

# ZOO'S PRINT



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Cover photo: Pika in Ladakh by Kamakshi Lekshmanan

## A day with the pikas of Ladakh



The summer of 2019 at Ladakh was silent. It was drier, and I would say, warmer than all my visits. From capturing landscapes and visiting monasteries, I was pulled towards wildlife in the land of high passes. I got hooked to the depth of these valleys, its people, the traversing scenes, the azure skies, and raining stars, setting me free, time and again.

A summer month at the valley filled with sand dunes, by the Shyok River, threw

some surprise showers. Nubra Valley turned silver as the clouds poured, and the swirl of winds blanketed the valley.

The pika, a fluffy mammal of the hare/rabbit family of this region, pulled me towards the music of melting glaciers.

The rocky patches by the stream is where we find one of the two pika species of this region, the Nubra Pika. The cute ashy one popped out of a huge rock and disappeared almost instantaneously. Then came the wait for the next three hours, and then the pika and I played hide and seek around the rocks. Well, I burnt a few calories running around them.

Nubra Pika or *Ochotona nubrica* in scientific terms, belongs to the Pika family of

the Ochotonidae. Found in the higher altitudes of Pakistan, India, Nepal, and China, this pika lives in rocky caves. Nubra Pikas feed on shrubs and plants found around their homes. They are incredibly active during the day and slow down during the twilight.

Unlike marmots (land squirrels in the Himalaya), the pikas do not hibernate and are seen through the summer and winter months in Ladakh.

The Ladakh Pika or *Ochotona ladacensis* is another pika species found at a similar altitude. The Ladakh Pika was again a pleasure to watch around the Tso Kar Lake. The burrows dug beneath the carpet of green grass, a secret tunnel, is where the Ladakh Pikas maneuver.

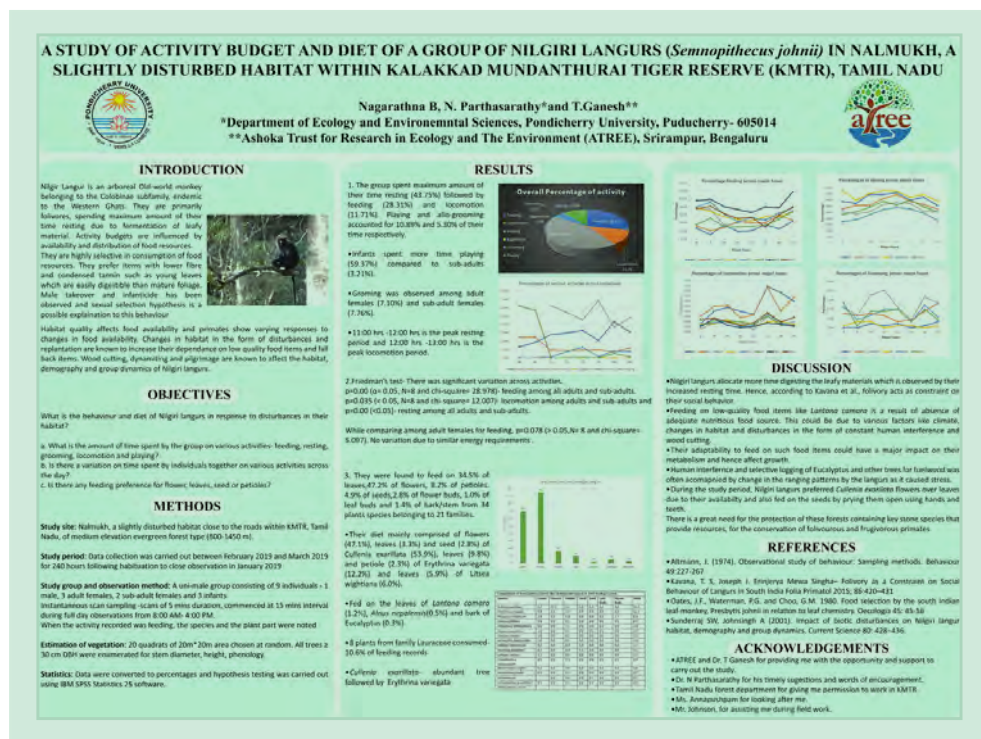
by Kamakshi Lekshmanan, Coimbatore  
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# Posters presented at the first meeting of the Association of Indian Primatologists

A study of activity budget and diet of a group of Nilgiri Langurs in Nalmukh, a slightly disturbed habitat within Kalakkad Mundanthurai Tiger Reserve (KMTR), Tamil Nadu

## Abstract

Anthropogenic factors have a serious impact on a species' habitat affecting the abundance and distribution of the species food resources. In this study the behaviour and the diet of Nilgiri Langurs located within a slightly disturbed habitat of KMTR, Tamil Nadu was studied.



The habitat was subjected to disturbances in the form of felling for fuelwood and other products and constant human interference. The study was carried out in the post monsoon season from February to March on the activity budget of a single group of Nilgiri Langurs. The findings of the study indicate that the group spent 43.75% of their time resting, 28.31% feeding, 11.71% on locomotion and the rest on social interactions (16.23%). Feeding records showed that they fed on 34 plant species

belonging to 21 families. Of these, 8 plant species was consumed the most accounting for 23.5% of the families. The diet mainly comprised of *Cullenia exarillata* flowers (47.1%), *Erythrina variegata* leaves (9.8%) and *Litsea wightiana* leaves (5.9%). The group also fed on the leaves of *Lantana camara* (1.16%), *Alnus nepalensis* (0.5%) and the bark of *Eucalyptus* (0.27%). Nilgiri Langurs that are primarily arboreal in nature would descend to as low

as 5 metres or below from the ground to consume the leaves of *Lantana camara*, *Maesa indica* and *Solanum erianthum*. The adaptability to feed on such food items could possibly have an impact on their metabolism and overall growth.

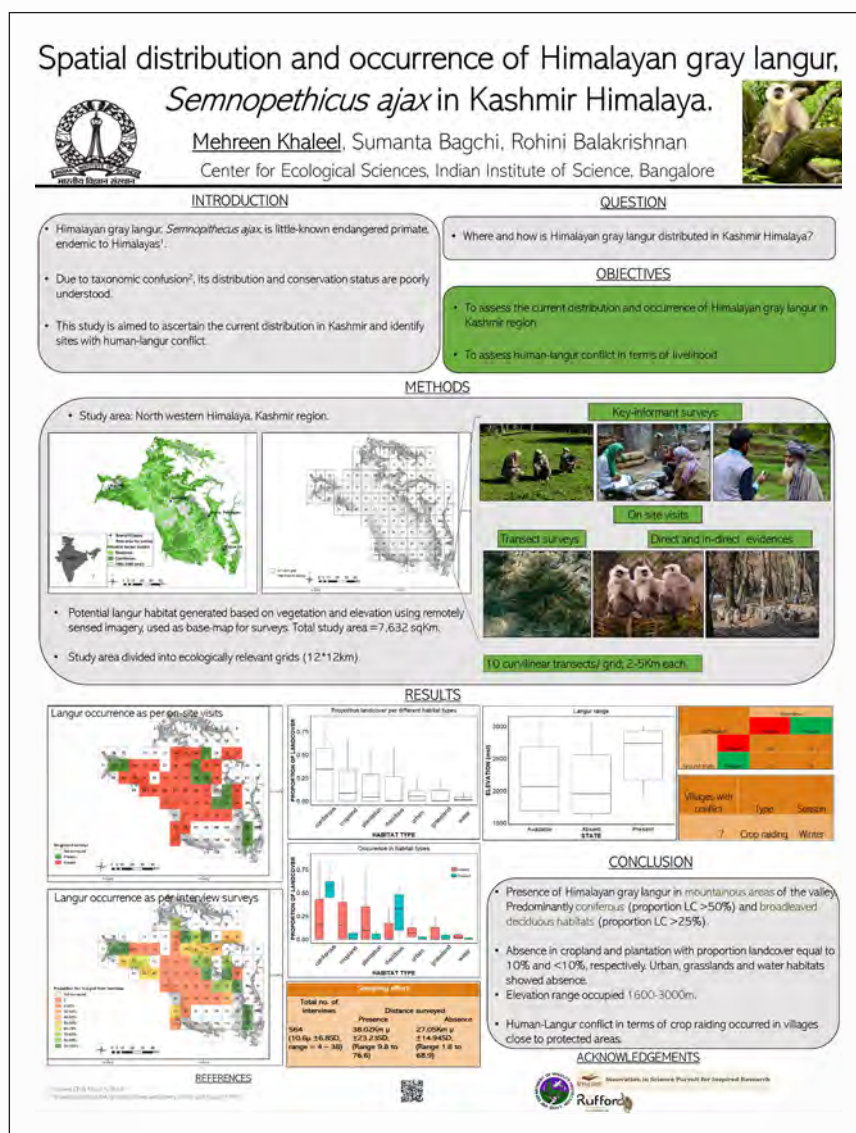
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# Spatial occurrence and distribution of Himalayan Gray Langur in Kashmir Himalaya

## Abstract

Himalayan Gray Langur, *Semnopithecus ajax*, is little-known endangered primate, endemic to Himalayas. It was initially reported to be present in Chamba, Kistawar and Dachigam National park. Its distribution in Kashmir Himalaya is poorly known. In Kashmir and adjoining regions, it is likely at risk of extinction due to land use change and conflict with humans. In this study, we aim to ascertain the current distribution in Kashmir region, and identify sites which face human-langur conflict. Using well-structured questionnaire and on-ground surveys we have attempted to determine the spatial distribution in the region.

This study shows that Himalayan gray langur are distributed in the protected mountainous forest areas of Kashmir. They are largely forest dwelling in habit and prefer an elevation within 1600-3000 m. The results suggest a wider range of Himalayan Gray Langur in Kashmir which was previously thought to be restricted in a small range. Conflict in the form of crop raiding was found in the villages around protected areas. The current distribution serves



as a base-map for various management policies towards the conservation of this high-altitude primate. Moreover, insights about the conflict will help managers in developing ideas to reduce and prevent conflict. Due to the presence of this species in the broadleaved deciduous and

coniferous forests of Kashmir, it becomes important to preserve and protect these habitats for its survival.

**Keywords:** High altitude primates, *Semnopithecus ajax*, distribution, conflict, Kashmir Himalayas.

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# Bugs & All

Invertebrate Conservation & Information Network of South Asia (ICINSA)

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## Record of Giant Freshwater Prawn *Macrobrachium rosenbergii* (De Man, 1879) in Krishna River, southern India



Adult giant freshwater prawn *M. rosenbergii* collected from the Krishna River at Nagarale village.

*Macrobrachium rosenbergii* is commonly known as Giant River prawn or giant freshwater prawn, it is nocturnal, bottom dwelling and sluggish in nature and highly territorial. *Macrobrachium rosenbergii* is distributed in Bangladesh, Brunei Darussalam, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka and Thailand (New 2002). This species is widely cultured both within its natural range and far beyond. Throughout its

range it is extensively fished for, as well as being the main focus for freshwater shrimp aquaculture. Commercial development of prawn farming has now become widespread, especially in South-Asian countries. *M. rosenbergii*, is a commercially important species in India due to its fast growth rate, large size and good demand with premium price. The species lives in large rivers and stream with a connection to the sea. The maximum recorded size for females and males are 29

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cm and 33 cm respectively. The spawning season of *M. rosenbergii* varies in different regions in its distributional range in the Indo West Pacific region. In temperate regions, the breeding season coincides with the summer; while in tropical regions it is generally restricted to the onset of the rainy season (Valenti 1984) successful mating occurs between soft shelled females and hard shelled males. Gravid females migrate downstream into estuaries, where the eggs hatch as free swimming larvae. The larvae pass through 11 zoeal stages before reaching the post larval stage (Karmakar 2002). Although commercially fished for throughout its range it is not thought to represent a threat to the global population. In view of its large natural range and the absence of any known major threats the species is considered as of Least Concern in IUCN Red List (De Grave et al. 2013).



**Adult giant freshwater prawn *M. rosenbergii* collected from the Krishna River at Mhaisal site.**

Study area begins from Karad (17.286501 N and 74.181427 E) to Mhaisal (16.8155019 N and 74.6496991 E) state border of Maharashtra approximately 105 Km distance. We have collected different body sized freshwater prawn *M. rosenbergii* in the Krishna River during monsoon and

post monsoon season in the specific sites where deep muddy region is present. Collection was made by using cast and drag nets with the help of local fisherman. Collected specimen was immediately photographed using digital SLR camera (Canon EOS-1100D) at the site, then fixed in 4%





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formalin solution. The specimens were brought to the laboratory and identified with the help of standard keys mentioned in the taxonomic catalogue and manual (New 2002). Adult giant freshwater prawn *M. rosenbergii* collected from Takari (17.1309366 N and 74.3616738 E), Nagarale (17.097651 N and 74.4496237 E) and Mhaisal sites of the Krishna River. Collected specimens lengths were 19 to 31 cm. This is the first report on record of freshwater prawn *M. rosenbergii* in the Krishna River, Sangli district, Western Maharashtra. These specimens may come from the aquaculture ponds accidentally through the streams and lakes present either side of the Krishna River along with rain water during monsoon. Detailed study is necessary to know the species density, diversity, reproductive pattern and ways of introduction in the Krishna River system of Western Maharashtra.

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## Ex situ conservation of threatened plant species of the Western Ghats

The Western Ghats is one of the world's "Hottest biodiversity hotspots" and one among the 34 global hot spots of biodiversity by means of its rich and varied flora with enormous species diversity abound in endemic taxa (Chandran et al. 2008). There are about 44 monotypic genera, 1,720 species and 135 intraspecific taxa of flowering plants (Ahmedullah & Nayar 1986; Shetty & Kaveriappa 2001). With the disconcerting pace of development and intensification of human activities, our biodiversity is threatened as never before. Nearly, a third of endemic plant species of Western Ghats are rare or threatened and several are believed to be extinct or on the verge of extinction (Shetty & Kaveriappa 2001). The study on the phenology and structural diversity of the rare, endangered, and threatened (RET), endemic, medicinally and economically important species of Western Ghats is required to understand the existing population followed by the conservation of these species (Shivaprasad et al. 2002; Sundarapandian et al. 2005; Sellamuthu & Lalitha 2010).

With the increasing population, demand towards plants for building purposes, as medicines and for nutritive values imparted a great threat to the plants of the Western Ghats in general and to Endemic and RET species in particular. The number of most of

the Endemic and RET plants is diminishing in the natural habitat due to the reasons such as the collection of raw materials, poor regeneration, collection of plants for house hold purposes etc (Chen et al. 2016). Keeping this in mind, the present study was undertaken to identify the threatened species in the Western Ghats and to increase their population in the Arboretum as an ex-situ conservation method.

Seeds/seedlings of 67 endemic and threatened species were collected from their natural habitats in the Western Ghats such as Agumbe (Shimoga District, 13.495°N, 75.080°E), Charmady (Belthangady Taluk, Dakshina Kannada District, 13.073°N and 75.447°E), Bisle Ghat (Sakaleshpura Taluk, Hassan District, 12.709°N and 75.676°E), Gersoppa (Kumta Taluk, North Kanara District, 14.228°N and 74.448°E), Gundya (Sakaleshpura Taluk, Hassan District, 12.827°N and 75.571°E), Hulikal Ghat (Hosanagara Taluk, Shimoga District, 13.724°N and 74.990°E) and Karike (Madikeri Taluk, Kodagu District, 12.443°N and 75.404°E) and transferred to polythene bags filled with soil and sand maintained in the green house for germination, growth and hardening of the seedlings. More than 200 hardened seedlings (3 seedlings each of threatened species) were transferred to the newly established arboretum at Mangalore

**Table 1. List of Endemic and Threatened plants conserved at Arboretum of Mangalore University, Karnataka.**

	<b>Botanical name</b>	<b>Family</b>	<b>Habit</b>	<b>Status and distribution</b>
1	<i>Actinodaphne malabarica</i> Balakr.	Lauraceae	Tree	Endemic <sup>#, ***</sup> Western Ghats – South and Central Sahyadris.
2	<i>Aegle marmelos</i> (L.) Core.	Rutaceae	Tree	Vulnerable <sup>**</sup> (Regional)
3	<i>Aglaia elaeagnoidea</i> , (Juss.) Benth.	Meliaceae	Tree	Endemic <sup>#, ***</sup> Western Ghats – South and Central Sahyadris.
4	<i>Alangium salvifolium</i> (L.f.) Wang	Alangiaceae	Tree	Vulnerable <sup>**</sup> (Regional).
5	<i>Alpinia galangal</i> Sw.	Zingiberaceae	Herb	Data deficient <sup>**</sup> Western Ghats – Kerala, Karnataka and Tamil Nadu.
6	<i>Aphanamixis polystachya</i> (Wall.) Parker	Meliaceae	Tree	Least concern <sup>*</sup> Vulnerable <sup>**</sup> (Regional)
7	<i>Artocarpus hirsutus</i> Lam.	Moraceae	Tree	Least concern <sup>*</sup> Vulnerable <sup>**</sup> , <sup>***</sup> (Global)
8	<i>Artocarpus gomezianus</i> Wall ex Trecul	Moraceae	Tree	Western Ghats - South, Central and Maharashtra Sahyadris <sup>***</sup> .
9	<i>Baccaurea courtallensis</i> Muell. - Arg.	Euphorbiaceae	Tree	Endemic <sup>#, ***</sup> Western Ghats – in evergreen forests of – Kerala, Karnataka and Tamil Nadu.
10	<i>Beilschmiedia wightii</i> (Nees) Benth. Ex Hook. F.	Lauraceae	Tree	Endemic <sup>##, ***, \$\$</sup> Western Ghats – occasional in South and Central Sahyadris.
11	<i>Blepharistemma membranifolium</i> (Miq.) Ding Hou	Rhizophoraceae	Tree	Endemic <sup>#, ***</sup> Southern Western Ghats.
12	<i>Calophyllum apetalum</i> Willd.	Clusiaceae	Tree	Vulnerable <sup>*</sup> Endemic, Vulnerable <sup>**</sup> (Global) Western Ghats – along the river banks in semi-evergreen forests at low altitudes, upto 600m. Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu.
13	<i>Canarium strictum</i> Roxb.	Bruseraceae	Tree	Vulnerable <sup>**</sup> , <sup>***</sup> (Regional) India, Sri Lanka, Bangladesh.
14	<i>Caryota urens</i> L.	Arecaceae	Tree	Least concern <sup>*</sup> Western Ghats – South and Central Sahyadris.
15	<i>Calamus nagbettai</i> R.R.Fernald & Dey	Arecaceae	Climber	Endemic <sup>#, ##, \$\$</sup> South Western Ghats – Kerala.
16	<i>Coscinium fenestratum</i> (Gaertn.) Coleb.	Menispermaceae	Climber	Data Deficient <sup>*</sup> Critically Endangered <sup>**</sup> (Regional) Western Ghats – semi evergreen and wet evergreen forests of Karnataka, Kerala, and Tamil Nadu.

	Botanical name	Family	Habit	Status and distribution
17	<i>Dipterocarpus indicus</i> Bedd.	Dipterocarpaceae	Tree	Endangered* Endangered** (Global). Endemic to the Western Ghats – evergreen to semi-evergreen forests upto 1,000m height in Kerala, Karnataka and Tamil Nadu.
18	<i>Dispyros buxifolia</i> (Bl) Heirn.	Ebanaceae	Tree	Western Ghats-Central and North Malanad in Central Sahyadri and in openings of South Sahyadri***.
19	<i>Diospyros malabarica</i> (Desr.) Kostel.	Ebenaceae	Tree	Endemic##,*** Western Ghats – Almost throughout. Common along river banks.
20	<i>Ensete superbum</i> (Roxb.) Cheesman	Musaceae	Herb	Endemic#,\$ Peninsular India.
21	<i>Euodialunu-ankenda</i> (Gaertn.) Merr.	Rutaceae	Tree	Least concern* Endemic to central and south India.
22	<i>Flacourtia montana</i> Graham	Flacourtiaceae	Tree	Endemic#.,*** Western Ghats – common trees in Sahyadris, Central and South Maharashtra Sahyadris.
23	<i>Garcinia gummi-gutta</i> (L.) Robs.	Clusiaceae	Tree	Vulnerable** (Global). Endemic to the Western Ghats – throughout in South and Central Sahyadris.
24	<i>Garcinia indica</i> (Thouars) Choisy	Clusiaceae	Tree	Vulnerable* Vulnerable** (Global). Endemic to the Western Ghats – in evergreen and deciduous forests upto 400m. Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu.
25	<i>Garcinia talbotii</i> Raiz&Sant.	Clusiaceae	Tree	Endemic## Western Ghats – South, Central and south Maharashtra Sahyadris.
26	<i>Gmelina arborea</i> Roxb.	Verbanaceae	Tree	Endemic## Throughout Western Ghats.
27	<i>Gymnacranthera farquhariana</i> (Hook.f.ex. Thomaon) Warb	Myristicaceae	Tree	Endemic#.,*** Western Ghats –Agasthyamali (West) and Central Malanad.
28	<i>Holigarna arnottiana</i> J.Hk.	Anacardiaceae	Tree	Endemic#.,*** Western Ghats – South and Central Sahyadri. Canopy trees in low and medium wet evergreen forests upto 1200m.
29	<i>Holigarna beddomei</i> Hook.f.	Anacardiaceae	Tree	Endemic##,*** Western Ghats – coastal areas and in forests at lower altitudes.
30	<i>Holigarna ferruginea</i> Marchand	Anacardiaceae	Tree	Endemic#.,*** Western Ghats – rare in South Sahyadri and frequent in Central Sahyadri. Canopy trees in low and medium wet evergreen forests upto 1300m.

	Botanical name	Family	Habit	Status and distribution
31	<i>Holigarna grahamii</i> (Wt.) Kurz.	Anacardiaceae	Tree	Endemic <sup>#, ***</sup> Moist deciduous to evergreen forests of Western Ghats of Maharashtra, Karnataka, Tamil Nadu and Kerala.
32	<i>Hopea canarensis</i> Hole	Dipterocarpaceae	Tree	Endangered <sup>*</sup> Endangered <sup>**</sup> Endemic to the Western Ghats – Kudremukh of Chikmagalur Region, Central Sahyadri.
33	<i>Hopea ponga</i> (Dennst) Mabb.	Dipterocarpaceae	Tree	Endangered <sup>*</sup> Endangered <sup>**</sup> Endemic to Western Ghats – South and Central Sahyadris. Common subcanopy trees in wet evergreen forests, upto 900m.
34	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Tree	Least concern <sup>*</sup> Endemic <sup>***, ##</sup> Western Ghats – semi evergreen to evergreen forests of Karnataka and Kerala.
35	<i>Humboltia brunonis</i> Wall.	Fabaceae	Tree	Endemic <sup>##, ***</sup> Western Ghats –between Wayanad and Sringeri regions of Central Sahyadri.
36	<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken	Flacourtiaceae	Tree	Vulnerable <sup>**</sup> (Global) Endemic <sup>#, ***</sup> Western Ghats – moist deciduous and semi evergreen forests of Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu.
37	<i>Ixora brachiata</i> Roxb.	Rubiaceae	Small tree	Endemic <sup>#, ***</sup> Western Ghats.
38	<i>Kingiodendron pinnatum</i> (Roxb. ex DC.) Harms	Caesalpiaceae	Tree	Endangered <sup>*</sup> Endangered <sup>**</sup> (Global). Endemic to the Western Ghats – in evergreen forests of Karnataka, Kerala and Tamil Nadu.
39	<i>Knema attenuata</i> Warb.	Myristicaceae	Tree	Least concern <sup>*</sup> Endemic <sup>***, #</sup> Western Ghats – South, Central and South Maharashtra Sahyadris.
40	<i>Kunstleria keralensis</i> Mohanan & Nair	Fabaceae	Climber	Endemic <sup>##, \$\$</sup>
41	<i>Lophopetalum wightianum</i> Arn.	Celastraceae	Tree	Least concern <sup>*</sup> Widespread throughout India, Indo-China, and Malaysia.
42	<i>Madhuca insignis</i> (Radlk.) H. J. Lam.	Sapotaceae	Tree	Extinct <sup>*</sup> Critically endangered. Endemic to South Western Ghats.
43	<i>Madhuca neriifolia</i> (Moon) H.J.Lam	Sapotaceae	Tree	Least concern <sup>*</sup> Vulnerable <sup>**</sup> (Regional). Common along the streams and rivers upto 1200m in Western Ghtas – South and Central Sahyadris.

	Botanical name	Family	Habit	Status and distribution
44	<i>Mastixia arborea</i> (Weight) Beddome	Cornaceae	Tree	Least concern* Endemic <sup>***, #</sup> Western Ghats South and Central Sahyadris. Subcanopy trees in evergreen forests, upto 1900m.
45	<i>Maytenus rothiana</i> (Walp.) Ramamoorthy	Celastraceae	Small tree	Endemic <sup>##, ***</sup> Western Ghats – Maharashtra & Karnataka.
46	<i>Memecylon malabaricum</i> (CL.) Cong.	Melastomataceae	Tree	Endemic <sup>#</sup>
47	<i>Myristica fatua</i> Houtt. var. <i>Magnifica</i> (Beddome) Sinclair	Myristicaceae	Tree	Endangered <sup>**</sup> Rare and threatened Endemic to the Western Ghats – in swampy areas of evergreen forests of Karnataka, Kerala and Tamil Nadu.
48	<i>Myristica malabarica</i> Lam.	Myristicaceae	Tree	Vulnerable <sup>**</sup> Endemic to the Western Ghats – in evergreen forests of Maharashtra, Karnataka and Kerala up to 800m.
49	<i>Nilgirianthus barbatus</i> (Nees.) Bremek	Acanthaceae	Shrub	Endemic <sup>\$\$\$</sup> Western Ghats.
50	<i>Nilgiriathes ciliates</i> (Nees) Bremek	Acanthaceae	Shrub	Endangered <sup>**</sup> (Global). Endemic to the Western Ghats.
51	<i>Nothopegia racemose</i> (Dalz.) Ramam.	Anacardiaceae	Tree	Endemic <sup>##, ***</sup> Western Ghats South and Central Sahyadris.
52	<i>Nothapodytes nimmoniana</i> (J. Graham) Mabbes	Icacinaceae	Tree	Endangered <sup>***</sup> Western Ghats – in openings of evergreen forests upto 2300m in South, Central, and South Maharashtra Sahyadris.
53	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Endemic <sup>##</sup> In evergreen and deciduous forests of the Western Ghats.
54	<i>Oroxylum indicum</i> (L.) Benth. Ex:Kurz	Bignoniaceae	Tree	Vulnerable <sup>**</sup> (Regional). Western Ghats- occasional from South to Central and south Maharashtra Sahyadris and West Coast Region. Along the margins of evergreen and in moist deciduous forests up to 800m.
55	<i>Persea macrantha</i> (Nees) Kosterm.	Lauraceae	Tree	Endangered <sup>*</sup> (Regional). Distributed in peninsular India and Sri Lanka; in the Western Ghats-South, central and south Maharashtra Sahyadris, canopy trees in evergreen forests upto 2000m.
56	<i>Poeciloneuron indicum</i> Beddome	Clusiaceae	Tree	Endemic <sup>#</sup> Southern Western Ghats – in evergreen forests up to 1200m in Kerala, Karnataka and Tamil Nadu.

	Botanical name	Family	Habit	Status and distribution
57	<i>Polyalthia fragrans</i> (Dalz.) Beddome	Annonaceae	Tree	Endemic <sup>#,***</sup> Western Ghats – in semi evergreen to evergreen forests up to 1200m in Maharashtra, Karnataka, Kerala and Tamil Nadu.
58	<i>Psychotria flavida</i> Talbot	Rubiaceae	Shrub	Endemic <sup>##</sup> Southern Western Ghats.
59	<i>Pterocarpus santalinus</i> L.f.	Fabaceae	Tree	Near Threatened <sup>†</sup> Endangered <sup>**</sup> (Global) Distributed in Southern India, hilly regions of Nepal, Pakistan and Sri Lanka.
60	<i>Pterospermum reticulatum</i> Weight. & Arn.	Sterculiaceae	Tree	Vulnerable <sup>†</sup> Endemic to Western Ghats – South and Central Sahyadris.
61	<i>Saraca asoca</i> (Roxb.) Willd	Caesalpiniaceae	Tree	Vulnerable <sup>†</sup> Endangered <sup>**</sup> (Regional) Distributed in the Western Ghats – South, Central, and South Maharashtra part of Sahyadris as an understory tree along the streams in evergreen to semi-evergreen forests up to 600m.
62	<i>Spatholobus purpureus</i> Prain. Ex: Baker	Papilionaceae	Climbing shrub	Endemic <sup>##</sup> Western Ghats.
63	<i>Sterculia guttata</i> Roxb.	Sterculiaceae	Tree	Distributed throughout the Western Ghats <sup>##</sup> .
64	<i>Syzygium travancorium</i> Gamble	Myrtaceae	Tree	Critically Endangered <sup>**</sup> (Global) Endemic to Western Ghats of Karnataka, Kerala and Tamil Nadu.
65	<i>Trichopus zeylanicus</i> Gaertn. subsp. <i>travancorius</i> (Bedd.) Burkill	Dioscoreaceae	Herb	Critically Endangered <sup>†</sup> (Global) Endemic to the Western Ghats of Kerala and Tamil Nadu.
66	<i>Vatica chinensis</i> L.	Dipterocarpaceae	Tree	Critically Endangered <sup>†</sup> Critically Endangered (Global) In evergreen forests of the Western Ghats along the streams at low elevation in Karnataka, Kerala and Tamil Nadu.
67	<i>Vateria indica</i> L.	Dipterocarpaceae	Tree	Critically Endangered <sup>†</sup> Vulnerable <sup>**</sup> (Global). Endemic to the Western Ghats/western coast – usually in evergreen forests up to 1300m in Karnataka, Kerala and Tamil Nadu.

<sup>†</sup><https://www.iucnredlist.org>, <sup>\*\*</sup><http://enis.frlht.org/junclist.php>, <sup>\*\*\*</sup>[http://www.biotik.org/species\\_list\\_india.html](http://www.biotik.org/species_list_india.html), <sup>#</sup>Shetty & Kaveriappa (2001), <sup>##</sup><http://indiabiodiversity.org>, <sup>§</sup>Cheesman 1968, <sup>§§</sup><http://www.kfri.res.in/noticeboard.asp?ID=17>, <sup>§§§</sup><http://florakarnataka.ces.iisc.ac.in/hjcb2/herbsheet>

University Campus, Mangalagangothri (12.816°N, 74.923°E) (Table 1). The maintenance of an arboretum of endemic and RET species not only helps in conservation but also provides an opportunity for the student community to know more about our plant resources, their uses and importance. In addition, the collected plant species also form a study material for further research.

Among the 67 species conserved in the arboretum, *Alpinia galangal* Sw., *Ensete superbum* (Roxb.) Cheesman and *Trichopus zeylanicus* Gaertn. subsp. *travancoricus* (Bedd.) Burkill are herbs. *Calamus nagbetta* R.R. Fernald & Dey, *Cosciniium fenestratum* (Gaertn.) Coleb. and *Kunstleria keralensis* Mohanan & Nair are climbers. *Nilgirianthus barbatus* (Nees.) Bremek, *Nilgirianthus ciliates* (Nees) Bremek and *Psychotria flavida* Talbot are shrubs. *Spatholobus purpureus* Prain. Ex: Baker is a climbing shrub and all the remaining 57 species are trees.

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## Sighting of an aberrant coloured Western Yellow Wagtail *Motacilla flava* at Chandlai Dam, Jaipur



An aberrant coloured Western Yellow Wagtail *Motacilla flava*.

Chandlai (26.695°N & 75.876°E) is a small lake about 3km away from the Jaipur-Kota Road, in the outskirts of Jaipur, Rajasthan, India. It is a waste water pond, but is like a haven for water birds. Around 10,000 migratory birds can be seen at the Chandlai Lake. Since October 2009, our team has made regular visits to this pond for making an avian checklist. On 2 November 2009 we saw a different bird species near the pond in the agricultural field being ploughed by a tractor. Some birds usually take their food

from the ploughed field and chase the tractor like drongos, Cattle Egrets, mynas, Indian Roller, pipits, and wagtails. With a telephoto lens, I was taking photos of different activities near this pond, when around 60m away, I saw a different type of bird which was very actively engaged in feeding from the field and speedily moving with the movement of a tractor. It was an aberrant coloured wagtail. Aberrantly coloured birds are easy to spot and are generally referred to as “albino”. Aberrantly coloured birds can be described in

seven separate aberration categories based on lack or excessive melanin deposition (Vargiya 2018). Generally, overall colour of plumage is the result of biological pigments (mostly melanins and carotenoids), structural colour or a combination of the two (Mahabal et al. 2016).

It was probably the first known published record of leucism in Western Yellow Wagtail from India (Source: [www.orientalbirdimages.org](http://www.orientalbirdimages.org)). Records of colour aberrations in Indian birds between 1886~2015 have been already published but do not include Wagtail species (Mahabal et al. 2016).

**Leucism:** In leucistic birds, affected plumage lacks melanin pigment due to the cells responsible for melanin production being absent. This results in a white feathers, unless the normal plumage colour also comprises carotenoids (e.g. yellows), which remain unaffected by the condition. Although leucism is inherited, the extent and positioning of the white colouration can vary between adults and their young, and can also skip generations if leucistic genes are recessive.

The reduction of pigment in leucistic birds causes feathers to weaken and be more prone to wear. In some situations this can hinder flight, which, in addition to leucistic birds usually being more conspicuous, can heighten risk of predation. There is also evidence that leucistic birds might, on occasion, not be recognized or accepted by a potential mate.

Class: Aves

Order: Passiriformes

Family: Motacillidae

*Motacilla flava* Linn.1758 (Western Yellow Wagtail)

**Auriculars:** White; Back: little yellow with some white spots in-between; Belly: little yellow with some white spots in-between; Breast: little yellow with more white spots in-between; Chin: Yellow; Crissum: Yellow; Crown: Pale yellow with more whiteness; Ear coverts: Almost white; Eye-ring: Upper area is white and lower one pale yellow. A black dot at the joint of upper and lower ring part towards crown; Flanks: mostly yellow; Forehead (front): White; Greater coverts: Off white; Lesser coverts: Off white; Lower mandible: Pinkish with some blackness; Mantle: yellow; Median coverts: Off white; Nape: yellow; Primaries: off white; Remiges: off white; Rump: yellow; Scapulars: Yellow; Secondary wings: off white; Semi-palmated: having half webbing between the toes; Side: Yellow; Supercilium: Pale Yellow; Tail: Almost off white; Tarsus: Pinkish black; Tertiary wings: White; Thigh: Yellow; Throat: Yellow; Undertail coverts: Yellow; Uppertail coverts: Yellow; Upper mandible: Pinkish black; Vent: yellow. This sighting is the first report of colour aberration in Western Yellow Wagtail from Indian subcontinent with photo in Oriental Bird Images (Bhardwaj 2009).

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## Occurrence of the Malabar Lark on Kulang Fort in Maharashtra, India



The Malabar Lark spotted in Kulang Fort in Maharashtra, India. © Rohan Bhagat.

Habitat and ecology are the two important factors that play a major role in the occurrence of a bird in a particular area. The Malabar Lark *Galerida malabarica* (Aves: Passeriformes: Alaudidae) (IUCN status: Least Concern), also known as the Malabar Crested Lark, is a resident bird of southeastern Gujarat and the Western Ghats which virtually breeds year-round (del Hoyo et al. 2004). It is a medium-sized, fairly sturdy lark with a prominent spiky crest, reddish-brown plumage, medium-long bill, and a fairly short tail. It is locally common in stony and grassy hillsides, forest clearings, scrublands, and fields. It is gregarious and sings either from perch or in high prolonged song flight with slow flapping wings (Rasmussen & Anderton 2012).

It is smaller than the Crested Lark *Galerida cristata* and larger than the Skye's Lark *G.*

*deva* as well as the Oriental Skylark *Alauda arvensis*, with a stouter bill, darker and more rufescent upperparts with much stronger blackish streaking, heavily spotted breast (washed with buff or rufous-buff), and pale rufous outer tail feathers (Grimmet et al. 2011).

This note describes the photographic record of the Malabar Lark in the hilly terrain on top of Kulang Fort in Kurungwadi, Ahmednagar, Maharashtra, India (19.591° N & 73.642° E), on 08 November 2018 at an altitude of 1,470m. While wandering among the fascinating spots and remains of the fort at around 11.30h, I spotted a bird at the topmost point of the fort. The upper part of the fort is completely rocky with no trees or shrubs. It only comprises of short grass which starts drying at the end of the monsoon season. I did not expect a small

bird such as a lark to be there at that altitude and that time of the day and hence took an image of it. I identified it as the Malabar Lark by comparing it with Grimmett et al. (2011).

Grimmett et al. (2011) and Rasmussen & Anderton (2012) did not record the species from Kurungwadi in Ahmednagar. Additionally, the distribution of the Malabar Lark in del Hoyo et al. (2004) does not include sightings from the mentioned area. The species, however, was recorded in the nearby area of Harishchandragad Kalsubai Wildlife Sanctuary by Kurhade (2010) with no notes on elevation. The Malabar Lark can be found till elevations of 1,828m according to Rasmussen & Anderton (2012) and Grimmett et al. (2011).

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## Record of Gaur from Phansad Wildlife Sanctuary



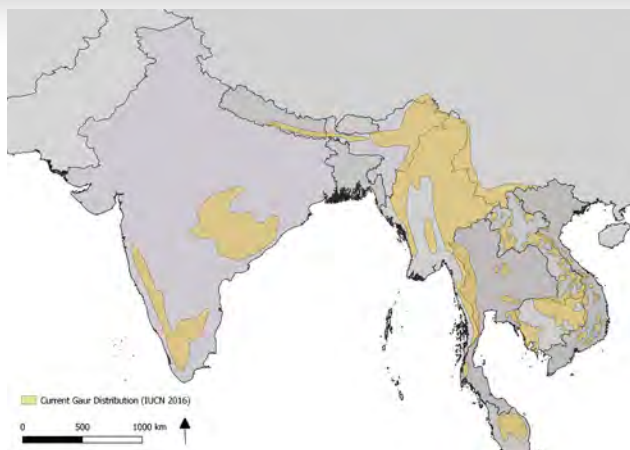
Gaurs grazing in the field near sanctuary.

The Indian Gaur *Bos gaurus* is the world's largest and tallest wild bovine having males often weighing 1000–1500 kg and females 700–1000 kg. They reach a height of about 165–220 cm. Males are about one-fourth larger and heavier than females. Gaurs are among the largest land animals, surpassed only by the elephants, rhinos, hippopotamus, and giraffes. The Indian Gaur is listed as schedule I species in the Wildlife Protection Act 1972 and has been assessed as Vulnerable on the Red List (Duckworth et al. 2016).

Gaur inhabits a wide variety of habitats ranging from tropical wet, semi-evergreen and bamboo forests, tropical moist deciduous to tropical dry deciduous forests. It is distributed in southern and southeastern Asia, from India to peninsular Malaysia. Approximately, 85% of its current global population occurs in India (Duckworth et al. 2016). Major population of Gaur is found in

three distinct regions: southwestern India, central India, and northeastern India. From its reported distribution in the past, the species has experienced dramatic range reductions with present population surviving in isolated forested patches (Choudhury 2002; Ahrestani 2018). Historically, the southwestern Indian population of Gaur ranged throughout the whole Western Ghats mountain range, from Kerala to the Dangs in Gujarat (Jerdon 1874; Choudhury 2002); however, the current northern limit of this population appears to be in Mahabaleshwar, Maharashtra (Choudhury 2002; Ahrestani & Karanth 2014; Duckworth et al. 2016; Sayyed 2016). Apart from a few anecdotal reports as mentioned by Choudhury (2002) and Kathayat & Mathur (2004), there are no recent confirmed records of occurrence of Gaur from north of Mahabaleshwar.

Phansad Wildlife Sanctuary (PWS; 18.423°N & 72.947°E) is situated on the western coast



**Current Gaur Distribution (IUCN 2016).**

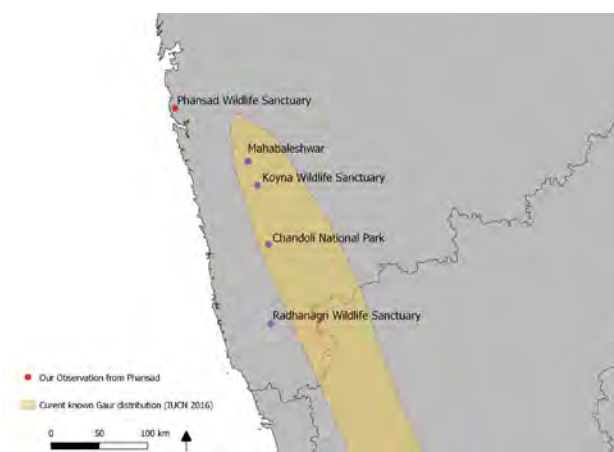
of Maharashtra in the Roha and Murud talukas of Raigad District. The Sanctuary was established in 1986 and spreads about 52.6km<sup>2</sup> in area. The Sanctuary area is mostly covered with southern moist mixed deciduous forest. It is also ranked among one of the highest conservation priority zones of Maharashtra (Rodgers & Panwar 1998). The landscape of PWS is virtually isolated from the mountains of the Western Ghats and if any wildlife corridor between these two regions exists, it is currently unknown.

In August 2018, locals of the Supegaon Village (18.426°N & 72.950°E), which is located in the Sanctuary, reported to us about the presence of Gaur within the Sanctuary. To confirm their presence, we conducted an opportunistic survey on old and newly formed paths and trails in September 2018 near the Supegaon area of the Sanctuary. During the survey, we found footprints, dung, and paddy crop damage showing signs of Gaurs near the sacred grove of Supegaon (18.430°N & 72.955°E); however, we couldn't sight or photograph any Gaur. On 15 September 2019, again

during a survey, we sighted a herd of Gaur near the sacred grove at about 06.10h and photographed it. The herd was of nine individuals, consisting two juveniles, two sub-adults and five adults. The herd was grazing in the paddy field adjacent to the forest, however, sensing the presence of unknown beings, the herd ran into the forest.

This is the first photographic records of Gaur in this Sanctuary and it confirms their presence. Apart from the recent sightings of the local villagers, no occurrence of Gaur was reported or documented earlier from the Sanctuary (Forest Dept. comm.). Whether the herd sighted here is a local herd or a migrated one from somewhere else is currently unknown. There is a need to conduct a genetic study to find out the source of this population, which may eventually help in finding the plausible corridor that these animals might have followed.

The Indian Gaurs are threatened with habitat loss and fragmentation. Diseases, particularly rinderpest, anthrax, and foot &



**New Record from Phansad WLS.**



**Herd of Gaurs with nine individuals.**

mouth diseases transmitted by domestic cattle are potentially serious threats. Some animals also die from ingestion of agrochemicals and human response when wandering into farmland and villages. These could be significant for already isolated and reduced populations (Choudhury 2002).

This herd was found near the Supegaon Village and was also observed feeding on paddy crops. Hence, cattle-borne diseases and ingestion of agrochemicals could be potential threats to this population. Apart from this, inbreeding due to habitat fragmentation and human-wildlife interactions are some potential threats. These findings warrant the need of long term monitoring of this population in the future. Further studies on movement patterns, population genetic studies, any human wildlife conflicts, and habitat use in PWS are needed.

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# An anecdote on combating Babesiosis in Tata Steel Zoological Park, Jamshedpur in the year 2018

Babesia is transmitted through vectors like ticks. The protozoa multiply in and destroy the red blood cells (RBC). Death occurs due to acute anaemia and jaundice. The chances of recovery of the infected wild animals are less.

## Preamble

The Tata Steel Zoological Park is situated in the city of Jamshedpur of Jharkhand State. The Zoo is of a medium category facility recognised by the Central Zoo Authority and is spread over an area of 25ha. The Zoo is annually visited by 4.5 lakh visitors. Among the large carnivores, the zoo has the Bengal Tiger, Leopard and the African Lion in its collection.

Three tiger cubs were born in this Zoo on the 23 August 2017. All the cubs were healthy at the time of birth, vaccinated against feline distemper, rabies, and herpes, which are commonly



**Tiger cubs in healthy prior to onset of disease. © Manik Palit.**

occurring diseases in cats. They were also dewormed. They were achieving all milestones normal in their growth until one of the cubs, TC1 was found dull on 21 February 2018 having high fever and went off feed. Symptomatic treatment with antibiotics was initiated and TC1 started responding to the treatment from 24 February 2018 when it consumed its food to the full.

However, on 25 February 2018, its eyes (cornea) turned opaque blue resulting in partial blindness with

deep yellow lining and dull appearance.

## Appearance of Babesia

Blood samples were collected by manually restraining TC1 on 26 February 2018 and sent for diagnosis to the local veterinary laboratory. It was confirmed positive of having infected with Babesia blood protozoa. It was accordingly treated with Berenil (Diminazine acetate -70mg/ml MSD pharma) and it recovered fully in a week's time including getting its vision back.



**TC1 - Discoloration of cornea & visual impairment.** © Manik Palit.

On 8 March 2018, TC1 was again restrained manually using nets for collection of blood and repeat testing. A repeat dose of *Bereni* was also injected. This time the blood report was found negative for Babesiosis. Normal sight/vision was also restored. On 15 March 2018, one more cub TC2 was found by animal keepers to have a similar problem and symptomatic treatment was provided. Blood was collected and sent for examination. Test report showed the presence of Babesia.

Treatment continued with Berenil, but this time the

recovery rate was slow. Only by 25 March 2018, TC2 started showing normal behaviour including its food intake.

As Babesia was found in TC1 & TC2, symptomatically TC3 was injected with Berenil 1.5ml (4mg.per Kg. Body wt. considering body weight to be 25–30kg) as prophylaxis from Babesia. The rest of the adult tigers were also injected with Berenil (5–7 ml).

On 16 March 2018, cub TC3 was found showing the symptoms as observed in other cubs. Treatment was provided as in the past; however, on 18 March 2018, the cub's condition was found critical manifested with signs of neurological disorder, unable to stand on four legs with posterior paralysis and convulsion. Saline therapy was immediately provided as support but the cub died 12.30h. Postmortem was carried out by the zoo and government veterinarians. On conducting postmortem, it was found that the animal had highly congested lungs and liver.

The report was inconclusive of any disease and cause of death was attributed to acute respiratory failure followed by cardiac arrest. Tissue samples from liver, lungs, kidney, and intestine were sent to the Ranchi Veterinary College and the Indian Veterinary Research Institute, Bareilly, U.P for histopathological analysis.

A female Bengal Tiger by name Ahana of age 3 years and 7 months died in our zoo on the night of 25 March 2018. She was under treatment along with saline therapy for suspected haemo- protozoan infection (Babesiosis/Anaplasmosis as confirmed through the blood tests) along with supportive treatment since 21 March 2018, the day she went off feed.

All reports regarding the medication given and mortality were shared with the Central Zoo Authority, New Delhi; the Chief Wildlife Warden, Jharkhand and with the District Animal Husbandry Officer, east Singhbhum, Jamshedpur, Jharkhand. Tissue samples collected during postmortem

were sent to the Indian Veterinary Research Institute, Bareilly, Uttar Pradesh for histopathological examination.

### In search of Babesia

On the recommendation of the Central Zoo Authority, New Delhi, an official request was made to the Institute of Animal Health and Veterinary Biologicals (IAHVB), Kolkata and the Centre for Wildlife Health, College of Veterinary Science and Animal Husbandry, Bhubaneswar to help in detailed investigation of the disease and suggest ways to containing the same.

A two-member scientist team comprising of Dr. Mritunjay Mandal and Pralay Mandal arrived from IAHVB on 29 March 2018. The team members collected blood samples from the infected tigers as well as healthy Tigers, Lions, and Leopards for analysis of blood protozoa.

Blood samples collected from the infected but recovered tigers and those unaffected were sent for analysis to the College of Veterinary Science and

Animal Husbandry, OUAT, Bhubaneswar, Odisha.

### Fact-finding team

The Zoo Veterinary Health Advisory Committee (ZVHAC) arrived at the Zoological park on 08 April 2018 to help the Zoo team in containing the disease.

The fact-finding team comprising of members of ZVHAC along with Dr. D.N. Dwivedi, District Animal Husbandry Officer, Tatanagar carried out a joint investigation on the death of Tigers. Relevant health records with respect to treatment, laboratory analysis and postmortem findings were examined

by the members in detail. Concerned enclosures were inspected where apparently healthy Tigers were housed and clinical examination were recorded by the team.

### Observation of fact-finding team

The Tata Steel Zoological Park had a total of six (03 female cubs, 01 male adult, and 02 female adults) wildcats of which one female cub and another female adult died on 18 and 25 March 2018, respectively.

All the three 7-month-old female cubs (TC1; TC2 & TC3) of one litter housed along with their mother Dona in one enclosure became



**Restraint of TC2 and collection of blood sample. © Manik Palit.**

ill; one on 21st February 2018 and the other two on 15/ 16 March 2018. Clinical signs recorded were onset of acute dullness, inappetence, fever, corneal opacity with impaired vision, posterior weakness and nervous signs. Blood smear examination in a local private veterinary laboratory revealed presence of *Babesia* sps. in all three cases. Two cubs (TC1 & TC2) recovered following treatment with Diminazine aceturate (Berenil) alone. Cub TC3 which was administered Berenil on 16 March 2018 succumbed on 18 March 2018.

Imidocarb was used on subadult tiger Ahana and white tiger Kailash on 21 March 2018. Ahana who was administered Berenil on 16 March 2018 and repeated with a dose of Imidocarb on 21 March 2018, failed to respond to therapy and succumbed after a brief illness of three days on 25 March 2018. Considering the gravity of the situation, prophylactic treatment was initiated with

Berenil and Imidocarb to apparently healthy adult animals on 16 & 17 March 2018, of which, Ahana died after a subacute suffering of nine days.

Biosamples from the dead animals were not available for examination. Blood samples collected from four live healthy animals (03 tiger and 01 leopard) were analyzed at three different laboratories i.e., Institute of Animal Health and Veterinary Biology, Kolkata, Centre for Wildlife Health, College of Veterinary Science and Animal Husbandry, Bhubaneswar and Indian Veterinary Research Institute, Bareilly, U.P. Reports indicated absence of hemoparasites. However, a serum analysis report of all the four samples at the Institute of Animal Health and Veterinary Biology, Kolkata revealed the presence of antibodies against Canine Distemper Virus (CDV). Samples sent to the Indian Veterinary Research Institute also corroborated the presence of CDV.



**ZVAHC members at work. © Manik Palit.**

Biochemical parameters were within the reference range.

On clinical examination, four animals i.e., male white tiger 'Kailash', tigress 'Dona' and tiger cub TC1 & TC2 were observed to be normal. Blood samples were again collected for laboratory investigation at the Centre for Wildlife Health, Bhubaneswar. Short term minor palliative treatment was suggested.

Interpretation of the fact-finding team  
Keeping the above-stated information in backdrop especially with respect to the onset of acute illness, clinical signs, laboratory investigation including direct blood smear examination and response to anti-protozoan therapy there was enough reason to believe that there was an outbreak of Babesiosis. However, further investigation is warranted to substantiate such finding and to explore the co-existence of Canine Distemper Virus.

#### **On the spot suggestions made by the fact-finding team**

- (i) Implementation of prophylactic measure as per Central Zoo Authority guidelines in big cats.
- (ii) Repair/replacement of the tiger enclosures particularly the floor and iron grills.
- (iii) Regular monitoring of susceptible population under risk to record their feed intake, characteristic of faeces and urine and any other deviation from normal behaviour.
- (iv) Avoid feeding pork with a thick layer of lard as the same was leading to obesity in

animals. Advised to discontinue pork and feed buffalo or goat meat.

#### **Containment of Disease-action taken by Zoo**

- (i) Regular fumigation of all feeding cells and outdoor enclosures of big cats & other zoo animals was initiated on war footing and continuing.
- (ii) Old flycatchers were removed and replaced with new ones in feeding /resting cubicle verandahs of all big cats.
- (iii) Regular monitoring of vector load in the zoo campus through the civic body JUSCO initiated and ongoing.
- (iv) Mechanism for day to day consultation with national expert veterinarians put in place on future management of the big cats in the zoo.

Further to the above, a request was made by the Zoo authorities to Indian Council of Medical Research (ICMR), New Delhi to help in proper investigation of Canine distemper virus in zoo large cats. This request was made by the zoo on the background that ICMR had recently concluded tests on Asian Lions in Gir, Gujarat and confirmed of presence of Canine distemper virus in the Lions.

A team of scientists comprising of Dr. Dilip R. Patil (Veterinarian), Scientist and Mr. H.L. Chakankar, Sr. Technician-3 from ICMR-National Institute of Virology, Pune, Maharashtra was deputed by ICMR to our zoo on 21 November 2018.

Blood samples and swabs (rectal, nasal, & ocular) were collected from all existing zoo leopards, lions and tigers and transported under cold chain to the Pune laboratory on 25 November 2018. Analysis of the samples was initiated on 26 November 2018 and results shared with the Zoological park which confirmed that none of the existing zoo large cats was having any blood protozoa infection or traces of the same. Secondly, presence of Canine Distemper Virus was also over ruled by the laboratory.

### Learnings

- (i) Tiger and in general all large cat enclosures, hygiene always must be maintained within resting / feeding cubicles and the area should be free of insects.
- (ii) The Zoo Veterinary Health Advisory Committee members should be regularly involved in the health management of animals through quarterly meetings and visits.
- (iii) The Zoo Veterinary Team should be in constant touch with their peers in other zoos for keeping themselves updated on diseases affecting animals and preventive care.
- (iv) Periodic tests of blood and tissues of large cats to be done through eminent institutions like IVRI, Bareilly; ICMR NIV, Pune; Institute of Animal Health & Veterinary Biologicals, Kolkata; and the Regional Wildlife Veterinary Health Centres identified by the Central Zoo Authority for keeping check on the level of infections etc. in large cats.

### Acknowledgement

We would like to put on record timely help extended by the members of the Zoo Veterinary Health Advisory Committee, namely Dr's. A.B. Srivastav, M. Navin Kumar and Niranjan Sahoo and organizational support of the Central Zoo Authority, Ministry of Environment Forests & Climate Change, Govt. of India; Indian Veterinary Research Institute, Bareilly; Institute of Animal Health & Veterinary Biologicals, Govt. of West Bengal; ICMR-National Institute of Virology, Pune and Animal Husbandry Department, Govt. of Jharkhand.

Thanks are also due to the entire Management & Team, Tata Steel Zoological Park who stood up to the challenge in containing the spread of Babesiosis amongst large cats.

### Bipul Chakrabarty<sup>1</sup> & Manik Palit<sup>2</sup>

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## The UN decade on Biodiversity 2011-2020 programme on Pollinators

On 10 January 2020, The Adrian Loyal School hosted The UN decade on Biodiversity Programme 2011- 2020 “Pollinators are not just bees” the first of its type in Karur District. Pressing forward in sowing the seeds of greatness Correspondent and Principal Janet Ragupathy initiated and ignited the programme by starting the morning Assembly and prayer. Jessie Jayakaran the Resource person, Member and Teacher Volunteer in ZEN South Asia, observed and selected 31 children for the proceedings. The programme was organized in four sessions.

Session one was introduction to Biodiversity and UN measures to encounter the damage caused to it. Jessie chronologically mentioned the measures taken by UN towards biodiversity conservation. Session two started with a short discussion about plants and its uses and the interdependence of animals and plants. Session three was the drawing and colouring and session four was



**Drawing a picture of a insect pollinator**

about guiding the participants for the future projects. Children were all astonished to know the number of micro and macro living creatures that is dependent on a single plant. The discussion gradually shifted its focus to fruits and flower yielding plants. They also learned about pollination and its importance.

The main focus is on pollinators, which is usually neglected and unnoticed but a prime factor in producing yield and in maintaining the eco balance. It was really surprising to know even the reckless disposal of garbage damages the eco system drastically especially the pollinators, as they prefer to live in a clean environment. The materials supplied by the Zoo Outreach Organisation were quite useful. Children learnt the different types of pollinators viz. vertebrates and invertebrates and their inevitable role in pollination.

The questioning session was so encouraging as the children came forward with immediate



**Jessie Jayakaran leading a session on pollinators**



**Students posing with pollinators headband**

responses. Lotus seeds brought by student Krithvi of grade four paved the initial step for making the pollinator corner in the school. A purposeful dance was taught and performed by every child even the teachers too enjoyed the dance which is followed, by the guidance for projects for the future.

Children enjoyed the programme to its full extent by colouring their favourite pollinator. Establishing a pollinator garden will be the ongoing programme. Children were given guidelines for observing and recording the types of pollinators along with the prescribed

time and place. The follow up continued by providing direction even for the involvement of parents and other members at home.

The days programme is an eye opener. Children got a closer view to their immediate environment. They were taught to keep environment clean and green and the logical reason behind it. The UN Biodiversity programme strengthened the Adrian Earth Ambassadors and their responsibilities.

*Submitted by: Ms. Janet Ragupathy, Principal, Adrian Loyal School, Karur and Ms. Jessie Jeyakaran. Email: jessiejey@rediffmail.com*



**Students who attended the pollinators programme**





## Call for donations

In the first phase of the fundraiser for the **Sally Walker Conservation Fund**, we target three objectives.

(i) **The Sally Walker Lifetime Award for Conservation** — The first award is proposed for 12 October 2020 on Sally's birth anniversary.

(ii) **The Sally Walker Training Programme in Conservation Biology and Application** — The first workshop to train young biologists and foresters is planned for the third week of March 2020.

(iii) **Communicating Science for Conservation through innovative education programs** — A series of outreach programs for the rural kids in the districts adjoining the Western Ghats in Tamil Nadu are being planned for in 2020.

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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 ZOOS' PRINT magazine.

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Articles should be typed into a Word format and emailed to [zooreach@zooreach.org](mailto: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.

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