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## Chilean Delegation Participates in International Conference of Scientific Vessel Operators in Canada

A Chilean delegation from the Institute for Fisheries Development (IFOP) participated in the International Research Ship Operators (IRSO) conference held from September 23 to 27 in Vancouver, Canada. This annual event brings together scientific vessel operators from 30 countries around the world, and Chile stood out as the only representative from South America, having the opportunity to present on the scientific research carried out by IFOP, through direct assessment cruises around Chile and oceanographic condition monitoring cruises-MPH for the study of fishery resources and oceans.

The objective of the event was to exchange experiences in the construction and operation of research vessels, share solutions to common problems in field research and improve



support for scientific research with new technologies. Among the topics discussed during the conference were the implementation of new technologies (Uncrewed marine vehicles: USV, ASV, AUV, ROV) equipped with different sensors for species detection, environmental and chemical monitoring, water sampling, seabed mapping, as well as communications technologies, platform stabilization systems, and the design, construction and operation of scientific vessels. Safety and well-being issues on board scientific platforms were also addressed. Among the highlighted activities, a visit was made to the Seaspan shipyard, where Canada's new scientific ice-breaker is being built.



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Gabriela Gutiérrez V. / Journalist

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IFOP's participation in IRSO was particularly significant this year, as it coincides with the institutional strategic planning update process. IFOP Director Gonzalo Pereira said: "IFOP has participated in IRSO for the past 30 years, and with this we hope to continue strengthening our international ties and advance in the modernization of our scientific fleet. Our presence at the conference allowed us to accurately identify the gaps in our scientific practices and equipment, a key aspect in a context where technology is beginning to play an important role in field research, which will allow us not only to overcome current limitations in coastal sectors, but also to optimize our capabilities in the type, quantity and frequency of data collection, telecommunications and remote monitoring. Past, present and future participation in IRSO reinforces IFOP's commitment to excellence in research for advice towards sustainable management of fishery resources in our country."

The Chilean delegation was made up of Gonzalo Pereira, Director, Patricio Herrera and Iván Toro from the Marine Operations area, and Carolina Lang from the Direct Evaluations department. In addition, representatives from the ASENAV shipyard were presenting the construction process of the B/C Dra. Barbieri, recently delivered to IFOP in agreement with the Undersecretariat of Fisheries and Aquaculture, highlighting the challenges associated with the design of a vessel that complies with international regulations and the requirements necessary for scientific research (Noiseless system).

Within the framework of the conference, the Director of IFOP received invitations from the NIWA institutes and the Schmidt Ocean Institute, dedicated to advancing oceanographic

research at a global level and the exchange of information on the oceans, to visit their research vessels, which are scheduled to call soon in Valparaíso. This opportunity offers to learn about experiences in the field of international research.

## IFOP Director explores opportunities for scientific collaboration in Vancouver

During his visit to Canada, the Director of the Fisheries Development Institute, Gonzalo Pereira, together with Researcher Carolina Lang, met with the Consul of Chile in Vancouver, Allan Najum, who has been working on collaboration agreements between Chile and Canada in various areas, including science. At the meeting, collaboration opportunities with Canadian scientific institutions were discussed in key areas for IFOP such as fisheries research and stock assessment.

The Director highlighted IFOP's interest in strengthening ties with local entities, taking advantage of Canada's advanced infrastructure and experience in research and fisheries resource assessment, as well as its participation as a member of ICES. Gonzalo Pereira stressed that "these alliances have the potential and relevance to facilitate capacity building, while promoting the exchange of knowledge, which results in synergistic actions."

For her part, researcher Carolina Lang points out that "IFOP is recognized in the international scientific community for its research, which is largely due to the active participation of its researchers in international conferences, working groups, and even peer reviews carried out in Chile for stock assessment. Therefore, this dialogue and visit to the consulate represent concrete steps towards the formalization of collaborations that are effective over time and have institutional support. I believe that the



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problems surrounding fluctuations in marine populations are not a new problem, but they need to be addressed from different disciplines and perspectives. Likewise, abrupt changes in the oceans, which are increasingly extreme and frequent, confront us with complex scenarios, where their consequences must be evaluated within the context of climate and ecosystem change. If a collaboration is achieved with institutions with a role similar to that of IFOP in Canada, it would be of great value and benefit, given the progress and experience of its researchers and academics in these issues. I believe that the Director made the most of his stay in Canada, with his active participation in the IRSO conference and his visit to the consulate.”

## IFOP participates in a women’s meeting on artisanal fishing and related activities in the Norte Grande

**MORE THAN 50 WOMEN FROM DIFFERENT COVES IN THE REGIONS OF ARICA AND PARINACOTA, TARAPACÁ AND ANTOFAGASTA MET TO SHARE THEIR EXPERIENCES AND LEARNINGS IN ARTISANAL FISHING.**

With the purpose of promoting the empowerment of women and making visible their multiple contributions in the artisanal fishing sector and related activities, the Humboldt II Project, a binational Chile-Peru initiative co-financed by the GEF and executed by the Undersecretariat of Fisheries and Aquaculture of Chile and the

Vice Ministry of Fisheries and Aquaculture of Peru, and implemented by the United Nations Development Program (UNDP), together with the Chilean partner institutions of the project: National Fisheries and Aquaculture Service (SERNAPESCA), the National Institute for Sustainable Development of Artisanal Fishing and Small-Scale Aquaculture (INDESPA) and the Fisheries Development Institute (IFOP), organized on September 4, a Meeting of Women in Artisanal Fishing and Related Activities in Iquique.



The meeting was attended by more than 50 women who collect seaweed, shellfish, fisherwomen, fish farmers, filleting women, marketers and other related activities, from the coves of Arica, Pisagua, Caramucho, Cavancho, Riquelme, Los Verdes, Río Seco, Chanavaya, Chanavayita, San Marcos, Chipana, Cañamo and Coloso. As part of the activity, the women made presentations where they shared their visions, experiences and the challenges they face in the fishing sector in their localities.

Various regional authorities attended along with them. The welcoming words were given by Karen Guissen, Zonal Director of Fishing and Aquaculture, Regions of Arica and Parinacota, Tarapacá and Antofagasta, who highlighted the sectoral advances in the incorporation of the gender approach. Leonardo Llanos, Executive Director of INDESPA, highlighted the fact that in 2023, they implemented a gender equality strategy in their organization, which has allowed them to design specific instruments for women and create opportunities and spaces that allow them to develop and become visible. For his part, Alejandro Gertosio, Binational Coordinator





of the Humboldt II Project, stressed the importance of these spaces for meeting and exchange between women, which the Project has promoted with beneficiaries from the Atacama and Coquimbo regions, as well as in the intervention areas in Peru. He highlighted that: “These initiatives are vital spaces to make visible the challenges and challenges of women of the sea, allowing them to be addressed by the different instances of the fishing institutionality.”

During the activity, leaders and representatives of artisanal fishing organizations and related activities gave presentations on their experiences, challenges and achievements in fishing activity. They highlighted the importance of valuing and supporting women who play an essential role in artisanal fishing, stressing the need to provide them with more training and education spaces.

Along with them, representatives and specialists from the fishing institutions shared the progress that, from their respective institutions, is being made to incorporate the gender approach and the empowerment of women in artisanal fishing. In this context, presentations were made by the Zonal Director of Fishing and Aquaculture of the regions of Arica and Parícuta in Antofagasta, a SERNAPESCA specialist from the central office (Valparaíso) and the gender officer of INDESPA. The topics presented were about artisanal fishing records, related activities and the importance of women’s participation in production development and technical assistance programs.

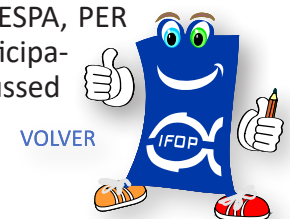
It should be noted that, along with the topics presented associated with current regulations, it was considered important to contribute to the training of women in matters related to the care of resources, where they are relevant actors in the various coves. In this context, Nancy Barahona Toledo, Senior Researcher at IFOP and focal point on Gender for this project,

made a presentation referring to the elements to be considered in the sustainability of fishery resources, focusing her presentation on the reproductive aspects and life cycle of four important resources in the far north: locate, huiros, northern octopus and anchovy.

The workshop concluded with a dynamic in which the participants, representatives of the artisanal fishing sector, identified the main difficulties they face, such as limited access to training and information, lack of recognition of their work and low presence in decision-making processes. Possible solutions were addressed to enhance the visibility and empowerment of women, including the creation of support networks and the implementation of specific training programs. This activity facilitated a valuable exchange of experiences and the generation of collaborative proposals to promote greater inclusion and greater gender equity in artisanal fishing.

## Workshop addresses strategies for the development of artisanal fishing and small-scale aquaculture in the Los Lagos Region

In Puerto Montt, the workshop entitled “Strategies for the development and promotion of artisanal fishing and small-scale aquaculture in the Los Lagos Region” was held. The purpose of the workshop was to present a model for the collection and analysis of information that allows for the identification of development gaps and productive potential, as well as to gather experiences that support the governance required for the definition of development funds. Representatives from various institutions such as GORE, CORFO, SNPA, SERCOTEC, INDESPA, PERMITÍLIDOS, SSPA and IFOP participated in the event, who discussed



proposals and strategies to improve the sustainability and competitiveness of the sector.

During the workshop, an innovative model based on the Sustainable Livelihood Framework (SLF) and Site Assessment (SA) was presented. These tools allow for the evaluation of the living conditions of fishing communities, providing information that supports investment decision-making, which promotes more efficient management of resources. During the workshop, crucial issues related to local governance were also addressed, emphasizing the importance of the articulation between local agents and the development programs implemented in the area. The workshop generated an opportunity for the exchange of ideas and experiences, promoting a constructive dialogue between key actors in the sector. The conclusions and lessons learned from the event seek to promote greater integration between public and private institutions and fishing communities, in order to guarantee sustainable and equitable development of artisanal fishing and small-scale aquaculture in the region.

This activity was part of the development of the project “Design of instruments for the promotion and development of productive units associated with artisanal coves”, led by professionals from the fisheries development division of SSPA and executed by professionals from the management areas section of IFOP.

## IFOP conducts an Oceanographic Cruise in the Almirante Montt Gulf in the Magallanes Region and Chilean Antarctica

The oceanography team of the IFOP Putemún de Castro Research Center, belonging to the Department of Environment of the Fisheries Development Institute, conducted an oceanographic cruise in the Almirante Montt Gulf and surrounding channels. The cruise was carried out between August 13 and 29, with departure and stopover in the town of Puerto Natales and included the participation of professionals Patricio Salas, Miguel Vergara and Sebastián Sepúlveda.

This activity is developed within the framework of the project Monitoring and Modeling of the Spatial and Temporal Variability of Oceanographic Processes in Southern Channels and Fjords, 2024-2025 in the Magallanes Region and Chilean Antarctica, and is part of the permanent cruises that are carried out seasonally in the region.

The general objective of these studies is to characterize, through observations and numerical modeling, the oceanographic processes in fjords and southern channels, and to improve knowledge of the scenarios and impacts of climate change.

The researcher, Patricio Salas, leader of the oceanographic cruise, indicated that this is the continuation of the first cruises that were carried out in the area in 2013. With these measurements, continuity will be given and at the same time the data obtained previously will be updated. In addition, he indicated that the techniques of anchoring lines with ADCP have been significantly improved, so it is expected to obtain more representative and better quality data.

The following specific activities were carried out on this cruise:

- Installation of oceanographic equipment: ADCP, temperature, dissolved oxygen and pressure sensors (tide gauges).



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- Taking water samples with Niskin bottles to obtain chemical-biological information.
- Measurements at predefined stations with CTD-O.

The cruise ship's team is expected to return in January 2025 to continue sampling.

## Workshop to promote the programs “Evaluation and monitoring of the health status of wild fish in freshwater and seawater, 2023-2024” and “Determination and surveillance of *Caligus rogercresseyi* resistance to antiparasitics applied in national salmon farming, Stage VII, 2023-2024”

This Thursday, September 26, the Workshop to Promote the programs “Evaluation and monitoring of the health status of wild fish in freshwater and seawater, 2023-2024” and “Determination and surveillance of *Caligus rogercresseyi* resistance to antiparasitics applied in national salmon farming, Stage VII, 2023-2024” was held.

The activity was organized by the Department of Hydrobiological Health, of the Aquaculture Research Division of the Fisheries Development Institute (IFOP).

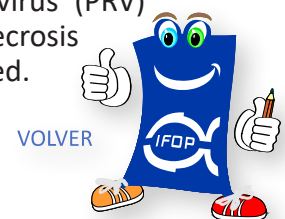
The workshop began with welcoming remarks from Gastón Vidal, head of the Aquaculture Research Division, who highlighted the importance of the workshop in the national context.

On behalf of the Undersecretariat of Fisheries and Aquaculture, Daisy San Pedro presented the research program on aquaculture management, highlighting its relevance in the regulation and conservation of hydrobiological resources. She explained the process of developing the program, which includes receiving proposals, approving budgets and the annual validation of permanent projects. Health and surveillance programs were also addressed, highlighting the advances in monitoring the health of wild fish and the susceptibility of *Caligus rogercresseyi* to different drugs.

“Evaluation and monitoring of the health status of wild fish in freshwater and seawater, 2023-2024”

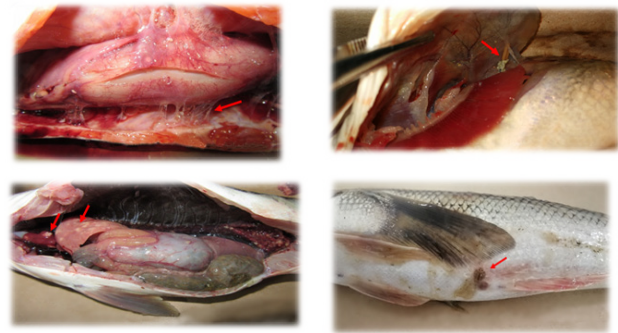
**Juan Carlos Quintanilla**, researcher at the IFOP Hydrobiological Health Department and who leads the program, presented the results, both historical and for the last stage (2023-2024), of the monitoring carried out on wild fish and free-living salmonids, in the detection of the main pathogens causing High Risk Diseases (HRD).

Additionally, he indicated that this program has been underway for more than a decade, carrying out surveillance on 14 pathogens causing HRD in a total of 21 areas distributed between the regions of La Araucanía to Magallanes and the Chilean Antarctic. He highlighted in his presentation that, of the total number of pathogens under monitoring, only the bacterial agents *Piscirickettsia salmonis*, *Flavobacterium psychrophilum*, *Renibacterium salmoninarum*, and the viral agents *Piscine orthoreovirus* (PRV) and *Infectious Pancreatic Necrosis Virus* (IPNV) have been detected.



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To conclude his presentation, Juan Carlos Quintanilla points out that the increased detection of pathogens in wild fish raises the epidemiological importance of these, in their potential role as reservoirs, maintainers and/or transmitters of pathogens, which cause EAR affecting farmed salmonid species.” Finally, he added that “further research is needed to elucidate the dynamics and mobility patterns of wild fish populations.”



“Determination and monitoring of *Caligus rogercresseyi* resistance to antiparasitics applied in national salmon farming, stage VII, 2023-2024”.

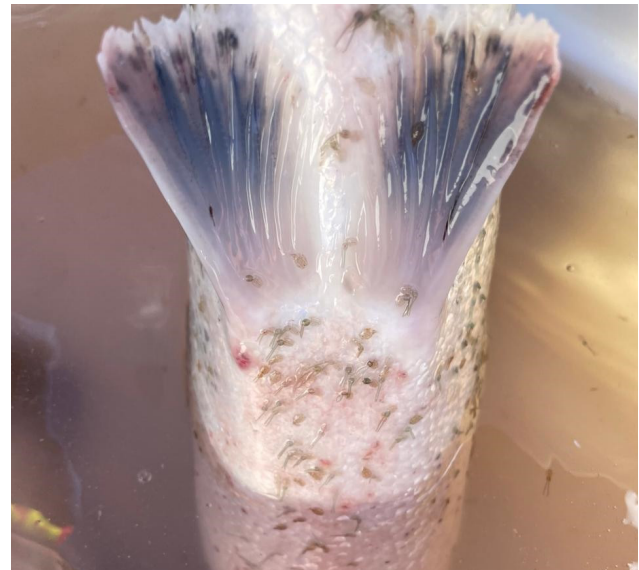
**Dr. Jaiber Solano**, IFOP researcher, presented the historical trends of in vitro susceptibility of *Caligus rogercresseyi* to three drugs mainly: azamethiphos, deltamethrin and cypermethrin. In relation to this, Dr. Solano highlights the loss of susceptibility observed for azamethiphos and deltamethrin, unlike cypermethrin, where a stabilization and even greater susceptibility of sea lice to this drug has been observed. He highlights that, unlike the first two drugs mentioned, the use of cypermethrin in national salmon farming has practically disappeared since 2017.

Additionally, within the results of this program, a marked increase in the effective concentration 50 (EC50) for Hydrogen Peroxide was highlighted, from 2022 to date. Highlighting then the loss of in vitro efficacy of this antiparasitic compound.

Finally, within the short-term projections of the program, Jaiber highlights the beginning of experimental caligus infestation trials, for the validation of protocols for the surveillance of other antiparasitic compounds that are widely used today in the industry and that, therefore, are of great interest for surveillance.

**Dr. Diego Valenzuela:** The *Caligus rogercresseyi* genome as an input for the control of caligidosis

As a complementary activity to the dissemination of the results of two of the IFOP surveillance programs, Dr. Diego Valenzuela-Miranda, researcher at the Interdisciplinary Center for Aquaculture Research (INCAR), addressed the study of the *Caligus* genome and its im-



pact on the aquaculture industry, highlighting the need to develop new non-pharmacological control mechanisms due to the observed drug resistance of the parasite. The first version of the *Caligus rogercresseyi* genome was presented, indicating that it consists of 21 chromosomes, 505 mega bases and 24,000 coding genes, highlighting that obtaining this information was “quite important as a center and gives us guidelines for the development of new *Caligus* control strategies, but also, for example, new strategies for monitoring drug resistance,” adding that this information contributes significantly to the development of new treatments against *Caligus* and particularly associated with the development of vaccines against caligidosis.

Dr. Valenzuela presented the results of the experimental efficacy of vaccines that have been developed at the INCAR center, as well as the projections of the center regarding the validation of molecular markers that help predict the susceptibility of caligus to antiparasitics, based on genomic duplications.



## “Climate change in the oceanography of Chilean Patagonia, towards a horizon of challenges in aquaculture”

On Friday, September 27, at the Vicente Costanera Hotel in the city of Puerto Montt, and also remotely, the Fisheries Development Institute (IFOP) held the workshop “Climate change in the oceanography of Chilean Patagonia, towards a horizon of challenges in aquaculture”. During the day, researchers and experts presented how to contribute to improving decision-making in the aquaculture and fishing sector in southern Chile.

Susana Giglio, representative of the Aquaculture Division of the Undersecretariat of Fisheries and Aquaculture, was in charge of inaugurating the event, followed by the welcoming remarks of Alejandra Oyanedel, head of the Environment Department of IFOP. Both highlighted the importance of sustainable development in aquaculture and the central role that scientific research plays in this process.

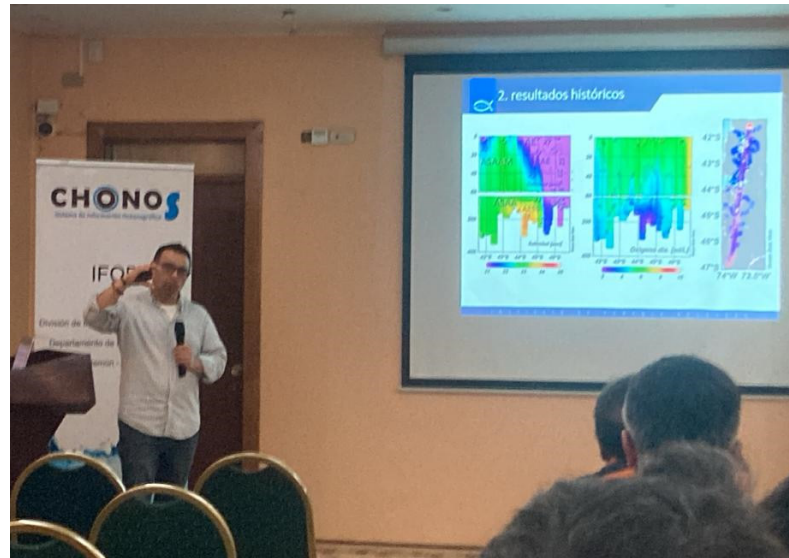
Later, there was the presentation by Pablo Reche, a researcher at IFOP, who spoke about the CHONOS platform, which is an oceanographic information system whose products and applications are the result of environmental studies that, through numerical modeling, aim to improve the management and planning of the territory, as well as the management of environmental and health contingencies <https://chonos.ifop.cl/>

Designed to provide oceanographic and atmospheric information in real time. Reche explained that this platform, created in 2018, is primarily intended for decision makers in the sector, but is accessible to any interested user. “CHONOS offers data from both numerical models and field observations, delivered in a timely and relevant manner to support decision making,” said Reche, highlighting its free and open use.

Among the most important components of the CHONOS platform is MOSA, a pioneering model in Patagonia that provides 72-hour oceanographic and atmospheric forecasts. Reche explai-

ned that this system allows monitoring critical variables that affect aquaculture in the region. “MOSA is the first operational model that provides forecasts of these variables, making it an essential tool for planning and managing aquaculture activities,” he said.

The workshop also included key presentations from other IFOP researchers. Oliver Venegas spoke about Oceanographic and Atmospheric Operational Monitoring and Modeling, focusing on the study of extreme events.



Gabriel Soto, meanwhile, addressed the Dynamics of Dissolved Oxygen in Patagonia, emphasizing the identification of fragile zones and associated processes that influence aquaculture activity.

Jurelys Vellojin gave a presentation on Coastal Acidification, highlighting the importance of constant monitoring in Patagonia to anticipate the effects of climate change on Chilean coasts. This topic is particularly relevant for the future of aquaculture, as changes in water quality can have significant impacts on farmed species.

Finally, Pablo Reche emphasized that CHONOS is constantly evolving, with new developments planned for the future. “These numerical models are continuously improved with new parameterizations, allowing us to obtain more accurate results as we go along,” he said, highlighting the collaboration between field observations and technical adjustments on the platform.



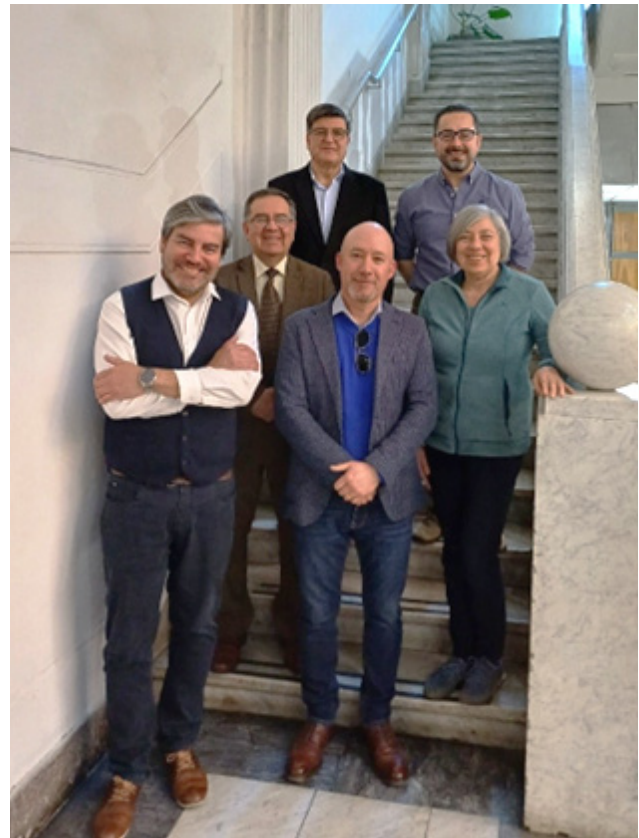


## Meeting of the Aquaculture Working Group of the National Oceanographic Committee, takes place at IFOP Valparaíso facilities

On Wednesday, September 25, at the IFOP headquarters in Valparaíso, the meeting of the Aquaculture Working Group (GT ACU) of the National Oceanographic Committee (CONA) was held. The GT ACU, which has been operating since 2017, has among its objectives to identify gaps and promote, through research and development, the diversification of national aquaculture with an ecosystemic approach; contribute to the dissemination of scientific and technical knowledge through programs that allow the dissemination and appreciation of the scope of aquaculture as a driver of national development; and promote actions that motivate the specialization of young professionals in aquaculture and related topics, through programs that respond to the requirements of aquaculture with an ecosystemic approach.

The group is chaired by Marcelo Campos Larraín and is made up of various national researchers and professionals with experience in the field of aquaculture. In addition to the president of the GT, Dr. Juan Manuel Estrada, professor at the Andrés Bello University, participated in the meeting; Doris Oliva, professor at the University of Valparaíso; Juan Fierro, Executive Secretary of CONA; Dr. Francisco Cárcamo, Head of the Reproduction and Cultivation Department of IFOP; and online MSc. Héctor Flores.

They were received at IFOP by Dr. Carlos Montenegro, Head of the Fisheries Research Division, representing the Executive Director. The holding of this meeting at IFOP is part of the celebration of the institute's sixtieth anniversary and reaffirms the active link between IFOP and CONA, with IFOP being one of the nine member institutions that formed the Committee in 1971. It should be noted that CONA is a public body whose main function is to coordinate institutions that carry out research and activities related to Marine Sciences in Chile and today it maintains 11 Working Groups on different topics, and IFOP participates in 10 of these WGs.



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