XXI SIMPÓSIO DE BIOLOGIA MARINHA
CEBIMAR - USP

# CADERNO DE RESUMOS

CENTRO DE BIOLOGIA MARINHA
UNIVERSIDADE DE SÃO PAULO
CEBIMar USP

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XXI SIMPÓSIO DE BIOLOGIA MARINHA
CEBIMAR - USP

# Créditos e Organização

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Hudson Tercio Pinheiro (CEBIMar/USP)

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### Secretária:
Marilin dos Santos

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### Secretária:
Marilin dos Santos

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## Lista de participantes

| Nome | Categoria |
|---|---|
| Aline Aparecida Zanotti | Aluno de pós-graduação |
| Amana Guedes Garrido | Profissional |
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| Cassiano Riyu Kohori | Aluno de pós-graduação |
| Cecília Damiano | Aluno de pós-graduação |
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| Leandro Manzoni Vieira | Profissional |
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| Ludmilla do Nascimento Falsarella | Aluno de pós-graduação |
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| Natália Pires Vieira Morais de Faria | Aluno de pós-graduação |
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| Rafael Eiji Iwama | Aluno de pós-graduação |
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| Samuel Coelho de Faria | Profissional |
| Sérgio Augusto Coelho de Souza | Profissional |
| Tammy Iwasa-Arai | Profissional |
| Taynara Candido Da Silva | Aluno de graduação |
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## Lista de participantes

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|---|---|
| Thaís Kananda da Silva Souza | Aluno de pós-graduação |
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| Vitória Ferreira Castelo Branco Reis | Aluno de pós-graduação |
| Vitoria Santos Mendes | Aluno de graduação |

# Sumário

## Apresentação

Com muito entusiasmo, comunicamos a edição de mais um **Simpósio de Biologia Marinha**, evento que tradicionalmente acontece no Centro de Biologia Marinha da Universidade de São Paulo (CEBIMar/USP).

O XXI Simpósio de Biologia Marinha (SBM) foi realizado de 27 a 30 de novembro de 2023, abrangendo a ecologia, a evolução e a conservação de ambientes marinhos e suas aplicações. A intenção foi fomentar o intercâmbio científico e fortalecer a disciplina na USP e no Brasil, estimulando a divulgação de pesquisa original e identificando áreas de interesse para novas colaborações.

O Simpósio contou com sessões plenárias, apresentações orais curtas e exposição de painéis e foi dividido em sessões de três áreas temáticas da Biologia Marinha: Conservação e áreas afins; Ecologia e Fisiologia; Sistemática e Evolução. Essas sessões foram iniciadas com plenárias proferidas por pesquisadores convidados, do Brasil e do exterior, seguidas por uma seleção de apresentações orais. Os demais trabalhos foram apresentados em painéis, durante seções específicas.

# Programação

## Dia 27/11/2023 – Segunda-feira

**Recepção dos participantes**

**13:00 h às 17:00 h: Minicurso "Submersíveis não tripulados em pesquisa científica marinha", ministrado pela equipe do NUTECMAR (Núcleo de Tecnologia Marinha e Ambiental).**

**19:00 h às 22:00 h: Cerimônia de abertura**

## Dia 28/11/2023 – Terça-feira

**Ecologia e Fisiologia**

Presidente da Sessão: Augusto A. V. Flores (CEBIMar/USP)

**9:00 h às 9:45 h: Sessão plenária**

Emmett Duffy (Smithsonian Environmental Research Center, USA)
MarineGEO: Empowering team science to sustain marine ecosystems on the edge

**9:45 h às 10:00 h: Coffee break**

**10:00 h às 12:00 h: Mesa redonda**

Moderador: Augusto A. V. Flores (CEBIMar/USP)

10:00 h às 10:30 h: Tânia M. Costa (Universidade Estadual Paulista, SP)
Ecological, behavioral and physiological responses to climate change: fiddler crab as a model

10:30 h às 11:00 h: Marina N. Sissini (Universidade Federal de Santa Catarina)
Rhodoliths in the Brazilian reefs: diversity, macroecology and conservation

11:00 h às 11:30 h: Mariana Bender (Universidade Federal de Santa Maria)
Unraveling biodiversity patterns and essential services of Brazilian reef ecosystems

11:30 h às 12:00 h: Discussão

**12:00 às 14:00: Almoço**

# Programação

## Comunicações orais - Ecologia e Fisiologia (Bloco 1)

14:00 h às 14:15 h: Anti-herbivory activity of Arthrocardia variabilis (Harvey) Weber-van Bosse and Dichotomaria marginata (J. Ellis & Solander) Lamarck considering the difference between their chemical profile
Coração, Amanda CS; Chyaromont, Amanda M; Silva, Talita F; Gomes, Brendo A; Silva, Marcos VT; Leitão, Suzana G; Teixeira Valéria L; De Paula, Joel C

14:15 h às 14:30 h: Loss of host macroalgal diversity affects the associated amphipod assemblage
Ferreira, Ana Paula; Machado, Glauco Barreto de Oliveira; Leite, Fosca Pedini Pereira

14:30 h às 14:45 h: Invasive sun corals and climate change: temperature effects on pelagic dispersal potential and interspecific competition
Barbosa, Andreia CC; Flores, Augusto AV

14:45 h às 15:00 h: Temporal and local spatial changes of the vertical sea water temperature in the Alcatrazes Archipelago and relationships with local depth: Carvalho, Breylla C.; Corrêa, Ana L. T.; Lira, Camila L.; Ciotti, Aurea M.

15:00 h às 15:15 h: Does higher nutrient concentration lead to biochemical and physiological effects on the coral Mussismilia hispida in a simulated global warming scenario
Patrocinio, Guilherme T. A.; Ciotti, Áurea M.; Lopes, Fernanda C.; Faria, Samuel C.; Martins, Camila M. G.

## 15:15 às 15:30 h: Cofee break e Sessão de pôsteres: Ecologia e Fisiologia

## 15:30 h às 16:30 h: Comunicações orais -Ecologia e Fisiologia (Bloco 2)

16:30 h às 16:45 h: Diel rhythms in coral microbial communities
Seiblitz, Isabela G. L.; Capel, Kátia C. C.; Zanotti, Aline A.; Zilberberg, Carla; Cordeiro, Cesar A. M. M.; Oliveira, Raquel R.; Francini, Carlo Leopoldo B.; Garrido, Amana G.; Kitahara, Marcelo V.

16:45 h às 17:00 h: Are ascidians unpalatable? A meta-analysis about the predation effect on ascidians
Garcia-da-Silva, Júlio Henrique; Leal, Laura Carolina; Dias, Gustavo Muniz

17:00 h às 17:15 h: The price of resilience: impacts on sexual reproduction of the coral Mussismilia braziliensis (Verrill, 1868) after the most severe bleaching event of the Southwestern Atlantic
Godoy, Leandro; Krein, Verônica; Cruz, Nayara O; Amaral, Amanda; Toledo, Alexandra P; Garrido, Amana G; Zilberberg, Carla

## Programação

17:15 h às 17:30 h: Temporal trends of the benthic reef communities of Rocas Atoll and Fernando de Noronha Archipelago
Bastos, Manoella B N; Aued, Anaide W; Segal, Bárbara

17:30 h às 17:45 h: Does the righting behavior really reflect the healthy condition of Echinoderms? A case study with the sea urchin Echinometra lucunter
Acipreste, Mariana F.; Queiroz, Vinicius; Custódio, Márcio R.

17:45 h às 18:00 h: The role of agonistic interactions in the co-occurrence of damselfishes in global coral reefs
Nunes, Rafaella; Floeter, Sergio R.; Bender, Mariana

**19:30 h: Jantar**

## Dia 29/11/2023 – Quarta-feira

### Sistemática e Evolução

Presidente da Sessão: Marcelo V. Kitahara (CEBIMar/USP)

### 9:00 h às 9:45 h: Sessão plenária

Mariana Freitas Nery (UNICAMP)
A história das baleias e tartarugas marinhas contada pelos genes

### 9:45 h às 10:00 h: Coffee break

### 10:00 às 12:00 h: Mesa redonda

Moderador: Marcelo V. Kitahara (CEBIMar/USP)

10:00 h às 10:30 h: Tito Lotufo (Universidade de São Paulo)
Desafios e perspectivas nos estudos sobre a filogenia dos Tunicata

10:30 h às 11:00 h: Maikon Di Domenico (Universidade Federal do Paraná)
Evolutionary questions about convergent morphological traits and endemism in meiofauna

11:00 h às 11:30 h: Marcelo Visentini Kitahara (Centro de Biologia Marinha da Univesridade de São Paulo - CEBIMar/USP)
Unraveling the Scleractinia evolution

11:30 h às 12:00 h: Discussão

## Programação

**12:00 h às 14:00 h: Almoço**

**14:00 ás 15:15 h: Comunicações orais –Sistemática e Evolução (Bloco 1)**

14:00 h às 14:15 h: New records of sea anemones (Cnidaria: Hexacorallia: Actiniaria) from the shallow coast of São Paulo State, Brazil
Durán-Fuentes, Jeferson; Biffi, Ayla; Gomes, Maicon; González-Muñoz, Ricardo; Stampar, Sérgio N

14:15 h às 14:30 h: Ophiuroidea fauna of Trindade and Martin Vaz Archipelago
Damiano, Cecília; Martins, Luciana; Borges, Michela

14:30 h às 14:45 h: Brazilian Bryozoa and Entoprocta in the Ernst G.G. Marcus and Eveline du Bois Reymond Marcus Collection
Vieira, Leandro M; Migotto, Alvaro E, Winston, Judith; Almeida, Ana C S; Spencer Jones, Mary E

14:45 h às 15:00 h: Molecular systematics of "Phidiana lynceus": a species complex
Marcelino, Mariane da Silva; Padula, Vinicius .

15:00 h às 15:15 h: Scyliorhinus Blainville, 1816 (Carcharhiniforme: Scyliorhinidae) from Western South Atlantic: species delimitation through integrative taxonomy
Lemos, Marina; Roque, Pollyana C G; Melo, Marcelo R S; Soares, Karla D A; Oliveira, Claudio

**15:15 às 15:30 h: Cofee break e Sessão de pôsteres: Sistemática e Evolução**

**15:30 h às 16:30 h: Comunicações orais –Sistemática e Evolução (Bloco 2)**

16:30 h às 16:45 h: Are morphological and molecular data enough to unveil species boundaries? the case of two congeneric amphipods
Longo, Pedro A. S.; Siqueira, Silvana G. L.; Mansur, Karine F. R.; Azevedo-Silva, Marianne; Leite, Fosca P. P. .

16:45 h às 17:00 h: Evolution of the innate immune system in barnacles (Crustacea: Cirripedia) and their adaptations to epibiosis and parasitism
Iwama, Rafael; Andrade, Sónia

17:00 h às 17:15 h: Phylogeny of Naineris Blainville, 1828 (Annelida, Sedentaria, Orbiniidae) and transfer of species to Protoaricia and Pettibonella
Álvarez, Ricardo; Di Domenico, Maikon; Budaeva, Nataliya

17:15 h às 17:30 h: Exploring the comparative transcriptomics of Amphipods (Crustacea: Eumalacostraca) and their habitat adaptations
Iwasa-Arai, Tammy; Andrade, Sónia

## Programação

17:30 h às 17:45 h: A new species and a new record of Leodice Lamarck, 1818 species (Annelida, Polychaeta, Eunicidae) associated with calcareous algae on the Continental Shelf of Northeast Brazil (Tropical Southwest Atlantic)
Kananda, Thaís; Zanol, Joana; Zapff, Luana; Christtofersen, Martin L

**19:30 h: Jantar**

## Dia 30/11/2023 – Quinta-feira

### Conservação e áreas afins

Presidente da Sessão: Hudson Tércio Pinheiro (CEBIMar/USP)

### 8:30 h às 9:15 h: Sessão plenária

Carlos Eduardo L. Ferreira (Universidade Federal Fluminense - UFF)

Monitoramento da biodiversidade recifal nas ilhas oceânicas brasileiras: Manejo e conservação de espécies chaves

### 9:15 h às 10:00 h: Coffee break

### 10:00 às 12:00 h: Mesa redonda

Moderador: Hudson Tércio Pinheiro (CEBIMar/USP)

10:00 h às 10:30 h: Leandra Gonçalves (Universidade Federal de São Paulo)
Conservação Marinha: para e com as pessoas

10:30 h às 11:00 h: Kelen L. Leite (Instituto Chico Mendes de Conservação da Biodiversidade)
Conservação e manejo no Arquipélago de Alcatrazes

11:00 h às 11:30 h: Ronaldo Bastos Francini Filho
Ecologia e conservação do grande sistema recifal amazônico

11:30 h às 12:00 h: Discussão

### 12:00 h às 14:00 h: Almoço

### 14:00 às 15:15: Comunicações orais – Conservação e áreas afins (Bloco 1)

14:00 h às 14:15 h: Implementation of remote sensing data in CETESB Water Quality Monitoring Program: support for environmental conservation in the São Sebastião Channel
Pereira, Bruno G ; Ciotti, Aurea M

## Programação

14:15 h às 14:30 h: Microbial profile of the hydrocoral Millepora alcicornis during a bleaching event reveals site-specific patterns
Kohori, Cassiano R.; Garrido, Amana G.; Zilberberg, Carla; Zanotti, Aline A.; Capel, Kátia C.; Kitahara, Marcelo V.

14:30 h às 14:45 h: Relative growth and morphological maturity of Minuca vocator (Herbst, 1804) (Brachyura: Ocypodidae)
Modenesi, Ligia M. ; Kriegler, Nicholas (1,2); Pinheiro, Marcelo A.A.

14:45 h às 15:00 h: How much of shallow and mesophotic reefs are protected?
Loyola da Cruz, Guilherme; Pinheiro, Hudson

15:00 h às 15:15 h: In vitro fertilization and development of corals from frozen semen: a strategy for conservation of the endemic species Mussismilia harttii
Viveiros, Hayla P V; Cruz, Nayara O; Amaral, Amanda P; Galuppo, Andrea G; Godoy, Leandro

**15:15 às 15:30 h: Cofee break e Sessão de pôsteres: Conservação e áreas afins**

**15:30 h às 16:30 h: Comunicações orais – Conservação e áreas afins (Bloco 2)**

16:30 h às 16:45 h: Iron pollution and the fragile coral reef ecosystem: understanding the behavioral responses of Stegastes fuscus
Souza, Juliana A; Francini-Filho, Ronaldo B

16:45 h às 17:00 h: The aesthetic value of Brazilian reefs
Waechter, Luiza; Luza, André; Dambros, Cristian; Almeida-Neto, Mário; Bender, Mariana

17:00 h às 17:15 h: An integrated physiological and genomic approach to assess ecotoxicological effects of anthropogenic contamination in situ on the swamp mangrove crab, Ucides cordatus (Decapoda: Ocypodidae) and its mangrove environment
McDonnell, Rachel; McNamara, John

17:15 h às 17:30 h: Evaluation of adaptive management to control the invasion of sun corals in the Alcatrazes no-take MPA, southeastern Brazil
Coelho-Souza, Sergio A; Meira, Heitor M; Falsarella, Ludmilla N; Mendes, Vitória S; Candido, Carolina; Leite, Kelen L; López, María S

17:30 h às 17:45 h: Unveiling exotic and invasive species in marine protected areas using environmental DNA (eDNA)
Oliveira, Valte N; Zanotti, Aline A; Kitahara, Marcelo V; Capel, Kátia C C

**18:00 - Premiações - 19:30 h: Jantar / Coquetel e apresentação cultural .**

## Primeira Sessão: Ecologia e Fisiologia – Plenária

### MarineGEO: Empowering team science to sustain marine ecosystems on the edge

J. Emmett Duffy (Smithsonian Institution, MarineGEO program and SERC)

Climate change and biodiversity loss pose grand, intertwined challenges to nature and society. Responding to these global changes requires global science, which requires a global team. Here we review the mission, development, and accomplishments of the Marine Global Earth Observatory (MarineGEO), a network of partners led by the Smithsonian Institution conducting coordinated science to understand how coastal ecosystems work to inform actions that keep them working. We focus on nearshore habitats ("ecosystems on the edge") because this is where people and biodiversity are concentrated and interact most. We aim to empower partners to do rigorous macroecological research via coordination, standardization, data management, and knowledge sharing. MarineGEO has now engaged partners from nearly 100 institutions in 34 countries across 56 of the world's coastal ecoregions and 6 continents to (1) establish standardized time series of change in seagrass, reef, and other coastal ecosystems; (2) coordinate experiments and comparative studies to understand drivers of change; and (3) lead data and knowledge syntheses to inform management and policy. We review selected results and implications of our network's research, chart the course ahead, outline our collaboration with the Marine Biodiversity Observation network and Marine Life 2030 program of the UN Ocean Decade, and discuss how we can work together on shared grand challenges.

## Primeira Sessão: Ecologia e Fisiologia – Mesa redonda

### Ecological, behavioral and physiological responses to climate change: fiddler crab as a model

Tânia Marcia Costa (Universidade Estadual Paulista, Instituto de Biociências, Campus do Litoral Paulista)

Climate change is imposing constant and more severe environmental challenges to coastal and marine species. Using fiddler crabs as a model, I present the effects of increasing temperature (or heatwaves) and decreasing pH on ecological, behavioral and physiological responses. The combined effect (increase in temperature and decrease in pH) on embryonic and larval development reduced survival at higher temperatures; embryo development and larval physiology were synergistically affected by both stressors. Acidification seems to affect the chemosensation of planktonic larvae, leading them to not distinguish between a non-harmful stimulus and a potential predator and potentially bringing a cascade of ecological impairments. Fiddler crabs have an amphibious life cycle and during the planktonic phase it is the coldest water temperature that defines the limits of species distribution. As temperature increases, species can expand their distribution ranges. An increase of 0.9°C in mean sea surface temperature over the past 37 years, for the coast of South America, may explain the recent expansion of Leptuca cumulanta. Fiddler crabs grow less, reach sexual maturity earlier, and have lower survival rates in response to the high metabolic costs imposed by higher temperatures. In the adult stage, physiological and behavioral responses differ between species. Species that inhabit vegetated areas are more vulnerable to increased temperature, with greater water loss (decrease survival) and may change their geographical distribution due to high temperature; species that inhabit non-vegetated areas are more tolerant to temperature increase, despite physiological changes (osmotic control) and may have a competitive advantage in a warming scenario. With heatwaves becoming more frequent, hotter and longer lasting in the coastal region of SP, we can expect potential reductions in larval recruitment and stocks, with negative effects on coastal habitats.

## Primeira Sessão: Ecologia e Fisiologia – Mesa redonda

### Rhodoliths in the Brazilian reefs: diversity, macroecology and conservation

Marina N. Sissini (Universidade Federal de Santa Catarina)

Rhodoliths are free forms of calcareous red algae and play a fundamental role in the construction of biogenic reefs, including coral reefs. With advances in the characterization of reef systems in the Southwestern Atlantic, unique reef formations have been revealed, where calcareous algae are the main builders of these formations, such as the Rocas Atoll, the "chapeirões" of Abrolhos and, the Coralline Hills of Vitória-Trindade Chain. In Brazil, these aggregations extend from the mouth of Amazonas River to Santa Catarina, and can occupy up to 230,000 $km^2$, according to predictive models. Rhodolith beds are considered "ecosystem engineers", being responsible for creating and maintaining marine habitats for a wide diversity of organisms, and at different stages of their life cycles. Despite its slow growth, rhodolith beds represent one of the largest carbonate deposits in the world, being important carbonate biofactories and long-term carbon storage. Rhodolith beds still receive little attention and have many gaps in relation to its distribution, composition and diversity patterns. Furthermore, like other marine organisms, rhodoliths are under local and global impacts, which will be presented and discussed, highlighting their ecological importance and contribution to people to promote their conservation in the Blue Amazon as a world natural heritage.

## Primeira Sessão: Ecologia e Fisiologia – Mesa redonda

### Unraveling biodiversity patterns and essential services of Brazilian reef ecosystems

Mariana Bender (Universidade Federal de Santa Maria, Departamento de Ecologia e Zoologia, Marine Macroecology and Conservation Lab., ReefSYN – Reef Synthesis Working Group)

Reefs, known as the most diverse marine ecosystems, play a crucial role in providing a wide array of services to millions of people worldwide. Both biogenic and rocky reefs extend along the vast Brazilian coast, with varying diversity patterns. Standardized and large-scale sampling of Brazilian reef assemblages have accumulated over the last 20 years, mostly an outcome of both human resources and the efforts of research programs as SISBIOTA-Mar and PELD-Iloc (Long Term Ecological Research of Brazilians Oceanic Islands). The ReefSYN (Reef Synthesis Working Group) has synthesized biological, environmental and social data to investigate biodiversity patterns and the ecosystem services derived from Brazilian reefs. More specifically, we investigated the functional diversity patterns of benthic and reef fish assemblages. Additionally, we examined the various services provided by these ecosystems, including reef fisheries, the aesthetic values associated with reefs, and the significance of seafood in ensuring food security for the Brazilian population. The functional diversity of benthic and reef fish assemblages vary in space, as does the aesthetic values of reefs as perceived by the Brazilian population. Despite seafood consumption in Brazil being relatively low compared to other countries, it is noteworthy that seafood offers superior micronutrient content compared to other widely consumed protein sources such as beef and poultry. In this presentation, I will delve into the intricate details surrounding the diversity and significance of Brazilian marginal reefs.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

# Anti-herbivory activity of Arthrocardia variabilis (Harvey) Weber-van Bosse and Dichotomaria marginata (J. Ellis & Solander) Lamarck considering the difference between their chemical profile

Coração, Amanda CS (1,2); Chyaromont, Amanda M (1); Silva, Talita F (1); Gomes, Brendo A (4); Silva, Marcos VT (3); Leitão, Suzana G (3,4); Teixeira Valéria L (2); De Paula, Joel C (1,2)

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Calcified rhodophytes have a structural defense mechanism against herbivory, reducing nutritional value due to high calcium carbonate content. They may also produce distasteful compounds, providing an additional defensive effect. Dichotomaria marginata exhibits anti-herbivory activity knowledge to few marine herbivores, while Arthrocardia variabilis lacks biological activity and chemical profile records. This study evaluated deterrence activity and chemical profiles of D. marginata and A. variabilis non-polar extracts against Pachygrapsus transversus (Gibbs, 1850). The specimens were collected from Tarituba (Paraty) and Vermelha Beach (Rio de Janeiro), sorted, dried, ground, and extracted using dichloromethane. Pachygrapsus transversus was collected in Niterói/RJ and acclimated with Ulva sp. as food for 24 hours. Artificial diets containing extracts of 2 g of each dried alga were offered for three days (N=19), ending at 30% consumption. LC-MS/MS analysis used ESI and APCI sources in both ionization modes. The chemical data were processed with MZmine v. 2.53, statistically evaluated on MetaboAnalyst 5.0, and annotated in GNPS platform. Anti-herbivory assays showed crab preference for control over treatment of D. marginata ($p=0,0009$), while A. variabilis had no statistical difference at the same quantity ($p=0,246$). However, A. variabilis extracts displayed anti-herbivory activity at 4 g ($p=0,00006$). ESI(+) analyses provided higher ion abundance and intensity for subsequent assays. PCA analysis indicated natural sample separation, revealing significant chemical differences between the species. The PLS-DA assay validated the discriminant model with an accuracy of 0.94 ($R^2=0.95$, $Q^2=0.91$). VIP-score identified m/z 458, 502, 546, 590, and 634 ions for species separation. Molecular networks showed clusters of phenolic compounds, phytosterols/phytostanols, and terpenoids. These results enhance our understanding of calcified red algae's defense mechanisms, with highly calcified species relying mainly on calcium carbonate armor and less on chemical compounds for protection, while less calcified species depend primarily on metabolite diversity and abundance.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

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CEBIMAR - USP

## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

# Loss of host macroalgal diversity affects the associated amphipod assemblage

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Biodiversity loss is a process that has accelerated in recent decades. In this scenario, the loss of habitat-forming species is of great concern since they facilitate the occurrence of other organisms. Marine macroalgae have been under strong decline in abundance and diversity, mainly due to climate change. These habitat-forming organisms facilitate the occurrence of other species by providing new habitats or increasing the complexity of existing ones. Also, they can minimize adverse abiotic conditions and negative interactions and, thus, their presence allow for the development of an abundant and diverse associated fauna, such as amphipod species. In this sense, the aim of this study was to investigate how the loss of habitat-forming species affects the associated fauna. Specifically, we asked (1) What is the effect of host macroalgal diversity on the amphipod assemblage? (2) What is the relative importance of richness and identity of host macroalgae for the amphipod assemblage? To answer these questions, we carry out a field experiment manipulating the richness of host macroalgae (Dichotomaria marginata, Padina gymnospora, Sargassum filipendula) on a subtropical rocky shore (Ubatuba, SP, Brazil). Treatments ranged from monoculture to polycultures, combining additive and substitutive designs. The polyculture treatment harbored higher amphipod abundance and richness than monocultures, and had a unique assemblage composition. These results were attributed to the richness, but not to the identity of host macroalgae. This pattern was observed in both experimental designs performed. Moreover, we observed an overyielding of the polyculture relative to that expected from the individual contribution of the monocultures (Dt>0) and based on the yield of the best monoculture (Dmax>0). These results show that more diverse substrates provide a greater variety of resources (e.g. habitat and food) than monospecific substrates. Therefore, we emphasize the importance of maintaining the diversity of host macroalgae for the associated faunal community.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Invasive sun corals and climate change: temperature effects on pelagic dispersal potential and interspecific competition

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Currently, biological invasions and climate change are considered the most important threats to marine biodiversity. Invasive sun corals Tubastraea tagusensis and T. coccinea have successfully colonized coastal reef habitats from Florida to Southern Brazil, negatively impacting native coastal assemblages. Despite being focus of several studies, there was so far no information on how sun corals might respond to ocean warming due to climate change. To better understand mechanisms underlying the invasion dynamics in the region and also foresee its possible pathways in a future warmer scenario we investigated: (i) species-specific distribution patterns from large scales across locations to small scales within locations, and their distribution according to a key environmental filter (depth) considered a proxy of thermal preferences; (ii) the effects of temperature on the performance of adult colonies towards a native competitor; (iii) temperature effects on propagule mortality, settlement and dispersal potential. Our results show species segregation across locations, and species-specific depth distributions trends, suggesting possible thermal preferences. At small patches with considerable co-occurrence, we observed a possible case of neutral coexistence, where both species presence can be modeled as independent events. When in contact with the endemic brain coral, T. tagusensis has shown to be a better competitor, imposing tissue damage and reduced growth to the native coral, exhibiting no sign of reduced performance regardless temperature or season. Sun-corals propagules presented an outstanding plasticity, likely to affect their pelagic duration and dispersal potential, due to an eventual temperature-regulated secondary competence window, allowing an escape response from high temperature habitats where larval mortality rates are high. This work presented a worrying future scenario since sun-corals performance will hardly be affected by climate change. Ocean warming of temperate regions may promote range extensions to subtropical and warm-temperate areas where temperature conditions for propagule survival and settlement success are best.

**Financiamento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)**
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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Temporal and local spatial changes of the vertical sea water temperature in the Alcatrazes Archipelago and relationships with local depth

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In the Alcatrazes Archipelago, located in the Southwest Atlantic, the influence of temperature variability on biological communities, inducing changes in biodiversity, has been observed. To overcome the scarce abiotic data available in the archipelago to date we monitored water temperature continuously. We used low-cost sensors (HOBO TidbiT MX2203 Temperature 400' Data Logger), to investigate the temporal variability along the water column at six sites in the sheltered side of the archipelago, between February/2022 and February/2023. The dataset was interpolated meter by meter and some metrics were calculated: (1) detection of the mixing layer (ML), the (2) thermocline (TC) and the (3) South Atlantic Central Water mass (SACW), when these were present in the water column. Due to differences in local depth at the monitoring sites, we expected to find differences in temperature patterns, where sites with greater depth would show greater stratification of the water column throughout the year. The expected vertical stratification of the water column occurred between November and March, with a warm (22.8±0.2°C) superficial layer and homogeneous (ML) and a colder (17.0±0.6°C) homogeneous (SACW) bottom layer. During the remaining months the water column was generally homogenous (21.9±0.1°C). A spectral analysis (FFT) highlighted energy peaks at 8, 7, 4.6, 3.5 and 2.7 days, suggesting influences of tides and winds, while a multidimensional scaling (nMDS) analysis allowed us to verify that seasonality is indeed what "commands" the stratification/destratification variations in the sampled sites. In summary, temperature variations in the sheltered side of Alcatrazes present a marked seasonality. Although local depth had little effect on temperature variations over this first year of observation, the presence of SACW was detected at all sites, and the greater the local depth, the greater its permanence during the year.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

# Does higher nutrient concentration lead to biochemical and physiological effects on the coral Mussismilia hispida in a simulated global warming scenario?

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Nutrient pollution, especially nitrate (NO3-) released by domestic effluent and plantations, is one of the local stressors that are affecting coral reef health. The effects of NO3- and other pollutants can be intensified by increased water temperature, which is the primary factor leading to coral bleaching and death. Oxidative stress, known as an imbalance between antioxidant capacity and reactive species favoring the latter, is the mechanism that leads to a symbiotic disruption between the coral and its endosymbionts, resulting in bleaching. In this view, we investigated whether a high and environmentally relevant NO3- concentration combined with elevated temperature can cause oxidative stress and further bleaching in the endemic Brazilian coral Mussismilia hispida. Colonies (N=8) from the Alcatrazes Archipelago, São Paulo state, were fragmented and acclimated in an open-water system for 14 days, at 26 oC and under 12 h light/12 h dark (180 PAR). Later, they were exposed to NO3- 30 µM enriched water at 26 oC or 29.5 ºC (IPCC 2023, + 3.5 ºC) for another 14 days in a closed-water system, with partial natural seawater changes (30%) to determine symbiont density (Sd), chlorophyll-a concentration (Chla), maximum photosynthetic quantum yield (Fv/Fm), total antioxidant capacity (TAC) and lipoperoxidation (LPO). In summary, our results showed that high NO3- concentrations did not significantly affect the oxidative status of coral M. hispida. However, animals exposed to heat stress, as well as heat stress with NO3-, exhibited increased TAC levels, followed by augmented LPO. Negative effects were higher in the presence of high NO3- concentration. Consequently, Sd, Chla and Fv/Fm were significantly reduced compared to the control condition (ambient NO3-, 26 oC). As expected, our results demonstrated that global warming is harmful to corals, and also show the importance of considering nutrient status to quantify coral bleaching.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Diel rhythms in coral microbial communities

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Features that vary in a diel pattern are ubiquitous among different organisms. Regarding scleractinian corals, physiological traits are known to change between day and night, but knowledge on oscillations in their associated microbiome is incipient. Currently available data is based on a few species of zooxanthellate corals (i.e. corals that host photosynthetic dinoflagellates), majoritarily from the Pacific Ocean. In an effort to expand the current understanding of the dial variation in coral microbiome, we investigated their composition and abundance during a 72-hour period for four species: the zooxanthellate Mussismilia hispida and Madracis decactis, and the azooxanthellate Tubastraea coccinea and T. tagusensis. Samples were taken every four hours for three days (each day corresponding to a replicate) in an experiment set in the Alcatrazes Archipelago (Southwestern Atlantic). After Illumina sequencing of 16S rDNA, DADA2 was used for quality control and taxonomy assignment. Data were rarefied and statistical analyses were performed in R and are still in progress. Alpha diversity (Shannon) was significantly different between M. decactis and the other species but not between daytime and nighttime within each species. Beta diversity (Bray-Curtis/PERMANOVA) by species followed a similar pattern, with no difference between day and night or by time. Regarding diel variation, calculated by JTKcycle for each species, significant results (ADJ.P<0.01) were found for one ASV (Amplicon Sequence Variant) in T. tagusensis, corresponding to Pseudoalteromonas sp. (highest abundance at 4 am). A lack of overall diel variation can suggest that these coral hosts have a greater ability to regulate their microbial communities. ASVs with diel rhythmicity were previously found in a zooxanthellate coral and an azooxanthellate anemone but while none of them belonged to Pseudoalteromonas, some belonged to the same class (Gammaproteobacteria). Future analyses should refine our current understanding of variations in the coral microbiome.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Are ascidians unpalatable? A meta-analysis about the predation effect on ascidians

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Ascidians are sessile animals that have adopted many strategies to survive predation and dominate reef communities worldwide. Chemical and physical defences, or even coloniality, are considered the main ascidian strategies to escape predation. Unpalatability through chemical defences has been confirmed in manipulative experiments using pellets or tissues of ascidians. However, predation exclusion experiments on the community scale show that ascidians are almost entirely preyed upon when exposed to predators. Based on these contrasting results, we performed a meta-analysis to assess the importance of the place of the implementation of the experiment, the experiment design, ascidians' sociability, and predator's type to the efficacy of ascidians' defences. We found that multiple factors, such as methodology and the identity of predators but not ascidians' sociability, can interfere with the effectiveness of the defences of ascidians. Studies that tested the palatability of ascidians against predators using pellets or tissues presented evidence for ascidians' defences, however, they depend on the predator's identity. We did not find evidence of ascidians' defences in the studies that tested the effect of predators on ascidians in the community. There is a lack of field experiments, mainly on solitary ascidians, that evaluate ascidians' predation in communities of natural or even artificial substrate. Research on ascidian defences is also biased toward the temperate region from the northern hemisphere. The common knowledge that ascidians are animals with active defences may be overestimated and defences are probably restricted to a limited number of species. This misconception is caused mainly by methodological and geographical biases that test only species with previous evidence of defences. Therefore, we need more worldwide studies focusing on the ecological relationships between ascidians and their natural predators.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

# The price of resilience: impacts on sexual reproduction of the coral Mussismilia braziliensis (Verrill, 1868) after the most severe bleaching event of the Southwestern Atlantic

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Coral reefs are home to at least 25% of all marine biodiversity and provide important ecosystem services to human society. The increase in ocean temperature and acidification, resulting from anthropogenic activities, have been responsible for numerous impacts on coral reefs in recent decades. The bleaching phenomenon, which occurs due to the rupture of the symbiosis between dinoflagellates of the Symbiodiniaceae family and scleractinian corals, is a major current concern. Bleaching causes the coral to lose its main source of nutrition, compromising its physiological activities and obtaining energy. If symbiosis is not reestablished, corals eventually die. Little is known about the impacts of bleaching on the sexual reproduction of reef-building corals. In Brazil, Mussismilia braziliensis is an endemic species, with occurrence restricted to Bahia and one of the most important reef-builder in Abrolhos. This study evaluated the impact of the most severe bleaching event ever recorded for the South Atlantic on the reproduction of M. braziliensis. The species recovered quickly from bleaching, prioritizing its energy stores and heterotrophy to keep colonies alive. Bleaching coincided with the beginning of gametogenesis, compromising reproduction in several ways. Only 10% of colonies spawned, there was a marked reduction (67%) in the number of bundles released per colony when compared to years without bleaching, and embryo viability was 3.75 ± 3.76%. In addition, some gamete bundles showed all spermatozoa dead soon after spawning. Impairment of sexual reproduction leads to impairment of reef cover, therefore studies with this approach should be prioritized in times of drastic environmental changes.

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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Temporal trends of the benthic reef communities of Rocas Atoll and Fernando de Noronha Archipelago

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Reef environments are one of the most biodiverse ecosystems on the planet. However, they have been threatened by increasing anthropogenic disturbances. Studying the dynamics of reef communities on isolated oceanic islands can help to understand their natural temporal variations and those derived from global climate changes. In this work, we identify and compare the dynamics of the benthic reef coverage of Fernando de Noronha (FN) and Rocas Atoll (RA) from 2013 to 2019, sampled annually through photoquadrats. The coverage percentage of organisms was categorized into functional groups. On both islands, the most abundant groups were turf and macroalgae, followed by calcifiers. Temporally, turf showed an opposite trend from 2017-2019, with a decrease in FN and an increase in RA. Macroalgae demonstrated a similar trend between islands, with a slight increase from 2015-2017 and a decrease from 2017-2019. Calcifiers showed different temporal trends, oscillating over the years in FN and decreasing in RA from 2013-2014 and 2018-2019. Cyanobacteria, despite the predominant low coverage, exhibited an increasing trend only for FN in 2017 and 2019. Therefore, FN presents low coverage of turf and macroalgae between 2018-2019, with a cyanobacteria increase in 2017 and 2019. RA presents low macroalgae and calcifiers coverage, with high turf between 2018-2019. Results suggest possible growth trends of opportunistic groups in recent years, coinciding with climate disturbances, which may indicate the impact of global anthropic drivers. This may suggest the beginning of an alteration of these benthic communities, culminating in the loss of biodiversity, structural complexity and ecosystem functions and services. Thus, we highlight how important long-term monitoring the Brazilian oceanic islands is to better understand and predict environmental and structural changes in the southwest Atlantic's reefs.

**Financiamento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES); Instituo Ambientes em Rede (IAR-Brasil); Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq); Programa Ecológico de Longa Duração nas ilhas oceânicas (PELD ILOC).**
**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### Does the righting behavior really reflect the healthy condition of Echinoderms? A case study with the sea urchin Echinometra lucunter.

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Although the righting behavior of echinoderms is largely used as an indicator of stress, there are no studies correlating this behavior with the true physiological status of the individuals. Here, the righting behavior of Echinometra lucunter was investigated during an experimental fungal infection and correlated to the physiological status of the individuals. Eighteen sea urchins were inoculated with Saccharomyces cerevisiae, at a final concentration of 105 and 107 cells/mL of coelomic fluid (low and high respectively) and the righting behavior, the total and differential coelomocyte counts (TCC and DCC) and cell viability were compared to the controls after 24h. The righting time was 87.0±30.4s in the controls but increased to 99.3±36.6s and 129.8±39.4s in low and high-infected individuals respectively. Regarding the coelomocytes, the TCC was 8.4±1.4x106 cells/mL in noninfested animals but increased to 10.6±3.3x106 and 11.3±2.9x106 in low and high-infected urchins. For DCC, the phagocytes increased by 9.3% and 11.1% in low and high individuals, while vibratile cells decreased by 6.2% and 20.6%, respectively. The red and colorless spherulocytes were very similar among the controls, low and high-infected echinoids. Lastly, the coelomocyte viability in the controls was 78±4%, decreasing to 76±2% and 65±10% in low and high-infected sea urchins, respectively. The results showed that, although the physiological condition of the innoculated individual had consistently differed from the controls, the righting behavior seemed to be altered only after the more severe physiological challenge observed in high-infected animals. These results show that more studies are necessary to understand the extent to which the righting behavior may be useful in predicting echinoderm health status.

**Financiamento: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)**
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## Primeira Sessão: Ecologia e Fisiologia – Comunicações orais

### The role of agonistic interactions in the co-occurrence of damselfishes in global coral reefs

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Coral reefs retain the highest marine biodiversity and support a diverse array of fish species that interact in multiple ways. Among these species, damselfishes stand out as conspicuous reef fish, known for their territorial and aggressive behavior. These characteristics often lead to competitor dominance and a low probability of coexistence between damselfish species at the same place. However, the extent to which the territorial behavior of damselfishes influences patterns of agonistic interactions remains unknown. This study aims to fill this knowledge gap by investigating how the agonistic interactions within the Pomacentridae family happen at a global scale and which are the factors influencing these interactions to happen. To achieve this goal, we utilized a comprehensive global dataset, comprising eight sites representing a gradient of species richness and phylogenetic relatedness among fishes. In order to understand the factors underlying agonistic interactions, we employed a Path Analysis. Additionally, the out-degree centrality metric was used to assess the structure of agonistic interactions and identify the central species at each study site. The results revealed that the agonistic interactions of damselfishes were driven majorly by the species co-occurrence (Path Coefficient = 0.74) and secondly by their territorial behavior (PC = 0.07). Other tested variables, such as local richness (PC = 0.03) and maximum abundance (PC = -0.13) did not influence agonistic interactions. Among damselfishes, those from the Stegastes genus played a central role in agonistic interaction networks across six out of eight study sites, which is associated with their territorial behavior and high frequency of interactions. This study significantly contributes to improving our knowledge of the relationship between co-occurrence and agonistic interactions, as well as understanding the structure of these interactions within the Pomacentridae family.

**Financiamento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)**
**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

# A random forest model for estimating Underwater Photosynthetic Active Radiation (PAR) in the São Sebastião Channel, São Paulo, Brazil

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Photosynthetic Active Radiation (PAR) attenuation is a fundamental variable for water quality, and its continuous monitoring, particularly in urbanized areas, is essential for coastal management. This work focuses on PAR vertical distribution in the southern portion of the São Sebastião Channel (SSC), São Paulo, Brazil, for the first time using a 6-year time series of CTD casts obtained between 2014 and 2020. The SSC is a dynamic environment, and measurement of subsuperficial PAR measurements are especially challenging in the upper few meters due to wave action and shadowing effects during sampling. Here we investigated how Random Forest (RF) models (a machine learning technique) would help to estimate PAR using oceanographic variables as predictors, chosen among 12 available in total. Water temperature, salinity, depth, chlorophyll-a fluorescence, dissolved oxygen, turbidity, atmospheric pressure, wind speed, wind direction, air temperature, above-surface PAR and astronomical season. Developed RF models used depth, turbidity, water temperature or above-water solar radiation as predictor variables performed well estimating PAR deeper than 4 m, with RMSE lower than 50 µmol s-1 m-2. However, they presented larger errors (RMSE above 200 µmol s-1 m-2) near the surface (between 0 and 1 m) and when for PAR above 500 µmol s-1 m-2. Still, we show that it is possible to estimate PAR from a CTD equipped with a turbidity sensor, thus offering an alternative to classic PAR parametric models, although requiring substantially more data. This implies that our models were necessarily exposed to different conditions, which are often mentioned as limiting factors on classic PAR parametrizations. Our results help to partially fill a gap in observed underwater PAR in the SSC, as no preliminary studies are available, so this study may be used as a blank for future scientific investigations and local monitoring actions.

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XXI SIMPÓSIO DE BIOLOGIA MARINHA
CEBIMAR - USP

## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Characterization of the oocyte development of the dusky grouper Epinephelus marginatus (Teleostei, Serranidae)

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The teleost reproductive physiology is modulated by several environmental signals, which in turn stimulate the Hypothalamus-Pituitary-Gonads axis to synthesize and secrete the neurohormones and hormones responsible for the reproductive processes. The dusky grouper Epinephelus marginatus is a protogynous hermaphrodite species of great economic importance and is listed on the International Union for Conservation of Nature (IUCN) Red List as “vulnerable” species. The interest in breeding of this species in captivity is evident, but the restocking program becomes complex due to the female’s dysfunction showed in captivity, mainly in reach the complete ovarian maturation. Therefore, the aim in this study is evaluate the oocyte development of E. marginatus in the natural environment compared to animals in captivity. The animals were caught in the natural environment by artisanal fishermen around Montão de Trigo Island (São Sebastião city, São Paulo). E. marginatus born and raised were acquired from Redemar Alevinos (Ilha Bela, São Paulo), and transferred to the Marine Biology Center (CEBIMar/USP). These analyses were performed during the reproductive period (October to January) and outside the reproductive period (April to August). Fish were anesthetized, euthanized, and ovaries were collected; fixed in Bouin’s solution for 24hand submitted to routine histology techniques (staining with haematoxylin and eosin). Histological sections (5 µm) were analysed under a transmitted light microscope, in which the different stages of oocyte development were described. The ovarian phases identified were: oogonia, oogonia nests, perinucleolar oocytes (initial and advanced), alveolar cortical oocytes, vitellogenic oocytes and atretic oocytes. On the other hand, alveolar cortical and vitellogenic oocytes were only observed in the natural environment group during the reproductive period. All this information is important for improving the artificial reproduction of E. marginatus through controlled breeding programmers, and these results may support future studies on Brazilian aquaculture of marine teleost species.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Does photosymbiosis affect coral metabolism? An experimental approach under simulated climate changes

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Coral reefs are valuable, essential ecosystems: although they cover less than 0.1% of the ocean floor, they host approximately 25% of all marine biodiversity. Stony corals (Anthozoa, Scleractinia) show 21 independent appearances of symbiosis with intracellular photosynthetic dinoflagellates, and four events occurring in lineages with facultative mutualism, all from an asymbiotic, plesiomorphic condition. The historical profile of scleractinian coral diversity reveals that symbiotic forms were the most affected during the Cretaceous-Paleogene extinction, and the same holds true in the Anthropocene, as 75% of the world's reefs are threatened by bleaching (expulsion of symbionts and/or chlorophyll degradation). Therefore, the objective of this project is to test, under simulated conditions of warming (+3.5ºC) and acidification (-0.6 pH unit) for 15 days of exposure, whether: (i) symbiotic corals show a greater reduction in oxygen consumption; (ii) symbiotic corals demonstrate higher levels of oxidative stress; (iii) asymbiotic corals show lower reductions in enzyme activities of energy metabolism and calcification process. The absence of photosymbiosis should promote a higher tolerance to simulated climate changes in scleractinian corals owing to the putative more balanced redox homeostasis under stressful conditions. The evolution of physiology associated with symbiosis acquisition, as well as the comparative perspective on oxidative and energy metabolism in the face of climate change, will reveal the role of shared ancestry in coral sensitivity, as well as shed light on some of the physiological causes of the potential greater tolerance of asymbiotic corals.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

# Does temperature affect oxidative status? Learning from corals and octocorals under simulated global warming

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Coral and octocoral bleaching is characterized by the breakdown of the symbiotic relationship between animal host and endosymbiont photosynthetic microalgae. This phenomenon is mainly related to thermal stress conditions that increases reactive oxygen species production by the photosynthetic machinery. Under the context of climate change, an increase of ocean temperature up to 4.5 °C by 2100 could lead to bleaching and death of several coral reefs. In a moderate predictive scenario, we aim here to characterize coral and octocoral metabolic physiology in order to test whether high temperature triggers molecular damage and antioxidant capacity. Colonies ($5 \leq N \leq 6$) of the octocorals Plexaurella grandiflora and Neospongodes atlantica, and of the corals Madracis decactis and Tubastraea coccinea were submitted to a moderate predictive scenario of global warming (+3.5 °C), as well as kept in a control scenario (26°C), for 14 days, in an open system. For the present moment, the oxidative status was evaluated via total antioxidant capacity (TAC) and lipid peroxidation (LPO). The effects of 'temperature' and 'species' were assessed using two-way analysis of variance (ANOVA), followed by multiple comparisons test (SNK) if necessary. In summary, system temperature remained stable under both conditions (control: 26.0 ± 0.4°C; treatment: 29.4 ± 0.3°C). Heat treatment showed no effect on LPO and TAC levels, however 'species' affected such metrics. Tubastraea coccinea, an azooxanthellate species, showed the highest levels of TAC and lowest levels of LPO in both control and treatment conditions, whereas M. decactis showed the highest LPO levels, and was the only species with visual bleaching. Thus, exposure to high temperature did not affect the oxidative status in the representatives here evaluated, however the interspecific variability was significant between coral and octocoral species. We highlight here T. coccinea, an invasive species, with high physiological tolerance to thermal stress.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Effects of fasting and refeeding on plasma fatty acids of juvenile dusky grouper, Epinephelus marginatus (Perciformes: Serranidae)

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The dusky grouper Epinephelus marginatus is included in the red list of the International Union for Conservation of Nature (IUCN) in a state of vulnerability. The species has great ecological importance but shows late growth and reproduction. Anthropogenic factors, such as overfishing, reduce their natural stocks, so studies on physiology of species are important to improve rearing. Thus, the objective of this study was to investigate the plasma fatty acid (FA) profile of the dusky grouper in different periods of food restriction, aiming to understand the physiological processes of the species in periods of food restriction. The animals were divided into 500L tanks in RAS (Recirculating Aquaculture System), in 3 treatments (3 tanks/treatment): T1–feeding (30 days constant feeding), T2–refeeding (15 days feeding restriction and 15 days refeeding) and T3–feeding restriction (30 days without feeding). Three animals/tank were sampled, on the respective days: 7; 15; 15+12 hours; 22 and 30. The plasma total FA profile was analyzed by gas chromatography and data underwent statistical analysis (Two Way ANOVA, followed by Tukey $p < 0.05$). Animals from T2 had lower percentages of saturated (SFA) at 7 days compared to 30 days, and higher monounsaturated FA (MUFA) compared to T1, after 30 days. Also after 30 days, fish from T1 showed higher plasma concentrations of MUFA than T2, which suggests an excess of nutrients in the diet for fish in T1 compared to T2. In addition, animals from T2 showed lower values of LC-PUFA and omega-3 after 30 days, possibly showing a lower requirement for the catabolism of physiologically important FAs. Therefore, the present study shows that dusky grouper presents better physiological conditions in relation to 15-day fast, once the species preserved PUFA and mobilized SFA and MUFA, inversely to other treatments.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Effects of phenanthrene on Epinephelus marginatus (Perciformes: Serranidae): behavioral changes, lipoperoxidation and acetylcholinesterase activity

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Polycyclic aromatic hydrocarbons (PAHs), such as phenanthrene (PHE), are the main crude oil components (achieving 98% of their composition). In the marine environment, ecological disasters with oil spills are the main external sources of PAHs and PHE. The dusky grouper Epinephelus marginatus is a protogynous hermaphrodite species of great economic importance and is listed on the International Union for Conservation of Nature (IUCN) Red List as a “vulnerable” species. Previous studies suggest that plasma androgen 11-Ketotestosterone was reduced in E. marginatus exposed to PHE, suggesting that this compound may cause changes in steroidogenesis. Therefore, we evaluated the effects of PHE on behavior/physiology by performing a 96h sublethal bioassay. Briefly, E. marginatus juveniles were divided into four treatments: 1) 0.1 mg/L of PHE; 2) 1 mg/L of PHE; 3) vehicle exposure (ethanol, 0.004%), and 4) control group (sea water). During the experimental exhibition, we recorded each fish tank for 1h at the following exposure times: 0, 6, 10, 24, 30, 34, 48, 54, 58, 72, 78, 82, and 95h for subsequent analysis of the behavior. After 96h of exposure, the animals were anesthetized, and blood was collected for plasma cortisol profile analysis by enzyme-linked immunosorbent. Then, the animals were euthanized and brain, muscle, liver and gill samples were collected for analysis of ACHE activity and lipoperoxidation. Preliminary behavior analyses indicated alters equilibrium in high PHE concentration. High mucus production was observed in the groups exposed to PHE and the dilution vehicle. Plasma cortisol profile was higher in animals exposed to PHE compared to control and vehicle groups. Thus, it is possible to observe that PHE influences the physiology of E. marginatus, mainly in the plasma cortisol profile, animal behavior and reproduction, suggesting that PHE is a behavior, endocrine, and reproductive disruptor in this species.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Metabolism underpins osmoregulatory capacity in the semi-terrestrial crab Minuca rapax (Brachyura, Ocypodidae)

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Gills are multifunctional organs that perform respiratory and osmoregulatory functions in crustaceans. During evolution, the number or surface area of anterior gills (respiration) was accompanied by an increase in the number or surface area of posterior gills (osmoregulation) as crustaceans colonized terrestrial environments, resulting from different selective pressures. Thus, there is a functional link between the two physiological processes in crustaceans that live alternately in the air and underwater, as a consequence of the tidal cycle. We hypothesized that oxygen consumption is associated with osmoregulatory capabilities because maintenance of osmotic gradients is correlated with available energy. Male crabs of the species Minuca rapax were collected at low tide from a small estuary in São Sebastião, São Paulo state, and acclimated to seawater salinity at 25 °C for 5 days. Oxygen consumption in air (VO2) and osmolality of hemolymph were determined at different osmotic media ranging from fresh water to 72‰ S, after 6 hours of exposure. In summary, M. rapax exhibited strong hyper-/hypo-osmoregulatory capabilities and maintained higher osmotic gradients at lower and higher salinities by salt uptake and secretion mechanisms, respectively, demonstrating a remarkable osmoregulatory versatility. There was an effect of salinity on VO) 2), with higher rates at the extreme osmotic conditions of 0‰ and 72‰ S. Therefore, as hypothesized, higher metabolic rates correlate with strong osmotic gradients, these typical conditions for semiterrestrial animals inhabiting unstable osmotic environments. Elevated metabolic rates provide an energy budget for hyperregulation when in dilute media and for hyporegulation when distant from water sources.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

# Reef fish functional structure in insular ecosystems of the South-Western Atlantic Province

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Coral reefs shelter the highest marine biodiversity on the Earth. Such diversity extends to mesophotic ecosystems (30–150m), but the filters that drive the distribution and functional attributes along depth gradients are still unknown. The Tropical Atlantic Province have several mesophotic ecosystems that support many endemic species. Here, we sought to respond to how the interactive biogeographic effects and environmental filters shape the vertical fish diversity patterns in ME, in order to understand how the functional attributes lead to fish assemblage distribution in different depth zones. The study sites include Fernando de Noronha Archipelago (FNA) and Saint Peter & Saint Paul Archipelago (SPSPA), Brazil, in the Atlantic. These areas are internationally recognized as an environment of high economic and ecological value, having marine protected areas limited to shallow reefs. This characteristic suggests the importance of management policies for deep reefs, since they are affected by fishing exploitation and pollution. We characterized the fish community using underwater visual census using mixed-gas closed-circuit rebreathers at depths down to 120 m. We registered 6.982 individuals distributed in 45 families and 95 species and classified the assemblages according to the depth zone: shallow and mesophotic. Our results show that species richness was higher in shallow communities in the largest and least isolated island, following the expected according to the island biogeography theory. However, we found opposite results for functional richness, where the highest values were found in the smallest and most isolated island. Therefore, our results indicate that biogeographic filters affect species and functional richness in different ways, and also that shallow and mesophotic seems to be structured by distinct rules. Like shallow reefs, mesophotic should also be included in environmental protection plans, giving attention to the unique ichthyofauna found at these depths.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Revisiting Current Knowledge and Research Gaps in Seagrass Ecology Worldwide

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Seagrass ecosystems encompass a diverse group of marine flowering plants that occur in coastal waters and play a vital role in supporting oceans biodiversity and resilience, as well as human populations' sustenance. However, they are facing a rapid decline due to growing threats of climate change, pollution, and coastal development, making it increasingly urgent to effectively assess and improve the production and application of seagrass ecological knowledge. Based on a broad literature review and topic Latent Dirichlet Allocation (LDA) modelling analysis, we generated a qualitative and quantitative scrutiny of main published contents to evaluate the relevance of main research topics, and how they connect, through time (1827-2020). We found an increasing trend of contributions on conservation and management science, along with biotechnology and remote sensing, but those topics were largely disconnected to advances on ecological processes that operate at either small (e.g. biotic and abiotic interactions, biogeochemistry fluxes and hydrodynamics, seasonality and productivity) or large spatiotemporal scales (biogeography, landscape ecology, connectivity, shoreline processes). Furthermore, we found that several topics were addressed separately for only one or a few species, mostly larger seagrasses or species with broader geographical ranges compared to smaller species with more restricted distributions, some of which still poorly studied. We reinforce the importance of bridging basic ecological science, at a range of scales, to more applied research and technological developments aiming long-term monitoring, conservation and restoration. Scientific cooperation in broader networks may greatly contribute to a more equitable understanding of seagrass systems, especially by improving our knowledge on species distributed in more neglected ecoregions (including endangered species). This essay highlights the importance of revisiting current knowledge to identify research gaps that may potentially hinder scientific advance on the ecosystem ecology of seagrass, and therefore limit the effectiveness of any conservation policies aiming their sustainable management.

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## Primeira Sessão: Ecologia e Fisiologia – Pôsteres

### Towards an evolutionary physiology in Southwestern Atlantic corals: a phylogenetic comparative approach

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Corals (Anthozoa, Scleractinia) are sensitive organisms to a series of environmental alterations. Increases in water temperature cantrigger changes in molecular stability and chemical reactions, ultimately affecting the organismal physiology. Under normal conditions, reactive oxygen species (ROS) are used as signaling molecules to stimulate cell proliferation and renewal, as well as the defense system of organisms, but can cause deleterious effects to the body, when in large amounts, by oxidizing stable molecules such as lipids in cell membranes. According to the 'Oxidative theory of coral bleaching', bleaching is characterized as a coral immune defense resulting from oxidative stress for those shallow-water species that establish photosymbiosis with dinoflagellates. As a protective mechanism against further oxidative damage, coral expels the source of ROS production - the algae symbiont. This results in the loss of the main source responsible for ATP production, impairing the maintenance of physiological functions such as growth (i.e. calcification). This project aims to characterize and comparatively evaluate physiological and biochemical biomarkers in several species of stony corals with and without photosymbiosis, from different environments on the Brazilian coast (from intertidal to deep water). It will be possible to verify the effects of gains and losses of symbiosis on the evolution of energy and oxidative metabolism, as well as on the physiology of calcification. Our hypotheses are three-fold: (i) corals without photosymbiosis have lower levels of oxidative stress; (ii) corals with photosymbiosis have greater energy availability and enzyme activity as pacemakers of calcification; (iii) non-significant phylogenetic structure of metabolic physiology and calcification. The effect of the vertical gradient on energy availability, oxidative stress and growth, using symbiosis and phylogeny as covariates, will indicate the potential for tolerance or susceptibility to environmental disturbances.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Segunda Sessão: Sistemática e Evolução – Plenária

### A história das baleias e tartarugas marinhas contada pelos genes

Mariana Freitas Nery (UNICAMP)

Na palestra, vou proporcionar uma visão sucinta da Genômica Comparada, destacando suas aplicações e os avanços significativos que ocorreram na última década. O foco principal será em pesquisas conduzidas por mim e outros cientistas para investigar a evolução molecular de cetáceos, que englobam baleias e golfinhos e de tartarugas marinhas. A narrativa evolutiva dos cetáceos e tartarugas marinhas, representando alguns dos grupos que fizeram essa transição do ambiente terrestre para o ambiente aquático, é bem documentada a partir de registros fósseis e, mais recentemente, tem sido explorada com abordagens moleculares. A apresentação abordará esses tópicos de forma mais detalhada.

## Segunda Sessão: Sistemática e Evolução – Mesa redonda

### Desafios e perspectivas nos estudos sobre a filogenia dos Tunicata

Tito Lotufo (Universidade de São Paulo)

Embora não seja consenso absoluto, a maioria das evidências moleculares tem apontado que os tunicados formariam o grupo irmão dos vertebrados, tendo assim um papel muito importante na compreensão sobre a evolução dos cordados. Dentre os Tunicata, os trabalhos mais recentes têm também jogado luz nas relações entre o que tradicionalmente se considerava como as grandes classes, modificando substancialmente também a taxonomia do grupo. Serão apresentados e discutidos os trabalhos mais recentes, gargalos e perspectivas nos estudos sobre a filogenia do táxon.

## Segunda Sessão: Sistemática e Evolução – Mesa redonda

### Evolutionary questions about convergent morphological traits and endemism in meiofauna

Maikon Di Domenico (Universidade Federal do Paraná)

The meiofauna evolution and morphology variability of populations and communities have traditionally focused on studying morphology and adaptation. Conversely, meiobenthologists are lagging behind in these areas of research. Both historically and today, some of the most discussed paradigms in meiofauna are "Meiofauna paradox", "Meiofauna ubiquity", and "Is everything small everywhere?", which may actually reflect either the absence of general patterns, or endemic species or the lack of a feasible meiofauna definition. As a result through phylogenetics, understanding convergent adaptation as small body sizes, wormy behavior, and the presence and function of adhesive glands demands the implementation of comparative phylogenetic methods such as gene expression and genetic differentiation in adaptation. Integrative networks using phylogenetics, morphology, systematics, and ecology will bring new avenues of questions for marine metazoan evolution.

## Segunda Sessão: Sistemática e Evolução – Mesa redonda

### Unraveling the Scleractinia evolution

Marcelo Visentini Kitahara (Centro de Biologia Marinha da Univesridade de São Paulo - CEBIMar/USP)

Resumo não disponível.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# New records of sea anemones (Cnidaria: Hexacorallia: Actiniaria) from the shallow coast of São Paulo State, Brazil

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Sea anemones (order Actiniaria) are organisms of the phylum Cnidaria, one of the most biodiverse groups of anthozoans, and they are characterized by being sedentary, solitary marine animals with a polypoid shape. At present, little is known about the actiniarians in the state of São Paulo. Only 14 species of sea anemones have been recorded at the specific level, and 2 at the genus level, representing about 30% of the total number of species known in shallow waters (<25 m depth) along the Brazilian coast. Furthermore, the available data on their distribution are still inconsistent. Many of these species were found associated with rocky areas between Ubatuba and Ilhabela. However, several species that were previously reported in São Paulo are currently being synonymized or invalidated due to incomplete descriptions. This study aims to characterize the species richness from the intertidal zone, distributed in the localities of Ubatuba and São Sebastião in the state of São Paulo. Three specimens of each morphotype will be collected, and their external and internal structures, cnidocysts, will be described, along with the amplification of three mitochondrial markers (12S, 16S, COIII) and two nuclear markers (18S and 28S). According to our preliminary results, 64 specimens were collected and identified, including 10 at the species level, 5 to genus, and one to superfamily. The presence and potential description of five new species (Actinostella, Antholoba, Anthopleura, and cf. Aulactinia), two invasive species, new records for Brazil, and the revalidation of Anthopleura cascaia. This information not only contributes to the knowledge of sea anemone biodiversity but also can be used as a tool to identify species in adjacent states and emphasize the importance of better management and conservation measures in the region.

**Financiamento: Fundação de Amparo à pesquisa do Estado de São Paulo (FAPESP)**
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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

### Ophiuroidea fauna of Trindade and Martin Vaz Archipelago

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In Brazil, there has been limited research on the Ophiuroidea fauna of oceanic islands, as scientific efforts have primarily focused on species from the continental shelf, especially in the southwestern region. Among the Brazilian oceanic islands known and studied, there is the Trindade and Martin Vaz Archipelago (TMV), located about 1.200 km off the Brazilian coast, east of Vitória – ES. Among the echinoderms, ophiuroids are the most studied group in the TMV. However, the available literature on this group from islands is extremely reduced, with only a few studies and significant informational gaps, including the absence of descriptions and/or images of registered species. Therefore, the main objective of the project is to describe, from in-depth morphological studies, the taxonomic biodiversity of the Ophiuroidea fauna of the TMV. The study is being conducted using specimens collected by the PROTRINDADE/CNPq project, during the years 2012-2019. Morphological analyses of external (arm plates, disc cover, etc) and internal (dental and oral plate, vertebrae, etc) diagnostic structures have been performed, with the aid of morphometry, Scanning Electron Microscope (SEM), and X-ray Microtomography µCT). So far, approximately 1.500 specimens have been studied, revealing the presence of 10 species and eight families Amphiuridae Ljungman, 1867, Ophiactidae Matsumoto, 1915, Ophiocomidae Ljungman, 1867, Ophiodermatidae Ljungman, 1867, Ophiolepididae Ljungman, 1867, Ophiomyxidae Ljungman, 1867, Ophionereididae Ljungman, 1867 e Ophiothrichidae Ljungman, 1867. The species are being delimited, described, and illustrated in detail. The obtained results are expected to contribute to the knowledge of the biodiversity of the Ophiuroidea class in the archipelago. We are grateful to CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brazil) and FAPESP (São Paulo Research Foundation) – BIOTA-Collections Project (Process nº 2018/10313-0), the ProTrindade Project (Process nº 2016/50373-6) and Postdoctoral grant of LM (Process nº 2021/06442-1).

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# Brazilian Bryozoa and Entoprocta in the Ernst G.G. Marcus and Eveline du Bois Reymond Marcus Collection

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The German zoologists Ernst Gustav Gotthelf Marcus [1893-1968] and Eveline du Bois Reymond Marcus [1901-1990] went into exile in São Paulo, Brazil, in 1936, where Ernst took up the chair of Zoology at the newly formed Universidade de São Paulo. During their career in Brazil, they published several monographs on taxonomy, embryology, histology, and development of several marine and freshwater bryozoans and entoprocts, which resulted in the report of 179 bryozoan species (51 new to science) and 17 entoproct species (10 described as new). Therefore, between 1936 and 1968, these studies included approximately half of the total number of shallow-water species recorded from the Brazilian coast. Most of the specimens studied by them were considered lost in the decades since their collections were made. In 1948, the Natural History Museum, London (NHMUK) received some specimens in an exchange between Ernst Marcus and Anna B. Hastings. Since the first report of this collection in 2007 there have been additional findings on the Marcuses' collections. The discovery of more specimens in the Departamento de Zoologia of USP in the beginning of 21st century, however, revealed that most specimens studied by them still existed, stored over years as dried, in alcohol, or in balsam slides. The material – more than 2,000 specimens (205 type specimens) – is now deposited in the Museu de Zoologia, Universidade de São Paulo, Brazil (MZUSP), and in the NHMUK. Currently, specimens of 170 bryozoan species (of 179) and 15 entoproct species (of 17) identified by Ernst and Eveline are in these collections. While some specimens have suffered damage over the years, the majority have stood the test of time, preserving the invaluable contributions of these pioneering scientists for future generations of zoologists to explore and learn from.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

### Molecular systematics of "Phidiana lynceus": a species complex

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Nudibranchia are small marine and estuarine sea slugs that feed on other invertebrates, such as sponges and cnidarians. The family Facelinidae is characterized by an elongated body, cerata organized in rows or arcs, and a uniserial radula with a prominent central cusp. Among the Facelinidae, the genus Phidiana Gray, 1850 includes two species recorded from Brazil: Phidiana lynceus Bergh, 1867 and Phidiana riosi García & Troncoso, 2003. P. lynceus reaches about two centimeters in length and has a light-yellow body with a thin white dorsal line between the rhinophores and the posterior end of the body. The cerata can vary from dark red to black with a lighter tip. P. lynceus was originally described from the Virgin Islands, Caribbean Sea and later recorded from different localities between Florida and southeastern Brazil, as also a few records in St. Helena Island and Canary Islands. The present study aims to review the taxonomy of P. lynceus under an integrative molecular (genes COI, 16S and 28S) and morphological approach. The dataset currently includes circa 30 specimens of P. lynceus from different regions. Preliminary results based on phylogeny, species delimitation and external morphology analyses indicate four candidate species under the name P. lynceus. The candidate species can be differentiated by the shape and coloration of oral tentacles, rhinophores and cerata. These results will be further evaluated with the addition of more specimens in the analyses and the study of internal morphology.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# Scyliorhinus Blainville, 1816 (Carcharhiniforme: Scyliorhinidae) from Western South Atlantic: species delimitation through integrative taxonomy

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The family Scyliorhinidae (Carcharhiniformes) comprehends 38 species of sharks. The genus Scyliorhinus presents 16 valid species. However, the history of taxonomic rearrangements, along with gaps of information and sampling, led to disparities in identification and the consolidation of a good diagnosis of these species. Sharks from this genera usually do not exceed 600 mm TL and present a spot pattern that is mostly absent in their ventral region. Its body is dorsoventrally depressed and, unlike other genera, presents a projecting flap on the upper lip margin that covers the lower labial furrow. In addition, there is a great variety of color patterns, a significant taxonomic character. The species of Scyliorhinus occurs on the coasts of all continents, except for Antarctica, down to 800 m deep. The present work seeks to understand the relationships and distributions of Scyliorhinus at Brazilian Southeastern continental slope, focusing on S. haeckelii and S. cabofriensis. The material used in this study includes eight specimens (345–521 mm TL) collected by the DEEP-OCEAN project, on the continental slope off São Paulo and Santa Catarina States (27°26'60''W 47°28'61''S - 28°29'86''W 47°03'81''S) using bottom trawls. Additionally, five specimens from the didactic collection of Oceanographic Institute, University of São Paulo, were used for comparison. A total of 77 morphometric measurements were collected, seven of them showing a slight difference, mostly related to the pelvic fins and the fifth gill slit, along with three meristic data. While current studies suggest that S. haeckelii have more predominant spots with approximate bilateral symmetry compared to S. cabofriensis, this variation was not as prominent on the specimens analyzed. Prospective work includes sequencing of mitochondrial genes (COI) to further diagnose the specimens and to map the distribution of Scyliorhinus from the Western South Atlantic.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# Are morphological and molecular data enough to unveil species boundaries? the case of two congeneric amphipods.

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DNA barcode has risen as an effective method for investigating and revising taxonomic diversity, including the identification of cryptic species. Cymadusa filosa Savigny, 1816 (Crustacea: Amphipoda) has long been considered a species complex. Seven species from the genus Cymadusa have been recorded for Brazilian coast, including Cymadusa tartarugae Andrade & Senna, 2017, in Armação dos Búzios, RJ. We recently discovered a population of Cymadusa in Palmas Island (Ubatuba, SP) that presented many diagnostic features of C. tartarugae, including the morphology of gnathopods. In this study, we investigated the species boundaries between C. filosa and C. tartarugae, using an integrative approach with morphological and molecular data. We included populations of C. tartarugae from Arraial do Cabo; C. filosa from Arraial do Cabo and different sites along SP coast, and Cymadusa cf. tartarugae from Palmas Island. We characterized the shape of the propodus of Gnathopods 1 and 2 with geometric morphometric analyses. We sequenced the barcoding region of COI gene and included sequences from other Cymadusa species available on public repositories. Available sequences of Ampithoe ramondi were used as an outgroup. Morphometric analysis supported the separation between C. filosa and C. tartarugae, with specimens from Palmas grouping with C. tartarugae. Molecular analysis confirms the existence of two separate valid species. However, Palmas population is genetically similar to C. filosa. Therefore, in this study we genetically validate C. tartarugae as a separate species from C. filosa. However, we reinforce the great morphological variability of C. filosa, with the existence of morphotypes that are cryptic to C. tartarugae. Our results highlight the importance of using integrative taxonomic approaches for species delimitation, given approaches based solely on morphology may lead to misidentifications. We encourage further studies for understanding the evolutionary origin and the ecological drivers of the revealed morphological congruence between C. filosa and C. tartarugae.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

### Evolution of the innate immune system in barnacles (Crustacea: Cirripedia) and their adaptations to epibiosis and parasitism

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The innate immune system is of central importance in the prevention of deleterious effects in infection response. The adaptive immune system offers long-term protection and the innate immune system is the first line of defense against pathogens. While vertebrate immune systems are relatively well-characterized, immune response in invertebrates is only known for a few model species. Therefore, strategies used to evade pathogens and factors driving their evolution are poorly understood. Transitions to parasitic and epibiotic lifestyles are known to result in adaptations that allow organisms to live in close association with their hosts. Moreover, such transitions expose the parasite, the epibiont and their respective hosts to a new set of pathogens. Hence, it is expected that these organisms present adaptations related to the immune response due to such transitions. Barnacles are members of the phylum Arthropoda with around 1,200 extant species distributed among two lineages. Members of Rhizocephala are common parasites of other crustaceans. Epibiotic species are distributed within Thoracica and represent independent transitions from a non-epibiotic to an epibiotic lifestyle. This unique distribution of parasitism and epibiosis allows the study of adaptations related to the immune response against pathogens in response to transitions. The present study aims to screen for well-known components of the innate immune response in barnacles, as well as to understand patterns of evolution driving the diversification of gene families with immune function using publicly available transcriptomes and genomes. We will also sequence one genome of an epibiotic barnacle. At present, we found genes belonging to the following families: toll-like transmembrane receptors (TLRs), RIG-I-like receptors (RLRs), Interferon Regulatory Factors (IRFs) and Vago in barnacles. We will further investigate patterns of evolution by looking for signs of positive selection, relaxed selection and expansion or contraction within epibiotic or parasitic lineages.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# Phylogeny of Naineris Blainville, 1828 (Annelida, Sedentaria, Orbiniidae) and transfer of species to Protoaricia and Pettibonella

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Naineris Blainville, 1828 is a worldwide distributed genus of the family Orbiniidae Hartman, 1942 that currently includes 20 species from tropical to temperate waters. Species of Naineris are distinguished by having rounded or truncated prostomium, and a clear division of the body into thorax and abdomen. The three best-known species of Naineris are considered cosmopolitan in literature: N. setosa, N. dendritica, and N. laevigata; at least N. dendritica proved to be a species complex based on molecular data. For each species, we provide a synonym list, location of type material, type locality, geographic distribution, habitat, etymology, and availability of molecular data. Our molecular analysis includes 159 specimens of Naineris representing 25 species collected worldwide. Phylogeny (both ML and BI) based on the combined matrix of two mitochondrial (COI and 16S) and one nuclear (28S) marker results in four large and well-supported clades, each supported by morphological synapomorphies. Clade one included Naineris quadricuspida (type species) and shared the presence of thoracic neuropodial papilla at a middle position, presence of uncini with a ribbed shaft and rounded tip with a terminal notch, and by presenting multiple rows of uncini in thoracic neuropodia, Clade two combined species multiple dorsal organs and similar chaetae composition, Clade three included species with paired dorsal sensory organs and only crenulate capillaries in thoracic neuropodia, and Clade four was comprised of species with paired dorsal sensory organs and similar chaetae composition. Our results suggest polyphyly of the genus Naineris with Naineris sensu stricto, including N. quadricuspida and N. uncinata, and the rest of the species grouped in a separate clade which may represent a new genus.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

### Exploring the Comparative Transcriptomics of Amphipods (Crustacea: Eumalacostraca) and their Habitat Adaptations

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Amphipoda, a taxonomically diverse group within Crustacea, exhibit a wide range of adaptations to different habitats. These adaptations include thriving in marine, freshwater, terrestrial, and even parasitic lifestyles. Despite the ecological and evolutionary significance of these adaptations, the molecular mechanisms behind them remain poorly understood. Comparative transcriptomics offers a powerful approach to unravel the genetic basis of these habitat adaptations and identify key genes and pathways involved. In this study, we employed comparative transcriptomics to analyze the gene expression profiles of amphipods from diverse habitats. Using Illumina NextSeq, we generated transcriptomic data from the skeleton shrimp Caprella dilatata (Caprellidae) and the whale louse Cyamus boopis (Cyamidae). Coupling available data from open repositories, we compared the transcriptomic profiles of amphipods from different habitats, we anticipate discovering genes and pathways associated with specific adaptive traits, such as genes related to osmoregulation, salinity tolerance, desiccation resistance, or other habitat-specific adaptations. These findings will contribute to our understanding of the genetic basis of habitat adaptations in amphipods. Additionally, this comparative transcriptomic analysis will help elucidate the evolutionary relationships among amphipod species with different habitat preferences. By analyzing gene expression profiles and identifying habitat-specific genes and pathways, we will gain valuable insights into the genetic basis of these adaptations. This research will contribute to our understanding of the ecological and evolutionary processes shaping the diversity of amphipods within the order Eumalacostraca.

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## Segunda Sessão: Sistemática e Evolução – Comunicações orais

# A new species and a new record of Leodice Lamarck, 1818 species (Annelida, Polychaeta, Eunicidae) associated with calcareous algae on the Continental Shelf of Northeast Brazil (Tropical Southwest Atlantic)

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Leodice Lamarck, 1818 is widely distributed and can be found in all oceans, inhabiting both hard and soft substrates at various depths (Zanol & Budaeva, 2021). Currently, there are 34 known species of Leodice recorded worldwide, with seven of these species found along the Brazilian coast (Amaral et al. 2006-2022; Read & Fauchald 2023; Wu et al. 2013). In this study, we present the description of a new species and a new record for the Tropical Southwest Atlantic, L. pellucida (Kinberg, 1865). The specimens were collected from 93 stations located on the Continental Shelf of the Tropical Southwest Atlantic, spanning from coordinates 6°58'S 34°46'W to 7°34'S 34°45'W, at depths ranging from 10—35 m. They were fixed in 4% formaldehyde, preserved in 70% alcohol, and deposited in the Paulo Young Invertebrate Collection (UFPB). The new species resembles L. antillensis (Ehlers, 1887), L. articulata (Ehlers, 1887), L. mexicana (Fauchald, 1970), and L. websteri (Fauchald, 1969) by having branchiae restricted to 55% of the body, and subacicular hooks yellow and bidentate. However, these species differ in that specimens of Leodice n. sp. have long antennae and palps with moniliform articulations, pectinate chaetae with both marginal teeth longer than the other teeth, two types of aciculae, one to two subacicular hooks per parapodium, and six pairs of maxillae. Leodice pellucida is originally described from the Caribbean Sea, and it has not been recorded for any other locality. We observed for the first time for this species tridentate compound falcigers chaetae present in posterior chaetigers. These new records contribute for the knowledge on Sowthwestern Atlantic marine fauna and expanding the number of Leodice species known for the Brazilian coast to nine.

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

# A checklist of Sipuncula (Annelida) from archipelago Trindade and Martim Vaz, southeastern Atlantic, Brazil.

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Sipuncula is a group of marine Annelida with no apparent segmentation, except for a ladder-like ventral nervous system with pairs of ganglia, which becomes a single nerve cord with no ganglia after metamorphosis from larva to juvenile. The current phylogeny of the group divides them into six families and sixteen genera. In Brazil, there are 39 species of Sipuncula from all six families distributed in twelve genera. Since the last species compilation in 2005, few studies related to this group have been made in Brazil. The ProTrindade Research Program from CNPq, coordinated by Professor Marcos Tavares, made eleven collecting campaigns between 2012 and 2019 at the archipelago of Trindade and Martim Vaz to inventory marine benthic invertebrates. This oceanic and volcanic archipelago is located at 1.200 km of coastline from Espírito Santo. As a result of this, a collection of 340 sipunculans were deposited at Museu de Zoologia de São Paulo (MZUSP). During a visit to the MZUSP collection, we analyzed this material and identified five Sipuncula genera: Antillesoma (Stephen and Edmons, 1972), Aspidosiphon (Diesing, 1851), Lithacrosiphon (Shipley 1902), Nephasoma (Pergament, 1940) and Phascolosoma (Leuckart, 1828). An extra level of analysis is necessary to identify species, such as dissection and study of the internal anatomy of each individual, so we asked for a material loan to study them in our lab. So far, we have identified four species: Antillesoma antillarum (Grübe and Oersted, 1858), Lithacrosiphon cristatus (Sluiter, 1902), Phascolosoma nigrescens (Keferstein, 1865), and Phascolosoma perlucens Baird, 1868. Among these, the last is a new record for the Brazilian coast.

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

# A new species of the genus Poecilochaetus Claparède in Ehlers, 1875 (Poecilochaetidae, Annelida) from Guanabara Bay, Rio de Janeiro, Brazil

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The genus Poecilochaetus Claparède in Ehlers, 1875 has 33 species with a nearly worldwide distribution at various depths. Along the Brazilian coast five species are found: P. australis Nonato, 1963, P. perequensis Santos & Mackie, 2008, P. modestus Rullier, 1965, P. serpens Allen, 1904 and P. polycirratus Santos & Mackie, 2008. Of these, only P. australis and P. perequensis have been reported to Guanabara Bay on sand and muddy sediment. The objective of this work is to describe a new species of Poecilochaetus present in the Guanabara Bay. Three specimens deposited in the collections of the Museu de Zoologia da Universidade de São Paulo (MUZUSP) and Museu Nacional do Rio de Janeiro (MN-UFRJ) were analyzed under stereo and compound microscopes. The new species present an unique distally trilobed median lobe of the nuchal organ, few tubercles on the ventral side, notochaetae spinose starting on chaetiger 3, and plumose starting on chaetiger 22, neurochaetae spinose starting on chaetiger 7, lacks palps, branchiae and quitinous plate. The new taxon it is most similar to P. australis, P. polycirratus and P. elongatus Imajima 1989, but differs from all described species for the genus in the shape of the nuchal organ. Additionally, it differs from the most similar in several features, such as in the start of spinose noto, P. australis starts on chaetiger 7 and P. elongatus on 2 and neurochaetae of P. polycirratus starts on chaetiger 9. Poecilochaetus sp. nov. also differs from P. polycirratus and P. elongatus in the quantity of rounded tubercles on the ventral side, in P. australis tubercles are absent. Based on these differences, we conclude that it is a new species for science of the genus Poecilochaetus.

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

# Description of a new species and family of the genus Antholoba Hertwig, 1882 (Actiniaria: Metridioidea) of the southwestern Atlantic, Brazil

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The genus Antholoba Hertwig, 1882 (Actiniaria, Enthemonae) is characterized by the presence of short and numerous tentacles, a folded oral disc in lobes or cup-shaped with an expanded distal part, a smooth or reticulated column wall on its surface, a very long mesogloeal sphincter, and the absence of acontia. At the present, the genus belongs to the family Actinostolidae (superfamily Actinostoloidea) and has two valid species recorded in Antarctica, the northeast and southeast Atlantic, and the southeast-western Pacific: A. achates (Drayton in Dana, 1846) e A. perdix (Verrill, 1882). In this study we describe a new species of the genus Antholoba, based on specimens collected in a locality of the southwestern of Brazil. All specimens were described based on their external morphological characteristics and cnidom, one specimen was examined internally, and one specimen sequenced using three mitochondrial (12S rDNA, 16S rDNA, and COIII) and two nuclear (18S rDNA and 28S rDNA) genetic markers, and comparison with two sequences of its congener from South America, A. achates (Argentina and Chile). The new species of sea anemone, Antholoba fabiani sp. nov. is characterized from its congeners by the presence of >750 short tentacles (eight cycles), >192 pairs of mesenteries (seven cycles), gametogenic tissue in the 4th and 6th pair of mesenteries, and the presence of b-mastigophores in the mesenteric filaments. Our phylogenetic analyses support the distinction between the two species. Furthermore, the resulting phylogenetic trees recover the species of the genus Antholoba as a sister group of the family Aliciidae, within the superfamily Metridioidea, rather than Actinostoloidea, establishing the new family Antholobidae fam. nov.

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

# Families of polychaetes (Annelida) present in the surroundings of the Cagarras Island Natural Monument (Rio de Janeiro, Brazil)

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Polychaetes are mostly marine annelids, which usually dominate benthic communities on soft and hard substrates, contributing to nutrient cycling and sediment aeration. In Brazil, 1343 species, 463 genera and 76 families of polychaetes have been recorded, of which 62 families are present along the coast of Rio de Janeiro state. The Cagarras Island Natural Monument is a no-take Marine Protected Area (MPA)- located from 4 to 8 km southward of the Ipanema beach. However, studies on the diversity of polychaetes in this MPA and its surrounding waters are still scarce. The present study aims to fill this knowledge gap. Sediment samples were recovered in seven stations between 11 and 40m depth in the vicinity of Redonda, Palmas and Comprida islands using a Van Veen grab on 14 February 2022. The samples were elutriated, sieved in a 0.5 mm mesh and fixed in ethanol 92.8% in the field. Specimens were sorted and identified under stereomicroscope. A total of 609 specimens were identified to 23 polychaete families. The families Syllidae Grube, 1850, Spionidae Grube, 1850, and Terebellidae Johnston, 1846 were the most abundant and widely distributed. Among these, Syllidae had a more uniform distribution, being the most abundant one in the majority of the stations, while the other two families had a high relative abundance in few stations. The relative abundance of the families contrasts with those observed for Guanabara Bay despite their proximity. These differences could be explained by contrasting environmental variables such as pollution, substrate, water flow and input of fresh water. These are preliminary results and future perspectives include finishing the identification of all samples and further analyses of the biodiversity.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Segunda Sessão: Sistemática e Evolução – Pôsteres

### Genome sizes and repeatome traits in order Ceriantharia (Anthozoa)

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Ceriantharia stands as a prominent group within anthozoans, comprising 54 currently valid species. Certain members of this clade exhibit both planktonic and benthic life cycles. While its exact evolutionary relationships remain subject to debate, there is a general consensus that Ceriantharia represents one of the earliest branches among anthozoans. Taking into account nuclear genomic knowledge, there is a lack of general information about them. This project sequenced general DNA extractions using Illumina (short reads, paired-end strategy) from five cerianthid species of different genera representing main phylogenetic clades. From these datasets, we described and analyzed general genome traits as genome sizes and their basic repetitive content. Our basic results present genome sizes around 500 megabases and repetitive content of approximately 35%, even for species representing clades with cladogenic relationships related to more than 400 million years. When compared to proximal clades as Zoantharia, our initial results indicate a genomic stasis condition according to these genomic traits. Subsequent studies will describe the repeatome content in bigger detail, highlighting additional trends in Ceriantharia as well as the Anthozoa genome evolution.

**Financiamento: Fundação de Amparo à pesquisa do Estado de São Paulo (Fapesp)**
**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

# Phylogeographic patterns and genetic diversity of the meiofauna species Saccocirrus pussicus and Kata leroda

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This study analyzed the genetic diversity of two soft-bodied meiofauna worms that measure, respectively, about 0.3 mm and 0.2 mm long, Saccocirrus pussicus (Marcus. E,1948) and Kata leroda (Marcus. E,1950). The meiofauna is a diverse and ecological group of organisms that has a role in nutrient recycling, organic matter decomposition and benthic food chain. The aim of this study is to understand the distribution of genetic variability of these overlooked species, as they require specific methods of collection, preservation and identification. Samples were collected from four sandy beaches on the southeast coast of Brazil and preserved in 99% alcohol. The 28SrRNA and 16SrRNA regions were amplified by PCR and population and demographic analyses were performed. The results were compared to verify if there is a relationship between life history and population genetic variability. The results indicated that the species present population genetic structuring, for Kata, 28SrRNA FST was 0.55143, and in Saccocirrus, 16SrRNA FST' is 0.51355. These results may indicate that there are barriers that prevent or reduce dispersion or gene flow between them. In addition, the species present different levels of intrapopulational genetic diversity, which may reflect different reproductive and adaptive strategies. The results contribute to the knowledge of meiofauna diversity and evolution and to the conservation of marine biodiversity.

**Financiamento: Fundação de amparo à pesquisa do estado de São Paulo (fapesp)**
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## Segunda Sessão: Sistemática e Evolução – Pôsteres

### Phylogeographic study of Podocerus chelonophilus (Crustacea: Peracarida): a sea turtle epibiont' patterns of dispersal

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Amphipods are small crustaceans of the superorder Peracarida, which includes species distributed in marine, freshwater, and terrestrial environments worldwide. Several species within this order are considered epibionts, and due its direct development, they are expected to have a low dispersal capacity, and likely be endemic. However, gene flow capability and genetic structuring of marine epibionts can also be influenced by the host. Here, we aimed to uncover the genetic diversity patterns of Podocerus chelonophilus (Chevreux & Guerne, 1888), an epibiont of the loggerhead turtle (Caretta caretta (Linnaeus, 1758)). We used sequence data based on the mitochondrial cytochrome b gene (Cyt b) and the nuclear internal transcribed spacer region (ITS-1) of 119 individuals from 22 turtles belonging to 3 localities: Arembépe (BA), Povoação and Regência (ES), a distance of 1,220 km on coast. Analyses showed high diversity, with 25 (Cyt b) and 24 (ITS-1) haplotypes but with no clear geographic pattern in the haplotype network. Genetic diversity analyses showed higher molecular diversity indices values for the ITS-1 marker (Θπ: 41.4; Θs: 13; Θk: 26). We estimated pairwise genetic structure between turtles (average Cyt b FST : 0 to 0.55; ITS-1; FST : 0 to 0.52) and localities (average Cyt b FST : 0 to 0.002; ITS-1; FST: 0 to 0.01), showing no genetic differentiation among them. The AMOVA analysis also presented evidence of high connectivity between localities and turtles (Cyt b FST: 0.005; ITS-1; FST : 0.00) with most of the genetic variation contained within turtles. The lack of genetic structuring among localities, may indicate that crossbreeding of epibionts only occurs in turtle's feeding and nesting areas. This is the first phylogeographical study of a sea turtle epibiont on the Brazilian coast. These results can greatly contribute to the knowledge regarding the dispersal of epibiont crustacean species, and indirectly give us a glimpse of the populational dynamics of its hosts.

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## Segunda Sessão: Sistemática e Evolução – Pôsteres

### Polychaete annelids from Ilha Grande Bay (Rio de Janeiro): preliminary results

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Polychaeta is a taxon of annelids that play a fundamental role in marine ecosystems. However, the identification and taxonomic classification of these organisms is a constant challenge due to its morphological diversity along with the current need of specialists. The main objective of this work is to conduct a taxonomic survey of polychaetes from the Ilha Grande Bay (Rio de Janeiro) through the project "Environmental, social and economic susceptibility of Ilha Grande Bay to spills and the presence of oil in the sea" (MONITOMAR). Specimens were collected from six (6) sites with three (3) sampling stations each, resulting in eighteen (18) collecting points. The material was collected, separated and labeled mentioning location and date of collection. Alcohol is applied to aid in its preservation, and then the identification process begins with the assistance of a stereomicroscope, microscope and specialized literature. To date, more than 2.000 individuals distributed in 44 families have been identified and a new species of Syllidae described to science. The most abundant and frequent groups have been Syllidae (893 individuals) and Glyceriformia (316 individuals). The results obtained will be of paramount importance for research and scientific production of new species and/or new occurrences on this important region.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Segunda Sessão: Sistemática e Evolução – Pôsteres

### Taxonomic composition and zoogeographical affinities of Amphipoda (Crustacea) from Trindade and Martim Vaz Archipelago

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Trindade (20°30'S–29°20'W) and Martim Vaz (20°30'S–28°51'W) (TMV) constitute the most distant set of islands from the Brazilian coast, located away from at about 1,200 km and about 4200 km from the nearest African shore. The archipelago, formed by volcanic eruptions around 3–3.5 million years ago, is the emerged portion of a volcanic chain east-west oriented in direction off the coast of Espírito Santo. TMV is home to a species rich and precious fauna of benthic invertebrates. The immense majority of the collections from TMV was obtained from 2012 to 2022 during 286 daytime SCUBA diving, between 5–30 m, and numerous snorkeling dives and intertidal collecting. The amphipod material was mainly associated with sand, clumps of coralline algae and porous coral rocks, sponges, bryozoans and algae. Additional samples were obtained from artificial reef substrates placed for 12–15 months in depths of 10–20 m off Trindade Island. All specimens were preserved in 75% ethanol; some were photographed prior to preservation. The specimens are in the collections of the Museum of Zoology, University of São Paulo. A total of 1837 specimens distributed in 11 families were collected. The most abundant families were Maeridae (972 individuals), followed by Ampithoidae (638 specimens), together representing about 80% of the amphipod fauna. The knowledge about the amphipod fauna of TMV is essentially restricted to 3 sparse works (1951, 2017 and 2021) which together account for only 10 species in 4 families. Paradoxically, despite the influence of the South Equatorial Current enabling the exchange of species from the western shores of Africa, our preliminary results indicate that the TMV fauna has more similarities in its constitution from the western Atlantic.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Segunda Sessão: Sistemática e Evolução – Pôsteres

# Whale Tale Morphometrics: Unraveling Barnacle Coronula diadema (Linnaeus 1767) Adaptations on Humpback Hosts, Megaptera novaeangliae (Borowski, 1781)

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Coronula diadema barnacle is a filter-feeding epibiont, with a larval stage that typically settles on humpback whales (Megaptera novaeangliae). This study aimed to investigate potential differences in the adult barnacle's morphology considering two main factors: 1) the host's sex, as males exhibit more aggressive behavior during competition for mature females, including body, head, and tail slaps, suggesting possible variations in barnacle shape depending on the host's sex; 2) the settlement location on the host's body, as different regions may experience distinct hydrodynamic conditions and nutrient availability, potentially influencing barnacle morphology. 196 barnacles were collected from 21 humpback whales found stranded in the states of Bahia, Rio de Janeiro and Rio Grande do Sul, along the Brazilian coast. Morphometric analyses were conducted using dorsal and lateral photographs, with 11 and seven landmarks, respectively, all properly scaled. A Procrustes analysis was applied to generate a covariance matrix, which was then subjected to principal component analysis (PCA) to identify differences among predefined groups (ventral grooves, pectoral fins, and genitals; male and female). Preliminary results revealed slight differences between males and females in lateral photographs and variations between pectoral fins, ventral grooves, and genitals in dorsal photographs. The first two components of PCA explained eigenvalues of 75% in lateral photographs and 45% in dorsal photographs. By averaging the data based on sex in both lateral and dorsal photographs, the primary source of variation was associated with PC1. Regarding settlement location, higher variation was observed in PC2 in dorsal photographs, confirming the existence of morphometric differences related to settlement. Overall, this study sheds light on the potential influence of host sex and settlement location on the morphology of C. diadema barnacles attached to humpback whales, providing valuable insights into the ecological and evolutionary dynamics between the epibiont and its host.

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## Terceira Sessão: Conservação e áreas afins – Plenária

### Monitoramento da biodiversidade recifal nas ilhas oceânicas brasileiras: Manejo e conservação de espécies chaves

Carlos Eduardo L. Ferreira (Universidade Federal Fluminense - UFF)

Resumo não disponível.

# Terceira Sessão: Conservação e áreas afins – Mesa redonda

## Conservação Marinha: para e com as pessoas

Leandra Gonçalves (Universidade Federal de São Paulo)

Tem como objetivo compartilhar visões e conceitos fundamentais sobre a conservação dos ecossistemas marinhos. Serão destacadas iniciativas inovadoras que buscam envolver ativamente as pessoas e os diferentes usuários do mar em ações de conservação marinha. A conservação marinha é um desafio global que requer a participação ativa de governos, organizações não governamentais, cientistas e comunidades locais. Compreender a importância do oceano para o equilíbrio do nosso planeta é fundamental para a implementação de estratégias efetivas de conservação. Nesse contexto, serão abordados diferentes temas. Um deles é a importância da interdisciplinaridade e da transdisciplinaridade na conservação marinha. A integração de conhecimentos científicos, sociais e culturais é essencial para compreendermos os ecossistemas marinhos de forma holística e promover ações eficazes de conservação. Além disso, serão apresentadas algumas iniciativas e estratégias de conservação marinha, tais como processos de políticas públicas, criação de áreas marinhas protegidas e ações de sustentabilidade dos recursos marinhos. Serão exploradas boas práticas na gestão dos recursos marinhos, levando em consideração as necessidades das comunidades locais e dos diferentes usuários do mar, destacando a necessidade de equidade e justiça nas ações de conservação. Em suma, a palestra "Conservação Marinha: para e com as pessoas" visa compartilhar conceitos, estratégias e iniciativas que visem promover a conservação dos ecossistemas marinhos.

## Terceira Sessão: Conservação e áreas afins – Mesa redonda

### Conservação e manejo no Arquipélago de Alcatrazes

Kelen L. Leite (Instituto Chico Mendes de Conservação da Biodiversidade)

O Arquipélago dos Alcatrazes está na plataforma continental de São Sebastião/SP, região sobre influência de Águas Tropicais da Corrente do Brasil, Águas Centrais do Atlântico Sul e Águas Costeiras. Essa confluência de correntes permite a ocorrência de espécies tanto de águas quentes como frias, consequentemente uma grande biodiversidade marinha. A parte insular está isolada do continente a cerca de 12.000 anos, isolamento que criou condições ideais para especiação da fauna e flora e alguns registros de espécies em processo de especiação, fundamentais para a ciência. O Arquipélago está protegido por duas áreas marinhas protegidas (AMPs) de proteção integral, A Estação Ecológica Tupinambás e o Refúgio de Vida Silvestre do Arquipélago de Alcatrazes. Juntas as unidades protegem uma área de 70.000 hectares, sendo as únicas áreas marinhas de proteção integram do Litoral Norte de São Paulo. Os objetivos das AMPs estão focados na conservação de aves, espécies endêmicas e ameaçadas, incentivo a pesquisa cientifica e monitoramento ambiental, manutenção de estoques pesqueiros e promoção de turismo náutico em harmonia com a natureza.

# Terceira Sessão: Conservação e áreas afins – Mesa redonda

## Conservação Marinha: para e com as pessoas

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## Terceira Sessão: Conservação e áreas afins – Comunicações orais

# Implementation of remote sensing data in CETESB Water Quality Monitoring Program: Support for environmental conservation in the São Sebastião Channel

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(1) Instituto Oceanográfico da Universidade de São Paulo ; (2) Centro de Biologia Marinha da Universidade de São Paulo.

Virtual monitoring systems built from satellite imagery, numerical models and in-situ data aim to provide valuable information about coastal ecosystems and overcome gaps in monitoring programs based only on field campaigns. This study aims to evaluate the use of satellite images in the development of a virtual system for monitoring ocean color and water quality parameters in the São Sebastião Channel, seeking to verify the viability of applying remote sensing data to build a monitoring system in quasi-real time (daily - 8 days) and improve the resolution of the time series (semi-annual) of CETESB coastal water quality program. Preliminary results include the correlation analysis between chlorophyll-a and salinity (-0.3 to 0.05), sea temperature (-0.37 and -0.2) and total organic carbon (-0.13 to 0.2) collected by CETESB at 5 points that demonstrated distinct environmental characteristics along the São Sebastião Channel. A matchup exercise was performed between chlorophyll-a estimates from the VIIRS sensor (OC3) and the percentage difference between in-situ and satellite data was between 4% and 300% and revealed the challenges in using easily accessible information and 750m spatial resolution. Next steps in the research include processing data from the high spatial resolution sensors (300, 100m, 30m and 15m) and identifying possible sources of errors and uncertainties in ocean color estimates. The aim is to enable the accurate collection of ocean color data by satellite in a highly complex coastal system such as the São Sebastião Channel and to subsidize the creation of computational tools for observing ocean color parameters in the region.

**Financiamento: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES**
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## Terceira Sessão: Conservação e áreas afins – Comunicações orais

# Microbial profile of the hydrocoral Millepora alcicornis during a bleaching event reveals site-specific patterns

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During the summer of 2019, Brazilian zooxanthellate corals and hydrocorals were severely impacted by a bleaching event caused by marine heatwaves. One of the most affected species was the hydrocoral Millepora alcicornis, one of the few branching species found in Brazil. This study is one of the first to evaluate and describe the bacterial profile of this species before, during, and after a bleaching event, focusing on two locations in Arraial do Cabo – RJ, which have distinct environmental pressures. Significant differences in the bacterial community were observed between the colonies from Praia dos Anjos and Praia do Forno (more and less impacted, respectively). While the Anjos colonies exhibited a more homogeneous bacterial community, the colonies from Praia do Forno displayed more distinct profiles, which may have been influenced by the difference in the extent of environmental impact that each beach is subjected to. Overall, it was observed that bleached samples were more distinct from healthy and recovered samples. Additionally, no statistically significant differences were observed between healthy, semi-recovered, and recovered samples, suggesting that the microbiome tends to return to normal early in the colony recovery process. Among the identified bacterial genera, some are potentially beneficial to the host's health, such as Thalassospira, Kiloniella, and Endozoicomonas, which showed significant variations during the bleaching and recovery of the colony, especially from Praia dos Anjos, and may be associated with processes that contribute to the acclimatization or recovery of the holobiont. Unclassified bacteria from the Flavobacteriaceae family, commonly associated with diseases, constituted the core microbiome of M. alcicornis, showing increased abundance in colonies undergoing recovery compared to bleached colonies, suggesting a possible opportunistic process.

**Financiamento: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP); Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)**

**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

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CEBIMAR - USP

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

# Relative growth and morphological maturity of Minuca vocator (Herbst, 1804) (Brachyura: Ocypodidae)

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The size at sexual maturity of brachyuran crabs plays a crucial role in understanding their biology and has been investigated in fiddler crabs (Gelasiminae) to facilitate conservation efforts. This study focused on Minuca vocator, conducted in a mangrove along the Itanhaém River, south coast of São Paulo state. Crabs were collected, sexed, and subjected to measurements of carapace width (CW), and propodus length of the major chela (PL) for males, and abdominal width (5th somite) (AW) for females. Regression analyses were applied to the PLxCW and AWxCW relationships and fitted using a power function to determine the breaking point between juveniles and adults (using “segmented” function in R-environment) or the proportion of overlap (using a logistic equation). The growth rate (constant 'b') varied with ontogeny in both sexes. Male analysis included 208 individuals (2.5 to 22.1mm CW) and revealed a breaking point at 8.5mm CW, indicating a positive allometric growth smaller for juveniles (b=1.24) than adults (b=1.82). Female analysis involved 130 specimens (4.3mm to 21.9mm CW) and indicated a maturity size 28.4% larger than males (10.8mm CW), with higher positive allometric growth in juveniles (b=1.55) than in adults (b=1.17). The growth pattern observed in these morphometric relationships was similar to those reported in previous studies of Brazilian Gelasiminae (differential allometric growth throughout ontogeny, regardless of sex). In the north coast mangroves (Ubatuba, SP), a more pristine region, the maturity size recorded for M. vocator was 30% larger than that found in Itanhaém (SP) mangrove, which experiences high urbanization pressure and shows greater effects of contaminants (e.g., metals, PAHs, etc.) documented in previous studies. Despite the latitudinal proximity, the difference between areas is likely due to contrasting food quality, such as organic matter, as more pristine mangroves promote a better energy budget, which can directly influence the size at maturity.

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## Terceira Sessão: Conservação e áreas afins – Comunicações orais

### How much of shallow and mesophotic reefs are protected?

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Situated between 30 to 150 meters of depth, mesophotic coral ecosystems (MCEs) host distinct communities compared to shallow reefs (0 – 30m). Yet, despite both being severely affected by environmental stressors, the ecological studies and conservation policies are mainly conditioned to shallower environments. Therefore, considering the biological relevance and the variety of ecosystem services provided by reefs (e.g. food provisioning and tourism), it is crucial to quantify how much of these ecosystems are protected by legal mechanisms. This research aims to generate high-resolution bathymetric maps that encompass the shallow and mesophotic layers of reefs and then calculate how much of each depth strata is protected by marine protected areas (MPAs). The study area encompasses eight sites from distinct biogeographic provinces of the Atlantic, Pacific, and Indian Oceans. The depth and geospatial data were obtained from public databases and official repositories of the countries, with the GIS analysis conducted in the QGIS software. As preliminary results, we saw that the island of Guam has more than half of its MPAs area concentrated in shallow reefs, with only 6% designated to the deepest portion (120 – 150m). In Hawaiian waters of the Big Island, the depth intervals of 0 – 30m and 30 – 60m have, respectively, 39.4% and 46.7% of their areas protected by MPAs, while in the other strata (60 – 90m, 90 – 120m, and 120 – 150m) these numbers are at least 65%. However, when looking at no-take MPAs, there is only 1% of coverage down to 60 meters and a complete lack of protection in deeper areas. These results, associated with ichthyofaunistic assemblage data, will allow us to analyze how the biodiversity is protected along the bathymetric gradient. Thus, generating data for regions and ecosystems less studied, this research will contribute to the management and conservation of MCEs worldwide.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

### In vitro fertilization and development of corals from frozen semen: a strategy for conservation of the endemic species Mussismilia harttii

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Coral reefs are one of the most diverse ecosystems on the planet, exercising a key role in maintaining ecosystem services that support thousands of human communities around the globe. However, this ecosystem has been suffering severe damage, occasioned mainly due to anthropogenic factors like the climate crisis. About 50% of the planet's coral reefs have already been lost, and the rest are in a worrying situation. In this context, passive restoration alone seems no longer effective, and the development of reproductive biotechnologies aimed at conservation become crucial. Cryopreservation emerges as an alternative that can effectively help in the conservation of corals. The objective of this pioneering study was to develop an in vitro fertilization protocol using frozen sperm of the endemic species Mussismilia harttii. For the fertilization, spermatozoa were thawed and diluted to form inseminating doses at concentrations 105 and 107 spermatozoa/mL. In test tubes containing filtered sea water, fresh oocytes were added and then aliquots of the respective sperm concentrations. Two control treatments were used, one containing fresh semen and the other one containing only oocytes. After fertilization, the samples were transferred to 500 mL aquariums, with four replicates per treatment. The fertilization rate attained for all treatments was 100% and the larval settlement rate reached 26 ± 16%. We were able to create the first coral sperm bank in the South Atlantic, with an efficient in vitro fertilization protocol using frozen semen. This scientific achievement proves to be a powerful biotechnological tool that could help restore coral reefs and preserve their genetic diversity.

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CEBIMAR - USP

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

# Iron pollution and the fragile coral reef ecosystem: understanding the behavioral responses of Stegastes fuscus

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Coastal pollution impacts highly sensitive coral reefs worldwide, threatening the survival of this ecosystem. Human land-based activities, such as mining, may damage downstream terrestrial systems with water contaminated by waste material. Discharges of mining tailings in streams can reach coral reefs, carrying sediments with metal composition which impairs coastal water quality. Pollution impacts may affect not only coral cover itself, but also the abundance of an array of coral-associated reef fish. Reef fish rely on sensory cues to locate habitats for their ontogenetic development. From settlement to recruitment, the use of structurally complex habitats, such as mangroves, macroalgae and seagrass beds, is necessary for the survival of early stages of fish, before they reach adult habitats: the reefs. Metal contamination can alter fish social behavior, such as agonistic and territorial behavior, which may be crucial for resource acquisition and predator defense during juvenile stages. To better understand how metal pollution may impact juvenile reef fish, we exposed juvenile individuals of the damselfish Stegastes fuscus to different concentrations of iron (important trace element contaminant from mining activities). We found that juvenile damselfish are not affected by iron contamination, showing a potential resistance to pollutants even in extreme conditions. The resistance of certain fish species to marine pollution brings a positive expectation for the survival of reef ecosystems amid human impacts. Recent research shows that some fish species are developing resistance to pollution, allowing them to tolerate higher levels of contaminants and detoxify harmful chemicals. This resilience is promising for reef recovery and conservation efforts. However, it should not diminish the urgency to reduce pollution and protect marine biodiversity. Striving for a sustainable balance between human activities and reef preservation remains crucial.

**Financiamento: Projeto Coral Vivo; Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)**

**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

### The aesthetic value of Brazilian reefs

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Marine underwater wildlife and seascape components offer unique opportunities for humans' personal and emotional connections with nature. Yet people may perceive or value reef characteristics differently. We assessed the aesthetic value of Brazilian reefs according to different reef users (e.g., recreational divers, researchers, recreational and commercial fishers, and tourists) through an online questionnaire. We accounted reef aesthetics using pictures of 82 fish species and 65 seascapes. To measure respondents' perceptions, we related the aesthetic value of each picture to bony and cartilaginous fishes' traits (e.g., body size, body shape and body colour) and the seascape components such as the presence of top predators or mesopredators, fish schools, benthic organisms and the presence (or absence) of emerged reef components. Further, we developed an index to map the aesthetic value of nine reef sites along the Brazilian Province. A total of 320 reef users answered the questionnaire. Different users had similar aesthetic perceptions about fishes, underwater and out-of-the-water components. The unique body shape of manta rays and colourful species were the most valued attributes of cartilaginous and bony fishes, respectively. The most valued underwater seascapes were those with the presence of marine predators and large fish schools. Also, out-of-the-water seascapes were most valued when presenting emerged reef patches. When combining these distinct components of aesthetic values, we found that reefs in Northeast Brazil (i.e., Parrachos, Rocas' Atoll and Costa dos Corais) had the highest aesthetic values among evaluated sites. Reefs in this region are fundamental to Brazilian tourism economic revenue, while hosting threatened species with high aesthetic values and key ecological functions.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

# An integrated physiological and genomic approach to assess ecotoxicological effects of anthropogenic contamination in situ on the swamp mangrove crab, Ucides cordatus (Decapoda: Ocypodidae) and its mangrove environment

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Anthropogenic pollutants threaten the health of mangrove environments. Mangroves are vital ecosystems that provide ecological and monetary services. The mangrove crab Ucides cordatus, a key biological monitor, will be used as a tool to diagnose and classify anthropogenic impacts on its mangrove environment and on its physiological, biochemical and genetic responses due to the crab's intimate proximity with mangrove sediments. An integrative approach will be proposed to evaluate physiological and genetic responses to metal contaminants in crabs from two differentially impacted mangrove areas: (i) a protected environment within the Juréia-Itatins Ecological Station; and (ii) an unprotected environment from the São Vicente/Cubatão municipality, both on the coast of São Paulo State. Hepatopancreas and gill tissues will be dissected for physiological evaluation. Oxidative stress activity and protein concentration will be measured spectrophotometrically and enzyme activity will be calculated using relative molar coefficients. Muscle tissue will be utilized for DNA and RNA extraction. Next generation sequencing will be employed for differential analysis of population genetics, genetic structure, gene regulation and gene expression responses. The transposition of crabs from the Juréia-Itatins mangrove system to a controlled medium reproducing the São Vicente/Cubatão mangrove environment will allow the evaluation of stress responses like oxidative enzyme activity and differentially expressed genes. Positive correlation tests between degree of contamination and genetic parameters and physiological responses in U. cordatus will establish an effect of anthropogenic pollutants. Such information will provide quantifiable measures of pollutant effects that should be instrumental in improving environmental risk assessment and in establishing conservation strategies. Our objectives, approach, methodology and possible preliminary results will be presented.

**Financiamento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)**
**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Não**

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CEBIMAR - USP

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

### Evaluation of adaptive management to control the invasion of sun corals in the Alcatrazes no-take MPA, southeastern Brazil

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Islands and coastal mainland areas are hotspots of invasions and although boundaries of protected areas provide some resistance to invasions, even the most isolated and well-managed reserves are experiencing pressure from invasive alien species. Established invasions need to be managed as the example of sun coral invasion in the Brazilian coastline. Few MPAs has controlling actions program but it occurs in the no-take Alcatrazes MPA since 2013. Approximately 1.2 million colonies ≈ 92 % of T. tagusensis) were removed, resulting in more than 12.3 tonnes in 267 days in the field. We evaluated sun coral population dynamics and observed a decrease in the relative abundance of sun coral after management actions, decreasing the dominance and increasing the absence frequencies in some parts of the MPA. However, an annual evaluation showed a minor increase in the abundance of the pest and sun coral cover ranged between 4 and 28 %. Our results show that management actions keep a populational structure formed mainly by small colonies (up to 5 polyps), but it increased fast between annual field campaigns. In some places, sun coral cover returns to the same value in less than a year. Considering that benthic composition has a high cover of turf algae, a change in ecosystem functioning is expected since a primary producer is changed by a heterothrophic habitat modifier. Many groups were negatively affected by sun coral presence, such as ascidians, bryozoans, CCA, hydrozoans and cnidarians. In one site, a positive correlation was observed with macroalgae since its tridimensionality growth is seasonal. Data analyses keep in practice, but we can conclude that the management plan in Alcatrazes is maintaining sun coral populational structure and consequently decreasing propagule pressure. Then, currently it is controlling sun coral spread but it is far to think about its eradication in Alcatrazes MPA.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Terceira Sessão: Conservação e áreas afins – Comunicações orais

### Unveiling exotic and invasive species in marine protected areas using environmental DNA (eDNA)

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Marine biological invasions are a significant threat to global biodiversity, triggering negative impacts on native ecosystems. Managing non-native species is increasingly challenging as organisms progress through different stages of invasion. Thus, early detection is a critical tool to establish procedures to prevent their spread. Recent methodologies, such as the metabarcoding of environmental DNA (eDNA), has proven to be an efficient tool for detecting non-native species, overcoming limitations of visual methods. In Brazil, the southeastern region harbors the largest port of Latin America and also the highest number of recorded exotic and invasive species. More specifically, 73 exotic species are recorded along the São Paulo coast, including 10 that are known to occur in the Tupinambás Ecological Station and the Wildlife Refuge of the Alcatrazes Archipelago. Here we used eDNA samples to identify non-native species within the Archipelago. Water and sediment samples were collected from 25 sites and two gene regions targeting a wide diversity of marine metazoans, a fragment of cytochrome oxidase I (COI) and the hypervariable region V4 of the minor subunit of nuclear ribosomal DNA (18S), were amplified and sequenced. The study focused on high reliability of taxonomic assignments, with only assignments having 100% percent identity and a minimum score of 400 being retained. Among the non-native species identified there are four (i.e., Temora turbinata, Megabalanus coccopoma, Carijoa riisei, and Ophiactis savignyi) of which all but C. riisei were not previously known for Alcatrazes and might be the first record in the archipelago. It is important to highlight that for the 150 non-native species cataloged in Brazil, only 90 and 62 species had available data at the NCBI database for the COI and 18S, respectively. Such limitations highlight the need to expand and improve genetic databases to strengthen the potential of eDNA as an early detection tool.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# Advancing marine conservation: assessing the role of fishermen in payment for environmental services initiatives

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In the context of the prevailing environmental crisis, engaging with society and fostering social participation have emerged as key strategies to advance marine conservation efforts. One innovative approach with potential benefits for conservation is Payment for Environmental Services (PES), which entails involving local actors as providers or stewards of ecosystem services while potentially generating alternative income for the local community. While successful PES implementations in terrestrial environments have been extensively documented in the literature, PES mechanisms targeting marine ecosystems remain relatively unexplored. This research presents a systematic literature review aimed at investigating existing marine PES initiatives worldwide, focusing specifically on initiatives involving fishermen as beneficiaries. Among 42 obtained results, only 10 addressed the issue of PES with the participation of fishermen. The majority of these studies presented predictive PES models, exploring local stakeholders' preferences for various PES scenarios (n=4), assessing economic feasibility and cost-benefit analyses (n=3), and proposing PES as a management mechanism (n=1). Only a few projects in force were identified (n=2), indicating a notable gap between theoretical propositions and practical implementation. Regarding the involvement of stakeholders, the results indicate that fishermen predominantly assume supporting roles in most of the proposals, often benefiting from management assistance or functioning as co-managers in only one article. The limited number of works, primarily hypothetical, addressing PES as a potential tool for sustainable resource management underscores the need for comprehensive mapping of marine PES initiatives and the adoption of transdisciplinary approaches. By doing so, we can bridge the gap between theory and practice, fostering the development of effective mechanisms that promote marine conservation with active engagement of local actors. This research emphasizes the importance of broadening dialogue and encouraging social participation in marine conservation, facilitating the advancement of sustainable practices in the face of the ongoing environmental crisis.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# Areas of endemism of calcareous sponges (Porifera, Calcarea) in the Western Atlantic

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Calcareous sponges are benthic marine animals, and their global biodiversity is underestimated [1]. In order to gain a better understanding of the species composition in the Western Atlantic, an analysis of endemism was conducted for the Caribbean, Brazil, and the Falkland/Malvinas Islands. A total of 79 species and 295 occurrences underwent Geographic Interpolation of Endemism analysis, which revealed that the Northeast and East marine ecoregions of Brazil are the most biodiverse in the Western Atlantic. When observing the number of endemic species, it was found that Brazil has 35 species, while the Caribbean has 28 species. These findings contradict the pattern observed for other marine organisms, where the Caribbean is recognized as a hotspot for marine biodiversity [2]. Considering the general lack of knowledge about this group of sponges and the scarcity of faunal surveys in the Caribbean region, there might be a survey bias, resulting in higher biodiversity being found along the Brazilian coast. Also, in Brazil, there are no records of the class Calcarea along most of the São Paulo coast, as well as the coastlines of Paraná and Rio Grande do Sul. The Argentine coast also lacks data, with the Falkland/Malvinas Islands being the only recorded location with 5 species. In this study, the identification of areas of endemism not only reveals regions of interest for the conservation of calcareous sponge biodiversity, but also highlights the significant gaps in our knowledge of the faunal composition of these animals in the Western Atlantic.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# Biotic homogenization in artificial marine habitats. Global standards and alternatives to minimize the introduction of exotic species

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Globalization has brought significant benefits to humanity, but also big impacts on ecosystems. One of these impacts is the introduction of exotic species, whether intentional or accidental. These introductions have led to a drastic reduction in native biodiversity, resulting in the homogenization of biota in human-altered habitats worldwide. Numerous strategies have been implemented to combat and mitigate the introduction of exotic species. Some focus on preventing potential vectors of exotic species, while others aim to control species that have already invaded predominantly man-made structures. Sun corals (Tubastraea spp.) are examples of exotic species that have been spreading along the Brazilian coast for many years, causing a significant loss of diversity. Previous studies have shown that manually removing sun corals is an effective short-term approach. Likewise, a recent study using PVC panels demonstrated the long-term efficacy of pre-colonization by a native organism. Based on these findings, we removed sun corals from thirty 25x25 cm areas of a recreational marina's wall. We then implanted pieces of the native sponge Mycale angulosa into twenty of these areas, varying densities, to determine the minimum effort required for the successful establishment of these sponges against sun coral invasion. Two months later, 89% of the sponges were alive and growing. In sponge-present areas, sun corals were absent regardless of density. So far, sponges have proven effective in preventing sun coral establishment. However, we acknowledge potential changes over the next two years of the experiment, during which we will evaluate community diversity. We believe that manual sun coral removal, combined with the pre-colonization by M. angulosa, can be an effective long-term strategy to prevent sun coral establishment.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# Decadal Changes and Phenological Response to Extreme Ocean Temperatures in the Southeast Brazilian Continental Margin.

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Phenology studies of phytoplankton allow us to characterize periodical cycles of their abundance, which can trigger significant impacts with cascading effects on the entire marine system. We estimate the phenological indices of the Southeast Brazilian Continental Margin (SBCM) from 1999 to 2023, emphasizing patterns and trends of phytoplankton abundance over the last two decades and their potential association with extreme events of sea surface temperature (EE-SST). The time of initiation, duration, and maximum intensity of high chlorophyll concentrations period (HCCP) of each decade was calculated by the cumulative sum of remote sensing chlorophyll anomaly. The daily data were extracted from images of merged ocean color sensors within the Copernicus/ESA. The EE-SST of each decade was calculated by the difference between daily data and the 90th percentile of the climatology, considering the minimum duration of 7 days for each event. The daily SST was extracted from the NCEP. The results reveal a high negative trend of chlorophyll in the second decade from Cabo Frio up to off São Sebastião. There was a decrease in EE-SST between the two decades in this region compared to the overall SBCM. A significant change in the duration of HCCP northeast of Ilhabela was observed, which decreased by two months in the latter decade. The southernmost Continental Shelf (CS), under the influence of the Plata River plume, demonstrated a positive trend in chlorophyll concentration during the second decade. This area experienced the highest number of EE-SST. There was a significant increase in the duration of HCCP by 1,5 months, doubling the maximum intensity. The SBCM is recurrently being impacted by extreme events associated with climate change that, as observed in this study, affect the abundance of phytoplankton, mainly in the CS, where upwelling and nutrient-rich waters significantly influence the seasonal cycles of these primary producers.

**Financiamento: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)**
**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Terceira Sessão: Conservação e áreas afins – Pôsteres

# Evaluating the presence of the allien brittle star Ophiothela mirabilis (Echinodermata: Ophiuroidea) in a no-take marine protected area in Southeastern Brazil.

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The brittle star Ophiothela mirabilis Verril, 1867 (Ophiotrichidae) is a potentially invasive non-native species on the Brazilian coast. Originally described in the Pacific coast of Central America, it's first record in Atlantic waters was in 2000, then rapidly spreading through Brazilian coastline, from 8o to 26o S. It's presence near major ports in Brazil and Caribe suggests that the ophiuroid may have been introduced to new regions by shipping, in ballast water or in fouling communities on the ship hulls. Even areas far from the coast can still be colonized through oceanic currents that transport its planktonic larvae, thus having the potential to reach distant Marine Protected Areas (MPAs). The Alcatrazes MPA resides 35 km from the Port of São Sebastião (São Paulo, Brazil). As the ship traffic in the region is intense, the present study aimed to investigate the presence of O. mirabilis within the MPA, in order to support first conservation measures to the marine reserve. Thus, the goals of the study were to verify the ophiuroid's occurrence area and produce a map; report hosts associated species; and describe the population size structure based on specimens collected in February/2022 and May/2023. We surveyed 17 areas within the MPA, in which 7 of them reported the ophiuroid. A total of 156 individuals were measured, with an average disc diameter of 1.65 ±0.11mm and the biggest arms with 5.67±0.65mm. Only 4,5% of the sample were individuals with all 6 arms, while vast majority (around 93,6%) presented an arm configuration that suggests a fissiparity event. Also, we identified 5 host taxon/functional group used by O. mirabilis, observing a higher abundance in Leptogorgia punicea. Although there are no records of negative impacts on native species, monitoring is still essential as its impact can remain subtle in the environment.

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**O trabalho foi desenvolvido com o uso da infraestrutura do CEBIMar? Sim**

## Terceira Sessão: Conservação e áreas afins – Pôsteres

### First report of sperm cryopreservation from an endemic Southwestern Atlantic coral

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Coral reefs are one of the most important ecosystems to sustain marine life. However, corals worldwide are facing severe environmental pressures and high mortalities at a rate that spontaneous recovery seems no longer to be effective. Thus, efforts to develop strategies for the conservation of coral reefs must be immediate, and gamete cryopreservation could be a promising tool. This study aimed to develop a cryopreservation protocol for sperm of the Brazilian coral Mussismilia harttii. To understand the sensitivity of the spermatozoa to cryoprotectants and the freezing process, we investigated different cryoprotectants, concentrations, and cryopreservation techniques. Colonies (n=50) were placed in 1000-L tanks with a semi-open capture system connected to the ocean and were monitored until spawning. After collection, spermatic quality was assessed and sperm pool from groups of three colonies was obtained and distributed among treatments. Spermatozoa were exposed to the cryoprotectants dimethyl sulfoxide (DMSO) and methanol at concentrations of 10, 15, and 20% and cryopreserved by vitrification and controlled slow freezing. The successful combination of 20% DMSO associated with controlled slow freezing resulted in samples with 83.57 ± 2.22% viable spermatozoa. This study marks the history of cryobiology applied to genetic conservation of Brazilian corals, leaving as legacy the first coral gamete bank in the South Atlantic, containing 2.4 billion spermatozoa from the endemic coral M. harttii.

**Financiamento: Fundo brasileiro para a biodiversidade (FUNBIO), Fundação Grupo Boticário de Proteção à Natureza.**
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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# From reefs to rigs: balancing conservation and exploration in Brazil's Economic Exclusive Zone

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Marine habitats play a crucial role in the health and vitality of the ocean but face numerous threats, such as oil exploration. We analyzed the distribution of oil blocks and their threats to megahabitats, reefs considered priorities for conservation (PAN Corais) and threatened species in the Brazilian Exclusive Economic Zone (EEZ). Since 1998, a total of 4,793 blocks have been offered, with a significant 64% of them located in marine environments and 544 blocks leased. 16% of the area of the EEZ is covered by blocks, but the representativeness of megahabitats varies. Notably, 95% of the area of megahabitats comprises either soft sediment or hard bottom, whereas cold-water coral, though representing a smaller portion, faces a substantial 62% overlap with the blocks. Also, blocks cover 14% of all mesophotic reefs while only 12% of the soft sediment, which represents 80% of the megahabitats area, overlaps with blocks. We found an average of 29.02 ± 18.65 (mean ± SD) threatened species per cell within the EEZ, but this number increases to 41.89 ± 17.79 within the PAN Corais, which is overlap by 28% of the marine blocks. Our findings emphasize the conflict between oil exploration and the conservation of vital marine habitats and species in Brazil, which is among the top oil producers and consumers globally. We highlight the crucial role of PAN Corais in delimiting areas to safeguard vulnerable species. Brazil is among reached record-breaking production in 2022, with the majority sourced from offshore fields. Further, it is concerning that despite having tools for conserving marine ecosystems and responding to oil spills, it failed to handle oil disasters in 2019. Regardless of these challenges and contrasts, the outcomes of the ongoing exploration dispute in the Amazon River mouth will shape the country's stance in the global energy transition debates.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

### Marine thermal events observed in the sheltered face of the Alcatrazes Archipelago

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High (HSWT) and low (LSWT) sea water temperature events have been reported worldwide and their frequency and intensity have increased in recent years, and their effects on the structure and functioning of marine biodiversity need to be better understood worldwide, especially if they surpass the surface. Here we investigated the occurrence of HSWT and LSWT events in Alcatrazes Archipelago, a marine protected area on São Paulo coast, which receives episodically, near the bottom, the South Atlantic Central Water mass (SACW), that influences the vertical distribution of temperature. Loggers (HOBO TidbiT MX2203 Temperature 400' Data Logger) were deployed on six sites of the sheltered side of the Archipelago between February/2022 and February/2023 at different depths, acquiring data at 10 minute intervals. HSWT and LSWT events were detected when temperatures were higher than the 90th percentile and lower than the 10th percentile of the time series respectively, and lasted more than five days. Results showed four events of HSWT at 3 meters depth and five events at 8 meters depth, characterized as moderate to strong. Furthermore, we computed the maximum of five events of LSWT at 3 meters depth and five events at 8 meters depth, characterized as moderate to severe. During 2022-2023 Alcatrazes Archipelago was subjected to HSWT and LSWT events year round but different sites showed different degrees of influence at a given time. The high frequency of observations and fine vertical scale allowed it to detect anomalous warm water (up to 27.46 degrees) and cold water (up to 16.57 degrees) at 3-8 meters during the events. Furthermore, it is important to observe the alternations between warm water periods and significant decreases in sea water temperatures. Strong gradients in surface temperature in the warmer months are related to the presence of SACW at lower depths.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

# The impact of marine debris on seabirds found on the southern coast of Brazil

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The present study investigated the occurrence of anthropogenic marine debris in seabirds and its effects on the health and conservation of species collected by the Beach Monitoring Project of the Santos Basin (PMP-BS) from August 2019 to October 2022. Using data available in the Aquatic Biota Monitoring Information System - SIMBA, 1428 seabirds were analyzed, belonging to 44 species, of which 15 had an occurrence equal to or greater than 10 individuals. Approximately 40.9% of the analyzed birds had anthropogenic waste in their digestive tracts, with plastic being the most commonly found material. The species Puffinus gravis showed the highest frequency of litter ingestion (88,5%), followed by three other species of the Procellariiformes order, corroborating the tendency of these birds to ingest marine debris. Birds that ingested litter had lower body condition scores compared to those that did not, suggesting a possible relationship between these factors. Although it was not possible to establish a direct link between litter ingestion and the bird's cause of death, a higher rate of lesions in the digestive system was observed in birds that ingested litter. It can be concluded that the presence of anthropogenic waste in the oceans represents a major threat to marine birds, emphasizing the need for further studies to better understand the impacts of these waste materials and to adopt effective mitigation measures

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

### Variation of reef fish community structure on Brazilian oceanic islands: a ten-year series

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The reef environments in oceanic islands constitute unique ecosystems. The physical isolation of the islands, their geological characteristics and responses to sea level fluctuations resulted in the establishment of biogeographical patterns distinct from those present in coastal regions. Oceanic islands are home of organisms that have adapted to different conditions, exhibiting a high degree of speciation and endemism. Therefore, they are important sites for both ecological and evolutionary studies and for conservation actions. Despite their importance for marine biodiversity, Brazilian oceanic islands have few studies related to the natural variability of their communities, including analysis of β diversity and abundance gradients. In this context, the main objective of this project is to evaluate the variability of fish communities in Brazilian oceanic islands – Arquipélago de Trindade e Martin Vaz, Atol das Rocas, Arquipélago São Pedro e São Paulo e Arquipélago de Fernando de Noronha. For this, the project intends to combine island biogeography theory with community ecology approaches, as well as evaluating how the effects of the Anthropocene are affecting the conservation status of these ecosystems. In addition to generating scientific products, we intend to contribute with measures aiming to the effective conservation of these environments.

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## Terceira Sessão: Conservação e áreas afins – Pôsteres

### What drives the water transparency changing in Alcatrazes Archipelago?

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Sea water transparency usually is represented by the Secchi disk depth (ZSD) and the monitoring of this variable indicates water quality and provides relevant information to understand characteristics, patterns, environmental variations and general events in a given location. The light attenuation in aquatic systems can be quantified by coefficients determining the decrease in solar irradiance with depth (KdPAR). The present study aims to estimate the relationship between in situ measurements of ZSD and abiotic factors as a temperature, salinity, PAR and KdPAR in Alcatrazes Archipelago (São Paulo, Brazil). The region is known for its transparent waters, but also receives periodic contributions of distinct water masses. Data were collected between December/2021 and July/2023 using a standard Secchi disk and a number of CTDs, some including PAR sensors (AAQ-Rinko/JFE, Maestro/RBR and CastAway/SonTek/YSI). Irradiance data as a function of depth were processed, removing the first 4 meters and calculating the variables averages referring to the mixed layer (ML) when present or up to the maximum depth. KdPAR data showed a correlation of 0.65 with ZSD and 0.46 with temperature; ZSD showed a correlation of -0.30 with salinity; and the temperature of 0.57 with PAR. When we evaluated the presence of colder waters in the water column , we noticed a decrease in the correlation between KdPAR and ZSD (0.09) and an increase between ZSD and salinity (0.61). Profiling PAR in the water column is very complex, and with that we are developing a new way of obtaining and processing data. Although these are preliminary results, it is possible to verify that the presence of colder waters changes the variables related to water transparency and their correlations.

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