

PICES - 2017

*S12 Seasonal and climatic influences on prey consumption by marine birds, mammals and predatory fishes*

Vladivostok, 26 September 2017

**Integrated Study of Marine Mammals: An Update  
of The Regional Project in The Southeast  
Asia**

Xuelel ZHANG (FIO, China, [zhangxl@fio.org.cn](mailto:zhangxl@fio.org.cn))

Kongkiat Kittiwatanawong (PMBC, Thailand)

Saifullah Arifin Jaaman (UMT, Malaysia)

# Why to Study MM?

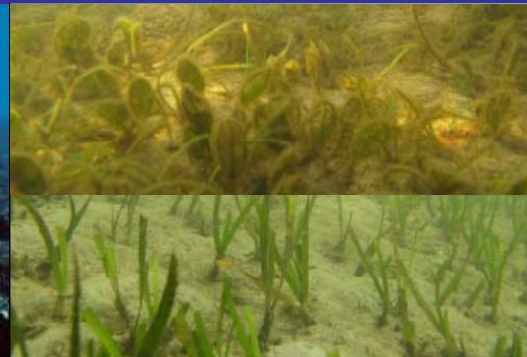
- MMs are top predators/grazers
- MMs are icons of a healthy ecosystem
- MMs are friends to humans
- Conservation MMs is conservation of the whole ecosystem



**Irrawaddy dolphin**



**Dugong**



# What to Study of MM?

- Size of MM population (feeding pressure)
- Habitats and migration (where and when feed)
- Preys/food availability (what & how much being fed)
- Behaviors (swimming, reproduction)
- etc.

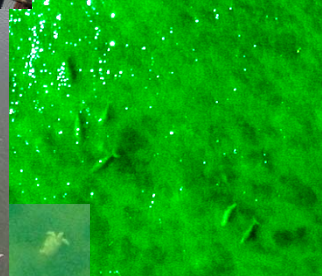
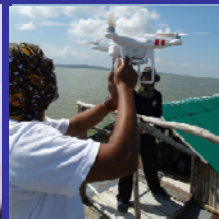
# How to Study MM?

- Difficult to study
  - regulations, confines to natural environment hostile to terrestrially-limited humans
  - time/labor-limited/consuming and expensive
- NOT easy to get sample for prey analysis



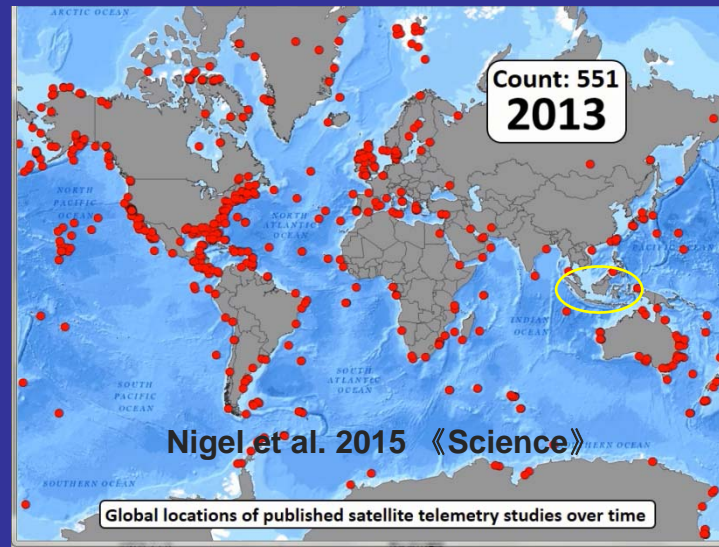
# How to Study MM?

- New technologies
  - Aerial survey:  
microplanes (expensive and dangerous) vs. UAVs  
(fors: economic, safe, convenient and sharp images;  
advanced - autotracking, IR, night observation, wide  
zoom range, etc.)  
pros: weather impacts, wind, rain



# How to Study MM?

- New technologies
  - Satellite/radio telemetry (+/- data loggers):
    - fors: long period, continuous monitoring of the habitats, migration paths
    - pros: rels on animal capture, the satellite(s) used matter acuracy



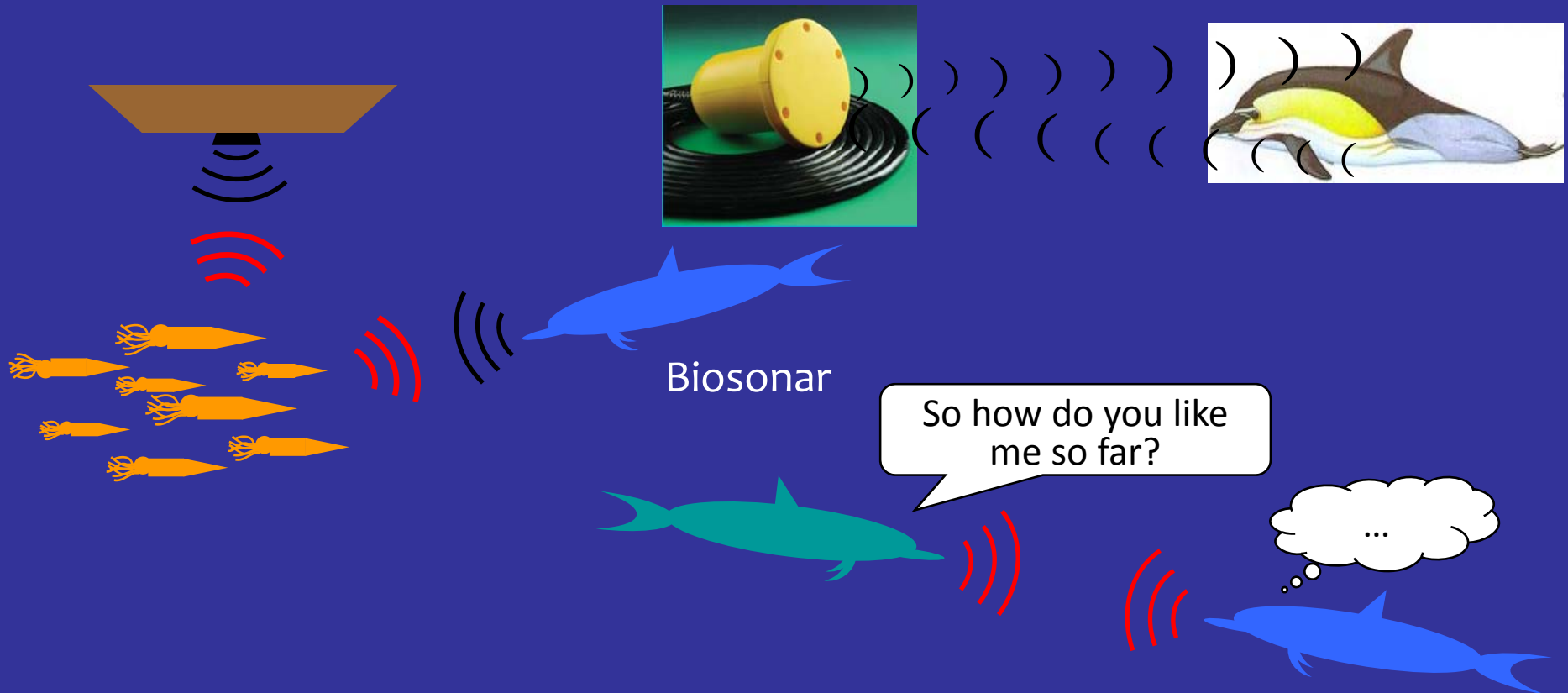
# How to Study MM?

- New technologies
  - Unmanned auto-vessel, synoptic observation platform
    - environment: SST, SSS, pH, chl<sub>a</sub>, etc
    - video monitor: MM and preys
    - Echosounding and hydrophone: preys and habitat
    - water sampling



# How to Study MM?

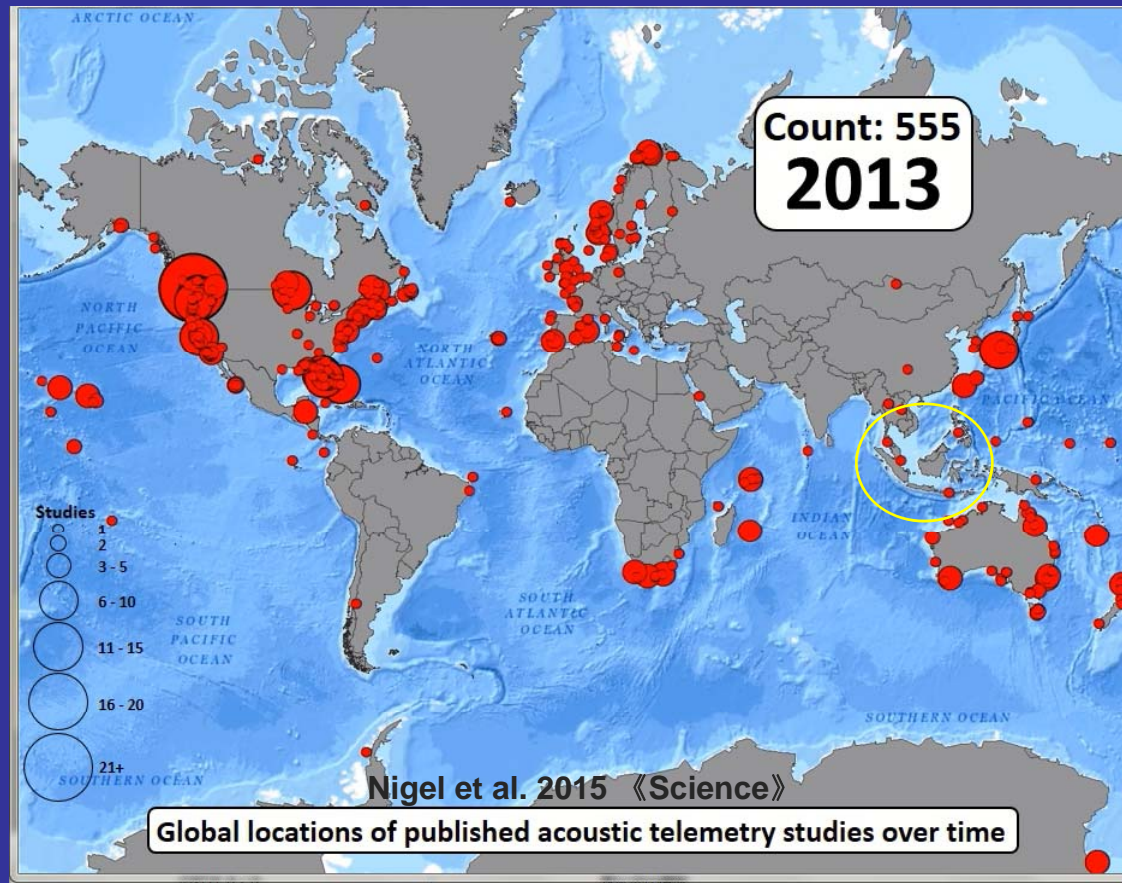
- New technologies
  - Bioacoustics: passive, active





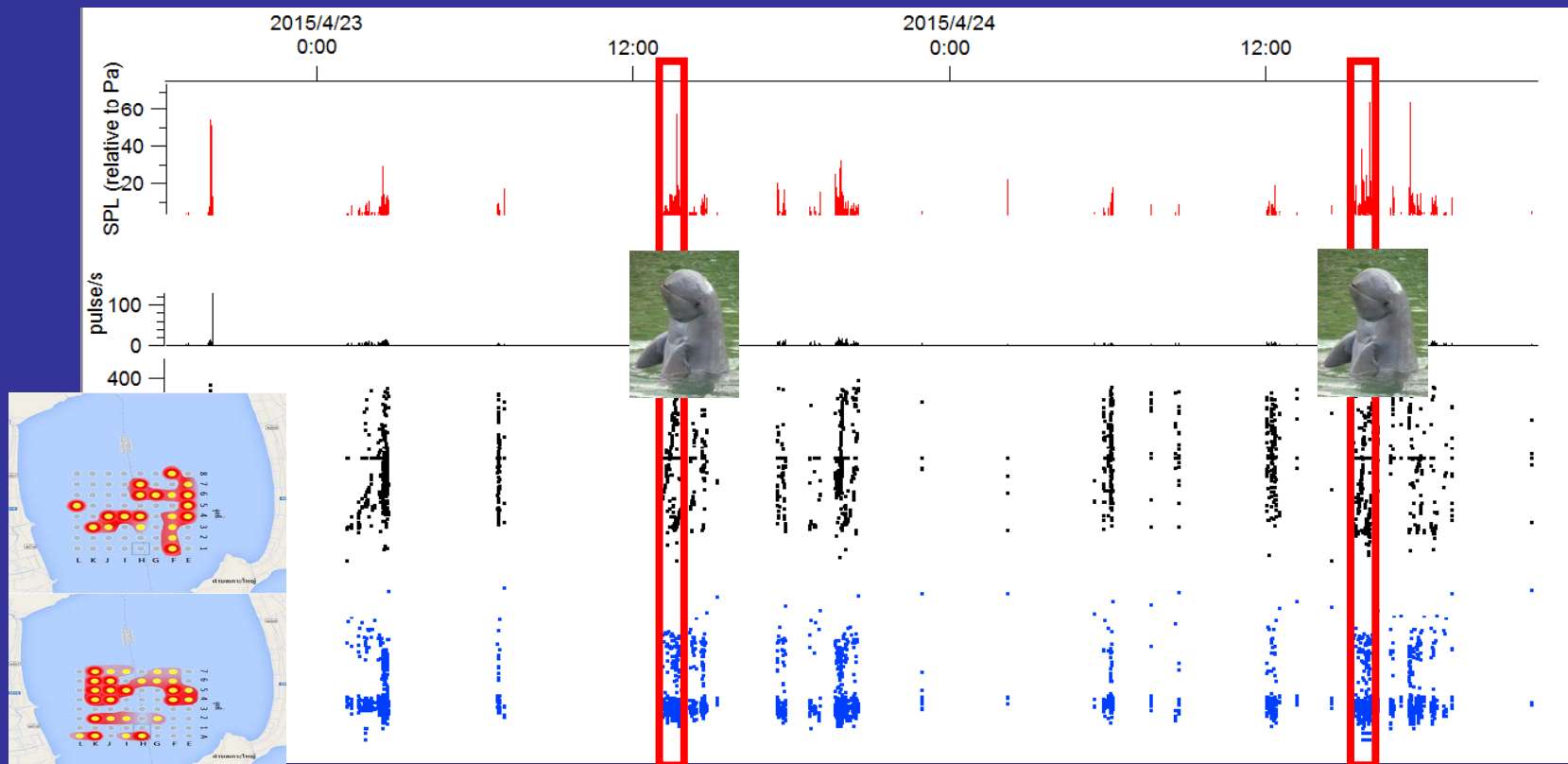
# How to Study MM?

- New technologies
  - Bioacoustics: ultrasonic, sonic



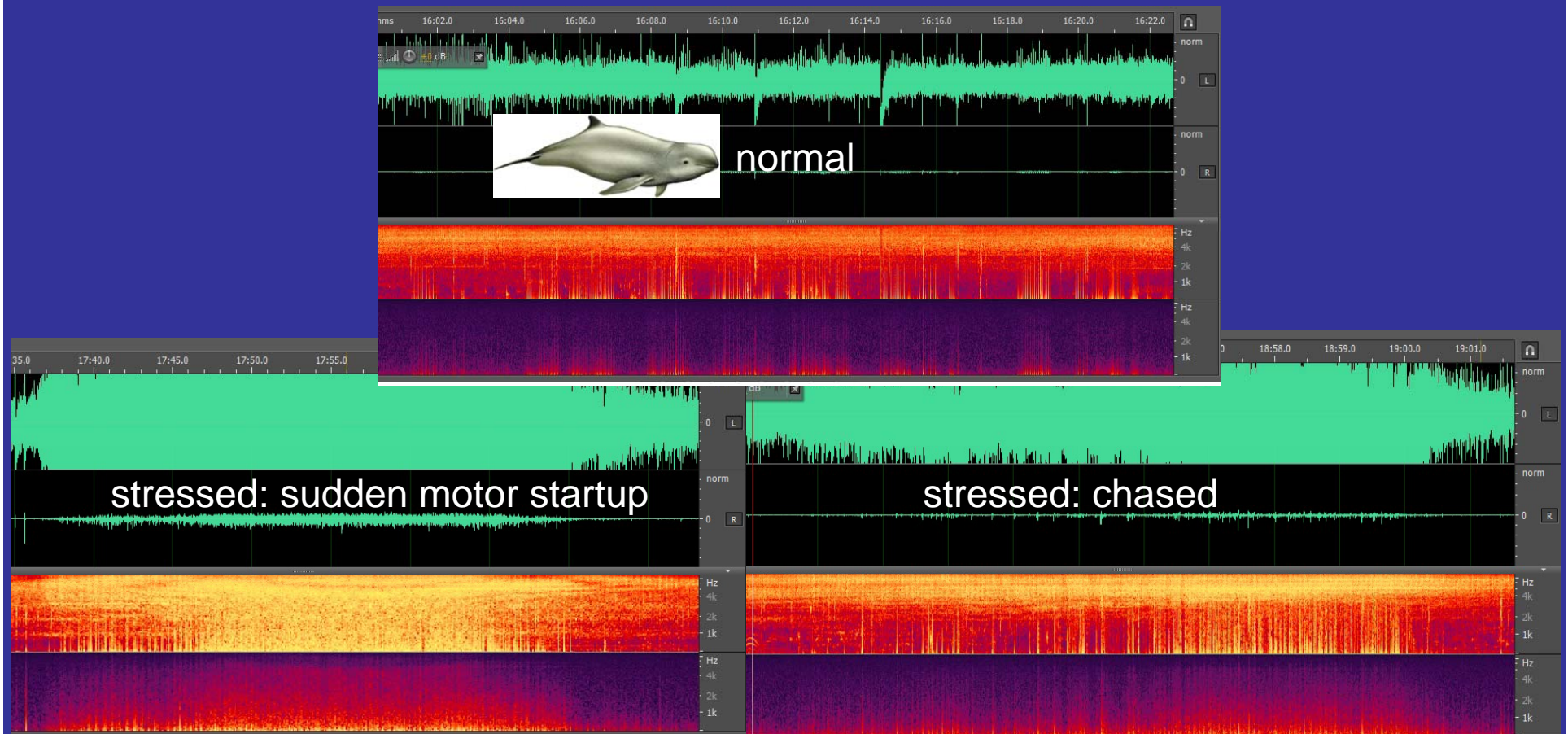
# How to Study MM?

- New technologies
  - Bioacoustics: ultrasonic monitoring of dolphin hot spots and sighting in Songkhla Lake (Lagoon), Thailand



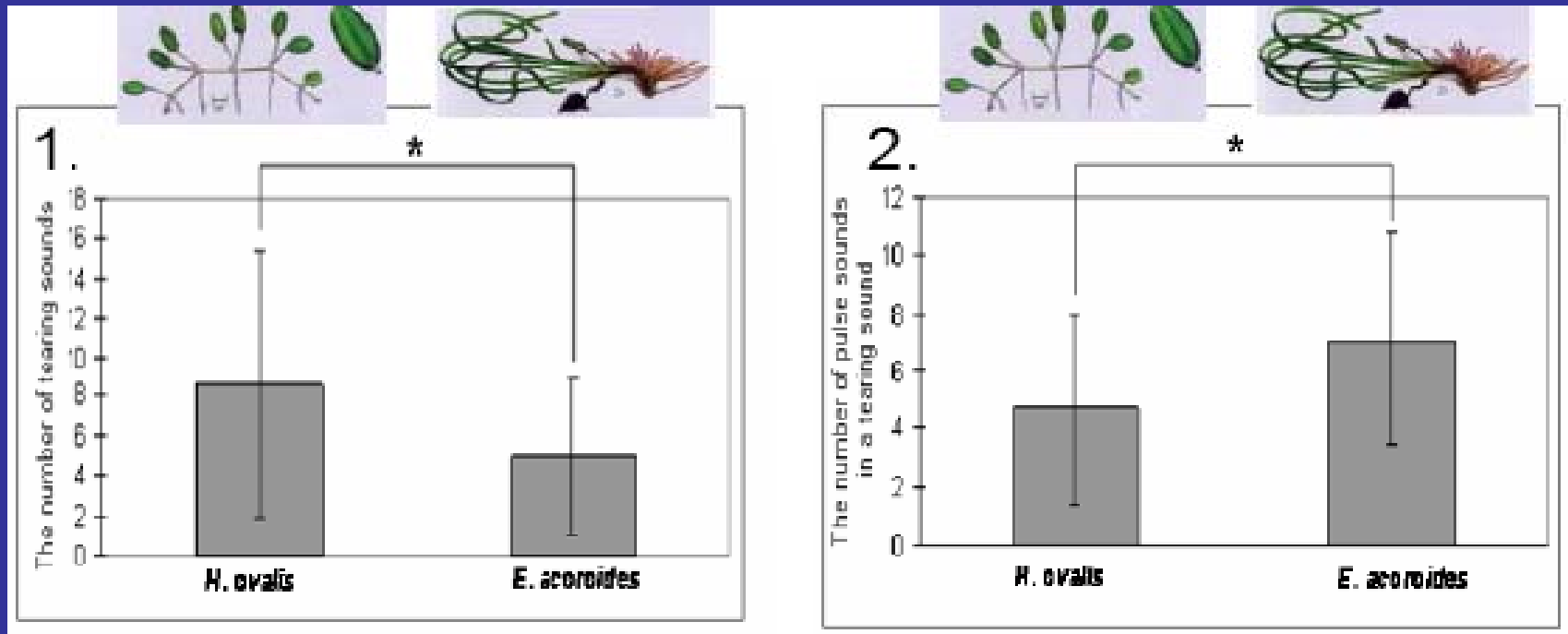
# How to Study MM?

- New technologies
  - Bioacoustics: "sonic" observation in the Bay of Brunei



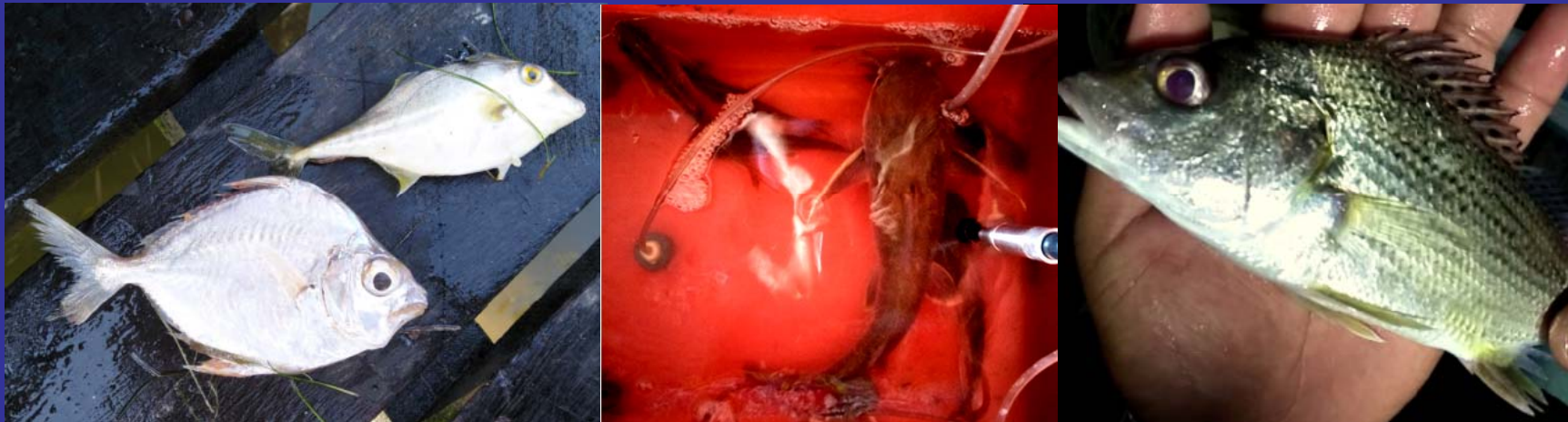
# How to Study MM?

- New technologies
  - Bioacoustics: selective seagrass grazing by dugongs



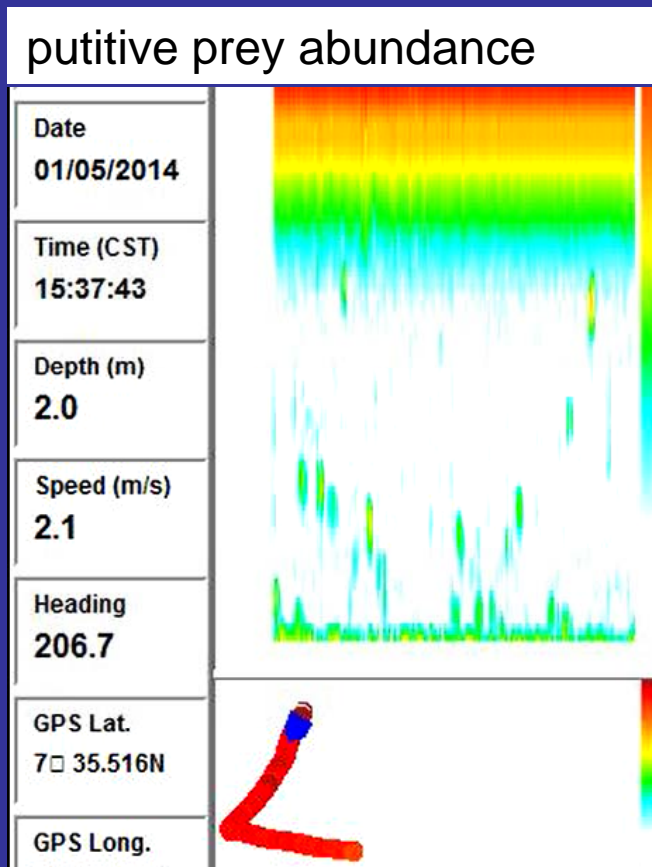
# How to Study MM?

- New technologies
  - Bioacoustics: selective feeding by dolphins?



# How to Study MM?

- New technologies
  - Bioacoustics: habitat mapping



# How to Study MM?

- New technologies
  - Bioacoustics:
    - Better detection efficiency
    - Non-invasive
    - Day and Night observation
    - Continuous and long term monitoring
    - Collecting information of both MM and preys the same time

# How to Study MM?

- New technologies
  - Molecular/isotope analysis with autopsy and biopsy samples
    - analysis of lipids or stable isotopes--->feeding habits / age
    - hormone levels ---> reproductive status
    - genetic analysis --->subpopulations, relationships within/between population/species



# Intergrated Study of MM

## Empowering our capacity

- Population dynamics
  - sighting, photo ID
  - UAVs
  - genetics
- Habitat and migration
  - sighting, photo ID
  - UAVs
  - bioacoustics
  - satellite/SMS telemetry
- Biology and behaviors
  - Molecular/isotope analysis
  - sighting
  - UAVs
  - bioacoustics
  - satellite/SMS telemetry

## Acknowledgement

- Regional Study of MES (Mammals and Sea Turtles) in the Tropical Asia for Effective Conservation, [UNESCO/IOC WESTPAC Project 2015-2017 \(MESTA\)](#)
- China-ASEAN Countries Collaboration on Marine Endangered Species Researches, [China-ASEAN Maritime Cooperation Fund Project 2015-2018 \(MESR\)](#)
- Local partners' co-financed projects



Thank you

