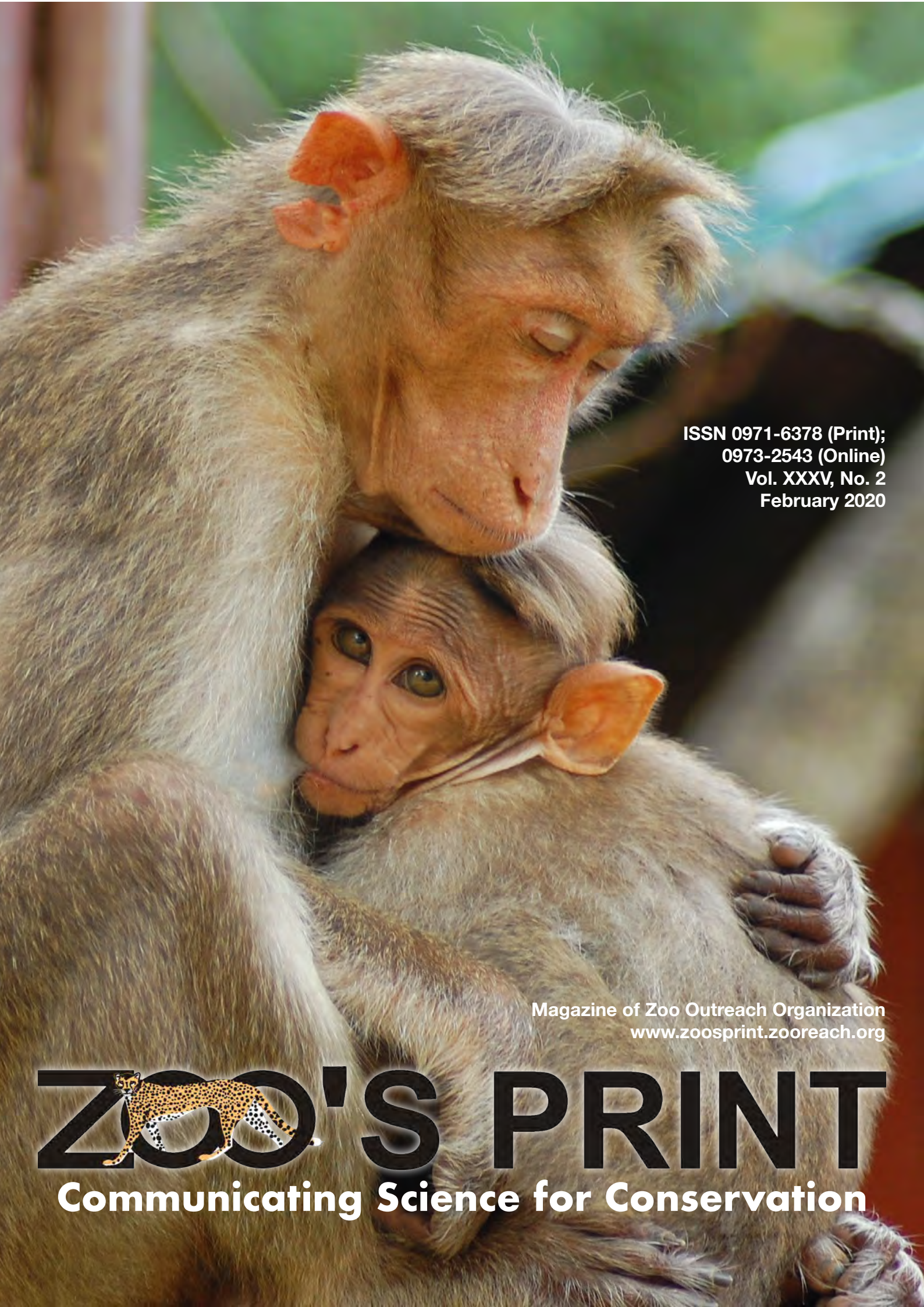




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Cover photo by Malgorzata Arlet, Poland

The Story of the Elephant Detector

Wildlife research is a career which involves digging deep into the nature and existence of an animal, with a special goal of protecting it from extinction. Wildlife researchers usually choose an animal to dedicate their life's work to. They do this by hypothesising a question on them and then they conduct research to answer those important questions. More often than not, wildlifers brim with stories – stories that go beyond the reach of their research work and revolve around the people whom they encounter during their work.

For the last six years, I have been studying a nocturnal primate - the Malabar Slender Loris. My research takes me to different forests of the Western Ghats, including the Aralam Wildlife Sanctuary, one of my field sites in northern Kerala. The region around my field site is a human-elephant interaction zone. The wild elephants leave the forests, usually at night, and raid the crop fields. They eat the crops, damage houses and sometimes kill the people who try to chase them away. The locals are very scared of the elephants and seldom leave their homes after dark.

When an elephant comes into their fields or houses, the people call the forest department to help chase the

elephants back into the forests.

Sometimes, a few brave men from the village try scaring the elephant back to the forests with noises from bursting fire crackers or by banging plates and metal vessels.

In May 2016, around the jack fruit harvest season, I was in Aralam on fieldwork. Due to brief spells of rainfall, we had frequent short periods of power cuts. I routinely headed into the forest at night to collect data on the lorises. The forest department always got calls from the villagers, requesting them to chase away the elephants. But during this time, the forest department did not find any elephants in that section of the village. The calls increased as days went by, but there were no elephants for about 50% of the time that the forest department came to investigate. The villagers demanded that the forest department put up a 'machan' (an elevated platform mostly on trees, using wood planks) to keep a night watch for the elephants. The forest department was not happy about the demand, as it would cost them quite a lot to hire extra night watchers. However, the forest department eventually gave in and deployed night watchers for five whole nights.

The curious forest department went into the village to investigate how the villagers were so sure of the presence of elephants. To their bewilderment, the villagers said they had an elephant detector, which beeped every time the elephants were near the forest border. The confused forest department officers asked to see this amazing elephant detector. I was in the forest when I got a call and was asked to rush back immediately. When I got back, the people from the village brought the range officer to meet me and to show him my 'elephant detector'. When the range officer realized what it was, he grew annoyed and told me irritably to switch off my 'elephant detector' – my UPS.

As lorises are nocturnal, I would spend most of the nights in the forest. Being a remote sanctuary, Aralam did not have proper electricity facilities. The voltage dropped often, leading to frequent power cuts. I largely depended on the back-up power from my unlimited power source (UPS). The UPS would make a beeping sound every time there was a power cut.

It just so happened that the elephants preferred to move into the village, under the cover of darkness, when there was a power cut. The villagers have keenly observed that the beeping of my UPS coincided with the elephants entering the

villages, thereby dubbing it the 'elephant detector'.

This incident is a testament to the extraordinary ways in which my research work folds into the life of the people around me and how they have affected my work. Even while elephants were a terror to the villagers, they greatly helped me with my work. The elephants terrorised the villagers, keeping them inside their houses after dark. This greatly reduced the villagers' interference with my work and ensured my safety from a few pesky villagers. The movement of the elephants created pathways through the dense foliage, making it easier for me to manoeuvre through the forest in search of the lorises. Their dung kept my lorises well-fed. Since lorises are predominantly insectivorous, they feast on the insects that are attracted to the elephant dung. As long as I respected the elephants' space and did not interfere with their movements, they did not mind my presence in their forests.

It was a good thing that the people of the village accommodated my presence in their homes. Before long, we were working together on a new, cost-effective, wildlife-friendly remedy for the frequent interaction between man and animal – the instalment of lights around their houses

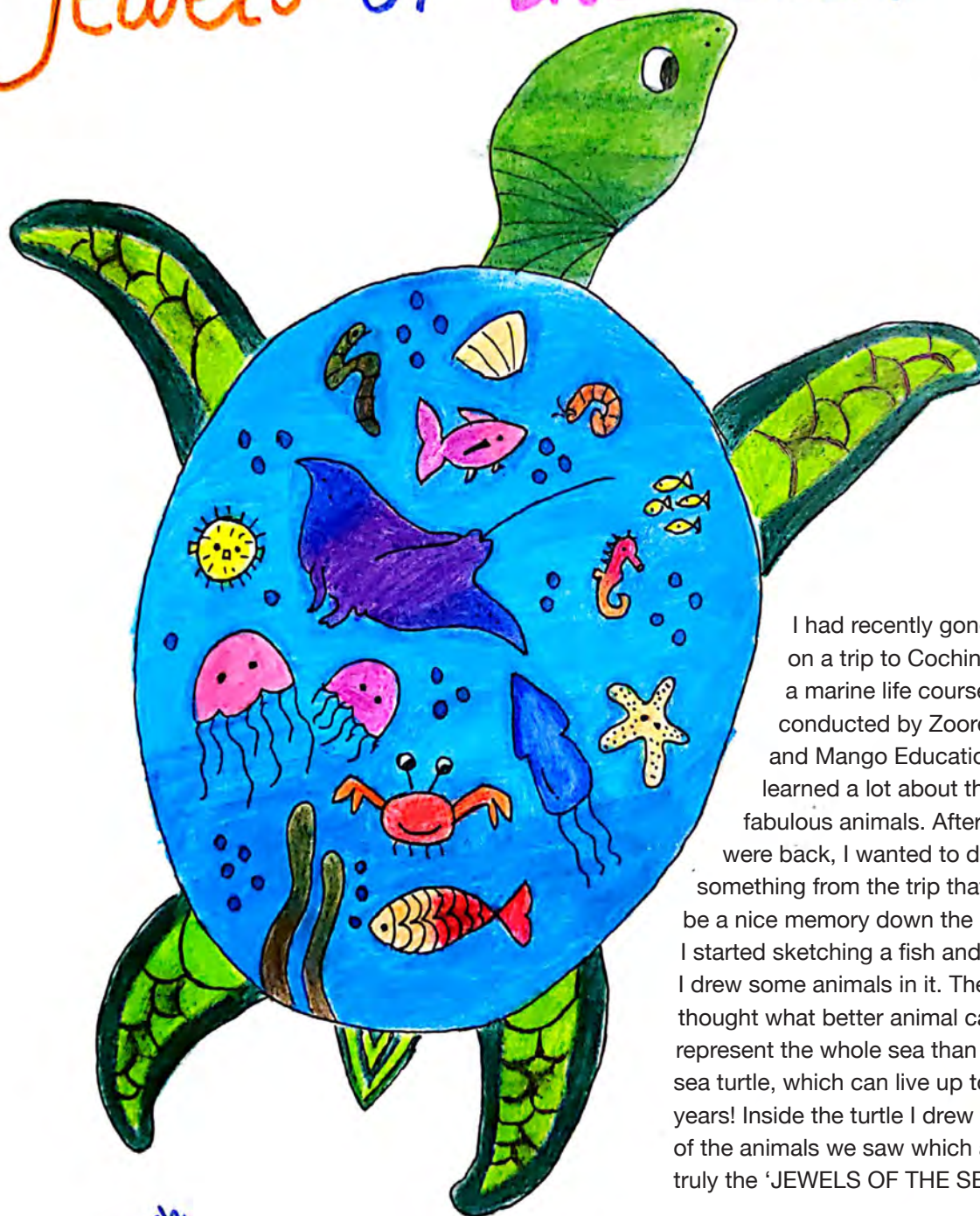
and fields. To combat the problem of frequent power cuts, I helped the villagers to adapt to solar lights. The forest department has also put up solar powered white lights in the paths that were most used by the elephants to get to the village. The villagers have also begun to harvest the jack fruits just before they ripen, to avoid attracting the elephants. The interaction has greatly reduced since in this village. But I left behind the 'elephant detector'... just in case.

Smitha D Gnanaolivu, Department of Advanced Zoology and Biotechnology, Loyola College, Chennai, Tamil Nadu 600034, India. Biopsychology lab, Institution of Excellence, Vijnana Bhavan, University of Mysore, Manasagangotry, Mysore, Karnataka 570006, India. Email: simmy.smitha@gmail.com

Illustration by Abha Vajinath, a 14-year-old self-taught toon artist residing in Bangalore, Karnataka. She is being home-schooled for the last four years to help give her more time to practice her passion for the fine arts. Abha has been creatively inclined since childhood and takes an interest in theatre and Badminton.



Jewels of the SEA



I had recently gone on a trip to Cochin for a marine life course conducted by Zooreach and Mango Education. I learned a lot about these fabulous animals. After we were back, I wanted to draw something from the trip that can be a nice memory down the lane. I started sketching a fish and then I drew some animals in it. Then I thought what better animal can represent the whole sea than the sea turtle, which can live up to 150 years! Inside the turtle I drew some of the animals we saw which are truly the 'JEWELS OF THE SEA'.

Sanjana..N. Sathish

Sanjana N. Sathish, 11 Years
Mettupalayam Road, Coimbatore

" IF WE SAVE OUR WILD PLACES,
WE WILL ULTIMATELY SAVE
OURSELVES "

- Steve
Irvin



Sanjana.N. Sathish

I wanted to draw a wildlife conservation picture about the recent events in Australia where bushfires ravaged a big part of the forests. I thought of how many animals and how many trees were burned. The damage was so extensive and the pictures and videos I watched were really heartbreaking. The sight of some animals hanging onto the trees for their life and so many dead animals laying on the burnt ground brought tears to my eyes. I wish that someone would take responsibility and prevent fires from occurring and destroying both the animals and their habitats.



Zooreach update

Study of maternal care and infant personality development in Bonnet Macaques in Kerala

In primates, early life interactions with the mother influence behavior later in life. However, still we do not know much about the connection between personality of the mother, maternal care and personality of her young, especially in the wild.

In this study we would like to investigate these interesting questions by following females of Bonnet Macaques (*Macaca radiata*) and their infants during the first year of life. So far, Bonnet Macaques observe all females and infants from two groups in Thenmala, southern India to

explore what are the sources of variation in maternal care in this species and to test to what degree personality of the mother has an influence on infant personality.

Studying free-living Bonnet Macaques will give us more detailed picture on individual development than study in captivity. Moreover, data from our cousins, primates, can be very important in creating models of human parenting that show the whole range of parental response, the individual differences and parenting style, and the different way in responding to various situations. Our results will contribute to



the discussions on the impact of maternal behavior vs. outside environment on personality development of the infant in an early life.

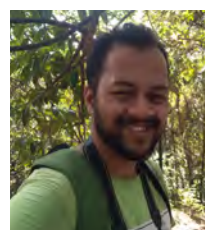
We can learn a lot from our primates, not only about their personalities, but about personality itself and how it evolved in various environments.

The primary investigator in this project, Dr Arlet, is a biologist with a passion for the study of social behavior from ecological and evolutionary perspectives. Professor Lynne Isbell, Chair of the Anthropology Department at the University of California, Davis (UCD) is the collaborator of the project. Prof. Isbell is an experienced primatologist who worked on female behaviour for much of her long career. Prof. Mewa Singh (Department of Psychology

and Institute of Excellence, University of Mysore, India) is the collaborator in India. He is a life-long distinguished Professor in primatology and specialist on bonnet macaque's ecology and behaviour." The research is funded by NSC Harmonia grant 2018/30/M/NZ8/00025 to M.Arlet.



ADAM MICKIEWICZ
UNIVERSITY
IN POZNAŃ



Partha Sarathi Mishra, Snehal S. Gole, Vinyza Farhad Dhanbhoora

Researchers, ZOO

Study of maternal care and infant personality development in Bonnet Macaques in Kerala



Dawkinsia exclamatio,
an endemic restricted
to the Kallada River in
southern Kerala.

WILD update

Floods and fish: Exclamatio Barb in River Kallada

The state of Kerala was impacted by an extreme flooding event in August 2018, considered to be the worst in 100 years, resulting in close to 400 human mortalities and displacement of several hundred thousand people. The unprecedented floods gave rise to landslides and changes in the morphology and flow patterns of many of the rivers, which originate and flow through a global biodiversity hotspot – the Western Ghats. While the socio-economic and anthropogenic impacts of the floods have been discussed widely, there has been little focus on the impacts to biodiversity, and in particular freshwater ecosystems, which comprise a large share of the State's natural capital. A comprehensive study is being carried out to assess the impacts

of the catastrophic floods on the habitats and populations of several single location endemic and threatened species in the rivers of Kerala. Comprehensive field surveys are being carried out in four major river systems affected by floods, viz, Periyar, Chalakudy, Pampa, and Achankovil, in addition to micro-habitat-based surveys in six critical freshwater fish habitats including Periyar Tiger Reserve, Valparai, Malakkapara, Santhampara, New Amarambalam, and Shenduruney Wildlife Sanctuary to determine the abundance, population status, and impacts to the habitats of the 'single-location fish species'. This survey is supplemented by unstructured interviews and focus group discussions with relevant stakeholders including local fishers, forest guards, local



communities residing along the river banks, and researchers.

Surveys carried out in the Kallada River, particularly in three areas, (i) upstream of, (ii) downstream of, and (iii) actual range of *D. exclamatio*, an endemic species of the river indicated no changes to either the morphology of the stream habitats or to the populations of the species. Kallada River received less impacts of the floods compared to other river systems of the State and could be the reason for this unaltered state of species and habitats.

Catch per effort (calculated as catch of the species obtained in 5 continuous cast nettings* and 5 scoop net operations at a habitat) of the species was seven in the post-flood sampling compared to five during the pre-flood surveys carried out in 2013.



Arya Sidharthan

Researcher, WILD; PhD Student, KUFOS, Kochi

Impacts of the 2019 catastrophic flood on single-location endemic freshwater fish species of the Western Ghats



Remarkable variation in *Phryganistria virgea* (Westwood, 1848) [Pharnaciini (Phasmatidae)] from India

The tribe Pharnaciini Günther, 1953 (Clitumninae: Phasmatidae) is so far represented in India by four genera out of five known from the world. These are *Pharnacia* Stål, 1877, *Phobaeticus* Brunner 1907, *Phryganistria* Stål, 1875 and *Tirachoidea* Brunner v. Wattenwyl, 1893. The fifth genus *Baculonistria* Hannemann, 2008 is known from China only, again a country adjacent to India. The genus *Phryganistria* is comprised of six species of which only one species *Phryganistria virgea* (Westwood, 1848) was first recorded from Assam, India by James Wood-Mason in 1877 and was identified as *Phibalosoma virgea* and the species is so far known from northeastern India (Sikkim and Darjeeling of West Bengal); Bangladesh (Sylhet, the type locality of the holotype male); Bhutan and Pulau Penang.

A female collected from Mouling National Park (MNP), Arunachal Pradesh has been identified now as *Phryganistria virgea*, shows many notable characteristics and deviations from typical description. A male came from Sibsagar (Assam) which is hardly different from the description for the male of *Phryganistria virgea*. The states Arunachal Pradesh, Assam and Meghalaya (Shillong) are adjacent and previously treated as single state Assam. The pre-independence Assam was even bigger by including part of present Bangladesh (Sylhet). The entire area is almost homogeneous in floral and faunal

composition. A detailed description of the male, female and eggs are given along with affinities with the related species under the genus.

The dry preserved male and female specimens in the collection of Orthoptera Section of Zoological Survey of India, Kolkata (Calcutta) are very old. Mostly they are without definite date of collection but the date of entry in sectional register is from 12.05.1936 to 14.06.1938. The rest females, all identified as *Phryganistria virgea*, are from Assam: Nemotha, 24.82°N, 92.80°E; Meghalaya: Shillong, 25.47°N, 91.37°E; Tamil Nadu: Yarkaud, 11.77°N, 78.20°E. Their morphology shows several grades of modification from the female from MNP.

Description

Female (MNP): Head, thorax and abdomen entirely smooth. Eyes rounded. Head elongated, with a medio-dorsal fine carina; posterior of head with a median notch.

Thorax: Prothorax a little flat, with a pair of elongated and a slightly raised swollen areas at anterior division, posterior division a little longer and almost smooth. Mesothorax and metathorax rounded; former of nearly uniform diameter, a little widened at the insertion of legs; metathorax a little less than half of mesothorax and of uniform diameter.



Forelegs: in femora, anteroventral and posteroventral carinae spineless; triangular spines on both posterodorsal (8 spines) and anterodorsal carina (17–18 spines), gradually shorter distally and irregularly spaced; in tibiae, distal end without any lobulated expansion (as in middle and hind legs), only the posterodorsal carina with 30–32 minute spines among fine stiff bristles.

Midlegs: comparatively shorter than fore and hindlegs. Femur with 7 spines on anterodorsal carina, 5 small spines on posterodorsal carina; posteroventral carina with 8–9 spines, a little bigger than the former; the anteroventral carina with 5–6 further stouter spines, medioventral carina smooth. Tibia with 15–16 small spines on anterodorsal carina; similar but more minute spines on posterodorsal carina (12–15); anteroventral carina with 16 minute spines; posteroventral carina with 16–17 minute spines; 1st tarsal segment is shorter than rest segments together and little foliaceous distally (probably same is true for other legs).

Hindleg: femora with 7 minute spines on anterodorsal carina, with 5–6 minute spines on posterodorsal carina, 7–8 small spines on anteroventral carina and with 8–9 minute spines on posteroventral carina; medioventral carina spineless; tibiae with 20–23 very minute spines on anterodorsal carina, with almost similar number of minute spines on posterodorsal carina, 20 minute spines on anteroventral carina and with 17 minute spines on posteroventral carina.

Median segment: This is half of the metanotum.

Abdominal segments: These are gradually longer distally up to 6th segment and then

gradually shorter behind; 9th and 10th segments are nearly of similar length; all abdominal segments are rounded and hardly flattened dorsoventrally; 7th segment is narrowed in front; last three segments are nearly triangular in outline; 10th tergum carinated, divided into two nearly lobe like portions by a concavity in the middle; the rear end almost is straight. The supra anal lamina minute, rounded at extremity, strongly keeled in middle, extends very little beyond the tip of the lobes of the 10th segment. Cerci thick, very little shorter than the supra anal lamina, a little flat and beset with black bristles. Preopercular organ bears a pair of small, nearly triangular spines beset with few hairs; one is a little shorter than the other.

Operculum (broken): Extends beyond the end of 10th segment by at least the length of 9th and 10th together, laterally compressed, proximal 1/3rd smooth, the distal 2/3rd shows longitudinal fine parallel lines or striations along entire length.

Egg (ex. abdomen): bear superficial similarity with *Phryganistria virgea*, *P. grandis* and *P. heusii* (vide drawings, Hannemann, 2008: 273). Capsule oval in cross section along middle, longer than wide, surface black, smooth except for fine granulations. Operculum black, oval, its surface flat and irregular. Capitulum lost, borne by the nipple like organ (0.75 mm). Micropyle triangular to heart shaped, its longitudinal length comparatively short, postero-lateral margin wider, with minimum depression below and with short median line. Length 4.9 (excluding capitulum), width 4.0.

Measurements (mm): female: Length of body up to tip of 10th segment 265;

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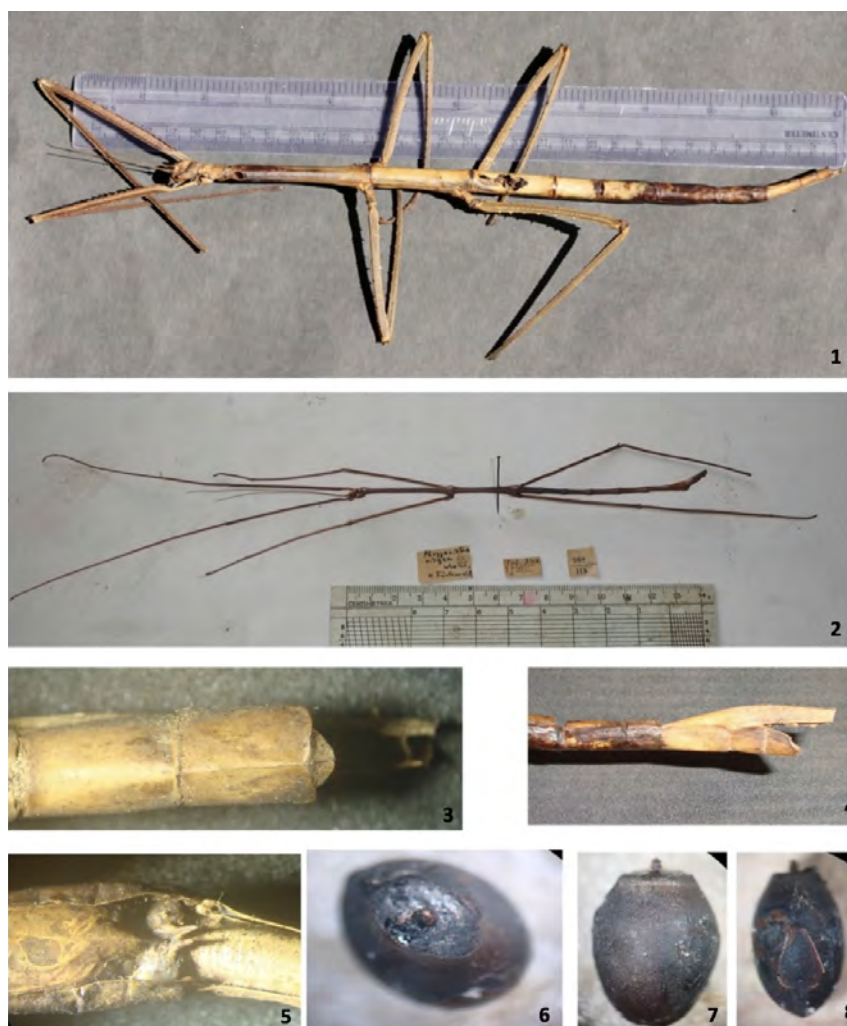


Image 1–8. *Phryganistria virgea*: 1—Female, entire | 2—Male, entire | 3—Supra anal plate of female | 4—Last abdominal segments of female | 5—Pre-opercular organ of female | 6–8—Egg of female.

antennae 45.0mm + (broken); prothorax 12, mesothorax 59, metathorax 27, median segment 13, rest of abdomen 145; in fore leg, femur 76, tibia 101, tarsi lost; in midleg, femur 54, tibia 62, tarsi 24; in hindleg, femur 62, tibia 78, tarsi lost; operculum 35.0 + (broken at tip).

Material examined:

DDBR/349, 04.v.2003, 1 female, 2km from Jengging on the way to Karko village, Mouling National Park, Upper Siang District, Arunachal Pradesh, 28.58°N, 94.86°E, elevation 613m. coll. N. Teehar & G. Lollen, preserved at Orthoptera section, Z.S.I., Kolkata.

Male (Assam): Eyes large, rounded, protruding. Head smooth, narrowed behind, with four indistinct lobes behind. Antennae longer than anterior femur. Prothorax longer than wide, smooth. Mesothorax long, smooth, very little wide in front, a little wider behind. Metathorax nearly $\frac{1}{2}$ of mesothorax. Median segment just a little less than half of metathorax. Abdominal segments 2–6 gradually longer posteriorly; 7th shorter than 6th, 8–10th triangular in outline, 8–9th carinated, junction of 8–9th is widened; 10th divided into laterally compressed lobes which are beset interiorly with spines. Cerci long, incurved, do not reach apex of the lobe of 10th segment.

Forelegs: in femur, anterodorsal carina with 22 small, triangular spines being gradually minute distally; posteroventral carina with 2 minute spines near basal half. Tibia almost spineless except for stiff bristles. Metatarsus a little longer than rest segments together.

Midlegs: in femur, all carinae with 10–12 minute spines; medioventral carina spineless. In tibia, anteroventral carina and

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posteroventral carina with 22–24 small spines; spines on anterodorsal carina 17–18; all spines are close beset distally. Metatarsus as long as rest segments together.

Hindlegs: in femur, anterodorsal carina and posterodorsal carina with 12–14 minute spines; anteroventral carina and posteroventral carina with 12–13 spines which are a bit longer than anterodorsal carina and posterodorsal carina; medioventral carina spineless. Tibia without spines on dorsal carinae; with 22 fine spines on anteroventral carina and posteroventral carina, medioventral carina with 5–6 minute spines at distances. Metatarsus as long as rest segments together.

Poculum swollen, not with blackish tint, surface smooth, not ridged, with distinct transverse line in front of posterior triangular area.

Measurements (mm):

Male: Body length 148.0 (longest among 5 examples); head 4.8; antennae 67.5; prothorax 5.0; mesothorax 34; metathorax 18.0; median segment 8.0, rest abdomen 78.0. In foreleg: femur 53, tibia 65, tarsi 24; in midleg:



Image 9–11. 9—*Phryganistria virgea* (MNP, upper), *P. virgea* (Shillong, middle) and *P. virgea* (Yarkaud, lower) | 10—Poculum of *P. virgea* (MNP, upper), *P. virgea* (Nemotha, lower) | 11—Egg of *P. virgea* (Shillong).

femur 42, tibia 42, tarsi 17; in hindleg: femur 49, tibia 54, tarsi 22.

Material examined: Regd. No. 989/H5, 1 male, Sibsagar, Assam, 26.98°N, 94.63°E, coll. Moti Ram, (identified

as *Phryganistria virgea* by Günther).

Relationship

The MNP female shows some similarities and dissimilarities with the following examples. With the single female from

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Yarkaud, (Regd. No. 1006/H5), the MNP female is most related by the presence of size, formation of operculum and nearly similar poculum. However, the MNP female differs from *Phryganistria virgea* by the absence of posteromedian tubercle on abdominal tergites, margins of abdominal segments 2–7 are not widened laterally, the median segment is longer, metatarsus more lobated, less number of spines on legs and completely different form and length of micropylar plate.

The following features in males of *Phryganistria virgea* (Hennemann et al., 2008: 215) are not present in the male from Assam:

1. Cheeks sometimes with a faint dark postocular stripe.
2. Tibiae often with a few faint, pale transverse bands; the basal one most distinct.
3. Pronotum slightly shorter.
4. Cerci extend beyond apex of anal segment.
5. Profemora considerably longer than head, pro- and mesonotum combined.

Compared to *Phryganistria heusii* (Hennemann & Conle, 1997), the MNP female does not bear posteromedian tubercle on abdominal tergites 2–6 of female, fore femora not black and basal area not pale straw, shape of preopercular organ different and the micropylar plate is shorter.

Compared to *Phryganistria fruhstorferi* (Brunner v. Wattenwyl, 1907), in MNP female, the females are longer in length and the operculum is very much extended beyond the end of 10th segment; in male, lateral surfaces of the thorax not black and the

lateral lobes of 10th segment not tapered as in *Phryganistria fruhstorferi*.

The MNP female differs much from *P. grandis* Rehn, 1906, by its longer median segment, spiniform preopercular organ (lobular in *Phryganistria grandis*). The preopercular organ is narrowed and longer in the MNP female (shortened boat form in *Phryganistria grandis*). The micropylar plate is quite short and not elongated in the MNP female.

Intermediate features in *Phryganistria virgea* (Westwood, 1848)

The two females of *Phryganistria virgea* from Shillong, Meghalaya have the following peculiarities.

1. Nearly same length and construction of body as *Phryganistria virgea*.
2. The abdominal tergites of segments 3–6 with lateral margins not horizontally expanded (laterally broadened) as in *Phryganistria virgea*, rather distinctly deflexed down alongside the body. As a result, in a top view, those segments are rounded. However, in lateral view, the tergites are oval in outline (as in MNP female).
3. The number of spines on carinae of four posterior femora is more than in MNP female and much similar to *Phryganistria virgea*.
4. The preopercular organ is a pair of distinct, slender spines which are straight and longer than in MNP female, almost as in *Phryganistria virgea*.
5. Reference to page 273, fig. 190 (Hannemann & Conle 2008), capitulum and micropylar plate of egg are similar to *Phryganistria virgea* and *Phryganistria heusii* (Hennemann & Conle, 1997). But these are also a little different from *Phryganistria grandis* Rehn, 1906 and *Phryganistria virgea*.

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Among these three, considering the length of operculum, only the species *Phryganistria virgea* seems closer to these females from Shillong.

Therefore, based on distribution and structural details, it may be presumed that the Shillong females are somewhat in the intermediate of MNP female and *Phryganistria virgea*.

Comment

The MNP female along with other females provided several strong variations. Absence of flattened shape of abdominal segments and the egg structure are particularly very distinctly different from the typical one. The authors initially had an impression of this variation as a new species and intended to name as *Phryganistria rotundatolobata* which is withheld till further information.

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T.K. Mukherjee¹, G. Srinivasan² & P. Chatterjee³

¹ 65A/6, Swinhoe Lane, Kolkata, West Bengal, India. Email: mukherjee.tushar@gmail.com

² Zoological Survey of India, Santhome High Road, Chennai, Tamil Nadu 600028, India. Email: gurusrinivasanzsi@gmail.com (corresponding author).

³ Vidyasagar Evening College, Machubazar, Kolkata, West Bengal 700006, India. Email: uparbat@yahoo.co.in

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Sighting of two rare butterflies from the northern Western Ghats, India



[A] Upperwings (UP) and [B] Underwings (UN) of *Horaga onyx cingalensis*.

The Western Ghats along with Sri Lanka together is a globally recognized biodiversity hotspot. The butterfly fauna of the Western Ghats of India is well documented (Kunte 2008). It hosts around 336 butterfly species of which approximately 12% species are endemic to the Western Ghats and 59 species are legally protected in India (Nitin et al. 2018). In this article, we describe the sighting of two rare butterflies, namely, Common Onyx *Horaga onyx cingalensis* from Maharashtra and Purple-spotted Flitter *Zographetus ogygia* from Goa, in the northern Western Ghats. A description of their observations of species is given below:

Common Onyx *Horaga onyx cingalensis* (Moore, 1857)

Horaga onyx cingalensis is a rare butterfly subspecies found in the southern Western Ghats of India and recorded up to 2,000m above sea level (Bhakare & Ogale 2018). On 24 October 2016, while surveying butterflies on Mahadevgad road, Amboli, Maharashtra, India (15.964°N; 73.994°E) at 652m in the morning, the authors along with Hemant Ogale saw a small blue butterfly basking on a small shrub. In the first instance, it superficially resembled the Monkey Puzzle *Rathinda amor*. The butterfly remained active for 15 minutes. Its flight was weak and not



sustained for long. The butterfly did not open its wings much. Authors photographed the butterfly and on comparison of its images with other species belonging to the Lycaenidae family and description and distribution mentioned in the literature (Varshney & Smetacek 2015; Bhakare & Ogale 2018), the species was identified as the Common Onyx *Horaga onyx cingalensis*.

Currently, four species of *Horaga* are known from India: *onyx*, *viola*, *syrinx*, and *albimaculata*. *H. onyx* is protected under Schedule II category of the Indian Wildlife Protection Act 1972, known to occur from Himachal Pradesh to Assam, Nepal, Bhutan, Arunachal Pradesh, Bangladesh, Myanmar, southern India, and Sri Lanka. In the Western Ghats, the subspecies of *Horaga onyx*, namely *cingalensis* is distributed from Kerala to Maharashtra (Varshney & Smetacek 2015). Here, we report its occurrence in the form of photographic evidence from Maharashtra which confirms its existence in the northern Western Ghats.

Purple-spotted Flitter *Zographetus ogygia* (Hewitson, 1866)

On October 19 2017, while photographing butterflies at Cotigao Wildlife Sanctuary, Cancona, southern Goa (14.972° N; 74.204° E, at 30m), the first author saw a small, fast-flying brownish-orange skipper adjoining to the dense evergreen forest trail near a fast flowing stream in riparian habitat. The



Underwings (UN) of *Zographetus ogygia*.

butterfly basked on the leaf of a shrub for a short while permitting the first author to photograph it. It was identified as the Purple-spotted Flitter *Zographetus ogygia* (Hewitson, 1866) on the basis of description and distribution mentioned in the literature (Sondhi et al. 2013; Bhakare & Ogale 2018). The Purple-spotted Flitter is a rare butterfly species which is recently known to occur in the Western Ghats of India (Nitin et al. 2018).

Presently, three species of *Zographetus* are known from India: *ogygia*, *rama*, and *satwa* (Varshney & Smetacek 2015). *Zographetus ogygia* (Hewitson, 1866) is known to occur in India from Sikkim to Arunachal Pradesh, northeastern India (Sondhi et al. 2013; Varshney & Smetacek 2015). Out of 336 butterfly species recorded from the Western Ghats, a total of 254 occur in Goa (Rangnekar & Dharwadkar 2009). Previously, the existence of species was not documented in the available literature on the fauna of Goa (Gaonkar 1996; Borkar & Komarpant 2002;

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Rangnekar 2007; Sharma & Borkar 2008). So far in the Western Ghats species have been observed in the states of Kerala and Karnataka with a single observation in the state of Goa and documented in the form of photographic evidence on the website www.ifoundbutterflies.org/sp/1022/Zographetus-ogygia. Hence, this article confirms its existence in the northern Western Ghats and represents its northernmost observations which increase the total number of butterflies recorded from Goa State to 255 species.

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- Omkar Adhikari¹ & Makarand Kulkarni²**
¹ Bombay Natural History Society, Hornbill House, Dr. Salim Ali Chowk, Mumbai, Maharashtra 400001, India. Email: proahaetulla@gmail.com (corresponding author)
² A-6, Om Gayatri Society, Manjarli, Badlapur (W), Maharashtra 421503, India. Email: makrndkaka@gmail.com
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 For communication, Email: daniel@zooreach.org





Longhorn beetle incidence on *Sida cardifolia* in Itanagar, Arunachal Pradesh



Adult longhorn beetles *Aristobia reticulator* seen scrapping stem.

In the present note, stem scrapping behaviour by the longhorn beetle *Aristobia reticulator* (Fabricius, 1781) (Coleoptera: Cerambycidae) on the Heart-leaf *Sida cardifolia* L. (Malvaceae) from Arunachal Pradesh is reported. Three specimens (numbered 3–5 in Table 1) collected are duly pinned and deposited in APRC/ZSI Museum (APRC/ZSI/IV/2493). For each plant, scrapping on the main stem and on axillary branches was recorded. A total

of 81 stem scrapings were counted on a random survey of 28 plants in the campus with an average count of 2.9 scrapings/plant and the highest recorded was 27. Twelve plants did not show mark of scrapings on their stems. Previously, *A. reticulator* was reported damaging economically important crops like litchi, guava, red gram, and China-rose (Kumawat et al. 2017); the authors have earlier reported beetles feeding on barks, thereby girdling stems, branches and



Table 1. Morphometric measurements (mm) of eight adult specimens. Specimen number 3, 4 and 5 were collected in the present study; other specimens (number 1, 2, 6, 7 and 8) were used from the collections of the APRC museum.

	Morphometric parameters	Specimens examined							
		1	2	3	4	5	6	7	8
1	Total length	42	28.3	32.74	27.92	34.99	35.6	29.56	25.75
2	Max. body width	11.99	9.99	10.8	9.92	12.31	11.34	11.1	9.1
3	Head length	3.75	7.28	3.61	7.47	8.27	8.8	8.43	6.78
4	Head width	5.88	5.52	6.03	5.57	6.17	6.24	6.04	5.41
5	Antennal length	33.6	28.48	32.17	28.34	36.02	29.84	26.4	25.09
6	Max. pronotum length	6.1	5.26	5.74	5.19	7.17	8.13	8.68	6.96
7	Max. pronotum width	10.08	8.52	9.53	7.89	10.01	10.46	9.11	7.68
8	Elytron length	23.64	21.13	22.06	20.84	25.67	25.7	23.23	19.42
9	Max. elytron width	5.57	6.14	6.84	6.09	7.69	7.12	6.46	4.82
10	Length of anterior leg	16.82	15.26	17.77	15.03	19.71	19.59	13.74	13.44
11	Length of middle leg	18.21	16.38	18.68	15.24	20.39	18.06	16.68	16.27
12	Length of posterior leg	19.39	19.83	17.67	18.28	21.5	21.44	16.27	15.96

soft twigs in East Siang District, Arunachal Pradesh. Agarwala & Bhattacharjee (2015) reported *Microcos paniculata* as the plant food of adult *A. reticulator* in the state of Tripura. The species is also reported from Sikkim, Assam, Manipur, and Meghalaya (Mukhopadhyay & Biswas 2000; Shylesha et al. 2000; Agarwala & Bhattacharjee 2015; Kariyanna et al. 2017). The incidence of *A. reticulator* on *Sida cardifolia* is a new record as food of adults.

The longhorn cerambycid beetles were seen scrapping on the stems or resting on the

stem during dusk and dawn. Beetles flew away or fell to the ground when disturbed. Morphometric parameters of eight individuals (three collected in this study and the remaining five are preserved specimens in APRC Museum) measured using digital callipers are provided in Table 1 and these show conformity with the size range recorded by Agarwala & Bhattacharjee (2015). The Heart-leaf Sida is a herb native to India with ayurvedic properties, its tonic is reported to possess rejuvenating, anti-inflammatory, libido-enhancing, and fat-burning properties due to the presence of a number of active



compounds, including alkaloids ephedrine, phytosterol, and potassium nitrate (<http://www.himalayawellness.com/herbfinder/sida-cordifolia.htm>).

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M. Jayashankar

Arunachal Pradesh Regional Centre, Zoological Survey of India, Senki Valley, Itanagar, Arunachal Pradesh 791113, India.

Present address: Department of Zoology, St. Joseph's College (Autonomous), 36, Lalbagh Road, Bengaluru, Karnataka 560027, India. Email: jay81zoology@gmail.com

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Sighting of Spot-bellied Eagle Owl *Bubo nipalensis* in Ramnagar Forest Division, Uttarakhand, India

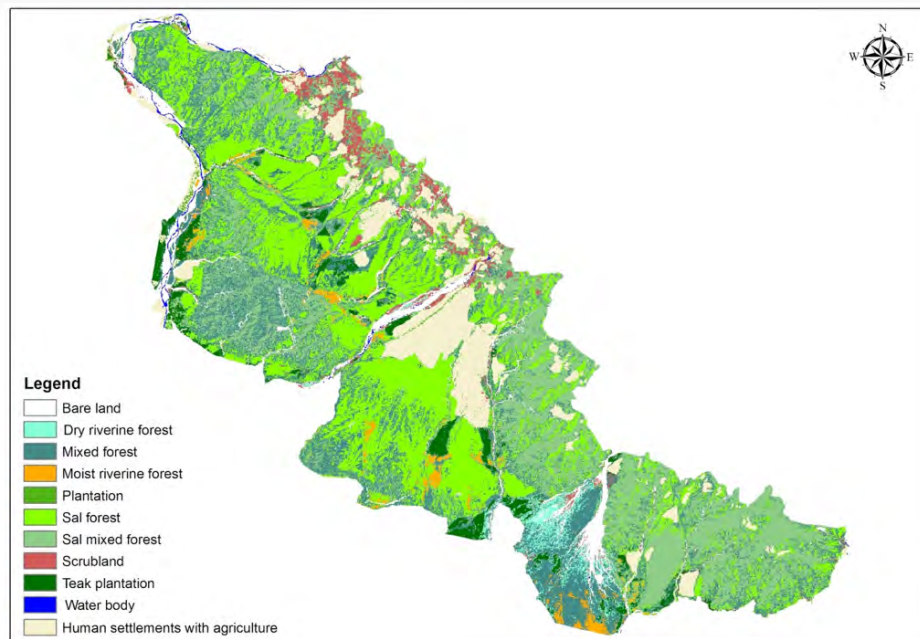


Spot-bellied Eagle Owl in Ramnagar Forest Division, Uttarakhand

Owls are top vertebrate predators with 243 species distributed across the world (Gill & Donsker 2017). Besides being the bio-indicator of ecosystem health (Sergio et al. 2004), they are vital for broader, ecosystem-level conservation. Their conservation inherently protects many other species, habitats and ecological functions, yet they are in crisis. As many as seven species are Critically Endangered, 22 are Vulnerable, eight are Endangered, and 23 are Near Threatened as per the IUCN Red List of Threatened Species (IUCN 2017). Habitat loss, pesticide use, vehicle collisions

and illegal trade are some of the causes responsible for their decline and current status (Sergio et al. 2004; Ahmed 2010).

Owls are represented by two families, viz., Tyonidae (Barn owls) and Strigidae (Typical owls). The Strigidae, chiefly arboreal and nocturnal, occupy a wide assortment of ecological niches and are found all over the world from the Arctic to cool temperate regions of the southern hemisphere except Antarctica and some oceanic islands. A total of 223 known species inhabit woodlands, forest edges, hot deserts, bare mountains



Habitat types in Ramnagar Forest Division, Uttarakhand.

or grasslands. Their evolutionary status is not well-established but they are considered to be monophyletic in origin (Mahmood et al. 2014) and are closely related to Musophagidae and distantly related to Falconidae.

Spot-bellied Eagle Owl *Bubo nipalensis* is a large, nocturnal raptor, native to Bangladesh, Bhutan, Lao People's Democratic Republic, Myanmar, Nepal, Vietnam, Sri Lanka, Thailand, China, Cambodia, and India (Birdlife International 2016). In the Indian subcontinent, its distribution ranges from sub-montane tracts and lower Himalaya up to c. 2,100m from Kumaon eastwards through Nepal, Sikkim, Bhutan, Assam Hills, north and south of Brahmaputra River, Nagaland, Manipur, and Bangladesh (Ali & Ripley 1981). Though the bird is resident, yet there are very few sighting reports of this species from different parts of India; Jaypal et al. (2005), Deshmukh (2008), Majumder et al. (2011) from Madhya Pradesh, Choudhary (2001) from Nagaland, Whistler & Kinnear (1935), Srinivasan (2013) from Andhra Pradesh. Occurrence of this species in Uttarakhand

has only been reported from Goriganga Valley, Kumaon Himalaya (Tak & Sati 1994). Since then, several avifaunal surveys have been conducted covering its distribution range in Uttarakhand (Bhatt & Joshi 2011; Kidwai et al. 2013), however, the occurrence of the species has not been reported.

During vegetation survey on 14 May 2017, a Spot-bellied Eagle Owl was sighted in Ramnagar Forest Division (RFD), Uttarakhand (29.275°N & 79.365°E). The owl was large, well camouflaged, brown with yellowish beak and two outwardly slanting erect black-and-white aigrettes or ear tufts above the head. Its breast was marked with crescentic more like heart-shaped spots. The bird was roosting on a *Holoptelea integrifolia* tree. On being disturbed, the bird flew and perched on a *Cassia fistula* tree. RFD encompasses an area 487km² and administratively divided into five forest ranges. There are 11 major vegetation types; sal forest, sal mixed forest, mixed forest, teak plantation, scrubland, moist riverine forest, dry riverine forest, barren land, waterbody, agriculture with human habitation, and plantation. The

specimen was sighted in Kaladungi range near Hanuman temple in a dry riverine forest. The habitat around the sighting location was well wooded dominated by *Holoptelea integrifolia*, *Dulbergia sisso*, *Acacia catechu* with low occurrence of *Aegle marmelos*, *Ardina cordifolia*, and *Ehretia laevis*. The shrub layer is largely composed of *Lantana camara*, *Adathoda vasica*, *Colebrookea oppositifolia*, and *Murraya koenigii*. It was around 1,500m away from Kaladungi Town.

The species is essentially a forest dweller and spends the day drowsing on densely foliated tree and does its hunting during the night within the forest (Ali & Ripley 1981). It is an opportunistic predatory species and is capable of preying upon Indian Peafowl, Jungle Fowl, Jackals, hare, fawns of Barking Deer, lizards, snakes, and fishes (Ali & Ripley 1981). The global population of the species has not been assessed and hence categorized as Least Concern under IUCN Red List of Threatened Species. In India too, the species has been listed under Schedule IV of Wildlife (Protection) Act, 1972, despite the fact that its sightings are not as common as of other sympatric species. Grimmer et al. (2006) commented on its probable presence in Uttarakhand as the region is within its distribution limits. Hence, current sighting is important as it confirms the presence of the species in Ramnagar Forest Division and opens up an opportunity to study the status of the species in order to ascertain its current conservation status.

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**Gargi Sharma¹, Tanveer Ahmed²,
Harendra Singh Bargali³, Neha Verma⁴ &
Afifullah Khan⁵**

^{1,2,5} Department of Wildlife Sciences, Aligarh Muslim University, Aligarh, Uttar Pradesh 202002, India.

^{2,3} The Corbett Foundation, Dhikuli, Ramnagar, Nainital, Uttarakhand 244715, India.

⁴ Ramnagar Forest Division, Ramnagar, Nainital, Uttarakhand 244715, India.

Emails: ¹ 12gargisharma@gmail.com, ² tanveerwildlife@gmail.com (corresponding author), ³ harendratcf@gmail.com, ⁴ amitneha@yahoo.com, ⁵ afifullah.khan@gmail.com

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First breeding record of the Small Pratincole *Glareola lactea* and River Tern *Sterna aurantia* in Periyar Lake, Periyar Tiger Reserve, Kerala, India



Small Pratincole juvenile. © C. Sivakumar

Periyar Lake is a large inland waterbody lying within the Periyar Tiger Reserve in Idukki District of Kerala. The lake is mostly open water with tall dead trees protruding out of the lake surface. These trees are used as nesting and resting sites by waterbirds. When water level recedes, submerged landmasses emerge out the lake surface forming small 'thuruthu' (Malayalam for island). To continuously monitor the waterbird population in Periyar Lake, the Periyar Tiger Conservation Foundation (PTCF) has been conducting monthly surveys from October 2016. The surveys have revealed that the Lake is home to 38 species of waterbirds and 15 of them breed here (Patrick unpub. data).

On 17 February 2019, during the routine monthly survey, a flock of 30 Small Pratincoles *Glareola lactea* were sighted at the second thuruthu, close to the Mullaperiyar Dam. On closer observation of the flock, some birds exhibited head bobbing, which was assumed as a courtship behaviour and hence the survey team intensified the search. The search yielded, three small eggs that were located under a boulder. These eggs, however, turned out to be White-browed Wagtail *Motacilla maderaspatensis* eggs.

In the March survey, the team did not record any eggs. On 17 April 2019 when the team surveyed the site again, 28 eggs were recorded in clutches of two. All the eggs were laid on the ground either exposed to the sun or under small stones. The eggs were



Small Pratincole eggs. © C. Sivakumar



Small Pratincole egg and chick. © C. Sivakumar

small (2–2.5cm in length, $n=16$). Egg colour was sandy brown to light green with speckles throughout the egg. Some of the eggs were darker. Eggs were laid in the barren portion of the Island (sloping north) and not among the grasses.

The same day three larger eggs were recorded in a single clutch (4.2cm, $n=3$). These eggs were laid slightly above the barren ground (on the flat top portion of the Island) and was lined with small sticks. Two River Terns *Sterna aurantia* were observed circling above the thuruthu. Since the Red-wattled Lapwing *Vanellus indicus* (which lays similar sized eggs) was not spotted in the vicinity nor its call heard, the eggs were assumed to be River Tern eggs. The presence of chicks during the next visit confirmed our assumption. These observations represent the first record of breeding of the two species in Periyar lake. Details collected during subsequent visits to

the second thuruthu are provided in Table 1. Small Pratincole is a recent colonist in Periyar Lake and was recorded for the first time in May 2018 (Sreekumar et al. 2018). River Tern was first reported in Periyar Lake in 1986 (Santharam 1989). They are usually seen in the Lake from November to May in less numbers. Poor rainfall (low water level exposing the thuruthu's for a long period) after the 2018 floods may have prompted them to nest in the thuruthu. Both the species are widely distributed in India and inhabit large rivers and lakes with sand banks, estuarine mudflats and ploughed paddyfields (Ali & Ripley 1987; Sashikumar et al. 2011). They are known to breed together (Bharucha et al. 1988; Neelakanthan 1990). In Kerala, most of the records of the two species were from the



River Tern eggs. © C. Sivakumar



River Tern chick. © C. Sivakumar

Table 1. Details collected from the nesting site.

Date	Small Pratincole			River Tern		
	Egg	Chick	Juvenile	Egg	Chick	Juvenile
17.iv.2019	28	-	-	3	-	-
26.iv.2019	18	7	-	-	2	-
04.v.2019	7	4	-	-	2	-
14.v.2019	3	3	2	-	-	-
30.v.2019	-	2	17	-	-	1

northern districts. Breeding records have come from Velayani, Kalady, Mangalam dam, Thirunnavaya, Shoranur, and Shendhurney dam (Neelakanthan 1990; Sashikumar et al. 2011).

In Periyar Lake, the thuruthus get exposed when water level recedes. This temporary habitat is utilised by bird species such as the White-browed Wagtail *Motacilla maderaspatensis* and Paddyfield Pipit *Anthus rufulus* for nesting. The inaccessibility of the thuruthus to potential egg predators such as the Mongoose (Striped-neck *Herpestes vitticollis* and Brown *H. fuscus*) make them safe nesting site for these bird species. Elephants *Elephas maximus*, however, are attracted to the islands because of the fresh grass and there is a chance that they might trample the eggs. Monitor Lizard *Varanus bengalensis* is also a potential threat. In addition, fishermen use the thuruthus for rest during the night. They leave behind fishing nets and breeding birds might get entangled and die as was the case with one White-browed Wagtail. In order to make the islands safe, accessibility must be denied at least during the breeding season (February to May) for fishermen. The discovery of the nesting site is yet another significant reason for not increasing the height of the stored water level in the Mullaperiyar dam to 46m, especially since the River Tern is a globally threatened species.

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J. Patrick David¹, C. Sivakumar², Silpa V. Kumar³ & Georgi Matchachan⁴

¹ Conservation Biologist, ² Tiger Monitoring Assistant, ³ Secretary, ⁴ Executive Director, Periyar Tiger Conservation Foundation, Thekkady, Kerala 685509, India. Emails: ¹ patdavid28@gmail.com (corresponding author), ² sivakumarwild@gmail.com, ³ silpa_vkumar@yahoo.com, ⁴ fdpttkdy@gmail.com

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Sighting of the threatened Lesser White-fronted Goose and Greater White-fronted Goose from Thol Bird Sanctuary, Gujarat, India



Lesser White-fronted Goose. Three individual were found mixed with a flock of Bar-headed Geese
© Naushad Theba.

‘Thol’ is an artificial lake near Thol Village in Mehsana District, Gujarat. This freshwater lake is surrounded by heavy marshes all around. During 1988, this lake was declared as “Thol Bird Sanctuary”. More than 300 species of various kind of birds were reported, including resident birds and migratory birds (Anon 2019).

In India, amongst few migratory species, Lesser White-fronted Goose *Anser erythropus* and Greater White-fronted Goose *Anser albifrons* are winter migratory species found in different aquatic regions. Lesser White-fronted Goose is listed in the IUCN Red list as a Vulnerable species (Birdlife International 2017). It is a rare and

sparse winter visitor to northern India. It has been occasionally recorded in various states of India, i.e., Kashmir, Uttar Pradesh, Haryana, West Bengal, Bihar, and Assam (Ali & Ripley 1983; Islam & Rahmani 2005; Rahmani 2012). The Greater White-fronted Goose is apparently a regular winter visitor to the northern plains, from the Indus Valley to eastern Uttar Pradesh, with scattered records elsewhere (Rasmussen & Anderton 2012). Greater White-fronted Goose has been previously recorded three times (twice in Little Rann of Kachchh and once in Thol Lake) and Lesser White-fronted Goose recorded only in little Rann of Kachchh in Gujarat (Ali 1954; Kaushik 2009; Shreeram & Deomurari 2014). Generally, it is found only



Lesser White-fronted Goose feeding on the grass © Naushad Theba.

two or three birds, separately or mixed with flocks of Greylag Geese *Anser anser* (Ali & Ripley 1983).

During our regular bird watching visit to Thol Lake on 13 February 2018, we observed many migratory bird species in various parts of the lake. While observing the birds near Bhimasan Village, which is a small grassland patch inundated with water (23.144°N, 72.406°E), we observed, Lesser White-fronted and Greater White-fronted Goose with a group of Bar-headed Goose *Anser indicus* and Graylag Goose *Anser anser*.

At 10.29h, in a small group of Bar-headed Goose, we marked three geese that were different from the others; their size was smaller and their color was darker. White color was very prominent at the frontal part of the beak

and also a yellow orbital-ring found as some descriptive parameters for identification of that particular bird. After putting a lot of efforts, observation and taking sufficient pictures it was confirmed as Lesser White-fronted Goose. To observe these birds carefully we used high ended instruments like high magnification binoculars and spotting scopes. We witnessed them for two long hours during which they were

found to be feeding on grass *Cynodon dactylon*.

They flew towards the front portion of the sanctuary when disturbed. We spotted the same group of geese together at around 13.45h. We observed them preening for about 20 minutes and they once again started feeding voraciously. On the very next day, 14 February 2018, at the same location the group of Lesser White-fronted Geese were found once again. During our follow up visit, on 17 February 2018, we found four individuals of Greater White-fronted Geese on the opposite side of the Campsite area (23.132°N, 72.411°E) of the Sanctuary. These birds were found foraging with flocks of Greylag Geese *Anser anser*. Thereafter, we observed three Lesser White-fronted Geese from 13 to 24 February 2018 at the above



Thol lake. LWFG—Lesser White-fronted Goose | GWFG—Greater White-fronted Goose.

mentioned location. We made one monitoring visit to follow up our work, but we could not find any of the Lesser White-fronted Geese after 25 February 2018 to the recent dates. We also observed a group of four Greater White-fronted Geese from 17 February to 8 March 2018, however, on 9 March 2018 only one individual was observed and we assume that these bird species started their return migration from that date onwards.

Based on our observation it was confirmed that the two species of geese were observed and reported for the very first during February–March 2018 in Thol Bird Sanctuary, although it was observed by others in various areas of Gujarat State; however, all sightings were based only on single birds and not a group. The present observation from this part of the Gujarat State may indicate that it might become a regular winter visitor in this area.

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Greater White-fronted Goose mixed with flocks of Greylag Geese
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Irshad N. Theba¹ & Ankita K. Patel²

^{1,2} GEER Foundation, Indroda Nature Park, P.O. Sector-07, Gandhinagar, Gujarat 382007, India.

Emails: ¹ irshadtheba@gmail.com (corresponding author),

² pankita1906@gmail.com

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Ayanikkad Heronry: a new addition to the heronries of Kerala, India



Breeding Indian Pond Heron

Heronries are defined as the breeding place for water birds. Heronries are formed by the aggregation of a large number of colonial breeders belonging to various families. In Kerala, large as well as small colonies composed of mixed species were recorded earlier (Subramanya 2005; Sashikumar et al. 2015). Kerala has about 15 species of resident and breeding water birds nesting in various heronries. Protection from predators, food availability are considered to be the major driving forces behind the communal breeding (Sashikumar et al. 2015). Heronries are noisy with foul smell, causing disturbances to the humans and provoke the public to deter the breeding communities. As the number of nests and the breeding

population provides an indication of the aquatic health, continuous efforts are needed to monitor the heronries. Along with that, documentation of the heronries provides information regarding the species breeding within an area, its current status and their existence. Earlier, heronry based studies were conducted throughout Kerala by Subramanya (2005) and Sashikumar et al. (2015). Later on Sashikumar et al. (2007, 2008, 2011) and Roshnath et al. (2013, 2015) monitored the status of heronries of Kannur and northern Kerala. Avifaunal studies of Kole wetlands of Thrissur (Sivaperuman & Jayson 2000), avifauna of Mangalavanam Bird Sanctuary (Jayson 2001), the status of Kumarakam heronry (Narayan et al. 2007),

assessment of Little Egret heronries in Malappuram, Palakkad, and Waynad districts (Seedikkoya et al. 2012) were the other major works carried out in the past. The aim of this study was to identify the breeding water bird species, population structure, nest abundance, preference to the nesting trees and threats posed by the breeding community of birds towards the inhabitants of Ayanikkad Island and vice versa.

Study area

The Kole Wetlands is one of the largest, highly productive and threatened wetlands in Kerala and has

been declared a Ramsar Site (2002), Important Bird Area since 2004 and a High Value Biodiversity Area since 2009 and it comes in Central Asian Flyway of migratory birds. The Kole wetlands lies between 10.333–10.666°N and 75.966–76.183°E Thrissur District, Kerala, India. The Ayanikkad Island or 'Ayanikkad thuruthu' (10.536°N & 76.127°E) is located near Chittilapilly (5km) in the northern part of Thrissur Kole wetlands (Fig. 1). This heronry is a land area (about 4ha) surrounded by Kole wetlands. The southeastern part of the land area is composed of coconut and plantain plantations and

other area has 32 human settlements.

Methodology

Heronry survey was carried out during June 2016 to October 2016 and June 2017 to December 2017. Direct observation method (Altman 1974) was adopted and counting was done with the help of binoculars (10x40) and a spotting scope. The heronry was visited twice every month and the species were identified using standard field guides (Ali 2003; Grimmet et al. 2011).

The information on the species of nesting bird, number of nests of each species, number of nesting trees, nesting tree species, position of the nest, nest height, DBH of nesting trees and geographical co-ordinates of the location using global positioning system were also recorded from the heronry. Secondary data regarding various aspects of heronry was collected from the local people.

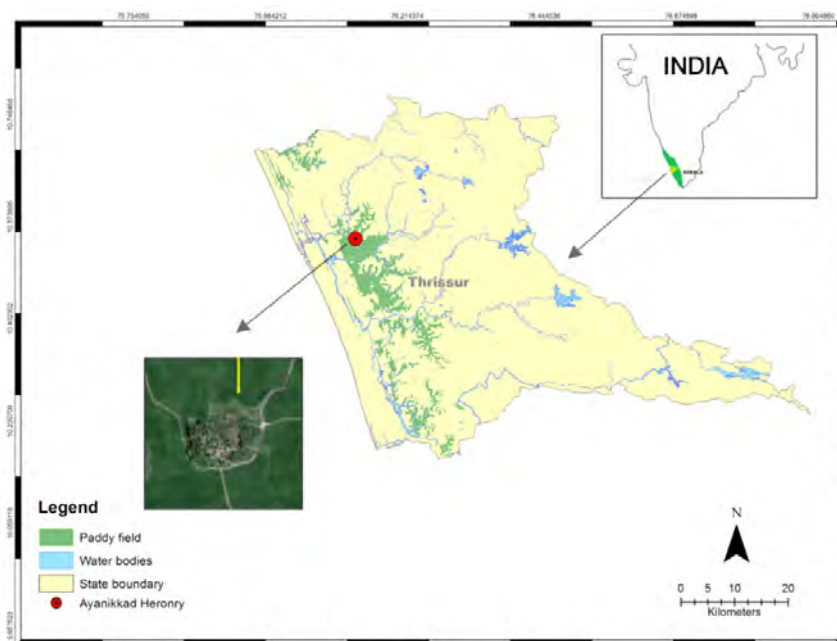


Fig. 1. Location of Ayanikkad heronry in Thrissur District.

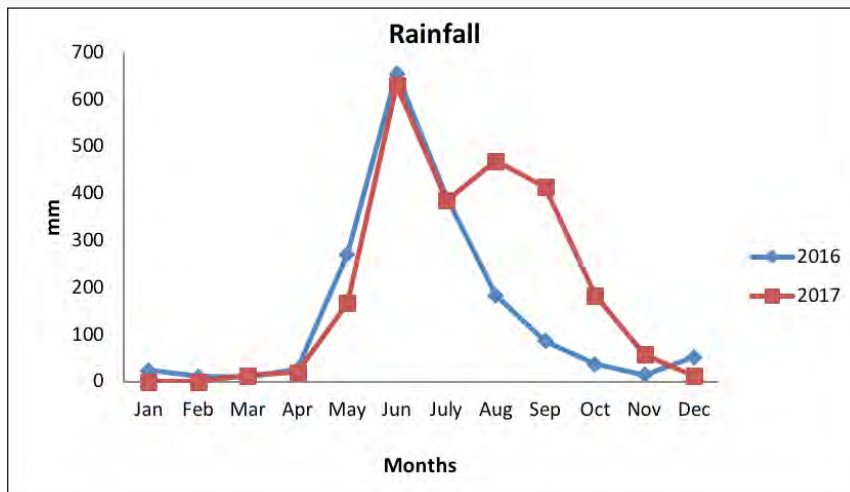


Fig. 2. Rainfall during the years 2016 and 2017 (Source: Kerala Agricultural University).

Results

Ayanikkad heronry has two species of water birds: Little Cormorant *Phalacrocorax niger* belonging to *Phalacrocoracidae* and Indian Pond Heron *Ardeola grayii* to *Ardeidae*. Little cormorant was the most abundant species with 61 nests in 2016 and 77 nests in 2017 while Indian Pond Heron as the least one with six and 48 nests in 2016 and 2017. In 2016, Little Cormorant population was highest with 61 nests (July) (Fig. 3) and with a population of 149 individuals (August) (Fig. 5). Little cormorant was found throughout the survey period but as in the case of Indian Pond Heron, it was seen only during the mid of June to September. A population

of 19 individuals of Indian Pond Heron (September) (Fig. 5) with nine nests (August) (Fig. 4) was recorded from this heronry; in 2017 heronry census, 77 nests (October) (Fig. 3) of Little Cormorant with a population of 163 individuals (Fig. 6) were recorded. Both Little Cormorant and Indian Pond Heron was found throughout

the survey period. Similarly, Indian Pond Heron population was highest during October with 81 individuals (Fig. 6) and with 48 nests in September (Fig.4).

Most nests of Little Cormorants were found during July and August (in 2016) and during September and October (in 2017) (Fig. 3). Whereas maximum number of nests of Indian Pond Heron was spotted during July and August (2016) and September and October (2017) (Fig. 4). Abundance of birds in the heronry during various months of breeding season in 2016 and 2017 are given above (Fig. 5 & Fig. 6). Usually with the advent of South-west monsoon, the waterbirds initiate breeding. The increase in water level in

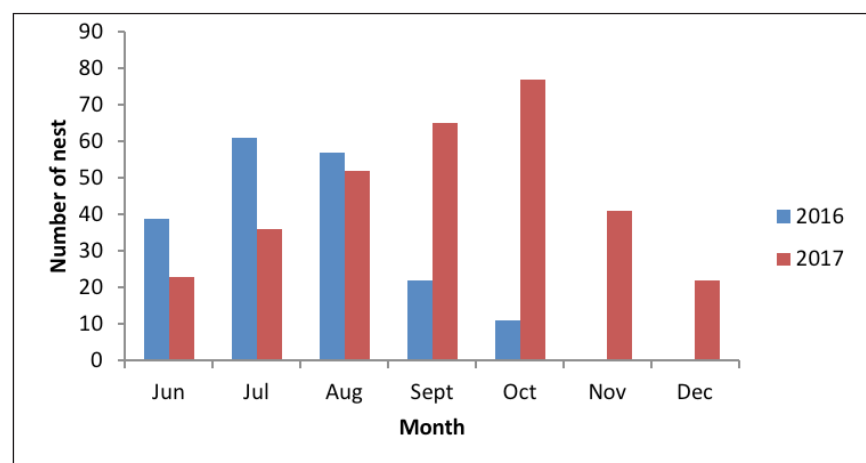


Fig. 3. Nest of Little Cormorant during 2016 and 2017.

Table 1. Nesting tree species and number of nests during 2016 and 2017.

	Common name	Scientific Name	DBH	2016	2017
1	Mango tree	<i>Mangifera indica</i>	68	8	10
2	Tamarind tree	<i>Tamarindus indica</i>	34	4	8
3	Tamarind tree	<i>Tamarindus indica</i>	26	4	12
4	Mango tree	<i>Mangifera indica</i>	44	5	12
5	Mango tree	<i>Mangifera indica</i>	110	10	13
6	Jackfruit tree	<i>Artocarpus heterophyllus</i>	29	13	14
7	Takoli	<i>Dalbergia lanceolaria</i>	64	6	13
8	Tamarind tree	<i>Tamarindus indica</i>	94	1	-
9	Mango tree	<i>Mangifera indica</i>	182	-	2
10	Kaini	<i>Trema orientalis</i>	92	-	4
11	Banyan tree	<i>Ficus religiosa</i>	310	-	13
12	Mango tree	<i>Mangifera indica</i>	74	-	1
13	Kaini	<i>Trema orientalis</i>	75	-	18
14	Mango tree	<i>Mangifera indica</i>	79	16	5
		Total number of nests		67	125

the Kole wetlands leads to the entry of migrating fishes for breeding into the Kole wetlands and these fishes form the main constituent of the diet of breeding birds. In 2016, South-west monsoon struck Kerala during May itself and breeding started and by the end of June, the rainfall decreases, eventually leading to the end of the breeding season by October. Whereas in 2017, during May, the rains were less and this may have resulted in delayed nesting activities; breeding was initiated by the mid-June. Later, with the onset

of North East Monsoon in Kerala (Fig. 2) many Little cormorants in the heronry prepared for the second breeding and several nests were spotted in October.

The Ayanikkad heronry comprises 14 nesting trees belonging to six species (Table 1). Little cormorants nested on all trees species except *Ficus religiosa* whereas Indian pond heron selected all the tree species. Nest occupancy (%) of Little Cormorant and Indian Pond Heron in the various trees during the 2016 and 2017

is given in Table 2. The study recorded a vertical alignment of the nesting birds in the same tree. In



Poaching of Little Cormorant.

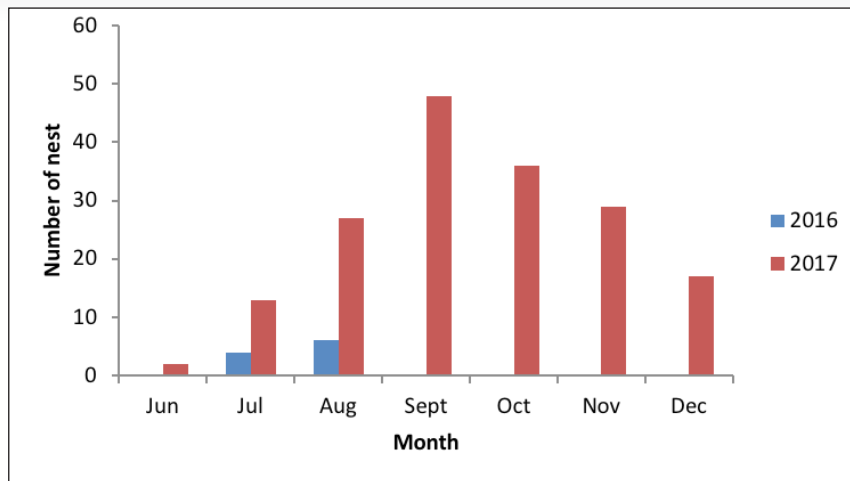


Fig. 4. Nest of Indian Pond Heron during 2016 and 2017.

several trees where Little Cormorant and Indian Pond Heron nest together, the Indian Pond Heron nest in the lower canopy along the main branches and Little Cormorants nest in the upper canopy. Indian Pond Heron nests were recorded in the trees which are within the human settlements while Little Cormorants were seen both inside the human settlements and along the fringes of the island. Most of the Little Cormorant nests, however, are found inside the human settlements. In general, Indian Pond Heron nests are constructed (8 ± 2.5 m higher from the ground) using sticks of various sizes arranged in a peculiar fashion and kept along the main branches of the tree. Little Cormorants construct the

nest (10 ± 5.7 m above the ground) using leaves and twigs, in a circular fashion and show strong preference to the mid and top canopy. Little Cormorant population construct nests close to each other, with an inter-nest gap of 2 ± 1.5 m and that of Indian Pond Heron is about 4 ± 2.2 m. The presence of House Crow *Corvus*

splendens and Greater Coucal *Centropus sinensis* were observed in the heronry but their predation on heronry birds was not observed. By the end of October (2016) and December (2017) the waterbird nests were occupied by house crows.

The inhabitants of the Ayanikkad Island were worried of the breeding community of birds. The foul smell and remnants of fishes and frogs falling down from the nests also creates several hygienic issues for the people. Apart from this, the dead and decayed birds and left out food materials attracted several insects like ants, bees, mosquitoes etc. Several inhabitants were affected with Dengue fever



Poaching of Indian Pond Heron.

(n=17) and in the prevailing situation the inhabitants were forced to deter the breeding colonies from the Island. They have experimented many measures like throwing stones, cutting down the branches of nesting tree, bursting of crackers etc. But all these mitigative measures were successful only during the initial stages. Later on, the inhabitants started the consumption of eggs and chicks. Ayanikkad Heronry was not recorded in the history of heronry census conducted so far in Kerala, so we are reporting this heronry as an addition to the heronries of Kerala.

Conclusions and Recommendations

According to Asian Waterbird

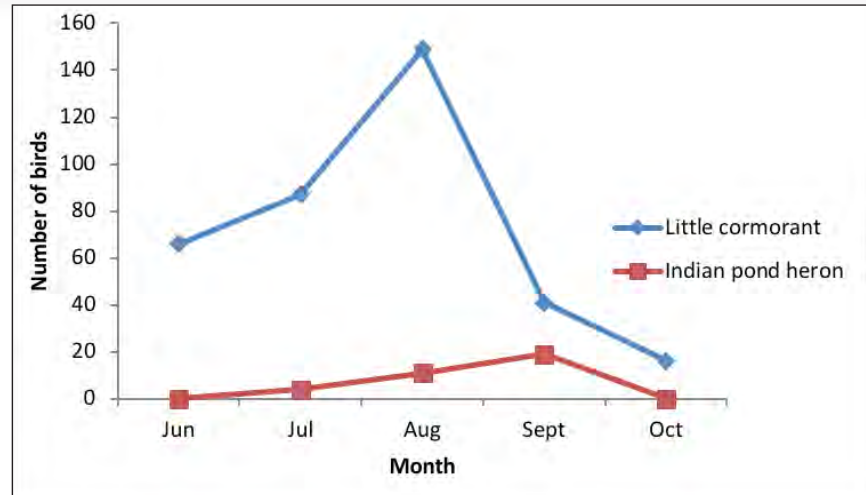


Fig. 5. Abundance of birds in the heronry during 2016.

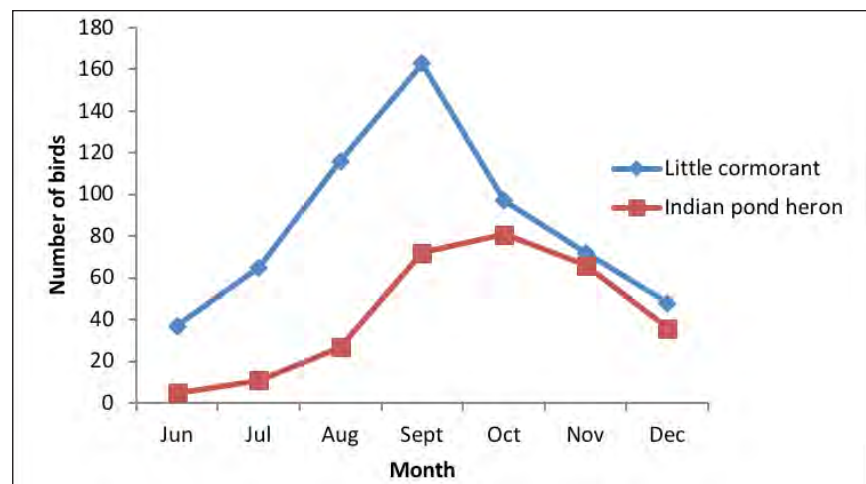


Fig. 6. Abundance of birds in the heronry during 2017.



Young one of Little Cormorant.

Census data regarding the past three decades, Little Cormorants as well as Indian Pond Heron population is on decreasing trend in Kole wetlands (Nameer et al. 2015). Monsoon does impact the breeding cycle of waterbirds and the water level of Kole wetlands is also having an important effect on the breeding of waterbirds. In

Table 2. Nest occupancy (%) in different trees during the 2016 and 2017.

	Tree species	2016		2017	
		Little cormorant	Indian Pond heron	Little cormorant	Indian Pond heron
1	<i>Dalbergia lanceolaria</i>	9.84	0.00	15.58	2.08
2	<i>Tamarindus indica</i>	11.48	33.33	20.78	8.33
3	<i>Mangifera indica</i>	57.38	66.67	38.96	27.08
4	<i>Tremaorientalis</i>	0.00	0.00	11.69	27.08
5	<i>Ficus religiosa</i>	0.00	0.00	0.00	27.08
6	<i>Artocarpus heterophyllus</i>	21.31	0.00	12.99	8.33

2017 the intensity of rain was heavier than in 2016 and also with the timely intervention of environmentalists, illegal fishing in monsoon flood plains were decreased and the fish population was more compared to the past (Greeshma P., pers. obs.). Thus the waterbirds were able to undergo second breeding. Indian pond heron population had increased compared to cormorant population in the Ayanikkad heronry (n=81). Trees (exclusively Banyan tree and tamarind tree) with thick canopy serve as the best nesting place for the pond herons. The major part of the heronry tree species is composed of *Mangifera indica* (42.86%). As most of the mango trees are within human settlements both species show highest affinity

to these trees for breeding. Bird droppings with foul smell contaminate all the water sources inside the island and the people were forced to cover all the wells. The leaves of vegetables and plantain were covered with the dropping and people

were not able to use these leaves for cooking purposes. People opined that, the acid in the bird droppings lead to the wilting of several plants and leaves of coconut trees. In order to deter the birds, inhabitants practiced several techniques. Consumption



Leaves contaminated with the dropping of breeding birds.

of eggs and chicks are the major anthropogenic disturbances faced by the breeding community, which in turn leads to the population reduction. Irrespective of all these disturbances, 2017 heronry census data proved that waterbirds can withstand the anthropogenic stress and hindrances. Awareness programmes and incentives to the inhabitants should be initiated for the betterment of the conservation of the heronry and also effective hygienic and health care measures should be taken to decrease the problems due to the breeding birds.

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P. Greeshma¹ & E.A. Jayson²

^{1&2} Wildlife Department, Kerala Forest Research Institute, Peechi, Thrissur, Kerala 680653, India.
Emails: ¹ greeshmap@kfri.res.in (corresponding author); ² jayson.58@gmail.com

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World Wetlands Day 2020 celebration at ENVIS-RP, Institute of Wildlife Sciences, University of Lucknow

The theme for World Wetlands Day 2020 is “Wetlands and Biodiversity”. It was celebrated by the ENVIS – RP, Institute of Wildlife Sciences, ONGC for Advanced studies, University of Lucknow in collaboration with the U.P. State Biodiversity Board, Lucknow and Biodiversity and Wildlife Conservation Lab, Department of Zoology, University of Lucknow. The ENVIS-RP organized a field visit to Nawabganj Bird Sanctuary, Unnao on 2nd February 2020 for schools and college students. More than 100 students participated in the wetlands field visit and water bird census.

On this occasion Coordinator of ENVIS-RP Prof. Amita Kanaujia said, Wetlands are very important for the environment as well as places of many water birds, terrestrial animals, etc. Further Amita Kanaujia said it is necessary to appraise the students about the importance of wetlands and the need to conserve them. All students during the field visit, learned about the wetlands, its biodiversity and prepared a checklist of water birds of Nawabganj Bird Sanctuary.

The Uttar Pradesh Bird Festival -2020 held in the Sir Sarovar Bird Sanctuary at Keetham, Agra was inaugurated by State Environment, Forest and Climate Change Minister Shri Dara Singh Chauhan and Minister of State Forest Shri Anil Sharma, PCCF, CCF, the ACCF and also other forest officer. On this occasion, ENVIS-RP Team set up an



Participants during water bird's census: identification and observation.

awareness stall for awareness regarding the bird's ecology, habitat and threats to wetlands and birds. Prof. Amita Kanaujia delivered a lecture on Vultures Silent Guardians of Nature. Two books titled Sarus Crane: The Icon of Indian Wetlands and Vulture Silent Guardians of Nature was released by the



Lecture delivered by Dr. Rajesh Prakash Chaube and Prof. Amita Kanaujia on wetlands biodiversity and conservation.

Lucknow Dr. Rajesh Prakash Chaube delivered a lecture on “Diversity of Water birds” and told about wetlands and other aquatic habitat of birds. He told about the importance of wetlands in survival of water birds. One more lecture on “Conservation of wetlands in reference to ground water” was delivered by Dr. Venkatesh Dutta, Associate Professor, School of Environmental Sciences, Babashaeb Bhimrao Ambedkar (Central) University, Lucknow.

State Environment, Forest and Climate Change Minister Shri Dara Singh Chauhan and Minister of State Forest Shri Anil Sharma, PCCF, CCF and the ACCF.

In the continuation, a One Day Workshop on **Wetlands and Biodiversity** was organized on 4th February 2020. Approximately 80 students from more than 15 schools, colleges and universities participated in the workshop. During the workshop Ornithologist from

*Submitted by: Adesh Kumar &
Amita Kanaujia, University of
Lucknow, Lucknow.
Email: adesh.science@gmail.com*



Participants of Nawabganj Bird Sanctuary, Unnao, Uttar Pradesh field visit.

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.

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Articles should be typed into a Word format and emailed to zooreach@zooreach.org. Avoid indents, all caps or any other fancy typesetting. You may send photos, illustrations, tables.

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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Associate Editor: Daniel B. Ayyachamy

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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

Post Box 5912, 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti, Coimbatore, Tamil Nadu 641035, India

Phone: +91 9385339862 & 9385339863

E-mail: zooreach@zooreach.org

Website: www.zoosprint.zooreach.org,

www.zooreach.org



FACILITATING CONSERVATION PLANNING



Course description: Planning for the recovery of threatened species or ecosystems is a complex process. Often multiple stakeholders and interests need to be balanced, alongside those of the biological units we value. Navigating through this socio-cultural 'minefield' takes a suite of skills which are rarely covered within existing degree or post-graduate biology course programmes.

As conservation professionals, we can find ourselves in the challenging position of having to manage inter-stakeholder disagreements over how best to respond to a given conservation problem. Likewise, we may end up in a deadlock with other colleagues over what the 'right' decision is, to resolve a conservation issue. Facilitation skills can provide us with the confidence and competence we require to work through such situations and often end up with good decisions that are endorsed by everyone.

These skills can be particularly valuable for various aspects: species conservation planning processes or site-specific projects/problems.

In fact, wherever problems are complex or decisions require the collaboration of multiple individuals or organisations, facilitation skills will help improve the outcome.

Learning outcomes: By the end of this course participants will be able to:

- Demonstrate how to facilitate effective workshops and meetings
- Apply the 'One Plan Approach' to species conservation planning processes
- Deal with conflict under different circumstances
- Demonstrate effective listening skills
- Describe how to provide feedback to individuals to improve relationships and work effectively

The courses are offered free and will be held at the NCF office in Mysore from 23-26 March 2020. Limited travel and/or accommodation support will be available for a few candidates.

Funded by:
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Resource people: Jamie Copsey (Director of Training, IUCN Conservation Planning Specialist Group), Sanjay Molur (Convener, CPSG South Asia/Executive Director Trustee, Zoo Outreach)

Co-ordination: Aparajita Datta

Duration: 4 days

Capacity: 20 participants

Dates: 23–26 March, 2020

Location: NCF office, Mysore

Course format: This will be a blended course, mixing pre-course online lectures and knowledge checks with a four-day face-to-face taught workshop in which participants spend much of their time in facilitated scenarios to develop their skills.

WHO CAN APPLY:

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