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TALKS

Introductive Talk

GAINO ELDA*, PANSINI MAURIZIO & PRONZATO ROBERTO
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former professors at the University of Genova

The Italian Spongiologists: a Historical Overview

The Italian scientific spongiologists school appeared later than similar schools in other countries. In spite of that, Italian sponge scientists spreaded from Genoa, as a center of origin, settling in universities, research centers, laboratories, schools and natural parks. Michele Sarà and Gustavo Pulitzer-Fìnali, were the founders in the second half of the 20th century. Now, at the fourth generation, the school's interests range from basic fields e.g., taxonomy morphology, ecology, evolution, phylogeny, cell biology, microbiology, symbiosis, molecular biology to palaeontology. From another point of view, the applied research focus is also on sponge farming (mariculture), bioprospecting, conservation, and sustainable aquaculture.

Talk 1

MORROW CHRISTINE[1]*, RIOS PILAR[2], CRISTOBO JAVIER[2], CÁRDENAS PACO[3], XAVIER JOANA[4], DOMINGOS CELSO[4], ÓLAFSDÓTTIR STEINUNN HILMA[5], DE MONTETY LAURE[5] & GUDMUNDSSON GUDMUNDUR[6]

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Fan-shaped *Iophon* & *Forcepia* (*Forcepia*) from the deep-sea sponge grounds of Iceland & Greenland

In September 2022, a group of sponge taxonomists were invited to the Sandgerði Marine Station in Iceland to sort and identify sponges from the BioIce surveys and other surveys between Iceland and Greenland. Skeletal architecture and spicule morphology were investigated using a combination of light and scanning electron microscopy. As the specimens had been previously fixed in formalin, they were unsuitable for molecular analysis. A number of large, fan-shaped sponges belonging to the genera *Forcepia* (*Forcepia*) Carter, 1874 and *Iophon* Gray, 1867 were part of the collection. Amongst the large fans were specimens identified as *Forcepia* (*Forcepia*) *lundbecki* Van Soest & Hooper, 2020; two species of *Forcepia* (*Forcepia*) which are possibly new to science, *Iophon* cf. *piceum* and three species of *Iophon* which may also be new. On external appearance, some of these fan-shaped sponges could easily be mistaken for cup or fan-shaped *Phakellia* Bowerbank, 1862 or *Axinella* Schmidt, 1862 species, whilst others resemble *Poecillastra compressa* (Bowerbank, 1866). Fan-shaped sponges can be a major component of deep-sea sponge grounds, yet our knowledge of their taxonomy and the extent of convergent evolution of growth forms, even in the relatively well studied waters of the northeast Atlantic is still poorly understood. This highlights the difficulties with trying to identify and characterize deep-sea sponge communities based on ROV imagery alone. The prevalence of species that are potentially new to science also emphasizes the need for more taxonomic work on the deep-sea sponges of this region. The sponge collection held at the Icelandic Institute of Natural History has a valuable role to play in helping us to more accurately characterize these benthic marine ecosystems and to better understand species distributions, biodiversity and the interconnectedness between different deep-sea sponge grounds in the northeast Atlantic.

Talk 2

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Deep-sea sponges in deep Earth history: fossil record provides spectacular evolutionary evidence of the Hexactinellida

Hexactinellida constitute a well-defined monophyletic sponge phylum, known in the fossil record since Early Cambrian with its time of prosperity in the Late Cretaceous. However, the fossil record of sponges, including hexactinellids, is very variable. Isolated spicules are commonly found in many marine and also in some limnic paleoenvironments, but these remains are only of limited taxonomic and stratigraphic value. Siliceous sponges with rigid skeletons, Hexactinellida and "Lithistida" are commonly well-preserved and abundant, or even reef-builders, especially in the Late Mesozoic of Northern Europe. Special Lagerstätten "fossil windows" provide a unique view into the evolution and paleoecology of rarely preserved glass sponges with soft skeletons (Amphidiscophora and Lyssacinosida), which are today restricted to deep-water environments and are generally poorly known. The Upper Cretaceous Arnager Limestone of Bornholm (Denmark) is representative of such rare deposits of extraordinarily preserved non-rigid hexactinellids. These include the first fossil evidence of *Rossella*, a genus restricted to the Southern Ocean today (Brücker & Janussen 2005). Furthermore, early Paleozoic sponge fossils are found in some regions of Northern Europe and Skandinavia. Especially informative for the early Paleozoic evolution of sponges are some exclusive Lagerstätten of South China, including the first definitely articulated sponge fossils from Yangtze Platform (Yunnan) and Anhui. Fossil evidence combined with the (few available) molecular clock results demonstrate the very successful, eminently conservative evolutionary strategies of Hexactinellida.

Talk 3

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Asconema setubalense in Aviles Canyon System (Bay of Biscay), a community of sponges affected by human impacts

It is increasingly common for countries with coast, to preserve a part of their marine territory under different degrees of protection. The aggressions and destruction of habitats are constant and it is necessary to promote areas where deep-sea species can be perpetuated. This is especially necessary for vulnerable marine ecosystems (MVEs) that are much more fragile, less resilient and therefore more likely to disappear. In the Aviles Canyon System (ACS) after the work of the Spanish Institute of Oceanography in the last twenty years, it has been possible to map and detect benthic fragile communities that have been strongly impacted by fishing activities. This is the case of glass sponge, *Asconema setubalense*, Kent, 1870, a large species with a saccular, tubular or funnel-like shape, with thin walls that inhabits the depths of the North Atlantic, Arctic and western Mediterranean from 93 to 4270 m. The populations of this species in the Cantabrian Sea (Bay of Biscay) are abundant in the bathyal, and have been strongly impacted by the activities of trawling and bottom long line fishing. Particularly in ACS, transects have been made with non-invasive methods such as ROTV and ROV in the development of the ECOMARG, INDEMARES, INTEMARES and SponGES projects and it has been proven that due to these human activities specimens are damaged with significant mortality, breakage and abnormal or irregular growths that in many cases lead to sediment coating and subsequent death. The videos analyzed have allowed us to verify the impact on the populations, the large amount of fishing gear abandoned in the bottoms, as well as to characterize and describe the communities that live in this area so modified, which is the reason for this communication. Opportunistic species that colonize the benthos after impact are frequent, such as *Munida* spp., species of encrusting sponges such as *Hymedesmia* spp. and in a second phase, larger sponges may appear on the rocks, such as *Artemisina transiens*, *Geodia barretti* or *G. megastrella* as well as other structuring taxa as gorgonians, mainly *Callogorgia verticillata* which is also very affected by fishing activity.

Talk 4

DE VOOGD NICOLE J.[1,2] * & VAN SOEST ROB W.M.[1]
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Mesophotic and rariphotic sponges from (Klein)-Curaçao

Mesophotic coral reef ecosystems (MCE's) which occur at depths between 40-150m are of great importance, due to their potential for refugia and are known to be biodiversity hotspots. However, these ecosystems are still very much understudied, mainly due to technical constraints. With the advent of ROV's, technical diving and manned submersibles, MCE's have gained increased scientific attentions in recent year, especially in the Caribbean Sea. Sponges are, in general very abundant on MCE's and it is hypothesized, that sponges increase in biomass and diversity with depth down to 150m. However, to understand sponge community changes with depths, the diversity of sponges must be fully documented first. In the past decade, explorations to mesophotic depths with a manned submersible to the islands of Bonaire and Klein-Curaçao led to description of 13 new sponge species, showing the potential of mesophotic depth for species discovery. In the present study, we were able to make additional submersible-based surveys at depths between 90-309 depths at the island of Curaçao and Klein Curaçao and report on the sponge fauna and their ecological range extensions compared with earlier studies in the wider Caribbean basin. We collected 50 species, including 20 new records for Klein (Curaçao) of which so far, 2 are new to science including the Poecilosclerid *Hymenancora* sp. nov. possessing peculiar chiastosigma and the lithistid *Neophrissospongia* sp. nov. The survey included eight Hexactinallida sponges containing the elusive venusflower basket sponge *Heterotella pomponae* harbouring symbiotic shrimps. Several specimens of the rare *Dicytoplax lecus* were collected around 250-300m of depth and thought to be restricted to deeper waters (>700m). Earlier observations of these sponges restricted to the Bahamas including *Conorete pourtalesi* and now from Curaçao suggest that the majority of glass sponges are widely distributed in the Caribbean region. Other notable new records include *Caltropella lithistina,* & *Asteropus syringifer.*

Talk 5

PINHEIRO ULISSES[1]* & ANNUNZIATA BRUNO[2]
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How deep do you know about Brazilian Deep-Sea Sponges?

The history of Brazilian spongiology is intrinsically linked with the study of deep-sea sponges. Although the first species described from Brazil was the shallow-water sponge Darwinella muelleri (Schultze, 1865), it was for the deep environment that we had the first systematized collection. The Challenger Deep–Sea Expedition (1872-1876) provides Brazilians specimens resulting in the description of more than 40 species (Poléjaeff, 1883, 1884; Schulze, 1885, 1887a; Ridley & Dendy, 1886, 1887; Sollas, 1886a, 1888). In the 20th century, several oceanographic expeditions, notably Calypso (in the 1960s) and the Revizee project (1990s), provided plenty of specimens to the Brazilian Sponges Collections. In the 2000s, the majority of expeditions were conducted in the oil exploration areas, such as in the Potiguar Basin (Rio Grande do Norte and Ceará states) and in the Campos Basin (Espírito Santo and Rio de Janeiro states). This scenario seems to have created a bias in the knowledge of the Brazilian spongofauna, since the deep-sea sponges are as available as the shallow-water sponges. In this sense, the present work aims to analyze the bathymetric distribution of the Brazilian sponges in order to identify which of them are the true distribution gaps. A bibliographic survey of the occurrence of all 561 species of Brazilian marine sponges was carried out, of which it was possible to extract bathymetric data for only 476 so far. It was observed that 25% of the species could reach 100m deep, and 20% live exclusively in environments deeper than 100m. On the other hand, 44% of the species are exclusively Shallow-water species until 30m deep (shallow-water sponges) and 33% are distributed among intertidal and 99m deep.

Talk 6

RIOS PILAR*, BOZA CRISTINA, HERES PABLO, CALVO-DIAZ ALEJANDRA & CRISTOBO JAVIER
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Incrusting and small species sponges that increase the biodiversity in Capbreton Canyon

The Spanish part of the Capbreton Canyon System, in the Bay of Biscay, is one of the areas actually in study, to know if it could be a new marine protected area in the Cantabrian Sea and to be included in the Natura 2000 network. As a part of this research, integrated in the LIFE IP INTEMARES project, the ICB19 and ICB20 cruises of the Spanish Oceanographic Institute (IEO-CSIC) on board B/O RAMÓN MARGALEF were carried. The biological characterization through non-invasive visual systems, using different underwater vehicles and data collection using sampling techniques like rock dredge (RD), beam trawl (BT) and Smith McIntyre dredge, provides a knowledge of the biodiversity in the area. Sponge diversity were examined at 98-800 m depth on the sector of the Capbreton Canyon System, located in front of the Basque Country coast, between 3º0'W and 2º3'W in longitude and 43º30'N and 43º50'N in latitude. A total of 13 RD and 21 BT were analyzed for the presence and abundance of sponges. The results of this analysis include small and cryptic sponges whose substrate is mainly rocks. The presence of *Chelonaplysilla noevus* (Carter, 1876) and *Hymedesmia* (*Hymedesmia*) *paupertas* (Bowerbank, 1866) both frequent between 98-273 m in depth, were the most abundant. Species composition shows too the presence of the Genus *Halicnemia*, *Hamacantha*, *Desmacella*, *Cliona*, *Coelosphaera*, *Desmacella*, *Hymeraphia*, *Janulum*, *Melonanchora*. For some of these species we report the first occurrence in the Bay of Biscay, originally described from the close Celtic Seas.

Talk 7

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Revision of the boreo-arctic Atlantic and Mediterranean Tetillidae (Demospongiae, Spirophorina): new species and new genera

The Tetillidae Sollas, 1886 are massive spherical sponges 0.5-20 cm in diameter and are found worldwide. They are especially diverse in deep-waters of the North Atlantic, represented by a set of poorly described species from the late 18th or 19th century belonging to the genus *Craniella* and *Tetilla*. Consequently, taxonomists have overused the single name *Craniella cranium* (Müller, 1976) for specimens collected in the North Atlantic and the Mediterranean Sea. In shallow-waters, only *Cinachyrella tarentina* and *Levantiniella levantinensis* are known, both in the Mediterranean. We have obtained new *Craniella* specimens from the Norwegian/Swedish coast, the Norwegian/Greenland Seas, Rosemary Bank (off Scotland), Denmark Strait, Davis Strait, Brittany, Northern Spain and the Balearic Islands. In addition, *Cinachyrella* specimens (from the Azores, Morocco, Italy) and *Levantiniella* material (from Israel) has been examined. The material has been used for the partial sequencing of the cytochrome c oxidase subunit 1 (COI) and 28S (C1-C2 fragment). Type material of most species and some of their synonyms was also examined. Preliminary results point to at least four new species of *Craniella*, one new species of *Cinachyrella* and resurrection of four *Craniella* species. Two deep-sea "*Tetilla*" clades suggest the creation of two new genera.

Talk 8

DÍAZ JULIO A.[1]*, ORDINES FRANCESC[2], MASSUTÍ ENRIC[2] & CÁRDENAS PACO[3]

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From caves to seamounts: the hidden diversity of tetractinellid sponges from the Balearic Islands, with the description of eight new species

The sponge fauna of the Western Mediterranean is one of the most studied in the world. Yet sampling new habitats and a poorly studied region like the Balearic Islands highlights once again our limited knowledge of this group of animals. This work focused on tetractinellid sponges collected in several research surveys (2016-2021) on a variety of ecosystems of the Balearic Islands, including shallow caves, seamounts and trawl fishing grounds, in a broad depth range (0-725 m). Tetractinellid material from the North Atlantic, as well as type material, were also examined and re-described in this work. All species were barcoded with the traditional molecular markers COI (Folmer fragment) and 28S (C1-D2 fragment). A total of 36 species were identified, mostly belonging to the family Geodiidae (15 species), thereby bringing the number of tetractinellids recorded in the Balearic Islands from 15 to 39. Eight of these species are new: *Stelletta* sp. nov., *Penares* sp. nov1, *Penares* sp. nov2, *Geodia* sp. nov3, *Geodia* sp. nov3 and *Geodia* sp. nov4 from the Balearic Islands; and *Geodia* sp. nov5 and *Caminus* sp. nov. from the North East Atlantic. Also, *Geodia anceps* (Vosmaer, 1894) and *Spongosorites maximus* Uriz, 1983 become junior synonyms of *Geodia geodina* (Schmidt, 1868) and *Characella pachastrelloides* (Carter, 1876), respectively. *Stelletta dichoclada* Pulitzer-Finali, 1983 and *Erylus corsicus* Pulitzer-Finali, 1983 are reported only for the second time, since their description in Corsica in 1983. *Pachastrella ovisternata* Lendenfeld, 1894 is documented for the first time in the Mediterranean and its potential synonymy with *Pachastrella monilifera* Schmidt, 1868 is discussed in light of the molecular results.

Talk 9

DOMINGOS CELSO[1], RIOS PILAR[2], CRISTOBO JAVIER[2] * & XAVIER JOANA R.[1,3]

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The *phoenix* project – disentangling a species complex in the deep Atlantic

The identification of species is one of the first steps towards the protection of habitats and the management of regions of interest. However, many groups of animals, such as sponges, are extremely difficult to identify. Glass sponges (Porifera, Hexactinellida) are prominent in the deep sea where they build important structural habitats - sponge aggregations and reefs. Yet knowledge of their diversity and distribution is limited. The genus *Regadrella* Schmidt, 1880 was originally described from specimens collected the Caribbean Sea and currently encompasses 11 species, the majority of which occur in the Pacific Ocean. To date, the only *Regadrella* species reported for the Atlantic Ocean is *Regadrella phoenix* Schmidt, 1880, the type species of the genus. This species has been reported in the South Pacific, North Atlantic, the Caribbean Sea and in South Africa. The species lacks a precise diagnosis according to the Systema Porifera, as it allows for variation in the presence of different spicules, highlighting the inadequacy of the original description. In this study, we conducted a comprehensive literature review encompassing all existing records of *Regadrella phoenix*, compiling and comparing the morphological characteristics described in each reference to determine whether all these records can indeed be classified as *Regadrella phoenix*. In addition, we analyzed samples recently collected in the tropical Atlantic, Cantabrian Sea and the Azores region. The analysis of the 18 references, reveals that the majority of identifications were solely based on fragments, with very few providing comprehensive descriptions of the external morphology and spicules. All this variation in spicular composition suggests that *Regadrella phoenix* may constitute a species complex, and include several undescribed species. This is further supported by the fact that examined samples, while quite similar to *Regadrella phoenix*, have unique characteristics. The ongoing molecular work and the analyses of samples from other regions (including the type locality) will allow a redefinition of *R. phoenix* and describe other new *Regadrella* species from these regions.

Talk 10

XAVIER JOANA R.[1,2] *, CÁRDENAS PACO[3], SANTÍN ANDREU[1] & the SponBIODIV CONSORTIUM
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Delivering knowledge and tools for sustainable management and conservation of marine sponge biodiversity from genes to ecosystems – the SponBIODIV project

Sponges form highly-structured habitats (sponge grounds, gardens and reefs) that play key functional roles and deliver numerous ecosystems goods and services. They serve as habitat and nursery to numerous other species including commercially exploited fish, and bath sponges have been harvested for centuries for commercialization of their spongin skeleton, thus supporting local communities' livelihoods. They are also recognised as prolific sources of compounds with pharmacological potential, thereby providing additional societal and economic benefits to humankind. However, sponges and their habitats are increasingly threatened by human activities (e.g. fisheries, climate change, deep-sea mining, general pollution). Despite significant advances in recent years, knowledge of their biodiversity, distribution, biology and ecology is still sparse and largely fragmentary. This gap in knowledge integration hampers their inclusion in conservation frameworks, compromising the establishment of ecologically representative, interconnected and resilient networks of protected areas, and consequently the achieving of biodiversity targets and commitments. In this talk, we will present SponBIODIV, a project funded in scope of the European Biodiversity Partnership (Biodiversa+) that brings together an All-Atlantic and Mediterranean consortium of research institutions. SponBIODIV will use an interdisciplinary approach to build a common and enhanced knowledge base on the biodiversity, biogeography and connectivity patterns of sponges and sponge habitats across the Atlantic Ocean and Mediterranean Sea, from coastal areas to mesophotic and deep-sea ecosystems. Generated knowledge and tools will support the design of conservation and monitoring strategies, to ensure a better management and protection of sponge biodiversity, from genes to ecosystems, from national to European scales and beyond, in line with the global agenda for sustainable development.

Talk 11

ENRICHETTI FRANCESCO[1]*, TOMA MARGHERITA[1], BAVESTRELLO GIORGIO[1], COSTA GABRIELE[2], BERTOLINO MARCO[1] & BO MARZIA[1]

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Diversity and distribution of the bathyal sponge facies of the Ligurian Sea

The Mediterranean spongofauna is highly diversified, accounting for more than 700 species mainly reported from shallow waters. New technologies recently led to an increasing number of discoveries also in the deep sea. Two Ligurian bathyal campaigns (2017-2021) allow to provide here a taxonomical characterization of the deep spongofauna inhabiting canyons and seamounts (from 200 to 1825 m depth) and a description of the main sponge-dominated facies.

A total of 41 species are identified. The majority of them (62%) are characterized by miniaturized growth form (< 2 cm) and are generally associated with white coral frameworks. Large sponges account for 16 species, occasionally reaching high abundances and creating characteristic facies, especially in the upper bathyal (200-500 m). The fan-shaped sponge *Pachastrella monilifera* Schmidt, 1868 is a common species, forming high-density aggregations in the Deiva Marina Canyon (450 m) and on the St. Lucia Seamount (220 m). The volcano-like sponge *Characella pachastrelloides* (Carter, 1876) creates distinct facies on the Ulisse (500 m) and Occhiali (300 m) seamounts. A peculiar facies of the lollipop sponge *Stylocordyla pellita* (Topsent, 1904) is reported from the Penelope Seamount (480 m). Pseudo-encrusting species of intermediate size occasionally reach high abundances, as *Haliclona* (*Gellius*) cf. *bioxeata* on the Occhiali Seamount coral thanatocoenoses (320 m) and the hexactinellid *Tretodictyum reiswigi* Boury-Esnault, Vacelet & Chevaldonné, 2017 on seamounts rocks (450-520 m). Other characteristic species include *Leiodermatium pfeifferae* (Carter, 1873), *Atergia corticata* Stephens, 1915, *Phakellia* spp., and *Desmacella annexa* Schmidt, 1870. Aggregations of the hexactinellid *Farrea bowerbanki* Boury-Esnault, Vacelet & Chevaldonné, 2017 (Janua Seamount, 830 m) represent the only sponge-dominated facies of the lower bathyal (500-3000 m) found so far.

These findings are discussed considering the most updated international deep-sea habitat classification systems, while comparison with other basins allows to obtain information on their large-scale geographic distribution.

Talk 12

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Drivers of community composition in mesophotic sponge grounds in the Mediterranean coast of Israel

Sponge grounds are recognized as unique and vulnerable environments that require specific research attention and protection. By raising structural-complexity, sponge grounds provide habitats, refuge from predators and serve as nursery grounds for invertebrates and fish.

Off Israel's Mediterranean coast, several mesophotic sponge grounds (MSG) were discovered. These unique habitats are a biodiversity hotspot in the relatively species-poor Levant-Sea. In the last decade, we have been studying 15 of these MSG to evaluate their function, biodiversity, and the processes that shape their communities.

We conducted photographic surveys comparing sponge diversity, richness, percent coverage and environmental parameters of 15 pinnacles in five locations at 100m depths, to understand the relationship between the environmental determinants and sponge community composition.

We found that the MSGs are rich and divers, holding over 100 sponge species and morphospecies, of which 46 were collected and identified. These species belong to two families in the class Homoscleromorpha and 16 orders and 42 families of the class Demospongiae and two orders of the class Calcarea. The average richness in the mesophotic varied between 8 and 30 species/m2, and the average abundance varied between 16 and 90 sponge individuals/m^2.

Sponge communities differed significantly between the different locations and between pinnacles from the same location (NMDS, ANOSIM). The effect of the environmental variables was analyzed in RDA ordination; Depth, elevation, complexity, and the distance from the nearest pinnacle had a significant effect and explained 20% of the dissimilarity.

Along the rather impoverished Israeli coast, and in the face of climate change as well as other anthropogenic influences, that is already affecting sponge communities, these sponge grounds should be legally protected. And indeed, the results of this study are already being used by the Israel National Park Authority and several government offices in promoting the establishment of permanent marine reserves.

Talk 13

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Biodiversity of Mozambique rock sponges

The Comoro Islands are of volcanic origin and known for their high marine biodiversity, with a wide range of habitats including coral reefs, seagrass meadows, and mangroves that support a variety of marine species including sponges. However, the biodiversity of the Comoro Islands is also threatened by anthropogenic activities, including overfishing, illegal fishing, pollution, habitat destruction, and climate change. To date, there has been no research conducted on the diversity of (rock) sponges in this region. In 2017, the French Oceanographic Campaign BioMAGlo (Biodiversité Mayotte-Glorieuses), led an expedition around the Comoro Islands, focused on the collection of deep-water Porifera. Here, we describe several novel species and one new family within the order Tetractinellida and provide DNA barcodes. Phylogenetic relationships of these novel species, new records and the position of the new family are discussed and compared with other material from the Atlantic, the Mediterranean and the Pacific. The new species represent the six genera *Corallistes*, *Gignouxia*, *Macandrewia*, *Isabella*, *Leiodermatium* and *Microscleroderma*. Phylogenetic reconstructions suggest the position of the new family within the proposed tetractinellid suborder, that awaits formal description. Moreover, the generic affiliation of the new species is confirmed by independent markers of mtDNA and rDNA. All in all, this integrative taxonomy study enhances our understanding of sponge biodiversity in the Comoro Islands, underscoring the significance of marine conservation measures such as the establishment of marine protected areas and sustainable management practices. The findings of novel sponge species and a new family will contribute to ongoing efforts to protect and sustainably manage the marine biodiversity of the Comoro Islands.

Talk 14

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Characterization of *Iophon* spp. (Porifera, Demospongiae) in association with the brittle stars genus *Ophioplinthus* (Echinodermata, Ophiuroidea) in the Southern Ocean

Sponges represent one of the most important components of the Antarctic zoobenthos, with over 350 known species found on hard and soft substrata, where they increase habitat heterogeneity. Due to hard substrates scarcity in the Antarctic sea bottom, sponges often show peculiar morpho-functional adaptations required to thrive on soft bottoms or to colonize biotic secondary substrates. In these cases, the associations are referred to as ectosymbioses. Symbiotic interactions represent important ecological and evolutionary drivers, often promoting speciation through host shift. Extensive investigations into benthic biodiversity in the Southern Ocean and the ecological role of symbiotic interactions has been recently re-evaluated.

In this context, particularly intriguing is the ectosymbiontic relationships established between brittle-stars of the genus *Ophioplinthus* Lyman, 1878 and the demosponge genus *Iophon* Gray, 1867. Even though this interaction is widely reported in the Antarctic scientific literature, detailed information regarding the partners is still limited. In this work we analysed the samples available at the Italian National Antarctic Museum (MNA, Section of Genoa) to classify the partners of the association at the finest possible level. Thanks to these new materials we report the first record of *I. flabellodigitatum* Kirkpatrick, 1907 on *O. brevirima* (Mortensen, 1936) and of *I. unicorne* Topsent, 1907 on *O. gelida* (Koehler, 1901). Out of the 166 *Ophioplinthus* specimens examined in this work, the significant proportion of 57.8% were found to be engaged in symbiotic associations, highlighting the importance of this interactions within the Antarctic brittle star population. In the specimens studied, the presence of *Iophon* has different degrees of development but numerous specimens of *O. gelida* did not exhibit this association, while all the *O. brevirima* specimens present the symbiosis. Our analysis also reported a difference between the external morphology of the two *Iophon* sponge compared to the original description by Kirkpatrick of 1907.

Talk 15

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Long-term survey of sponge biodiversity in a Mediterranean cave with bathyal affinities

Since 1991, a submarine cave of the Marseille region, the 3PP cave (La Ciotat), is one of the main sites of research on cave ecosystems in the world. Unlike most of the karstic systems of the Mediterranean Sea, this cave presents a descending profile from the entrance to the back, trapping cold winter water all year round. The 3PP cave is more than 100 m long, the last rays of light disappearing after a turn, 50 m from the entrance. Therefore, at only ca. 20 m depth and after 50 m of penetration inside the cave, the experience is much like entering a bathyal enclave within the coastal zone. This local peculiarity has been a source of several zoological oddities.

In 1991, the first cave-dwelling population of a hexactinellid sponge, *Oopsacas minuta* Topsent, 1927 was found there in abundance (up to 100 ind/m²) in rather shallow depths (18-24 m). Later on, a sponge devoid of choanocytes became one of the most incredible discoveries in sponge science. Belonging to Cladorhizidae, then exclusively bathyal-abyssal, this species appeared to be the first demonstrated case of carnivory among Porifera. After the formal description of *Lycopodina hypogea* (Vacelet & Boury-Esnault, 1996), descriptions of carnivorous sponges have been boosted, all of them being bathyal, abyssal or hadal.

These two amazing findings motivated an in-depth exploration of this cave ecosystem, but the biodiversity inventory has never been completed. So far about 100 sponge species have been inventoried from 3PP cave, but several new descriptions are pending. In addition, the status of deep-sea mesocosm of the 3PP cave has also allowed the initiation of various works in functional and evolutionary ecology. Here, we present the current state of our knowledge, and on-going research projects, together with some prospects for the coming years.

Talk 16

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The taxonomic interpretation of skeletal features: warnings from sponge silicon physiology

Siliceous sponges need to consume silicate to produce their silica skeletons. Since the late 1990s, silicate consumption kinetics obtained experimentally for six demosponges and one hexactinellid species have concurred that modern sponges are chronically limited by silicate availability. This situation derives from the fact that diatoms are more efficient competitors that consume silicate faster to produce their own skeleton. Massive consumption by diatoms lowers the silicate concentration in most marine habitats to levels at which sponges can barely process it for skeletal growth.

Silicon limitation is expected to adversely affect the formation of the sponge skeleton and, therefore, is also expected to affect our interpretation of the skeletal traits at some point. This is not a trivial matter, as sponge skeletons are important tools still used by sponge taxonomists for a primary identification of sponge species, which is subsequently linked to molecular markers. However, there is still little information to assess at what level the "chronic limitation by silicon availability" is affecting the sponge skeleton and how it would, in turn, affect the way taxonomists describe and interpret the variability of the skeletal features for species discrimination.

In this study, after culturing sponges of several species (*Crambe crambe, Tethya citrina, Agelas oroides, Petrosia ficiformis*) for months or years in silicate concentrations above those in their natural habitat, we have observed a number of important skeletal differences within each species as a result of silicate availability. The findings, among other things, allow us to derive some basic guidelines that taxonomists should consider to more confidently discriminate within-species skeletal variability from skeletal differences between sister species.

Talk 17

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Lithistid sponges from submarine caves of the eastern Mediterranean Sea: hidden diversity and false endemicity?

Recent exploration in numerous marine caves of the Eastern Mediterranean Sea brought to light several taxa of lithistid sponges, including specimens and aggregations of considerable dimensions. Lithistids were found in 15 sea caves spanning from Zakynthos Island in the Eastern Ionian Sea to Cyprus in the Levantine Basin. Samples from caves of the Aegean Sea belonged to the taxa *Neophrissospongia endoumensis* Pisera & Vacelet, 2011, *Microscleroderma lamina* Pérez, Vacelet, Bitar & Zibrowius, 2004, *Gastrophanella phoeniciensis* Perez, Vacelet, Bitar & Zibrowius, 2004, two different corallistids (probably new taxa), and an undescribed phymaraphiniid (reported for the first time in the Mediterranean Sea). Marine caves of Cyprus revealed three lithistid taxa, i.e., *Leiodermatium* sp., *Aciculites* cf. *mediterranea* Manconi, Serusi & Pisera, 2006 and *Microscleroderma lamina*. The above taxa formed dense facies and aggregations inside caves with internal freshwater springs, just below the superficial freshwater layer. We believe that these hypersilicified sponges are benefited by the higher water silicate content, delivered by freshwater, as shown by measurements in marine caves of Crete. In addition, a number of small encrusting specimens from Aegean and Ionian caves with limited freshwater inflow had malformed desma skeleton, rare or absent ectosomal spicules, and often without microscleres (probably corallistids and/or rhizomorine taxa), making their precise determination difficult. We assume that deficient spiculation is caused by very low silica levels in these caves leading to malformed/incomplete skeleton development. The presence of at least six (possibly eight) different taxa of lithistids in 15 marine caves (some widely separated geographically), including taxa known only from the Western Mediterranean (or even Atlantic Ocean) and Lebanon, contradicts with current scientific ideas about their diversity, distribution and origin. Herein, it is shown that targeted samplings and taxonomic identification based on spicules can overcome some serious misidentifications, underestimations of diversity and false patterns of endemism.

Acknowledgements
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the Southeastern Aegean Protected Areas of the Natural Environment and Climate Change Agency (NECCA) for their help and support during fieldwork. Material from Cyprus was collected in the framework of the project "Mapping and evaluation of *Posidonia* meadows and other important marine habitats under the European Habitats Directive (92/43/EEC), in the coastal waters of Cyprus", funded by the Department of Fisheries and Marine Research (DFMR) of the Republic of Cyprus (25% National Resources, 75% European Maritime and Fisheries Fund - EMFF)". Part of the material from the Aegean Sea was collected in the framework of the project "Support of the Dodecanese Protected Areas Management Body for the implementation of management measures for protected areas, species and habitats (MIS 5034797)", included in the NSRF 2014-2020 Operational Programme "Transport Infrastructure, Environment and Sustainable Development" and co-financed by Greece and the European Union.

Talk 18

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Diversity of the class Homoscleromorpha from Fernando de Noronha Archipelago, Northeast Brazil

With only 135 species recorded in the world, the diversity of the class Homoscleromorpha is still underestimated. On the Brazilian coast, for example, only 14 species are known, five of them registered to Fernando de Noronha Archipelago (FNA). The objective of this study was to describe 11 species of Homoscleromorpha from FNA. The sponges were collected by SCUBA diving in three submarine caves (Sapata Cave, Ilha do Meio Cave and Pedras Secas tunnel) and a tide pool, photographed in situ, and fixed in 70% ethanol, glutaraldehyde, and CHAOS for morphological, cytological, and molecular analysis. Morphological analyses were made using classical procedures for sponges. DNA was extracted by the phenol-chloroform method, and the mitochondrial genes COX-1 and CYT-B were amplified. Among the species found, four were already known to FNA and seven are new species to science. *Plakortis insularis* and *Plakinastrella microspiculifera* had already been recorded to FNA. *Oscarella zoranja*, from Eastern Caribbean, and *Plakortis microrhabdifera,* from Atoll das Rocas, are being registered for the first time in FNA. The new species are *Plakina* spp. nov. 1, 2, and 3; *Plakinastrella* spp. nov. 1 and 2; *Plakortis* sp. nov., and undescribed aspiculate Plakinidae. *Oscarella zoranja, Plakortis insularis, Plakinastrella microspiculifera,* and six of the new species were found in the semi-obscure zone of Sapata Cave and Ilha do Meio Cave. *Plakortis microrhabdifera was* found outside of both caves and at the Pedras Secas tunnel. *Plakina* sp. nov. 3 was found under boulders at Caieras beach, and it is the only species reported to a shallow water tide pool. So far, we upgraded the knowledge of Homoscleromorpha biodiversity to 14 species in FNA, to 22 on the Brazilian coast, and to 142 species in the world.

Talk 19

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Cave-dwelling calcareous sponges (Porifera: Calcarea) from Marquesas Archipelago, French Polynesia

The Marquesas Archipelago (MA) has numerous submarine caves. These caves present different geomorphologies and rich biodiversity of marine invertebrates dominated by sponges. Although calcareous sponges are known to be abundant in cryptic habitats, only two out of the five Calcarea species reported from Marquesas were collected in caves and crevices so far. Hence, our objective was to study the diversity of the cave-dwelling calcareous sponges from the MA. In the present work, 18 sponges were collected in semi-dark or dark habitats, such as tunnels and underwater caves, most of them being lava tubes located between 10 and 35 m of depth. Through morphological and molecular (ITS and C-LSU) analyses, five species were identified, of which four are new to science, including one new genus: *Borojevia* "incrustans" sp. nov., *Bidderia* "lobata" sp. nov., *Leucascus* "polynesiensis" sp. nov., and "*Tuhunella cavernicola*" gen. nov. sp. nov. In general, sciaphilic sponge communities are different from those inhabiting the adjacent rocky shores. Indeed, considering the Calcarea from the French Polynesia, *L.* "polynesiensis" sp. nov. was the sole species found both inside and outside caves. *Murrayona phanolepis* Kirkpatrick, 1910 was the single species previously reported from submarine caves in the MA and, together with the other three new species, was found exclusively in this habitat. Nevertheless, *M. phanolepis* is a widespread species occurring over 12,000 km of distance, which might represent a relictual distribution. Even though the number of species for the region is still underestimated, it is noticeable that the French Polynesian submarine caves seem to harbour a unique diversity of calcareous sponges.

Talk 20

MURICY GUILHERME[1,3]*, LAGE ANAÍRA[1,2], SANDES JOANA[1], KLAUTAU MICHELLE[2], PINHEIRO ULISSES[4], LAPORT MARINELLA[5], OLIVEIRA BRUNO[6], PEQUENO CAROLLINE[1]& LOPES MATHEUS[2]

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Sponge communities of submarine caves and tunnels in Fernando de Noronha Archipelago, Northeast Brazil

Submarine caves are important reservoirs of rare and relict sponges, but there is little information about marine caves in Brazil. In this study, we describe three submarine cavities from Fernando de Noronha Archipelago, Northeast Brazil, and their sponge communities. Sapata Cave is 15 m wide and 30 m long and mostly 12–18 m depth, with a wide semi-obscure room near the entrance that becomes narrower and forms a dark chimney closed at the top, at 5 m depth. Ilha do Meio Cave is smaller and shallower, from 5–10 m depth, but is followed by a narrow passage 25 m long that leads to a totally dark second room, 5–8 m wide. Pedras Secas tunnel is 3-5 m wide by 15 m long, at 18 m depth, opened at both extremities. It has only a semi-obscure zone with high water movement. The sponge communities in the semi-obscure zone of the three cavities are very rich and dominated by Homoscleromorpha (*Oscarella*, *Plakortis* and *Plakinastrella*) and Demospongiae (*Ectyoplasia*, *Spirastrella*, Haplosclerids), but Calcarea are also diverse (especially *Ascandra* and Clathrinidae). The intermediately obscure zone of both caves, 15–30 m inside the cave, is dominated by a "lithistid" sponge (*Gastrophanella*), thinly encrusting Spirastrellids, and small undescribed Homoscleromopha and Calcarea. The totally dark zone in Ilha do Meio Cave is almost azoic, with only a few spirastrellids, one calcarea, polychaete tubes, and some crustaceans. Pedras Secas tunnel has very abundant sponges, of mainly the same species of the semi-obscure zones of the caves, but not those of the darker zones. So far, over 30 sponge species were found in these submarine cavities in Fernando de Noronha. Several of these species are new to science and some contain previously unknown bacteria with interesting pharmacological activities, that are currently under investigation.

Talk 21

PICTON BERNARD[1]*, MICARONI VALERIO[2], SCHUSTER ASTRID[3], MORROW CHRISTINE[4], STREHLOW BRIAN WILLIAM[3], CANFIELD DONALD EUGENE[3]

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Molecular insights into the genus *Eurypon* Gray, 1867 (Raspaillidae: Axinellida)

Intensive surveys of encrusting sponges by SCUBA diving at several sites around Britain and Ireland, but with particular emphasis on Lough Hyne in southwest Ireland has resulted in the discovery of a number of undescribed species which fit the definition of *Eurypon*. They have different colours and surface appearances, but similar spiculation and simple skeletons. The specimens were photographed *in situ* then a small fragment was removed for morphological analysis using light and scanning electron microscopy and molecular analysis using 28 rRNA and COI barcodes.

Molecular data suggests the genus is polyphyletic and distributed across 2 different orders. There are two main groups of *Eurypon* within the Raspaillidae (Axinellida) and *Eurypon* cf. *viride* (Topsent, 1889) clusters within Biemnida. It is suggested that within Raspaillidae the transition from encrusting to erect growth forms and vice-versa has occurred on multiple occasions, and that similar architecture is frequently a convergent character.

Talk 22

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Demospongiae from submarine caves of Fernando de Noronha Archipelago, Northeast Brazil

Sponges are among the most diverse groups of benthic invertebrates at Fernando de Noronha Archipelago, Northeast Brazil. However, the sponges from the submarine caves of the Archipelago are still poorly know, with only five species of Demospongiae recorded. In this study, we improve the knowledge about the biodiversity of cave-dwelling Demospongiae from Fernando de Noronha Archipelago, through the collection, description and identification of specimens based on morphological and molecular characters. The sponges were collected in two submarine caves (Sapata Cave and Ilha do Meio Cave) by SCUBA diving, photographed *in situ*, and fixed in 70% ethanol and CHAOS for morphological and molecular analysis. Dissociated spicule mounts, SEM preparations, and skeletal sections were made using classical procedures for Demospongiae. DNA was extracted by the phenol-chloroform method, and the mitochondrial gene COX-1 and the ribosomal gene 28S (D3–D5 region) were amplified and sequenced using the primers LCO1490, HCO2198, NL4F and NL4R. A total of 48 specimens of Demospongiae was collected, belonging to 21 species. Eleven of these are probably new to science, belonging to the genera *Agelas*, *Batzella*, *Ircinia*, *Dysidea*, *Thorecta*, *Xestospongia*, *Haliclona, Neopetrosia*, *Oceanapia* and *Jaspis*. They all occur in the semi-obscure zones of the caves, with exception of *Ircinia* sp., which was found at the cave entrance. Ten species are already known, of which four were previously reported from caves (*Gastrophanella cavernicola, Dercitus* (*Stoeba*) *latex, Diplastrella megastellata* and *Ectyoplasia ferox*) and six are reported for the first time from the submarine caves of Fernando de Noronha (*Agelas dispar*, *Amphimedon compressa*, *Chondrosia collectrix*, *Dragmacidon reticulatum*, *Spirastrella hartmani* and *Topsentia ophiraphidites*). The molecular diversity of these species is currently under investigation. This study increased from five to 22 the number of species of Demospongiae known from submarine caves in Fernando de Noronha Archipelago.

Talk 23

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Filling the knowledge gaps in the Webbnesia marine diversity: The Madeiran shallow-water sponge fauna

Despite few pioneering works on the late XIX and early XX century, the poriferan fauna of Madeira had remained mostly unexplored until today, being one of the least studied within the eastern Atlantic archipelagos. After an exhaustive analysis of both new material collected by SCUBA diving as well as a thorough literature research, a total of ca. 130 sponge species are now known to occur from Madeira archipelago. Yet this is still most likely an underestimation of its real sponge diversity. Among the new additions to its sponge fauna there are: i) first records of Homomscleromorpha, with at least three *Oscarella* species, some rare species with Mediterranean (*Spongosorites* cf. *cavernicola*) and Senegalese (*Hymedesmia (Hymedesmia) senegalensis*) origin, ii) new genus and iii) several potential new species, including a new species of *Hemimycale*. Currently, most sponge information available for the island is still skewed towards shallow and subtidal fauna. Other less accessible environments, such as caves or the deep sea, still remain largely unexplored. Finally, there is supporting-evidence to suspect that *Chalinula nigra*, might be a recent introduction to the island, which may have been facilitated by marine transit.

While this work contributes towards our better understand of the island's poriferan diversity, there is still need for a quantified and objective faunal baseline, distribution, population size structures for most Madeiran sponges, particularly in the mesophotic zone and the deep-sea as for the Selvagens Islands.

POSTERS

POSTER 1

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Quantitative assessment of sponge communities in marine caves of Dugi Otok Island (Croatia, Adriatic Sea)

Marine caves support rich biodiversity with sponges presenting an important functional role as ecosystem engineers and constituting the most representative colonizers of their darker interior. Although plenty of marine caves have been reported on the Croatian coastline, they are mostly qualitatively studied. In the current study, one semi-submerged and three fully submerged marine caves of Dugi Otok Island (Adriatic Sea, Croatia) were quantitatively assessed for their benthic communities with an emphasis on sponge assemblages. In total, 175 photographic quadrats (25 x 25 cm) were collected and analyzed from one tunnel-shaped and three blind-ended caves reaching the maximum depth of 13.5 meters. Quadrats were photographed on the cave walls, along the horizontal axis, covering the entrance, semidark and dark zones of the caves. Sponge taxa were identified to the lowest possible taxonomical level and their surface coverage was calculated using PhotoQuad software. Sponge assemblages dominated in the semidark zone of all caves and in the dark zone of one cave. Their maximum percentage of coverage reached 89% in a single photoquadrat. Thirty-nine sponge taxa were identified in total, including two Calcarea, four Homoscleromorpha and 33 Demospongiae. Sponge species richness based on the quadrat analysis for the four studied caves ranged between 25 and 31 taxa. *Spirastrella cunctatrix* Schmidt, 1868 showed the highest coverage at the entrance zone of all caves, reaching a maximum value of 32% in a single quadrat. The same species, as well as *Diplastrella bistellata* (Schmidt, 1862) and *Thymosiopsis cuticulatus* Vacelet & Pérez, 1998 dominated in the semidark and dark cave zones reaching the coverage of 52, 50 and 30% in a single quadrat, respectively. Future analysis of fifty-four sponge tissue samples, collected for morphological and molecular identification is expected to reveal a more extensive sponge species list of the studied caves and shed more light on their assemblages.

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POSTER 2

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Sponge fauna of mesophotic bioconstructions along the Apulian coasts (Southern Italy, Mediterranean Sea)

Calcareous bioconstructions that develop in the mesophotic zone are characterized by unique ecological features and high species diversity. These habitats are important biodiversity hotspots and play a crucial role in ecosystem functioning, providing ecological niches and refuge. In the Mediterranean Sea, scleractinians and bivalves take on the role of key reef builders in the invertebrate mesophotic bioconstructions, creating complex habitats and providing a place for a diverse associated benthic fauna. Sponges are significant components of these biogenic assemblages, as they participate in bioconstruction and bioerosion processes within the concretions, as well as nutrient cycling, and serve as important environmental engineers. Nevertheless, there is currently a lack of information on both the structuring and associated species of these bioconstructions. By analyzing the taxonomic composition, distribution and percentage covering of the Porifera fauna, the present study aims to increase our understanding of mesophotic communities. The analyses were conducted in six areas along the Apulian Adriatic coast (SE Italy). Samples collection was carried out between 40 m and 55 m depth by SCUBA divers. At each station, underwater photographs (n=30) were taken to estimate the sponge covering values. A total of 138 taxa of Porifera were identified, 109 of which were found in the oyster mesophotic bioconstructions, and 79 were present in the scleractinians mesophotic assemblages. *Plakortis simplex*, *Acanthella acuta*, *Axinella verrucosa*, *A. damicornis*, *Haliclona mediterranea* and *Raspaciona aculeata* were present in all the studied areas. Shannon diversity index of sponge communities was higher at the scleractinian reefs (2.19 *vs* 2.53, t-test, $p<0.03$) while covering was higher at oyster reefs (~23.82% *vs* ~16.02%, $p>0,05$). The sponge community described in the present study highlights the uniqueness of mesophotic bioconstructions. Understanding the biodiversity patterns of sponge fauna within mesophotic bioconstructions is essential for effective conservation and management strategies. The fragile nature of these habitats, combined with increasing anthropogenic pressures, highlights the urgency of studying and protecting these unique ecosystems. Our results emphasize the need for continued research efforts to ensure the preservation of these invaluable ecosystems and their associated biodiversity.

POSTER 3

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Clarifying the status of *Raspaciona aculeata* and *Raspailia aculeata*

Topsent erected *Raspaciona aculeata* for *Raspailia aculeata*, (=*Halichondria aculeata*, Johnston, 1842) but he based his description of a bright red encrusting sponge on material from the Mediterranean, which contrasts with the brown sponge described by Johnston, with a type locality in England. We collected specimens from the UK and Ireland, as well as the Mediterranean, and compared these with the type material of Johnston, and the description given by Topsent . *28S rRNA* sequences were obtained from samples matching the descriptions of *Raspaciona aculeta* and *Raspailia aculeata* and results were used to construct a RaxML genetree. The genetree shows that *Raspailia aculeata* clusters closely with *Eurypon clavigerum* whilst *Raspaciona aculeata* clusters closely with *Eurypon curvoclavus*. DNA analysis also returned a difference of 9% between these two entities on the *28S* D1-D2 region indicating they should be considered as separate. Based on our results, we propose to resurrect *Raspailia aculeata* and amend the distribution records for this apparently northern species. A new name is required for the bright red Mediterranean species *Raspaciona aculeata*. *Eurypon gracile* (Bertolino, Calcinai & Pansini, 2013) described from the Mediterranean has several notable similarities to *Raspaciona aculeata* and merits further examination of type material in order to confirm whether these are conspecific.

POSTER 4

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Remarkable sponge communities in red coral banks of the North Aegean Sea

The Aegean Sea is the most well-studied ecoregion about sponge diversity in the Eastern Mediterranean. However, most studies have been carried out within conventional diving depth limits (0-30 m) or with trawl nets on soft substrates. Mesophotic sponge communities on hard substrates remain essentially unexplored. In this study, benthic biodiversity on red coral banks was assessed with two small-sized Remotely Operated Vehicles (ROVs) at a depth of 42-64 m in the framework of the GFCM Research Programme on Mediterranean Red Coral. In total, eight ROV dives were conducted, covering an area of 922 m^2. In addition, two deep SCUBA dives were performed between 50 and 60 m. Species identification was based on the analysis of videos, photographic material and observations reported by scientific divers. A total of 28 sponge taxa (27 Demospongiae and one Calcarea, belonging to 21 families and 16 orders) were identified. The most abundant sponges belonged to the genus *Axinella*, followed by *Agelas oroides* (Schmidt, 1864), *Spirastrella cunctatrix*/*Crambe crambe*, and *Aplysina* sp. The most common species was *Axinella polypoides* (Schmidt, 1862), with almost 1200 specimens observed, being the main structuring organism in the surveyed area. However, many axinellids were too small to be identified based only on video material. While the first three taxa were present along all transects, *Aplysina* was observed mostly on a biogenic reef constructed by the bivalve *Neopycnodonte cochlear* (Poli, 1795). Another interesting finding was the first known record of *Haliclona poecillastroides* (Vacelet, 1969) in Greek waters. These early results show the importance of sponges as structuring taxa in the mesophotic zone of the Eastern Mediterranean, unlike in the Western basin, where the main structuring organisms in this bathymetric range are usually anthozoans. Further studies are required to gain a better understanding of mesophotic sponge gardens in this region.

Acknowledgments

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POSTER 5

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Sponges associated with Antarctic stylasterids (Cnidaria, Hydrozoa) from the deep Ross Sea: what's new?

In 2017, during the XXXII Antarctic campaign on board R/V *Italica*, in the context of the PNRA research project GRACEFUL (PNRA16_00069), several deep (670-1022 m) remotely operated vehicle (ROV) explorations in the Ross Sea documented wide areas of thanatocoenosis and scattered living colonies of stylasterids. These aggregations of stylasterids create a secondary substrate defined as a 'deep marine animal forest' that supports a high biodiversity of associated sponges. A total of 228 sponges, belonging to 38 species, was recorded attached on *Inferiolabiata labiata* (Moseley, 1879) fragments. The most abundant species is *Iophon radiatum* Topsent, 1901, with 47 specimens, followed by *Clathrochone* cf. *clathroclada* (Lévi & Lévi, 1982) with 24 specimens and *Clathria paucispicula* (Burton, 1932) with 17. Ten species are first records from the Ross Sea, one species (*Halichondria* (*Halichondria*) *cristata* Sarà, 1978) represents a first record from Antarctica, and other 9 species are probably new to science.

Very low levels of coral coverage by sponges were found despite the large number of species. On average, we estimated the presence of 2 species per fragment of *I. labiata* with a maximum of 8 species on a single colony fragment. All the sponge specimens were very small and did not exceed 5 cm^2, while 81% of the sponge samples ranged between 0.003 - 0.5 cm^2. In fact, these stylasterids represent an available secondary substrate, but being dead, they are prone to be covered by bottom sediments, while filter-feeding epibionts usually prefer living and elevated substrates.

Data from our surveys indicated a rich and diverse sponge fauna associated with stylasterid thanatocoenosis in deep Antarctic waters, in line with the known levels of diversity of this region.

POSTER 6

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New records of sponges associated with siliquariid molluscs from the Indo-Pacific Ocean

Siliquariidae family represents a small group of Caenogastropoda molluscs that can be found fixed on hard substrates or, as in the genus *Tenagodus* Guettard, 1770, obligatorily dwelling within the body of sponges of the class Demospongiae.
Despite this obligatory interaction, references to symbiosis in literature are relatively scarce, due to the rarity and elusiveness of these partnerships. The association does not appear to be strictly species-specific, although only a limited number of sponge families are known to host these molluscs.
Pansini et al. (1999) and Bieler (2004) are the only two authors who accurately described the details of this symbiosis. Both highlighted the perfect connection between the sponge's aquiferous system and the filter-feeding apparatus of Siliquariids. This allows the mollusc to convey and discharge self-drained water into the sponge incurrent canal system.
The aim of this work was to investigate the association, with a particular focus on the involved sponge's characterization.
A total of 29 samples from the Philippines and New Caledonia, collected between 1978 and 1993 at depths ranging from 90 m to 550 m, were analyzed. Sponge morphological characterization was carried out using the standard method.
We reported the presence of Demospongiae belonging to 5 genera: *Topsentia* Berg, 1899; *Spongosorites* Topsent, 1896; *Erylus* Gray, 1867; *Penares* Gray, 1867 and *Discodermia* du Bocage, 1869. These genera align with those already reported by Pansini, while Bieler also mentions *Siliquariaspongia* Hoshino, 1981 and *Thrombus* Sollas, 1886, not present in our samples. Such sponges are mainly encrusting or with a massive habit, nearly completely covering the shell. As far as porifera are concerned, symbiosis is not obligatory and, in fact, all sponge species involved can also lead to a free-living existence.
Additionally, a literature analysis suggests that the growth form and color of sponges may be strongly influenced by the presence of Siliquariids.

POSTER 7

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Taxonomic revision of *Sycettusa* Haeckel, 1872 from the Arctic deep-sea

The genus *Sycettusa* comprises several species with high morphological similarity, most of them defined by inaccurate descriptions from the 19th century, lacking details for a reliable taxonomic identification. The present work aims to revise the deep-sea Arctic species of *Sycettusa* (*S. kuekenthali* and *S. nitida*) and three other shallow-water morphologically similar species (*S. lanceolata*, *S. thompsoni* and *S. glacialis*). Type material deposited in different institutions was accessed for species redescription based on a morphological approach. Slides (spicules and sections) of additional material were prepared for some species following standard procedures. Morphological differences among *S. kuekenthali* (from Svalbard), *S. lanceolata* (from Murman Coast and White Sea) and *S. thompsoni* (from eastern Canada) were not sustained upon closer examination. We found that relevant shared features were not addressed in the original descriptions of these species, such as a large variation in shape and size of the atrial spicules (especially the length of apical actines) and the presence of spines in the diactines. Therefore, the three species either evolved very slowly their morphological characters or represent only one species, in which case should be synonymized. These hypotheses will be further checked through molecular analyses. If there is only one species, *S. kuekenthali* would be a widely distributed Arctic species, both geographically and bathymetrically (<912 m). Regarding *S. nitida* (<550 m), a species from Norway, it can be easily differentiated from *S. kuekenthali* by spicule shape, however, it is closely related to *S. glacialis*, from Greenland. The main difference between them is the presence of diactines only in *S. nitida*, although these spicules are not abundant. Overall, the redescription of the Arctic *Sycettusa* species revealed morphological characteristics overlooked in the past, as a first step towards better understanding the diversity of this genus in the Arctic.

POSTER 8

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Identification of poorly known deep-sea sponges from seamounts of the Azores Region

The diversity of deep-sea sponges along the Mid Atlantic Ridge (MAR) in the North Atlantic and from near-ridge seamount chain complexes under the Azores triple Junction Plateau is still poorly understood. Poriferans from the Azores region were systematically studied during the 19th century. However, recent research using contemporary methods and technology is only limited to certain groups, such as Hexactinnelids and "lithistids". The characterization of sponge assemblages (composition, structure, bathymetric and geographical distribution) from the Azores comes from the initial historical oceanographic expeditions (e.g. Prince Albert Monaco, Seamounts I Exp.), which collected sponges by dredging the seafloor at bathyal areas of the MAR and on islands slopes. During that period, the prime effort in collecting and identifying Prince Albert of Monaco's campaign material was undertaken by Emile Topsent. This magnificent masterpiece represented the first contribution to improve the knowledge of Porifera in the Azores region, and the basis for all the subsequent research, once he described several new species to science and established the Porifera species census for the region. However, some of the species were not comprehensively described since only small fragments were available. Crossing information of historical records with material obtained from recent expeditions, especially those that use seafloor imagery, is fundamental for ecological studies (distribution, abundance, species associations). The present work aims to add more detailed and standardised information about in-situ and ex-situ morphology, as well as spicules (using optical microscopy imaging techniques) of rare and/or poorly known species of the Azores based on comparisons with previous historical descriptions. Although still requiring confirmation with molecular methods, preliminary descriptions of new records, some of which may represent new species, have been performed. By improving the scientific knowledge of this fauna, this work will provide new insights into the biogeography of mid-Atlantic bathyal areas and a contribution to the management of deep-sea ecosystems.

POSTER 9

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Rare and new *Spongosorites* species from Eastern Mediterranean marine caves

Marine caves harbor approximately half of the Mediterranean sponge diversity, and therefore have been characterized as "sponge biodiversity reservoirs". Sponges are among the most abundant taxa within Mediterranean caves, and have received a lot of attention by marine cave researchers during the past decades. Nevertheless, there are still important gaps in the study of their taxonomy and geographical distribution. One of the regions with high potential for finding new cave-dwelling species is the Aegean Sea (Eastern Mediterranean), due to the numerous cave systems along its rocky coasts and islands. The demosponge genus *Spongosorites* Topsent, 1896 appears to be prevalent in cave environments. Three of the five species known in the Mediterranean Sea have been found in marine caves: *S. cavernicola* Bibiloni, 1993, *S. flavens* Pulitzer-Finali, 1983, and *S. intricatus* (Topsent, 1892). Species identification in this genus is challenging as it mostly relies on subtle differences in spicule morphology (styles or derivatives) and size. In this work, two different morphotypes of *Spongosorites* were collected from several caves across the Aegean Sea (0-12 m depth; entrance, semi-dark and dark cave zones), one white and subglobular in shape and the other yellow and thinly encrusting, usually epibiotic on other sponges. The former was identified as a species new to science, which is mainly distinguished by the possession of its oscula at the top of tubular processes, a unique feature within the genus. The latter was tentatively identified as *S.* cf. *flavens*, having slight differences in spicule morphology. It seems particularly challenging to determine whether the observed differences point towards a new species of *Spongosorites* or if they correspond to different morphotypes of *S. flavens*. To this end, further examination and redescription of type material is underway.

POSTER 10

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Sponge fauna of two semi-submerged caves of the Adriatic Apulian coast (Southern Italy, Mediterranean Sea)

Marine caves constitute a particularly important marine habitat, being referred to as "biodiversity reservoirs" or "refuge habitats" due to the large number of taxa that find refuge inside them, including several endemic, rare and protected species. Porifera are commonly recognized as the main component of sessile benthic communities in marine caves in terms of abundance, coverage, and biomass. Most faunal studies of Porifera in marine caves have been carried out in the Mediterranean Sea, and along the southern Adriatic coast, numerous sea caves have been surveyed. Nonetheless, marine caves in the province of Bari, especially those between Torre a Mare and Monopoli, are largely unknown regarding their populations. This work presents the sponge fauna of Colombi Cave and Rondinella Cave, two semi-submerged caves located along the cliff of Polignano a Mare (BA). Video transect surveys have been conducted at three stations along the cave: entrance, center and end. At each station, 10 frames were randomly extracted and analyzed with photoQuad software. Overall, 75 taxa of Porifera have been identified within the two semi-submerged caves. The analysis of the video transects and the relative frames allowed us to identify 24 of them, while for the remaining 51 taxa standard laboratory analyses were necessary. Of the 75 porifera, 71 were identified at the species level and among them 3 are new records for marine caves (*Sycon* cfr. *setosum*, *Haliclona (Halichoclona) fistulosa* and *Siphonodictyon infestum*), 5 (*S.* cfr *setosum*, *Timea crassa*, *Clathria (Microciona) strepsitoxa*, *Hamigera hamigera* and *Hymedesmia (Hymedesmia) pansa*) are new records for the southern Adriatic Sea and 14 are endemic species for the Mediterranean Sea. Furthermore, 4 species belong to the list of protected species of the SPA/BIO protocol. The two caves share almost half of the total species recorded (31 species), while 28 species were recorded exclusively in the Colombi cave and 12 in the Rondinella cave. The comparison with the literature data relating to the sponge fauna of Apulian semi-submerged caves allowed to add 8 new reports to the semi-submerged cave sponge Apulian fauna and 48 new reports for the semi-submerged cave sponges of Bari coast.

POSTER 11

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News from low light habitats along the Israeli coast of the Mediterranean Sea

In the last decade, we have been thoroughly studying various shallow and mesophotic habitats along Israel's Mediterranean coast. Low-light habitats, including mesophotic sponge grounds, caves, and alcoves, have been found to be biodiversity hot spots. The outcome of this research effort is an ever-growing list of sponge species recorded for the first time in Israel and the Levant, some might be new to science.

Interestingly, we found two color morphs of *Tedania* cf. *anhelans* that can reach ~20 cm and are distributed only in the mesophotic sponge grounds. In shallow habitats, we found miniature *Tedania* sp. that differs in coloration and morphology from the mesophotic morphs. However, the three morphs share the same spicule types. We also encountered an unknown *Ciocalypta* sp. in shallow and mesophotic depth that was found to be closely related to *C. carballoi*, (based on molecular data and morphology) which is known to be distributed down to ~25 m. Other low light habitats such as caves are not very common along the Israeli coast and are found mainly in its northern part. So far, we have studied a small cave from which we collected a white *Sarcotrgus* sp. and an encrusting white Tetractinellid sponge.

The most important outcome of these studies is that presently two new mesophotic marine nature reserves are promoted to protect the sponge grounds and are now in the advanced stage toward final approval. Taxonomy has a major part in this important outcome, convincing decision-makers that the sponge grounds hold unique, new, sometimes endemic, and endangered species. We are positive that as we continue our effort to identify the sponges sampled over the years, and expand our research to unexplored sites and habitats, new records and species will be revealed.

POSTER 12

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Senckenberg Ocean Species Alliance (SOSA) — a project to facilitate discovery, conservation and fascination

Although sponges are a key component of many marine benthic communities, a large number of species remain unknown, unprotected and utterly underappreciated by science and society. The Senckenberg Ocean Species Alliance (SOSA) is a 10-year project dedicated to breaking down barriers in species-based marine research and conservation. The core activities of SOSA are:
(1) speeding up species descriptions of marine invertebrates without sacrificing quality by providing technical taxonomic services;
(2) supporting conservation through the Marine Invertebrate Red-List Authority (MIRLA) within the IUCN global Red List of Threatened species;
(3) stimulating societal engagement with and appreciation of marine biodiversity through a wide range of creative public outreach.
We first aim to devise new approaches to describe species and make names available quicker than is done at present. Our first goal is to provide the necessary organizational backbone and staff support to build a global network of volunteer contributors for species-based conservation. The aim in 10 years is to bring both taxonomy and global Red List assessments to places where they are most urgently needed by franchising out this new work model to regions with high marine biodiversity.
Caught your interest? Approach us to become part of the rapidly growing international SOSA networks: we want to support colleagues to integrate Red List assessments including providing assessor training. And you can support SOSA in fighting the "taxonomic bottleneck", as a client or as a taxonomic expert collaborator. Stay tuned through our project website and social media!

POSTER 13

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Mesophotic distribution of some common shallow-water sponges

The analysis of the video footage of 654 Remotely Operated Vehicles (ROV) dives carried out along the Italian coast on hard substrata at mesophotic and bathyal depths (40-1825 m) allowed to tentatively obtain data on the current basin-scale distribution and bathymetric limits of some demosponges typically considered of shallow waters: *Aplysina cavernicola* Vacelet, 1959, the group *Axinella damicornis/verrucosa*, *Chondrosia reniformis* Nardo, 1846, and *Hexadella racovitzai* Topsent, 1896. These taxa were the most common in our dataset, with *A. damicornis/verrucosa* being present in about 40% of the explored sites, *H. racovitzai* in about 28%, and *A. cavernicola* and *C. reniformis* in about 20% of the investigated sites. The latitudinal distributions are characterized by a high occurrence of all the considered species in the Ligurian Sea (87% of the sites for *Axinella* spp., and about 60% of the sites for the other species) and a progressive decrease towards the southern Tyrrhenian Sea, occasionally with a second minor peak of occurrence in the Sicily Channel. The recorded depth ranges were, respectively, 40-140 m for *A. cavernicola*, 40-190 m for *Axinella* spp., 40-132 m for *C. reniformis*, and 40-165 m for *H. racovitzai,* with a clear decreasing trend according to depth for all the considered taxa. They are in accordance with the known bathymetric distribution of the species, except for *Axinella* spp., whose maximum reported depth is 130 m. The four taxa, frequently observed together, are mentioned as typical or associated species of five circalittoral and offshore circalittoral reference habitats in the recently revised UNEP/SPA-RAC classification, but here they have also been reported in other habitats. *A. cavernicola*, *C. reniformis* and *H. racovitza*i were frequently found out of submarine caves on circalittoral coralligenous accretions and deeper banks, while *Axinella* spp., despite being typical in the infralittoral, was observed in several mesophotic habitats, including rocky cliffs and detritic bottoms.

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