BLOOMS OF *TRICHODESMIUM THIEBAUTII* AND THEIR EFFECT ON EXPERIMENTAL PEARL CULTURE AT VEPPALODAI

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ABSTRACT

Blooms of the blue-green alga, *Trichodesmium thiebautii*, were observed at the pearl culture farm off Veppalodai in the Gulf of Mannar in March-April and September, 1973. Although the alga occurred in high concentration, it did not cause any unusual mortality of pearl oysters in the open-sea farm. However, a few hundreds of experimental oysters kept in bloom-laden water in the laboratory died due to the death and decay of the algal filaments. It is pointed out that in a widespread bloom situation, as in the present instance, work on pearl culture is hampered as it is not possible to draw clear, bloom-free water for "seeding" operations.

Blooms of *Trichodesmium* have often been reported from the Indian waters (Nagabhushanam 1967, Qasim 1970 and others). Ramamurthy (1970) stated that booms of *T. erythraeum* occur annually during March in the Porto Novo waters. At the head of the Gulf of Mannar, algal blooms have been a recurring phenomenon (Chacko 1942, Chidambaram and Unny 1944, Chacko and Mahadevan 1956, James 1972). Blooms of *T. thiebautti* Gomont were observed in the vicinity of the pearl culture farm off Veppalodai (Lat. 8°57'N, Long. 78°14'E) in the Gulf of Mannar in March-April and September, 1973. During this period, experimental oysters kept in sea water drawn from the inshore area suffered heavy mortality. This note describes the phenomenon of algal bloom and its effect on pearl culture at Veppalodai.

A bloom was first noticed on March 29 in the pearl culture farm. The bloom was dense at the site of the rafts, but the concentration was low away from there. Detailed observations were made on March 30 during a cruise from Tuticorin to Vaipar, a distance of about 25 km. The boat travelled nearly parallel to the shore at a distance of about 1.5 km from the shore line. Plankton was collected in Tuticorin Bay, off Pattanamaruthur, Veppalodai and Vaipar. While the composition of plankton was normal at Tuticorin Bay (depth 3 m), filaments of *T. thiebautii* appeared in large numbers off Pattanamaruthur (depth 4.5 m). Fish eggs and larvae, copepods and *Lucifer* were the dominant organisms in the plankton at this station. Further north, the concentration of the alga increased and typical bloom situation was observed off Veppalodai (depth 5 m) and northwards. The fishermen reported a widespread bloom situation in the southern Gulf of Mannar.

The sea was calm and the surface was of a brownish shade. No particular odour was noticeable. Bundles of algal filaments were seen floating all over the surface; they were in greater concentration in the agglutinations of air bubbles in the form of froth. A half-metre diameter net, made of organdie, was used for the collection of plankton. After a haul lasting 10 minutes the net was found completely smeared with the filaments. When the plankton was transferred to a bottle, the algae concentrated at the top 1 cm giving a dark green colour. (If is noteworthy that even a year after preservation in formalin, the algae retained the green colour). Thick pads of algae were found washed ashore between the tidal marks.

The phytoplankton was almost exclusively composed of *Trichodesmium thiebautii*. The algal bundles, each consisting of 10-20 filaments, were elongate or roughly spindle-shaped and measured 0.75-1.75 mm in length. Zooplankton was sparse and comprised few fish eggs and larvae, copepods, amphipods, *Lucifer* etc. Temperature, oxygen and salinity values did not show any unusual variations.

The bloom persisted in the area for a week and was noticed to extend over the pearl banks, about 25 km south of Tuticorin, on April 2. There was intermittent rainfall during April 5-9 and the bloom disappeared. However, on April 11, the blue-green alga reappeared in bloom and continued up to April 28 with varying intensities.

Although the bloom was present for a month with an abatement for a week, it had apparently no deleterious effect on the pearl oysters in the farm. There was no unusual mortality of oysters during this period. Nor were any animals found washed ashore as was reported in the Pamban area in the earlier instances (Chacko 1942, Chidambaram and Unny 1944). However, the abundance of *Trichodesmium* in the sea made maintenance of experimental pearl oysters in the laboratory nearly impossible. Sea water directly taken from the inshore area and stored in a fibreglass tank of about 1000 litre capacity was used for keeping the oysters in the laboratory. Due to the death and decay of the algal filaments in the tank, oysters kept therein suffered mortality. The dead algae formed a scum which was rendered reddish brown apparently due to the dissolution of the pigments of the oyster shells. A lot of 150 oysters died on April 4 and another lot of 276 oysters on April 25. It became impossible to carry out nucleus-implantation operations on the oysters during this period.

The same species of blue-green alga was again noticed in bloom at Veppalodai in the morning September 15, 1973. The bundles were densely concentrated in a narrow belt of about 5 meters width, for a distance of about 1.5 km from the shore to the farm site. When the winds started blowing around noon, the identity of the bloom belt was lost. However, here was a low concentration of algae in the area. The bloom persisted only for four days on this occasion.

The present observations resemble those of James (1972) at Mandapam where several species of fishes and crustaceans had died in the aquaria due to decaying filaments of *T. thiebautii*, but there was no mortality of fishes in the sea on account of the bloom. The published reports show that blooms of *Trichodesmium* occur frequently in the tropical seas around India and these are mostly non-toxic (Qasim 1970, Ramamurthy 1970). Mortalities associated with algal blooms have taken place in a tidal pool where a high concentration of the algae might cause physical asphyxiation in the fishes (Chacko 1942) or close to shore due to the putrefaction and pollution caused by the dead algae (Chidambaram and Unny 1944). Mortality also occurs in enclosed systems using the bloom-laden water, where the animals might die due to the death and decay of the algal filaments (James 1972, present communication). It becomes evident from the observations that during a dense bloom situation, work on pearl culture which requires clear sea water for optimum results in nucleus implantation and in the post-operative phase of culture, suffers heavily.

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