ZOO'S PRINT

Communicating science for conservation

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Cover photo: Cat Skink. © Swaathi Na.

FRONICLES AT BISLE!

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THESE SOUNDS KEPT RUNNING IN THE BACKGROUND OF MY MIND AS I WAS TRAVELING BACK TO COIMBATORE FROM BISLE. IT WAS A 2-1/2 DAY WORKSHOP, ON EVERYTHING ABOUT FROGS, HELD AT A COZY COTTAGE TUCKED AMIDST THE DENSE GREENS, MISTY MOUNTAINS, AND THE CHILLY WINDS OF THE BISLE GHATS. THERE WERE SEVENTEEN OF US - THE AMATEUR WILDLIFERS, EACH WITH THEIR OWN PURPOSE TO LEARN AND TO EXPLORE THE RIBBITY RIBBIT LIFE OF FROGS. SOME WANTED TO BE ABLE TO IDENTIFY THE FROGS & UNDERSTAND THEIR BEHAVIOURS, SOME WANTED AN EXPERIENCE TO BE AMONGST EXPERTS & WITNESS THEIR LOVE FOR THESE FUNKY CREATURES, AND SOME, TIRED OF THEIR OFFICE CONCRETE, WANTED TO SOIL THEIR BOOTS & FEEL THE WALK IN A FOREST. THE WORKSHOP WAS A MIX OF WALKS & TALKS WITH THE FROG EXPERTS. I SHARE A FEW OF THE INTERESTING TIDBITS, STORIES, INTERACTIONS AND EXPERIENCES WE HAD AT THE WORKSHOP HERE.

MAKING FROG ORIGAMI! TAXONOMY OF FROGS MADE SIMPLE! WE GROUPED THESE FROG ORIGAMI BY THEIR COLOR, SIZE, PATTERNS, AND SHAPE.

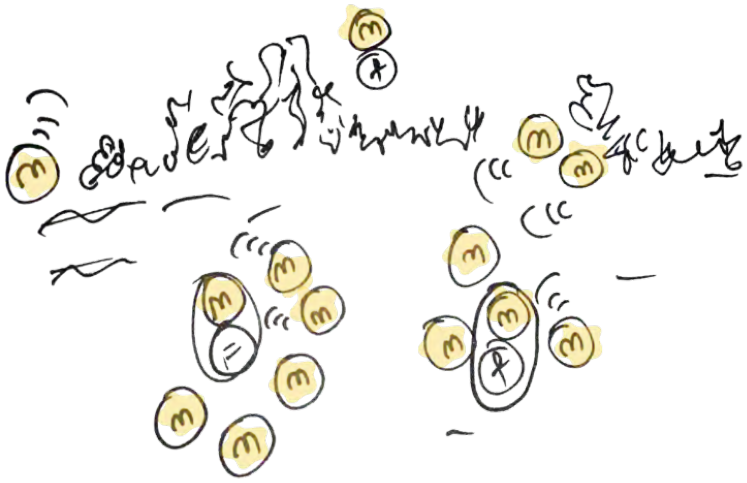
DR. K.V. GURURAJA'S (KVG) AWESOME FROG TOY COLLECTIONS! CHECK THEM OUT, WHEN YOU MEET HIM!

HEAVY RAINS, COLD AIR, DENSE PLANTS, CRAZY SOUNDS, ABSOLUTE DARKNESS. TO LOCATE A FROG IN THIS CHAOS WAS AN ABSOLUTE ADVENTURE!

DURING OUR WALKS, WE RECORDED PHYSICAL FEATURES OF THE FROGS, HABITAT IT WAS FOUND IN, CALL PATTERNS, INTERACTIONS WITH OTHER WILDLIFE AND SO ON. SESSION BY DR. VIDISHA KULKARNI ON HOW TO DOCUMENT OUR OBSERVATIONS THROUGH SKETCHES AND SOME KEY CHARACTERS NECESSARY TO IDENTIFY FROGS AT FAMILY LEVEL, HELPED US DIRECT OUR OBSERVATIONS BETTER.

MATING MATTERS~

During our morning survey, we came across a small puddle and the surrounding bush full of yellow turned male toads. Upon careful look, one could see a female underneath, non-yellow & brown in colour. This is called the amplexus position where the male holds the female firmly from behind, while mating. We spent a good 1-2 hours observing these guys and their ongoing dynamics. Oh toad, the stuff we observed! These guys can gyrate one's mind!

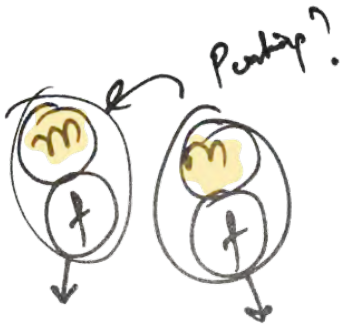


There were mating pairs inside the puddle and in the bushes. Some individual males were in the bushes, constantly calling out & some were flocking around the pairs, trying to push the mating males off the female by physical push while also calling.

The mating males in the puddle had more competition in the puddle than the ones in the bush due to the number of males waiting to mount the female. So, some would mate in the bushes to avoid the hassle of fighting with a gang of males. But a female needs water at some point. So, they will have to make it to puddle sooner or later. And once they do, voila! The battle is on! They are surrounded by individual males in no time!

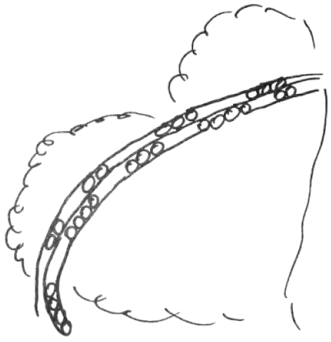
When the unpaired males were stressing the mating males, the mating male would make a *Tick Tick Tiuuu* sound signalling them to not to come near. KVG brought this observation to our notice. Apparently, frogs don't just have a mating call, but also alarming calls & other call types that we know nothing of!

I saw a mating male pushing the mating male of another pair from its hind legs. Why would it do that? Is it to ensure that the other non-mating males don't surround them too? Now I don't remember if they were surrounded by any unpaired males. So, whether it did it actively or not, only long careful observations might answer.



I saw a male that had mounted on top of the mating male that was not only aggressively trying to lift the mating male off the female but was also constantly calling out.

Around the end of the mating, the yellow colour of the male toad would eventually fade. Now, why do they turn yellow before mating?

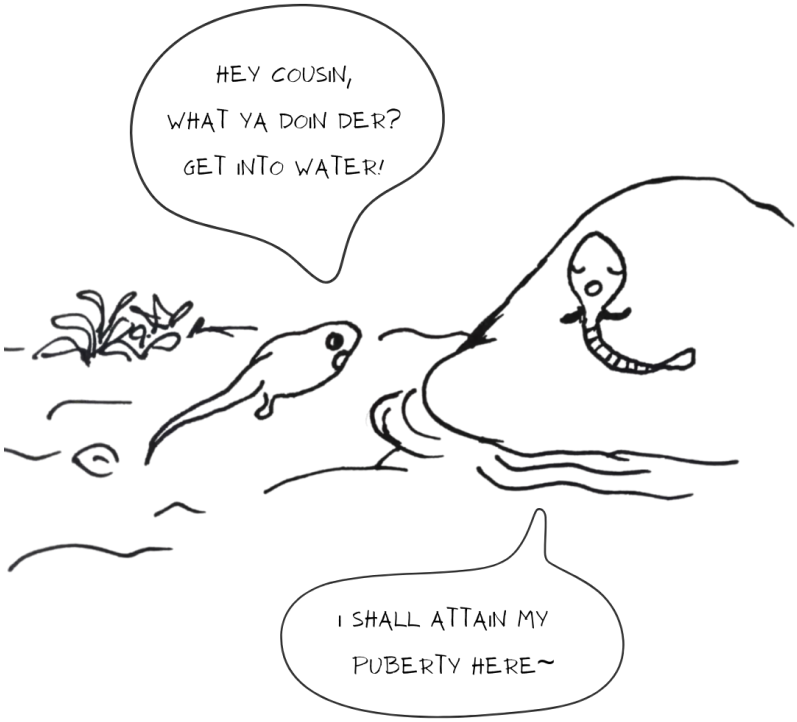


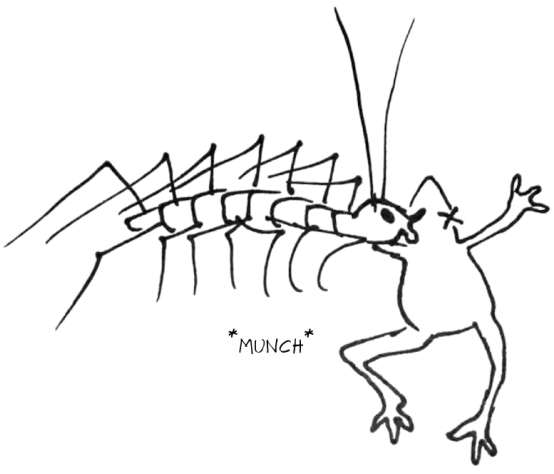
The most beautiful thing we ever saw was the strings of eggs laid by the female. The eggs of frogs, fishes are anamniotes. Meaning, they have no shell and they require constant oxygen from surroundings. Hence the eggs are always laid inside a water/moisty area. This also explains why frogs are bioindicators. Small fluctuations in chemical composition & temperature of the water can hugely impact their survival.

SOME COOL FROGGO FACTS/STORIES

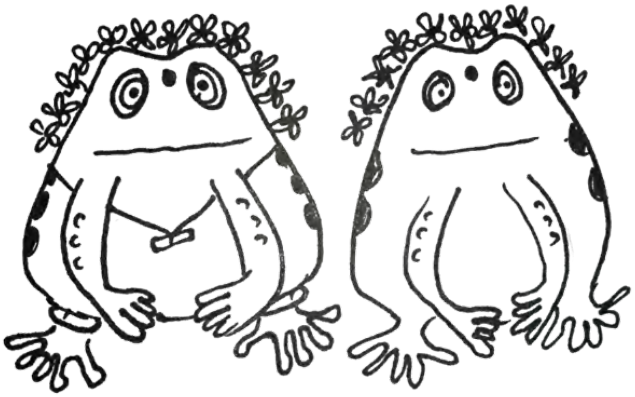
PURPLE FROG NASIKABATRACHUS SAHYADRENSIS, COMES OUT FOR 15 DAYS, ONLY DURING MONSOONS IN A YEAR. WHILE THEY ARE QUITE CHALLENGING TO SPOT, ONE CAN HEAR THEIR CALLS COMING FROM UNDERGROUND! THEY WERE FIRST RECORDED FROM KERALA AND ARE ENDEMIC TO WESTERN GHATS OF INDIA.

SOME TADPOLES ARE TERRESTRIAL! THEY LIVE ON ROCKS AND LEAVES TILL THEY BECOME ADULTS! LIKE SOUTHERN INDIAN FROG INDIRANA SEMIPALMATA!



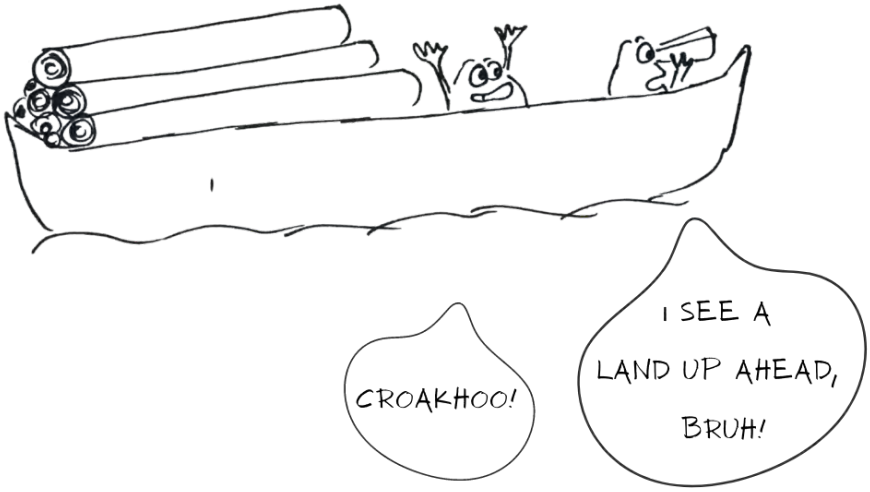


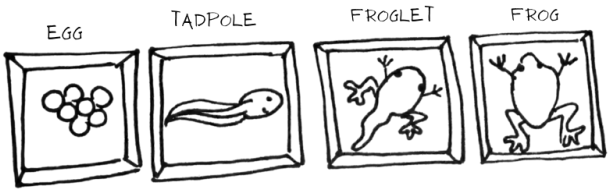
DURING THE PREVIOUS BISLE FROGWATCH, PEOPLE SAW HOUSE CENTIPEDE - SCUTIGERA SPP. FEEDING ON A FROGLET! WHETHER IT WAS SCAVENGING A DEAD ONE OR PREDATING A LIVE ONE, REMAINS A MYSTERY, UNTIL MORE SUCH OBSERVATIONS CAN BE MADE.



KAPPE MADUVE (FROG'S MARRIAGE)! AT UDUPI, KARNATAKA, PEOPLE GET TWO FROGS MARRIED HOPING THAT WOULD BRING RAINS. WHILE A FEW CONSERVATIONISTS RECKON THAT THIS CULTURAL BELIEF HAS PROTECTED THE WETLAND OF THESE FROGS FOR MANY YEARS, A FEW FEEL UPSET WITH THE IRRATIONALITY AND IGNORED ANIMAL WELFARE OF SUCH BELIEFS.

MANGALURU NARROW MOUTHED FROG MICROHYLA KODIAL IS FOUND ONLY IN MANGALORE, KARNATAKA, TILL DATE. IT HAS NO CLOSEST RELATIVES IN INDIA. SO, IT IS SPECULATED THAT THESE FROGS CAME HERE DURING TIMBER SHIPMENTS TO INDIA FROM SOUTHEASTERN ASIA.





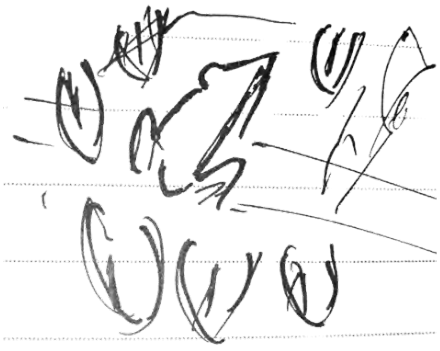
THERE ARE A FEW FROG SPECIES THAT HAVE NO TADPOLE, FROGLET STAGES. THE FROGS THAT HATCH OUT OF THE EGGS ARE ALREADY ADULTS. ALL THE GROWTH HAPPENS INSIDE THE EGG. FOR EXAMPLE, CHALAZODES BUBBLE NEST FROG RAORCHESTES CHALAZODES.

ASHOKAVANA

A WILDLIFE RESEARCHER'S HAVEN!

THIS PLACE ENCOURAGES ANY WILDLIFE ENTHUSIASTS TO STUDY THE LANDSCAPE, SPECIES, HABITAT OF BISLE BY GIVING THEM A PLACE TO STAY. THIS IS NOT A RECREATIONAL SPACE FOR PEOPLE TO BRING THEIR FAMILY/ FRIENDS TO HANG OUT, BUT A LEARNING SPACE TO EXPLORE BIODIVERSITY. IF INTERESTED IN DOING A STUDY, CONTACT THE BISLE FROGWATCH TEAM.

THE BISLE FROG WATCH TEAM HAS BEEN DOING THIS WORKSHOP FOR THE PAST 11 YEARS NOW. RESEARCH ON BIOACOUSTICS, BIOGEOGRAPHY, NATURAL HISTORY, TAXONOMY; EDUCATION & MANY MORE ASPECTS OF FROG CONSERVATION WORKS ARE BEING EXPLORED BY THE TEAM MEMBERS. THE WORKSHOP SET THE ZEAL TO WORK ON CONSERVING THE SPECIES MUCH STRONGER IN ALL OF US.



FROGGING IS NOTHING BUT TAKING A SNEAKY PEEK INTO FROG'S LIVES! :[]

ACKNOWLEDGEMENTS: I THANK THE BISLE FROG WATCH TEAM FOR GIVING ME THE OPPORTUNITY TO LEARN FROM THEM; PAYAL MOLUR, FOR IMBIBING DOCUMENTATION SKILLS IN ME; DR. SANJAY MOLUR, FOR MOTIVATING ME TO WRITE ABOUT THIS EXPERIENCE.

WRITING & ILLUSTRATIONS BY
USHA RAVINDRA
WILDLIFE CONSERVATIONIST
ZOO OUTREACH ORGANISATION
11.0415757, 76.9885876, 400 M
USHA@ZOOREACH.ORG

Getting high on THC '23 in Honey Valley

Hidden snugly in the midst of the emerald carpets of coffee plantations, surrounded by the misty forest of Coorg, with meandering streams bubbling with laughter to the secrets murmured by the waterfalls lies the beautiful Honey Valley homestay. With its diverse array of moths, butterflies, spiders, frogs, leeches that give love bites, and a zillion other wildlife, the whole place is a delight to any nature lover. It is at this wonderful place that the first of three workshops as part of the Tropical Herpetology Course was conducted from the 11 to 13 August 2023.

Headed by herpetologists Vivek Philip Cyriac, Shubham Prashanth Soni, and naturalist Amatya Sharma, the first three-day workshop was focused on introducing the diversity and distribution of herpetofauna. Participants from diverse fields took part in the course. The juvenile Beddome's Keelback which we found right outside our accommodation gave the workshop an exciting start. Vivek started off the course by introducing herpetology with a lively presentation giving global perspectives of the distribution and diversity of amphibians with interesting stories about the evolutionary history weaved in through

THC_23 team. © Anonymous.

Anuj talking about geographic ranges and distribution maps. © Shubham Soni.

Cat Skink. © Swaathi Na.

THC_23 team looking at a Ponmudi bush frog. © Priyank Shah.

Cnemaspis wynadensis. © Swaathi Na.

Juvenile Beddomes Keelback. © Nisha BG.

Kodagu Striped Caecilian. © Nisha BG.

it. He also gave a brief overview of the morphology and identification features of the broad families of frogs in India correlating them with their ecology. This was followed by Shubham's interactive session on the various methods of documentation and the importance of documentation. He highlighted the numerous ways in which this data can be used for research and analysis if documented properly. He also stressed about the ethics that should be maintained during the process.

After lunch, we did a fun activity where we analysed a few specimens of frogs to try and guess their preferred habitat and family-level identification by looking at their morphological characters. As the sun set over the horizon and the cacophony of cicadas slowly started dying out, the chorus of frogs began. Armed with the knowledge we had gained from morning and having had enough of seeing these beautiful creatures in pictures, we stepped into the darkness, filled with anticipation to see them first-hand. Inspired by hearing a few snippets of the talks,

View from Honey Valley homestay. © Shubham Soni.

a few other people who had come on a vacation to the homestay joined us for herping. The night rewarded us with Wayanad Night Frog ***Nyctibatrachus grandis***, ***N. minimus***, Malabar Torrent Toad ***Blaira ornata***, Elegant Dancing Frog ***Micrixalus elegans***, Cricket Frog ***Minervarya*** sp., Skittering Frog ***Euphlyctis cyanophylctis***, various species of ***Indosylvirana***, several species of bush frogs, ***Monilisaurus*** sp., shieldtail snake ***Uropeltis*** sp., and a Malabar Vine Snake ***Ahaetulla borealis***.


Mrunali Raut presenting her thesis work. © Shubham Soni.

The second day started with the melodious note of the Malabar Whistling Thrush and Vivek giving a global perspective about reptiles. The infectious enthusiasm he has when he speaks about snakes will make anyone fall in love with these amazing creatures. He spoke about reptile diversity, their distribution, morphology, and scale counting. He showed us examples of the important role that scalation plays in differentiating between two species.


Looking at the morphology of the specimen to try and identify the species. © Priyank Shah.

The fascinating world of skinks was introduced to us by Aniruddha Datta-Roy. The talk was given not on the basis of the diversity but on their biology which ensured we started admiring these beautiful creatures from a whole new lens. One of the interesting facts he told us was that some skinks have this amazing ability to be both gravid and pregnant, which means they can lay eggs and give birth to live young ones simultaneously.

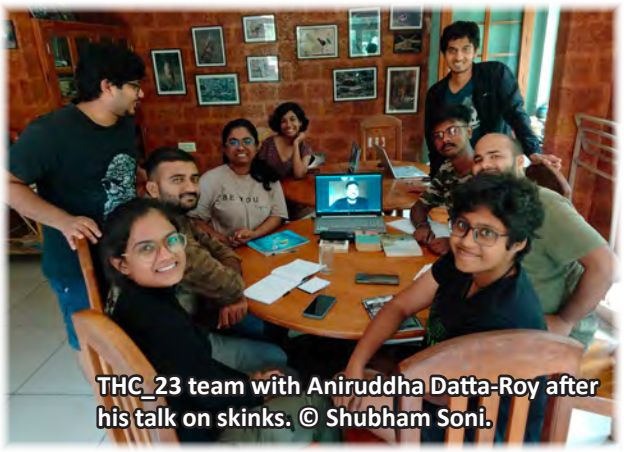

Resting near the stream after a herp walk. © Nisha BG.


Shubham talking about documentation and ethics in documentation. © Nisha BG.


Striped Coral Snake. © Lohit, Y.T.


Searching for wildlife during the herpwalk. © Priyank Shah.

Travancore Wolf Snake. © Nisha BG.



THC_23 team with Aniruddha Datta-Roy after his talk on skinks. © Shubham Soni.

It was impossible for us to stay inside after listening to Roy's talk about skinks. The weather outside was sunny and just perfect for sighting skinks. And sure enough, we saw two species of skinks, Bronze Grass Skink ***Eutrophis macularia***, a cat skink ***Ristella*** sp., and other reptiles like Wynad Day Gecko ***Cnemaspis wynadensis***, Beddome's Keelback ***Amphiesma beddomei***, and a Striped Coral Snake ***Calliophis nigrescens***. The genus ***Ristella*** gets its name of cat skink because of its rectractable claws. The skinks were photographed at different angles, which we later used to learn about dichotomous keys and how to identify a species using them. Our initial plan was to go to the nearest shola patch, but we got sidetracked by these amazing finds and ended up near a waterfall.

After this refreshing walk, we gathered back to hear about the work of Anuj Shinde, a master's student from Tel Aviv University in Israel, and Mrunali Raut, a postgraduate from Mumbai University. Anuj spoke about geographic ranges and distribution maps and why we should think twice before relying on any distribution map. He also showcased how much work can be done by utilizing the secondary data obtained from citizen science initiatives. He also encouraged all of us to start recording our observations in other citizen science initiatives such as the Shieldtail Mapping Project, IBP (Indian

Vivek explaning the concept of species delimitation. © Shubham Soni.

Biodiversity Portal), iNaturalist, etc. Mrunali presented her thesis – oviposition site preference and hatching success of the Indian Golden-backed Frog ***Indosylvirana indica***. It was fascinating to hear about the hard work that was put in from her side and that you don't need fancy, expensive equipment to design and implement a good research project. Amatya Sharma's initial observation of the egg clutches played a vital role in shaping the research which highlights the significance of a collaboration between naturalists and wildlife researchers. The second night of herping proved to be just as fruitful as the first night. We got to see a Kodagu Striped Caecilian ***Ichthyophis kodaguensis***, a Travancore Wolf Snake ***Lycodon travancoricus***, and several frog species.

The final day ended with an intriguing talk on species delimitation, the various different species concepts, and the problems with overestimation and underestimation of species diversity. Vivek also spoke about the rules of nomenclature, the process behind describing a new species, and the problems behind contemporary species delimitation.

Apart from the actual course content, and seeing approximately 30 species of herps, the whole experience turned out fabulous because of the passion the entire group had for herpetology. It was three full days of herp talks, herp walks, and even gossiping sessions were productive because it was about herp taxonomy. The workshop was made more special because of the extra care that the mentors took to make sure we understood everything, answered all our questions with patience, and followed up with their word by sending extra reference materials and fun reads on herpetology.

Acknowledgments
I thank Suresh uncle, his wife, and the entire Honey Valley homestay team for their passionate efforts in maintaining the place as a haven for wildlife and nature lovers. I am thankful to the organisers, Vivek Cyriac, Shubham Soni, and Amatya Sharma for conducting this wonderful workshop, for introducing me to Honey Valley, and for setting my base in herpetology right. I am grateful to Sanjay Molur who pushed me to write about the whole experience. I credit Shubham Soni for coming up with the hashtag, "High on THC'23". I thank Anuj Shinde, Chinmay C. Maliye, Dhananjay Kumar, Jyotsna Nag, Lohit Y.T., Mrunali Raut, and Nisha B.G., for the interactions I had with them and for making this a memorable experience.

Tropical Herpetology Course

It is a comprehensive course on amphibian and reptile biology which includes field visits to three different places in the Western Ghats, research talks by experts, hands-on activities, and lots more. The course has three main mentors – Vivek Philip Cyriac, an evolutionary ecologist and herpetologist who has predominantly worked on uropeltid snakes, Shubham Prashant Soni, an ecologist and herpetologist interested in understanding behavioral processes that underline the evolution of herpetofauna, and Amatya Sharma, a naturalist & wildlife photographer interested in documenting reptile and amphibian behaviors.

In 2023, the course has been split into three individual workshops.

Workshop 1 – Honey Valley Homestay, Coorg (11–13 August) – Diversity & Distribution.
Workshop 2 – The Niche, Sirsi (8–10 September) – Natural History & Field Surveys.
Workshop 3 – Chikkamagaluru (location & date TBA) – Behaviour & Publishing.

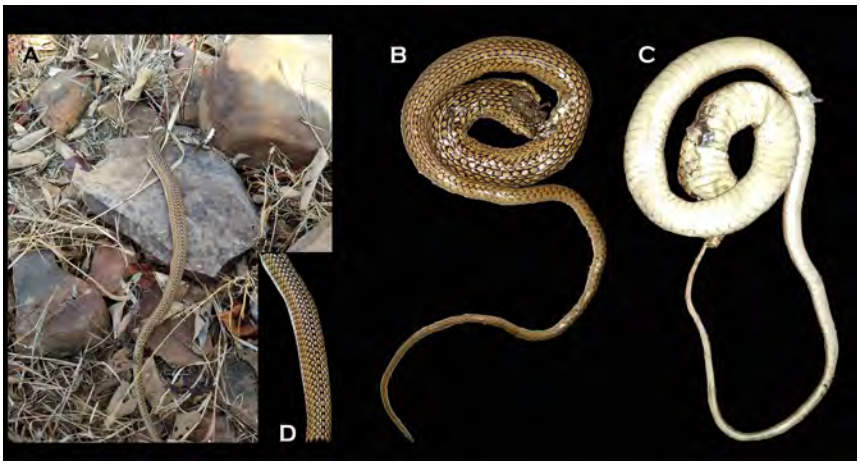
Swaathi, NA., Zoo Outreach Organisation, Coimbatore.

#238
21 August 2023

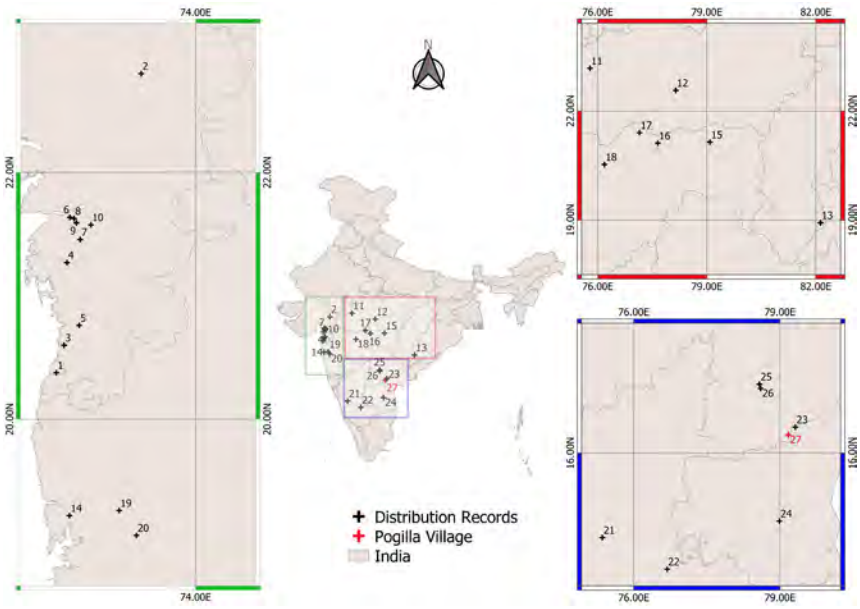
Report of the Stout Sand Snake in Amarabad Range of Telangana, India

The snake genus *Psammophis* comprises of four species in India (Whitaker & Captain, 2004) viz., *P. leithii* (Gunther, 1869), *P. condanurus* (Merren, 1820), *P. longifrons* (Boulenger, 1890), and *P. schokri* (Forskal, 1775). The Stout Sand Snake *Psammophis longifrons*, originally described by Boulenger in 1890 is a rarely encountered endemic snake from peninsular India. The type locality of the species is 'Cuddapah Hills', Andhra Pradesh (Smith 1943; Sharma 2000).

On 29 January 2018, during a tiger estimation survey in Pogilla Village, in the Eastern Ghats of Telangana (16.3656N & 79.1731E, 213 m), we observed a mongoose feeding on a snake in the forest area. The anterior part of the specimen was chewed and



A kill of *Psammophis longifrons* from Pogilla Village, Amarabad range of Telangana, India. © Ch.M.D. Tarun.



Published distribution records of *Psammophis longifrons* from the Indian sub-continent. The numbering corresponds to the numbers in the first column of Table 1.

Table 1. Documented records of *Psammophis longifrons* from India.

	State	Location	Reference
1	Gujarat	Daman Ganga	Smith 1943; Whitaker & Captain 2004
2		Panch Mahals	Smith 1943; Whitaker & Captain 2004
3		Valsad	Smith 1943; Whitaker & Captain 2004; Vyas & Patel 2013
4		Kamrej, Surat District	Vyas 1987
5		Chikhli, Navsari District	Vyas & Patel 2013
6		Kadakia College	Trivedi & Mody 2018
7		Asharma, Surat	Trivedi & Mody 2018
8		Ankleshwar, Bharuch	Trivedi & Mody 2018
9		Sai Vatika, Bharuch	Trivedi & Mody 2018
10		Nilkanthnagar, Valia, Bharuch	Trivedi & Mody 2018
11	Madhya Pradesh	Ujjain	Ingle 2009
12		Suplai, Hoshangabad	Manna 2022
13	Chhattisgarh	Bastar District	Naidu 2022
14	Maharashtra	Thane	Dreckmann1892
15		Nagpur	Smith 1943; Whitaker & Captain 2004
16		Amravati	Nande & Deshmukh 2007; Pal & Mirza 2009; Joshi 2011
17		Melghat	Nande & Deshmukh 2007; Joshi 2011
18		Buldhana	Nande & Deshmukh 2007; Pal & Mirza 2009; Joshi 2011
19		Murbad	Vishe 2013
20		Bhimashankar	Mane 2017
21	Karnataka	Shikaripur, Shimoga District	Premkumar & Sharma 2017
22		Chinkara Wildlife Sanctuary, Bukkapatna, Tumkur District	Kalki & Gowda 2021
23	Andhra Pradesh	Bhramandapuram tanda (Jogutanda), Vijayapuri south, Macherla Mandal, Guntur District Vijayapuri south, Macherla Mandal	Hussain et al. 2020; Ganesh & Guptha 2021
24		Cuddapah Hills, Kadapa (type locality)	Boulenger 1890
25	Telangana	Buddha Nagar, Boduppal	Visvanathan et al. 2017
26		Hayathnagar	Visvanathan et al. 2017
27		Pogilla Village	Present report 2023

taken away by the mongoose. We took photographs of the remaining posterior portion of the snake specimen for identification of the species. Judging by the presence of black edges on the dorsal scales, this specimen was initially identified as Stout Sand Snake *Psammophis longifrons*. Scale counts of posterior part of the specimen were carried out. The ventral scales were rounded and anal plate paired. Sub caudal 91; paired. Dorsal scales were counted on middle and posterior part with 17:13 rows. The individual was a male, thus identified

based on the presence of hemipenis. All the key diagnostic characters agreed with those given in Smith (1943). The species identity was also confirmed from the photograph by an expert biologist Zeeshan A. Mirza.

The immediate habitat in which the snake specimen predated by mongoose was sighted was dry deciduous forest with rocky patches near the river Dindi. This species is found mainly in dry forest, agricultural field, and rocky terrain (indiabiodiversity.org). As per the Wildlife Protection Act, 1972, this species comes under Schedule II and IUCN Red List status of the species is 'Least Concern'.

Within India, the distribution of this *Psammophiidae* snakes is known from seven states, viz., Maharashtra, Gujarat, Andhra Pradesh, Madhya Pradesh, Karnataka, Chhattisgarh, and Telangana (Table 1). This record at Pogilla Village, Nalgonda District is the third record for Telangana State. This village is located in the Eastern Ghats. The nearest record from Vijayapuri south, Macherla (No. 23 in Table 1) is located approximately 20 km to the east, which comes under Andhra Pradesh State. Previous two records from the Telangana State were from Boduppal and Hayathnagar (Nos. 25 and 26, respectively, in Table 1) situated 164 km and 150 km away from the present record (Visvanathan et al. 2017).

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Ch.M. Deepak Tarun[1], Mahesh Bilaskar[2], Anuj Raina[3] & Ginkuntla Saikiran[4]

[1] 9-109/7, Gayatrinagar Colony, Boduppal, Hyderabad, Telangana 500092, India.
[2] Department of Environmental Sciences, Savitribai Phule Pune University, Ganeshkhind Road, Pune, Maharashtra, 411007, India.
[3] M-1203, Godrej Tivoli, Godrej Garden city, Jagatpur, Ahmedabad, Gujarat 382470, India.
[4] Department of Plant Science, Central University of Kerala, Kasaragod, Kerala 671316, India.
Email: [2]rishi08sep@gmail.com (corresponding author)

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Observation of an injured Terai Tree Frog - vulnerability to survival

An injured Terai Tree Frog *Polypedates teraiensis* (Dubois, 1987) was encountered during the herpetofaunal survey in the Itanagar Wildlife Sanctuary, Papum Pare District, Arunachal Pradesh on 16 June 2022 at 1815 h. Malformation in toads and frogs are quite common in Mizoram population (Siammawii et al. 2021a,b,c; Lalremsanga 2022). Such injury may be due to inter-specific or prey-predator relationships or may be due to attempt of predation by possible snake species like *Fowlea piscator* (Schneider, 1799) or may be other snake species. This document reports on such abnormalities in frogs for the first time from Arunachal Pradesh and also documents the occurrence of *Polypedates teraiensis* in regional level.

Globally, genus *Polypedates* has 25 valid species, of which 13 species are found in India (Frost 2023). Terai Tree Frogs are nocturnal in habit and it prefers moist bushes, and shrubs around the water pools. It breeds in stagnant water or in storage tanks and forms

***Polypedates teraiensis* with forelimb injury from Itanagar Wildlife Sanctuary. © Kirty Prosad Nath.**

a foam nest (Ahmed et al. 2009). *Polypedates teraiensis* population of northeast India was previously identified as *P. leucomystax* (Gogoi & Sengupta 2017). It is distributed from eastern Nepal and Bhutan to northeastern India. While in India, *Polypedates teraiensis* is distributed in West Bengal, Meghalaya, Assam, Arunachal Pradesh, Nagaland, Manipur, Sikkim, Gujarat, and Madhya Pradesh.

The specimen has been identified on the basis of key features listed by Chanda (2002), Ahmed et al. (2009), and Mathew & Sen (2010) such as dorsally brown with four to six longitudinal lines, head large, skin between eyes bony and ossified, tympanum large and distinct, limbs long, all digits with large discs, fingers free, toes fully webbed.

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Kirty Prosad Nath[1], Britijoy Khersa[2], Yomto Mayi[3], L. Seitinmang Khongsai[4], Shantabala Devi Gurumayum[5] & Hmar Tlawmte Lalremsanga[6]
[1-5] Zoological Survey of India, Arunachal Pradesh Regional Centre, Senki Valley, Itanagar, Arunachal Pradesh 791113, India.
[1&6] Developmental Biology and Herpetology Laboratory, Department of Zoology, Mizoram University, Aizawl, Mizoram 796004, India.
Email: [1]kirtynth.hp@gmail.com (corresponding author)

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Unfolding Sri Lanka's avian heritage in postage stamps

Stamps showcasing avian diversity in Sri Lanka.

Stamps celebrating resident birds in Sri Lanka.

The conservation of forests and wildlife is crucial for maintaining ecological balance and preserving biodiversity (Shyam & Joshi 2006). However, human activities such as habitat destruction and urbanization pose significant threats to these precious resources (Mandol & Rastogi 2004). The aim of this article is to showcase the avian representation in the postage stamps of Sri Lanka through time.

Stamps Showcasing Avian Diversity in Sri Lanka

The bird stamps of Sri Lanka offer a glimpse into the remarkable avian diversity of the country. The 1979 stamps feature five endemic species, including the vibrant Sri Lanka Blue-Magpie *Urocissa ornata*, Sri Lanka Hanging-Parrot *Loriculus beryllinus*, Sri Lanka Whistling-Thrush *Myophonus blighi*, Sri Lanka Spurfowl *Galloperdix bicalcarata*, and Yellow-fronted Barbet *Psilopogon flavifrons* are all bird species found in Sri Lanka.

The 1987 stamps highlight species such as the Orange-billed Babbler *Argya rufescens*, Layard's Parakeet *Psittacula calthrapae*, White-throated Flowerpecker *Dicaeum vincens*, White-faced Starling *Sturnornis albofrontatus*.

Celebrating Resident Birds in Sri Lanka

The "Resident Birds of Sri Lanka" stamps from 2003 depict the diverse avian species found within the country, including the Grey Heron *Ardea cinerea*, White-throated Kingfisher *Halcyon smyrnensis*, Black-crowned Night-

Stamps of national parks.

Heron *Nycticorax nycticorax*, Orange Minivet *Pericrocotus flammeus*, White-rumped Shama *Copsychus malabaricus*, and Malabar Trogon *Harpactes fasciatus*.

National Parks and Avian Wonders

The collection of stamps consists of a series featuring diverse bird species found in national parks across Sri Lanka and Thailand. The stamps portray remarkable avian creatures such as the White-bellied Sea-Eagle *Haliaeetus leucogaster*, showcased in a 2006 set from Wilpattu National Park, and the Sri Lanka Whistling-Thrush *Myophonus blighi*, depicted in a 2010 set from Horton Plains National Park. The Black-necked Stork *Ephippiorhynchus asiaticus*, a magnificent wading bird, appears in a 2013 set from Yala National Park and a 2013 sheet from Thailand. Additionally, the Rock Pigeon *Columba livia* is presented in a 2014 set and sheet from Pigeon Island National Park, while the Painted Stork *Mycteria leucocephala* is featured in a 2016 set from Kumana National Park. These stamps celebrate the natural beauty and avian diversity found within these protected areas, providing a delightful tribute to these captivating bird species.

Highlighting Wetland Birds

The 2016 "World Wetlands Day" stamps emphasize the importance of wetlands and their diverse birdlife. Species like the Greater Flamingo *Phoenicopterus roseus* and the Caspian Tern *Hydroprogne caspia* symbolize the beauty and grace of these vital ecosystems.

Preserving Endemic Species

This set of stamps from 2021 features a selection of endemic bird species found exclusively in Sri Lanka. The Sri Lanka Woodshrike *Tephrodornis affinis* is showcased in a mesmerizing stamp, highlighting its unique characteristics. The Spot-winged Thrush *Geokichla spiloptera* is presented in a captivating stamp, showcasing its distinctive spotted wings. The Sri Lanka Grey Hornbill *Ocyceros gingalensis* is depicted in a remarkable stamp, capturing its striking appearance. The Sri Lanka Swallow *Cecropis hyperythra* is featured in an exquisite

Stamps highlighting wetland birds.

Stamps on preserving endemic species.

stamp, showcasing its graceful flight. Lastly, the Crimson-fronted Barbet *Psilopogon rubricapillus* is portrayed in a stunning stamp, displaying its vibrant colors. These stamps pay homage to the endemic avian treasures of Sri Lanka, providing a glimpse into the country's rich birdlife and conservation efforts.

Postage stamps serve as powerful tool for raising awareness about nature and wildlife conservation. The showcased collections from Sri Lanka not only celebrate avian diversity but also convey messages of preserving national heritage and protecting biodiversity. These small but impactful pieces of art have the potential to inspire individuals to take action and contribute to the sustainability of our planet.

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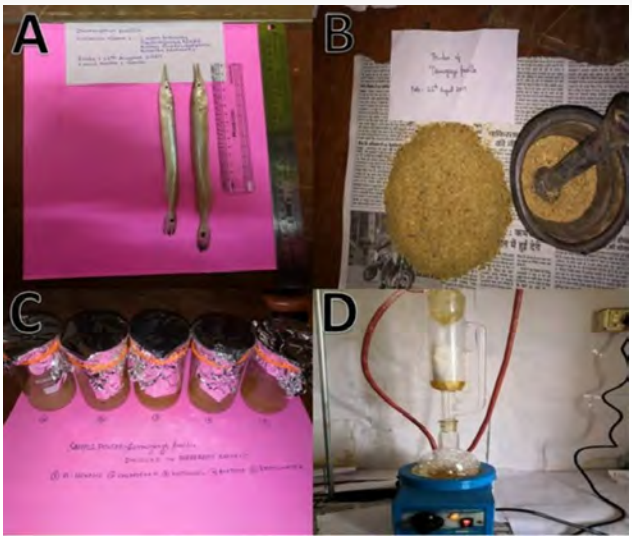
S. Hashim Mohammed
PhD Scholar, National Institute of Advanced Studies, IISc Campus, Bangalore, Karnataka 560012, India.
Email: lapizlazuli131@gmail.com

Citation: Mohammed, S.H. (2023). Unfolding Sri Lanka's avian heritage in postage stamps. Bird-o-soar #208, In: *Zoo's Print* 38(8): 19–21.

Establishment of the relationship between Indian Skimmer and their foods

Indian Skimmers searching food. © Sanjeet Kumar.

Rapid urbanization, habitat fragmentation, and transformation of natural habitat for human settlement and other anthropogenic activities have resulted in a significant loss of biodiversity. Today, most of the riverine birds are found to be in the verge of endangerment. Particularly in Odisha state, there are about 568 bird species recorded, and from them, about 27 species are globally threatened, including 16 riverine birds (Birdlife International 2014). The Indian Skimmer (IS) or Indian Scissors-bill is one of the threatened riverine birds of Odisha state. It is found along stretches of large rivers, swamps, lakes, and estuaries. In Odisha, it is reported from Bhitarkanika, Satkosia, Dhamra, Nalabana, and Mundali. Mundali is an important breeding site in Odisha (Rajguru 2017). Indian Skimmer does not swim or dive, rather feeds on calm water by skimming the surface with its lower mandible (Whistler 1949). IS feeds on fauna that are present on the water's surface. They feed mainly on small fishes. However, their diet includes some small insects, insect's larvae, and crustaceans (Gochfeld & Burger 1994; Hammerson & Cannings 2006). Rajguru (2017) has documented that IS feeds five major fish species near Mundali. These are *Salmophasia bacaila* (Jalla), *Salmophasia sardinella* (Sana jalla), *Stystomous sarana* (Jalla bedi), *Pethia ticto* (Kerandi), and *Dermogenys pusilla* (Gania). This present study is focused on analyzing



Experimental works on food of Indian Skimmer: A—*D. pussila* | B—Powder of fish sample | C—Extracts | D—Extraction.

the biochemical nature of a particular fish, *D. pusilla* and to find out secondary metabolites present in the fish that may be responsible for the breeding behavior of the bird and ultimately lead to its survival. *D. pussila* is selected for experimental works. It is locally called Gania in the Odia language. Keeping in mind, the importance of surface fish in breeding of IS, an attempt has been taken to analyze the secondary metabolites of *D. pussila* extracts in order to find out the presence of bioactive compounds that might be responsible to trigger the hormones or behaviors for mating or breeding. It could be useful to make conservation plan through feeding behavior of IS.

For validation of the role of secondary metabolites presence in *D. pussila*, a field survey was carried out, followed by phytochemical screening and thin layer chromatography (TLC) of potent extracts. During 2018–2020, information on Indian Skimmer and their ecological behavior was gathered from the fishing communities. The fish (*D. pussila*) was identified using published literature (Rajguru 2017). The extraction, qualitative analysis of secondary metabolites, and TLC analysis were carried out using standard methods (Kumar et al. 2013).

The field observations during surveys revealed that IS consumes mainly five types of surface fish species in Mundali areas of Odisha state. It was also seen that those fishes abundantly found during the breeding season. Rajguru (2017) reported that their food habit comprises mainly of five different types of surface feeding fish species, some crustaceans, and other small invertebrates. It was noticed that the most common consumed fish was *D. pussila* by IS. The phytochemical analysis of *D. pussila* extracts (n-hexane, chloroform, methanol, acetone, and aqueous) revealed that methanol extracts showed the presence of tannin, saponins and terpenoids while steroid is only observed in aqueous extract. The TLC analysis also showed spot in polar-non polar mobile phase (Chloroform: Methanol; Rf: 0.69). The presence of terpenoids and steroids might be helpful in triggering hormones that can induce breeding in IS. Such similar type of works carried out by Groothuis & Schwabi (2008) and they reported that steroid hormones play an important role in offspring development whereas in 2016, Rivas et al. (2016) described the role of steroid hormones in avian follicles. Rout et al. (2019) and Das et al. (2019) worked on the correlation between food habits and breeding behavior of IS and reported that there are certain bioactive compounds present in the foods (*Salmophasia bacaila* and *Pethia ticto*) of

IS which might play a role in its breeding and egg laying activities.

The Indian Skimmer is a vulnerable and extremely poorly studied avifauna. The present study showed that the secondary metabolites present in the foods of IS might play an important role in their breeding behaviors. Therefore, a conservation strategy is needed for the food of IS in their breeding habitat. Further, more exploration works and advance research on the foods of Indian Skimmer is urgently needed to address their conservation.

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Lagna Bebarta[1], Sauranjeeta Majhi[2], Asima Subhadarshini[3], Ashrita Mohanty[4] & Sanjeet Kumar[5]

[1-5] Biodiversity and Conservation Lab, Ambika Prasad Research Foundation, Bhubaneswar, Odisha 751006, India.
Email: [5]sanjeet.biotech@gmail.com (corresponding author).

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First report of leucistic Little Ringed Plover from West Bengal, India

Little Ringed Plover *Charadrius dubius* Scopoli, 1786 is a bird of family Charadriidae. It is a widespread resident and winter visitor in all over India (Grimmett et al. 2011; Grewal et al. 2016). Little Ringed Plover is categorised as a 'Least Concern' species on the IUCN Red List of Threatened Species and the population trend of this bird is stable (BirdLife International 2022).

It is a small sized (14–17 cm) bird, which has uniform upper wing with only a very narrow wing-bar (Grimmett et al. 2011). It has small and dark-coloured bill with pinkish or yellowish legs (Grimmett et al. 2011). It has striking yellow eye-ring (Grimmett et al. 2011). Upperparts of the body are sandy-brown and white forehead with brown-cap (Grewal et al. 2016). Black eye masks, black breast, white neck-ring, white chin and white throat with white coloured under part are the keys of its identification (Grewal et al. 2016).

Normal coloured Little Ringed Plover.

Leucistic Little Ringed Plover.

On 13 November 2022, during birding on Damodar Riverbed (23.556N, 84.209E) in Andal Block, Paschim Bardhaman District, West Bengal at 0849 h, a colour-aberrant plover was observed by the author along with a normally coloured Little Ringed Plover *Charadrius dubius* on the riverbed (Nayak 2022). After taking a single photograph the colour-aberrant bird flew off from the site and could not

be traced later. Nikon D5300 DSLR camera with Nikkor Af-P 70–300mm VR lens were used for photography. The bird seemed frightened and it appeared insecure, although other individuals of the species were allowed us to approach closer.

Different types of colour aberrations like leucism, progressive graying, albinism, brown, ino, dilution, melanism are commonly seen in avifaunal world (van Grouw 2021) and leucism is the most common colour aberration (Guay et al. 2012). Initially, it was presumed to be an albino Little Ringed Plover. However, interactive discussion in 'Ask Id of Indian Birds' Facebook group revealed that the individual was leucistic, since some body parts like bill, legs and feathers of eye-ring, eye-mask, stripe on forehead, breast-band, neck-band and tail were still bearing its normal colour (van Grouw 2013).

According to van Grouw (2021) leucism is a form of colour aberrations where complete lack of both the melanin pigments from some or all of the skin found and it occurs due to a neural crest disorder which results in the congenital absence of the melanin cells from some or all of the plumage area. Leucism varies from partially leucistic (few white feathers along with normally coloured other body parts found in an individual) or totally leucistic (a fully white coloured individual). A leucistic bird may have partial or full white feathered body but the eyes remain normally coloured while bill and feet may or may not have normal colour (van Grouw 2021; Gayen et al. 2022). In many cases confusion arises while differentiating leucism from albinism. Actually albinism is a type of colour aberration when complete lack of both the melanin pigments in feathers, eyes and skin occurs due to absence of tyrosinase enzyme in the cells (van Grouw 2021). Plumage colouration has great importance for birds since it helps in camouflage, mate selection and social signalling (Gayen et al. 2022). Since colour-aberrant individuals lack camouflage and are more noticeable, resulting in higher chances of being predated than normally coloured individuals (Mayntz 2020; Gayen et al. 2022), this is possibly the cause of fear of the particular leucistic individual. It is also reported in many cases that these leucistic individuals may not be recognised or accepted by its potential mating partner (Mayntz 2020).

Author could not find any scientific report of leucism of Little Ringed Plover from Indian subcontinent although a report of occurrence of albinism in Little Ringed and Lesser Sand Plover *Charadrius mongolus* has been reported earlier by Mahabal et al. (2016). Lucistic Little Ringed Plover has been photographed before this present observation from Maharashtra, Andhra Pradesh, Kerala, and Tamil Nadu as per eight individual posts in Facebook platform. But author could not find any report on colour aberrations of Little Ringed Plover from West Bengal. However there are a few reports of leucism of some other birds from West Bengal, viz. Coppersmith Barbet *Psilopogon haemacephalus*, Lesser Whistling-Duck *Dendrocygna javanica*, House Sparrow *Passer domesticus*, Black Drongo *Dicrurus macrocercus*, Jungle Myna *Acridotheres fuscus*, and Collared Kingfisher *Todiramphus chloris*.

Although there are many reports on leucism, melanism and albinism in various species of Indian birds but no compact study has been carried out except Mahabal et al. (2016). Since leucistic birds has to face challenges like higher chance of being predated, higher chances of rejection by potential mates, feather weakening etc. in their life span. However, since this observation is confirmed to sighting of a single leucistic individual only for a very short time span, it is not possible to say whether this individual facing same challenges or not. Hence a long-term and detailed study on birds with abnormal colouration in West Bengal and India has been recommended through this communication.

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Amar Kumar Nayak
Searsole Junior Basic School, Searsole Rajbari, Paschim Bardhaman, West Bengal 713358, India.
Email: amarnayak.stat@gmail.com

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Igniting young minds: outreach at Keeranatham Panchayat Union Middle School, Coimbatore, Tamil Nadu

Zoo Outreach Organisation (Zooreach) in collaboration with BOSCH embarked on a corporate social responsibility (CSR) project that plans to not only breathe life back into the Nallusamy Check Dam and Sambrani Kuttai in Keeranatham, Coimbatore, but also aims to revive forgotten bonds and ignite newfound kinship between the locals of that region and the wetland. The Zooreach team recognized that restoring the wetland also meant reconnecting the students of that community with their natural heritage to foster a sense of belonging and guardianship. According to the team's research, it was found that the majority of the community's young minds studied in Keeranatham Panchayat Union Middle School. With this insight the Zooreach team consisting of Priyanka Iyer, Payal Molur, and Swaathi Na conducted an outreach program in the school campus of Keeranatham Panchayat Union Middle School on 27 July 2023.

It was a sunny afternoon when the team reached the model school grounds ready to welcome a group of eager students to the workshop. Twenty-nine students from classes 6, 7, and 8 were gathered in the school's classroom. Priyanka and Swaathi kicked off the workshop with an ice breaker activity to evaluate the attitude of the students about the wetland and the different biodiversity present near them through the 'Smiley Face' game. Based on the questions asked to the students, they had to run towards any of the smileys (happy, sad, fear, confused, angry) that most appropriately described their emotion to the question. The game had everyone giggling and expressing themselves, breaking down the initial shyness. The game provided insights into student's attitudes towards wildlife for example, many of them were afraid of bats. Understanding such emotions helped us tailor educational experiences for them.

Students learnt about adaptation such as opposable thumbs that differentiates primates from other mammals through a game, leading to laughter and a newfound appreciation for their own remarkable abilities. The 'Bat' game helped students understand the extraordinary adaptations of bats, their vital ecological roles in pollination and reducing disease-spreading vector populations, and dispel myths about them.

After the whirlwind of activities played with the students, with passion and expertise, Priyanka delved into a captivating presentation about various bird species. Her presentation painted vivid pictures of the habitats, behaviors, different flying patterns and challenges these birds faced. The presentation aimed to not only help them identify birds at a broader group level but also kindle a love for the diverse birdlife in and around their homes and Nallusamy Checkdam. During the presentation

Students gain insights into the adaptations of bats through the bat game.

Eager minds engrossed in attentive curiosity during the presentation.

Priyanka enchants the students with a presentation, unraveling the vibrant world of diverse bird species.

Students delve into a game exploring adaptations like opposable thumbs.

Students engage in the 'Smiley Face Game'.

we were joined by the long term volunteers of the BOSCH team who were engrossed in the presentation and took part in the activities.

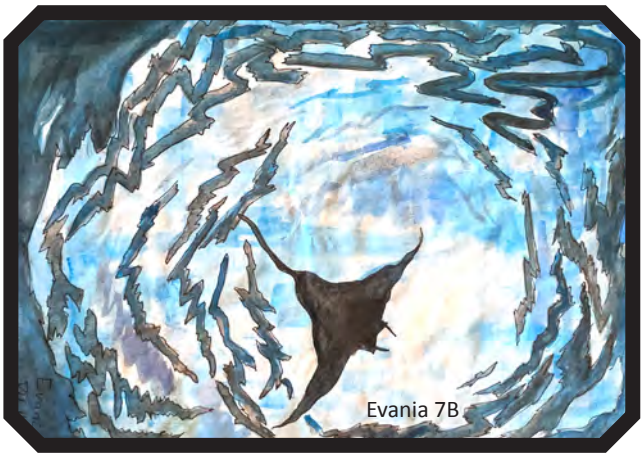
As we came to the end of the program, a playful 'Bird Hand Flapping' game filled the air with joyous laughter. It was a moment of lighthearted fun to end the workshop.

To conclude, the outreach program had been a resounding success based on the feedback received from the school students, igniting a spark of awareness through myth busting and curiosity regarding biodiversity in semi-urban areas. The young participants left with smiles on their faces, eager to share their newfound knowledge and inspire others to join them on this path of new knowledge discovery.

Tandrali Baruah, Educator, Zoo Outreach Organisation

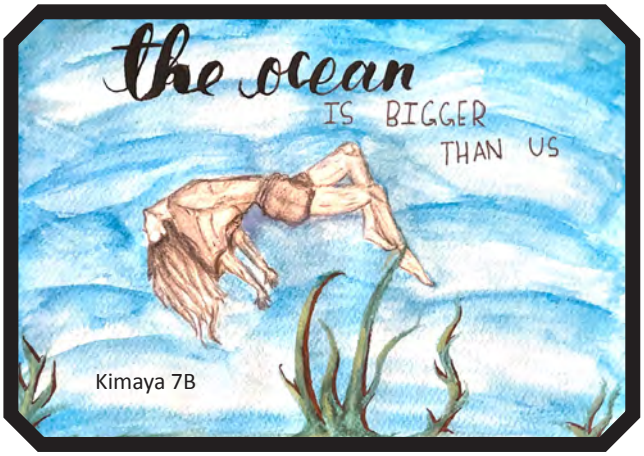
Art Feature by students of CS Academy

The artwork crafted by students in grades 6, 7 and 8 of CS Academy within the framework of the 1OCEAN initiative a program encompassing sustainable fishing, bycatch reduction, exploration of shark and ray behaviors, marine preservation, and ocean education led by Zooreach, exemplify their dedication to promoting ocean conservation. Highlighted below are a few of the featured artworks with their captions.

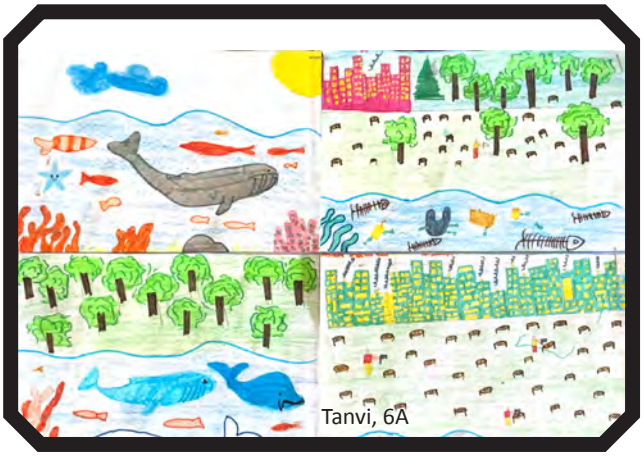


Elegance in motion: The elegant, sleek, powerful and versatile manta ray, which is also the official mascot for 1OCEAN

Visual ode to the abundant diversity in the ocean: Embracing ocean literacy principle 5



Eternal Reverie: Embarcing the vastness of the ocean that surrounds us, a masterpiece of the ocean grandeur.

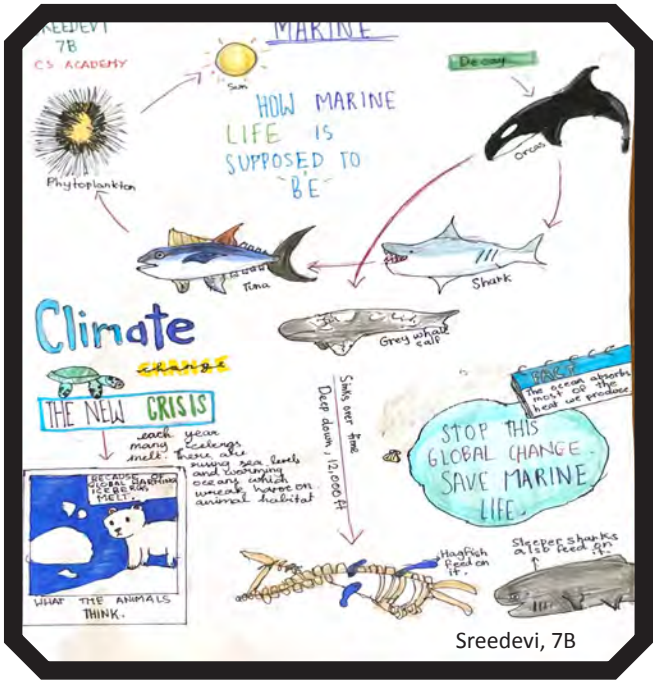


Choices we make: A visual tale of living in harmony with nature and the consequences we face if we donot.

Sun, Sand and Sea: The ocean dwellers soak in the sunshine on beach day. These marine species enjoy a beach day maintaining the purity of the environemt, leaving behind no traces of litter.

Beyond blue water: Ocean, the well spring of life is now not only abundant with life but also plastic.

Earth's Tears: Melting ice and plastic shores tell a tale of urgent change.

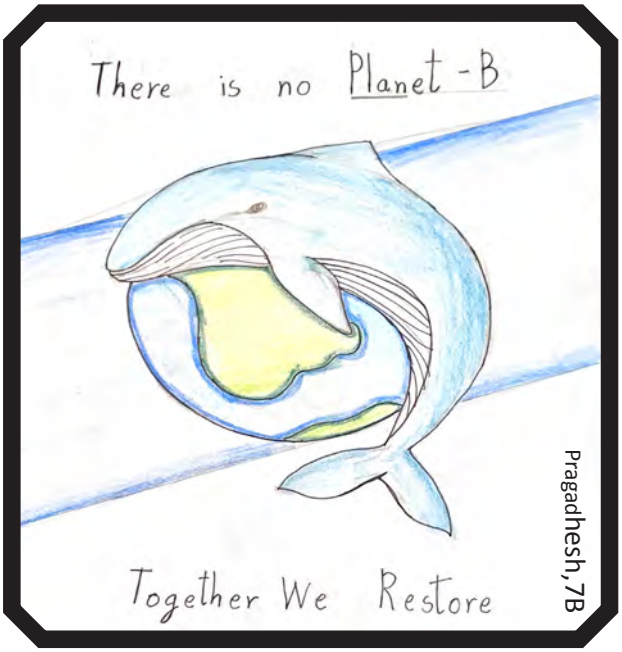


The climate change ripples through marine life, reshaping the delicate balance of the underwater world.

Discover the fun facts about sea turtles while they remind us to steer clear of plastics.

Turning the tide: The vital role of plastic recycling for our ocean. Plastic recycling holds importance not only for coastal states but also for inland regions.

The artwork showcased by CS Academy students speaks volumes, conveying a resounding message that echoes the urgent need to safeguard our ocean. With each artwork and creative expression, they higlight the critical importance of preserving and protecting our marine ecosystems together.



As we bid adieu to the pages filled with colours and narratives let's carry forward the inspiration these students have provided and continue to do our part in saving the ocean and the planet. Let these artworks serve as a call to action, encouraging us all to play a role in safeguarding the ocean that connects us and sustain us.

ZOO'S PRINT

Communicating science for conservation

ZOO'S PRINT Publication Guidelines

We welcome articles from the conservation community of all SAARC countries, including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and other tropical countries if relevant to SAARC countries' problems and potential.

Type — Articles of semi-scientific or technical nature. News, notes, announcements of interest to conservation community and personal opinion pieces.

Feature articles — articles of a conjectural nature — opinions, theoretical, subjective.

Case reports: case studies or notes, short factual reports and descriptions.

News and announcements — short items of news or announcements of interest to zoo and wildlife community

Cartoons, puzzles, crossword and stories

Subject matter: Captive breeding, (wild) animal husbandry and management, wildlife management, field notes, conservation biology, population dynamics, population genetics, conservation education and interpretation, wild animal welfare, conservation of flora, natural history and history of zoos. Articles on rare breeds of domestic animals are also considered.

Source: Zoos, breeding facilities, holding facilities, rescue centres, research institutes, wildlife departments, wildlife protected areas, bioparks, conservation centres, botanic gardens, museums, universities, etc. Individuals interested in conservation with information and opinions to share can submit articles ZOOS' PRINT magazine.

Manuscript requirements
Articles should be typed into a Word document with no more than 800 words of text and 10 key References (Tables, Images with copyright information, and Videos are encouraged) and **emailed to zp@zooreach.org.** Include the names of one or two potential reviewers when submitting a publication.

Articles which should contain citations should follow this guideline: a bibliography organized alphabetically and containing all details referred in the following style: surname, initial(s), year, title of the article, name of journal, volume, number, pages.

Editorial details
Articles will be edited without consultation unless previously requested by the authors in writing. Authors should inform editors if the article has been published or submitted elsewhere for publication.

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Editor: Sanjay Molur
Associate Editor: R. Marimuthu
Managing Editors: Latha G. Ravikumar & B. Ravichandran
Editorial Assistant: S. Radhika
Copy Editor: Sapna Ramapriya

Zoo Outreach Organisation Trust Committee and Sr. Staff
Managing Trustee: Late Sally R. Walker
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Scientist: B.A. Daniel
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ZOO'S PRINT magazine is informal and newsy as opposed to a scientific publication. ZOO'S PRINT magazine sometimes includes semi-scientific and technical articles which are reviewed only for factual errors, not peer-reviewed.

Address
Zoo Outreach Organisation
3A2 Varadharajulu Nagar, FCI Road, Ganapathy,
Coimbatore, Tamil Nadu 641006, India
Phone: +91 9385339862 & 9385339863
E-mail: zooreach@zooreach.org
Website: www.zoosprint.zooreach.org,
www.zooreach.org

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