

ANNUAL REPORT 2020



CEAB
exploring aquatic ecosystems

CENTRE OF ADVANCED
STUDIES OF BLANES

“We believe that scientific research and collaboration can transform the world toward sustainability”

“We promote the sustainable management of water resources and integrated watershed management policies”

“We aim to develop a digital infrastructure for Global Change and Marine and Freshwater Biodiversity Observatories”

“We provide high performance facilities for Functional and Behavioural Ecology studies”



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CEAB (Centre of Advanced Studies of Blanes)

is a public research institute of the **Higher Council of Scientific Investigations (CSIC)**, Spanish Ministry of Science, Innovation and Universities



Launched in October 1985 as a multidisciplinary research center, the current research focuses on Ecology and Biodiversity, mostly of marine and freshwater ecosystems.

The CEAB is formed by **two research departments** dedicated to marine biology, limnology and ecology:

- Department of Continental Ecology
- Department of Marine Ecology

The research staff is divided in **seven research groups**.

“We are a public research center dedicated to marine biology, limnology and ecology”

The **CEAB** aims are:

- Identification of the **biological diversity** and understanding their functions and interactions in nature.
- Application of this knowledge to the rational use and management of **natural resources** and the prediction of ecosystem responses to environmental changes.
- Work with a wide range of environmental studies and approaches, from **biochemical and genetic composition to dynamics of populations and ecosystems**.
- Development of a creative and technically sound research with **solid conceptual backgrounds** on marine and freshwater biology and ecology.

EXECUTIVE BOARD



Emilio O. Casamayor
Director
CSIC Professor



Teresa Alcoverro
Deputy Director
Tenured Scientist



Frederic Bartumeus
Head of Continental
Ecology Department
ICREA Research Professor



Dani Martin
Head of Marine Ecology
Department
Tenured Scientist



Sergio Valencia
Head of Administration
Manager



Emilio O. Casamayor
Director

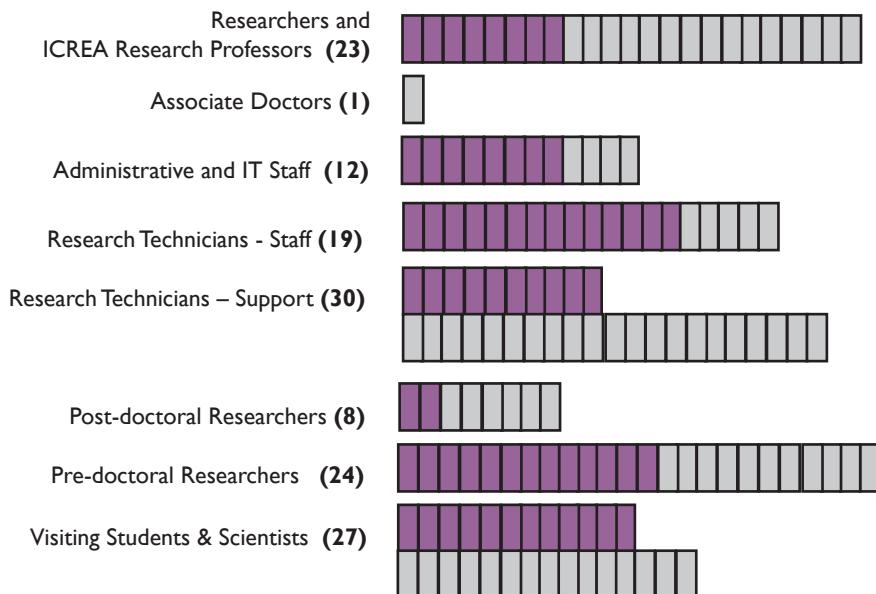
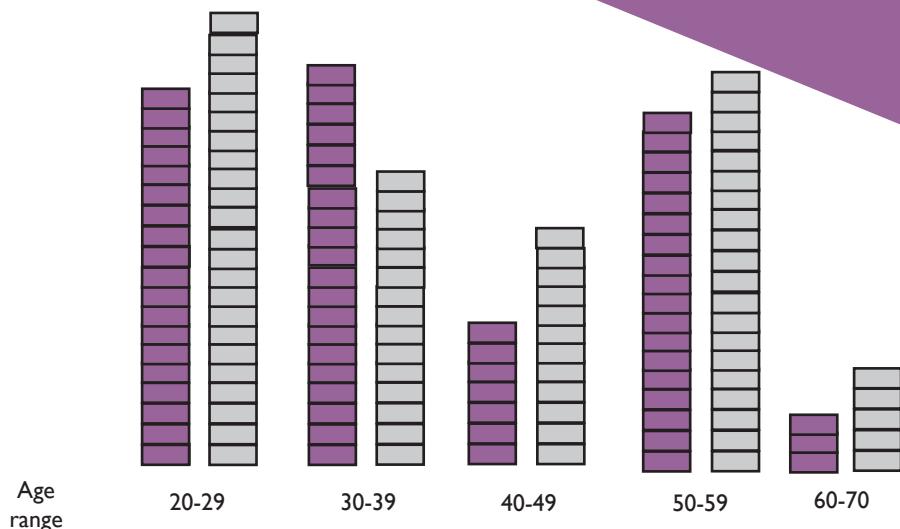
“Covid” has been the top word of 2020, with at least 100 times more citations than any other word of the year in the 21st century. Face mask, social distancing, flatten the curve, lockdown, work at home, and contingency plans have been also very familiar words used often during a year that we will never forget. A year where science came to the rescue more than ever before to avoid economic and social collapse and where the general public could see science working in real time. As a society we pay a high cost with the loss of many loved ones. CEAB also lost its first director, Antonio Cruzado. We express our support and solidarity for their families and friends.

Despite all these difficulties, we have concluded 2020 with a high scientific productivity, maintaining our widespread internationalization and scientific collaboration. We improved facilities and the working atmosphere, and undertook a facelift of the institute, making a virtue out of necessity.

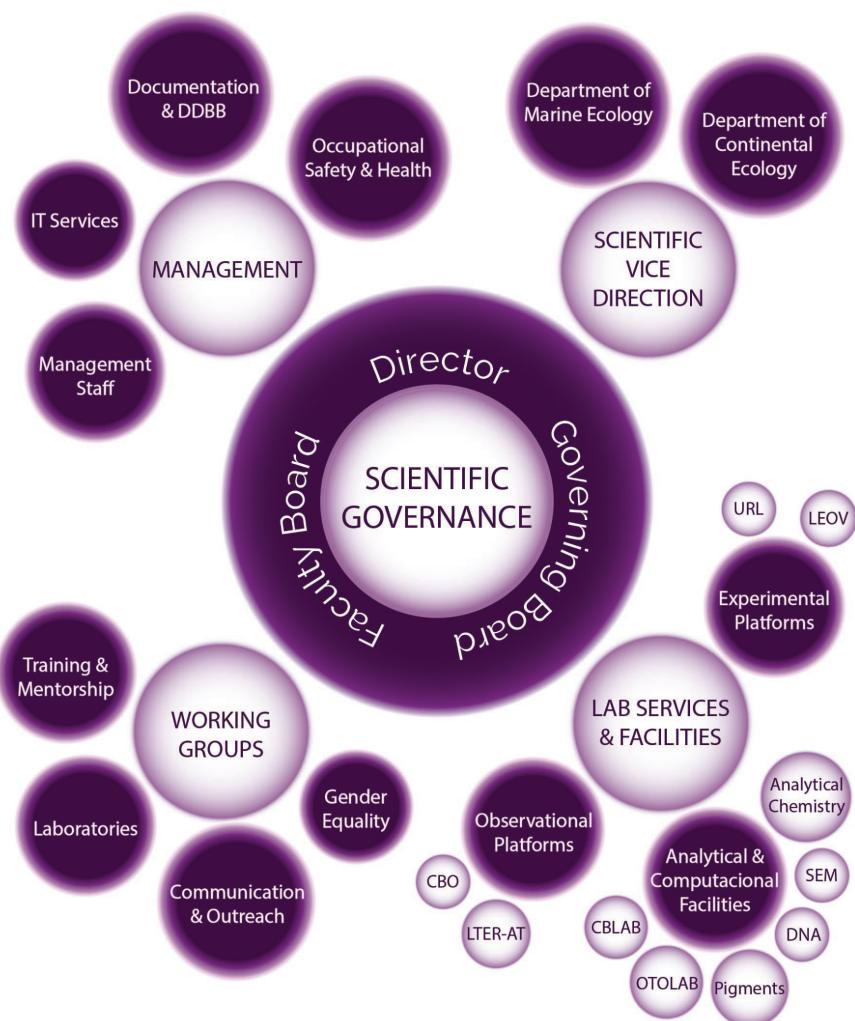
A top word of 2020 in Blanes was also Gloria, a strong storm that changed the appearance of the coastline and the Tordera catchment. Covid and Gloria remind us of the urgency of adaptation to the strong alterations that global change will bring us.

CEAB people: 144
Men: 77 (53%)
Women: 67 (47%)

 **Women**
 **Men**



ORGANIZATION CHART



SEM: Scanning Electronic Microscopy

LEOV: Laboratory for Experimentation with Live Organisms

URL: Urban River Lab

CBLAB: Computational Biology Lab

LTER-AT: Long Term Ecological Research-Aigüestortes

CBO: Coastal Benthic Observatory

OTOLAB: Otolith Research Lab



Global and Climate Change:

Diagnosis and prognosis of global change effects on aquatic systems, species invasions and dispersal patterns, loss of natural habitats, and changes in the distribution and abundance of species.



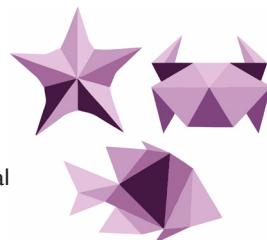
Conservation and Management of Aquatic Ecosystems:

Applied knowledge for the rational management of natural resources and the improvement and conservation of aquatic ecosystems.



Theory and Computation in Ecology and Evolution:

Use of mathematical and computational techniques as essential tools to provide conceptual advances and to understand Ecology and Biodiversity.



Functional and Integrative Aquatic Ecology:

Understand how organisms relate to each other and understand their functions and interactions in nature, from genes to communities combining fieldwork, empirical studies, and meta-analysis.



Aquatic Biodiversity:

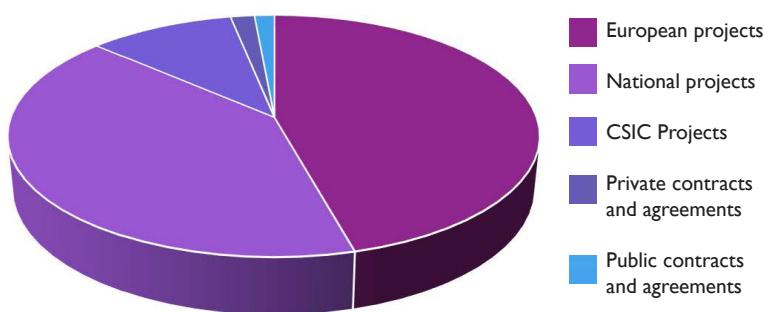
Identify the diversity of organisms, taxonomic characteristics and phylogenetic relationships, and describe new biological species with environmental surveys and naturalistic observations worldwide.

57 Active Research Projects
62% Competitive Research Grants
38% Non-Competitive Grants
11 External Collaboration Projects

EXTERNAL FUNDING

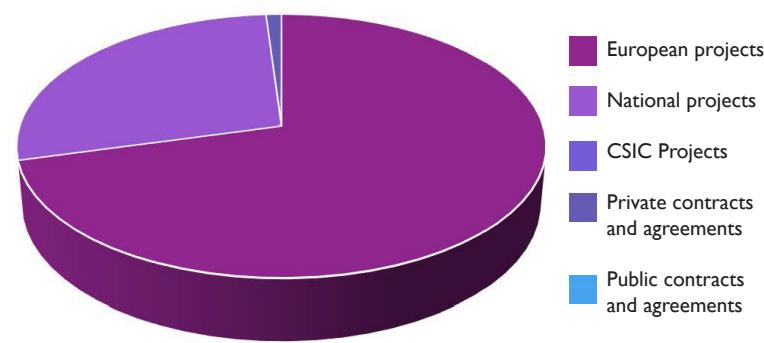
2020 SCIENTIFIC BUDGET

Competitive projects: 6.820.504,60€. Non-competitive projects: 1.299.321,00€



ACTIVE RESEARCH PROJECTS: TOTAL FUNDING

Competitive projects: 2.397.129,52€. Non-competitive projects: 244.686,17€

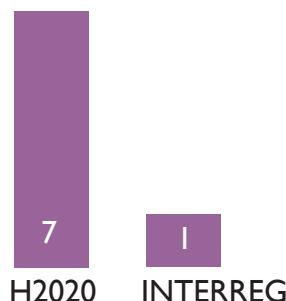


European projects (14) National projects (23) CSIC projects (9)
Private contracts and agreements (7) Public contracts and agreements (4)

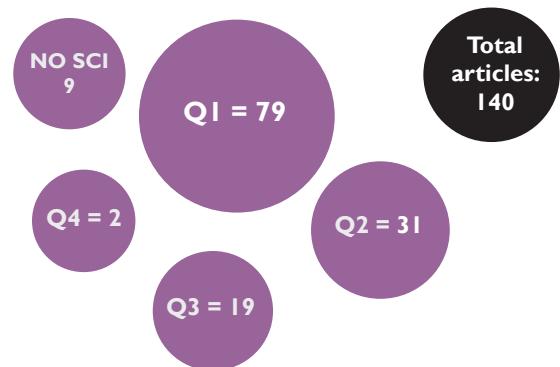
SCIENTIFIC PRODUCTION

	Scientific Articles	Books	Book Chapters	PhD Thesis	Master Thesis
2020	140	10	33	8	7
2019	114	3	18	3	6
2018	111	1	8	6	8
2017	112	1	11	6	4
2016	119	0	19	7	9
2015	93	3	7	8	20

EU RESEARCH PROJECTS



PAPERS IN INTERNATIONAL JOURNALS



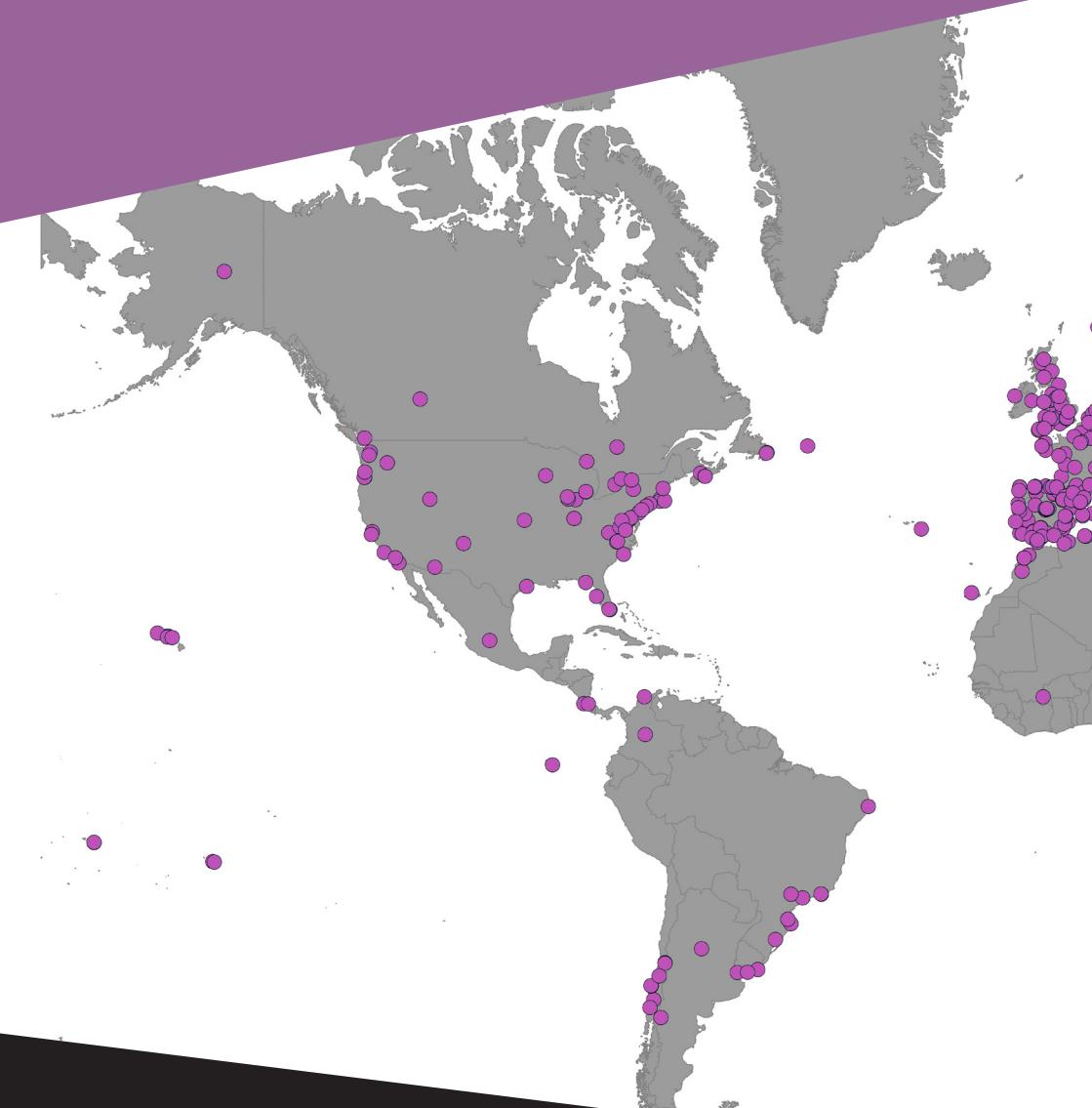
CEAB OUTREACH ACTIVITIES

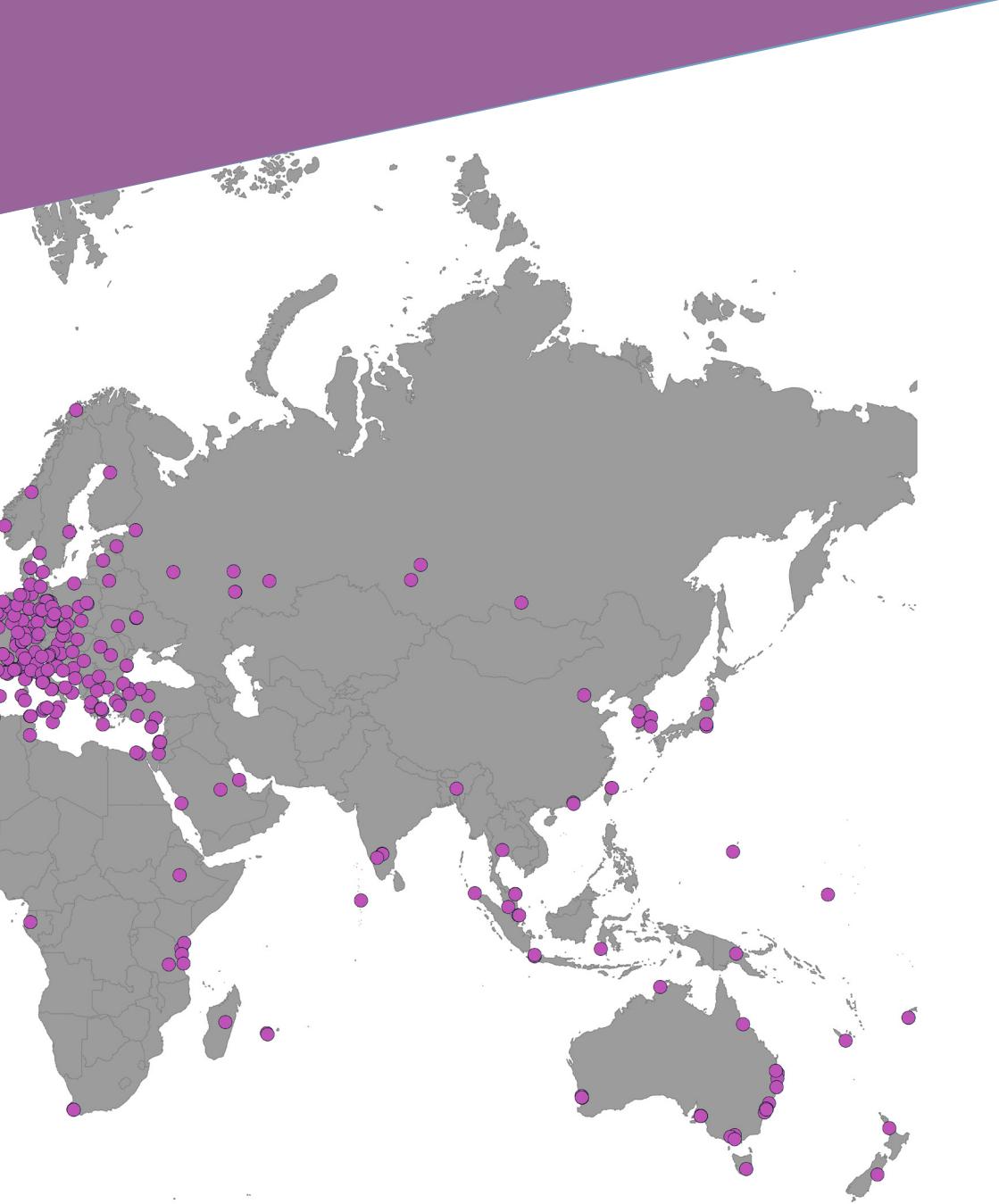
	Visitors and participants	Students
2020	No visitors for COVID-19	
2019	4143	28%
2018	2360	48%
2017	8265	15%
2016	8115	50%

APPEARANCES IN MASS MEDIA

336	2020
377	2019
373	2018
294	2017
208	2016

CEAB co-authorship network of scientific collaborations from papers published in 2020





RELEVANT ACTIVITIES

► CONSERVATION, MANAGEMENT AND BLUE GROWTH IN THE DECADE OF OCEANS

Rafael Sardá (CEAB-CSIC), spoke in this conference about the United Nation's 2030 Agenda for Sustainable Development defined Sustainable Development Goal 14 ("Live Below Water"), a goal in which healthy and productive oceans are the principal consideration. The main objective of SDG 14 is "to conserve and sustainably use the world's oceans, seas and marine resources for sustainable development".



2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development

► OBSERVADORES DEL MAR - A MARINE CITIZEN SCIENCE PLATFORM WORKING FOR A HEALTHY OCEAN



CEAB-CSIC participate in the platform Observadores del Mar. Observadores del Mar is a marine citizen science platform launched in 2012 devoted to enhancing the understanding of the conservation status of marine ecosystems. The platform hosts different projects reporting information on biodiversity data focusing mainly on species distribution and abundance, and the impacts of anthropogenic activities, including both the occurrence of episodic events (e.g. jellyfish blooms) and associated mid-to long-term changes (e.g. colonization of invasive species).

► 2020 ICCAT INTERSESSIONAL MEETING OF THE BLUEFIN TUNA SPECIES GROUP

Anna Gordoa (CEAB-CSIC) participated during 2020 in the meetings of the International Commission for the Conservation of Atlantic Tunas as the Rapporteur of Eastern Atlantic and Mediterranean stocks.



► SYMPOSIUM ON URBANIZATION AND STREAM ECOLOGY: MOVING THE BAR ON MULTIDISCIPLINARY SOLUTIONS TO WICKED URBAN STREAM PROBLEMS

Eugènia Martí (CEAB-CSIC) participated in The Symposium on Urbanization and Stream Ecology (SUSE), an interdisciplinary meeting held approximately every 3-5 years with the specific aim to further the scientific study of stream ecosystems in urban landscapes. The topic was “Moving the bar on multidisciplinary solutions to wicked urban stream problems”.



► PLASTIC0PYR PROJECT. GUIDELINES FOR MONITORING PLASTIC LITTER IN MOUNTAIN RIVERINE SYSTEMS : FROM MACRO- TO MICROPLASTIC SIZES



The guidelines are the first attempt to guide the study of plastic pollution in Mountain riverine systems draining touristic watersheds. These protocols have been tested and validated in the field by the PLASTIC0PYR team and are recommended for monitoring the environmental impact of tourism.

► MOSQUITO-BORNE DISEASE SCENARIOS IN EUROPE

Frederic Bartumeus participate in the Versatile Emerging Infectious Diseases Observatory (VEO), a project that allows to gather high quality information from which to develop early warning tools. The observatory will monitor emerging infectious diseases, as well as the appearance of bacterial resistance, in order to carry out a risk assessment.



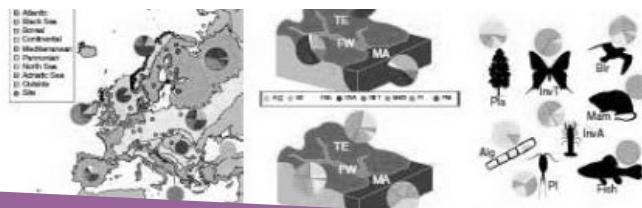
PUBLICATIONS IN HIGH-IMPACT JOURNALS

► META-ANALYSIS OF MULTIDECadal BIODIVERSITY TRENDS IN EUROPE

Nature Communications 11 :3486

Local biodiversity trends over time are likely to be decoupled from global trends, as local processes may compensate or counteract global change. We analyze 161 long-term biological time series (15–91 years) collected across Europe, using a comprehensive dataset comprising ~6,200 marine, freshwater and terrestrial taxa. We test whether (i) local long-term biodiversity trends are consistent among biogeoregions, realms and taxonomic groups, and (ii) changes in biodiversity correlate with regional climate and local conditions.

Our results reveal that local trends of abundance, richness and diversity differ among biogeoregions, realms and taxonomic groups, demonstrating that biodiversity changes at local scale are often complex and cannot be easily generalized. However, we find increases in richness and abundance with increasing temperature and naturalness as well as a clear spatial pattern in changes in community composition (i.e. temporal taxonomic turnover) in most biogeoregions of Northern and Eastern Europe.

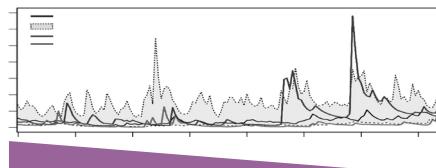


► DROUGHT ALTERS THE BIOGEOCHEMISTRY OF BOREAL STREAM NETWORKS

Nature Communications 11 :1795

Drought is a global phenomenon, with widespread implications for freshwater ecosystems. While droughts receive much attention at lower latitudes, their effects on northern river networks remain unstudied. We combine a reach-scale manipulation experiment, observations during the extreme 2018 drought, and historical monitoring data to examine the impact of drought in northern boreal streams. Increased water residence time during drought promoted reductions in aerobic metabolism and increased concentrations of reduced solutes in both stream and hyporheic water. Likewise, data during the 2018 drought revealed widespread hypoxic conditions and shifts towards anaerobic metabolism, especially in headwaters.

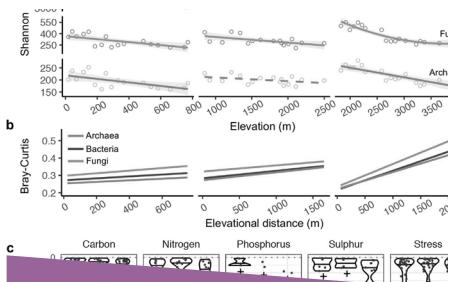
Finally, long-term data confirmed that past summer droughts have led to similar metabolic alterations. Our results highlight the potential for drought to promote biogeochemical shifts that trigger poor water quality conditions in boreal streams. Given projected increases in hydrological extremes at northern latitudes, the consequences of drought for the health of running waters warrant attention.



► CLIMATE MEDIATES CONTINENTAL SCALE PATTERNS OF STREAM MICROBIAL FUNCTIONAL DIVERSITY

Microbiome 8 : 92

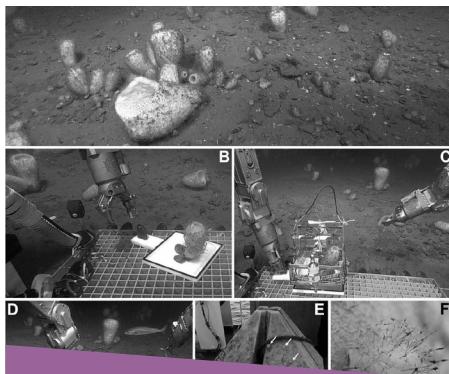
Understanding the large-scale patterns of microbial functional diversity is essential for anticipating climate change impacts on ecosystems worldwide. However, studies of functional biogeography remain scarce for microorganisms, especially in freshwater ecosystems. Here we study 15,289 functional genes of stream biofilm microbes along three elevational gradients in Norway, Spain and China.



► COOPERATION BETWEEN PASSIVE AND ACTIVE SILICON TRANSPORTERS CLARIFIES THE ECOPHYIOLOGY AND EVOLUTION OF BIOSILICIFICATION IN SPONGES

Science Advances 6 : eaba9322

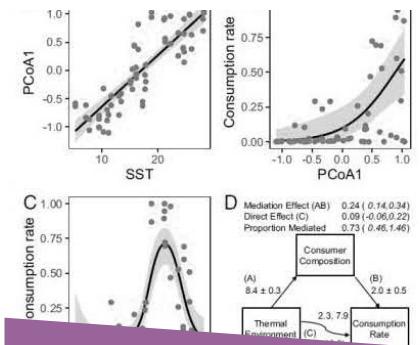
The biological utilization of dissolved silicon (DSi) influences ocean ecology and biogeochemistry. In the deep sea, hexactinellid sponges are major DSi consumers that remain poorly understood. Their DSi consumption departs from the Michaelis-Menten kinetics of shallow-water demosponges and appears particularly maladapted to incorporating DSi from the modest concentrations typical of the modern ocean.



► CLIMATE DRIVES THE GEOGRAPHY OF MARINE CONSUMPTION BY CHANGING PREDATOR COMMUNITIES

PNAS 117 : 45

The global distribution of primary production and consumption by humans (fisheries) is well-documented, but we have no map linking the central ecological process of consumption within food webs to temperature and other ecological drivers. Using standardized assays that span 105° of latitude on four continents, we show that rates of bait consumption by generalist predators in shallow marine ecosystems are tightly linked to both temperature and the composition of consumer assemblages.



LABORATORY SERVICES & FACILITIES

These services are available to all CSIC researchers, as well as to external researchers from public research centers and private corporations.

EXPERIMENTAL PLATFORMS



LABORATORY FOR EXPERIMENTATION WITH LIVE ORGANISMS

The LEOV is an aquarium-lab designed for the experimentation with live organisms in an aquatic environment of either fresh or sea water. The seawater circuit can be used in a continuous or a recycling way and it has a heat interchanging system allowing water heating or cooling ranging from 14°C to 25°C. The LEOV facilities also include two high-performance tracking platforms to generate big behavioural and large-scale movement data based on postural images and centroid-based high-resolution tracks of small-bodied organisms.

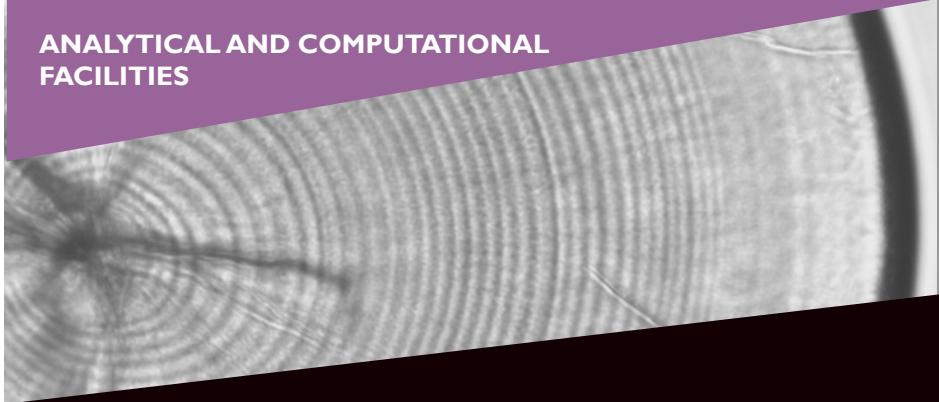
URBAN RIVER LAB

The URL is an experimental outdoor facility addressed to study the effects of urban activity on streams and rivers aiming to develop innovative tools and strategies to mitigate point source impact and to achieve a more efficient and sustainable management of freshwater ecosystems and resources.

The URL consist of 15 flumes and 12 wetlands designed for experimental studies, fed by the effluent of a wastewater treatment plant in Montornès del Vallès.



ANALYTICAL AND COMPUTATIONAL FACILITIES



ANALYTICAL CHEMISTRY

The nutrient analysis service is equipped with a Continuous Flow Autoanalyser to determine the concentration of dissolved inorganic nutrients, total phosphorus and several reactive nitrogen compounds.

Applications:

- ◆ Control of phytoplankton and production of biomass
- ◆ Analysis of environmental pollution in waters
- ◆ Temporal estimation of trophic levels and fish productivity
- ◆ Analysis of waste water treatment plants effluents

PIGMENTS ANALYSIS

The UHPLC service is mainly used for the analyses of liposoluble organic pigments present in water samples, biofilms and sediments.

Applications:

- ◆ Studies of seasonal phytoplankton dynamics
- ◆ Taxonomic characterization of phytoplankton and biofilm communities
- ◆ Paleoecology studies

SCANNING ELECTRONIC MICROSCOPY

The electronic microscopy service is available for the observation of samples with the Scanning Electron Microscope (SEM) and for energy dispersive X-ray microanalysis (EDS).

Applications:

- ◆ Structure and ultrastructure of animal and plant tissues and organs
- ◆ Forensic studies (search of particles, tissues, threads, semen...)
- ◆ Identification of minerals, synthetic substances, antibiotics, etc.
- ◆ Studies in metal and alloys corrosion
- ◆ Biodeterioration of artworks
- ◆ Rock and mineral texture

COMPUTATIONAL BIOLOGY LAB

High Performance Computational Cluster (Cluster CAR)

Applications:

- ◆ Bioinformatics and molecular ecology
- ◆ Spatial ecology
- ◆ Theoretical and computational ecology
- ◆ Data mining and KDD (Knowledge Discovery in Databases)
- ◆ Data and image banks
- ◆ Training

MOLECULAR AND GENETIC ECOLOGY LABORATORY

The Molecular and Genetic Ecology Lab provides support to those projects concerning taxonomy, biodiversity, ecology and evolution of aquatic organisms that require the use of DNA-based molecular techniques.

These techniques extend from the amplification and sequencing of DNA for biodiversity and phylogenetics studies, up to cloning, metabarcoding, genomics, metagenomics and proteomics.

OTOLITH RESEARCH LAB

The analysis of growth structures, such as otoliths, offers the possibility to estimate the age and growth rates in diverse organisms and organic structures.

Applications:

- ◆ Fish vertebrae, scales and otoliths
- ◆ Cephalopod statoliths
- ◆ Bivalve valves
- ◆ Coral skeletons
- ◆ Polychaete jaws
- ◆ Cricket exoskeletons
- ◆ Turtle shields
- ◆ Echinoderm skeletons

OBSERVATIONAL PLATFORMS



HIGH MOUNTAINS OBSERVATORY

The Long Term Ecological Research site Aigüestortes is an observational facility located in the Central Pyrenees, within the Aigüestortes i Estany de Sant Maurici National Park. It comprises a field station and several monitored catchments. The research sites are equipped with automatic weather stations, discharge gauge stations and lake and stream water temperature loggers.

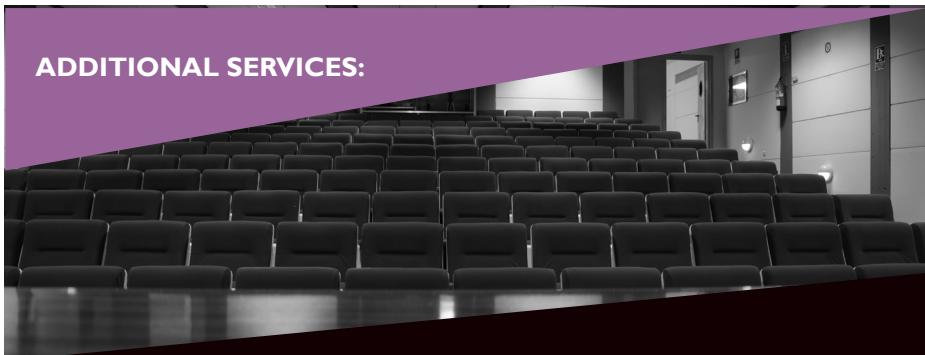
A network of sampling stations is surveyed to collect chemical and biological samples at different time intervals, from biweekly

to seasonal. The sampling network consists of eight streams, fourteen lakes and two atmospheric deposition collectors for water chemistry.

THE COASTAL BENTHIC OBSERVATORY

The Coastal Benthic Observatory carries out an annual evaluation of the Ecological Quality of the Catalan coastal waters using different biological indicators and the evaluation of invasive species effects. Temporal surveys are also carried out in the Medes Islands.

ADDITIONAL SERVICES:



NAUTICAL SERVICE

The Nautical Service offers several facilities:

- ◆ Hirondelle: semi-rigid inflatable boat mainly used for scuba diving and small-scale sampling in the coastal area of Blanes.
- ◆ Nesea: semi-rigid inflatable boat mainly used for scuba diving and small-scale sampling in the coastal area of the Medes Islands.
- ◆ 10 additional pneumatic small boats from 3 to 4.5 m in length for coastal sampling and scuba diving.

DIVING STATION

The diving facilities integrated in the CEAB building complex, consist of a dressing room, a tank charge facility; an independent room equipped with a 200 bar fixed compressor able to charge 3 tanks simultaneously, two portable compressors, with electrical and fuel engines, respectively, and also diving tanks of different capacities.

CONFERENCE ROOMS

The CEAB houses a conference room for 160 people which is equipped with projection and sound systems as well as recording facilities. It also houses a fully-equipped meeting and video conferences room and additional rooms adapted for small meetings.





Leonor Sousa
Administrative Staff
Assistant



Concha Almansa
Administrative Staff
Assistant



Xavier Roijals
Executive Staff
Assistant



Ramon Coma
Executive Staff
Assistant

ADMINISTRATION



Marta Alamán
Administrative Staff
Assistant



David Alenyà
Administrative Staff
Assistant



Carmela Bosca
Administrative Staff
Assistant



Gemma Peña
Administrative Staff
Assistant



Ángel Luque
Staff Support
Assistant



Rafael Cortés
Staff Support
Assistant

Missing in the picture: Sergio Valencia (Head of Administration); Vicent Portales (Administrative Staff Assistant); Marta Mora (Hired Technician).



Núria Raventós
Hired Technician
(Otoliths Service)



Montserrat Soler
Staff Technician
(HPLC Service)



Gustavo Carreras
Staff Technician
(DNA Service)



Gemma Agell
Outreach Staff
Technician

TECHNICIANS



Ferran Crespo
Staff Support Assistant
(Nautical Service)



Manel Bolívar
Staff Technician
(Diving Service)



Carmen Gómez
Staff Technician
(LabQA Service)



Miquel Ribot
Staff Technician
(URL)



Esther Jordana
Staff Technician



Maria García
Staff Technician



Maria Paola Satta
Staff Technician



Xavier Torras
Staff Technician



Susana Pinedo
Staff Technician

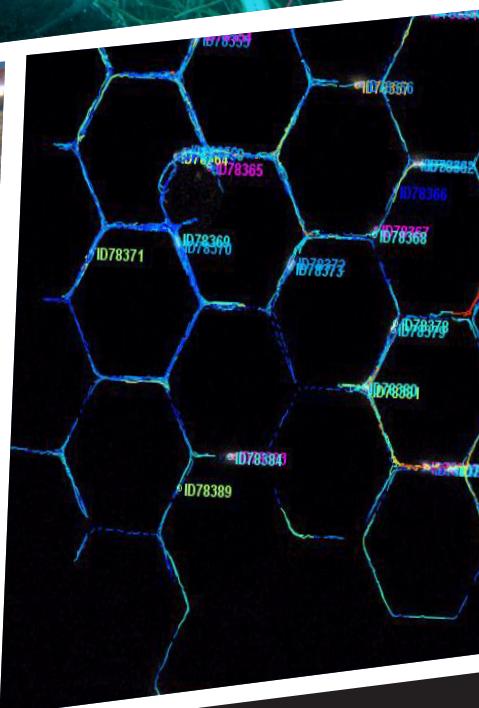
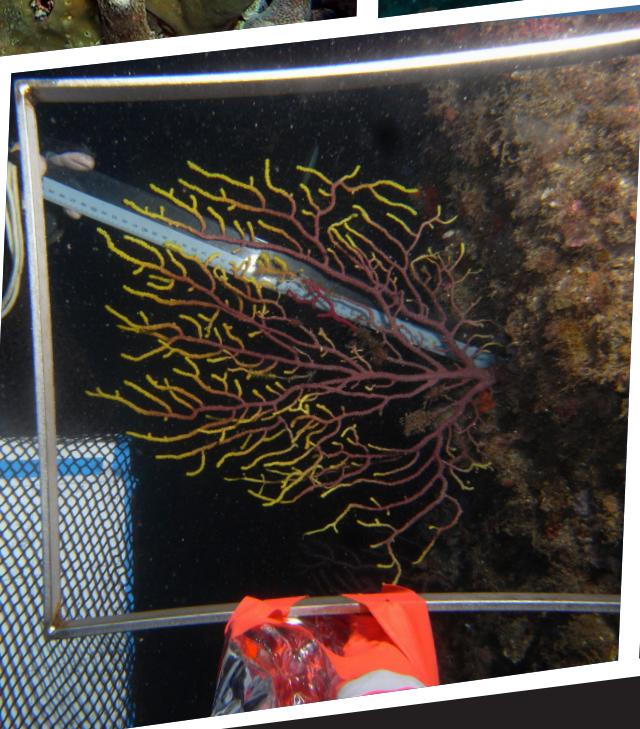
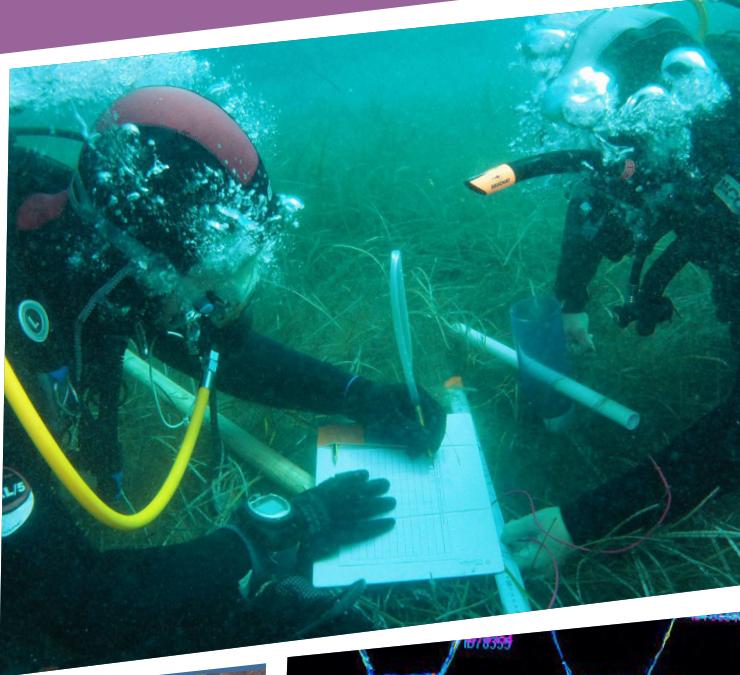


Paola Mura
Staff Technician

OUR RESEARCH GROU



PS



SOCIAL-ECOLOGICAL SYSTEMS IN COASTAL AND MARINE ENVIRONMENTS

Head of Research Group:
Gordoa Ezquerra, Ana

We seek to explore how social-ecological systems work in the coastal and marine environments by developing conceptual and empirical approaches for a better understanding and management and for addressing specific social problems of sustainability

We develop scientific research and applications in the frontier between social and natural systems, how they work and interact, how to cope with present and emerging local and global environmental problems and the role, if any, that science and regulations might play on it.

The group has a long and successful history in the Coordination of International Cooperation Projects mostly in Namibia. Research topics include social-ecological research, sustainable exploitation of living marine resources, operational oceanography and fisheries (both professional and recreational), and coastal management.



Ana Gordoa
Group leader



Rafa Sarda
Staff Scientist



Alberto Olivares
Hired Scientist

PROJECTS

ECOPLAYA. Integrated Coastal Zone Management 2.0: Tools for the implementation of the Ecosystem Approach in the Management of Beaches

Principal Investigator: Rafael Sardá
Entity: Fundación One Ocean Foundation
Budget:
Years: 2019 - 2022

PECES II. Pesca Marítima Recreativa: Acciones de Recuperación y Adquisición de datos

Principal Investigator: Ana Gordoa
Entity:
Budget: 14.627,83 €
Year: 2019-2021

BLUE CARBON. Hacia un mercado de carbono azul en España. Adaptación normativa para la implementación de proyectos de compensación de carbono en ecosistemas marinos.

Principal Investigator: Alberto Olivares
Entity: MCIYU
Budget: 179.634,44 €
Years: 2020- 2023

SCIENTIFIC PRODUCTION

PAPERS

Aguzzi, Jacopo; Flexas, María del Mar; Florghel, S.; Lo Iacono, Claudio; Tangherlini, M.; Costa, Corrado; Marini, S.; Bahamon, Nixon; Martini, Séverine; Fanelli, Emanuela; Danovaro, Roberto; Stefanni, Sergio; Thomsen, L.; Riccobene, G.; Hildebrandt, M.; Masmitja, I.; Río, Joaquín del; Clark, E.B.; Branch, A.; Weiss, P.; Klesh, A.T.; Schodlok, Michael P. Exo-Ocean Exploration with Deep-Sea Sensor and Platform Technologies. *Astrobiology* 20(7): 1-20 (2020). <https://digital.csic.es/handle/10261/207128>

Bahamon, Nixon; Aguzzi, Jacopo; Ahumada-Sempoal, Miguel Ángel; Bernardello, Raffaele; Reuschel, Charlotte; Company, Joan Baptista;

Peters, Francesc; Gordoa, Ana; Navarro, Joan; Velásquez, Zoila; Cruzado, Antonio. Stepped Coastal Water Warming Revealed by Multiparametric Monitoring at NW Mediterranean Fixed Stations. *Sensors* 20 (9): 2658 (2020). <https://digital.csic.es/handle/10261/211352>

Carretón, Marta; Company, Joan B.; Boné, Alexandra; Rotllant, Guiomar; Guerao, Guillermo; Bahamon, Nixon; Roldán, María Inés; Dos Santos, Antonina. Decapod crustacean larval community structure of the submarine canyon off Blanes (NW Mediterranean Sea). *Scientia Marina* 84(1): 71-82 (2020). <https://digital.csic.es/handle/10261/199431>

Assessing Knowledge Gaps and Management Needs to Cope With Barriers for Environmental, Economic, and Social Sustainability of Marine Recreational Fisheries: The Case of Spain.

Pita, Pablo; Alós, Josep; Antelo, Manel; Artetxe, Iñaki; Biton-Porsmoguer, Sebastián; Carreño, Arnau; Cuadros, Amalia; Font, Toni; Beiro, José; García-Charton, José A.; Gordoa, Ana; Hyder, Kieran; Lloret, Josep; Morales-Nin, Beatriz; Mugerza, Estanis; Sagüé, O.; Pascual-Fernández, José J.; Ruiz, Jon; Sandoval, Virginia; Santolini, Elena; Zarauz, Lucia; Villasante, Sebastián.

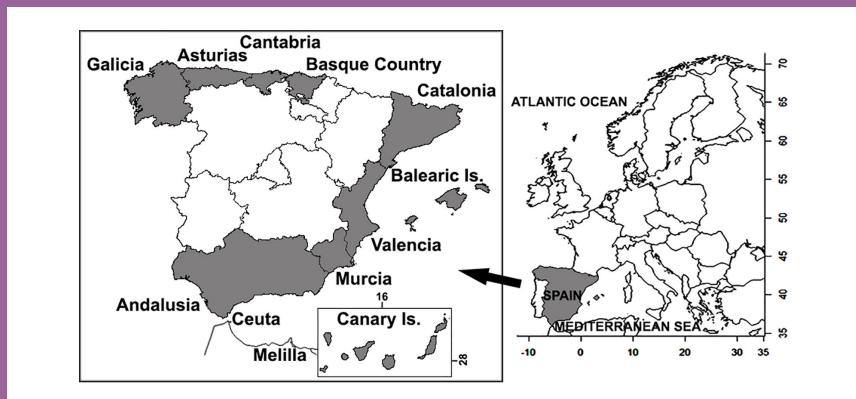
Frontiers in Marine Science 7 :23 (2020)

<https://digital.csic.es/handle/10261/20227>

Abstract:

The European Parliament is concerned about the lack of information on the relevance of nine million Europeans engaged in marine recreational fishing (MRF), committing Member States to encourage environmental and socioeconomic sustainability of the sector.

The objective of this paper is to provide recommendations to guide research actions and management policies, based on the case of Spain, a key country because its complex administrative regimen and the intensive use of its coasts, including 900,000 recreational fishers. A review of the state of the knowledge was performed to identify research gaps, while governance challenges were identified in an International Symposium on MRF. In the last two decades research on MRF was remarkable (139 publications). However, public investment in research (€2.44 million in the same period) should be improved to cover knowledge gaps on socioeconomic relevance, on impacts on vulnerable species and on implications of global warming. The license system should be standardized to allow estimation of effort, catch and expenditure. Social networks, mobile applications, fisher ecological knowledge, and citizen science programs could help to develop cost-effective research and management. Science-based, adaptive policies should improve the allocation of resources between MRF and other stakeholders, introducing co-management to reduce conflicts.



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Öndes, Fikret; Ünal, Vahdet; Öndes, Hakan; Gordoa, Ana. Charter fishing in the Aegean Sea (Turkey), Eastern Mediterranean: The missing point of fisheries management.

CONGRESSES & CONFERENCES

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Fisheries Research 224 : 105457 (2020). <https://digital.csic.es/handle/10261/196793>

Pintó, Josep; Garcia-Lozano, Carla; Sardá, Rafael; Roig-Munar, Francesc Xavier; Martí, Carolina. Efectes del temporal Glòria sobre el litoral. Treballs de la Societat Catalana de Geografia 89 :89-109 (2020). <https://digital.csic.es/handle/10261/224823>

Rouyer, T.; Kimoto, A.; Zarrad, R.; Ortiz, M.; Palma, C.; Mayor, C.; Lauretta, M.; Gordoa, Ana. Data and model set-up for the 2020 update stock assessment of the Eastern and Mediterranean Atlantic bluefin tuna stock. ICCAT Collective Volume of Scientific Paper (77) : 325-351 (2020). <https://digital.csic.es/handle/10261/230618>

Sagristà, Enric; Sardá, Rafael. Assessing the success of integrated shoreline management in the Tordera Delta, northeastern Spain. Regional Environmental Change 20 :87 (2020). <https://digital.csic.es/handle/10261/217181>

Avila, C.; Gil, J.; Sarda, Rafael. Living in a sponge: a preliminary study of the fauna associated to the Antarctic sponge *Kirkpatrickia variolosa*. UHINAK 2020. IV Congreso transfronterizo sobre Cambio Climático y Litoral. 04/11/2020. Spain. POSTER

Bellaibi, F.; Mallarach, J. M.; Sarda, Rafael. A geoethical approach to the governance of Social-ecological Systems: the case of Delta de la Tordera (Catalunya). XI Congreso Ibérico de Gestión y Planificación del Agua. 03/09/2020. Spain. ORAL

Navarro, J.; Vigo, M.; García, J. A.; Masmitjana, I.; Bahamón, N.; Rotllant, G.; Recasens, L.; Colmenero, A. I.; Barría, C.; Aguzzi, J.; Company, J. B. Marine no take areas as a tool to recover iconic Mediterranean fisheries in decline: The case of the Norway lobster, *Nephrops norvegicus*. The 6th International Marine Conservation Congress (IMCC6). 17/08/2020. Germany. POSTER

Nixon Bahamon; Jacopo Aguzzi; Joan B. Company. Sistemas de observación marina en el actual contexto de calentamiento global. Curso de Oceanografía, Ingeniería Pesquera, Universidad del Magdalena. 20/11/2020. Santa Marta. Colombia. CONFERENCE

Olivares,Alberto. El papel de la tecnología en la construcción del nuevo modelo energético postcarbono. II Congreso Internacional de la Asociación iberoamericana de Derecho de la Energía. 28/08/2020. Colombia. ORAL

Sardá, Rafael; Pogutz, S. Busines for Ocean Sustainability. GSOM Business in Society: Changing Paradigm and a new reality. Conference 2020. 11/11/2020. Russia. ORAL

Sarda, Rafael; Pogutz, S. Business for Ocean Sustainability. International Sustainable Development Research Society (ISDRS). Sustainability in Transforming Societies . 15/07/2020. Hungary. ORAL

Sardá, Rafael. Conservation, Management and Blue Growth in the Decade of Oceans. III Fortaleza's Austral Spring School/ Labomar-UFC. 14/10/2020. Brazil. INVITED TALK

Sarda, Rafael. Webinar: Corporate Sustainability in the 21st Century: increasing the resilience of social-ecological. AAEE ESADE Business School. 12/05/2020. Spain. INVITED TALK

Vigo, M.; Navarro, J.; García, J. A.; Bahamón, N.; Aguzzi, J.; Rotllant, G.; Company, J. B. A non invasive tool for the assessment of an overexploited protected area in the Northwestern Mediterranean Sea. The 6th International Marine Conservation Congress (IMCC6). 17/08/2020. Kiel. Germany. ORAL

Vigo, M.; Navarro, J.; Masmitjana, I.; García, J. A.; Bahamón, N.; Rotllant, G.; Aguzzi, J.; Company, J. B. Assessing spatial movements and the daily activity of the fishing iconic Norway lobster (*Nephrops norvegicus*) to design marine protected areas in highly exploited deep-sea habitats. The 6th International Marine Conservation Congress (IMCC6). 17/08/2020. Kiel. Germany. ORAL

Vigo, M.; Navarro, J.; Masmitjana, I.; García, J. A.; Bahamón, N.; Rotllant, G.; Aguzzi, J.; Company, J. B. Movement patterns of Norway lobsters in deep-sea Mediterranean habitats: useful information to design marine protected areas. VII International Symposium on Marine Sciences (ISMS 2020). 01/07/2020. Barcelona. Spain. ORAL

BOOK'S CHAPTER

Bellaubi, Francesc; Mallarach, Josep Maria; Sarda, Rafael. A Geoethical approach to the governance of social-ecological systems: the case of Delta del Tordera. Actas del XI Congreso Ibérico de Gestión y Planificación del Agua. Fundación Nueva Cultura del Agua-Universidade Lusíada de Lisboa. Pp. 787-800 (2020). <https://digital.csic.es/handle/10261/238777>

Olivares, Alberto; Fauth, Gabriela. El derecho de propiedad de los datos recopilados por los contadores inteligentes de electricidad. El derecho de propiedad: estudios públicos y privados. Tirant lo Blanch Pp. 469-492 (2020). <https://digital.csic.es/handle/10261/211381>

Rotllant, G.; Verdi, A.; Santos-Bethencourt, R.; Bahamón, N.; Company, J. B. Diversity, abundance and biomass of deep-sea decapod crustaceans of the Uruguayan continental slope (South West Atlantic Ocean, SWAO). Deep-water Pycnogonida and Crustacea from the Americas. Springer. Pp. 443-472 (2020). <https://digital.csic.es/handle/10261/235822>

Sardá, Rafael. Hacia una Gestión Integrada de la Zona Costera basada en la Gestión por Ecosistema. Capacitat de càrrega i gestió adaptativa per a la preservació dels ecosistemes marins i costaners. Documenta Universitaria. Pp. 17-32 (2020). <https://digital.csic.es/handle/10261/225551>

DOCTORAL THESES

UNIVERSITAT DE BARCELONA (UB).

Aplicación de herramientas de gestión por ecosistema para su uso en la gestión integrada de zonas costeras (GIZC): el caso del delta de la Tordera y la playa de S'Abanell. Student: Enric Sagristà Soler. Advisor: Rafael Sardá Borroy.

UNIVERSITAT DE BARCELONA (UB).

Connectivity of the deep-sea red shrimp *Aristeus antennatus* in the northwestern Mediterranean Sea by modeling the Lagrangian transport of larvae. Student: Morane Clavel Henry. Advisor: Nixon Bahamón.

MASTER THESIS

UNIVERSITAT DE BARCELONA (UB).

Estudi comparatiu de la comunitat ictiologica de l'alguer de Mataró. Student: Jordi Gispert. Advisor: Rafael Sardá Borroy.

DEGREE'S FINAL PROJECT

UNIVERSITAT DE BARCELONA (UB).

Servicios del Ecosistema en playas: El caso de las playas del Delta de la Tordera. Student: Raul Rodríguez Pérez. Advisor: Rafael Sardá Borroy.

INTEGRATIVE FRESHWATER ECOLOGY



Head of Research Group:
Casamayor, Emilio O.

Freshwater ecosystems provide goods and services of critical importance to human societies. However, they are among the most heavily altered ecosystems with an over proportional biodiversity loss. Biogeochemistry of freshwater ecosystems is closely linked to terrestrial, atmospheric, and climatic perturbations, and responds specially to the effects of global change.

We address the interactions between abiotic and biotic factors on different levels of organization qualitatively and quantitatively, looking for a more holistic understanding of biodiversity functioning and ecological processes in freshwaters.

Our expertise covers from microbes to macrophytes and fish, and freshwater biogeochemical cycling. We use cutting edge analytical interdisciplinary methodologies and carry out observational and experimental research over both long temporal and broad spatial scales.



Lluís Camarero
Staff Scientist



Esperança Gacia
Staff Scientist



Teresa Buchaca
Hired Scientist



Emilio O. Casamayor
Group Leader



Núria Cruset
Hired Technician



Anna Lupon
Hired Scientist



Helena Guasch
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Mateu Menéndez
PhD Student



Sara
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Víctor Osorio
Hired Technician



Jennifer Caner
Hired Technicia



Ibor Sabas
PhD Student



Eugènia M.
Staff Scien



Mariàngels Puig
Staff Scientist



Xavier Triadó
Hired Scientist



Marc Ventura
Staff Scientist



Susanna Bernal
Hired Scientist



Castelar
Technician



Miquel Ribot
Staff Technician

Missing in the picture:

Andreu Albó (Degree Student);
Laura Amorós (Master Student);
Martí Arañó (Degree Student);
Maria Argudo (PhD Student);
Fernando Baldero (JAE intro
2020); Jessica Nayeli Bernal
(Hired Technician); Andrea
Cano (Degree Student);
Eglantine Maria Chappuis (Hired
Technician); Maria Colomé
(Degree Student); Delfina
Cornejo (JAE intro 2020); Ricart
García (Degree Student); Henar
Margenat (Hired Technician);
Daniel Montagud (PhD Student).
; Celia Montalban (Degree
Student); Xavier Peñarroya
(Master Student); David Pineda
(JAE intro 2020); Nuria Isabel
Rubio (Marie Curie); Jongmo
Suh (PhD Student).



Federica Lucati
PhD Student

PROJECTS

CANTERA. *Influencia del régimen hidrológico en los ciclos del carbono y nitrógeno en la interfase río-ribera*

Principal Investigator: S. Bernal

Entity: MINECO

Budget: 102.850,00€.

Years: 2019-2022

ECO-REACTOR. *El papel biorreactivo del bosque de Ribera y de los arroyos intermitentes en la mitigación los impactos del efluente de las plantas depuradoras urbanas*

Principal Investigator: E. Gacia

Entity: MINECO

Budget: 122.210,00€.

Years: 2019-2021

TRANSFER-C. *Claus per a entendre la transferència de les fluctuacions atmosfèriques a la dinàmica del plàncton lacustre: processos a la conca*

Principal Investigator: Ll. Camarero

Entity: MINECO

Budget: 177.870 €

Years: 2016-2020

PLASTICOPYR. *Estrategias para la reducción de la contaminación por plásticos y la mejora de la calidad ecológica y servicios medioambientales en los ríos de montaña*

Principal Investigator: H. Guasch

Entity: Interreg POCTEFA_UE

Budget: 90.187,00€.

Years: 2019-2022

PLASTICSinBIOFILMS. *Consortium for the investigation of the dynamics of plastic particles in fluvial systems*

Principal Investigator: H. Guasch

Entity: Proyecto investigación CSIC
(Programa i-Link+)

Budget: 206.282,70€.

Years: 2019-2020

INTERACTOMA. *Aproximación ecológica y metagenómica a las interacciones biológicas del microbioma ambiental*

Principal Investigator: E. O. Casamayor

Entity: MINECO

Budget: 171.820,00€.

Years: 2019-2021

HI-REQ. *Smart high-frequency environmental sensor networks for quantifying nonlinear hydrological process dynamics across spatial scales*

Principal Investigator: E. Martí

Entity: Entity: European Union (H2020)

Budget: 180.000 €

Years: 2016-2020

FUNBIO. *Cascadas tróficas como generadoras de cambios en la biodiversidad, funciones del ecosistema y procesos evolutivos en lagos de alta montaña*

Principal Investigator: M. Ventura

Entity: MINECO

Budget: 154.880,00€.

Years: 2019-2021

AQUACOSM. Network of Leading European AQUAtic MesoCOSM Facilities Connecting Mountains to Oceans from the Arctic to the Mediterranean.
Principal investigator: Eugènia Martí.
Entity:
Budget:
Years: 2017-2020

BIOOCULT. Ecosistemas acuáticos de alta montaña: refugio de biodiversidad oculta y centinelas del cambio global.

Principal Investigators: M.Ventura
Entity: OAPN
Budget: 95.991,65€.
Years: 2019-2022

Recolección, análisis de muestras y de datos biológicos y geoquímicos y comunicación científica a través de los Servicios científico-técnicos del CEAB
Principal Investigator: E. O. Casamayor
Entity: Proyectos Intramurales Especiales – CSIC
Budget: 390.086 €
Years: 2017-2021

Index Biològic BMWPC 2016.

Principal Investigator: M.A. Puig
Entity: Nestlé Waters España, S.A.
Budget: 1.714,00€.
Years: 2019-2020

PRORISK. Els millors professionals en avaluació del risc químic per obtenir els màxims beneficis dels serveis dels nostres ecosistemes.
Principal investigator: Helena Guasch
Entity:
Budget: 3.994.233,77€.
Years: 2020-2023

Trabajos de evaluación ecológica y medioambiental de sistemas sensibles ambientalmente en el Salar de Atacama
Principal Investigator: Marc Ventura
Entity: SQM SALAR S.A
Budget: 166.864€
Years: 2019-2020

RESTORBODIV. Monitoring of high mountain lake biodiversity restoration.
Principal investigator: Marc Ventura
Entity:
Budget: 74.270,82€.
Years: 2020-2022

FLUVIAL-PREMOVAL. Exceso de fósforo (P) y actividad humana en ecosistemas fluviales: Dinámica del P, biomarcadores microbianos y estrategias para su remediación.
Principal investigator: Helena Guasch
Entity:
Budget: 120.000€.
Years: 2020-2023.

APATURA IRIS. Seguimiento del estado ecológico de la riera del Catllar y estudio experimental del papel ecosistémico de la fauna piscícola autóctona.

Principal investigator: Helena Guasch

Entity:

Budget: 2.500€.

Years: 2020-2021

MONOCLE. Multiscale Observation Networks for Optical monitoring of Coastal waters, Lakes and Estuaries

Principal Investigators: M.Ventura

Entity: H2020_Unión Europea

Budget: 472.710,35€.

Years: 2018-2022

Impacto del cambio global sobre la flora acuática protegida de los lagos del Pirineo

Principal investigator: Esperança Gacia.

Entity:

Budget: 3.434,59€.

Years: 2020-2022

Analysis of the otoliths of Mullus barbatus, Mullus surmuletus and Merluccius merluccius on photography to determine age in years

Principal Investigator: E. O. Casamayor

Entity: AQUABIO TECH LIMITED

Budget: 8.517,00€.

Years: 2019-2020

Analysis of the otoliths of coryphaena hippurus to determine age in days and provide second reading for quality control of the samples analysed following the timeline below

Principal Investigator: E. O. Casamayor

Entity: AQUABIO TECH LIMITED

Budget: 9.830,00€.

Years: 2019-2021

Trabajos de evaluación ecológica y medioambiental de sistemas sensibles ambientalmente en el Salar de Atacama

Principal Investigator: E. O. Casamayor

Entity: SQM SALAR S.A.

Budget: 101.978,00€

Years: 2019-2020

ALKALDIA_2. Gradientes de alcalinidad y ph a escala fina: Las cuencas de los Pirineos como ecosistemas modelo

Principal investigator: Lluis Camarero

Entity:

Budget: 90.000€

Years: 2020-2023

SCIENTIFIC PRODUCTION

PAPERS

Anticó, E.; Fontàs, C.; Vera, R.; Mostazo, G.; Salvadó, V.; Guasch, Helena. A novel Cyphos IL 104-based polymer inclusion membrane (PIM) probe to mimic biofilm zinc accumulation. *Science of the Total Environment* 715 : 136938 (2020). <https://digital.csic.es/handle/10261/204605>

Argudo, María; Gich, Frederic; Bonet, Berta; Espinosa, Carmen; Gutiérrez, Marina; Guasch, Helena. Responses of resident (DNA) and active (RNA) microbial communities in fluvial biofilms under different polluted scenarios. *Chemosphere* 242 : 125108 (2020). <https://digital.csic.es/handle/10261/221042>

Atli, Gülfazar; Guasch, Helena; Rubio-García, Francesc; Zamora, Luis; Vilagispert, Anna. Antioxidant system status in threatened native fish *Barbus meridionalis* from the Osor River (Iberian Peninsula): I. Characterization and II. In vitro Zn assays. *Environmental Toxicology and Pharmacology* 79 : 103428 (2020). <https://digital.csic.es/handle/10261/215257>

Ávila, Anna; Molowny-Horas, Roberto; Camarero, Lluís. Stream chemistry response to changing nitrogen and sulfur deposition in two mountain areas in the Iberian Peninsula. *Science of the Total Environment* 711 : 134697 (2020). <https://digital.csic.es/handle/10261/197281>

Barral-Fraga, Laura; Barral, María Teresa; MacNeill, Keeley; Martíñá-Prieto, Diego; Morin, Soizic; Rodríguez-Castro, María Carolina; Tuulaikhuu, Baigal-Amar; Guasch, Helena. Biotic and Abiotic Factors Influencing Arsenic Biogeochemistry and Toxicity in Fluvial Ecosystems: A Review.

International Journal of Environmental Research and Public Health 17 : 2331 (2020). <https://digital.csic.es/handle/10261/205963>

Bastias, Elliot; Bolívar, Manel; Ribot, Miquel; Peipoch, Marc; Thomas, Steven A.; Sabater, Francesc; Martí, Eugènia. Spatial heterogeneity in water velocity drives leaf litter dynamics in streams. *Freshwater Biology* 65 : 435-445 (2020). <https://digital.csic.es/handle/10261/196786>

Bastias, Elliot; Ribot, Miquel; Jonsson, Micael; Sabater, Francesc; Martí, Eugènia. Chemical and optical properties of leachates from different riparian particulate organic matter sources influence instream microbial activity. *Freshwater Science* 39(4): 812-823 (2020). <https://digital.csic.es/handle/10261/222113>

Bastias, Elliot; Ribot, Miquel; Bernal, Susana; Sabater, Francesc; Martí, Eugènia. Microbial uptake of nitrogen and carbon from the water column by litter-associated microbes differs among litter species. *Limnology and Oceanography* 65(8) : 1891-1902 (2020). <https://digital.csic.es/handle/10261/205220>

Bernal, Susana; Drummond, Jennifer D.; Castellar, Sara; Gacia, Esperança; Ribot, Miquel; Martí, Eugènia. Wastewater treatment plant effluent inputs induce large biogeochemical changes during low flows in an intermittent stream but small changes in day-night patterns. *Science of the Total Environment* 714 : 136733 (2020). <https://digital.csic.es/handle/10261/199177>

- Comer-Warner, Sophie; Knapp, Julia L. A.; Blaen, P. J.; Klaar, Megan J.; Shelley, Felicity; Zarnetske, Jay P.; Lee-Cullin, Joseph; Folegot, Silvia; Kurz, Marie J.; Lewandowski, Jörg; Harvey, Judson W.; Waerd, Adam S.; Mendoza-Lera, Clara; Ullah, S.; Datry, Thibault; Kettridge, Nicholas; Goddy, Daren; Drummond, Jennifer D.; Martí, Eugènia; Milner, Alexander; Hannah, David M.; Krause, Stefan.** The method controls the story - Sampling method impacts on the detection of pore-water nitrogen concentrations in streambeds. *Science of the Total Environment* 709 : 136075 (2020). <https://digital.csic.es/handle/10261/197399>
- de Celis, Miguel; Belda, Ignacio; Ortiz-Álvarez, Rüdiger; Arregui, Lucía; Marquina, Domingo; Serrano, Susana; Santos, Antonio.** Tuning up microbiome analysis to monitor WWtps' biological reactors functioning. *Scientific Reports* 10 : 4079 (2020). <https://digital.csic.es/handle/10261/205234>
- Denfeld, Blaize A.; Lupon, Anna; Sponseller, Ryan A.; Laudon, Hjalmar; Karlsson, Jan.** Heterogeneous CO₂ and CH₄ patterns across space and time in a small boreal lake. *Inland Waters* 10(3) : 348-359 (2020). <https://digital.csic.es/handle/10261/219399>
- Espinosa, Carmen; Abril, Merixell; Guasch, Helena; Pou, Núria; Proia, Lorenzo; Ricart, Marta; Ordeix, M.; Llenas, Laia.** Water Flow and Light Availability Influence on Intracellular Geosmin Production in River Biofilms. *Frontiers in Microbiology* 10 : 3002 (2020). <https://digital.csic.es/handle/10261/200080>
- Giménez-Grau, Pau; Felip, Marisol; Zufiaurre, Aitziber; Pla-Rabes, S.; Camarero, Lluís; Catalán, Jordi.** Homeostasis and non-linear shift in the stoichiometry of P-limited planktonic communities. *Ecosphere* 11(9) : e03249 (2020). <https://digital.csic.es/handle/10261/221110>
- Gosá, Alberto; Martínez-Silvestre, Albert; Cruset, Eloi; Pou-Rovira, Quim; Ventura, Marc.** Síndrome de edema en *Lissotriton helveticus* salvajes del Pirineo y su entorno. *Boletín de la Asociación Herpetológica Española* 31(I) : 165-169 (2020). <https://digital.csic.es/handle/10261/224691>
- Guerrieri, R.; Lecha, Lucas; Mattana, Stefania; Caliz, Joan; Casamayor, Emilio O.; Barceló, Anna; Michalski, Greg; Peñuelas, Josep; Ávila, Anna; Mencuccini, Maurizio.** Partitioning between atmospheric deposition and canopy microbial nitrification into throughfall nitrate fluxes in a Mediterranean forest. *Journal of Ecology* 108(2) : 626-640 (2020). <https://digital.csic.es/handle/10261/193943>
- Hoffmeister, S.; Murphy, K. R.; Cascone, C.; Ledesma, José L. J.; Köhler, S. J.** Evaluating the accuracy of two in situ optical sensors to estimate DOC concentrations for drinking water production. *Environmental Science Water Research & Technology* 6 : 2891-2901 (2020). <https://digital.csic.es/handle/10261/219386>
- Kaal, Joeri; Lavery, Paul S.; Martínez Cortizas, Antonio; López-Costas, Olalla; Buchaca, Teresa; Salinas, Cristian; Serrano, Oscar.** Reconstruction of 7500 years of coastal environmental change impacting seagrass ecosystem dynamics in Oyster Harbour (SW Australia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 558 : 109953 (2020). <https://digital.csic.es/handle/10261/221041>
- Leiva-Dueñas, Carmen; Leavitt, Peter R.; Buchaca, Teresa; Martínez Cortizas, A.; López-Merino, Lourdes; Serrano, Oscar; Lavery, Paul S.; Schouten, S.; Mateo, Miguel Ángel.** Factors regulating primary producers' assemblages in *Posidonia oceanica* (L.) Delile ecosystems over the past 1800 years. *Science of the Total Environment* 718 : 137163 (2020). <https://digital.csic.es/handle/10261/199996>

- Llorens-Marès, Tomàs; Catalán, Jordi; Casamayor, Emilio O.** Taxonomy and functional interactions in upper and bottom waters of an oligotrophic high-mountain deep lake (Redon, Pyrenees) unveiled by microbial metagenomics. *Science of the Total Environment* 707 : 135929 (2020). <https://digital.csic.es/handle/10261/199451>
- Lucati, Federica; Miró, Alexandre; Ventura, Marc.** Conservation of the endemic Pyrenean newt (*Calotriton asper*) in the age of invasive species: interlake dispersal and colonisation Dynamics. *Amphibia-Reptilia* 41(2) : 281-282 (2020). <https://digital.csic.es/handle/10261/199365>
- Lucati, Federica; Poignet, Manon; Miró, Alexandre; Trochet, Audrey; Aubret, Fabien; Barthe, Laurent; Bertrand, Romain; Buchaca, Teresa; Calvez, Olivier; Caner, Jenny; Darnet, Elodie; Denoël, Mathieu; Guillaume, Olivier; Le Chevalier, Hugo; Martínez-Silvestre, Albert; Mossoll-Torres, Marc; O'Brien, David; Osorio, Víctor; Pottier, Gilles; Richard, Murielle; Sabas, Ibor; Souchet, Jérémie; Tomàs, Jan; Ventura, Marc.** Multiple glacial refugia and contemporary dispersal shape the genetic structure of an endemic amphibian from the Pyrenees. *Molecular Ecology* 29(15) : 2904-2921 (2020). <https://digital.csic.es/handle/10261/215105>
- Lupon, Anna; Catalán, Núria; Martí, Eugènia; Bernal, Susana.** Influence of Dissolved Organic Matter Sources on In-Stream Net Dissolved Organic Carbon Uptake in a Mediterranean Stream. *Water* 12(6): 1722 (2020). <https://digital.csic.es/handle/10261/215719>
- Lupon, Anna; Denfeld, Blaize A.; Laudon, Hjalmar; Leach, Jason; Sponselle, Ryan A.** Discrete groundwater inflows influence patterns of nitrogen uptake in a boreal headwater stream. *Freshwater Science* 39(2): 228-240 (2020). <https://digital.csic.es/handle/10261/207182>
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Drought alters the biogeochemistry of boreal stream networks.

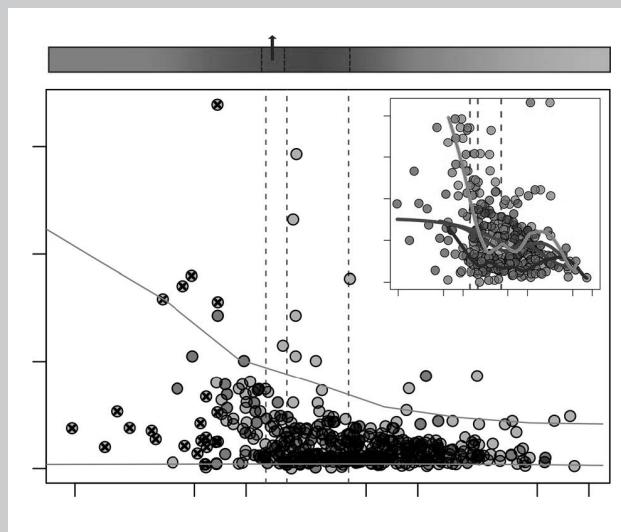
Gómez-Gener, Lluís; Lupon, Anna; Laudon, Hjalmar; Sponseller, Ryan A.

Nature Communications 11: 1795 (2020).

<https://digital.csic.es/handle/10261/208958>

Drought is a global phenomenon, with widespread implications for freshwater ecosystems. While droughts receive much attention at lower latitudes, their effects on northern river networks remain unstudied. We combine a reach-scale manipulation experiment, observations during the extreme 2018 drought, and historical monitoring data to examine the impact of drought in northern boreal streams.

Increased water residence time during drought promoted reductions in aerobic metabolism and increased concentrations of reduced solutes in both stream and hyporheic water. Likewise, data during the 2018 drought revealed widespread hypoxic conditions and shifts towards anaerobic metabolism, especially in headwaters. Finally, long-term data confirmed that past summer droughts have led to similar metabolic alterations. Our results highlight the potential for drought to promote biogeochemical shifts that trigger poor water quality conditions in boreal streams. Given projected increases in hydrological extremes at northern latitudes, the consequences of drought for the health of running waters warrant attention.



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CONGRESSES & CONFERENCES

Benito, X.; Catalán, N.; Lupon, A.; Pastor, A.; Rodriguez-Lozano, P.; Sánchez-Montoya, M. M. Women in Limnology. XX Congress of the Iberian Association of Limnology (AIL-2020). 29/10/2020. Spain ROUND TABLE

Bodmer, P.; Casas-Ruiz, J. P.; Ledesma, J. L. J. Integration of Terrestrial and Aquatic Carbon Fluxes across the landscape. BIOGEOMON 2020: The 10th International Symposium on Ecosystem Behaviour. 26/07/2020. Estonia. ROUND TABLE

Fagín, E.; Brancelj, A.; Felip, M.; Masqué, P.; Pla-Rabés, S.; Camarero, L.; Catalan, J. Human enhancement of high-mountain lake productivity throughout history: the case of the ultraoligotrophic Lake Redon (Pyrenees). XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Spain. ORAL

Guasch, Helena. Aquatic biofilms in effect-based monitoring and risk evaluation programs. 6th Aquatic Biofilms Workshop. 25/06/2020. Switzerland. ORAL

Guasch, Helena. Cómo ser Bióloga y ¡disfrutar en el intento! Reflexiones de una ecotoxicóloga que lleva 30 años amando la investigación. Ciclo de conferencias: Mujeres en ciencias Ambientales. Instituto de Ecología y Desarrollo Sustentable (INEDES) de la Universidad Nacional de Luján y el CONICET, Argentina. 05/10/2020. Luján. Argentina. CONFERENCE

Guasch, H. Microbial Community Ecotoxicology under Multiple Stressors Scenarios. SETAC Europe SciCon Meeting. 06/05/2020. Belgium. ROUND TABLE

Guasch, H. Micro-Organisms in complex systems : biological interactions, pollution & climate change. 2nd International

Conference on Microbial Ecotoxicology (Ecotoxicomic2020). 07/10/2020. INVITED TALK

Guasch, Elena; Margenat, Henar; Martí, Eugènia; Gacia, Esperança; Le Roux, Gael; Hansson, Sophia; Griocche, Alain; Cabrera, María; Martínez, Mònica; López, Manel; Vila, Anna; Romani, Anna M. PLASTICOPYR PROJECT. Guidelines for monitoring plastic litter in Mountain riverine systems : from macro- to microplastic sizes. MICRO2020 International Conference. 23/11/2020. Spain. ORAL

Guasch, H.; Margenat, H.; Cornejo, D.; Martí, E.; Gacia, E.; Le Roux, G.; Hansson, S.; Griocche, A.; Cabrera, M.; Martínez, M.; Serra, J.; López, M.; Vila, A.; Romani, A. M. Fate and impacts of microplastics; knowledge and responsibilities. MICRO2020, International Conference. 23/11/2020. Spain. ORAL

Krause, S.; Abbott, B. W.; Baranov, V. A.; Bernal, Susana; Blaen, P.; Datry, T.; Drummond, J.; Fleckenstein, J. H.; Gomez-Velez, J. D.; Hannah, D. M.; Knapp, J. L. A.; Kurz, M. J.; Lewandowski, J.; Martí, Eugènia; Mendoza-Lera, Clara; Milner, A.; Packman, A. I.; Pinay, G.; Ward, A. S.; Zarnetske, J. P. The quest for understanding the organisational principles of hyporheic exchange flow and biogeochemical cycling across scales. AGU Fall Meeting 2020. 11/12/2020. ORAL

López, A.; Guasch, H. Fluvial ecology of a weir and metal-impacted river in the Pyrenees. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Spain. POSTER

Lupon, A.; Gómez-Gener, L.; Fork, M.; Laudon, H.; Martí, E.; Sponseller,

R. Resazurin, a smart tracer for analyzing groundwater influences on stream metabolism. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Madrid. Spain. ORAL

Lupon, A.; Martí, E.; Bernal, S.; Guasch, H.; Rodríguez-Lozano, P. “El batec dels rius”, an outreach project for stream lovers. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Madrid. Spain. POSTER

Martí, E.; Ribot, M.; Lupon, A.; Castellar, S.; Gacia, E.; Ledesma, L.; Guasch, H.; Sabater, F.; Bernal, S. Bringing carbon bioavailability into the nitrogen cycling in urban streams. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Spain. ORAL

Miralles-Lorenzo, J.; Picazo, A.; Rochera, C.; Morant, D.; Casamayor, E. O.; Menéndez-Serra, M.; Camacho, A. Changes in aquatic and sediment prokaryotic communities along environmental gradients in Spanish saline lakes as revealed by 16S rRNA gene amplicon Illumina NGS. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Spain. ORAL

Poblador, S.; Martínez-Sancho, E.; Menéndez-Serra, M.; Casamayor, E.O.; Estiarte, M.; Lupon, A.; Martí, E.; Peñuelas, J.; Sabaté, S.; Sabater, F. Greenhouse gas emissions from riparian trees: are trees active producers or passive transporters from soil microbial processes? XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Spain. ORAL

Poblador, S.; Martínez-Sancho, E.; Menéndez-Serra, M.; Casamayor, E. O.; Estirte, M.; Lupon, A.; Martí, E.; Peñuelas, J.; Sabaté, S.; Sabater, F. Greenhouse gas emissions from a Mediterranean floodplain forest: the role of tree emissions under a changing flooding regime. European Geophysical Union 2020. 08/05/2020 . ORAL

Ribot, M.; Bernal, S.; Mayora, G.; Gacia, E.; Sabater, F.; Triadó-Margarit, X.; Deulofeu, O.; Casamayor, E. O.; Sorolla, A.; Martí, E. An industrial byproduct as alternative labile carbon source enhances nitrogen removal in freshwaters receiving wastewater treatment plant inputs. XX Congress of the Iberian Association of Limnology (AIL-2020) / III Iberoamerican Congress of Limnology (CIL-2020). 26/10/2020. Madrid. Spain. ORAL

Rodríguez-Lozano, P.; Martí, E.; Bernal, S.; Lupon, A. “El batec dels rius”: sensibilización sobre el régimen hidrológico de los ríos. XI Congreso Ibérico de Gestión y Planificación del Agua. 08/09/2020. Spain. ORAL

Ward, Adam; Drummond, Jennifer; Li, Angang; Lupon, Anna; Kurz, Marie; Zarnetske, Jay; Stegen, James; Marti, Eugenia; Ouellet, Valerie; Brekenfeld, Nicolai; Mao, Feng; Graham, Emily; Bernal, Susana; Krause, Stefan; Hannah, David. An inductive approach to characterize physical, chemical, and biological system interactions in a 5th order river basin. 22nd EGU General Assembly. 04/05/2020. ORAL

Wen, H.; Perdrial, J.; Bernal, Susana; Abbott, B. W.; Dupas, R.; Godsey, S. E.; Harpold, A.; Rizzo, D.; Underwood, K.; Adler, T.; Hale, R.; Sterle, G.; Li, L. Temperature controls production but hydrology controls export of dissolved organic carbon at the catchment scale. European Geosciences Union (EGU) online Meeting. 04/05/2020. ORAL

DOCTORAL THESES

UNIVERSITAT DE GIRONA (UdG).

Stochastic models and the temporal dynamics of ecological communities. Student: Vicente Luis Jiménez Ontiveros. Advisors: Emilio O. Casamayor & David Alonso.

UNIVERSITAT DE BARCELONA (UB).

Temperature variability, predation pressure and zooplankton composition in Pyrenean high mountain lakes. Student: Ibor Sabas Saludas. Advisor: Marc Ventura Oller.

MASTER THESES

UNIVERSITAT DE BARCELONA (UB).

Análisis de la variación temporal de la captación de nitrato en ríos de cabecera en cuencas mediterráneas. Trabajo de investigación de final de máster. Máster Oficial en Ciencia y Gestión Integral del Agua. Advisor: Anna Lupon, Eugènia Martí & Susana Bernal. TRABAJO FIN DE MASTER

UNIVERSITAT DE BARCELONA (UB).

La disponibilitat de carboni influencia la captació bruta d'amoni en un riu mediterrani intermitent. Màster Ecologia, Gestió i Restauració del Medi Natural. Student: Xavier Peñarroya Galceran. Advisor: Susana Bernal Berenguer & Anna Lupon Navazo. TRABAJO FIN DE MASTER

DEGREE'S FINAL PROJECT

UNIVERSITAT DE GIRONA (UdG).

Influencia de la disponibilidad de carbono en la retención de nitrato en ríos de distintas bioregiones y con distintos usos del suelo. Programme: Biology (Universitat de Girona). Student: Alex Ingelmo Romero. Advisor: Susana Bernal Berenguer.

UNIVERSITAT DE GIRONA (UdG).

Variabilitat genètica i identificació d'espècies del gènere *Phoxinus* (Cyprinidae) en estanys d'alta muntanya dels Pirineus Occidentals. Student: Andreu Albó Timor. Advisor: Marc Ventura Oller.

CSIC has signed a scientific cooperation contract with the **Chilean mining company SQM Salar S.A.** to help assess the conservation and sustainability status of the **Salar de Atacama**, one of the driest ecosystems on Earth and rich in lithium and potassium resources. **SQM Salar S.A.** is one of the world leaders in the exploitation of lithium and potassium from the largest salt deposit in **Chile**. Salt flat brines are a major source of minerals and especially lithium, a strategic highly demanded commodity with uses ranging from light batteries to cancer treatment. A multidisciplinary **CSIC** team with expertise in ecology and natural resources will carry out a diagnosis of the current state of knowledge on microorganisms, soil, water, flora, fauna, and other aquatic organisms present in the area. **Marc Ventura** and **Emilio O Casamayor**, from the **Center for Advanced Studies in Blanes**, have joined the team of experts belonging to a total of seven **CSIC** institutes.



<https://www.ceab.csic.es/pressimpacts/>

PLASTICØPYR: STRATEGIES TO REDUCE PLASTIC POLLUTION IN MOUNTAIN ECOSYSTEMS

Principal Investigator: H. Guasch

Entity: Interreg POCTEFA_UE

Budget: 90.187,00€.

Years: 2019-2022

The PLASTICØPYR project aims to sustainably prevent the accumulation of plastics in mountain ecosystems in order to make tourism compatible with the conservation of these ecosystems. PLASTICØPYR responds to the challenge of making tourism compatible with the conservation and improvement of mountain fluvial ecosystems.

The general objective of the project is to reduce in a sustainable way the accumulation of plastics in the mountain ecosystems and their subsequent transport to the sea. The expected results in natural sites located in the Pyrenees of Catalonia, Andorra and France are: 1) the development of tools to evaluate and disseminate the environmental impact of plastics on fluvial ecosystems; 2) the decrease of the production of plastic wastes and an improvement of its management; 3) the involvement of citizenship in the research of plastic pollution and in the co-creation of self-sustainable use and substitution models. The main beneficiaries are mountain ecosystems and their inhabitants through reducing plastic pollution and having a strategy for the reduction of single-use plastics compatible with local economic development. The present project will supply unique protocols to be shared in the three countries which represent a reduction of the cost in the development of management strategies. This entails a greater interaction between the parties that share objectives and therefore maximizes the positive synergies between the different stakeholders. It also involves the improvement of the ecological quality of rivers with the subsequent reduction of local and downstream depollution costs; landscape improvement with territories endowed with protection regulations and therefore attractivity enhancement of the area. The originality and novelty of the project lie in the development of a strategy that involves citizens, research centres, specialized companies and local agents in research, dissemination of the environmental issues and co-creation of circular economy business models that did not exist before.



MOLECULAR ECOLOGY OF THE MARINE BENTOS

Head of Research Group:
Uriz Lespe, María Jesús

We seek to assess evolutionary and ecological processes in benthic systems by combining field observation, experimentation, and molecular tools. We aim to understand the diversity, functioning, and responses of the marine benthos to environmental changes, both natural and human-induced, to predict future scenarios of marine ecosystems.

Current topics cover the taxonomy and molecular phylogeny and ecology of benthic assemblages (metagenomics) and species (sponges, polychaetes, crustaceans, ascidians, and fishes), with particular emphasis on symbiotic interactions. Life cycles, population genetics, demography, and phylogeography studies help us to detect and understand the colonization pathways and the fate of exotic (introduced) marine species in native ecosystems.

Moreover, the production of secondary metabolites by marine benthic organisms is studied under the dual perspective of their ecological functions and biotechnological applications.



Daniel Martin
Staff Scientist



Xavier Turon
Group Leader



Enrique Macpherson
Staff Scientist



María Jesús Uriz
Ad Honorem



Chiara Romano
Hired Scientist



Héctor Torrado
PhD Student



Missing in the picture: Paula Carolina Rodríguez (Hired Technician); Marwa Chaibi (PhD Student); Adrià Antich (PhD Student); David Buckley (Hired Technician); Oriol Sacristan (Hired Technician); Jan Sureda (Hired Technician); Jana Gallart (Degree Student); Paola Mura (Staff Technician).

PROJECTS

POPCOMICS. *Biodiversidad marina y genómica: de las poblaciones a las comunidades*

Principal Investigator: X.Turon
Entity: Ministerio de Ciencia, Innovación y Universidades
Budget: 164.802 €
Years: 2018-2020

BIGPARK. *Evolución de la biodiversidad en fondos marinos de Parques Nacionales impactados por especies invasoras y cambio climático: monitorización genética y ecológica*

Principal Investigator: X.Turon
Entity: OAPN
Budget: 49.818,00€.
Years: 2019-2022 €

AMARE. *Actions for Marine Protected Areas*

Principal Investigator: E. Macpherson
Entity: European Union (Interreg)
Budget: 206.629 €
Years: 2016-2020

GALaThEoidea lobster adaptAtions to deep sea Environments

Principal Investigator: E. Macpherson
Entity: Proyecto investigación CSIC
Budget: 10.954,00€.
Years: 2019-2021

CREOCEAN. *Estudio de sistemas naturales afectados por proyectos de gestión de litoral o infraestructura en mar abierto*

Principal Investigator: D. Martin
Entity: CREOCEAN
Budget: 30.000€
Year: 2003-2021

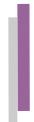
CONECTIVIDAD. *Conectividad, biodiversidad y evolución en organismos marinos*

Principal Investigator: E. Macpherson
Entity: Proyectos Intramurales Especiales
Budget: 206.282€
Years: 2017-2020 €

SCOoba. *Symbiotic Cooperation and Boring Activity of *Cliona* sponges under a climate change context*

Principal Investigator: X.Turon
Entity: European Union (Marie Curie)
Budget: 239.191 €
Years: 2017-2020

SCIENTIFIC PRODUCTION



PAPERS

Atienza, Sara; Guardiola, Magdalena; Praebel, Kim; Antich, Adrà; Turon, Xavier; Wangensteen, Owen S. DNA Metabarcoding of Deep-Sea Sediment Communities Using COI: Community Assessment, Spatio-Temporal Patterns and Comparison with 18S rDN. Diversity 12 : 123 (2020). <https://digital.csic.es/handle/10261/205693>

Barbanti, Anna; Torrado, Hèctor; Macpherson, Enrique; Bargelloni, Luca; Franch, Rafaella; Carreras, Carlos; Pascual, Marta. Helping decision making for reliable and cost-effective 2b-RAD sequencing and genotyping analyses in non-model species. Molecular Ecology Resources 20(3) : 795-806 (2020). <https://digital.csic.es/handle/10261/201592>

Carreras, Carlos; García-Cisneros, Alex; Wangensteen, Owen S.; Ordóñez, Víctor; Palacín, Cruz; Pascual, Marta; Turon, Xavier. East is East and West is West: Population genomics and hierarchical analyses reveal genetic structure and adaptation footprints in the keystone species *Paracentrotus lividus* (Echinoidea). Diversity and Distributions 26 : 382-398 (2020). <https://digital.csic.es/handle/10261/196768>

Casso, Maria; Turon, Marta; Marco, Núria; Pascual, Marta; Turon, Xavier. The Microbiome of the Worldwide Invasive Ascidian *Didemnum vexillum*. Frontiers in Marine Science 7 : 201 (2020). <https://digital.csic.es/handle/10261/208558>

Jakiel, Aleksandra; Palero, Ferran;

Błażewicz, Magdalena. Secrets from the deep: Pseudotanaidae (Crustacea: Tanaidacea) diversity from the Kuril–Kamchatka Trench. Progress in Oceanography 183 : 102288 (2020). <https://digital.csic.es/handle/10261/199144>

Macpherson, Enrique; Chan, Tin-Yam; Kumar, Appukuttannair Biju; Rodríguez Flores, Paula C. On some squat lobsters from India (Decapoda, Anomura, Munididae), with description of a new species of Paramunida Baba, 1988. Zookeys 965 : 17-36 (2020). <https://digital.csic.es/handle/10261/219257>

Macpherson, Enrique; Rodríguez Flores, Paula C.; Machordom, Annie. New occurrences of squat lobsters of the genus Eumunida Smith, 1883 (Decapoda, Eumunididae) in New Caledonia, the Solomon Islands and Papua-New Guinea, with the description of a new species. Zootaxa 4786:485-496 (2020). <https://digital.csic.es/handle/10261/213282>

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Sacristán-Soriano, Oriol; Pérez Criado, Natalia; Àvila, Conxita. Host species determines symbiotic community composition in Antarctic sponges (Porifera: Demospongiae).

Helping decision making for reliable and cost-effective 2b-RAD sequencing and genotyping analyses in non-model species

Barbanti, Anna; Torrado, Hèctor; Macpherson, Enrique; Bargelloni, Luca; Franch, Rafaella; Carreras, Carlos; Pascual, Marta.

Molecular Ecology Resources 20(3) : 795-806 (2020)

<https://digital.csic.es/handle/10261/201592>

Abstract:

High-throughput sequencing has revolutionized population and conservation genetics.

RAD sequencing methods, such as 2b-RAD, can be used on species lacking a reference genome. However, transferring protocols across taxa can potentially lead to poor results. We tested two different IIB enzymes (*Alfl* and *CspCI*) on two species with different genome sizes (the loggerhead turtle *Caretta caretta* and the sharpsnout seabream *Diplodus puntazzo*) to build a set of guidelines to improve 2b-RAD protocols

on non-model organisms while optimising costs. Good results were obtained even with degraded samples, showing the value of 2b-RAD in studies with poor DNA quality.

However, library quality was found to be a critical parameter on the number of reads and loci obtained for genotyping. Resampling analyses with different number of reads per individual showed a trade-off between number of loci and number of reads per sample. The resulting accumulation curves can be used as a tool to calculate the number of sequences per individual needed to reach a mean depth ≥ 20 reads to acquire good genotyping results. Finally, we demonstrated that selective-base ligation does not affect genomic differentiation between individuals, indicating that this technique can be used in species with large genome sizes to adjust the number of loci to the study scope, to reduce sequencing costs and to maintain suitable sequencing depth for a reliable genotyping without compromising the results. Here, we provide a set of guidelines to improve 2b-RAD protocols on non-model organisms with different genome sizes, helping decision-making for a reliable and cost-effective genotyping.



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Galià-Camps, C.; Carreras, C.; Turon, X.; Pascual, M. Predicting 2b-RAD loci abundance and testing results in *Styela plicata*. VII International Symposium on Marine Sciences. 01/07/2020. España. ORAL

Pascual, M.; Carreras, C.; García-Cisneros, A.; Wangensteen, O. S.; Ordóñez, V.; Palacín, C.; Turon, X. East is East and West is West: population genomics and hierarchical analyses reveal genetic structure and adaptation footprints in the keystone species *Paracentrotus lividus* (Echinoidea). VII SESBE. Congress of the Spanish Society for Evolutionary Biology. 05/02/2020. España. POSTER

Pascual, M.; Carreras, C.; García-Cisneros, A.; Wangensteen, O. S.; Ordóñez, V.; Palacín, C.; Turon, X. Population genomics and hierarchical analyses reveal genetic structure and adaptation in *Paracentrotus lividus* (Echinoidea). VII International Symposium on Marine Sciences. 01/07/2020. España. POSTER

Segovia, N.; Haye, P.A.; Turon, X. ¿Espacio o tiempo? Depende. Importancia relativa de la distribución espacial y temporal de tres linajes de la ascidia *Pyura chilensis* en la costa Pacífica sureste. LXIII Annual Meeting of the Biological Society of Chile. 25/11/2020. Chile. ORAL

BOOK'S CHAPTER

Glasby, C. J.; Gil, João; Martin, Daniel. Chapter 12. Class Polychaeta. In: Damborenea, C., Rogers, D.C. & Thorp, J.H. (Eds.) Thorp and Covich's Freshwater Invertebrates, Fourth Edition. Volume V – Keys to Neotropical and Antarctic Fauna. Academic Press, London. Pp. 480-486 (2020). <https://digital.csic.es/handle/10261/217885>

Halsband, C.; Ahyong, S.; Brandt, A.; Kosobokova, K.; Ward, P.; Goodall-Copestake, W. P.; Macpherson, E.

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Mercedes R. Marchese; Roberto G. Alves; Alejandro Oceguera-Figueroa; Christopher J. Glasby; João Gil; Daniel Martin; Tarmo Tim; Stuart R. Gelder; Cristina Damborenea. Chapter 12 - Phylum Annelida. Thorp and Covich's Freshwater Invertebrates. Volume 5: Keys to Neotropical and Antarctic Fauna. Academic Press / Elsevier. Pp. 431-486 (2020). <https://digital.csic.es/handle/10261/238787>

DOCTORAL THESES

UNIVERSITAT DE BARCELONA (UB).
Genomic analyses of an introduced ascidian and implications for invasiveness.
Student: Maria Casso Carrasco. Advisor: Xavier Turon Barrera.

UNIVERSITAT DE BARCELONA (UB).
Macro- and micro- symbioses involving sponges: ecological roles in the marine benthos.
Student: Marta Turon Rodrigo. Advisor: Daniel Martin Sintes & María Jesús Uriz Lespe.

DEGREE'S FINAL PROJECT

UNIVERSITAT DE BARCELONA (UB).
Aplicació de la realitat augmentada a l'estudi taxonòmic d'invertebrats del macrobentos marí. Student: Jana Gallart Gironès. Advisor: Daniel Martin Sintes.

UNIVERSITAT DE BARCELONA (UB).
Monitoratge temporal dels Artròpodes del port de Blanes mitjançant col·lectors biològics.
Student: Mireia Gonzalez Mingote. Advisors: Adrià Antich Gonzalez & Xavier Turon Barrera.

POPCOMICS: MARINE BIODIVERSITY AND GENOMICS

Principal Investigator: X.Turon
Entity:
Budget: 164.802€.
Years: 2018-2020

The goal of the project PopCOmics is to tackle current challenges in marine biology research with genomic techniques; from analyses of populations of keystone species in Mediterranean ecosystems (engineer, vulnerable, commercial and introduced species) to changes in biodiversity as a response to impacts at the community and holobiont levels.



BENTHIC ECOSYSTEM FUNCTIONING

Head of Research Group:
Ballesteros Sagarra, Enric

We aim to understand patterns and processes underlying the structure and functioning of the marine benthos at multiple temporal and spatial scales and at different environmental situations.

We combine descriptive field ecology and natural history with experimental and modelling approaches to understand functional drivers of species, communities and ecosystems. We are interested on how benthic ecosystems may be influenced by human alterations at local, regional and global scales.

Most of the ecosystems studied are shallow rocky bottoms and seagrass meadows in a wide range of geographical areas: Mediterranean Sea, Atlantic, Indian and Pacific Oceans and Gulf of California and Caribbean Sea.



Rafel Coma
Staff Scientist



Enric Ballesteros
Group leader



Teresa Alcoverro
Staff Scientist



Arthur Rohan
External collaborator



Jordi Pagès
External collaborator



Susana Pinedo
Staff Technician



Esther Jordana
Staff Technician



Maria García
Staff Technician

Missing in the picture:
Tomas Bañeras (Degree Student); Boada, Jordi (Hired Technician); Itziar Burgues (PhD Student); Emma Cebrián (Staff Scientist); Sónia de Caralt (Hired Scientist); Mar Fusté (Degree Student); Laia Illa (Master student); Cristina Galobart (Pre-doc); Raul Gonzalez (Pre-doc); Gerard Mas (Master Student); Mario Minguito (Pre-doc); Eduard Serrano (Hired scientist); Wei Tian (PhD Student); Sandra Zedillo (Master student)



Maria Paola Satta
Staff Technician



Xavier Torras
Staff Technician



Jana Verdura
PhD student

PROJECTS

UMBRAL. *Respuestas de la vegetación marina bentónica al estrés: transiciones críticas, resiliencia y oportunidades de gestión.*

Principal Investigator: Teresa Alcoverro

Entity: MINECO

Budget: 106,843

Years: 2018-2020

BE_CALM. *Papel de las esponjas en el acoplamiento biogeoquímico bento-pelágico: intercambio de carbono y nutrientes entre el coralígeno y las comunidades circundantes*

Principal Investigator: R. Coma

Entity: MINECO

Budget: 193.600,00€.

Years: 2019-2021

La evaluación de la calidad ambiental del puerto de Barcelona, en base a la composición faunística de los fondos sedimentarios

Principal Investigator: E. Ballesteros

Entity: Ports de Barcelona

Budget: 45.496€.

Years: 2018-2022

MERCES. *Marine ecosystem restoration in changing european seas.*

Principal Investigator: Enric Ballesteros

Entity: European Union (H2020)

Budget: 22.212 €

Years: 2016-2020

Impacte del temporal Gloria als herbeis de Posidonia del Mediterrani Occidental

Principal Investigator: Teresa Alcoverro

Entity: MINECO

Budget: 44.500€.

Years: 2020-2021

SCIENTIFIC PRODUCTION

PAPERS

Bahbah, Lamia; Bensari, Bilel; Khadidja, Chabane; Torras, Xavier; Ballesteros, Enric. Cartography of littoral rocky-shore communities to assess the ecological status of water bodies through the application of CARLIT method in Algeria (South-Western Mediterranean Sea). *Marine Pollution Bulletin* 157 : 111356 (2020). <https://digital.csic.es/handle/10261/216074>

Ballesteros, Enric. On the presence of a species of Batophora J. Agardh, 1854 (Chlorophyta: Dasycladales) in Formentera, Balearic Islands. *Boll. Soc. Hist. Nat. Balears* 63: 109-117 (2020). <https://digital.csic.es/handle/10261/224987>

Ballesteros, Enric ; Marsinyach, E.; Bagur, M.; Sales, Marta; Movilla, Juan Ignacio; Bolado, I.; Cefali, Maria Elena. The pearl oyster *Pinctada imbricata radiata* (Leach, 1814) (Bivalvia: Pteriidae) reaches Minorca, Balearic Islands. *Boll. Soc. Hist. Nat. Balears* 63: 97-108 (2020). <https://digital.csic.es/handle/10261/224692>

Ballesteros, Enric; Pons-Fita, Alèssia. Corals and macroalgae can sometimes coexist. *Frontiers in Ecology and the Environment* 18(3): 150 (2020). <https://digital.csic.es/handle/10261/206346>

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Influence on the Restoration Potential of Marine Habitats in Europe. *Frontiers in Marine Science* 7 : 184 (2020). <https://digital.csic.es/handle/10261/208840>

Buñuel, Xavier; Alcoverro, Teresa; Pagès, Jordi F.; Romero, Javier; Ruiz, Juan M.; Arthur, Rohan. The dominant seagrass herbivore *Sarpa salpa* shifts its shoaling and feeding strategies as they grow. *Scientific Reports* 10 : 10622 (2020). <https://digital.csic.es/handle/10261/216073>

Creed, J. C.; Rocha, R. M.; Hoeksema, Bert W.; Serrano, Eduard; Rilov, Gil; Milazzo, Marco; Miranda, R. J.; Sánchez, J. A.; Fleury, B. G.; Silva, A. G. Invasive Alien Species and Their Effects on Marine Animal Forests. Perspectives on the Marine Animal Forests of the World. Springer. Pp. 419-467 (2020). <https://digital.csic.es/handle/10261/229176>

De Caralt, S.; Verdura, Jana; Vergés, Alba; Ballesteros, Enric; Cebrian, Emma. Differential effects of pollution on adult and recruits of a canopy-forming alga: implications for population viability under low pollutant levels. *Scientific Reports* 10 : 17825 (2020). <https://digital.csic.es/handle/10261/221450>

Duggan-Edwards, Mollie F.; Pagès, Jordi F.; Jenkins, Stuart R.; Bouma, Tjeerd J.; Scov, Martin W. External conditions drive optimal planting configurations for salt marsh restoration. *Journal of Applied Ecology* 57(3) : 619-629 (2020). <https://digital.csic.es/handle/10261/198215>

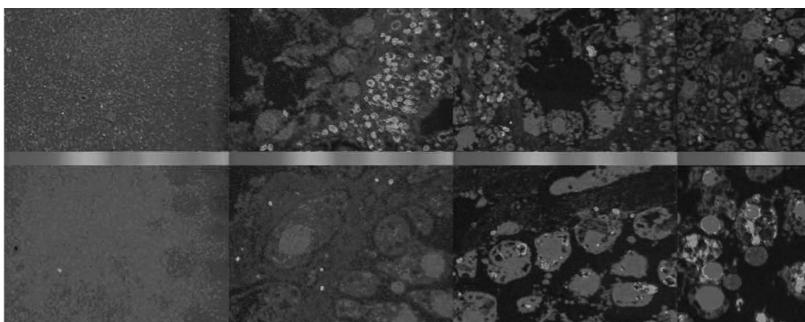
Heterotrophy in the earliest gut: a single-cell view of heterotrophic carbon and nitrogen assimilation in sponge-microbe symbioses

Rix, Laura; Ribes, Marta; Coma, Rafael; Jahn, Martin T.; Goeij, Jasper M. de; Van Ovelen, Dick; Escrig, Stéphane; Meibom, A.; Hentschel, Ute.

The ISME Journal 14 : 2554-2567 (2020)
<https://digital.csic.es/handle/10261/216072>

Sponges are the oldest known extant animal-microbe symbiosis. These ubiquitous benthic animals play an important role in marine ecosystems in the cycling of dissolved organic matter (DOM), the largest source of organic matter on Earth. The conventional view on DOM cycling through microbial processing has been challenged by the interaction between this efficient filter-feeding host and its diverse and abundant microbiome. Here we quantify, for the first time, the role of host cells and microbial symbionts in sponge heterotrophy. We combined stable

isotope probing and nanoscale secondary ion mass spectrometry to compare the processing of different sources of DOM (glucose, amino acids, algal-produced) and particulate organic matter (POM) by a high-microbial abundance (HMA) and low-microbial abundance (LMA) sponge with single-cell resolution. Contrary to common notion, we found that both microbial symbionts and host choanocyte (i.e. filter) cells and were active in DOM uptake. Although all DOM sources were assimilated by both sponges, higher microbial biomass in the HMA sponge corresponded to an increased capacity to process a greater variety of dissolved compounds. Nevertheless, *in situ* feeding data demonstrated that DOM was the primary carbon source for both the LMA and HMA sponge, accounting for ~90% of their heterotrophic diets. Microbes accounted for the majority (65–87%) of DOM assimilated by the HMA sponge (and ~60% of its total heterotrophic diet) but <5% in the LMA sponge. We propose that the evolutionary success of sponges is due to their different strategies to exploit the vast reservoir of DOM in the ocean. communities.



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- Katsanevakis, Stelios; Poursanidis, Dimitris; Hoffman, Razy; Ballesteros, Enric; Cebrian, Emma; García, María; Santamaría, Jorge; Verdura, Jana; et al.** Unpublished Mediterranean records of marine alien and cryptogenic species. *BioInvasions Records* 9(2): 165-182 (2020). <https://digital.csic.es/handle/10261/211161>
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- McKinley, Emma; Pagès, Jordi F.; Ballinger, Rhoda C.; Beaumont, Nicola.** Forgotten landscapes: Public attitudes and perceptions of coastal saltmarshes. *Ocean and Coastal Management* 187 : 105117 (2020). <https://digital.csic.es/handle/10261/200297>
- Medrano, Alba; Hereu, Bernat; Mariani, Simone; Neiva, João; Pagès-Escolà, Marta; Paulino, Cristina M.; Rovira, Graciela; Serrão, Ester A.; Linares, Cristina.** Ecological traits, genetic diversity and regional distribution of the macroalga *Treptacantha elegans* along the Catalan coast (NW Mediterranean Sea). *Scientific Reports* 10 : 19219 (2020). <https://digital.csic.es/handle/10261/222574>
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Garcia, Maria. Las especies invasoras en el litoral catalán. Diversidad y amenazas de los ecosistemas bentónicos. 1^a Edición del Curso. Fundación CRAM (Centro de Recuperación de Animales Marinos). 07/06/2020. Spain. CONFERENCE

Garcia, Maria. Las especies invasoras en el litoral catalán. Diversidad y amenazas de los ecosistemas bentónicos. 2^a Edición del Curso. Fundación CRAM (Centro de Recuperación de Animales Marinos). 13/12/2020. Spain. CONFERENCE

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Moreno, J.; Mayol, J.; Bibiloni, G.; Pons, G. X.; Ballesteros, E. Illes i illots de Cabrera i del Migjorn de Mallorca. Atles de les Petites Illes i els Illots de les Balears. Perifèric Edicions. Pp. 101-108 (2020). <https://digital.csic.es/handle/10261/223806>

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MASTER THESES

UNIVERSIDAD DE LA LAGUNA (ULL). Conservación de los bosques de la gorgonia *Eunicella singularis* frente al cambio climático: la poda de ramas muertas como herramienta de gestión. Student: Gerard Mas Giménez. Advisor: Rafael Coma Bau & Eduard Serrano Gras.

UNIVERSITAT DE BARCELONA (UB). Ecological state shift dynamics in temperate rocky reefs: understanding the role of barnacle

Perforatus perforatus (Bruguière, 1789) on the recovery of macroalgal communities. Student: Alex Aubach Masip. Advisor: Teresa Alcoverro Pedrola. T

UNIVERSITAT DE BARCELONA (UB). Sea urchin barrens facilitate limpet abundance, a weak stabilizing feedback unable to maintain bare rock states. Student: Laia Illa López. Advisor: Teresa Alcoverro Pedrola.

UMBRAL: RESPONSES OF BENTHIC MARINE VEGETATION TO STRESS

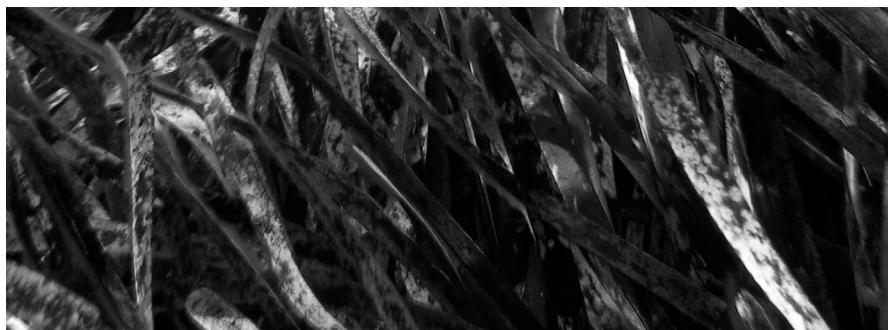
Principal Investigator: T.Alcoverro

Entity:

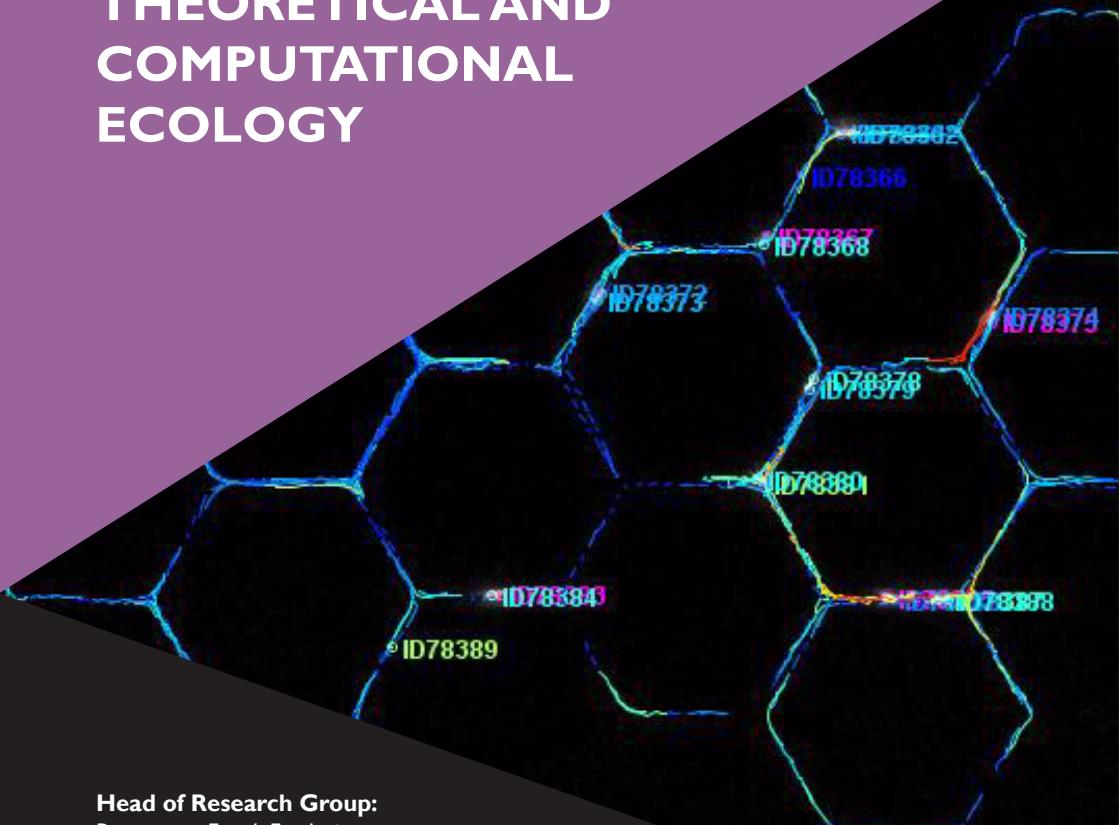
Budget: 106.843€.

Years: 2018-2020

This project aims to develop empirical and theoretical tools to understand how nearshore ecosystems respond to anthropogenic stressors. We will use quantitative studies to characterise the dynamics of ecosystem stress responses with an aim to characterise general principles that can be directly applied to the management and conservation of species and ecosystems. These dynamics often involve complex non-linear behaviours that generate abrupt (and therefore unexpected) transitions between 'normal' or 'health' states (with their functions and services intact) and 'deteriorated' states (with significant losses in function and services). Managing for this surprise requires a clear understanding of stress tolerance thresholds, beyond which critical ecosystem transitions are likely to occur. We will characterise the ecological dynamics driving these non-linearities and attempt to determine how these mechanisms are mediated by environmental conditions (temperature and nutrients) and by the biological features of the species involved. Using Mediterranean marine macrophyte communities as our study systems, we intend to develop predictive and diagnostic tools to deal with the management of complex ecosystem dynamics in a conceptually robust and unified manner. This framework will help predict when ecosystems are close to critical transitions, and their sensitivity to other environmental conditions such as global warming or eutrophication. Specific objectives include: (1) experimental documentation of ecosystem responses (linear or non-linear) to the most relevant stressors (overfishing, eutrophication); (2) identification and experimental validation of the mechanisms underlying these dynamics; (3) experimental validation of factors and conditions that mediate the mechanisms that determine critical transitions; (4) generation of a robust predictive framework of ecosystem behaviour that uses mechanistic models to reliably integrate non-linear behaviours using the mechanisms identified in earlier objectives; (5) observational validation of model predictions using natural gradients of relevant variables (temperature, nutrients) and (6) development of handy management tools, indicators and criteria to predict and prevent critical transitions to maximize the resilience of coastal ecosystems.



THEORETICAL AND COMPUTATIONAL ECOLOGY



Head of Research Group:

Bartumeus Ferré, Frederic

We seek to provide conceptual advance in ecological theory using mathematical and computational techniques. We are particularly interested in building a bridge between theory and data.

We are a highly collaborative and multidisciplinary research group that develops specific research lines and provides general theoretical foundations of observational and empirical research in ecology mostly in the context of Community Ecology & Biodiversity, Population Ecology, Movement & Behavioural Ecology, Invasion Biology, and Epidemics.

We aim to evaluate ecological theory through the analysis of empirical data, the development of mechanistic and integrative (across scales) modeling approaches, and the study of the role of environmental and biological stochasticity in ecological phenomena, from foraging behavior to biodiversity patterns.



David Alonso
Staff Scientist



Bartumeus Frederic
Group leader



Miquel Becerro
Staff Scientist



Meritxell Genovart
Hired Scientist



Daniel Oro
Staff Scientist



Joan Garriga
Hired Technician



Vicente Jiménez
PhD student



Missing in the picture: Laura Blanco (hired Scientist); Ernesto Carneiro (External Collaborator); Julia Castro (IAE-INTRO); Catuxa Cereda (PhD Student); Carlos Javier Dommar (Hired Scientist); Santiago Escartín (Hired Scientist); Zivko Juznic (Hired Scientist); Natali Lazzari (Hired Technician); Roger Lloret (Pre-doctoral Researcher); Simone Mariani (Hired Scientist); Cristina Martínez (Degree Student); Adrà Molina (Degree Student); Leïa Navarro (PhD Student); Marta Pardo (PhD Student); Oriol Ponce (Degree Student); Paul Wawrzynkowsky (Master Student); José Antonio Sanabria (Hired Technician); Sandra Zedillo (Master Student).

PROJECTS

DIVERSITAT. Estado y tendencias de la biodiversidad de los arrecifes litorales españoles

Principal Investigator: M. Becerro

Entity: MINECO

Budget: 181.500,00€.

Years: 2019-2021

BIG MOSQUITO BITE. Community-Driven Big Data Intelligence to Fight Mosquito-Borne Disease

Principal Investigator: F. Bartumeus

Entity: La Caixa Foundation

Budget: 507.600,00€.

Years: 2019-2022

CRISIS. Efectos de escala en las transiciones críticas frente a la incertidumbre ambiental: desarrollo de nuevas aproximaciones teóricas

Principal Investigator: D. Alonso

Entity: MINECO

Budget: 110.110,00 €

Years: 2019-2021

DRAGON. Eradication of invasive species with high impact and effects on ecological resilience: the case of the black rat on the island of Dragonera

Principal Investigator: D. Oro

Entity: LFundación BBVA

Budget: 100.000€.

Years: 2020-2022

VEO. Versatile Emerging infectious disease Observatory

Principal Investigator: F. Bartumeus

Entity:

Budget: 675.375€.

Years: 2020-2024

PREDICTOR. Las mariposas como indicadores y predictoras de cambio global en la Red Natura 2000

Principal Investigator: D. Oro

Entity:

Budget: 31.555€.

Years: 2020-2023

SUSE. Social uses of search ecology: stochastic foundations and experimental research

Principal Investigator: F. Bartumeus

Entity: MINECO

Budget: 134.310

Years: 2016-2019

RESILDRAG. Erradicación de especies invasoras de gran impacto y efectos sobre la resiliencia ecológica: el caso de la rata negra en la isla de Dragonera

Principal Investigator: D. Oro

Entity: Fundación BBVA

Budget: 90.099€.

Years: 2020-2022

ONE HEALTH. Preparing for vector-borne virus outbreaks in a chaning world : a One Health Approach

Principal Investigator: F. Bartumeus

Entity:

Budget: 10.000.000€.

Years: 2020-2025

Meta-analysis of multidecadal biodiversity trends in Europe

Pilotto, Francesca; Oro, Daniel; et al.

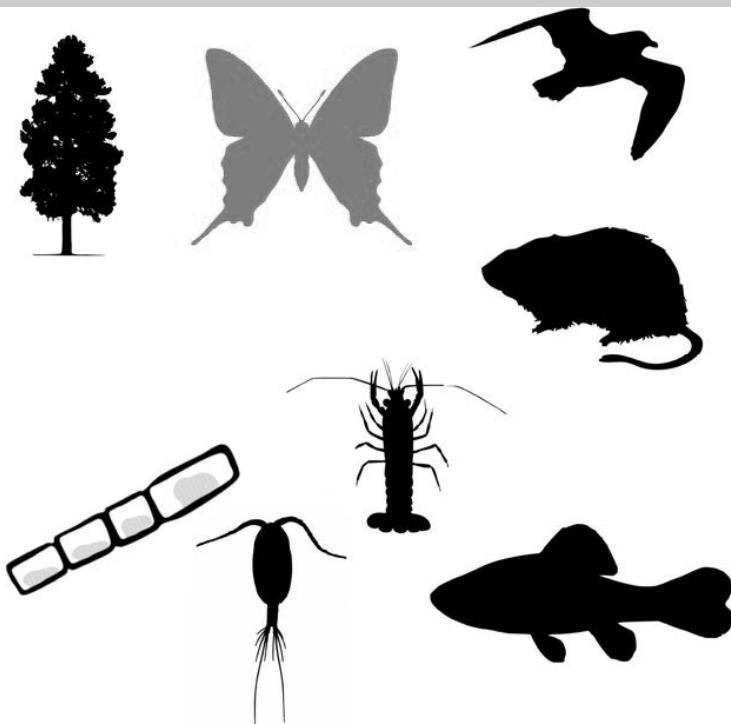
Nature Communications 11 :3486 (2020)

<https://digital.csic.es/handle/10261/217194>

Abstract

Local biodiversity trends over time are likely to be decoupled from global trends, as local processes may compensate or counteract global change. We analyze 161 long-term biological time series (15–91 years) collected across Europe, using a comprehensive dataset comprising ~6,200 marine, freshwater and terrestrial taxa. We test whether (i) local long-term

biodiversity trends are consistent among biogeoregions, realms and taxonomic groups, and (ii) changes in biodiversity correlate with regional climate and local conditions. Our results reveal that local trends of abundance, richness and diversity differ among biogeoregions, realms and taxonomic groups, demonstrating that biodiversity changes at local scale are often complex and cannot be easily generalized. However, we find increases in richness and abundance with increasing temperature and naturalness as well as a clear spatial pattern in changes in community composition (i.e. temporal taxonomic turnover) in most biogeoregions of Northern and Eastern Europe.



SCIENTIFIC PRODUCTION



PAPERS

Ábreo, Marino Eugenio; Acuña-Perales, Nicolás; Alfaro-Shigueto, Joanna; Azócar, Jorge; Barragán Rocha, Ana Rebeca; Baquero, Andrés; Cotto, Alejandro; Darquea, Jodie; de Paz, Nelly; Donoso, Miguel; Dutton, Peter H.; Fonseca, Luis; Gadea, Velkiss; García, Débora; Genovart, Meritxell; Jimenez, Astrid; del Rosario Juárez, María; López Sánchez, Karla Cecilia; Mangel, Jeffrey C. Enhanced, coordinated conservation efforts required to avoid extinction of critically endangered Eastern Pacific leatherback turtles. *Scientific Reports* 10 : 4772 (2020). <https://digital.csic.es/handle/10261/205694>

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Lin, Shengtao; Wang, Zinan; Araújo, H. A.; Raposo, E. P.; Gomes, Anderson S. L.; Wu, Han; Fan, Mengqiu; Rao, Yunjiang. Ultrafast convergent power-balance model for Raman random fiber laser with half-open cavity. *Optics Express* 15 : 22500 (2020). <https://digital.csic.es/handle/10261/221045>

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CONGRESSES & CONFERENCES

Alonso, David; Oro, Daniel. The effect of functional responses for harvested stage-structured populations. British Ecological Annual Meeting. Festival of Ecology - British Ecological Society. 18/12/2020. United Kingdom. CONFERENCE

Arcos, J. M.; Escandell, R.; Genovart, M.; Catchot, S.; Oro, D.; García, D.; Guilford, T.; Igual, J. M.; Louzao, M.; Mc Minn, M.; Sanz-Aguilar, A.; Tavecchia, G. Aproximacions demogràfiques per avaluar l'estat de conservació dels dos procèl tàrids a terres de parla catalana: la Baldriga i el Virot petit. 2n Congrés d'Ornitologia de les Terres de Parla Catalana. 10/10/2020. Spain. POSTER

Bartumeus, Frederic. Ciencia ciudadana e innovación para la gestión de enfermedades transmitidas por mosquitos."I Congreso Virtual de la Sociedad Española de Epidemiología (SEE) y da Associação Portuguesa de Epidemiología (APE) Epidemiología, sostenibilidad y responsabilidad social. 21/10/2020. Valencia. Spain. ORAL

Bartumeus, Frederic. Models participatius i d'innovació oberta per a la salut pública: el cas de Mosquito Alert. X Jornada de Enfermedades Emergentes. 20/06/2020. Spain. ORAL

Bartumeus, Frederic. Mosquito-borne disease scenarios in Europe. Versatile Emerging infectious disease Observatory Forecasting,

nowcasting and tracking in a changing world. Kick-off Meeting. 05/06/2020. INVITED TALK

Bartumeus, Frederic. Citizen science for mosquito surveillance. 2nd AIM-COST Annual Conference and WG meetings. 12/02/2020. Portugal. ORAL

de Pablo, F.; Capo, J.; Genovart, M.; Escandell, R.; Oro, D. La importancia de los seguimientos a largo plazo en conservación de la biodiversidad. Las aves marinas en la Reserva de Biosfera de Menorca. 2n Congrés d'Ornitologia de les Terres de Parla Catalana. 10/10/2020. Spain. ORAL

Igual, J. M.; Sanz Aguilar, A.; Rotger, A.; Martín, M.; Oro, D.; Genovart, M.; Tavecchia, G. Resultados tras dos décadas de seguimiento ininterrumpido de la pardela cenicienta en el parque natural de Dragonera (Illes Balears). 2n Congrés d'Ornitologia de les Terres de Parla Catalana. 10/10/2020. Spain. ORAL

Martínez García de la Torre, Cristina; Susial-Martín, Patricia E.; Alonso, David. David contra Goliath: El Papel de la Política Agraria Común en las Transiciones Agroecológicas. Perspectivas desde el Pequeño Campesinado Catalán. Agroecología 2020. VIII Congreso Latinoamericano. 25/11/2020. Online. ORAL

BOOK

Oro, Daniel. Perturbation, Behavioural Feedbacks, and Population Dynamics in Social Animals. Oxford University Press (OUP) (2020). <https://digital.csic.es/handle/10261/205723>

BOOK CHAPTER

Genovart, M.; Igual, J. M.; Sanz-Aguilar, A.; Oro, D. La Baldriga o virot (*Calonectris diomedea*) a l'Illa des Pantaleu. Atles de les Petites Illes i els Illots de les Balears. Perifèric Edicions. Pp. 94-95 (2020). <https://digital.csic.es/handle/10261/223922>

COMMUNITY-DRIVEN BIG DATA INTELLIGENCE TO FIGHT MOSQUITO-BORNE DISEASE (BIG MOSQUITO BYTES)

Principal Investigator: F. Bartumeus

Entity: La Caixa Foundation

Budget: 507.600€

Years: 2019-2022



Spain stands at a crossroads. The expansion of *Ae.albopictus* throughout the Iberian Peninsula and the arrival of *Ae.aegypti* in the Canary Islands have increased the risk of serious outbreaks of dengue, chikungunya, or Zika, in Spain. With hundreds of imported cases already co-present with vectors, and autochthonous dengue transmissions confirmed in 2018, it is only a matter of time before Spain is faced with a serious public health crisis. Yet Spain lacks reliable information about disease risk patterns and the dynamics of potential outbreaks.

This project will fill this gap by bringing together experts in epidemiology, entomology, big data, movement ecology and socio-demography to build an innovative system that can harness the data revolution for public health preparedness. It will produce vital, comprehensive, actionable knowledge about mosquito-borne disease (MBD) risks and potential outbreaks in Spain. It will fuse multiple big data sources and employ cutting edge modelling and infrastructure to: (1) explore determinants and distribution of MBD risk, (2) illuminate links between social inequality and MBDs, (3) infer the role of human mobility in MBD risk, (4) ensure continuous model calibration and update, and (5) deliver real-time models to public health agencies. The system will give decision-makers the information they need, while also making raw data and open source code available for continuous improvement through open innovation.

Our consortium includes (i) the team behind Mosquito Alert, the pioneering citizen science system that delivers real-time intelligence on tiger mosquitoes to public health agencies in Spain, (ii) Spain's core epidemiological experts, which collect and analyze human cases on mosquito-borne disease throughout the country, (iii) entomologists implementing vector control in Spain, and (iv) socio-demographers at the forefront of research using mobile phones and other big data sources to explore human-mosquito encounter rates.

DOCTORAL THESIS

UNIVERSITAT DE BARCELONA (UB).

Movement ecology in pelagic seabirds. Student: Zuzana Zajkova. Advisor: Frederic Bartumeus Ferre.

DEGREE'S FINAL PROJECT

UNIVERSITAT DE BARCELONA (UB).

Camins per a la transformació del sistema alimentari a la conca baixa de la Tordera: L'agroecologia com a destí. Student: Cristina Martínez García de la Torre. Advisor: David Alonso Giménez.



SPONGE ECOBIOLOGY & BIOTECHNOLOGY

Head of Research Group:
Maldonado Barahona, Manuel

We combine objectives concerning fundamental research with others of potential practical application. The work is structured around marine invertebrates, mainly sponges (Porifera) which play a relevant ecological role and show a high biotechnological potential.

We use sponges to address the evolutionary links between protozoan and metazoan for a better understanding of the evolutionary emergence of the Animal Kingdom.

We explore the eco-biology of Porifera silicification aiming to unveil biotechnological applications.



Manuel Maldonado
Group leader



María López
PhD student



Missing in the picture: Samuel Abalde (Hired Technician);
Erik García (Hired Technician); Cèlia Sitjà (PhD Student).

PBS. Exploring the biological production of silica and its applications in science and technology

Principal Investigator: M. Maldonado
Entity: MINECO
Budget: 145.000€.
Years: 2016-2020

SPONGES. Deep-sea Sponge Grounds Ecosystems of the North Atlantic: an integrated approach towards their preservation and sustainable exploitation

Principal Investigator: M. Maldonado
Entity:
Budget: 491.923€.
Years: 2016-2020

Deep-sea Sponge Grounds Ecosystems of the North Atlantic: an integrated approach towards their preservation and sustainable exploitation

Principal Investigator: M. Maldonado
Entity:
Budget: 491.922,50€
Years: 2016-2020

DARKSI Explorando las implicaciones bioecológicas, biogeocíquímicas y tecnológicas de la "sílice oscura" en el océano

Principal Investigator: M. Maldonado
Entity: MINECO
Budget: 163.000€
Years: 2020-2023

SCIENTIFIC PRODUCTION

PAPERS

Maldonado, Manuel; Beazley, L.; López-Acosta, María; Kenchington, Ellen L. R.; Casault, Benoit; Hanz, Ulrike; Mienis, Furu. Massive silicon utilization facilitated by a benthic-pelagic coupled feedback sustains deep-sea sponge aggregations. *Limnology & Oceanography* 66 : 366-391 (2020). <https://digital.csic.es/handle/10261/220475>

Maldonado, Manuel; López-Acosta, María; Beazley, L.; Kenchington, Ellen L. R.; Koutsouveli, V.; Riesgo, A. Cooperation between passive and active silicon transporters clarifies the ecophysiology and evolution of biosilicification in sponges. *Science Advances* 6(28): eaba9322 (2020). <https://digital.csic.es/handle/10261/217110>

Pham, Christopher K.; Murillo, Francisco Javier; Lurette, Camille; Maldonado, Manuel; Colaço, Ana; Ottaviani, D.; Kenchington, Ellen L. R. Author Correction: Removal of deep-sea sponges by bottom trawling in the Flemish Cap area: conservation, ecology and economic assessment. *Scientific Reports* 10:4879 (2020). <https://digital.csic.es/handle/10261/230112>

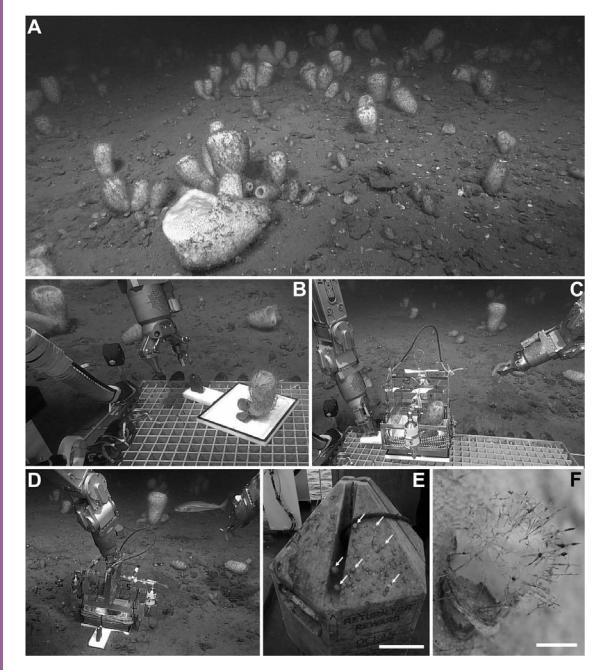
Riesgo, A.; Taboada, S.; Kenny, Nathan J.; Santodomingo, Nadia; Moles, Juan; Leiva, Carlos; Cox, Eileen; Ávila, Conxita; Cardona, Luis; Maldonado, Manuel. Recycling resources: silica of diatom frustules as a source for spicule building in Antarctic siliceous demosponges. *Zoological Journal of the Linnean Society* : zlaa058 (2020). <https://digital.csic.es/handle/10261/222294>

Shaffer, Megan R.; Davy, Simon K.; Maldonado, Manuel; Bell, James J. Seasonally Driven Sexual and Asexual Reproduction in Temperate *Tethya* Species. *The Biological Bulletin* 238(2) : 89-105 (2020). <https://digital.csic.es/handle/10261/211683>

Sitjà, Celia; Maldonado, Manuel; Farias, C.; Rueda, Jose L. Export of bathyal benthos to the Atlantic through the Mediterranean outflow: Sponges from the mud volcanoes of the Gulf of Cadiz as a case study. *Deep-Sea Research Part I* 163: 103326 (2020). <https://digital.csic.es/handle/10261/218975>

DOCTORAL THESIS

UNIVERSITAT DE BARCELONA (UB).
The bathyal connections between the Mediterranean Sea and the Northeastern Atlantic Ocean: an assessment using deep-water sponges as a case study. Student: Celia Sitjà Poch.
Advisor: Manuel Maldonado Barahona.



Cooperation between passive and active silicon transporters clarifies the ecophysiology and evolution of biosilicification in sponges

Maldonado, Manuel; López-Acosta, María; Beazley, L.; Kenchington, Ellen L. R.; Koutsouveli, V.; Riesgo, A.

Science Advances 6(28): eaba9322 (2020)

The biological utilization of dissolved silicon (DSi) influences ocean ecology and biogeochemistry. In the deep sea, hexactinellid sponges are major DSi consumers that remain poorly understood. Their DSi consumption departs from the Michaelis-Menten kinetics of shallow-water demosponges and appears particularly maladapted to incorporating DSi from the modest

concentrations typical of the modern ocean. Why did sponges not adapt to the shrinking DSi availability that followed diatom expansion some 100 to 65 million years ago? We propose that sponges incorporate DSi combining passive (aquaglyceroporins) and active (ArsB) transporters, while only active transporters (SITs) operate in diatoms and choanoflagellates. Evolution of greater silicon transport efficiency appears constrained by the additional role of aquaglyceroporins in transporting essential metalloids other than silicon. We discuss the possibility that lower energy costs may have driven replacement of ancestral SITs by less efficient aquaglyceroporins, and discuss the functional implications of conservation of aquaglyceroporin-mediated DSi utilization in vertebrates.



GROUP OF AQUATIC MACROPHYTE ECOLOGY (GAME)

Head of Research Group:
Mateo Mínguez, Miguel Ángel

GAME has pioneered in the study of the carbon cycle associated to coastal vegetated ecosystems. Emphasis is made in the phenomenon of refractory accumulation of organic carbon during centuries or millennia in their sediments. Our studies triggered the nowadays worldwide spread and fertile research field of Blue Carbon, of which GAME is considered a reference group.

Taking advantage of the high chronological coherence in the accumulation of those highly organic sediments and their exceptional state of preservation, we also aim at studying long-term changes in the ecosystems at the land-ocean interface using a multiproxy palaeo-ecological approach.

With an integrative, inclusive and collaborative vocation, GAME makes incursions in a wide variety of scientific disciplines such as biogeochemistry, molecular biology, edaphology, geophysics, palaeo-ecology, palynology, microbiology, genetics, or archaeology.



Miguel Ángel Mateo
Group leader



Missing in the picture: Candela Marco (Hired Scientist); Pol Ramis (Degree Student).



Carmen Leiva
PhD student



Nerea Piñeiro
PhD student

SCIENTIFIC PRODUCTION

PAPERS

Kaal, Joeri; Lavery, Paul S.; Martínez Cortizas, Antonio; López-Costas, Olalla; Buchaca, Teresa; Salinas, Cristian; Serrano, Oscar. Reconstruction of 7500 years of coastal environmental change impacting seagrass ecosystem dynamics in Oyster Harbour (SW Australia). *Palaeogeography, Palaeoclimatology, Palaeoecology* 558 : 109953 (2020). <https://digital.csic.es/handle/10261/221041>

Kaal, Joeri; Martínez Cortizas, Antonio; Mateo, Miguel Ángel; Serrano, Oscar. Deciphering organic matter sources and ecological shifts in blue carbon ecosystems based on molecular fingerprinting. *Science of the Total Environment* 742 : 140554 (2020). <https://digital.csic.es/handle/10261/221034>

Lafratta, A.; Serrano, Oscar; Masqué, Pere; Mateo, Miguel Ángel; Fernandes, M.; Gaylard, S.; Lavery, Paul S. Challenges to select suitable habitats and demonstrate 'additionality' in Blue Carbon projects: A seagrass case study. *Ocean and Coastal Management* 197 : 105295 (2020). <https://digital.csic.es/handle/10261/221033>

Leiva-Dueñas, Carmen; Leavitt, Peter R.; Buchaca, Teresa; Martínez Cortizas, A.; López-Merino, Lourdes; Serrano, Oscar; Lavery, Paul S.; Schouten, S.; Mateo, Miguel Ángel. Factors regulating primary producers' assemblages in *Posidonia oceanica* (L.) Delile ecosystems over the past 1800 years. *Science of the Total Environment* 718 : 137163 (2020). <https://digital.csic.es/handle/10261/199996>

Monnier, Briac; Pergent, Gérard; Mateo, Miguel Ángel; Clabaut, P.; Pergent-Martini, C. Seismic interval velocity in the matte of *Posidonia oceanica* meadows: Towards a non-destructive approach for large-scale assessment of blue carbon stock. *Marine Environmental Research* 161 : 105085 (2020). <https://digital.csic.es/handle/10261/221044>

Piñeiro Juncal, Nerea; Leiva-Dueñas, Carmen; Serrano, Oscar; Mateo, Miguel Ángel; Martínez Cortizas, A. Pedogenic Processes in a *Posidonia oceanica* Mat. *Soil Systems* 4(2): 18 (2020). <https://digital.csic.es/handle/10261/215621>

BOOK CHAPTER

Cebrián, Emma; Alcoverro, Teresa; Ballesteros, Enric; Boada, Jordi; Cheminée, A.; Coma, Rafael; García-Rubies, Antoni; Garrabou, Joaquim; Hereu, Bernat; Kersting, D. K.; Linares, Cristina; Mateo, Miguel Ángel; Teixidó, Nuria. Impacte ecològic de les llevantades sobre les comunitats de fons rocosos: el cas del temporal Gloria. Sobre el temporal Gloria (19-23.01.20), els seus efectes sobre el país i el que se'n deriva : Report de Resposta Ràpida (R³). Institut d'Estudis Catalans (IEC). Pp. 103-111 (2020). <https://digital.csic.es/handle/10261/224162>

Factors regulating primary producers' assemblages in *Posidonia oceanica* (L.) Delile ecosystems over the past 1800 years

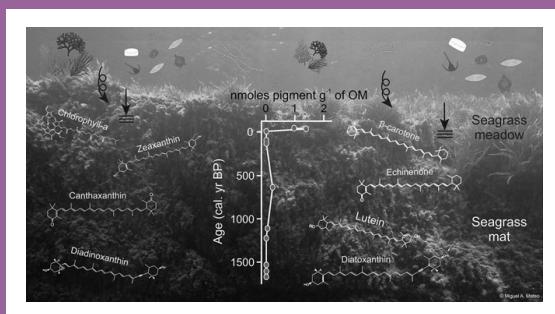
Leiva-Dueñas, Carmen; Leavitt, Peter R.; Buchaca, Teresa; Martínez Cortizas, A.; López-Merino, Lourdes; Serrano, Oscar; Lavery, Paul S.; Schouten, S.; Mateo, Miguel Ángel

Science of the Total Environment 718 : 137163 (2020)

<https://digital.csic.es/handle/10261/199996>

Posidonia oceanica (L.) Delile meadows are highly productive coastal marine ecosystems that provide multiple ecosystem services. The seagrass is not always the major contributor to total primary production, however, little is known about long-term changes in the composition of primary producers within seagrass meadows. Understanding compositional shifts within the community of primary producers is crucial to evaluate how climate and anthropogenic change affect the functioning of seagrass ecosystems. Here we analysed marker pigment composition in seagrass cores from two bays of the Cabrera Island (Balearic Islands, Spain) to assess long-term changes in phototrophic community composition and production in seagrass meadows, and identify the environmental factors triggering those changes. The

proxy dataset was explored using principal component analyses (PCA): one including the pigment dataset to look for associations between producers' groups, and another one combining the pigment dataset with plausible local and global regulatory factors to assess the environmental drivers of change. Analyses of characteristic pigments and morphological fossils (cysts) showed that the abundance of dinoflagellates increased over the last 150–300 years, coeval with a rise in solar irradiance and air temperature. When compared among embayments, pigments from cyanobacteria predominated in seagrass meadows located at Es Port, a sheltered bay receiving higher terrestrial runoff; whereas pigments from diatoms, seagrasses and rodophytes were more common at Santa María, an exposed bay with clearer waters. Water depth also played a role in controlling the phototrophic community composition, with greater abundance of diatoms in the shallowest waters ($b5$ m). Overall, our results suggested that historical and spatial variation in seagrass meadows' phototrophic community composition was influenced by the interaction between local factors (catchment- bay characteristics) and global climate processes (energy influx). Together these patterns forecast how marine primary producers and seagrass ecosystem structure may respond to future global warming.





Plataforma de Coneixement per a la Gestió del Patrimoni Natural i la Biodiversitat

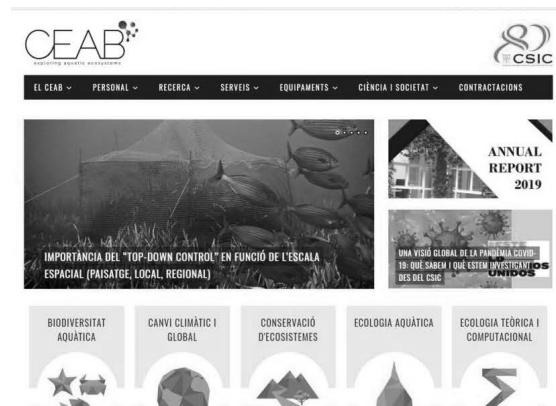
PRISMATIC is a free information science-policy platform designed to exchange available scientific knowledge generated in Catalonia with public managers, politicians and/or technicians and stakeholders with responsibilities in environment and biodiversity management and conservation.

The platform collects the scientific material in a summarized format and easy to follow language, accessible in www.prisma-tic.cat and social networks. The information is also shared through a monthly newsletter and an annual workshop. This science-policy platform has been promoted by the Departament de Territori i Sostenibilitat de la Generalitat de Catalunya and coordinated by CREAF.

The CEAB has published a total of 23 articles since its early participation in the project, being usually considered among the most visited and best qualified pieces of information.



CEAB WEBSITE



42.290 Unique visitors

54.563 Number of visits

48 Own news on blog



1.010 followers
>8.000 impressions
>400 views



3.430 followers
>150.000 impressions
>6.900 views



32 followers
43 videos
311 views

**02/01/2020**

Residues from brewing allow nitrates to be removed from wastewater.

**08/01/2020**

Marine species could migrate to deeper areas due to climate change.

**07/02/2020**

Mediterranean sea urchins are more vulnerable than previously thought.

**25/02/2020.**

Billions of microbes travel in dust storm.

**14/04/2020**

The CSIC uses mobile data to study the effectiveness of confinement on the dispersion of COVID-19.

**9/07/2020.** CEAB scientists have identified the mechanism by which marine sponges acquire silicon available in seawater.**25/08/2020**

Scientists describe new species of crustaceans from sea bug families.

**02/10/2020**

The Mosquito Alert App incorporates two new invasive mosquito species.

**04/12/2020**

Scientist describe for the first time the presence in waters of Menorca of a pearl oyster.

336

Utilizan mosto de cerveza y residuos de poda para depurar agua contaminada

Son los primeros en el mundo que aplican este método para tratar aguas contaminadas con hasta el 40% en niveles de TIO.

Infocampo
02.01.2020

Los científicos advierten que fenómenos como el Glòria serán más frecuentes

El Glòria es un fenómeno meteorológico que se produce cuando la atmósfera se calienta y se eleva, lo que implica que se pierde la estabilidad generalizada de la capa de aire que se encuentra entre los 1000 y 2000 metros de altura.

El Nacional
25.01.2020

Un segle per recuperar el fons mari arrasat pel temporal 'Gloria'

Los científicos consideran que el problema, conocido por su gravedad en todo el planeta, es cada vez más global.

Diari Ara
17.02.2020

Creix el delta del riu Tordera

• La tala de bosques augmenta la deforestación, per tener espacios del 'Gloria'.

• La lluvia circular da paso al desastre, ja que la lluvia a l'interior del mar desaparece asent, afirma l'investigador Rafael Sanch

El Punt Avui
28.02.2020

el MERCANTIL

El puerto de Barcelona debatirá sobre la calidad de las aguas con la celebración de una jornada

El evento contará con la participación de los expertos en las relaciones con el agua y las acciones de mejora de las aguas.

El Mercantil
02.03.2020

La Vanguardia

Ciencia ciudadana y datos masivos, ¿la nueva vacuna contra el dengue?

El proyecto pretende crear una red de voluntarios que entienda su trabajo en las horas extra que tiene de ocio para detectarlos.

La Vanguardia
23.03.2020

El CSIC lanza cuatro encuestas ciudadanas para evaluar el impacto social del COVID-19

URGENTE! DETEN LA EJECUCIÓN

EuropaPress
18.05.2020

Descubren cómo las esponjas marinas forman sus huecos con silicio del mar

Resumen, Vol. 31(1) - Cuadernos del Centro de Estudios Avanzados de Mallorca del CSIC (CEAC-CSIC) han identificado un organismo que forma huecos en la roca de silicio del fondo del mar, lo que contribuye a la erosión marina.

Los científicos han publicado en la revista 'Nature' que el organismo que crea estos huecos es una especie de esponja marina que vive en aguas profundas y que se alimenta de minerales.

Los huecos son resultado de un efecto similar para protegerse del agua, ya que las esponjas tienden a moverse y se adhieren a la roca para evitar que las corrientes las arrastren.

La Vanguardia
09.07.2020

dispara la población de garrapatas y mosquitos transmisores de enfermedades

La cifra de casos de enfermedades transmitidas por garrapatas y mosquitos dispara, lo que afecta a las personas que viven en zonas rurales y costeras, incluyendo más de 100.000 enfermos.

ABC
13.07.2020

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[EL MUNDO](#) | [Tendencias](#) | [Clima](#) | [Economía](#) | [Cultura](#) | [Deportes](#) | [Tecnología](#) | [Reportajes](#) | [Opinión](#) | [Humor](#)

[España](#) | [Mundo](#) | [Anuario](#) | [Diseño](#) | [Cultura](#) | [Lecturas](#) | [Cataluña](#) | [Comunidad Valenciana](#)

[10 ÚLTIMOS DEL CORONAVIRUS](#)

[Último](#) | [Última hora del coronavirus](#) | [Último CP](#) | [Última hora de las elecciones generales](#) | [Última hora de la crisis del coronavirus](#) | [Última hora de la crisis del coronavirus](#) | [Última hora de la crisis del coronavirus](#)

SOCIEDAD | [Comunidad](#)

El mosquito tigre vuelve con fuerza a Barcelona por el confinamiento del estado de alarma

HISTORIAS MUNDIALES | [Historias mundiales](#)

ANÁLISIS | [Análisis](#) | [Coronavirus](#) | [Mundo 2020](#) | [Méjico](#)



El Mundo
17.09.2020

[www.laperiodicocatalunya.com](#) | [Edición digital](#) | [Páginas](#) | [Noticias](#) | [Internacional](#) | [Deportes](#) | [Cultura](#) | [Tecnología](#) | [Reportajes](#) | [Opinión](#) | [Humor](#)

La pradera de posidonia de Mataró pierde 3,9 hectáreas por el temporal Gloria

La resaca del temporal de otoño ha dejado una zona con 3,9 ha de posidonia en el fondo de los agujeros costeros de la playa de Sant Antoni de Mataró prácticamente desaparecida.

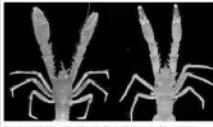


El Periodico
27.07.2020

[www.diariodegirona.cat](#) | [Edición digital](#) | [Páginas](#) | [Noticias](#) | [Internacional](#) | [Cataluña](#) | [Barcelona](#) | [Girona](#) | [Tarragona](#) | [Actualidad](#) | [Opinión](#)

Investigadors gironins posen nom a noves espècies de «xinxes de mar»

Unos investigadores del Institut d'Estudis del Mar (IEM) han descubierto dos nuevas especies de crustáceos que habitan en las aguas profundas del Mediterráneo.



Diari de Girona
25.08.2020

[www.europapress.es](#) | [Edición digital](#) | [Páginas](#) | [Noticias](#) | [Internacional](#) | [Deportes](#) | [Economía](#) | [Cultura](#) | [Tecnología](#) | [Reportajes](#) | [Opinión](#) | [Humor](#)

Investigadores españoles describen varias especies de una familia de crustáceos conocidos como chinchetas de mar

Un grupo de científicos del Instituto de Estudios del Mar (IEM) y del Centro Superior de Investigaciones Científicas (CSIC) han descrito siete nuevas especies de chinchetas de mar procedentes de aguas profundas del Mediterráneo.



EuropaPress
28.08.2020

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De la plaga del plástico al aumento del nivel del mar: estas son las amenazas del Mediterráneo

Los científicos del Instituto de Estudios del Mar (IEM) y del Centro Superior de Investigaciones Científicas (CSIC) han elaborado un informe sobre las amenazas que más peligro representan para el Mediterráneo.



El Español
04.11.2020

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Estudiantes de Ibiza analizan la presencia de plásticos en las playas

Alumnos del IES Balear han llevado a cabo un análisis de la contaminación en las playas de la isla.



Diario de Ibiza
23.11.2020

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EL 2020 registra el doble de mosquitos tigre a l'Estat que l'any anterior

Les observacions de mosquit tigre del novembre es multiplicaran per sis respecte del 2019.



El Punt Avui
01.12.2020

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Describen por primera vez la presencia en aguas de Menorca de una ostra periférica

Investigadores de la CEAB-CSIC, Oben y la Estación de Investigación Jaume Ferrer



Menorca al día
04.12.2020

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10 è FESTIVAL DE MÚSICA ANTIGUA DELS PIRINEUS

Investiguen la contaminació per plàstics als rius del Pirineu i com conscientiar-ne la ciutadania

Centres del Centre d'Estudis Arqueològics de Mallorca organitzen activitats en els rius del Pirineu per aquesta setmana.



Nació Digital
30.12.2020



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