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**Sixteenth Session of the IOC-FAO Intergovernmental Panel**

**on Harmful Algal Blooms**

Rome, 27-29 March 2023

Item 4.7.3 of the Provisional Agenda

**REPORT OF THE IPHAB TASK TEAM ON A GLOBAL INTER-AGENCY CIGUATERA STRATEGY FOR IMPROVED RESEARCH AND MANAGEMENT**

**The report is structured according to the decision taken in 2021, reproduced below:**

**Agency actions taken during the inter-sessional period:**

* **Signature of the** **MoU between the WHO, IAEA, IOC-UNESCO and FAO** to develop and implement a partnership through an Interagency Global Ciguatera Strategy remains pending. *Discussions should be raised on the relevance of maintaining this activity.*
* **eWG on CTX (Codex CCFC 15)**: The objective of this electronic working group is to prepare a discussion paper on the development of a code of practice or guidelines to prevent or reduce ciguatera poisoning, building upon the work already undertaken by FAO in collaboration with IAEA and IOC-UNESCO. Several countries reviewed the draft of the discussion paper including, France, Spain, Brazil, Japan and New Zealand. The document has been sent to the Codex Secretariat and the Codex website will provide instructions on how to submit additional comments, if any. (fao.org/fileadmin/user\_upload/codexalimentarius/invitations/Ciguatera.pdf)
* **Ocean Decade Workshop in Denmark**: Chairs of IPHAB Task Teams attended a 2 days-meeting (26-27 April, Elsinor, Denmark) to prepare a Decade Action submission within the [UN Decade for Ocean Science for Sustainable Development (2021-2031).](https://oceandecade.org/) The specific objective was for IPHAB to formulate its strategy to demonstrate the role that HAB science could play in addressing the Ocean Decade Challenges. A proposal was drafted but is still awaiting validation and further submission
* **Joint FAO-IOC-IAEA Technical Guidance for the implementation of early warning systems for harmful algal blooms:** as part of the expert meetings that took place between October 2020 and January 2021 under the coordination of MY Bottein, a chapter (lead author: Pat Tester) describing EWS for benthic harmful algal species including *Gambierdiscus* spp. was produced.
* **Update on IAEA projects**: IAEA had launched a new 5-year coordinated research project (CRP) on “Nuclear Techniques to Support Risk Assessment of Biotoxins and Pathogen Detection in Food and Related Matrices (D52044)” in January 2022. This CRP on biological toxins (biotoxins) and foodborne pathogens has a One Health perspective and focus on analytical methods and generation of data on biotoxins such as cyanotoxins in fresh-/inland water and associated foods along the chain; biomarkers of these toxins and some targeted mycotoxins; toxins from pathogens; and pathogens of both zoonotic and nonzoonotic nature associated with outbreaks and national or international emergencies and concerns.   
  In this framework ECOSEA at Université Côte d’Azur, France has a project on “Linking marine biodiversity conservation, benthic harmful algal blooms and seafood safety”.

**Conferences**

* **The 19th International Conference on Harmful Algae**, was held for the first time in 100% virtual format from 11-15 October 2021 in Mexico. A total number of 804 participants from 53 countries “attended” the conference. The scientific program proposed 16 different sessions including a plenary lecture on “Ciguatera: current evidence and management options” (M-Y Dechraoui Bottein et al.) as well as a session on “Ciguatera and benthic HABs” in which 29 out of 40 talks directly related to the topic of ciguatera. In addition, a special session on “Early Warning Systems for HABs” chaired by -Y Bottein was also scheduled.
* **The 12th International Conference on Modern and Fossil Dinoflagelllates** (Dino12), was held from 4-8 July 2022 in Las Palmas de Gran Canaria with the support of the Canarian Observatory of Harmful Algae (COHAB) (University of Las Palmas de Gran Canaria). One workshop on sampling methods for benthic dinoflagellates was included in Dino12 activities. In particular, key points towards the standardization of monitoring protocols for *Gambierdiscus* were discussed.

NOTE: in 2025 the Third UN Ocean Conference, organized jointly by France and Costa Rica, will take place in Nice

**Meetings**

* **Defining an analytical strategy for ciguatera management in French Overseas Departments and Regions (ODRs)**: an eWG involving stakeholders from France, la Réunion, Guadeloupe, Martinique, French Guyana, and French Polynesia was constituted at the initiative of Ms. Virginie Hossen from the Direction Générale de l’Alimentation of the French Ministry of Agriculture and Food (also acting as one of the French delegates within the eWG on CTX of Codex CCFC). Discussions aimed at a better uniformization within ODRs of the strategy in terms of epidemiological surveillance, analytical approach for CTX detection (two-tiered approach using CBNA-N2a and LC-MS/MS) and communication/public awareness interventions.

**Ciguatera-projects funded independently from the agencies**

**EUROPE**

* *Update EuroCigua II project:* The EuroCigua II – project (EFSA co-funded) continues for 2 years (2022-2024) the work begun under the EuroCigua project. A kick-off meeting was held in Las Palmas de Gran Canaria in 2022 and a sampling strategy is currently being designed.
* *Projet EMERTOX*: The [EMERTOX-project (H2020 Marie-Curie RISE, 2018 - 2023)](https://www2.ciimar.up.pt/projects.php?id=57) has been prolonged for 18 months due to Covid-19 delays without additional funding. The project focuses on clarifying the distribution of HABs and their toxins from the Cape Verde Islands to the British Isles, including partners from Cape Verde, Morocco, Tunisia, Italy, Portugal, Spain, France and UK. Ifremer focuses on benthic dinoflagellates and has sampled 4 islands in the Cape Verde Archipelago. The distribution of *Ostreopsis* throughout the area, with France as the Northern distribution limit has been confirmed, while *Gambierdiscus* species have been identified from Cape Verde Islands into the Mediterranean Sea.
* Projet BENTOX: the Université Côte d’Azur and the European University ULYSSEUS, through IDEX Investissement d’Avenir, funded in 2023 several new initiatives on benthic HABs. These projects, initiated by ECOSEAS, are implemented in collaboration with laboratories in Italy and Cuba, and aim at linking, through a one-health approach, environmental health and food safety.

**PACIFIC Ocean**

* ***Update on the Pacific CIGUAWATCH Initiative****:* This initiative led by the Institut Louis Malardé (ILM) in French Polynesia aims at implementing a regional platform dedicated to online trainings and data sharing on ciguatera. Trainings on the epidemiological and environmental monitoring of ciguatera use various tools including video tutorial available via the e-platform <https://ciguawatch.ilm.pf> which was released in April 2022. Data thus collected will feed a shared database depicting the evolution of ciguatera status at the regional level. Awareness materials and a database on traditional knowledge of ciguatera tailor-made for each participating country are also being developed as part of this initiative. Three countries sponsored by FAO-SAP currently benefit from these capacity-building activities: Fiji, Samoa and Tonga, whereas Wallis and Futuna and New Caledonia have recently joined the program.
* ***Update on the CIGUAPROD Project (French Polynesia):***Various P-CTX standards and CTX-contaminated biological materials are now commercially available through the website <https://phyconesia.ilm.pf> hosted at ILM. Pure CTX standards (CTX1B, CTX3C, CTX3B and CTX4A) are readily available while biological reference materials are currently being tested for their homogeneity and stability.
* ***Update on the SafeFish Ciguatera strategy (Australia****):* In 2019,aCiguatera strategy adapted to the Australian scenario was officially launched by SafeFish, a local conglomerate of research and industry stakeholders. Although most of the prioritized actions were put on hold due to Covid crisis and lock-out, a survey was conducted to raise awareness of ciguatera poisoning among Australian recreational fishers, and its main outcomes presented at the 19th ICHA conference in La Paz, Mexico

(<https://issha.org/wp-content/uploads/2022/09/ICHA_Proceedings-with-DOI-12-Sept-22.pdf>).

**CARIBBEAN**

* CIGUAPIRE: a first identification by Elisabeth Mudge (NRCC, Halifax) of algal precursors of Caribbean CTX1 was reported at the US-HAB meeting in October 2022, publication of the finding has been submitted and is currently under review. If this is indeed confirmed, it will be a long-awaited major breakthrough for the Atlantic ciguatera research and management.
* CARMINA (2021-2026, AFD – cofounded): this French-led initiative in the Caribbean region (with 10 partners, and potentially IAEA support) has been formally started in 2022 and aims at describing the biodiversity, biogeography, toxicity and toxin-production of the genera *Gambierdiscus*, *Fukuyoa* and *Coolia* in the Caribbean region. The 3-day virtual kick-off meeting was held in May 2022 (see HAN-article) and equipment (microscopy, culturing and qPCR) has been put in place in Martinique. Sampling has started in several partner countries.
* New work led by the Institute of Marine and Environmental Technology, University of Maryland to quantifying the movements in 3D of the benthic dinoflagellate *Gambierdiscus* using Digital holographic microscopy (DHM). This project aims at providing information on swimming speed and interactions with other species, and better understanding of their reaction to stimuli, circadian rhythms, and different taxa, which in turn could be used to inform models and better guide direct sampling and management efforts.

**Highlights**

* PEPR ATLASEA: another French-funded initiative to sequence genomes of ca. 5000 French marine organisms from metropolitan France and overseas territories. These organisms may include possibly up to 10 dinoflagellates and *Gambierdiscus polynesiensis* has been put forward as a priority, provision of genetic material agreed by Institut Louis Malardé.
* Identification of the algal precursors of C-CTXs: see significant progress recently achieved by A. Robertson’s group and Canadian collaborators within the CIGUAPIRE program.

**Identified un-funded priority activities**

* **Development of a technical guidance document** **on Ciguatera risk management including** Sampling and Analysis Plan for the surveillance of *Gambierdiscus* as well as fish and fisheries CTX-contamination in the environment or fish markets & distribution chain.
  + **Preparation of a background document** to include components such as collection of CTX-fish contamination data and
  + **Expert meeting t**o include participation of fish and fisheries experts, bio-statisticians and ciguatera experts and managers from endemic areas in the Caribbean, Indian Ocean (e.g. from Mauritius, la Réunion and Seychelles), Atlantic (e.g. Canary Islands) and the Pacific (including team from SKLMP in Hong Kong working on ciguatera in the Kiribati; Cawthron Institute in NZ working in Cook and Tonga islands, Philippines…etc.).
  + **Technical document on Ciguatera risk management** based on algal and fish environmental surveillance, seafood surveillance and epidemiological surveillance. –this could build on FAO/WHO Expert meeting report, FAO E-learning and the above-mentioned planned workshop.
* **Funding is needed to support organization costs (consultant + Travel expenses of experts)**
* Establish a **Global Ciguatera Strategy website (via IOC et Henrik?)** to link to all activities and products of the Strategy. Possible contents:

Inter-agency MoU (formal engagement) and strategy: it is now urgent to get confirmation that the IOC-developed strategy is fully endorsed (or not) by all partner agencies

Documentation pertaining to the Strategy (Codex Alimentarius documents, IPHAB reports, FAO-WHO reports, data calls, etc.)

Existing CP-related literature and project databases (with regular updates)

Links to relevant e-learning platforms and websites (FAO e-learning course, ILM websites :[www.ciguatera.pf](http://www.ciguatera.pf); <https://ciguawatch.ilm.pf>) and databases: HAEDAT, OBIS, INFOSAN,

Centralized ciguatera alert system using information from HAEDAT, RASFF, INFOSAN or other platforms in place …

* **Funding is needed to support development costs (consultant)**

**Other project ideas**

* Preparation of fish tissue **reference material** and organize a **method validation exercise** (RBA, N2a and LC-MS/MS) as follow-up of action initiated by the IAEA (CRP and TC projects)
* Establish a solid **link between algal toxins and fish toxicity** for enhanced early surveillance and early warning of ciguatera (especially for CTXs from the Atlantic, and the Indian Ocean).
* Provide the support needed to countries to **maintain or further entries into the OBIS/HAEDAT databases** on worldwide occurrence reports of *Gambierdiscus*/*Fukuyoa* spp and ciguatera events and thus support the continuation of Global HAB status report production. As well INFOSAN is very little used to declare ciguatera cases, any action possible from WHO to support CP case report?
* Conduct **inter-laboratory exercise** on benthic HAB collection methods.