



Project
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**Towards Ecosystem Conservation and Sustainable Artisanal
Fisheries in the Mediterranean basin**

WP4: Characterization of the study area

**Visual guide for benthic bycatch of
artisanal fishing gears**

June 2014



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Authors

Marzia Bo¹, Adel Gaamour², Khemiri Sana², Djabou Hanem², Bassem Mhedhbi², Gtari Zied², Taher Ahmed Kassab², Jordi Grinyó³, Carlos Domínguez³, Stefano Ambroso³, Anabel Muñoz³, David Díaz³, Sandra Mallol⁴

Institutions involved

¹University of Genoa, ²National Institute of Marine Sciences and Technologies, ³Institute of Marine Sciences-CSIC, ⁴Spanish Institute of Oceanography.



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Introduction

One of the main aims of the ECOSAFIMED project is the evaluation of the effect of local artisanal fisheries over the benthic communities in the study areas selected. In order to recover information about the interaction of this traditional activity over benthic communities, onboard sampling surveys has been carry on with scientific observers in artisanal boats. In this way, scientific observers have been able to obtain a detailed quantification of the species composition of the catches, with special attention to structural species.

In order to facilitate the development of this work and to provide a quick and easy identification of the benthic bycatch of artisanal fishing gears, a visual guide has been developed by project partners prior to the onboard observations.

The collection of images have not been always easy due to property reasons, so this visual guide has been fed after the onboard surveys with new images of the species catches during this activity. Consequently, it is considered a living document which can be completed whenever new images of benthic species are available for the project. In some cases, the acquisition of adequate pictures of all species has been impossible.

Legend from Observer Datasheet with list of all the types of benthic species possibly found in the bycatch







| LEGEND (see visual guide) | |
|--|---|
| <p>Type of benthic species</p> <ol style="list-style-type: none"> 1. Algae <ol style="list-style-type: none"> a. Red algae b. Brown algae c. Green algae d. Maërl 2. Phanerogams 3. Sponges 4. Cnidarians <ol style="list-style-type: none"> a. Hydrozoa b. Anthozoa 5. Echinoderms <ol style="list-style-type: none"> a. Asteroidea b. Crinoidea c. Ophiuroidea d. Echinoidea e. Holothuria 6. Bryozoans 7. Ascidians 8. Polychaeta 9. Molluscs <ol style="list-style-type: none"> a. Bivalvia b. Gastropoda | <p>Quantity Categories: Individuals: a. <20; b. 20-50; c. 50-100; d. >100</p> <p>Wind speed: Beaufort scale (knots) Wind direction: following wind rose eight Clouds: see level of coverage Current direction: following wind rose eight main directions Current intensity: 1. Low; 2. Medium; 3. High Sea: Douglas scale</p> <p>Status of Discards (combination allowed) 1. Alive 2. Dead 3. Undesized 4. Bitten 5. Rotten 6. Damaged</p> <p>Benthic Status returned (combination allowed) 1. Alive 2. Dead 3. Damaged</p> <p>Picture Code: Gear+day+month+year (2digits)_nºHaul_Nºpict Trammelnet (Tn); Longline (Lg); Gillnet (Gn); Traps (Tp)</p> |







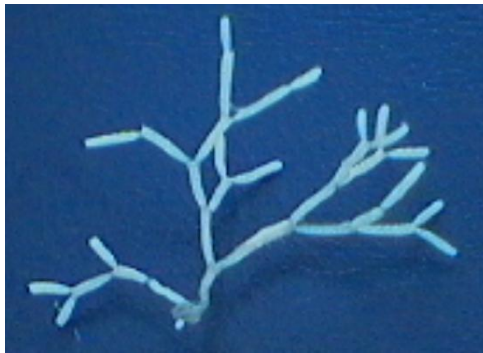
In the table are reported all the species identified in the checklist as potentially impacted by artisanal fishing gears in the order shown in the legend of the onboard observer datasheet. This guide has been created with the aim of helping the onboard observers with visual representations of some of the most common benthic bycatch species. It may also be a useful instrument for ROV operators to recognize the species on board of the oceanographic vessel and for this reason we included for each species an onboard picture as well as an underwater photograph.





Table of the benthic bycatch types and species






1. Algae





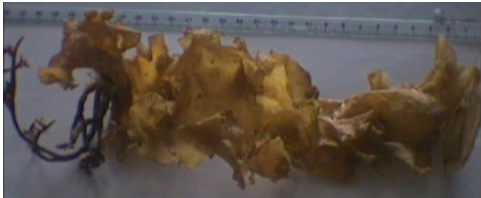

a. Red algae

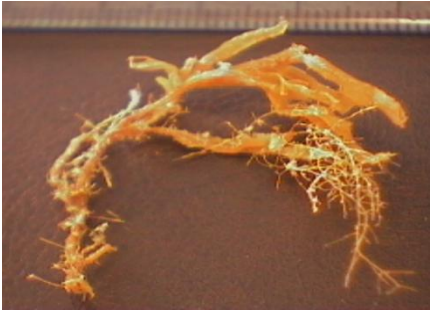




| | | |
|--------------------------------------|---|--|
| <p><i>Lithothamnion valens</i></p> |  |  |
| <p><i>Mesophyllum</i> spp.</p> |  |  |
| <p><i>Peyssonnelia squamaria</i></p> |  |  |

| | | |
|---|---|--|
| <p><i>Phyllopora crispa</i></p> |  |  |
| <p><i>Phymatolitho n calcareum</i></p> |  |  |
| <p><i>Vidalia volubilis</i></p> |  |  |
| <p><i>Lomentaria articulata</i></p> |  | |



| | | |
|---------------------------------------|---|---|
| <p><i>Jania rubens</i></p> |  | |
| <p><i>Sebdenia dichotoma</i></p> | |  |
| <p><i>Dumentia Contorta</i></p> |  | |
| <p><i>Chondria capillaris</i></p> |  | |

| | | |
|--|---|--|
| <p><i>Fauchea repens</i></p> |  | |
| <p><i>Ptilota gunneri</i></p> |  | |
| <p><i>Lithophyllum Spp.</i></p> |  | |
| <p>b. Brown algae</p> | | |
| <p><i>Cystoseira spp.</i></p> |  |  |

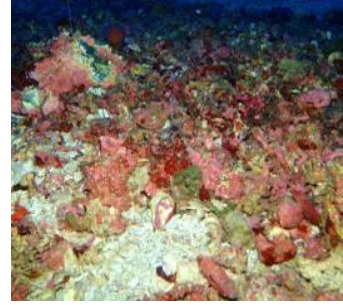
| | | |
|---|---|---|
| <p><i>Laminaria rodriguezii</i></p> |  |  |
| <p><i>Sargassum spp.</i></p> |  |  |
| <p><i>Phyllariopsis brevipes</i></p> |  | |
| <p><i>Haloptaris filicina</i></p> |  | |

| | | |
|--|---|--|
| <p><i>Dictyota</i> <i>Dichotoma</i></p> |  | |
| <p><i>Cystoseira</i> <i>zostroides</i></p> |  | |
| <p><i>Dictyota</i> <i>hamifera</i></p> |  | |
| <p>c. Green algae</p> | | |
| <p><i>Codium bursa</i></p> |  |  |

| | | |
|---------------------------------------|--|--|
| <p><i>Ulva</i> spp.</p> |  |  |
| <p><i>Flabellia petiolata</i></p> |  | |

| <p>d. Maërl</p> | | |
|--|---|---|
| <p>Maërl not structured</p> |  |  |

Maërl structured



2. Phanerogams

Dead *Posidonia oceanica*



Live *Posidonia oceanica*



Cymodocea nodosa



3. Sponges

Acanthella acuta



Aplysina cavernicola



Axinella damicornis



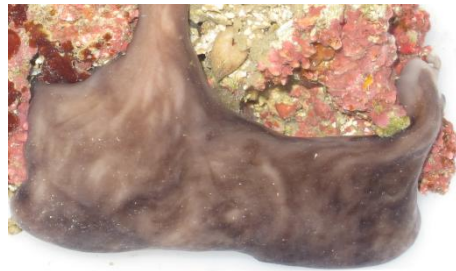
Axinella polypoides



*Axinella
verrucosa*



*Chondrosia
reniformis*



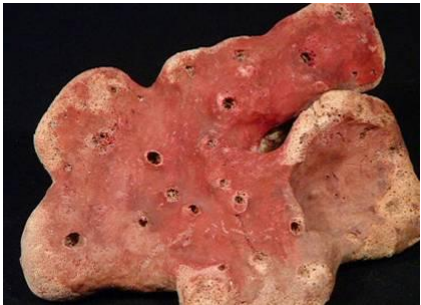










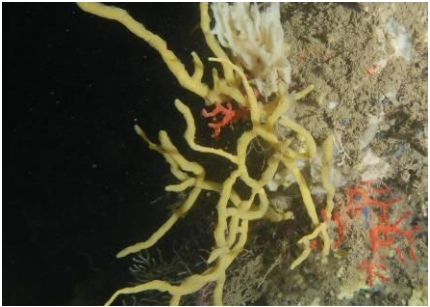
*Haliclona
elegans*




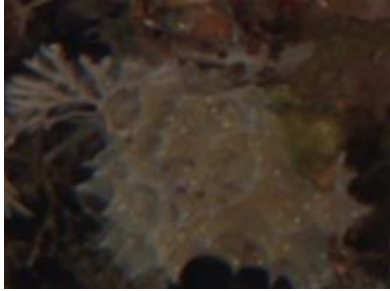




*Haliclona
mediterranea*



| | | |
|---|---|---|
| <p><i>Pachastrella monilifera</i></p> |  |  |
| <p><i>Petrosia ficiformis</i></p> |  |  |
| <p><i>Phakellia robusta</i></p> |  |  |
| <p><i>Pocillastra compressa</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>Siphonochalina crassa</i></p> |  | |
| <p><i>Spongia officinalis</i></p> | | |
| <p><i>Suberites domuncula</i></p> |  | |
| <p><i>Suberites syringella</i></p> |  |  |

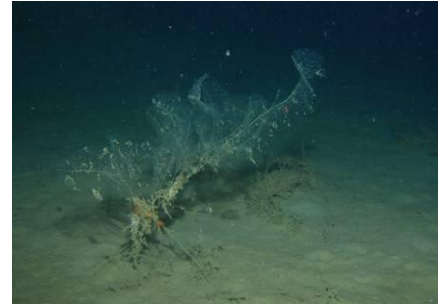
| | | |
|---------------------------------------|---|--|
| <p><i>Tethya aurantium</i></p> |  |  |
| <p><i>Pleraplysilla Spinifera</i></p> |  |  |
| <p><i>Dysidea fragilis</i></p> |  | |
| <p><i>Clathrina Sp</i></p> |  | |
| <p>4. Cnidarians</p> | | |

a. Hydrozoa

***Nemertesia
antennina***



***Lytocarpia
myriophyllum***

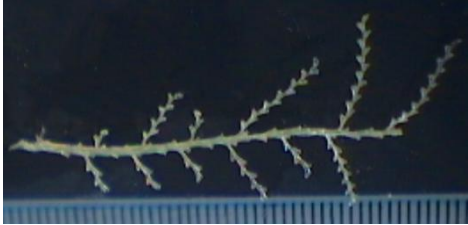










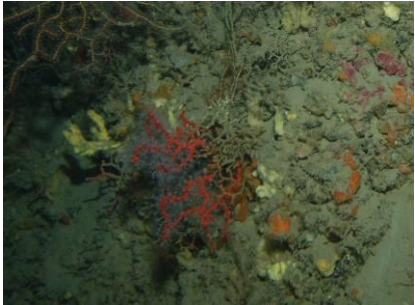
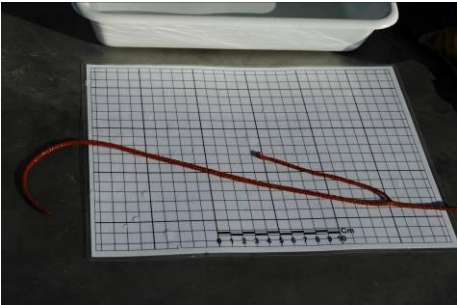



***Sertularella* spp.**




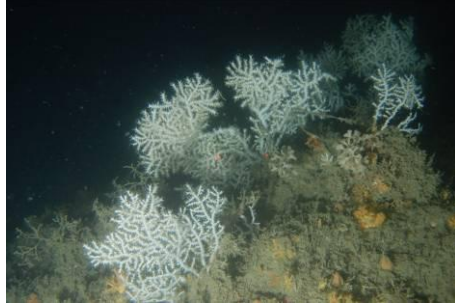
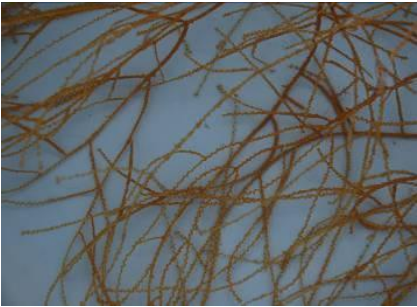













***Abietinaria
abietina***











| | | |
|---------------------------------------|---|---|
| <p><i>Sertularella spp.</i></p> |  | |
| <p><i>Lytocarpia myriophyllum</i></p> |  | |
| <p>b. Anthozoa</p> | | |
| <p><i>Acanthogorgia hirsuta</i></p> |  |  |
| <p><i>Bebryce mollis</i></p> |  |  |





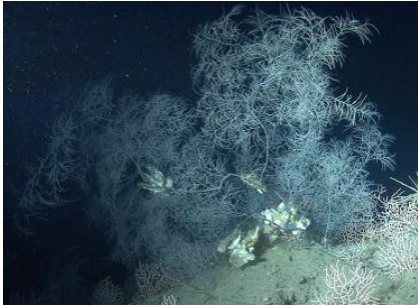


| | | |
|---|---|---|
| <p><i>Callogorgia verticillata</i></p> |  |  |
| <p><i>Corallium rubrum</i></p> |  |  |
| <p><i>Ellisella paraplexauroides</i></p> |  |  |
| <p><i>Eunicella cavolinii</i></p> |  |  |


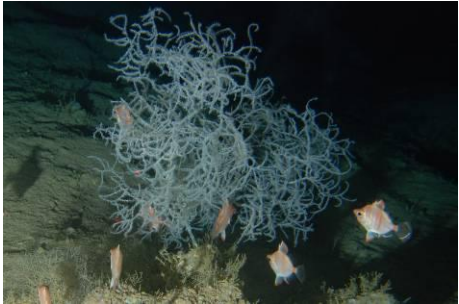



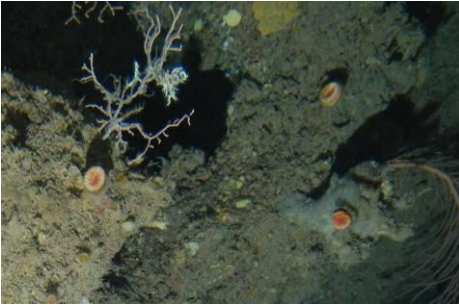


| | | |
|---|---|--|
| <p><i>Eunicella singularis</i></p> |  |  |
| <p><i>Eunicella verrucosa</i></p> |  |  |
| <p><i>Leptogorgia sarmentosa</i></p> |  |  |
| <p><i>Paramuricea clavata</i></p> |  |  |

| | | |
|--|---|---|
| <p><i>Paramuricea macrospina</i></p> |  |  |
| <p><i>Swiftia pallida</i></p> |  |  |
| <p><i>Viminella flagellum</i></p> |  |  |
| <p><i>Alcyonium acaule</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>Alcyonium palmatum</i></p> |  |  |
| <p><i>Chironephtya mediterranea</i></p> |  |  |
| <p><i>Paralcyonium spinulosum</i></p> |  |  |
| <p><i>Veretillum cynamorium</i></p> |  |  |

| | | |
|--|---|---|
| <p><i>Funiculina quadrangularis</i></p> |  |  |
| <p><i>Pennatula rubra</i></p> |  |  |
| <p><i>Kophobelemnon stelliferum</i></p> |  |  |
| <p><i>Pteroeides spinosum</i></p> |  |  |

| | | |
|---------------------------------------|---|---|
| <p><i>Spinimuricea klavareni</i></p> |  |  |
| <p><i>Virgularia mirabilis</i></p> | |  |
| <p><i>Antipathella subpinnata</i></p> |  |  |
| <p><i>Antipathes dichotoma</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>Leiopathes glaberrima</i></p> |  |  |
| <p><i>Parantipathes larix</i></p> |  |  |
| <p><i>Caryophyllia cyathus</i></p> |  |  |
| <p><i>Caryophyllia smithii</i></p> |  |  |

*Cladocora
caespitosa*



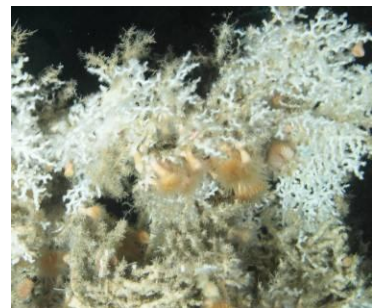
*Dendrophyllia
cornigera*


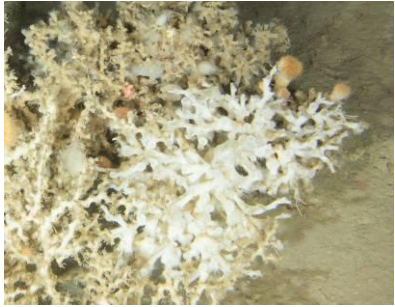










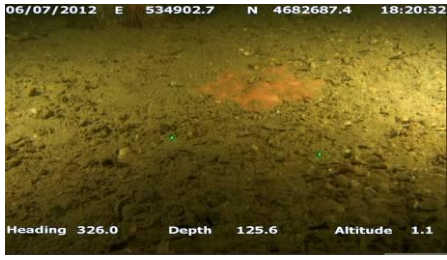


*Dendrophyllia
ramea*











*Desmophyllum
dianthus*

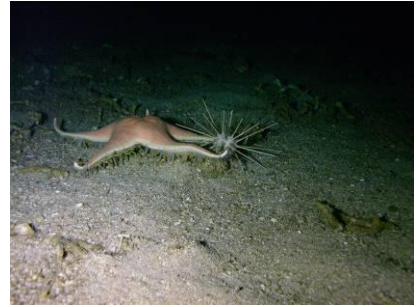
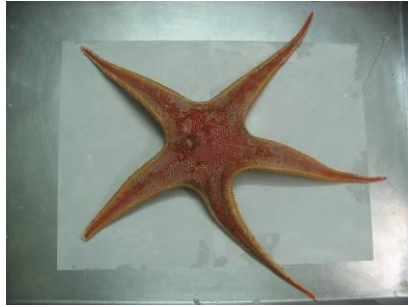


| | | |
|--------------------------------------|---|--|
| <p><i>Lophelia pertusa</i></p> |  |  |
| <p><i>Madrepora oculata</i></p> |  |  |
| <p><i>Parazoanthus axinellae</i></p> |  |  |
| <p><i>Savalia savaglia</i></p> |  |  |

| | | |
|---------------------------------------|---|--|
| <p><i>Cerianthus membranaceus</i></p> |  | |
| <p>5. Echinoderms</p> | | |
| <p>a. Asteroidea</p> | | |
| <p><i>Anseropoda placenta</i></p> |  |  |
| <p><i>Astropecten aranciacus</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>Chaetaster longipes</i></p> |  |  |
| <p><i>Echinaster sepositus</i></p> |  |  |
| <p><i>Hacelia attenuata</i></p> |  |  |
| <p><i>Marthasterias glacialis</i></p> |  |  |

*Tethyaster
subinermis*

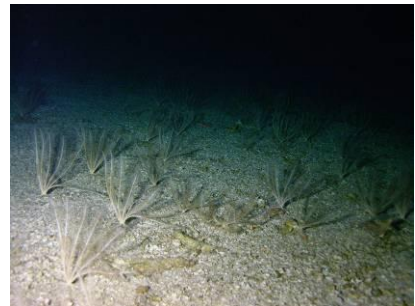


b. Crinoidea


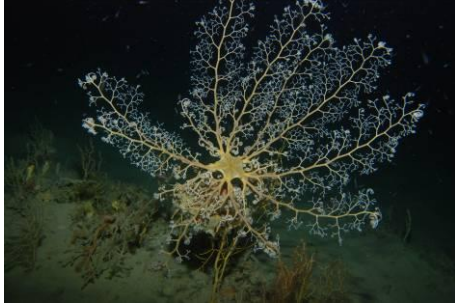





*Antedon
mediterranea*

















*Leptometra
phalangium*



















c. Ophiuroidea






| | | |
|---|---|--|
| <p><i>Astrospartus mediterraneus</i></p> |  |  |
| <p><i>Ophiura texturata</i></p> |  |  |
| <p><i>Ophiothrix fragilis</i></p> |  |  |
| <p><i>Ophiolepis superba</i></p> |  | |
| <p>d. Echinoidea</p> | | |



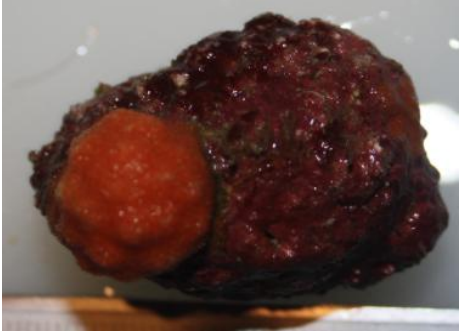
| | | |
|--|---|--|
| <p><i>Centrostephanus longispinus</i></p> |  |  |
| <p>Cidaridae</p> |  |  |
| <p><i>Echinus acutus</i></p> |  |  |
| <p><i>Echinus melo</i></p> |  |  |




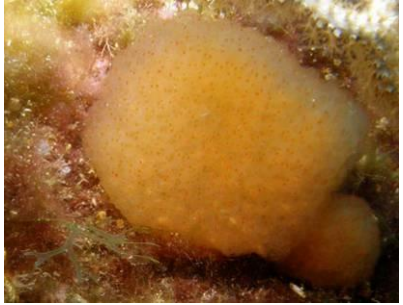




| | | |
|--|---|---|
| <p><i>Spatangus purpureus</i></p> |  |  |
| <p><i>Sphaerechinus granularis</i></p> | |  |
| <p>e. Holothuroidea</p> | | |
| <p><i>Holothuria forskali</i></p> |  |  |
| <p><i>Holoturia polii</i></p> | |  |









| | | |
|------------------------------------|---|--|
| <p><i>Holoturia tubulosa</i></p> |  |  |
| <p><i>Stichopus regalis</i></p> |  |  |
| <p>6. Bryozoans</p> | | |
| <p><i>Caberea boryi</i></p> |  |  |
| <p><i>Hornera frondiculata</i></p> |  |  |







| | | |
|--|---|--|
| <p><i>Myriapora truncata</i></p> |  |  |
| <p><i>Pentapora fascialis</i></p> |  |  |
| <p><i>Reteporella grimaldii</i></p> |  |  |
| <p><i>Smittina cervicornis</i></p> |  |  |







| | | |
|---|---|---|
| <p><i>Turbicellepora avicularis</i></p> |  |  |
| <p><i>Cellaria Sp.</i></p> |  |  |
| <p><i>Cellaria salicornioides</i></p> |  | |





| | | |
|--|---|--|
| <p><i>Chartella papyrea</i></p> | |  |
| <p><i>Smittina landsborovii</i></p> | |  |
| <p><i>Schizomavella mamillata</i></p> |  | |
| <p>7. Ascidians</p> | | |
| <p><i>Aplidium albican</i></p> | | |







| | | |
|--|---|---|
| <p><i>Aplidium conicum</i></p> |  |  |
| <p><i>Aplidium proliferum</i></p> |  |  |
| <p><i>Ascidia mentula</i></p> |  |  |
| <p><i>Botryllus schosleri</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>Clavelina dellavallei</i></p> |  |  |
| <p><i>Diazona violacea</i></p> |  |  |
| <p><i>Halocynthia papillosa</i></p> |  |  |
| <p><i>Microcosmus sulcatus</i></p> |  |  |




| | | |
|-------------------------------------|--|---|
| <p><i>Phallusia mamillata</i></p> |  |  |
| <p><i>Pyura dura</i></p> |  |  |
| <p><i>Aplidium proliferum</i></p> | |  |
| <p>8. Polychaeta</p> | | |
| <p><i>Hermodice carunculata</i></p> | |  |








| | | |
|--|---|---|
| <p><i>Sabella pavonina</i></p> |  |  |
| <p><i>Sabella spallanzanii</i></p> | |  |
| <p><i>Salmacina-Filograna</i> complex</p> |  |  |
| <p><i>Aphrodita aculeata</i></p> |  | |


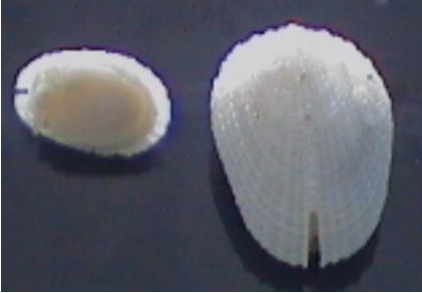



| | | |
|---|---|--|
| <p><i>Nereis SP</i> <i>Nereidae</i></p> |  | |
| <p><i>Laetmonice hystrix</i></p> |  | |
| <p>9. Molluscs</p> | | |
| <p>a. Bivalvia</p> | | |
| <p><i>Neopycnodonte cochlear</i></p> |  |  |





| | | |
|-------------------------------|---|---|
| <p><i>Ostrea edulis</i></p> |  |  |
| <p><i>Pinna nobilis</i></p> | |  |
| <p><i>Pteria hirundo</i></p> |  |  |
| <p><i>Venus verrucosa</i></p> |  | |

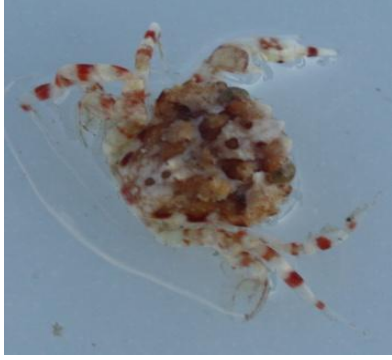



| | | |
|--|---|--|
| <p><i>laevicardium crassum</i></p> |  | |
|--|---|--|

| b. Gastropoda | | |
|-------------------------------|---|---|
| <p><i>Bolma rugosa</i></p> |  | |
| <p><i>Charonia lampas</i></p> |  |  |

| | | |
|-------------------------------------|---|---|
| <p><i>Lunatia fusca</i></p> |  | |
| <p><i>Hexaplex trunculus</i></p> |  |  |
| <p><i>Tethys fimbria</i></p> |  |  |
| <p><i>Umbraculum umbraculum</i></p> |  |  |

| | | |
|---|---|---|
| <p><i>turritella lentiginosa</i></p> |  | |
| <p><i>Propilidium exiguum</i></p> |  | |
| <p><i>Calliostoma conulus</i></p> |  | |
| <p>10. Others</p> | | |
| <p>Brachiopoda <i>Gryphus vitreus</i></p> |  |  |

| | | |
|--|---|--|
| <p>Pisa Armata</p> |  | |
| <p>Dardanus calidus</p> |  | |
| <p>Pagrus prideaux</p> |  | |
| <p>Licarcinus Corrgatus</p> |  | |

| | | |
|--|---|--|
| <p>Lophozozymus incisus</p> |  | |
| <p>Ceradocus Spinicauda</p> |  | |
| <p>Processa modica modica</p> |  | |
| <p>Gobius niger</p> |  | |