

GUIDEBOOK

on

CORAL REEF ASSOCIATED ORGANISMS

COLLECTED FROM

AUTONOMOUS REEF MONITORING STRUCTURES (ARMS) IN THE PHILIPPINES

A Tool for Capacity Building in Monitoring Biodiversity
at Selected Reef Sites in the Philippines

Learn about **biodiversity**.

Help **protect** our reefs.

This Guidebook is an output of the Coastal Assessment for Rehabilitation Enhancement: Capability Development and Resiliency of Ecosystems (CARE-CaDRES) Project under the Department of Environment and Natural Resources Biodiversity Management Bureau (DENR BMB) with additional support from The University of the Philippines Diliman Extension Grant through the Office of the Vice Chancellor for Research and Development (OVCRD).

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Vol 1
2022



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VOLUME 1 (2022)

Guidebook on Coral Reef Associated Organisms Collected from Autonomous Reef Monitoring Structures (ARMS) in the Philippines – A Tool for Capacity Building in Monitoring Biodiversity at Selected Reef Sites in the Philippines Volume 1 (2022)

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It was a great opportunity for us to put together this Guidebook and Field Guide of coral reef-associated organisms collected in the ARMS (Autonomous Reef Monitoring Structures) deployed at 5 NIPAS (National Integrated Protected Area Systems) sites. The Field Guides are found inside the Guidebook. The completion of this Guidebook is made possible through the financial and technical contributions of partners from government agencies, local government units, academic institutions, and other organizations.

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Preface

This Guidebook is a compilation and layout of photos of cryptic organisms collected using artificial reef structures called ARMS (Autonomous Reef Monitoring Structures) deployed at 5 NIPAS (National Integrated Protected Area Systems) sites in the Philippines. The sites are Palau, Mabini (Verde Island Passage), Masinloc, Tubbataha, and Siargao. ARMS are passive, three-dimensional collectors developed by NOAA (National Oceanic and Atmospheric Administration, USA) which are meant to sample marine cryptofauna by mimicking the complexity of hard bottom marine substrates. ARMS attract both encrusting species such as corals and algae, and motile organisms such as crustaceans, mollusks, and polychaetes. ARMS provide a standardized and quantifiable biodiversity measure since marine communities are sampled over the same area and in the same exact manner over time. The abundance, composition, and diversity of organisms collected by ARMS are assessed through morphological and molecular analysis.

This Guidebook contains the Field Guides of organisms collected by ARMS after a year of deployment at each of the 5 NIPAS sites. It also contains procedures for ARMS assembly, deployment, retrieval, and processing tailored to Philippine settings; and a guide to the scientific classification of organisms collected. The Guidebook is meant to serve stakeholders namely local government units, park managers, students, and researchers interested in monitoring diversity at the sites.

Dr. Maria Lourdes San Diego-McGlone

Project Leader

Monitoring Biodiversity at NIPAS Sites and Ocean Acidification
Baseline Study

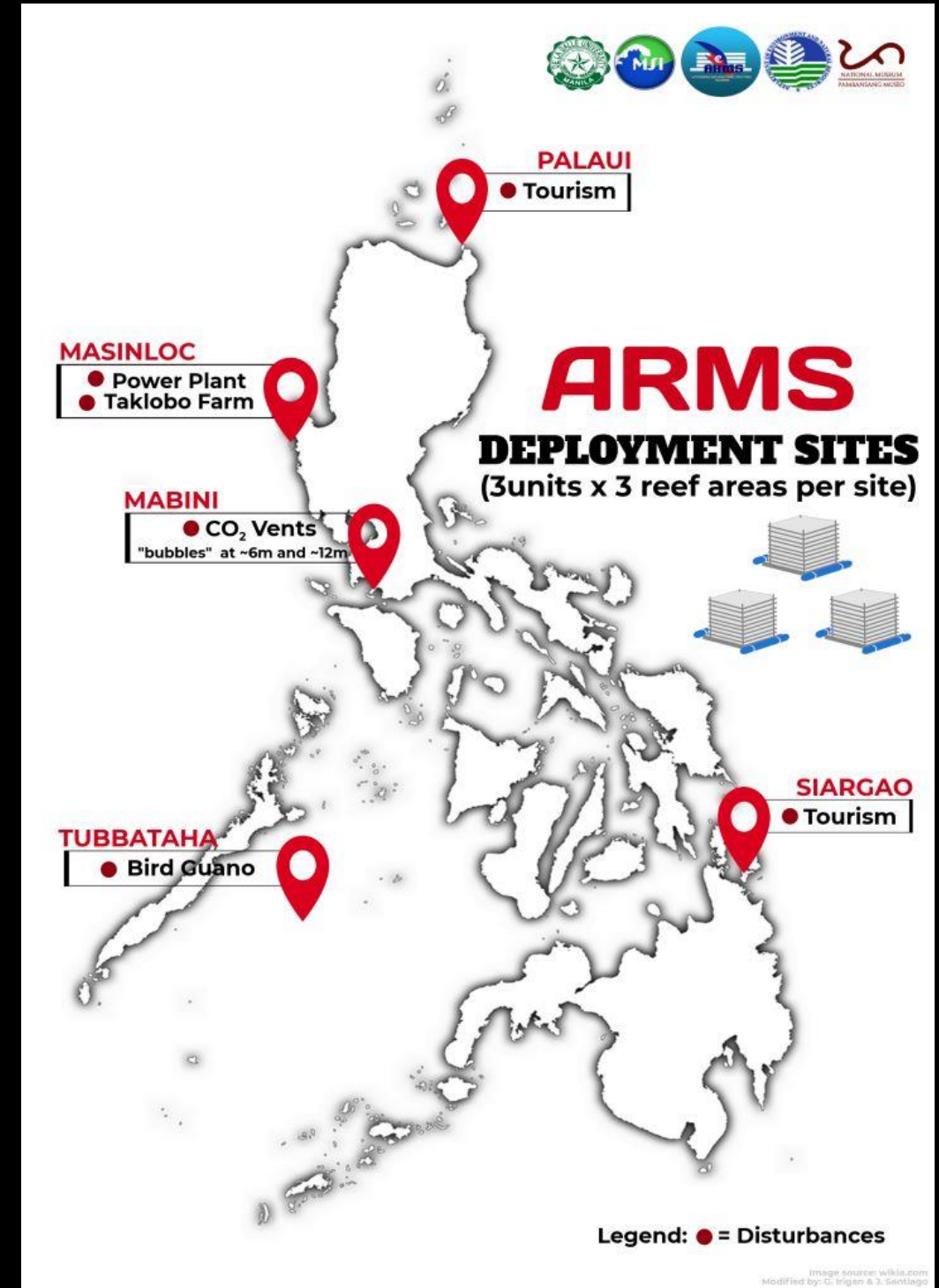


What are ARMS?

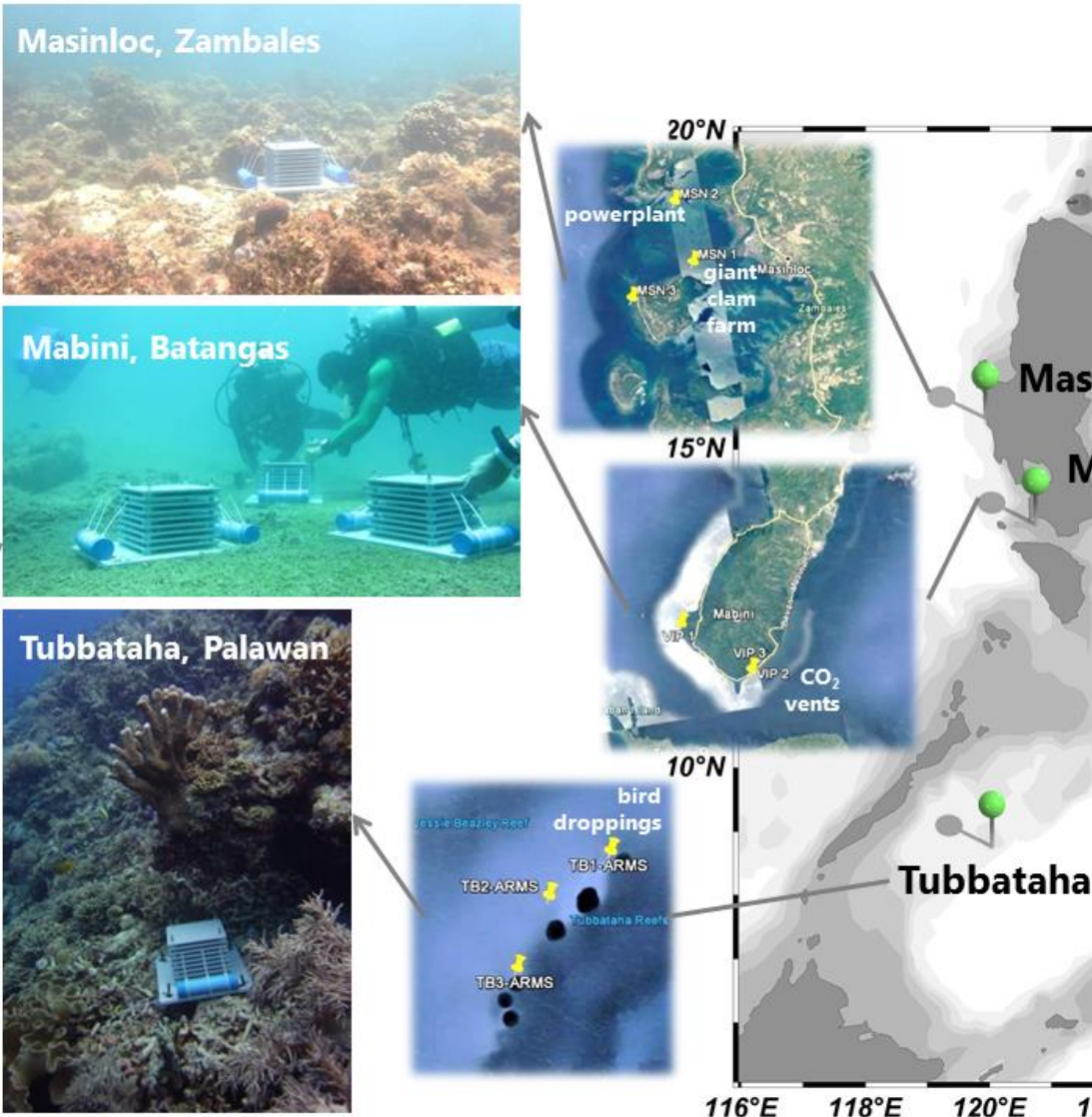
- Autonomous Reef Monitoring Structures
- A set of stacked polyvinyl chloride plates
- Designed to mimic the complexity of coral reefs in terms of attracting the colonizing invertebrates (aka "Reef hotel")
- Developed by U.S. NOAA - Pacific RAMP
- >800 ARMS units deployed throughout the Pacific, Indian and Atlantic Oceans

Purpose of ARMS?

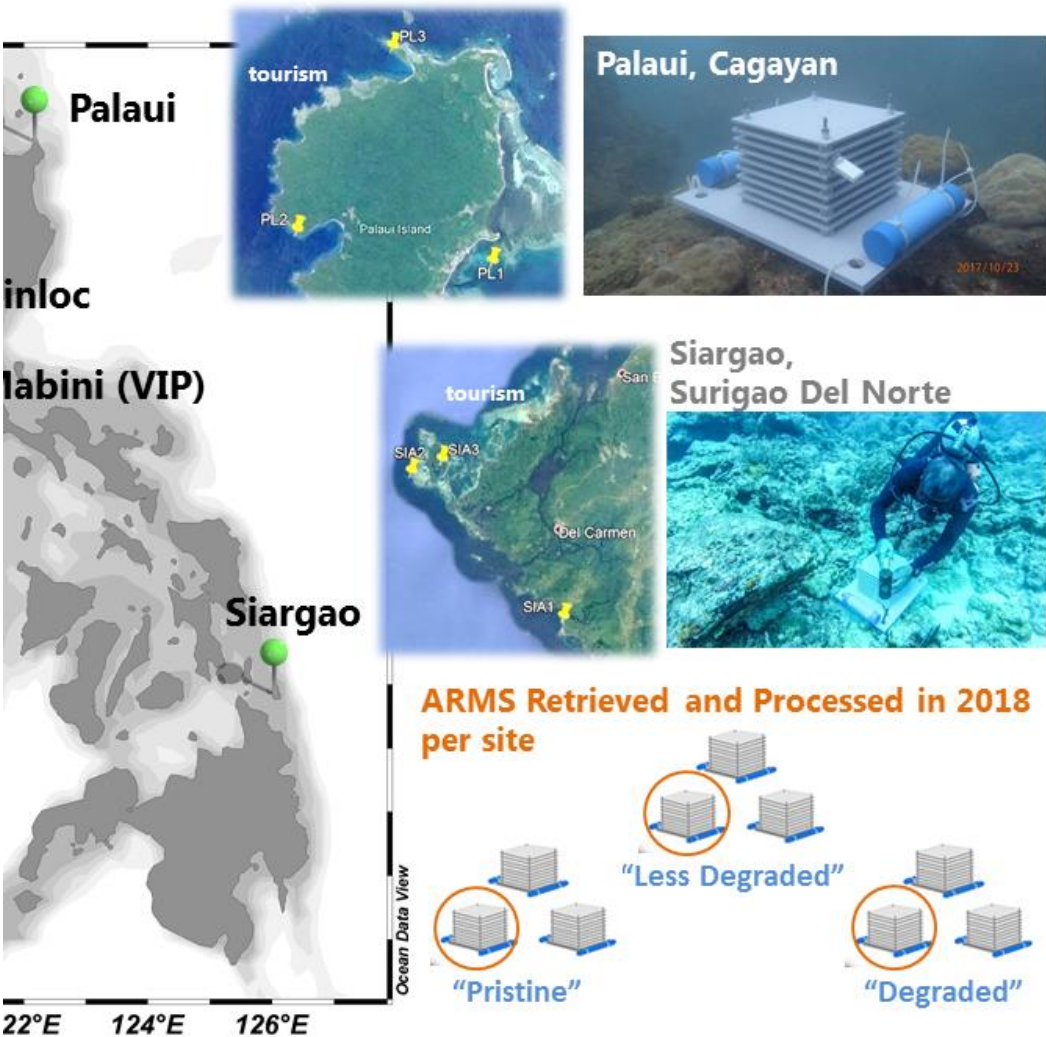
- Provides standard method for taxonomic and molecular analysis to assess invertebrate biodiversity particularly for small, cryptic organisms that constitute the bulk of reef diversity
- Increases ability to monitor/predict ecological impacts of global climate change, particularly ocean warming and acidification
- Serves as "sentinels" or lookout for climate change



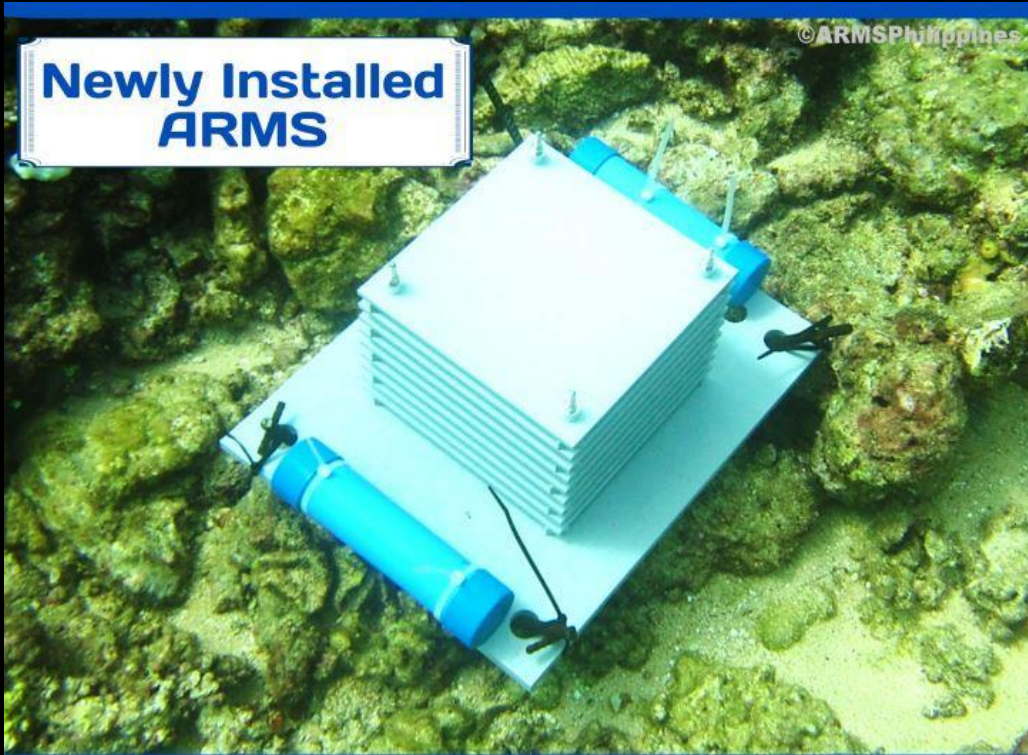
ARMS Philippines



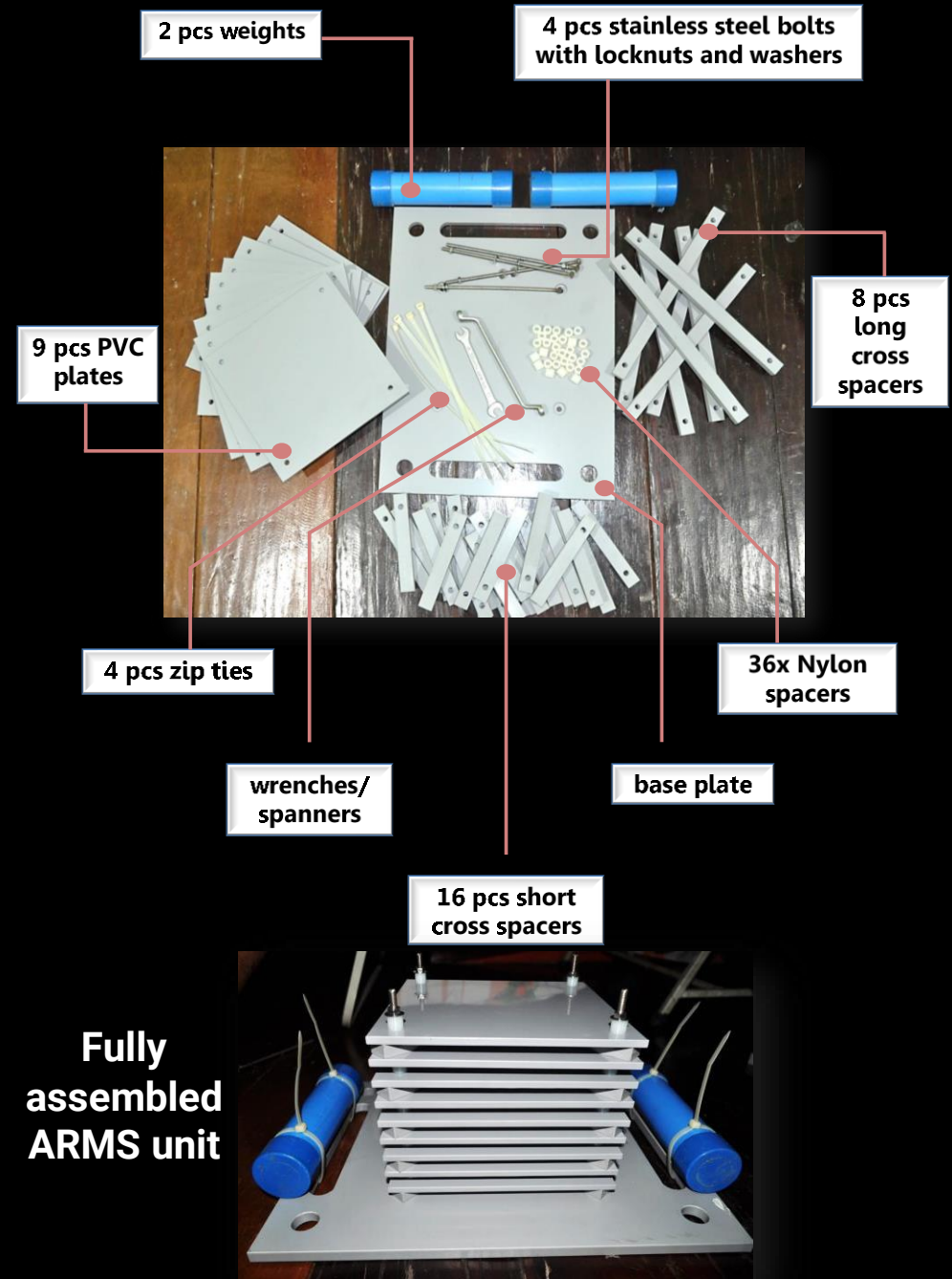
ARMS locations at the five NIPAS sites. A total of nine (9) ARMS units were deployed at each NIPAS site. Three units each were



installed at three coral reef stations per site arbitrarily designated as “least disturbed” or “pristine”, “less degraded” and “degraded”.



Materials for ARMS Unit Assembly



ARMS Deployment

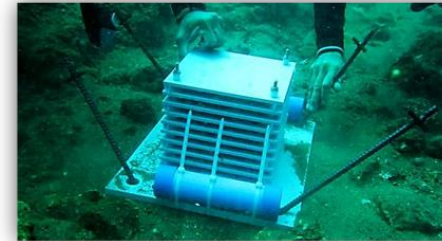
Materials

- 1 fully assembled ARMS unit
- 4 pieces of 24-inch stainless steel stakes
- 1 heavy-duty sledgehammer
- 8 pieces heavy duty zip ties (24-36")
- 1 floater (20-L water container)
- 1 GPS
- 1 underwater camera
- 1 metadata spreadsheet

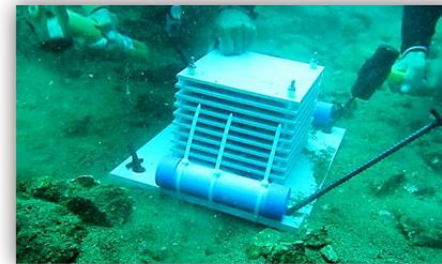


Methods

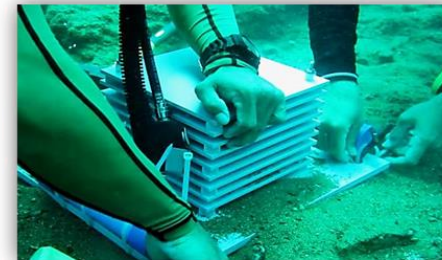
1. Tie a floater to the ARMS unit. This will make transport of the ARMS underwater easier.
2. Find a suitable spot where ARMS can be properly installed. It should be within the vicinity of coral reefs.
3. At the site, lay the ARMS on the seafloor and untie the floater.



4. Place the ARMS on the desired spot and put stakes through the holes on the corners of the base plate. Stakes should be pre-sharpened before deployment for ease in hammering and a stronger hold on the substrate.



5. Hammer the stakes thoroughly until the ARMS unit is properly anchored to the substrate.



6. Use zip ties to secure attachment of the weights and head of the stakes to the ARMS base plate.



7. When the ARMS unit is fixed onto the substrate, the photos of the whole set-up and mark the location using a GPS.

ARMS Retrieval



Materials

In the water

- 1 GPS
- 1 site marker floater
- 1 zip tie
- 1 “recovery crate”, a small plastic megabox (the size should be enough to cover the nine plates of the ARMS unit properly and avoid escape of organisms during ascent)
- 2-4 hooked bungee cords
- 1 dive knife or dive scissors
- 1 hammer
- 1 chisel
- 1 dive bag or net (for weights and metal stakes)



On the boat

- 1 plastic bin (the size should be able to accommodate the whole ARMS unit with the plastic box cover)
- 2 aerators (battery operated) with bubbler and stone
- filtered seawater (the volume should be able to submerge the retrieved ARMS unit) using a Niskin sampler (with weights and rope for water collection) and 60 µm metal sieve (to filter out large particles)

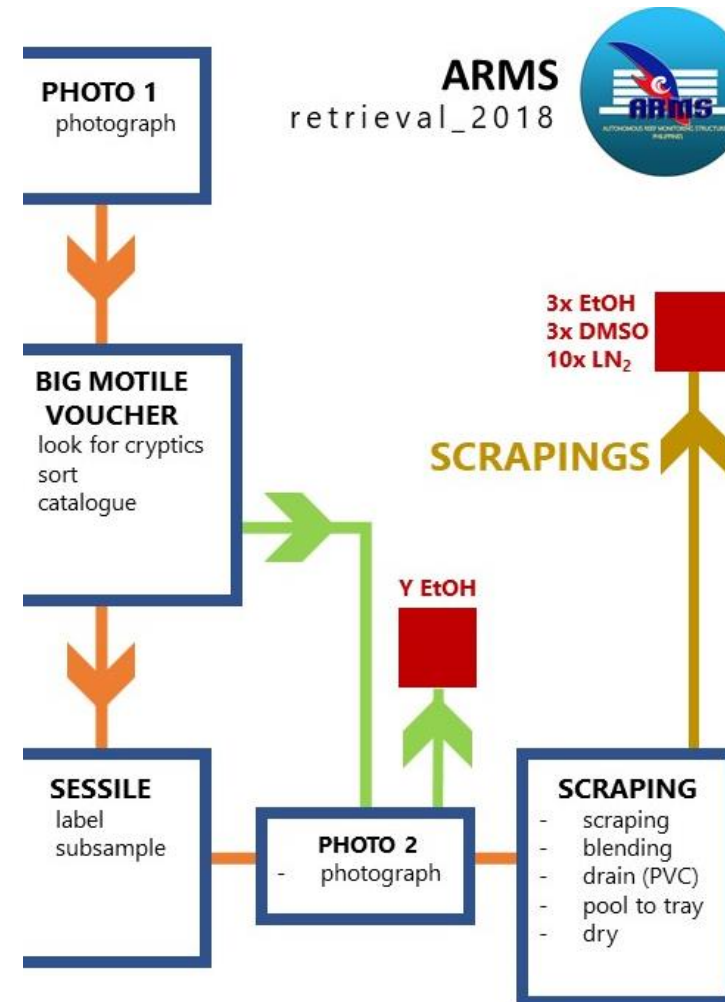
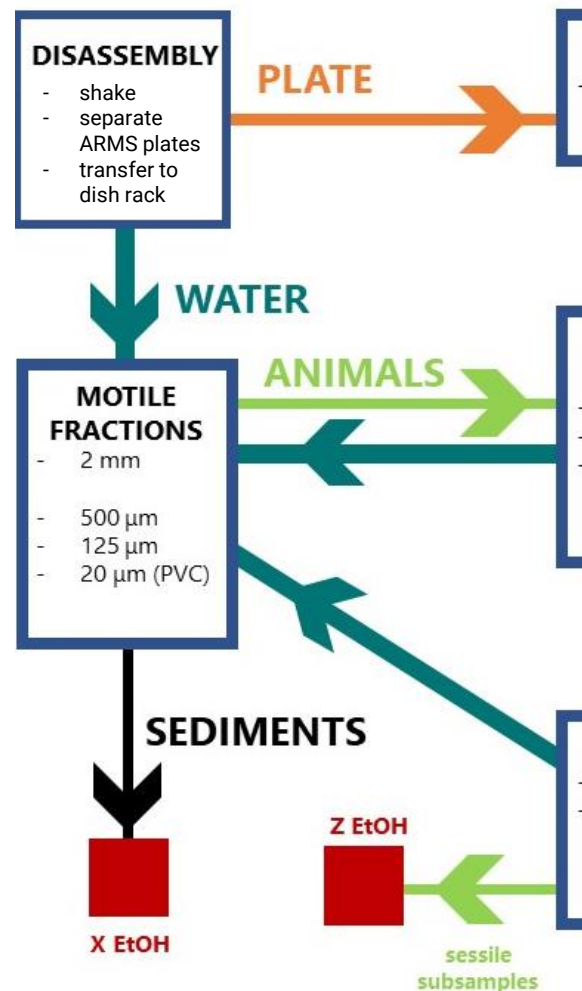


Methods

1. **Navigate** to the location of the ARMS units using a GPS.
2. Once the deployment site is reached, **inspect** the site by snorkeling and diving. As soon as the ARMS unit is found, **inflate the floater** to mark the location where the divers will be retrieving the ARMS unit.
3. **Take photos** of the surroundings of the ARMS unit before retrieval.
4. **Mark a corner** of the ARMS unit using a zip tie and note the direction it represents.
5. **Cover the ARMS unit** using the recovery crate.
6. Using a dive knife or scissors, **remove** the growth of any organism that prevents the ARMS unit to be securely covered by the recovery crate.
7. **Secure the recovery crate** to the ARMS unit using bungee cords.
8. **Remove the weights and metal stakes** used to attach the ARMS unit to the benthos using a hammer and chisel. Place the removed items in a dive bag or net.
9. **Invert the ARMS unit** and recovery crate such that the base plate of the ARMS is on top or facing upward. Make sure bungee cords remain secure and no organism escapes during ascent to the surface.
10. As soon as the ARMS unit is on the boat, **transfer the ARMS unit** carefully to a plastic bin with filtered and aerated seawater.
11. **Remove the recovery crate** carefully and rinse off any remaining sediment or organism from the crate to the plastic bin where the ARMS unit is placed.
12. Upon reaching the shore, **transfer the bin** to a stable and equipped working area and proceed immediately with the ARMS processing steps.

ARMS Processing Flow

The processing of retrieved ARMS units has several steps and requires good coordination among the teams at the different processing stations. This diagram shows a summary of these steps. Although it may seem confusing at first, the colors of the arrows serve as a guide on how the **plates**, **animals** (motile and sessile), **water**, **scrapings**, and **sediments** will be handled. At the end of each processing day, you should be able to have **samples** (represented by red squares in the diagram) that you will bring to your laboratory to study biodiversity. These are **animals** (motile voucher samples and sessile subsamples) and **sediments** all preserved in ethanol (EtOH), and **scrapings** of sessile samples preserved in EtOH, dimethyl sulfoxide (DMSO) and liquid nitrogen (LN₂).



ARMS Processing

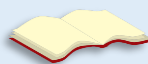
A summary of helpful notes at each processing station is provided in this section and are guided by the following symbols:



Most important steps



Number of people needed



Checklist of materials

Preparations

Bleaching



- Make sure plastic wares and other materials are cleaned well with bleach and distilled water before use
 - The smell of bleach should be gone before using the containers again



➤ 1-2



- Bleach
- 2 plastic containers (e.g., 50 L megabox) – one containing diluted bleach solution (5%) and the other containing distilled water

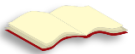
Seawater filtration



- Prepare filtered seawater for **ARMS Disassembly** station
- Make sure there is enough filtered seawater for all stations



➤ 2 (1 holding the sieve, 1 pouring the water)



- 2 blue carboys (20 L each)
- 1 white tray (big)
- 1 metal sieve (63 µm)
- 5-10 black carboys with seawater (20 L each)

The notes below are primarily based on the detailed step-by-step instructions from the Global ARMS Program website (<https://naturalhistory.si.edu/research/global-arms-program>) that should be carefully read prior to processing day (scan the QR code to bring you to the website). Some modifications were added based on experience working in local Philippine settings. It is highly recommended to process one ARMS unit at a time to prevent the mix-up of plates and samples.



Some helpful reminders before proceeding:

- ✓ Wear **gloves** (e.g., latex) during ARMS processing.
- ✓ **Do not touch** the water **with bare hands**.
- ✓ Clean the containers and tools with **bleach in between** processing of different ARMS units.

1



ARMS Disassembly



- Disassemble the ARMS unit systematically
- Transfer the plates to a new crate in order of plate #s in preparation for **Plate Photos**



➤ 3-4 (1 holding the ARMS unit, 1 leading the removal of screws, 1 supporting the removal of screws, 1 putting the zip ties per plate)



- 1 crate containing the retrieved ARMS unit and 2 aerators
- 1 crate with filtered seawater, 2 aerators and plastic dish rack
- Tools for disassembly
- 3 sets gloves (arm-length)
- 9 pcs zip ties with “#-Top” label sticker to mark the plate number and top side of the plate

ARMS Processing

2



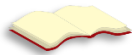
Plate Photos



- Take good quality photos (whole plate and grid) at the fastest time possible (to allow immediate processing of ARMS plate)
- Hand over each plate to **Big Motile Vouchering** station



- 1-2 (1 taking whole plate photos, 1 taking grid photos)



- 1-2 DSLR cameras
- 1-2 tripods
- 1 white tray (small) with 4 spacers attached to 4 corners, filtered seawater
- Plate labels

Format:

Program or Project Acronym
YYYY-MM-DD_Station#_Year#_Plate#Side

For example:

CARE CaDRES
2018-06-23_TUB1_Y1_9T

(T = top, B = bottom)

3



Big Motile Vouchering



- Remove motile organisms from plates by gentle shaking and brushing
- Sort motile organisms per phylum into small plastic cups.
- Photograph each motile species to document its live color.
- Label and catalog each species, and place them in a container filled with 80% ethanol

Catalog Number Format:

Specimen Depository Acronym – Specimen Locality
Acronym – Unique Number (e.g., PNMNH-Zam-0001)

- Hand over the plates to the **Sessile Subsampling** station



- 3-5 (1-2 shaking, brushing, and sorting; 1-2 taking photos; 1 doing microscopy and preservation)



- 1 white tray (big) with filtered seawater, 1 aerator
- 1 white tray (small) from Plate Photos station
- 1 brush
- 2 wash bottles with filtered seawater
- 1 wash bottle with ethanol (>96%)
- Small plastic cups with filtered seawater
- Plastic spoons
- Plastic droppers
- Plastic/stainless forceps
- Vials (screw cap; small and big)
- Glass jars (for big organisms)
- Catalog #s
- Record sheet (motile vs. sessile catalog numbers; the range of catalog numbers per ARMS station)
- Reference books and guides for identification of organisms
- Stereomicroscope (if available)



For taking high-resolution photos:

- 1 DSLR camera
- Lamp with white light
- Black felt cloth
- Caliper
- Petri dish
- Small brushes
- Needle pointers



- For more tips on how to take organism photos, scan this QR code for a supporting reference.

ARMS Processing



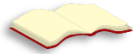
Motile Fractions Processing



- Filter the water from the disassembly crate and dish rack crate
- Transfer >1 mm fraction to a big tray in the **Big Motile Vouchering** station
- Transfer the <1mm-500 μ m fraction to 1 small tray
- Transfer the <500 μ m-125 μ m fraction to 1 small tray
- Preserve the <1mm-500 μ m and <500 μ m-125 μ m fractions (10 to 30% sample to preservative ratio)
- Make sure all the seawater used during the processing of the ARMS unit passes through all the fraction filters.



- 2 (1 holding the sieves; 1 pouring the water)



- 2 white trays (big) (1 for getting samples from the crate; 1 for keeping the filtrates)
- 2 white trays (small) (for 500 μ m, 125 μ m fractions)
- 3 metal sieves (1 mm, 500 μ m, 125 μ m)
- 40 μ m nylon sieve
- 1 wash bottle with filtered seawater
- 1 pail
- 50 ml centrifuge tubes with graduation
- Plastic spoons
- Ethanol (96 to 99%)

4



Sessile Subsampling



- Properly label and take photos of the plate with catalog #s of sessile samples
- Take and preserve samples of sessile organisms
- Hand over plates to **Plate Scraping** station



- 2-3 (1 putting catalog #s on sessile organisms; 1-2 getting sessile tissue sample)



- 1 white tray with filtered seawater
- 1 DSLR camera
- 5 ml plastic vials (screw cap)
- 1 wash bottle with ethanol (>96%)
- Scalpel blades
- Alcohol lamp

5



Plate Scraping



- Scrape off all sessile organisms from all plates
- Preserve sub-samples for DNA analysis (10 to 30% sample to preservative ratio)
- Make sure all scrapings are blended properly and evenly distributed before preservation.



- 3 (2 scraping the plates; 1 getting sub-samples for preservation)



- 2 white trays (small) (no seawater)
- 1 wash bottle with filtered seawater
- Tools for scraping
- Blender
- 40 μ m nylon sieve
- Small spatula
- 2 ml tubes for sample preservation
- Ethanol (96 to 99%)
- DMSO
- Dewar flask with liquid nitrogen
- Ziplock bags

About the Field Guide

ARMS Cryptofauna Field Guide

This Field Guide aims to enhance the non-taxonomists, citizen scientists, and students’ perception of looking at the scientific classification of organisms as an advantage rather than a barrier. The scientific names could be tongue-twisting but it is better to let the general public know that every organism is valued because they have a universal name and a place in the hierarchy of life. We hope to promote scientific literacy in our everyday lives. Hence, the cryptic organisms found in the Autonomous Reef Monitoring Structures (ARMS) were identified if possible, to species or first name level to encourage the citizen scientists to pursue science in its essence.

This guide follows the hierarchical classification based on the recent taxonomic views and development.

- Kingdom
 - Phylum
 - Subphylum
 - Class
 - Order
 - Superfamily
 - Family
 - Scientific name (Genus and species) and the author of the species discovered

Taxonomic classifications of organisms are provided after each phylum description per site.

The phylum classifications are color-coded.

Phylum Platyhelminthes

Phylum Annelida
Subphylum Polychaeta

Phylum Mollusca

Phylum Arthropoda
Subphylum Crustacea

Phylum Echinodermata

Phylum Hemichordata

Phylum Chordata

The common name is indicated and placed before the scientific name so that the organism will be easily remembered. The sizes of the organisms are also provided. The sites and their regional locations are indicated at the bottom of each page.

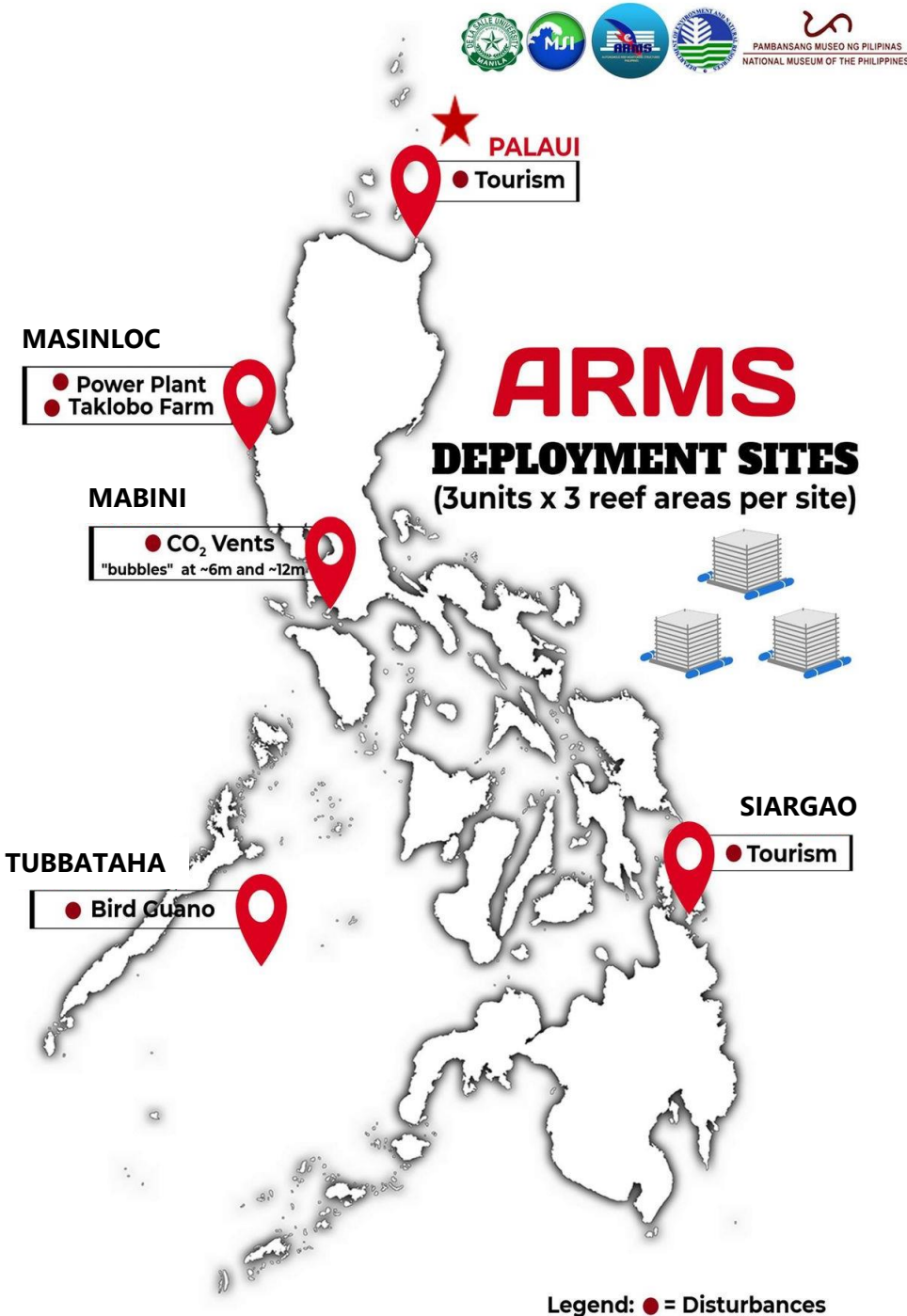
Marivene Manuel-Santos
National Museum

FIELD GUIDE



CORAL REEF ASSOCIATED ORGANISMS COLLECTED FROM AUTONOMOUS REEF MONITORING STRUCTURES (ARMS)

PALAUI, CAGAYAN
PHILIPPINES 2022



PHYLUM ANNELIDA

Characterized by the usually long and multi-segmented and bilaterally symmetrical body with no internal skeletal structures, have parapodia for locomotion and move by peristalsis or undulation. The blood circulates throughout the main body cavity without any kind of pump. This group exists in almost all types of environments and members of this group are popularly known as earthworms, bristle worms, peanut worms, and leeches.

Taxonomic classification of some species of annelids that found shelter in the ARMS units in Palaui station:

CLASS POLYCHAETA [Bristle Worms]

Subclass Errantia

Order Amphinomida

Family Amphinomidae

Eurythoe sp.

Order Phyllodocida

Suborder Nereidiformia

Family Hesionidae

Hesione sp.

Suborder Glyceriformia

Family Glyceridae

Glycera sp.

Subclass Sedentaria

Infraclass Canalipalata

Order Terebellida

Suborder Terebellimorpha

Family Terebellidae

Loimia sp.



Phylum Annelida

Subphylum Polychaeta



Family: AMPHINOMIDAE
Scientific Name: *Eurythoe* sp.
Common Name: Fire Worm



Family: HESIONIDAE
Scientific Name: *Hesione* sp.
Common Name: Leopard Worm

Phylum Annelida

Subphylum Polychaeta



Family: GLYCERIDAE
Scientific Name: *Glycera* sp.
Common Name: Blood Worm



Family: TERESELLIDAE
Scientific Name: *Loimia* sp.
Common Name: Spaghetti Worm

PHYLUM MOLLUSCA

Soft-bodied animals that may or may not be covered by a hard exoskeleton or “shell”. They display a wide variety of forms in each subgroup but share common key characteristics. From the large predatory squids and octopuses to the smallest grazing forms, mollusks are grouped into seven classes: Aplacophora (mollusks without plates), Monoplacophora, (mollusks bearing one plate), Polyplacophora (mollusks bearing many plates), Bivalvia, (mollusks bearing a pair of shells) Gastropoda (“stomach foot” mollusks bearing one shell), Cephalopoda (“head foot” mollusks), and Scaphopoda (“boat feet” mollusks).

Taxonomic classification of some species of mollusks that found shelter in the ARMS units in Palaui station:

- CLASS POLYPLACOPHORA
 - Unidentified Polyplacophora
- CLASS GASTROPODA
 - Subclass Caenogastropoda
 - Order [unassigned] Caenogastropoda
 - Superfamily Cerithioidea
 - Family Cerithiidae
 - Cerithium* sp.
 - Order Littorinimorpha
 - Superfamily Tonnoidea
 - Family Cymatiidae
 - Gyrineum gyrinum* (Linnaeus, 1758)
 - Superfamily Cypraeoidea
 - Family Cypraeidae
 - Naria* sp.
 - Superfamily Rissooidea
 - Family Rissoinidae
 - Rissoina* sp

- Order Neogastropoda
 - Superfamily Turbinelloidea
 - Family Costellariidae
 - Vexillum modestum* (Reeve, 1845)
 - Superfamily Buccinoidea
 - Family Colubrariidae
 - Colubraria nitidula* (G. B. Sowerby I, 1833)
 - Family Pisaniidae
 - Clivipollia pulchra* (Reeve, 1846)
 - Family Nassariidae
 - Nassarius pauperatus* (Lamarck, 1822).
 - Subclass Heterobranchia
 - Infraclass Euthyneura
 - Order Pleurobranchida
 - Superfamily Pleurobranchioidea
 - Family Pleurobranchidae
 - Berthellina* sp.
 - Unidentified gastropoda
 - Order Nudibranchia
 - Superfamily Chromodoridoidea
 - Family Actinocyclusidae
 - Hallaxa hileenae* Gosliner & S. Johnson, 1994
- CLASS BIVALVIA [Two Shells]
 - Subclass Pteriomorphia
 - Order Arcida
 - Superfamily Arcoidea
 - Family Arcidae
 - Arca* sp.
 - Order Ostreida
 - Superfamily Pinnoidea
 - Family Pinnidae
 - Atrina* sp.
 - Unidentified Bivalve

Phylum Mollusca

1 mm



Class: Polyplacophora
Common Name: Chiton

Phylum Mollusca

2 mm



Family: CERITHIIDAE
Scientific Name: *Cerithium* sp.
Common Name: Cerith

5 mm



Family: CYMATIIDAE
Scientific Name: *Gyrineum gyrynum* (Linnaeus, 1758)
Common Name: Tadpole Triton

Phylum Mollusca



3 mm

Family: CYPRAEIDAE
Scientific Name: *Naria* sp.
Common Name: Cowrie



5 mm

Family: RISSOINIDAE
Scientific Name: *Rissoina* sp.
Common Name: Rissoid Snail

Phylum Mollusca



3 mm

Family: COSTELLARIIDAE
Scientific Name: *Vexillum modestum* (Reeve, 1845)
Common Name: Ribbed Miter



3 mm

Family: COLUBRARIIDAE
Scientific Name: *Colubraria nitidula* (Sowerby I, 1833)
Common name: Shiny Dwarf Triton

Phylum Mollusca



Family: PISANIIDAE

Scientific Name: *Clivipollia pulchra* (Reeve, 1846)

Common Name: Goblet Snail



Family: NASSARIIDAE

Scientific Name: *Nassarius pauperatus* (Lamarck, 1822)

Common Name: Impoverished dog whelk

Phylum Mollusca



Class: Gastropoda

Phylum Mollusca

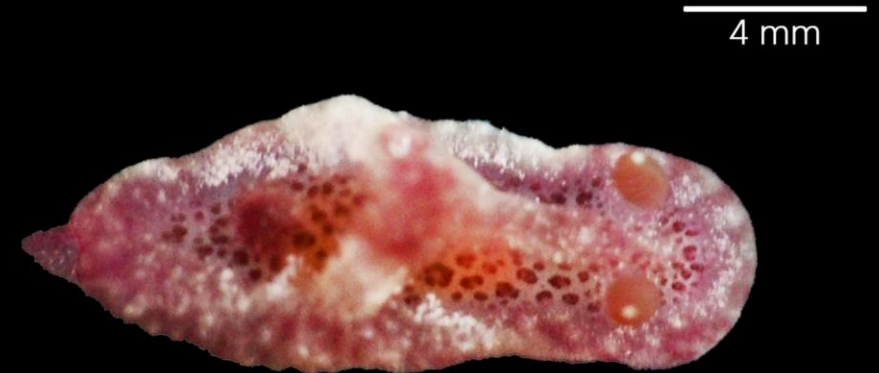


Class: Gastropoda

Phylum Mollusca



Family: PLEUROBRANCHIDAE
Scientific Name: *Berthellina* sp.
Common Name: Lemon Berthellina



Family: ACTINOCYCLIDAE
Scientific Name:
Hallaxa hileenae Gosliner & S. Johnson, 1994
Common Name: Dorid Nudibranch

Phylum Mollusca



Family: ARCIDAE
Scientific Name: *Arca* sp.
Common Name: Arc Clam

Phylum Mollusca



Family: PINNIDAE
Scientific Name: *Atrina* sp.
Common Name: Pen Shell Clam



Class: Bivalvia

PHYLUM ARTHROPODA

SUBPHYLUM CRUSTACEA

Crustaceans are the “insects” of the sea which include popular animals like barnacles, amphipods, skeleton shrimps, shrimps and prawns, hermit crabs, squat lobsters, lobsters, crabs, and mantis shrimps. Being such a large and diverse group, their life cycle may vary but each crustacean must molt or shed its hardened epidermis or shells in order to grow. Organisms under this subphylum are identified by a head with paired mandibular jaws, a pair of maxillae, two pairs of antennae, and appendages that are mostly separated into two branches (biramous).

Taxonomic classification of some species of crustaceans that found shelter in the ARMS units in Palaui station:

- CLASS MALACOSTRACA
 - Order Decapoda
 - Suborder Pleocyemata
 - Infraorder Caridea
 - Superfamily Crangonoidea
 - Family Crangonidae
 - Philocheras* sp.
 - Superfamily Palaemonoidea
 - Family Palaemonidae
 - Periclimenes* sp.
 - Superfamily Alpheoidea
 - Family Alpheidae
 - Alpheus* spp.
 - Family Hippolytidae
 - Saron marmoratus* (Olivier, 1811)

- Infraorder Anomura
 - Superfamily Galatheoidea
 - Family Galatheididae
 - Galathea* sp.
- Infraorder Gebiidea
 - Family Upogebiidae
 - Unidentified Upogebiid
- Infraorder Brachyura
 - Superfamily Palicoidea
 - Family Crossotonotidae
 - Crossotonotus spinipes* (de Man, 1888)
 - Superfamily Majoidea
 - Family Majidae
 - Schizophrys aspera* (H. Milne Edwards, 1834)
 - Family Epialtidae
 - Huenia* sp.
 - Superfamily Portunoidea
 - Family Portunidae
 - Thalamita* sp.
 - Superfamily Xanthoidea
 - Family Xanthidae
 - Xanthias joanneae* Mendoza, 2013
 - Unidentified Xanthids

Phylum Arthropoda
Subphylum Crustacea



2 mm

Family: CRANGONIDAE
Scientific Name: *Philoceras* sp.
Common Name: Sand Shrimp



5 mm

Family: PALAEMONIDAE
Scientific Name: *Periclimenes* sp.
Common Name: Anemone Shrimp

Phylum Arthropoda
Subphylum Crustacea



4.5 mm



5.5 mm

Family: ALPHEIDAE
Scientific Name: *Alpheus* spp.
Common Name: Pistol Shrimp

Phylum Arthropoda

Subphylum Crustacea



Family: HIPPOLYTIDAE
Scientific Name: *Saron marmoratus* (Olivier, 1811)
Common Name: Marbled Shrimp



Family: GALATHEIDAE
Scientific Name: *Galathea* sp.
Common Name: Squat Lobster

Phylum Arthropoda

Subphylum Crustacea



Family: UPOGEBIIDAE
Common Name: Mud Shrimp



Family: CROSSOTONOTIDAE
Scientific Name: *Crossotonotus spinipes* (de Man, 1888)
Common Name: Stilt Crab

Phylum Arthropoda Subphylum Crustacea



Family: MAJIDAE

Scientific Name: *Schizophrys aspera*
(H. Milne Edwards, 1834)

Common Name: Common Decorator Crab



Family: EPIALTIDAE

Scientific Name: *Huenia* sp.

Common Name: Arrowhead Crab

Phylum Arthropoda Subphylum Crustacea



Family: PORTUNIDAE

Scientific Name: *Thalamita* sp.

Common Name: Swimming Crab



Family: XANTHIDAE

Scientific Name: *Xanthias joanneae* Mendoza, 2013

Common Name: Ocellated Xanthias

PHYLUM ECHINODERMATA

Exclusively marine animals easily distinguished by having five duplicate body parts (pentamerous radial symmetry), several bone-like elements made of calcium carbonate that form the internal skeleton of the animal that provides support and protection (calcareous ossicles), body cavities forming water-vascular system (coelomic canals), soft body appendages, and tube feet used in feeding and locomotion. This group also displays a wide variety of forms from the soft-bodied sea cucumbers to the spiky sea urchins. This group is subdivided into six classes: Crinoidea (sea lilies and feather stars), Asteroidea (sea stars), Ophiuroidea (brittle stars), Concentricycloidea (sea daisies), Echinoidea (sea urchins), and Holothuroidea (sea cucumbers).

Taxonomic classification of some species of echinoderms that found shelter in the ARMS units in Palaui station:

- SUBPHYLUM ASTEROZOA
 - CLASS OPHIUROIDEA
 - Order Amphilepidida
 - Superfamily Ophiolepidoidea
 - Family Ophiolepididae
 - Ophiolepis* sp.
 - Unidentified Ophiuroids

- SUBPHYLUM ECHINOZOA
 - CLASS ECHINOIDEA
 - Order Cidaroida
 - Family Cidaridae
 - Prionocidaris* sp.
 - Unidentified Echinoid

- Order Camarodonta
 - Family Parasaleniidae
 - Parasalenia poehlili* Pfeffer, 1887
- CLASS HOLOTHUROIDEA
 - Order Dendrochirotida
 - Family Cucumaridae
 - Cucumaria* sp.
 - Order Synallactida
 - Family Stichopodidae
 - Stichopus* sp.

Phylum Echinodermata



2 mm

Family: OPHIOLEPIDIDAE
Scientific Name: *Ophiopsis* sp.
Common Name: Brittle star



5 mm

Class: Ophiuroidea
Common Name: Brittle Star

Phylum Echinodermata



5 mm



8 mm

Class: Ophiuroidea
Common Name: Brittle Star

Phylum Echinodermata



Family: CIDARIDAE

Common Name: Pencil Urchin

Scientific Name: *Prionocidaris* sp.

3 mm



Family: PARASALENIIDAE

Scientific Name: *Parasalenia poehlii* Pfeffer, 1887

Common Name: Spiny Urchin

2 mm

Phylum Echinodermata

Class: Echinoidea

Name: Sea Urchin



1 mm



10 mm

Family: CUCUMARIIDAE

Scientific Name: *Cucumaria* sp.

Common Name: Sea cucumber

2 mm



Family: STICHOPODIDAE

Scientific Name: *Stichopus* sp

Common Name: Sea cucumber.

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA

This group includes all animals with backbones called vertebrates characterized by a bilaterally symmetrical body, multi-layered epidermis, have three types of muscle tissues (striped, unstriped, and cardiac), have a well-developed body cavity, complete alimentary canal, well-developed respiratory and excretory systems, have endocrine glands, have three- or four-chambered heart, are unisexual and reproduce sexually (except for hagfish) and the brain is protected by a skull.

Taxonomic classification of some species of vertebrates that found shelter in the ARMS units in Palau station:

SUPERCLASS GNATHOSTOMATA / PISCES

CLASS ACTINOPTERYGII

Order Scorpaeniformes

Suborder Scorpaenoidei

Family Scorpaenidae

Scorpaenodes sp.

Order Perciformes

Suborder Labroidei

Family Labridae

Pseudocheillinus sp.

Suborder Gobioidi

Family Gobiidae

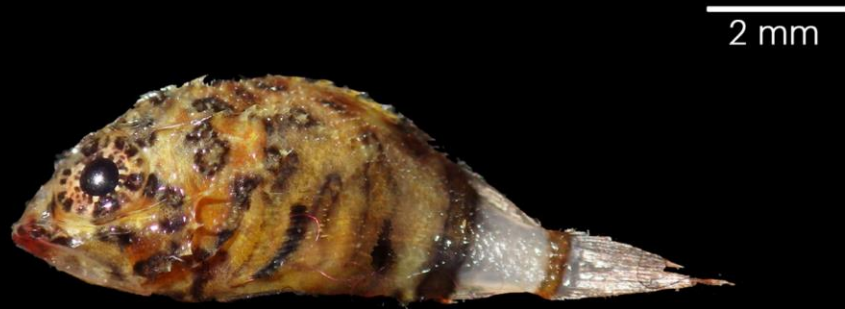
Priolepis inhaca (Smith, 1949)

Eviota sp.

Unidentified juvenile fish



Phylum Chordata



Family: SCORPAENIDAE
Scientific Name: *Scorpaenodes* sp.
Common Name: Scorpion Fish



Family: LABRIDAE
Scientific Name: *Pseudocheilinus* sp.
Common Name: Lined Wrasse

Phylum Chordata



Family: GOBIIDAE
Scientific Name: *Priolepis inhaca* (Smith, 1949)
Common Name: Brick Goby



Family: GOBIIDAE
Scientific Name: *Eviota* sp.
Common Name: Dwarf Goby



Family: GOBIIDAE

FIELD GUIDE

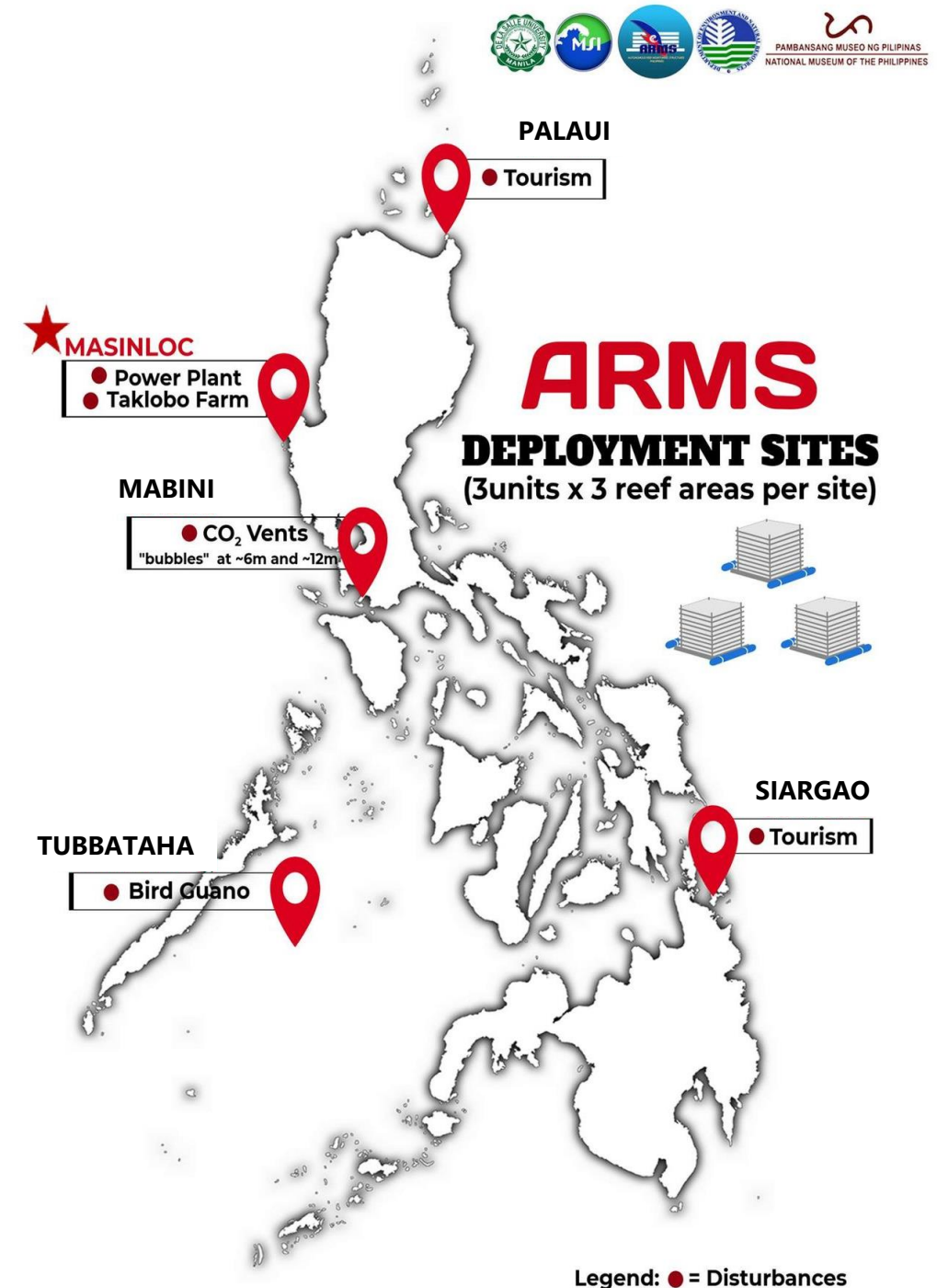
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PHYLUM PLATYHELMINTHES

Members of this group are invertebrates that have flat body with no complete digestive system. They have a gastrovascular cavity which is used to bring in food and is also used to expel food waste. They are known as predators, as scavengers, and as parasites. They have internal fertilization because they possess both eggs and sperms. This taxon is divided into four classes: the free-living (Turbellaria) which is usually found in marine waters, the ectoparasites of fish (Monogenea), the internal parasites of humans and other organisms (Trematoda), and the tapeworms as internal parasites of many vertebrates (Cestoda).

Taxonomic classification of some species of flatworms that found shelter in the ARMS units in Masinloc station:

SUBPHYLUM RHABDITOPHORA

Order Polycladida

Suborder Cotylea

Family Pseudocerotidae

Pseudobiceros sp.



Phylum Platyhelminthes



Family: PSEUDOCEROTIDAE

Scientific Name: *Pseudobiceros* sp.

Common Name: Marine Flat Worm

PHYLUM ANNELIDA

Characterized by the usually long and multi-segmented and bilaterally symmetrical body with no internal skeletal structures, have parapodia for locomotion and move by peristalsis or undulation. The blood circulates throughout the main body cavity without any kind of pump. This group exists in almost all types of environments and members of this group are popularly known as earthworms, bristle worms, peanut worms, and leeches.

Taxonomic classification of some species of annelids that found shelter in the ARMS units in Masinloc station:

CLASS POLYCHAETA [Bristle Worms]

Subclass Sedentaria

Infraclass Canalipalpata

Order Sabellida

Family Serpulidae

Serpula sp.

Subclass Errantia

Order Phyllodocida

Suborder Aphroditiformia

Family Polynoidae

Iphione sp.

Suborder Nereidiformia

Family Nereididae

Nereis sp.



Phylum Annelida Subphylum Polychaeta



Family: SERPULIDAE
Scientific Name: *Serpula* sp.
Common Name: Christmas Tree Worm



Family: POLYNOIDAE
Common Name: Scale Worm
Scientific Name: *Iphione* sp.



Phylum Annelida Subphylum Polychaeta



Family: NEREIDIDAE
Scientific Name: *Nereis* sp.
Common Name: Rag Worm



PHYLUM MOLLUSCA

Soft-bodied animals that may or may not be covered by hard exoskeleton or “shell” and display a wide variety of forms in each subgroup but share common key characteristics. From the large predatory squids and octopuses to the smallest grazing forms, mollusks are grouped into seven classes: Aplacophora (mollusks without plates), Monoplacophora, (mollusks bearing one plate), Polyplacophora (mollusks bearing many plates), Bivalvia, (mollusks bearing a pair of shells) Gastropoda (“stomach foot” mollusks bearing one shell), Cephalopoda (“head foot” mollusks), and Scaphopoda (“boat feet” mollusks).

Taxonomic classification of some species of mollusks that found shelter in the ARMS units in Masinloc station:

CLASS GASTROPODA

Subclass Vetigastropoda

Superfamily Haliotoidea

Family Haliotidae [Abalones]

Haliotis clathrata Reeve, 1846

Superfamily Trochoidea

Family Trochidae

Jujubinus polychroma (A. Adams, 1853)

Subclass Coenogastropoda

Order [unassigned] Coenogastropoda

Superfamily Cerithioidea

Family Cerithiidae

Cerithium balteatum Philippi, 1848

Cerithium sp.



PHYLUM MOLLUSCA

Order Littorinimorpha

Superfamily Rissooidea

Family Rissoinidae

Apataxia sp.

Order Neogastropoda

Superfamily Muricoidea

Family Muricidae [Murex Shells]

Orania walkeri (G. B. Sowerby, 1908)

Chicoreus brunneus (Link, 1807)

Superfamily Turbinelloidea

Family Costellariidae

Vexillum crocatum (Lamarck, 1811)

Vexillum infaustum (Reeve, 1845)

Vexillum sp.

Superfamily Buccinoidea

Family Columbelloidea [Turtle Dove Shells]

Euplica ionida (Duclos, 1840)

Euplica turturina (Lamarck, 1822)

Family Fascioliidae [Tower Latirus Shells]

Peristernia ustulata (Reeve, 1847)

Family Nassariidae

Nassarius sp.

Subclass Heterobranchia

Infraclass Euthyneura

Order Pleurobranchida

Superfamily Pleurobranchioidea

Family Pleurobranchidae

Berthellina sp.

CLASS BIVALVIA [Two Shells]

Subclass Pteriomorpha

Order Pectinida

Superfamily Pectinoidea

Family Pectinidae [Scallops]

Mimachlamys sp.

Subclass Heterodonta

Infraclass Euheterodonta

Order Venerida

Superfamily Veneroidea

Family Veneridae

Periglypta sp.

Phylum Mollusca



3 mm

Family: HALIOTIDAE

Scientific Name: *Haliotis clathrata* Reeve, 1846

Common Name: Abalone Shell



1 mm

Family: TROCHIDAE

Scientific Name: *Jujubinus polychroma* (A. Adams, 1853)

Common Name: Top Shell

Phylum Mollusca



6 mm

Family: CERITHIIDAE

Scientific Name: *Cerithium balteatum* Philippi, 1848

Common Name: Cerith Shell



5 mm

Family: CERITHIIDAE

Scientific Name: *Cerithium* sp.

Common Name: Cerith Shell

Phylum Mollusca



Family: RISSIONIDAE
Scientific Name: *Apataxia* sp.
Common Name: Rissoid Shell



Family: MURICIDAE
Scientific Name: *Orania walkeri* (G. B. Sowerby III, 1908)
Common Name: Murex Shell

Phylum Mollusca



Family: MURICIDAE
Scientific Name: *Chicoreus brunneus* (Link, 1807)
Common Name: Murex Shell



Family: COSTELLARIIDAE
Scientific Name: *Vexillum crocatum* (Lamarck, 1811)
Common Name: Saffron Mitre

Phylum Mollusca



Family: COSTELLARIIDAE
Scientific Name: *Vexillum infaustum* (Reeve, 1845)
Common Name: Ribbed Mitre



Family: COSTELLARIIDAE
Scientific Name: *Vexillum* sp.
Common Name: Ribbed Mitre

Phylum Mollusca



Family: COLUMBELLIDAE
Scientific Name: *Euplica ionida* (Duclos, 1840)
Common Name: Dove Shell



Family: COLUMBELLIDAE
Scientific Name: *Euplica turturina* (Lamarck, 1822)
Common Name: Turtle Dove Shell

Phylum Mollusca

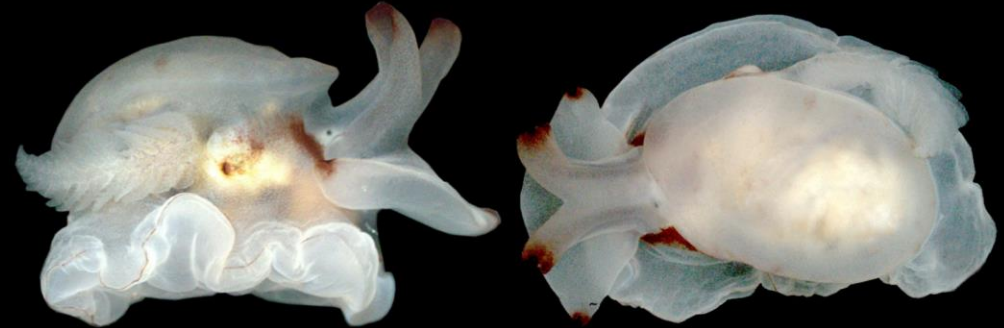


Family: FASCIOLARIIDAE
Scientific Name: *Peristernia ustulata* (Reeve, 1847)
Common Name: Spindle Snail

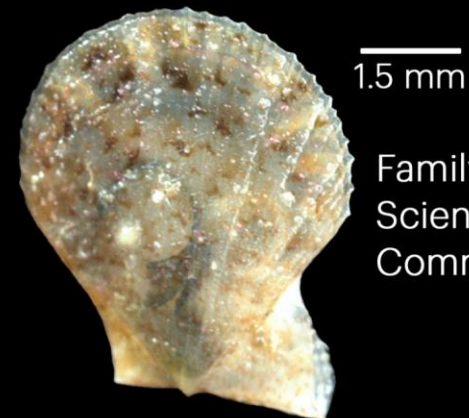


Family: COSTELLARIIDAE
Scientific Name: *Vexillum* sp.
Common Name: Ribbed Mitre

Phylum Mollusca



Family: PLEUROBRANCHIDAE
Scientific Name: *Berthellina* sp.
Common Name: Side-gilled Sea Slug



Family: PECTENIDAE
Scientific Name: *Mimachlamys* sp.
Common Name: Scallop



Family: VENERIDAE
Scientific Name: *Periglypta* sp.
Common Name: Venus Clam

PHYLUM ARTHROPODA

SUBPHYLUM CRUSTACEA

Crustaceans are the “insects” of the sea which include popular animals like barnacles, amphipods, skeleton shrimps, shrimps and prawns, hermit crabs, squat lobsters, lobsters, crabs, and mantis shrimps. Being such a large and diverse group, their life cycle may vary but each crustacean must molt or shed its hardened epidermis or shells in order to grow. Organisms under this subphylum are identified by a head with paired mandibular jaws, a pair of maxillae, two pairs of antennae, and appendages that are mostly separated into two branches (biramous).

Taxonomic classification of some species of crustaceans that found shelter in the ARMS units in Masinloc station:

- CLASS MALACOSTRACA
 - Subclass Eumalacostraca
 - Superorder Peracarida
 - Order Amphipoda
 - Infraorder Corophilda
 - Superfamily Caprelloidea
 - Family Caprellidae
 - [unidentified caprellid]
 - Superorder Eucarida
 - Order Decapoda
 - Suborder Pleocyemata
 - Infraorder Caridea
 - Superfamily Palaemonoidea

- Family Palaemonidae
 - Periclimenes* sp.
- Infraorder Anomura
 - Superfamily Galattheoidea
 - Family Galatheididae
 - Galathea* sp.
 - Superfamily Paguroidea
 - Family Paguridae
 - Pagurus* sp.
- Infraorder Brachyura
 - Superfamily Portunoidea
 - Family Portunidae
 - Thalamitoides quadridens* A. Milne-Edwards, 1869

Phylum Arthropoda Subphylum Crustacea



Family: CRANGONIDAE
Scientific Name: *Philocheras* sp.
Common Name: Sand Shrimp



Family: PALAEMONIDAE
Scientific Name: *Periclimenes* sp.
Common Name: Anemone Shrimp

Phylum Arthropoda Subphylum Crustacea



Family: GALATHEIDAE
Scientific Name: *Galathea* sp.
Common Name: Squat Lobster



Family: PAGURIDAE
Scientific Name: *Pagurus* sp.
Common Name: Hermit Crab

Phylum Arthropoda

Subphylum Crustacea



Family: PORTUNIDAE

Common Name: Swimming Crab

Scientific Name: *Thalamitoides quadridens*

A. Milne-Edwards, 1869

PHYLUM ECHINODERMATA

Exclusively marine animals easily distinguished by having five duplicate body parts (pentamerous radial symmetry), several bone-like elements made of calcium carbonate that form the internal skeleton of the animal and which provide support and protection (calcareous ossicles), body cavities forming water-vascular system (coelomic canals), soft body appendages, and tube feet used in feeding and locomotion. This group also displays a wide variety of forms from the soft-bodied sea cucumbers to the spiky sea urchins. This group is subdivided into six classes: Crinoidea (sea lilies and feather stars), Asteroidea (sea stars), Ophiuroidea (brittle stars), Concentricycloidea (sea daisies), Echinoidea (sea urchins), and Holothuroidea (sea cucumbers).

Taxonomic classification of some species of echinoderms that found shelter in the ARMS units in Masinloc station:

Subphylum ASTEROZOA

Class OPHIUROIDEA

Order Amphilepidida

Superfamily Ophiactoidea

Family Ophiactidae

Ophiactis sp.

Class ASTEROIDEA

Order Valvatida

Family Asterinidae

Aquilonastra sp.



Phylum Echinodermata



Family: OPHIACTIDAE

Scientific Name: *Ophiactis* sp.

Common Name: Brittle star



Family: ASTERINIDAE

Scientific Name: *Aquilonastra* sp.

Common Name: Coral Dwelling Sea Star

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA

This group includes all animals with backbones called vertebrates characterized by a bilaterally symmetrical body, multi-layered epidermis, have three types of muscle tissues (striped, unstriped, and cardiac), have a well-developed body cavity, complete alimentary canal, well-developed respiratory and excretory systems, have endocrine glands, have three- or four-chambered heart, are unisexual and reproduce sexually (except for hagfish) and the brain is protected by a skull.

Taxonomic classification of some species of vertebrates that found shelter in the ARMS units in Masinloc station:

SUPERCLASS GNATHOSTOMATA / PISCES

Class ACTINOPTERYGII

Order Perciformes

Suborder Percoidei

Family Pseudochromidae

Pseudochromis fuscus Müller & Troschel, 1849

Suborder Gobioidi

Family Gobiidae

Eviota albolineata Jewett & Lachner, 1983

Trimma hayashii Hagiwara & Winterbottom, 2007

Order Pleuronectiformes

Family Soleidae

Aseraggodes sp.



Phylum Chordata



Family: PSEUDOCROMIDAE

Scientific Name: *Pseudochromis fuscus*

Müller & Troschel, 1849

Common Name: Dusky Dottyback (yellow phase)



Family: GOBIIDAE

Scientific Name: *Eviota albolineata*

Jewett & Lachner, 1983

Common Name: Redspotted Pygmygoby

Phylum Echinodermata



Family: GOBIIDAE

Scientific Name: *Trimma hayashii*

Hagiwara & Winterbottom, 2007

Common Name: Four-eye Pygmygoby



Family: SOLEIDAE

Scientific Name: *Aseraggodes* sp.

Common Name: Sole Fish

FIELD GUIDE

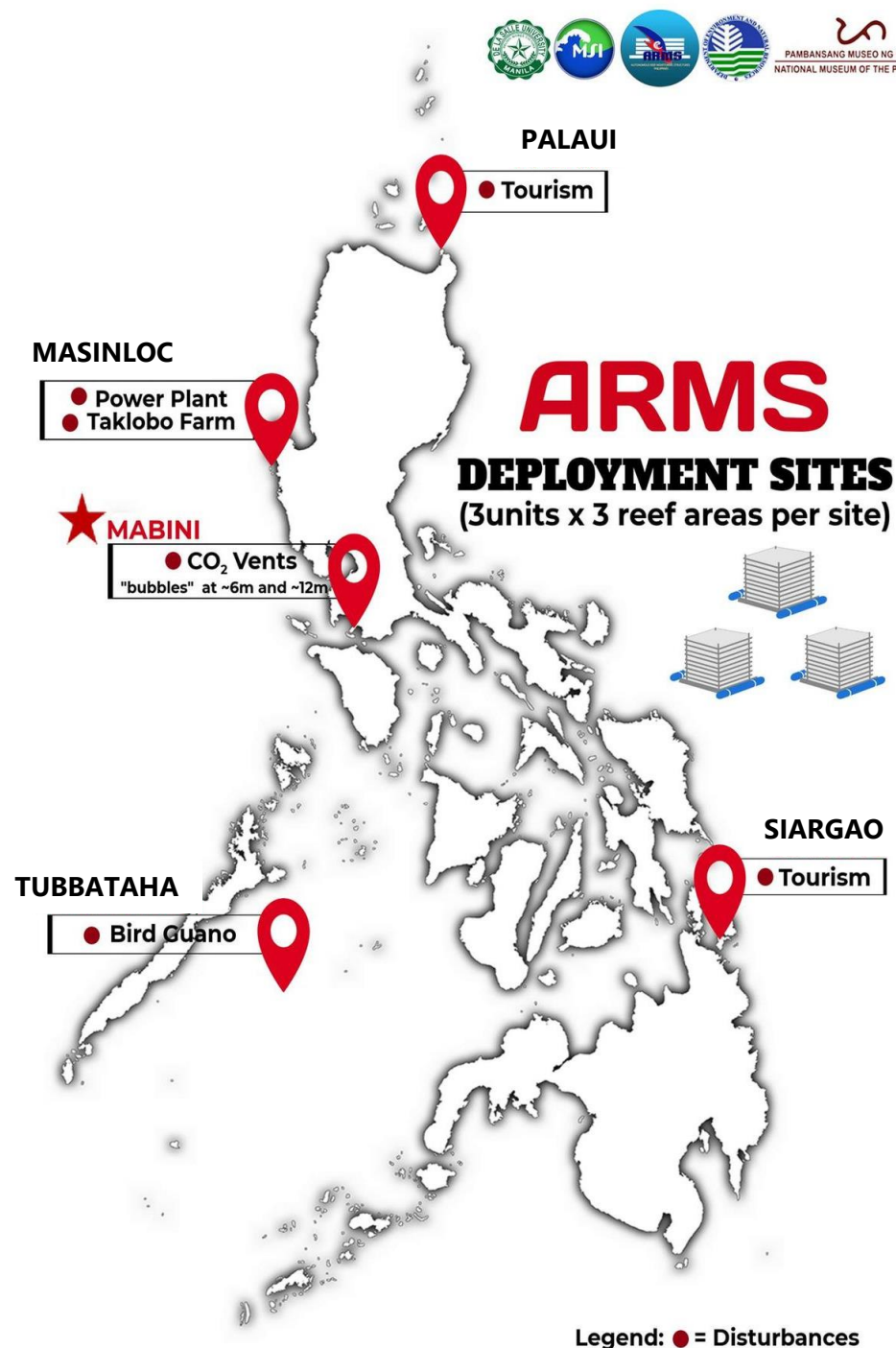
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MABINI, BATANGAS
PHILIPPINES 2022



PHYLUM ANNELIDA

Characterized by the usually long and multi-segmented and bilaterally symmetrical body with no internal skeletal structures, have parapodia for locomotion and move by peristalsis or undulation. The blood circulates throughout the main body cavity without any kind of pump. This group exists in almost all types of environments and members of this group are popularly known as earthworms, bristle worms, peanut worms, and leeches.

Taxonomic classification of some species of annelids that found shelter in the ARMS units in Mabini station:

CLASS POLYCHAETA [Bristle Worms]

Subclass Sedentaria

Infraclass Scolocida

Order Capitellida

Family Capitellidae

Heteromastus sp.

Order Chaetopterida

Family Chaetopteridae

Chaetopterus sp.

Infraclass Canalipalpata

Order Sabellida

Family Sabellidae

Sabellastarte spectabilis (Grube, 1878)

Sabellastarte sp.

Order Terebellida

Suborder Terebellimorpha

Family Terebellidae

Amphitrite sp.

Loimia sp.

Thelepus sp.



Phylum Annelida Subphylum Polychaeta



Family: CAPITELLIDAE

Scientific Name: *Heteromastus* sp.

Common Name: Thread Worm



Family: CHAETOPTERIDAE

Scientific Name: *Chaetopterus* sp.

Common Name: Parchment Tube Worm

Phylum Annelida Subphylum Polychaeta



Family: SABELLIDAE

Scientific Name: *Sabellastarte spectabilis* (Grube, 1878)

Common Name: Fan Worm



Family: SABELLIDAE

Scientific Name: *Sabellastarte* sp.

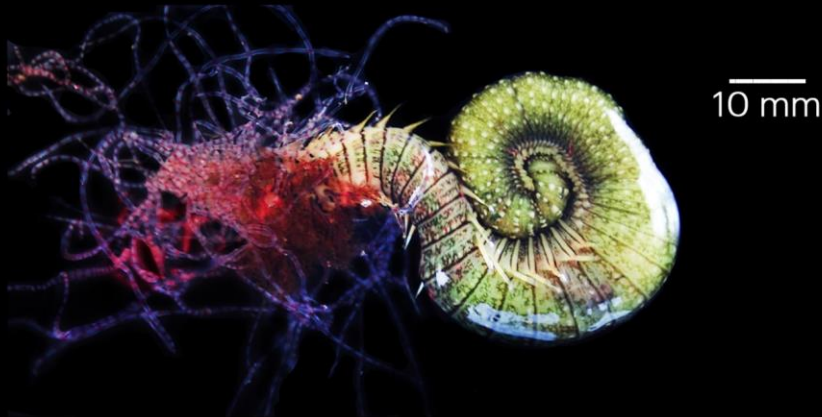
Common Name: Fan Worm

Phylum Annelida

Subphylum Polychaeta



Family: TEREHELLIDAE
Scientific Name: *Amphitrite* sp.
Common Name: Spaghetti Worm



Family: TEREHELLIDAE
Scientific Name: *Loimia* sp.
Common Name: Spaghetti Worm

Phylum Annelida

Subphylum Polychaeta



Family: TEREHELLIDAE
Scientific Name: *Thelepus* sp.
Common Name: Spaghetti Worm

PHYLUM MOLLUSCA

Soft-bodied animals that may or may not be covered by a hard exoskeleton or “shell” and display a wide variety of forms in each subgroup but share common key characteristics. From the large predatory squids and octopuses to the smallest grazing forms, mollusks are grouped into seven classes: Aplacophora (mollusks without plates), Monoplacophora, (mollusks bearing one plate), Polyplacophora (mollusks bearing many plates), Bivalvia, (mollusks bearing a pair of shells) Gastropoda (“stomach foot” mollusks bearing one shell), Cephalopoda (“head foot” mollusks), and Scaphopoda (“boat feet” mollusks).

Taxonomic classification of some species of mollusks that found shelter in the ARMS units in Mabini station:

CLASS POLYPLACOPHORA [Chitons]

Order Chitonida

Family Chitonidae

Chiton sp.

CLASS GASTROPODA

Subclass Vetigastropoda

Superfamily Fissureloidea

Family Fissurellidae [Limpets]

Diodora sp.

Superfamily Haliotoidea

Family Haliotidae [Abalones]

Haliotis sp.

Superfamily Trochoidea

Family Turbinidae [Turban Shells]

Turbo smithi G. B. Sowerby III, 1886



PHYLUM MOLLUSCA

- Subclass Coenogastropoda
 - Order Littorinimorpha
 - Superfamily Tonnoidea
 - Family Cymatidae [Tadpole Tritons]
 - Gyrineum gyrinum* (Linnaeus, 1758)
 - Order Neogastropoda
 - Superfamily Muricoidea
 - Family Muricidae [Murex Shells]
 - Orania walker* (G. B. Sowerby, 1908)
 - Superfamily Buccinoidea
 - Family Columbellidae [Turtle Dove Shells]
 - Euplica turturina* (Lamarck, 1822)
 - Mitrella moleculina* (Duclos, 1840)
 - Mitrella* sp.
 - Family Fascioliariidae [Tower Latirus Shells]
 - Turritatirus turritus* (Gmelin, 1791)
 - Family Pisaniidae [Welks and Goblet Snails]
 - Clivipollia incarnata* (Deshayes, 1834)
 - Engina spica* Melvill & Standen, 1895
 - Pisania ignea* (Gmelin, 1791)
 - Pollia* sp.
 - Family Nassariidae
 - Nassarius* sp1
 - Nassarius* sp2
 - Superfamily Conoidea
 - Family Conidae [Cone Shells]
 - Conus araneosus* [Lightfoot], 1786

- CLASS BIVALVIA [Two Shells]
 - Subclass Pteriomorpha
 - Order Arcida
 - Superfamily Arcoidea
 - Family Arcidae [Ark Clams]
 - Barbatia foliata* (Forsskal in Nebuhr, 1775)
 - Arca* sp1
 - Arca* sp2
 - Order Pterioda
 - Family Pteridae [Pearl Oysters]
 - Pinctada* sp.
 - Order Ostreida
 - Superfamily Pinnoidea
 - Family Pinnidae [Pen Shells]
 - Streptopinna saccata* (Linnaeus, 1758)
 - Order Pectinida
 - Superfamily Pectinoidea
 - Family Pectinidae [Scallops]
 - Mimachlamys* sp.
 - Order Limida
 - Superfamily Limioidea
 - Family Limidae
 - Limaria* sp.

Phylum Mollusca



1 mm

Family: CHITONIDAE
Scientific Name: *Chiton* sp.
Common Name: Coat of Mail Shell



12 mm

Family: FISSURELLIDAE
Scientific Name: *Diodora* sp.
Common Name: Keyhole Limpet

Phylum Mollusca



4 mm

Family: HALIOTIDAE
Scientific Name: *Haliotis* sp.
Common Name: Abalone Shell



5 mm

Family: TURBINIDAE
Scientific Name: *Turbo smithi* G. B. Sowerby III, 1886
Common Name: Miniature Turban

Phylum Mollusca



Family: CYMATIIDAE

Scientific Name: *Gyrineum gyrinum* (Linnaeus, 1758)

Common Name: Tadpole Triton



Family: MURICIDAE

Scientific Name: *Orania walkeri* (G. B. Sowerby III, 1908)

Common Name: Murex Shell

Phylum Mollusca



Family: COLUMBELLIDAE

Scientific Name: *Euplica turturina* (Lamarck, 1822)

Common Name: Turtle Dove Shell

Phylum Mollusca



Family: COLUMBELLIDAE

Scientific Name: *Mitrella moleculina* (Duclos, 1840)

Common Name: Dove Shell



Family: COLUMBELLIDAE

Scientific Name: *Mitrella* sp.

Common Name: Dove Shell

Phylum Mollusca



Family: FASCIOLARIIDAE

Scientific Name: *Turritatus turritus* (Gmelin, 1791)

Common Name: Tower Latirus



Phylum Mollusca



Family: PISANIIDAE

Scientific Name: *Clivipollia incarnata* (Deshayes, 1834)

Common Name: True Welk



Family: PISANIIDAE

Scientific Name: *Engina spica* Melvill & Standen, 1895

Common Name: True Welk

Phylum Mollusca



Family: PISANIIDAE

Scientific Name: *Pisania ignea* (Gmelin, 1791)

Common Name: True Welk



Family: PISANIIDAE

Scientific Name: *Pollia* sp.

Common Name: Goblet Snail

Phylum Mollusca



Family: NASSARIIDAE
Scientific Name: *Nassarius* sp.
Common Name: Dog Welk



Family: NASSARIIDAE
Scientific Name: *Nassarius* sp.
Common Name: Dog Welk

Phylum Mollusca



Family: CONIDAE
Scientific Name: *Conus araneosus* [Lightfoot], 1786
Common Name: Cobweb Cone Shell

Phylum Mollusca



3 mm

Family: ARCIDAE

Scientific Name: *Barbatia foliata* (Forsskål in Niebuhr, 1775)

Common Name: Ark Clam



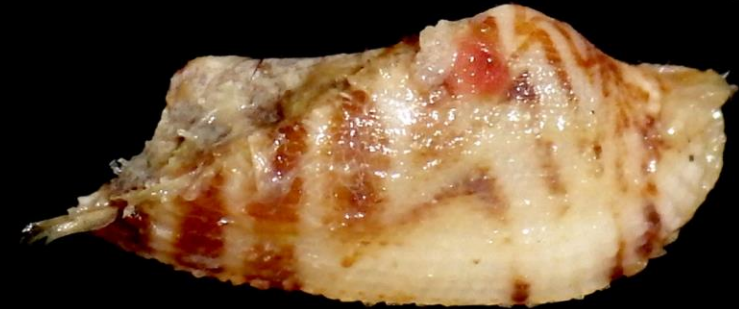
3 mm

Family: ARCIDAE

Scientific Name: *Arca* sp.

Common Name: Ark Clam

Phylum Mollusca



2 mm

Family: ARCIDAE

Scientific Name: *Arca* sp.

Common Name: Ark Clam



13 mm

Family: PTERIDAE

Scientific Name: *Pinctada* sp.

Common Name: Pearl Oyster

Phylum Mollusca



12 mm

Family: PINNIDAE

Scientific Name: *Streptopinna saccata* (Linnaeus, 1758)

Common Name: Pen Shell

Phylum Mollusca



3 mm

Family: PECTINIDAE

Scientific Name: *Mimachlamys* sp.

Common Name: Scallop



3 mm

Family: LIMIDAE

Scientific Name: *Limaria* sp.

Common Name: Fire Clam

PHYLUM ARTHROPODA

SUBPHYLUM CRUSTACEA

Crustaceans are the “insects” of the sea which include popular animals like barnacles, amphipods, skeleton shrimps, shrimps and prawns, hermit crabs, squat lobsters, lobsters, crabs, and mantis shrimps. Being such a large and diverse group, their life cycle may vary but each crustacean must molt or shed its hardened epidermis or shells in order to grow. Organisms under this subphylum are identified by a head with paired mandibular jaws, a pair of maxillae, two pairs of antennae, and appendages that are mostly separated into two branches (biramous).

Taxonomic classification of some species of crustaceans that found shelter in the ARMS untis in Mabini station:

- CLASS MALACOSTRACA
 - Order Decapoda
 - Suborder Pleocyemata
 - Infraorder Stenopodidea
 - Family Spongicolidae
 - Spongiocaris* sp.
 - Infraorder Caridea
 - Superfamily Nematocarcinoidea
 - Family Rhynchocinetidae
 - Rhynchocinetes* sp.
 - Superfamily Palaemonoidea
 - Family Palaemonidae
 - Periclemenes* sp.
 - Superfamily Alpheoidea
 - Family Alpheidae
 - Alpheus* sp.

- Infraorder Anomura
 - Superfamily Galatheoidea
 - Family Galatheidae
 - Galathea* sp1
 - Galathea* sp2
 - Galathea amboinensis* De Man, 1888
 - Allogalathea elegans* (Adams & White, 1848)
 - Family Porcellanidae
 - Polyonyx* sp1
 - Polyonyx* sp2
 - Polyonyx* sp3
 - Petrolisthes* sp1
 - Petrolisthes* sp2
 - Infraorder Brachyura
 - Superfamily Majoidea
 - Family Majidae
 - Schizophyrs aspera* (H. Milne Edwards, 1831)
 - Family Epialtidae
 - Hyastenus* sp
 - Superfamily Portunoidea
 - Family Portunidae
 - Thalamita* sp.
 - Thranita coeruleipes* (Hombron & Jacquinot, 1846 [in Hombron & Jacquinot, 1842-1854])
 - Thalamitoides quadridens* A. Milne-Edwards, 1869
 - Superfamily Carpilioidea
 - Family Carpiliidae
 - Carpilius convexus* (Forskål, 1775)
 - Superfamily Pilumnoidea
 - Family Pilumnidae
 - Eumedonus* sp
 - Pilumnus longicornis* Hilgendorf, 1878
 - Superfamily Xanthoidea
 - Family Xanthidae
 - Chlorodiella* sp.
 - Actaeodes consobrinus* (A. Milne-Edwards, 1873)
 - Liomera monticulosa* (A. Milne-Edwards, 1873)
 - Liomera rubra* (A. Milne-Edwards, 1865)

Phylum Arthropoda Subphylum Crustacea



Family: SPONGICOLIDAE
Scientific Name: *Spongiocaris* sp.
Common Name: Sponge Shrimp



Family: RHYNCHOCINETIDAE
Scientific Name: *Rhynchocinetes* sp.
Common Name: Camel Shrimp

Phylum Arthropoda Subphylum Crustacea



Family: PALAEMONIDAE
Scientific Name: *Periclimenes* sp.
Common Name: Anemone Shrimp



Family: ALPHEIDAE
Scientific Name: *Alpheus* sp.
Common Name: Pistol Shrimp

Phylum Arthropoda Subphylum Crustacea



Family: GALATHEIDAE
Scientific Name: *Galathea* spp.
Common Name: Squat Lobster

Phylum Arthropoda Subphylum Crustacea



Family: GALATHEIDAE
Common Name: Squat Lobster
Scientific Name: *Galathea amboinensis* De Man, 1888



Family: GALATHEIDAE
Scientific Name: *Allogalathea elegans* (Adams & White, 1848)
Common Name: Squat Lobster

Phylum Arthropoda
Subphylum Crustacea



Family: PORCELLANIDAE
Scientific Name: *Polyonyx* spp.
Common Name: Porcelain Crab

Phylum Arthropoda
Subphylum Crustacea



Family: PORCELLANIDAE
Scientific Name: *Petrolisthes* spp.
Common Name: Porcelain Crab

Phylum Arthropoda Subphylum Crustacea



Family: MAJIDAE
Scientific Name: *Schizophrys aspera* (H. Milne Edwards, 1834)
Common Name: Decorator Crab



Family: EPIALTIDAE
Scientific Name: *Hyastenus* sp.
Common Name: Decorator Crab

Phylum Arthropoda Subphylum Crustacea



Family: PORTUNIDAE
Scientific Name: *Thalamita* sp.
Common Name: Swimming Crab



Family: PORTUNIDAE
Scientific Name: *Thranita coeruleipes*
Hombron & Jacquinot, 1846
Common Name: Swimming Crab

Phylum Arthropoda Subphylum Crustacea

10 mm



Family: PORTUNIDAE

Scientific Name: *Thalamitoides quadridens*

A. Milne-Edwards, 1869

Common Name: Swimming Crab

3 mm



Family: CARPILIIDAE

Scientific Name: *Carpilius convexus* (Forskål, 1775)

Common Name: Marble Stone Crab

Phylum Arthropoda Subphylum Crustacea

5 mm



Family: PILUMNIDAE

Scientific Name: *Eumedonus* sp.

Common Name: Crinoid Crab

15 mm



Family: PILUMNIDAE

Scientific Name: *Pilumnus longicornis* Hilgendorf, 1878

Common Name: Hairy Crab

Phylum Arthropoda Subphylum Crustacea

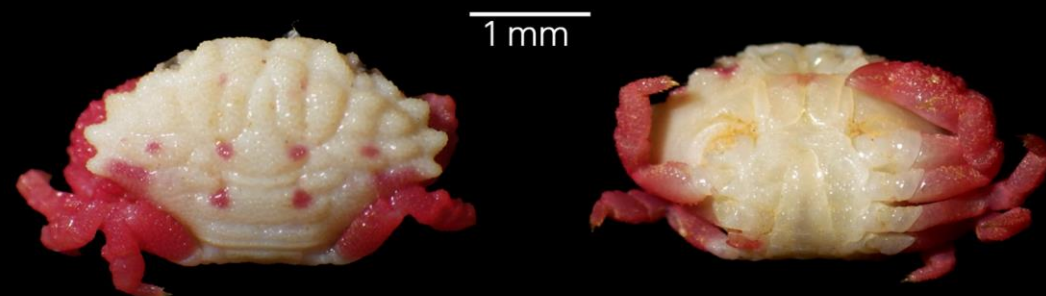


Family: XANTHIDAE
Scientific Name: *Chlorodiella* sp.
Common Name: Coral Crab



Family: XANTHIDAE
Scientific Name: *Actaeodes consobrinus*
(A. Milne-Edwards, 1873)
Common Name: Rubble Crab

Phylum Arthropoda Subphylum Crustacea



Family: XANTHIDAE
Scientific Name: *Liomera monticulosa*
(A. Milne-Edwards, 1873)
Common Name: Xanthid Crab



Family: XANTHIDAE
Scientific Name: *Liomera rubra* (A. Milne-Edwards, 1865)
Common Name: Red Liomera

PHYLUM ECHINODERMATA

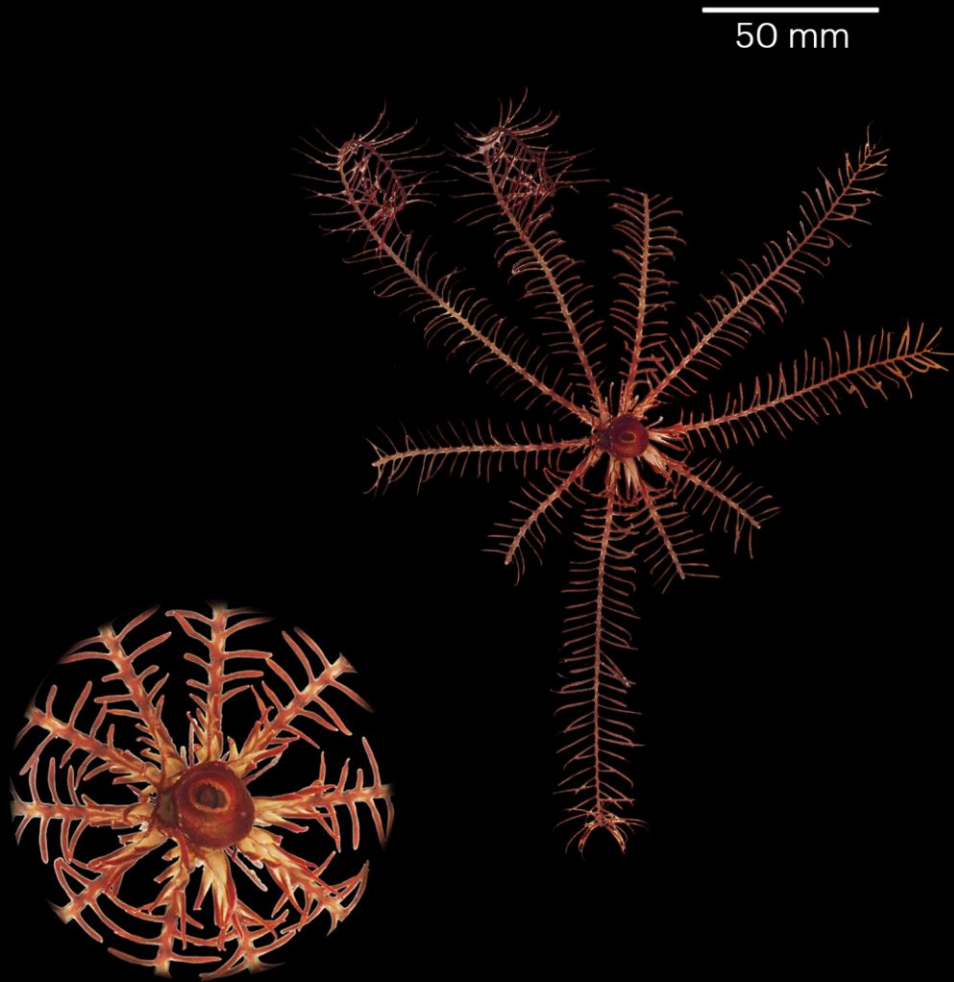
Exclusively marine animals easily distinguished by having five duplicate body parts (pentamerous radial symmetry), several bone-like elements made of calcium carbonate that form the internal skeleton of the animal and which provide support and protection (calcareous ossicles), body cavities forming water-vascular system (coelomic canals), soft body appendages, and tube feet used in feeding and locomotion. This group also displays a wide variety of forms from the soft-bodied sea cucumbers to the spiky sea urchins. This group is subdivided into six classes: Crinoidea (sea lilies and feather stars), Asteroidea (sea stars), Ophiuroidea (brittle stars), Concentricycloidea (sea daisies), Echinoidea (sea urchins), and Holothuroidea (sea cucumbers).

Taxonomic classification of some species of echinoderms that found shelter in the ARMS units in Mabini station:

- SUBPHYLUM CRINOZOA
 - CLASS CRINOIDEA
 - Order Comatulida
 - Superfamily Antenodoidea
 - Family Antedonidae
 - Antedon* sp.
 - Superfamily Himerometroidea
 - Family Mariametridae
 - Mariametra* sp.

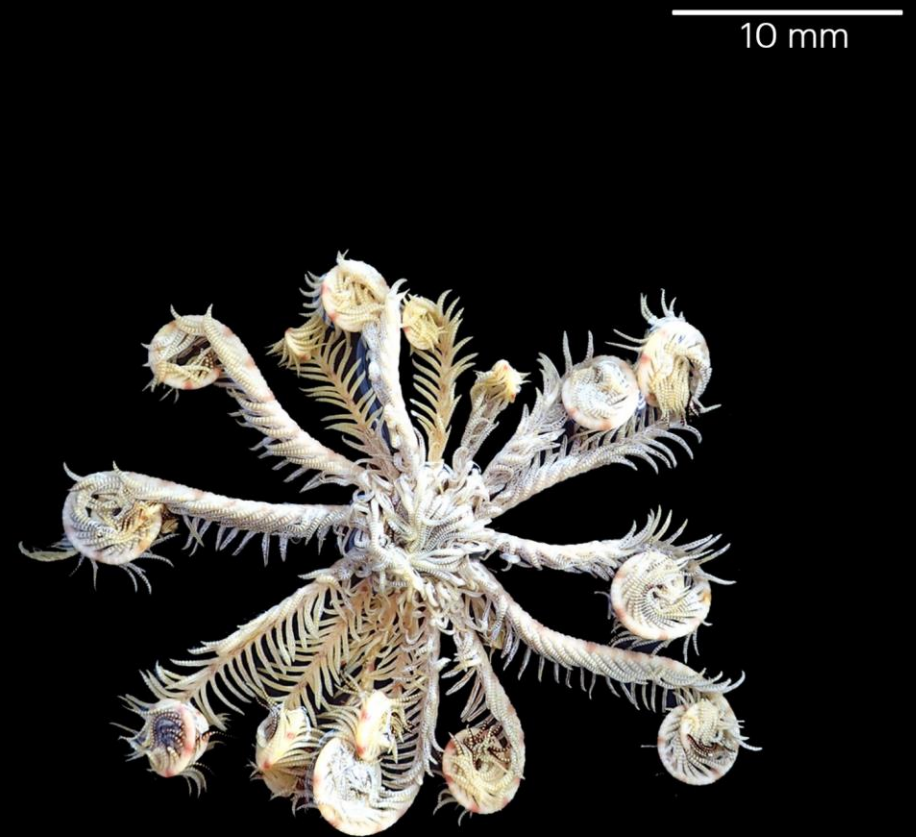
- SUBPHYLUM ASTEROZOA
 - CLASS OPHIUROIDEA
 - Order Amphilepidida
 - Superfamily Ophiolepidioidea
 - Family Ophiolepididae
 - Ophiolepis* sp.
 - Superfamily Ophiactoidea
 - Family Ophiotrichidae
 - Ophiothrix* sp.
 - SUBPHYLUM ECHINOZOA
 - CLASS HOLOTHUROIDEA
 - Order Apodida
 - Family Chiridotidae
 - Chiridota* sp.

Phylum Echinodermata



Family: ANTEDONIDAE
Scientific Name: *Antedon* sp.
Common Name: Feather star

Phylum Echinodermata

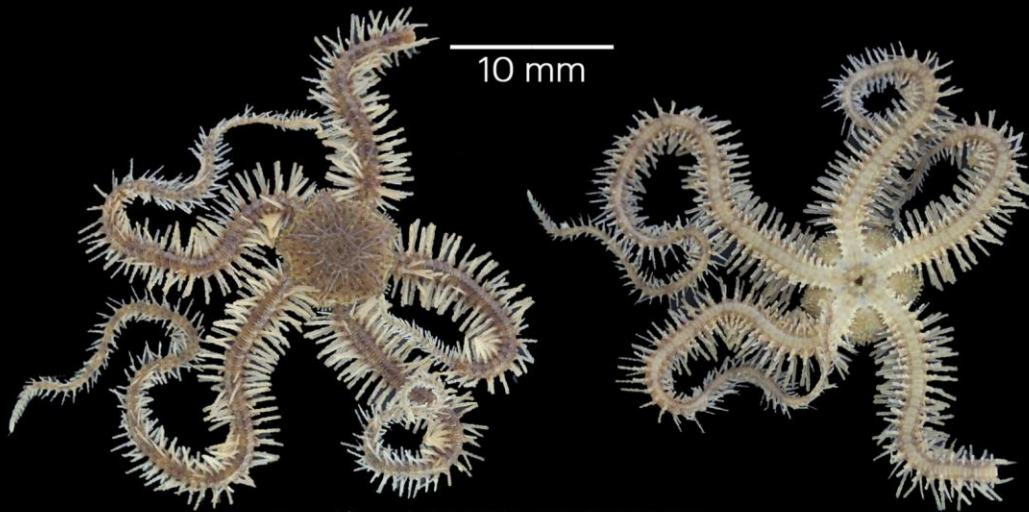


Family: MARIAMETRIDAE
Scientific Name: *Mariametra* sp.
Common Name: Feather Star

Phylum Echinodermata



Family: OPHIOLEPIDIDAE
Scientific Name: *Ophiolepis* sp.
Common Name: Brittle Star



Family: OPHIOTRICHIDAE
Scientific Name: *Ophiotrix* sp.
Common Name: Brittle star

Phylum Echinodermata



Family: CHIRIDOTIDAE
Scientific Name: *Chiridota* sp.
Common Name: Sea Cucumber

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA

This group includes all animals with backbones called vertebrates characterized by a bilaterally symmetrical body, multi-layered epidermis, have three types of muscle tissues (striped, unstriped, and cardiac), have a well-developed body cavity, complete alimentary canal, well-developed respiratory and excretory systems, have endocrine glands, have three- or four-chambered heart, are unisexual and reproduce sexually (except for hagfish) and the brain is protected by a skull.

Taxonomic classification of some species of vertebrates that found shelter in the ARMS units in Mabini station:

SUPERCLASS GNATHOSTOMATA / PISCES

CLASS ACTINOPTERYGII

Order Perciformes

Suborder Percoidei

Family Apogonidae

Fowleria sp.

Suborder Gobioidi

Family Gobiidae

Trimma sp.

Unidentified goby



Phylum Chordata



5 mm

Family: APOGONIDAE
Scientific Name: *Fowleria* sp.
Common Name: Cardinal Fish



5.5 mm

Family: GOBIIDAE
Scientific Name: *Trimma* sp.
Common Name: Dwarf Goby

Phylum Chordata



5 mm

Family: GOBIIDAE
Common Name: Goby

FIELD GUIDE

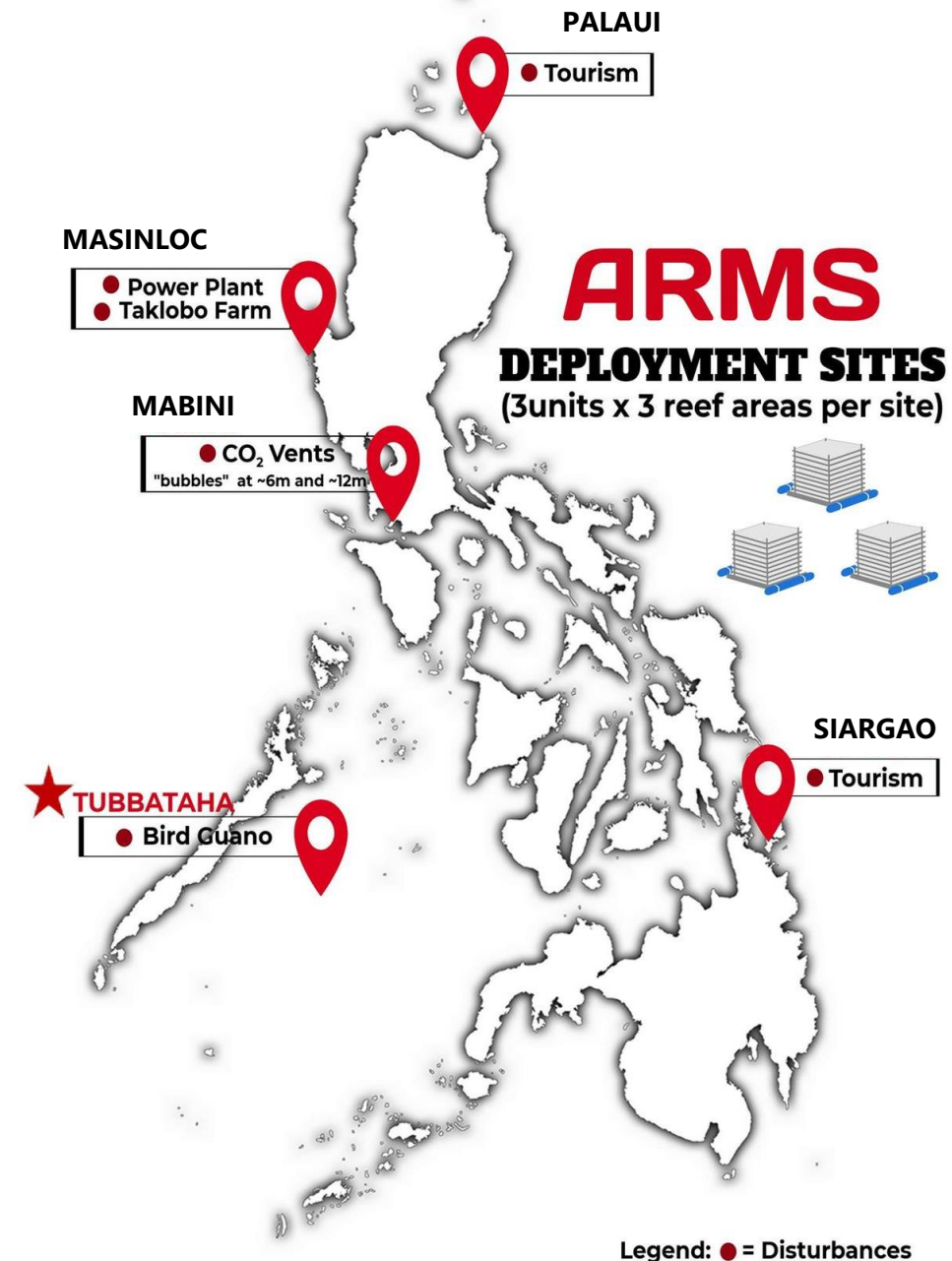
CORAL REEF
ASSOCIATED ORGANISMS

COLLECTED FROM

AUTONOMOUS REEF
MONITORING STRUCTURES
(ARMS)



TUBBATAHA, PALAWAN
PHILIPPINES 2022



PHYLUM ANNELIDA

Characterized by usually long and multi-segmented and bilaterally symmetrical body with no internal skeletal structures, have parapodia for locomotion and move by peristalsis or undulation. The blood circulates throughout the main body cavity without any kind of pump. This group exists in almost all types of environments and members of this group are popularly known as earthworms, bristle worms, peanut worms, and leeches.

Taxonomic classification of some species of annelids that found shelter in the ARMS units in Tubbataha station:

CLASS POLYCHAETA [Bristle Worms]

- Subclass Errantia

- Order Eunicida

- Family Eunicidae

- Eunice* sp.

- Infraclass Canalipalpata

- Order Sabellida

- Family Sabellidae

- Sabellastarte spectabilis* (Grube, 1878)



Phylum Annelida
Subphylum Polychaeta



Family: EUNICIDAE
Scientific Name: *Eunice* sp.
Common Name: Eunicid Worm

Phylum Annelida
Subphylum Polychaeta



Family: SABELLIDAE
Scientific Name: *Sabellastarte spectabilis* (Grube, 1878)
Common Name: Feather Duster Worm

PHYLUM MOLLUSCA

Soft-bodied animals that may or may not be covered by hard exoskeleton or “shell” and display a wide variety of forms in each subgroup but share common key characteristics. From the large predatory squids and octopuses to the smallest grazing forms, mollusks are grouped into seven classes: Aplacophora (mollusks without plates), Monoplacophora, (mollusks bearing one plate), Polyplacophora (mollusks bearing many plates), Bivalvia, (mollusks bearing a pair of shells) Gastropoda (“stomach foot” mollusks bearing one shell), Cephalopoda (“head foot” mollusks), and Scaphopoda (“boat feet” mollusks).

Taxonomic classification of some species of mollusks that found shelter in the ARMS units in Tubbataha station:

CLASS GASTROPODA

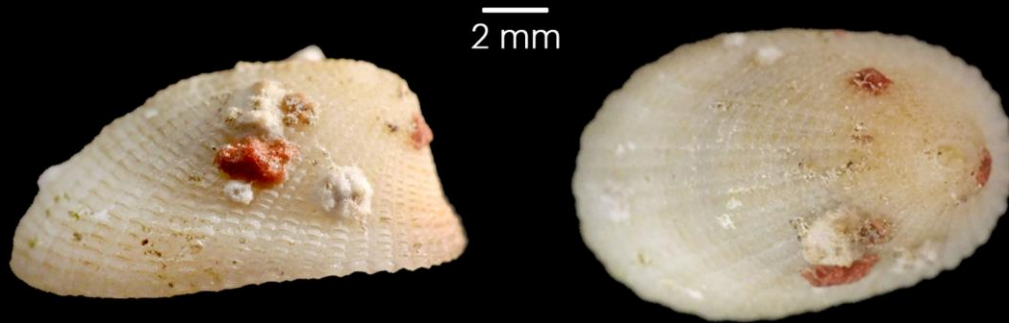
- Subclass Vetigastropoda
 - Superfamily Fissureloidea
 - Family Fissurellidae [Limpets]
 - Diodora galeata* (Helbing, 1779)
- Subclass Coenogastropoda
 - Order [Unassigned] Coenogastropoda
 - Superfamily Cerithioidea
 - Family Cerithiidae
 - Cerithium lissum* R. B. Watson, 1880
 - Cerithium* sp.

- Order Littorinimorpha
 - Superfamily Tonnoidea
 - Family Cymatidae [Tadpole Tritons]
 - Cymatium* sp.
- Order Neogastropoda
 - Superfamily Mitroidea
 - Family Mitridae
 - Nebularia contracta* (Swainson, 1820)
 - Superfamily Turbinelloidea
 - Family Costellariidae
 - Vexillum crocatum* (Lamarck, 1811)
 - Superfamily Buccinoidea
 - Family Columbellidae [Turtle Dove Shells]
 - Euplica turturina* (Lamarck, 1822)
 - Superfamily Conoidea
 - Family Conidae [Cone Shells]
 - Conus obscurus* G. B. Sowerby I, 1833

CLASS BIVALVIA [Two Shells]

- Subclass Pteriomorpha
 - Order Arcida
 - Superfamily Arcoidea
 - Family Arcidae [Ark Clams]
 - Barbatia foliata* (Forsskål in Niebuhr, 1775)
 - Arca* sp.
- Order Pectinida
 - Superfamily Anomioidea
 - Family Anomiidae
 - Anomia* sp.
 - Superfamily Pectinoidea
 - Family Pectinidae [Scallops]
 - Laevichlamys cuneata* (Reave, 1853)
 - Laevichlamys* sp.
 - Mirapecten rastellum* (Lamarck, 1819)

Phylum Mollusca



Family: FISSURELLIDAE

Common Name: Cup-shaped Keyhole Limpet

Scientific Name: *Diodora galeata* (Helbling, 1779)



Family: CERITHIIDAE

Scientific Name: *Cerithium lissum* R. B. Watson, 1880

Common Name: Cerith

Phylum Mollusca



Family: CERITHIIDAE

Scientific Name: *Cerithium* sp.

Common Name: Cerith



Family: CYMATIIDAE

Scientific Name: *Cymatium* sp.

Common Name: Hairy Triton

Phylum Mollusca



Family: MITRIDAE

Scientific Name: *Nebularia contracta* (Swainson, 1820)

Common Name: Contracted Mitre



Family: COSTELLARIIDAE

Scientific Name: *Vexillum crocatum* (Lamarck, 1811)

Common Name: Saffron Mitre

Phylum Mollusca



Family: COLUMBELLIIDAE

Scientific Name: *Euplica turturina* (Lamarck, 1822)

Common Name: Turtle Dove Shell



Family: CONIDAE

Scientific Name: *Conus obscurus* G. B. Sowerby I, 1833

Common Name: Obscure cone

Phylum Mollusca

4.5 mm



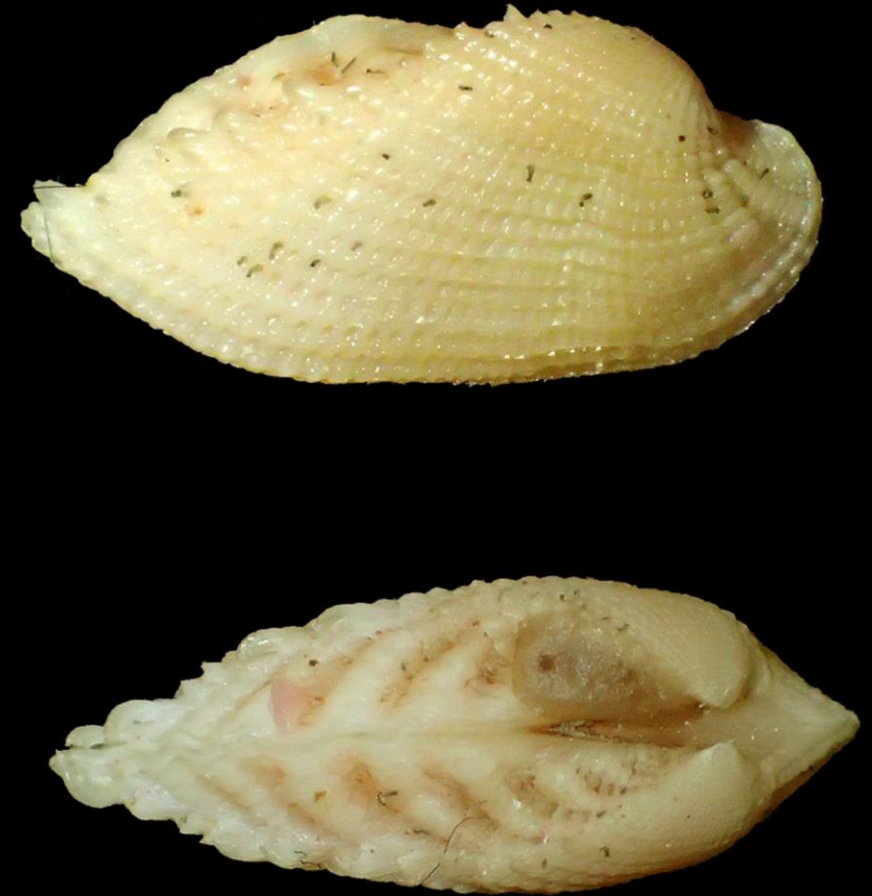
Family: ARCIDAE

Scientific Name: *Barbatia foliata* (Forsskål in Niebuhr, 1775)

Common Name: Arc Clam

Phylum Mollusca

2 mm



Family: ARCIDAE

Scientific Name: *Arca* sp.

Common Name: Arc Clam

Phylum Mollusca



5.5 mm

Family: ANOMIIDAE
Scientific Name: *Anomia* sp.
Common Name: Jingle Shell



2 mm

Family: PECTINIDAE
Scientific Name: *Laevichlamys cuneata* (Reeve, 1853)
Common Name: Scallop

Phylum Mollusca



2 mm



Family: PECTINIDAE
Scientific Name: *Laevichlamys* sp.
Common Name: Scallop



2 mm



Family: PECTINIDAE
Scientific Name: *Mirapecten rastellum* (Lamarck, 1819)
Common Name: Scallop

PHYLUM ARTHROPODA

SUBPHYLUM CRUSTACEA

Crustaceans are the “insects” of the sea which include popular animals like barnacles, amphipods, skeleton shrimps, shrimps and prawns, hermit crabs, squat lobsters, lobsters, crabs, and mantis shrimps. Being such a large and diverse group, their life cycle may vary but each crustacean must molt or shed their hardened epidermis or shells in order to grow. Organisms under this subphylum are identified by a head with paired mandibular jaws, a pair of maxillae, two pairs of antennae, and appendages that are mostly separated into two branches (biramous).

Taxonomic classification of some species of crustaceans that found shelter in the ARMS units in Tubbataha station:

- CLASS MALACOSTRACA
 - Subclass Hoplocarida
 - Order Stomatopoda
 - Suborder Unipeltata
 - Superfamily Gonodactyloidea
 - Family Gonodactyllidae
 - Gonodactylus* sp.
 - Family Pseudosquillidae
 - Pseudosquilla* sp.
 - Subclass Eumalacostraca
 - Order Decapoda
 - Suborder Pleocyemata
 - Infraorder Caridea
 - Superfamily Palaemonoidea
 - Family Palaemonidae
 - Cuapetes tenuipes* (Borradaile, 1898)

- Superfamily Alpheoidea
 - Family Alpheidae
 - Alpheus* sp.
 - Family Hippolytidae
 - Saron marmoratus* (Olivier, 1811)
- Infraorder Anomura
 - Superfamily Galattheoidea
 - Family Galatheididae
 - Allogalathea elegans* (Adams & White, 1848)
- Infraorder Brachyura
 - Superfamily Portunoidea
 - Family Portunidae
 - Subfamily Carupinae
 - Laeonectes nipponensis* (Sakai, 1938)
 - Subfamily Thalamitinae
 - Gonioinfradens paucidentatus* (A. Milne Edwards, 1861)
 - Thalamitoides quadridens* A. Milne-Edwards, 1869
- Superfamily Xanthoidea
 - Family Pilumnidae
 - Pilumnus longicornis* Hilgendorf, 1878
- Superfamily Trapezoidea
 - Family Tetraliidae
 - Tetralia glaberrima* (Herbst, 1790)
 - Family Trapeziidae
 - Trapezia tigrina* Eydoux & Souleyet, 1842

Phylum Arthropoda
Subphylum Crustacea



Family: GONODACTYLIDAE
Scientific Name: *Gonodactylus* sp.
Common Name: Mantis Shrimp

Phylum Arthropoda
Subphylum Crustacea



Family: PSEUDOSQUILLIDAE
Scientific Name: *Pseudosquilla* sp.
Common Name: Mantis Shrimp

Phylum Arthropoda
Subphylum Crustacea



Family: PALAEMONIDAE
Scientific Name: *Cuapetes tenuipes* (Borradaile, 1898)
Common Name: Red Claw Cuapetes Shrimp

Phylum Arthropoda
Subphylum Crustacea



Family: ALPHEIDAE
Scientific Name: *Alpheus* sp.
Common Name: Pistol Shrimp



Family: HIPPOLYTIDAE
Scientific Name: *Saron marmoratus* (Olivier, 1811)
Common Name: Marble Shrimp

Phylum Arthropoda Subphylum Crustacea



Family: GALATHEIDAE
Scientific Name: *Allogalathea elegans*
(Adams & White, 1848)
Common Name: Squat Lobster

Phylum Arthropoda Subphylum Crustacea



Family: PORTUNIDAE
Scientific Name: *Laleonectes nipponensis* (Sakai, 1938)
Common Name: Swimming Crab



Family: PORTUNIDAE
Scientific Name: *Gonioinfradens paucidentatus*
(A. Milne Edwards, 1861)
Common Name: Swimming Crab

Phylum Arthropoda Subphylum Crustacea



Family: PORTUNIDAE

Scientific Name: *Thalamitoides quadridens*

A. Milne-Edwards, 1869

Common Name: Swimming Crab



Family: PILUMNIDAE

Scientific Name: *Pilumnus longicornis* Hilgendorf, 1878

Common Name: Common Hairy Crab

Phylum Arthropoda Subphylum Crustacea



Family: TETRALIIDAE

Common Name: Coral Crab

Scientific Name: *Tetralia* sp.



Family: TRAPEZIIDAE

Scientific Name: *Trapezia tigrina* Eydoux & Souleyet, 1842

Common Name: Red-spotted Coral Crab

PHYLUM ECHINODERMATA

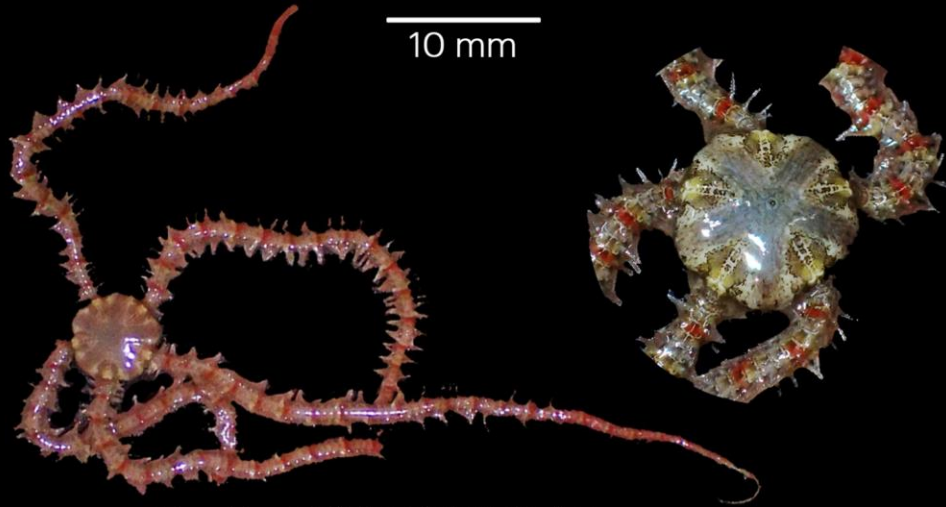
Exclusively marine animals easily distinguished by having five duplicate body parts (pentamerous radial symmetry), several bone-like elements made of calcium carbonate that form the internal skeleton of the animal and which provide support and protection (calcareous ossicles), body cavities forming water-vascular system (coelomic canals), soft body appendages, and tube feet used in feeding and locomotion. This group also displays a wide variety of forms from the soft-bodied sea cucumbers to the spiky sea urchins. This group is subdivided into six classes: Crinoidea (sea lilies and feather stars), Asteroidea (sea stars), Ophiuroidea (brittle stars), Concentricycloidea (sea daisies), Echinoidea (sea urchins), and Holothuroidea (sea cucumbers).

Taxonomic classification of some species of echinoderms that found shelter in the ARMS units in Tubbataha station:

- SUBPHYLUM ASTEROZOA
 - CLASS OPHIUROIDEA
 - Order Amphilepidida
 - Superfamily Ophiactoidea
 - Family Ophiotrichidae
 - Macrophiothrix* sp.

- SUBPHYLUM ECHINOZOA
 - CLASS ECHINOIDEA
 - Order Camarodonta
 - Family Parasalenidae
 - Parasalenia poehlii* Pfeffer, 1887
 - Order Cidaroida
 - Family Cidaridae
 - Eucidaris metularia* (Lamarck, 1816)
 - CLASS HOLOTHUROIDEA
 - Order Holothuriida
 - Family Holothuridae
 - Holothuria* sp.

Phylum Echinodermata

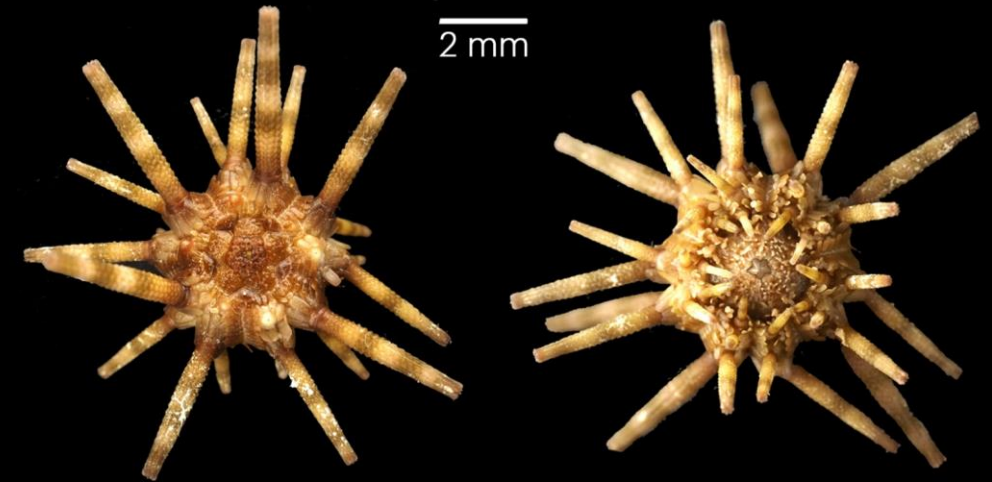


Family: OPHIOTRICHIDAE
Scientific Name: *Macrophiothrix* sp.
Common Name: Brittle Star



Family: PARASALENIIDAE
Scientific Name: *Parasalenia poehlii* Pfeffer, 1887
Common Name: Spiny Urchin

Phylum Echinodermata



Family: CIDARIDAE
Scientific Name: *Eucidaris metularia* (Lamarck, 1816)
Common Name: Ten-lined Urchin



Family: HOLOTHURIIDAE
Scientific Name: *Holothuria* sp.
Common Name: Sea Cucumber

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA

This group includes all animals with backbones called vertebrates characterized by a bilaterally symmetrical body, multi-layered epidermis, have three types of muscle tissues (striped, unstriped, and cardiac), have a well-developed body cavity, complete alimentary canal, well-developed respiratory and excretory systems, have endocrine glands, have three- or four-chambered heart, are unisexual and reproduce sexually (except for hagfish) and the brain is protected by a skull.

Taxonomic classification of some species of vertebrates that found shelter in the ARMS units in Tubbataha station:

SUPERCLASS GNATHOSTOMATA / PISCES

CLASS ACTINOPTERYGII

Order Perciformes

Suborder Percoidei

Family Pseudochromidae

Pseudochromis marshallensis Schultz, 1953



Phylum Chordata

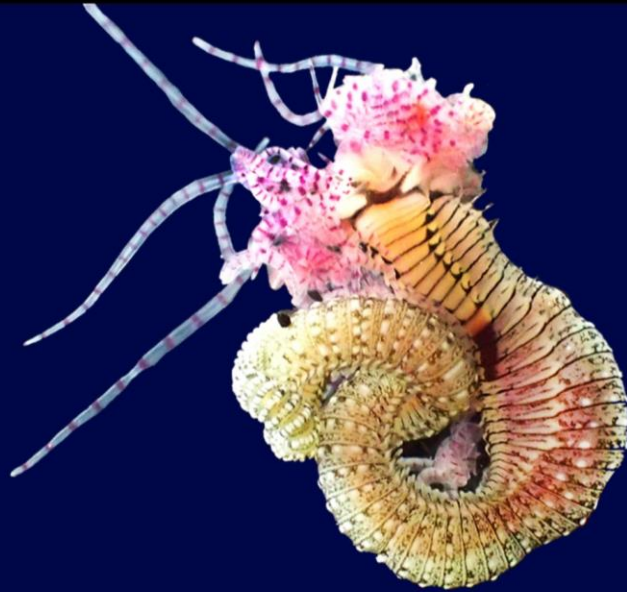


Family: PSEUDOCROMIDAE

Scientific Name: *Pseudochromis marshallensis* Schultz, 1953

Common Name: Marshal dottyback

FIELD GUIDE



CORAL REEF ASSOCIATED ORGANISMS

COLLECTED FROM

AUTONOMOUS REEF MONITORING STRUCTURES (ARMS)

SIARGAO, SURIGAO DEL NORTE
PHILIPPINES 2022

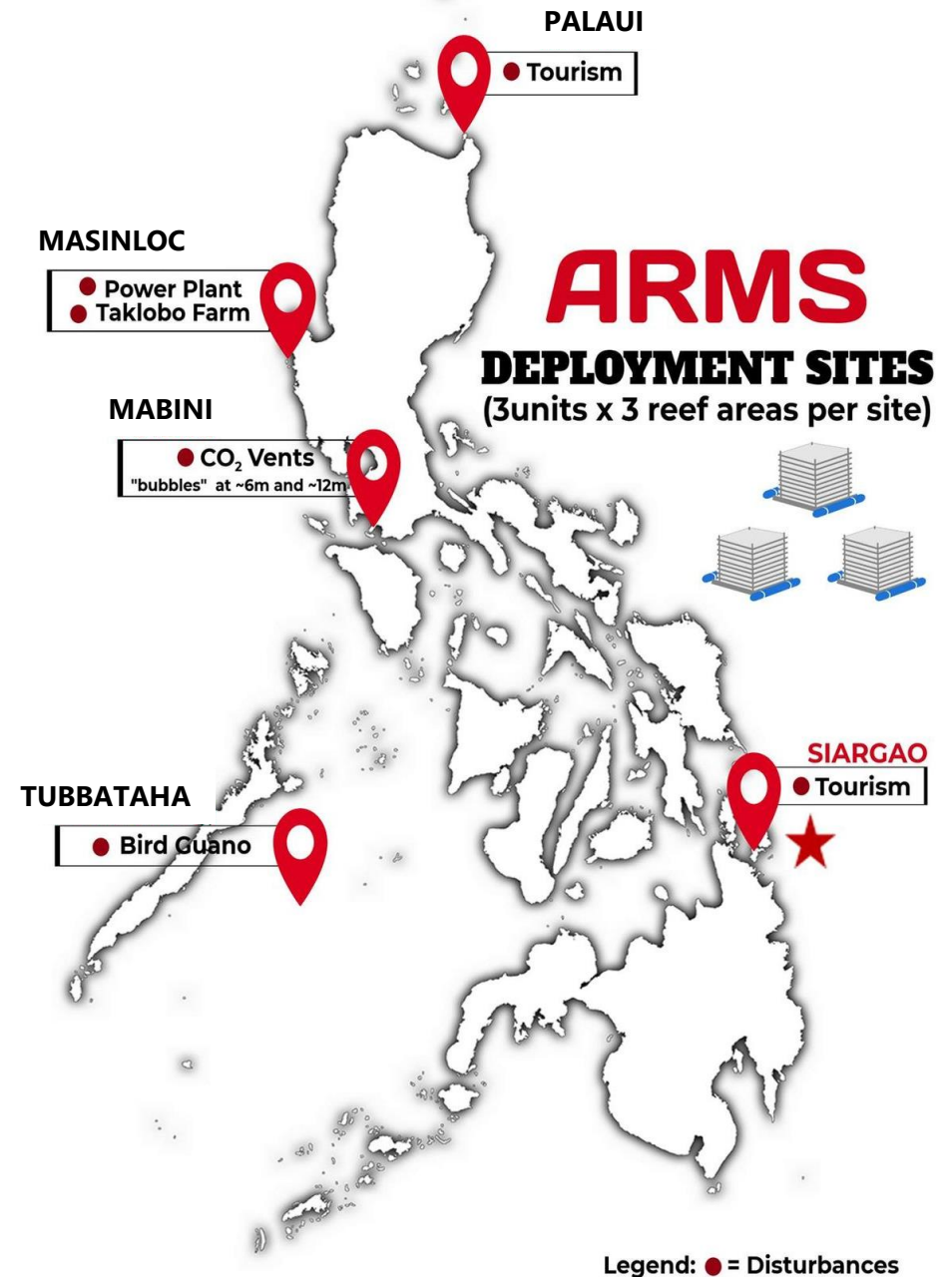


Image source: wikia.com
Modified by: G. Irgan & J. Santiago

PHYLUM PLATYHELMINTHES

Members of this group are invertebrates that have flat body with no complete digestive system. They have a gastrovascular cavity which is used to bring in food and is also used to expel food waste. They are known as predators, as scavengers, and as parasites. They have internal fertilization because they possess both eggs and sperms. This taxon is divided into four classes: the free-living (Turbellaria) which is usually found in marine waters, the ectoparasites of fish (Monogenea), the internal parasites of humans and other organisms (Trematoda), and the tapeworms as internal parasites of many vertebrates (Cestoda).

Taxonomic classification of some species of flatworms that found shelter in the ARMS units in Siargao station:

SUBPHYLUM RHABDITOPHORA

Order Polycladida

Suborder Acotylea

Superfamily Leptoplanoidea

Family Leptoplanidae

Leptoplana sp.



Phylum Platyhelminthes



1 mm

Family: LEPTOPLANIDAE
Scientific Name: *Leptoplana* sp.
Common Name: Marine Flat Worm

PHYLUM ANNELIDA

Characterized by the usually long and multi-segmented and bilaterally symmetrical body with no internal skeletal structures, have parapodia for locomotion and move by peristalsis or undulation. The blood circulates throughout the main body cavity without any kind of pump. This group exists in almost all types of environments and members of this group are popularly known as earthworms, bristle worms, peanut worms, and leeches.

Taxonomic classification of some species of annelids that found shelter in the ARMS units in Siargao station:

CLASS POLYCHAETA [Bristle Worms]

Subclass Sedentaria

Infraclass Canalipalpata

Order Terebellida

Suborder Terebellimorpha

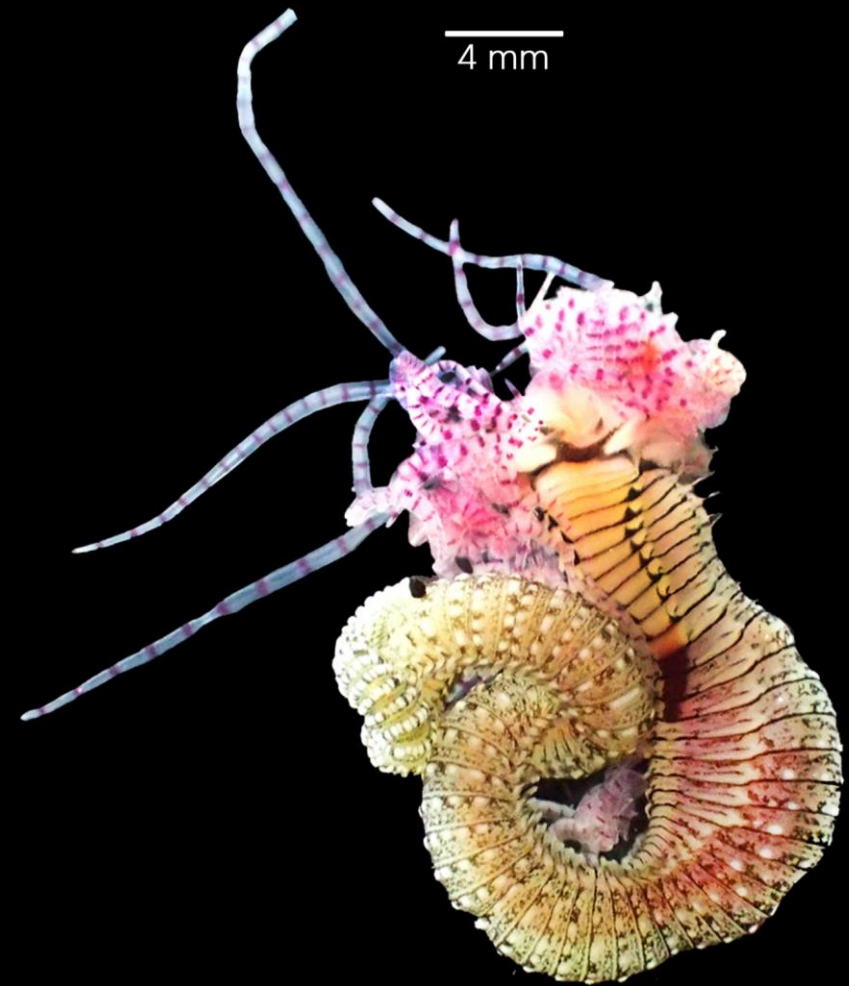
Family Terebellidae

Loimia sp.



Phylum Annelida

Subphylum Polychaeta



Family: TERESELLIDAE
Scientific Name: *Liomia* sp.
Common Name: Spaghetti Worm

PHYLUM MOLLUSCA

Soft-bodied animals that may or may not be covered by hard exoskeleton or “shell” and display a wide variety of forms in each subgroup but share common key characteristics. From the large predatory squids and octopuses to the smallest grazing forms, mollusks are grouped into seven classes: Aplacophora (mollusks without plates), Monoplacophora, (mollusks bearing one plate), Polyplacophora (mollusks bearing many plates), Bivalvia, (mollusks bearing a pair of shells) Gastropoda (“stomach foot” mollusks bearing one shell), Cephalopoda (“head foot” mollusks), and Scaphopoda (“boat feet” mollusks).

Taxonomic classification of some species of mollusks that found shelter in the ARMS units in Siargao station:

CLASS GASTROPODA

- Subclass Coenogastropoda
 - Order [unassigned] Coenogastropoda
 - Superfamily Cerithioidea
 - Family Cerithiidae
 - Cerithium balteatum* (Reeve, 1846)
 - Cerithium* sp.
 - Clypeomorus* sp.
 - Order Littorinimorpha
 - Superfamily Rissooidea
 - Family Rissoinidae
 - Rissoina plicatula* Gould, 1861
 - Order Neogastropoda

- Superfamily Buccinoidea
 - Order Neogastropoda
- Superfamily Muricoidea
 - Family Muricidae [Murex Shells]
 - Subfamily Ergalataxinae
 - Drupella margariticola* (Broderip, 1833)
- Superfamily Buccinoidea
 - Family Nassariidae
 - Nassarius* sp.
- Subclass Heterobranchia
 - Infraclass Euthyneura
 - Order Cephalaspidea
 - Superfamily Harminoeidea
 - Family Haminoeidae
 - Diniatys dentifer* (A. Adams, 1850)
 - Order Nudibranchia
 - Superfamily Chromodoridoidea
 - Family Chromodoridoidea
 - Goniobranchus decorus* (Pease, 1860)

Phylum Mollusca



Family: CERITHIIDAE

Scientific Name: *Cerithium balteatum* (Reeve, 1846)

Common Name: Cerith



Family: CERITHIIDAE

Scientific Name: *Cerithium* sp.

Common Name: Cerith

Phylum Mollusca



Family: CERITHIIDAE

Scientific Name: *Clypeomorus* sp.

Common Name: Cerith



Family: RISSOINIDAE

Scientific Name: *Rissoina plicatula* Gould, 1861

Common Name: Rissoinid Sea Snail

Phylum Mollusca



Family: MURICIDAE

Scientific Name: *Drupella margariticola* (Broderip, 1833)

Common Name: Shouldered Castor Bean



Family: NASSARIIDAE

Scientific Name: *Nassarius* sp.

Common Name: Dog Welk

Phylum Mollusca



Family: HAMINOEIDAE

Scientific Name: *Diniatys dentifer* (A. Adams, 1850)

Common Name: Bubble Snail



Family: CHROMODORIDIDAE

Scientific Name: *Goniobranchus decorus* (Pease, 1860)

Common Name: Decorated Chromodoris

PHYLUM ARTHROPODA

SUBPHYLUM CRUSTACEA

Crustaceans are the “insects” of the sea which include popular animals like barnacles, amphipods, skeleton shrimps, shrimps and prawns, hermit crabs, squat lobsters, lobsters, crabs, and mantis shrimps. Being such a large and diverse group, their life cycle may vary but each crustacean must molt or shed its hardened epidermis or shells in order to grow. Organisms under this subphylum are identified by a head with paired mandibular jaws, a pair of maxillae, two pairs of antennae, and appendages that are mostly separated into two branches (biramous).

Taxonomic classification of some species of crustaceans that found shelter in the ARMS units in Siargao station:

- CLASS MALACOSTRACA
 - Order Decapoda
 - Suborder Pleocyemata
 - Infraorder Stenopodidea
 - Family Stenopodidae
 - Odontozona* sp
 - Infraorder Caridea
 - Superfamily Palaemonoidea
 - Family Palaemonidae
 - Periclimenes* sp.
 - Superfamily Alpheoidea
 - Family Alpheidae
 - Synalpheus* sp.

- Infraorder Anomura
 - Superfamily Galatheoidea
 - Family Galatheididae
 - Galathea* sp.
 - Infraorder Brachyura
 - Superfamily Palicoidea
 - Family Crossotonotidae
 - Crossotonotus spinipes* (de Man, 1888)
 - Superfamily Majoidea
 - Family Epialtidae
 - Huenia heraldica* (De Haan, 1837)
 - Superfamily Portunoidea
 - Family Portunidae
 - Thranita danae* (Stimpson, 1858)

Phylum Arthropoda Subphylum Crustacea



Family: STENOPODIDAE
Scientific Name: *Odontozona* sp.
Common Name: Coral Shrimp



Family: PENEIDAE
Scientific Name: *Periclimenes* sp.
Common Name: Anemone Shrimp

Phylum Arthropoda Subphylum Crustacea



Family: ALPHEIDAE
Scientific Name: *Synalpheus* sp.
Common Name: Pistol Shrimp



Family: GALATHEIDAE
Scientific Name: *Galathea* sp.
Common Name: Squat Lobster

Phylum Arthropoda Subphylum Crustacea



Family: CROSSOTONOTIDAE

Scientific Name: *Crossotonotus spinipes* (de Man, 1888)

Common Name: Stilt Crab



Family: EPIALTIDAE

Scientific Name: *Huenia heraldica* (De Haan, 1837)

Common Name: Decorator Crab

Phylum Arthropoda Subphylum Crustacea



Family: PORTUNIDAE

Scientific Name: *Thranita danae* (Stimpson, 1858)

Common Name: Swimming Crab

PHYLUM ECHINODERMATA

Exclusively marine animals easily distinguished by having five duplicate body parts (pentamerous radial symmetry), several bone-like elements made of calcium carbonate that form the internal skeleton of the animal and which provides support and protection (calcareous ossicles), body cavities forming water-vascular system (coelomic canals), soft body appendages, and tube feet used in feeding and locomotion. This group also displays a wide variety of forms from the soft-bodied sea cucumbers to the spiky sea urchins. This group is subdivided into six classes: Crinoidea (sea lilies and feather stars), Asteroidea (sea stars), Ophiuroidea (brittle stars), Concentricycloidea (sea daisies), Echinoidea (sea urchins), and Holothuroidea (sea cucumbers).

Taxonomic classification of some species of echinoderms that found shelter in the ARMS units in Siargao station:

SUBPHYLUM CRINOZOA

CLASS CRINOIDEA

Order Comatulida

Superfamily Antenodoidea

Family Antedonidae

Antedon sp1

Antedon sp2

SUBPHYLUM ASTEROZOA

CLASS OPHIUROIDEA

Order Amphilepidida

Superfamily Ophiactoidea

Family Ophiotrichidae

Macrophiothrix nereidina (Lamarck, 1816)

Ophiothrix sp.



Phylum Echinodermata



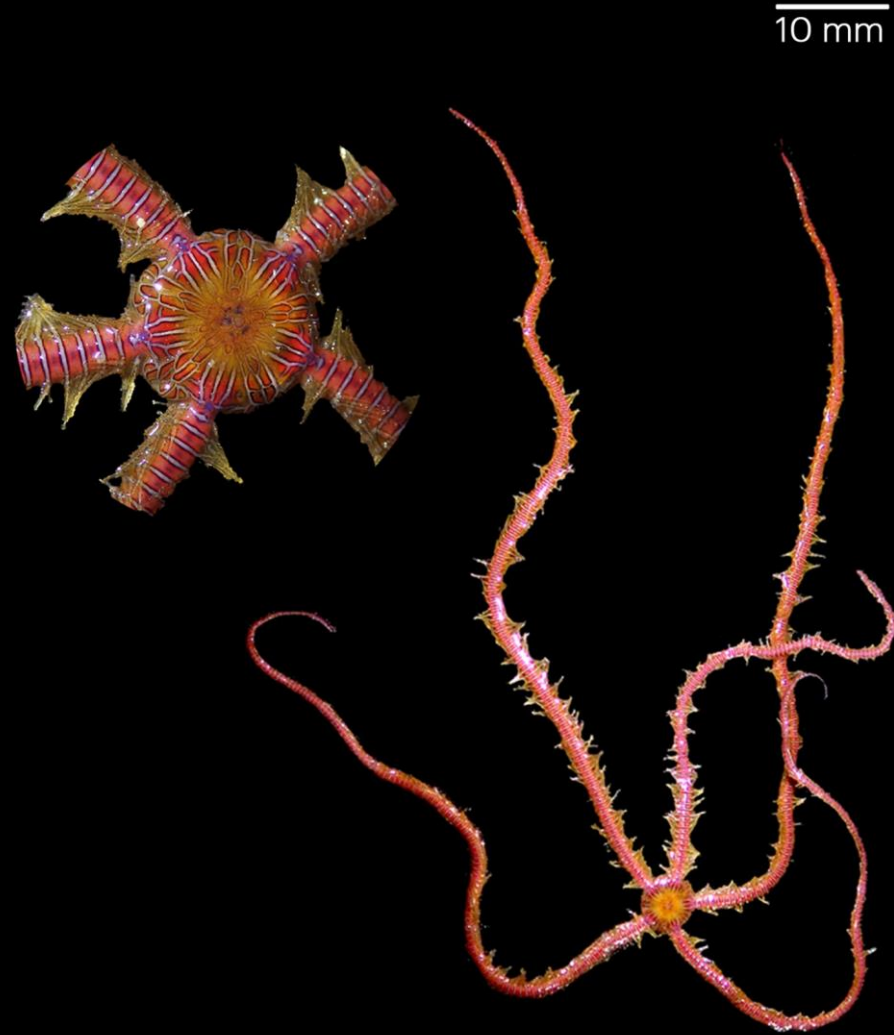
Family: ANTEDONIDAE
Scientific Name: *Antedon* sp.
Common Name: Simple Feather Star

Phylum Echinodermata



Family: ANTEDONIDAE
Scientific Name: *Antedon* sp.
Common Name: Simple Feather Star

Phylum Echinodermata



Family: OPHIOTRICHIDAE
Scientific Name: *Macrophiothrix nereidina* (Lamarck, 1816)
Common Name: Sea Nymph Brittle Star

Phylum Echinodermata



Family: OPHIOTRICHIDAE
Scientific Name: *Ophiothrix* sp.
Common Name: Brittle Star

PHYLUM HEMICHORDATA

This phylum represents the lowest group of chordates that provides a clue to the link between the chordates in general and the non-chordates, particularly the echinoderms owing to the striking similarity of their larval stages. Commonly known as acorn or tongue worms, its worm-like body has proboscis, collar, and trunk. They usually inhabit mucus-lined burrows of sandy and muddy shores of the intertidal zone and lives singly.

Taxonomic classification of some species of hemichordates that found shelter in the ARMS units in Siargao station:

CLASS ENTEROPNEUSTA

Order [Unassigned] Enteropneusta

Family Ptychoderidae

Ptychodera flava Eschscholtz, 1825



Phylum Hemichordata

5 mm



Family: PTYCHODERIDAE

Scientific Name: *Ptychodera flava* Eschscholtz, 1825

Common Name: Acorn Worm

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA

This group includes all animals with backbones called vertebrates characterized by a bilaterally symmetrical body, multi-layered epidermis, have three types of muscle tissues (striped, unstriped, and cardiac), have a well-developed body cavity, complete alimentary canal, well-developed respiratory and excretory systems, have endocrine glands, have three- or four-chambered heart, are unisexual and reproduce sexually (except for hagfish) and the brain is protected by a skull.

Taxonomic classification of some species of fishes that found shelter in the ARMS units in Siargao station:

SUPERCLASS GNATHOSTOMATA / PISCES

CLASS ACTINOPTERYGII

Order Perciformes

Suborder Percoidei

Family Apogonidae

Cheilodipterus parazonatus Gon, 1993

Family Pseudochromidae

Pseudochromis tapeinosoma Bleeker, 1853

Suborder Gobioidi

Family Gobiidae

Eviota prasites Jordan & Seale, 1906



Phylum Chordata



3 mm

Family: APOGONIDAE
Scientific Name: *Cheilodipterus parazonatus* Gon, 1993
Common Name: Mimic Cardinal Fish

Phylum Chordata



8 mm

Family: PSEUDOCROMIDAE
Scientific Name: *Pseudochromis tapeinosoma* Bleeker, 1853
Common Name: Black Margin Dottyback



3 mm

Family: GOBIIDAE
Scientific Name: *Eviota prasites* Jordan & Seale, 1906
Common Name: Hairfin Dwarfgoby

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Final Note



Five (5) National Integrated Protected Areas System (NIPAS) sites

- Palaui Island Protected Landscape and Seascape
- Masinloc-Oyon Protected Landscape and Seascape
- Verde Island Passage
- Tubbataha Reefs Natural Park
- Siargao Island Protected Landscape and Seascape

Seven (7) Major Phyla

- Platyhelminthes
- Annelida (Subphylum Polychaeta)
- Mollusca
- Arthropoda (Subphylum Crustacea)
- Echinodermata
- Hemichordata
- Chordata

Through this DENR CARE-CaDRES project, we were not only able to obtain organisms that are indicators of the possible effect of ocean acidification and other global and local stressors on the cryptic organisms in our coral reefs, but we were also able to train several representatives of the DENR, LGUs, NGOs, and academe on ARMS deployment, retrieval, and processing. We hope that through the capacity building efforts, these trained personnel will become the sentinels for the protection of our reef cryptobiota.

We look forward to the continued support of funding agencies, and partners in the government, academe, and other organizations to help us carry on with this work. We hope the Guidebook will serve well not only those doing monitoring and conservation work at the specific NIPAS sites but other sites as well. We also wish that this output will spark wonder and interest, especially among the younger generations who will browse through these pages. We cannot properly protect creatures we do not know much about. **Learn about biodiversity. Help protect our reefs.**



