



6TH EDITION OF WORLD CONGRESS ON

Aquaculture, Fisheries & Marine Biology

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Aquaculture Horizons: Integrating Science,
Sustainability, and Global Collaboration

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6TH EDITION OF

WORLD CONGRESS ON

AQUACULTURE, FISHERIES & MARINE BIOLOGY

HYBRID EVENT
08-10
OCTOBER 2026

BOOK OF
ABSTRACTS



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Keynote Speakers



Atul Kumar Jain

Ornamental Fisheries Training and
Research Institute, India



T.V. Anna Mercy

Kerala University of Fisheries and
Ocean Studies, India



Subhas Das

The University of Burdwan, India



Violetta M Yurakhno

A. O. Kovalevsky Institute of Biology of the
Southern Seas of RAS, Russian Federation



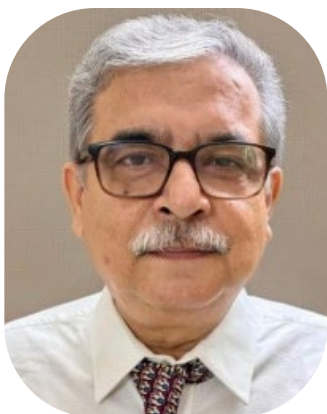
Gerardo Rodriguez Quiroz

Instituto Politécnico Nacional, Mexico



Virendra Kumar Goswami

Indian Institute of Technology & Environment
and Peace Foundation, India



Nitai Chandra Kundu

Centre for Environmental Management and
Participatory Development, India

Welcome Message



T V Anna Mercy

Kerala University of Fisheries and Ocean
Studies, India

Good morning, everyone.

Honoured delegates, distinguished scientists, esteemed colleagues, and friends - Ohayo Gozaimasu. It is with immense gratitude that I accept this honour to address you in the beautiful city of Tokyo. It is a distinct privilege to deliver this keynote address at the World Aquaculture Conference (WAC-2026). Today, I am delighted to present my paper titled Integrating art, science and rural development: the multifaceted Role of Aquarium Keeping. For millions, aquariums serve as their initial connection with nature. For too long, ornamental fish have been perceived merely as decoration – a beautiful hobby behind glass. However, in truth, their significance extends far beyond this. The aquarium is not merely a tank; it is a bridge connecting people to nature, economy to ecology, and tradition to innovation. This industry provides a livelihood for countless breeders, serves as a powerful tool for conservation, education, and mental well-being, and stands as a multi-billion-dollar pillar of sustainable aquaculture. I invite you to look beyond the glass tank – to recognize the immense opportunity, profound responsibility, and inherent sustainability it represents.



Welcome Message

Violetta M. Yurakhno, PhD

A. O. Kovalevsky Institute of Biology of the Southern Seas
of Russian Academy of Sciences, Russian Federation

Dear participants of the 6th Edition of the World Congress on Aquaculture, Fisheries & Marine Biology (WAC 2026)!

I know firsthand how hard it is to catch fish and other aquatic organisms, especially in marine and oceanic environments, to raise them artificially, to study various aspects related to the life and health of living organisms, to establish production processes, and to ensure smooth operation.

This is all a noble mission, aimed at feeding the people of the planet, giving them the knowledge and skills to survive in the face of population growth and food shortages in some regions. In this cause that unites us, I wish everyone great success and achievements, and new shining heights!

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About Magnus Group

About

Magnus Group, a distinguished scientific event organizer, has been at the forefront of fostering knowledge exchange and collaboration since its inception in 2015. With a steadfast commitment to the ethos of Share, receive, grow, Magnus Group has successfully organized over 200 conferences spanning diverse fields, including Healthcare, Medical, Pharmaceuticals, Chemistry, Nursing, Agriculture, and Plant Sciences.

The core philosophy of Magnus Group revolves around creating dynamic platforms that facilitate the exchange of cutting-edge research, insights, and innovations within the global scientific community. By bringing together experts, scholars, and professionals from various disciplines, Magnus Group cultivates an environment conducive to intellectual discourse, networking, and interdisciplinary collaboration.

Magnus Group's unwavering dedication to organizing impactful scientific events has positioned it as a key player in the global scientific community. By adhering to the motto of Share, receive, grow, Magnus Group continues to contribute significantly to the advancement of knowledge and the development of innovative solutions in various scientific domains.

About WAC 2026

About

The **6th Edition of the World Congress on Aquaculture, Fisheries & Marine Biology (WAC 2026)**, held on **October 8-10, 2026**, in **Tokyo, Japan**, and **virtually**, provided an international platform for professionals dedicated to advancing aquaculture, fisheries, and marine biological sciences. Centered on the theme “*Aquaculture Horizons: Integrating Science, Sustainability, and Global Collaboration*,” the congress brought together researchers, scientists, academicians, aquaculture specialists, fisheries professionals, marine biologists, environmental experts, policymakers, and industry representatives from across the globe.

WAC 2026 featured a diverse scientific program encompassing research presentations, scientific discussions, and knowledge-sharing sessions focused on recent discoveries, technological developments, emerging challenges, and sustainable approaches in aquaculture, fisheries, and marine biology. The congress encouraged the exchange of scientific findings and practical insights across various disciplines, highlighting advancements in aquatic resource management, marine ecosystem conservation, sustainable aquaculture practices, fisheries development, and environmental protection.

The congress facilitated international engagement and interdisciplinary collaboration through its hybrid format, enabling participants to connect and exchange ideas both in person in Tokyo and through virtual participation. This Abstract Book brings together the research contributions and scientific perspectives presented at **WAC 2026**, serving as an accessible academic resource for continued learning, reference, and future collaboration. The congress reflected a shared commitment to advancing scientific understanding, promoting sustainable practices, and strengthening global cooperation toward a resilient and sustainable future for aquaculture, fisheries, and marine ecosystems.

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**AQUACULTURE, FISHERIES
&
MARINE BIOLOGY**

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KEYNOTE
PRESENTATIONS





T. V. Anna Mercy

Kerala University of Fisheries and Ocean Studies, Panangad,
Cochin 682019, Kerala, India

Biography: Dr. T.V. Anna Mercy studied M.Sc. Marine Biology at Cochin University, Kerala, India. She received Ph. D from Kerala University in 1982. Her Ph. D work was on a unique Indian blind clariid fish *Horaglanis krishnai* Menon that dwells only in subterranean wells at Kottayam, Kerala. She became the Junior Assistant Professor at College of Fisheries, Kerala Agricultural University, Panangad in 1984 & became Professor in 2002. She pioneered research on Indigenous fresh water Ornamental Fishes of the Western Ghats of India, developed captive breeding technology for 15 prioritized fresh

water species including *Sahyadria denisonii*, which is a much sought after ornamental fish in the international market. It is popularly known as Miss Kerala. She has published about 100 research papers including 50 in peer reviewed journals and authored/co authored many books. Presented research papers on different aspects of ornamental fishes in several international conferences at Brazil, Oregon, USA, China, South Africa, Ethiopia, Iceland, Netherlands, China, Sri Lanka, Singapore, Korea, Malaysia, Indonesia and Australia.

Integrating art, science and rural development: The multifaceted role of aquarium keeping

Ornamental fish keeping has evolved beyond a recreational pastime to become a dynamic trade, a creative art form, a scientific discipline, and a catalyst for rural socioeconomic development. This presentation explores the multifaceted nature of ornamental aquaculture, highlighting its role in generating sustainable livelihoods, especially among rural and marginalized communities. The sector integrates husbandry skills, aesthetic design, and scientific innovation in breeding, nutrition, and disease management. As global demand for ornamental species rises, small-scale farmers and entrepreneurs are increasingly able to participate in profitable value chains, supported by low initial investment requirements and opportunities for skill-based employment. Through case examples and recent developments, the presentation will demonstrate how ornamental fish culture contributes to income diversification, women's empowerment, youth engagement, and environmentally responsible aquaculture practices. Ultimately, it underscores the potential of the ornamental fish sector as a viable model for inclusive rural development and a bridge between science, art, and commerce.



Atul Kumar Jain

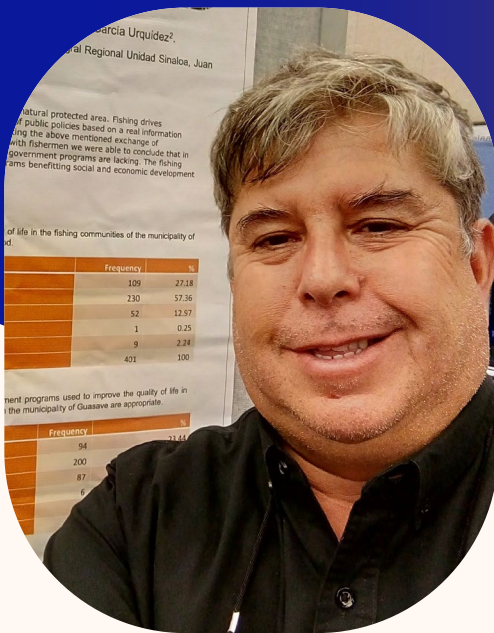
Ornamental Fisheries Training and Research Institute,
Udaipur-313001, Rajasthan, India

Biography: Dr. Atul Kumar Jain is a techno-entrepreneur and founder president of the Ornamental Fisheries Training and Research Institute (OFTRI). Earlier, Jain was a fisheries scientist at ICAR-Central Institute of Fisheries Education, Mumbai, from 1983 to 2006 and later established a freshwater ornamental fish farm downstream of Asia's second largest manmade lake, Jaisamand. It was subsequently upgraded to a skill development and research centre. OFTRI has imparted training to about 1000 persons including farmers, entrepreneurs, students, aquarium traders and department officials

etc. Many of OFTRI alumnus have established their own ornamental fish production farms or aquarium shops. Jain has authored three important books on ornamental fisheries namely, BMPs for freshwater ornamental fish production, Policy issues on OFD in India, and lastly Ornamental fisheries and aquarium keeping: Insights from the Indian aquarium industry. He is a guest faculty and visiting professor at several fisheries colleges in India, associated with schemes and policy formulation for OFD in the country.

Shifting horizons of global ornamental fish trade: Trends, transitions, and emerging market dynamics

The Asian continent countries, mainly of south, east, and south-east Asia led by Singapore, have been the leading exporter of aquatic ornamental organisms, with the USA as the major importer for decades. However, a notable shift occurred in global export-import trade after 2011. The value of global exports, which was continuously following an ascending trend though with a declining growth rate, became stable, in fact slightly negative; Japan emerged as leading exporter post-2018 and continues to maintain the same; the share of Singapore in global exports declined sharply; Spain became a leading exporter of marine aquatic ornamentals; the share of European continent countries increased; the percentage share of the USA in global imports declined; and the share of marine aquatic organisms in global exports grew to 30%. All these changes in global export and import suggest a major shift in demand patterns, supply chain, market trends, and hobbyists' preferences. A detailed analysis of data retrieved from the database of the Food and Agriculture Organization on global export and import of aquatic ornamental organisms of the last 50 years was performed to understand the dynamics of the global ornamental fish and aquarium trade. The paper describes the outcome of this detailed analytical study including growth trends of the trade, transitions in the export-import patterns, the hobby of aquarium keeping, economic importance of the sector both for exporting and importing countries, and impact on marine aquatic biodiversity. A case study of India is discussed, highlighting how generation of basic data on domestic aquarium trade contributed to growth of the sector in the country through policy support.



Gerardo Rodríguez-Quiroz*, Arturo Polanco Torres, Píndaro Álvarez Ruíz, Carina Gámez Jiménez, Ana Elsi Ullo Pérez

Instituto Politécnico Nacional, CIIDIR Unidad Sinaloa, Blvd Juan de Dios Bátiz Paredes 250, San Joaquín, Guasave, Sinaloa, México 81101

Biography: Dr. Gerardo Rodríguez Quiroz studied Oceanology in the Universidad Autónoma de Baja California, Mexico in 1989 and has a Ph.D. degree from CIBNOR, SC. He is full-time professor and researcher at the Instituto Politécnico Nacional since 1999. He has been conducting research on organic aquaculture and the relation between artisanal fishermen and natural protected areas in Mexico. He has directed 8 theses, which include 2 Ph.D. degrees and 6 M.S. degrees. Since 2010, he has been member of the National Researcher System (SNI) of CONACYT and has been granted the 1998 Baja California Environmental Award.

Earthworm vermicompost to enhance shrimp *Litopenaeus vannamei* growth and inhibit AHPND disease in an experimental culture

In Mexico, annual shrimp aquaculture production is increasing, thereby requiring more feed inputs and disease inhibitors. Among organic fertilizers, *Eisenia foetida* solid humus is considered a strong promoter of plankton growth, helping develop these aquatic organisms. On the other hand, the excessive use of antibiotics in aquaculture has negatively affected farmed species and reduced shrimp growth because bacteria have become more resistant to antibiotics. That is why it is important to find environmental alternatives to reduce shrimp diseases. The aim of this study was to evaluate the effects of different doses of solid earthworm vermicompost as growth promoters and AHPND inhibitors.

Five treatments with three replicates were established, with 120 shrimp larvae in 120 L tanks with zero water exchange. The tanks were fertilized with initial doses: control (0.00 mg·L⁻¹ Solid Vermicompost [VC]), 275, 550, 825, and 1100 mg·L⁻¹. The doses were thereafter reduced by half on day fifteen. The experiment lasted 45 days. Growth, Food Conversion Ratio and survival were measured. After the growth experiment, mortality accumulation was evaluated for each treatment when shrimp were challenged against *Vibrio parahaemolyticus* in three-liter bowls with three replicates, with 10 shrimp of 1.5 g each. Water quality parameters were not constant during the experiment and showed significant differences ($P > 0.05$) between the oxygen and pH treatments. We found that shrimp reared with organic fertilizer had the best growth (Figure 1) and the lowest food conversion average. On the other hand, treatment over 550 mg/L of vermicompost was effective against *V. parahaemolyticus*. Less than three shrimp died in these treatments in a period of 72 h, contrary to treatments with less than 550

mg/L which had over 50% of the mortality in the first 18 h of the challenge (Figure 2). Control had the highest mortality, with 80% of the shrimp dead before the 24 h trial.

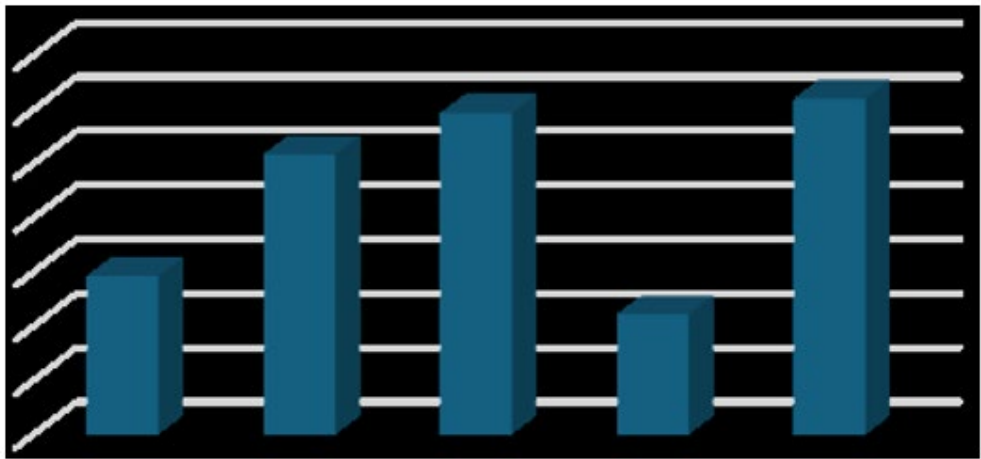


Figure 1. Shrimp growth with vermicompost.

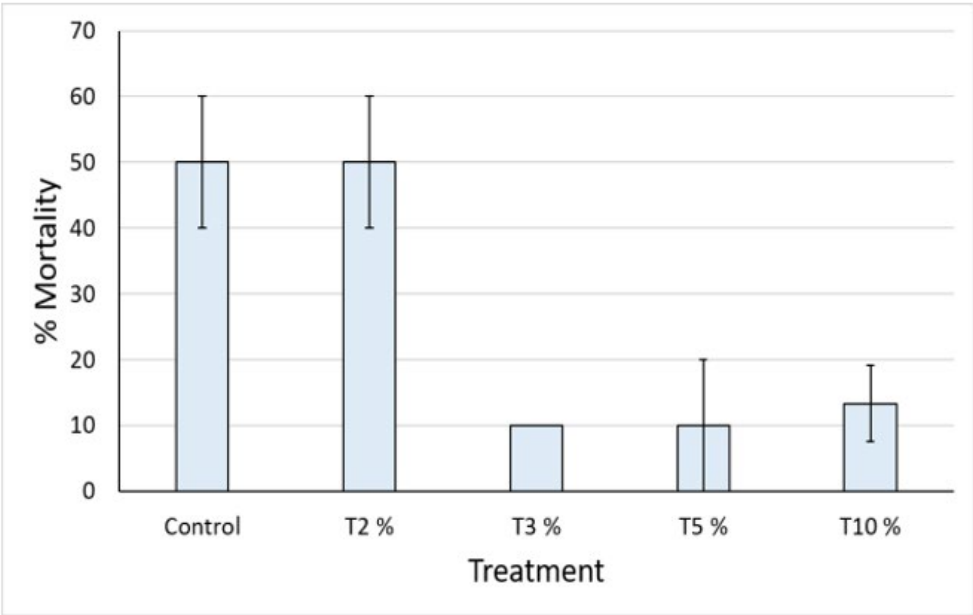
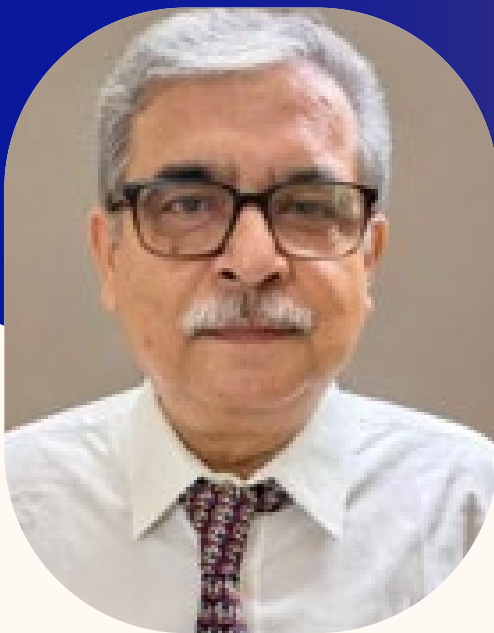


Figure 2. Shrimp mortality after being infected with AHPND.

Some studies suggest that vermicompost is an important food resource for juvenile shrimp. This organic fertilizer improves water quality and enhances phytoplankton production. We find that vermicompost is a real option for shrimp growth and can lower production costs. It can also enhance shrimp survival and increase shrimp production when used in the first stages of shrimp, when they are more susceptible to diseases, but further investigation is needed to identify which bacterial consortium in the vermicompost acts as an inhibitor of AHPND.



Nitai Chandra Kundu

Centre for Environment Management and Participatory Development (CEMPD), Kolkata, India

Biography: Dr Nitai Chandra Kundu (Born in 1959) is an expert in Applied Social and Environmental sciences with committed and dedicated in research and teaching from 1986 to till now. Carrying out Research and training, Policy formulation and Evaluation, part time teaching in several University. He started his career after his Master degree from Calcutta University as Research Fellow during 1982-1986 Under State Planning Board and Registered for PhD in Calcutta University and then he joined as Research Associate during 1986-1993, in Institute of Wetland Management and Ecological Design, an

autonomous Research Institute under Govt in Calcutta. Later he joined as Scientist, 1993-2003, in Institute of Wetland Management and Ecological Design, Calcutta. and Sr. Scientist, 2003- 2013, Institute of Environmental Studies and Wetland Management (formerly Institute of Wetland Management and Ecological Design), Calcutta. He also joined parallelly as Chief Technical Officer in 2006-2011 in East Kolkata Wetlands Management Authority, Department of Environment, Govt of West Bengal Kolkata. He also worked as Sr. Scientist, from February, in 2013- September, 2016 West Bengal Pollution Control Board on a particular assignment. He left Institute of Environmental Studies and Wetland Management as Sr. Scientist, in January, 2019, (formerly Institute of Wetland Management and Ecological Design), Calcutta and joined Centre for Environmental Management and Participatory Development (CEMPD) in 2019 and continuing as Chief Advisor till date. As regards his academic qualification he did Pre-University and Graduation from University of Calcutta and also Master Degree from University of Calcutta in Social Science in 1981. He did Ph.D. from University of Calcutta in 1994 and Environment Management Degree from University of Birmingham in 1993. He completed 24 Research projects 29 Research papers of national and international standard, 8 Books and one edited international Journal on Science and Technology and Development. He supervised PhD and M Phil students.

Fisheries development as tools to save the wetlands in India and enhancement of local livelihood – Indian experiences

Water area, now popularized as wetlands in general, is vulnerable since the beginning of civilization. Economic activities of the human population led to the encroachment of wetlands throughout the world because of their low economic return compared to other non-wetland uses. This incidence is severe in flood plain wetlands and urban and peri-urban wetlands. Low economic return from the existing traditional uses like fishery, tourism, nutrient recycling and other uses in urban and peri-urban areas, and wetlands in flood plain areas, could not apparently compete with agriculture; as a sequel of ongoing economic development this led to rapid change of land use in flood plain and urban areas. In spite of several measures taken up at national and international level to stop and harmonize the situation, the threat of conversion is common in these two types of wetlands.

Available literature indicates that expansion of upland croplands was the most vital cause of natural wetland loss, followed by flooded rice (18.2%), urban areas (8.0%), forestry (4.7%), wetland cultivation (4.3%), pasture (2.0%) and peat extraction (0.9%).

This keynote address focuses on the use of floodplain, peri-urban and urban wetlands for productive use with the potential of pisciculture and allied activities, which can be a potential alternative trade-off to save this valuable resource and thereby the potential ecosystem.

As a corollary of this trend, wetland shrinkage worldwide is much more acute in urban wetlands located inside, in the vicinity of, or on the fringe of the urban area—popularly known as peri-urban area, actually prospective urban area—in Kolkata and other municipal towns in India and West Bengal compared to the flood plain wetlands. However, only economically potential practices can make the management of these vulnerable water areas much more competitive against the market-force-driven conversion to non-wetland use, in the perspective of livelihood enhancement.



Subhas Das

Eco-toxicology Laboratory, Department of Environmental Science, The University of Burdwan, West Bengal, India

Biography: Dr. Subhas Das is a fisheries professional and working in the Department of Fisheries, Government of West Bengal since last almost seventeen years. He has acquired Bachelor of Fishery Science (B.F.Sc.) from the West Bengal University of Animal and Fishery Sciences, West Bengal, India; M.Sc. in Environmental Science from Vidyasagar University, West Bengal, and Ph.D. in Environmental Science from the University of Burdwan, West Bengal. Presently he is a registered candidate of Doctor of Science under the Department of Environmental Science, the University of Burdwan, West Bengal,

India. His field of specialization under the broad subject area is Fisheries, Aquaculture, Environment and Ecology, while his major research interest under the thrust area is fish nutrition, fish immunology, eco-toxicology, biochemistry, histology, histochemistry, scanning-electron microscopy, immune-histochemistry, enzyme-histochemistry, haematology, metagenomics, amino acid profiling.

Haringhata[®] Fish: A concept of responsible farming with sensible marketing for better livelihood and sustainable development

In Purba Bardhaman district a study was conducted in ponds under semi-intensive (one control and two treatments) culture conditions to evaluate the quality of fish, specifically food-fish, particularly Indian Major Carps, and air-breathing teleosts reared in a ratio of 2:5:1:1 for a specific duration of ninety days both during breeding and dry seasons. These fishes were fed only farm-feed (4-5% day⁻¹): Control (C), choline chloride (Treatment A: 350 g 15 days⁻¹ bigha⁻¹) with farm-feed, and HumiflocTM (Treatment B: 1.75 kg 15 days⁻¹ bigha⁻¹) plus farm-feed. Results from serological, scanning electron microscopy, and histochemical analyses showed a significant increase in productivity. Enriched-quality food fish for human consumption was also demonstrated by nutritional and fatty acid composition data of cultivated fish species. In contrast to another study, two benthic fish species, exposed to PTMs and PAHs in the Digha coastal belt, West Bengal, displayed concerning results, depicting leukaemia (Polycythaemia vera, lymphoproliferative disease, Non-Hodgkin lymphoma and Hodgkin lymphoma). Thus, based on the prevailing studies, the *Haringhata*[®] Fish (chilled fish) is now produced in a responsibly farmed condition and is currently being sold to consumers through West Bengal Livestock Development Corporation Limited through its sensible marketing channels. So, it can be inferred from these two distinct studies that the source of fish and the adopted fish-culture technique are quite important for providing quality food-fish for mammalian consumption. Thus, the Sustainable Development Goals (SDGs) are ultimately achieved by enriching two sectors: producers (fish farmers) through socio-economic advancement and consumers (mammals) through the provision of high-quality food-fish.



Violetta M. Yurakhno

A. O. Kovalevsky Institute of Biology of the Southern Seas of RAS, Sevastopol, Russian Federation

Biography: Violetta M. Yurakhno graduated from the Molodezhnenskaya Secondary School of Simferopol in 1981 with a gold medal, from Simferopol State University in 1986 with honors, completed her postgraduate studies in 1989, and defended a PhD thesis on Myxosporeans of Black Sea fish: systematics, fauna, ecology, zoogeography in 1994. She is the author of 213 publications and a famous specialist in parasites of fish in the World Ocean. Has works on ichthyology, nature conservation, and the history of biology. Described 26 new species of myxosporeans (25) and leeches (1).

Indicated many new species for the fauna of the Black, Azov and East Seas. She has extensive international cooperation.

Conditionally pathogenic microparasites (Microsporidia and Myxosporea) of mullet fish – potential objects of mariculture in the Black and Azov Seas

Mullet fish have high nutritional value and excellent taste, which is why they are farmed in various countries around the world (on all continents except Antarctica). In the Black Sea and Sea of Azov, these fish are not farmed, but rather exploited for commercial purposes. However, they may eventually be bred in culture farms, so it is important to understand the parasites that can harm them and spoil the commercial value of fish products. In the Black Sea and the Sea of Azov, we highlight one species of microsporidian from the genus *Loma* Morrison & Sprague, 1981, and three species of myxosporeans from the genus *Myxobolus* Bütschli, 1882, which are conditionally pathogenic microparasites for mullet hosts.

Loma mugili Ovcharenko, Sarabeev, Wita & Czaplińska, 2000 was found in the Molochny Estuary of the Sea of Azov in the endothelial cells of the gill filaments in 4.5% of the So-iuy mullet *Planiliza haematocheilus* (Temminck & Schlegel, 1845) with an intensity of 1–36 (9.7) cysts and an abundance of 0.39 cysts. This parasite caused mass mortality of mullet fingerlings in this region in the autumn of 1996. Incidentally, the So-iuy mullet was successfully introduced to the Azov and Black Seas by Soviet scientists in the late 1970s, brought from the Sea of Japan, which belongs to the Pacific Ocean basin.

Myxobolus exiguus Thélohan, 1895 caused a mass mortality of the native Flathead grey mullet *Mugil cephalus* (Linnaeus, 1758) and Golden grey mullet *Chelon auratus* (Risso, 1810) in the spring of 1949 in the Kerch Strait and Maly Knut Bay, due to gill swelling and bleeding. This

phenomenon coincided with a natural fish kill due to deteriorating hydrological conditions and never recurred on such a scale. However, *M. exiguus* has become a rare species in the Black and Azov Seas in recent decades. Since 1987, it has not been encountered in Sevastopol, and in Kerch and Genichesk it had extremely low rates of prevalence in mullet (1 and 3%, respectively) with an intensity of single spores in a smear.

Myxobolus parvus Schulman, 1962 was found in 1996–1997 on the gills of *Planiliza haematocheilus* with a maximum infestation prevalence of 54% and high intensity. In some cases, a white, fluid film consisting of the parasite's spores and plasmodia was observed coating the gills of this fish species, inevitably affecting the respiratory function of the affected organ.

Myxobolus episquamalis Egusa, Maeno & Sorimachi, 1990 was found on the scales of *Mugil cephalus* in the Black Sea near Zhelezny Rog Cape in May (at a water temperature of 18.4 °C), June (19.5 °C), and October (14.0 °C) 2015. The proportion of sick individuals varied from 3 to 15% in spring, reached 40% in summer, and decreased to 2.5% by autumn. No mortality cases were noted; however, extensive scale damage reduced the commercial value of the fish. This species was also found on the scales of *M. cephalus* in Turkey in 2017–2018, and in 2025 it was encountered in photographs taken by Crimean spearfishers, who were concerned about the presence of many fish with severe scale damage in schools of mullets. It was most likely introduced to the Black Sea by *M. cephalus*, which migrated from the Mediterranean Sea, where it had previously been known to infect this host.

The fact that these species of myxosporeans can be transferred to adjacent water bodies and parasitize other species of host fish emphasizes the need for increased monitoring of the parasitological situation associated with microparasites of mullets in the Black and Azov Seas.

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Virendra Kumar Goswami

Indian Institute of Technology and Environment and Peace Foundation, India

Biography: Dr. Virendra Kumar Goswami, Ph.D. from the Indian Institute of Technology (IIT) Kharagpur, M.Sc. from Sagar University, MS from the University of Wisconsin, USA, Post-Doctorate Fellow at the University of Illinois, Chicago, USA. 'Visiting Scientist' to the United Nations Industrial Development Organization (UNIDO), ICTP, Italy. Expert Panelist to the International Civil Aviation Organization (ICAO), Canada, and the United Nations. Founder President of the Environment & Peace Foundation and Wing Commander (Retd.) with more than 550 hours of flying as a supernumerary aircrew.

'Distinguished Alumnus Awardee-2023' of IIT Kharagpur & Member: Peer-Review-Committee for the selection of the Distinguished Alumnus Award-2024&2025. He worked at the Space Science Engineering Centre, NASA-NOAA (National Oceanic Atmospheric Administration) at the University of Wisconsin, USA. Former Vice Chancellor: Sangam & Sunrise Universities. Goswami has been Director of Engineering Institutes. Special Invitee by the World Meteorological Organization (WMO) of the United Nations, Geneva in 2001&2016. Expert Panelist of Association of Indian Universities (AIU) & Ph. D & M. Tech Examiner at Centre of Energy Studies at IIT Delhi. More than 44 years of teaching, research, and administrative experience at Home and Abroad. Also, Member: American Geophysical Union) SCB,IMS and SAMA. Lately, appointed Reviewer /Member of the Editorial Board of the Royal Meteorological Society (R. Met. S), Atmospheric Science Letters (R. Met. SAL) as well as Prof. Emeritus. GNEC-Maulana Azad Medical College, Sharda University, Greater Noida, and RVIT, India. Presented Research Papers(275), Authored-Edited Books(14), Patents(6), in the fields of Chemical Technology, Atmospheric, Space Sciences, Health Sciences. Artificial Intelligence and Quantum Computing, Satellite Application, Climate Variability, control of Global Warming, and quality Higher Education at International and National Conferences held in India, the USA, the UK Latin America, South Africa, Canada, and Europe (more than 32 countries of all the Continents). Besides, headed various delegations at the Natl. & International Levels.

Application of artificial intelligence and NISAR satellite to study the air-sea CO₂ exchange and aquatic toxicology to develop 'Aquatic Pollution Remediation Technologies' (PART)

This study aims to apply Artificial Intelligence and NISAR satellite data to study aquatic toxicology, ocean energy, air-sea CO₂ exchange, and land, ocean and cryosphere interaction, comprising the study of ice-covered surfaces, islands, sea ice and selected oceans every 12 days by using the recently launched NISAR (NASA-ISRO) satellite. NISAR was launched on 30 July 2025 by ISRO-GSLV (Geostationary Satellite Launch Vehicle), an expendable three-stage rocket that stands 169.6 feet (51.7 meters) tall.

Next, the aim is to correlate these investigations with climate variability, and develop physicochemical and spectroscopic methods to control aquatic pollution by developing

innovative technologies to harness ocean energy, evolving methods and materials to generate non-toxic cleaning products. The oxidation process would be employed to treat groundwater contaminants by making use of chemical oxidants viz. hydrogen peroxide, persulfate, permanganate and ozone. These oxidants have been able to cause the rapid and complete chemical destruction of many toxic organic chemicals, amenable to partial degradation by subsequent bioremediation through chemical oxidation applied in subsurface systems and in above-ground water treatment systems involving chemical oxidation regeneration of Granular Activated Carbon (GAC).

Also, it aims to use Artificial Intelligence to study deep-sea morphology and remote sensing technology (NISAR satellite) to understand air-sea exchange during extreme atmospheric forcing and biophysical interactions on Air-Sea CO₂ Exchange. with climate variability, for estimating energy and material (e.g., carbon, nitrogen) exchange between the upper and deep ocean and to understand spatial and temporal non-homogeneity in deep-ocean mixing; distribution of deep-ocean mixing intensity, and the physics that drives that distribution and the energetics of the ocean, and reducing the uncertainties in global circulation and climate models. Also, AI and remote sensing would be employed to understand the impacts of Ocean Systems Interactions, Risks, Instabilities, and Synergies (OSIRIS), ocean-cryosphere interactions and sea-based pollutants on the ocean ecosystem through correlational studies with climate variability to develop Aquatic Pollution Remediation Technologies (PART).

Keywords: Artificial Intelligence, NISAR Satellite, Aquatic Toxicology, Ocean Energy, Air-Sea CO₂ Exchange, Land, Ocean and Cryosphere, OSIRIS, PART

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ORAL
PRESENTATIONS





Adam Bell^{1,2*}, Kevan Main², Nicole Rhody², Andrea Tarnecki³, Lior Guttman^{4,5}

¹Department of Civil and Environmental Engineering, University of South Florida, USA

²Mote Aquaculture Research Park, Mote Marine Laboratory, Sarasota, FL, USA

³Auburn University Shellfish Lab, School of Fisheries, Aquaculture & Aquatic Sciences, Auburn, Alabama, USA

⁴The Department of Blue Biotechnologies and Sustainable Mariculture, The Leon H. Charney School of Marine Sciences, University of Haifa, Haifa 3498838, Israel

⁵Morris Kahn Marine Research Station, The Leon H. Charney School of Marine Sciences, University of Haifa, Haifa 3498838, Israel

Algal biofilter treatment of fish pathogens in recirculating aquaculture systems

Integrated Multi-Trophic Aquaculture Recirculating Aquaculture Systems (IMTA-RAS) are proven to be great for the sustainable production of fish while conserving water and recycling nutrients. Fish pathogens are a significant cause of loss and cost in aquaculture. Frequently, pathogens accumulate in high nutrient areas such as in the microbial community of the nitrifying biofilter in the IMTA-RAS. On the other hand, algal biofilms can enhance the disease resistance and growth of the cultured species and increase water quality. Previous research at Mote shows that microbial communities of periphyton (algae, bacteria, and archaea in an attached submerged biofilm) may help to reduce the number of pathogens in the IMTA-RAS, preventing their establishment in biofilms. Validation of the effect of biofilter combination is necessary to establish where pathogens are residing within the IMTA-RAS and if periphyton is useful for remediating fish pathogens. Two trials were carried out on two separate 2500 L pilot scale IMTA-RAS for different biofilter combinations with samples taken over two different time periods per trial. The combinations tested in trials were periphyton only and periphyton in combination with a nitrifying biofilter. Samples were extracted with Qiagen EarthSoil Kits and validated on a Nanopore Nanodrop. High resolution classification of fish pathogens using the hsp70 gene and next generation sequencing was carried out to precisely examine fish pathogens in periphyton biofilters and nitrifying biofilters. Results will be compiled by OTU and into stacked bar charts, then compared for significant differences. The results indicated significant differences between the *Vibrio* communities in the MBBR and periphyton

biofilter with up to a 90% lower population in the periphyton. Additionally, communities of *Pseudomonas* and *Mycobacterium* showed a lower population count in the periphyton biofilter. The results may be explained by the microbial ecology relating different clades such as archaea, *Vibrios*, nitrogen cyclers, and Cyanobacteria. Total population of pathogens in the MBBR was 3107 ± 518 versus total pathogen population of 427 ± 149 in the periphyton. The microbial shift in the biofilter may be explained by microbial ecology and survival strategy (e.g. commensalism, parasitism, opportunism) differences between biofilter types. Although the results are promising, the microbial community needs to be correlated to removal of pathogens in the water column as well as operational and environmental conditions. Paired with biosecurity measures, IMTA-RAS biofilters provide a resilient, adaptable, and strong fortification for fish health.

Biography

Dr. Adam Bell entered aquaculture as part of a group of ambassadors from the USA helping rural farmers raise tilapia in rural Zambia. After this, he progressed into a PhD program at the University of South Florida in the USA, he worked on marine recirculating aquaculture systems growing algae, fish, and plants at the pilot scale (2500 L). He finished the PhD and then completed a postdoctoral on biomanufacturing at NASA.



**Adam Bell^{1,2*}, Sarina J. Ergas¹,
Kevan Main², Nicole Rhody², Lior
Guttman^{3,4}**

¹Department of Civil and Environmental Engineering,
University of South Florida, USA

²Mote Aquaculture Research Park, Mote Marine Laboratory,
Sarasota, FL, USA

³The Department of Blue Biotechnologies and Sustainable
Mariculture, The Leon H. Charney School of Marine Sciences,
University of Haifa, Haifa 3498838, Israel

⁴Morris Kahn Marine Research Station, The Leon H. Charney School of Marine Sciences, University
of Haifa, Haifa 3498838, Israel

Performance of moving bed biofilm, periphyton, and halophyte biofilters in marine multi-trophic aquaculture systems

Combining Multi-Trophic Recirculating Aquaculture System (MT-RAS) biofilter types leverages the strengths of different ecological biomes, benefits water treatment, resource recovery, economics, and environmental sustainability. The overall goal of this study was to determine the effects of different aquaculture biofilter combinations on MT-RAS. Three duplicate biofilter combinations were tested in a pilot scale MT-RAS with red drum (*Sciaenops ocellatus*): 1) Periphyton (algae and bacterial biofilm) with Halophytes (P+H), 2) Periphyton with Moving Bed Biofilm Reactors (P+M), and 3) Periphyton Only (P2). Experiments were performed in two trials (spring and summer) with four replicates. Water quality tests validated that $\text{NH}_3/\text{NH}_4^+$, NO_2^- , NO_3^- , and CO_2 were below fish toxic limits for all biofilter combinations. Fish mortalities were low, with food conversion ratios between 1.1 and 2.0. In all trials, periphyton added Dissolved Oxygen (DO) to the water (at an average of $+3.95 \pm 6.52 \text{ mg}/(\text{L} \cdot \text{d})$), thus reducing energy costs. Periphyton was also found to include valuable lipid content ($4.55 \pm 2.24\%$ of dry weight) with the detection of Ω -3 fatty acids. The P2 trials maintained a stable alkalinity and pH balance. The M+P trials removed $\text{NH}_3/\text{NH}_4^+$ at a high rate; however, they also required more energy for DO. Edible sea purslane growth rates ($1.0431 \pm 0.3361 \text{ g/day/plant}$) were efficient in all P+H trials. The microbiome revealed abundance of Ignavibacterium bacteria, Chrysophyceae, Cyanobacteria, Haptophytes, *Navicula* and *Chlorella* algae, *Nitrospira*, *Nitrospirae*, *Nitrososphaera*, and *Nitrosoarchaeum* nitrogen cyclers. Overall, periphyton biofilter combinations nitrify, denitrify, stabilize pH, photosynthesize, and produce oxygen and a value-added product⁷.

Biography

Dr. Adam Bell entered aquaculture as part of a group of ambassadors from the USA helping rural farmers raise tilapia in rural Zambia. After this, he progressed into a PhD program at the University of South Florida in the USA, working on marine recirculating aquaculture systems growing algae, fish, and plants at the pilot scale (2500 L). He finished the PhD and then completed a postdoctoral on biomanufacturing at NASA.



Dr. Aksya Kumar Sarkar*, M. Nazrul Islam, F.H. Ansary

Biotech Agro Care, Bangladesh, Managing Director & CEO, S.T.D., Basic Industrial Area, Benirpota, Sathkira-9400, Bangladesh

Effect of harmful agent on production income and biodiversity of shrimp farming in Bangladesh

Shrimp is one of the leading exportable seafood products from Bangladesh. In the 2017-2018 financial year, 36,168 MT of product was exported with a value of 40 crore 87 lac USD, yearly contributing 3.57% to the GDP. Research was conducted in three Upazila (Kaliganj, SyamNagar and Asasuni) under Satkhira district in the southwest region of Bangladesh. Three different farming practices—organic, traditional and control/extensive farming—were selected for the research. Farmers follow the traditional and control/extensive farming practices and average production is 275 kg/ha, which is the lowest compared to other countries producing shrimp around the world. Reasons for this low production are lack of better technology, dearth of quality seed and feed, and the effect of shrimp disease. Small-scale organic shrimp farming practice introduced recently has shown better production and profitability under three coastal sub districts (Upazila) of Satkhira district in the southwest part of the country. Three different farming practices were studied: (i) organic, (ii) traditional and (iii) control/extensive farming, where farmers were interviewed to collect data. In comparison to the production kg/ha/yr from the year 2012 to 2014, the highest production occurs in organic shrimp farming than others. Organic shrimp farming production is 13.16% higher than the traditional and 15.14% higher than the control/extensive shrimp farming. Traditional shrimp farming production is 1.98% higher than the control/extensive shrimp farming. The result shows that highest income ha/yr. is in organic shrimp then traditional and lastly control/extensive shrimp in total of year from 2012 to 2014. Percentage of gross sell of organic is 14.01% higher than traditional and 15.89% higher than the control/extensive shrimp farming. The traditional shrimp gross sell is 1.87% higher than the control shrimp. Interview and PRA method were used for the collection of data. The main research question was what effect does the overall production, income and biodiversity among the three different farming practices. Effects were found that production kg/ha is organic higher than traditional and control/ extensive shrimp farming practices. Traditional

farming production cost is higher than the organic and control/ extensive farming practices. Considering to the biodiversity organic farming conserve more biodiversity than traditional and control/extensive farming practices.

Compared to the organic, traditional and control/extensive farming practices, organic is a sustainable and environmentally friendly farming system. Organic farming is less input cost and higher production and high product value. Organic farming protects the environment and biodiversity. Organic farming could be creating the international image of Bangladeshi product in the international market.

Keywords: Organic, Traditional, Extensive Shrimp Farming, Production, Income Biodiversity.

Biography

Dr. Aksya Kumar Sarkar is a Shrimp Aquaculture specialist with 28 years of extensive experience in shrimp production, processing, and marketing. He holds an M.Sc. in Zoology and a PhD in Shrimp Aquaculture from the University of Rajshahi, Bangladesh, where his research focused on the impact of harmful agents on shrimp farming productivity, income, and biodiversity. He has worked with several internationally funded development projects, including FTEP-II (DFID funded), ATDP-II (USAID funded), and initiatives with the WorldFish Center. He also contributed his expertise to private sector organizations such as WAB Trading Asia Limited (Germany-based), KMI International, and the Organic Shrimp Project in Bangladesh and abroad. He has traveled widely across major shrimp-producing and marketing countries, gaining strong global exposure to aquaculture practices and trade. He is the author of two practical books on shrimp farming for Bangladeshi farmers and has seven scientific publications in national and international journals. He has actively participated in fisheries and aquaculture conferences in countries including India, Thailand, Vietnam, the Czech Republic, and Belgium. He is recognized for his contributions to sustainable shrimp aquaculture development, farmer education, and industry advancement.



Amanda Fox*, Josh Diamond, Thomas Coates

Animal Research Initiative, Seattle, WA, USA

Decapod crustacean live boiling

A decapod's ability to experience pain is an important consideration when discussing the ethics of live boiling. Historically, a lack of conclusive evidence has guided moral decisions regarding the treatment of lobsters and other decapods. However, a lack of conclusive evidence does not equate to evidence for the contrary. This paper analyzes current scientific findings to determine the existence of potential nociceptive experiences in decapods. Recent research suggests that the decision to live boil has almost certainly led to catastrophic consequences in the form of immense suffering. Scientific papers and studies have reached a near-consensus that decapods feel pain. Decapods have been shown to avoid pain when exposed and moreover actively make the decision to do so. Additionally, research has also shown a strong likelihood that these animals are entirely sentient. This paper concludes that the developing evidence regarding a decapod's capacity for conscious experience validates revising current harvesting and slaughter methodology.

Biography

Amanda L. Fox was born in Cheverly, Maryland, on May 28, 1988. Previously studying at North Seattle College, she is currently pursuing a Bachelor's degree in earth and environmental sciences at Arizona State University in Tempe, Arizona. She has spent the past decade working within the intersection of public health, animal welfare, and environmental science and currently serves as the Senior Research Executive for Animal Research Initiative. Her research includes zoonotic disease prevention, invasive species, ecological resilience, and biodiversity preservation.



Ambati Ranga Rao

Department of Biotechnology, School of Biotechnology and Pharmaceutical Sciences, Vignan's Foundation for Science, Technology and Research (Deemed to be University),
Vadlamudi-522213, Andhra Pradesh, India

Applications of microalgal astaxanthin and its importance in aquaculture: Recent developments

Astaxanthin is a high-value natural carotenoid renowned for its exceptional antioxidant activity and essential role in pigmentation, making it a key functional ingredient in modern aquaculture. Besides imparting the desirable red coloration to fish and crustaceans, astaxanthin enhances growth, survival, flesh quality, reproductive performance, egg quality, and resistance to environmental and pathogenic stress. Its immunomodulatory, hematological, and antioxidant properties have significantly increased the demand for naturally derived astaxanthin as a sustainable alternative to synthetic pigments. Microalgae are the primary natural producers of astaxanthin, with *Haematococcus pluvialis* serving as the leading commercial source, while several other species also exhibit considerable production potential. Advances in microalgal cultivation, harvesting, extraction, and purification technologies are improving production efficiency and economic feasibility. This article highlights major astaxanthin-producing microalgae, recent progress in downstream processing, and the expanding applications of astaxanthin in enhancing aquaculture productivity, product quality, and sustainability.

Biography

Dr. A. Ranga Rao Ambati is a distinguished biotechnology scientist and academic with over 21 years of experience in teaching, research, innovation, and academic leadership. Ambati serves as Senior Scientist (Rank of Associate Professor) and Director of the Advance Research Centre at Vignan's Foundation for Science, Technology and Research (VFSTR), India. His Research focuses on algal biotechnology, food biotechnology, functional foods, nutraceuticals, natural products, and bioprocess engineering. Recognized among the World's Top 2% Scientists (Stanford University/Elsevier, 2019–2025), he has published over 100 scholarly contributions with h-index: 32 and i10-index: 69, and received several prestigious international/national awards for excellence in biotechnology research.



Ana Claudia Sánchez-Ortiz^{1*}, Raúl Snell-Castro¹, Rafael Franco-Sapién¹, Ángel Isidro Campa-Córdova²

¹University Center for Exact Sciences and Engineering,
University of Guadalajara, Guadalajara, México

²Northwest Center for Biological Research, La Paz, Baja
California Sur, México

From biotechnology to intelligent aquaculture: Integrating microbiome engineering, artificial intelligence, and knowledge transfer for sustainable production

Aquaculture is entering a new technological era in which increasing production efficiency can no longer depend on conventional management practices. Disease emergence, antimicrobial resistance, environmental variability, resource limitations, and the complexity of host–microbiome interactions require a transition toward more predictive, preventive, and knowledge-driven production systems. Biotechnology has already provided important tools for addressing these challenges, including probiotics, plant-derived bioactive compounds, molecular diagnostics, bioremediation, and microbiome-based approaches. However, the next challenge is to integrate these biological tools with advanced data analysis and Artificial Intelligence (AI) to transform information into actionable decisions.

This presentation proposes a conceptual framework for the transition from biotechnology to intelligent aquaculture, integrating microbiome engineering, multi-omics, artificial intelligence, and knowledge transfer. Probiotics and regional plant-derived bioactive compounds are considered not simply as alternatives to antibiotics, but as potential tools for modulating microbial communities, improving host performance, and increasing resilience to pathogenic pressure. In particular, agricultural residues and underutilized plant resources may represent valuable sources of phytochemicals while contributing to circular bioeconomy strategies. These approaches generate increasingly complex datasets describing microbial communities, host responses, environmental conditions, production performance, and pathogen dynamics.

Artificial intelligence provides an opportunity to integrate these heterogeneous datasets and identify patterns that may be difficult to recognize through conventional analytical approaches. Machine learning and generative AI can potentially support literature mining, candidate identification, experimental design, microbiome analysis, disease-risk prediction, environmental monitoring, feed management, and decision-support systems. Importantly, AI should not replace biological experimentation or expert judgment; rather, it can serve as an enabling technology that accelerates hypothesis generation, knowledge integration, and evidence-based decision-making.

A critical component of intelligent aquaculture is the human dimension. Scientific innovation has limited impact when technologies cannot be effectively transferred, understood, or adopted by producers, technicians, students, and decision-makers. Therefore, capacity building, digital literacy, knowledge management, and technology transfer must be incorporated into the innovation process. The integration of AI with biotechnology and organizational learning can facilitate continuous professional development and improve access to scientific knowledge, particularly in regions where technical resources and specialized expertise are limited.

The proposed framework moves aquaculture management from a predominantly reactive model, in which interventions occur after disease or production problems emerge, toward a predictive and preventive model, in which biological, environmental, and production data are continuously integrated to anticipate risks and guide interventions. This transition has the potential to improve animal health and productivity while reducing unnecessary antimicrobial use, optimizing resource utilization, and strengthening environmental sustainability.

Ultimately, intelligent aquaculture should not be understood as the replacement of biology by technology. It represents the integration of biological knowledge, biotechnology, data, artificial intelligence, and human expertise to create more resilient, adaptive, and sustainable production systems. This convergence may provide a pathway for accelerating innovation and translating scientific advances into practical solutions capable of supporting the next generation of global aquaculture.

Biography

Ana Claudia Sánchez-Ortiz is a Research Professor in the Department of Chemical Engineering, University Center for Exact Sciences and Engineering (CUCEI), University of Guadalajara. A Marine Biologist with an M.Sc. in Marine Biotechnology and a Ph.D. in the Use, Management, and Conservation of Natural Resources, specializing in Aquaculture Biotechnology, She is a Level I member of Mexico's National System of Researchers (SNI) and PRODEP recognized. Research focuses on probiotics, functional additives, plant-derived bioactives, pathogen detection, host responses, microbiome dynamics, metagenomics, bioremediation, and the biotechnological potential of microorganisms and marine resources, integrating biotechnology and emerging technologies to advance sustainable, resilient, and innovative aquaculture systems.



**Angka Putra^{1,2*}, Sarifah Aini¹,
Hyun-Woo Kim^{3,4,5,6}, Shantanu
Kundu^{1,7,8}**

¹Interdisciplinary Program of Marine and Fisheries Sciences and Convergent Technology, Pukyong National University, Busan 48513, Republic of Korea

²Faculty of Fisheries, Cokroaminoto Makassar University, Jl. Perintis Kemerdekaan KM. 11, Makassar, South Sulawesi 90245, Republic of Indonesia

³Department of Marine Biology, College of Fisheries Science, Pukyong National University, Busan 48513, Republic of Korea

⁴Research Center for Marine Integrated Bionics Technology, Pukyong National University, Busan 48513, Republic of Korea

⁵Marine Integrated Biomedical Technology Center, The National Key Research Institutes in Universities, Pukyong National University, Busan 48513, Republic of Korea

⁶Department of Biology, Faculty of Science and Technology, Airlangga University, Surabaya 60115, Republic of Indonesia

⁷Ocean and Fisheries Development International Cooperation Institute, College of Fisheries Science, Pukyong National University, Busan 48513, Republic of Korea

⁸International Graduate Program of Fisheries Science, Pukyong National University, Busan 48513, Republic of Korea

When mainland meets islands: Unravelling the evolutionary legacy of Southeast Asian freshwater fishes in the Sundaland biodiversity hotspot

Sundaland represents one of the most dynamic biogeographic landscapes in Southeast Asia, where the mainland and islands have experienced recurrent shifts in connectivity driven by geological processes and Quaternary sea-level fluctuations. During periods of low sea level, exposure of the Sunda Shelf altered the configuration of freshwater habitats and established palaeodrainage networks that connected regions now separated by marine barriers. This history raises a fundamental question: to what extent does the evolutionary history of extant freshwater fishes retain signatures of past connections? The freshwater fishes provide an informative system for addressing this issue because their distributions are closely associated with drainage systems, while their limited ability to cross oceanic barriers can generate pronounced geographic genetic structure. Accordingly, this study examines the

evolutionary legacy of ancient Sundaland by investigating how palaeogeographic history and environmental fragmentation may have shaped phylogeographic and evolutionary patterns in Southeast Asian freshwater fishes, with particular emphasis on genetic distinctiveness between mainland and island lineages. The mitogenomic evidence was used to resolve relationships among lineages and assess genetic divergence, which were subsequently contextualized in relation to geographic structure within a palaeolandscape framework. The findings suggest that evolutionary responses to palaeogeographic change vary among taxa, potentially reflecting differences in dispersal capacity and divergence times influenced by geological history. Overall, these observations highlight the importance of understanding Southeast Asian freshwater fish diversity within historical configurations of landscape connectivity rather than interpreting it solely through present-day biogeography. From this perspective, the mitogenomic approaches link contemporary genetic patterns to palaeogeographic scenarios connecting mainland and island regions of Southeast Asia, revealing insights into the persistence of the evolutionary legacy of ancient Sundaland in the genomes of extant freshwater fishes.

Biography

Angkasa Putra is a Ph.D. researcher at the Biodiversity and Evolutionary Genomics Laboratory within the Interdisciplinary Program of Marine and Fisheries Sciences and Convergent Technology at Pukyong National University in Busan, Republic of Korea. He holds a fellowship from the Global Bluefood Leadership Program, funded by the Ministry of Oceans and Fisheries of the Republic of Korea, which supports the pursuit of a doctoral degree. Throughout his academic career has been awarded a series of prestigious scholarships that have supported his education from primary and secondary school through undergraduate studies in Indonesia, followed by master's and doctoral programs in South Korea. These achievements reflect a sustained record of academic excellence and a long-standing commitment to scholarly development. His research expertise centers on the biological sciences, with particular emphasis on molecular biology and genomics, bioinformatics, biodiversity and biogeography, molecular systematics and phylogenetics, ecology and evolutionary biology, population and landscape genetics, and genetic conservation. To date, he has published more than 20 articles in reputable peer-reviewed journals and has actively presented his research findings at numerous scientific conferences. Although ichthyology constitutes his principal area of research, his broader interests encompass diverse animal taxa distributed across Southeast and South Asia, the Korean Peninsula, parts of Africa, and the Antarctic region, spanning ecosystems ranging from terrestrial and freshwater to brackish, marine, and polar environments.



Anita M George*, Mithun Sukumaran

Department of Aquatic Biology and Fisheries, University of Kerala,
Kariavattom 695 581, Thiruvananthapuram, Kerala, India

Exploring the aquaculture potential of marine sponges (Phylum Porifera) in Kerala, India: A focus on growth dynamics and optimization of farming protocols

Marine sponge (Demosponges) culture gains importance based on their pharmacological (bioactive compounds), cosmeceutical and nutraceutical values (collagen) and biomaterials (biofilms). Moreover, their efficient filter-feeding nature, totipotency, plasticity, ecological resilience and excellent aquiferous system that supports bioremediation make them a promising candidate for sustainable aquaculture. Several attempts at integrated aquaculture with an aim to increase sponge biomass and their use of microorganisms and contaminants in bioremediation show impressive results. However, a critical limitation to its cultivation at large scale lies in the scarcity of quantitative data on its growth dynamics. There is no quantitative and qualitative data on the successful culture of marine sponges in India. Additionally, the current literature offers only fragmented and often non-comparable estimates of growth rates, typically derived from short-term observations. The highlighted knowledge gap hinders the optimization of farming protocols and the evaluation of productivity under different rearing conditions. As a preliminary attempt in India, we aim to provide new insights into the in situ rearing of two different and biomedically important sponge species in the natural and confined environment and understand their growth dynamics. A photogrammetric approach was used to monitor the growth of sponge explants. Our research highlights the suitability of a three-dimensional approach for their growth monitoring with an average increase in volume corresponding to collagen and bioactive compound production. This contribution not only highlights the methodological challenges in monitoring sponges but also proposes future directions for experimental design and long-term monitoring to unlock its full aquaculture potential in Asia.

Biography

Dr. Anita M George is a marine biologist and one of India's few experts in sponge taxonomy, serving as Assistant Professor in the Department of Aquatic Biology, University of Kerala. With a strong foundation in octocoral and sponge systematics, she brings unique expertise to advancing sponge aquaculture in India. Her research integrates taxonomy, growth dynamics, and microbiome studies to optimize farming protocols for commercially valuable and biomedically significant sponges. As India's first woman scientific diver with SCUBA certification, she combines field experience with laboratory innovation, aiming to develop sustainable sponge-farming strategies that support bioprospecting, pollution mitigation, and future applications in biotechnology.



T. V. Anna Mercy*, N. K. Pillai

Kerala University of Fisheries and Ocean Studies, Panangad,
Cochin 682019, Kerala, India

Ethological patterns of the Indian blind catfish *Horaglanis krishnai* Menon (Siluriformes: Clariidae) in captivity

Horaglanis krishnai Menon is a unique, completely blind clariid catfish endemic to the subterranean channels of dug-out wells in Kottayam, Kerala, South India (Lat. 8° 4' N and 10° 21' N; Long. 76° 13' E and 77° 38' E). While siluroid fishes are known for their remarkable adaptability to diverse aquatic habitats, the ethology of stygobitic species remains understudied due to sampling constraints. This study investigates the baseline behavioral patterns of *H. krishnai* under controlled laboratory conditions. Specimens were collected from the silty substrates of deep wells and housed in heterosexual groups within enriched laboratory tanks mimicking their natural environment (27–28°C, sand-and-pebble substrate). Quantitative and qualitative observations were conducted to evaluate four core ethological parameters: locomotion, comfort behavior, feeding strategies, and light sensitivity. Despite total blindness, *H. krishnai* exhibited distinct photophilic/photophobic sensitivity to light stimuli. Furthermore, the fish demonstrated a precise predatory feeding habit, unerringly capturing *Chironomus* larvae. This target localization is facilitated by highly developed tactile and olfactory systems that compensate for visual aphotic conditions. This presentation details the experimental frameworks, behavioral matrices, and evolutionary implications of these sensory adaptations in subterranean teleosts.

Biography

Dr. T.V. Anna Mercy studied M.Sc. Marine Biology at Cochin University, Kerala, India. She received Ph. D from Kerala University in 1982. Her Ph. D work was on a unique Indian blind clariid fish *Horaglanis krishnai* Menon that dwells only in subterranean wells at Kottayam, Kerala. She became the Junior Assistant Professor at College of Fisheries, Kerala Agricultural

University, Panangad in 1984 & became Professor in 2002. She pioneered research on Indigenous fresh water Ornamental Fishes of the Western Ghats of India, developed captive breeding technology for 15 prioritized fresh water species including *Sahyadria denisonii*, which is a much sought after ornamental fish in the international market. It is popularly known as Miss Kerala. She has published about 100 research papers including 50 in peer reviewed journals and authored/co authored many books. Presented research papers on different aspects of ornamental fishes in several international conferences at Brazil, Oregon, USA, China, South Africa, Ethiopia, Iceland, Netherlands, China, Sri Lanka, Singapore, Korea, Malaysia, Indonesia and Australia.



Anne Mokoro

School of Natural Resources, Department of Fisheries and Aquatic Sciences, University of Eldoret, PO Box 1125-30100, Eldoret, Kenya

Potential of high-value freshwater shellfish farming in Kenya's North Rift Region: Environmental suitability, export markets and infrastructure requirements

Ornamental aquaculture offers a high-value, low-volume enterprise that can be developed in places where conventional food-fish farming is constrained by land, cold temperatures or fragmented markets. This study assessed the potential for ornamental fish farming across the eight counties of Kenya's North Rift Economic Bloc: Uasin Gishu, Trans Nzoia, Nandi, Elgeyo-Marakwet, Baringo, Turkana, West Pokot and Samburu. A regional feasibility design combined county development plans, national aquaculture policy documents, published research on ornamental fish culture and trade, and an expert-weighted multi-criteria decision analysis. Seven criteria were scored on a five-point scale and converted to a 0-100 suitability index. Candidate species were screened for thermal tolerance, production-system compatibility, market robustness and biosecurity. Three enterprise scenarios were then used to estimate saleable fish, gross sales and direct employment. Uasin Gishu ranked first (84.4), followed by Trans Nzoia (80.2), Nandi (78.0), Elgeyo-Marakwet (74.3), Baringo (71.6), Turkana (69.6), West Pokot (64.0) and Samburu (59.0). The analysis indicates that the region should not be treated as one uniform production zone. Cool highlands are particularly suitable for goldfish and koi in outdoor ponds, while greenhouse tanks and warm valley/lowland sites broaden opportunities for guppies, mollies, platies, swordtails, bettas, angelfish and selected captive-bred African cichlids. Under transparent illustrative assumptions, a pilot network of 25 enterprises could generate about KES 45 million in annual gross sales and 63 direct jobs, while an export-ready regional hub of 150 enterprises could reach about KES 840 million and 600 direct jobs. These are scenarios rather than forecasts and require validation through pilot production and market contracts. The paper concludes that North Rift ornamental aquaculture is technically plausible and economically promising when organized as a zoned cluster with a central

hatchery, quarantine and packing hub in the Eldoret area, satellite grow-out units, strict live-fish movement controls, farmer training and market development.

Biography

Anne Mokoro is an Assistant Director of Fisheries in Kenya and a researcher affiliated with the Department of Fisheries and Aquatic Sciences at the University of Eldoret. She is a GIS specialist with professional expertise in fisheries management, aquaculture development, spatial planning, and aquatic resource conservation, with research focusing on sustainable aquaculture, ornamental fisheries, fisheries governance, aquaculture site suitability, and Blue Economy development. She has contributed to research and policy initiatives that integrate geospatial technologies with fisheries management to support evidence-based planning, environmental sustainability, and livelihood improvement in Kenya's fisheries and aquaculture sector.



Anthony Inder Mazeroll*, Carlos Chuquipiondo G.

Amazon Research Center for Ornamental Fishes, Iquitos, Peru

Conservation through sustainable breeding of ornamental fishes

The Amazon Basin is one of the world's most biodiverse freshwater ecosystems, harboring more than 3,000 fish species and supporting a significant international ornamental fish trade. In the Peruvian Amazon, the capture and export of native ornamental fishes provide an important source of income for local communities. However, increasing exploitation of wild stocks, habitat degradation, invasive species, prolonged droughts, and overharvesting threaten both aquatic biodiversity and the livelihoods that depend on these resources. Sustainable aquaculture may provide an alternative source of ornamental fishes while reducing pressure on wild populations.

This study evaluated the feasibility of community-based breeding of *Apistogramma* sp. 'Alto Tapiche' (Cichlidae), a commercially valuable ornamental fish native to the Peruvian Amazon. As a proof-of-concept, breeding pairs were stocked in 2 × 2 × 1 m earthen ponds and maintained under semi-natural conditions without supplemental feeding for six months. Reproductive success and survival were assessed at the end of the rearing period.

Approximately 200 individuals per pond, ranging from juveniles to adults, were recovered after six months, demonstrating successful reproduction and survival under low-input aquaculture conditions. These results indicate that *Apistogramma* sp. 'Alto Tapiche' can be successfully bred in small-scale earthen ponds with minimal management inputs.

Community-based ornamental fish aquaculture represents a promising strategy for reducing dependence on wild-caught stocks while creating sustainable livelihood opportunities. Expanding such breeding programs could contribute to the conservation of native fish biodiversity and strengthen the socioeconomic resilience of communities participating in the ornamental fish trade in the Peruvian Amazon.

Biography

Anthony Inder Mazeroll is a biologist and ichthyologist specializing in fish ecology, behavior and conservation. Mazeroll earned a Ph.D. in Zoology from Northern Arizona University. Mazeroll's research focused on the behavior, navigation, and migration of coral-reef fishes. Mazeroll was Fulbright Scholar in Jordan. Mazeroll was a professor for 30+ years at West Texas A&M University and Soka University of America. Mazeroll retired in May 2024. Mazeroll's research in the Peruvian Amazon, focuses on fish ecology, invasive species, conservation, and sustainable aquaculture. Mazeroll is the co-founder and executive director of the Amazon Research Center for Ornamental Fishes in Iquitos, Peru.



Chittaranjan Baruah^{1*}, Rekha Kalita², Pankaj Das²

¹Postgraduate Department of Zoology, Darrang College (Autonomous), Tezpur-784001, Assam, India

²Department of Zoology, Gauhati University, Gauhati-781014, Assam, India

Fish disease dynamics and aquatic health in Assam, Northeast India: A decadal assessment

Northeast India is a globally significant freshwater biodiversity region, while Assam supports diverse riverine, wetland and pond-based fisheries alongside expanding intensive and semi-intensive aquaculture. Fish diseases increasingly threaten productivity, farm profitability and the sustainability of aquatic food systems. The present study provides a decadal assessment (2016–2026), based on primary field observations and longitudinal records, to characterize disease occurrence, temporal and seasonal patterns, environmental associations and farmer-led health-management practices in cultured fishes of Assam, with detailed observations from Biswanath District. Parasitic, bacterial and fungal infections, together with non-infectious disorders, were documented. The principal conditions included argulosis, *Lernaea* infestation, Epizootic Ulcerative Syndrome (EUS), fin and tail rot, saprolegniasis, columnaris disease and dropsy. Argulosis was the most frequently reported condition, followed by *Lernaea* infestation and EUS. Disease occurrence exhibited marked temporal and seasonal variation, particularly following stocking and during rainy, post-monsoon and winter periods. Cypriniformes accounted for the largest proportion of affected fishes (49.09%), followed by Perciformes (27.00%), Siluriformes (13.00%) and Anabantiformes (10.91%). Disease occurrence was associated with variation in temperature, dissolved oxygen, pH, ammonia, nitrite and hydrogen sulphide, as well as stocking density, hydrological disturbances and other environmental stressors. Removal of affected fish was the most common management response, followed by chemical treatment, indicating a predominantly reactive approach to disease control. These findings emphasize the need to shift towards preventive and integrated aquatic-health management through biosecurity, scientific pre-stocking preparation, pond sanitation, water-quality optimization, early disease recognition and timely diagnosis. The decadal assessment demonstrates substantial temporal and seasonal heterogeneity in the disease profile and highlights the importance of parasitic infections alongside established

conditions such as EUS. The study provides a primary-data baseline for strengthening disease surveillance, risk-based prevention, farmer capacity building and environmentally responsible health-management practices to enhance the resilience, productivity and sustainability of aquaculture in Assam and the wider Northeast Indian region.

Keywords: Fish Diseases, Aquatic Health, Argulosis, EUS, Aquaculture, Assam.

Biography

Dr. Chittaranjan Baruah, M.Sc., Ph.D. in Zoology, Advanced Postgraduate Diploma in Bioinformatics, member of International Union for Conservation of Nature (IUCN), Founder & Editor of Asian Journal of Conservation Biology (ISSN 2278-7666, only Scopus-indexed international journal of Northeast), Awardee of Conservation Leadership Program (CLP) award (2010) jointly awarded by BirdLife International, Fauna & Flora International (FFI) and Wildlife Conservation Society (WCS); Recipient of Academic Excellence Award of INSc - Institute of Scholars, Bangaluru, (2024). He was an Asian Scholar of ASPin-situCC based at Wetlands Institute, New Jersey, USA for six months (2010). He had pursued one month Conservation Leadership Training at University of Calgary, Canada (2010). He is presently serving as Associate Professor in the Postgraduate Department of Zoology, Darrang College (Autonomous), Assam, India and Member Secretary of Darrang College (Autonomous), Convener of Institutional Innovation Council (IIC), Convener of R&D Cell of Darrang College (Autonomous), Tezpur, India. Prior to the present apaduate and postgraduate teaching and research experience. pointment, he had served as Research Associate in Bioinformatics at the DBT-BIF Center, Gauhati University for a period of 3 years. He has 13 years of undergraduate and postgraduate teaching experience. He has so far credited with more than 60+ research papers in international Peer reviewed journals, 7 books, 3 Edited books, 20 book chapters, 50+ seminar presented papers, delivered more than 30+ talks in Bioinformatics as Visiting Professor in North Lakhimpur College (Autonomous) and as Resource person in the higher learning institutions of northeast India and abroad including Pakuan University, Indonesia Gauhati University, Assam Agriculture University, Bodoland University, CSIR-NEIST, Cotton University, USTM (Meghalaya), St. Anthony's College (Shillong), Mangaldai College and Kaliabor College and Dhing College, Biswanath College, Assam. He has completed six research projects as Principal Investigator with international funding (from UK, USA and UAE) and national funding project of DBT, Govt of India. He is one of the Recognized Ph.D. Research Guide of Gauhati University and University of Science and Technology Meghalaya (USTM) and one scholar has been awarded PhD degree, and 4 students have been pursuing PhD Research work under his guidance. He is a PhD. Research Advisory Committee (RAC) member of Bodoland University. He is Life member of 10 National & International Professional Bodies, Editorial Board members, Indonesian Journal of Applied Environmental Studies (InJAST) and Reviewer of 11 leading international Bioinformatics and Molecular Biology journals published by Springer Nature, Elsevier and Taylor and Francis. He has been serving as Secretary of Assam Science Society-Tezpur branch since 2014. Recently he has received 2 design patents and 2 utility patents have been published.



Dickens P. Mahwayo

RiseUp Malawi, Malawi

A close analysis of major causes of the loss of fish fauna and diversity in Lake Malawi

Background: Lake Malawi is the third largest freshwater lake in Africa and the ninth largest freshwater lake in the world. It contains more fish species than any other lake in the world. The diversity of these species is of special significance as most of them are endemic to Malawi. Apart from providing fish to the nation—an affordable source of animal protein for a large percentage of Malawians—the fisheries resources in Lake Malawi provide livelihoods to over 1.6 million people in Malawi. The fisheries sector in Malawi contributes approximately 4% to national Gross Domestic Product, and about 85% of fish caught in Malawi comes from Lake Malawi. Of late it has been noted that this freshwater fish fauna and diversity is under severe threat from anthropogenic activities, which is becoming worse in the light of the devastating effects of climate change and high population growth.

Study Objectives: A study was conducted to explore and analyse the major causes of the loss of fish fauna and diversity, which includes a declining catch of traditional fishery in Lake Malawi.

Methodology: A qualitative prospective mixed-method cohort study, involving interpretative literature review, focus group discussions, key informant interviews and in-depth interviews, was carried out with a randomly selected sample of 62 respondents from Senga Bay, Msaka, Chembe, Bolera, Moto, Kadango and Chikulo fishing beaches in Salima and Mangochi respectively. Apart from Senga Bay, all other study areas are within the South Eastern and Western Arms of Lake Malawi, which are the most productive part of the lake. The study respondents included members of Beach Village Committees, large-scale commercial fishers and fisheries extension officers. Data collected between March 2014 and November 2017 was analysed on a continuous basis using tally sheets.

Key Findings: The study documented the following as major causes of the loss of fish fauna and diversity in Lake Malawi.

Destructive and illegal fishing: Over the years there has been an increase in the use of destructive and illegal fishing equipment, used even in restricted fish breeding areas (spawning grounds), to the extent of sweeping the underwater vegetation that provides great fish spawning grounds.

Extensive pollution: Excessive feeding in cages under cage culture, now in full practice in Lake Malawi, is contributing to the accumulation of eutrophication and nitrogen/phosphorus which eventually affects the fish fauna. In addition, agricultural activities in the upland catchment areas of some of the rivers that feed Lake Malawi pollute the water with chemical fertilisers, pesticides and other pollutants.

Over-exploitation of fisheries resources/overfishing: There is an increase in fishing efforts using modern and motorised equipment, including solar lamps, and a general increase in the number of fishing units on Lake Malawi.

Introduction of exotic species: Some exotic, non-native/alien species meant for aquaculture and mariculture have been introduced in some parts of the lake either by design or default, with potential to disturb the life cycle of the fish fauna and its diversity.

Effects of climate change: Climate change is negatively affecting the fish fauna and diversity by, among others, causing a drop in water levels and siltation, bringing negative changes to the ecosystem.

Conclusion: Despite its economic and social importance, the Lake Malawi fish fauna is exposed to many manmade threats. Malawi's economy is agro and natural-resource based, and the majority of Malawians rely on income derived from agriculture and natural resources including fisheries; as such the government and its development partners should reinvigorate their efforts in the protection, management and conservation of the highly diversified fish fauna of Lake Malawi.

Keywords: Fauna, Diversity, Pollution, Fisheries, Spawning.

Biography

Dickens is a Published Researcher, an Environmentalist, a Marketer and a Conference Speaker. He has conducted several studies on Environment/Climate Change, Renewable Energy, Gender Equality and Women Empowerment, Population and the Built Industry, Water and Food security just to mention a few. He has delivered several presentations at both local and international Conferences. He has served on the Boards of Health, Education, Environment and Economic Development as well as Malawi Children's Village. He also served as the Chairperson of the National Land Coalition as well as Civil Society Organisations Network. Has over twenty five years of work experience in both local and international NGOs, with thirteen years working with donor funded projects implementing livelihood improvement interventions targeting rural communities in which he has been playing coordinating and managerial roles.

He is the current Vice Chairperson of the National Land Coalition Steering Committee. He is a 2020 Goldman Environmental Award Nominee for African Region. He Holds a Bachelor Of Environmental Science-(Climate Change), a Bachelor of Business Administration and a Public Relations Certificate.



**F. H. S. Fogaca^{1,3*}, N. R. B. Cônsolo²,
L. S. Almeida³, L. A. Colnago³**

¹Embrapa Agroindústria de Alimentos, Avenida das Américas, 29501, Guaratiba, Rio de Janeiro, RJ, 23020-470, Brazil

²Universidade de São Paulo, Faculdade de Zootecnia e Engenharia de Alimentos, Avenida Duque de Caxias Norte, 225, Jardim Elite, Pirassununga, SP, 13635-900, Brazil

³Embrapa Instrumentação, Rua 15 de Novembro, 1452, Centro, São Carlos, SP, 13561-206, Brazil

Application of magnetic resonance tools for qualification and traceability of seafood

The global seafood industry faces persistent challenges related to product quality, safety, and authenticity, driven by complex supply chains, increasing demand, and the perishable nature of aquatic products. Traditional analytical methods often fall short in providing rapid, comprehensive, and non-destructive insights into the intricate biochemical changes occurring in seafood. Proton Nuclear Magnetic Resonance (¹H NMR) spectroscopy has emerged as a powerful and versatile tool for metabolomics, offering a holistic view of the low-molecular-weight compounds (metabolites) present in biological samples. The present study applied ¹H High-Resolution Nuclear Magnetic Resonance for chemical fingerprint identification in mullets from Araruama Lagoon and Sepetiba Bay, with the objective of obtaining a geographical identification brand for fish from the Lakes Region of Rio de Janeiro State. Lyophilized mullet muscle samples were used to prepare aqueous extracts. Subsequently, the samples were carefully transferred to 5 mm NMR tubes and placed in the NMR spectrometer (600 MHz) for analysis. As partial results, 22 metabolites related to degradation biomarkers, essential metabolites, energy expenditure, and muscle structure were identified. The statistical analysis of the results showed differences in metabolite concentrations among mullets from distinct locations. The ¹H NMR tool was efficient in determining metabolites that can be considered biomarkers in analyses for seafood traceability.

Keywords: Mullet, Metabolites, Biomarkers, Analyses, Muscle.

Biography

Fabiola Helena dos Santos Fogaca is a Senior Researcher at Embrapa Food Technology, with a degree in Animal Science and a master's and doctorate in Aquaculture from the State University of São Paulo, Brazil. She has experience in aquaculture and fishing, food science and

technology, and bioaccessibility of compounds. Her expertise includes the use of analytical tools such as metabolomics for seafood traceability, as well as the monitoring and control of contaminants. She completed a postdoctoral fellowship at the Portuguese Institute of the Sea and Atmosphere/Lisbon/Portugal, where she concentrated on the development of analytical methods to evaluate the risks and benefits of fish consumption.



Fauzia Anwar Sherwani^{1*}, Shifali Hafeez²

¹Aligarh Muslim University, India

²Government Degree College Beerwah, India

Cadmium-induced disruption of Na⁺/K⁺-ATPase activity in *Clarias batrachus*: Implications for aquatic toxicology

Heavy metal contamination of aquatic ecosystems is a major global environmental concern and a central issue in aquatic pollution and toxicology due to the persistence, mobility, and high toxicity of these pollutants. Heavy metals such as Cadmium (Cd) readily bioaccumulate and biomagnify, posing serious risks to aquatic organisms and human health. Cadmium, in particular, is a widespread heavy metal pollutant and a potent agent of heavy metal toxicity that is directly absorbed by fish through the gills, gastrointestinal tract, and skin, where it disrupts key physiological and biochemical processes. Fish are widely recognized as sensitive bioindicators of heavy metal toxicity and aquatic pollution, reflecting the health status of contaminated aquatic environments. The present study investigated the effects of cadmium exposure in fresh water and higher salinity on Na⁺/K⁺-ATPase activity in the gills and kidneys of the catfish *Clarias batrachus* as a model species in aquatic toxicology. Na⁺/K⁺-ATPase is a vital membrane-bound enzyme involved in ion transport, osmoregulation, and maintenance of cellular homeostasis. Fish were transferred from Tap Water (TW) to Cadmium-Exposed Tap Water (Cd+TW) and Cadmium-Exposed 30% Seawater (Cd+30% SW), and enzyme activity was quantified in key osmoregulatory tissues (gills and kidneys). Gill Na⁺/K⁺-ATPase activity showed a highly significant reduction in both cadmium-treated groups (except on day 6 in 30% SW) compared with controls (TW), with strong statistical significance ($P < 0.01$ to $P < 0.0001$), indicating severe disruption of branchial ion transport and enhanced heavy metal toxicity and suggesting that cadmium-induced oxidative stress and energy reallocation reduced osmoregulatory capacity. Kidney Na⁺/K⁺-ATPase activity was also significantly reduced in the Cd+TW group ($P < 0.01$ to $P < 0.0001$), confirming renal sensitivity to cadmium toxicity. In contrast, no significant suppression was observed in the Cd+30% SW group, indicating that increased salinity prevented or attenuated cadmium-induced inhibition of renal Na⁺/K⁺-ATPase. Overall, these findings demonstrate that cadmium-driven heavy metal toxicity significantly impairs

osmoregulatory enzyme function in *Clarias batrachus*, and that environmental salinity is an important modulatory factor in aquatic pollution and toxicology. The study further supports the use of fish as effective bioindicators for monitoring heavy metal contamination in aquaculture and natural aquatic systems.

Biography

Dr. Fauzia Sherwani is an Associate Professor in the Department of Zoology, Women's College, Aligarh Muslim University, where she earned her Ph.D., M.Phil., M.Sc., and B.Sc. degrees. A committed educator, she teaches courses in Animal Diversity, Comparative Anatomy, Public Health and Hygiene, Biotechniques, and Applied Zoology. A trained ichthyologist, her research focuses on fish physiology and osmoregulation and emphasizes interdisciplinary collaboration with heavy metal toxicity, nutrition, and cancer. She has published in national and international journals, presented at conferences, and received competitive fellowships and grants, including a Women Scientist grant from the Department of Science and Technology, Government of India.



Hiroshi Taniguchi^{1*}, Ari Shinojima^{2,3}

¹Free Bird Institute, Fiji

²Department of Ophthalmology, Keio University School of Medicine, Japan

³Laboratory of Photobiology, Keio University School of Medicine, Japan

The paradox of an ocean nation: Why Fiji imports seafood despite its abundant marine resources

The Republic of Fiji is an island nation endowed with rich marine resources, where a significant portion of the population engages in artisanal coastal fishing. Rather than utilizing modern fishing tackle or commercial nets, traditional free-diving with handcrafted spears remains the predominant fishing technique. Consequently, target catches are largely restricted to specific high-value reef species, such as grouper (kawakawa), barracuda (sirasira), coral trout (donu), and trevally (sanga). Despite the high prevalence of fishing in coastal communities, local ecological awareness regarding non-target or non-commercial marine species remains remarkably limited. This study explores a striking socio-economic paradox: while high-value wild catches from artisanal spearfishing are almost entirely sold to local markets, coastal residents rely heavily on imported processed seafood—such as canned tuna and mackerel—for daily domestic consumption. Furthermore, the lack of broad ecological documentation among local fishers has led to notable gaps in marine biodiversity records. For example, recent field observation and sampling by the author resulted in the confirmed catch of Dorab wolf-herring in Fijian waters, extending the documented distribution range of this species in the Southern Hemisphere by approximately 3,000 kilometers—a biological presence previously overlooked locally due to the absence of local nomenclature and commercial value. This presentation examines the structural causes of this resource paradox, focusing on traditional fishing practices, local taxonomy awareness, and market incentives. Bridging this disconnect through community-based fisheries education and socio-economic support is essential for advancing sustainable marine conservation and food security in Pacific Island nations.

Biography

Hiroshi Taniguchi is an entrepreneur and independent marine research enthusiast who has resided in Fiji for over 22 years. As the CEO of Free Bird Institute, he manages educational institutions while conducting field surveys on Fijian coastal fisheries and marine ecology. His fieldwork notably led to expanding the documented geographic habitat of the Dorab wolf-herring by 3,000 kilometers in the South Pacific. His current research interests focus on traditional fishing practices, community-based resource awareness, and the socio-economics of seafood consumption in Pacific Island nations.



John Thomas

Centre for Nanobiotechnology, Vellore Institute of Technology,
Vellore, Tamil Nadu, India

Treatment of bacterial infection in fishes using bioactive compounds

Bacterial infections are major threat to aquaculture. Antibiotics are used for treating the infections. Antibiotics can cause resistance. Pigment-producing endophytic fungus was isolated for treating the bacterial infections in fishes. The crude extract from the endophytic fungus was used to treat the bacterial manifestations caused by the pathogen. Invitro antibacterial activity of the extract was tested against the pathogen. Invitro antioxidant activity was also performed using the isolated compound. The isolated bioactive compound was effective in treating the bacterial infections in fishes and can be used as an alternative for treating the bacterial infections.

Biography

Dr. John Thomas completed M.Sc Microbiology from University of Madras in 2004. M.Phil in Microbiology from Bharadhidasan University, Trichy in 2007. He then completed Ph.D in Microbiology (Aquaculture specialization) in the year 2010 from Thiruvalluvar University, Tamil Nadu, India. He is currently working as an Associate Professor at Vellore Institute of Technology, Vellore. He has published more than 60 research articles in Scopus indexed journals. He also has more than 15 book chapters, 1 book and several patents. 2 of his patents have been awarded. He has completed some research projects funded by Govt. of India.



Julita Gutkowska^{1*}, Szymon Smoliński²

¹National Marine Fisheries Research Institute (NMFRI), Poland

²National Marine Fisheries Research Institute, Poland

The influence of water temperature changes on the spawning period of the Baltic sprat (*Sprattus sprattus balticus*)

The Baltic sprat (*Sprattus sprattus balticus*) is a small pelagic fish and one of the key commercial species in the Baltic Sea, with annual landings exceeding those of other ichthyofaunal taxa in the region. As an important component of the marine food web, sprat plays a crucial role in ecosystem functioning as a prey species for predator fishes. Advancing knowledge of its biology and ecology provides essential input for the sustainable management of marine living resources and fisheries in the Baltic Sea.

A long-term dataset spanning more than 50 years (from 1970 onwards) indicates a shift toward an earlier onset of sprat spawning in the southern Baltic. Over the same period, an increase in water temperature has been observed, reflecting ongoing climate-driven changes in the marine environment. Such changes may significantly influence reproductive processes, including the timing, duration, and intensity of spawning.

The present study aims to assess long-term variability in the timing and duration of Baltic sprat spawning and to evaluate the extent to which these changes are associated with water temperature. To determine the duration of spawning, information on the gonad development stage collected during ichthyological analysis was used, allowing for a detailed examination of reproductive phenology over multiple decades. The results provide insight into temporal trends in sprat reproduction and their potential links to environmental drivers.

This research contributes to a better understanding of climate-related changes in sprat spawning phenology and can support further studies as well as ecosystem-based fisheries management in the Baltic Sea.

Biography

Julita Gutkowska is a senior specialist at the National Marine Fisheries Research Institute in Poland. She specializes in the biology and ecology of Baltic small pelagic fish. She earned a Master's degree in Oceanography from the University of Gdańsk, Poland, is a member of two ICES working groups whose work focuses on fisheries. Currently, she concentrates on the biology of sprat, one of the key commercial species in the Baltic Sea.

Ibtissam Boukhadmi^{1*}, Loubna Ferraj¹, Meriem Bousseba², Mly Lahcen Ouahidi³, Mohamed Kabriti³, Mohammed El Bouch³, Mustapha Hasnaoui¹

¹Environmental, Ecological and Agro-Industrial Engineering Laboratory, Department of Biology, Faculty of Sciences and Techniques, Sultan Moulay Slimane University, 23020 Beni Mellal, Morocco

²Biotechnology, Environment and Georesources Research Laboratory, Higher School of Technology, Sultan Moulay Slimane University, 54000 Khenifra, Morocco

³National Laboratory for Pollution Studies and Monitoring (LNESP), Rabat, Morocco

Feeding morphology and growth dynamics of three commercially important fish species (*Oreochromis niloticus*, *Cyprinus carpio*, *Sander lucioperca*) from the Al Massira Reservoir, Morocco

Freshwater fish populations in Moroccan reservoirs remain poorly studied compared to their ecological and economic importance for local fisheries. This study characterized the feeding morphology and growth parameters of three commercially important species, Nile tilapia (*Oreochromis niloticus*), common carp (*Cyprinus carpio*), and pikeperch (*Sander lucioperca*), sampled monthly over 12 months (June 2022–July 2023) from commercial catches in the Al Massira Reservoir (Oum Er Rbia basin, Morocco).

Cranial biomechanics were assessed using the Suction Index (SI) and the Mechanical Advantage of Jaw Closing (MA). Common carp showed the highest suction capacity (SI median=0.37), consistent with its omnivorous benthic feeding mode, while pikeperch displayed the highest jaw-closing mechanical advantage (MA median=0.52), reflecting its piscivorous strategy; Nile tilapia occupied an intermediate position for both indices. Growth parameters estimated using the ELEFAN method (TropFishR, R software) yielded asymptotic lengths (L_{∞}) of 59.97, 83.54, and 89.22 cm and growth coefficients (K) of 0.08, 0.12, and 0.08 year⁻¹ for the three species respectively, with growth performance indices (ϕ') of 2.76, 2.94, and 2.83.

These results provide essential baseline biological data for the sustainable management of these species and a functional framework for evaluating how anthropogenic stressors, including persistent organic pollutants, may affect feeding efficiency and growth.

Keywords: Feeding Morphology, Suction Index, Mechanical Advantage, Growth Parameters, Von Bertalanffy, Al Massira Reservoir.

Ibtissam Boukhadmi^{1*}, Loubna Ferraj¹, Meriem Bousseba², Mly Lahcen Ouahidi³, Mohamed Kabriti³, Mohammed El Bouch³,
Mustapha Hasnaoui¹

¹Environmental, Ecological and Agro-Industrial Engineering Laboratory, Department of Biology, Faculty of Sciences and Techniques, Sultan Moulay Slimane University, 23020 Beni Mellal, Morocco

²Biotechnology, Environment and Georesources Research Laboratory, Higher School of Technology, Sultan Moulay Slimane University, 54000 Khenifra, Morocco

³National Laboratory for Pollution Studies and Monitoring (LNEPS), Rabat, Morocco

Seasonal distribution of organochlorine pesticides and polychlorinated biphenyls in three fish species and their implications for human health risk: The case of Al Massira Reservoir, Morocco

Fish represent a major pathway for the transfer of Persistent Organic Pollutants (POPs) to humans, due to their lipophilic affinity and resistance to degradation. This study assessed the distribution of eight Organochlorine Pesticides (OCPs: α -HCH, γ -HCH, β -HCH, aldrin, dieldrin, DDD, DDE, DDT) and four Polychlorinated Biphenyls (PCBs: PCB28, PCB52, PCB101, PCB180) in the muscle tissue of Nile tilapia (*Oreochromis niloticus*), common carp (*Cyprinus carpio*), and pikeperch (*Sander lucioperca*) from the Al Massira Reservoir, Morocco, sampled monthly over one year and analyzed by gas chromatography.

Pikeperch, as the top trophic-level predator among the three species, accumulated markedly higher levels of both OCPs and PCBs than common carp and Nile tilapia, consistent with a biomagnification pattern along the trophic chain. Pollutant levels also varied significantly across sampling months, with several compounds, notably dieldrin, γ -HCH, aldrin, PCB52, and α -HCH, showing clear seasonal fluctuations linked to climatic and hydrological conditions in the reservoir.

Health risk assessment indicated that OCP levels remained below international safety thresholds, pointing to negligible risk for consumers. In contrast, PCB levels, although comparatively low, exceeded the theoretical long-term cancer risk threshold for regular fish consumers, with children found to be more vulnerable than adults. These findings underline the need for reinforced environmental monitoring of POPs in Moroccan aquatic ecosystems and for sustainable management strategies to protect both biodiversity and public health.

Keywords: Organochlorine Pesticides, PCBs, Seasonal Distribution, Biomagnification, Health Risk Assessment, Al Massira Reservoir, Morocco.



**Manjusha Lekshmi*, Sanath
Kumar, B. B. Nayak**

ICAR-Central Institute of Fisheries Education, Mumbai,
Maharashtra 400061, India

Emerging seafood-borne pathogens: Food safety implications

Seafood-associated food-borne diseases continue to represent an important public health challenge globally. The growing emergence and re-emergence of pathogenic microorganisms has increased the need for systematic surveillance of aquatic environments and seafood products to ensure food safety. Seafood can serve as an important carrier of several food-borne pathogens, including *Escherichia coli*, *Salmonella enterica*, *Listeria monocytogenes*, *Vibrio parahaemolyticus*, *Vibrio cholerae*, and *Staphylococcus aureus*. In addition to these conventional pathogens, emerging microorganisms such as *Arcobacter* spp., *Cronobacter* spp., non-fermenting Enterobacterales, and enteric viruses are increasingly recognized as significant threats to seafood safety and human health. Changes in the epidemiology of these pathogens are strongly influenced by globalization of food trade, climate change, and rapid coastal urbanization, all of which contribute to their spread and persistence in aquatic ecosystems. Among these, microaerophilic *Arcobacter* spp. have gained attention as virulent seafood-associated pathogens capable of causing gastroenteritis and other infections in humans. Likewise, *Cronobacter sakazakii* is an emerging opportunistic pathogen reported in a range of ready-to-eat and minimally processed foods, including seafood products. Its ability to survive under dry and low-moisture conditions further enhances its persistence and pathogenic potential. Furthermore, aquatic environments can facilitate the transfer of virulence and antimicrobial resistance genes, leading to the development of more resistant and pathogenic bacterial strains. Enteric viruses, particularly noroviruses, also constitute a major seafood safety concern. Bivalve molluscs are especially susceptible to contamination from fecally polluted waters, enabling viral transmission through the fecal–oral route and resulting in outbreaks of gastroenteritis. Adoption of scientific seafood safety practices, including hygienic handling, effective post-harvest management, sanitation, temperature control, and regular microbial surveillance, is essential to reduce contamination and limit the transmission of emerging pathogens through seafood products.

Biography

Dr. Manjusha L. currently serves as Senior Scientist at the Fish Processing Technology Section of the Fisheries Resources Harvest and Post-Harvest Management Division, at ICAR- Central Institute of Fisheries Education (CIFE), Mumbai. She specialises in seafood microbiology, with a focus on conventional and emerging seafood-borne bacteria of public health significance. Pathogens such as human enteric viruses, *Cronobacter sakazakii*, non-lactose fermenting Enterobacterales, *Arcobacter* spp., *Salmonella* and *E. coli* are being studied with reference to their incidence, virulence mechanisms and survival characteristics in seafood and development of rapid diagnostic methods pathogen detection. She works with a research group dealing with seafood-borne antimicrobial-resistant bacteria, their mechanisms, bacterial bioremediation of seafood waste and pathogen biocontrol.



Mekonen Hailu Tachbele

National Fishery and Aquatic Life Research Center (NFALRC),
Ethiopia

Current aquaculture status and cultured fish species in Ethiopia

Ethiopia harbors a rich biological diversity of native fish resources and recognition of the potential to use these resources to make significant contributions towards improving food security through aquaculture. However, very little aquaculture production technique has developed and its practice has been limited to pond fish farming at farmer level and stocking of small water bodies, without subsequent monitoring and impact evaluation. Currently the Ethiopian government has proposed aquaculture as an option to boost fish production and as an alternative means to food security and poverty alleviation. Nowadays it is considered as an integral part of rural and agricultural development policies and strategies. In the early 2008's, over 2.5 million fingerlings, primarily consisting of Nile tilapia (*Oreochromis niloticus*), Tilapia zilli, common carp (*Cyprinus carpio*) and crucian carp (*Carassius carassius*), were stocked in artificial lakes, reservoirs and small water bodies. Culture-based fisheries is a dominant type of aquaculture practice in Ethiopia. It involves the stocking of newly constructed reservoirs with fingerlings collected from existing water bodies, mostly with tilapia. This consists of extensive aquaculture operations in several small rural-based fish ponds sized between 100 and 300 m². Fish culture cages and pens have also begun to be implemented in Koga reservoir, Gilgel Gibe III reservoir and Lake Tana. Currently, the fish feeding habit of the people of Ethiopia is highly increasing, especially in and around the rift valley system and areas where artificial lakes are constructed for other purposes. So practicing of aquaculture up to a feasible level is required to feed the ever-increasing and adapting fish-eating population of this country. The National Fishery and Aquatic Life Research Center (NFALRC) and some regional fishery research centers such as Ziway and Hawassa are currently primarily concerned with strain improvement of Nile tilapia (*Oreochromis niloticus*), the most commercially significant and mostly cultured fish species. However, in some professions, such as fish breeding and genetic improvement,

fish feed formulation and processing, and fish production and management in pond culture systems, there is a significant shortage of skilled labor, despite some encouraging recent initiatives. Therefore, exchanging knowledge with professionals in such global gatherings and getting technical support from experienced nations in these fields will undoubtedly enable us to significantly raise the production of our aquaculture.

Keywords: Ethiopian Aquaculture, Potentials, Opportunities, Challenges, Nile Tilapia.

Biography

Mekonen Hailu Tachbele is a young researcher at the National Fishery and Aquatic Life Research Center, Ethiopian Institute of Agricultural Research. He holds BSc in Biology and MSc in Aquatic Ecosystems and Environmental Management from Addis Ababa University, Ethiopia. Currently, he is in his third year of pursuing a PhD in Aquaculture at Shanghai Ocean University, China. Over the past five years, his work has focused on the sustainable development of aquaculture, fish health and broodstock management, and the enhancement of aquaculture practices to improve food security and livelihoods. He has authored four publications addressing the impacts of fish parasites and their prevention mechanisms, broodstock management, and fisheries management.



Minerva Concepción Maldonado-García^{1*}, Juan Carlos Pérez Urbiola¹, Deneb Maldonado-García², Francisco Javier Encarnación-Hernández¹, Roxana Bertha Inohuye-Rivera¹, Víctor Laurencez-Reyes³, Marco Antonio Hernández-de Dios¹, José Antonio Estrada-Godínez⁴, Carmen Rodríguez-Jaramillo¹, Felipe Ascencio-Valle¹

¹Centro de Investigaciones Biológicas del Noroeste S.C., La Paz, Baja California Sur, México

²Secihti - Centro de Investigaciones Biológicas del Noroeste S.C., La Paz, Baja California Sur, México

³Centro Regional de Investigación Acuícola y Pesquera, Instituto Mexicano de Investigación en Pesca y Acuicultura Sustentables, La Paz, Baja California Sur, México

⁴Facultad de Ciencias del Mar, Universidad Autónoma de Sinaloa, Mazatlán, Sinaloa, México

Early gonadal development phases leading to sexual maturity in the Pacific white snook (*Centropomus viridis*) under captive conditions in B.C.S., México

The advancement of biotechnology in cultivating the Pacific white snook (*Centropomus viridis*) is noteworthy. This study aimed to elucidate the reproductive biology of *C. viridis* during the early stages leading up to first sexual maturity, with particular focus on spermatogenesis. We evaluated several factors, including 1) weight and growth, with physiological indices such as the condition factor (K) and the Gonadosomatic Index (GSI); 2) Gonadal Development (GD); and 3) environmental influences, including water temperature and photoperiod. We identified four distinct phases of GD: phase I: immature, phase II: developing, phase III: spawning capable, and phase IV: regressing. The spermatogenesis process involved various cell types: 1) spermatogonia (diameter $5.01 \pm 0.80 \mu\text{m}$), 2) primary spermatocytes ($3.29 \pm 0.36 \mu\text{m}$), 3) secondary spermatocytes ($2.76 \pm 0.30 \mu\text{m}$), 4) spermatids ($2.38 \pm 0.48 \mu\text{m}$), and 5) spermatozoa ($1.48 \pm 0.44 \mu\text{m}$). Phase III, indicating sexual maturity, was first observed in July 2020 (approximately 3 years old). Almost a year later, in May, K peaked (>1.0), and by July 2021, with the water temperature on the rise, GSI reached a value greater than 0.8. These findings provide the first documented description of early gonadal development and sexual maturation in captive-born male *C. viridis*.

Biography

Dr. Minerva C. Maldonado earned a Bachelor's degree in Oceanology in Baja California, Mexico, a Master's degree from the Autonomous University of Baja California Sur, Mexico, and a Doctorate in Science in the Use, Management, and Preservation of Natural Resources from the Northwest Biological Research Center (CIBNOR) in La Paz, Baja California Sur, Mexico, specializing in Marine Fish Reproduction at the IATS in Castellón, Spain. She has worked for 29 years as a Senior Researcher at CIBNOR. Her research has focused on marine fish farming, and she has published numerous scientific articles in indexed journals and popular science articles. She has led research projects funded by the federal government for community projects and has established partnerships with private companies. She has also trained instructors at various academic levels, conducted courses on marine fish, and helped organize a Science Fair for students from preschool through high school, emphasizing the scientific method. She believes that developing aquaculture in Mexico is a high priority for recovering and preserving the diversity of various species that are being overexploited and left unregulated. She believes that the sea is important for our health because we can obtain high-quality marine protein through aquaculture.



Marco A. Hernandez de-Dios¹,
Dariel Tovar-Ramírez¹, Deneb
Maldonado García¹, Mario A.
Galaviz-Espinoza², Minerva
Maldonado-García^{1*}, Milton
Spanopoulos Zarco¹

¹Centro de Investigaciones Biológicas del Noroeste
(CIBNOR), La Paz, México

²Facultad de Ciencias Marinas, Universidad Autónoma de
Baja California (UABC), Ensenada, México

Functional additives as a boost to reproductive performance: A review in marine fish

This contribution brings current knowledge on the use of functional food additives in the reproductive performance of marine fish. Several authors who have worked with specialized diets focused on the dietary needs of brood fish are reviewed and discussed with the objective of identifying the functional additives that have been gaining relevance to improve reproductive performance. Furthermore, the use of commercial and experimental diets that may have an effect on spawning viability, egg quantity and egg quality such as hatching rates, larval survival, fatty acid and amino acid composition, once the feed is supplemented with some nutritional compounds is discussed. Our intention with this review is to highlight the benefits of the use of vitamins, carotenes, fatty acids and proteins of animal origin in the nutrition of brood fish, which have been shown to improve the quality of the progeny under captive conditions. Finally, future perspectives on the use of additives in marine fish nutrition are offered.

Keywords: Broodstock, Nutrition, Vitamin, Carotene, Protein, Fatty Acids.

Biography

Dr. Minerva C. Maldonado earned a Bachelor's degree in Oceanology in Baja California, Mexico, a Master's degree from the Autonomous University of Baja California Sur, Mexico, and a Doctorate in Science in the Use, Management, and Preservation of Natural Resources from the Northwest Biological Research Center (CIBNOR) in La Paz, Baja California Sur, Mexico, specializing in Marine Fish Reproduction at the IATS in Castellón, Spain. She has worked for 29 years as a Senior Researcher at CIBNOR. Her research has focused on marine fish farming, and she has published numerous scientific articles in indexed journals and popular science articles. She has led research projects funded by the federal government for community projects

and has established partnerships with private companies. She has also trained instructors at various academic levels, conducted courses on marine fish, and helped organize a Science Fair for students from preschool through high school, emphasizing the scientific method. She believes that developing aquaculture in Mexico is a high priority for recovering and preserving the diversity of various species that are being overexploited and left unregulated. She believes that the sea is important for our health because we can obtain high-quality marine protein through aquaculture.



Nadia Boutaleb^{1*}, Ikrame Charef¹, Bouchaib Bahlaouan², Véronique Le Tilly³, Olivier Sire³

¹Laboratory of Biotechnology, Agri-Food, Materials and Environment Team: Biotechnologies, Resource Valorization, Quality, Health and Ecotoxicology, Faculty of Science and Technology Mohammeda, Hassan II University of Casablanca, Mohammeda, Morocco

²Higher Institutes of the Nursing Professions and Techniques of Health ISPITS Casablanca 22500, Morocco

³IRD, UMR CNRS 6027, University of Bretagne Sud, Bretagne INP, ENSTA, Institut Polytechnique de Paris, Univ. Brest, Lorient, France

Circular biofilm engineering: Ecological MBBRs using selected microalgae–fungal consortia for sustainable treatment of fish processing wastewater

The seafood processing industry generates wastewater heavily loaded with organic matter, nitrogen and phosphorus, making its treatment a major challenge for protecting aquatic ecosystems and promoting the circular bioeconomy. This study proposes an ecological biofilm engineering approach based on a Moving Bed Biofilm Reactor (MBBR) using natural biofilm carriers and microbial consortia selected according to the target pollutants to be removed.

Wastewater collected from a seafood processing facility in the Greater Casablanca region was characterised and treated using a consortium composed of selected microalgae, *Aspergillus niger*, *Enterococcus faecium*, *Saccharomyces cerevisiae* and indigenous microorganisms. Sardine scales and shell-derived materials were evaluated as ecological alternatives to conventional synthetic carriers for biofilm development. Reactor performance was assessed by monitoring the removal of Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD₅), total nitrogen, phosphorus, nitrate, nitrite, total suspended solids and selected heavy metals. Principal Component Analysis (PCA) was performed to identify the optimal carrier–consortium combinations.

The ecological MBBR achieved more than 90% removal of COD and BOD5 within 24 hours, while nitrogen and phosphorus removal progressively improved with increasing hydraulic retention time. The selected microalgae–fungal consortium enhanced biofilm formation, process stability and nutrient recovery, whereas the ecological carriers promoted efficient microbial colonisation.

This study introduces the concept of target-oriented ecological biofilm engineering, in which microbial consortia and biofilm carriers are rationally selected according to the dominant pollutants present in seafood processing wastewater. This strategy offers an innovative, sustainable and adaptable platform for advanced wastewater treatment, resource recovery and circular bioeconomy applications within the aquaculture and seafood processing sectors.

Biography

Dr Nadia Boutaleb is Professor of Biotechnology and Environmental Engineering at the Faculty of Sciences and Techniques, Hassan II University of Casablanca, Morocco. Her research focuses on environmental biotechnology, biofilm engineering, wastewater treatment, microalgae, fungal biotechnology, microbial ecology and the valorisation of biological resources. She has authored numerous peer-reviewed publications and actively supervises research on sustainable bioprocesses for water treatment and circular bioeconomy. Her current work explores ecological biofilm reactors using selected microbial consortia and natural carrier materials for the treatment and valorisation of industrial and aquaculture effluents.



Ndjuissi Tamko Arlette Noel

University of Douala, Douala, Cameroon

Effects of probiotic doses and stocking density on water quality and some growth performances of *Clarias gariepinus* fingerlings

Stocking density is a very important factor in aquaculture. In African catfish (*Clarias gariepinus*), high densities often lead to a deterioration in water quality, slower growth, and increased mortality. This study, conducted from April 20 to June 20, 2025, at the Grenier d'Afrique farm (Nkolinda, Yaoundé), aimed to evaluate the effect of probiotics on water quality and growth performance of fry raised at different stocking densities. A total of 2,160 fries (1 ± 0.3 g) were divided into three treatments: 0 g/m³ (control), 3 g/m³ and 5 g/m³ of the probiotic AQUAcare (Skretting), containing *Bacillus subtilis*, *B. amyloliquefaciens*, *B. pumilus*, and *B. licheniformis*. Each treatment was applied at three densities (2, 4, and 6 fry/L) in duplicate. After 60 days, NO₂⁻ concentrations did not vary significantly ($p > 0.05$), while NH₄⁺ concentrations increased significantly with density ($p < 0.05$). The best zootechnical performance was recorded with 3 g/m³ at 2 fry/L: weight gain (63.70 ± 3.67 g), average daily gain (1.06 ± 0.06 g/day), survival rate ($88.33 \pm 2.35\%$), and feed conversion ratio (1.33 ± 0.11). The highest Specific Growth Rate (SGR) was observed with 5 g/m³ at 2 fry/L. However, the high-density dose of 5 g/m³ (6 fry/L) generated the highest production cost (2,846.40 CFA francs/kg) and negative profitability. Thus, the application of 3 g/m³ of probiotics at low density improves growth and survival, while moderate density optimizes profitability.

Keywords: *Clarias gariepinus*, Probiotics, Growth Performance, Water Quality, Stocking Density, Profitability.

Biography

Dr. Arlette Noël NDJUISSI TAMKO is a Lecturer-Researcher at the University of Douala, National Higher School of Agronomy, Halieutic and Veterinary Medicine, Cameroon. She holds a PhD in Marine Science, specializing in Aquaculture, Fish Health and Pathology, from Ningbo University, China, and an MSc in Applied Ecology with a focus on Parasitology from the University of Dschang, Cameroon. Her research interests include fish nutrition, fish health and pathology, fish diseases, microbiology, and sustainable aquaculture. Her research focuses particularly on the use of natural feed additives and alternative nutritional strategies to improve fish growth, feed utilization, health, and production performance. She has published research on dietary supplementation and feed ingredients in African catfish and other cultured fish species. At WAC 2026, she will present her research entitled "Effects of probiotic doses and stocking density on water quality and some growth performances of *Clarias gariepinus* fingerlings".



Orthancia Rasoanomenjanahary^{1*},
Thierry Lavitra¹, Claudia Rodine¹,
Gaetan Tsiresy², Lantoasinoro
Nirinarisoa Ranivoarivelo¹

¹Institut Halieutique et des Sciences Marines (IH.SM),
University of Toliara, Mahavatsy 2 route vers port, Toliara 601,
Madagascar

²University of Analanjirofo, Fénérive-Est 509, Madagascar

Biomass assessment and cultivation trial of the edible red macroalga *Gracilaria corticata* in southwest of Madagascar

Seaweed is still not widely used as a food source in Madagascar, despite the fact that these plants represent potentially exploitable resources. This study focuses on the macroalgae *Gracilaria corticata*, with the aim of using this species in human food to solve the problem of malnutrition. The biomass of *G. corticata* in the bays of Ranobe and Toliara on the south-west coast of Madagascar was estimated in July-August 2023 from ten sites (BR1, BR2, BR3, BR4, BR5, BT1, BT2, BT3, BT4 and BT5). Each sample consisted of 4 transects and 24 quadrats, giving a total of 40 transects and 240 quadrats for all the sites. The collected samples were then taken, weighed and dried, with the dry weights expressed in g·m⁻². *G. corticata* was grown using two different methods, the off-bottom method and the long-line method, over a period of 45 days at Sarodrano. Growth performance was recorded every 15 days. The results showed that the average biomass in Ranobe bay was 23.14 g·m⁻² and that in Toliara bay was 17.17 g·m⁻². In Ranobe Bay, biomass is correlated with the recovery rate, with a positive correlation of 0.98. Given the quantity of *G. corticata* available in its natural state in these bays, phycoculture could be envisaged to exploit this species. However, during the trial period, the rate of cuttings lost increased significantly, from 9.09% to 85.45% for the off-bottom method and from 7.78% to 77.78% for the long-line method. Furthermore, the highest average weight of *G. corticata* at the end of culture was 164 ± 61.7 g, observed in the off-bottom method, while 145 ± 6.1 g was observed in the long-line method. In addition, the Specific Growth Rates (TCS) obtained showed a high value of 3.26 ± 0.28%·d⁻¹ for the long-line method and 2.43 ± 2.73%·d⁻¹ for the off-bottom method. These results demonstrate the feasibility of cultivating these algae on the Sarodrano reefs, opening up promising prospects for seaweed farming in Madagascar and regional food security.

Keywords: Southwest of Madagascar, *Gracilaria corticata*, Biomass, Phycoculture, Long-Line, Off-Bottom.

Biography

Orthancia Rasoanomenjanahary is a Master's student in Marine Sciences at the Institut Halieutique et des Sciences Marines (IH.SM), University of Toliara, Madagascar. Her research focuses on aquatic resources, with particular interest in seaweed cultivation, fisheries, aquaculture, and biodiversity conservation. She conducted research on the edible red macroalgae *Gracilaria corticata*, focusing on biomass assessment and cultivation trials to evaluate its potential contribution to food security in southwestern Madagascar. Her work aims to support the sustainable use of aquatic resources and the conservation of aquatic ecosystems in Madagascar.



Qiong Zhao^{1*}, Ke Zhou¹, Fengfeng Zhang¹, Yu Wang², Jun Hao², Fengxing Xie¹, Qian Yang³

¹Tianjin Institute of Agriculture Resource and Environment, Tianjin Academy of Agricultural Science, Tianjin 300384, China

²Tianjin Fisheries Research Institute, Tianjin 300221, China

³Harbin Institute of Technology, School of Life Science and Technology, Harbin 150001, China

Relations between core taxa and metabolic characteristics of bacterial communities in *Litopenaeus vannamei* ponds and their probiotic potential

Microorganisms play a crucial role in purifying aquaculture water bodies. However, there is limited understanding regarding the core species of bacterial communities in aquaculture ponds and their metabolic functions. Using 16S rRNA gene sequencing technology, network analysis, and Biolog EcoPlates, we identified keystone and core taxa of bacterial communities in *Litopenaeus vannamei* ponds and investigated their correlations with their community's carbon source utilization abilities based on Biolog EcoPlates. We found that keystone and core taxa in bacterial communities were significantly correlated with the carbon source utilization abilities of bacterial communities. The positively correlated core taxa include (1) *Bacillus*, *Flavobacterium*, *Brevibacillus*, and *Paenibacillus*, which are used as probiotics in aquaculture, and (2) *Candidatus Aquiluna*, *Dechloromonas*, *Sulfurifustis*, *Terrimicrobium*, *Alsobacter*, and *Gemmobacter*, which have been reported to play a role in nitrogen removal. Furthermore, the positively correlated *Tropicimonas* (Rhodobacterales: Rhodobacteraceae) in aquaculture has not yet been applied. By nitrogen degradation experiments in aquaculture wastewater, we confirmed the synergistic relationship between the genera *Tropicimonas* and *Bacillus*. The co-introduction of *Tropicimonas sediminicola* SDUM182003 and *Priestia aryabhatai* HG1802 or *Bacillus subtilis* XQ1804 into the aquaculture tailwater reduced the time required for the removal rates of nitrite nitrogen and nitrate nitrogen to reach over 90% by 24–48 h. Our research reveals the correlation between core taxa and community carbon source utilization, indicating that the core taxa of bacterial communities play a crucial role in the metabolic functions of the community, and offering a reference for exploring new bacterial genera with probiotic potential.

Biography

Zhao Qiong, Ph.D., Senior Engineer, specializes in the research and development of aquaculture probiotics and plant fermentation. She has led 7 scientific research projects and received a Third Prize of Tianjin Science and Technology Progress Award. As the first author, she has published 7 academic papers in journals such as *Aquaculture*, *Aquaculture International*, and *Microorganisms*. She holds 3 authorized patents as the first inventor and has contributed to the formulation of 5 local standards.



**Roba Tashome^{1*}, Simagegnew
Melaku², Alemayehu Dagne²,
Behailu Taye²**

¹Department of Biology, Mattu University, Mattu, Ethiopia

²Mattu University, Mattu, Ethiopia

Feed formulation from locally available ingredients as replacement diet of commercial feed for growth performance of Nile tilapia, *Oreochromis niloticus* (Linnaeus, 1758) in concrete pond culture system, Southwest Ethiopia

Aquaculture in Ethiopia remains more potential than actual practice, despite the fact that the country's physical and socio-economic conditions support its development. A 90-day experiment was conducted to compare the performance of two locally formulated feeds as possible replacements for expensive commercial feed used for rearing Nile tilapia. A randomized complete block experimental design was used. Each block had four treatments with two replicas. A total of 192 fingerlings were obtained from Sebeta Fishery and Aquatic Life Research Center and stocked at a rate of 2 fish per m² in all experimental ponds. All growth performance parameters such as weight and length were measured using an electronic balance and measuring board respectively during the experiment at every 15 days. All physicochemical characteristics of the water were monitored to the recommended range for fish growth. The highest mean final weight was recorded in CF (73.88 ± 25.11) followed by FF2 (65.02 ± 12.50), then FF1 (52.62 ± 15.97) and control (38.50 ± 9.81). The highest final mean length was also recorded in CF (15.04 ± 1.72) followed by FF2 (14.50 ± 1.15), then FF1 (13.31 ± 1.43) and control (12.28 ± 1.34). One-way ANOVA comparing mean weight and length and the post hoc test output revealed that there was a significant difference ($p < 0.05$) between CF, FF1 and control fishes, being higher in CF followed by FF1 and control in growth performance. Despite higher growth performance being recorded in Commercial Feed Meal (CF), there was no significant difference ($P > 0.05$) between CF and FF2. The most appropriate formulated feed with better growth performance and a candidate to replace the commercial fish feed is locally Formulated Feed Two (FF2), which is composed of soya bean, common bean, sorghum bran and poultry

manure. Therefore, the conceptual framework assumes that different feed formulations influence the growth performance of Nile tilapia, and locally formulated feeds may provide comparable growth results to commercial feeds if they contain adequate nutrients.

Biography

Roba Tashome is a Lecturer at Mattu University, Ethiopia. He actively engaged in academic teaching, research, and scholarly activities within his field. His research interests primarily focus on aquaculture, where he has contributed both original research and review papers addressing key issues and developments in the sector. In addition to his research publications, he has actively participated in the academic community by presenting his work at various national and international conferences. These engagements have provided him with valuable opportunities to share knowledge, exchange ideas, and collaborate with researchers and professionals from diverse backgrounds. He committed to advancing research and education in aquaculture and related fields, with the goal of contributing to sustainable development and scientific innovation.



Sami Mili^{1,2*}, Rym Ennouri^{3,4}, Manel Fatnassi⁴, Siwar Agrebi¹

¹University of Carthage, Faculty of Sciences of Bizerte, Zarzouna, 7021 Bizerte, Tunisia

²University of Carthage, Laboratory of Fisheries Sciences, National Institute of Marine Sciences and Technologies (INSTM), 28 Rue du 2 mars 1934, Salammbô 2025, Tunis, Tunisia

³Laboratory of Ecology, Biology and Physiology of Aquatic Organisms, Department of Biology, Faculty of Science of Tunis (FST), University of Tunis El Manar, 2092 Tunis, Tunisia

⁴University of Carthage, Higher Institute of Marine Sciences of Bizerte (ISSMB), Errimel, B.P. 15, 7080 Bizerte, Tunisia

Assessing stock discrimination and exploitation status of an emerging *Sardinella aurita* fishery in the Bizerte Lagoon (Tunisia) in a changing climate

Coastal lagoons are critical yet vulnerable ecosystems that serve as essential fishing grounds and nurseries for marine species. The Bizerta Lagoon in Tunisia, a regional hub, has recently experienced a dramatic and unexplained increase in the number of round sardinella (*Sardinella aurita*) caught, rising from 30 kg in 2014 to 25,171 kg in 2023. This signals a significant shift in the ecology and fisheries of these resources.

The aim of this study is threefold: to determine the stock structure of *S. aurita* between the lagoon and the adjacent sea; to assess its current exploitation status; and to discuss the potential environmental and management drivers behind this population expansion.

Stock discrimination was performed using otolith contour shape analysis (geometric morphometrics) on samples from the Bizerta Lagoon and the Mediterranean Sea. The fishery status was assessed using Length-Based (LBB) and Catch-Based (CMSY++) stock assessment models.

Otolith analysis revealed two distinct morphotypes, confirming the existence of two separate stocks inhabiting the lagoon and marine environments. Both assessment models indicated that the lagoon stock is not currently overfished. However, the average catch length (20.65 cm) far exceeds the length at first sexual maturity (14.3 cm).

This study provides the first evidence of a distinct, under-exploited stock of *S. aurita* in Bizerta Lagoon. The spectacular increase in catches, likely driven by climate-mediated environmental changes that have created favourable conditions, presents a critical case study of climate adaptation in coastal fisheries. We recommend implementing a bespoke monitoring and adaptive management programme to secure this emerging resource as a sustainable opportunity for Tunisian small-scale fisheries. This could provide valuable insights into the management of changing lagoon ecosystems worldwide.

Biography

Professor Sami MILI is a distinguished scholar and administrator in the fields of fisheries science and aquatic ecosystems. He completed his foundational studies in June 2001, earning a Bachelor of Science in Natural Sciences from the Faculty of Sciences in Bizerte, Tunisia. He further advanced his expertise with a Master's degree in Aquatic Ecosystem Production, obtained in March 2004 from the National Agronomic Institute of Tunisia (INAT) in collaboration with the National Institute of Marine Sciences and Technologies (INSTM). In September 2013, He attained his Ph.D. in Fisheries Science through a joint program between INAT and INSTM, solidifying his academic and research credentials. Professionally, he served from 2017 to 2024 as the General Director of the Higher Institute of Fisheries and Aquaculture of Bizerte (ISPAB), where he oversaw academic and strategic development. Since January 2025, he has held a professorship at the Faculty of Sciences of Bizerte, contributing to education and research in marine and environmental sciences. He is also an active contributor to the scientific community, serving as an editorial board member for several peer-reviewed journals specializing in aquaculture, marine biology, and fisheries.



Sérgio Saraiva Nazareno dos Anjos^{1,2*}, Letícia Jungmann Cançado¹, Alexandre Nascimento de Almeida²

¹Brazilian Agricultural Research Corporation (Embrapa), Brazil

²University of Brasília, Brazil

Foresight, market and economic analysis of microalgae for aquaculture feed: Use of *Chlorella sorokiniana* biomass in a hypothetical diet formulation for Pacific white shrimp (*Penaeus vannamei*)

With the global population projected to reach 9 billion by 2050, ensuring food security is a primary challenge for the Food and Agriculture Organization (FAO) and a core target of Sustainable Development Goal 2 (SDG 2: Zero Hunger and Sustainable Agriculture). Aquaculture is widely recognized by the FAO as a high-value sector capable of bolstering food security by expanding the global protein supply. However, feed costs account for up to 70% of aquaculture operating expenses, primarily driven by the seasonality and price volatility of fishmeal—a key dietary ingredient. In Brazil, soybean meal is commonly used as a fishmeal substitute due to its high availability; however, its application is limited by antinutritional factors, low digestibility, and poor palatability.

Microalgae represent a promising alternative; these versatile microorganisms can be cultivated under diverse environmental conditions to produce biomass that is nutritionally competitive with both fishmeal and soybean meal. This study aimed to estimate the economic value of *Chlorella sorokiniana* biomass and evaluate its competitiveness in hypothetical feed formulations for juvenile-to-adult Pacific white shrimp (*Penaeus vannamei*) reared in semi-intensive and intensive pond systems. The analysis was supported by foresight methodologies, including patentometric, bibliometric, and Delphi analyses.

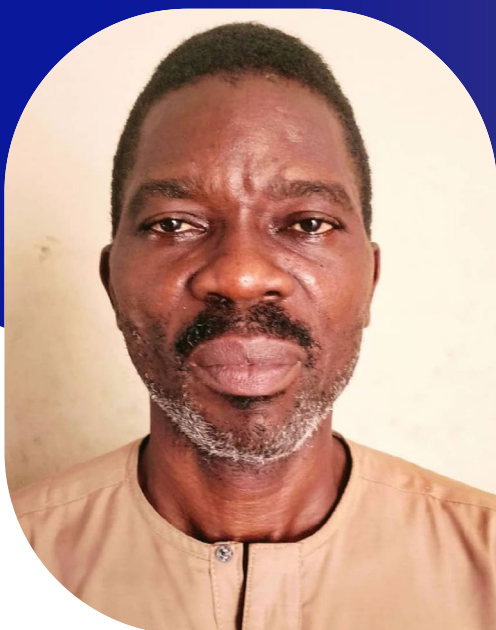
This research aligns scientific and technological scenarios surrounding microalgae with the aquaculture feed and supplement market—a convergence of strategic importance to Brazil in fields such as biorefineries, the circular bioeconomy, sustainable development,

and food security. Beyond their utility in greenhouse gas mitigation, microalgae are highly competitive as aquaculture feed ingredients due to the Polyunsaturated Fatty Acid (PUFA) profile of the evaluated *C. sorokiniana* biomass (strain LBA39, sourced from the Collection of Microorganisms and Microalgae Applied to Agroenergy and Biorefineries – CMMAABio, Embrapa Agroenergy). Notably, this strain is rich in essential omega-3 (alpha-linolenic acid) and omega-6 (linoleic acid) fatty acids.

To assess the financial feasibility of the hypothetical formulations, we applied a discounted cash flow methodology adapted to incorporate the Gompertz growth curve. The model demonstrated that utilizing this microalgae biomass is currently economically unfeasible, reflecting its low technological maturity (Technology Readiness Level 3, TRL 3). Conversely, biomass remains highly competitive from a nutritional standpoint. In the long term, it has the potential to serve as a viable alternative to soybean meals and to replace up to 40% of fishmeal in commercial feed formulations, while simultaneously contributing to climate change mitigation and food security initiatives. The current financial barriers associated with this strain can be overcome through targeted investments in scaling up cultivation systems and training specialized professionals in industrial-scale biomass cultivation and downstream processing.

Biography

Sérgio Saraiva Nazareno dos Anjos is a multidisciplinary professional serving as a Technology Transfer Analyst at the Brazilian Agricultural Research Corporation (Embrapa). His expertise lies at the intersection of innovation, sustainable finance, and bioeconomy. Driven by a strong academic foundation, he holds a PhD in Environmental Sciences, an MBA in Agribusiness Management, and bachelor's degrees in both Pharmaceutical Sciences, Administration and Economics. His core competencies and research focus include Innovation Management and Sustainability & Finance. In addition to his corporate role, he actively contributes to advancing the sector as a member of research groups dedicated to Ecological Macroeconomics and Sustainable Finance & Investments.



Olayimika S. O. A.^{1*}, Lamai S. L.¹,
Olugboji O. A.², Garkida A. D.³

¹Water Resources, Aquaculture and Fisheries Technology
Department, Federal University of Technology, Minna, Niger
State, Nigeria

²Mechanical Engineering Department, Federal University of
Technology, Minna, Niger State, Nigeria

³Glass Technology Department, Ahmadu Bello University,
Zaria, Kaduna State, Nigeria

Relationship between shapes and glass thicknesses on water holding capacity of 60-litre aquaria

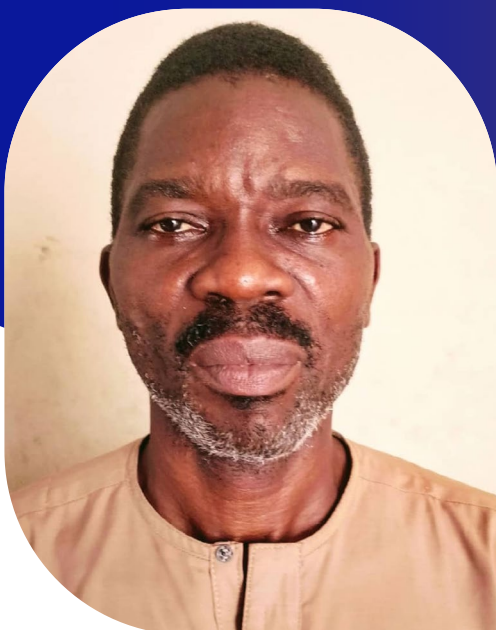
Glass thicknesses and shapes of 60 Litres (L) glass aquaria was studied. Designed glass aquaria were constructed (3 mm, 4 mm and 5 mm glass thicknesses) for shapes (tower, prism and cuboid) in triplicate and tested for leakages. Water was introduced into each aquarium and monitored under room condition for 49 days. Failure occurred in 3 mm for all the shapes. 4 mm and 5 mm failed in prism and tower shaped, during and shortly after filling without a significant difference ($p>0.05$). Cuboid shaped retained water, without significant difference ($p>0.05$) between 4 mm and 5 mm. A significant difference occurred ($p<0.05$) in water holding ability by various aquaria shapes and thicknesses of glass. 4 mm and 5 mm are recommended for the construction of cuboid shaped 60 L glass aquarium considering customers' financial ability for a choice. This will minimize loss of time, money, manpower and materials and increases healthiness, job creation and wealth for the people. Further researches should be carried out on other glass thicknesses, shapes and volumes to meet the existing demand.

Keywords: Aquarium, Glass Thicknesses, Shapes, Water Holding.

Biography

Dr. Solomon Olu'sola Abiodun OLAYIMIKA lectures at Water Resources, Aquaculture and Fisheries Technology Department, Federal University of Technology Minna, Niger State, Nigeria; West Africa (over twenty years), formerly farm manager and breeder in some private organizations. A holder of B. Sc. Fisheries, M. Tech (Fisheries) and PhD Aquaculture. Leading in Ornamental fisheries, Aqua-tourism and Fish-Biotechnology researches in West Africa with strong interest, researches and skills in: Fish Vats Engineering and Construction, Fish Breeding and Genetics, Climate-Smart Aquaculture, Water Quality Management, Value

Chain, Fish Economics and Business, Fisheries and Aquaculture Development. Supervised over hundred undergraduate researches and teach and trained hundreds of them in various courses and skills, likewise teach, supervised thesis and trained Master and Doctorate researchers/students. Highly involved in many communities services and training of people for self empowerment and self employed. Had many reputable Journals, Conference proceedings and Conference Papers at various levels published and co-authored a textbook of international repute. An editor and reviewer to some journals. Currently, carrying out some peculiar and path finding researches that requires international networking, collaborations and sponsorships.



Olayimika S. O. A.*, Eze U.R., Akinola S. O., O'-Olayimika A. I. G.

Water Resources, Aquaculture and Fisheries Technology
Department, Federal University of Technology, Minna, Niger
State, Nigeria

A preliminary investigation into the possibility of domestication of Solafunmi (*Sierrathrissa leonensis*) as an aquarium fish for ornamental purpose

The need to improve mental health/wellbeing is very essential in overall improvement of human performance which ornamental fisheries is fulfilling using aquarium fish viewing as a means, apart from its aesthetic and recreational purposes. Solafunmi a trade name given to *Sierrathrissa leonensis*, a freshwater fish by the domesticator for ornamental purposes, commonly called clupeid (English: West Africa pygmy herring), harvested from a drying stream when moving in schools after being driven to a confined area using scoop net, pale to brown colour in natural habitat. Anti-stress was administered and acclimatised. Twenty fish was introduced into glass aquarium (with 10 litres of water) in triplicate without aerator, formulated feed was administered and accepted by the fish under these average (range) conditions: Water: pH 6.72 (5.9 – 7.5), temperature- 18.6°C (16 – 21.5°C), dissolved oxygen- 6.27 mg/l-1 (5.93- 6.58 mg/l-1), conductivity- 309.667 µs/cm (173.3 – 370.5 µs/cm), room temperature- 23.9°C (22 – 27.5°C) and with high survival rate- 18.67 (18 – 19), that is 93.35%, actively moving in groups, non-aggression and very hardy, thus, highly recommended as an aquarium fish. Further researches on biology, feed, reproduction and other developments are ongoing to make it a better aquarium fish.

Keywords: Domestication, Aquarium, Solafunmi, Ornamental, Non-Aggressive.

Biography

Dr. Solomon Olu'sola Abiodun OLAYIMIKA lectures at Water Resources, Aquaculture and Fisheries Technology Department, Federal University of Technology Minna, Niger State, Nigeria; West Africa (over twenty years), formerly farm manager and breeder in some private

organizations. A holder of B. Sc. Fisheries, M. Tech (Fisheries) and PhD Aquaculture. Leading in Ornamental fisheries, Aqua-tourism and Fish-Biotechnology researches in West Africa with strong interest, researches and skills in: Fish Vats Engineering and Construction, Fish Breeding and Genetics, Climate-Smart Aquaculture, Water Quality Management, Value Chain, Fish Economics and Business, Fisheries and Aquaculture Development. Supervised over hundred undergraduate researches and teach and trained hundreds of them in various courses and skills, likewise teach, supervised thesis and trained Master and Doctorate researchers/students. Highly involved in many communities services and training of people for self empowerment and self employed. Had many reputable Journals, Conference proceedings and Conference Papers at various levels published and co-authored a textbook of international repute. An editor and reviewer to some journals. Currently, carrying out some peculiar and path finding researches that requires international networking, collaborations and sponsorships.

Teshome Belay^{1*}, Elias Dadebo², Girma Tilahun², Degsera Aemro³

¹Department of Animal Sciences, College of Agriculture and Natural Resource, Dilla University, Dilla 419, Ethiopia

²Department of Aquatic Sciences, Fisheries and Aquaculture, College of Natural and Computational Sciences, Hawassa University, Hawassa 05, Ethiopia

³Department of Fisheries and Aquatic Sciences, School of Fisheries and Wildlife, College of Agriculture and Environmental Sciences, Bahir Dar University, Bahir Dar 5501, Ethiopia

Reproductive biology and feeding habits of the Nile tilapia *Oreochromis niloticus* (Linnaeus, 1758) (Pisces: Cichlidae) in Lake Hawassa, Ethiopia

The study was conducted from February 2023 to January 2024 aimed to investigate the reproductive biology and feeding habits of Nile tilapia *Oreochromis niloticus* in Lake Hawassa, Ethiopia. 816 mixed sexes of *O. niloticus* were considered for reproductive biology; sampling involved gillnets with mesh sizes of 6, 8, 10, and 12 cm and random samples from landing sites. To get different size ranges, additional data were collected for feeding habits and morphometric relationships using smaller-sized gillnets (2 and 2.5 cm), hand nets (6 mm size), and randomly from local fishers gathered with hooks, resulting in a total sample of 987. Microsoft Excel, SPSS v27, and MATLAB software were used for data analysis. The results showed that the sex ratio (1:0.93) did not deviate from the theoretical 1:1 ratio (χ^2 , $p > 0.05$). The TL50 maturity was 18.5 cm for males and 19.1 cm for females. *O. niloticus* from Lake Hawassa showed year-round breeding, peaking in January and February. Fecundity ranged from 105 to 1,541 eggs/ripe fish. Phytoplankton was the most frequent (95.72%), contributed 88.2%, and predominated at 96.6% in the stomach of *O. niloticus*. Ontogenetic dietary shifts were not statistically significant ($C > 0.6$). Significant dietary variations were noted between rainy and dry months, particularly for the occurrence of macrophytes (χ^2 , $p < 0.05$) and volumetric contributions of detritus (t-test, $p < 0.05$). *O. niloticus* from Lake Hawassa showed positive allometric growth ($b > 3$) and was significantly different from 3 (t-test, $p < 0.001$). The mean relative condition factors showed significant variation by sampling month (ANOVA, $p < 0.05$). The result concluded that *O. niloticus* from Lake Hawassa is categorized as a phytoplanktivorous trophic category. Based on the present findings, it is recommended to stop the harvesting of *O. niloticus* below 19.1 cm and enforce fishing closures during peak breeding months (January and February). The insignificant dietary shift and phytoplankton dominance in the diet of *O. niloticus* suggest that a parallel study on phytoplankton biomass and primary production, as a proxy of yield and management of *O. niloticus* stock in Lake Hawassa, should be considered for future studies.

Keywords: Feeding Habits, Lake Hawassa, *Oreochromis niloticus*, Phytoplanktivorous, Reproductive Biology.



Thomas Coates*, Amanda Fox

Animal Research Initiative, Honolulu, HI, USA

Outrageously unnatural: The dangers of octopus farming

The viability of octopus aquaculture has recently been evaluated in experimental settings with a desire to mass produce intensively confined octopus products in the near future. This paper analyzes case studies and known challenges that highlight the ecological, economic, ethical, and public health hazards involved with octopus farming. Escapes from confined octopuses are frequently documented and can result in the introduction of apex-predators into local ecosystems. Once into surrounding waters, these carnivorous predators present risks such as disease spread, consumption of exorbitant numbers of crustaceans, and depletion and hybridization of wild octopuses. Moreover, waste runoff from these facilities poses environmental and public health challenges by intensifying harmful algal blooms and introducing parasites. Land-based facilities pose their own set of unique problems: octopuses can walk for up to ten minutes on land, have been found escaping into drain pipes, and due to 24/7 reliance on water filtration, electricity outages lead to mass die-offs which burden public resources through taxpayer-supported relief programs. Additionally, octopuses are remarkably sentient and farming them entails ethical standards that are unavailable in an aquaculture setting. Their high intelligence means an elevated desire for stimulation, which they would be deprived of in these facilities. In experimental settings, this has resulted in extreme stress, self-mutilation, and high mortality rates largely attributed to cannibalism. Many regions have introduced or completed bans on octopus farming. Based on our findings, we recommend against artificially concentrating octopuses for any purpose.

Biography

Thomas Coates is a Policy Analyst at Animal Research Initiative who specializes in legislation specifically pertaining to animals and the environment. His work focuses on ascertaining particularly strict or lenient policies and researching their impact. He studied communications

at Western Washington University with a double minor in Economics and Philosophy. He has researched animal related issues for over 9 years, and is passionate about providing credible information regarding human and animal coexistence to inspire a more compassionate approach while prioritizing human longevity.

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Zae-Zae A. Aguinaldo^{1*}, Ricardo P. Babaran², Arturo O. Lluisma¹

¹The Marine Science Institute, University of the Philippines–Diliman, Quezon City, Philippines

²Institute of Marine Fisheries and Oceanology, College of Fisheries and Ocean Sciences, University of the Philippines Visayas, Miagao, Iloilo, Philippines

A tale of two sisters: De novo genome assembly and comparative genomic analysis of two *Decapterus* species, *D. macarellus* and *D. macrosoma*

Round scads (*Decapterus* spp.) are highly migratory pelagic fishes that support major fisheries throughout Southeast Asia, including the Philippines. The close morphological similarity among species within this genus complicates taxonomic identification, particularly for the sister species shortfin scad (*D. macarellus*) and mackerel scad (*D. macrosoma*). Despite their ecological and economic importance, genomic resources for *Decapterus* remain limited, hindering comparative genomic studies that could elucidate patterns of genetic divergence, evolutionary relationships, and adaptive traits.

Here, we present the first de novo genome assemblies of *D. macarellus* and *D. macrosoma*. The *D. macarellus* assembly comprised 1,477 contigs with an N50 of 1.88 Mb and a total size of 674 Mb, while the *D. macrosoma* assembly contained 440 contigs, with an N50 of 20.45 Mb and a total size of 718 Mb. Genome completeness was high for both assemblies, with BUSCO scores of 98.1% for *D. macarellus* and 98.3% for *D. macrosoma* based on 3,640 single-copy orthologs from the Actinopterygii_odb10 lineage dataset. Repetitive elements accounted for 25.86% and 29.30% of the *D. macarellus* and *D. macrosoma* assemblies, respectively. Genome annotation identified 25,733 protein-coding genes in *D. macarellus* and 26,680 in *D. macrosoma*, with approximately 99% functionally annotated in both species. Synteny analysis revealed a high level of collinearity between the two genomes, while also identifying several structural variations, including inversions and translocations. Furthermore, phylogenomic analyses revealed incongruence between mitochondrial and nuclear genome-based trees, suggesting uncertainty in the current placement of these species as sister taxa.

These high-quality genomic resources provide a foundation for comparative and evolutionary studies of round scads, advancing our understanding of their biology and ultimately contributing to sustainable fisheries management of this economically important genus.

Biography

Zae-Zae A. Aguinaldo is a graduate student pursuing a master's degree in marine science at The Marine Science Institute, University of the Philippines Diliman. Her research interests focus on the genetics and genomics of marine organisms, including seaweeds, shrimps, fishes, and Environmental DNA (eDNA). She previously worked as a Research Associate, where she developed experience in laboratory research, field sampling, and bioinformatics analysis of Next-Generation Sequencing (NGS) data, contributing to studies on fish and seaweed phylogenetics and shrimp genomics. She has also served as a research technical consultant, providing technical support and conducting workshops for researchers and students.

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E-mail: aquaculture@magnusconference.com