

BLOOM OF *ASTERIONELLA GLACIALIS* CASTRACANE IN NEARSHORE WATERS OF COVELONG (MADRAS), BAY OF BENGAL

ABSTRACT

Monospecific bloom of *A. glacialis* in the nearshore waters of Covelong, Bay of Bengal, occurred on 30th May, 1989. Estimations of planktonic diatom populations, chlorophyll 'a' and physico-chemical parameters of waters were carried out before and after the bloom period in order to assess the causes for initiation and termination of the bloom.

OCCURRENCE of phytoplankton blooms in nearshore waters of bays is an interesting biological event in different seas. In the east coast of India, phytoplankton blooms generally occur between February and May every year (Ganapathy and Subba Rao, 1958). Information on bloom forming planktonic diatoms is limited in the seas around India, but detailed investigations have been made on the bloom, of *Trichodesmium* (Qasim, 1970; Devassy *et al.*, 1978) and dinoflagellates (Sargumam *et al.*, 1989).

In the present investigation, an attempt has been made to study the physico-chemical and biological characteristics of the nearshore waters of Covelong (Madras) during the bloom of *A. glacialis*.

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Materials and methods

Surface water samples were collected before, during and after the bloom period from Covelong (Madras) (12°46' N; 80°15' E) near the shore in May and June 1989. Temperature was measured using a standard centigrade thermometer. Salinity measurement was made using laboratory salinometer. For the esti-

mation of dissolved oxygen, nutrients and chlorophyll pigment, methods described by Parsons *et al.* (1984) were adopted. Phytoplankton population density was derived using the Utermöhl's sedimentation technique (Vollenweider, 1974) followed by counting in a Sedgwick Rafter cell, scanned under an inverted microscope.

Results and discussion

During the present period of study, temperature, pH and salinity remained more or less stable whereas DO concentration fluctuated between 4.9 and 9.5 ml l⁻¹. Concentrations of nutrients *viz.* nitrate and silicate were high during the peak period of bloom, but phosphate concentration was low probably due to utilisation, while blooming phosphate and silicate concentrations decreased at the onset of termination of the bloom. Chlorophyll 'a' showed two-fold increase on the initial levels, during the peak period of bloom (Table 1).

During the period of bloom, surface waters appeared brown due to the high concentration of *A. glacialis* which contributed 75 to 85% of the total phytoplankton. Along with *A. glacialis*, diatoms such as *Bellerophon malleus*, *Pleurosigma elongatum*, *Rhizosolenia styliformis* and *Thalassiothrix frauenfeldii* were also present.

Bloom of *A. glacialis* off Waltair Coast was attributed to local upwelling in the Bay of Bengal associated with enrichment of nutrients

and lowering of surface water temperature (Subba Rao, 1969). Bloom of *A. glacialis* in the nearshore waters of Gopalpur, Orissa Coast, was due to limited variation in salinity and availability of nutrients and its reduction appearance and persistence of *A. glacialis* bloom were due to hydrographical stability especially of temperature and salinity and availability of nutrients. A rapid decrease in silicate concentration from the peak period of

TABLE 1. Physico-chemical and biological characteristics observed during *A. glacialis* bloom in May and June 1989

	2nd	May 20th	30th	June 17th	30th
Temperature (°C)	.. 29.0	29.0	30.0	31.0	32.5
pH	.. 8.04	8.09	8.00	8.30	8.30
Salinity (x 10 ⁻³)	.. 34.40	34.45	35.15	33.29	32.39
Dissolved oxygen (ml l ⁻¹)	.. 4.90	6.12	5.55	5.90	9.50
Phosphate (µg at P l ⁻¹)	.. 0.43	0.35	0.33	0.29	0.16
Nitrate (µg at NO ₃ l ⁻¹)	.. 10.25	10.00	13.25	18.77	0.86
Nitrite (µg at NO ₂ l ⁻¹)	.. 1.52	0.01	6.11	10.71	0.47
Silicate (µg at Si l ⁻¹)	.. 56.09	160.92	199.99	36.58	17.07
Chlorophyll 'a' (mg m ⁻³)	.. 1.09	2.41	2.49	0.21	0.04
Phytoplankton density (Cells l ⁻¹)	..				
<i>A. glacialis</i>	.. 2,000	200,000	300,000	150,000	100,000
Other diatoms	.. 15,000	5,000	3,000	13,000	14,000

was due to nutrient depletion and the grazing pressure exerted by the copepods in the surface layers (Choudhury and Panigrahy, 1989). Results of the present study reveal that the bloom (about 5-10 folds), amidst an increase in nitrate and nitrite concentrations, could have terminated the bloom, as suggested by Choudhury and Panigrahy (1989).

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