

IFOP signs an agreement with Ministry of Science

On Monday, December 13th, in Puerto Montt, IFOP signed a collaboration agreement with Ministry of Sciences, in which main National Fisheries Research institution will contribute environmental information as a result of its activity and that are part of "Climatic Change Monitoring System to monitor fisheries and Aquaculture "(www.ifop.cl) to Climatic Change Observatory promoted by Ministry of Sciences (https://www.minciencia.gob.cl/occ/).

Luis Parot Donoso, IFOP Executive Director explained "our research institute has a direct activity in fishing resources evaluation and environmental monitoring for more than 40 years along the entire Chilean coast, including Red Tide events monitoring and supporting Aquaculture sustainable development through numerical modeling. Due to the above mentioned, it is probably



the institution that has the greatest amount of open sea bio-fishing and environmental data at national level, conducting almost 4000 oceanographic stations per year, sometimes even reaching depths of 1000m".

Recent emergency in Castro and its serious impact on territory and its inhabitants, has revealed our vulnerability to water scarcity, climate change, and urgent need to have anticipation mechanisms facing this type of phenomenon. It is in this challenge where Science Ministry, together with the scientific community, play a key role in ma-

king information available and providing the best



Editorial committee Luis Parot D. / Executive Director Gabriela Gutiérrez V. / Journalist



research evidence, decision-making and adaptation and mitigation initiatives promotion ", said Minister Couve .

As explained by the authority, signed agreements during this visit will make it possible to make available a large volume of data from more than 20 IFOP and IEB meteorological and biological monitoring stations which collect information on variables such as temperature. C02 and methane levels. vegetation levels, radiation, rainfall, wind direction and oceanographic data such as salinity and pH level. "A new contribution from research community to face climatic change impacts and are complementary to other excellence centers monitoring capacity and advances in space observation of New National Satellite System", added the minister

IFOP monitoring system gathers part of the information that is permanently worked on, with online meteorological stations in biologically sensitive points for fishing and aquaculture activity, while citizen meteorological network RedMeteo (https: // redmeteo .cl /) with 61 online stations and with climatic indicators derived from public data for Research by Navy Hydrographic and Oceanographic Service (SHOA) as well as Navy Metrological Service (SERVIMET)



and Chilean Meteorological Directorate (DMC) . In turn, the IFOP System will also contribute information to the International Alert, Prediction and Observation System for Fisheries Resilient to climatic change in Humboldt Current great Marine ecosystem in which Peru and Ecuador participate coordinated by Defense Fund Environmental (EDF).

Dr. Letelier, IFOP's Oceanography and Environment department head, pointed out that "this agreement is an example of a collaborative attitude that national and international public and private institutions must have to generate and disseminate quality scientific data and information in order to understand, face and adapt to Climatic Change in different sectors of society".

IFOP researcher Dr. Gonzalo Fuenzalida exhibits at XLIII Chilean Microbiology Congress

Between November 30th and December 2nd, the XLIII Chilean Microbiology Congress will be held. It is organized by Chilean Microbiology Society, which is done yearly and this time is online.

Dr. Gonzalo Fuenzalida participates in IFOP with phytoplankton communities Genetic diversity research contrasting environments along Chilean Coast.

Dr. Fuenzalida explained "During the last decades, mass se-

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quencing technology has allowed scientists to advance in aquatic ecosystems biodiversity research. Specifically, metabarcoding technique allows prokaryotic and eukaryotic organisms simultaneous identification in aquatic samples by sequencing common DNA regions to a wide variety of species. Therefore, the technique has a potential applicability in biological ecosystems routine monitoring .Useful in understanding Harmful Algal Blooms (HAB) phenomena.

In this work, Chilean southern coast phytoplanktonic communities molecular diversity is explored using sequencing of V4 region of the 18S ribosomal gene in samples from 34 sites from two biogeographic areas with contrasting oceanographic characteristics: fjords / channels versus exposed Pacific Ocean (36 ° S to 53 ° S), areas that in recent years have experienced an increase in the frequency and intensity of Harmful Algal Blooms events with enormous ecological, social and economic consequences". Ifopino



Gonzalo Fuenzalida Del Rio, is a Marine Biologist from Universidad Austral de Chile and a Ph.D. in Ecology and Evolution from Pierre et Marie Curie University (currently Sorbonne University) in France.

From 2017 up to date he has been a Semi-Senior Researcher at Harmful Algae Studies Center (CREAN) which belongs to Fisheries Development Institute (IFOP) in Puerto Montt, where one of its main objectives is molecular tools implementation for harmful microalgae detection and quantification in two monitoring and detection programs for red tides on Pacific Ocean coast and fjords and channels area in southern Chile.

Outstanding participation of IFOP researchers in VIII National Aquaculture Congress

Held between November 29th and December 3rd, the VIII National Aquaculture Congress was held. The event was organized by Universidad Catolica de Temuco (UCT) together with Chilean Aquaculture Society (SCHACUI), also with IFOP sponsorship. Instance which proposes to form a joining point between academia, institutions and intensive aquaculture productive sector, as well as small-scale (artisanal), suppliers and services, in order to share advances, proposals, innovations, diversification and improvements, aimed at making a more sustainable activity, environmen-

tally friendly and, above all,

achieving recognition of aquaculture contribution in localities surroundings where the activity takes place.

From IFOP Fisheries Research Division, Gonzalo Muñoz participated with "Effects of social outbreak and reduced mobility due to COVID-19 on salmonid exports from Los Lagos Region: An estimate with panel data". Possible consequences of both externalities were evaluated, considering an indicator variable for first and continuous for the second, mobility variation (ISCI | COVID Analytics), in exported salmonids production from Los Lagos Region, guantified in MMUS \$ FOB, using panel data design fitted with linear regression models, without lags. Discussing efficiency of fixed and random effects of the specified model in FOB billing response.

And from IFOP Aquaculture Division, researchers Sebastián Cook presented with "Experiences of small-scale aquaculture of algae and bivalves on Chiloé island". It shows cultivation experiences results of three macroalgae species, Agarophyton chilense (pelillo), Chondracanthus chamissoi (sea chicory) and Macrocystis pyrifera (huiro), as well as co-cultivation of bivalves Crassostrea gigas (Japanese oyster), Choromytilus chorus (shoe woolly) and Mytilus





chilensis (Chorito) with macroalgae. Different culture structures were used (e.g. long line, stretchers, plansa), which generated variable results associated with sites and also type of culture structure. Implications in terms of diversification of small-scale aquaculture (PSA) are discussed.

Francisco Galleguillos with "Gaps and challenges in small-scale aquaculture development in Chile: a bio-economic modeling view". Bioeconomic analysis tool is used as a tool to analyze different production stages, both in hatchery and in seawater phase, and thus estimate potential benefits of Small-Scale Aquaculture (PSA) practices. Biological, technological, environmental and economic information was modeled to estimate potential productivity, income and benefits for users who undertake this type of cultivation practices. Gaps and challenges to project this activity are discussed.

Francisco Cárcamo with "Aquaculture Contribution to repopulation and ecological restoration in Chile". Results of a bibliographic review and empirical evidence on the contribution of hatchery and fattening aquaculture, of the last three decades, to repopulation and ecological restoration in Chile are presented. Lines of action and research are proposed and discussed to

understand these interactions and update its respective normative and regulatory frameworks.

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For the first time Subpesca joins international network and publishes free and open access data on exotic pests

INFORMATION, COMPILED THE TO-GETHER WITH MMA AND IFOP FOR "GLO-BAL BIODIVERSITY INFORMATION FACI-LITY", IS ABOUT DIDYMO, A SPECIES PRE-SENT IN FRESHWATER BODIES IN THE SOUTH-CENTRAL ZONE OF CHILE

At the end of 2020, the Ministry of the Environment (MMA) invited Fisheries and Aquaculture Undersecretariat (Subpesca) to participate in "Global Biodiversity Information Facility" (GBIF), an international network that, with more than 1,200 public organizations and private companies present in 123 countries, seeks to provide the community with free and open access to biodiversity data.

Subpesca accepted this invitation and since then, together with the MMA and also Fishing Promotion Institute (IFOP), has worked on "Monitoring of plague species Didymosphenia geminata in water bodies of the south-central zone of Chile, Stage I (2016 - 2017) " project data publication. An interinstitutional work, whose dataset you can review at https://www.gbif.org/ dataset/9b7806e5-bd00-46c3-a5e1-3b3ee5c0e7f1

Publication DOI: https://doi.org/10.15468/ wryneh

With this valuable information, Subpesca has become the third public service in the country that provides free and open access to data sets on GBIF platform. Likewise, it is



the first institution to make available data on an invasive alien species worldwide, which has 330 monitoring events and 1,320 associated occurrences, in addition to 990 records of environmental variables, between Nuble and Magallanes regions and Chilean Antarctica.

A more than relevant initiative, considering that Didymo (Didymosphenia geminata) was officially detected in 2010 and declared a pest species the same year, within the framework of the Hydrobiological Pest regulation. This, because it is a threat to freshwater bodies such as rivers and lakes, the flora and fauna that inhabit these spaces, and also recreational fishing and tourism.

Subpesca in the context of its Permanent Research Program (ASIPA), defined in article 91 of the General Law on Fisheries and Aquaculture and which mainly executes IFOP, continues to generate a significant amount of biological and scientific information through different studies and programs monitoring.

With this action, Chile advances in fulfillment to its commitments derived from Convention on Biological Diversity (CBD), especially in goal 19 of Aichi, to share knowledge on biodiversity.Inturn,itcontributesto the UN Sustainable Development

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Goals (SDGs) and to one of the fundamental functions of the MMA: to facilitate publication and access to the biodiversity data that the country generates.

Source: https://www.subpesca.cl/portal/617/w3-article-112910.html

IFOP researchers will present their results at "VII Seminar on Research Applied to Mythiliculture (SIAM)"

The seminar has been held annually since 2015 and brings together national researchers to present their results associated with mythiliculture.

This Thursday, November 25th, in the morning and afternoon (8: 30-12: 30 and 14: 30-18: 00) "VII Seminar on Research Applied to Mitiliculture (SIAM 2021)" will be held. Instance in which researchers from different national ins-



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titutions meet to present their results associated with mythiliculture.

In this edition, there will be 10 exhibitions, of which 3 will be in charge of IFOP's Aquaculture Research Division researchers.

The first IFOP speaker will be David Opazo, Environment Department researcher, who will present between 10:00 and 10:30 the work entitled "Mitilids larvae abundance in Los Lagos region inland sea". In this exhibition. IFOP Mitilidae Larvae Monitoring Program main results be presented, research whose purpose is to describe and understand mitilid larvae natural supply on which mitilid farming industry is based today.

The second shift will correspond to Dr. Luis Henríquez, Repopulation and Cultivation Department researcher who will present between 11:00 and 11:30 the work entitled "Ecosystemic engineers aquaculture, effects of cultivation, biogenic structuring and its role in coastal ecosystems restoration".

Finally, in the afternoon session, it will be Dr. Óscar Espinoza's IFOP's Harmful Algae Studies Center (CREAN) head, who will present between 16:00 and 16:30 the work entitled "Climate variability and environments oceanographic studies associated with exceptional Harmful Algal Blooms in Los Lagos region ". In this exhibition, management and monitoring programs for red tides and marine toxins IFOP's CREAN historical results will be presented, with an emphasis on exceptional FAN events and favorable atmospheric-oceanographic conditions for their development in the inland sea. and coastline exposed to the Pacific of the Lake District.

In addition to IFOP researchers presentations. Seminar will feature 7



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other presentations by prominent researchers from various national institutions, including Universidad Católica del Norte, Universidad Austral de Chile, Instituto Tecnológico de la Mitilicultura, Universidad de Chile, Universidad de la Frontera and Universidad Santo Tomás.

Detailed effects of social outbreak and pandemic on salmonid exports

Chile: Research seeks that companies apply sufficiently flexible operational frameworks to adapt themselves to emergencies derived restrictive measures

By Loreto Appel (salmón expert)

Between November 29th and December 3rd, VIII National Aquaculture Congress was held, an instance in which Gonzalo Muñoz, IFOP Fisheries Research Division general coordinator presented "Effects of the social outbreak and reduction of the mobility due to Covid-19 in salmonid exports from the Los Lagos Region: An estimate with panel data ", research carried out jointly with Uiversidad Catolica de Temuco and associate researcher, Alfonso Mardones, from Food Production Research Center (Nipa-UCT), and Ximena Salas, from same higher education institution.



In conversation with Salmon expert, the researcher stated that, considering that recently two sudden events such as the social outbreak of October 2019, and arrival and rapid Covid-19 pandemic spread to the country, in March 2020, these facts affected many productive activities with its consequent impact on goods and / or services, "we consider that it would be appropriate at sectoral level to evaluate its possible effects on salmonids production in Los Lagos Region, guantified through final amounts of monthly turnover FOB in millions of dollars (MMUS \$)evolution, according to their main destination countries, using unobservable variables, such as panel data, together with their main linear estimation methods, pooled model, intra-individual fixed effects model (within) and random effects model (random)".

In this way and based on Torres econometric analysis (2020), included in IFOP technical document "Covid-19Effects in national fishing and aquaculture sector" (Palta et al., 2020), a created data design was created by a panel whose individual dimension included six main destination countries for salmonid exports from Los Lagos Region; United States, Mexico, Brazil, Japan, China and Russia, out of a total of 78 nations according to figures published by the National Institute of Statistics (INE), and the time series, from January 2017 to July 2021.

"The analysis of this long and balanced panel, included a static model whose expression included as regressive variables, tons of salmonids exported to each destination country (causal variable) proportion together with an indicator variable, to differentiate months linked to social outbreak (Torres, 2020), from October 2019 to February 2020, under the assumption that this impact only stopped with pandemic arrival to the country, in March 2020, an influence that was added

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to the model such as country's monthly average mobility reduction in region's communes (control variables) ", explained Muñoz.

According to the professional, the data correspond to salmon exports from Los Lagos region in millions of dollars (MMUS \$ FOB), without species distinction, and within live fish, fillets, fresh or refrigerated , frozen, dry, salted, smoked, cooked, pellets and flour consignments included in 2017 tariff code of National Customs Service (SNA), as well as amount of exported merchandise in tons, per month and yearly according to country and territory whose source was same public customs service, published by INE on its regional statistics website.

"Meanwhile, regional communes mobility variation was obtained from ISCI | COVID Analytics platform, website between Institute of Complex Engineering Systems (Isci) from Universidad de Chile, Telecommunications National Company (Entel) and Entel Ocean (Entel's digital unit)alliance, taking the first two weeks of March 2020 as a reference base -total mobility-", said Muñoz.

Adjustments results with used estimation methods were all significant in their parame-



ters, showing that both sudden events have had a certain effect on the contraction of salmonid exports in terms of FOB turnover during their tenure, based on the main countries of destination of the region's production.

In Muñoz's opinion, this result partially coincides with that reported by Torres (2020), since, although in part of this analysis, the unit of measurement was salmonid harvests to quantify both effects, and also period of study plus limited, "for Los Lagos region incidence of social outbreak had a consequence opposite to our evaluation. However, pandemic in the country did cause a considerable decrease in salmonid harvests, exportation quantity.

According to this IFOP professional, this type of analysis aims to visualize how unforeseen and wide-ranging externalities can have regionally relevant export goods such as salmonids for Los Lagos region. "In this way, it intends to contribute to planning and identifying contingency strategies that include actions and include all involved parts in the process in order to adapt to crisis situations, and thus mitigate their negative effects."

Then, Muñoz asserted that obtained inference with these panel data indicates that prevention measures and actions promoted by Government to face the pandemic have been successful for their objectives, through less mobility in the region, "but they have impacted with least movement throughout supply and distribution chain related to salmon export trade, which entails suggesting that companies apply sufficiently flexible operational frameworks in order to adapt to restrictive measures derived from emergencies ".

https://www.salmonexpert.cl/



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"IFOP Valparaíso recognizes her contribution in matters of risk prevention to Olga Espejo"

She has almost 30 years of experience in the institution, she works as Head of General Services and Office of Parts.

Olga has been characterized by maintaining a collaborative spirit and committed to the safety of her colleagues, being a permanent contribution to the efforts made by the Institute in these matters.



