



WESTPAC Project MARINE TOXINS AND SEAFOOD SAFETY (MTSS)

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➤ CHALLENGES

- Expanding of seafood poisonings in the region, incl. unknown/new toxins;
- Almost of all member states have not enough capacity and human resource to identify causative toxins (excepted Japan, HongKong and Viet Nam);
- Need of updating on occurrence of marine toxins in the region for strategy to minimize their risk to the public health.

Objectives

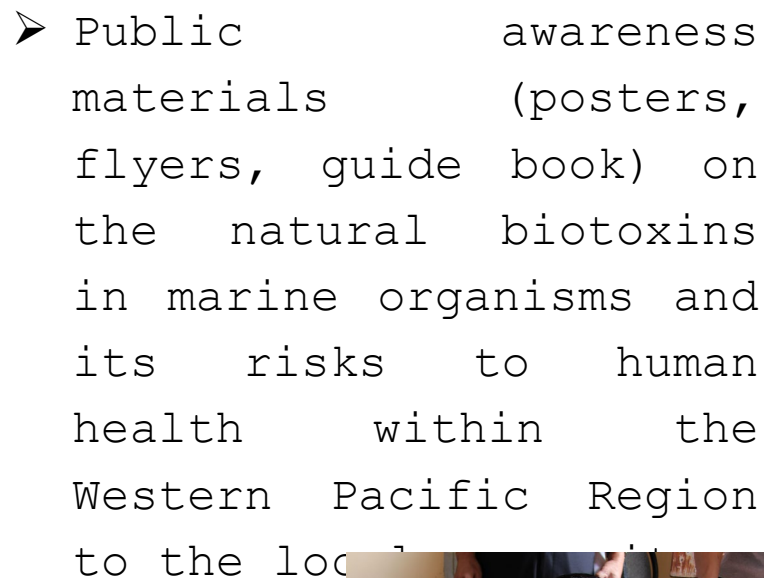


GENERAL OBJECTIVE

To address need from WESTPAC member states for better understanding on occurrence of marine toxins related to seafood poisoning in the region to serve a strategy on seafood security to minimize the risk of seafood poisoning to the public health.

Objective Assessment of regional status on occurrence of marine toxins related to seafood poisonings.

Since its establishment



➤ The cooperation and conduct joint studies on marine toxin research and seafood safety among WESTPAC scientists, institutions and countries using

- The capacity in the region for marine toxin detection, identification and analysis, through the development and operation of



Major activities, outputs & outcomes



Major activities (2020–2022)

- Supporting in identification of causative marine biotoxins causing food poisoning in member states (Malaysia, Vietnam);
- Updating occurrence of marine toxins and seafood poisonings in the region

Outputs & Outcomes

- Scientific publication on a causative toxins in seafood poisonings in Malaysia, Vietnam;
- Better understanding on marine toxins' occurrence and their impact in the region.

Fisheries Science (2020) 86:181–186
<https://doi.org/10.1007/s12562-019-01375-3>

ORIGINAL ARTICLE

Occurrence of tetrodotoxin in three *Nassarius* gastropod species in Khanh Hoa Province, Vietnam

Ha Viet Dao¹ · Ky Xuan Pham¹ · Ben Xuan Hoang¹ · Masato Tanioka² · Ryuichi Watanabe³ · Toshiyuki Suzuki³

Received: 5 August 2019 / Accepted: 10 October 2019 / Published online: 12 November 2019
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Abstract

Neurotoxic poisonings with fatal symptoms caused by consumption of *Nassarius* gastropods have been reported in Vietnam but the causative toxins have not been confirmed. In the present study, *Nassarius conoidalis*, *N. glans* and *N. pullus*, which are considered to be common causative species, were collected in Khanh Hoa province, Vietnam in May 2016 for toxin analysis using LC/MS/MS. The results confirmed that TTX is a dominant toxin in these gastropods. Among them, *N. glans* exhibited the highest toxicity (412.7 ± 107.3 MU/g), followed by *N. conoidalis* (144.8 ± 82.0 MU/g) and *N. pullus* (19.6 ± 9.8 MU/g). This is the first report confirming TTX in these species. All specimens in this study were highly toxic, indicating that the frequency of toxic specimens of the three *Nassarius* species is extremely high. Further, their toxicities were all beyond the

Fisheries Science
<https://doi.org/10.1007/s12562-022-01638-6>

ORIGINAL ARTICLE

Ciguatera toxin in moray eels raising the risk for seafood safety in Viet Nam

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Received: 31 May 2022 / Accepted: 31 August 2022
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Abstract

Recently, suspected ciguatera fish poisoning (CFP) cases caused by the consumption of moray eels, popular seafood for locals and tourists, have been reported in Viet Nam. However, little is known about ciguatera toxins (CTXs) in these marine fish. In May 2020, 119 specimens of six moray eel species were collected for CTX detection from Ly Son Island (site 1), Ninh Hai Coast (site 2), Phu Quy Island (site 3), and Spratly Islands (site 4), where suspected CFP from moray eel consumption have occurred. CTX-1B was detected by liquid chromatography–mass spectrometry (LC/MS) analysis in 12 specimens belonging to four *Gymnothorax* species: (*G. fimbriatus*, *G. flavimarginatus*, *G. javanicus*, and *G. undulatus*), accounting for about 10% of the total specimens. Remarkably, CTX-1B levels detected in all toxic specimens were beyond the threshold of 10 ng/g CTX-1B equivalent. The highest occurrence was observed at site 4 (15.6%) ($n=45$), followed by site 1 (10.0%) ($n=40$) and site 2 (6.3%) ($n=16$); whereas no CTX-1B was detected in any specimens ($n=18$) from site 3. These results

an Open Access Journal by MDPI

Identification of Fish Species and Toxins Implicated in a Snapper Food Poisoning Event in Sabah, Malaysia, 2017

Ha Viet Dao; Aya Uesugi; Hajime Uchida; Ryuichi Watanabe; Ryoji Matsushima; Zhen Fei Lim; Steffiana J. Jipanin; Ky Xuan Pham; Minh-Thu Phan; Chui Pin Leaw; Po Teen Lim; Toshiyuki Suzuki

Toxins 2021, Volume 13, Issue 9, 657

At least 3 scientific papers pub

Timeframe & Objectives



Objectives

1. Regional Status on marine biotoxin occurrence, effects, and research analysis
2. Develop research capacity for Ciguatoxin, an emerging seafood safety concern, for seafood safety
3. Development of the RTRC and provision of services to other countries (trainings, joint research, and technical analysis)

Timeframe

Apr. 2023– Apr. 2027
(04 years)

Expected outputs, or outcomes

- 1: Scientific publications, media news on occurrence of marine toxins corresponding to seafood poisoning...
- 2: Practical protocols for sampling, identification and analysis of CTX; skilled persons who can work on toxin analysis
- 3: Service and supporting in identification of causative toxins of seafood poisonings in member states; shared working environment on marine toxins

Planned activities

May 2023 – April 2025



				Funding Required		Remark
Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources	
1. Co-field research on "Sampling and reservation method to analyse ciguatoxin"	To strengthen capacity on scientific sampling toxic benthic organisms	<ul style="list-style-type: none"> - A practical protocol for scientific sampling of toxic benthic organisms; - 5-10 trained persons who can take sampling in efficient way; - Scientific sampling skill for toxic benthic organisms is improved. 	Sept. 2023/Apr. 2024 Vietnam	30 K USD	10 K USD (IO, VN)	Delayed til April 2025
2. Expert sending for "Verification method to analyze CTX by LCMS"	To strengthen capacity on toxin analysis	<ul style="list-style-type: none"> - A practical protocol for CTX analysis; - 02 trained persons who can work on CTX confirmation - Scientific method for toxin study is improved 	June/Sept . 2023, HongKong/ Japan		5 K USD (IO, VN)	Done
3. Evaluation of RTRC	Providing/sharing working condition marine	- Regional serving on TTX, STX and CTX analysis and research;	2023 IO, Vietnam	5 K USD	2 K USD (IO, VN)	Done

Major activities, outputs & outcomes



Latest accomplishment, particular those during 2024 to now

Major activities

- Activity 1. Screening on CTX and TTX in common marine animals in VN and others member states (if possible)
- Activity 2. CTX and TTX distribution in marine ecological system
- Activity 3. Identification of causative species and responsible toxin implicated to seafood poisonings (if there is)

Outputs & Outcomes

- Output 1. Specimen collection of potential toxic species (gastropod, crab/horseshoe crab and fish)
- Output 2. Scientific publications, media news, website information on occurrence of marine toxins related to seafood poisoning
- Output 3. Implicated species and toxin (s) causing seafood poisonings

Timeframe

Project start year: 2024

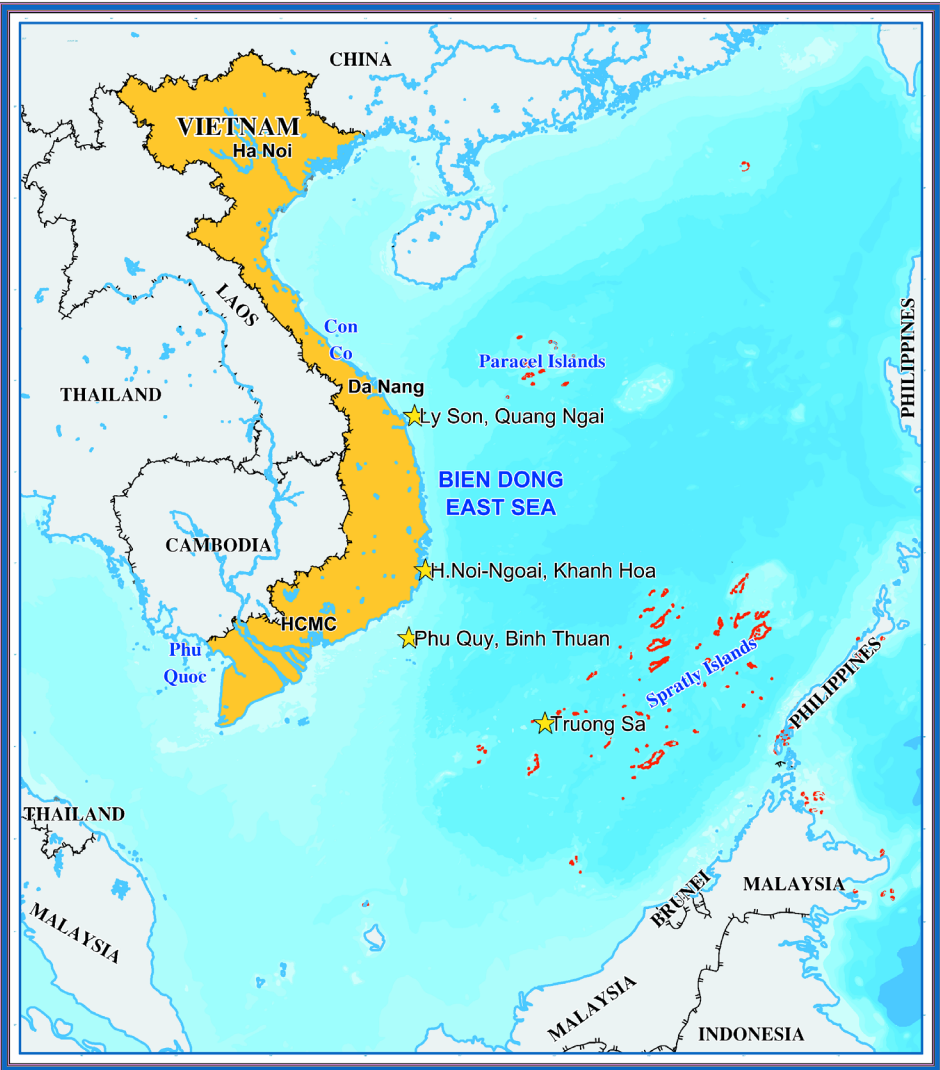
Major activities, outputs & outcomes

During 2024 to now



Major activities

- Activity 1. Survey on the distribution of potential marine poisonous animals
- Activity 2. Identification of CTXs and TTXs in marine animals in VN
- Activity 3. Identification of causative species and responsible toxin implicated to seafood



Species	Number of specimens			
	Khanh Hoa	Ly Son Islands	Phu Quy Island	Grand Total
Reef fish				
<i>Scarus ghobban</i>		3	3	6
<i>Scarus rivulatus</i>			4	4
<i>Siganus guttatus</i>		6	2	8
<i>Siganus virgatus</i>		6	3	9
<i>Torquigener pallimaculatus</i>			3	3
<i>Arothron caeruleopunctatus</i>			2	2
<i>Arothron hispidus</i>		9	4	13
<i>Arothron mappa</i>			1	1
<i>Arothron stellatus</i>		2	1	3
<i>Diodon holocanthus</i>		9	2	11
<i>Diodon hystrix</i>		3		3
<i>Diodon liturosus</i>		2	1	3
<i>Lutjanus argentimaculatus</i>	1			1
<i>Lutjanus bohar</i>	2		3	5
<i>Lagocephalus sceleratus</i>			1	1
Moray eel				
<i>Echidna polyzona</i>			2	2
<i>Enchelycore schismatorhynchus</i>		1		1
<i>Gymnothorax fimbriatus</i>			1	1
<i>Gymnothorax flavimarginatus</i>	1		1	2
<i>Gymnothorax hepaticus</i>		1		1
<i>Gymnothorax isingteena</i>		2		2
<i>Gymnothorax undulatus</i>		1	1	2
Crab				
<i>Atergastis floridus</i>		2	5	7
<i>Daldorfia horrida</i>		2		2
<i>Zosimus aeneus</i>		4	3	7
<i>Etisus</i> sp.			1	1
Snail				
<i>Nassarius papillosus</i>		32		32
Grand Total	4	85	44	126

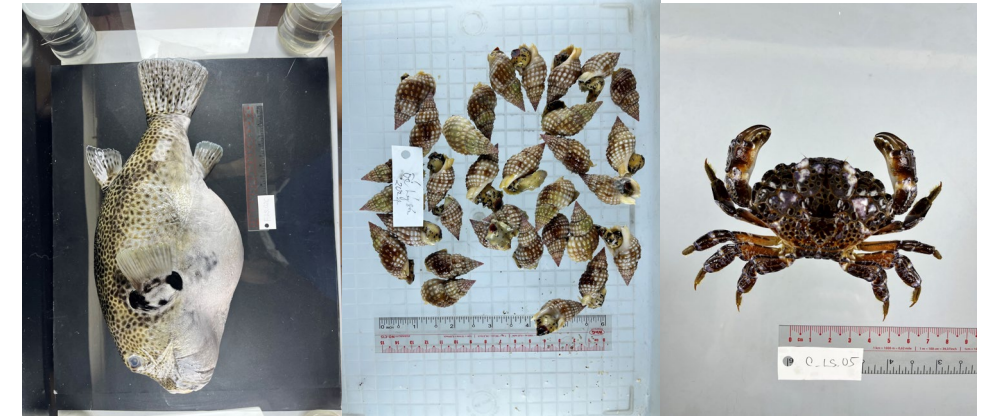
Major activities, outputs & outcomes

During 2024 to now



Outputs & Outcomes

- Output 1. Specimen collection of potential toxic species (gastropod, crab/horseshoe crab and fish).
- Output 2. List of marine poisonous animals in VN and member states.
- Output 3. 02 manuscripts are under preparation.



Problems encountered & recommended actions



Problems encountered

- Problem 1. Lack of personal resource, who are interested on topic in some member states;
- Problem 2. Not enough attention from local government;
- Problem 3. short-term project with limited budget

Recommended actions

- Action 1. Seeking for active persons from member states (now Korea and HongKong China joined);
- Action 2. Trying to get involvement from stakeholders;
- Action 3. Trying to use budget from member states' gov. under umbrella of national scientific project (VN successes, HK is trying)

Strategic considerations for future development



1. Mapping on occurrence of marine toxins related to seafood poisoning in the region;
2. Strengthened regional net work on marine toxins and seafood safety by service and share working environment using RTRC in Viet Nam.

Potential action plans for future implementation for the period of 2025-2026 and beyond

1. Accumulate data on occurrence of marine toxins in the region for mapping;
2. Co-research on "hot pot" area to have better understanding on marine toxins origin and mechanism to accumulate in ecological system

- FOR SAFE AND HEALTHY LIFE
- FOR A STRONGER REGION

Thank You

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