Regional Workshop on Monitoring and Management Strategies for Benthic HABs

Monitoring of Benthic HABs in Colombian Caribbean

By Natalia Arbeláez Merizalde
Marine and Coastal Research Institute-INVEMAR
MONITORING BENTHIC DINOFLAGELLATES

• Colombia was part of two projects financed by IAEA:
  • Designing and implementing systems for early warning and evaluation of the toxicity of Harmful Algal Blooms (HABs) in the Caribbean region, RLA7014.
  • Establishing the Caribbean Observing Network for Ocean Acidification and its Impact on Harmful Algal Blooms, using Nuclear and Isotopic Techniques, RLA7020.
• In the framework of this projects was established the monitoring system for harmful microalgae (planktonic and benthic)
• Active since 2010
• Substrate: Seagrass *Thalassia testudinum*

Goal of the monitoring: To construct an early warnings system for HABs events that allows the environmental authorities from Colombia take measures in order to prevent the potential risk.
# Species Distribution and Abundance

| Benthic species causing harmful events | • Some reports of CFP in Colombian Caribbean  
• *Gambierdiscus* spp. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td>• Limited information about its distribution in the country</td>
</tr>
</tbody>
</table>
| Monitoring harmful Benthic dinoflagellates | • Monthly or bimestrial  
• Quantified densities  
• Carried out by INVEMAR |
SPATIO–TEMPORAL SCALE OF SAMPLING STRATEGY

Local scale
- Monitoring developed in two sites located in a Chengué Bay, Tayrona Natural Park, Colombian Caribbean.

Sites selection
- Substrate: Seagrass *Thalassia testudinum*.
- Enough substrate available to perform the sampling.
- Substrate available throughout the years.

Temporal scale for cell quantification
- Monthly or bimestrial.
- Covering all the climatic periods.

Replication level
- Limited
- From April 2016 to September 2017 two methods were applied (artificial and natural substrate) for data comparison.
SAMPLING METHODS AND QUANTIFICATION

**Sampling methods applied and preferred sampling substrate**

- Natural substrate: Seagrass *Thalassia testudinum* – water samples.
- From April 2016 to September 2017, artificial substrate method was implemented (Tester et al., 2014).

**Fixatives used**

- Planktonic samples: Lugol
- Benthic samples: Formaldehyde

**Samples treatment before counting**

(Thalassia testudinum leaves) → Shake to detach the cells from the substrate → Sample are filtered with a two hundred micron sieve → Sample are filtered with a twenty micron sieve → Samples are deposited in plastic jars and fixed
SAMPLING METHODS AND QUANTIFICATION

**Counting method applied**
- Cell counting is performed by S-R slide, following Reguera et al. (2011; 2016).
- Using light microscope.

**Microalgal species identify**
- Thecal analysis (drops of hypochlorite).
- Use of SEM (Master’s Thesis)
- Use of specific guides for confirm the identification based on morphological characteristics.
Data gathered are qualitative and quantitative.

Comparable data over the spatio / temporal scale - country/region (for the same substrate).

Data centralized and available (INVEMAR and HEADAT).

The information could be useful for risk monitoring, but more data is needed, both in time and space.
Monitored potentially harmful dinoflagellates implemented in two pints in the Colombian Caribbean

One Magister thesis
Title: Spatio-temporal variation of the assemblage of potentially toxic epiphytic dinoflagellates of *Thalassia testudinum* in Santa Marta, Colombian Caribbean.
Objective: To evaluate the spatio-temporal variation of potentially toxic epiphytic dinoflagellates and the effect of some environmental variables on their composition and density in two coastal systems of the Colombian Caribbean.

One PhD Thesis in course
Title: Influence of resources and regulators over the abundance of benthic dinoflagellates in the Colombian Caribbean.
Objective: To determine on a daily scale, the abundance changes of potentially harmful benthic dinoflagellates, of the genera *Gambierdiscus*, *Fukuyoa*, *Ostreopsis* and *Prorocentrum*, in response to variation of resources, regulators and abundance of other genera of microfitobenthos.
MONITORING BHABs IN COLOMBIA

Implementation of artificial substrate (fiberglass screens)

From April 2016 to September 2017

Data to comparing natural and artificial substrate
MONITORING BHABs IN COLOMBIA
Thank you for your attention

Contact: natalia.arbelaez@invemar.org.co