

Distribution of Molluscans in Narmada River, India.

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Abstract: Molluscan species were collected from specific stations of Narmada River from July 2009 to June 2010. During the present investigation carried out, about eight species of class gastropoda and eight species of class pelecypoda were recorded through out the year. Among the gastropoda group, *Vivipara bengalensis* was most dominant followed by *Bellamyia bengalensis*, *Indoplanorbis*, *Unio species*, *Thiara scabra*, *Pila globosa*, *Thiara lineata*, and *Thiara tuberculata*. Among pelecypoda the dominant species was *Lymnaea acuminata*, followed by *Lymnaea auricularia*, *Corbicula striatella*, *Pissidium clarkeanum*, *Melanoides tuberculata*, *Musculium indicum*, *Parreysia favidens*, *Corbicula striatella* and *Perreysia caerulea*. *Vivipara bengalensis* and *Bellamyia bengalensis* dominated the Molluscans fauna and are distributed from the shore line to 3 m depth in all types of sediments. They were found dead on the shore in large numbers during summer. Their maximum density was recorded in summer and minimum in post monsoon season.

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Key Words: Molluscan Fauna, Narmada River, diversity, sediments, detritivores.

Introduction

Aquatic ecosystem provides a home to many species including phytoplanktons, zooplanktons, aquatic plants, insects, molluscans etc. They are organized at many levels from smallest building blocks of life to complete ecosystems, encompassing communities, populations, species and genetic levels. All aquatic ecosystems around the globe are generally colonized by the representatives of phylum Arthropoda and Mollusca.

Benthic invertebrates occupy the bottom of water body. The functional role of benthic communities in the trophic dynamics of river ecosystem is well acknowledged. The composition, distribution of benthic organisms over a period of time provide index of the ecosystem. In recent years, there is a greater emphasis world over for better understanding of benthic environment. Clarke (1979) attempted to show the utility of molluscs in primary classification of the rivers in their various trophic status stages. Choubisa (1992) has collected 32 species of molluscs from various freshwater habitats of southern Rajasthan. Harman (1974) has also pointed out that molluscs are bio-indicators of freshwater pollution.

Molluscans are of great significance because they form the food of fishes and their productivity play an important link in the food chain. Benthic organisms are detritivores and form an important link in the food chain. On account of their ability to convert low quality and low energy detritus into better quality

food for higher organisms in the food web with the unfolding of importance of benthos in food chain, benthic productivity has been correlated with fish resources. Molluscans communities are good indicators of localized conditions, indicating the water quality. The presence of thriving populations of molluscan indicates the land is not acidic; hardly molluscs survive beyond a pH of 5. (Boycott 1934).

Materials and Methods

About Narmada River

Narmada is the largest west flowing river in India and it originates from the Makhala range in Shahdol district, Madhya Pradesh. It flows 1300 km west through the states of Madhya Pradesh and Gujarat before draining into the Gulf of Khambhat in the Arabian Sea. It is said to be one of the most beautiful rivers in India. In terms of its catchment area it is the seventh largest among the fourteen major river basins in the country. With many short tributaries flowing from north and south, the Narmada basin forms a very important topographic feature of peninsular India.

Sampling sites-

The samples were collected from the selected sampling stations in the Narmada River which are as under.

Omkareshwar

Omkareshwar is a famous place of pilgrimage, situated 77 km from Indore in Khandwa District, Madhya Pradesh. Shaped like the holy Hindu Symbol 'OM' this sacred island, on the conflux of the river Narmada and Kaveri is visit by pilgrims from all over the country to seek blessing at the temple of Shri Omkar Mandhata.

It's Latitude (DMS) - 22°15, 1"N and Longitude – (DMS) 76°8', 48"E.

Mandleshwar

Mandleshwar is a small town and a Nagar Panchayat Khargon district in the state of Madhya Pradesh, India, Asia. It is a town of historical and religious importance situated on the banks of Narmada River at a distance of 8 km east from Maheshwar, which was the capital of Holkar States and 99 km from Indore.

It's latitude- 22.18, latitude (DMS) 22°10', 60"N and Longitude -75.67, longitude (DMS) 75°40', 0"E.

The studies were carried out from July 2009 to June 2010 from two sampling stations namely Omkareshwar and Mandleshwar. Samples were collected from the deeper profundal zone by using Ekman grab and at shallow zone profundal by using surber sampler following Wetzel (2001). Three samples were taken from each station to minimize the sampling error. All samples were preserved in field with 5% formalin solution. Samples were returned to laboratory and later sorted and picked by using low power scanning lens. Organisms were identified by using standard keys, like Pennak (2004), Tonapi (1980), Adoni et al. (1985) Subba Rao(1993)

Results

In normal condition the distribution of macro benthos fauna has been reported to be dependent on the availability and distribution of preferably food items. In fact, their capacity to exploit areas with optimum food supply might be explained by their abundance (Grimas 1965). During the present investigation carried out, about eight species of class gastropoda and eight species of class

pelecypoda were recorded through out the year. Their maximum density was recorded in summer and minimum in monsoon season. Among the gastropoda group, *Vivipara bengalensis* was most dominant followed by *Bellamya bengalensis*, *Indoplanorbis*, *Unio species*, *Thiara scabra*, *Pila globosa*, *Thiara lineata*, and *Thiara tuberculata*. Among pelecypoda the dominant species was *Lymnaea acuminata*, followed by *Lymnea auricularia*, *Corbicula striatella*, *Pissidium clarkeanum*, *Melanoides tuberculates*, *Musculium indicum*, *Parreysia favidens*, *Corbicula striatella* and *Perreysia caerulea*.

Vivipara bengalensis contribute about 80-90% of the total biomass of molluscs and its individuals are found comparatively large in number at 0.5 m and 1.5 m depth during March to august where as they are more in number at 3 m depth during cold periods.

Melanoides tuberculates contributes 1-10% to the total biomass and its number is maximum during December to January.

Among gastropods *Thiara lineata* and *Thiara tuberculata* are comparatively few in number and are distributed more or less evenly at 1.5 m depth. At 3 m depth it is found only during April, August November and December. It contribute 0.5-3% of total molluscan biomass and occur maximum at 0.5 m to 1.5 m depth respectively.

Indoplanorbis is restricted up to 1.5 m depth, its highest number is found in April to June and it contribute about 0.3 to 2.5 of the total molluscan biomass.

Discussion

Molluscans are represented in freshwater bodies by only two classes, gastropoda and pelecypoda (Makie 1998) and a group of most diverse and dominant fauna in water bodies. They perform key role in functioning the aquatic ecosystems. The availability of maximum molluscs during summer months could be related to two important ecological phenomenons. (a). The maximum abundance of decomposers settled organic matter and macrophytes on the bottom of water body and, (b). Increased water temperature, activating the process of decomposition of these organic sediments (Malhotra et al 1996)

Table 1. Monthly fluctuations of mollusca fauna at Omkareshwar Station of Narmada River (July 2009-June 2010)

S. No	Name of the Group/ Class	Species	No. of Species seen during different Months from Jul 2009–June 2010.											
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
1.	Gastropoda	<i>Pila globosa</i>	8	5	5	12	13	16	8	5	18	13	16	26
		<i>Thiara scabra</i>	17	33	8	15	23	18	83	47	39	18	21	19
		<i>Bellamyia bengalensis</i>	9	8	10	15	20	12	3	8	15	17	23	83
		<i>Thiara lineate</i>	0	0	0	3	3	3	0	8	0	3	2	0
		<i>Thiara tuberculata</i>	0	0	3	0	4	0	0	0	0	8	4	3
		<i>Vivipara bengalensis</i>	30	18	19	29	26	36	20	28	20	38	33	22
		<i>Unio species</i>	81	57	3	82	19	50	15	13	14	28	23	18
		<i>Indoplanorbis</i>	12	11	17	18	16	13	13	13	18	18	23	23
		<i>Corbicula striatella</i>	63	52	45	06	33	00	3	8	8	81	9	30
		<i>Musculium indicum</i>	01	7	32	8	6	3	6	8	55	15	90	33
2.	Pelecypoda	<i>Melanoides tuberculates</i>	9	13	12	11	9	15	18	16	12	13	10	3
		<i>Perreysia caerulea</i>	2	4	0	9	6	4	0	6	8	3	5	6
		<i>Parreysia favidens</i>	1	1	3	6	3	5	1	3	8	4	5	2
		<i>Lymnaea acuminata</i>	14	16	17	20	22	25	11	10	13	22	25	18
		<i>Lymnaea auricularia</i>	3	5	9	7	2	6	8	6	3	8	4	6
		<i>Pissidium clarkeanum</i>	9	10	8	11	16	13	10	6	8	11	16	13

Table 2. Monthly fluctuations of mollusca fauna at Mandleshwar Station of Narmada River (July 2009-June 2010)

	<i>Melanoides tuberculates</i>	11	15	8	16	12	18	19	13	11	7	9	3
	<i>Perreysia caerulea</i>	5	0	0	1	0	0	0	0	2	0	1	1
	<i>Parreysia favidens</i>	0	3	5	8	3	2	0	0	3	0	6	5
	<i>Lymnaea acuminata</i>	3	6	8	11	10	13	4	3	2	7	5	7
	<i>Lymnaea auricularia</i>	3	9	8	7	2	5	0	3	5	3	7	4
	<i>Pissidium clarkeanum</i>	8	9	5	11	15	11	1	3	5	11	13	2

Fig. No. 1:- Monthly variation of mollusca fauna during Jul 2009 - June 2010

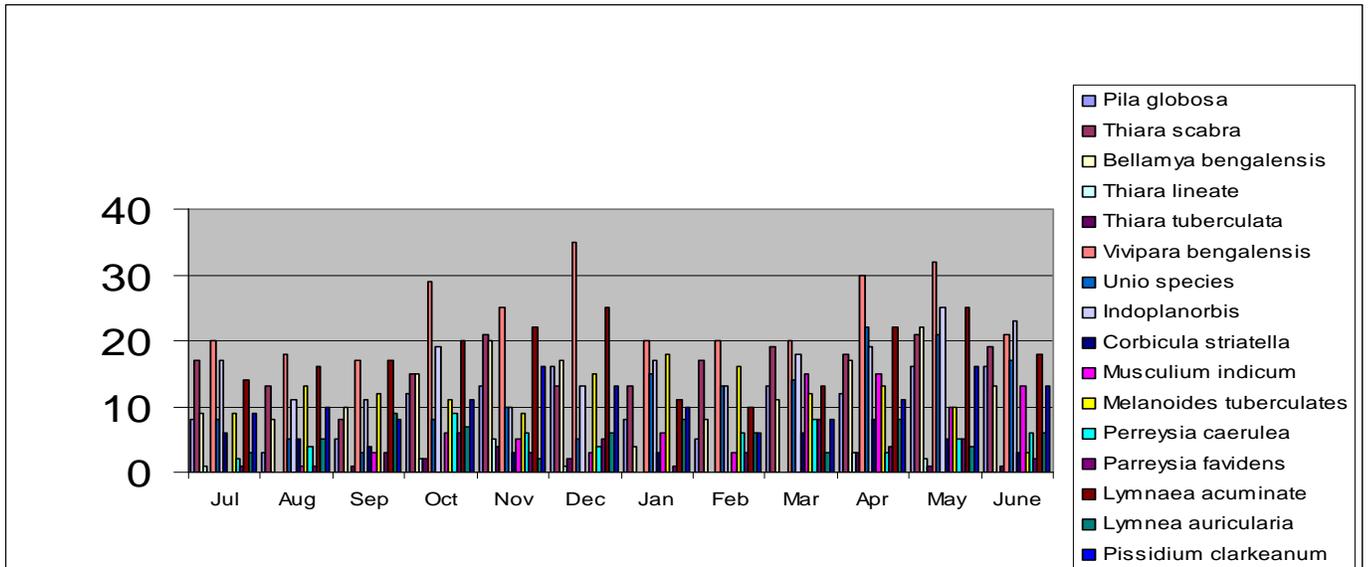
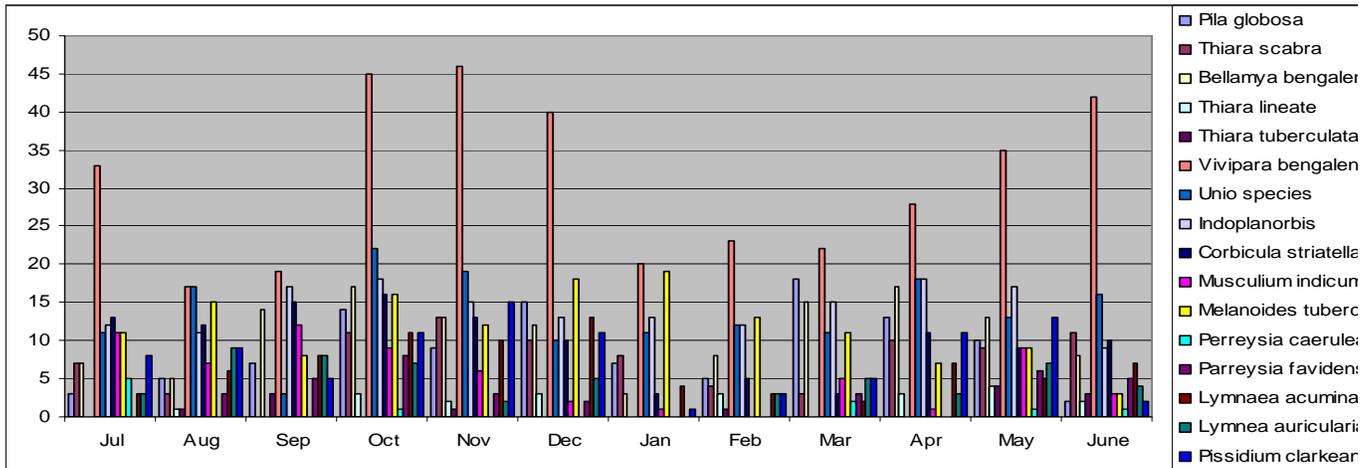


Fig. No. 2:- Monthly variation of Mollusca during Jul 2009 - June 2010.



It seems true that the fluctuation brought about by these process in that water body study, create a very conductive micro as well as macro environment for the health growth and multiplication of the molluscan fauna. Higher abundance of Molluscans with increased water, temperature and decomposed organic matter has been also reported by Bath et al (1999).

In the present study *Vivipara bengalensis* and *Bellamya bengalensis* dominated the Molluscans fauna and are distributed from the shore line to 3 m depth in all types of sediments. They were found dead on the shore in large numbers during summer. The maximum number of species was found during autumn while minimum numbers were found during the winter season (Cabuk et al 2004). Several authors (Shrivastava 1956, 1959; Krishnamoorthi 1979; Michael 1968; Sharma (2006) and Gupta 1976) also observed *Vivipara bengalensis* as one of the major species among the benthic fauna. Satyamurti (1960) observed *V. bengalensis* inhabits polluted water bodies in large numbers especially during hot season, buries itself in the mud up to 15 cm depth to aestivate and may be found dead on the bank. Micheal (1968) recorded a peak of the population of *Vivipara* in April month in West Bengal, such peak population was also observed in May and June month in Mandleshwar station.

The population density of molluscan gets decreased in the period of post monsoon season. Oliver (1960) explained that this may be due to the sudden inflow of water from the catchment area or water inlet or outlet system. The maximum diversity of Molluscans was found in summer season.

On of the most important factor which seems to determine the habitat and activities of molluscs is the amount of dissolved salts especially calcium carbonate in water, which is essential material for shell formation. Pennak (2004) reported that the dissolved oxygen is the limiting factor for the distribution of molluscs, absence of molluscan population in shallow strata of the Omkareshwar region indicates that the dissolved oxygen is an important environment in limiting their distribution.

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