

SOME OBSERVATIONS ON THE *TRICHODESMIUM* BLOOM ALONG THE SOUTH-WEST COAST OF INDIA

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ABSTRACT

Blooms of *Trichodesmium erythraeum* occurred at several places along the south-west coast of India during March 1977. Notable feature of the environment during the bloom was high ammonia-N and low levels of other nutrients. Phytoplankton population, other than *Trichodesmium*, was very sparse. Swarming of *Physalia* coincided with *Trichodesmium* bloom. High ammonia values were observed during the bloom.

During the 16th oceanographic cruise of R. V. *Gaveshani* from 4 to 17 March, 1977, blooms of *Trichodesmium erythraeum* were noticed at several places along the west coast of India. Earlier records of *Trichodesmium* bloom pertain to areas from Ratnagiri to Mangalore, Laccadives, etc. (Qasim, 1970, Prabhu, Ramamurthy, Dhulkhed and Radhakrishnan, 1971 and Ramamurthy, Selvakumar and Bhargava, 1972). The present observations extend the limit further down south. The densest concentrations of bloom was at station 320 (Lat. 13°19' N, 73°32' E) off Malpe.

The bloom stretched for several hundred miles in length in the form of continuous thick streaks, about 6-8 m in width. The colour of the bloom was straw brown. On close inspection, it was seen that the bloom was thickly infested with the *Physalia physalis* the "Portuguese Man-of-War". A surface tow was taken for about five minutes with a zooplankton net. The net was completely clogged with the clumps of *Trichodesmium* and *Physalia*. Vertical distribution (Table I) as well as the visual analysis revealed that these organisms were largely confined to the upper one metre.

At station 336 off Anjengo (Lat. 8°39' N, Long. 76°26.5' E) another large bloom of *Trichodesmium* was noticed. This bloom was in the form of several long discontinuous patches. Its colour was brown. The *Trichodesmium* bloom consisted of clumps of 8-15 filaments. At the station 338 off Cochin (Lat. 10°09' N, Long. 74°54' E) the growth of *Trichodesmium* was noticed with fewer filaments (39 filaments/ml) floating in the sea.

Samples were collected from different depths for phytoplankton counts, dissolved oxygen, salinity and nutrient analysis. Phytoplankton crop, as could be seen from Table I, was mainly composed of *Trichodesmium erythraeum* with a few cells of *Nitzschia*, *Chlorella* and *Ceratium*. At station 336 off Anjengo only *Trichodesmium* among phytoplankton was encountered.

Temperature, salinity and oxygen did not show any change (Table I). Estimation of different physico-chemical parameters were carried out as per the methods described elsewhere (Verlencar and D' Silva, 1977). The interesting feature of the bloom at station 320

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was high ammonia-N (average 2.95 μg at N/1) and low levels of phosphate-P, urea and nitrate-nitrogen. High ammonia content was perhaps produced during the bloom, that *Trichodesmium* fixes atmospheric nitrogen, is well known (Mague, Mague and Holm-Hansen, 1977). Concentrations of ammonia and nitrate-N were high at station 336 while phosphate-P was below detection limit. High nitrate-N could probably be attributed to oxidation of ammonia during nitrogen fixation. Also phosphate-P may be a limiting factor for the bloom as visual observations revealed that the bloom at this location was discontinuous as if, it was in the decreasing stage and almost devoid of many phytoplankton organisms except *Trichodesmium*.

The prominent zooplankton noticed was *Physalia physalis* at station 32 found floating as small balloons in the water covered with bloom. These animals are also common on Florida beaches during the winter tourist season and sting the swimmer which can be excruciatingly painful. The venom of these animals contain a powerful neurotoxin which affects the nervous system and can thereby cause cardiac arrest resulting in death (Leahy, 1975). The swarming of *Crescis acicula* and *Penilia avirostris* along with *Trichodesmium* bloom off Cochin in March 1973, has been reported by Sakthivel and Haridas (1974), but the association of the *Physalia physalis* with these algae is being reported for the first time.

Blooms of *Trichodesmium* occur in different regions along the west coast of India about the same period depending upon the sea conditions. Qasim (1970) has summarised many reports regarding the effects of *Trichodesmium* on the fishery of different regions. The present observation did not show any ill effects on fish, but the unusual swarming of *Physalia* with the bloom would definitely inactivate the bathers with "sea stings".

Trichodesmium bloom was also noticed along the Goa coast (Devassy-personal communication). Prabhu, Ramamurthy, Dhulkhed and Radhakrishnan (1971) have reported adverse effects on the oil sardine fishery of the year 1968 due to *Trichodesmium* bloom. Although the bloom occurred in great profusion along the south-west coast of India during the year 1977, both oil sardine and mackerel fisheries were good during this year almost throughout the west coast.

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