Old questions, new tools

In the Barents Sea, warm currents and cold currents intermingle. The Russian hydrographer Nikolai Knipowitsch and his successor Leonid Breitfuss attributed these patterns to insolation and advection respectively. A century later, this conflict is still not fully resolved, as deliberations at a meeting last year in Baiona (Spain) reveal [1]. An analogous biological problem was cause for dispute in the same decades. Winter herring had disappeared from the west Swedish coast about 1810, not to reappear until 1877. This “periodicity”, traced through the whole last millennium by Axel Ljungmann, was attributed by Fredrik Laurentz Ekman (grandfather of Ekman transport) to variations in the strength of the low salinity Baltic outflow and preference of the winter herring for more saline “bank water” entering the Skagerrak from the North Sea. Per Teodor Cleve identified Arctic diatoms in the bank water, and Otto Pettersson sided with Ekman and Cleve, that herring, plankton, and water were advected together. But Hauken Hasberg Gran, supported by Johan Hjort, disagreed; they maintained that resting stages of Arctic plankton were present year round in the local sediments, and produced blooms when conditions became favourable. Contemporary students of the same problem have written that “In a hydrographically complex...” (Cont’d on p.2)

A strong permanent halocline at 60-80 m creates poor oxygen conditions in the near bottom layer of the Gulf of Finland, Baltic Sea. With anoxic conditions, phosphates are released from the sediments and hence higher phosphorus concentrations occur in the upper water column after seasonal convective mixing (larger dashed circles) which reach the halocline. Consequent lowering of the N:P ratio in the upper water column creates favourable conditions for N-fixing cyanobacteria. With a weak halocline, phosphates bind to the sediments, and less is mixed to the upper water column. In an environment with high a N:P ratio, N-fixing cyanobacteria do not have a competitive advantage in phytoplankton succession, and hence the formation of intense blooms is unlikely.

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During summer thermal stratification, upper water layer inorganic nutrients are depleted, and the main processes which bring nutrients from lower layers below the thermocline to the upper layers are wind induced mixing (especially in the frontal regions) and coastal upwelling. There is a quasi-permanent salinity front in the Gulf of Finland entrance area where inflowing saltier open Baltic Proper waters weaken the vertical salinity stratification and stronger wind impulses can bring nutrients from lower layers to the upper layer. As the phosphacline is located in the upper part of thermocline and the nitracline is about 5 m deeper, mostly phosphates are brought up during wind induced mixing and coastal upwelling processes. This will lower the N:P ratio in the upper layers and will create favourable conditions for cyanobacterial bloom development.
area such as the Skagerrak ... a distinction between succession and sequence may be hard to perceive” [2]. Hydrographic complexity is not of course unique to the Skagerrak.

At the recent GEOHAB Open Science Meeting, HABs and Stratification (Paris, 5-8 December 2005), it was noted that blooms of harmful algae are often confined to “thin layers”, raising questions like; are the dynamics of these populations controlled by biological or by physical mechanisms, or do they result from combinations of both? Further, what kind of evidence would we need to exclude different possibilities? These are hard questions, with echoes of the old dispute about density-dependent and density-independent population regulation which so exercised the minds of an earlier generation of ecologists. It is only quite recently that instruments have been designed which can collect the data we need to address some of these questions. The introduction to the conference abstracts reminds us that “... thin layers (intermittent and less than 1m thick) pose problems for sampling and modelling of harmful algal populations. Coupling physical effects (turbulence, shear, advection) and biological behaviour (migration, physiological adaptation) holds the key to understanding vertical distributions, bloom dynamics, and patterns of toxicity.” Thus questions like those asked in the late nineteenth century by some of the pioneers of marine science continue to puzzle us.

The coastal and inshore regions where HABs occur are hydrodynamically more diversified than offshore due to turbulent mixing by tides, and wind stress and runoff patterns. As well, HABs are often brief high amplitude events superimposed on seasonal cycles, so that Sverdrup’s critical depth model cannot effectively capture the population dynamics [3]. Some field studies reported at this meeting detailed some of these complexities. *Alexandrium tamarense* blooms in the St. Lawrence Estuary are influenced by winds and runoff, by vertical migration, and perhaps also by humic substances (Juliette Fauchet). *Karenia mikimotoi* in the Western Approaches to the British Isles responds to insolation, salinity, and self-induced warming (Liam Fernand), and is advected from place to place by geostrophic jets related to cold pools (Robin Raine, and see [4]). Advection also seems to play a key rôle for *Dinophysis acuta* -in western Iberian waters; populations on the central Portuguese coast respond to downwelling and convergences, especially in a core area off Peniche-Aveiro. A northerly surface current, more intense in autumn, can advect populations to the Galician Rías Bajas (Teresa Moita), where it sometimes adds to the problems caused by the more persistent *Dinophysis acuminata* there (Beatriz Reguera; Yolanda Pazos). In the Gulf of Finland, a deep permanent halocline is sustained by intermittent advection from the North Sea, and renewal patterns determine the availability of phosphorus from year to year; cyanobacterial dynamics depend via vertical convection on this nutrient bank, as well as on the seasonal thermocline, so that the magnitude of blooms depends on both intra- and inter-annual events (see Box 1).

At HABXI in Cape Town, it was suggested that small gyres act as holding zones for *Dinophysis* populations in the Bay of Biscay. Many such gyres emerge in numerical experiments of the region; some of the mechanisms which may cause them to persist have been identified, and the characteristics which can lead to accumulation of *Dinophysis* explored (Hongqin Xie). The problem of identifying retentive structures of this kind in hydrodynamic simulations was tackled (Marc Segond) using Marco Dorigo’s entrancing ‘ant colony optimization (ACO)’ algorithm (virtual ants), more familiar perhaps to oil shippers and trucking companies (see Box 2). This was applied to the output from the model used by Hongqin Xie, and shown to perform better than informal procedures. Its application to output from the Portuguese MOHID model (Marcos Mateus) [5] might provide new insights into the mesoscale ecology of *Dinophysis* in western Iberian waters already mentioned.

The Core Research Project [6] identifies eight key questions. Of these, five (A, B, F, G, H) are closely related, and were touched on to varying degrees, or at least implicitly, during discussions at this meeting. These refer to (A) adaptive strategies, (B) seeding strategies,
One essential of life cycle closure is that some stage must be able to find its way ‘home’. For example, in a hypothetical species with two mandatory stages, vegetative cells and cysts, some of the latter must end up in the parent seed banks which provide inocula for subsequent generations. If they do not, then the probability is that their progeny will inoculate different water masses, not those from which they were derived. Then the next growth phase may not encounter suitable conditions, and if it does, the next crop of cysts will be even less likely to find its way back to the parental seed bank. ‘Losses’ on this account may be advantageous in the sense of providing opportunities for dispersal and range expansion, essentials of long term survival, but will in most cases require to be underpinned by persistence in the core area. Life history strategies therefore require retention mechanisms, and seeding strategies are part of the same requirement (questions A & B). The timing of excystment, growth patterns, control of vertical distributions, and encystment are behavioral components of these strategies. Detailed accounts of these problems for *Alexandrium* in the Bay of Fundy and Gulf of Maine have been published [7].

Cross-shelf and longshore advection (G) are among the processes, given certain patterns of coastal morphology and bathymetry (F), which generate the hydrodynamic features which makes retention mechanisms possible. Vertical migration (VM) has long been thought to be in part a means to promote retention. If this is so, VM patterns need to be tailored to particular retention systems, and adaptable enough to respond to changes in the latter caused by climatic variations (H).

A variety of new instruments were described at this meeting, and it is now becoming possible to obtain more detailed views of the underwater environment at the small scales where individual phytoplankton colonies and cells interact with the microphysics. Hidekatsu Yamazaki maps biological and physical turbulent microstructure in freefall profiles using TurboMAP (Turbulent ocean Microstructure Acquisition Profiler) [8], and has demonstrated that phytoplankton tends to aggregate in regions of low turbulence. Peter Franks uses a sheet of laser light to stimulate chlorophyll fluorescence and views an undisturbed image plane with a CCD camera (Box 3). Particle tracking velocimetry (PTV) is being explored by Alex Nimmo Smith; this system uses four cameras to track suspended particles in three dimensions and provides views of fluid motion in a 20 cm cube [9]. These new tools, and the development of multidisciplinary projects (such as the EU FP & Harmful Algal Blooms in Thin Layers) focused on target species will hopefully shed new lights into the interactions between microphysical structures and microalga growth and life history stages.

www.geohab.info

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An Online Guide to UK Harmful Phytoplankton and its Future

Harmful algal blooms (HAB) and the occurrence of toxic species threaten the livelihood of coastal communities worldwide; they pose a risk to both human health and businesses, such as fisheries and aquaculture. Furthermore, it is clear that to prevent disasters, careful monitoring of harmful and toxic species is paramount. However, the identification and study of harmful species is complicated by the large number of phytoplankton groups that occur, even within a single sample (e.g., dinoflagellates, diatoms, raphidophytes and haptophytes). Unfortunately, the extensive and disparate nature of information on these taxa often impairs monitoring programmes, which are often staffed by non-specialists. Resources are, therefore, now needed to provide relevant and current information on HAB species in an easy-to-use, clearly structured, and condensed format.

To address this need in the UK, an online guide to harmful phytoplankton (http://www.liv.ac.uk/hab) has been established at the University of Liverpool with funding from the UK Environment Agency (EA). This resource not only communicates the taxonomic information normally found in scientific publications, but it is also of educational value and provides non-taxonomists with the information needed for the reliable identification of key harmful phytoplankton species.

The EA-funded site has a user-friendly navigation structure, resembling a cross between a field guide and a scientific paper. It starts with an introduction and methods section. Then, at the heart of the site are the individual species data sheets that contain data on the species, schematic drawings, and images of live and fixed cells. Individual species sheets can be accessed from a contents page, via drop down menus on each species sheet, or by simply browsing through all sheets.

The data sheets, when first accessed are essentially presented as thumbnails, providing a quick and informative overview. This would be similar to holding a page of a book at arm’s length. Then, by clicking on different areas of the data sheet, either images or text, these areas can be viewed in new enlarged windows. In this way information can be arranged according to the needs of the user, and information on different spe...
cies can be compared. In addition, the site contains an illustrated glossary, a schematics section, and a reference list, all of which can be accessed from all data sheets. Finally, for those who do not have regular access to a computer, or prefer hard copies, all data sheets and other sections are available as pdf files for downloading and printing.

The HAB site is based on the well-tested format of its sister site (The user friendly guide to coastal planktonic ciliates, http://www.liv.ac.uk/ciliate). Both sites are proven tools, with considerable international educational value (the ciliate site now gets 2000 hits a day and serves over 70 countries, and the newer HAB site now receives 1000 hits per day). Both of these sites are technically very simple and can, therefore, be viewed on low power computers and with older browsers, which are still commonly used in many parts of the developing world.

Although the HAB site concentrates on species found in UK waters, it is still beneficial to a large number of users, as it combines detailed species descriptions with more general information on harmful genera and families found all over the world. In fact, the UK partners on this site are extremely keen to expanding it to serve the international community. Interested parties should contact David Montagnes (dmontag@liv.ac.uk).

**Future plans**

Although the HAB site described above has proven to be a useful resource, and received contributions from many researchers, it is still far from a comprehensive internet repository; it would be difficult for any one site to do. We are still faced with the problem that it is often difficult to access information that is spread over disparate databases, uses different formats, and is assembled using different software tools. In the study of harmful algae, even more so than in other areas of phytotplankton research, it is vital to rapidly verify identifications and communicate results on the basis of these IDs. There thus is a need to strengthen and formalise the connectivity of existing resources.

We suggest that accessing and sorting information from multiple resources will become a much easier task once existing online facilities are networked, and can be searched jointly. Such networks will be a more efficient and cost-effective way of dealing with taxonomic information. Concomitantly, this will lead to a greater chance of data remaining online in the long-term. In short, we need to pool our resources.

Our next step, therefore, is to link existing images, data, educational material, and analysis tools (e.g., taxonomic keys) to a true online database that will allow structured searches. We plan to achieve this through a collaboration with the recently funded EU project: PLANKTON*NET (coordinated by the Alfred Wegener Institute for Polar and Marine Research http://ebck.rd.awi-bremerhaven.de/protist/baypaul/microscope/general/page01.htm). This project will first create a network of online plankton databases in partner institutes. Then, it will provide an opportunity to incorporate resources not belonging to the initial consortium into the network by assisting external partners in establishing their own PLANKTON*NET sites or hosting their data as image collections on existing PLANKTON*NET nodes. We, therefore, encourage collaboration with researchers holding taxonomic information about harmful phytoplankton. Interested parties should contact Alexandra Kraberg (akraberg@awi-bremerhaven.de).

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**CYANONET: A Global Network for Cyanobacterial Bloom and Risk Management**

Cyanobacteria harmful algal blooms (CyanoHABs) have been increasing globally in number, severity and duration, partly as a consequence of anthropogenic eutrophication. CyanoHABs are capable of producing a range of toxins which have been implicated in, and in some cases proximally responsible for, animal and human poisoning incidents throughout the world. However, recognition of the problems presented by cyanotoxins is variable, and significant geographical and institutional differences exist regarding the identification, monitoring, reporting and risk management of cyanobacterial blooms and toxins.

In order to increase CyanoHAB awareness, and to promote education and training, a global project (CYANONET) has been formed which takes into account regional and local characteristics, capabilities and requirements. The project (Co-ordinator, Geoffrey A. Codd, University of Dundee, UK) was created after the UNESCO International Hydrology Programme V Conference in Venice and is part of the UNESCO IHP-VI Action in Echology. CYANONET aims to provide a global situation assessment of the occurrence and impacts of CyanoHABs, cyanotoxins and risk management responses for the protection of water resources and health. Now at the end of Phase I of the project, CYANONET’s Initial Situation Assessment and Recommendations have just been published.

This report* is available online at http://unesdoc.unesco.org/images/0014/001425/142557E.pdf and will shortly be available in printed format.

The CYANONET Report presents an initial situation assessment of the occurrence of cyanohabits (blooms, scums, mats) and cyanotoxins in natural and controlled waters; adverse health
incidents (illness, poisonings, mortalities) of humans and animals associated with, or attributable to cyanobacteria and cyanotoxins; the existence and outcomes of systematic surveys and epidemiological studies of associations between cyanobacteria, cyanotoxins and human health; effects of cyanobacteria on water supply, waterbody-use and ecological status; the availability and implementation of management measures to reduce adverse effects of cyanobacteria and cyanotoxins; and the availability of educational, awareness-raising and training materials and practices.

Phase I of the CYANONET project has now been completed, and was the work of an International Steering Committee (ISC). Regional responsibilities for the promotion of CYANONET’s aims and objectives are being addressed by: William R. Harding (Africa); Sandra M.F.O. Azevedo (South and Central America); Wayne W. Carmichael (North America); Suvendra N. Bagchi (Asia, Western sector); Kunimitsu Kaya (Asia, Eastern sector); Michael D. Burch (Australasia and Oceania); and Geoffrey A. Codd and Hans C. Utkilen (Europe): plus a growing network of National Contacts. Approximately 70 countries in Africa, Asia, Australasia and Oceania, Europe, North and South America were included in the survey which showed that cyanotoxins occur, and have adverse effects on human and animal health throughout all regions for which data are available. Furthermore, a CYANONET website (www.cyanonet.org) with public access has been established (Website Manager, Tomasz Jurczak, University of Lodz, Poland) and is under development.

The Report has highlighted wide differences between countries regarding the information available about cyanoHABs and cyanotoxins, and in the availability of management strategies to monitor and control them. Completion of Phase I of the CYANONET survey has enabled the ISC to identify needs and make recommendations for the next phase of CYANONET. These include: extension of the network of National Contacts, particularly in areas where little or no information has been obtained; to continue data collection, situation assessment and develop information sharing; and to develop guidance materials and management tools. By improving global communication and access to information about cyanoHABs and cyanotoxins, countries will be better equipped to make effective management decisions for the protection of water resources and human health.


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The International Workshop on HAB Dynamics of Targeted Species in the East Asia Waters (EASTHAB II)

November 25-27, 2005, Qingdao China

Recurrent red tides appeared in the East Asia waters during the last decade and the potential harmful effects attracted concerns from the circumjacent countries. It has become a common interest to study the dynamics of the most important HAB species among these countries. To improve the mutual understanding of the most recent progresses on these studies, an international workshop on HAB dynamics of targeted species in the East Asia waters was held in Qingdao, China from Nov. 25 to 27, 2005. This was the second meeting organized under the framework of EASTHAB originally proposed in Jeju Island, Korea by scientists from Korea, Japan and China in Oct. 10-12, 2004. The meeting was hosted by Prof. Mingjiang Zhou in the Institute of Oceanology, Chinese Academy of Sciences and partially supported by the National Key Project of China, “The Ecology and Oceanography of Harmful Algal Blooms in China (CEOHAB, 2001CB4097)”. 21 Scientists from Japan, Korea and China participated in the meeting with 16 oral and 1 post presentations. The meeting was focused on the dynamics of targeted species, especially Cochlodinum polykridoides and Prorocentrum donghaiense in East Asia waters. The infrastructure and potential role of EASTHAB were also discussed. It was decided that the next EASTHAB meeting would be held in Nagasaki, Japan in November of 2006.
Green bloom of *Tetraselmis* sp. in Valparaiso Bay

At the beginning of 2006, waters of beaches in Viña del Mar, Valparaiso Bay, Chile (32°57′S-71°33′W) (Fig. 1), appeared bright vegetal green, especially visible in the breaking waves (Fig. 2a). This unusual phenomenon alarmed inhabitants and tourists.

Surface phytoplankton samples (1L) were collected from January 2nd to January 6th 2006 at 4 sampling stations starting with the beach located at the mouth of Marga Marga river up to Montemar cove. Surface temperature and light attenuation (Secchi disc) were simultaneously measured. Samples were kept refrigerated in cool boxes with ice (6 °C) and were transported to the Laboratories of Phycology, Marine Chemistry, Biochemistry, Electronic Microscopy and Quality Control of the Universidad de Valparaíso, as well as to the summer course “Spectral characterization of dissolved and particulate organic material from aquatic systems” held at the Faculty of Marine Sciences by Dr. Rodolfo Iturriaga to determine their spectral absorption.

Microscopic examination of the morphology and cell structure at the Phycology Laboratory confirmed the presence of the phytoflagellate *Tetraselmis* (Stein) (Chlorophyta, Prasinophyceae). The cells were extremely fragile and changed from motile and ellipsoidal to ovoid and non-motile (Fig. 2 b, c, d). Marga Marga beach showed the highest densities, with 3.0–5.0 x 10⁵ cel/mL (haemocytometer 0.1 mm deep). Montemar cove was least affected and marginal to the phenomenon. During the two first days the green bloom was a monoculture, evolving at the 5th and 6th day to a culture with scarce presence of other phytoflagellates such as *Asteromonas gracilis* and *Chlamydomonas* sp., two species of dinoflagellates (one of them naked), and the diatoms *Chaetoceros* and *Skeletonema costatum* were observed.

The cells of *Tetraselmis* sp. isolated from the beaches of Viña del Mar do not resemble those of *T. suecica* and *T. tetrathele*, both recorded in Valparaíso Bay [1, 2]. Species of *Tetraselmis* are innocuous and several are often used as live food for marine aquaculture organisms in concentrations higher than 1.0 x 10⁶ cel/mL.

Nutrient analysis of the samples showed an abrupt increase of the nitrate and phosphate concentrations between January 2nd and January 4th 2006. Nitrate increased from concentrations close to the limit of detection to values higher than 30 µmol/L. In the case of phosphate, the increase reached more than 20 µmol/L, with one of the localities approaching an unusual surface concentration of 46 µmol/L. The phosphate values decreased abruptly on January 5th to low values between 0.3 and 0.8 µmol/L. At the same time nitrate values fell below the detection limit, showing a close relationship in abundance with the green bloom.

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First detection of toxic *Pseudo-nitzschia calliantha* in Bizerte Lagoon, Tunisia

Domoic acid toxicity was first reported in December 1987, on Prince Edward Island in Canada, when an outbreak of amnesic shellfish poisoning (ASP) occurred among humans who had eaten blue mussels [1]. It was subsequently reported along the Pacific coasts of California and Mexico, where mass mortalities of sea birds and sea lions were documented [2]. The domoic-acid-producing algae are certain members of the ubiquitous marine diatom genus *Pseudo-nitzschia* Peragallo that are widely distributed in the world’s oceans, including coastal waters [3]. Their incidence in the Mediterranean Sea has been well documented [4].

The results of a monitoring program carried out in areas of bivalve mollusc production in Tunisia (Gulf of Gabs, Boughrara Sea, Lake Tunis and Bizerte Lagoon) showed that *Pseudo-nitzschia* species occur in the area [5]. The Bizerte Lagoon (Fig. 1) has zones of extensive aquaculture activity, where mussel production reaches 136,811 tons per year [6]. The presence of potentially toxic *Pseudo-nitzschia* spp. may be an impediment to further aquaculture development. For example, Sakka et al. [7] found that *Pseudo-nitzschia delicatissima* is a common member of the phytoplankton community.

Investigating the spatial and temporal distribution of potentially toxic *Pseudo-nitzschia* species in the Bizerte Lagoon is therefore crucial in order to understand the bloom dynamics in the area. For this purpose, monthly water sampling began in 2004, using Niskin bottles at 2 m below the surface, at four stations within the lagoon and one station in the Mediterranean Sea; results from one station (Fig. 1) are reported here. Members of the total phytoplankton community, including *Pseudo-nitzschia* species, were counted in Lugol’s-preserved samples, using the Uthermöl sedimentation technique under an inverted microscope. Depending on whether the valve width is greater or smaller than 3 µm, and according to Hasle [3], *Pseudo-nitzschia* species were respectively ranked to the *Nitzschia delicatissima* or *Nitzschia seriata* group.

As shown in Fig. 2, *delicatissima* group species were found to be dominant both numerically and throughout the year. Cells within the *seriata* group were present at much lower concentrations and only during May, January and February. The highest concentration of the genus *Pseudo-nitzschia* (226,390 cells L⁻¹) was recorded in July 2004, and was exclusively represented by *delicatissima* group species. A monoclonal culture (clone SI-5) was established by isolating a single cell from natural samples. Cells from the stationary phase (day 33) of this culture were analysed for domoic acid production by HPLC after FMOC derivatization [8]. The clone was confirmed to be toxic, with a domoic acid...
concentration in the whole culture (cells plus medium) of 150 ng mL⁻¹.

For identification at the species level, acid-cleaned material collected on July 2004 was examined by SEM (Fig. 3). The valve width is 2.68 µm and the length is 35.1 µm. A central interspace is present, and fibulae are about 18 in 10 µm. Striae are more numerous than the fibulae, approximately 37 in 10 µm, and composed of a single row of poroids, with 4 poroids in 1 µm. The hymen of the valve poroids exhibit a flower pattern. These morphometrics are typical of *Pseudo-nitzschia calliantha* [9]. The toxic clone IS-5 was similarly identified as being *P. calliantha*.

This is the first time that the toxicity of any species of *Pseudo-nitzschia* has been demonstrated from Tunisian coastal waters, and the first for *P. calliantha* in the Bizerte Lagoon. It is still too early to fully describe the bloom dynamics and variability of *Pseudo-nitzschia* species in this lagoon. The continuation of this study should let us know more about the distribution and abundance of *Pseudo-nitzschia* species in the area.

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**Training Course on Harmful Algal Blooms**

**3 - 5 November 2005, Pisco**

The government of Perú through the Ministerial Agency (PCM) has signed an agreement with the International Bank of Reconstruction and Development (BIRF) for financial support and execution of the Project: Support for Improvement of Productivity and facilitation of Foreign Commerce. The main objective of this project is to sustain and increase Peruvian exports, through the Monitoring of Harmful Algal Blooms, to ensure the security and high quality of fishery products affected by HAB.

The Fishing Technology Institute of Perú – ITP, was created in 1979 as a governmental Institution depending on...
the Production Ministry. Its main function is to promote scientific and technological research with the aim of optimal and rational use of aquatic resources. The ITP has a modern infrastructure with pilot plants for the manufacture and preservation of food products.

Since 2005, The Fishing Technology Institute of Perú is the governmental Institute in charge of establishing and improving National Programmes for the control of harmful algae blooms.

One of the tasks of the Project is training the professional staff involved in the sanitary control of fishery products. For that, a three day course-workshop was held in Pisco (ICA - Perú). The objective of the course was to provide participants with a broad perspective of the different aspects of harmful algae that need to be dealt with in these programmes, and to train them and provide practice in the basic techniques which are applied in contingency plans for the occurrence of toxic/noxious algal events.

The course included theoretical classes, but special emphasis was given to practical workshops in which participants had the opportunity to collaborate in sampling activities. These included: (i) factors that favour the development of HABs, (ii) design elements in monitoring in different countries, (iii) the identification of noxious or toxic algae from their waters; and a practical class on board the IMARPE boat (Sea Institute of Perú), in Bahía de Paracas, Pisco, and phytoplankton sample analysis in IMARPE- Pisco laboratory.

A common situation in developing countries is that a few experts, sometimes in quite remote places, have to deal with varying aspects related to the occurrence of harmful algae events. So, several participants from other institutes attended the course, from Piura University (North Perú), University of San Luis Gonzaga-Ica (South Perú), the Marine Institute of Perú (IMARPE), and Non-Governmental Organizations like the Huayuná Institute and the Association of Mariculturists of Pisco.

The course was given by Lic. Graciela Ferrari from Montevideo-Uruguay.

• Spain

VII IOC-AECI-IEO Course on Toxic Microalgae and Marine Biotoxins

The IOC-IEO Science and Communication Centre on Harmful Algae, organized the VII Course on Toxic Microalgae and Marine Biotoxins that was held at the Instituto Español de Oceanografía in Vigo, Spain, from the 6th to the 24th February. As in previous years, it was sponsored by the IOC, the Agencia Española de Cooperación Internacional (AECI) and the IEO.

The course focused on “Monitoring programmes on Toxic Phytoplankton and Marine Phycotoxins according to European Regulations”, and was intended for experts committed to the setting up or strengthening of their national or regional monitoring programmes on Harmful Marine Algae. 12 scientists from Latin America (Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico and Peru) and Magreb (Tunis) participated in the course.

Contents included a general section on monitoring programmes and two specific workshops to be chosen by the participants: “Taxonomy and Ecology” or “Determination of Marine Biotoxins”. It also included a sampling day on board the O.V. “J.M. Navaz” and the subsequent work at the laboratory with the samples taken to isolate and establish a culture.

Classes were given by experts from the IEO, Instituto de Investigaciones Mariñas, European Union Reference Laboratory on Marine Biotoxins, Sanidad Exterior de Vigo, Instituto Tecnolóxico para o Control do Medio Maríño, Centro de Investigacións Mariñas and ANFACO-CECOPESCA. Participants had the opportunity to attend both theoretical and practical lectures in these research and monitoring centres. They also visited the facilities of an association of mussel growers, a molluscs depuration plant and the national association of canned seafood.

In general, this course experience was very positive both for the students and the participating experts. Fruitful contacts have been establish that will continue in the future.
ISSHA President’s Corner

ISSHA WEBSITE UPDATE & 12TH INTERNATIONAL HA CONFERENCE

The ISSHA website (www.issha.org) has been upgraded and has a new look thanks to the efforts of Tracy Villareal (ISSHA Secretary) and Nina Lindholm (ISSHA Treasurer). Check it out and follow the link to the 12th International Conference on Harmful Algae which is just a few short months away (www.bi.ku.dk/hab) in 4-8 September 2006 in Copenhagen. This promises to be an exciting and productive meeting with some new activities including an auction and HAB Jam. If you would like to contribute something weird, wacky or wonderful to the auction please contact Gert Hansen (Gerth@bi.ku.dk). Per Hansen (PJHansen@bi.ku.dk) is interested in participants for a HAB Jam session, so don’t be shy about sharing your musical talents.

Coming deadlines for the 12th HAB Conference include
• 1 June 2006 for the end of early registration
• 31 July for the end of late registration.

One of the things that will be addressed at the ISSHA General Meeting during the conference is the venue for the 2010 meeting. I would like to request that individuals, labs or groups interested in hosting the 14th HAB meeting, please contact me (Pat.Tester@noaa.gov) and plan to give a short presentation to the membership prior to the vote. As you recall the 13th HAB Conference will be in 2008 in Hong Kong, China.

2006-2007 MEMBERSHIP DUES

As a reminder to all ISSHA members, your 2006-2007 dues are now payable to Nina Lundholm. Conference participants can pay at the time they register but if you are not planning on attending the 12th HAB Conference, renew your membership to keep your voting privileges for the next slate of ISSHA officer (2007).

Books and CDs

ISSHA with IOC has the honor of co-publishing an illustrated photo guide to the cyanobacteria authored by Gertrud Cronberg and Helene Annadotter. Hopefully this volume will be available in time for the 12th HA Conference. Watch for details on ISSHA’s website. Also, remember that The Physiological Ecology of Harmful Algal Blooms is available on CD-ROM from the website as well.

Have a good summer and I’ll see you in Copenhagen.

Warmest regards,
Pat Tester
ISSHA President

ISSHA AWARDS: CALL FOR NOMINATIONS

Current members of ISSHA are invited to submit nominations for the following awards:

The Yasumoto Lifetime Achievement Award

This award is offered in recognition of a long, and outstanding record of contribution to harmful algal research. Previous recipients: Dr. T. Yasumoto (2000), Dr. G.R. Hasle (2002), and Dr. T. Smayda (2002). Other senior scientists similarly honored by the harmful algal research community before ISSHA included Dr. L. Provasoli, Max Taylor, and Dr. E. Balech.

The Young Scientist Achievement Award

This award is offered in recognition of outstanding achievement in any aspect of harmful algal research by a scientist early in their career (i.e. within ten years of receiving their PhD). The award is intended for an exceptional or “break-through” contribution to an area of harmful algal research, rather than a cumulative record of achievement. Previous recipient: Dr. C. Scholin (2002).

Any ISSHA member may submit nominations for either achievement award, which should provide a complete, yet succinct description of the nominee’s contribution (not more than one page). Nominations should be sent by e-mail to Barrie Dale (barrie.dale@geo.uio.no), Chair of the Committee on Achievement Awards, to be received by 28 April 2006. It should be noted that ISSHA does not necessarily give achievement awards at every International HAB Conference. Nominations received by 28 April 2006, will be considered by the ISSHA Council, and eventual awards will be presented at the XII HAB Conference in Copenhagen, 4-8 September 2006.

B. Dale, Chair of the Committee on Achievement Awards
**Future events**

**JUNE 2006**

**TRAINING COURSE: PSP BY LC. AOAC METHOD 2005.6** - LAWRENCE et al.

June 19-21, 2006. Seattle, USA.

The AOAC International’s Marine and Freshwater Toxins Task Force is offering, for the first time, a Training Course for OMA 2005.6 - Paralytic Shellfish Poisoning Toxins (saxitoxins) in Shellfish - Prechromatographic, Oxidation and Liquid Chromatography with Fluorescence Detection. Instruction for this new course will be by Health Canada, Foods Research Division and will be held June 20-21, 2006, at Washington State DOH lab with Lawrence method orientation and overview on the morning of June 19, 2006 at the Ramada Inn, Seattle Univ. District North.

The course will emphasize critical aspects for success using this method and is the first in a series of courses addressing the Task Force / OMA level official methods.

Further information at: www.aaoac.org/marine_toxins/task_force.htm

**SEPTEMBER 2006**

**12th INTERNATIONAL CONFERENCE ON HARMFUL ALGAE**

September 4-8, 2006. Copenhagen, Denmark.

Call for submission of abstracts and registration form: February 1, 2006.

Deadlines:
- Abstracts reception: May 15, 2006
- Early registration: June 1, 2006
- Late registration: July 15, 2006

Further information can be found at: www.bi.ku.dk/hab/

**MARCH 2007**

**ICMSS07**

New Zealand is hosting the 6th International Conference Molluscan Shellfish Safety in Blenheim 18th-23rd March 2007. The conference is held every two years and brings together scientific, industry and regulatory people from all over the world. The conference agenda will allow the sharing of scientific research, management systems, debate on international trade issues and networking between stakeholders. More details can be found on www.nzfsa.govt.nz/icmss07.

**NEW ZEALAND 2007**

6TH INTERNATIONAL CONFERENCE MOLLUSCAN SHELLFISH SAFETY

**The other (far?) side of HAB's**

Dear potential HAB performer,
You are invited to participate in a very special evening.

As a part of the social programme for the 12th International Conference on Harmful Algae in Copenhagen 2006 we invite you to perform and entertain the Conference participants in an informal and cosy atmosphere on Tuesday 5 September.

All contributions are welcome! We expect the performances to be musical, poetic or “stand up”, but we are open to all contributions.

Looking forward to your response at pa@bioconsult.dk / PJHansen@bi.ku.dk, the sooner the better!

The Conference Organizers
www.issa.org

**HARMFUL ALGAE NEWS**

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