• Greece

The coincidence of a *Prymnesium parvum* bloom and the mass kill of birds and fish in Lake Koronia

An extremely dense bloom of the haptophyte *Prymnesium parvum* N. Carter (Fig. 1) occurred in August-September 2004 in the shallow Lake Koronia giving the water a yellow-golden colour. The bloom peaked from 9 to 11th September, 2004. This is the first record of a harmful *P. parvum* bloom in both inland and marine waters in Greece. Harmful algal blooms studied to date in Greek inland waters have been caused by cyanobacteria [for a review see 1].

Lake Koronia located in northern Greece (40° 40’ 58” N; 23° 09’ 33” E), at an altitude of 75 m above sea level has undergone a massive decrease in lake volume over the past 20 years, with dramatic decreases in surface area and maximum depth. In the 1970’s the surface area was 46.2 km² and the maxi-

(Cont’d on p. 2)

Fig. 1. Light micrograph (phase contrast) of a water sample, containing predominantly *Prymnesium parvum*, collected from Lake Koronia on 11th September, 2004. Inset: Motile *P. parvum* cell with visible flagellae and haptonema. Bars indicate 10 µm; inset 5 µm.

• Guatemala

Violet bloom produced by a cyanobacterium in a Guatemalan lagoon

During September 2003, violet discolorations due to cyanobacteria were observed in the water of Ipala Lagoon, 168 km from Guatemala City (Fig. 1), a crater of volcanic origin. These waters are drinkable and have been used by the nearby village for many years, without trouble. It is not known when these discolorations began, but the organism is now so abundant, that a sample in a flask has a strong violet colour, like paint (Fig. 2). Counts with a hematocytometer gave estimates of 94,400 cells/mL. This cyanobacterium is strongly pigmented comprised approximately 99% of total cell count; there were a few Pennales and many phytoflagellates difficult to identify in the fixed sample.

(Cont’d on p. 2)
(Cont’d from p. 1) um depth was 8 m. In 1995 the surface area was 30 km² and the maximum depth 1 m and finally in the summer of 2002 the lake dried up completely. Early in 2003 water started accumulating again in the lake and to date the maximum depth is about 0.9 m.

The physical and chemical conditions of the lake water at the peak of the *P. parvum* bloom were as follows: the water temperature was 20.9 °C, the pH 8.2, the transparency 0.18 m Secchi depth, the salinity 5.3‰, the conductivity 9.2 mS cm⁻¹, the surface water dissolved oxygen concentration 9.9 mg L⁻¹ and the above bottom water concentration was 7.9 mg L⁻¹. The phosphate phosphorus concentration was 118.9 µg L⁻¹, the dissolved inorganic nitrogen concentration was 543.6 µg L⁻¹ and the N:P atomic ratio was 10.1.

*Prymnesium parvum* population densities ranged from 120 to 1450 x 10⁶ cells L⁻¹, at the peak of the bloom, at different sampling stations in L. Koronia. The phytoplankters *Pediastrum boryanum* (Turpin) Meneghini and *Cryptomonas* sp. were also present in abundance, with population densities of 1.8 x 10⁶ and 2.1 x 10⁶ individuals L⁻¹, respectively.

A massive bird kill was observed to coincide with the bloom peak of *P. parvum*, while one week later a mass fish kill was also observed. The number of dead birds reported at a meeting organised by the Prefecture of Thessaloniki was estimated to be in the tens of thousands. Thirty species of water bird were found dead, including over 200 young individuals of *Pelecanus crispus*, a world-endangered species, and individuals of *Platela_leuconotia* and *Egretta alba*, as reported by the Hunting Federation of Macedonia and Thrace. Reports from the local authorities estimate that the number of dead fish is in the order of hundreds. From the literature it is known that fish kills can be caused by *P. parvum* and *Prymnesium* sp. [2, 3, 4, 5]. For example, fish died in the epilimnion where the density of *Prymnesium* sp. was 10-40 x 10⁶ cells L⁻¹ [4]. However, to the best of our knowledge, there are no reports to date of bird kills associated with blooms of *P. parvum*. It is known that *P. parvum* produces pyrnesmins, potent haemolytic, ichthyotoxic and cytotoxic glycosides and other allelopathic substances [6, 7, 8]. Allelopathic compounds released by *P. parvum* induce changes in the plankton community structure [9].

Investigations are underway to elucidate the cause(s) of this ecological catastrophe in L. Koronia. The lake is covered by the Directives 79/409/EEC [10] and 92/43/EEC [11], the RAMSAR Convention (http://www.ramsar.org) and is a part of a National Wetland Park [12]. The ecological importance of Lake Koronia cannot be underestimated and it is an invaluable haven for large populations of resident and migratory birds.

The dominant cyanobacterium is *Merismopedia aerojinea*, in colonies of 2, 4, 8 and 16 small cells arranged in quadrangular lamelliform colonies. The shape of the cells ranges from oval to hemispherical, the diameter is 2.5-4 µm and length 3-4 µm, with a very fine granular content of violet color, sometimes concentrated (Fig. 3). The colour distinguishes it from *Merismopedia glauca* (Ehr.) Naegeli, a species very common in fresh waters but of blue-green colour, though some authors consider it the same species [1]. Other authors [2, 3] differentiate it and give values of 3-5 µm diameter, and we did not find colonies this size. There are no signs of toxicity and there are no deaths related to its consumption. This is the first time the species has been known to cause discoloration, although it was already characterized for its violet color. After eight months the water still has this violet pigmentation, even though the organism is no longer present.

References


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Fish kills or mass mortality events of fish. Monitoring of global fish kills and the life and work of Margarethe Brongersma-Sanders

Dr Sue Turner has been awarded a grant from the Schure-Beijerinck-Popping Fund of The Royal Netherlands Academy of Sciences for research into ‘Fish Kills as Climatic Indicators’ and to delve into the life and pioneer work of Dr Margarethe Brongersma-Sanders, especially her contributions to the understanding of fish kills and their relationship to harmful algal blooms. She was the first to understand the link between dead fish, upwelling currents and red tide events and the creation of oil. Later in life on the strength of her work she became a consultant to Shell. She classified fish kills into several categories with algal causes being uppermost.

A database of fish kill events is being compiled, especially in the poorly known southern hemisphere, to track causes in the fossil and recent record. Recent data will be compared with fossil to define a key of characteristics from different causes. The aim is to gain climatic, palaeoclimatic, palaeogeographic and palaeoecological information from fossil fish kill events and discern patterns such as those related to El Niño-La Niña. If anyone working on blooms, either marine or freshwater, has records of fish kills, please contact me.

References


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Fig. 1. Geographical location of Ipala Lagoon.

Fig. 3. Merismopedia aeruginea (Digital zoom).
Indian satellite IRS-P4 (OCEANSAT). Monitoring algal blooms in the Arabian Sea

The launching of IRS-P4 (OCEANSAT), India’s first operational ocean satellite on 26 May 1999, gave a much-needed fillip to the country’s ocean research efforts. The satellite carries two sensors, MSMR (Multi-channel Scanning Microwave Radiometer) for data collection on SST, wind speed, atmospheric water vapour etc., and OCM (Ocean Colour Monitor) for data on atmospheric aerosols, suspended sediments, chlorophyll concentration and detection and monitoring of algal blooms in the sea. Though there have been reports on sporadic occurrences of algal blooms in the Arabian Sea, the attention of Indian oceanographers was attracted only when harmful algal blooms in other oceans, and their adverse impacts on fisheries, came into focus.

With increasing awareness, and the availability of better observational and sea going facilities, several Indian research groups have reported on various aspects of blooms, e.g., of *Trichodesmium erythreum*, *Noctiluca scintillans* [1-5]. But all these observations were from the coastal waters and had limited spatial and temporal coverage. Assessments of effects on fish landings or fish mortality as sequels to the blooms were only circumstantial. This underlined the need for extensive spatial and temporal studies to cover the whole expanse of Indian waters, enumeration of the bloom forming species and understanding of the conditions that trigger blooms.

The collaborative efforts of the Space Applications Centre (SAC of ISRO) Ahmedabad, and the National Institute of Oceanography (NIO of CSIR), Goa, provided the impetus for this venture, and to fully utilize the OCM capability of OCEANSAT and oceanographic research vessels FORV Sagar Sampada and ORV Sagar Kanya of Department of Ocean Development (through CSIR/SAC/NIO) for sea truthing and validation. With this in view, all cruises had a major aim to perfect our techniques for use of ocean colour, gather data on physical, chemical and biological conditions of Indian waters, and assess primary productivity and build up a data base on bloom aspects.

The cruises of FORV Sagar Sampada (Cr. 212) in the year 2003 and a repeat cruise in 2004 (Cr. 222) during the same period and location (Feb 26 to Mar 15) between Goa and Porbander sector (NE Arabian Sea, 10-22°N and 66-75°E) were organized during the OCEANSAT satellite pass, for sea truthing and validation. An extensive bloom of *Noctiluca scintillans* that imparted a green colour was detected. The bloom was found gradually extending westward as far as Oman. This was very obvious from the time series, generated from the OCM data, and from earlier observations made during the years.
coupled system. Cycling in the ocean-atmosphere imagine their contribution to the carbon area that the blooms occupied, one can sampled. Considering the very large toplankton population in the area of 5-10 times larger than the total phy-ters (10-15 m) supported 1080-4128 cells/L. The bloom population was surface water samples showed 64 - 3228 Noctiluca cells/L and deeper waters (10-15 m) supported 1080-2542 cells/L. The bloom population was of 5-10 times larger than the total phytoplankton population in the area sampled. Considering the very large area that the blooms occupied, one can imagine their contribution to the carbon cycling in the ocean-atmosphere coupled system.

This is the first report of large-scale Noctiluca blooms from open waters of the NE Arabian Sea, and we plan to make further observations with longer cruises in the waters of the Arabian Sea, as well as the Bay of Bengal. Since the present observations were in repeated stations, data analysis will facilitate better understanding of the inter-annual variability in the productivity pattern and improve our knowledge of the blooming species.

References

Italy
Further investigation on blooms of Ostreopsis ovata, Coolia mononis, Prorocentrum lima on the macroalgae of artificial and natural reefs in the Northern Tyrhenian Sea

Ostreopsis ovata, Coolia mononis, Prorocentrum lima, Prorocentrum sp., Amphidinium sp. have been detected on the Tuscany coast, Tyrhenian Sea, on macroalgae on the artificial reefs of Marina di Massa and Versilia, and on the natural reefs of Livorno. The same dinoflagellates have been found on the islands of the Tuscany archipelago: Elba, Giannutri, Giglio [1, 2]. During these blooms, red tides caused by the detachment of such epiphytic algae from the macroalgae can occur [3]. The blooms have been considered responsible for inflammation of the upper respiratory tract and conjunctivitis in swimmers [3, 4].

The present study, from July 2002 to August 2003, was in the same areas monitored in our previous studies [1]: the artificial reefs of Marina di Massa (Massa), and the natural reefs of the locality of Calafuria south to Livorno (indicated as Livorno in text and tables). Ciguatoxins were detected with the ELISA immunological procedure, after a simple chromatographic extraction in methanol. The toxicological test with Artemia salina was done with filtrates of the microalgae homogenized in seawater, and on suspended cells captured with a phytoplankton net (mesh size: 20 mm). The material was frozen, treated with ultrasound for 20 s, and finally filtered. The test was repeated 2 times, each on 10 specimens of A. salina for 24 h. in a 10 mL sample. The results are expressed in % of dead specimens of A. salina. Cell counts were made in an Utermöhl chamber at 100x and species identification was done at 1000x UV in calcofluor. The cell density is expressed either as the ratio of the number of cells to 1 g of macroalgae (wet weight), or as the ratio of the number of cells to 1 mL of the seawater used for detaching the dinoflagellates, or as the ratio of the number of cells to 10 L of seawater filtered with a phytoplankton net (mesh size: 20 µm).

The density of O. ovata in macroalgae increases with water temperature (Figs. 1, 2). During blooms, the density of O. ovata is greater on the artificial reef of Marina di Massa than on the natural reefs of Livorno. In summer, the increase of algal density from zero to the maximum value is extremely fast,
while the reduction of algal density and the apparent disappearance of *O. ovata* in autumn-winter is gradual. This pattern reflects the capability of this species to produce resistant forms, hardly detectable in the natural environment, which are activated when temperature rises above 20-25°C. Growth of *C. monotis* also depends on temperature: in Marina di Massa, *C. monotis* was found only in August-September 2002 and in July-August 2003, when the peak value was recorded, while in Livorno, *C. monotis* occurred all year and reached a peak in August. *P. lima* was found during the whole year on the reefs of Livorno, but only in small numbers in Marina di Massa, in August 2002. These results show that the selectivity of the ecosystem of the artificial reefs of Marina di Massa is greater than the selectivity of natural reefs of Livorno, in accordance with our previous studies [3]. During blooms on the macroalgae, high quantities of *O. ovata* and *C. monotis* are present in the water around the reefs. The highest density of *O. ovata* was observed in August-September 2002 and in July 2003 at Marina di Massa, and in September 2002 and July 2003 at Livorno. The highest density of *C. monotis* was detected in September 2002 and in August 2003, while *P. lima* was present in small numbers only at Livorno, in August 2002 and April 2003 (Table 1).

The toxicological tests with *A. salina* reveal a significant correlation (p<1%) between the number of *O. ovata* in extracts of macroalgae from Marina di Massa and the percentage of dead crustaceans in 24 h, which varies from 65% to 100% while the number of *O. ovata* was in the range of 542 to 906 cells mL⁻¹. The correlation between the mortality and the algal concentration was not significant with *C. monotis*, *P. lima* and *Amphidinium sp.*

The liposoluble toxins extracted in methanol were tested by using specific antibodies and detected through colorimetric analysis. The concentrations, expressed in ppb, are shown in Table 2. No significant increase of Cigua-Check positivity in shellfish and fish was observed during the blooms. Thus shellfish and fish do not concentrate the cigua-like compounds. Tests at the Centre for Marine Research of Cesenatico (the Italian national authority centre for the study of algal toxins), treating mice with the same concentrations of toxins as those detected in our tests, have not shown any toxic effect [3].

Between winter and early spring *O. ovata* is not detectable, although motionless forms of *O. ovata* can exceptionally be found enclosed in a thick membrane. In vitro, a temperature decrease or a reduction in nutrients leads to round forms enclosed in a jelly envelope, identical to those observed in *O. siamensis* [5].

*C. monotis*, *P. lima*, and *Amphidinium sp.* are present all the year on the Livorno reefs, but never reach high concentrations there. On the Marina di Massa reefs, the blooms of *C. monotis* occur at the same time as those of *O. ovata*, are larger than at Livorno, but more ephemeral. *P. lima* and *Amphidinium sp.* never reach high concentrations. Since the toxicity of *O. ovata* has not been clearly proved yet, it is possible that *C. monotis* plays an important role in the potential episodes of ecotoxicity. The problem of the toxicity for humans following the ingestion of either edible shellfish or predatory fish could be effectively addressed with comprehensive studies on the ability of potentially toxic Mediterranean species to produce toxins (palitoxin and hemolysins *Ostreopsis sp.*, yessotoxin *C. monotis*) detectable by following chemical or biological tests, and promoting an adequate environmental and sanitary surveillance.

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**Table 1. Potentially toxic dinoflagellates detected in samples taken with a plankton net (cells/10 L⁻¹).**

<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>Amphidium sp.</th>
<th>Dinophysis caudata</th>
<th>Dinophysis sacculus</th>
<th>Dinophysis rotundata</th>
<th>Alexandrium sp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marina di Massa</td>
<td>20/08/02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livorno</td>
<td>26/05/03</td>
<td></td>
<td>8</td>
<td>118</td>
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<td>197</td>
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<tr>
<td>Livorno</td>
<td>11/06/03</td>
<td>79</td>
<td>126</td>
<td>39</td>
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<td></td>
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<tr>
<td>Massa</td>
<td>24/07/03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Massa</td>
<td>06/08/03</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Livorno</td>
<td>06/08/03</td>
<td>8</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Table 2. Cigua-Check (ppb).**

<table>
<thead>
<tr>
<th></th>
<th>Artificial reefs (Marina di Massa)</th>
<th>Natural reefs (Livorno)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 03</td>
<td>June 03     16 July 03</td>
</tr>
<tr>
<td>Mytilus sp.</td>
<td>&lt;0.8</td>
<td>0.9          1</td>
</tr>
<tr>
<td>Patella sp.</td>
<td>0.9</td>
<td>&lt;0.8         0.9</td>
</tr>
<tr>
<td>Murena aelena</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Octopus vulgaris</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>Boops salpa</td>
<td>0.9</td>
<td></td>
</tr>
</tbody>
</table>
Cochlodinium polykrikoides

An extensive bloom produced by Cochlodinium polykrikoides was detected, embracing the whole Pacific coast of Costa Rica. The bloom was characterized by a red-oxide colour and was located in front of the beaches of Puntarenas and Caldera in the Gulf of Nicoya, Costa Rica (10°N, 85°W). This phenomenon had never observed before in this country; the species dominated other phytoplankton usually responsible for blooms. The phenomenon started during the previous dry season (from December 2003 to March 2004) showing an important increase in April.

During this event a penetrating and fetid smell was perceived that affected the affluence of tourism to some beaches; there was also a great quantity of foam. Near some coastal towns beaches; there was also a great quantity of foam. Near some coastal towns dead fish, mainly Carangidae, were observed. In Culebra Bay, mortality of coral reefs was observed due to dense cell concentrations that reached depths up to 6 meters (Carlos Jimenez, in press). Near the tourist aquarium Parque Marino del Pacifico, there has been damage such as deformation in larvae of Lutjanus (Lutjanidae), probably because the aquarium takes its water close to the blooms. Fishing activity was reduced, perhaps due to the presence of the large amount of mucus and decreased oxygen concentration in the water.

Since the year 2000, we have observed extensive algal blooms that last more than one year on the Pacific coast of Costa Rica, dominated by different morphotypes of Pyrodinium bahamense [1]. Prior to this, long lasting blooms were not observed. In May 2002, an extensive bloom was observed with similar characteristic to that reported in this note; on that occasion, 17 cases of human intoxication, with respiratory symptoms and burning feeling in the eyes were reported. This bloom was also dominated by Cochlodinium polykrikoides and the cyanobacterium Trichodesmium erythraeum [2].

Later on, during the rainy months of September and October 2003, several blooms of this dinoflagellate were reported, reaching maximum concentrations of 17.5 x 10⁴ cells/L by mid-October 2003.

The time distribution of blooms produced by C. polykrikoides had increased from May 2002 until the present, mainly located on the central Pacific coast. In a same manner, this species has recently been reported in the Gulf of California [3, 4], and in Mexico. The Costa Rica blooms observed are generally monospecific, displacing other species usually present during this season. We wish to stress the need for research on HAB along the coasts of Costa Rica, where climatic changes or the increase in the anthropogenic eutrophication of coastal waters may be changing HAB patterns.

References:
On 24-25 September 2002, a red tide and mortality of fish and crabs occurred in Luanda Bay, Angola, associated with dinoflagellates. This was the first phytoplankton bloom here with mortality in which the causative species were identified. Brownish water with an extent of approximately 2 km² lasted for 2 days. *Alexandrium* spp. (maximum 5.1x10⁶ cells/L), and *Gyrodinium spirale* (maximum 6.5x10⁵ cells/L) were the most abundant species found in the fish harbour area (8º 47'S, 13º 16'E). An unidentified species of *Chattonella* also contributed to the bloom with lower cell concentrations (9x10⁴). This phenomenon caused mortality of *Dentex*, *Epinephelus* and *Merluccius* species and of crabs.

Surface samples were collected at 5 stations in the fish harbour on 24 and 25 September 2002 (Fig. 1).

Samples were either fixed in 2% formol or kept alive for some hours to help identification of species. For the qualitative and quantitative determination of the samples, the Utermöhl technique was used. Samples were studied using an inverted microscope with contrast, phase and epifluorescence Axiovert 200. Cell counts are shown in Table 1. Mortalities were first noticed on the morning of the 24th, intensified as the day progressed and decreased on the 25th. This event caused panic amongst subsistence fishermen in the area.

*Alexandrium* spp. were found at all stations, with a dominance of 100% at station 5 on the 24th and station 1 on the 25th. The dominance of this species was approximately 90% at stations 2 and 3, on the 25th. Species of *Alexandrium* and *Gyrodinium* produce PSP toxins and cause fish mortality [1]. *Prorocentrum* which occurs amongst the microalgae identified has previously been associated with fish mortalities in Angola by Silva [2]. The raphidophyte *Chattonella* was found in concentrations of 5.8x10⁴ and 9x10⁴ cells/L at stations 1 and 3 respectively. Although the mechanisms by which raphidophytes cause death are poorly known, physical damages to fish gills due to mucus secretion; hemolytic activity may also be involved [3, 4], as well as the production of free radicals [5].

It seems possible that increased nutrient levels in the area affected contributed to the occurrence of the bloom.

Most mass mortalities in the sub-equatorial southeast Atlantic have been recorded on the Namibian coast, especially in the Walvis Bay area in 1940s, with *Gymnodinium* implicated. A fish mortality in 1997 on the Swakopmund coast was associated with *Gymnodinium galatheanum*. Similar phenomena were also recorded in South Africa (St. Helena Bay in 1997), causing a mortality of sardines and attributed to the presence of PSP (Paralytic Shellfish Poisoning), produced by *Alexandrium catenella*. This was the first confirmed case of an organism pro-

**Table 1. Abundance (nº cells/L) of the most representative species.**

<table>
<thead>
<tr>
<th>Species</th>
<th>St. 1</th>
<th>St. 2</th>
<th>St. 3</th>
<th>St. 4</th>
<th>St. 5</th>
<th>St. 1</th>
<th>St. 2</th>
<th>St. 3</th>
<th>St. 4</th>
<th>St. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alexandrium</em> spp.</td>
<td>4.6x10⁵</td>
<td>7x10⁴</td>
<td>5x10³</td>
<td>2.5x10⁴</td>
<td>51x10²</td>
<td>51x10⁵</td>
<td>10x10⁵</td>
<td>30x10³</td>
<td>5.8x10⁴</td>
<td>2.5x10³</td>
</tr>
<tr>
<td><em>Chatonella</em> spp.</td>
<td>5.8x10⁴</td>
<td>9x10⁴</td>
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<td></td>
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<tr>
<td><em>Gonyaulax spinifera</em></td>
<td>2x10⁴</td>
<td>2.5x10⁴</td>
<td>2.5x10³</td>
<td>4x10⁴</td>
<td>6x10⁴</td>
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<td><em>Gymnodinium</em> spp.</td>
<td>7x10³</td>
<td>4.7x10⁴</td>
<td>8x10⁴</td>
<td>6x10⁴</td>
<td></td>
<td>6x10⁴</td>
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<td>30x10³</td>
<td>6x10⁴</td>
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<td><em>Gyrodinium spirale</em></td>
<td>5x10³</td>
<td>3x10⁴</td>
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<td><em>Navicula</em> spp.</td>
<td>2.5x10³</td>
<td>2.5x10³</td>
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<td></td>
<td>2.8x10⁴</td>
<td>6.9x10⁴</td>
<td>20x10⁴</td>
<td>43x10³</td>
</tr>
<tr>
<td><em>Nitzia closterium</em></td>
<td>12x10³</td>
<td>5x10³</td>
<td>2x10⁴</td>
<td>3.8x10⁴</td>
<td></td>
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<td>5x10³</td>
<td>10x10³</td>
<td>10x10³</td>
<td>2.5x10³</td>
</tr>
<tr>
<td><em>Prorocentrum micans</em></td>
<td>4.6x10⁴</td>
<td>7.6x10³</td>
<td>5x10⁴</td>
<td>12x10⁵</td>
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<td>2.5x10³</td>
<td>2.5x10³</td>
<td>5x10³</td>
<td>10x10³</td>
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<tr>
<td><em>Scripsiella</em> spp.</td>
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Fig. 1. Map of location of the samplings in the Fishing harbour, Luanda.

We thank Dra. Lia Neto and Dr. Osvaldo Costa for sample collection and the National Direction for inspection of a small vessel.

### References


### HABTech2003 Workshop, New Zealand

The second HABTech workshop was again held in Nelson, New Zealand, hosted and organised by Cawthron Institute. The aim of HABTech03 was to provide participants with a highly informative and enjoyable event, providing practical information on new developments in analytical methods for harmful algal species and marine biotoxins in shellfish and other seafood products. The plenary speakers were experts in their fields, many of them key international researchers. Two panels of experts were drawn together to give their opinions and answer the questions: «What is the future of the mouse in monitoring and regulations?», «What are the risks and benefits of shifting to new technologies for monitoring?» and «How can we speed up regulatory acceptance of new methods?». A summary of these presentations and Hot Topics can be found in the published Proceedings.

A unique feature of HABTech was the demonstration sessions where participants had ‘hands-on’ experience with the latest techniques for HAB and toxin detection. We endeavoured to provide an in-depth coverage of the field, including genetic techniques for algal identification and a wide range of assays for toxin analysis - functional, immuno and instrumental. At least 50 posters were presented, providing a wealth of detailed information to complement the plenary and demo session materials. Extended abstracts of the Posters and Demonstrations are included in the Proceedings.

Without APEC, NRC Canada, and the New Zealand Ministry of Research Science & Technology and their substantial sponsorship of the workshop we would not have been able to bring together the speakers and other key people from APEC countries to Nelson. The APEC connection was greatly facilitated by Dr Michael Quilliam from the Institute of Marine Biosciences, NRC, Halifax. His project *Development and Validation of Phycotoxin Analytical Methods, Standards and Reference Materials for Seafood Product Certification and Safety* in the APEC Red Tide program provided impetus for several of the research projects that were demonstrated and discussed. The project contributes to an effort by APEC to coordinate monitoring and management of HABs within the 21 APEC economies in order to facilitate a free flow of goods and services, and in particular, shellfish and fish products potentially contaminated with algal toxins. Key tasks of the project included methods development and validation, certified reference materials (CRMs), and toxicity data on pure toxins and information on all of these was presented at the workshop. Mike’s enthusiasm, drive and exceptional knowledge of the area were appreciated during the planning and organising of the workshop.

Our thanks also go to those registrants who supported the workshop by supplying demos and to sponsoring companies for their loans of key equipment and consumables. In particular we acknowledge the Micromass Quattro Micro LC-MS system loaned by Waters Australia Pty.

The Proceedings can be purchased from Cawthron through the librarian or obtained free on request on CDROM. PowerPoint presentations and photos are included. Go to the Cawthron website for request information: www.cawthron.org.nz.

P. Holland, L. Rhodes & L. Brown (Proceedings editors), Cawthron Institute, PB 2 Nelson, New Zealand.
Open Science Meeting: HABs and Eutrophication

7-10 March 2005

Baltimore, Maryland USA

Eutrophication is recognized as one of the factors contributing to the increasing proliferation of harmful algal blooms in coastal areas worldwide. This meeting, the third in a series of Open Science Meetings convened by GEOHAB, is designed to bring experts together from around the world to review the state of knowledge with respect to our understanding of the role of eutrophication in the proliferation of worldwide HABs, and take the initial steps in designing the next phase of research on comparative, eutrophic ecosystems and species that will be necessary to address this critical, global issue.

GEOHAB is a programme of international co-operative research on HABs in marine and brackish waters.

The GEOHAB Scientific Goal is to improve prediction of HABs by determining the ecological and oceanographic mechanisms underlying their population dynamics, integrating biological, chemical, and physical studies supported by enhanced observation and modelling systems.

The GEOHAB Mission is to foster international co-operative research on HABs in ecosystem types sharing common features, comparing the key species involved and the oceanographic processes that influence their population dynamics.

Conference Topics:

- Global trends in eutrophication and HABs
- Physiology of HABs with respect to nutrients
- Comparative studies on HABs in eutrophic areas
- HAB programmes in global eutrophic areas
- Modelling of nutrients and HABs
- New methodologies for nutrient and HAB monitoring

Important Dates

First Announcement: 25 September 2004
Abstract Deadline: 10 December 2004
Registration Deadline: 10 January 2005

The community is invited to submit abstracts for contributed oral and poster sessions.

Information regarding Meeting Proceedings will be forthcoming.

Registration: US $200

One-Day Registration: US $50
Student Registration: US $120
Late Registration: US $250

Registration is limited to 200 persons, so please register early!

For more information, contact the Meeting Co-ordinator: Ed Urban, Executive Director, SCOR, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, MD 21218 U.S.A., Email: Ed.Urban@jhu.edu

To submit an abstract, register, and book your hotel:

http://www.jhu.edu/scor/GEOHAB-OSM3.htm
Dear ISSHA members and HA community,

My tenure as President of the International Society for the Study of Harmful Algae will be over at the end of November 2004, when the new President of our Society will be announced at the 11th International Conference on Harmful Algae in South Africa. I want to take this opportunity to tell you of the progress we have made as a fledgling Society and to thank you for your interest in, and support of, ISSHA. As with everything else, PEOPLE make things happen. Without the dedication of members, particularly the elected Council members and the Executive, ISSHA would not have developed to the stage it has today. Most societies, in the beginning, travel a bumpy road. ISSHA was no exception but it weathered the initiation period. Through the efforts of the Executive over the last several years, particularly Stephen Bates (Secretary), Allan Cembella (Vice-President), Henrik Enevoldsen (Treasurer), and Max Taylor (Past-President), this Society was kept on course. Among our first hurdles was to draft ISSHA Statutes, review them, and present them to the membership for ratification. This happened! To me, this was a major accomplishment and was principally due to the efforts of Jane Lewis and Henrik Enevoldsen. Thank you both. Another accomplishment was the ISSHA website and here I would like to thank Allan Cembella, Nancy Lewis, Judy Kleindinst, and Stephen Bates. Following those advancements came the election of 14 Council Members from around the world and the first Council meeting in April 2004, in Denmark. The minutes of that meeting are posted on the ISSHA website at www.issha.org.

At that meeting standing committees were established. Each committee was given a direction with assigned tasks. One of the committees is the Committee Travel Awards, chaired by Don Anderson. Council members were successful in obtaining money for more than 15 students and scientists to attend the 11th International Conference on Harmful Algae. Again, my thanks to a dedicated Council. That brings us full circle to the next election, that of the new Executive.

I have truly enjoyed being a part of ISSHA and working with colleagues and friends to advance our Society.

Karen A. Steidinger, ISSHA President.

Members vote for the new ISSHA Executive

Members of the current Executive (Karen Steidinger, President; Allan Cembella, Vice-President; Yasukatsu Oshima, Vice-President; Stephen Bates, Secretary; Henrik Enevoldsen, Treasurer; and Max Taylor, Past President) are nearing the end of their extended terms, after having served since February 2000. To put the election of the new ISSHA Executive into gear, a nomination announcement was posted on the ISSHA website and sent to all members via the ISSHA list server. The ballots were then mailed on 22 September, with a request that they be returned to our Treasurer by November 5th. Although we had sufficient nominations for all positions, many nominees declined due to work loads. Therefore, with positions where there was only one candidate willing to serve if elected, a second «write-in» candidate could be inserted.

The ballots will be brought to the Cape Town XI International Conference on Harmful Algae, where they will be opened and counted. The results will be announced at the ISSHA General Assembly, which will be held during the conference (Thursday, 18 November, late afternoon). The new Executive will serve a three-year term, starting with the General Assembly in Cape Town. ISSHA is fortunate to have Council members that are dedicated and active, and their continued service will help the new Executive.

Committee on Elections (Karen Steidinger and Stephen Bates).
Application for Membership: 
International Society for the Study of Harmful Algae

Name: ____________________________________________________
Address: ____________________________________________________
____________________________________________________
____________________________________________________
E-mail: ____________________________________________________
Tel: _______________________________________________________

Type of Membership ($US or equivalent Euros):
Regular ($20) □  Student ($10) □  Corporate ($40) □

Credit Card:
Visa: □  MasterCard: □  Eurocard: □  Maestro: □  Visa-Electron: □

Card number: ____________________________________________

Expiry date: ______ / ______ (MUST be indicated)

Security code: ___________ (last three digits on back of credit card)

Amount USD: _______________

Signature: ____________________________ Date: ________________

This form is approved by PBS. VAT (or SE #): SE 21 41 61 42

If you prefer to pay by bank transfer please transfer via your bank or by home banking (e-banking) to the account of ISSHA: 
Nordea Bank, IBAN DK7920008473580633, Frederiksborgsgade 14-16, 1360 Copenhagen K, Denmark.

Checks are not accepted.

Send or fax this form to:
Henrik Enevoldsen, ISSHA Treasurer
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Øster Farimagsgade 2D
DK-1353 Copenhagen K
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Fax: (45) 33134447

HARMFUL ALGAE NEWS

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