

Summary of National Report on HABs in China

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1. Introduction

For many years, HABs have had a severe economic impact on shellfish and finfish resources, public health, and aquatic environment throughout the coastal regions of China. It is now evident that the magnitude, frequency and geographic extent of these occurrences have increased significantly over the last several decades. This phenomenon affects China which rely heavily on coastal fisheries and mariculture for their food supply and economics.

Fish kills are the main economic effect caused by HABs in China. Some algal species can seriously damage fish gills, either mechanically or through production of hemolytic and hemagglutinating substances.

In 2003, the national sea waters witnessed altogether 119 cases of marine red tides, added up area about 14.55 thousand square kilometers. Compared to that of 2002, either events or affected areas are increased.

According to the monitoring data from 2000 to 2004, the higher number of HABs were recorded from Zhejiang, Fujian and Guangdong Provinces, which were located in East and South China seas. Comparing with these three provinces, the HABs in coastal provinces along Yellow Sea and Bohai Sea were relative lower.

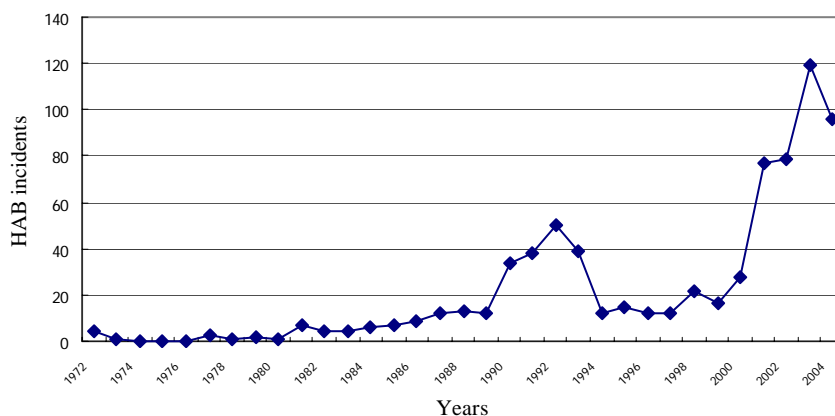


Figure 1 HAB incidents in coastal China from 1972 to 2004

For long term statistics point of view, the HAB occurrences in coastal China have been increased all the time, with a sharp increase after 2000 (Fig.1). The explanations for this increasing are: a) the HAB incidents were increased with increased marine eutrophication; and b) the national routine HAB monitoring network has been applied.

2. Situation of HAB Occurrence

2.1 Red tide

A total of 6 red tide events out of 112 cases caused mass mortality of fish and shellfish during 1998–2004 in Chinese waters of the Yellow Sea and Bohai Sea. Other 106 cases were harmless. Compared to the East China Sea and the South China Sea, The red tide in Yellow Sea and Bohai Sea has characteristics of larger affected areas and longer duration.

So far a total of 23 species caused red tides in Chinese waters of Yellow Sea and Bohai Sea. They are belong to 4 taxonomic groups of phytoplankton and one group of zooplankton: dinoflagellates, diatoms, raphidophytes, haptophytes, and ciliates. The most common causative species in the area are diatoms and dinoflagellates. *Noctiluca scintillans*, *Skeletonema costatum*, and *Mesodinium rubrum* are the principal causative species in the region. *Noctiluca scintillans*, *Skeletonema costatum*, *Gymnodinium* sp., *Gymnodinium sanguineum*, *Ceratium furca* , *Prorocentrum* sp., caused mass mortality of fishery resources.

the locations of the most frequent red tide occurrence in Yellow Sea and Bohai Sea are Dalian Bay, Liaodong Bay, Bohai Bay, Laizhou Bay, Jiaozhou Bay, and Donggang waters. Liaodong Bay and Bohai Bay are locations where red tides occurred most often.

Compared to that of the South China Sea, the areas that affected by red tides are relative large in Bohai Sea and Yellow Sea. The oceanographic, meteorological, and biological conditions may be the major factors to decide this pattern of bloom distribution.

Red tides in Bohai Sea and Yellow Sea occur normally from February to October with high frequency from May to September. June, July and August is the most frequent season for red tide occurrence.

In the Bohai Sea and Yellow Sea area, seven species brought about mass mortality of fish, shrimp, jellyfish and shellfish resulting in economic loss of fishery industry. The causative species are: *Ceratium furca* , *Exuviaella cordata*, *Gymnodinium* sp., *Gymnodinium sanguineum*, *Noctiluca scintillans*. *Prorocentrum* sp., and *Noctiluca scintillans*. The most serious damage was caused by *Gymnodinium* sp. in Bohai Bay in 1989.

2.2 Toxin-producing Plankton

Most common shellfish poisonings in China are Paralytic Shellfish Poisoning (PSP) and Diarrhetic Shellfish Poisoning (DSP). They are caused by bivalves consuming specific toxin-producing planktons, and symptoms of intoxication would appear when these bivalves are consumed by humans. So far PSP and DSP have been observed in China.

Most of the toxin monitoring and studies have been focused on shellfish species. In laboratory study, 4 species of *Alexandrium tamarense*, *A. minutum*, *A. catenella*, and *Gymnodinium catenatum* have been proved to be responsible for PSP. Several species of *Dinophysis fortii*, *D. ovata*, *D. acuminata* and *Exuviaella marina* were probably responsible for DSP in China.

The PSP and DSP are widely distributed in whole coasts of China. The toxin occurrence, frequency and shellfish toxin levels in southern parts of Chinese coast are greater than those in northern areas.

There were two toxic blooms recorded in the Bohai Sea area. One was a bloom of *Ceratium furca* and *Dinophysis ovata* which covered 5000 km² in Bohai Sea area in 1998. DSP toxin was detected in the shellfish after the bloom at the region. Another bloom was caused by *Exuviaella marina* in the shrimp pond in Dalian in 1999. DSP have also been detected in the shellfish collected from the same pond.

Shellfish intoxication has been wide spread in China, especially in southern China, since late 1960's. More than 600 persons have suffered from shellfish intoxication since 1967 when the first patient was reported. 30 people died because of the PSP. Almost all intoxication cases were from southern China. Ciguatera caused human intoxication has also been frequently recorded in southern China.

3. Suggested Activity for the NOWPAP Region

NOWPAP waters are shared by four countries. A common data and information network of HAB monitoring is very useful and necessary to all countries in the region.

For better understanding and management of HABs, international cooperation is very important between countries in the NOWPAP region and with relevant international organizations. Information exchange, data sharing and cooperative studies are necessary for achieving the cooperation.

Reference

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