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Small-scale aquaculture, IFOP researchers interest focus

Researchers from Repopulation and Cultivation Department, IFOP's Aquaculture Research Division, study potential benefits and interactions of co-cultivation of extractive species under small-scale aquaculture scheme (APE) in the environment and as a development alternative for artisanal fishermen and fish farmers. A research topic which focuses on areas affected by high levels of nutrients produced by human activities (eutrophication), where bivalve molluscs could help reduce organic matter load and abundance of microalgae control through filtration, while macroalgae capture and consume inorganic nutrients. Also, macroalgae can be used as bioremediators of environments affected by heavy metal contamination generated by industrial waste, for example. "This line of research is being addressed as one of the study objectives" Comprehensive Program for Algae Aquaculture for Artisanal Fishermen and Small-scale Aquaculture Development", which is part of Fisheries and Aquaculture Permanent Program, which is carried out in by virtue of the existing agreement between Economy Undersecretariat and Smaller Companies and IFOP, the scientific-technical counterpart being Fisheries and Aquaculture Undersecretariat, as



indicated by Dr. Francisco Cárcamo Head of Repopulation and Culture Department.

Another research line undertaken by department's members focuses on mitigating the effects of weather change on small-scale aquaculture. In this context, if bivalves and macroalgae are cultivated together, they could benefit each other since some of their biological processes can be coupled. For example, ocean acidification (reduction of ocean surface pH) is a phenomenon generated by atmospheric CO2 diffusion into seawater. This reduction in pH produces an accelerated dissolution of bivalves shells at the same time that it hinders their formation

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(calcification), which affects these organisms growth. Macroalgae, during photosynthesis, use CO₂ from seawater, causing an increase in pH, which favors calcification in bivalves. At the same time, macroalgae need nutrients and CO₂ to grow, which are excreted into the environment as waste by bivalves. This is the main theme of (FONDECYT initiation 11190297) project led by Dr. Pablo Leal, whose experiments are being carried out at Marine Resources and Resources Laboratory (ARMLab), located at the Hueihue Experimental Center, Ancud.

Finally, Dr. Luis Henríquez has led the study of the potential positive effects of small-scale aquaculture on local ecosystems, such as emerging habitats formation. In general, these emerging habitats are born after bivalves and macroalgae shedding that fall to the sea floor. This could increase abundance and richness of species under cultivation centers compared to contiguous areas without cultivation centers. This is relevant since the species found in these new habitats include species of ecological and economic importance that could eventually be managed and exploited, in addition to providing larvae of these species. However, it should be noted that the positive effect on local ecosystem is limited to smaller farms and extractive species that do not require artificial feeding, such as bivalves and macroalgae, and under site-specific physical conditions.

In summary, an important part of the Repopulation and Culture Department carried out research aimed at providing scientific-technical bases to support Chilean small-scale aquaculture development and sustainability with benefits for the environment and for fishermen and farmers.

IFOP launches website with educational material

<https://www.ifop.cl/comunicaciones/material-educativo/>

IFOP Fishing Promotion Institute permanently carries out outreach activities in schools, fishing coves and general community. In order to raise awareness on marine resources and ocean care. All this is supported by graphic material and explanatory videos on various topics researched by the institute.



Due to current pandemic situation, the educational and promotional material we have has been gathered in a link, in which you can download everything you want for free

The site offers, among others, marine resources information, red tide videos, painting books, marine birds and mammals locust, clams, sharks, algae, benthic resources, turtles educational and entertaining sheets. And also interesting questions as ¿how to analyze the fishes age?

Along with the above mentioned, it is possible to download a marine species guide, Putemún marine reserve and wetland biodiversity book, macroalgae cultivation manual.

With this contribution the institute intends to help to know and care the ocean and its resources.



IFOP will broadcast Aquaculture Bacterial Resistance Surveillance Program results via streaming

IT IS ORGANIZED BY IFOP AQUACULTURE RESEARCH DIVISION

Next Wednesday, June 24th, between 09:30 and 11:00, " Surveillance of commonly used antimicrobials pathogen resistance in national salmon farming scientific research program closing workshop will be held online. "Stage VI, developed by Fisheries Development Institute Hydrobiological Health Department.

The program, which began in 2014, aims to develop surveillance of the phenomenon of pathogens resistance to commonly used antimicrobials in national salmon farming.

The research is part of the Permanent Program executed by Fisheries Development Institute (IFOP), as established by the General Law of Fisheries and Aquaculture, through an agreement with Economy and Smaller Companies Undersecretariat , being the Undersecretariat of Fisheries and Aquaculture (Subpesca) its technical counterpart

The program has been developed focusing on two main themes. On one hand, validating and standardizing bacterial susceptibility evaluation techniques against national salmon farming most used antimicrobials, for different pathogens that affect this productive sector, considering at this stage, in addition, criteria definition for correct analysis results.

On the other hand, the program carries out periodic samplings in farming centers from the Los Lagos Region to the Magallanes and Chilean Antarctic Region, with producer companies support , establishing a bacterial resistance monitoring pilot program.

The event in particular considers, in addition to delivering current stage research program results , it also includes Undersecretariat for Fisheries and Aquaculture and the National Service for Fisheries and Aquaculture presentations performed by its representatives .

The workshop is open, will be held through MEET platform and has limited spaces upon registration.



World albatross day is celebrated by Fishing Development Institut and ACAP

Chile belongs from its beginnings to the Albatross and Petreles Conservation Agreement (ACAP). Albatrosses have been one of the fishing bycatch activities most affected bird species, so international cooperation is necessary for their conservation. ACAP has established June 19 as World Albatross Day to raise awareness about these birds around the world.

Albatross, are large seabirds that dominate the southern hemisphere seas, in their feeding trips they can cover from New Zealand to Chile. Efforts for this group of birds conservation has led the States in which it is distributed to generate measures for their protection, at the same time cooperation between scientists and fishermen has been encouraged. Interactions with fishing operations and threats on land will be identified, as well as the implemented solutions.

Dr. Marco Favero, former ACAP Executive Secretary and current member of ACAP Populations and Conservation Status Working Group explained, "Albatrosses are globally threatened seabirds that require our urgent attention. Governments and decision makers must understand this urgency and deepen conservation actions that reverse the negative effects on these species and their habitats "- <https://www.conicet.gov.ar/>

Luis Adasme IFOP researcher and ACAP Seabird Bycatch Working



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King crab and southern scallop Sustainable management in Magallanes

During the first semester of 2019, Wildlife Conservation Society Chile (WCS) and Fisheries Development Institute (IFOP), signed a Collaboration Agreement which aims to carry out joint actions in Research and innovation field for Magallanes region artisanal fishing development.

The collaborative work of both institutions has its first fruits. With The Walton Family Foundation (WFF) support, it has been possible to finance two research initiatives that seek to provide new information for southern king crab and oyster fisheries sustainable management.

The first initiative presented by WCS is called: "Implementing ecosystem-based management solutions for king crab (*Lithodes santolla*) and southern oyster fisheries (*Chlamys vitrea*) in Magallanes Region, Chile" and has a two years duration.

Marine ecoregion of canals and fjords in southern Chile rugged geography, added to the long hours of work at sea as a result of the distances to be traveled and adverse weather conditions, are factors that make artisanal fishing work different from that carried out in the rest of the country, and that should be considered when proposing new management strategies, both in the crab fishery and in the southern oyster.

Rodrigo Guijón, WCS Chile Marine Program Coordinator, indicated that "with research, training and experiences exchange, the project seeks to add value to fishing with active participation of key actors in Magallanes artisanal fisheries. It is about advancing towards the care of the ecosystems in which fishery resources are found from their good management, working together with the fishermen's organizations, processing plants and authorities, to facilitate discussion and guide science towards necessary solutions".

Another topic that will be addressed by this initiative is "Fishing gear and improvements Assessment of proposal for ecosystemic exploitation of spider crab in the Magallanes region". Erik Daza Valdebenito, IFOP's Head in the region, stated: "We will work with WCS in a pilot experience to incorporate alternative escape mechanisms to centollera trap development, the idea is to facilitate male specimens release under the minimum legal size of catch (12 cm long cephalothorax)

VOLVER



Group official member highlighted: "Since ACAP beginning Fisheries Development Institute has had an active participation in different multilateral meetings, showing the work and IFOP work in research around interactions between fishing operations and seabirds, this has allowed, over time, to broaden knowledge about this problem and raise awareness about the importance of mitigating effects of fishing on this species.group "

In 2016, Chile hosted the 9th ACAP meeting organized by the Undersecretariat for Fisheries and Aquaculture and Fisheries Development Institute. IFOP Chief Fisheries Evaluation Department, Dr. Carlos Montenegro Silva, explained the role of the institute in this topic: "IFOP directly advises Fisheries and Aquaculture Undersecretariat, providing input information to prepare the national annual report. In addition, he is in charge of monitoring the National Action Plan (PAN-AM) and maintains constant monitoring of this issue through Main National Fisheries Monitoring Programs".

Among IFOP albatrosses, dissemination activities we can highlight various talks with fishermen, students and the community in general that aim to teach the population in a didactic and entertaining way about these magnificent birds and highlight the current conservation crisis that threatens them.

IFOP recently developed a seabirds guide and also launched a joint campaign with explora Valparaíso in which stands out ¿Why should we protect seabirds?

and species that are part of the accompanying fauna associated with fishery. On the other hand, we will carry out field tests with artisanal fishermen in order to evaluate crab fishing gear interaction with large marine cetaceans, the objective is to recommend mitigation measures to the Management Committee and respond to the requirements for the export of this resource to North American market. ”

The second initiative, presented by IFOP, is entitled: “Ecosystemic evaluation of southern oyster fishery (*Chlamys virens*) in Parry Bay fjord, Marine Coastal Protected Area of Multiple Uses (AMCP-MU), Almirantazgo, Magallanes region, Chile”. Carlos Montenegro Head of IFOP Fisheries Assessment Department, points out:

“The general project’s objective is to generate updated information on the condition status of this species from an ecosystemic perspective. For more than 10 years, it has not been known how the oyster beds are in this protected area. We will work together with

WCS for two years, to generate scientific and technical information on the ecosystem, incorporating fishermen and authorities in the construction of recommendations that allow managing the sustainable exploitation of this species that today is the object of conservation in the study area ”.

Coordinated and informed work with the Undersecretariat of Fisheries and Aquaculture through its Zonal Directorate of Fisheries and Aquaculture and other public services, artisanal fishermen, management committees and other relevant fisheries actors is essential in this project.

“We would like this alliance between IFOP and WCS to give fishermen and authorities valuable tools, especially to improve commercial opportunities without harming resources, in the difficult moment facing the sector,” said Guijón.

news and photography: IFOP WCS



Working on the Abate Molina Scientific ship



Scientific Observers in the field



Simón Zepeda Coquimbo



María Escudero Coquimbo



Sebastián Torres Coquimbo



From left to right Sebastián Torres, Juan Tapia, Juan Guerrero (all from Coquimbo)



Verónica Alcaino San Antonio