

## Harmful Algal Blooms

**Sachithrangi Aththanayaka**  
 Assistant Marine Environment Officer  
 Marine Environment Protection Authority

Algal blooms occur due to the sudden proliferation of micro or macro algal species. Some blooms are beneficial to the ecosystem while some are harmful. They dominate over the local algal community. Sometimes they can discolor the water as well (E.g.: red tides).



A bloom of *Noctilica scintillans*. This is called as red tide.  
 (Source: Anderson, 2005)

Algal blooms can be of various types; Blooms with an impacts on ecosystems through high densities Blooms causing fish kills Toxic micro algal blooms

Harmful algal blooms (HABS) belong to 6 algal groups. They are dinoflagellates, diatoms, cyanobacteria, haptophytes, raphidophytes and pelagophytes.

Algal blooms become nuisance in different ways.

### Oxygen Depletion

When huge number of phytoplankton cells die it consume oxygen for the decomposition of the cells. This leads to the depletion of oxygen. Sometimes it can create hypoxic or anoxic condition and harm the other marine organisms.

### Reduce light penetration

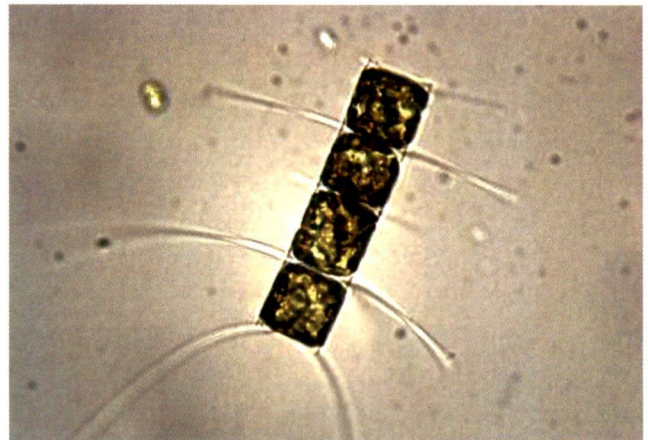
They occupy in the surface water and disturbs to the penetration of light. It affect to the photosynthetic species such as seagrass.

### Beach fouling

Some species such as *Phaeocystis* sp secrete mucus which can make thick and smelly foams. It covers the beach and cause visual pollution.

### Cause fish kills

Algae can clog the fish gills resulting mucus secretion and respiratory irritation causing fish death (E.g. *Chaetoceros* sp).



*Chaetoceros* sp

### Produce toxins

There are some dinoflagellates (Eg: *Noctilica* sp, *Alexandrium* sp, *Gymnodinium* sp), diatoms and cyanobacteria species which produce toxins that are harmful to fish, shellfish and human. Most of the known fish and shell fish poisoning toxins are produced by the dinoflagellates. In marine environment cyanobacterial blooms are less compared to the freshwater ecosystems. These toxins can harm the gastrointestinal, nerve and cardiovascular systems.



Noctiluca sp

Algae produce toxins due to various reasons. They use toxins to protect from the grazers. At the same time some species produce toxic chemicals to deter the other algal species. This phenomena is called as allelopathy. Sometimes toxins are released as a result of secondary metabolites of bioluminescence, pheromones, nitrogen storage and so on.

At present frequency of the occurrence of algal blooms are increasing due to various reasons. Main cause is the eutrophication. Excess nitrogen and phosphorus can create an imbalance of N:P:Si in coastal environment leading to the occurrence of harmful algal species. Another factor is the selective removal of the species in higher trophic levels. This

can indirectly increase the phytoplankton biomass. On the other hand introduction of exotic species (via ballast water and aquaculture) and the climatic change also affect to the frequent occurrence of HABs. Apart from that there are improved methods to detect blooms and proper monitoring programs. That is also a reason for the frequent detection of HABs compared to past years.

However HABs can create economic loss by various means. HABs monitoring programs need money and the amount depend on the method of monitoring and detection. At the same time due to the presence of HABs a country has to impose close seasons and close areas for fishery and this also affect to the economy. More over valuable fish and shell fish species can die due to the poisoning and it will also affect to the fisheries industry.

**References:**

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