



SACON NEWSLETTER

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Sálim Ali Centre for Ornithology and Natural History
(South India Centre of Wildlife Institute of India, MoEFCC, Govt. of India)
Anaikatty (Post), Coimbatore – 641 108,
Tamil Nadu (INDIA)



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Layout & Design

S.Vigneshwaran



News Letter JAN 2024 - MARCH 2024



INSTITUTIONAL ACTIVITIES

“Kovai Vizha” – Nature trekking at SACON

As part of the Kovai Vizha celebrations, Omega Tribes, in association with SACON, conducted a “Nature Walk” on 06 January 2024 at our campus. Around 40 participants embarked on an early morning birding and nature trail led by Dr. P. Pramod, Senior Principal Scientist. This dynamic group of adults and children enthusiastically engaged in discussions about various aspects of wildlife, delving into the fascinating and sometimes quirky behaviours of different species. They also had the opportunity to debunk several common myths about nature, gaining a deeper and more accurate understanding of the natural world. Participants observed diverse flora and fauna throughout the walk, making the experience educational and captivating.



Training Programme on Bird Identification & Forensics

Under the “Modernization of Tamil Nadu Forest Force” scheme of Tamil Nadu Forest Academy, 20 forest officials from across Tamil Nadu participated in a five-day training program on “Bird Identification and Forensics” organised by SACON from January 8 to 12, 2024.

The training began with a brief introduction to SACON’s past and ongoing research activities by Dr. Aditi Mukherjee, followed by an introduction to Bird Identification and various field census techniques used to estimate bird populations by Dr. S. Babu. Dr. Rajah Jayapal delivered an interactive lecture on the birds of Tamil Nadu, noting species that were once common but have now become locally extinct. The knowledge gained during these technical sessions was reinforced through field visits to various wetlands in Coimbatore. These excursions allowed participants to practice using the “Birds of the Indian Subcontinent” field guide and gave many their first sightings of harriers, various ducks, swifts, swallows, and other water birds.

Technical sessions on Wildlife Crime, Trade, and Forensics by Dr. Ashutosh Singh, Feather Microstructure and its application in Wildlife Forensics by Dr. Swapna Devi Ray, and Molecular Techniques, Forensics, and Conservation by Dr. Shomita Mukherjee laid the foundation for understanding the role of forensics in wildlife crime. Participants engaged in a mock crime scene investigation set up by the SACON team, where they applied the protocols learned to collect and seal evidence properly and identify suspects. A visit to the National Avian Forensics Laboratory at SACON demonstrated the processing of the evidence they collect in the field.

The final part of the training focused on conservation. Dr. Manchi Shirish S. delivered a thought-provoking lecture on bird conservation strategies using case studies from the Andaman Islands, emphasising the critical role of forest personnel and the local stakeholders in these efforts. Dr. M. Mahendiran presented on the Monitoring and Management of wetland birds with select case studies. At the same time, Dr. Vidyadhar Atkore discussed the importance of conserving river birds and their ecological role. Dr. P. Pramod also provided insights into the crucial role of nature education in bird conservation.

This comprehensive training program equipped the forest officials with essential skills and knowledge to enhance their efforts in bird identification, forensics, and conservation



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South India Centre of Wildlife Institute of India,
Ministry of Environment, Forest & Climate Change, Government of India,
Anaikatty, Coimbatore - 641108

In association with
Tamil Nadu Forest Academy
under
"Modernization of Tamil Nadu Forest Force",
on
Bird Identification & Forensics
08 - 12 January 2024

Multi-Stakeholder Meeting for Indian Swiftlet Conservation in Maharashtra

A multi-stakeholder meeting was held on 19th January 2024 at Chatrapati Shivaji Maharaj Sabagraha of Vengurla Nagar Parishad to discuss the conservation of the Indian Swiftlet (*Aerodramus unicolor*) in Maharashtra. The meeting aimed to introduce the project's objectives, discuss results and involve stakeholders in preparing the Indian Swiftlet Conservation Plan (ISCP) for the region. The organisers, Dr Manchi Shirish S and Dr Goldin Quadros, Principal Scientists, and Ms Dhanusha Kawalkar, PhD Scholar, also educated and sensitised stakeholders about species conservation by screening a documentary about SACON's ongoing work by Mumbai Tarun Bharat in collaboration with The Habitats Trust. After knowing the Indian Swiftlet's distribution is limited to the southern region of the Sindhudurg district in Maharashtra state, the Forest Official and Chief Municipal Officer suggested declaring the Indian Swiftlet the district bird of Sindhudurg to raise awareness about the species and its habitat. Since the population is reaching a threshold and the absence of natural habitats are a major threat to the species in the Vengurla rocks, Media stakeholders suggested ex-situ conservation and declaring major islands as the Indian Swiftlet Conservation Reserve (ISCR) to protect habitats and provide opportunities for sustainable development. One of the major threats to the Indian Swiftlet is the rampant spray of insecticides, especially on mango plantations, so academicians have suggested educating the orchard owners about organic farming. The meeting concluded with stakeholders thanking the organisers for inviting them and considering their views on preparing the ISCP, and the organisers acknowledged the active participation of the stakeholders.



Three-day workshop on Wildlife Conservation

The importance of multi-stakeholder involvement in wildlife conservation cannot be overstated. This complex endeavour requires contributions from science, law, policy-making, community engagement, and sustainable development. Each stakeholder brings unique perspectives, resources, and skills, making collaboration essential for effective outcomes. By fostering inclusive and participatory approaches, we harness collective expertise to address conservation challenges comprehensively and sustainably, ensuring the long-term survival of wildlife and their ecosystems. This holistic approach enhances conservation efforts and fosters shared responsibility and stewardship for the planet among diverse groups.

Recognising this imperative, a three-day Wildlife Conservation Training Workshop was organised for Class I/Group A Officers under the aegis of the Ministry of Environment, Forest and Climate Change (MoEFCC). This training program on Wildlife Conservation has been organised for Group A/Class 1 personnel of other services from 22 to 24 January 2024 at the Hash Six hotels, Coimbatore. The course objectives were meticulously designed to address key facets of wildlife conservation, ranging from understanding India's ecological diversity to sensitising stakeholders about their roles in fostering interdepartmental cooperation. The workshop also aimed to enhance participants' capacities in addressing wildlife offences and implementing Standard Operating Procedures effectively.

Coimbatore City Police Commissioner Thiru V. Balakrishnan inaugurated the workshop and addressed the audience about global warming, and its impacts. The technical sessions, helmed by esteemed scientists and experts in the field, provided a comprehensive overview of critical topics. Dr. P.V. Karunakaran initiated the proceedings by discussing the Rationale of the Training Programme, emphasising the pivotal role of diverse sectors in wildlife conservation. Dr. Rajah Jayapal followed suit with a compelling discourse on India's Wildlife Heritage, highlighting why its preservation is paramount. Delving deeper into ecological dynamics, Dr. Goldin Quadros shed light on Ecosystems and Habitats, underlining the intricate interplay between human activities and wildlife habitats. The session on Human-Wildlife Interaction, led by Dr. Manchi Shirish S., offered insights into the complexities of coexistence and the challenges posed by anthropogenic activities.



Group Photo with Chief Guest, Thiru. V. Balakrishnan, IPS, Participants, SACON Faculty and the Volunteers

As the workshop progressed, attention turned towards proactive conservation measures. Dr. P.R. Arun and Dr. Riddhika Ramesh discussed the imperative of future-proofing our survival through development and prioritising biodiversity. Dr. Shomita Mukherjee provided valuable insights into India's Biogeography and Land Policies, stressing their significance in conservation planning. The fight against wildlife crime took centre stage with Dr. Ashutosh Singh's session on *Combating Wildlife Crime with New Age Forensics*.

Our invited guest speaker, Thiru. Chandrasekaran G., Deputy Conservator of Forests (Retd.), elucidated Legal Protection for Wildlife and Habitats, emphasising the importance of legal frameworks in safeguarding biodiversity. A highlight of the workshop was the exploration of citizen-driven conservation initiatives. Dr. Rajah Jayapal and Dr. P. Pramod discussed Wildlife Conservation through Citizen Science and Movements, showcasing the power of community engagement in conservation efforts.



Field visits added a practical dimension to the theoretical knowledge imparted during the workshop. Participants visited the SACON campus, where they had the opportunity to explore various laboratories focusing on ecotoxicology, wetlands, GIS, and national avian forensics. A visit to the Gass Forest Museum provided insights into India's rich natural heritage, while a field trip to Silent Valley National Park with Dr. P. Pramod and Dr Vidyadhar Atkore offered a deeper understanding of the intricate connections between species and ecosystems.

Forest Officers Training

60 trainees, each in two batches, visited SACON on 13 and 26 March 2024 for an exposure visit. Dr. M. Mahendiran explained SACON's research activities and also spoke about the various sanctuaries of TN. The trainees also visited the Ecotoxicology and National Avian Forensics Lab and learned the protocols for sample collection at the crime scene and the activities and functions of these labs.



Nature Awareness Programmes

During this quarter, around 300 students, along with their faculty, visited SACON. They were taken on a nature trail around the SACON campus, where they learnt about the surrounding forests, the impacts of invasives, environmental economics, and ways in which they can contribute to the conservation of nature. Dr. Rajah Jayapal briefly explained citizen science initiatives and how they can contribute to them. They also interacted with Dr. P. Pramod and Dr. S. Babu, engaging in lively discussions about wildlife and a career in this field. They were also introduced to the basics of bird identification and the common birds of Coimbatore. They were also taken on lab visits to our National Avian Forensics Laboratory and the Ecotoxicology Laboratory led by Dr. Ashutosh Singh and Dr. K. Nambirajan, respectively. The participants were also shown wildlife documentaries to enhance their knowledge of the issues faced by wildlife.



S.No	College Name	Date	No of Students & Staff
1	Sri GVG Visalakshi College, Udumalpet	31 January 2024	29 students and 2 staff
2	Dept. of Commerce, RVS College	05 February 2024	55 students, 3 staff
3	Dept. of Environmental Science, Bharathiar University, Coimbatore	06 February 2024	Around 25 students
4	Dept. of Commerce, RVS College	07 February 2024	47 students, 3 staff
5	American College	08 February 2024	13 students, 2 staff
6	Rotaract club of KCT College with Interact club of Veerasamy Mudaliar High School	13 February 2024	37 participants
7	Dept. of Commerce, RVS College	19 February 2024	46 students, 3 staff
8	Nehru Memorial College, Trichy	01 March 2024	19 students
9	ADM College, Nagapattinam	01 March 2024	47 students along with 2 staff

World Wetlands Day 2024

World Wetlands Day is celebrated annually on February 2nd to raise awareness about the importance of wetlands for people and the planet. It marks the date of adopting the Convention on Wetlands, known as the Ramsar Convention, on February 2, 1971, in Ramsar, Iran.

The theme for this year, "Wetlands and Human Well-being", highlights the importance of wetlands in supporting human life and overall well-being. Wetlands are vital in providing essential ecosystem services, including water purification, flood control, habitat for biodiversity, and recreational opportunities.

SACON EIACP PC RP celebrated World Wetlands Day 2024 by organising multiple awareness activities both online and offline in connection with "Mission LiFE" and "Save Wetlands Campaign", a People's movement to Celebrate, Revive and Rejuvenate Wetlands. The activities included an online quiz on wetland birds, a mobile van awareness campaign toured Coimbatore to raise awareness about wetlands, a "Wetland Bird Watching" event at Kumarasamy Lake, and disseminating awareness posters on social media. With over 3000 participants involved in these initiatives, the significance of wetlands in supporting biodiversity and human well-being was effectively communicated, encouraging individuals to take action to protect these valuable ecosystems.



National Exhibition cum Awareness Programme on Mission LiFE

SACON EIACP Programme Centre participated in the National Exhibition cum Awareness Programme on Mission LiFE, held at the India Gate in New Delhi on February 9th and 10th, 2024. The EIACP cell, MoEF&CC organised the event hosted by the EIACP Programme Centre at WWF, New Delhi.

The SACON EIACP team exhibited knowledge products, including information on wetlands and related species, cloth bags, seedball pen & pencil kits, and Mission LiFE awareness materials to engage visitors on environmental issues and promote sustainable living. The involvement of around 5000 visitors, including school children, teachers, college students, researchers, MoEF&CC officials, NGOs, and the general public, demonstrated the impact and outreach of the exhibition. The Mission LiFE game, specifically designed for sustainable lifestyle practices, successfully attracted the interest of school children, indicating a positive engagement with the younger generation.

International Day of Forests 2024

SACON EIACP commemorated International Day of Forests on March 21st at Panchayat Union Primary School in Jambukandy, Anaikatty. The team conducted an interactive session with school children, emphasising the importance of forests, sustainable forest management, and conservation efforts. Children showcased their art skills, depicting the role of forests in their lives. The team also distributed seedball pen & pencil kits to encourage tree plantation and cloth bags, promoting the "Say No to Plastics" campaign. A bilingual poster highlighting the day's theme was displayed, and the event concluded with a Mission LiFE pledge taken by the SACON EIACP team, school children, and teachers to adopt sustainable lifestyle practices.

World Water Day 2024

World Water Day, observed globally on March 22nd, reminds people of the critical importance of freshwater and the sustainable management of water resources. Established by the United Nations in 1993, World Water Day aims to raise awareness about the global water crisis and inspire action to address water-related challenges. Each year, World Water Day focuses on a specific theme related to water issues. The theme of World Water Day 2024 was 'Water for Peace'.

The SACON EIACP Programme Centre organised an awareness initiative at Panchayat Union Primary School in Panapally, Anaikatty, to commemorate the occasion. The event focused on educating children about water conservation to combat scarcity and preserve resources for future generations. The team briefed the Mission LiFE concept's seven themes, promoting sustainable practices for a better future. Also, a bilingual poster showcasing the theme was released within the school premises and on social media for wider dissemination. SACON researchers contributed by sharing stories and examples related to biodiversity and environmental conservation, engaging 25 students and two teachers in the event.



POPULAR ARTICLES

The Blackbuck Ballet: A Chronicle of Phulmati and Phulchand

By Avimanyu Mukherjee
avimanyu619@gmail.com
Volunteer, DST-SERB Python Project

News Letter JAN 2024 - MAR 2024

Upon the emerald expanse of India's plains, a creature of exquisite grace glides – the blackbuck, a living poem penned by nature itself, *Antilope cervicapra*. This antelope, of a stature both noble and medium, dons a coat as dark as a moonless night, its spiralling horns a testament to the land's vast culture. Known as *Kala Hiran*, or *Krishna Mriga*, it embodies the rich biodiversity that India cradles. The Blackbuck, a creature once abundant, now finds its name inscribed within the Red Data Book of the IUCN, a chronicle of species teetering on the precipice. Since the year 2003, it has been deemed "Near-Threatened," a status echoed by the international community in the listings of CITES (Appendix III) and India's Wild Life (Protection) Act, 1972 (Meena & Jaipal, 2020). Standing tall on limbs as slender as reeds swayed by the monsoon breeze, the Blackbuck is a sculptor's dream come true. Males, draped in a midnight coat, are the very essence of elegance, while their female companions are adorned in the hues of a fawn. Menon (2023) opines that the crown jewel lies upon the heads of the males – their horns, a marvel of spiralling grace, reaching a length of around 75 cm or 30 inches, which can rival a bard's lute. These are not mere ornaments but symbols of dominance, trophies earned in the grand contests of nature. However, a shadow falls upon this ebony jewel of Rajasthan and, indeed, all of India. Habitat loss, a relentless tide, threatens to engulf their haven. The delicate balance is broken – a natality rate of 12 fawns per mature female per year struggles to keep pace with a mortality rate that claims 26 individuals annually (Meena & Jaipal, 2020). Whispers of captive breeding programs now dance on the wind, a desperate attempt to preserve a creature of India's wild soul. Although some species can be very hard to breed, captive breeding has a high success rate. As per data, 19% of all mammals and 10% of all bird species have been bred in captivity (University of Michigan, 2024).

In the emerald embrace of Keoladeo National Park, Rajasthan, a chance encounter intertwined the lives of villagers and park authorities. Five blackbucks whispered secrets from a temple afar, becoming a beacon of hope for a dwindling population. A translocation program, a refuge woven, awaited them. Yet, fate, a fickle choreographer, claimed four lives, leaving a lone female to waltz with uncertainty. Undeterred, a spark of resilience flickered. A male blackbuck, before succumbing to the unknown, had sired a fawn within the female buck. This tiny miracle entered the world with a mother's fierce protectiveness shielding him. In the wild, she might have sought solace in tall grasses, but here, a quiet corner became their sanctuary.

Early Days: Protection and Nurturing

After a gestation period of around six months, a single fawn was born. The mother blackbuck, who was called "Phulmati" (Fig. 1) by the local people, with her heightened alertness, was incredibly protective from the very beginning. In the wild, she might choose a secluded spot with tall grass for birthing, but in a controlled environment, she found a quiet corner within the enclosure. The fawn, who was called "Phulchand" (Fig. 2), was precocial, meaning it could stand and walk shortly after birth. However, it remained incredibly vulnerable during its first few weeks. The mother used to stay close, constantly vigilant for predators, which could be other animals in the enclosure or even large birds. Caretakers in controlled environments minimised disturbances to abate stress on the mother and fawn. Nursing is a vital part of the bond. The fawn relied solely on its mother's milk for essential nutrients and antibodies to develop a robust immune system. The mother allowed the fawn to nurse frequently throughout the day, ensuring it received the nourishment needed to thrive.



Figure 1: The female Blackbuck "Phulmati"

Communication and Learning

While blackbucks are not known for complex vocalisations, mothers and fawns do communicate through subtle cues. The mother might nudge her fawn with her muzzle to guide it or make a soft bleating sound to keep it close. Fawns learn to recognize their mother's scent and calls, forming a strong attachment. As the fawn grew stronger, the mother began a crucial stage of teaching it survival skills. In a controlled environment, this involved learning to identify safe areas, recognizing the location of food and water sources and understanding basic predator avoidance behaviours. As I observed, the mother demonstrated these by grazing in specific areas or showing caution near unfamiliar objects.

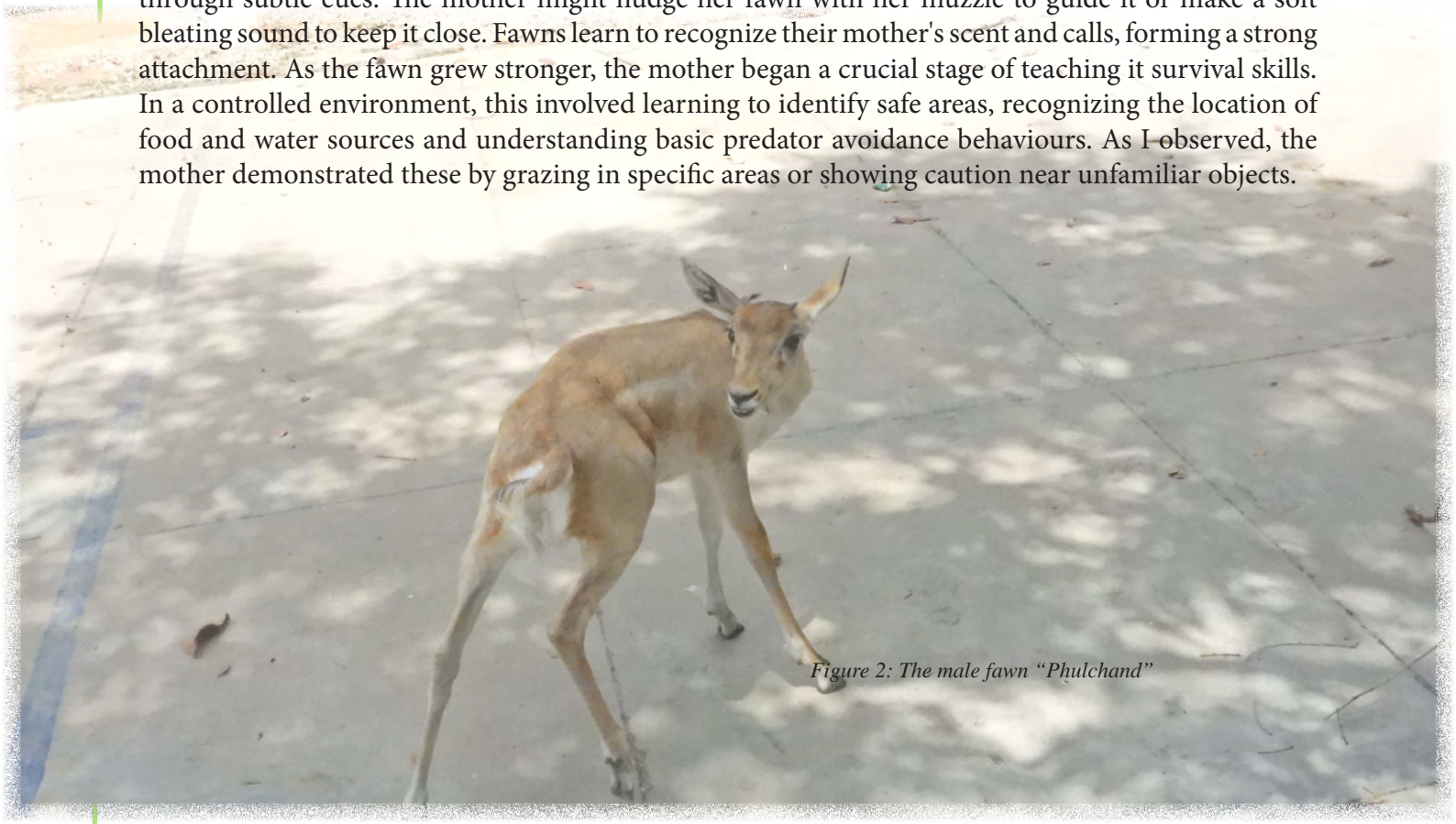


Figure 2: The male fawn "Phulchand"

A Gradual Shift: Independence and Integration

The mother-fawn bond weakened as the fawn matured. Around 3-4 months old, the fawn started to wean and became more independent in finding food. The mother might become less tolerant of constant nursing and encourage the fawn to explore its surroundings. This does not mean the bond disappears entirely. 'Phulchand' often remains close to his mother for several months, learning valuable social cues from observing the wild dynamics. 'Phulmati', in turn, offered occasional protection or reassurance.

One day, the inevitable pirouette would arrive. Phulchand would be ready to write his own chapter in the blackbuck story. But for now, their dance continued – a testament to the enduring power of a mother's love, even amidst the confines of a controlled environment. 'Phulmati' and 'Phulchand', a poignant duet, offered hope for the resilience of their species, a promise whispered on the wind.



Figure 3: Phulmati and Phulchand foraging on the nearby habitat

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Are White-bellied Herons Vanishing from Eastern Arunachal Pradesh?

By Francis A¹, Robia Kshetrimayum² and Vidyadhar Atkore³

¹ Junior Research Biologist-White-bellied Heron Project, SACON

Email: franckevin216@gmail.com

² Master-intern student, MIT-World Peace University, Pune

³ Scientist, Landscape Ecology Division

DST-SERB White-bellied Heron Project (2022-2025)

News Letter JAN 2024 - MAR 2024

The White-bellied Heron (WBH; Fig. 1) is a Critically Endangered bird (IUCN 2023), found in the Himalayan foothills of Bhutan and northeast India (Assam and Arunachal Pradesh), with some populations in Myanmar (BirdLife International 2024). These birds are rare, and it is estimated that only 50-249 individuals live worldwide (BirdLife International 2024). They are morphologically distinct from other Herons with slaty-grey plumage and a white underbelly, hence the name. They prefer high altitude pristine hill stream rivers as their habitat. They are piscivorous in their diet (Mondal and Maheshwaran 2021). These birds are subject to numerous anthropogenic pressures, mostly due to human activities. Extensive fishing, including illegal methods such as electrofishing and explosive fishing, sand/boulder mining, insect collection, hydropower dams, and hunting, are the major anthropogenic threats (Menziés et al 2020) that seem to drive the herons towards isolation in deep forests where human activity is minimal. The degree of such human activities also affects other biota lying within these river habitats.



Figure 1 White-bellied Heron (*Ardea insignis*) in fast flowing stream habitat. Photo: © Tshering Tobgay, RSPN

With the intention to study the WBH, its habitat, and its prey, we started our fieldwork at Namdapha Tiger Reserve (NTR) and Kamlang Tiger Reserve (KTR; Fig. 4, 5) of eastern Arunachal Pradesh in 2022. After spending a few months in the landscape by walking river transects, we had a sighting of this bird inside the NTR (along the Noa-Dhing river) in January 2024. Subsequently, in February 2024, a Lisu girl informed us seeing two individuals of WBH in NTR. Soon, we realized that these birds are very sensitive to human disturbances. As a result, they fly deep inside the core areas of PAs.

There are many ethnic tribes in these landscapes. Of them, we began interacting with three such communities – the Chakma, Lisu, (Fig. 2 & 3) and Mishmi. These communities are highly dependent upon natural resources (forest and fish), and of late, they rely more on agriculture. While staying with the Chakma community outside the NTR in Miao village, we began listening to various stories of these birds. Locally, WBH is called ‘*Raj-Phek*’. Locals say these birds are not easy to spot, but one must be patient. They are mostly seen along the hill streams and river channels full of boulders and cobbles. Lisu communities name this bird ‘*Ngwazeuh*’. They told us that WBH visits the river habitat in the early morning and later in the afternoon. They feed on fish, frogs, etc. The Miju Mishmi did not associate as strongly with the bird as the Chakma and Lisu did. For them, fish has a very special place in their culture. A wedding of the Miju Mishmi community will not be completed without the fish.



Figure 2. The Chakma Community of Namdapha Tiger Reserve



Figure 3. The Lisu Community of Namdapha Tiger Reserve

During our stay, we encountered anthropogenic threats that were harmful not only to these river birds but also to many native freshwater fishes! Of many, we encountered electrofishing activity by locals along the river near Miao town (Fig. 6 & 7). Locally, this method works with the batteries, which can be connected to two rods that create a current underwater that stuns/kills any organism within the proximity of the field of current. Explosive fishing is another harmful fishing method, sometimes referred to as blast fishing, is an illicit activity where schools of fish are stunned or killed for convenient collecting using dynamite or other explosives. Although this technique might benefit fishermen in the short run, it has disastrous long-term impacts on fish populations, freshwater ecosystems, and dependent local communities. This was observed in the non-protected areas of NTR regardless of the rules against using explosives for fishing, whereas electrofishing was common in both the reserves’ non-protected areas.

To prevent future habitat degradation and the eventual extinction of this magnificent bird, we must work to safeguard the WBH and its habitat. Considering this species’ potential revival, we need to raise awareness of the WBH’s vulnerability and significance. Stakeholder meetings, workshops and community meetings can significantly help achieve our motive. It is vital to conserve the fish diversity in the rivers which are exposed to illegal fishing methods, therefore we must advise against such fishing practices and enforce strict laws.

Such fishing methods can be nullified by replacing them with traditional fishing methods such as bamboo traps, cast nets, angling rods, and other indigenous methods that do not exploit the aquatic biota in large quantities, leaving room for expansion. Prioritising river conservation helps protect biodiversity and improve ecosystem services, which are essential for human well-being and adaptability to changing environmental conditions.



Figure 4. Kamlang River, Wakro, Lohit district (KTR)



Figure 5. Noa-Dihing River, Changlang district (NTR)



Figure 6. Electrofishing



Figure 7. Gathering dead fish after blasting

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Navigating the Quantum Sky: How Birds Use Cosmic Secrets to Find Their Way

By Gourav Sonawane
Phd Scholar & Project Volunteer, DST-SERB Python Project

Imagine soaring high above the Earth, journeying thousands of miles across continents, without a map or a GPS. It sounds like a scene from a superhero movie, but for migrating birds, it is just another day in the sky. These feathered adventurers possess an extraordinary navigational prowess that has baffled scientists for centuries. Moreover, now, researchers believe they have uncovered the surprising secret behind birds' incredible journeys: quantum physics.



Figure 1 Bar-headed Goose (*Anser indicus*)

Yes, you read that right: quantum physics, the mind-bending realm of tiny particles and bizarre phenomena. However, before we dive into the quantum magic of bird navigation, let us take a step back and marvel at the mystery of migration. Every year, millions of birds embark on epic migrations, travelling thousands of miles to breed, feed, or escape harsh weather. From the Arctic tern's marathon flight from the North Pole to the Antarctic to the monarch butterfly's incredible journey from Canada to Mexico, these aerial odysseys are nothing short of miraculous. But how do birds navigate such vast distances with pinpoint precision? For decades, scientists have searched for answers, studying everything from stars and landmarks to Earth's magnetic field. And now, a groundbreaking discovery suggests that birds might be tapping into the weird and wonderful world of quantum physics to guide their way. At the heart of this cosmic mystery are molecules called cryptochromes, nestled within the birds' eyes. When sunlight hits these molecules, it sets off a chain reaction that creates pairs of entangled electrons – particles that are mysteriously connected, no matter the distance between them.

It's like having a built-in quantum compass that's always pointing north. But here's where things get truly mind-blowing: these entangled electrons seem to be sensitive to Earth's magnetic field. By "seeing" the magnetic lines like a secret map of the sky, birds can orient themselves and navigate with

astounding accuracy. Now, I know what you're thinking – quantum physics and birds? It sounds like science fiction. However, the evidence is mounting, with studies showing that disrupting these cryptochrome molecules can throw off birds' navigational abilities. It's as if their internal compass goes haywire without its quantum guidance system. So, what does all this mean for us mere mortals? Well, aside from giving us a newfound appreciation for our feathered friends, understanding how birds navigate could have practical benefits for humans, too.



Figure 2- A gaggle of Graylag Goose (*Anser anser*)

Imagine a world where aeroplanes and spacecraft can navigate with the same precision as migrating birds, effortlessly soaring through the skies without getting lost. By studying how birds use quantum effects to find their way, scientists might unlock new technologies that revolutionize navigation systems, making them more reliable and resilient, even in the most remote corners of the Earth. In the end, the story of bird navigation reminds us of the wondrous mysteries that still await discovery in the natural world. From the depths of the ocean to the vastness of space, there are secrets waiting to be uncovered – secrets that could inspire us, challenge us, and, ultimately, bring us closer to understanding the awe-inspiring beauty of the universe.

So, the next time you see a flock of birds tracing patterns across the sky, take a moment to marvel at the cosmic dance unfolding before your eyes. Who knows what other wonders of the universe they might be tapping into as they navigate the quantum skies?

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How migrating birds use quantum effects to navigate by Peter J. Hore & H. Mouristein, 2024 *Scientific American*, A division of Springer nature America, Inc.

Exploring water quality in Coimbatore's Lakes: A rapid assessment

By Kanchan Choudhary¹, Merin Roy², Sri Sowmiya M³, Francis Anish⁴,
Bhawani Sabat⁵ and Vidyadhar Atkore⁶

¹PhD Scholar, ²Masters Intern, ³Volunteer, ⁴Junior Research Biologist,
⁵Phd Scholar, ⁶Scientist, Landscape Ecology Division
Email: kanchanchoudhary203@gmail.com

News Letter JAN 2024 - MAR 2024

Wetlands are areas of marsh, fen, peatland, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six meters (Ramsar Convention, 1971). They are often ecotones, transition zones between uplands and deepwater aquatic systems. Also, this transition position often leads to high biodiversity in wetlands, which “borrow” species from aquatic and terrestrial systems (Mitsch & Gosselink, 2007). Tropical wetlands support a range of ecosystem services and support the local livelihoods of many communities. Wetlands provide numerous essential ecosystem services such as fisheries, nutrient cycling, water supply, purification, and recreation. They are important carbon reservoirs; 20–30% of the world's soil carbon is found in wetlands, while only 5–8% of the world's land is composed of wetlands (Mitsch, 2013). Being one of the most biologically productive ecosystems on earth than rainforests and coral reefs (Mitra, 2003), they face anthropogenic threats such as pollution, exploitation, species invasion.

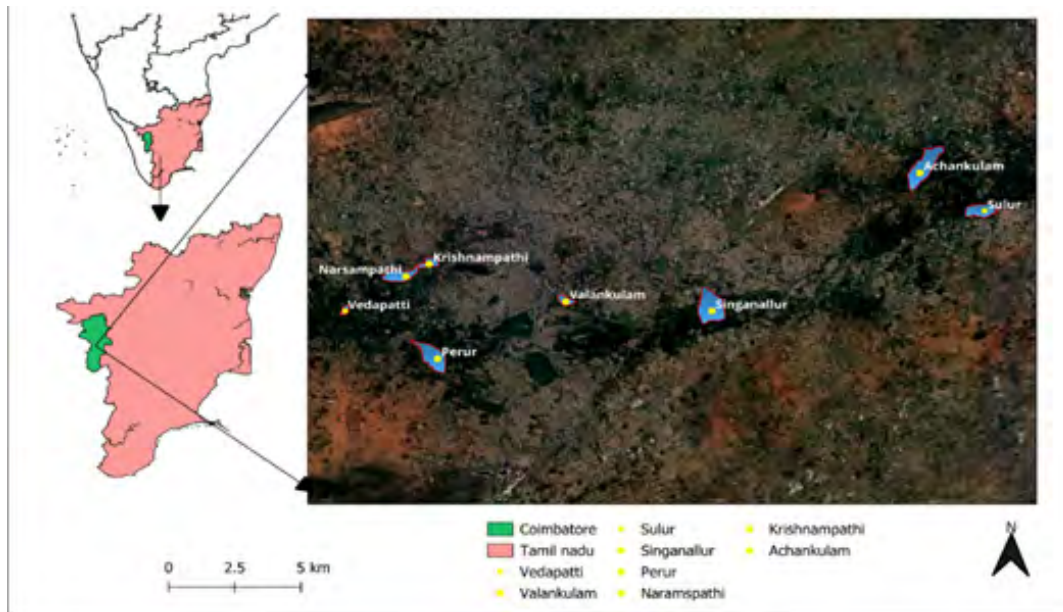


Figure 1. Lakes of Coimbatore surveyed. Map credit: Merin Roy

With the rising level of environmental pollution, especially water pollution in urban and semi-urban wetlands it becomes important to timely monitor the water quality of such lakes. The Noyyal River basin is a prominent and historical feature of lakes in Coimbatore and surrounding districts of Erode and Tirupur in Tamil Nadu state (Quadros, 2019). Water quality parameters such as temperature (T), electrical conductivity (EC), pH, total dissolved solids (TDS), and Salinity determine the life of many aquatic species. It can be easily measured by using a multiparameter water quality kit. By studying water quality parameters, we can understand the changes that occurred in wetlands over several years. Additionally, ecological insights will help formulate better and more comprehensive management strategies for rapidly degrading wetlands due to anthropogenic threats. A previous study classified most of the wetlands of Coimbatore as medium to bad category as per the standard specified by the National Sanitation Foundation Water Quality Index (NSFQWI) (Murli, 2020). To understand the

present state of wetlands, we surveyed eight lakes in Coimbatore on July 20, 2023, as part of the rapid assessment. Three different locations in each of the lakes were marked using GPS device, and water parameters were measured at these locations. The details of these lakes are as follows.

Krishnampathi Lake: This lake, situated in the Coimbatore district of Tamil Nadu state, has GPS coordinates of latitude 11°0'18.28" N and longitude 76°55'29.04"E, covering an area of 54.7 acres (0.22 sq. km) with a perimeter of 2.22 km.

Narsampathi Lake: Located at GPS coordinates latitude 11°0'0.94" N and longitude 76°55'0.38"E, covers an area of 123 acres (0.5 sq. km) and has a perimeter of 3.68 km.

Perur Lake: This lake is also known as Sundakkamuttur or Puttuvikki Lake. It is located at GPS coordinates latitude 10°58'9.66" N and longitude 76°55'41.86" E, covers an area of 196 acres (0.79 sq. km), and has a perimeter of 4.55 km.

Vedapatti Lake: This lake, also known as Pudukulam Lake, is situated in the Coimbatore district at GPS coordinates latitude 10°59'12.62" N and longitude 76°53'45.64" E, covers an area of 23.4 acres (0.1 sq. km) and has a perimeter of 1.43 km.

Singanallur Lake: This is a manmade lake/ tank to preserve water. Its GPS location is latitude 10°59'20.59" N and longitude 77° 1'21.88"E. The lake's area is 267 Acres/1.1 sq. km, and its Perimeter is 4.35 km.

Achankulam Lake: Located in the Coimbatore district at GPS coordinates latitude 11°2'32.88"N and longitude 77°5'37.27"E, covers an area of 266 acres (1.1 sq. km) and has a perimeter of 5.25 km.

Sulur lake: This lake, located at GPS coordinates latitude 11°1'43.09"N and longitude 77°6'58.66"E, covers an area of 134 acres (0.54 sq. km) and has a perimeter of 3.53 km.

Valankulam Ukkadam: a small reservoir in the Ukkadam area, is located at GPS coordinates latitude 10°59'30.10"N and longitude 76°58'19.80"E, covering an area of 42.1 acres (0.17 sq. km) with a perimeter of 1.85 km.

A multiparameter water quality kit (Hanna Inc.) was used to measure the key water parameters of these wetlands. The electric conductivity (EC) is expressed as micro-siemens per centimetre ($\mu\text{S cm}^{-1}$). According to Chapman (1996), EC is related to the concentrations of total dissolved solids (TDS) and major ions present in water for a given water body. The total suspended solids (TSS) and total dissolved solids (TDS) correspond to non-filterable and filterable residues, respectively. Salinity is measured in a practical salinity unit (psu), which is based on the properties of seawater conductivity (Chapman, 1996).



Figure 2. Water sampling in Achankulam lake. Photo: Kanchan Choudhary

The survey result revealed interesting insight. The water from most of the selected wetlands was colourless and odourless. However, the water sample from Ukkadam Lake had an objectionable odour. The average range of water temperature from all 8 selected lakes was 25.08 °C -29.29°C, pH (7.16 – 8.49), EC (153 µS/cm - 2571 µS/cm), TDS (76 ppm – 1286 ppm), Salinity (0.07 psu – 1.32 psu) (Table 1).



Figure 3. Glossy Ibis (*Plegadis falcinellus*) on water hyacinth (*Eichhornia crassipes*) in Achankulam. Photo: Kanchan Choudhary

Table 1. The range and average values of water parameters measured across lakes in Coimbatore.

Sr. No	Lake name	Temperature (°C)	pH	EC (µS/cm)	TDS (ppm)	Salinity (psu)
1	Krishnampathi	27.74-29.29 (28.37)	7.51-8.30 (8.01)	1737-1848 (1777)	868-924 (888)	0.87-0.93 (0.89)
2	Narsampathi	26.91-27.37 (27.20)	7.25-7.51 (7.35)	568-580 (574)	284-290 (287)	0.27-0.28 (0.28)
3	Perur	27.37-27.70 (27.41)	7.16-7.38 (7.28)	311-313 (312)	155-156 (155.67)	0.15-0.151 (0.15)
4	Vedapatti	27.76-28.13 (27.93)	7.57-7.7 (7.65)	153-157 (154.33)	76-78 (76.67)	0.07-0.071 (0.07)
5	Singanallur	25.08-25.39 (25.27)	8.02-8.17 (8.08)	1393-1394 (1393.67)	1110-1121 (1115.67)	1.13-1.15 (1.14)
6	Achankulam	26.22-26.75 (26.42)	7.75-8.49 (8.14)	2550-2571 (2565)	1123-1286 (1231)	1.31-1.32 (1.32)
7	Sulur	25.98-26.39 (26.21)	8.01-8.14 (8.11)	1397-1398 (1397.67)	787-933 (884)	0.94-0.941 (0.94)
8	Ukkadam Valankulam	27.60-27.91 (27.73)	8.35-8.4 (8.38)	1366-1370 (1365.67)	680-685 (682.67)	0.68-0.681 (0.68)

Various wetland birds were observed in these lakes. These include spot-billed pelican (*Pelecanus philippensis*), painted stork (*Mycteria leucocephala*), purple heron (*Ardea purpurea*), darter (*Anhinga melanogaster*), pond heron (*Ardeola grayii*), glossy Ibis (*Plegadis falcinellus*), little egret (*Egretta garzetta*), Indian cormorants (*Phalacrocorax fuscicollis*), common kingfisher (*Alcedo atthis*), swamp hen (*Porphyrio poliocephalus*), spot-bellied duck (*Anas poecilorhyncha*), Eurasian coot (*Fulica atra*) are a common sight. Freshwater fishes like rohu (*Labeo rohita*), catla (*Catla catla*), pool barb (*Puntius sophore*), tilapia (*Oreochromis niloticus*), gambusia (*Gambusia affinis*), mirgal (*Cirrhinus cirrhosus*), boopis razorbelly minnow (*Salmostoma boopis*), rosy barb (*Pethia conchonius*), great snakehead (*Channa marulius*) were observed (Jayaram, 2010) through opportunistic fishermen’s catch in some of these wetlands.

Based on the rapid survey, the lakes of Coimbatore city are under high pressure from pollution, fishing, and the spread of invasives. Maintaining high water quality standards is essential to ensure the safety and well-being of the lake biodiversity and the dependent human population.



Figure 5. Nile Tilapia (*Oreochromis niloticus*)



Figure 3. Snake head (*Channa marulius*)



Figure 4. Pool Barb (*Pethia conchonius*)

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सालिम अली पक्षीविज्ञान एवं प्रकृति विज्ञान केंद्र
Sálim Ali Centre for Ornithology and Natural History
South India centre of Wildlife Institute of India,
Ministry of Environment, Forest and Climate Change, Govt. of India
आनैकट्टीए कोयम्बत्तूर – 641 108 तमिल नाडु इंडिया
Anaikatty (Post), Coimbatore – 641 108 Tamil Nadu, INDIA

Tele: +91 - 422-2203100, 109; Fax: +91- 422 - 2203132
Website: www.sacon.in
Email: salimali@sacon.in, salimalicentre@gmail.com

Editorial Board

Aditi Mukherjee, Manchi Shirish S., Vidyadhar Atkore & R. Jayakumar
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