Harmful Algae News

An IOC Newsletter on Toxic Algae and Algal Blooms

No. 69 - February 2022 · https://hab.ioc-unesco.org/

The 19th (1st Virtual) International Conference on Harmful Algae hosted from Mexico

The 19th International Conference on Harmful Algae (19 ICHA), was held in a virtual format for the first time, from the 11th - 15th of October, 2021 in Mexico. The Conference was hosted by the academic institutions IPN-CICIMAR and CIBNOR. Christine Band Schmidt chaired the local organizing committee with the support of members of the Mexican Society for the Study of Harmful Algae (SOMEFAN).

Initially, the Conference was planned to be held in the beautiful city of La Paz, Mexico, in October 2020, but due to the COVID-19 pandemic, it was postponed for one year. Innocently, at that point we still believed the virus would be under control in a few months and that we could all get back to our normal academic lives. However, as we all know this did not happen, and many of us are still working at home and in strict quarantine. At the start of 2021, we thought a hybrid event was possible. We believed that at least some of the colleagues would manage to travel to La Paz. Still, reality reached us when we realized that many of us, including Mexican colleagues, would not be allowed to travel to an in-person conference. Facing these facts, we had no other option than to hold a 100% virtual conference. This solution came with another reality: our lack of experience in logistics and technical details for organising such a task. However, the ISSHA council took this challenge to heart. Under the excellent guidance of our past president Vera Trainer we started monthly meetings in 2021 to discuss all of the details we needed to consider. The staff from Intermeeting (our conference organizer) also participated actively in these meetings since they were also facing the same challenge. Good communication and these productive meetings were an excellent way of working: they got us all on the same page, and between us, we made this Conference work.

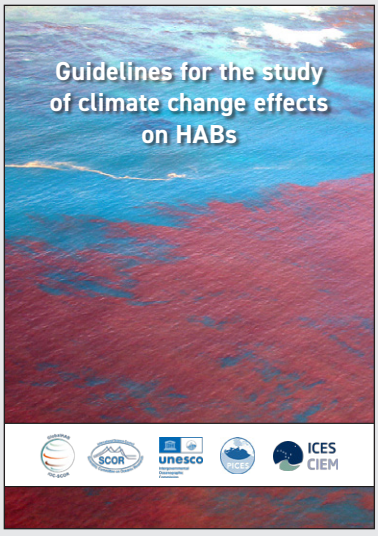
The 19th International Conference was the second ICHA meeting held in Latin America and the first hosted by Mexico. We had a total number of 804 participants from 53 countries. The maximum attendance in the different sessions ranged from 46 and 401 participants, most of the sessions had an average around 100 participants. As always, plenary talks and special sessions had the highest number of participants, all with more than 200 participants. To our surprise, the virtual format allowed colleagues who usually cannot attend ICHA conferences due to the travel

The Virtual Conference Centre

unesco

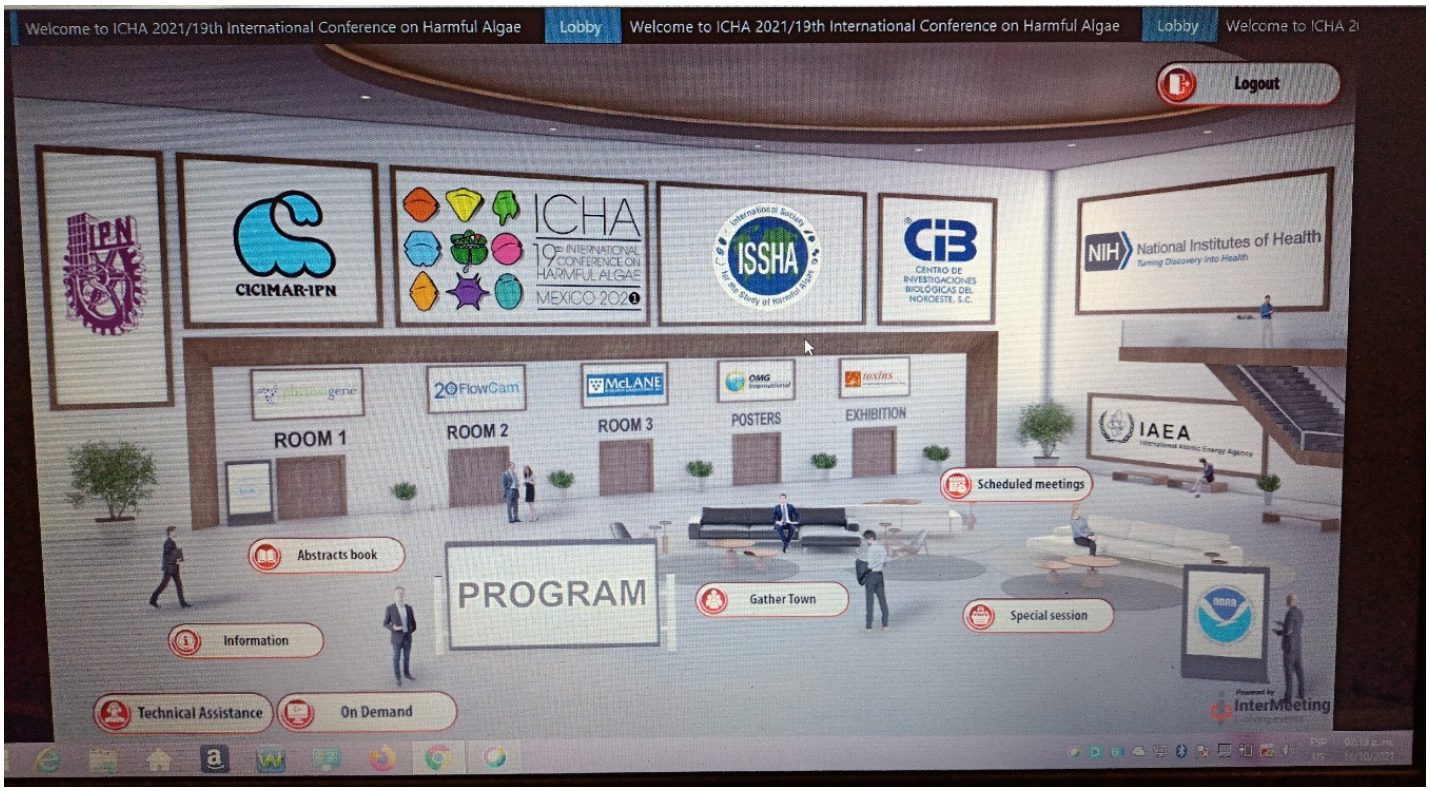
Intergovernmental Oceanographic Commission

Content



NEW BOOK!

See book content and free download at the new IOC website



Lobby of the virtual ICHA 2021

costs to attend the meeting. The Conference started with two pre-conference sessions of the Young Investigator Networking Session coordinated by Lorena Durán, Carlos Rodríguez, Philipp Hess, and Harry Nelson. Previously, Lorena Durán and Carlos Rodríguez interviewed outstanding harmful algae scientists and longtime ISSHA members: Allan Cembella, Barrie Dale, Beatriz Reguera, Christine Band, Donald Anderson, Gustaaf Hallegraeff, and Vera Trainer. These interviews are available at: *www.youtube.com/channel/UCAjwNmXU-I9hBeWUw91k5w*.

The conference program was divided into two time slots to cover all the world time zones in the best possible way. The diverse topics covered were also divided between both time windows. However, this was not possible for a few topics due to the low number of contributions. Each time slot had three parallel sessions. For the first time in an ICHA conference, we had to face the challenge of sending our recorded contributions a month before the start of the Conference in order to have the platform ready on time. Recording the presentations was complicated for many of us since obtaining research results during 2021 was slower than in other years. Fortunately, all participants managed to send scientifically sound and very nice presentations.

The program could be downloaded to mobile phones or computers, and it indicated the time of the presentations in each specific time zone. We had five

Christine Band-Schmidt, Chair of the Local Organizing Committee. Welcome from La Paz, Mexico, the conference venue that could not be…

The Mexican scientists comprising the Local Organizing Committee

special sessions held live on Zoom that covered breakthrough topics on harmful algae from marine and freshwater environments: "HAB Early Warning Systems Session", "Impacts of HABs on fish farms: Addressing industry and global insurance needs", "Control of Cyanobacterial Blooms", "NHABON-NE, a prototype node for a national HAB sensor network in the United States", and the presentation of the new book WHO guidance on cyanotoxins. All sessions were led by outstanding experts and held at noon Mexican time to facilitate participation from all time zones. We knew this was complicated since, for some, it was very early in the morning and for others very late at night, but this was the best solution we found. ISSHA members were fully engaged, chairing nine plenary talks, 245 oral presentations, 40 speed talks, and 110 poster presentations. They also evaluated student presentations, elected the Yasumoto lifetime achievement awardees, and held the new ISSHA committee elections. After each session, virtual interactions among participants and presenters was accessible through live questions and answers. Also, informal meetings were possible on the platform "Gather Town." All presentations were available on the conference platform until the 30th of November 2021, which gave us the opportunity for the first time to see the presentations we missed.

Unfortunately, the popular ISSHA auction and the traditional social events could not be held this time, but they are still on the list of activities for future ICHA conferences. We look forward to *in-person* ICHA conferences again; however, after the organization of this Conference, we have learned that combining *in-person* and virtual conferences could offer all ISSHA members a broader opportunity to participate in these meetings.

It is essential to mention that this Conference could not have been held without the support of our generous sponsors: FAO, IAEA, SCOR, Flowcam, NIH, NOAA, McLane, Phytotoxigene, GlobalHAB, MDPI Toxins, COSCyT, Sumilab, RedFAN, and SOMEFAN. We greatly appreciate their support; it allowed us, among other things, to cover the registration fees of students and scientists from under-represented countries, as well as to hold several of the special sessions.

Thank you all for making this another great ICHA conference and for helping us hold the flame of ISSHA during complicated times. We very much look forward to seeing you all in person again.

Author
Christine Band Schmidt, Local Organizing Committee Chair, Instituto Politécnico Nacional-Centro Interdisciplinario de Ciencias Marinas, La Paz, B.C.S. Mexico

Email corresponding author:
cjband@yahoo.com

Scientific Highlights of the 19th International Conference on Harmful Algae

Summarizing all of the science from a conference is a huge and perhaps impossible task, but once done, it can serve as a reference for the future. We had five exciting and intensive virtual conference days where all the latest information in our field was presented. Undoubtedly, we cannot include summaries from all talks, and hence this overview focuses on some of the highlights. It would have been impossible to write these highlights without the incredible help of the session chairs and co-chairs. We thank all of them for their support!

Word cloud as a summary

We start this overview with a word cloud, which is a visual representation of the titles of the abstracts presented in the conference and provides the most prominent terms where larger font size means more counts (Fig. 1). So, the Word Cloud captures the essence of the 19th International Conference on Harmful Algae in one picture!

During our meeting, the most common words and the main topics were *management*, *bloom, HABs* and *toxins*, for which the latter came in other terms as well, like *toxic* and *toxicity*. *Shellfish* is also a prominent word, similar in coverage as *harmful*. The word cloud reveals a focus on dinoflagellate species, specifically on the genera *Alexandrium*, *Gambierdiscus*, *Dinophysis*, *Karenia*, but diatom genera, such as *Pseudo-nitzschia,* and freshwater *cyanobacteria* with *Microcystis* as prominent group, are also mentioned. The way we are now measuring diversity is using *genetic* and *molecular characterization* tools, which clearly also found their way in the titles and abstracts of the meeting. Several other words appear that can be related to each other. For example, *management* of *coastal* areas where *monitoring* of *species* and *events* are taking place.

Plenary talks

The plenary talks covered various topics, ranging from the taxonomy, toxicity, ecology, and management of harmful algal blooms across freshwater and marine habitats around the world. We heard about lessons learned from 40 years of research on the physiology, toxicity, and ecology of *Dinophysis* (**Beatriz Reguera**), the phylogeny and taxonomy of unarmed dinoflagellates in the Kareniaceae family (**Mitsunori Iwataki**), and the impacts of climate change on the eco-physiology of the harmful cyanobacterium *Cylindrospermopsis* (**Michele Burford**). Some other talks emphasized the role of species interactions, including gene expression, biosynthesis, and toxicity of HABs in response to copepods (**Uwe John**), and the intracellular interactions between

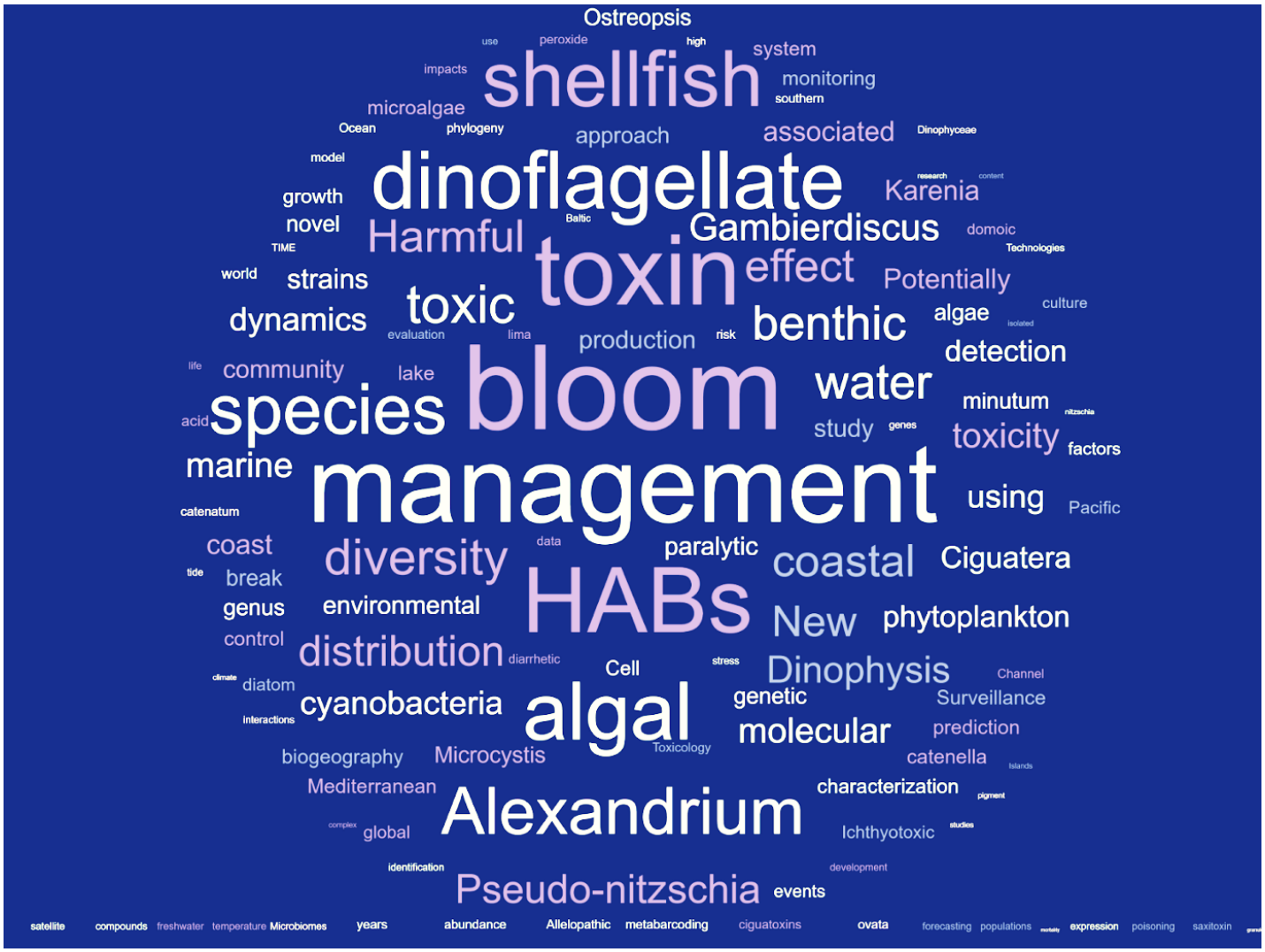


Fig. 1. Word cloud of the submitted titles and abstracts

predatorial protists, viruses, and bacteria (**Alexandra Worden**). Several plenary talks highlighted insights on HAB management, including emergent management strategies for monitoring, biotoxin detection, and human health risks associated with Ciguatera Poisoning (**Marie-Yasmine Dechraoui Bottein**); community partnerships in monitoring of HABs and shellfish toxins (**Christopher Whitehead**); examples about the importance of national networks to share HAB knowledge and promote communication, education and outreach (**Ernesto García-Mendoza**), and the consequences of eutrophication and extreme events on HABs and implications for salmon farming off the coast of Chile (**Jorge Mardones**).

1. Taxonomy - Who is out there?

A high diversity of benthic and epiphytic dinoflagellate flora in Australian tropical waters was reported, including *Coolia tropicalis*, *C. areolata*, *Ceratocorys malayensis*, *Prorocentrum lima* and *P. sculptile*, and also five new or currently undescribed species including one *Amphidinium*, one *Gymnodinium*, two *Ostreopsis*, and one *Prorocentrum* species (**Christopher Bolch**). A new species of the genus *Gertia* was described (**Kazuya Takahashi**), which is a unique peridinin-containing species in the Kareniaceae. In addition, there were several descriptions of new tropical dinoflagellates including two species of *Heterocapsa* (**Afiqah Hamilton Hanifah**), two species of *Alexandrium* (sub. gen. Gessnerium; **Nursyahida Abdullah**), a novel Suessiacean dinoflagellate (**Wai Mun Lum**) and new DNA sequence data for a diversity of gymnodinoid species (**Alexis Escarcega**).

Using cell immunolocalization techniques, cellular compartments that are involved in ciguatoxin (CTX) production and release in *Gambierdiscus australes* were identified. This finding suggests that the cell endomembrane system is involved in toxin production (**Giorgio Honsell**). Variations in toxin content and metabolomic profile were described for two genetically similar populations of *Gambierdiscus eccentricus* with different geographical origins along the coast of Brazil. Toxicity risks associated with *G. eccentricus* appear higher with warmer, clearer, and less turbulent coastal waters (**Luiz Mafra**). Moreover, CTX was shown to be retained for at least 3.3 months after fish are removed from a CTX source. This should be considered when developing models of CTX cascades between dinoflagellates and resident high site-fidelity fish and has implications for toxin analyses of fish that migrate away from CTX sources for long periods (**Clay Bennett**). A ciguatera poisoning survey along the west coast of Mexico showed that this illness is poorly documented and understood, particularly among medical professionals. This survey was the first step in developing effective means to inform physicians and the public (**Aramis Olivos-Ortiz**). Coupling of ecological and epidemiological data showed that the most significant respiratory impacts caused by *Ostreopsis* take place when blooms enter the late log phase, which is important information for protecting human health (**Elisa Berdalet**).

2. Distribution and diversity - Where are they?

There is no doubt about the high diversity and wide spread of HABs and toxins (many presentations) and molecular approaches reveal increasing diversity in HABs and toxin genes, but toxin genes and genotypes are not always related (**Cecilio Valadez-Cano**, **Emma Johansson**), and we are still asking ourselves if the frequency of HABs is increasing. A global monitoring metadatabase did reveal regional trends but reported no uniform global trend in HABs and increased occurrence could be linked to enhanced monitoring (**Gustaaf Hallegraeff**). In some specific cases, such as *Dinophysis*, a decadal distribution and associated shellfish toxins in the Regional Seas of Europe showed that while some subregions presented an increasing or decreasing trend for some species, no overall trend was detected at the genus level (**Philipp Hess**). A review of Ciguatera Poisoning (CP) global occurrences and trends was presented, which highlighted some major issues that currently hamper global efforts to capture the true burden of ciguatera. In this case, databases clearly reflect a significant weakness in data entry of CP events and *Gambierdiscus/Fukuyoa* spp. occurrence records, so data collated from scientific and grey literature are also important to understand global trends. The available time-series data on a limited number of CP endemic to countries/regions revealed that none of the studied areas showed an identical trend (**Mireille Chinain**). Longer time series on regional HABs were presented as well, which used ancient DNA and akinetes with over >9,000 and > 400 years records of dinoflagellates (Fig. 2) and cyanobacteria, respectively (**Linda Armbrecht**, **Steffaney Wood**).

3. Toxins and toxicology - What are they making?

An expansion of *Alexandrium pseudogonyaulax* in Northern European waters was shown, together with the global distribution of other known goniodomin (GD) producers. GD showed conversions and appropriate chromatographic techniques need to be applied in order to avoid artefacts. Preliminary results suggest that GD are not responsible for ichthyotoxicty of GD-producing species (**Bernd Krock**). A new data dependent LC-HRMS method was presented, which led to the discovery of several gymnodimine fatty acid esters and the detection of new gymnodimines through a backward analysis approach. Also, pinnatoxin G (PnTx-G) was for the first time detected in mussels in Sardinian coastal waters in 2016 (**Luciana Tartaglione**). The ichthyotoxicity of *Chattonella marina* was shown to depend on photosynthesis, especially related to the photoreaction stage (**Zhuoyun Xu**). Results from an experiment where *Daphnia magna* was exposed to cell free cyanobacterial spent medium from *Microcystis aeruginosa* highlighted that besides microcystin-LR, other secondary metabolites contribute to a negative impact of this cyanobacterium on *D. magna* survival and stress response (**Gorenka Bojadzija Savic**).

The phylogeny, lipid composition, pigment signature, ichthyotoxicity and growth of the fish-killing dinoflagellate *Heterosigma akashiwo* from Chilean Patagonia was highlighted. Further characterization of more Chilean isolates is needed to understand the precise ichthyotoxic mechanisms and environmental drivers that trigger massive bloom events in Chilean Patagonia (**Ana Flores**). A screening of the ichthyotoxic potency of *Karlodinium veneficum* strains against the rainbow trout fish gill cell line (RTgill-W1) showed that a

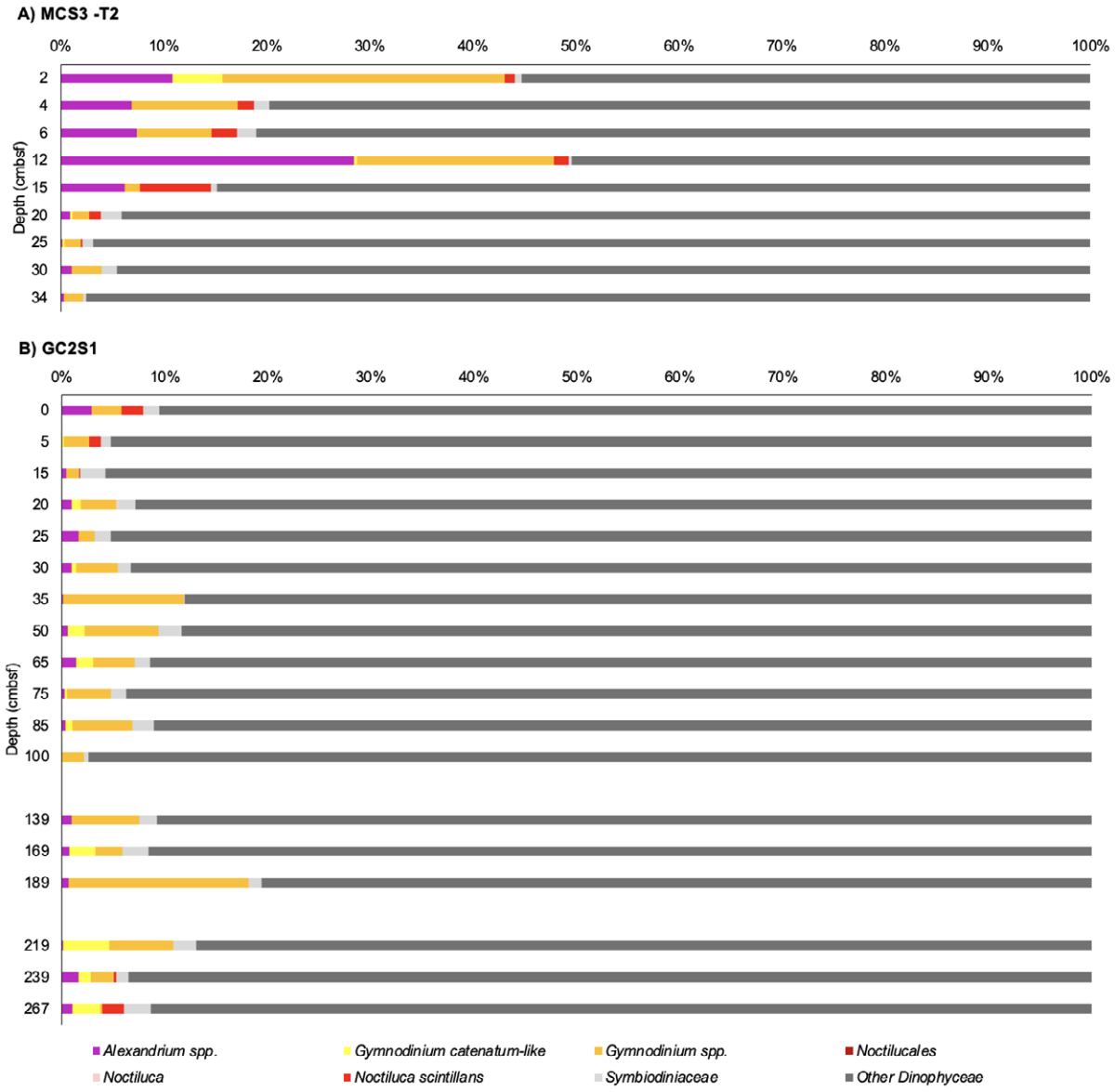


Fig. 2. Long-term history of HABs off Eastern Tasmania, Australia, using sedimentary DNA (courtesy of Linda Armbrecht)

French Mediterranean and a French Atlantic *K. veneficum* strain induced over 50% loss of cell viability. A high level of intra-specific variability of ichthyotoxic activity was observed among strains, and cytotoxicity of the intracellular and extracellular fractions were strain dependent. In general, the methanolic extracts were more cytotoxic than their corresponding extracts in the culture media (**Rima Beesso**). The emergent toxin pinnatoxin is shown to interact with nicotinic receptors (nAChRs), especially the muscle and neuronal (α7) subtypes, through binding and electrophysiological experiments. High-resolution 3D-imaging and in vitro competition studies on rat embryo sections revealed the specificity of [3H]-PnTx-G binding and its selectivity for muscle and neuronal nAChR subtypes (such as the α7 subtype). Results from the use of a human perfused cotyledon model and mass spectrometry analyses furthermore showed that PnTx-G crosses the human placental barrier, which indicates the potential adverse impact that exposure to pinnatoxins may have for human health (**Denis Servent**).

4. Species and interactions - What are they doing?

There were a number of presentations about *Alexandrium* life cycles including how cyst dormancy cycling controls *Alexandrium catenella* bloom termination in the Nauset Marsh estuary (**Michael Brosnahan**) and the degree day-based cyst germination rates and in situ germling production of this species (**Alexis Fischer**). These studies confirm with experimental data the usefulness of the approach (combining the effect of temperature and time) in life cycle experiments involving cyst germination, latitudinal differences, and the effect of global warming in phenological changes. The role of sexual reproduction, cyst dormancy cycling and germination rate in HAB development was also proved in the dinoflagellate *Alexandrium monilatum* in lower Chesapeake Bay (**Savana Mapes**). In the case of *Microcystis* blooms, the species was able to be successfully revived from the natural sediments in laboratory mesocosm studies (**Caitlin Romanis**), highlighting the success and pervasiveness of the genus stems from a meroplanktonic life cycle that features dense pelagic blooms in the summer and the benthic sedimentation of vegetative cells in the winter and the contrary. A cryopreservation method was developed that allows vegetative cells of thecate dinoflagellates (*Vulcanodinium rugosum*, *Alexandrium*

pacificum and *Durusdinium trenchii*) to be successfully frozen and revived with high viability (**Joseph Kihika**). This highlights the potential to have a microalgae diversity bank in the future.

Several presentations were focused on the intimate association between hosts and their microbiomes (**Christopher Gobler, Michèle Gourmelon,** Ávila **Andrés, Miguel Martinez-Mercado**) and parasite-host relation and genotype diversification for bloom species. **Antosiak** et al. showed how cyanophages infect freshwater *Aphanizomenon flos-aquae* attacking the carbon metabolism and in this way producing a decrease in the bacterial population. **Sassenhagen** et al. focused on infection experiments of diatoms obtained in spring bloom with eukaryotic unicellular parasites, where Chytridiomycota got the highest relative abundance after the diatom peak. The effect of four parasitoids acting on the dinoflagellates *Alexandrium pacificum* focusing on the parasitoid biological characteristics and possible bloom control was studied (**Boo Seong Jeon**). Overall, the studies presented interesting and cutting-edge approaches to the study of interactions between host and parasite or phages with implications for the physiology, ecology, and biological control of HABs. High diversity of parasitic chytrids in coastal areas affected by *Alexandrium* and *Ostreopsis* blooms was presented (**Alan Fernández Valero**). If these organisms are parasitoids or saprophytes is an open question, but there is no doubt that viruses, chytrids, and protists are impacting the physiology and ecology of HABs. Various examples of complex allelopathic interactions between HABs and competitors, grazers (Fig. 3) and parasites were also presented (**Marc Long, Sierra Cagle, Anna Junker-Olesen, Leyberth Fernández-Herrera**).

5. Management - What can we do?

Blooms of *Alexandrium catenella* were shown to not only contaminate shellfish in Alaskan waters with PSP toxins, but also commercially important fish (such as herring) which were found to contain PSP toxins with values several times above safety level. Highest concentrations were observed in the internal organs of the fish (**Steve Kibler**). At least 18 patients were hospitalized in Mirbat (Oman) in October 2020, after eating oysters (*Saccostrea cuccullata*) and mussels (*Perna perna*) that were

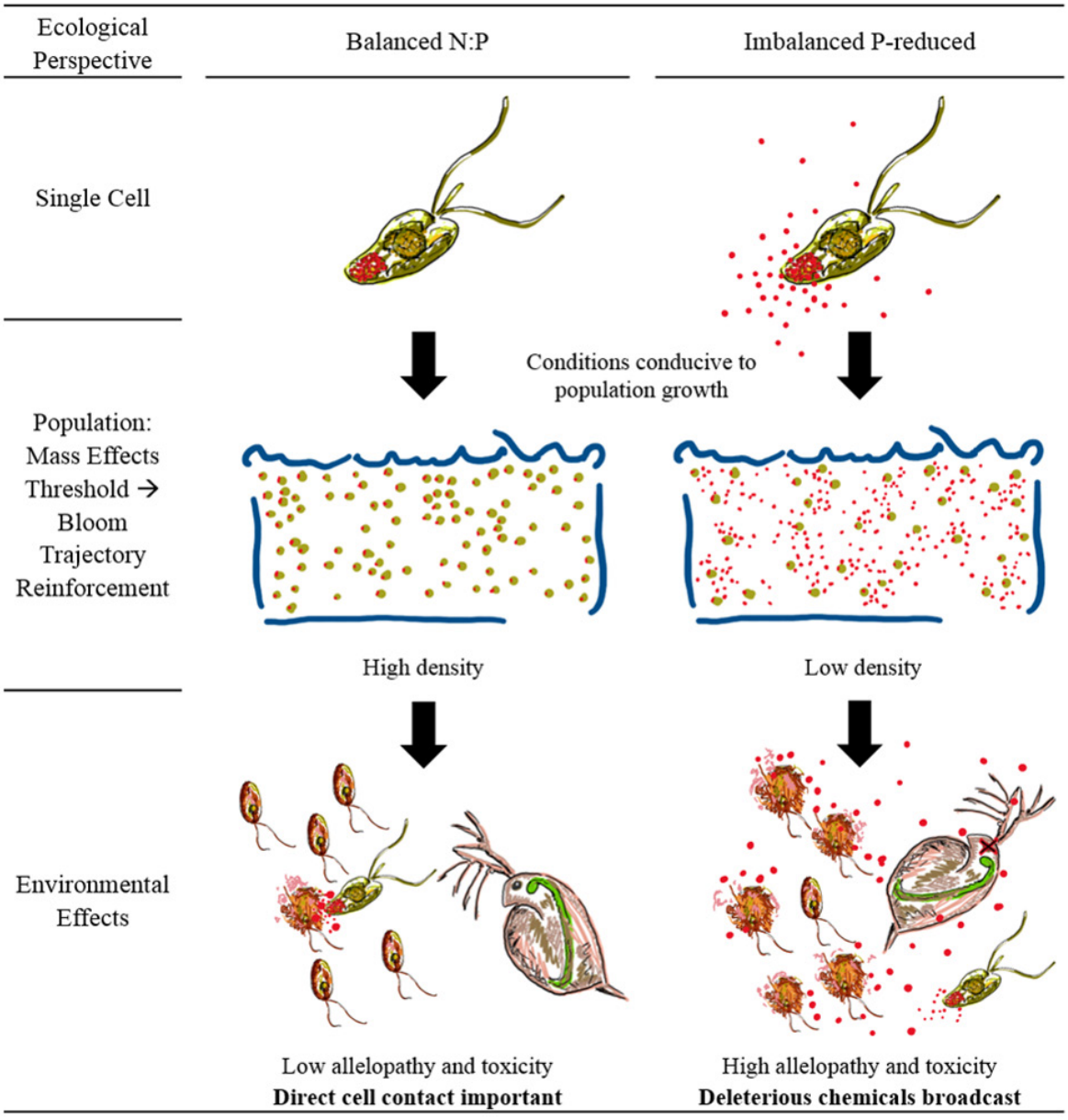


Fig. 3. Conceptual overview on the allelopathy driven interactions between Prymnesium parvum and Daphnia magna (courtesy of Sierra Cagle)

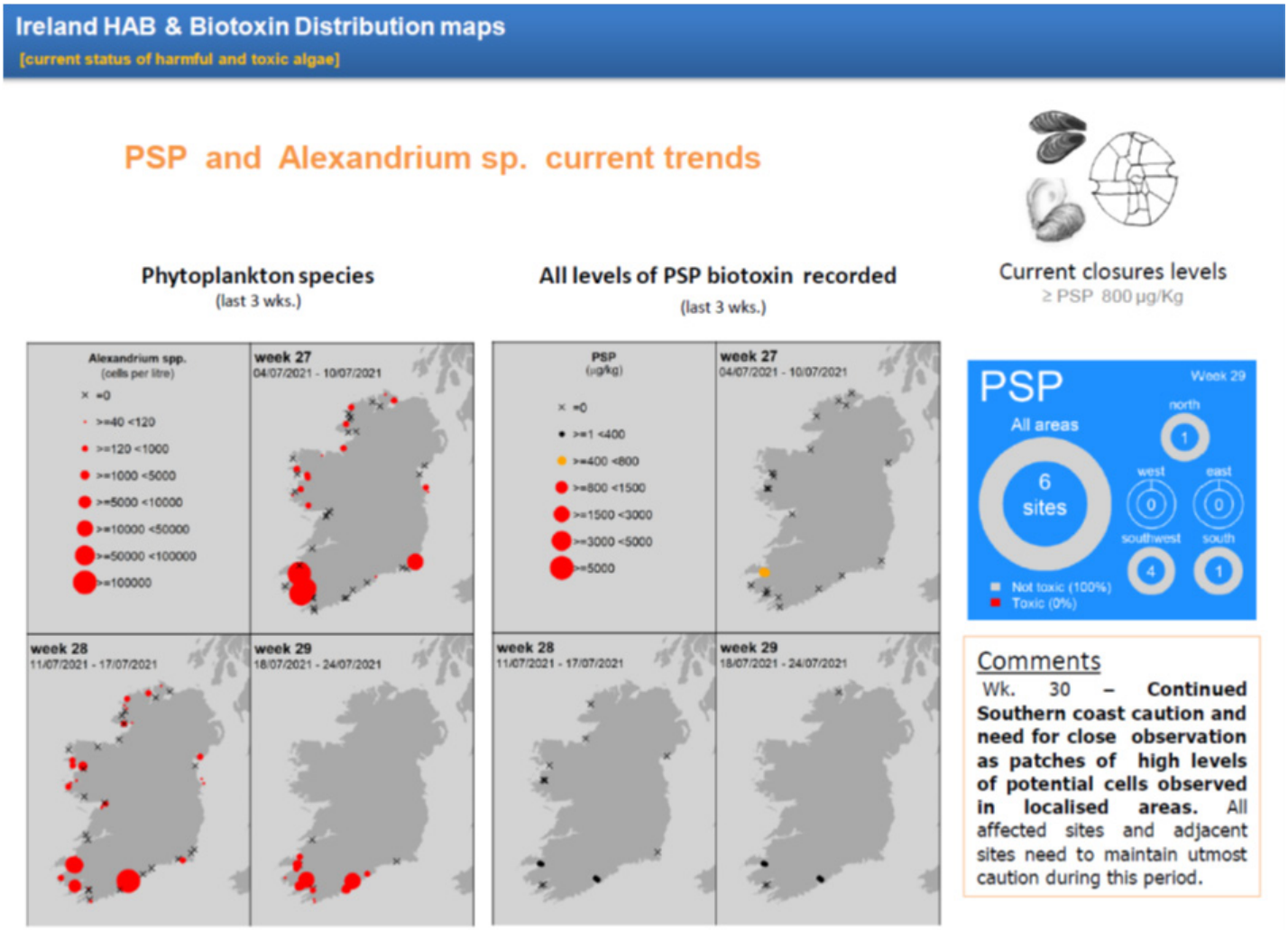


Fig. 4. Example from a weekly HAB bulletin reporting HAB events along the Irish coast (courtesy of Dave Clarke)

harvested along the coast. Analysis of seawater and oyster samples confirmed high levels of PSP toxins (**Margarita Fernández-Tejedor**). The design, implementation, and contents of HAB bulletins and early warning systems, including best practices guidelines on the development of weekly reports and forecasts, were reported for Scotland (**Callum Whyte**) and Ireland (**Dave Clarke**) (Fig. 4). Opportunities for improved forecasts of *Dinophysis* blooms in the Gulf of Mexico were shown with modelling approaches using temperature and prey size (**James Fiorendino**). More dedicated discussions took place in the special session on HAB Early Warning Systems chaired by **Aurelia Tubaro and, Marie-Yasmine Dechraoui-Bottein**.

Satellite surveillance of algal blooms in lakes and coastal waters was shown to have great potential for HAB monitoring. Particularly during COVID when human activity in the field was restricted, a new satellite *Copernicus Sentinel-2* with a pixel size of only 20 m, compared to 200 m in previously used satellites, increased the number of lakes that could be monitored for algal blooms many-fold (**Michelle Tomlinson**). For the assessment of the economic threat of diarrhetic shellfish poisoning (DSP), a financial-DSP-shellfish production model was developed for Scottish shellfish production. This model facilitated the investigation of the effect of DSP levels on shellfisheries closures and associated reductions in shellfish production in money equivalents. The model showed that a 1% increase in DSP toxin levels over the regulatory threshold reduced production by 1,080 tons, 15% of Scottish shellfish production (**Keith Davidson**).

A number of presentations showed that multi-sensor observations provide insights into bloom dynamics and raise new questions, especially about decoupling between cells, toxins, and shellfish. This was also highlighted in the special session on the national HAB sensor network of the United States (**Michael Brosnahan**). New developments were presented for the Imaging FlowCytobot, which showed continued operation for 6 months, handling over 60 samples a day covering size ranges of 5-150 µm (**Gregory Doucette**). Results from the Environmental Sample Processor (ESP) showed its applicability for high frequency sampling, with over 60 samples analyzed per deployment, with near real time monitoring of species and toxins using specific nucleic acid markers (**Nicolaus Adams**). Nanotube based electrochemical sensors were presented for rapid, sensitive and low cost analysis of HABs and their toxins (**Mònica Campàs**). Improved RNA detection of toxic species using magnetic microbeads and amperometric detection at screenprinted carbon electrodes were able to detect as low as five cells per liter for some species. This fast, simple, and cheap methodology can be integrated in easy-to-use portable systems (**Linda Medlin**).

Various mitigation strategies for harmful cyanobacterial blooms were presented. This included the payment

for lake ecosystem services and selection of environmental measures together with local farmers, which may reduce overall costs (**Claudia Wiegand**). A special session on the new WHO book 'Toxic cyanobacteria in water' provided advice and guidelines for the management of freshwater cyanobacterial blooms, including the need for system analysis to understand sources of nutrients (**Ingrid Chorus**). This was echoed in another special session on the control of cyanobacterial blooms, where various control strategies were also presented (**Petra Visser, Dedmer Van de Waal**). Such control methods may involve emergency methods, such as the use of hydrogen peroxide for selective suppression of harmful cyanobacteria. This was confirmed in a tropical reservoir, where cyanobacteria were suppressed and water quality improved (**Allan Santos**). Other talks described interaction of hydrogen peroxide with other factors, including reduced efficiency through interspecific protection by green algae (**Jef Huisman**), or limitation of these methods for high biomass blooms (**Eleni Keliri**). Another special session focused on the impacts of HABs on fish farms, and collaboration with the insurance industry was highlighted as an effective mitigation strategy to reduce losses due to planktonic fish-kills (**Mark Wells, Charles Trick**).

The last sessions of the meeting dealt with the wellness of coastal communities, where different experiences related to HAB impacts on society and its activities were shared. Dialogue and comprehension of the system were among the main approaches to achieve a better understanding of HABs and the importance of ocean communities. Different methods were presented including the use of social media and inclusive partnerships with participatory science for collaborative risk assessment (**Vera Trainer, Kazumi Wakita, Silvia Ramírez, Sergio Álvarez**).

Gracias amigos!

Authors
Dedmer Van de Waal, ISSHA Vicepresident, Netherlands Institute of Ecology (NIOO-KNAW), Droevendaalsesteeg 6708 PB, Netherlands

Esther Garcés, ISSHA Publication Committee Chair, Institut de Ciències del Mar (CSIC), P. Maritim de la Barceloneta, 37-49, 08003 Barcelona, Spain

Email corresponding authors:
d.vandewaal@nioo.knaw.nl
esther@icm.csic.es

Two local organizers and students from La Paz, B.C.S. Mexico at the closing of ICHA 2021 in La Paz. From left to right: Martín Yanez, Nadia Herrera, Christine Band, Ignacio Leyva (front center), Gema Villa and Leyberth Fernández.

Christine Band (the hostess) with her present, a beautiful carving from Prof Takayama, representing Gymnodinium catenatum, her main study topic. Present brought as a surprise to Christine by Nadia Herrera and other students of her.

ISSHA's Corner

The International Society for the Study of Harmful Algae (ISSHA) convened the 19th (1st Digital) International Conference on Harmful Algae (19 ICHA), held in La Paz, México, from 10th to 15th October 2021. The ISSHA Council had monthly meetings on-line between May and October to plan the Conference activities, Council elections, travel awards, achievement awards and the ISSHA General Assembly.

Travel Awards

There were applications for registration awards from countries all over the world to the ISSHA Travel Award Committee. Sponsors for the awards included the Scientific Committee for Ocean Research (SCOR), the National Oceanic and Atmospheric Administration (NOAA), the International Atomic Energy Agency (IAEA), the Food and Agriculture Organization (FAO) and private donations from ISSHA members. A total of 78 participants (including students, regular ISSHA members and managers) had their registration waived.

General Assembly, Council Elections, Closing Ceremony and Venue for the 20th ICHA 2023

The digital ISSHA General Assembly was held on Monday 11th October from 14:00 to 16:00.

The 13th ISSHA General Assembly was opened by President **Vera Trainer** and minutes from the previous assembly were approved. ISSHA members had voted on-line to renew Council officials and Executive members. Some had to step down after six years serving the Society in an executive position. Results of the elections were given by ISSHA Secretary. Officials stepping down were President **Vera Trainer** (USA), and Council members **Aurelia Tubaro** (Italy), **Ana Amorin** (Portugal), **Ingrid Sassenhagen** (France-Germany), **Keith Davidson** (UK) and **Marta Estrada** (Spain). Vera Trainer thanked all of them in the name of ISSHA for their years of service. Special thanks were given to **Marta Estrada**, council member and Chair of the Award Committee, for her years of dedication to the hard work of that committee, in particular coordinating all the student evaluations during the ICHA conferences to choose the Maureen Keller Awards. **Wayne Litaker** (USA) was the new elected ISSHA President.

Below is the new ISSHA Executive and Council for the 2021-2023 period (new members and old ones occupying new executive positions are in italics):

President
Wayne Litaker (USA)

Vice presidents
Po Teen Lim (Malaysia)
Dedmer Van de Waal (The Netherlands)
Secretary: Elin Lindehoff (Sweden)
Treasurer: Nina Lundholm (Denmark)
Past-president: Vera Trainer (USA)

Council Members
Philipp Hess (France)
Christine Band-Schmidt (Mexico)
Tim Harwood (New Zealand)
Luiz Mafra (Brazil)
Shauna Murray (Australia)
Esther Garcés (Spain)
Aifeng Li (China)
Marie-Yasmine Dechraoui Bottein (France)
Henrik Enevoldsen (Denmark)
Satoshi Nagai (Japan)
Ichiro Imai (Japan)
Rosa Figueroa (Spain)
Lorena Duran Riveroll (Mexico)
Ian Jenkinson (China, France)

Student Representative
Carolin Peter (Sweden)
Steffaney Wood (USA, student advisor)

The profiles of the ISSHA officers and council members can be found at *ISSHA Council*.

All details were planned in advance on line. Secret messengers, wearing COVID-proof masks, knocked on the door of the awardees at the right place and time. In this way, the prizes were awarded in real time and in direct connection with the digital venue of the event.

Linda Medlin was surprised at the time of the Yasumoto award announcement by her husband Dick Crawford with a Takayama carving of Alexandrium tamarense (mature cell and hatching cyst).

ISSHA Achievement Awards 2021

ISSHA 2021 Yasumoto Lifetime Achievement Award

Linda Medlin was the winner of the ISSHA 2021 Yasumoto Lifetime Achievement Award. The prize was in recognition for her outstanding contributions to the field of molecular biology applied to the study of marine phytoplankton diversity, monitoring of harmful algae and development of

molecular probes targeting HAB species (including their different life cycle stages), difficult to identify with conventional microscopy methods. More information about Linda's biography and publications can be found *here*.

Nomination letter of Linda Medlin to the ISSHA Council

"There are many, many reasons why Linda deserves this Award. Here we describe just a few. Linda has many accomplishments that qualify her for this prestigious award. Her long and productive scientific career has been crucial to the development of HAB research in Germany and Europe, and includes numerous contributions across the international community. Linda has a strong reputation in the fields of taxonomy and phylogeny. As an example, in a seminal 1988 paper with Mitchell Sogin, which has now been cited more than 2600 times, she published the 18S rRNA primers that are still used around the world for precise phylogenetic description of eukaryotic species and their evolutionary histories.

Linda, together with Chris Scholin, was instrumental in the development and application of species specific probes, FISH, and arrays for the rapid detection of HAB species. She initiated several workshops on FISH probe design and its application. Besides her German grants in HAB science and being the first and most productive scientist in German HAB science, she is also one of the foremost Euro-HAB scientists, as she led and initiated several successful HAB projects funded by the EU.

Besides being extraordinarily focused on her scientific career, she has always been known for her excitement and never-ending enthusiasm, and she is a great promotor of women in science! She has always fought for highly qualified women to make their careers based on their science and professional qualities. One thing that stands out is her dynamic role at HAB conferences; she was always active in keeping the scientific discussion running no matter what the topic. There was always the threat for the Chair to keep her controlled, allowing for no more than two brilliant questions, however Chairs, as well as the audience, benefitted by having Linda in the audience ensuring a high quality discussion among many different fields of HAB research. We have always been impressed by her deep and wide knowledge about nearly everything that matters in science!

Linda moved from the USA to the UK in 1983 and later to the AWI Germany (1991-2008). After being very creative and active during this period, she started in France (2009) at the CRNS Banuyls sur Mer.

She has been heavily involved in studies of the molecular ecology of many HAB species, establishing the backbone for studies on diatom phylogeny and leading several investigations on diatom evolution, and pushing genetic studies of a variety of toxic HAB species, often in collaboration with colleagues from all over the world. Many of Linda's PhD students and postdocs have moved into successful careers of their own, which has been a greater stimulus for plankton research in its own right. Her scientific productivity is exemplary, with about 200 peer-reviewed papers and more than 17,500 citations on a wide array of topics, in particular in the HAB field.

In summary, Linda Medlin is a creative and highly critical thinker with broad and significant impacts in HAB research, as well as major contributions to the educational aspects of our field. She has always been one of the most creative and productive members of our community, and has positively impacted the lives and careers of many people in HAB research. She eminently deserves the Yasumoto Award, and we therefore urge the Selection Committee to recognize her accomplishments and service with this honor. The timing would be perfect as Linda just recently retired from her long and impressive scientific career.

Nomination letter of Linda Medlin for the Yasumoto Lifetime Achievement Award 2021.

Presented by Marina Montresor, Stazione Zoologica Anton Dohrn, Napoli; supported and signed by 18 more senior HAB experts from Europe (11), North America (3), Asia (4) and Australia (1).

Sing Tung Teng with a carving of a tropical Synophysis from Prof Takayama.

The ISSHA 2021 Patrick Gentien Young Scientist Award

Sing Tung Teng received the *ISSHA 2021 Patrick Gentien Award* in recognition for his outstanding research about the diversity, systematics and erection of new diatoms species within the genus *Pseudo-nitzschia*. Species of this genus produce domoic acid, the neurotoxin responsible for the Amnesic Shellfish poisoning (ASP) syndrome.

The candidate nomination was presented by ISSHA members Profs Chui Pin Leaw (Malaysia), Stephen Bates (Canada) and 12 more senior scientists China (3), Japan (4), Malaysia (3), The Philippines (2) and Singapore (1).

Sing Tung began his research on the diversity of *Pseudo-nitzschia* species in the tropical Western Pacific region when he was working on his master degree. There was very little information about the causative organisms of ASP in this vast region. Four years after completing his PhD thesis under the supervision of Dr. Po Teen Lim, he had made impressive accomplishments. His sound knowledge of the taxonomy of pennate diatoms combined with his skills with molecular tools led him to the erection of several new species that included: *P. kodamae*, *P. sabit*, *P. bipertita, P. limii* (Teng et al. 2014, 2015, 2016). He also contributed substantially to the descriptions of *P. circumpora*, *P. batesiana*, *P. lundholmiae*, *P. fukuyoi*, *P. simulans*, *P. nanaoensis*, *P. chiniana*, *P. qiana*, *P. uniseriata*, and *P. yuensis*. He has been involved in the description of more than half (29 out of 53) the species of *Pseudo-nitzschia* in the tropical

waters of the South China Sea, a marginal sea of the Western Pacific (Teng et al. 2013, 2014).

Sing Tung Teng has demonstrated his training and dissemination skills by introducing a taxonomic grouping of *Pseudo-nitzschia* based on frustule morphology, which eventually developed into an interactive key to species identification and a database of *Pseudo-nitzschia* species.

Jose L. García-Corona

Maureen Keller Awards to best student presentations

Best student oral presentation **José Luís García-Corona,** from the European Institute for Marine Studies (Best, France) for his presentation about: "*In situ detection of the phycotoxin domoic acid in bivalve tissues: deciphering the subcellular mechanisms involved in its retention in the king scallop* Pecten maximus*"* co-authored by Caroline Fabioux, Hélène Hegaret, Elodie Fleury, Malwenn Lassudrie and Adeline Marzari.

José Luis is a marine biologist graduated with honors from the Autonomous University of Baja California Sur in 2014. He received the State Youth Award and the Science and Technology Medal in 2017 for his contributions to science development in Mexico. He obtained a Master of Science degree in aquaculture biotechnology from the Biological Research Center of the Northwest in 2018, where he developed alternatives to improve gonad maturation and oocyte quality in marine bivalves with commercial interest in Mexico. His research is mainly focused on the study of the physiological, functional, and genomic responses of marine bivalves with high-commercial interest that face changing environmental conditions. Since 2019, he is a doctoral researcher at the Laboratory of Marine Environmental Sciences of the European Institute of the Sea, in Brittany, France. His doctoral research, supervised by Dr. Caroline Fabioux and Dr. Helene Hegaret, aims to decipher the main physiological and molecular mechanisms involved in contamination and decontamination kinetics by domoic acid in *P. maximus*, comparing its response with other fast-DA depurator species.

Steffaney Wood

Oral Presentation, Honorable Mention was awarded to **Steffaney Wood**, from Scripps University, La Jolla (USA) for her presentation on: "*Cyanobacterial akinete distribution, viability, and toxin records in sediment archives from the Northern Baltic Sea*" co-authored by Anke Kremp, Henna Savela, Sultana Akter, Vesa-Pekka Vartti5, Saija Saarni and Sanna Suikkane.

Steffaney is a PhD student at Scripps Institution of Oceanography, UCSD in the Bradley Moore and Andrew Allen labs. She currently studies domoic acid biosynthesis in *Pseudo-nitzschia* diatoms.

Steffany began her career as a Fulbright-EDUFI Fellow at the Finnish Environment Institute Marine Research Centre, conducting research on harmful cyanobacteria blooms in the northern Baltic Sea. She continued with the same topic her MSc in in Microbiology and Microbial Biotechnology at the University of Helsinki, Finland and completed it in May 2020. The work presented at ICHA2021 was part of that research.

Steffaney is also a 2018 graduate of Davidson College where she majored in Environmental Studies with a Chemistry minor. During her time at Davidson, she was awarded a NOAA Hollings Undergraduate Scholarship and had the opportunity to work in Dr. Vera Trainer's lab. She credits this experience with fostering her interest in the ocean sciences and HAB research.

Taichi Ataka

Taichi Ataka, Kochi University, Japan, received the Maureen Keller student award for the best poster titled, "*Effect of adding macroalgal extracts on the growth of* Gambierdiscus scabrosus *and* G. silvae *isolated from Japan*", co-authored by Hiroshi Funaki, Haruo Yamaguchi, and Masao Adachi. Born in Japan, he pursued Bachelor of Agriculture and Marine Science at Kochi University and is pursuing his master's degree at Kochi University under the supervision of Prof. Masao Adachi. Koshi University is located in Shikoku Island, one of the warm-temperate areas in Japan where ciguatera poisoning (CP) has been sporadically reported. Taichi is very interested in clarifiying the mechanism of CP outbreaks in Japan including the clarification of the causative organisms and toxins for the poisonings in Japan. He is also interested in biological interactions in *Gambierdiscus* spp., in particular the interations between the macroalgae and *Gambierdiscus* and between *Gambierdiscus* and bacteria. He focused on the effect of fractions extracted from macroalgae on the growth of *Gambierdisus* in Japan and clarified that the addition of the extracts

from some species of Rhodophyta to the cultures significantly enhanced the growth of the two *Gambierdiscus* species that occur in Japan. He is now starting an investigation to clarify the effect of bacteria on *Gambierdiscus* growth in an attempt to elucidate the growth characteristics of *Gambierdiscus* in complex marine ecosystems.

Kochi University, Osone Kou 1519-19, Corpo IZUMI303 Nankoku City, Kochi Pr.

Marta Estrada with her presents (a Mexican "alebrije" carving and a conference T-shirt) with Elisa Berdalet as the local surprise messenger.

Teresa Silva

Teresa Silva was awarded with an honorary mention for her poster presentation, *"BHAB occurrence in the south coast of Madeira Island, Portugal: from 2018 to 2020"*, co-authored by Ana Amorim, Ana Sousa and Manfred Kaufmann. Teresa has a degree in Biology from the University of Aveiro and a MSc. in Molecular Biology and Genetics from the Faculty of Sciences of the University of Lisbon (UL), Portugal. In 2011, she joined the team of the Marine and Environmental Sciences Centre (MARE, UL) integrating several scientific projects focusing on phytoplankton ecology and chemotaxonomy. For her Masters degree', she investigated the physiological, toxin and genetic characteristics of *G. catenatum* populations occurring in the Portuguese mainland coast. She also studied the contribution of *G. catenatum* life cycle (cysts) in bloom dynamics. In 2016, she moved to Madeira Island (Portugal) to join the MPhytoLab (PI: Manfred Kaufmann), University of Madeira, where she is collaborating in several studies aiming to characterize the phytoplankton communities from seamounts and islands of the Macaronesian region, as well as to characterize the BHAB populations occurring in the Madeira Archipelago. She has participated in 8 national and international oceanographic expeditions in the Northeast Atlantic Ocean onboard research vessels. Currently, Teresa is working on her PhD project "Harmful benthic dinoflagellates from Madeira Archipelago in a changing ocean: ecology, systematics and toxicity" (Supervisors: Ana Amorim - University of Lisbon, Manfred Kaufmann - University of Madeira & Philipp Hess - IFREMER-France). Her main research goal is to characterize BHAB assemblages in coastal waters of Madeira Island, in order to assess risks and provide baseline information for the implementation of a sustainable monitoring.

Closing Ceremony

The closing ceremony was held on October 15th from 16:00 to 17:30. The Patrick Gentien (young scientist) and the best oral and poster presentations deserving the Maureen Keller awards were announced.

Ichiro Imai presented ongoing preparations and logistic information for those planning to attend the 20th ICHA conference to be held in Hiroshima, Japan, in 2023. The bid from Chile presented by **Leonardo Guzmán** to host the 21st ICHA 2025 in Punta Arenas, at the southern end of Magallanes, Chilean Patagonia, was chosen for the conference venue in 4 years' time. Finally, the new president **Wayne Litaker** expressed the gratitude of the ISSHA members and all participants in the 19th ICHA to the previous president, Vera Trainer and to the host of the Mexico conference, **Christine Band-Schmidt.** Both of them received a surprise messenger knocking at their office/home doors to give them a present in real time during the closing ceremony.

ISSHA President goodbye

Dear ISSHA members:
As many of you know, at the general glection held prior to the International Conference on Harmful Algae (ICHA2021) from 11-15 October 2021 (La Paz, Mexico), I stepped down as the president of the International Society for the Study of Harmful Algae (ISSHA), and welcomed your new president, Dr. Wayne Litaker. I want to take a moment to reflect on the accomplishments of the ISSHA Council during my tenure as president. First, we developed a new ISSHA logo and website. One of the motivations for the development of the new website, was the need to secure our membership list and all email addresses on a password protected site. The website also needed updating and a general refresh. The new ISSHA website has information on jobs, upcoming workshops, contains the *Proceedings of the past ICHA meetings*, and much, much more. Please take a moment to look at the *website* and feel free to contact your student representative, Carolin Peter (*carolin.peter@lnu.se*), with information about job postings, upcoming workshops, or other suggestions. Second, modest requests for funding for travel to international courses or workshops can be made by ISSHA members; students should take advantage of this opportunity. More details can be found *here*. Third, we have made sure that we acknowledge accomplished members of the ISSHA community, our *Trailblazers*. Any current ISSHA member can nominate one of their colleagues to become a Trailblazer by contacting any member of the current *ISSHA Council*.

Vera Trainer

Finally, but perhaps most importantly, we have adopted the policy that an early career scientist, an ISSHA student, will be nominated as a member of the Council. Our first ever student Council representative was Steffaney Wood (USA), who was recently replaced by Carolin Peter (Sweden). These students will receive support for their registration for the next ICHA conference as a thank you for their participation in Council meetings and assistance with website updates.

I was especially pleased by the attendance and enthusiasm shown by the entire ISSHA community at the first ever virtual ICHA meeting, chaired by Christine Band-Schmidt, with help from the local and international steering committees and the conference organizer, Intermeeting. We look forward to a hybrid (virtual and in-person) meeting style in 2023 in Hiroshima, Japan. As your past-president, I will continue to help the ISSHA Council and Wayne. I want to specifically thank Beatriz Reguera, now the past-past president of ISSHA for all of her help during my tenure. I couldn't have done it without you, Beatriz! I look forward to seeing all of you at future meetings! All the best for a healthy and productive 2022. Sincerely

Vera Trainer, ISSHA Past-President
National Marine Fisheries Service,
NOAA, Seattle, WA, USA

Hiroshima, Japan, voted as venue for the ICHA 2023

UNESCO Taxonomic Reference List of Harmful Micro Algae Editors Workshop 2021

On November 18-19th 2021, the nine thematic editors responsible for the UNESCO Taxonomic Reference List of Harmful Micro Algae and Henrik Enevoldsen from IOC-UNESCO gathered together in a hybrid format workshop, to discuss several aspects of this Register, which is a product of the IOC Harmful Algal Bloom (HAB) Program and the World Register of Marine Species (WoRMS). This took place in Hillerød, Denmark with a large physical attendance, supplemented with online attendance of a few editors and the WoRMS Data Management Team.

The nine thematic editors of the list are: Catharina Churro, Santiago Fraga, Mona Hoppenrath, Mitsunori Iwataki, Jacob Larsen, Nina Lundholm, Kenneth Mertens, Øjvind Moestrup and Adriana Zingone.

The goals of the workshop were: (1) discussing the future of the list, (2) discussing how the list can be improved, e.g. through the addition of new types of entries and links, (3) participating in a hands-on training on how to use the online editing platform provided by the WoRMS Data Management Team (DMT) which led to (4) bringing the list up-to-date and (5) nomination of a new chair of the HAB list.

The two days were very productive, both in terms of adding content to the Register, as well as discussing the way forward and the implementation of some initial decisions that were made during the meeting. A new addition to the website, currently under development will contain a list of species that cause non-toxic, harmful events.

During the meeting, the chairmanship of the group was passed on from Øjvind Moestrup, who has led the group for 24 years, to Nina Lundholm.

The organization of this workshop was supported by IOC UNESCO. The Data Management Team (DMT) is supported by LifeWatch Belgium, part of the E-Science European LifeWatch Infrastructure for Biodiversity and Ecosystem Research. LifeWatch is a virtual laboratory, which is used for different aspects of biodiversity research. The Species Information Backbone of LifeWatch aims at bringing together taxonomic and species-related data and at filling gaps in our knowledge.

Link for the list: *HAB Taxonomic Reference List*

Authors
Leen Vandepitte, World Register of Marine Species (WoRMs)

Nina Lundholm, University of Copenhagen, Denmark

Email:
leen.vandepitte@vliz.be
nlundholm@snm.ku.dk

Book Review: A Catalogue of Phytoplankton from the Mexican Central-Pacific (in Spanish)

Authors: Hernández-Becerril, D.U., Barón-Campis, S.A., Ceballos-Corona, J.G.A., Alonso-Rodríguez, R., Rincones-Reyes, K.M., Becerra-Reynoso, R.T. & Arce-Rocha, G. 2021. Catálogo de fitoplancton del Pacífico central mexicano. Cruceros "MareaR" (2009-2019). B/O "El Puma". Universidad Nacional Autónoma de México. 254 pp. ISBN 978-607-30-4944-3

Our knowledge of the marine phytoplankton shows a strong bias towards the coastal areas of temperate seas, where the monitoring programs are mainly focused on harmful species. Consequently, there is a deficit of information on the phytoplankton of warm seas, and especially from the open ocean. Within the context of climate change, where tropical species expand their ranges of distribution, the biodiversity in warm seas requires more attention. However, we often only have the option of consulting classical monographs for each major taxonomical group (diatoms, dinoflagellates, coccolithophorids, etc.) with illustrations based only on-line drawings, and the nomenclature and classification is not updated. Fortunately, this new book contributes to filling this deficit providing an essential guide for phytoplanktologists, not only working on warm regions, but also in temperate waters because numerous species have wide ranges of distribution.

This book compiles the observations from research cruises carried out during 10 consecutive years in the Mexican Pacific. The transects were perpendicular to the coast, allowing, in addition to the oceanic species, to show the diversity of neritic species (i.e., *Alexandrium*). The authors combine net and bottle samplings, as well as different preservation methods, which allows a wide representation of phytoplankton, from the rarest species, to species with special preservation requirements such as coccolithophorids. We will find an underestimation of some groups such as the naked dinoflagellates, but this is inevitable because these fragile organisms are lost or distorted with the sample preservation. The result is a complete guide for the identification of warm-water phytoplankton, and also essential for phytoplanktologists working on temperate waters showing a trend to the "tropicalization". The text and micrographs reported 501 taxa: 257 dinoflagellate species, 195 dinoflagellate species, 35 coccolithophorids, and other groups. This is a record of the current species composition present in the region, and an essential tool to evaluate the future changes of biodiversity. The organization of the text, especially the combination of photographs from both optical and electron microscopy arranged in plates grouping the taxa based on their similarity, with distinct views of the individuals, allow comparisons. The high number of species included is remarkable which guarantees that in most of the cases the user will find the information required.

Phytoplankton is characterized by its extraordinary diversity, and phytoplanktologists are used to consulting bibliography from different sources and languages. The use of Spanish as language is not a handicap, and the profusion of photographs makes it a useful guide for any user regardless the language. This is a textbook for the phytoplankton identification courses organized by the authors, and the extensive glossary solves for the Spanish-speaking community any doubts on translation of the terminology to describe morphological characters. This is an essential resource for any person interested in marine phytoplankton, and it should be in every library that serves students and researchers in marine biology. Future editions are expected with additional information, including updated new records, and it is expected an extension with records from the Gulf of Mexico and the Caribbean Sea. The authors are commended for this effort in compiling their observations that facilitate the work of the identification and the formation of the phytoplankton observers.

Such a comprehensive study is the result of a joint effort led by Prof. Hernández-Becerril, who together with Prof. Rosalba Alonso, have largely contributed to the formation of a high numbers of phytoplankton experts that participate as co-authors, and also students that collaborate in the samplings and observations. Prof. Hernández-Becerril is one of the largest contributors to the knowledge of the biodiversity of warm-water phytoplankton in recent decades. His expertise with numerous taxonomical innovations (*Neocalyptrella*, *Proboscia*, etc.) is reflected in the extraordinary representation of typical warm-water genera such as *Asteromphalus*, but also other genera with a complex distinction of the species such as *Coscinodiscus*, *Chaetoceros* or *Thalassiosira*. Thecate dinoflagellates are largely represented with genera *Protoperidinium* or *Tripos*, but it is remarkable the high diversity of Dinophysales, a group where Prof. Hernandez-Becerril and his co-workers have proposed numerous taxonomic innovations. An effort was made to differentiate species that that many of us would simply pooled as *Phalacroma* cf. *rotundatum*. Two new combinations of little known dinophysoid dinoflagellates, *Phalacroma tailisunii* comb. nov. and *P. cyrtoptera* comb. nov. are proposed.

Authors
Fernando Gómez, Department of Biological and Environmental Sciences and Technologies, University of Salento, Lecce, Italy

Email corresponding author:
fernando.gomez@fitoplancton.com

Forthcoming Events

2022 UN Ocean Conference

GLOBAL ONLINE STAKEHOLDER CONSULTATION
Inputs to concept papers of interactive dialogues
Contribute your inputs to the concept papers of the interactive dialogues for the 2022 UN Ocean Conference! (see back page)

Deadline: 21 February 2022
Contribute your inputs here: *bit.ly/EConsultationOceanConference2022*

1. GlobalHAB WS: Modeling and Prediction of Harmful Algal Blooms see *https://oceanexpert.org/event/2573*

2. The IOC HAB Programme has launced its new website, visit *https://hab.ioc-unesco.org/* *The IOC HAB website has undergone a long awaited rejuvenation. You will find the well know features and information as well a new tool to search all previous HAN issues*

SAVE THE DATE

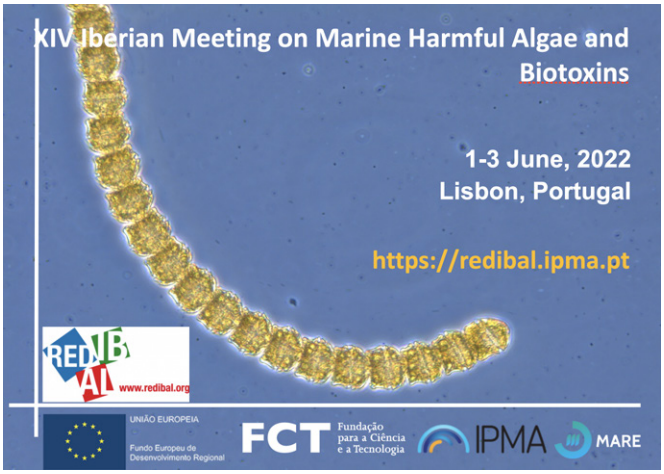
XIV Iberian Meeting on Marine Harmful Algae and Biotoxins

1-3 June 2022, Lisbon, Portugal

The XIV Iberian Meeting on Marine Harmful Algae and Biotoxins will be held in Lisbon, Portugal, from 1-3 June 2022, at the Magalhães Auditorium of the Portuguese Institute of Sea and Atmosphere (IPMA). This long-standing meeting (since 1990) brings together researchers and regulators to discuss all aspects of HABs, with emphasis on Iberia and the Macaronesia archipelagos (Canary Islands, Madeira, and Azores).
The meeting will focus on new challenges posed by HABs and related threats to human health, environment, and economy. Presentations will be organized in 5 main topics:

1. HABs and Climate change
2. Global and regional HAB trends: What have we learned from more than 30 years of monitoring in the Iberian Peninsula?
3. New challenges: new HAB species and emerging toxins
4. New approaches and technologies for detection of marine HABs and biotoxins in biological and environmental samples
5. Data science, management, and intelligent decision support systems.

Full information on the meeting *https://redibal.ipma.pt/*



GlobalHAB symposium on automated *in situ* observations of plankton

Aims and background

Harmful Algal Blooms (HABs) are affecting aquatic ecosystems and human societies.

Biotoxin-producing HABs species and species causing fish mortalities are problems for aquaculture, fisheries and also for tourism. HABs have caused mortality of marine mammals and pose a threat to human health. Ecosystem-disruptive HABs and highbiomass HABs may cause anoxia in deep water and some HABs result in a decrease in coastal water quality and fouling of beaches. High-frequency in situ observations of HABs and predators of HAB species are needed to be able to understand HAB dynamics, to develop predictive models of HABs and to produce well-founded warnings for HABs. In recent years, novel *in situ* instrumentation have been developed for automated high-frequency HAB detection in near-real time. In addition, instruments for observing grazers, i.e. microzooplankton and multicellular zooplankton have been developed. These instruments are now being adopted in research and piloted in monitoring programmes. Some of the instruments are becoming available commercially.

The aim of the symposium is to bring together experts on, and users of, automated in situ imaging systems to present methods, recent results and to share experiences.

Another aim is to carry out a comparison of results when analysing plankton communities quantitatively. Young scientists are particularly encouraged to attend the symposium and a special follow-on workshop for young scientists on data processing and report/article writing.

A hybrid symposium

Part of the symposium will be available on line. An evening session is planned for presentations made by participants not on-site. Presentations from the morning sessions will be recorded and published at an IOC web site, link to be communicated later. Training sessions in the afternoons will not be recorded, but instruction videos will be published on line.

Deadline for registration

15 March 2022

Pre symposium video conference

Virtual meeting Monday 30 May 2022 1600-1900 CET. All on site participants will be invited. Planning of hands-on training, intercomparison experiment etc.

Number of participants

On site max ~30 persons including lecturers

On line participation to the hybrid parts of the symposium max ~100 persons

Venue

Kristineberg Marine Research Station, Fiskebäckskil, Sweden

This is well-equipped field station is located at the mouth of the Gullmar fjord on the Swedish west coast, adjacent to the North Sea. More information is available at *https://www.gu.se/en/kristineberg*

Instruments

Imaging in flow instruments will be the main focus of the symposium. Instruments will include the Imaging FlowCytobot, the FlowCam and the CytoSense/Sub.

Symposium fee

The fee for on-site participation in the symposium includes costs for accommodation, food and bench fee. Cost per participant is 9000 SEK (approximately USD 1000 and €900).

Registration requires no payment. Payment can be made using credit card upon acceptance.

Financial support for participants

Funds are available for our sponsors to support a limited number of participants. Early career scientists can apply for support for travel costs and symposium fee when registering. The workshop coordinators will contact applicants to discuss potential funding prior to finalization of the participants.

Co-conveners

Bengt Karlson, SMHI, Sweden
Keith Davidson, SAMS, Oban, United Kingdom
Raphael Kudela, University of California, Santa Cruz, USA
Marina Montresor, Stazione Zoologica Anton Dohrn, Italy
Peter Tiselius, University of Gothenburg, Sweden
Lars Naustvoll, Institute of Marine Research, Norway
Elisa Berdalet, Institute of Marine Sciences (ICM-CSIC), Spain

Dates and deadlines

Deadline for registration 15 March 2022

Decision about participants early April 2022

Registration

Register through web forms at the SCOR web site: *https://www.gu.se/en/kristineberg*

www.neiwpcc.org/events/ushab11

#USHAB2022

LOGO CONTEST

For logo contest rules, please visit **our conference website.**

11TH U.S. SYMPOSIUM ON HARMFUL ALGAE

SAVE THE DATE: OCTOBER 23-28, 2022

We are pleased to announce that the 11th U.S. Symposium on Harmful Algae will be held on October 23-28, 2022 in Albany, New York, at the Hilton Albany. Local coordination is being led by NEIWPCC, New York State Department of Environmental Conservation, and U.S. Geological Survey with support from the U.S. National Office for Harmful Algal Blooms at the Woods Hole Oceanographic Institution.

The theme for the upcoming symposium is **"Science to Support Solutions from Shore to Shore"**. From freshwater to marine systems, the prevalence of harmful algal blooms (HABs) is a national environmental challenge, and solutions are needed. Celebrating this event in New York – the only state with Great Lake shorelines, marine coasts, and the diverse range of ecosystems between these extremes – creates an ideal setting to discuss progress in understanding algal bloom ecology and the solutions necessary to prevent and reduce HABs.

This conference is open to all registrants. Attendees will include national representatives and researchers from academia; state, federal, tribal, and municipal governments; the private sector; and watershed organizations.

Please **visit our conference website** periodically for the most current information on the conference.

NEIWPCC | NEW YORK STATE Department of Environmental Conservation | USGS science for a changing world | NOAA NCCOS

FOR GENERAL QUESTIONS ABOUT ATTENDING, SPONSORING, OR EXHIBITING AT THE 11TH U.S. SYMPOSIUM ON HARMFUL ALGAE, please contact Maryann Dugan @ **mdugan@neiwpcc.org**.

NEIWPCC COVID-19 POLICY

NEIWPCC is committed to providing an event that keeps all participants as safe as possible and promotes the well-being of our community. NEIWPCC requires all individuals who participate in the 11th U.S. Symposium on Harmful Algae to be fully vaccinated in order to attend. Please **visit our website** for more info.

Deadline
Deadline to submit material for HAN 70:
April 30, 2022

DOI: *https://doi.org/10.5281/zenodo.6136273*

Compiled and edited by
Beatriz Reguera, Centro Oceanográfico de Vigo, IEO (CSIC)
Subida a Radio Faro 50, 36390 Vigo, Spain
Tel: +34 986 492111
Fax: +34 986 498626
Email: *beatriz.reguera@ieo.es*
and
Eileen Bresnan, Marine Scotland, Victoria Road, Aberdeen AB1 9DB, Scotland
Tel.: +44 122 4876544
Fax: +44 1224295511
Email: *eileen.bresnan@gov.scot*

Project Coordinator
Henrik Enevoldsen, IOC Science and Communication Centre on Harmful Algae, University of Copenhagen, Universitetsparken 4, 2100 Copenhagen Ø, Denmark
Tel.: +45 23 26 02 46
E-mail: *h.enevoldsen@unesco.org*

Lay-out
Department of Biology, University of Copenhagen, Denmark

The publication of Harmful Algae News is sponsored by the Department of Biology, University of Copenhagen

ISSN 0020-7918