

Harmful Phytoplanktons in the Coast of Arthunkal in Kerala, Southwest Coast of India

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Abstract: *The presence of Harmful Algal cells in the coastal waters of Arthunkal was investigated for one years (January – December 2015). A plankton net was used for collection and the collected samples were fixed in 4% neutral formaldehyde and placed in polythene vials for later sorting and identification. The samples were examined under the microscope and cells were identified. Harmful algal blooms impact human health, marine environments, and also can have a large economic impact. These HABs are responsible for the death of many species of marine mammals and seabirds. Some harmful algal species disrupt the marine environment. Thus, a rapid and effective method to monitor and detect the presence of HABs and their toxins is of high importance.*

Keywords: Harmful algae, algal diversity, abundance

1. Introduction

Harmful algal blooms (HABs) occur throughout the world as a result of high concentrations of marine algae, many of which produce potent toxins [1]. The significant adverse impacts of HABs on public health, economics and natural resources have led to intensive monitoring programs to detect the presence of HABs. Although such programs are essential for alerting the public to potential dangers, the severity and growing threat of HABs and their impacts could justify bloom mitigation and direct control as approaches for protecting public health and the marine ecosystem [2].

Phytoplankton or micro-algae play a vital role as primary producers in all aquatic habitats, but when their population overwhelms other forms of aquatic life, an environmental and economic impact is likely. Very prominent in coastal waters, this population increase or bloom formation generally discolours the surface waters to red, pink, brown, or white.

Only about 200 species (184-207) of the total 4000 known (3365-4024) marine phytoplankton species produce exceptional blooms which constitute only about 5.5- 6.7% of the total. Of these, only 1.8 to 1.9% has been so far identified to be toxic. 73-75% of these toxic species are dinoflagellates followed by diatoms. Rapidophyceae, Cyanophyceae, Prymnesiophyceae, Cryptophyceae, Prasinophyceae, Chlorophyceae and Euglenophyceae, all have members which produce exceptional blooms but their percentage is very low compared to that of the first two. Of the dinoflagellates, four genera, *Alexandrium*, *Dinophysis*, *Gymnodinium* and *Prorocentrum* are responsible for majority of the toxic events. New species of toxic algae are being continually added to the list.[3].

2. Materials and Methods

Study Site: Arthunkal coast (9°35'883" N; 76°17'302"E)

Field sampling

The study was carried out along the coast of Arthunkal in Kerala, South West Coast of India. Sampling was carried out

seasonally (January - December 2015) using a plankton net of mesh size 10µ. Samples were taken from a distance of 1km from the shoreline.

The samples were fixed in 4% neutral formaldehyde and placed in polyethene vials. They were examined under the microscope and the cells were identified.

3. Results and Discussion

List of harmful algal cells in the coastal water of Arthunkal

DINOFLLAGELLATES

1.Noctiluca scintillans

Division: Pyrrophyta
Class: Dinophyceae
Order: Noctilucales
Family: Noctilucaceae
Genus: *Noctiluca*

2.Dinophysis caudata

Division: Pyrrophyta
Class: Dinophyceae
Order: Dinophysiales
Family: Dinophysiaceae
Genus: *Dinophysis*

3.Ceratium fusus

Division: Pyrrophyta
Class: Dinophyceae
Order: Gonyaulacales
Family: Ceratiaceae
Genus: *Ceratium*

DIATOMS

4.Pseudo-nitzschia spp

Division: Chrysophyta
Class: Bacillariophyceae
Order: Bacillariales
Suborder: Bacillariineae
Family: Bacillariaceae
Genus: *Pseudo-nitzschia*

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CYANOPHYCEAE

Marine Algal Blooms. Lavoisier Publishing, Paris, pp. 103–112.

5. *Trichodesmium* spp

Phylum: Cyanophyta
 Class: Cyanophyceae
 Order: Nostocales
 Family: Oscillatoriaceae

Noctiluca scintillans was present in premonsoon and post monsoon season. *Noctiluca scintillans* accumulates large amounts of ammonia in the vacuoles which maybe toxic to fish. It is found to feed heavily on fish eggs and zooplankton which leads to disruption in the food web. *Trichodesmium* spp was present in all the seasons. Fish that are impacted by cyanobacteria may develop skin lesions, making them vulnerable to infection and disease. Toxic blooms may also impact gill functioning. Gas exchange across the gill surface is reduced by mucous over the gills. *Pseudo-nitzschia* sp present in all the seasons. *Dinophysis caudata* was present in premonsoon and post monsoon seasons. *Ceratium fusus* found all the seasons in the coastal waters of Arthunkal. Seasonal variations of algal cells are found the table 1. Some harmful algal species disrupt the marine environment. Thus, a rapid and effective method to monitor and detect the presence of HABs is of high importance.

Table 1: Presence of algal cells in the coastal waters of Arthunkal

Taxa	PRM	MON	POM
Class: Cyanophyceae <i>Trichodesmium</i> sp	+	+	+
Class: Bacillariophyceae <i>Pseudo-nitzschia</i> sp	+	+	+
Class: Dinophyceae <i>Noctiluca scintillans</i>	+	+	+
Class: Dinophyceae <i>Dinophysis caudata</i>	+	-	+
Class: Dinophyceae <i>Ceratium fusus</i>	+	+	+

PRM=Premonsoon, MON=Monsoon, POM=Postmonsoon, + Present, - absent

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