



**GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN
COMMISSION GÉNÉRALE DES PÊCHES POUR LA MÉDITERRANÉE**

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***Algal Blooms
in the Mediterranean and Black Sea:
a brief review***

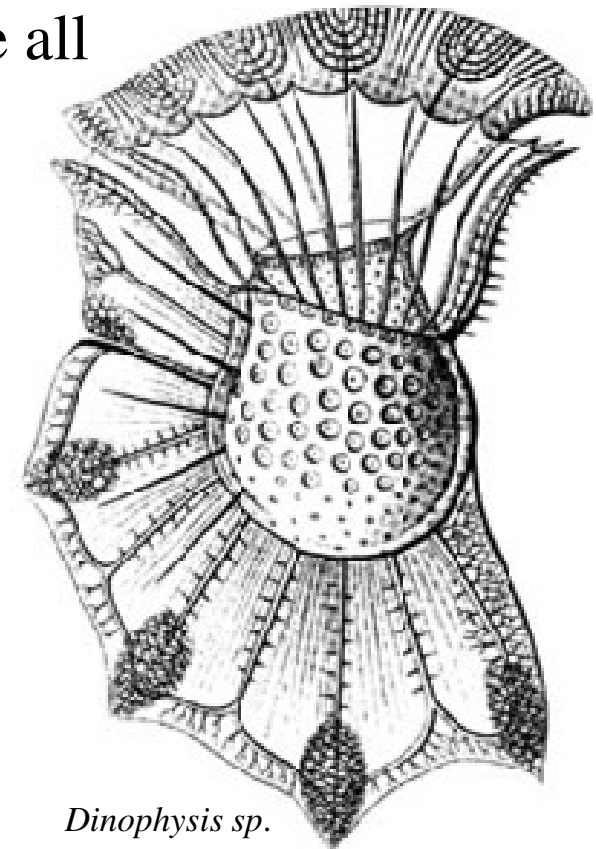
by
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GFCM Secretariat

**Workshop on Algal and Jellyfish Blooms in the
Mediterranean and Black Sea (6th/8th October 2010, Istanbul, Turkey)**

What does “algal blooms” mean ?

Usually the term ‘algal bloom’ is used for:

- Large accumulations of **phytoplankton**, **macroalgae** and occasionally **heterotrophic protists**;
- “Phytoplankton blooms”, “microalgal blooms”, “toxic algae”, “red tides”, or “**harmful algal blooms (HABs)**” are all terms for this phenomenon;
- About 300 species of **phytoplankton** are reported to bloom (about $\frac{1}{4}$ of them produce toxins), they are found in 5 groups of microalgae: Dinophyceae (dinoflagellates), Prymnesiophyceae (Haptophyceae), Raphidophyceae, Bacillariophyceae (diatoms), Cyanophyceae (blue-green algae)



Dinophysis sp.

How algal blooms look like ?

They can colour the water giving rise to:


- **red** tides,
- **brown** tides,
- **green** tides;

and also:

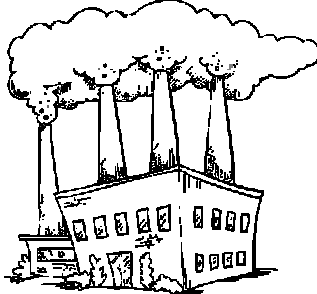
- float on the surface in **scum** and cover beaches with **biomass** or **exudates** (foam)



Why do they rise in “blooms” ?



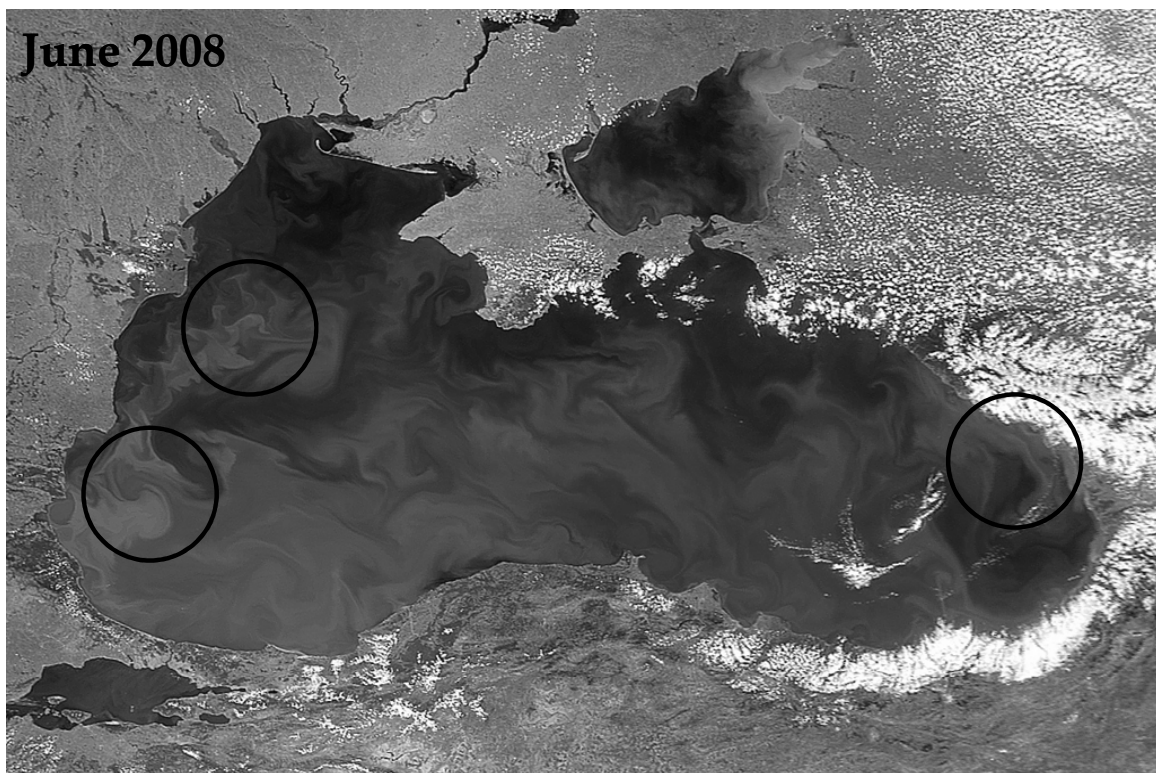
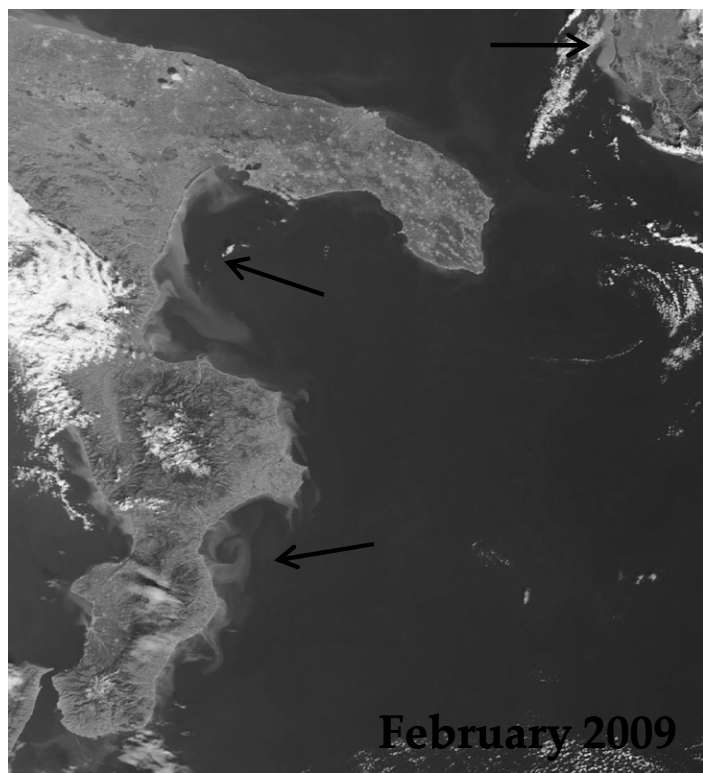
- Usually, phytoplankton **naturally develop** in response to favourable conditions for cell growth and accumulation (seasonally, in response to nutrients re-distribution in the water)



- ... but algal blooms are occurring **more frequently/in more locations** than ever → cultural eutrophication (intensive urbanization and recreational use of coasts have led to an increase of nutrients sources)

... and the **Mediterranean and Black Sea** are nutrient-rich, semi-enclosed, low turbulence areas

a **new and unique** environment for which several phytoplankton species with harmful effects may become dominant



“ Microalgal blooms were identified as one of the key issues for the Black Sea’s ecological health” (Moncheva et al. 2001)

Massive algal bloom events in the GFCM area
have been reported since 1980s:

*Ostreopsis, Prorocentrum, Noctiluca, Gymnodinium,
Alexandrium, Dinophysis, Pseudo-nitzschia, Gonyaulax*
are the most common microalgal-genus blooming in our seas

How can algal blooms be harmful ?

Toxin production

(synthesis of compounds that can alter cellular processes)

- contaminate seafood
- kill fish, seabirds and mammals
- lesions and skin irritation

High-Biomass production (*anoxia*)

- fish starvation
- indiscriminate killing of sea life
- loss and impoverishment of coastal ecosystems

 Huge health/environmental problems and economic losses

... negative effects on humans !

- **Toxin air-breathing**

microalgal species can release **toxins can become aerosolized** after lysis or that become caught up in bubble-mediated transport

- **Cell surface contact**

microalgal species cause **dermatitis** in humans swimming or bathing in affected waters

- **Consumption of affected marine food resources**

HABs cause **mortality of fish, seabirds, marine animals and humans**, typically as a result of the transfer of toxins through the food web

- **Consumption of affected marine food resources**

Shellfish and fish accumulate toxins in their organs;
five human syndromes (gastrointestinal, neurological disorders) are presently recognized to be caused by consumption of contaminated seafood:

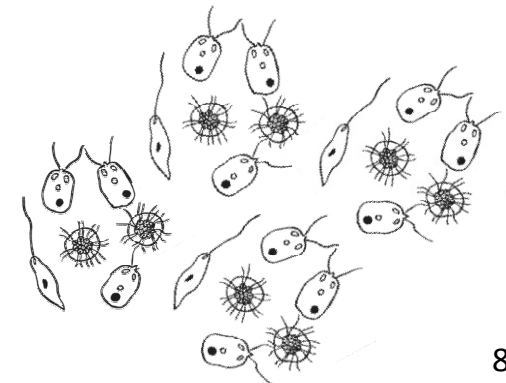
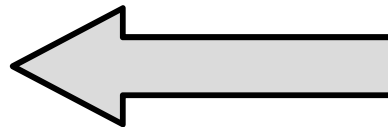
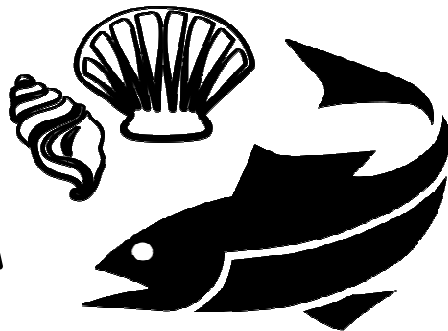
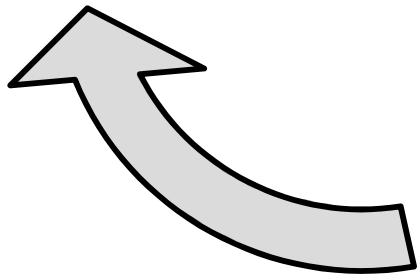
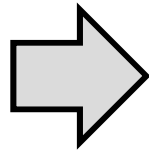
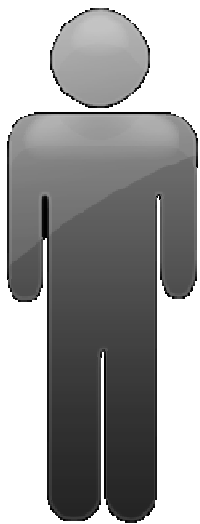
Amnesic shellfish poisoning (ASP)

***Ciguatera fish poisoning (CFP)** ☠️ *(never recorded in GFCM Area)

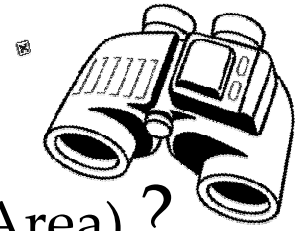
Diarrhetic shellfish poisoning (DSP)

***Neurotoxin shellfish poisoning (NSP)** *(never recorded in GFCM Area)

Paralytic shellfish poisoning (PSP) ☠️

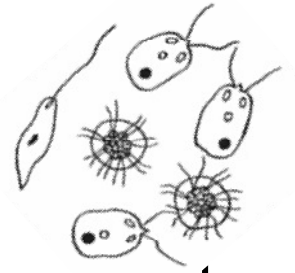


Which are the main international research programmes on algal bloom (covering the GFCM Area) ?



- from 1993: **The IOC HAB Programme (Unesco)**
(sponsor, host, coordinate scientific workshops and conferences and offer training courses on toxin detection, taxonomy, and other skills needed in order to manage HABs)
- from 1999: **The EUROHAB (EC)**
(generate and coordinate the required research to better manage the effects of toxic/harmful algae in marine and brackish waters of the EU)
- from 1998: **The GEOHAB (Unesco & SCOR)**
(coordinate, builds international, regional and national efforts in HAB research, encourage the exchange of technologies, concepts and findings)

... we have the necessity to:



- understand **how to cope** with algal blooming events (what can we do? prevent? mitigate?)
- **share monitoring and data collection experiences** in the Mediterranean and Black Sea
- develop a network of **experts in the GFCM Area**
- **set up recommendations** with the aim of coordinating the efforts of GFCM Members' Governments



... thank you for your attention !

Bibliographic references at http://151.1.154.86/gfcmwebsite/SAC/2010/SCMEE_Algal_Jelly/docs.html