

Seasonal variations of environmental parameters of the Mirya sandy shore, Ratnagiri

■ SNEHAL S. LOKHANDE AND A.D. ADSUL

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SUMMARY : The present study deals with seasonal verification of the physico-chemical parameters of intertidal sandy shore for a period of one year from April 2011 - March 2012. Seasonal variation occurred in certain physico- chemical properties due to surface run-off.

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Key Words :

Interstitial water,
Sandy beach,
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Intertidal ecology plays an important role in marine production, environmental preservation and in developing as well as usage of marine resources. Intertidal regions are in close proximity to human activities, thus having considerable extreme value. The variation in distribution, composition and structure of benthic communities on sandy beaches has been related to changes in environmental parameters. The anthropogenic actions also had major impacts, with overexploitation, invasive species and climate change being among the problems faced intertidal communities. Species have to adapt to life in the sand to ensure that the supply of oxygen and food are sufficient even when they are not protected from wave action. Marine benthic organisms are valuable due to their immense ecological significance. They also function as integrators of ecological processes and disturbances over long time scales.

The structures of interstitial environment play an important role on the morphology and the biology of the population inhabiting in it. The present study deals with the seasonal variations of environmental parameters of the intertidal exposed Mirya sandy beach.

state along the west coast of India. Mirya sandy beach (Lat. 17°00'35.25"N Long.73°16'49.42" E) is located along the western side of Ratnagiri. All samples were collected during lowest low tide of each month when maximum intertidal exposure prevailed. During each sampling, in-situ parameters such as atmospheric temperature, interstitial water temperature, sediment temperature, interstitial dissolved oxygen, salinity of interstitial water, interstitial water pH and sediment pH were recorded (Parsons *et al.*, 1984).

EXPERIMENTAL FINDINGS AND DISCUSSION

The variation in water parameters was recorded month-wise and season-wise: pre-monsoon (February - May), monsoon (June - September) and post- monsoon (October - January).

Atmospheric temperature:

The atmospheric temperature during the period of investigation varied from 23.4 to 30.6 °C. The maximum temperature at low tide was recorded in the month of December (30.6 °C). From the month of June the atmospheric temperature started to decline and in July and August low

Author for correspondence :

SNEHALS. LOKHANDE

Department Fisheries
Hydrography, College of
Fisheries, Shirgaon,
RATNAGIRI (M.S.) INDIA
Email: snehal.lokhande147@
gmail.com

See end of the article for
Coopted authors*

EXPERIMENTAL METHODOLOGY

Ratnagiri is a coastal district of Maharashtra

values were recorded. The minimum value was recorded in the month of March (23.4°C) (Fig. 1). Gopalakrishnan (1970) observed that maximum and minimum atmospheric temperature was 30.4°C and 19.9°C, respectively while studying the ecology of Okha coast. Sarma and Mohan (1981) recorded the temperature variations from 23 to 29°C along the Bhimilipatnam coast. Lakshmana Rao and Pattnaik (1986) recorded the maximum temperature (31.0°C) in the month of June and minimum (22.5°C) in the month of January along the Orissa coast.

Interstitial water temperature:

The interstitial water temperature varied between 22 and 30.5°C. The maximum temperature was recorded in the month of April (30.5°C) and the minimum in the month of March (22°C) at respective lowest low tides (Fig. 1). Dwivedi *et al.* (1974) recorded that the temperature of interstitial water varied from 23.9 to 25.9°C along the Calangute beach of Goa. Ramamoorthy (2005) reported that the interstitial water temperature varied from 24.80 to 32.00°C and 22.90 to 30.70°C at Panambur and Chitrapur along the Mangalore coast.

Sediment temperature:

The sediment temperature at lowest low tide during the present investigation varied between 22.3 and 32.2°C. The maximum sediment temperature was recorded in the month of April (32.2°C) and minimum in the month of March (22.3°C) at respective low tides (Fig. 1). Wafer *et al.* (1980) observed the temperature variations from 25.1 to 30.8°C and relatively low temperature during the monsoon period at the west coast of India. Lakshmana Rao and Pattnaik (1986) recorded the maximum temperature in the month of January

(38.5°C), March (36°C) and May (37°C) while the minimum values were recorded in the month of July and October.

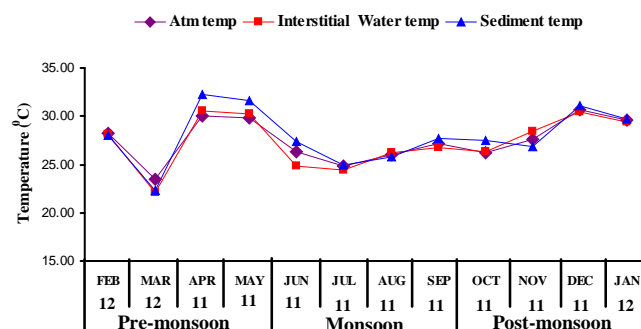


Fig. 1 : Variation in temperature (°C) in the Mirya, sandy shore during 2011-2012

Interstitial dissolved oxygen:

The dissolved oxygen of interstitial water varied from 3 to 9.3 mg/l. The maximum dissolved oxygen was recorded in the month of August (9.3 mg/l) and minimum in the month of March (3 mg/l) (Fig. 2). Dwivedi *et al.* (1974) reported that the oxygen content of interstitial water ranged from 2.1 to 5.5 mg/l⁻¹ along the Calangute beach of, Goa. Achuthankutty *et al.* (1978) observed that the dissolved oxygen of interstitial water ranged from 4 to 5 mg/l⁻¹ except in July (5.6 mg/l) and in November (3.8 mg/l) at Baina, Goa. Wafer *et al.* (1980) recorded that the dissolved oxygen of interstitial water varied from 1 to 3 mg/l⁻¹ at west coast of India. Lakshmana Rao and Pattnaik (1986) revealed that the dissolved oxygen of interstitial water was slightly lower than that of shore water. The highest value of interstitial dissolved oxygen was recorded in the month October (11.24 mg/l) and

Table 1: Monthly and seasonal variation of environmental parameters of water in the Mirya, sandy shore

Year	Months	Atm. temp. (°C)	Water temp. (°C)	Sand temp. (°C)	DO of interstitial water (mg/l)	Salinity of interstitial water (‰)	pH of water	pH of sediment	
2011	Apr.	30	30.57	32.20	4.4	30.03	8.5	7.6	
	May	29.83	30.27	31.60	4.1	29.23	7.5	6.8	
	June	26.33	24.87	27.40	7.4	28.87	6.5	5.6	
	July	24.87	24.40	25.00	8.5	24.63	7.5	5.9	
	Aug.	26.00	26.23	25.80	9.3	19.83	7.5	6.3	
	Sept.	27.17	26.73	27.70	5.8	24.47	8.5	6.3	
	Oct.	26.17	26.37	27.50	6.6	25.33	8.5	6.8	
	Nov.	27.57	28.47	26.90	4.5	29.73	8.5	7.4	
	Dec.	30.67	30.43	31.10	4.9	34.77	9.5	8.2	
	Jan.	29.60	29.43	29.70	3.4	34.53	8.5	7.7	
	2012	Feb.	28.27	28.17	28.00	5.4	33.23	9.5	8.4
		March	23.43	22.07	22.30	3	33.27	7.5	8.1
Max.		30.67	30.57	32.20	9.3	34.77	9.5	8.4	
Min.		23.43	22.07	22.30	3	19.83	6.5	5.6	

lowest in February (2.45 mg/l) along the Orissa coast.

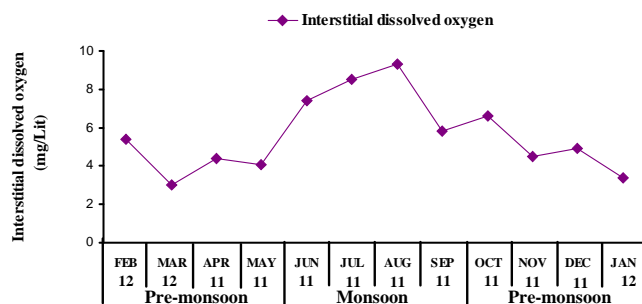


Fig. 2 : Variation in interstitial dissolved oxygen in the Mirya, sandy shore during 2011-2012

Interstitial water salinity:

The pooled monthly variations in the salinity of interstitial water are presented in Table 1. The salinity of interstitial water varied from 19.83 and 34.77 per cent. The maximum salinity was recorded in the month of December (34.77%) and the minimum in the month of August (19.83%) (Fig. 3). Dwivedi *et al.* (1974) reported the interstitial water salinity variations from 22.5 to 33.56 per cent. A gradual increase in salinity was observed at the end of September along the Calangute beach of Goa. Wafer *et al.* (1980) recorded that the salinity of surf water ranged from 16.20 to 24 per cent at Arambol, Bawal and Colva sandy beaches of Goa. Achuthankutty *et al.* (1978) recorded that the surf water salinity varied from 34.02 to 24 per cent with the higher salinity values recorded during summer while lower during monsoon season.

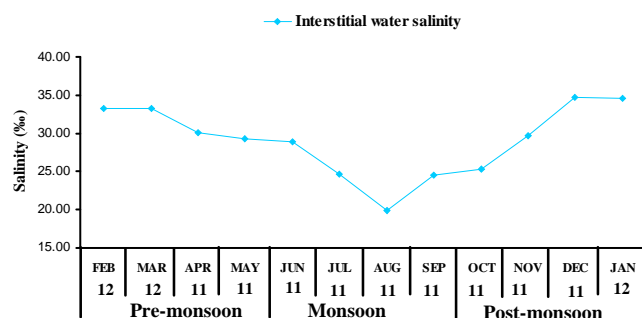


Fig. 3 : Variation in interstitial water salinity in the Mirya, sandy shore during 2011-2012

Interstitial water pH:

The pH of interstitial water varied from 6.5 to 9.5. The maximum pH was recorded in the month of December (9.5) and the minimum in the month of June (6.5) Fig. 4. The variation of pH of intertidal water was observed between 7.9 and 8.1 and it has been concluded that pH of interstitial water was always lower than that of the surface water on the sandy beach of

Cochin (Philip, 1970). Wafer *et al.* (1980) observed that the pH of surf water varied from 7.7 to 8.3 at Colva, 7.6 to 8.2 at Armbol and 7.7 to 8.2 at Bawal along the Goa coast. The observations regarding interstitial water pH variation observed in the present study are similar to the researchers mentioned above which suggest that lower pH values recorded during monsoon may be attributed to the terrestrial run off from the surrounding area.

Sediment pH:

The sediment pH varied from 5.6 to 8.4. The maximum pH was recorded in the month of February (8.4) and the minimum in the month of June (5.6) Fig. 4. (Mense, 1988) recorded the maximum and minimum values of sediment pH during the monsoon season (8.4) and in the pre-monsoon season (7.6), respectively. Koli (1995) recorded that the sediment pH ranged from 7.00 to 7.50 during the post-monsoon and 7.10 to 7.20 during the pre-monsoon season on Mirya sandy shore of Ratnagiri.

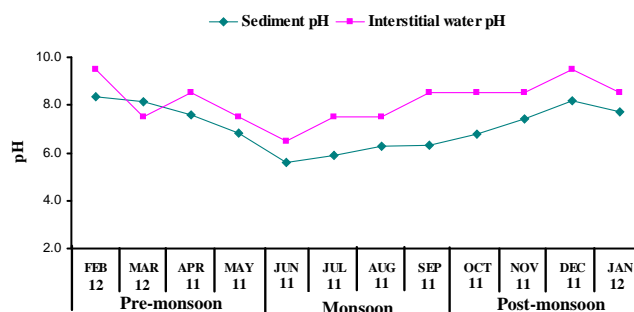


Fig. 4 : Variation of pH in the Mirya, sandy shore during 2011-2012

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Coopted Authors' :

A.D. ADSUL, Department Fisheries Hydrography, College of Fisheries, Shirgaon, RATNAGIRI (M.S.) INDIA
Email: aniresearch@rediffmail.com

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