

**PLAN DE ACTUACIÓN
ACTUATION PLAN**

2014-2017

INSTITUTO DE CIENCIAS MARINAS DE ANDALUCIA

ICMAN

Versión 1. 18 de marzo de 2016

1. Datos Generales / General Data



Código del Centro / Center Code:	070302
Tipo Centro / Center Type:	Centro Investigación
Titularidad / Ownership:	Propio
Áreas Científicas / Scientific Areas:	Recursos Naturales Ciencias Agrarias
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Director:	JULIAN BLASCO MORENO
Vicedirectores / Deputy Director:	FRANCISCO PRAT BAELLA ISABEL EMMA HUERTAS CABILLA
Gerente / Manager:	RAFAELA PRADA CARRASCO
Constituido por / Established by:	
Integrado por / Integrated by:	
Departamentos / Departments:	DPTO DE BIOLOGIA MARINA Y ACUICULTURA DPTO DE ECOLOGIA Y GESTION COSTERA
Unidades Asociadas / Associated Units:	

2. Reseña Histórica / Historical Outline

2.1 Origen / Origin

Fecha de Constitución / Foundation Date:	01/09/1955
Entidades Fundadoras / Founder Entities:	José M ^a Albareda
Primer Director / First Director:	Julio Rodríguez-Roda Compaired

2.2 Objeto con el que fue creado / Founding aim

Researches in Marine Biology and Fisheries

2.3 Reseña histórica extendida / Extended historical outline

Brief historical review:

The beginnings of the Instituto de Ciencias Marinas de Andalucía- Institute of Marine Sciences of Andalucía- (ICMAN) dated from 1943, when the Spanish Council for Scientific Research (CSIC) funded the Instituto de Biología Aplicada -Applied Biology Institute-. This Institute established in 1949 the Section of Marine Biology. In 1951, under administration of Fundación Juan de la Cierva for Technical Research, this section was renamed Instituto de Investigaciones Pesqueras (Fisheries Research Institute) which included four coastal laboratories: Blanes, Vinaroz, Castellón and Vigo. An additional laboratory was built in the fishery harbour area of Cadiz in 1955, named "Instituto de Investigaciones Pesqueras. Laboratory de Cadiz". Short later, in 1957, the recent built laboratory of Barcelona became the headquarters of the Institution.

In 1978 with the reorganization of the CSIC, laboratories of Blanes, Cadiz, Castellon and Vigo became independent Institutes from the one in Barcelona, and the Cadiz unit took the name of Instituto de Investigaciones Pesqueras de Cádiz. In 1986, after being located for 31 years in the Cadiz harbour and due to the necessity to expand and improve the already limited old facilities, the Institute moved to a new brand building situated in the University Campus of Puerto Real (Cadiz), changing then the name to the current Instituto de Ciencias Marinas de Andalucía (Andalusian Institute of Marine Sciences) (ICMAN-CSIC).

The choice of this new place stemmed primarily from the closeness to the Faculty of Sciences (University of Cadiz) and to the planned Faculty of Marine Sciences, which was completed a few years later. These University schools provide fruitful collaborations and graduate students in both Chemistry and Marine and Environmental Sciences. The ICMAN has grown and progressed, developing nowadays an important research activity and formation of new researchers in several fields of the marine sciences, such as aquaculture, oceanography, ecotoxicology and management of coastal ecosystems.

A new additional building with laboratories and offices was open in 2008. Likewise, a new building equipped for experimentation with aquatic animals open in 2010. Since 2012, the ICMAN as founder member is integrated in the CEI-MAR (Campus of International Excellence of Sea/Oceans) which hosts several Universities and Institutions of Spain, Portugal and Morocco.

The ICMAN (CSIC) is situated on the Campus of Rio San Pedro of the University of Cadiz, in the district of Puerto Real, at 1 Km away from this town and 7 Km apart of the city of Cadiz. The campus also accommodates the Faculty of Marine and Environmental Sciences, the Faculty of Naval Engineering and Marine Civil and the School of Education. The campus is surrounded by the Pinewood of Algaida and the marshes of Rio San Pedro, both included in the Natural Park Bahía de Cadiz. Other research institutions related to marine activities can be found in the area of the Bay of Cadiz, such as the Spanish Oceanographic Institute (IEO); the Instituto Hidrográfico (Hydrographical Institute) and the Real Observatorio (Observatory) both depending on the Spanish Navy; "El Toruño" (IFAPA) that is a Research Centre for Marine Aquaculture belonging to Regional Government of Andalucía. In addition, some important private aquaculture companies and Foundations (CUPIMAR S.A, Easyalgae, Futuna Blue, CTaqua) can also be found in this area.

3. Organización / Organization

Descripción: Organigrama, Comités asesores externos, Estructura departamental, Líneas de investigación del Plan de Actuación 2010-2013 / Description: Organization chart, Steering Committees, Department structure, Research Lines (as establishes in the 2010-2013 Actuation Plan):

The ICMAN belongs to two Scientific Areas of CSIC, the area of Natural Resources and the area of Agriculture Sciences. The centre is composed by the following structural and functional units:

- Direction
- Vice-direction
- Executive Committee (Junta de Instituto)
- Scientific Committee (Claustro científico)
- Administrative Management
- Ethical Committee on Animal Experimentation (CEEAA)

According to the research lines performed, the institute agglutinates two departments:

- 1.-Department of Marine Biology and Aquaculture (Agriculture Sciences. Area 4)
- 2.-Department of Ecology and Coastal Management (Natural Resources. Area 3)

The Department of Marine Biology and Aquaculture (DMBA) is formed by five permanent researchers, one postdoctoral Marie Curie researcher, several PhD. students and technicians. The research activities are supported with the funding provided by national and international grants along with incomes supplied by research contracts with private companies. The research of the Department focuses the study of biological processes in aquatic animals that are applicable to aquaculture production. The final aim is to advance in the technology for the sustainable production of high quality protein of aquatic origin for human consumption. All researchers and technicians are grouped in one research group – Fish Physiology and Sustainable Aquaculture -

The Department of Ecology and Coastal Management (DECM) is composed by eleven scientists with permanent position, two postdoctoral fellows, several PhD. students and technicians. As in the other department, research activities performed by the DECM are supported by grants and funding is provided by national and European programmes along with incomes supplied by research contracts with public and private companies. At present, the totality of scientists involved in the DECM share the goal of generating basic knowledge on the functioning of the wide variety of ecosystems that integrate the coastal region surrounding the southern Iberian Peninsula with the final aim at providing an integrated view of the ecology of such environments that helps to understand the response of our neighbour coastal area to both natural and anthropogenic impacts. The researchers and technicians of DECM are grouped in two research groups –Oceanography of Ecosystems- and – Ecotoxicology, Ecophysiology and Biodiversity in Aquatic Systems-.

A relevant aspect for a better understanding of the scientific role plays by the ICMAN lies on its geo-strategic situation. The Institute is located in the vicinity of the Strait of Gibraltar, which acts as a linking node between Europe and Africa and connecting the Atlantic Ocean to the Mediterranean Sea. On the other hand, the neighbour coast has a long tradition in exploitation of marine natural resources in terms of both fishery and aquaculture. The ICMAN is the only institute of CSIC dedicated to Marine Sciences in the southern Iberian Peninsula. In fact, it is necessary to come across 1500 km around the Spanish line coast to hit another CSIC's marine centre. Therefore, the ICMAN is required to respond to scientific demands that occur in this vast area characterized by a singular geopolitical position.

The management of the important economic resources associated to this oceanic region and shelf compels deep and updated knowledge on oceanography, coastal ecosystems and aquaculture. The two departments integrating the ICMAN have been constituted accordingly in order to supply adequate scientific basis and support. As a result, advisory expertise is frequently requested by regional or national authorities with full administrative responsibility on the Andalusia region. However, the objectives and studies developed in the ICMAN also go far beyond the National domain and constitute the core of our

participation in several international programmes (i.e. IMBER, GLOBEC, SOLAS, Diversitas), projects (SESAME, CARBOOCEAN, SEACASE, PLEUROGENE, PROSPAWN; ARRANA, Tree of life) and European Networks (Larvanet, Aquagamet; and Eur-Oceans).

General description of the Institute and the different facilities

The ICMAN-CSIC occupies a ground of 4567 m². Until 2007, the built surface was 1550 m², which was recently augmented to 3200 m² due to a new annexed building constructed. The Institute has a main building and an animal facility for housing fish and performing experimental marine culture and a parking area of 100 m².

The main building has three levels. The ground floor accommodates the Reception Office, the Administrative Office, the Director Office, the Meeting Room, the Library, the Auditorium and the Repair-Workshop room whereas the first and second floors hold research laboratories and offices of both departments.

The animal facilities include two buildings, one of them annexed to the main building, which is arranged in three zones: Zone A) area for housing fish and performing experiments, equipped with six 10-20 m² tanks. Zone B) a multipurpose area, with storage facilities for unused equipment of the animal facility. Zone C) Zone with laboratories for assays with living aquatic organisms (fish, molluscs, crustaceans). This last zone includes two wet labs and one room for maintenance and production of auxiliary planktonic species (microalgae, rotifers and Artemia), also working as an external supplying service. This room includes the equipment for water treatment and sterilization. A fourth room includes an aquarium system for housing and perform experiments with zebrafish. The second animal facility building aside from the main building (Zone D) is arranged in two compartments: one storage room connected to a tank facility room equipped with ten 5 m² circular tanks.

All the animal facilities are equipped with a continuous seawater supply, at 33 salinity and 19°C temperature, obtained from the salt-water aquifer spread in marshes area of the Bay of Cadiz. The water is pumped towards two deposits to be subsequently distributed by gravity to the different rooms.

Detailed Surfaces (ICMAN)

O F F I C E S :

Total (m²): 658.7 m²

Divided in 152.4 m² for Gerency-Administration and Services and 355.7 m² for research.

AQUATIC ORGANISMS EXPERIMENTAL LABORATORIES:

Total: 710 m²

Divided in two parts: The old animal experimentation facility with 524 m² and the new facility with 186 m².

L A B O R A T O I R E S :

Total: 691.5 m²

Divided in 313.8 in the first floor and 377.7 in the second floor of the main building

AUDITORIUM: 77.8 m²

LIBRARY: 48.6 m²

OTHER USES:

Total: 105 m²

Including the meeting room (40 m²), dinning-room (68 m²), restrooms and dressing room (11.4 m²)

CHAMBERS WITH TEMPERATURE CONTROL: Total: 2.4 m²

Including a cold-temperature chamber in the ground (5.4 m²), chamber in the first floor (5.7 m²), and a microalgae collection and laboratory room in the culture plant (15.3 m²).

POWER, GAS AND WATER SUPPLIES:

Total: 103.1 m²

Including all rooms holding equipment related with electric (control room, emergency service), gas (propane, =2, N2..) and seawater supply

REPAIR-WORKSHOP ROOM: 31.3 m²

For reparation and designing of devices, and also as store of maintenance material.

E Q U I P M E N T S :

Total: 36.6 m²

Including rooms for machinery, apparatus and equipment of general use (freeze-driers, freezers, etc).

U N D E R G R O U N D

Archive/storage room: 157.25 m²

4. Análisis DAFO / SWOT Analysis

4.1 Debilidades / Weaknesses

- 1.- The high average age of scientific and technical staff (several retirements are expected in the coming years) and the necessity to obtain permanent positions for young and active researchers who are presently linked to the ICMAN under non-stable contracts.
- 2.- Decreasing number of postdoctoral researchers due to lack of expectations in the Institution.
- 3.- The absence of qualified technicians in relation to some new scientific services initiatives performed by the Institute and each scientific group.
- 4.- Work saturation due to the low ratio researchers/number of projects, activities, services and management tasks.
- 5.- The urgent necessity of renewing part of the laboratories and the of animal experimental facilities including some scientific equipment.

4.2 Amenazas / Threats

The main threat comes from the present Government politic in research investments, and the consequent financial situation of CSIC.

- The difficulties in an efficient use of budget in approved proposals.
- The declining budget in State and Regional Research Programmes and the delays in calls for proposals.
- The low replacing rate of stable staff expected in the following years.
- Lack of expectations for students and young researchers

4.3 Fortalezas / Strengths

- 1.- Consolidated research groups with deep knowledge of the addressed research topics (oceanography, biodiversity, ecotoxicology and physiology) with multi- and inter-disciplinary vision and integrated perspective of the processes occurring in coastal marine ecosystems and aquatic organisms.
- 2.- Involvement of our research activity in international programmes, such as SOLAS, IMBER and DAISIE.
- 3.- Projection in the European research scenario through our participation, managing role and coordination in networks and projects funded by the 7th Framework Programme.
- 4.- High capacity to obtain financial resources from the different public, private, National and International sources.
- 5.- Location in the scientific and technological campus of the University of Cádiz hosting the School of Sciences and the School of Marine and Environmental Sciences, with involvement in specialized courses, and with a fluid collaboration with several University groups.

4.4 Oportunidades / Opportunities

- 1.- The new directives for research emanating in the Frame Work Program 8th (Horizon 2020) directly fit into the strategic schedule that has been implemented by our groups. Our research addresses to solve concrete environmental, food production and technological challenges within our target region but with projection and applicability toward the rest of the world. Components embraced by the Blue Growth concept heavily demand this kind of focus.

2.- The recent establishment of CEIMAR (Campus for International Excellence on the Sea) in which the ICMAN has been founder member as well as CEIMAR.net offer new opportunities to extend our international collaboration and to attract new students and researchers.

3.- The raising awareness of the society on the potential effects of global change on coastal systems is demanding a better knowledge on the functioning of coastal systems

4.- The declining of fisheries worldwide and the FAO forecast for an sharp increase of the necessity of aquatic products for human consumption in the coming decades is demanding the development of new and sustainable technologies in aquaculture.

4.5 Ventajas Selectivas / Selective Advantages

1.- Geographic location and geographic covering of our research. The ICMAN has a relevant geo-strategic situation. The Institute is located in the vicinity of the Strait of Gibraltar, which acts as a linking node between Europe and Africa and connecting the Atlantic Ocean to the Mediterranean Sea. On the other hand, the neighbour coast has a long tradition in exploitation of marine natural resources in terms of both fishery and aquaculture. The ICMAN is the only institute of CSIC dedicated to Marine Sciences in the southern Iberian Peninsula

2.- Running and maintaining the internationally recognized ocean observing system GIFT (Gibraltar Fixed Time Series) established almost one decade ago, we provide long term time series of data for the challenges tackled by H2020, in particular by contributing to the understanding of the role of the North Atlantic in Earth system dynamics.

3.- The groups of the ICMAN develop singular researches and techniques that are not being carried out by any other groups at CSIC, Spain, or Europe.

5. Objetivos y Estrategias / Objectives and Strategies

5.1 Objetivos Generales / General Objectives

1.- To promote basic and applied research to provide the fundamental knowledge for a rational use of coastal environment and the development of an affordable aquaculture industrial sector both compatible with a sustainable and healthy environment.

2.- To become a reputed Centre for research on Marine Sciences (Coastal Management and Fish Biology) in Europe

5.2 Actuaciones Generales Propuestas / Proposed General Actuations

1.- Incorporation of young researchers in the staff to decrease the average age of scientists and compensate for the near retirement of some staff scientists in the next three years. This is a priority for keeping and increasing the high research standards of the ICMAN groups and lines

2.- Improving the research facilities of the ICMAN. The laboratories of the old building of the ICMAN have some deficiencies that make difficult the development of new experimental techniques. The old building of the animal facility unit also needs an improvement to make more efficient experiments obtaining definitive and conclusive results, as well as to keep fish in the best welfare standard according to the National and European regulations.

3.- Integrating and focusing on common interests of our research teams as well to strengthening links with other international groups with similar interests to potentiate our multidisciplinary knowledge and skills trying to reach valid results in shorter time.

4.- Reinforcing efforts in obtaining research contracts with the maritime and aquaculture industries to face the most important problems for a successful production.

5.- To improve the transfer of knowledge and technology to the industry and the society in general.

6.- To increase the visibility of the research carried out in the ICMAN.

5.3 Objetivos Científicos / Research Objectives

1.- The generation of basic knowledge on the functioning of the wide variety of ecosystems that integrate the coastal region surrounding the southern Iberian Peninsula with the final aim at providing an integrated view of the ecology of such environments that helps to understand the response of our neighbour coastal area to both natural and anthropogenic impacts within the current scenario of global change.

2.- To provide deep fundamental knowledge for advancing in the technology for the production of high quality protein from aquatic origin for human consumption. This means to produce juvenile fish with the best performances under sustainable system and welfare conditions according to the European rules.

5.4 Actuaciones Científicas Propuestas / Scientific Proposed Actuations

1.- To incorporate innovative aspects and techniques required to develop an advanced research in the specific topics of each research group. International collaborations will be very helpful in this task.

2.- Obtaining funding through competitive calls at National and European level in subjects focusing on the different research. To increase the effort for obtaining funding in other international scenarios (North and South America and Asia)

3.- To continue renovating the facilities for aquatic animal experimentation

5.5 Objetivos de Transferencia de Tecnología / Technology Transfer Objectives

To advise and transfer the knowledge and technology to the industry for providing inputs for maritime and aquaculture industrial innovation.

5.6 Actuaciones en Transferencia de Tecnología / Technology Transfer Proposed Actuations

1.- The researchers of ICMAN have a good and fluid interchange with the productive sector. The ICMAN will continue all these efforts for providing inputs for industrial innovation by its presence in scientists-stakeholders forums relates with the technological transfer in accordance with the research done and the capacity of the producers.

2.- In the field of Aquaculture continuous contact will be established with regional and national producer association (ASEMA and APROMAR) and with the foundation for technological transfer in Andalusia (Ctaqua).

3.- Building on the experienced gained in the execution of the Guadalquivir River integrating study to increase the generation of technological and conceptual tools to implement knowledge-based policies to manage the environment for the administration, stakeholders and decision takers.

5.7 Objetivos de Formación / Training Objectives

1.- To prepare a new generation of young scientists able to continue our researches with outstanding levels and with the capacity to respond to new scientific challenges.

2.- To update the formation level of assistant researchers and technicians.

5.8 Actuaciones Propuestas en Formación / Training Proposed Actuations

1.- To increase the effort to maintain a high number of graduate and Ph.D. students and postdoctoral fellowships in Fish Physiology and Ecology and Coastal Management topics.

2.- To continue the involvement of the scientific staff in Masters and High Specialization International courses. To take advantage of the new framework offered by CEIMAR to increase and improve our training activities at International level.

3.- To Improve formation of assistant researchers and technicians with specialized courses.

5.9 Objetivos de Divulgación / Outreach Objectives

To disseminate our research and findings, and to communicate the importance of our work to a general audience as well as to people requiring a more specialized information.

5.10 Actuaciones Propuestas en Divulgación / Outreach Proposed Actuations

1.- An additional impulse in order to inform deeper and better the society about the knowledge generate for our research. Therefore more effort will be done in the dissemination activities by participation in public media, TV documentaries, newspapers, flyer and press releases etc...

2.- To enhance the quality and the contents of the website of the Institute.

5.11 Objetivos de Internacionalización / Internationalization Objectives

1.- To expand our International collaboration network with research centres, universities and the Industry, in order to increase our participation in shared research and the interchanging scientists and students.

2.- To maintain an active participation of the ICMAN in European and other International Research Programmes.

5.12 Actuaciones Propuestas en Internacionalización / Internacionalization Proposed Actuations

1.- To maintain and improve our collaboration with Centres and Scientists of other countries. To continue with the policy of short-term stay of our Ph.D. students and to attract foreign students funded by national or international programmes.

2.- To maintain and enhance the integration in the International networks related with the different sub-disciplines addressed in the research lines of the Institute to promote new collaborations and participation in International projects and specialized courses. Special effort will do on student interchange as well as in attracting postdoctoral researchers.

6. Indicadores de Seguimiento (Objetivos Cuantitativos) / Monitoring Indicators (Quantitative Objectives)

6.1 Objetivos Cuantitativos / Quantitative Objectives

To tend to 2 publications Q1 per year and researcher in the staff.

To supervise at least 1 doctoral thesis per researcher in the staff during the period of the current Action Plan

To obtain at least 130000 euros per researcher in the staff during the period of the current Action Plan

7. Grupos de Investigación / Research Groups

7.1 Grupos de Investigación / Research Groups

Ecotoxicología, Ecofisiología y Biodiversidad de Sistemas Acuáticos Especialización

A3. Recursos Naturales

A3.3 Ciencias del Mar

LS - LIFE SCIENCES

LS8 Evolutionary, Population and Environmental Biology

7. Other

7.1. Other

5. Climate action, resource efficiency and raw materials

5.2. Sustainably managing natural resources and ecosystems

Investigadores Principales

BLASCO MORENO, JULIAN

Objetivos

El objetivo general del grupo es profundizar en el conocimiento de los procesos biogeoquímicos costeros y oceánicos, centrado en el estudio la biodiversidad de los ecosistemas acuáticos y sus respuestas al estrés ambiental. El grupo aborda estudios de entrada de elementos químicos naturales o antropogénicos de origen terrestre o atmosférico y su efecto en los ciclos biogeoquímicos marinos. Los objetivos del grupo son:

1. Conocer el comportamiento ambiental y los efectos ecotoxicológicos de contaminantes convencionales y emergentes (fármacos, productos cosméticos y nanopartículas) en organismos acuáticos de diferentes phyla.
2. Evaluar el riesgo asociado a la presencia de mezclas de compuestos y a los forzamientos relacionados con escenarios de cambio global.
3. Estudio del impacto antropogénico regional y global sobre los ciclos biogeoquímicos marinos (metales traza).
4. Estudio e identificación de las vías de entrada de contaminantes al sistema costero (aguas subterráneas, deposiciones atmosféricas, ríos, etc.).
5. Estudios de transferencia e intercambio de elementos naturales y antropogénicos en la interfase atmósfera-oceano (estudios de microcapa superficial).
6. Desarrollo y puesta a punto de técnicas y métodos analíticos para el estudio de procesos biogeoquímicos marinos.
7. Analizar los procesos de bio-captación de CO₂ por las microalgas marinas.
8. Aislamiento de picoplancton fototrófico en diferentes áreas biogeográficas.
9. Estudios de la variabilidad genética en poblaciones de crustáceos decápodos y moluscos bivalvos, con especial interés en las barreras que suponen el Estrecho de Gibraltar y el frente Almería-Orán.
10. Seguimiento de la aparición de especies de invertebrados de origen africano en el golfo de Cádiz y su posterior expansión.
11. Identificación de estadios larvarios de crustáceos decápodos usando técnicas morfológicas y moleculares. Elaboración de una clave de identificación.
12. Estudios de filogenia de crustáceos decápodos usando técnicas moleculares y morfología de adultos y fases larvarias. Los problemas y las dificultades a corto-medio plazo derivan por un lado de la elevada edad media del grupo, y por tanto la necesidad de incorporación de nuevos investigadores que aseguren una tasa de reposición adecuada. Durante la ejecución de este PE, se producirá el retiro de tres investigadores del grupo. Por otro lado, la necesidad de sustitución de algunos de los equipamientos que posee el grupo (ICP, citómetro de flujo, que han superado ampliamente el tiempo de vida media con más de 15 años) lo que permitiría al grupo disponer equipos con una tecnología actual que permita analizar los contaminantes a niveles ambientales relevantes. Es necesario proceder a la adaptación de un laboratorio para el análisis de ultra-trazas, como consecuencia de la reciente incorporación de un investigador proveniente del campo de metales traza. Con relación al personal técnico asociado al grupo la ratio técnicos/investigador está próximo al 0.5 que está alejado de los óptimos.

The main objective of the research group is to increase the knowledge of coastal and oceanic biogeochemical processes, focusing on the biodiversity studies of aquatic ecosystems and their responses to the environmental stress. The research group address studies on the input of natural and anthropogenic chemical elements from land and atmosphere to sea, as well as their effect on the marine biogeochemical cycles. Specific objectives of the research group:

1. To know the environmental behavior and ecotoxicology effects of conventional and emergent (pharmaceuticals, cosmetics, nanoparticles) pollutants in aquatic organisms from different phyla.
2. To assess the environmental risk associated to mixes of pollutant and the drifting due to global change.
3. To analyze the impact of anthropogenic activities on biogeochemical marine cycles (trace metals) in a regional and global level.
4. To identify the inputs and pathways of pollutants to the coastal systems (ground waters, rivers, atmospheric deposition, etc.).
5. To study the processes of transfer and exchange of natural and anthropogenic substances in the atmosphere-ocean interface (surface microlayer).
6. To develop and optimize analytical techniques and methods for the study of biogeochemical marine processes.
7. To analyze the CO₂ bio-catchment processes of marine microalgae.
8. To isolate marine phototrophic picoplankton at different geographic areas.
9. To check the genetic variability in populations of decapod crustaceans and bivalve mollusks, with special interest on the natural barriers of Gibraltar Strait and the Almería-Orán front.
10. To monitor occurrence of African-origin invertebrates in the Gulf of Cádiz and further expansion of these species.
11. To identify larval stages of decapod crustaceans by the use of both morphologic and molecular techniques and development of identification keys.
12. To carry

out studies on phylogeny of decapod crustaceans by the use of both morphologic and molecular techniques for adults and larval stages. Short term problems and difficulties for the research group came from two sources. First, during the next 3 years three members of the research group retire, which should be considered by incorporating new personnel in the group in order to keep the research compromises. Second, it is necessary to replace part of the equipment of the research group (ICP, flow cytometer, which have largely surpass their half-life time, counting on more than fifteen years in operation). This will let the research group to work with updated technology which will permit to analyze pollutants at environmentally relevant concentrations. It is also imperative to adapt a laboratory for the ultra-trace analysis, as a consequence of the incorporation in our group of a researcher expert in the trace metal field. Finally, regarding to the assigned technicians to the research group, the resulting ratio technician/scientific is near to 0.5, far away from optimal ratios.

Fisiología de Peces y Acuicultura Sostenible

Especialización

A4. Ciencias Agrarias

A4.4 Producción y sanidad animal

LS - LIFE SCIENCES

LS4 Physiology, Pathophysiology and Endocrinology

4. Biotechnology

4.1. Boosting cutting-edge biotechnologies as future innovation drivers

2. Food security, sustainable agriculture, marine and maritime research and the bioeconomy.

2.2. Sustainable and competitive agri-food sector for a safe and healthy diet

Investigadores Principales

YUFERA GINES, MANUEL

Objetivos

El objetivo principal es proveer el conocimiento necesario y poner a punto técnicas para la producción de juveniles de alta calidad y de forma sostenible de peces marinos de interés comercial. El objetivo final es transferir a la industria acuícola tecnología para mejorar la competitividad y establecer las bases científicas y tecnológicas para incrementar la producción de proteínas de origen marino que se requerirán en las próximas décadas para alimentación humana. Específicamente, nuestro interés científico se enfoca hacia los siguientes procesos: control de la reproducción e inducción a la puesta; establecimiento de bancos de germoplasma de recursos genéticos de diferentes especies; ontogenia, fisiología, metabolismo, nutrición y patologías durante el desarrollo larvario y estado juvenil; diseño de dietas para alimentación de larvas y dietas alternativas para juveniles; y el estudio de enfermedades y patologías infecciosas, nutricionales y ambientales (xenobióticos, disruptores endocrinos) en especies cultivadas y salvajes. Es decir, adquirir el conocimiento de las bases científicas necesarias para transferir procesos más eficientes y respetuosos con el medioambiente. La diversificación de especies es también una prioridad importante de nuestras investigaciones con el objeto de proporcionar alternativas económicas y sostenibles a la Industria acuícola. Por lo tanto los objetivos específicos y estratégicos son: - Adquirir un conocimiento avanzado de los mecanismos de la regulación endocrina de la gametogénesis, formación de vitelo y puesta para conseguir un adecuado control de la reproducción. - Establecer un banco de germoplasma de recursos genéticos de diferentes especies de interés en la acuicultura europea y mediterránea para avanzar en reproducción, genética y en general en domesticación. - Conocer en detalle la ontogenia tanto en especies consolidadas como en nuevas especies potencialmente cultivables. Comprender que condiciones son necesarias para conseguir un desarrollo larvario y un crecimiento equilibrados que permitan obtener alevines saludables y resistentes. - Avanzar en la comprensión de las bases nutricionales y fisiológicas que permitan el diseño de dietas a la carta para larvas de peces y de dietas más sostenibles para alevines, así como la optimización de los protocolos de alimentación. - Comprender el impacto de las enfermedades y patologías infecciosas, nutricionales y ambientales (xenobióticos, disruptores endocrinos) en peces cultivados y salvajes, y mejorar los protocolos y estándares de bienestar en cultivo y en experimentación animal. - Asesorar y transferir a la industria acuícola el conocimiento y los procedimientos tecnológicos para mantener una alta competitividad. - Incrementar nuestra red de colaboración internacional no solo en Europa en la que estamos bien establecidos sino también en Latinoamérica. La principal fortaleza del grupo es abarcar una serie de objetivos científicos interrelacionados y su experiencia en técnicas de investigación clásicas y novedosas que nos permiten un abordaje integral de nuestros estudios. Además, la investigación del grupo complementa los objetivos de otros grupos de acuicultura del CSIC con escaso solapamiento. Todos los miembros de equipo tienen la capacidad de obtener financiación y proyectos. La principal debilidad es la relativa alta edad media de los investigadores de plantilla. Hay un desequilibrio de género en el grupo. La estrategia para solucionar estos desequilibrios ha sido y seguirá siendo mantener un elevado esfuerzo para conseguir becas y contratos para estudiantes de doctorado y doctores.

The main objective is to provide the basic knowledge, and develop and setup techniques for the production of high quality and robust juvenile of commercial interest marine fish, and focusing in the achievement of sustainable procedures. The final aim is to transfer technology to the aquaculture industry to improve the competitiveness and establish a scientific-technological basis for increasing the production of protein

required for human feeding in the next decades. Particularly, our scientific interest targets the following topics: control of reproduction and spawning induction; establishment of germplasm bank of genetic resources of different species; ontogeny, physiology, metabolism, nutrition and pathologies during larval development and juvenile stage; design of diets for larval feeding and alternative dry food for juveniles; studies of disease and infectious, nutritional and environmental pathologies (xenobiotics, endocrine disruptors) cultured and wild fish. In other words, to get a deep knowledge of the scientific bases of the processes to transfer more environmental friendly and efficient procedures. Diversification of species is also an important priority in our research in order to provide economic and sustainable alternatives to the aquaculture industry. Therefore the specific scientific and strategic objectives are: - To acquire a deep knowledge on the mechanisms of endocrine regulation of gametogenesis, yolk formation and spawning in fish in order to get a fine control of reproduction. - To establish a germbanks of genetic resources for different species of interest in the European and Mediterranean aquaculture to advance in reproduction, genetics and domestication in general - To know in detail the ontogeny of consolidated and potentially new cultured species. To understand which are the optimal conditions for a balanced larval development and growth in order to reach a healthy and robust juvenile phase. - To advance in the understanding of nutritional and physiological basis that allow the design of more sustainable tailored diets for larvae and juveniles as well as an optimization of feeding protocols - To understand the impact of infectious, nutritional and environmental pathologies (xenobiotics, endocrine disruptors) on cultured and wild fish, and to improve protocols and standards of welfare in rearing facilities and in animal experimentation - To advice and transfer to the aquaculture industry the knowledge and technological procedures for maintaining a high competitiveness - To increase out international collaboration network not only in Europe in which is already well established but also in Latin America Main strength of the group is to cover a series of inter-related scientific objectives and skill in classical and novel methodologies that allow to perform integral approaches in our studies. In addition, the research of our group complements the objectives of other aquaculture groups of CSIC with low overlapping. All members of the team are able to obtain projects and financial resources. Main weakness is the relatively high average age of the researchers in the staff. There is a gender unbalance in the group. The strategy to solve these imbalances has been in the past and will be in the future to maintain our high effort to obtain grants for predoctoral students and postdoctoral researchers.

Oceanografía de Ecosistemas

Especialización

A3. Recursos Naturales

A3.3 Ciencias del Mar

PE - DOMAIN PHYSICAL SCIENCE AND ENGINEERING

PE10 Earth System Science

2. Nanotechnologies

2.5. Developing capacity-enhancing techniques, measuring methods and equipment

2. Food security, sustainable agriculture, marine and maritime research and the bioeconomy.

2.3. Unlocking the potential of aquatic living resources

Investigadores Principales

RUIZ SEGURA, JAVIER TOMAS

Objetivos

1.- Diseñar y ejecutar investigación para determinar el funcionamiento de los ecosistemas marinos, incluyendo ciclos biogeoquímicos y su conexión con transferencias tróficas, la interacción con las actividades del hombre y los servicios que éste obtiene de los mismos. 2.- Evaluar desde una perspectiva multidisciplinar los efectos del cambio esperado en las condiciones climáticas sobre las características, funcionamiento y estado de los ecosistemas marinos del Mediterráneo, incluyendo el seguimiento de procesos oceanográficos en hot spots. 3.- Proyección del conocimiento científico generado en los objetivos 1 y 2 a elementos que ayuden para la toma de decisiones en el medio ambiente. 4.- Transferencia al sector privado de la tecnología e innovación generada en el ejercicio científico descrito en los objetivos anteriores, de acuerdo con las directrices generales definidas en el H2020. VENTAJAS SELECTIVAS 1) Technology development, with services and products that are subsequently transferred and used by public administration stakeholders and the private sector. This is exceptional in the area of Natural Resources. 2) We are the only group in Spain able to apply remote sensing techniques to discriminate phytoplankton taxonomy from the space. 3) Running and maintaining the internationally recognized ocean observing system GIFT (Gibraltar Fixed Time Series) established almost one decade ago, we provide long term time series of data for the challenges tackled by H2020, in particular by contributing to the understanding of the role of the North Atlantic in Earth system dynamics. 4) Probabilistic modeling of marine ecosystem for decision taking, including risk management and ecosystem service insurance. 5) We are able to understand jellyfish outbreaks within the ecosystem dynamics, identifying environmental triggers in their complex life-cycles.

OBJECTIVES 1. - Design and execute research to determine the functioning of marine ecosystems, including biogeochemical cycles and their connection with trophic transfers, interaction with human activities and the services they provide. 2. – Access from multidisciplinary point of view the effects of the expected change in climatic conditions on the characteristics, functionality and state of Mediterranean marine

ecosystems, including the monitoring of oceanographic processes in hot spots. 3. - Projection of scientific knowledge generated in Objectives 1 and 2 to elements that help for decision-making in the environment. 4. – Transfer to private-sector the technology and innovation generated in the scientific implementation described in the above objectives, in agreement with the major axis of action defined in H2020. SWOT ANALYSIS STRENGTH 1.-Involvement of our research activity in international programmes, such as SOLAS and IMBER. 2.- Projection in the European research scenario through our participation, managing role and coordination in networks and projects funded by the 7th Framework Programme. 3.- Interdisciplinary vision and integrated perspective of the coastal processes developing in marine ecosystems. 4.- Technology developers, with services and products that are subsequently transferred and used by public administration stakeholders and the private sector. This is exceptional in the area of Natural Resources. 4.- High and rapid response capacity to scientific demands occurring in a vast region (Gulf of Cadiz- Strait of Gibraltar-Alboran Sea) characterized by a singular geo-politic and oceanographic situations. 5.- Expertise in addressing problems caused by environmental disasters or by the anthropogenic pressure on fragile ecosystems. 6.- Elevated working capacity in relation to the number of tenured scientists within the group, with the aim to respond responsibly to the research scenery of the different national and international programmes. WEAKNESS 1.- Work saturation due to the low ratio researchers/number of projects, which potentially could lead to reduce our response capacity in a growing framework of environmental problems associated to global change. 2.-The necessity to obtain permanent positions for young and active researches who are presently under non-stable conditions within the group. 3.-Absence of qualified technicians and administrative stuff in relation to the activities performed by the group and the high number of initiatives we are involved in. 5.- The lack of tools that facilitate the conciliation of professional and family life of the female researches, considering that 50% of the scientists in the group are women with short-aged children. OPPORTUNITIES The new directives for research emanating in the Frame Work Program 8th under the name of Horizon 2020 directly fit into the strategic schedule that has been implemented by our group over the last decade. Rather than speculating on abstract research, our efforts have been focussed to yield the best science in order to address and solve concrete environmental and technological challenges within our target region. Components embraced by the Blue Growth concept heavily demand this kind of focus and we are already getting involved in the future consortia that will develop proposals for the emerging Topics of H2020. THREATS The main threat comes from the present financial situation of CSIC. Despite the crisis, the group is being effective to raise funds but CSIC finances hamper their efficient use to fulfil the objectives committed, particularly those associated to European initiatives. This situation of economic uncertainty may potentially lead to damage the prestigious reputation of the group in Europe

8. Servicios Científico-Técnicos / Scientific & Technical Support Laboratories

8.1 Listado de Servicios / List of Scientific & Technical Support Units

ANÁLISIS DE MATERIA ORGÁNICA DISUELTA (COD Y NDT)

Especialización

A0. Especialidad del Área y Subárea Científica CSIC

A3. Recursos Naturales

Disciplina ERC

LS - LIFE SCIENCES

Investigadores Principales

HUERTAS CABILLA, ISABEL EMMA

Objetivos

Únicamente muestras recogidas en ambientes acuáticos naturales, incluidos ecosistemas de agua dulce (ríos, estanques y lagunas), de la franja costera (estuarios, marismas y plataformas continentales) y del océano abierto se consideran para la determinación del COD y NDT. En ciertos casos, también se permiten muestras tomadas en cultivos de organismos marinos bajo condiciones controladas. Las muestras deberán recogerse en recipientes de borosilicato (previamente lavados con ácido clorhídrico diluido y combustionados a 450°C), filtrarse a través de filtros de fibra de vidrio Whatman GF/ F 47 mm pre-combustionados a 450 °C y acidificarse con 50 microlitros de ácido ortofosfórico al 25%. Los viales que contengan las muestras (preferentemente 25 mililitros) deben sellarse y conservarse a 4°C en oscuridad hasta su análisis.

Only samples from natural aquatic environments, including freshwater ecosystems (rivers and ponds), the coastal fringe (estuaries, salt marshes and continental shelves) and the open ocean are considered for DOC and TDN determinations. In certain cases, samples taken from controlled cultures of marine organisms are also accepted. Samples must be collected in borosilicate bottles (pre-acid-washed and combusted at 450°C), filtered through pre-combusted 450°C Whatman GF/F glass fibers filters 47 mm and acidified with 50 microliters of H3PO4 (25%). Vials containing samples (25 mL preferentially) must be sealed and stored at 4°C in darkness until analysis.

ANÁLISIS DE NUTRIENTES Y ANÁLISIS ELEMENTAL (C, H, N, S)

Especialización

A0. Especialidad del Área y Subárea Científica CSIC

A3. Recursos Naturales

Disciplina ERC

LS - LIFE SCIENCES

Investigadores Principales

BLASCO MORENO, JULIAN

Objetivos

Las muestras para el análisis de nutrientes se deben entregar congeladas en tubos de 5 mL (facilitados por el Servicio) e identificados según las normas que se le facilitan. Para el análisis elemental las muestras deberán ser entregadas secas, molturadas y homogeneizadas, en una cantidad no inferior a 100 mg.

Samples for nutrient analysis will be delivered in 5 mL plastic tubes (samples should be frozen and the tubes will be obtained of the service under request). Identification of the samples should be unequivocal and according to the service protocols (to contact with technician). Samples for elemental analysis should be delivered dry and well homogenized. The minimal amount will be 100 mg.

BIBLIOTECA Y DOCUMENTACION

Especialización

A0. Especialidad del Área y Subárea Científica CSIC

A3. Recursos Naturales

Disciplina ERC

LS - LIFE SCIENCES

Investigadores Principales

WULFF BARREIRO, ENRIQUE

Objetivos

(Información no disponible)

MANAGEMENT

Especialización

(Información no disponible)

Investigadores Principales

(Información no disponible)

Objetivos

This service encloses the Management; the basic maintenance-infrastructure of ICMAN and informatics equipments and systems. MANAGEMENT: General Management: Budget management Management of human resources (permanent, grants and contracts) Management of Projects (regional, national and international) Management of private and public contracts Missions, trips and payments Invoices and bank transfers Accountability and economic justification of projects Repair and Maintenance: 1.- upkeep structural, electrical, and plumbing systems of the ICMAN building 2.- vehicles and ship maintenance and optimization of their use 3.- General reparations of equipments and installations 4.- Phone, Fax, postal mails, couriers 5.- Bus service Informatic Services: Services offered by the area of informatics: 1.- Informatics equipment, hardware and software maintenance 2.- Users support and email accounts. 3.- Storage Servers, Network Attached Storage (NAS) and backups systems: 4.- Maintenance and update of the website of the institute.

UNIDAD OPERACIONAL DE CAMPO (OPECAM)

Especialización

A0. Especialidad del Área y Subárea Científica CSIC

A3. Recursos Naturales

Disciplina ERC

LS - LIFE SCIENCES

Investigadores Principales

TOVAR SANCHEZ, ANTONIO

Objetivos

La unidad OPECAM tiene como prioridad prestar servicio a las tareas de investigación que se desarrollan en el ICMAN. Las solicitudes de servicio serán exclusivamente realizadas por el personal investigador del ICMAN y a través de su página web (<http://muestreosicman.blogspot.com.es/p/principal.html>). Los gastos derivados del servicio correrán a cargo del investigador solicitante. Aquellas solicitudes que precisen el uso del servicio fuera del horario laboral deberán previamente ser consensuadas y autorizadas por el responsable del mismo. Las principales tareas de esta unidad son: • Dar soporte a los investigadores de ICMAN en el diseño, organización logística y estrategias de muestreo. • Apoyar a los investigadores en la recogida de muestras, instalación de instrumentación y análisis in-situ. • Colaborar en el procesado y análisis posterior de muestras y datos obtenidos en las campañas.

The main goal of OPECAN units is give support to the different research tasks developed in the ICMAN. The services request will be exclusively done by the ICMAN research staff by using the unit web site (<http://muestreosicman.blogspot.com.es/p/principal.html>). Costs shall be borne by the research staff. Applications that require the use of the service after hours should be previously agreed and approved by the service. The main tasks of this unit are: Supporting ICMAN's researchers on the design, logistic organization and sampling strategy. Supporting researchers in collecting samples, installing instruments and in-situ analysis. Assist in the processing and subsequent analysis of samples and data from the campaigns.

ZONA DE CULTIVO Y ANIMALARIO

Especialización

A0. Especialidad del Área y Subárea Científica CSIC

A4. Ciencias Agrarias

Disciplina ERC

LS - LIFE SCIENCES

Investigadores Principales

PRAT BAELLA, FRANCISCO

Objetivos

- El servicio de Zona de Cultivos y Animalario, registrado como centro de cría y usuario de animales de experimentación con número de registro REGA ES11028000311, está abierto a todos los investigadores del ICMAN y a investigadores externos que colaboren con éstos en el marco de Proyectos de Investigación autorizados por el órgano competente (Dirección General de la Producción Agrícola y Ganadera de la Consejería de Agricultura Pesca y Desarrollo Rural de la Junta de Andalucía). - El servicio solo ofrece alojamiento, mantenimiento y cuidado de los animales, pero no provee los mismos y su uso estará en función de la disponibilidad de tanques en cada momento. - Hay un responsable científico (Francisco Prat) cuyas funciones son: 1) la de velar in situ del cumplimiento del RD 53/2013; 2) que se hayan nombrado los especialistas responsables en bienestar de los animales y veterinario designado; 3) garantizar que el personal que se ocupa de los animales tiene acceso a la información específica sobre las especies alojadas en el establecimiento y 4) velar porque el personal esté adecuadamente formado, esté capacitado, tenga acceso a una formación continua, y que, mientras no haya demostrado tal capacitación, esté sometido a supervisión por personal capacitado. - Hay un responsable técnico (José Luis Coello) que tiene la función del cuidado de los animales, mantenimiento de las instalaciones y garantizar que solo accede a la zona de cultivo y animalario el personal debidamente autorizado. En ningún caso, el personal del servicio tiene la obligación de participar en los muestreos o procedimientos. - Existe una página web, (<http://www.icman.csic.es/enlaces.php> >> Zona de cultivo / Animalario ICMAN.CSIC) con todas las normas y condiciones del servicio, así como todos los formularios necesarios para solicitar el uso del Servicio. - El acceso a todas las instalaciones del servicio, excepto la Sala B, está restringida a los usuarios autorizados, incluidos aquellos cuya investigación sea con animales invertebrados y por tanto no estén sujetos a la normativa vigente. Cada usuario debe solicitar el alta de acceso mediante correo electrónico al responsable del servicio, usando el formulario correspondiente. Una vez acabe el proyecto se tiene la obligación de solicitar la baja como usuario usando el mismo formulario. - Todos los animales alojados en la zona de cultivo y animalario deben estar registrados en el Libro de Registro de los Animales. - Toda entrada de animales adquiridos por un usuario debe ser notificada inmediatamente mediante correo electrónico al responsable del servicio usando el formulario correspondiente e ir acompañada de su respectiva guía sanitaria y de transporte que indica que esos animales están sanos y, en su caso, la autorización del órgano competente si se trata de peces capturados en la naturaleza. - Los investigadores principales de los proyectos autorizados, o en su caso los usuarios a su cargo, deben informar sobre los procedimientos o muestreos realizados a la finalización de los mismos, adjuntado la notificación de bajas de animales producidas mediante correo electrónico al responsable del servicio usando los formularios correspondientes. - Únicamente se pueden llevar a cabo procedimientos incluidos en un proyecto autorizado por el órgano competente. - Queda totalmente prohibida la liberación a su hábitat, realojamiento en otra explotación u otro medio de cualquier animal registrado y alojado en la zona de cultivo y animalario del ICMAN sin previa autorización del órgano competente. - Queda totalmente prohibida la salida de cualquier animal vivo registrado en la zona de cultivo y animalario a otras dependencias del centro sin la autorización del responsable del servicio.

- The Aquaculture and Animal Facility Unit, authorised as breeder and user of experimental animal, with registered number ES11028000311, is open to all ICMAN research scientists and external scientists who collaborate with them under the framework of Research Projects authorised from the competent authority (Dirección General de la Producción Agrícola y Ganadera de la Consejería de Agricultura Pesca y Desarrollo Rural de la Junta de Andalucía). - The service only offers housing, maintenance and care of the animals, but do not supply them. The use of the facilities will be depending on the availability of tanks in any moment. - The service has a scientist responsible (Francisco Prat) for: 1) ensure that the staff dealing with animals comply with the RD53/2013; 2) ensure that persons responsible for the welfare and care of the animals and designated veterinarian have been nominated; 3) ensure that the staff dealing with animals have access to information specific to the species housed in the establishment; 4) ensuring that the staff are adequately

educated, competent and continuously trained and that they are supervised until they have demonstrated the requisite competence. - The service has a technical responsible (José Luis Coello) for: 1) care of animals; 2) maintenance of facilities; 3) ensure that only authorised staff has access to the facilities. The service personnel has no obligation to take part in samplings or procedures. - There is a web page available (<http://www.icman.csic.es/enlaces.php> >> Zona de cultivo / Animalario ICMAN.CSIC) containing all rules and service conditions together with all forms needed to request for using the service. - The access to all facilities., except Zone B, is only allowed to the authorised staff, including staff working with invertebrate animals not included in the European and Spanish regulations. All staff using the facilities must request for access permit to the person responsible for the service by email, and using the appropriate form. Once the access is no any longer needed the user has the obligation to request for the termination of the service using the same form. - All animals housed in the facilities have to be recorded in the Animal Records Book. - All acquired animals by users for housing in the facilities must be notified at arrival by email to the person responsible for the service using the appropriate form attaching also the transport and health guide indicating the health condition of the animals. In case of wild animals, the corresponding authorisation from the competent authority must be also attached. - The principal investigators of authorised projects, or the users under their responsibility, must notify about the procedures or sampling carried out once they are finished, notifying also the animals dead or killed during the procedure, by email to the person responsible for the service using the appropriate forms. - Only procedures included in the framework of a project can be carried out. - The release to the nature or rehoming in other establishment of the animals recorded and housed in the facilities without authorisation from the competent authority is totally forbidden. - Rehoming animals, recorded and housed in the service facilities, in other areas of ICMAN are totally forbidden without authorisation from the person responsible of the device.
