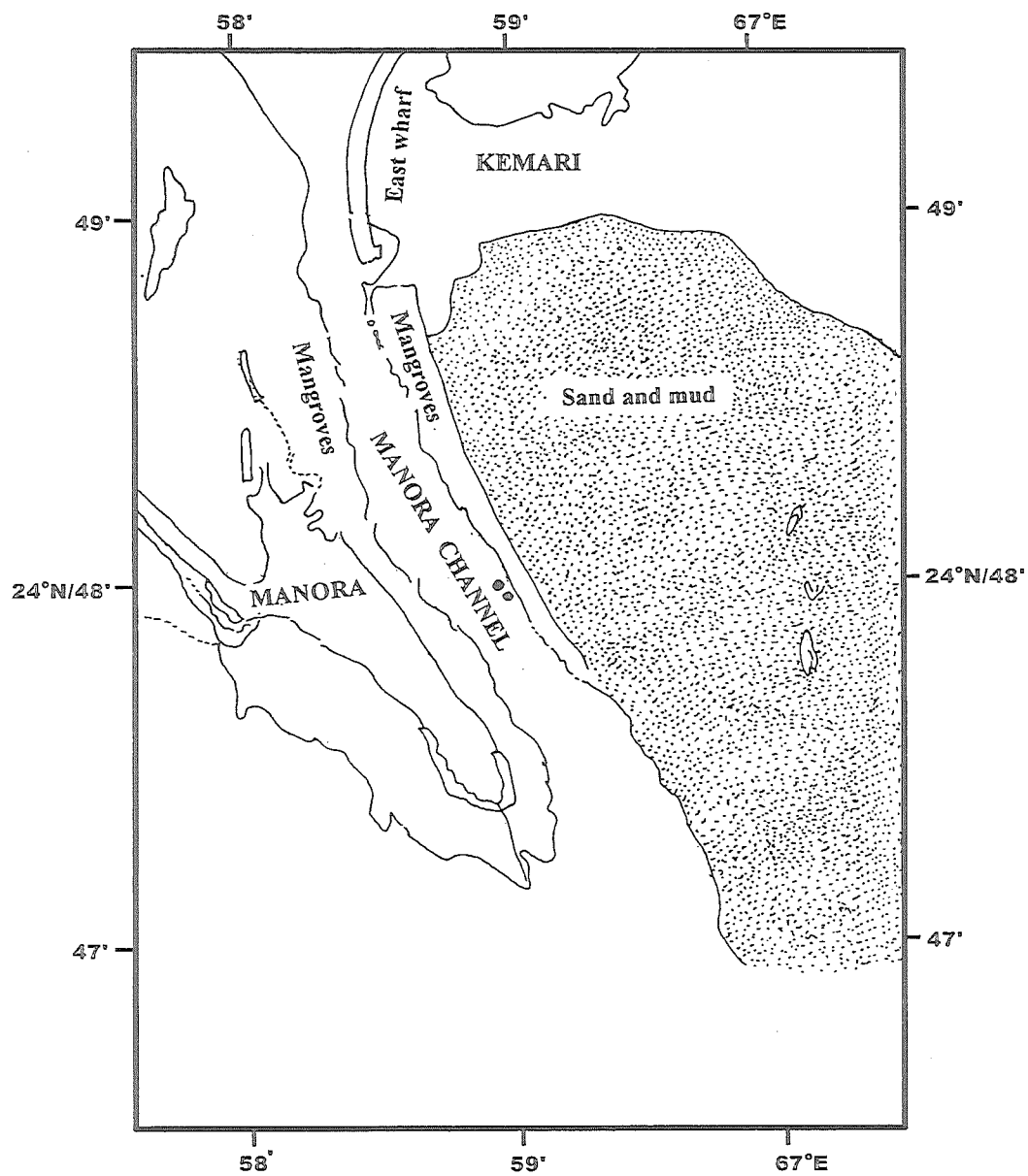


Fig. 1. Map showing collection sites.

## MATERIALS AND METHODS

The planktonic sampling was carried out in Manora Channel (Long. 66° 59' E and Lat. 24° 48' N ) which is bordered by mangroves (Fig. 1). The present materials of brachyuran larvae were collected fortnightly in 1993 (September- December except the single collection of August) during day time, four tows at two different stations (A and B): AI (surface sample), AII (subsurface sample), BI (subsurface sample), BII (surface sample) at shallow depth 15'-20' using Bongo net of 300 micron mesh size equipped with a flowmeter, in 10 minute tows. The salinity (ppt) was measured with an optical hand refractometer. Air and seawater temperatures were measured by a simple hand held thermometer and pH measured by a pH meter (PAL model TI95-26539). The samples were preserved in 5% formaldehyde. Brachyuran larvae were sorted under binocular microscope and transferred to 70% alcohol. Identification of these larvae was made upto possible taxon level. It was carried out by comparison with previously laboratory reared larvae of known parents and available literature. Larvae were deposited in the Marine Reference Collection and Resource Centre, University of Karachi.

## RESULTS AND DISCUSSION

The total number of 5,838 brachyuran larvae (zoeae and megalopae) are obtained from the planktonic samples, they are referable to 6 families pertaining to 7 genera and 12 species. Of these 4 species are confirmed and the 2 species are provisionally identified. There are 2 species identified upto generic level, and 1 zoea of Ocyropodid species and 3 megalopae of Xanthid species are identified only upto family level, as given in the following list:

Family Leucosiidae Samouelle, 1819

Subfamily Leucosiinae Miers, 1866

Genus *Philyra* Leach, 1817

*Philyra* sp.

Family Xanthidae MacLeay, 1838

Species A

Species B

Species C

Family Pilumnidae Samouelle, 1819

Subfamily Piluminae Alcock, 1898

Genus *Pilumnus* Leach, 1815

*Pilumnus ?karachiensis* Deb, 1987

Family Pinnotheridae de Haan, 1833

Subfamily Pinnotherinae de Haan, 1833

Genus *Pinnotheres* Bosc, 1802

*Pinnotheres ?pisum* (Linnaeus, 1767)

*Pinnotheres* sp.

## Family Ocypodidae Rafinesque, 1815

Ocypodid sp.

Subfamily Camptandriinae Stimpson, 1858

Genus *Serenella* Manning & Holthuis, 1981*Serenella indica* (Alcock, 1900)

Subfamily Scopimerinae Alcock, 1900

Genus *Dotilla* de Haan, 1835*Dotilla blanfordi* Alcock, 1900

## Family Grapsidae MacLeay, 1838

Subfamily Grapsinae MacLeay, 1838

Genus *Metopograpsus* H. Milne Edwards, 1853*Metopograpsus thukuhar* (Owen, 1839)

Subfamily Sesarminae Dana, 1851

Genus *Clistocoeloma* (A.M. Edwards, 1873)*Clistocoeloma lanatum* (Alcock, 1900)

There is no complete larval series of any of the collected species. *Philyra* sp. is represented by zoeal stages I and II, *Pilumnus ?karachiensis* by zoeal stage I, family Xanthidae is represented by only megalopal stages, *Pinnotheres ?pisum* by only zoeal stage II, *Pinnotheres* sp. by zoeal stage I, Ocypodid sp., *Serenella indica* and *Dotilla blanfordi* by zoeal stages I and II, *Metopograpsus thukuhar* and *Clistocoeloma lanatum* only by zoeal stage I.

The occurrence and numerical counts of brachyuran larvae are shown in table 1. Monthly variation in number of brachyuran larvae of the species composition are shown in figures 2 and 3. pH, salinity and temperature were almost same in Aug. to Dec. but number of brachyuran larvae were different because of this we can say that it is due to biological activities not because of physico-chemical factors. The abundance of larvae of different species are shown in figure 4. *Dotilla blanfordi* is the most dominant species representing 43.06% of the total larvae, followed by *Pilumnus ?karachiensis* (20.07%), *Clistocoeloma lanatum* (18.88%), *Metopograpsus thukuhar* (13.04%), *Serenella indica* (2.30%) and Ocypodid sp. and *Pinnotheres ?pisum* (1.20% and 1.18% larvae respectively). The remaining larvae of the Xanthid sp. A, B and C, *Philyra* sp. and *Pinnotheres* sp. occurred in very small percentage, as low as 0.02- 0.11%.

During this study we have not found larvae of any of the Portunidae, inspite of that adult portunids crabs are most abundant in mangroves especially the mud crab *Scylla serrata*. This species may have different salinity optima for larval growth and survival. The ovigerous females of this species migrate to offshore waters, to hatch eggs (Keenan *et al*, 1998).

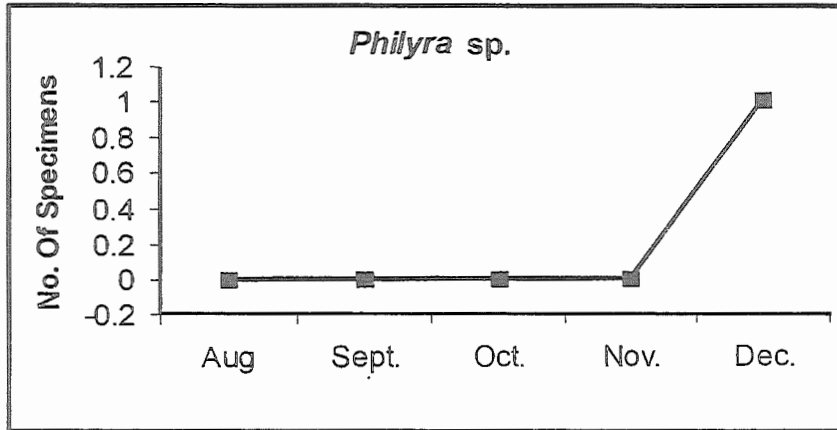
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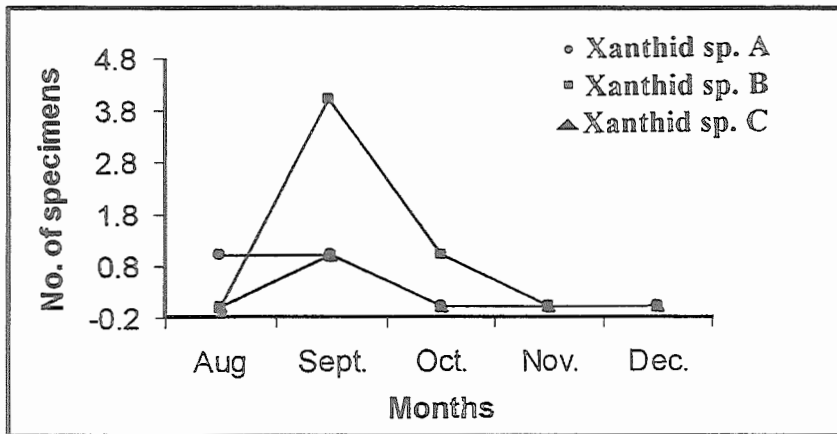
Table 1. Occurrence and Numerical Counts of Brachyuran Larvae at stations I and II of Manora Channel during 1993.

S.No.	Date of Coll.	Sta. No.	pH	Tide (m)	Depth (ft.)	Salinity‰	Temp. Air°C	Temp. Water°C	No. of Specimens
1	2 Aug. 1993	AI	7	0.9	-	36.0	27	26	2670
2	"	AII	"	"	15'-20'	"	"	"	ND
3	"	BI	"	"	"	"	"	"	ND
4	"	BII	"	"	"	"	"	"	ND
5	19 Sep. 1993	AI	"	"	-	35.0	24	22	245
6	"	AII	"	"	15'-20'	"	"	"	173
7	"	BI	"	"	"	"	"	"	27
8	"	BII	"	"	"	"	"	"	1
9	28 Sep. 1993	AI	"	2.3	-	"	26	24	181
10	"	AII	"	"	15'-20'	"	"	"	ND
11	"	BI	"	"	"	"	"	"	ND
12	"	BII	"	"	"	"	"	"	199
13	4 Oct. 1993	AI	"	2.5	-	"	22	20	668
14	"	AII	"	"	15'-20'	"	"	"	328
15	"	BI	"	"	"	"	"	"	492
16	"	BII	"	"	"	"	"	"	65
17	20 Oct. 1993	AI	"	2.04	-	"	24	22	ND
18	"	AII	"	"	15'-20'	"	"	"	ND
19	"	BI	"	"	"	"	"	"	10
20	"	BII	"	"	"	"	"	"	31
21	30 Nov. 1993	AI	"	1.9	-	35.0	26	24	25
22	"	AII	"	"	15'-20'	"	"	"	54
23	"	BI	"	"	"	"	"	"	399
24	"	BII	"	"	"	"	"	"	ND
25	8 Dec. 1993	AI	"	2	-	"	26	"	42
26	"	AII	"	"	15'-20'	"	"	"	4
27	"	BI	"	"	"	"	"	"	23
28	"	BII	"	"	"	"	"	"	77
29	23 Dec. 1993	AI	"	2.2	-	"	25	23	14
30	"	AII	"	"	15'-20'	"	"	"	12
31	"	BI	"	"	"	"	"	"	58
32	"	BII	"	"	"	"	"	"	40

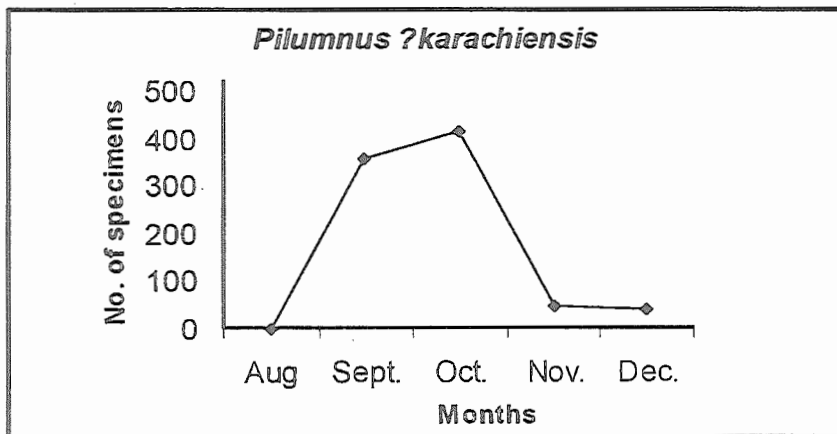
ND = Data not available.



A.

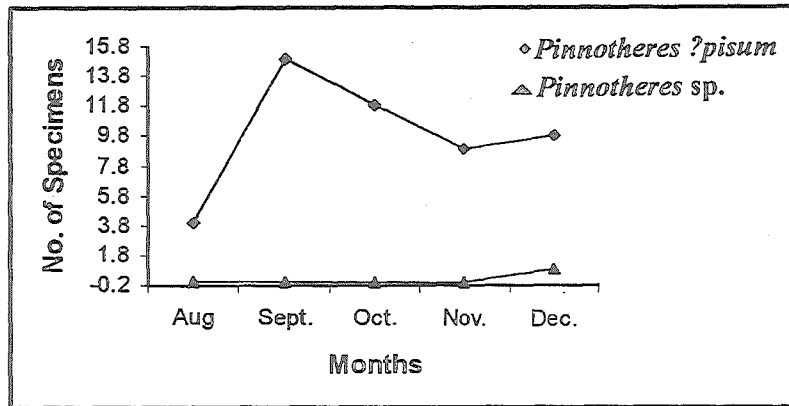


B.

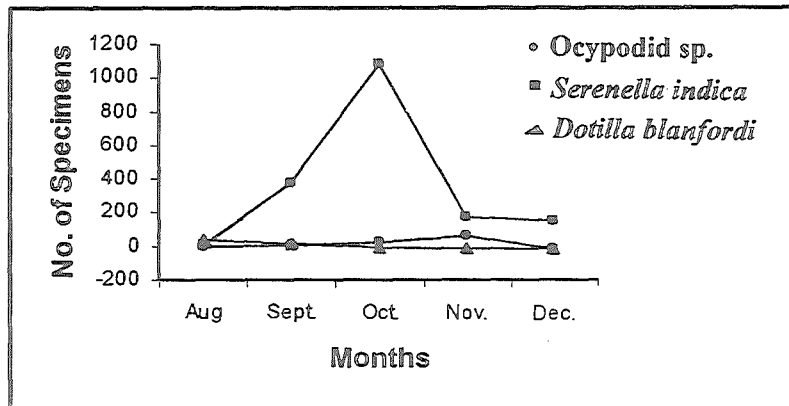


C.

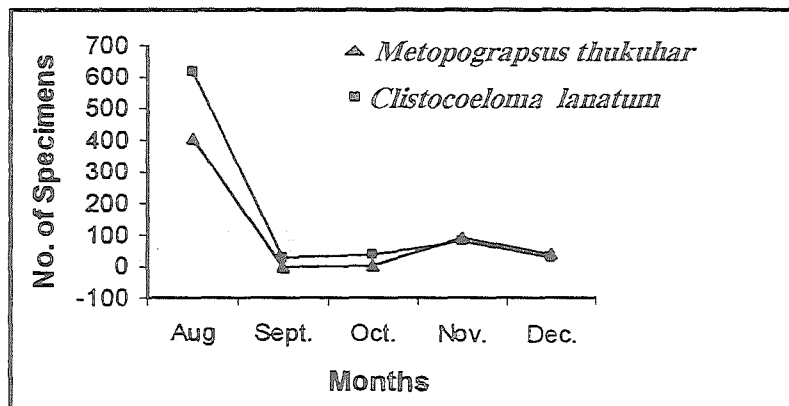
Fig. 2. Monthly variation in number of species of brachyuran larvae composition of A. *Philyra sp.*, B. Xanthid sp. A, B and C and C. *Pilumnus ?karachiensis* during August - December 1993.



A.



B.



C.

Fig. 3. Monthly variation in number of species of brachyuran larvae composition of A. *Pinnotheres ?pisum* and *Pinnotheres sp.*, B. *Ocypodid sp.*, *Serenella indica*, and *Dotilla blanfordi*, C. *Metopograpsus thukuhar* and *Clistocoeloma lanatum* during August - December 1993.

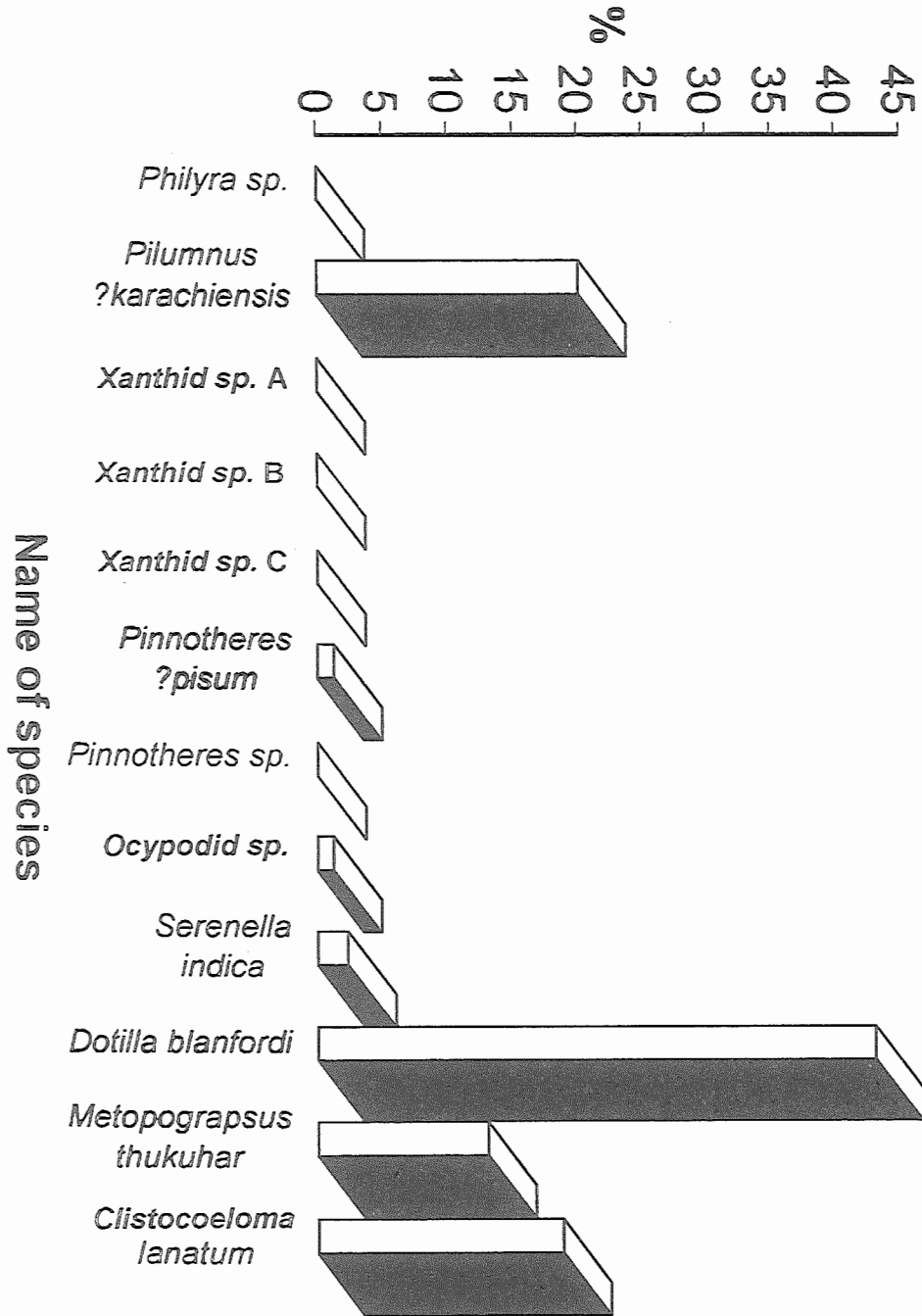


Fig. 4. Percentage composition of Brachyuran larvae collected during 1993 in the Manora Channel.



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#### REFERENCES

- Amir, N. 1989. Abundance and distribution of some brachyuran larvae (Decapoda, Crustacea) in the northern Arabian Sea. M. Phil thesis (unpublished).
- Atkins, D. 1954. The post-embryonic development of British *Pinnotheres* (Crustacea). *Proceedings of Zoological Society of London*. Vol. 124: 687- 715.
- Baba, K. and K. Miyata, 1971. Larval development of *Sesarma* (*Holometopus*) *dehaani* H. Milne Edwards (Crustacea, Brachyura) reared in the laboratory. *Rep. Memoirs. Faculty of Education, Kumamoto University*. 19(1): 54-64.
- Bano, H. 1998. Distribution and abundance of Crustacean larvae in the Northern Arabian Sea. M.Phil thesis (unpublished).
- Chhapgar, B.F. 1955. On the life history of *Philyra globosa* (Decapoda: Brachyura). *Records of the Indian Museum*. 53, 1-2: 87-92.
- Ghory, F.S. 2002. Occurrence and Abundance of Brachyuran larvae in the Manora Channel (Karachi, Pakistan). M.Phil thesis (unpublished).
- Gurney, R. 1938. Notes on some Decapod Crustacea from the Red Sea. VI-VII. *Proceedings of Zoological Society of London*. 108(B): 73-84.
- Hashmi, S.S. 1969. Early development stages of *Philyra globosa* (Fabricius) hatched in the laboratory. (Brachyura: Decapoda). *Journal of Agriculture Pakistan*. 20(2): 207-215.
- Hashmi, S.S. 1970a. The larvae of *Elamena* (Hymenosomidae) and *Pinnotheres* (Pinnotheridae) hatched in the laboratory (Decapoda: Crustacea). *Pakistan Journal of Scientific and Industrial Research*. 12: 212-278.
- Hashmi, S.S. 1970b. The larval development of *Philyra corallicola*. (Alcock) under laboratory conditions (Brachyura: Decapoda). *Pakistan Journal of Zoology*. 2(2): 219-233.
- Ingle, R.W. 1992. Larval stages of Northeastern Atlantic crabs. An illustrated key. Chapman and Hall, London. :vii-xi, 363.
- Kaestner, A. 1970. Invertebrate Zoology. Crustacea. 3. Translated and Adopted from the German by Herbert W. Levi and Lorna R. Levi. Intersciences Publishers. New York, :523, figs. 1-1-18-16.
- Kakati, V.S and K.N.J Sankolli, 1975. Larval culture of an estuarine crab *Sesarma lanatum* Alcock in the laboratory (Brachyura, Grapsidae). *Bulletin Department of Marine Science University of Cochin*. 7: 965-979.
- Keenan, C.P., P.J.F. Davie and L.D. Mann, 1998. A revision of the genus *Scylla* De Hann, 1833 (Crustacea: Decapoda: Brachyura: Portunidae). *The Raffles Bulletin of Zoology* 46(1): 217-245.
- Lim, S.S.L. and Leo W. H. Tan, 1981. Larval development of the hairy crab, *Pilumnus vespertilio* (Fabricius) (Brachyura, Xanthidae) in the laboratory and comparisons with larvae of *Pilumnus dasypodus* Kingsley and *Pilumnus sayi* Rathbun. *Crustaceana*. 41(1): 71-88.

- Mustaquim, J., R. Imtiaz and R. Sultana, 2001. Population Biology and larval morphology of the edible crab (*Scylla serrata*) from Karachi backwaters. *Pakistan Journal of Marine Biology*. 7(1&2): 299-327.
- Raja Bai, K.G. 1960. Studies on the larval development of Brachyura, I. The early and post larval development of *Dotilla blanfordi* Alcock. *Annals and Magazine Natural History*. (13)2: 129-135.
- Siddiqui, F.A. and N.M. Tirmizi, 1992. The complete larval development, including the first crab stage of *Pilumnus kempfi* Deb, 1987 (Crustacea: Decapoda: Brachyura: Pilumnidae) reared in the laboratory. *Raffles Bulletin of Zoology*. 40(2), 1992: 229-244.
- Tirmizi, N.M. and Q.B. Kazmi, 1996. Marine Fauna of Pakistan: 6. Crustacea: Brachyura, Brachyryncha Part II (Portunidae). MRC Publication. : 1-72.

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