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Biodiversity survey in Gamgul Siyabehi Wildlife Sanctuary

Introduction

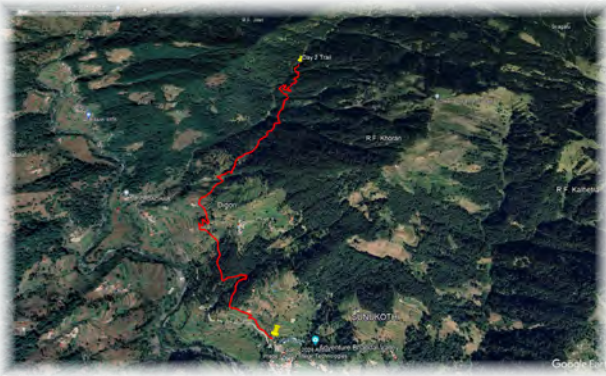
Our team was invited by the wildlife division of the Himachal Pradesh Forest Department to participate in a three-day biodiversity survey conducted on 24–28 May, in and around the Gamgul Siyabehi Wildlife Sanctuary. Located in the Bhandal valley in Salooni tehsil of the Churah division, it is one of the most picturesque sanctuaries in the Chamba District. The survey focused on recording the study area's biodiversity with special emphasis on birds and mammals. Covering an area of nearly 108.85 km², the vegetation consists of mixed broad leaved and coniferous forests composed primarily of *Cedrus deodara*, *Betula utilis*, *Abies pindrow*, *Picea smithiana*, Brown Oak, *Rhododendron campanulatum*, shrubs and alpine pastures. Although the survey was initially planned for five days, due to a change in weather conditions and difficult trails due to snow, it could be conducted only for three days.

Methodology

The methodology utilised in the study was to follow forest trail paths at an even pace and record any wildlife found along the way. To ensure proper documentation of the recorded species, we used the Geotracker App to record the trails and the Polaris App to record the GPS. The species name, number, and time for each sighting were recorded using our smartphones. The surveys were conducted in the early morning and evening hours when wildlife activity is typically higher.

Our team was divided into two groups to cover more area. Group A, consisting of Amrin and Kritika surveyed the trails near the forest rest house, in Bhandal accompanied by a local guide. Group B, consisting of Vishal, Vinod (Forest guard), Subhash, and Vipin (Forest mates) trekked 6 km from Langera to reach the sanctuary area one day prior to the survey. The team endured a climb of a steep 85-degree ascent to reach





Day 1 Trail.



Day 2 Trail.



Day 3 Trail.

© P. Kritika.

their base camp in Kiyada Dhaar. On the way, the team encountered several Black Bear scats and recorded the GPS locations for each finding to support as ad libitum data in the survey. However, the turn of weather brought rain and winds which made it difficult for the team to navigate in the darkness.

Day 1, 25 May 2024

Group A: Went on a 5 km trek along the forest trail with a local guide. Data was recorded from

06:39 am to 09:12 am. The steep and rocky trail was challenging due to the accumulation of leaf litter and the rain from the previous day which created a slippery surface. There were no mammals spotted during the entire trail but birds like Coal tits, Black Bulbuls, Great Barbets, and Streaked Laughing Thrush were recorded. Further along the trail, the dense canopy of the pine trees made it difficult to sight the birds. The team also encountered migrating shepherds grazing their livestock along the trails.

Group B: Started the survey after sunrise struck a warm glow over the landscape. The landscape was dominated by Himalayan oak *Quercus semicarpifolia* and Himalayan Birch *Betula utilis* trees. The abyss was filled with calls of Himalayan Monal and Koklass pheasants. Each call was recorded along with GPS readings to keep track of indirect signs. The team was flabbergasted to witness a Monal in flight which was the most striking finding of the day. The team went on another trek in the evening and noted that the forest was quieter in comparison to the morning hours with a few calls of Monals. There was not much wildlife recorded except a few flowering plants like *Anemonastrum obtusilobum*, *Thermopsis barbata*, etc.

Day 2, 26 May 2024

Group A: Following the same protocols, the team started the survey at 06:23 am and followed a different route guided by the local guide which started along farmland to reach the forest patch. Due to the lack of thick canopy trees, it was easier to spot birds near the farmlands than inside the forest. Hence, more birds were recorded near the farmlands than inside the forest. The team encountered some patches where there was no way ahead and they had to walk in the middle of the forest with a rough trail but since the local guide was present, there was nothing to worry about.



Group B scanning the landscape. © Vipin.



Understanding flora. © Vinod.



Documenting Black bear pug marks. © Vinod.

There were no mammals recorded in the trail and the bird calls were very faint, almost nil in the forest section. After walking for 4.6 km the team encountered a damaged trail and had to end the survey at 08:29 am. Species spotted included Himalayan Bulbuls, Coal tits, Ravens, Slaty-headed Parakeets, etc.

Group B: The team climbed up to an altitude of 3500 m from where it was possible to scan a larger area of the sanctuary. At the top of the mountain, multiple scats of Brown Bears were recorded. On the way back the team encountered a Red Fox and came across more Black Bear scats.

During the evening trek, a few calls of Monal and Koklass pheasants were recorded.

Day 3, 27 May 2024

Group A: On the final day, the team started at 06:27 am and the route was completely different than the previous two. Half of the trail was along the roadside and half of it was inside the forest. After trekking for about 5 km, the survey ended at 09:23 am.

The trail along the forest patch was a bit challenging in comparison to the last two days as parts of the trails were damaged at a few patches and the team had to cross a stream with running water. In comparison to the last two days, more birds were spotted along the roadsides and farmlands than in the forest patch. A Rhesus Macaque was observed on the pine trees on the roadside.

Group B: Due to the lack of ration and the scarcity of drinking water due to the drying up of the water source due to extreme heat, the team decided to move back to Bhandel. The journey started on the morning of 27 after loading their luggage on mules. On the way back, the team encountered fresh Black



Black bear scat.



Brown Bear scat.

© Vishal Ahuja.

Bear scats at different sites and indirect signs like broken branches, bent grasses, etc that indicated that the bear had climbed down following the same trail. The team spotted a Red Fox meticulously searching for Himalayan Pikas in the mud holes.

Along the path, the team came across *Spirea canescens* shrubs which had grown very tall due to not being cut by the locals. One might easily misidentify the shrub as a tree due to its morphological resemblance to a tree.

A local team member explained that Black Bears and Chamba Sacred Langurs are fond of eating its seeds and the animals often climb on top of the shrub’s canopy while foraging. The shrub also is beneficial to the local shepherds as they provide food and shade for their livestock hence, they avoid cutting its branches.

Results

Flora

The time of the survey coincided with the blooming season of the high-altitude pastures enabling the documentation of a diverse variety of floral species.

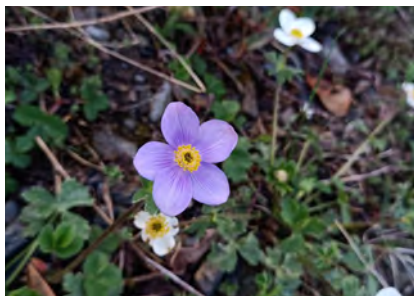
Fauna

The biodiversity survey in Gamgul Siyabehi Wildlife Sanctuary documented a diverse group of bird species. Mammal sightings were less frequent, but present including the direct observation of a Red Fox and indirect evidence of Black Bears and Brown Bears through scat findings. A summary of all the bird species recorded during the entire survey is given below.

Table 1. Summarises a list of the flora species recorded during the survey.

	Common Name	Scientific Name
1	Bell Rhododendron	<i>Rhododendron campanulatum</i>
2	Black Pea	<i>Thermopsis barbata</i>
3	Blue Himalayan Anemone	<i>Anemonastrum obtusilobum</i>
4	Dark Blue Gentian	<i>Gentiana carinata</i>
5	Dense-Raceme Corydalis	<i>Corydalis govaniana</i>
6	Drumstick Primrose	<i>Primula denticulata</i>
7	Grey Stem Spirea	<i>Spiraea canescens</i>
8	Himalayan Bergenia	<i>Bergenia stracheyi</i>
9	Himalayan May Apple	<i>Podophyllum hexandrum</i>
10	Himalayan Meadow Primrose	<i>Primula rosea</i>
11	Himalayan Spirea	<i>Spiraea canescens</i>
12	Himalayan Thimbleweed	<i>Anemonastrum obtusilobum</i>
13	Himalayan Trillium	<i>Trillium govanianum</i>
14	Marsh Marigold	<i>Caltha palustris</i>
15	Spurge	<i>Euphorbia sp.</i>

Flora species recorded during the survey.



Anemonastrum obtusilobum.



Bergenia stracheyi.



Caltha palustris.



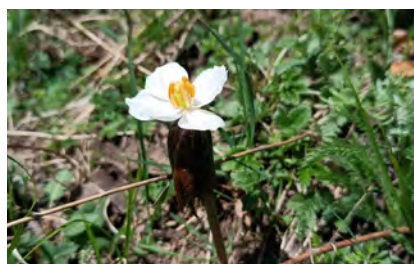
Euphorbia sps.



Gentiana carinata.



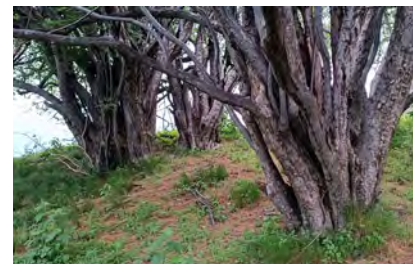
Corydalis govaniiana.



Podophyllum hexandrum.



Primula denticulata.



Woody branches of *Spirea canescens.*



Rhododendron campanulatum.



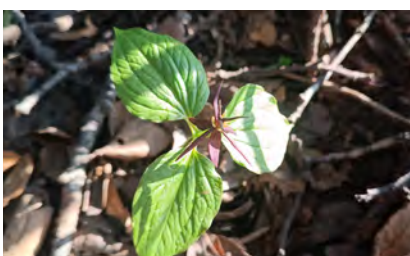
Spiraea canescens.



Primula rosea.



Thermopsis barbata.



Trillium govaniianum.

Fauna species recorded during the survey.



Common Raven.



Russet Sparrow.



Tickell's Leaf Warbler.



Grey Bushchat.



Streaked Laughing Thrush.



Great Barbet.



Blue Whistling Thrush.



Grey-hooded Warbler.



Rock Bunting.

© Amrin Ansari.

Scenic landscape of the survey area.

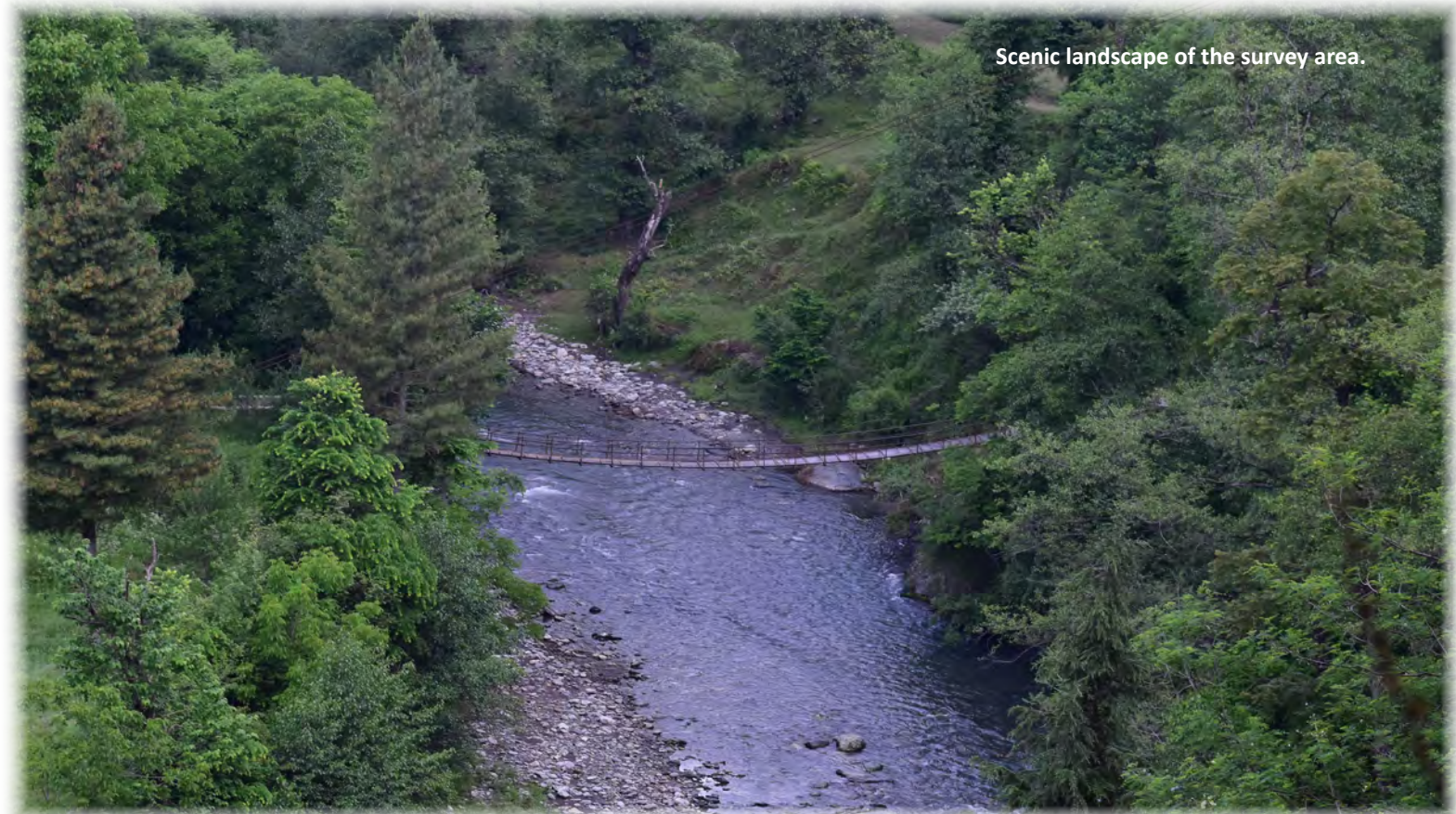


Table 2. Summarises a list of the bird species recorded during the survey.

	Common name	Scientific name
1	Ashy Drongo	<i>Dicrurus leucophaeus</i>
2	Barn Swallow	<i>Hirundo rustica</i>
3	Black Bulbul	<i>Hypsipetes leucocephalus</i>
4	Black-throated Tit	<i>Aegithalos concinnus</i>
5	Blue Whistling Thrush	<i>Myophonus caeruleus</i>
6	CoalTit	<i>Periparus ater</i>
7	Common Myna	<i>Acridotheres tristis</i>
8	Common Raven	<i>Corvus corax</i>
9	Common Stonechat	<i>Saxicola torquatus</i>
10	Eurasian Collared Dove	<i>Sterptopeli adcaocto</i>
11	Great Barbet	<i>Megalaima virens</i>
12	Green-backed Tit	<i>Parus monticolus</i>
13	Grey Bushchat	<i>Saxicola ferreus</i>
14	Grey-hooded Warbler	<i>Phylloscopus xanthoschistos</i>
15	Himalayan Bulbul	<i>Pycnonotus leucogenys</i>
16	Himalayan Monal	<i>Lophophorus impejanus</i>
17	House Sparrow	<i>Passer domesticus</i>
18	Long-tailed Minivet	<i>Pericrocotus ethologus</i>
19	Red-rumped Swallow	<i>Cecropis daurica</i>
20	Rock Bunting	<i>Emberiza cia</i>
21	Rufous Sibia	<i>Heterophasia capistrata</i>
22	Russet Sparrow	<i>Passer rutilans</i>
23	Scaly-bellied Woodpecker	<i>Picus squamatus</i>
24	Siberian Stonechat	<i>Saxicola maurus</i>
25	Slaty-headed Parakee	<i>Psittacula himalayana</i>
26	Spotted Dove	<i>Spilopelia chinensis</i>
27	Square-tailed Drongo Cuckoo	<i>Surniculus lugubris</i>
28	Streaked Laughing Thrush	<i>Trochalopteron lineatum</i>
29	Tickell's leaf warbler	<i>Phylloscopus affinis</i>

Acknowledgement

Grateful acknowledgements are made to Mr. K.S. Jamwal, DFO Wildlife Division, and Chamba Forest Department for inviting us to conduct this survey and hosting us throughout our stay. We would also like to thank our fellow forest guards and local guides who accompanied us in our study and provided insightful information about the local fauna. They helped us navigate through the challenging trails and ensured our safety. Our team is very grateful to receive this opportunity to contribute to the efforts towards understanding Chamba's biodiversity as part of our ongoing efforts to conserve the Chamba Sacred Langur under the Himalaya Langur Project, and to rewild the degraded landscape & rebuild livelihoods under the Himalayan Restoration Project.

Citation: Ahuja, V., P. Kritika & A. Ansari (2024). Biodiversity survey in Gamgul Siyabehi Wildlife Sanctuary. HLP-HRP Update. *Zoo's Print* 39(6): 01–07.



Additional sighting record of melanistic Northern Palm Squirrel from Gujarat

In mammals, the pigmentation of their coat, skin, and eyes is determined by melanin, which exists in two distinct forms: Eumelanin, responsible for producing brown or black colour, and pheomelanin, which contributes to the manifestation of red or yellow tones (Ito & Wakamatsu 2003; Barrull & Mate 2012).

On 9 March 2024, at 1600 h near Paturan Village, Junagadh, Gujarat (21.5897N, 70.5833E), we spotted a dark, small animal with a tail from approximately 300 m away. The animal was photographed for documentation. After observing the unidentified species for a few minutes, we confirmed it to be a melanistic male Northern Palm Squirrel *Funambulus pennantii* Wroughton, 1905; The Northern Palm Squirrel, also recognized as the Five-striped Palm Squirrel, is classified under family Sciuridae of order Rodentia.

This anomalous squirrel was observed foraging alongside



Melanistic and normal body coat of Northern Palm Squirrel.
© Devenchauhan.



Melanistic body coat of Northern Palm Squirrel. © Ravi Patel.

two individuals with normal coat colour. The authors maintained a specific distance during observation and

continued monitoring for two hours. The melanistic squirrel displayed a body condition similar to that of other



members of the squirrel species, exhibiting no physical abnormalities, and its dark black coat appeared healthy and glossy. According to a review done on colour aberration in Indian mammals from 1886 to 2017 by Mahabal et al. (2019) a total of 56 mammalian species out of 421 in the Indian subcontinent exhibited various colour aberrations. Notably, within India, 61 animals of different species were reported to manifest melanistic morphologies.

Karan et al. (2020) reported two melanistic Five-striped Palm Squirrel from Vadodara District, Gujarat in 2009 and 2020. Here, we are reporting third instance of melanistic squirrel from the state of Gujarat.

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Citation: Chauhan, D., A. Chavada & R. Patel (2024).

Additional sighting record of melanistic Northern Palm Squirrel from Gujarat. *Small Mammal Mail* #451, In: *Zoo's Print* 39(6): 08–09.



#250
21 June 2024

Record of colour aberrant Indian Flapshell Turtle from Pune, Maharashtra

The Indian Flapshell Turtle *Lissemys punctata* (Bonnaterre, 1789), is a soft-shell turtle belonging to the family Trionychidae of the order Testudines. It is seen in freshwater aquatic habitats across India. It is known to be an opportunistic omnivore and feeds primarily on aquatic vegetation, plant leaves, fruits, and aquatic animals (Bhupathy & Kurt 2010).



Colour aberrant Indian Flapshell Turtle *Lissemys punctata* from Pune, Maharashtra. © Shubham Pande.

On 10 June 2021, at 1500 h, Mr. Shubham Pande, a snake catcher, rescued a turtle near the Pavana River at Thergaon (18.6191N & 73.7806E). He closely observed the turtle and verbally informed the forest department, Pune division about the rescue. Being different in varying colours on the carapace, he took a photograph of the turtle for

record purposes and shared it with us for further study and immediately released the turtle into the nearby Pavana River. I examined the photographic record. Its carapace was depressed and oval in shape, like in adults. Flaps of plastron were present. Limbs and foreheads were

not scaled. Three-clawed fore and hind limbs (webbed) were seen. There were no scutes on the shell, and the carapace was covered with skin. The femoral flaps, nasal septal ridges, and shell closure mechanism are important species identification characteristics. Hence, we confirm the identity



of it as Indian Flapshell Turtle *Lissemys punctata* after referring to literature (Bhupathy & Kurt 2010). I observed that the turtle had fungal infection growth on its carapace and limbs.

Its body colour was partly yellowish-brown and partly dark brown in colour. Both eyes were normal in colour. It had a big, round, dark brown pigmentation spot surrounded by faded olive brown on the carapace and on the edge, a golden yellowish color; the limbs were muddy yellowish; the head and neck were faint rufus colours without any spots on them; and both left and right faces were completely white. It doesn't look like a case of albinism or leucism; it is partly hypomelanistic. Hence, this is a case of colour aberration.

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#251
21 June 2024

A report on unusual diet of Checkered Keelback from Vadodara, Gujarat

Fowlea piscator (Schneider, 1799), commonly known as Checkered Keelback, is a non-venomous, medium-sized, oviparous natricine snake with keeled dorsal scales, distributed throughout much of southern Asia (Das & Das 2017). The species is widely distributed throughout India and is reported from almost all regions of the Gujarat State (Patel & Vyas 2019). This species mainly feeds on frogs and fish (Daniel 2002), but occasionally eats turtles (Gyawali 2019), rodents & birds (Whitaker & Captain 2004), and even arthropods (Wadeker 1963). Herein we report a case of bat predation by *F. piscator* in Gujarat, India.

On 11 October 2022 at 2230 h, we received a snake rescue call from a society located in Harni



The rescued individual of Checkered Keelback *Fowlea piscator* regurgitating a bat of genus *Pipistrellus* sp. and Common Indian Bullfrog (A & B). Regurgitated bat of the genus *Pipistrellus* (C). © Hemant Vadhavana.



Village of Vadodara, Gujarat, India (22.3408 N, 73.2254 E). The snake was lying under a marble slab in the open garden near a residence. We identified the snake as an adult *Fowlea piscator* (total length = 91.9 cm), with a dull olive ground colour and a moderate amount of black patterning (Whitaker & Captain 2004). After the rescue, the snake, regurgitated a bat, followed by a Common Indian Bullfrog *Hoplobatrachus tigerinus* (Daudin, 1803) after about 10 minutes from the time of rescue. Checkered Keelback tend to regurgitate due to stress during handling or to escape from a certain location (Raju Vyas pers. comm. 11 October 2023), during the rescue process. Because the bat was partially ruptured when the snake regurgitated, the identification of the bat was limited to the genus level. The bat was identified as a member of genus *Pipistrellus* by consulting available literature (Brosset 1962; Shah & Srinivasulu 2020) and then having the identity confirmed by experts. Pipistrels are insectivorous bats widely distributed in forest, rural, and urban areas of central Gujarat (Devkar & Upadhyay 2015).

In Nepal, there are a few instances of attempted predation and prey handling of fish by *Fowlea piscator* (Devkota et al. 2020). The snake appears to be an opportunistic predator and has been observed feeding on boiled rice and cooked chicken at the Jahangir University Campus in Savar, Dhaka, Bangladesh (Moktadir & Hasan 2016). Bat predation by *Lycodon aulicus* (Common Wolf Snake) was also reported from Porbandar, Gujarat (Tank & Sharma 2016). Esberard & Vrcibradic (2007) reported multiple instances of snake predation of bats by

three different snake species in Brazil. Barti et al. (2019) reported cases of bat predation in underground habitats and highlighted the importance of snake predation on bats in the western Palaearctic. To our knowledge, the present report of bat predation by *Fowlea piscator* is the first occurrence of bat predation by the natricine snake species in wild and hence it is noteworthy.

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#252
21 June 2024

Indian Black Turtle in northeastern India with a new record from Assam

The Indian Black Turtle *Melanochelys trijuga* (Schweigger, 1812) is a very rare Geoemydidae turtle in northeastern India. Globally, its known range is from Sri Lanka, Maldives, peninsular India to Himalayan foothills, northeastern India, and Myanmar in the east (Ahmed et al. 2020). Of the four subspecies found within Indian limits, only one occurs in the eastern part of the country, i.e., *indopeninsularis*. Tikader & Sharma (1985) mentioned Jalpaiguri District, West Bengal as its easternmost range in India. They did not report it from anywhere in Assam or other neighbouring states.

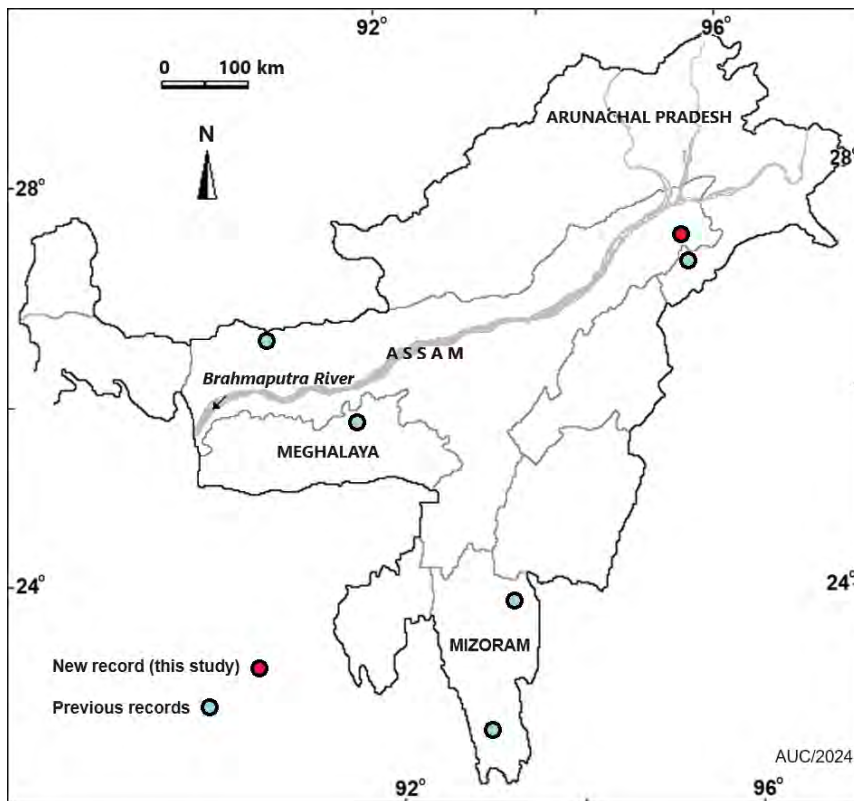
In northeastern India, the records are few and far between. In Arunachal Pradesh it has been recorded in just



Indian Black Turtle *Melanochelys trijuga* (ssp. *indopeninsularis*) near Dihing-Patkai National Park, Assam (2021). © Anwaruddin Choudhury.

one locality, from Hukanjuri, near Namsang in Tirap District in 1993 (Choudhury 2024). In Meghalaya also it has been recorded at one site - from near Lailad Village, Nongkhylllem Wildlife Sanctuary (Das 1990). In Mizoram, it has been recorded

in Ngopa Town (1100 m), which was obtained from Tuivai River (450 m), Champhai District (Choudhury 2004); and in Pawizawh Lui, Zawhlet Lui and Khuangpui Lui of northern part of Nengpui Wildlife Sanctuary (Pawar & Choudhury 2000). In Assam, the only known



Map of northeastern India showing the locations of Indian Black Turtle *Melanochelys trijuga* (ssp. *indopeninsularis*).

area of occurrence is in the western part of the state in Manas Tiger Reserve (Das 1990; Ahmed & Das 2010). Pawar & Birand (2001) had reported it from Nameri-Pakke but did not specify whether it was located in Assam (Nameri) or Arunachal Pradesh (Pakke or Pakhui). Purkayastha et al. (2015) have also shown the same area in their range map. The present account describes reporting of a live turtle photographed and several others observed in Dihing-Patkai landscape of far eastern Assam. The location is inside Upper Dihing (west

block) Reserved Forest, just outside Dihing-Patkai National Park in Tinsukia District (27.326 N, 95.489 E). The first observation and distant photos were obtained while studying the White-winged Wood Duck *Asarcornis scutulata* in two jungle pools inside dense rain forest in 1992–1994. In fact, on several occasions the ducks and turtles were seen resting together on fallen logs. However, the identification of the turtles remained tentative as *Melanochelys trijuga* and at least one more species was also there.

On 25 December 2021, a turtle was photographed and observed closely in one of the pools and was identified to be the Indian Black Turtle. It had elevated and elongated carapace with three keels. Carapace was dark brown. Its identification was further confirmed by expert (Abhijit Das pers. comm. 25.xii.2021). It appears that it is the only record in Assam outside Manas and first from eastern or upper Assam. The only known locality in Arunachal Pradesh is nearer to it. This new locality has added one to the existing few known sites in northeastern India.

It has been listed as 'Least Concern' by the IUCN Red List.

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New locality record of the epiphytic orchid, from Bannerghatta National Park, Eastern Ghats, India

India with its diverse climatic zones and range of forest types is considered one of the major habitats for orchids across the world. Due to species richness and endemism, much of India's orchid literature has focused on the north-east, northwestern Himalaya, and the Western Ghats (Prasad et al. 2019). The Eastern Ghats contains 22 species of the 130 recorded endemic orchids found in Peninsular India (Jalal & Jayanthi 2012). However, despite this diversity, research on the orchids of India is predominantly biased towards "orchid-rich" regions of the country. Thus, leaving a lacuna of information regarding the diversity and richness of orchid species found in the Eastern Ghats.

This paper documents *Taprobanea spathulata* (L.) Christensen from a new locality around the Bannerghatta National Park, Eastern Ghats in Karnataka State of India. *Taprobanea spathulata* was originally described as 'Ponnampu-maravara' by van Rheede (1692) and Linnaeus



Taprobanea spathulata: A—Plants in bloom in Bannerghatta National Park in Karnataka, showing epiphytic habit exposed to the sun | B—Naturally borne fruit | C—Plants blooming in similar habitat in Hosur District of Tamil Nadu | D—Close up of a flowering plant | E—Close up of inflorescence | F—Close up of inflorescence | G—Close-up of a flower. A—© Jananee Mohan. | B—© Dilipkumar A.V. | C–G— © Shashidhar Sastry.

(1753) gave the binomials *Epidendrum spathulatum* based on the illustrations

(which now form the lectotype (Majumdar & Bakshi 1979) for this name) provided by

van Rheede. Sprengel (1826) transferred it to *Vanda* as *Vanda spathulata*, which was followed by Hooker (1890) and subsequent authors. Based on the presence of porate pollinia and the side lobes of the labellum that are not continuous with the midlobe but are adnate to the adaxial surface of the midlobe, Christenson (1992) advocated using the name *Taprobanea spathulata* for this plant. This idea of Christenson was supported further by DNA studies, where genus *Taprobanea* was not found to be nested within the *Vanda* clade (Gardiner et al. 2013).

Taprobanea spathulata belongs to the monotypic genus *Taprobanea* (Gardiner et al. 2013; Teoh 2022) and is named after the Greek name for Sri Lanka (Christenson 1992). Earlier information about its distribution was limited to the Western Ghats and Sri Lanka (Hooker 1980). However, current distributions by Prasad et al. (2019) indicate its presence in the Eastern Ghats of Tamil Nadu and Andhra Pradesh. With a possible presence in Maharashtra and Odisha as well (Pankaj Kumar pers. comm. 29 October 2023). Apart from published literature, the species has also been reported in iNaturalist approximately 11 km from the current location (https://www.inaturalist.org/observations?taxon_id=895349). However, it was not officially published. Our findings further illustrate the distribution range of this species which is wider than previously thought.

Taxonomy

***Taprobanea spathulata* (L.) Christenson** Lindleyana 7: 91 (1992).
≡ *Cymbidium spathulatum* (L.) Moon in Cat. Pl. Ceylon: 60 (1824); *Epidendrum spathulatum* L. in Sp. Pl.: 952 (1753); *Limodorum spathulatum*

(L.) Willd. in Sp. Pl., ed. 4. 4: 125 (1805); *Vanda spathulata* (L.) Spreng. in Syst. Veg., ed. 16. 3: 719 (1826). **TYPE:** India, Icon. in Rheede, Hort. Malab. 12:7, t.3. (1692) as *Ponnampu-maravara* [Lectotype (designated by Majumdar & Bakshi 1979)].

Description: A sun-loving epiphytic herb, monopodial, towering above the surrounding understory. Stem terete, approximately 30–60 cm in length, with black spotted internodes; internodes 2.5–3 cm long. Roots lateral, emerging from the lower parts of the stem. Leaves distichous, oblong to spathulate, 6×3 cm, unequally bilobed at the apex, leathery, red-speckled. Inflorescence lateral, tall, erect, peduncle 20–40 cm long, bearing up to 10 flowers arranged laxly towards the apex on a zig-zag rachis. Flowers bright yellow, opening widely, resupinate, up to 4 cm wide; dorsal sepal obovate, tapering towards the base, rounded at the apex; lateral sepals wider; petals spathulate, rounded at the apex; labellum 3-lobed with side lobes attached to the abaxial surface of the labellum, midlobe pointing forwards, side lobes erect on both side of the column; column short almost semi-terete; fruits.

Phenology: Plants flower from September to January.

Notes on ecology: We observed a group of plants on the 30 October 2023 in the north-west region of Bannerghatta National Park adjoining the A Rocha field study centre. The plants encompassed an area of approximately 20 m², at an elevation of 919 m and at an average height of six feet from the ground, within previously recorded ranges (Chaburn &

Khela 2014). The plant was exposed to full sun with no overstorey, and moderately tall trees found in the immediate area. The specimen was found along a slope comprising a mix of rocky outcrops and vegetation. The surrounding understory comprised dry-deciduous and scrub species such as *Senegalia chundra* & *Dendrocalamus strictus* and shrubs such as *Pavetta indica*, *Phyllanthus polyphyllus*, & *Acacia sinuata*. At the time of observation, the plant was in the fruiting phase, with pods measuring 6.5 cm from base to tip, with red speckles and ridges running along the side.

Notes on threats to this species: According to the IUCN Red List, this species is listed as 'Vulnerable' (Chadburn & Khela 2014). Some of the threats include habitat destruction and over-collection, so plants have been restricted to a narrow range (Decruse et al. 2003). Although plants are not observed popularly in trade, it is known to be used in making hybrids. This shrinking range is further threatened by habitat loss and fragmentation (Chadburn & Khela 2014). Given that *Taprobanea* is a monotypic genus, there is a threat that with the loss of this species, the phylogenetic diversity will be lost too. While our observation gives an insight into the expected range of species distribution, we encourage further phylogenetic and ecological studies to understand how to better conserve it.

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Noval sighting and new distribution records of the Black Rajah in Gandhi Sagar Wildlife Sanctuary, Madhya Pradesh

The Black Rajah *Charaxes solon solon*, known for its elusive nature and captivating beauty has long been a subject of fascination among entomologists and conservationists. Despite its charismatic allure, comprehensive studies on the distribution and ecological dynamics of this species remain scarce (Houlihan et al. 2019). This research endeavours to address this gap by presenting

a detailed account of a rare sighting and unveiling new distribution records of the Black Rajah butterfly within the confines of the Gandhi Sagar Wildlife Sanctuary in Madhya Pradesh, India. As biodiversity faces unprecedented challenges, understanding the presence and patterns of rare species becomes imperative for effective conservation (Dennis et al. 2013). This study aims



Charaxes solon solon in Gandhi Sagar Wildlife Sanctuary. © Shiladitya Acharjee.

to contribute valuable insights into the ecological significance of the *Charaxes solon solon* butterfly's habitat, emphasizing the importance of continued research and conservation initiatives in safeguarding these remarkable yet vulnerable inhabitants of our natural landscapes (New et al. 1995).

Study Area

The study area in Gandhi Sagar

Wildlife Sanctuary, located in northwestern Madhya Pradesh at coordinates 24.28 N & 75.56 E, showcases a diverse landscape with hills, plateaus, and the reservoir created by the 1960-built Gandhi Sagar Dam. Encompassed by dry deciduous forests hosting teak, tendu, bamboo, and more, the sanctuary is home to notable wildlife like the Indian leopard, chital, sambar deer, wild



Map of the study area.



Records of previous and recent distribution of *Charaxes solon solon* from Madhya Pradesh, India.

boar, antelopes, various bird species, and a vibrant array of butterflies, covering an area of approximately 162 km².

Observation

The observation of *Charaxes solon solon* during a field study for assessment of habitat for Cheetah for Bringing

Back Cheetah project within the Gandhi Sagar Wildlife Sanctuary, (24.6842 N, 75.5664 E), underscores the presence of diverse butterfly species in this distinctive ecosystem. Notably, the survey was conducted by the first author in November, 2023 in winter season.

Species Description

The Black Rajah *Charaxes solon solon*, a medium-sized butterfly with a wingspan 70–80mm, displays a dark brownish-black colouration above. Greenish or white discal bands stretch across both wings, breaking into spots near the apex of the forewing. Notably, the hind wing features two similar-sized tails at veins 2 and 4. The tails are longer in females and have a more pointed appearance in males (Kehimkar 2016; Anon. 2024).

Distribution

The Black Rajah *Charaxes solon solon* is found in the northeastern states of India, particularly in northern part of West Bengal, Assam, Nagaland, and Manipur (Anon. 2024). It inhabits broadleaf evergreen forests and moist deciduous forests in these regions. This butterfly was previously recorded in Madhya Pradesh particularly in Cantonment, Garha, Jabalpur, Sirpur, Indore, Damoh Naka, Gayatri Temple, Barrai, Khargone, Hoshangabad, Omkareshwar, OFK Estate, Tropical Forest Research Institute, Amarkantak WS, and Narmada Nagar town

(Tiple 2012) and now it is recorded in Gandhi Sagar Wildlife Sanctuary. The distribution of the Black Rajah butterfly also extends to other countries in southeastern Asia such as Myanmar, Thailand, and Vietnam (Anon. 2024).

Discussion

Charaxes solon solon belongs to the Nymphalidae family and has not been recorded in Gandhi Sagar Wildlife Sanctuary. The rare sighting and new distribution records of this species within the confines of study area unveil intriguing insights into the ecological dynamics of this species. The observed presence of the Black Rajah in this region expands our understanding of its habitat range, contributing crucial data for future conservation strategies. This discovery promotes a reassessment of the sanctuary's ecological significance and highlights the need for continued monitoring.

The coexistence of the *Charaxes solon solon* with specific vegetation and environmental conditions underscores the delicate balance necessary for the survival of this rare butterfly. The implications extend beyond the species itself, resonating with broader conservation efforts in the face of environmental changes. Furthermore, the documented sighting promotes further exploration into the butterfly's life cycle, behaviour, and interactions with other species within the sanctuary.

Conservation Status

The Black Rajah butterfly is legally protected in India under Schedule II of the Wildlife (Protection) Act, 1972.

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Checklist of avifaunal diversity in Nilgiris Forest Division, The Nilgiris – Conservation Prospective

Indian Subcontinent ranks among the top ten countries in the world in terms of most number of bird species (Lepage 2016); covering 2.2% of the world’s terrestrial landmass, India is known to harbour about 12.5% of its avifauna. This spectacular diversity is believed to have arisen from multiple factors that include its unique biogeographical, and ecological history, its heterogeneity of physical features, and a high degree of eco-climatic variations ranging from tropical to temperate.

The Indian checklist acknowledges a total of 1263 species of birds constituting about 12% of the world avifauna (Alström et al. 2016), Taxonomically, it covers 23 orders, 107 families, and 498 genera, representing the global avian diversity by about 64%, 45%, and 21% respectively. Predictably, passerines (Order Passeriformes) form the most predominant group followed by the orders Charadriiformes and Accipitriformes (Praveen et al. 2016).

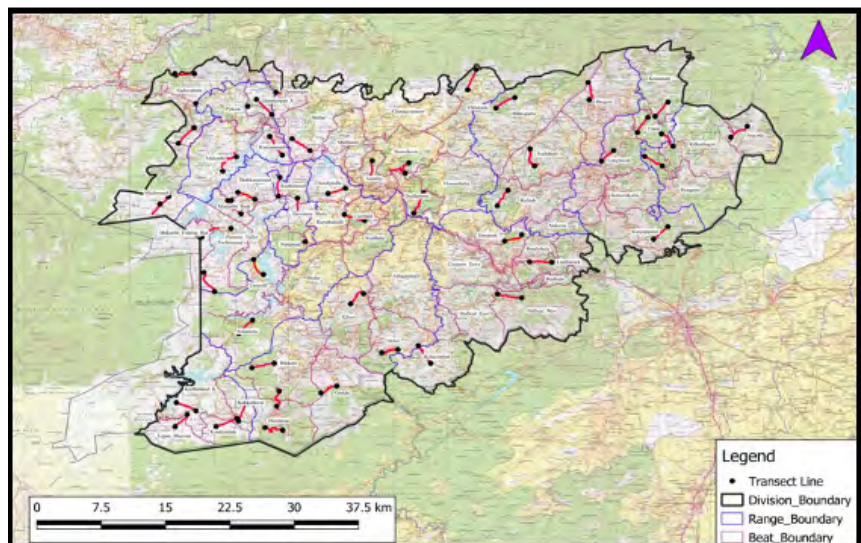
Birds are ideal bio indicators and useful models for studying a variety of environmental problems. Hence the condition of local landscape must be investigated to identify crucial determinants of the bird community structure for avian conservation (Kattan & Franco 2004).

Bird community evaluation has become an important tool in biodiversity conservation which is necessitating documentation of the current status of bird species for future monitoring and conservation (Islam & Rahmani 2004).

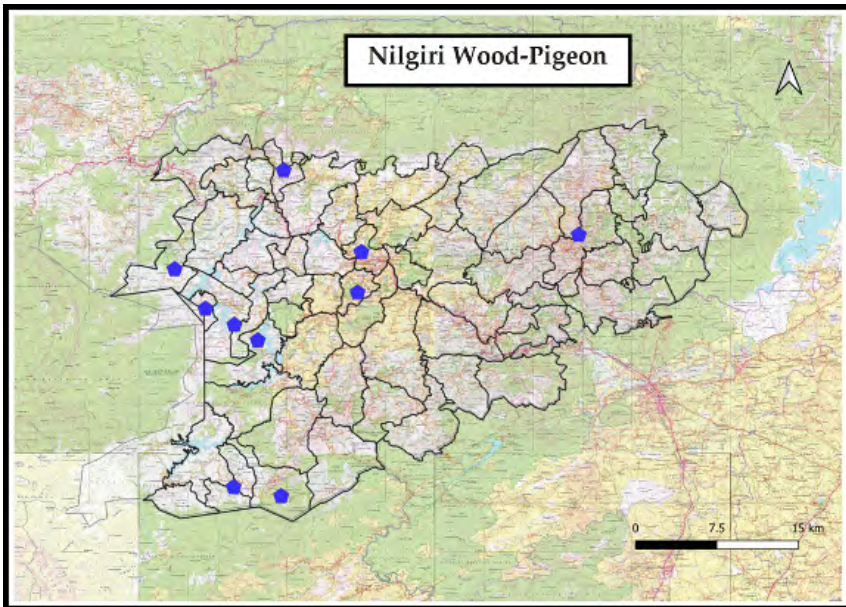
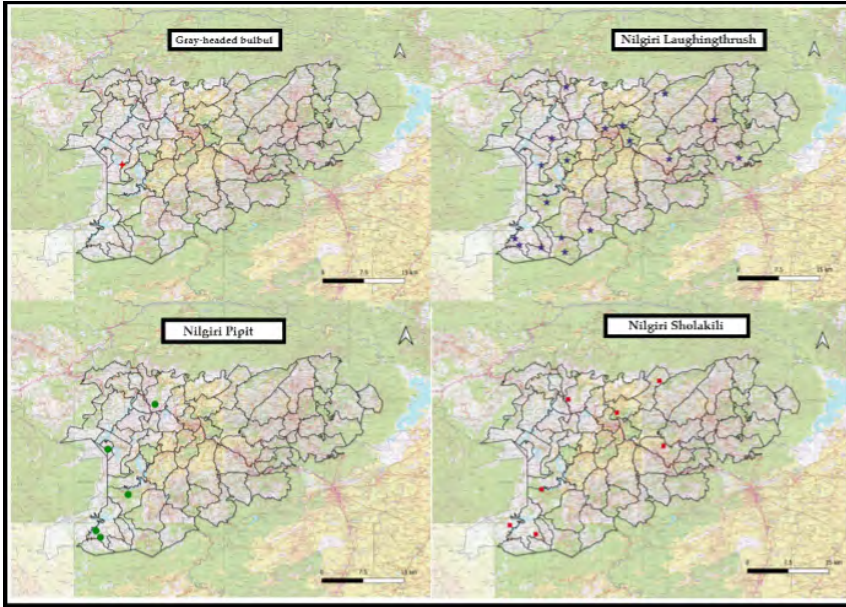
Although several studies related to the diversity of birds

have been done here and there in some parts of the Nilgiris Forest Division (NFD), but this study is a simultaneous research in entire NFD.

However, the present study aims to provide recent baseline information of the status of birds in the selected areas of the division. The present study was conducted in the NFD, Tamil Nadu. The division has 12 territorial ranges and one special range. The total forest area of this NFD is 527.466 km². It is located in the Nilgiris District, the district popularly known as the “Blue Mountains” which is a tiny district with an area of 2,565 km², forms an integral part of



Line transects laid to conduct the survey in NFD.



Map showing the five globally threatened birds recorded during the survey.

the Western Ghats and the Nilgiris Biosphere Reserve. Hence, Nilgiris is aptly called as the “Forest District of Tamil Nadu”. The forest cover in Nilgiris is 1445.940 km² (Forest Working Plan 2015–2025). Approximately, 65% of geographical area of this division lies at an altitude of

1500–2650 m. The climate is temperate to sub-tropical.

A two-day survey was conducted during the month of March 2022 for the documentation of the avian fauna of the region. Data was collected by using direct as well as indirect methods in order

to study the population status, distribution and diversity of avian fauna. The line transect method was used to collect the data from the different habitat types like shola, plantation, and mixed vegetation. A total of 32 transects were laid that covered most of the study area. The length of the transect was 2 km but the width varied according to survey area and visibility. The survey was conducted at dawn (0600–0900 h) and at dusk (1600–1900 h). Sixty-two volunteers collected the data from different regions in the division (two volunteers for every transect). The volunteers were wildlife biology students from Government Arts College, Udhamandalam. All the birds observed were identified by using the reference of Ali & Ripley (2007).

Observations from the field

During the survey, a total of 108 species belonging to 47 families were recorded (Table 1). The present study revealed that out of 108 species, two were ‘Endangered’ (Nilgiri Laughingthrush, Nilgiri Sholakili), two were ‘Vulnerable’ (Nilgiri Pipit, Nilgiri Wood-Pigeon), and one species (Gray-headed Bulbul)

Table 1. Checklist of bird species recorded during the terrestrial bird survey.

	Name of the species	Scientific name	Family	Movement pattern	No of sightings	Total individuals
1	Alpine Swift	<i>Tachymarptis melba</i>	Apodidae	FM	2	8
2	Ashy Prinia	<i>Prinia socialis</i>	Cisticolidae	R	4	5
3	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Muscicapidae	FM	4	11
4	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	Apodidae	R	2	2
5	Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	Vangidae	R	3	5
6	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	FM	5	7
7	Black-and-orange Flycatcher	<i>Ficedula nigrorufa</i>	Muscicapidae	R	21	42
8	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	FM	6	8
9	Black Eagle	<i>Ictinaetus malaiensis</i>	Accipitridae	R	3	3
10	Black-headed Bulbul	<i>Microtarsus melanocephalos</i>	Pycnonotidae	N	1	13
11	Black-rumped Flameback	<i>Dinopium benghalense</i>	Picidae	R	2	2
12	Black-winged Kite	<i>Elanus caeruleus</i>	Accipitridae	R	4	10
13	Black-naped Monarch	<i>Hypothymis azurea</i>	Monarchidae	FM	1	2
14	Blue Rock-Thrush	<i>Monticola solitarius</i>	Muscicapidae	FM	4	4
15	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Acrocephalidae	FM	5	7
16	Booted Eagle	<i>Hieraetus pennatus</i>	Accipitridae	FM	1	1
17	Brahminy Starling	<i>Sturnia pagodarum</i>	Sturnidae	FM	3	5
18	Bronzed Drongo	<i>Dicrurus aeneus</i>	Dicruridae	R	2	2
19	Brown-capped Pygmy Woodpecker	<i>Yungipicus nanus</i>	Picidae	R	1	1
20	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	Meropidae	FM	1	4
21	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Vangidae	R	1	1
22	Common Flameback	<i>Dinopium javanense</i>	Picidae	R	3	4
23	Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	FM	3	3
24	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	R	2	5
25	Common Rosefinch	<i>Carpodacus erythrinus</i>	Fringillidae	FM	9	15
26	Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	R	3	11
27	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Megalaimidae	R	1	1
28	Crimson-backed Sunbird	<i>Leptocoma minima</i>	Nectariniidae	R	2	2
29	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	Hirundinidae	R	1	2
30	Eurasian Hoopoe	<i>Upupa epops</i>	Upupidae	FM	11	13
31	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	Chloropseidae	R	2	3
32	Great Tit	<i>Parus major</i>	Paridae	R	24	70
33	Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	R	6	9
34	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae	FM	5	18
35	Gray-bellied Cuckoo	<i>Cacomantis passerinus</i>	Cuculidae	FM	1	1

	Name of the species	Scientific name	Family	Movement pattern	No of sightings	Total individuals
36	Gray-headed Bulbul	<i>Microtarsus priocephalus</i>	Pycnonotidae	R	1	1
37	Gray-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i>	Stenostiridae	R	12	29
38	Gray Junglefowl	<i>Gallus sonneratii</i>	Phasianidae	R	38	88
39	Gray Wagtail	<i>Motacilla cinerea</i>	Motacillidae	FM	20	40
40	House Crow	<i>Corvus splendens</i>	Corvidae	R	11	51
41	House Sparrow	<i>Passer domesticus</i>	Passeridae	R	13	176
42	Indian Blackbird	<i>Turdus simillimus</i>	Turdidae	FM	28	103
43	Indian Blue Robin	<i>Larvivera brunnea</i>	Muscicapidae	FM	2	7
44	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Monarchidae	FM	2	7
45	Indian Peafowl	<i>Pavo cristatus</i>	Phasianidae	R	5	9
46	Indian Pond-Heron	<i>Ardeola grayii</i>	Ardeidae	R	2	6
47	Indian Robin	<i>Copsychus fulicatus</i>	Muscicapidae	R	5	10
48	Indian Scimitar-Babbler	<i>Pomatorhinus horsfieldii</i>	Timaliidae	R	5	18
49	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Anatidae	FM	2	6
50	Indian Swiftlet	<i>Aerodramus unicolor</i>	Apodidae	R	7	25
51	Indian White-eye	<i>Zosterops palpebrosus</i>	Zosteropidae	R	31	151
52	Jungle Babbler	<i>Argya striata</i>	Leiotrichidae	R	8	36
53	Jungle Bush-Quail	<i>Perdica asiatica</i>	Phasianidae	R	2	4
54	Jungle Myna	<i>Acridotheres fuscus</i>	Sturnidae	R	31	136
55	Jungle Nightjar	<i>Caprimulgus indicus</i>	Caprimulgidae	FM	1	4
56	Jungle Owlet	<i>Glaucidium radiatum</i>	Strigidae	R	1	1
57	Large-billed Crow	<i>Corvus macrorhynchos</i>	Corvidae	R	30	133
58	Large Cuckooshrike	<i>Coracina macei</i>	Campephagidae	R	1	2
59	Long-tailed Shrike	<i>Lanius schach</i>	Laniidae	FM	10	27
60	Loten's Sunbird	<i>Cinnyris lotenius</i>	Nectariniidae	R	1	1
61	Malabar Whistling-Thrush	<i>Myophonus horsfieldii</i>	Muscicapidae	R	3	7
62	Mottled Wood-Owl	<i>Strix ocellata</i>	Strigidae	R	1	1
63	Nilgiri Flowerpecker	<i>Dicaeum concolor</i>	Dicaeidae	R	4	14
64	Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>	Muscicapidae	R	26	50
65	Nilgiri Laughingthrush	<i>Montecincla cachinnans</i>	Leiotrichidae	R	28	61
66	Nilgiri Pipit	<i>Anthus nilghiriensis</i>	Motacillidae	R	5	9
67	Nilgiri Sholakili	<i>Sholicola major</i>	Muscicapidae	AM	10	42
68	Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>	Columbidae	AM	11	24
69	Orange-headed Thrush	<i>Geokichla citrina</i>	Turdidae	FM	3	4
70	Orange Minivet	<i>Pericrocotus flammeus</i>	Campephagidae	R	3	6
71	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	R	9	22
72	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Accipitridae	FM	3	4
73	Oriental Scops-Owl	<i>Otus sunia</i>	Strigidae	FM	2	2
74	Paddyfield Pipit	<i>Anthus rufulus</i>	Motacillidae	R	1	6
75	Painted Bush-Quail	<i>Perdica erythrorhyncha</i>	Phasianidae	R	1	2

	Name of the species	Scientific name	Family	Movement pattern	No of sightings	Total individuals
76	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Dicaeidae	R	3	4
77	Pied Bushchat	<i>Saxicola caprata</i>	Muscicapidae	FM	47	129
78	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Nectariniidae	R	12	33
79	Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	R	3	6
80	Red-rumped Swallow	<i>Cecropis daurica</i>	Hirundinidae	FM	5	22
81	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	R	9	41
82	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	R	8	11
83	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae	R	62	375
84	Rock Pigeon	<i>Columba livia</i>	Columbidae	R	7	21
85	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittacidae	R	3	7
86	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Corvidae	R	2	2
87	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Estrildidae	R	2	11
88	Scarlet Minivet	<i>Pericrocotus speciosus</i>	Campephagidae	R	1	1
89	Shikra	<i>Accipiter badius</i>	Accipitridae	FM	1	1
90	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Accipitridae	FM	1	1
91	Spotted Dove	<i>Spilopelia chinensis</i>	Columbidae	FM	16	35
92	Spotted Owlet	<i>Athene brama</i>	Strigidae	R	1	1
93	Square-tailed Bulbul	<i>Hypsipetes ganeesa</i>	Pycnonotidae	FM	6	16
94	Streak-throated Woodpecker	<i>Picus xanthopygaeus</i>	Picidae	R	3	3
95	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i>	Muscicapidae	R	1	1
96	Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	Phylloscopidae	FM	3	4
97	Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	Sittidae	R	2	8
98	Western Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	FM	1	1
99	Western Yellow Wagtail	<i>Motacilla flava</i>	Motacillidae	R	3	7
100	White-cheeked Barbet	<i>Psilopogon viridis</i>	Megalaimidae	R	11	19
101	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae	FM	1	1
102	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Pycnonotidae	R	3	6
103	White-browed Fantail	<i>Rhipidura aureola</i>	Rhipiduridae	R	6	6
104	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Motacillidae	R	1	1
105	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	R	1	1
106	Yellow-browed Bulbul	<i>Acritillas indica</i>	Pycnonotidae	R	1	1
107	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriidae	R	1	1
108	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Paradoxornithidae	R	1	3
	Total				756	2405

FM–Full Migrant | R–Resident | N–Nomadic | AM–Altitudinal Migrant.

Table 2. Threatened and Near Threatened bird species recorded during the survey.

	Name of the species	Scientific name	Family	IUCN Red List	Movement pattern	No of sightings	Total individuals sighted
1	Gray-headed Bulbul	<i>Microtarsus priocephalus</i>	Pycnonotidae	NT	R	1	1
2	Nilgiri Laughingthrush	<i>Montecincla cachinnans</i>	Leiotrichidae	EN	R	28	61
3	Nilgiri Pipit	<i>Anthus nilghiriensis</i>	Motacillidae	VU	R	5	9
4	Nilgiri Sholakili	<i>Sholicola major</i>	Muscicapidae	EN	AM	10	42
5	Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>	Columbidae	VU	AM	11	24

R-Resident | AM-Altitudinal Migrant. EN-Endangered | VU-Vulnerable | NT-Near Threatened.



Gray-headed Bulbul.



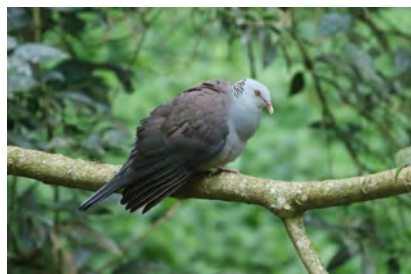
Nilgiri Laughingthrush.



Nilgiri Pipit.



Nilgiri Sholakili.



Nilgiri Wood-Pigeon.

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was 'Near Threatened' (Table 2). Important to note that, all five globally threatened species were recorded in the undisturbed shola forests of the division (Table 3).

The present study shows that NFD represents rich avian faunal diversity. It is the largest forest division in the Nilgiris

District. About 466 reserved forests are located in this division. According to the study, family Muscicapidae is recorded dominantly as in different protected areas of India (Sankar et al. 2006; Yaseen et al. 2011). In Nilgiris region, most of the avian related studies have been carried out in the lower

plateau. Hence, most of the studies focused either on a single species or bird group (Vijayan et al. 2000; Peter et al. 2015) but this survey reveals greater diversity of birds of upper Nilgiris region. The study conducted by Samson et al. (2018) at Doddabetta Hills of Nilgiris District revealed that a total of 123 species of birds belonging to 36 families and 16 orders were recorded. Hence, the entire study period was three years (2013–2016), and apart from that, the study is focused on particular region only. This study covers the entire division.

Table 3. GPS co-ordinates of locations of the five globally threatened birds observed.

	Name of the species	Scientific name	Name of the sighted locations	GPS co-ordinates of the locations	
1	Gray-headed Bulbul	<i>Microtarsus priocephalus</i>	Porthimund	11.3582 N	76.5808 E
2	Nilgiri Laughingthrush	<i>Montecincla cachinnans</i>	Simspark	11.3686 N	76.7955 E
			Bikkapathi	11.4776 N	76.7887 E
			Kunjappanai	11.3701 N	76.9129 E
			Longwood	11.4341 N	76.8717 E
			Aramby	11.4195 N	76.6882 E
			Doddabetta	11.3989 N	76.7291 E
			Glenmorgan	11.4885 N	76.6225 E
			Snowdown	11.4242 N	76.7170 E
			Nanjanad	11.3662 N	76.6238 E
			Kozhimund_K	11.2363 N	76.5365 E
			Korakundah	11.2213 N	76.5802 E
			Upper_Bhavani	11.2253 N	76.5439 E
			Geddai	11.2499 N	76.6630 E
			Thaisolai	11.2379 N	76.6144 E
			Meekeri	11.2137 N	76.6203 E
Avalanche	11.2964 N	76.5900 E			
Porthimund	11.3582 N	76.5808 E			
Thukkaramund	11.4028 N	76.5983 E			
3	Nilgiri Pipit	<i>Anthus nilghiriensis</i>	Avalanche	11.2964 N	76.5900 E
			Sholur	11.4465 N	76.6348 E
			Kozhimund_K	11.2363 N	76.5365 E
			Upper_Bhavani	11.2253 N	76.5439 E
Mukurthi_Fishing_Hut	11.3718 N	76.5564 E			
4	Nilgiri Sholakili	<i>Sholicola major</i>	Avalanche	11.2964 N	76.5900 E
			Bikkapathi	11.4778 N	76.7887 E
			Simspark	11.3686 N	76.7955 E
			Sholur	11.4465 N	76.6348 E
			Kozhimund_K	11.2363 N	76.5365 E
			Korakundah	11.2213 N	76.5802 E
Snowdown	11.4242 N	76.7170 E			
5	Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>	Emerald	11.3451 N	76.6006 E
			Aramby	11.4195 N	76.6882 E
			Longwood	11.4341 N	76.8717 E
			Mukurthi_Fishing_Hut	11.3718 N	76.5564 E
			Meekeri	11.2137 N	76.6203 E
			Mudimund	11.4051 N	76.5304 E
			Glenmorgan	11.4885 N	76.6225 E
			Porthimund	11.3582 N	76.5808 E
			Cairnhill	11.3855 N	76.6849 E
Korakundah	11.2213 N	76.5802 E			

The division covered by different types of vegetation, especially in the upper region mostly covered by montane temperate forests called as shola forests and open grasslands and the lower region moist deciduous forests and dry deciduous forest. In Nilgiris, most of the forest areas were invaded by lot of invasive and exotic plants like wattle, Blue Gum *Cestrum aurantiacum*, *Solanum mauritianum*, *Rubus* sp., and *Passiflora* sp. At the same time, the native plants bear fruits once yearly. Because of this, birds are only attracted to the exotic plants. Due to this, the forest cover may be destroyed and occupied by the invasive plants. Therefore, plantation of native fruiting plant species and gradual removal of exotic plants should be implemented (Chitheena et al. 2018) as it may increase the cover of native plant species' diversity in future. Further, proper management programmes and strategies in the hills will not only increase the number of resident bird species but will also attract migratory and vagrant species in the Nilgiris region.

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Third record of Tristram's Bunting from India

In recent years, citizen scientists have played a pivotal role in expanding our understanding of the avian fauna of northeastern India. It has led to the discovery of previously undocumented birds in the region. In this article, we report the occurrence of Tristram's Bunting *Emberiza tristrami* from Mehao Wildlife Sanctuary, Arunachal Pradesh.

On 29 March 2023, at 1117 h, while observing birds at Mehao Wildlife Sanctuary (28.2276 N & 95.8349 E) near Tiwari Gaon, lower Dibang Valley, we came across a different looking bunting (*Emberiza*) in a flock of Little Bunting *Emberiza pusilla* and Olive-backed Pipit *Anthus Hodsozni* flying across us. On observing closely, the bunting looked unfamiliar with alternate black and white stripes on the head, and a fair brown pattern body. We were able to take some photographs for correct identification of the bird later. From the photograph, we found that the bird had black and white alternate stripes on its head,



Tristram's Bunting *Emberiza tristrami* at Mehao Wildlife Sanctuary, Arunachal Pradesh. ©Anupam Nahardeka.

fair brown pattern body with black and brown stripes on its primary, secondary, tertiary wing and has rufous coloration on its rump, white whisker marks and broad black stripe curved to the neck. The morphological characters matched with the descriptions provided in different literatures (Naniwadekar et al. 2013; Thangaraj & Mani 2016). After thorough comparison with literatures and discussion with experts, we concluded the bird to be a female (non-breeding) Tristram's Bunting *Emberiza tristrami*. In the following days, several birdwatchers

photographed the species from the same area, which supported our observation.

Tristram's Bunting is reported to breed in northeastern Asia, and seen through winter in southern China and the northern regions of southeastern Asia. It is considered to be a vagrant northern Myanmar species (Rasmussen & Anderton 2012), which is 180 km away from Namdapha Tiger Reserve in Arunachal Pradesh, from where the species was first reported in India (Naniwadekar et al. 2013), and secondly from

Mehao Wildlife Sanctuary (Thangaraj & Mani 2016). Hence, our current observation record of the species is supposedly the third occurrence report from India, and second from Mehao Wildlife Sanctuary.

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Parasitic fungus *Ophiocordyceps melolonthae* in the forest fringed area of Fambonglho Wildlife Sanctuary, Sikkim

The study in the sub-temperate and temperate forest of Fambonglho Wildlife Sanctuary, East Sikkim was conducted and a unique species was encountered. The moist and shady location excavated unravelled the fungus that was identified as *Ophiocordyceps melolonthae* (Tul. & C.Tul.) G.H.Sung, J.M.Sung, Hywel-Jones & Spatafora. This species has distinct characters. Its stroma originated from lateral side of abdomen of host and has a distinct tough, light yellow fibrous stipe and a fertile part, clavate of 10–30 mm long. This is a novel taxon of Sikkim that was found growing under the forest litter in moist black soil. This species is also reported in Costa Rica, Argentina, Colombia, Ecuador, Venezuela etc (Zha et al. 2021).

The collected sample *Ophiocordyceps melolonthae* was examined in HARC-QCL Laboratory, FED and found that it infected *Hyphantria cunea*'s larva, although the



***Ophiocordyceps melolonthae* in the forest fringed area of Fambonglho Wildlife Sanctuary, Sikkim. © Durga.**

latter is regarded as one of the crop damaging species (Yang et al. 2006; Celar & Kos 2012; Greenfield et al. 2016 Wang et al. 2019).

Taxonomy

Ophiocordyceps melolonthae (Tul. & C.Tul.) G.H.Sung, J.M.Sung, Hywel-Jones & Spatafora

Family: Ophiocordycipitaceae

Altitude: 1,677 m

GPS: 27.275N; 88.4894E

Location: Thangsing, Forest

Fringed areas of Fambonglho Wildlife Sanctuary, east Sikkim
Coll.: D.K. Pradhan

Photographed on: 3 May 2013

Host: *Hyphantria cunea* Drury

Habitat: Under shady rocky crevices in sub-temperate and temperate regions (1,500–2,000 m).

Descriptions

Stroma originates from abdominal region of larva of the host but not from the larval head. Stroma have distinct tough, light yellow fibrous stipe

of 50–55 mm long and 3–4 mm thickness that bears fertile part, clavate of 10–30 mm long and 3–5 mm thickness. The tapered, light pale-yellow fertile area has superficial, crowded and loosely immersed perithecia.

Note: Comparing the characters, it indicated that the specimen was *Ophiocordyceps melolonthae* (Zha et al. 2021).

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Wildlife, Plastic & Us!!

International Plastic Bag Free Day is observed every year on July 3, a global initiative that aims to eliminate the use of plastic bags which was started by a member of ZWE (Zero Waste Europe) in 2008. But unfortunately, we cannot resolve the problem completely. In 2018, on the occasion of World Environment Day, the World Health Organization (WHO), United Nations sister agencies and thousands of communities and organizations from across the globe celebrated with the theme “Beat plastic pollution” – a call for action for the world to work together to address one of the greatest environmental challenges of our times and raise global awareness for the need to reduce the heavy burden of plastic pollution on people’s health and the threat it poses to the environment and wildlife.

According to the United Nations Development Programme’ official estimates, in 2018, India generated 3.4 million tons of plastic annually which affects not only the environment but also human and wildlife.



Plastic in Elephant dung. © Shiladitya Acharjee.



Waste Management system in Alipurduar Municipality, West Bengal. © Shiladitya Acharjee.

There are two tiger reserves in West Bengal; the Buxa TR situated in Alipurduar District recently came to light for sightings of Royal Bengal Tiger after many decades. Thus, the forest officials took precautionary measures for creating safe habitat in the interiors of the tiger reserve. Of the total 42 villages in the reserve, the state forest department identified 18

villages in the core area to be relocated. As per government official report, this district consumed plastic (annually approx. 250 million tons) which indicates also the usage of plastics inside the reserve & surrounding areas.

This usage of plastic inside the reserve area negatively impacts wildlife, with evidences of wild animals consuming the plastics



Wastage dump into Core Area of Buxa Tiger Reserve. © Shiladitya Acharjee.

in the Gorumara National Park, which occupies an area of approx. 126m². At the reserve, plastic carry bags and gutkha packets were found in the elephant dungs. In this matter, Raman Sukumar, professor at the Indian Institute of Science (IISc), Bengaluru, and an expert on elephants said elephants eat garbage and that is how plastics enter into their systems. “I have seen

elephants foraging on garbage outside of Bhubaneswar. The area where these dung piles were seen must have a group of elephants that had been feeding on garbage”, he said. Elephants are attracted to smelly rotten food and it is through this food that plastics get into their system, he added. Dr. Sukumar told that elephants derive a lot of energy from hind-

gut fermentation, a kind of microbial fermentation, but he was not sure whether this process could assimilate plastic (Singh 2019).

Nowadays, plastic is considered one of the biggest threats towards wildlife. If we do not sensitize local communities, tourists and other stakeholders about it now, it could turn into an ecological disorder in wildlife habitats and for wild animals. This will also become a challenge for humans for surviving. Recently, Govt. of India published a notification on Eco Sensitive Zone (ESZ) of Buxa TR, with rules & policies on what needs to be followed in this zone. One of the points is on solid waste management viz., solid waste disposal and management in the ESZ should be carried out in accordance with the Solid Waste Management Rules, 2016, published by the Ministry of Environment, Forest and Climate Change, Government of India vide notification number S.O. 1357 (E), dated 8 April 2016 (MoEF&CC 2016). This says that the inorganic material may be disposed in an environmentally acceptable manner at a site identified outside the ESZ. Alternatively, safe and environmentally

sound management (ESM) of solid waste in conformity with the existing rules and regulations using identified technologies may be allowed within ESZ in certain conditions.

Around 50 villages have been listed in the ESZ of the reserve. Thus, initiatives for proper disposal of solid waste including plastics and maintaining cleanliness of ESZ should be taken by government agencies. Besides, various NGOs and institutions need to come together for awareness generation of local communities on proper disposal of plastics and reusing plastic through beat plastic campaigns. A SWM program for mangining waste generation within this zone should be created. As a result, we will be generating employment in this area by producing eco-friendly items such as recycled plastic products, handicrafts,

eco-bricks, and more. This initiative will help create opportunities for local people. Also, government earns some revenues from this kind of sustainable ways.

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SIX- LEGGED TIGERS

11 CR 28 EN 10 VU 7 NT 9 DD

Join us to explore the secret world of these lost tigers!

7 HOTSPOTS

Zoo Outreach Organisation and the IUCN SSC South Asian Invertebrate Specialist Group initiated the first ever Tiger Beetle Red Listing exercise. The 5-day workshop conducted in Coimbatore assessed 122 species endemic to India. 12 experts contributed to the assessments in person. The exercise tentatively assessed 46% of the species threatened with extinction. It also confirmed the need for intensive research on these species, their habitat, distribution, prey base and lot more aspects. Though plantations, mining, tourism, and urbanization are the major threats, studies on the same are the need of the hour, while conservation initiatives have to be established immediately.

- Anamalai
- Nilgiri
- Meghamalai
- Palani
- Shillong plateau
- Darjeeling
- Gurdaspur

Red List Assessment of Tiger Beetles of India



8-12 June 2024
Coimbatore



*The Red List Status is Provisional.

A stylized illustration of a woman with long blonde hair and large black-rimmed glasses. She is wearing a green short-sleeved shirt with a palm tree pattern and dark pants. She is standing in a lush jungle with various green leaves and yellow flowers. In the background, a monkey is visible hanging from a vine. The overall style is vibrant and artistic.

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ZOO'S PRINT

Communicating science for conservation

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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 ZOO'S PRINT magazine.

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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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