

NOTES AND NEWS

PERCENTAGE COMPOSITION OF BRACHYURAN LARVAE COLLECTED DURING 1994 IN MANORA CHANNEL, KARACHI, PAKISTAN

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Brachyuran larvae are the most common zooplankton component of the Manora Channel, Karachi, Pakistan. The identification of these larvae would assist in the assessment of brachyuran species and provide information on percentage composition, occurrence, abundance and breeding habits of the brachyuran species in the Manora Channel area. However plankton caught larvae is not easily identified. An accurate identification of such material is only possible by the comparison with larvae reared under laboratory conditions and documented with illustrations. The identifications for this present study were based on the works of Gurney (1938); Atkins (1954); Chhapgar (1955); Raja Bai (1960); Hashmi (1969, 1970a, b); Baba and Miyata (1971); Kakati and Sankolli (1975); Rice (1975); Kakati (1977); Lim and Tan (1981); Yatsuzuka and Sakai (1984); Fielder, *et al* (1984); Amir (1989, M.Phil thesis unpublished); Ingle (1992); Siddiqui and Tirmizi (1992); Tirmizi *et al* (1993); Bano (1999, M.Phil thesis unpublished); Ghory and Siddiqui (2001); Ghory (2002, M.Phil thesis unpublished); Ghory and Siddiqui (2002).

MATERIALS AND METHODS

Day time plankton sampling was carried out in Manora Channel (Long. 66° 59' E and Lat. 24° 48' N) (Fig. 1) at fortnightly intervals during 1994 (January - December except for August and September because of monsoon season).

Two stations, A and B, 5 kilometers apart were sampled. The samples included four 10 minute tows 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'. Temperature, pH, and salinity were recorded.

The samples were preserved in 5% formalin. Brachyuran larvae were sorted under binocular microscope Ogawa Seiki (4 x 10 magnification) and transferred to 70% alcohol. Identification of these larvae was 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.

RESULTS

15,923 brachyuran larvae (zoeae and megalopae) were collected during sampling and a complete set of data is listed in the table 1. The larvae were assigned to eight families, eleven genera and twenty one species. Of these eight species are confirmed and two

species are provisionally identified, five species identified to generic level, and three zoeae of ocypodid species and three megalopae of xanthid species are identified only to family level as listed below:

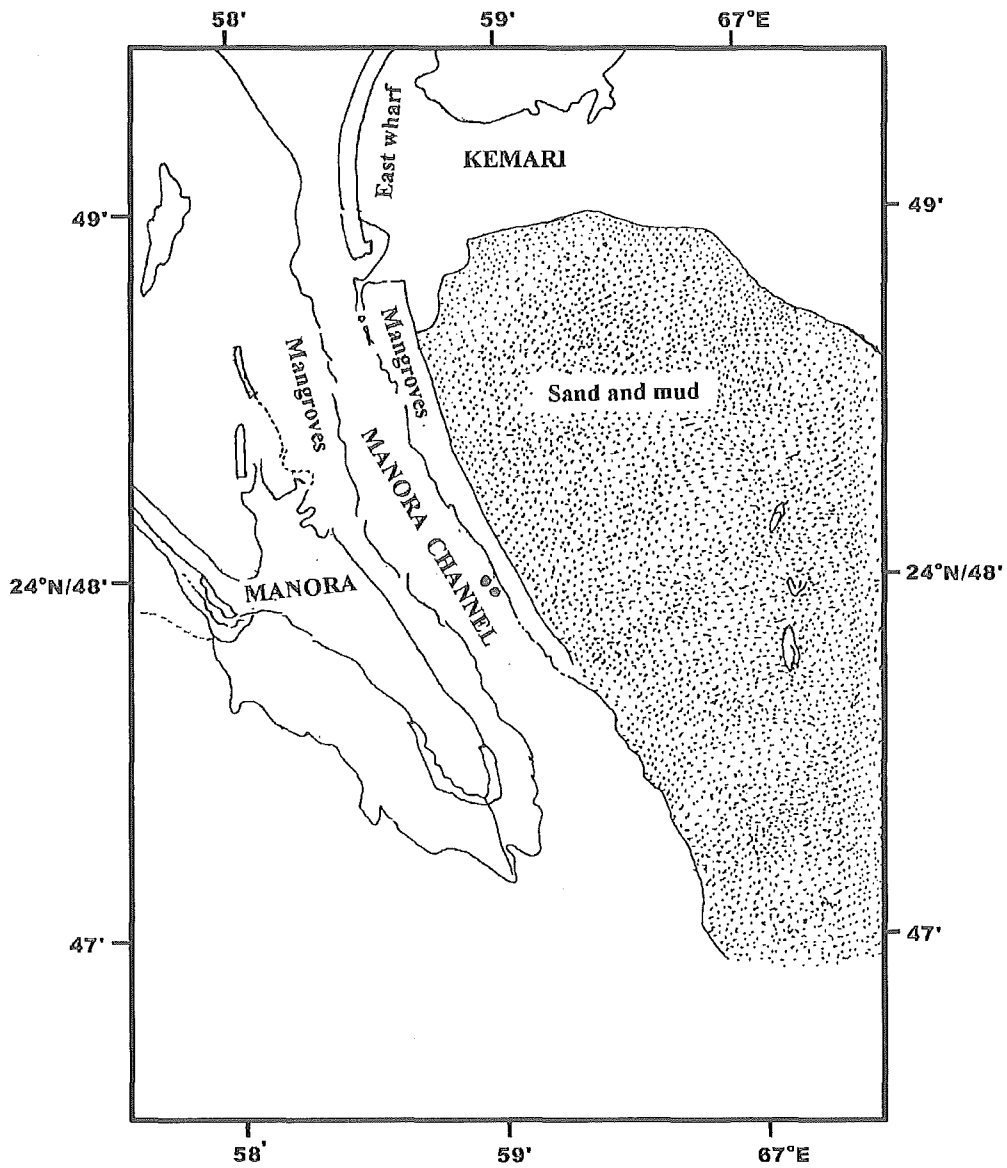


Fig. 1. Map showing collection sites.

Table 1. Occurrence and numerical counts of brachyuran larvae at stations I and II of Manora Channel during 1994.

S. No.	Date of Coll.	Sta. No.	pH	Tide (m)	Depth (ft.)	Salinity ‰	Temp. Air °C	Temp. Water °C	No. of Specimens
1	03 Jan .1994	AI	7	2	-	35.0	26	24	38
2	"	AII	"	"	15'-20'	"	"	"	22
3	"	BI	"	"	"	"	"	"	07
4	"	BII	"	"	-	"	"	"	-
5	18 Jan. 1994	AI	"	1.8	-	"	24	22	-
6	"	AII	"	"	15'-20'	"	"	"	01
7	"	BI	"	"	"	"	"	"	-
8	"	BII	"	"	-	"	"	"	07
9	06 Feb.1994	AI	"	"	-	"	22	20	16
10	"	AII	"	"	15'-20'	"	"	"	08
11	"	BI	"	"	"	"	"	"	05
12	"	BII	"	"	-	"	"	"	-
13	23 Feb.1994	AI	"	1.6	-	"	24	22	101
14	"	AII	"	"	15'-20'	"	"	"	02
15	"	BI	"	"	"	"	"	"	21
16	"	BII	"	"	-	"	"	"	08
17	21 Mar.1994	AI	"	2.6	-	"	28	26	82
18	"	AII	"	"	15'-20'	"	"	"	132
19	"	BI	"	"	"	"	"	"	17
20	"	BII	"	"	-	"	"	"	03
21	05 Apr.1994	AI	"	2.4	-	36.0	31	30	13
22	"	AII	"	"	15'-20'	"	"	"	256
23	"	BI	"	"	"	"	"	"	142
24	"	BII	"	"	-	"	"	"	35
25	26 Apr.1994	AI	"	3	-	35.0	28	26	965
26	"	AII	"	"	15'-20'	"	"	"	-
27	"	BI	"	"	"	"	"	"	1719

28	"	BII	"	"	-	"	"	"	289
29	08 May.1994	AI	"	2.6	-	36.0	29	28	140
30	"	AII	"	"	15'-20'	"	"	"	300
31	"	BI	"	"	"	"	"	"	8237
32	"	BII	"	"	-	"	"	"	-
33	29 Jun.1994	AI	7	2.7	-	36.0	28	27	107
34	"	AII	"	"	15'-20'	"	"	"	53
35	"	BI	"	"	"	"	"	"	194
36	"	BII	"	"	-	"	"	"	321
37	09 July,1994	AI	"	2.8	-	"	27	26	73
38	"	AII	"	"	15'-20'	"	"	"	42
39	"	BI	"	"	"	"	"	"	315
40	"	BII	"	"	-	"	"	"	05
41	04 Oct.1994	AI	"	2.7	-	"	31	29.5	51
42	"	AII	"	"	15'-20'	"	"	"	243
43	"	BI	"	"	"	"	"	"	44
44	"	BII	"	"	-	"	"	"	284
45	22 Oct.1994	AI	"	"	-	35.0	"	"	08
46	"	AII	"	"	15'-20'	"	"	"	82
47	"	BI	"	"	"	"	"	"	37
48	"	BII	"	"	-	"	"	"	23
49	07 Nov.1994	AI	"	2	-	"	30.5	29	273
50	"	AII	"	"	15'-20'	"	"	"	540
51	"	BI	"	"	"	"	"	"	265
52	"	BII	"	"	-	"	"	"	246
53	23 Nov.1994	AI	"	2.4	-	"	31	"	10
54	"	AII	"	"	15'-20'	"	"	"	75
55	"	BI	"	"	"	"	"	"	20
56	"	BII	"	"	-	"	"	"	09
57	27 Dec.1994	AI	"	0.6	-	"	23	21	-

Family Leucosiidae Samouelle, 1819

Subfamily Leucosiinae Miers, 1866

Genus *Philyra* Leach, 1817

Philyra sp.

Family Portunidae Rafinesque, 1815

Subfamily Portuninae Stephenson and Campbell, 1960

Genus *Charybdis* de Haan, 1833

Charybdis annulata (Fabricius, 1798)

Charybdis 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 Oziidae Dana, 1851

Subfamily Oziinae Dana, 1851

Genus *Menippe* de Haan, 1851

Menippe rumphii (Fabricius, 1798)

Family Pinnotheridae de Haan, 1833

Subfamily Pinnotherinae de Haan, 1833

Genus *Pinnotheres* Bosc, 1802

Pinnotheres ?pisum (Linnaeus, 1767)

Pinnotheres sp.

Family Ocypodidae Rafinesque, 1815

Species A

Species B

Species C

Subfamily Camptandriinae Stimpson, 1858

Genus *Nasima* Manning, 1991

Nasima dotilliforme (Alcock, 1900)

Genus *Serenella* Manning and Holthuis, 1981

Serenella indica (Alcock, 1900)

Subfamily Macrophthalminae Dana, 1852

Genus *Macrophthalmus* Latreille, 1829

Macrophthalmus (Mareotis) depressus Ruppell, 1830

Macrophthalmus sp.

Subfamily Scopimerinae Alcock, 1900

Genus *Dotilla* de Haan, 1835

Dotilla blanfordi Alcock, 1900

Dotilla sp.

Family Grapsidae MacLeay, 1838

Subfamily Grapsinae MacLeay, 1838

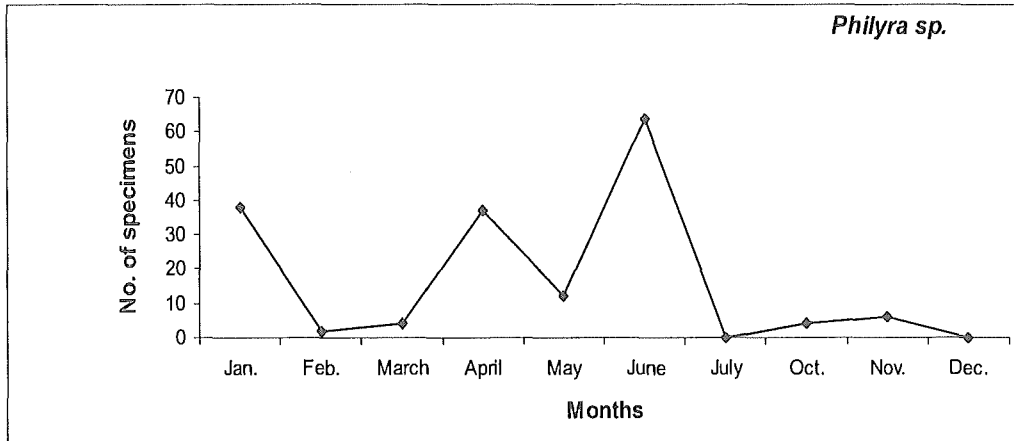
Genus *Metopograpsus* H. Milne Edwards, 1853*Metopograpsus thukuhar* (Owen, 1839)

Subfamily Sesarminae Dana, 1851

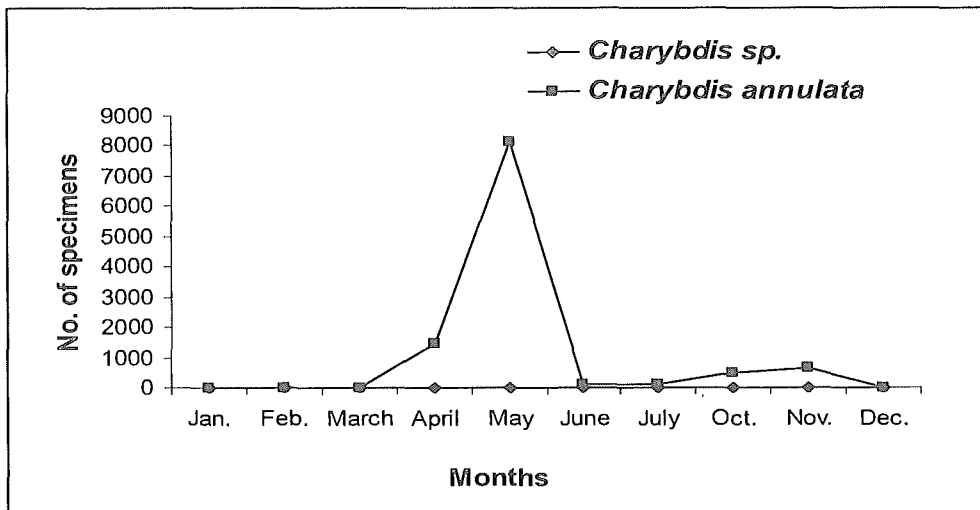
Genus *Clistocoeloma* (A. Milne Edwards, 1817)*Clistocoeloma lanatum* (Alcock, 1900)

Monthly variations in numbers of brachyuran larvae of the species composition are shown in Figures 2, 3, 4 and 5. Through this study we have been able to assess the peak of the breeding season, occurrence and abundance of the brachyuran species in the area of Manora Channel. *Philyra* sp. was abundant in January, April with the highest peak in June (Fig. 2A), *Charybdis annulata* peaked in May, while *Charybdis* sp. was constantly present in small numbers (Fig. 2B). Xanthid sp. A. has its peak abundance in January, April and October, Xanthid sp. B. was most abundant in January and Xanthid sp. C. was present in small numbers throughout the year (Fig. 3A). *Pilumnus ?karachiensis* reached a peak in April and November (Fig. 3B), where as *Menippe rumphii* showed a low peak in April and high one in November (Fig. 4A), *Pinnotheres* sp. showed a high peak in April and a low in December, where as *P. ?pisum* was found in small numbers throughout the year (Fig. 4B). *Metopograpsus thukuhar* peak abundance was in April, and *Clistocoeloma lanatum* found low peaks in April, May, June and July (Fig. 5A). *Nasima dotilliforme* attained a high peak in May, while *Serenella indica* showed peaks presence in April, May, June, and December. *Macrophthalmus (Mareotis) depressus* peaked in April and November, *Macrophthalmus* sp. showed a small peak in April, *Dotilla blanfordi* showed peaks in February, March, April, May, June, July, October and November. *Dotilla* sp. was found in small numbers during May, where as Ocypodid sp. A. peaked in November, Ocypodid sp. B. found a medium peak in April, with highest in July and lowest in October, Ocypodid sp. C. displayed a highest peak abundance in April and lowest in October (Fig. 5B). This analysis shows that most of the brachyuran species hatched larvae during summer and winter (April and November).

The percentage composition of the brachyuran larvae is shown in Figure 6. *Charybdis annulata* is the most dominating species represented by 64.75% of the total species larvae, that of *Clistocoeloma lanatum* have 9.43%, *Metopograpsus thukuhar* and *Dotilla blanfordi* rank next to the above two species in abundance, showing their percentage composition as 6.96% and 6.94% respectively *Pilumnus ?karachiensis* is represented by 4.92% *Serenella indica* and *Macrophthalmus (Mareotis) depressus* larvae have an abundance of 2.23% and 1.05% respectively in the present material. The remaining larvae of 14 species *Philyra* sp., *Charybdis* sp., Xanthid spp. A, B and C, *Menippe rumphii*, *Pinnotheres ?pisum*, *Pinnotheres* sp., *Nasima dotilliforme*, *Macrophthalmus* sp., *Dotilla* sp. and Ocypodid spp. A, B and C, are all present with a small percentage ca. 0.70-0.01%.

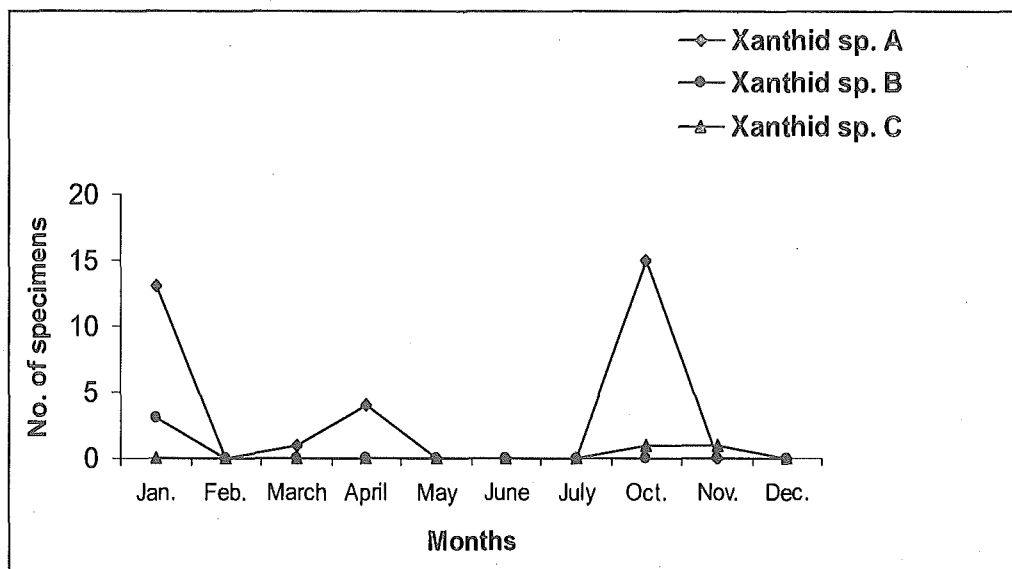


A.

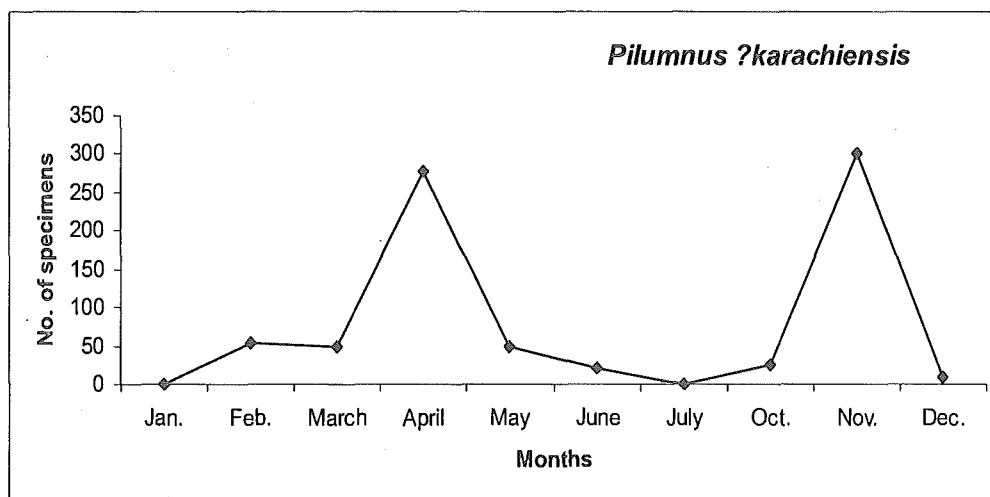


B.

Fig. 2. Monthly variation in number of species composition of brachyuran larvae: (A). *Philyra sp.* (B). *Charybdis annulata* and *Charybdis sp.* during January - December, 1994.

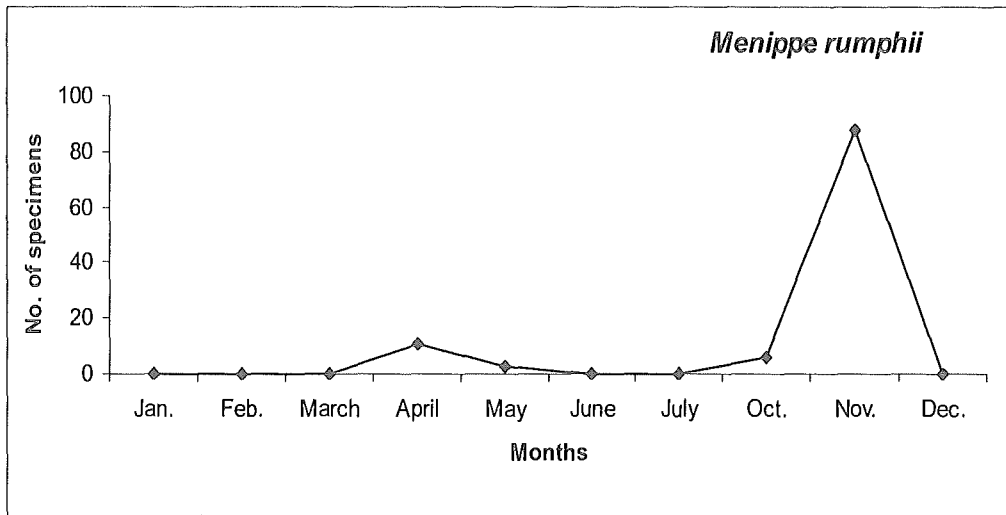


A.

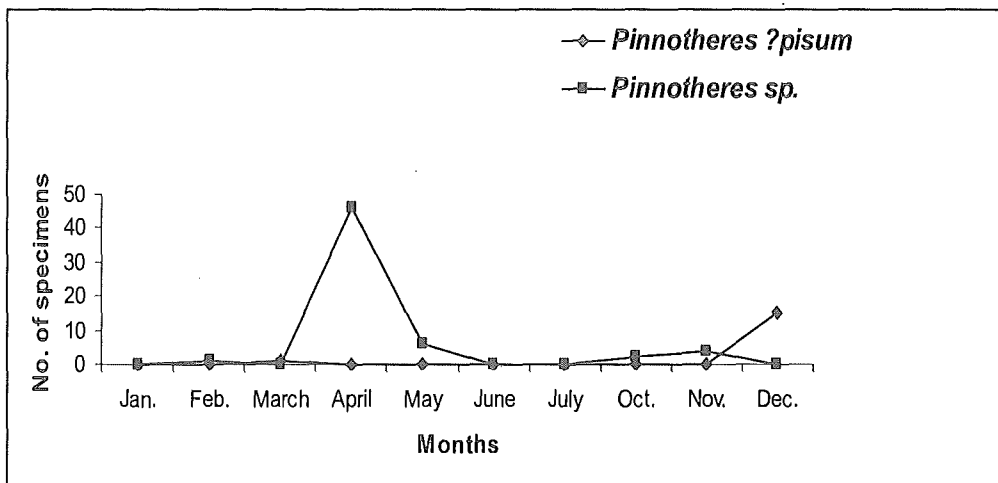


B.

Fig. 3. Monthly variation in number of species composition of brachyuran larvae: (A). Xanthid sp. A, B, and C; (B). *Pilumnus ?karachiensis* during January - December, 1994.

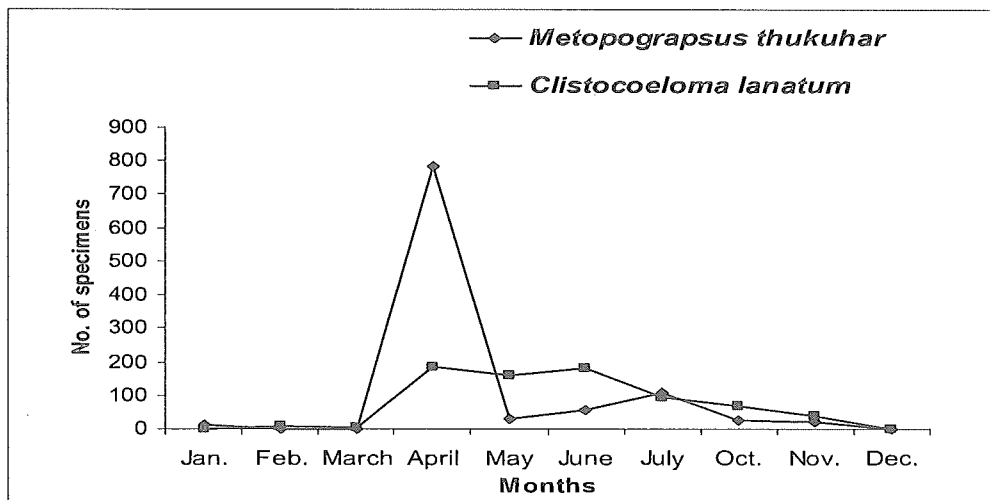


A.

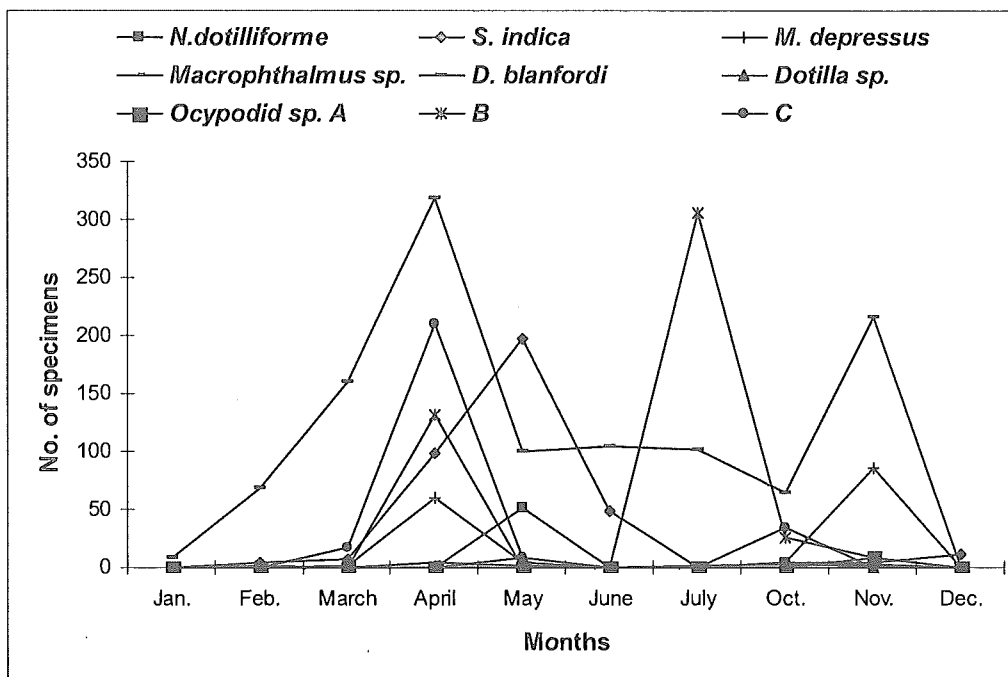


B.

Fig. 4. Monthly variation in number of species composition of brachyuran larvae: (A). *Menippe rumphii*; (B). *Pinnotheres ?pisum* and *Pinnotheres sp.*, during January - December, 1994.



A.



B.

Fig. 5. Monthly variation in number of species composition of brachyuran larvae: (A). *Metopograpsus thukuhar* and *Clistocoeloma lanatum* (B). *Nasima dotilliforme*, *Serenella indica*, *Macrophthalmus (M.) depressus*, *Macrophthalmus sp.*, *Dotilla blanfordi*, *Dotilla sp.* and *Ocypodid sp. A*, *B* and *C* during January - December, 1994.

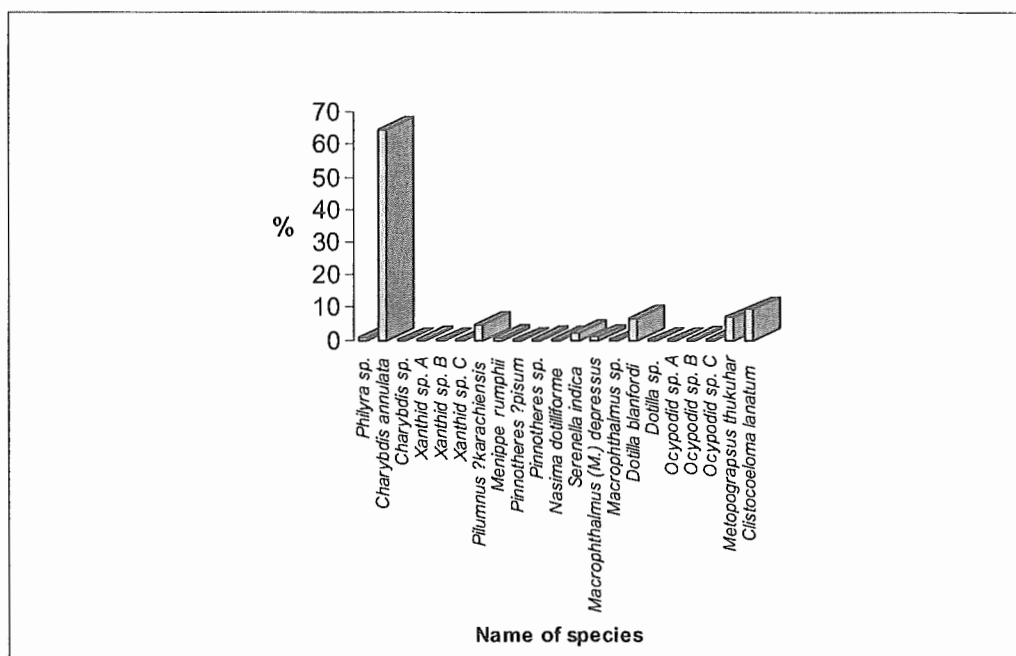


Fig. 6. Percentage composition of Brachyuran larvae collected during 1994 in the Manora Channel.

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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 data).
- 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 data).
- Chhapgar, B. F. 1955. On the life history of *Philyra globosa* (Decapoda: Brachyura). *Records of the Indian Museum*. 53(1&2): 87-92.
- Fielder, D.R., J.G. Greenwood and G. Campbell, 1984. The megalopa of *Charybdis feriata* (Linnaeus) with additions to the zoeal larvae descriptions (Decapoda: Portunidae). *Crustaceana*. 46(2): 160- 165.
- Ghory, F.S. 2002. Occurrence and Abundance of Brachyuran larvae in the Manora Channel (Karachi, Pakistan). M. Phil thesis (unpublished).
- Ghory, F.S. and F.A. Siddiqui, 2001. The complete larval development of *Pilumnus* sp. (Decapoda: Brachyura: Pilumnidae) reared under laboratory conditions. *Proceedings*

- of National Symposium on Arabian Sea as a Resource of Biological Diversity : 207-227.
- Ghory, F.S. and F.A. Siddiqui, 2002. Occurrence and abundance of brachyuran larvae in the Manora Channel (Karachi, Pakistan) during 1993. *Pakistan Journal of Marine Science*. 11(1&2): 27-36.
- 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.
- Kakati, V. S. 1977. Larval development of the crab, *Menippe rumphii* (Fabricius) as observed in the laboratory (Crustacea: Brachyura). *Proceedings of the Symposium on Warm Water Zooplankton Special. Publication. National Institute of Oceanography Goa.*: 634-641.
- 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.
- Lim, S.S.L. and L.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.
- 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.
- Rice, A.L. 1975. The first zoeal stages of *Cancer pagurus* L., *Pinnotheres pisum* (Pennant) and *Macrophthalmus depressus* Ruppell (Crustacea: Decapoda, Brachyura). *Bulletin of British Museum of Natural History (Zoology)*. 28: 237-247.
- Siddiqui, F.A. and N.M. Tirmizi, 1992. The complete larval development, including the first crab stage of *Pilumnus kampi* Deb, 1987 (Crustacea: Decapoda: Brachyura: Pilumnidae) reared in the laboratory. *Raffles Bulletin of Zoology*. 40(2): 229- 244.
- Tirmizi, N.M., F.A. Siddiqui and N. Amir, 1993. Distribution of brachyuran larvae collected by R.V. Dr. Fridtjof Nansen, 1977 (Cruises 1, 2) from coastal waters of Pakistan. In: *Proceedings. National Seminar on Study and Management in Coastal Zones in Pakistan*, (Eds. N.M. Tirmizi and Q.B. Kazmi). MRC and UNESCO, Karachi : 181-188.
- Yatsuzuka, K. and K. Sakai, 1984. The larvae and juvenile crabs of Japanese Portunidae (Crustacea: Brachyura). III *Charybdis japonica* A. Mine Edward. Text figs.1-14. Rep. *Usa Marine. Biological. Institute. Kochi University*. 6: 23-40.

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