

SEAFDEC-MFRD Regional Training Course on Harmful Algal Bloom Monitoring and Studies

A regional training course (TC) on HAB Monitoring and Studies for the Southeast Asian participants was successfully completed from July 8-14, 2018. The TC took place at Bachok Marine Research Station (BMRS), Institute of Ocean and Earth Sciences (IOES), University of Malaya (UM), Kelantan, Malaysia, jointly organized by SEAFDEC-Marine Fisheries Research Department (MFRD), Agri-Food and Veterinary Authority of Singapore (AVA), IOES, UM and IOC/WESTPAC HAB Program. This is part of the continual efforts of SEAFDEC/MFRD on capacity building for HAB monitoring and research in the region. Twenty-one officers from 10 Southeast Asian countries attended the course: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Singapore and Vietnam (Fig. 1). This marked the second TC of a series of training courses by SEAFDEC-MFRD.

The training course was structured with the main goal to equip the relevant Southeast Asian fisheries personnel with the knowledge required to implement a systematic HAB monitoring program and to enhance expert capacity in HAB research and development.

In the welcome address of Dr. Po Teen Lim, Head of Bachok Marine Re-

search Station, IOES, UM and the Chair of this TC, he highlighted the seriousness of the impact from HABs and urgency to address the HAB issues in the region. He further emphasized the importance of enhancing capacity building in the effort to minimize the impact of HABs on seafood safety and sustainability of rapid growing mariculture industries. Mr. Soon Eong Yap, Chief of SEAFDEC/MFRD in his opening comments, read by the representative from SEAFDEC/MFRD extended their appreciation to IOES for hosting the event. He stressed that the agency will continue to implement programs to enhance capacity building, in particular relating to post-harvesting technology.

The 7-days training course has been designed to expose participants to several aspects of harmful algae monitoring and investigations, these included experience of microalgae culturing, maintenance, species identification and detection. The TC was divided into two sessions: "Techniques in Culturing and Maintenance of HAB species", and "Basic Techniques in Molecular Characterization and Detection of HAB Species". The course provided extensive hands-on components and in-depth lectures. Participants had the opportunity to

work in the laboratory, handling light and fluorescence microscopes, flow cytometry, and molecular instrumentation such as PCR and real-time qPCR.

An introductory lecture was given by Dr. Po Teen Lim on the overview of HABs and increasing trend of HAB events in the Southeast Asian region. He stressed the importance to have precise identification, especially in HABs monitoring, in order to advise mariculture operators on the correct preventive measures.

In this TC, Dr. Mitsunori Iwataki (Asian Natural Environmental Science Center, University of Tokyo) gave comprehensive lectures on the identification and taxonomy of unarmored dinoflagellates and raphidophytes. Prof. Dr. Haifeng Gu (Third Institute of Oceanography, China) presented two lectures on Introduction to Cysts and Azaspiracid producers in the region. The importance of cysts in the life cycles of dinoflagellates and their roles in bloom dynamics was discussed in his first lecture (Fig. 2). Lecture on harmful diatoms, including *Pseudo-nitzschia*, was given by Dr. Hong Chang Lim (Tunku Abdul Rahman University College). He explained the taxonomy requirement on a detailed assessment of the frustule structure under advanced electron microscopy in *Pseudo-nitzschia* identification. The use of the online tool "3i Interactive key and database on *Pseudo-nitzschia*" was demonstrated by Dr. Sing Tung Teng (University Malaysia



Fig. 1. Regional Training Course on Harmful Algal Bloom Monitoring and Studies, BMRS, IOES, University of Malaya, 8-14 July 2018.

Sarawak), who has developed several web-based interactive keys of harmful microalgal species [<http://dmitriev.speciesfile.org/key.asp?key=Bacillariales&ng=En&i=1&keyN=2>].

Following the lectures on specific topics, a series of extensive hands-on and lab activities were conducted. The participants learned various culturing techniques such as culture medium preparation, single-cell isolation (Fig. 3), cell counts for growth rate estimation. Species identification using light and fluorescence microscopy has been demonstrated and hands-on by the participants (Fig. 4). Later the application of flow-cytometry in assessing the changes in population dynamics during a bloom event was introduced by Dr. CP Leaw. Throughout the lab activities, participants managed to identify species from cultured specimens using both Imamura-Fukuyo (IF) and calcofluor white staining.

Molecular detection techniques including genomic DNA isolation, gene amplification by PCR were taught in this TC by Dr. Kieng Soon Hii (UM) and others. Dr. Leaw later demonstrated real-time quantitative PCR (qPCR) for rapid detection and quantification of harmful species. In the following session, a basic tutorial on phylogenetic analyses was delivered by Dr. HC Lim.

A lecture on PSP toxin and the detection methods was delivered by Dr. PT Lim. In this session, an ELISA kit for PSP toxin detection developed by Nissui Pharmaceutical was introduced and demonstrated to participants during the TC.

The TC was ended with a discussion session, where Dr. Iwataki, the Project Leader of IOC/WESTPAC-HAB briefed the participants on the regional activities in the Western Pacific region. He also encouraged participants to strengthen the existing networking and collaboration. He pledged to continue supporting HABs activities (seminars, training courses) through expertise and reference materials in the region. The TC was finally closed by the representative from SEAFDEC, Mr. Yihang Ong, expressing his sincere thanks to IOES, IOC WESTPAC for making the TC a success.

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Fig. 2. Question and answer session with the facilitators, Prof. Dr. Haifeng Gu and Dr. Chui Pin Leaw.



Fig. 3. Participants actively involved in single-cell isolation.



Fig. 4. Participants were exposed to various microscopic techniques in species identification; a participant from Thailand using a fluorescence microscope.