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## CorreosChile celebrates 60 years of IFOP with a Commemorative Postcard issue

The company detailed that 15 thousand copies will be issued, with a value of \$720 each, which are available from Monday, December 23 in the main branches of the company throughout the country.

CorreosChile presented a commemorative postal issue to celebrate the 60 years of the Institute for Fisheries Development (IFOP), an organization specialized in scientific research in fisheries and aquaculture.

The postmarking ceremony of the first day of issue, held in Valparaíso, was led by the Executive Director of IFOP, Gonzalo Pereira, and the Retail Manager of CorreosChile, Leonardo Balmaceda, who agreed to highlight the legacy of an organization that since its beginnings has ensured the use and sustainable exploitation of the country's marine resources.



Gonzalo Pereira, Executive Director of IFOP, said "we are very happy about this ceremony and this event, because this is the last activity celebrating IFOP's 60 years. This year we have had activities throughout the year, we held an international activity on an ecosystemic approach, an activity on women in science, we received a donation of two libraries from former IFOP directors, and now we close in the best way with the launch of the commemorative postage stamp for these 60 years. This is historic, since it is the first time that CorreosChile has made an edition



### Editorial committee

Gonzalo Pereira P. / Executive Director  
Gabriela Gutiérrez V. / Journalist

### Graphic design

Mario Recabal M. / Senior graphic designer



celebrating IFOP. The stamp was a joint work of IFOP designer Natalia Golsman and CorreosChile designer Mauricio Navarro. It shows two ships with a sunset in Valparaíso and the silhouettes of the main fisheries in Chile. This has a tremendous symbolic and dissemination value, since it is an edition of 15 thousand stamps that will be sold in 13 CorreosChile sales points, and will also be available to stamp collectors. Therefore, it will have an expansive effect on the knowledge of our institution, because it also comes with an explanatory brochure on what IFOP does.”

For his part, the Retail Manager of CorreosChile, Leonardo Balmaceda, highlighted that for the company “it is a source of deep pride to be part of the celebration of this transcendental milestone in the history of IFOP through two postage stamps that, in addition to being kept in our rich philatelic history, are the most evident example of the living legacy of this important institution.”

The “60 Years of the Fisheries Development Institute” postal issue is made up of two illustrated postage stamps that show the scientific vessels Dra. Barbieri and Abate Molina, respectively. At the bottom of each stamp are represented the most emblematic species studied by each vessel during their research cruises. In the background, the sky can be seen framed within a wave shape, with a sunset joining both stamps.

CorreosChile detailed that 15 thousand copies will be issued, with a value of \$720 each, which are available from Monday, December 23 at the main branches of the company throughout the country.



## IFOP Putemún conducts scientific dissemination at the Ichuac rural school, in the commune of Puqueldón, Chiloé

On November 15, a group of professionals from the Putemún (Castro) research center of the Fisheries Development Institute, carried out a scientific dissemination activity at the “Ichuac” Rural School, an educational establishment dependent on the Municipal Education Corporation of Puqueldón, which provides education from Pre-school to 8th grade, located in the rural sector of Ichuac, commune of Puqueldón, Chiloé Province, Los Lagos Region.

Around 25 students from 5th to 8th grade, accompanied by teacher Cristian Vásquez, natural sciences teacher and pedagogical leader, actively participated in a day where they were presented in an educational and entertaining way the research activities carried out at IFOP at a national level, especially those developed by the Putemún research center located in Castro. During this activity, students were shown a talk supported by audiovisual material along with a sample of measuring equipment, organisms belonging to marine plankton in 3D format and aquariums with a diversity of marine animals in order to highlight the importance of these organisms in areas such as marine reserves, emphasizing the Choro Zapato reserve in Putemún, a town where the IFOP Putemún research center is located.



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## Fisheries Research in Action: The visit to the Dra. Barbieri B/C and its impact on the sustainable management of the yellow shrimp, red shrimp and nylon shrimp fishery resources

On Friday, November 15, 2024, authorities and professionals from the Fisheries Development Institute (IFOP), the Undersecretariat of Fisheries and Aquaculture (SSPA), the Ministry of Economy and the Ministry of the Environment participated in a visit to the Dra. Barbieri B/C. During the activity, which also included the presence of Dr. María Ángela Barbieri, the preliminary results of the project "Direct evaluation of yellow shrimp, red shrimp and nylon shrimp between the Atacama and Biobío regions, 2024" were presented, led by researcher Carolina Lang of the IFOP Direct Evaluations Department.

The attendees toured the vessel, learning about its advanced technological capabilities. Equipped with laboratories, monitoring equipment and advanced fishing and navigation systems, the Dra. Barbieri demonstrated its ability to collect critical data on the abundance and distribution of target species. "Each onboard campaign not only contributes to assessing the status of the stocks, but also expands our knowledge of marine biodiversity and ecosystems, which in the case of demersal crustaceans, up to 18 different species have been recorded in one fishing haul, including invertebrates, fish and chondrichthyans," said the professional in charge of the research.

The dissemination activity focused on publicizing the capabilities of the B/C Dra. Barbieri and the scope of the demersal crustacean project. At the event, Dr. (c) Carolina Lang highlighted that the project is not only limited to the traditional objectives of direct assessment, which is to provide relative abundance indices to support



The educational unit was grateful for the scientific talk given by IFOP professionals. Juan Vargas de la Torre, Director of the school, indicated "our students were very motivated with the topics discussed and with the observation of marine living beings in the aquariums, with the use of the electronic magnifying glass and other equipment that was provided as teaching material." The school has as one of its educational seals the care of the environment and has environmental certification, therefore, the collaborative approach in the educational process with the IFOP of Castro is of great importance and we are available to continue developing actions together. Our students are the beneficiaries.

The professionals María Angélica Alarcón, Valentina Besoain, Sebastián Sepúlveda and Patricio Salas, indicated that the students enjoyed the experience, especially the aquariums with living organisms that they were able to observe under a magnifying glass and to share their experience of what they themselves have been able to observe in their coastal environment.

The activity served as an opportunity to highlight the work of the IFOP in the region and the importance of wetland ecosystems such as the Putemún reserve. In summary, the visit to the school was a success in terms of participation and learning, and they intend to continue with the important mission of disseminating the work of the IFOP in the local communities of Chiloé.





decision-making, but that the collaboration with the Sustainable Productive Development Program (DPS) frames this research within the UN Sustainable Development Goals (SDG), contributing to food security and sovereignty and adaptation to climate change.

Another highlight was the visibility of the role of women in key positions, such as leading projects, piloting cruise ships and taking charge of sampling on board, roles historically dominated by men. “This approach reflects significant progress in reducing gender gaps, consolidating IFOP as a benchmark in inclusion and promotion of equality. This inspires future generations of female researchers to actively integrate into science and overcome historical barriers. With these efforts, IFOP not only reinforces its scientific mission, but also leads a transformative cultural change in the relationship between science and gender,” Carolina highlighted.

The activity not only highlighted the scientific relevance of the cruise, but also the human dimension behind its execution. Attendees had the opportunity to interact with the crew and leaders of the cruise, delving into the impact of the project on applied science and the strengthening of inter-institutional networks. The interactions helped to clarify the role of each organization involved and to highlight the importance of the articulation between them. In this regard, Gonzalo Pereira, Executive Director of IFOP, emphasized the value of these instances, stating: “They are an opportunity to make our work known and, at the same time, to reflect on the challenges that IFOP faces, especially in terms of funding. These challenges put the continuity of research at risk, preci-

sely at a critical moment when threats derived from climate change demand more research. It is essential to understand and anticipate how these changes will affect the availability and sustainability of fishery resources, as well as the social dimension and the communities that depend on them.”

### Reactions from the authorities

From the Undersecretariat of Fisheries and Aquaculture, represented by Marcos Troncoso (Manager, Crustaceans Unit, Fisheries Administration Division), Guisella Muñoz (Professional, Crustaceans Unit, Fisheries Administration Division) and Marta Hernández (Head of the Administrative Department), they explain that it is relevant to highlight that all the applied science carried out by the direct evaluation cruises executed by the IFOP are a vitally important piece in the decision-making process, in the management procedures established in different fisheries, and therefore in the fisheries management carried out by our institution. Also noteworthy is the quality and characteristics of the B/C Dra. Barbieri, as a new research platform that has impeccable facilities to meet the requirements that this institution needs to contribute to the conservation and sustainable use of resources. The strategic alliance between IFOP and DPS is an example to incorporate other State institutions that come together in the search for sustainable management of our fisheries with the best available information, allowing us to meet other objectives of interest both for this Undersecretariat and for the State of Chile, including food security; adaptation to climate change; gender equity and the fundamental role of wo-





lopment strategy based on sustainability requires sustainable production systems and for this, robust information based on science is key, for this reason the research work carried out by the IFOP is essential to outline strategies and good practices for food security and sovereignty. From the MMA, we recognize the importance of the DPS supporting this type of initiatives.”

men in research. Finally, we thank the Institute for the invitation to this important activity that made us aware of the work carried out by IFOP colleagues and the crew of the B/C Dra. Barbieri.

Marcelo Arredondo, Seremi of Economy, Development and Tourism, said: “On the scientific vessel Dra. Barbieri, we have witnessed the results of inaugural campaigns carried out on red shrimp, yellow shrimp and nylon shrimp, highlighting how these applied investigations are allowing us to obtain products corresponding to catch quotas based on fundamental knowledge that will allow the proper protection of these resources, in harmony with food security, productive and economic development of the sector, and in tune with the needs of adaptation to climate change.

From our ministry, and specifically through the Sustainable Productive Development Program, we are happy to support initiatives such as these from the IFOP, because they are highlighting the importance of scientific knowledge in decision-making for careful fishery management in the face of climatic, social, food and environmental challenges. Also noteworthy is the work of a team that considers gender equity relevant, starting with the ship’s crew. There is no doubt that this second IFOP operating unit, equipped with cutting-edge technology, will position the country with high quality standards in the fisheries science that we carry out. This is a joint effort that is producing high public value, based on a complex chain so that Dr. Barbieri can carry out her research operations in the ocean, throughout the country.

Víctor Caro Castro, Head of the Environmental Information and Economics Division of the Ministry of the Environment added “A deve-

## IFOP participates in Scientific Workshop on Mussel Aquaculture organized by the SECOS Millennium Institute

Macarena Herrera Abaroa, researcher of the Larval Monitoring of Mussels of the Aquaculture Division of the Fisheries Development Institute (IFOP), was invited to the 2nd Scientific Workshop of the Learning Platform on Mussel Farming of the Millennium Institute in Coastal Socio-Ecology (SECOS). The event took place from October 23 to 25, 2024 in Valle Las Trancas, Ñuble Region.

The workshop focused on three socio-ecological systems, among which the Mollusk Aquaculture platform stood out. IFOP’s participation in this space reinforces its commitment to scientific advancement in aquaculture and to the implementation of sustainable practices in the production of mussels in Chile.

The event brought together leading SECOS researchers, including Drs. Bernardo R. Broitman, Stefan Gelcich, Cristian A. Vargas, Pilar Haye, Felipe Vázquez, Marco Lardies, Nelson Lagos and Valeska San Martín, along with PhD candidates Nicole Castillo and Felipe Torres. In this edition, researcher Macarena Herrera provided a valuable external perspective with her presentation on “Territorial Perception of Mussel Seed Capture”, based on surveys from the IFOP Mussel Larval Monitoring



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Program, an effort that has contributed to the mussel farming sector for 13 years.

The central objective of the workshop was to analyze the current and projected state of the industry for 2025 in a global context, identifying both scientific advances and challenges and opportunities in mussel aquaculture. This approach seeks to develop adaptive capacities in the socio-ecosystem, and examine emerging opportunities for the sustainable growth of this industry.

The workshop methodology included the formation of subgroups of researchers, who will work on the preparation of an academic manuscript and a policy brief in Spanish for publication and national dissemination. The incorporation of external co-authors was also a key proposal, aimed at enriching collaborative work and providing multidisciplinary perspectives to the development of mussel aquaculture in Chile.

This type of event not only encourages collaboration and innovation in the sector, but also allows for the formulation of practical recommendations to strengthen its resilience to environmental and economic changes, contributing to the sustainable development of national aquaculture.

For more details on the mussel farming learning platform, visit ([socioecologiacostera.cl](https://socioecologiacostera.cl))](<https://socioecologiacostera.cl/hacemos/plataformas-de-aprendizaje/>)

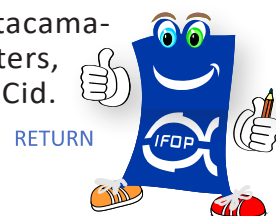
## IFOP Coquimbo stands out at the last Regional Outreach Meeting, closing of PAR EXPLORA

During November, the Regional Outreach Meeting of the PAR EXPLORA Coquimbo project, executed by CAZALAC, was held at the La Serena Coliseum. More than 300 students from all over the Coquimbo Region met and the presentation of the work carried out by various groups of students aged 10-16 years on research and innovation topics in the Coquimbo region was held.

One of the works that stands out among the presentations was guided as Scientific Advisor by the researcher from the Repopulation and Cultivation Department (RyC) of IFOP, Mg. Yeriko Alanis, who indicates that the work carried out by the young people was based on their concern regarding the state of the northern river shrimp in the Choapa River basin. The connection with the young people was through the teacher, Javier Toro, who was part of the sectoriality of the Choapa province, at the time when the repopulation and cultivation team was carrying out the project: "Program for the consolidation of the Aquaculture Fisheries Strategy (EPA) of the northern river shrimp (*Cryphiops caementarius*) in the Choapa River basin."

According to the teacher, the work together with the IFOP professional began in June and until October, was aimed at guiding the young people on how to approach the research, training in methodology and analysis of information, including in September, there was a visit by the IFOP researcher to our facilities at the Bicentennial High School of Excellence in Salamanca.

Finally, due to the management carried out with CAZALAC by the IFOP researcher, associated with the Atacama-Coquimbo Base headquarters, Mg. Alejandro Dal Santo Cid.







The exhibition of a stand of the Sampling Management Department of IFOP Coquimbo was held at the Regional Meeting of Outreach of the PAR EXPLORA Coquimbo project, which took place on November 6 at the Coliseo de La Serena. The Scientific Observers (OC) L. Janett Aliaga and Sebastián Rojas participated in this activity and it was led by the Senior OC, Claudia Valenzuela, who says that their participation was very successful, given that they had a high attendance of young people, with many questions and much interest in learning about the work of IFOP in the region.

Mg. Christopher Vivanco, a CAZALAC professional and IIE Manager of PAR EXPLORA, who was in charge of the coordination between scientific advisors and establishments, extended his gratitude for the participation of professionals, recognizing the relevance for these activities of having organizations such as IFOP, which promote the sustainable management of natural resources, awareness and providing advice to new generations for an innovative culture for the Coquimbo Region. The CAZALAC Water Center hopes to continue promoting these instances of collaboration with IFOP through the link that both organizations have, such as water, natural resources, the development of science, technology and innovation; in order to continue strengthening decision-making in the future with a much more comprehensive and sustainable perspective.



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## IFOP delegation presents at the VI SIBICORP Symposium in Portugal

The VI Ibero-American Symposium on Reproductive Ecology, Recruitment and Fisheries (SIBICORP) was held in the city of Lisbon, Portugal from November 11 to 15, 2024.

A national delegation made up of eight researchers from both Chilean universities and the Fisheries Development Institute participated in this meeting. In this regard, IFOP's participation was made up of researcher Carolina Hernández-Santoro with a presentation entitled: Changes in the reproductive tactics of the anchovy (*Engraulis ringens*) Compensation or adaptation to environmental variability? And researchers Sergio Mora and Patricio Barría presented two investigations: Comparative analysis of reproductive aspects of the swordfish (*Xiphias gladius*) and the common sardine (*Strangomera bentinki*) in the South Eastern Pacific Ocean; and The use of conceptual models as a collaborative tool for modeling the swordfish (*Xiphias gladius*) stock in the South Eastern Pacific Ocean.

All the presentations were well received and allowed for the creation of links and transfer of knowledge and potentially joint research with researchers from various countries.

The event allowed to learn about the state of the art in various topics of reproductive ecology, the advances that are being made in the last decade, scientific innovations in genetics, energy, morphometry and histology. The growing importance of the bioenergetic approach in reproductive ecology for the determination of annual fertility and spawning frequency, with the purpose of obtaining more precise estimates of the spawning biomass of the stock.

In relation to the recruitment process, the reinforcement of fisheries monitoring and the use of innovations in the field of biological indicators at a biochemical level such as proteomics and genomics have become important to detect the effects of climate



change. In particular, scientific evidence of a decrease in lengths in fish from the northern hemisphere with increasing surface and bottom temperatures was reported. During this meeting, the importance for countries to have good fisheries statistics, to reinforce the sampling coverage of catches (target species and accompanying fauna), and advances in the ecosystem approach to fisheries was reinforced. On the other hand, the importance of having quality databases, access to various environmental information platforms, the development of modeling and the use of Artificial Intelligence techniques applied to fisheries are contributing with new scientific evidence of this phenomenon. On the other hand, the use of genetic techniques to determine the origin of recruits in fishing areas where individuals from various populations converge was addressed. Genetic studies are also being carried out at a macro scale in order to understand the adaptive radiation of fish, whose processes are crucial to determine possible colonization of new habitats, in addition to their phylogenetic relationships, which are of vital importance in this decade marked by environmental changes and responding to the behavior of fish in the face of alterations that occur in fishing areas.

Finally, in the management of fisheries, it was mentioned that the increase in fishing effort, illegal, unreported and unregulated fishing are affecting all Ibero-American fishing nations to a greater or lesser extent. In some artisanal fisheries in the European Union, individual transferable quotas are being implemented to control the increase in fishing effort, and the negative externalities of this process are being absorbed.



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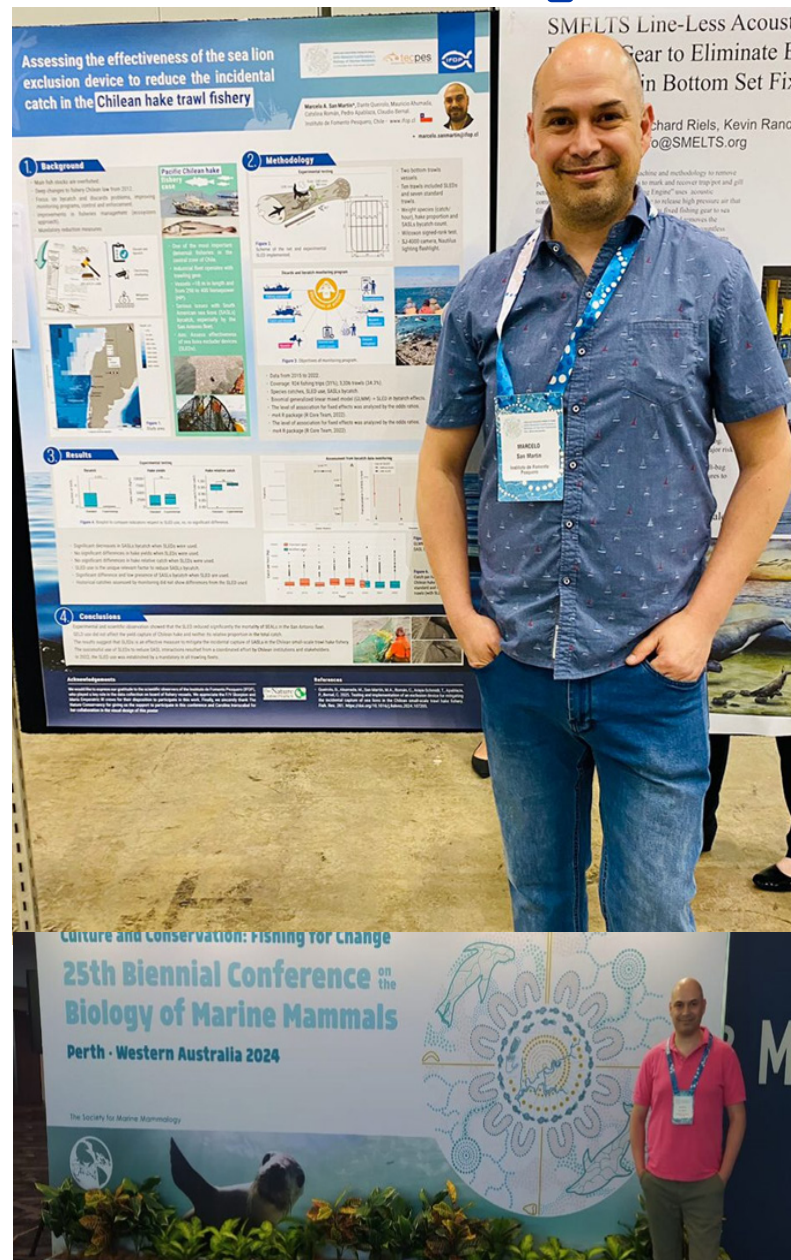


## Researcher from the Fisheries Development Institute presents work at a conference on marine mammals in Australia

The 25th Biennial Conference on the Biology of Marine Mammals, Culture and Conservation: Fishing for Change was held in Perth, Australia, from November 9 to 15. This event is the most important in the field and brought together more than 1,400 researchers from 73 countries. Among the various topics discussed at the conference, the problem of the interaction of marine mammals with fisheries around the world was one of the most relevant.

Senior researcher from IFOP, Marcelo San Martín, participated in the event and presented the work developed in conjunction with researchers from the Tecpes group at the Pontifical Catholic University of Valparaíso, entitled “Assessing the effectiveness of the sea lion exclusion device to reduce the incidental catch in the Chilean hake trawl fishery.” The work, which evaluated the performance and operation of the sea lion exclusion device (grid with escape window) in one of the trawl fisheries in the south-central area of Chile, was of particular interest to the attendees at the conference, especially because it was a practical work and showed, with scientific information, the efficiency of this type of device to reduce the incidental capture of sea lions during fishing activity.

Marcelo San Martín pointed out that, “these types of events are extremely important to share the experiences that are developed worldwide with the objective of reducing the impact that fishing activity causes on marine mammals, as well as those aimed at reducing the effects that this interaction produces on fishing.” Currently, Chile maintains a permanent monitoring program of the incidental captures of this group of animals in the main fisheries by IFOP, highlighting the implementation of regulatory measures to reduce the



problem by the Undersecretariat of Fisheries and Aquaculture. San Martín also commented, “This issue has become increasingly interesting, mainly considering the global reduction of marine resources (food for marine mammals) and the effects that climate change has caused in marine ecosystems, a situation that concerns and occupies us within IFOP.”

The researcher’s participation was made possible thanks to the support provided by The Nature Conservancy, within the framework of a collaboration agreement that it maintains with IFOP.

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## IFOP researchers attend “Southeast Pacific Meeting: Committed to a Sustainable Ocean” held in Panama

Between November 20 and 22, the “Southeast Pacific Meeting: Committed to a Sustainable Ocean” took place in Panama City. This event was organized within the context of the “Save the Blue Five” project, funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) through the International Climate Initiative (IKI) and implemented by the Permanent Commission for the South Pacific (CPPS), the German Development Cooperation (GIZ), Conservation International (CI) and Mar-Viva (MV).

The event was attended by nearly 300 attendees from 6 countries (Chile, including Costa Rica, Colombia, Ecuador, Peru and Panama).

Save the Blue Five is a regional project that seeks to protect migratory marine megafauna in the Southeastern Pacific Region (SEPR) from Costa Rica to Chile, which comprises an oceanic province of 20 million km<sup>2</sup>, home to diverse groups and species such as whales, dolphins, sharks, sea turtles and manta rays, known as Blue 5 species. Through this initiative, it is intended to contribute to countries with actions that promote the strengthening of the regional policy framework for the conservation and sustainable use of marine megafauna and promote the implementation of coordinated measures at local, national and regional levels.

The purpose of the meeting was to promote regional dialogue and collaboration for marine conservation in the SEPR region among relevant actors from different sectors in which opportunities, good practices, innovation and commitments will be identified.

The Chilean delegation was made up of 33 people, representatives of public institutions such as the Environment, Climate Change and Oceans Division of the Ministry of Foreign Affairs, the Undersecretariat of Fisheries and Aquaculture, the General Directorate of Mari-



time Interests and Merchant Marine and the Ministry of the Environment, among others, as well as researchers from different national universities, representatives of local communities and young leaders. From IFOP, Dr. Patricia Zárate from the Department of Oceanography and Environment and Dr. Daniela Díaz, Head of Cooperation at IFOP, participated.

During the meeting, different talks, workshops and parallel events were held, in various formats.

### **Dr. Daniela Díaz participated in the following parallel events:**

“Initiatives in Action for the Blue Five: Pitch for the selection of winners”, where 12 initiatives were presented to promote the conservation of the B5 and the sustainable use of marine biodiversity, and grants were awarded to 5 of them for their implementation.

“BBNJ Agreement Workshop: Challenges and Opportunities in the region”, where different views were presented on the contribution of regional organizations to the implementation of the United Nations Treaty Agreement for the Conservation and Sustainable Use of Marine Biodiversity in Areas Beyond National Jurisdiction.

Dr. Patricia Zárate was invited to the event because she is a specialist in sea turtles and large pelagic species and because she is a member of the Scientific Committee of the Regional Plan for Sea Turtles of the Permanent Commission of the Southeast Pacific. She participated in the following parallel events:

“Marine protected areas and the five blues in the Southeast Pacific region”, where management measures were designed for the conservation of mari-







ne protected areas with conservation values for the five blues. In this workshop, the work was carried out in groups that involved specialists of the species that make up the 5 groups of animals that came from the countries of the region.

“Conservation in the Eastern Pacific: Facing the challenges of climate change for the biodiversity of the region”.

“Solutions for the protection of the Blue Five” where 7 projects of good practices documented within the framework of the “Save the Blue Five” project were simultaneously presented.

Dr. Zárate comments, our institution has vast experience and specialists who will be a valuable contribution to the objectives of the “Save the Blue Five” project, which in turn, through this event and future instances to be developed, will provide a platform to share scientific research, experiences and best practices, which will contribute to the effective policies and strategies of our country and the countries involved in this regional initiative.

## IFOP: Connecting with Norwegian Research Institutes and Universities

Between October 28 and November 1, 2024, the Fisheries Development Institute (IFOP) conducted a technological tour to Norway with the purpose of seeking benchmarks and development models in research institutes and universities in that country in the field of infrastructure, technology and human capital necessary for climate change research and ocean digitalization, scientific data management (public data center), mechanisms for financing research in the public interest, along with the search for possible cooperation and joint work agreements.

The IFOP representatives on this visit were Jorge Miranda, Head of the Administration and Finance Division and Gastón Vidal, Head of the Aquaculture Research Division. The institutions visited were the Norwegian Institute for Water Research (NIVA), the Norwegian University of Life Science (NMBU), the University of Bergen (UiB) and the Institute of Marine Research (IMR). During this technological circuit, the Chilean Embassy in Norway, the Ambassador and his team were indispensable and a permanent collaborator both in the preparation of the work agenda and in the coordination of the meetings held in Norway.

Two meetings were held with NIVA, one in the Oslo offices with the scientific researcher Dr. Santiago de la Puente and then in the Bergen offices with the Research Director Dr. Ase Atland. Between NIVA and IFOP there was a pre-agreement of a collaboration agreement that was finally consolidated during the meetings in Norway. The agreement will surely be signed before the end of the year and its terms include collaboration in the field of oceanographic modeling to improve the administration of aquaculture, support in the creation of a data center for fisheries and aquaculture, exchange of researchers and the possibility of executing projects jointly.

A meeting was held with NMBU with Dr. Margareth Overland, di-





rector of the University's Food Research and Innovation Center and part of her technical team. Dr. Overland's specialty and research focus are in biotechnology. Through the biotechnological degradation and transformation of macroalgae, they produce functional microelements that are added to fish feed in order to strengthen the immune response of these animals. This technology can bring a new use for macroalgae, greater demand and perhaps an improvement in their prices, perhaps an opportunity for artisans who work in the production of this raw material. Among the agreements, the possibility of generating internships for IFOP professionals who want to improve in the field of biotechnology was opened, especially in the possibilities of using macroalgae as a raw material for functional foods.

With UiB, taking into account its capabilities and strengths, our interest was mainly oriented towards the management of large databases, artificial intelligence and machine learning, all oriented towards the development of climate change research. During our visit to the University we participated in a seminar on carbon and coastal-ocean biogeochemistry, we met with two researchers, Dr. Are Olsen and Dr. Stefan Sovolowski, and two University Administrators, Dr. Hans Egil, International Affairs Advisor, and Dr. Sverre Ole, International Cooperation Advisor. Our interest was in generating links that would allow us to send researchers on short stays to improve our modeling and forecasting capabilities in the field of climate change oriented to fisheries and aquaculture. The conversations tended towards that and we still have to move forward on an agreement that facilitates our interaction.

Finally, with IMR we met with the director Dr. Nils Gunnar and the director of aquaculture Dr. Geir Lasse, both of whom showed us the

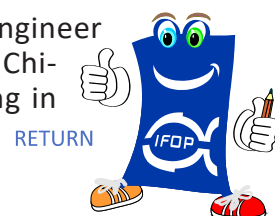
tasks that IMR develops in the field of aquaculture and were open to generating a collaboration agreement with IFOP, especially in oceanographic modeling and data management to create an environmental data center. Regarding the latter, they opened contact so that we could meet with the Director of HI Digital in charge of the IMR data management unit, a meeting that took place on November 26 via video conference. In the short term, we will try to agree on a work agenda with IMR that will allow us to have a broad collaboration whose results will favor progress for our IFOP.

## Peruvian researcher embarked on the scientific vessel Abate Molina

Continuing with the professional exchange between the Institute for Fisheries Development (IFOP) and the Peruvian Institute of the Sea (IMARPE), the acoustic researcher Gustavo Cuadros of IMARPE participated in the first part of the anchovy hydroacoustic evaluation cruise, being on board the scientific vessel Abate Molina, between November 18 and 29, 2024. The study area of this survey is located in the coastal zone up to 20 nautical miles between the regions of Arica and Parinacota to Antofagasta.

This exchange is part of the collaborative activities designed within the framework of the Binational Technical Group (GTB) for Direct Evaluations (EVALDIR) of the Chile-Peru GEF/UNDP SUBPESCA/Vice Ministry of Fisheries and Aquaculture "HUMBOLDT II" binational project, which began in October with the participation of the IFOP Direct Evaluations technician, Adrián Ibieta, on board the BIC Luis Flores Portugal in Peru.

During his participation, Engineer Gustavo Cuadros joined the Chilean work team, collaborating in





## Researchers from the Age and Growth Section conduct training in otolith chemistry

Between September and December 2024, researchers from the Age and Growth Section have participated in the training course “Use of otolith chemistry in fish ecology: theory and practice” taught by Dr. Edwin Niklitschek, professor at the University of Los Lagos and researcher at the marine research center (i~mar), together with the collaboration of Dr. Pamela Toledo from the same university. This training included theoretical and practical sessions, which addressed concepts and theoretical foundations that support the application of chemical analysis of otoliths, its main methods and applications in fish ecology studies such as: identification of demographic units, estimation of population mixing, habitat reconstruction, migrations, life cycle, etc. The practical courses included modules on sample preparation for elemental and isotopic analysis, and a visit to the Mass Spectrometry Laboratory of the Department of Geophysics at the University of Chile, directed by Dr. Fernando Barra, and to the Isotopic Analysis Laboratory at the Andrés Bello University, directed by Dr. Sebastián Klarian.



Dr. Francisco Cerna Troncoso, head of the Age and Growth Section at IFOP, indicated that this training has been highly beneficial for our team of researchers, because it has allowed us to acquire the knowledge and methodologies in the use of metals and stable isotopes present in fish otoliths, to undertake studies aimed at understanding ecological aspects and the dynamics of exploited marine populations, knowledge that is essential for the evaluation and sustainable management of our resources.



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the data collection on the acoustic evaluation cruise of anchovy biomass and shared practical experiences with the other members of the team, participating in the data preprocessing carried out on board.

The main objective of the Direct Assessments GTB for the Humboldt II Project is to standardize the protocols for estimating anchovy biomass in the southern region of Peru and northern Chile using hydroacoustic methods, in order to advance the assessments of the biomass of the shared stock of anchovy from southern Peru to northern Chile (SA SPNCH).

### This will allow:

- Establishing joint protocols for the assessment of anchovy, either simultaneously or consecutively.
- Generating at least three assessment reports of the shared stock of anchovy, based on protocols agreed upon by both countries, using direct and indirect methods.
- Strengthening the data exchange agreement and collaborative assessment of the shared stock of anchovy, based on the existing scientific cooperation agreement between IFOP and IMARPE.

This joint effort is a significant step towards the sustainable management of shared marine resources, ensuring the continuity of responsible fishing and the conservation of anchovy in the region.

## IFOP strengthens its international links

The Institute for Fisheries Development (IFOP) participated in the international linkage project led by researchers from the University of O'Higgins (UOH) and in collaboration with the Université de Caen (UNICAEN) in France, focused on the study of the response of bivalve mollusks to various pathogens in contaminated environments. This work is part of the FOVI430027 project, entitled "International linkage for the evaluation of the sentinel capacity of filter-feeding bivalve mollusks in the monitoring of emerging contaminants in marine coastal areas."

### First Seminar in France

On June 4, Dr. Cristian Valenzuela represented IFOP at the first Dissemination Seminar, held at the Université de Caen Basse-Normandie. His presentation, "Surveillance of bacterial resistance to antimicrobials commonly used in Chilean salmon farming," highlighted the monitoring of bacterial resistance in national salmon farming. Other researchers, such as Morgane Dérrien and Gabriel Arriagada, presented works related to ecological health and the sentinel capacity of mollusks "Ecological Health of a Chilean Shallow Coastal Lagoon" and "Assessing the Sentinel Capacity of Mollusks for Monitoring Antimicrobial Resistance in the Marine Environment: Preliminary Results", respectively.

### Activities in Chile

From November 19 to 22, two key activities were held in the country:

#### On-site seminar in Puerto Montt:

Researchers from both universities shared the progress of the project in the halls of the Caja de Compensación Los Andes. Among the presentations were:

Morgane Dérrien: *"Ecological health of a Chilean shallow coastal lagoon"*

Gabriel Arriagada: *"Evaluation of the sentinel capacity of mollusks to monitor antimicrobial resistance"*



Alicia Bruzos: *"Evolutionary history of contagious cancers in mollusks."*

#### Field sampling:

IFOP, UOH and UNICAEN researchers collected bivalve mollusks in Pelluhuín and Calbuco for later analysis. The specialized technician Grista Eisele participated in the laboratory activity where the methodology for preparing the samples for tissue studies was implemented.

#### Dissemination at the University of O'Higgins

On November 25, a third seminar was held at the University of O'Higgins, where the preliminary results were presented to the student community. The following presentations were highlighted:

Dr. Cristian Valenzuela: *"Status of bacterial resistance to antimicrobials in national salmon farming"*

M.Sc. Cristina Stuardo: *"Larval monitoring program for mussels: a contribution to the sustainability of Chilean mussel farming"*

Dr. Alicia Bruzos: *"Evolutionary history of contagious cancers in mollusks"*

Leo Chasselle: *"Monitoring in complex systems: the Bay of the Seine"*

Camille Détrée: participated telematically with the talk *"Textile microfibers: the hidden face of microplastic pollution in the oceans."*

### A transdisciplinary collaboration

This project reflects the importance of transdisciplinarity, integrating academic and research institutions such as IFOP to transfer knowledge and support decision-



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making on critical issues for environmental sustainability.

The results of the project are in the process of analysis under the supervision of the sponsoring program, with closing workshops and final reports in planning.

## IFOP Aquaculture and Fisheries Divisions hold talks in Quellón

On November 22, a series of educational talks were held in the town of Quellón, Chiloé Province, within the framework of the benthic dissemination plan, organized by the Sampling Management Department (DGM) of the Fisheries Research Division of the Fisheries Development Institute (IFOP). The main purpose of this activity was to bring the community closer to topics related to fishing and scientific studies of marine resources, addressing various specialties that IFOP develops in its dissemination work.

On this occasion, colleagues from both divisions met, promoting an exchange of knowledge on relevant topics such as harmful algal blooms, the fishery of different species and benthic taxonomy. An invitation was also extended to the municipal museum "Amador Cárdenas", whose curator, Sergio Panichini, presented a talk focused on shorebirds and mustelids of Chiloé. In his speech, he addressed aspects related to the diversity, behavior and threats faced by these species, emphasizing the problem of the presence of the mink and other human actions that impact their habitat. This talk was complemented with taxidermy specimens from the museum, which enriched the educational experience of the attendees.



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The day stood out not only for the relevance of the topics discussed, but also for integrating the areas of Aquaculture and Fisheries in a joint effort to disseminate and disseminate science at a territorial level. This multidisciplinary approach allowed strengthening the maritime heritage of Quellón, placing the Allá Kintuy school as the epicenter of this significant day.

It is important to note that, since last year, IFOP has been working on the benthic dissemination plan with the aim of connecting with the Quellón community, sharing the results of research and the role of scientific observers. The holding of these talks not only managed to present IFOP's institutional work, but also empowered the local community by deepening their understanding of their marine environment and the challenges they face. The active participation and interest expressed by the attendees reflected the importance of continuing with these scientific dissemination initiatives in the future.

The initiative included the participation of both scientific observers Daniel Triviño, Héctor Cosme de Quellón, the scientific observer Claudia Oyarzo who attended from Calbuco to participate, as well as the researcher Macarena Herrera who came from the Aquaculture Research Division (DIA) representing the Larval Monitoring Program for Mussels to present and provide support during the day. All this was led by



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the Quellón Coordinator Leslie Figueroa with the appropriate help of the scientific observer Valentina González.

The occasion also allowed researcher Macarena Herrera to generate training at the SER-CPLAN Infocenter in Quellón, to integrate the mussel farming community of Yaldad and surrounding areas to use the interactive platform “Endemic Seed” and bring the good news of the recent spawnings at the sampling station that the Monitoring Program has in said locality.

The link between both IFOP Divisions in this activity stood out for ratifying the satisfaction of reciprocal cooperation. This effort promoted an effective dissemination of scientific knowledge among researchers and professionals from both divisions, as well as its direct application in the improvement and precision of data collection. The collaboration established not only facilitated the exchange of ideas and methodologies, but also contributed significantly to the advancement in the quality of the results obtained, thus demonstrating the value of working together towards a common goal. The synergy generated through this interaction translated into tangible benefits for the ongoing projects, reflecting the joint commitment to excellence in research.

## IFOP trains its Scientific Observers in the identification of grenadier fish

On December 4 and 5, a training course on diagnostic techniques and recognition of species of the Macrouridae family was held at the IFOP base in San Antonio. The course was attended by scientific observers from the demersal crusta-

cean monitoring project and the National Discarding and Incidental Catch Monitoring Research Project and some observers from the demersal fish project. The training was conducted by Dr. Mauricio F. Landaeta from the Ichthyology and Biophysical Interactions Laboratory of the Faculty of Science of the University of Valparaíso.

The objective of this training was to acquire knowledge about the morphology and taxonomy of the family and associated genera, as well as the evolution, distribution, feeding, reproduction and development. A theoretical and practical part was carried out in the laboratory, where samples of specimens from different genera were examined and morphological and taxonomic characteristics seen in class were determined. In addition, otoliths were extracted for a possible study of age and growth.

It should be noted that these training sessions are within the institutional policy of continuous improvement in species identification, necessary for scientific observers in order to transmit new knowledge, develop new skills and new tools to optimize the quality of information collection.



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## IFOP participates in the IX National Aquaculture Congress in Coquimbo

The IX National Aquaculture Congress “AcuiCoquimbo 2024: Cultivating the development of the territory”, took place at the Guayacán Campus of the Catholic University of the North between November 27 and 29, 2024. The closing ceremony commemorated the National Aquaculture Day, highlighting the importance of this activity as a productive engine and sustainable alternative for the fishing sector.

The Faculty of Marine Sciences of the Catholic University of the North UCN together with the Chilean Aquaculture Society (SCHACUI) were the organizers of the event. Antonio Vélez, president of SCHACUI, highlighted the relevance of the Coquimbo region in the diversification of aquaculture species, highlighting sustainable practices and technological advances. Meanwhile, Dr. María Cristina Morales, president of the organizing committee, celebrated the participation of more than 200 registrants and the presentation of more than 120 works of great scientific impact, consolidating the congress as a national reference in innovation and aquaculture development.

Researchers from the Repopulation and Cultivation Department (RyC) presented two papers. Yeriko Alanis, researcher from the Coquimbo IFOP headquarters, presented the paper: “APE diversification in the Chungungo B AMERB: Guidelines for effective extension work”, which summarizes from an extension perspective the participatory work carried out for approximately 5 years with the Los Castillo fishermen’s organization to recover the productivity of their Benthic Resources Management and Exploitation Area (AMERB). Meanwhile, the head of RyC, Dr. Francisco Cárcamo, presented the work:



“APE diversification experiences in estuarine environments of the Los Lagos Region”, which presents productive and environmental results of different pilot and commercial crops carried out in the last 4 years in estuarine systems in southern Chile. In addition, he was co-organizer and moderator in the session and discussion called “Small-Scale Aquaculture” which included the participation of the Undersecretariat of Fisheries and Aquaculture and two prominent APE aquaculturists of the country.

For their part, researchers from the Center for Harmful Algae Studies (CREAN), Dr. Oscar Espinoza González and Dr. Javier Paredes Mella, presented the works: “Distribution and abundance of phytoplankton in the northern Pacific of Chile with emphasis on species associated with Harmful Algal Blooms (HAB)” and “Diversity of biotoxins and HAB-forming species in northern Chile: Implications for aquaculture”, respectively. These presentations were part of the FIPA 2023-17 project “Evaluation of biotoxins in the northern zone of Chile”, with which, for the first time in our country, a systematic sampling of biotoxins in shellfish and water samples was carried out, in addition to the identification of harmful and total phytoplankton species. The sampling was carried out in 9 locations distributed from the Coquimbo region to Arica and Parinacota and lasted for 7 months. This work had the collaboration of different IFOP bases and professionals from Valparaíso, Coquimbo, Mejillones, Iquique and Arica, who were essential to successfully carry out the sampling in the northern area.



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