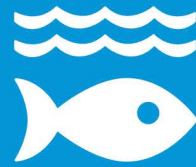


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Report on **Sustainable Development**

GOAL 14



Conserve and sustainably use the oceans, seas, and
marine resources for sustainable development



Over three billion people depend on marine and coastal biodiversity for their livelihoods. According to the UN SDG report, around 30 percent of the world's fish stocks are overexploited, reaching below the level at which they can produce sustainable yields. The ocean is in a state of emergency with increasing eutrophication, acidification, ocean warming, and plastic pollution, which is worsening health.

Sustainable development goal 14 is about managing and protecting marine and coastal ecosystems from pollution, addressing the impacts of ocean acidification, and enhancing the conservation and sustainable use of ocean-based resources through international law.

At Shiv Nadar University, our faculty are teaching and undertaking exciting research on issues around marine bodies, life below water, and aquatic ecosystems to advance SDG 14.

TEACHING AND LEARNING

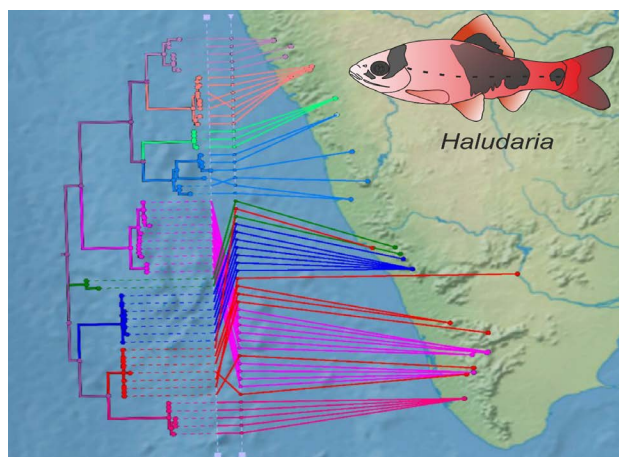
Every undergraduate student at Shiv Nadar University takes a core group of common subjects designated as the Core Common Curriculum (CCC). The CCC has an Ecology and Environmental Sciences component, including courses such as Global Environmental Issues (CCC 715) and Environmental Studies (CCC 704). The Department of Life Sciences offers a core course to undergraduate students on Ecology and Environmental Science (BIO 104). The course explores the importance of biological conservation, current anthropogenic stressors affecting ecosystems, and how these problems can be mitigated using a multidisciplinary approach, including biotechnology.

Student Stories

Opportunity for Undergraduate Research (OUR)- Flagship program at Shiv Nadar University

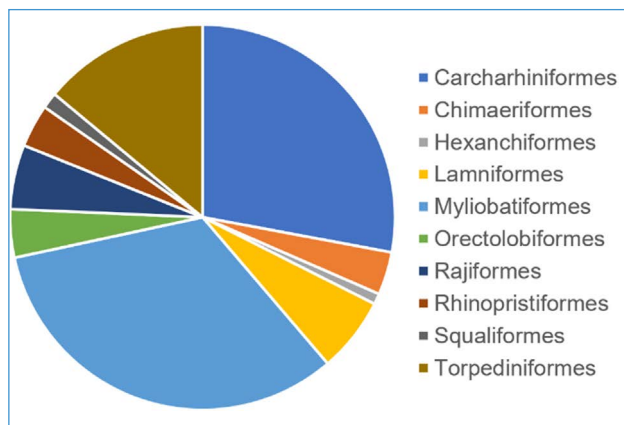
Genetic diversity in Mellon Barbs endemic to the Western Ghats of India

Mellon barbs of the genus *Haludaria* are endemic to the Western Ghats of India. Most of the species of Mellon barbs are threatened with extinction, yet there is limited understanding of their diversity and distribution within the Western Ghats. **Shubhika**



Pandey, an undergraduate student pursuing the B.Sc. (Research) Biotechnology, worked on the molecular phylogeny and evolution of Mellon barbs as a part of the OUR project. Her study shows that there are multiple undescribed species of Haludaria, which are highly restricted in their distributional range. By resolving the species complexes and understanding the distributional range, her study provides the first revision of the taxon since this genus was recognized as an endemic taxon of the Western Ghats.

Sreedhar Prabhu, an undergraduate student of Biotechnology, is working on generating genetic barcodes of cartilaginous fishes as part of OUR project. He sequenced 222 species belonging to 10 orders out of 13 extant orders of Chondrichthyes.



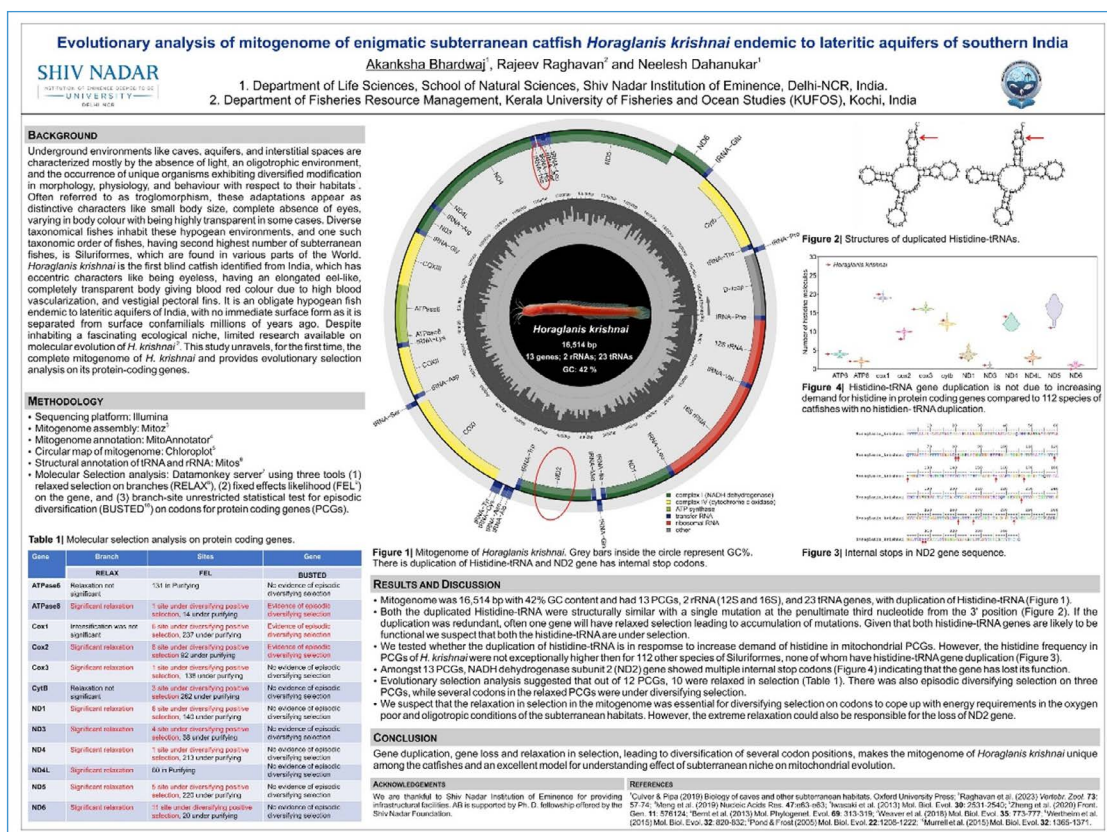
Molecular ecology of subterranean fishes.

Two Ph.D. students, Akanksha Bhardwaj and Tania Ann Varghese, are working on the molecular ecology and evolution of subterranean fishes of the Western Ghats.

Akanksha Bhardwaj is working on the genomic basis of evolutionary adaptations in subterranean blind catfish *Horaglanis krishnai* endemic to lateritic aquifers of the southern Western Ghats, Kerala, India. She has presented her work in poster and oral presentations.

Bhardwaj, A., Raghavan, R. & Dahanukar, N. (2025) Relaxed selection and gene duplication: subterranean adaptations in the mitogenome of aquifer-dwelling catfish *Horaglanis krishnai* endemic to southern India. Evolution 2025, a 2-day virtual conference, organized by the American Society of Naturalists, the Society of Systematic Biologists, and the Society for the Study of Evolution, May 29-30, 2025.

Bhardwaj, A., Raghavan, R. & Dahanukar, N. (2025) Evolutionary analysis of the mitogenome of the enigmatic subterranean catfish *Horaglanis krishnai* endemic to lateritic aquifers of southern India. Behaviour, Ecology and Evolution Symposium, Ashoka University, 26 and 27 April 2025.



Tania Ann Varghese is working on molecular ecology and the evolution of subterranean eel loaches of lateritic aquifers of the southern Western Ghats in Kerala, India, and their implications for their conservation. Tania has presented her work in poster and oral presentations.

Varghese, T. A., Jindal, T., Raghavan, R. & Dahanukar, N. (2025) Origin and evolution of subterranean eel loaches (Teleostei: Cobitidae) of Southern India. Evolution 2025, a 2-day virtual conference, organized by the American Society of Naturalists, the Society of Systematic Biologists, and the Society for the Study of Evolution, May 29-30, 2025.

Oligocene migration and Miocene origin of subterranean eel loaches (Teleostei: Cobitidae) of Southern India

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Tania Ann Varghese^{1*}, Tarani Jindal¹, Rajeev Raghavan² & Neelesh Dahanukar¹

¹Department of Life Sciences, School of Natural Sciences, Shiv Nadar Institution of Eminence, Delhi-NCR, India.

²Faculty of Ocean Science and Technology, Kerala University of Fisheries and Ocean Studies, Kochi, India



BACKGROUND

Eel-loaches of the genus *Pangio* are small, anguilliform freshwater fishes belonging to the family Cobitidae. There are 34 valid species of *Pangio* distributed across tropical streams of South and Southeast Asia. The lateritic aquifers on the western periphery of the Western Ghats biodiversity hotspot in Kerala host two unique subterranean species of *Pangio*, viz. *P. bhuja* and *P. pathala*. The subterranean species of *Pangio* exhibits multiple morphological differences from its surface congeners and sister taxa *P. ammophila*. However, the evolutionary origins of surface and subterranean *Pangio* in southern India remain poorly understood. This study employs a multigene phylogenetic approach using mitochondrial and nuclear markers to investigate the evolutionary history and biogeography of *Pangio* in Southern India.

OBJECTIVES

- Build multigene phylogeny of the family Cobitidae using mitochondrial and nuclear marker genes to understand the evolutionary history of the genus *Pangio*.
- Molecular dating to decipher the divergence patterns of Southern Indian *Pangio*.
- Biogeographical analysis to elucidate the spatial distribution of the members of the family Cobitidae across Eurasia.

MATERIALS AND METHODS

- Total 57 new sequences generated with the DNA extracted from specimens of *Pangio* and *Lepidocephalichthys*.
- Multigene maximum likelihood phylogeny of family Cobitidae using mitochondrial (cox1, cytb) and nuclear (rag1) genes based on newly generated sequences and additional sequences from GenBank [IQ-TREE].
- Molecular dating using RelTime with six fossil calibration points [MEGA12].
- Biogeographical analysis using Dispersal-Extinction-Cladogenesis model [RASP 4.0].

RESULTS AND DISCUSSION

- There are three clades that are currently identified as *Pangio* that do not form monophyletic group and have other sister taxa relations, suggesting that *Pangio* is polyphyletic (Fig. 1).
- Southern Indian eel loaches don't clade with *Pangio* sensu stricto from North India and South East Asia suggesting that it needs a new generic identity (Fig. 1).
- The common ancestor of southern Indian and Southeast Asian *Pangio* diverged approximately 30 million years ago (mya) (Fig. 2), when Indian plate was yet to completely merge into Eurasia. This suggests that there was some faunal exchange between southern India and Southeast Asia in the Oligocene.
- Southern Indian subterranean and surface forms are sister taxa to each other (Fig. 1 & 2).
- Surface and subterranean forms of *Pangio* separated 20 mya in Miocene (Fig. 2). This date coincide with Miocene drought, suggesting that the drought conditions might have compelled some population of surface dwelling *Pangio* to occupy subterranean channels.

CONCLUSIONS

Ancestral populations of eel loaches dispersed into southern India probably through some land bridge in the Oligocene. *Pangio* is polyphyletic and Southern Indian *Pangio* is likely to be an undescribed genus. Subterranean *Pangio* evolved from surface dwelling congeners in the Miocene probably due to massive drought at that time.

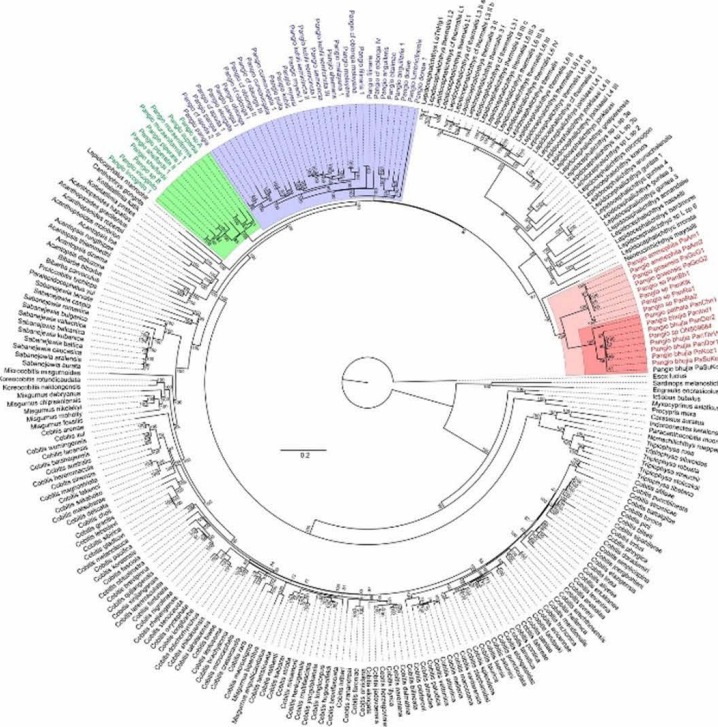


Figure 1| Multigene phylogeny of Cobitidae showing position of three *Pangio* clades.

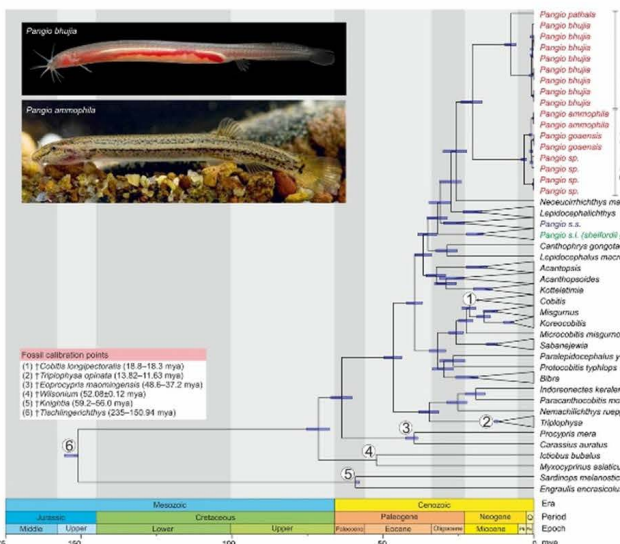
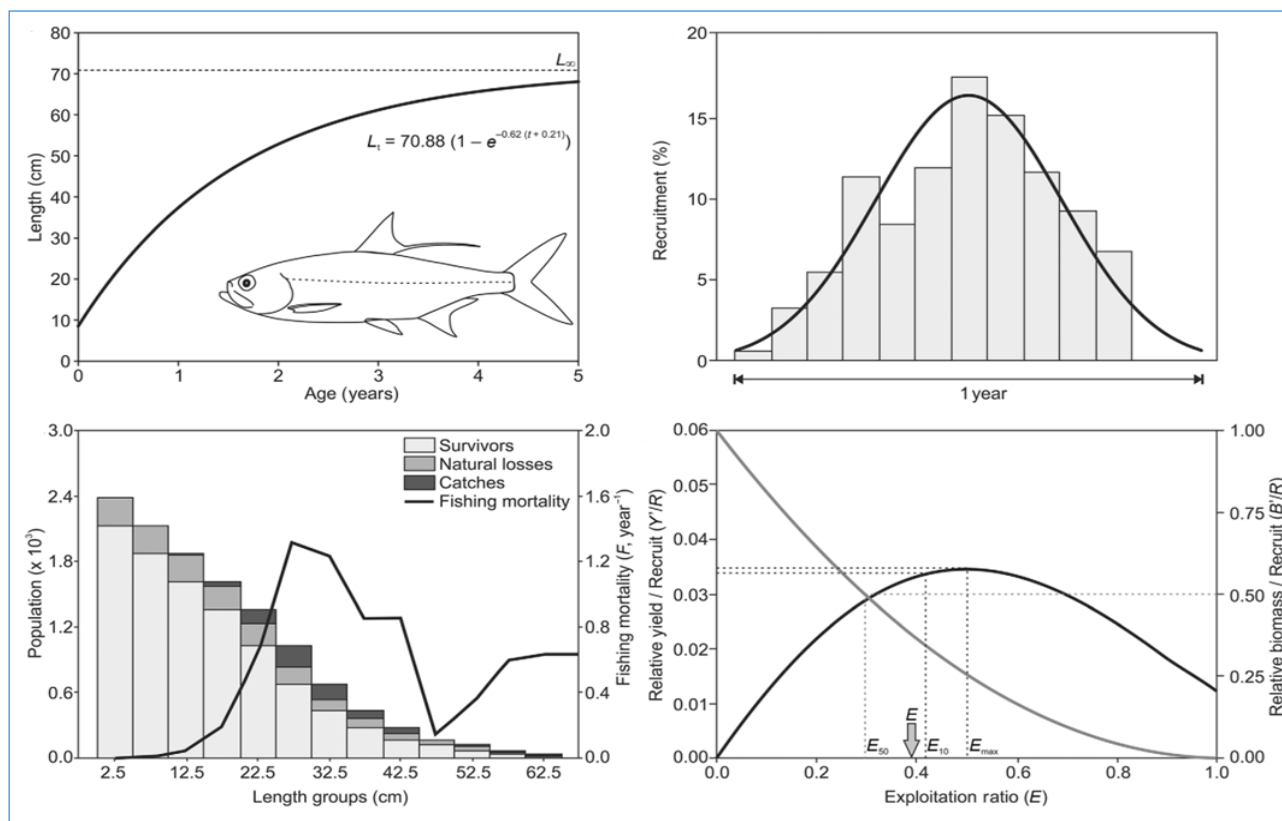


Figure 2| Molecular clock analysis for divergence of Cobitidae based on six fossil calibrations.

RESEARCH

Sustainability of the fisheries of a diadromous fish

Diadromous fishes migrate between saltwater and freshwater environments. They comprise a significant proportion of global fish catches. Since the diadromous fishes undertake long-distance movements across the environmental gradients, they are subjected to several stressors, both anthropogenic and ecological. The research provides population dynamics and exploitation



levels of one such diadromous fish, the Indo-Pacific tarpon *Megalops cyprinoides*, and comments on its sustainability and conservation. The study argues that there is a critical need to address overfishing and habitat degradation of the species to ensure its long-term sustainability.

Das, J., Shanmughan, A., Dahanukar, N., Raghavan, R. & Ranjeet K. (2024) Bridging knowledge gaps for the conservation and management of a 'Data Deficient', diadromous fish: The Indo-Pacific Tarpon, *Megalops cyprinoides*. Marine and Freshwater Research 75: MF23222. <https://doi.org/10.1071/MF23222>

Solutions of Tomorrow – Bio-degradable food wrapping

Dr. Yamini Sudha, Associate Professor, Department of Chemical Engineering, has used pectin biopolymer to develop composite thin films for bio-degradable vegetable and fruit wraps. Her research aims to significantly boost the shelf life of produce and reduce hazards to the human body and nature.

The biodegradable wraps are made by extracting pectin from bananas, oranges, and sweet lime. They are a natural, edible coating that can replace

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Dr. Yamini Sudha Sistla
Associate Professor
Department of Chemical
Engineering

Developed biodegradable film wraps by extracting pectin, a prospective biopolymer, from fruits.



Dr. Sistla is conducting her research at the Sustainability and Advanced Materials Lab, Shiv Nadar University, Delhi-NCR.

She and her team have produced small films with properties superior to those of pure pectin films.

<https://snu.edu.in/blogs/solutions-of-tomorrow-bio-degradable-food-wrapping/>



synthetic wax, which gives fruits gloss and longevity. She and her research group have successfully produced small films with improved properties compared to pure pectin films. "We are now working on process-related improvements to scale up the film production with the required physical, chemical, and mechanical properties," she says.

Dr. Sudha's research is linked to SDG 3 (good health and well-being), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production), and SDG 13, 14, and 15 (climate action, life below water, and life on land).

New genus and species

Understanding species' diversity and taxonomic resolution is the essential first step in conservation biology. Descriptions of new taxa are therefore crucial for conservation action and management. Dr. Neelesh Dahanukar, Assistant Professor, Department of Life Sciences, is leading research in his Molecular Ecology and Evolution laboratory. One of the works has led to the description of a new genus of hillstream loaches from Kerala and a new species of the freshwater fish genus *Oreochthys* from Meghalaya. The new genus of freshwater hillstream loaches, *Koima*, was described to accommodate two fishes, *Koima monilis* and *K. remadevii*, endemic to the southern parts of the Western Ghats of India. Description of the genus based on unique morphological and genetic characters suggests knowledge gaps in understanding biological diversity, even at higher taxonomic levels, in the Western Ghats of India. This endemic genus is highly restricted in the Western Ghats region of Kerala and Tamil Nadu.

Anoop, V.K., Dahanukar, N. & Raghavan, R. (2024). *Koima*, a new genus of nemacheilid loach from the Western Ghats, India (Cypriniformes: Nemacheilidae). *Zootaxa* 5538(2): 101-126. <https://doi.org/10.11646/zootaxa.5538.2.1>



A new species of freshwater fish, *Oreochthys warjaintia*, belonging to the family Cyprinidae, was described from the Pyngang stream of the Surma-Meghna River basin of Meghalaya, northeast India. The species is strikingly different from its congeners, both morphologically and genetically.

Dann, L., Dahanukar, N. & Raghavan, R. (2025) *Oreochthys warjaintia*, a new species of cyprinid fish from Meghalaya, India (Cypriniformes: Cyprinidae). *Journal of Fish Biology* 106 (3): 797-804. <https://doi.org/10.1111/jfb.16001>

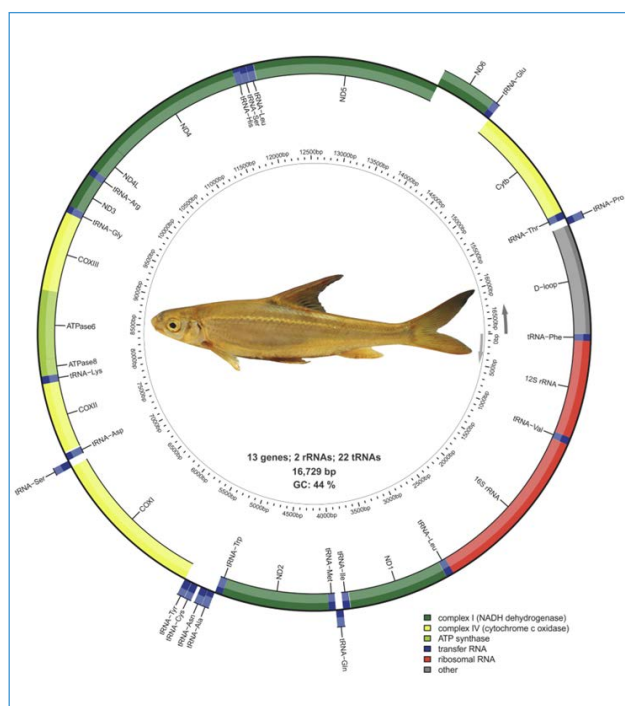


Photo credit: Lekiningroy Dann

Conservation genetics of endangered freshwater fish

This research provided the first complete mitochondrial genome of Endangered freshwater fish *Lepidopygopsis typus* endemic to Periyar Tiger Reserve of Western Ghats of Kerala, India. The study showed the restricted distribution, low population size, and relaxation in selection that can likely trigger the extinction of *L. typus*, and therefore, urged for an

Chandra, S., Abhilash, R., Sidharthan, A., Raghavan, R. & Dahanukar, N.* (2024) Complete mitogenome of *Lepidopygopsis typus*, an evolutionarily-distinct, endangered cyprinid fish from the Western Ghats Biodiversity Hotspot: phylogenetic relationships and implications for conservation. *Gene* 898: 148098. <https://doi.org/10.1016/j.gene.2023.148098>



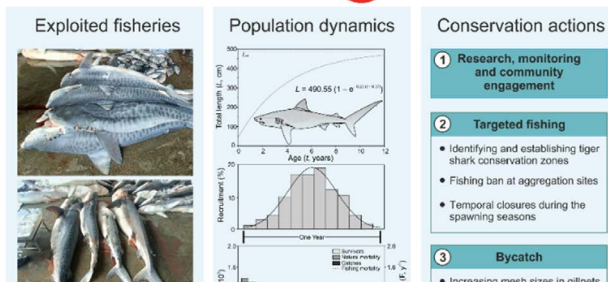
Despite their ancient origins about 439 million years ago, cartilaginous fishes like sharks, rays, skates, sawfish, and chimaeras are among the most threatened vertebrates on Earth. The studies on the ecology of cartilaginous fishes have essential conservation and sustainability implications.

history stages and implement size-based restrictions to reduce growth and recruitment overfishing.

Gurugubelli, M., Abisha, C., Arundhathy, T.A.,
Ranjeet, K., Dahanukar, N.* & Raghavan, R.* (2025)
A megafauna in distress: Unsustainable exploitation
of tiger sharks in the Arabian Sea and implications
for conservation. *Biological Conservation*
304: 111049. [https://doi.org/10.1016/j.
biocon.2025.111049](https://doi.org/10.1016/j.biocon.2025.111049)



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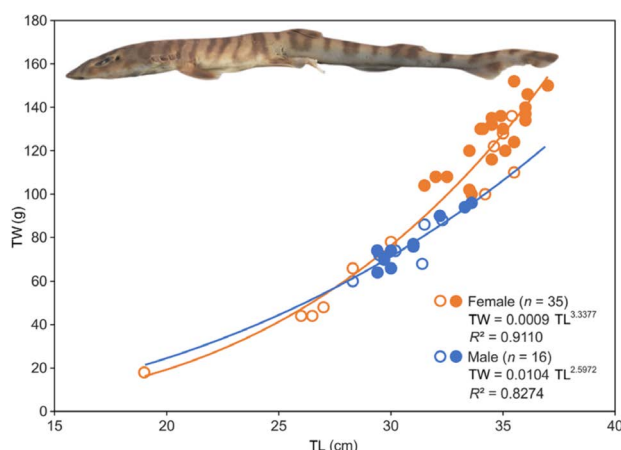


Another study on the *Quagga Catshark* *Halaelurus quagga*, shows there is limited information available on this catshark, which is hampering its conservation assessment. The study provided biological and ecological observations on the species based on the Quagga Catshark observed in the fish landing sites of the Kerala coast, suggesting intense deep-sea bottom-trawling off south-western India, posing a significant threat to *H. quagga*. If the fishery of this species is left unmanaged, it could likely trigger a threatened category for the species on the IUCN Red List.



The quagga catshark. | Photo Credit: Special Arrangement

Abisha, C., Dahanukar, N., Ranjeet K. & Raghavan, R. (2024) 'Data-Deficient' but potentially threatened: first biological observations on the poorly-known Quagga Catshark, *Halaelurus quagga*. *Marine and Freshwater Research* 75: MF23234. <https://doi.org/10.1071/MF23234>.



Rice husk-derived self-healing superhydrophobic films using a solvent-less approach for drag reduction and oil absorption behaviour.

The present work focuses on a sustainable approach to transforming rice-husk waste into self-healing superhydrophobic films with potential application

for drag-reduction and oil absorption. Rice husk was transformed into amorphous nano silica particles ($d_{50} \sim 150$ nm) exhibiting mesoporosity with a surface area of $400 \text{ m}^2/\text{g}$. Superhydrophobic films fabricated using a solvent-less approach showed the transition from flattened to nano-globular morphology with increasing silica content in polydimethylsiloxane (PDMS), leading to exceptional superhydrophobicity. The optimized film with a particle fraction of 60 % exhibited high de-wetting ($> 150^\circ$) and mechanical strength ($\sim 7 \text{ MPa}$). The film showed extremely low water droplet adhesion of $\sim 19 \mu\text{N}$, similar to that of a lotus leaf, owing to high negative Laplace pressure. Significantly, the film exhibited persisting de-wettability and endurance under harsh chemical, thermal, and mechanical conditions. The robustness is further fortified with room temperature self-healing and real-time self-regeneration characteristics, persisting even after strong acids and significant abrasion exposure. The multidimensional aspects of the film began with a 70 % drag reduction and effective oil-water separation. The present work provides a sustainable pathway for managing agricultural waste and a practical and easy-to-implement approach to tackling oil spill incidents.

Pathak, Prateek, Prabhjot Kaur, and H. S. Grewal. "Rice husk-derived self-healing superhydrophobic films using solvent-less approach for drag reduction and oil absorption behaviour." *Industrial Crops and Products* 222 (2024): 119812.

Wetlands contribution and linkage to support SDGs - A critical review.

This study was one of the pioneering efforts to compile comprehensive information on Ramsar sites¹. Globally. It delves into the significance of wetlands and the designation of Ramsar sites across various countries, incorporating a concise exploration of utilizing Unmanned Aerial Vehicles (UAVs) for wetland monitoring and assessment. The study conducted a comparative evaluation of Ramsar sites, analyzing their percentage area and overall coverage worldwide. Incorporating a Scientometric analysis utilizing the Scopus database, the study features a co-occurrence and thematic map, thematic evolution trend, and country

¹Ramsar Sites in India are the wetland sites listed under the Ramsar Convention on Wetlands of International Importance.

collaboration map. It emphasizes the interconnection between wetlands and Sustainable Development Goals (SDGs), particularly SDGs 6, 12, 13, 14, 15, and 17, aligning with wetland management and conservation and providing insights to researchers and policymakers.

Mohanty, Smrutisikha, Prem Chandra Pandey, Manish Pandey, Prashant K. Srivastava, and Chandra Shekhar Dwivedi. "Wetlands contribution and linkage to support SDGs, its indicators and targets-A critical review." *Sustainable Development* (2024).

Complete mitogenome of *Lepidopygopsis typus*, an evolutionarily-distinct, endangered cyprinid fish from the Western Ghats Biodiversity Hotspot: Phylogenetic relationships and implications for conservation

Dr. Dahanukar, Associate Professor, Department of Life Sciences, along with his team, provided the first complete mitogenome of the endangered species *Lepidopygopsis typus* or the Peninsular trout endemic to the Periyar Tiger Reserve of Kerala, India, and its implications in conservation genetics. The study provides molecular phylogenetic position, species evolution, and selection analysis of protein-coding genes. The small population size and relaxed selection of protein-coding genes suggest that the species' population is vulnerable to deleterious mutations that can wipe out the entire species, making the conservation of the species an immediate concern.



Chandra, S., Abhilash, R., Sidharthan, A., Raghavan, R. & Dahanukar, N. * (2024) Complete mitogenome of *Lepidopygopsis typus*, an evolutionarily-distinct, endangered cyprinid fish from the Western Ghats Biodiversity Hotspot: phylogenetic relationships and implications for conservation. *Gene* 898: 148098. <https://doi.org/10.1016/j.gene.2023.148098>

UNIVERSITY OPERATIONS

Campus Lake

The lake on campus is part of the Dadri wetlands, also called the Bil Akbarpur wildlife habitat. When the university was founded, this lake had almost dried up. However, following the spirit of the founding principles, the lake, like the rest of the campus, was immediately revived and preserved in its natural ecosystem.

This has allowed many fish and aquatic plants, such as *Nitella*, *Chara*, and other phytoplankton, to thrive. These phytoplankton, in turn, provide food for winged visitors. *Alternanthera philoxeroides* grows gregariously throughout the year on the lakes' fringes, encroaching on the water body and offering a good insect population to feed the birds.

During the summer, the lake is supported by external water to preserve life underwater, and the water is conserved and rejuvenated through rainwater harvesting. In little over 15 years, the lake is not just a scenic retreat but has become a living, breathing ecosystem supporting biodiversity on campus and a learning lab for ecological and environmental research.

PARTNERSHIPS

Biogeography of freshwater fishes across India and Sri Lanka

Dr. Dahanukar, Department of Life Sciences, and his collaborating team have published two papers discussing the freshwater fish faunal exchange between peninsular India and Sri Lanka. The studies provide fascinating insights into how the low sea levels in the Bay of Bengal facilitated the faunal exchange between India and Sri Lanka via the Palk Strait. A paper on the loach *Lepidocephalichthys* was published in *Hydrobiologia* in March 2024.

The study provides the first extensive phylogeny of the South Asian loach genus *Lepidocephalichthys* distributed in India and Sri Lanka. The study shows for the first time that the species *L. thermalis* is widely distributed in both peninsular India and Sri Lanka. The study suggests that ancestral members of the genus *Lepidocephalichthys* colonized Sri Lanka from Peninsular India in the late Miocene and multiple back-migrations to India, as well as colonization from the mainland, took place in the Plio-Pleistocene.

The collaborating team includes Dr. Hiranya Sudasinghe, University of Peradeniya, Sri Lanka; Dr. Rohan Pethiyagoda, Ichthyology Section, Australian Museum, Sydney, Australia; Dr. Madhava Meegaskumbura, Guangxi University, People's Republic of China; Dr. Lukas Rüber Naturhistorisches Museum Bern, Switzerland, and Dr. Rajeev Raghavan, Kerala University of Fisheries and Ocean Studies (KUFOS), Kochi, India.

Sudasinghe, H., Dahanukar, N., Raghavan, R., Ranasinghe, T., Wijesooriya, K., Pethiyagoda, R., Rüber, L. & Meegaskumbura, M. (2024) The loach genus *Lepidocephalichthys* (Teleostei: Cobitidae) in Sri Lanka and peninsular India: Multiple colonizations and unexpected species diversity. *Hydrobiologia* 851:1113-1133. <https://doi.org/10.1007/s10750-023-05321-4>

Algal discrimination and characterization using hyperspectral datasets of Chilika Lake, Odisha, India” by SERB under SRG grant, Government of India

This project aims to monitor the water quality of Chilika Lake, Odisha, the largest brackish lake in Asia. Funded for two years by the Science and Engineering Research Board under an SRG grant, the project uses Hyperspectral images, imaging spectroscopy, and field-measured data to understand the lake's productivity in terms of eutrophication. Over 25 water physico-chemical parameters were assessed to deliver the stages of eutrophication of the lake, which assessed its biological productivity and support level for aquatic organisms. The reasons included seawater exchanges, deposition of sediments, sewage discharge, etc. Chilika Lake is declared a Ramsar site (no 229), an essential area for breeding, wintering, and staging for 33 species

of water birds (the largest wintering ground for migratory waterfowl found anywhere on the Indian sub-continent). A rare breed of Irrawaddy dolphins was exclusively found here.

Research contributing to the International Union for Conservation of Nature (IUCN)

Dr. Neelesh Dahanukar has collaborated closely with the IUCN Freshwater Fish Specialist Group in assessing the conservation status of numerous freshwater fish species of the Indian subcontinent, particularly in the Western Ghats. His work includes multiple Red List assessments as well as comprehensive taxonomic surveys covering over 170 freshwater fish species. The IUCN Red List of Threatened Species helps understand the likelihood of a species going extinct unless conservation actions are designed to protect it.

Shiv Nadar University collaborates with The Habitat Trust (THT)

The Department of Life Sciences is working with [The Habitats Trust](#) (THT) to achieve synergistic gains by bringing together diverse expertise and launching multidisciplinary conservation programs. One of the programs is to work on eDNA studies of elasmobranchs across India's coastline. Elasmobranchs, including sharks, rays, and skates, are under enormous anthropogenic pressure worldwide, with many species classified as threatened with extinction. The sawfish, closely related to rays, are an intriguing and understudied group of elasmobranchs. The population of five known species of sawfish worldwide has declined by more than 90% due to overfishing (directed and bycatch) and habitat loss (IUCN). Three of the species are endangered, while the other two are threatened. Understanding the distribution of these critically endangered elasmobranchs is critical because they live in coastal waters and estuaries subjected to intense anthropogenic pressure. These can serve as flagship species for habitat conservation, and using eDNA methodology allows for large-scale sampling, making it ideal for studying such elusive species while paving the way to study organisms that are difficult to observe or extremely rare.

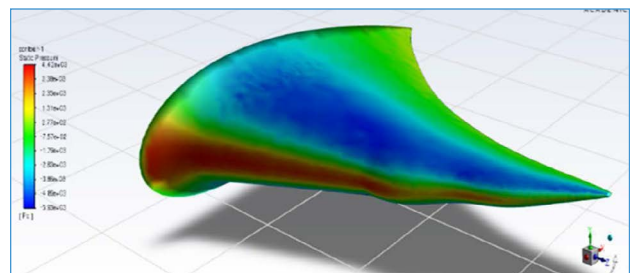
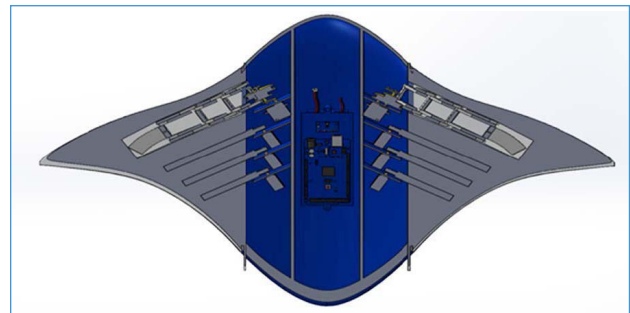
Four students from the B.Sc. Biotechnology (Research), are working on the molecular ecology and evolution of freshwater fish of Channoidea

(snakehead fishes), Mastacembelidae (spiny eels), Sisoridae (torrent catfishes), and Danioninae (minnows) in collaboration with THT.

Design and Development of Bio-inspired Unmanned Underwater Vehicles (UUV) in collaboration with the Naval Research Board (NRB)

Dr. Santanu Mitra, Associate Professor and Dr. Ganeshthangaraj Ponniah, Assistant Professor, at the Department of Mechanical Engineering are working on an interesting project that focuses on bio-inspired (manta ray/batoid) UUVs, with flexible propulsion systems, efficient locomotion, payload capacity for sensors, and a range of applications including pollution monitoring, threat detection, and species tracking. In collaboration with the Naval Research Board (NRB) of the Defense Research and Development Organization (DRDO), the department has designed a bio-inspired unmanned underwater vehicle, which is a physically intelligent system that looks like natural species, propels efficiently underwater, and achieves multiple tasks, including underwater pollution monitoring, oil cleaning, migration of species, and underwater threat detection, to name a few.

The design and manufacturing of flexible propulsion are essential to batoid-inspired UUVs. The current study focuses on the Manta Ray species that have a unique advantage over other underwater species and can carry a larger payload. The efficient locomotion of the vehicle leads to higher speed and energy efficiency. The higher payloads facilitate various sensors, cameras, and other sophisticated components to make it intelligent and adopt strategic locomotion.



Shiv Nadar Institution of Eminence is fully committed to the UN Sustainable Development Goals (SDGs). We have embraced a four-pronged strategy for SDGs through **teaching, research, our core institutional practices, and partnerships.**

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