

## STUDIES ON THE HYDROGRAPHY AND PLANKTON OF WATERS OFF AKARPATI NEAR NAVAPUR, WEST COAST OF INDIA DURING FEBRUARY-MARCH

S. A. H. ABIDI,\* B. N. DESAI AND JIYALAL RAM

*Regional Centre of National Institute of Oceanography, Versova, Bombay - 400 061.*

### ABSTRACT

Studies on selected physico-chemical parameters and plankton were carried out in waters off Akarpati during February-March 1978. In general, nutrient values increased towards offshore. However, along the northern transect a reverse trend was observed. Concentration of nutrients were higher in bottom than surface water. Diurnal variation of phytoplankton pigments showed great amount of fluctuation. From the chlorophyll and zooplankton data it would appear that the prevailing water quality supports fairly rich plankton population.

*Key-words* : Hydrography, plankton, west coast.

Akarpati (Navapur) is at 19° 50'N and 70° 40' E on the west coast of India. The present study undertaken as a part of the hydrographic survey sponsored by the Oil and Natural Gas Commission (ONGC) for laying a submarine pipeline in the waters off Akarpati (Navapur), is about 1.6 km. from the Tarapur Atomic Power Plant. Earlier investigations on the hydrography and biological productivity in this area are of Josanto and Desai (1975), Nair (1968), Kamath and Ganguly (1972) and Panampunnayil and Desai (1975).

Observations on the physico-chemical and biological characteristics of water were carried out along three transects off Akarpati (Navapur) — Fig. 1.

The observations were made on five selected dates during February-March 1978. Both surface and bottom water samples were collected for determining salinity, dissolved oxygen, inorganic phosphorus, nitrate-nitrogen and nitrite-nitrogen. Knudsen's method and Winkler's method were followed for determining salinity and dissolved oxygen respectively. Inorganic nutrients such as phosphate, nitrate-nitrogen and nitrite-nitrogen were determined following standard methods. Chlorophyll and Carotenoids were estimated following Strickland & Parsons (1968) at a single station (3A) over a 24 hour (14/15 March). Surface zooplankton samples were collected from all the stations using the Heron-tranter net. All hauls were of 5 minutes duration taken on 1st February and 18th March.

### *Hydrography*

Temperature at the surface varied from 23 to 26.5°C and at the bottom

\* Present address : Department of Ocean Development, Govt. of India, South Block, New Delhi - 110 011.

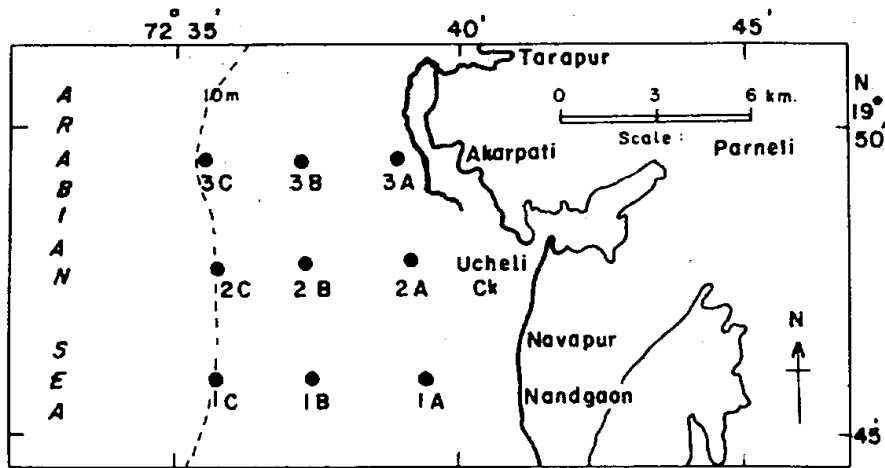


Fig. 1. Area of study.

from 23.5 to 25.7°C. Salinity at the surface varied from 32.81 to 36.61‰ and at the bottom from 33.02 to 36.01‰. Highest average salinity was observed at surface.

Dissolved oxygen values were relatively high both at the surface (4.48–5.69 ml/l) and bottom (4.20–6.69 ml/l) indicating adequate replenishment in this area. There was no appreciable difference in dissolved oxygen values between the surface and bottom samples.

Inorganic phosphate ranged from 1.1 to 10.00  $\mu\text{g}$  at/l at the surface and from 1.00 to 24.2  $\mu\text{g}$  at/l at the bottom. The phosphate values were in general, higher at the bottom.

Nitrate values at the surface varied from 0.57 to 7.6  $\mu\text{g-at/l}$  at the surface and 0.70 to 15.0  $\mu\text{g-at/l}$  at the bottom.

Nitrite values ranged from 0.07 to 1.2  $\mu\text{g-at/l}$  at the surface and 0.14 to 5.2  $\mu\text{g-at/l}$  at the bottom. As in the case of the two other nutrients, nitrite-nitrogen were also relatively high at the bottom indicating active regeneration at the bottom.

Total chlorophyll concentration varied from 4.04 (0900 hrs) to 74.52  $\text{mg/m}^3$  (1400 hrs) while chlorophyll *a* varied from 1.40 to 25.08  $\text{mg/m}^3$  and carotenoids from 1.51 to 23.98  $\text{m-SPU/m}^3$ .

Chlorophyll *a* values were higher in the forenoon (average 12.56  $\text{mg/m}^3$ ), than the afternoon (average 4.87  $\text{mg/m}^3$ ) and night (average 3.52  $\text{mg/m}^3$ ). The carotenoids showed a similar trend to that of chlorophyll *a* with higher values during the forenoon (average 11.93  $\text{m-SPU/m}^3$ ) than the afternoon (average 9.56  $\text{m-SPU/m}^3$ ).

Zooplankton biomass varied spatially from 0.30 to 3.10  $\text{ml}/100 \text{ m}^3$  in February and 2.0 to 8.60  $\text{ml}/100 \text{ m}^3$  in March. The average biomass was 3.07  $\text{ml}/100 \text{ m}^3$ . Nine faunal groups were commonly recorded in the collections. They were copepods, chaetognaths, lamellibranchiates, decapods, stomatopods, amphipods, medusae, fish eggs and larvae in the order of dominance.

The present investigation revealed near normal conditions of sea temperature, and dissolved oxygen except salinity values which were higher. How-

ever, the concentration of inorganic nitrogen and phosphorus was relatively high in the bottom waters indicating greater regeneration in the area.

Phytoplankton production as revealed by chlorophyll *a* values (1.40–25.08 mg/m<sup>3</sup>) were higher than the values (2.2–7.45 mg/m<sup>3</sup>) reported for the same month for South Maharashtra Coast (Jiyalal Ram, Abidi and Desai—in press). However, the range in chlorophyll *a* (0.09–1.74 mg/m<sup>3</sup>) recorded off Bombay by Bhattathiri and Devassy (1977) is lower than the present values. Zooplankton standing stock was moderate. The zooplankton biomass in February is comparable to that reported earlier for this area by Panampunnayil and Desai (1975).

Table 1. Diurnal variation of phytoplankton pigments at station 3A.

Date	Time	Chlorophyll (mg/m <sup>3</sup> )			Total chl. mg/m <sup>3</sup>	Carote- noid (m-SPU-m <sup>3</sup> )
		a	b	c		
14.3.78	1300	5.74	1.03	4.78	11.55	5.93
..	1400	11.06	13.05	50.40	74.52	16.71
..	1500	2.61	1.28	7.68	11.58	4.65
..	1600	4.64	5.44	13.39	23.47	6.63
..	1700	3.47	12.08	47.23	62.78	19.84
..	1800	3.97	4.92	23.81	32.70	8.32
..	1900	2.57	2.66	7.74	12.97	4.83
..	2000	1.62	0.56	3.20	5.38	4.72
..	2100	2.17	0.67	4.04	6.88	2.67
..	2200	3.03	1.09	6.16	10.27	4.22
..	2300	1.58	0.53	8.67	10.79	2.59
..	2400	2.21	0.14	3.43	5.78	2.36
15.3.78	0100	6.52	2.05	11.58	20.15	8.84
..	0200	4.63	4.11	18.89	27.63	7.85
..	0300	4.51	5.33	23.09	32.92	9.00
..	0400	1.40	0.83	1.91	4.13	1.51
..	0500	6.95	9.54	33.21	49.69	14.34
..	0600	3.69	2.33	10.81	16.83	5.19
..	0700	—	—	—	—	—
..	0800	15.55	1.86	10.43	27.84	13.37
..	0900	3.12	0.38	0.53	4.04	14.05
..	1000	25.08	1.39	19.40	45.87	23.98
..	1100	7.81	1.30	5.98	15.09	7.19
..	1200	7.61	2.43	13.01	23.04	8.84
..	1300	6.48	2.58	12.19	21.25	7.43

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