

# ZOO'S PRINT

Communicating Science for Conservation

Vol. XXXIV, No. 4, April 2019

ISSN 0971-6378 (Print); 0973-2543 (Online)



Magazine of Zoo Outreach Organization  
[www.zoosprint.zooreach.org](http://www.zoosprint.zooreach.org)

# ZOO'S PRINT

Communicating science for conservation

Vol. XXXIV, No. 4, April 2019

ISSN 0971-6378 (Print); 0973-2543 (Online)

## Contents

### Fantastic Facts

Snakebite Facts, Pp. 1-6

### Activity

Snake mask, P. 7

### Jottings

The outlying forest-dwellers: new bat subspecies found in Andaman  
-- Vidya Mary George, Pp. 8-9

### Instagram

Instagram images, P. 10

### Animal Care

Caring for orphaned Northern Palm Squirrel pups  
-- Prajwalita Sutaria, Pp. 11-12

### Wild Vibes

Conserving Livelihoods & the Chamba Sacred Langur, Pp.13-14

### SMALL MAMMAL MAIL

Northern Palm Squirrel: thermoregulatory behaviours of *Funambulus pennantii* in Rajasthan, India  
-- Vijay Kumar Koli, Anil Tripathi & K.S. Gopi Sundar, Pp. 15-18

### Plantasia

Muraina grass: new distribution record of the endemic grass *Ischaemum kingii* in Karnataka  
-- Hanchali Udayashankar Abhijit & Yelugere Linganaik Krishnamurthy, Pp. 19-21

### Mammal Tales

Indian Grey Wolf: first photographic record of *Canis lupus pallipes* from Papikonda National Park in northern Eastern Ghats, India

-- Anant Shankar, Nandani Salaria, Kumpatla Balaji & Thekke Thumbath Shameer, Pp. 22-26

Asian Elephant: how elephants learn to cope: a camera trap study from Kodagu, India

-- Shashi B. Mishra, Pallavi & Anil Kumar Khaple, Pp. 27-29

### Funguy

Red Caged Fungus: new record of *Clathrus ruber* from the southern Western Ghats of Tamil Nadu, India

-- Sundaram Santhoshkumar, Selvaraj Jeevith, Ponnusamy Samyudurai & Nallasamy Nagarajan, Pp. 30-33

### Field Report

World Wetlands Day celebration at Government Schools in Madhya Pradesh and Uttar Pradesh: the key role of wetlands in coping with climate change

-- Akhilesh Kumar & Sonika Kushwaha, Pp. 34-35

Cover photo design by Latha G Ravikumar, Zoo Outreach Organization, Coimbatore

# Snakebite Facts

Snakes are an integral part of every natural ecosystem in which they are found. **THEY FILL THE IMPORTANT ROLE OF BEING BOTH PREDATOR AND PREY AND ARE AN INTEGRAL PART OF NATURE'S BALANCE.**

Killing such a predator causes a spike in prey population.

Most of the people associate snakes with venomous bite but the danger of bite is usually exaggerated. The truth is **ONLY A SMALL FRACTION OF SNAKE SPECIES PRODUCE VENOM TO IMMOBILIZE PREY OR FOR DEFENSE.**

Snakes will not **BITE HUMANS UNLESS THEY FEEL THREATENED**, so leaving them alone is the best strategy for preventing a bite.

According to recent studies, **SNAKE VENOM CAN BE HELPFUL TO CURE SERIOUS AND LIFE-THREATENING DISEASES LIKE CANCER, DIABETES AND HYPERTENSION.**

**THE ONLY RESPONSIBLE AND POSSIBLE SOLUTION IS LEARNING HOW TO LIVE WITH WILDLIFE SAFELY.**

It is not possible to ensure we never encounter a snake, so instead of killing wildlife, learn to identify and respect these beneficial members of the ecosystem.



There are about **3150** species of snakes in the world and around **600** species are venomous.

In India, out of the about **270** species of snakes, about **60 are considered venomous.**

There only **6 most venomous snakes found in India.** Four of them called Big Four include Cobra, Common Krait, Russell's Viper and Saw-scaled Viper and other two are the most beautiful King Cobra and camouflaged Pit Viper. There are other venomous snakes also which are variedly distributed throughout the country.

Snakes can control the amount of venom they inject through bite. They tend to reserve to help them capture their food. About **40%** snakebites received by humans are "dry".

The majority of snake bites (as many as **85%** of snakes) are not poisonous if they bite. If you are bitten by a nonvenomous snake, you will recover. **Even a venomous bite, to be fatal, depends on many factors** like the size of the snake, whether the bite could be completed, whether it was a dry bite or not, the age, physique and affected limb of the victim. **Even in the case of a full bite, with appropriate first aid, care and treatment, victim can fully recover.**

Most of the snake deaths happen due to various factors such as improper first aid, practices of faith healing, not reaching hospital on time & lack of preparedness to deal with snakebite emergencies in rural hospitals across the country. **Anti-venom, administered at the right time, is sufficient to negate the effects of the bite.**

A graphic with a red square on the left containing a white cross and a black snake silhouette. To the right, the text 'SNAKEBITE' is in a smaller, spaced-out font, and 'FIRST AID' is in a large, bold, white font. The background is a textured, brownish-green surface.

# SNAKEBITE FIRST AID

**DO** Keep the victim calm, restrict movement. Assure the victim there is nothing to be afraid of and do not let him panic. Panic will increase heart rate and lead to spread of venom.

**DO** Restrict the movement of the limb where the bite happened. This will help slow the spread of the venom.

**DO** Remove any jewellery around the area of the bite before swelling begins.

**DO** Make the victim lie flat with bitten limb below the heart level.

**DO** Check the area of the bite for swelling and colour change. If it changes, the snake was probably venomous.

**DO** Monitor the victim's vital signs such as temperature, pulse, rate of breathing and blood pressure if possible.

**DO** Rush to hospital and get anti-venom serum. **ANTI-VENOM SERUM IS THE ONLY REMEDY FOR VENOMOUS SNAKES.** Even if the bite isn't poisonous, it may have a risk of tetanus, a serial bacterial infection. The anti-venom serum is available at most government hospitals and public health centres. Some private hospitals also started keeping the serum and treat. Visit this link to find out some of the hospitals that treat snakebites in India. <http://www.snakebiteinitiative.in/hospitals.html>



# SNAKEBITE

## DO'S

**DO** first aid (See Pp. 3).

**DO** take note of the snake's appearance if possible. This will help the doctor identify what bit (location will also be a clue).

**DO** Note the time the bite happened so the doctor knows how much time has passed.

**DO** clean the wound gently with antiseptic. At the same time the bite site should not be cleaned with any solution to remove the venom.

**DO** Keep the contact information of nearby poison control centers readily available.

## DONT'S

**DO NOT** use ice or any other cooling action on the bite.

**DO NOT** make cuts or incision in the bite site.

**DO NOT** burn the wound.

**DO NOT** use electrical shock.

**DO NOT** give water, any drink, food or medications. The victim should not be allowed to exert himself in any manner.

**DO NOT** try to capture or kill the snake. It may bite again.

**DO NOT** try to suck out of the venom with mouth. It doesn't work, it puts you at risk of getting poison in the mouth. A suction device should be applied over the bite.

**DO NOT** use aspirin, ibuprofen, or other painkillers that thin the blood.

**DO NOT** use electric wires, strings or tourniquet rubber. Cutting blood flow to the bite area can cause additional tissue damage.

# Prevention is

# POSSIBLE



Make yourself familiar with both poisonous and non-poisonous snakes in the place where you live and where you visit and simply avoid any potentially dangerous snakes you may encounter.



Pay attention to where you walk. A snake likely won't bite unless you step on it.



Be alert when you roam around night. To stay alert, avoid alcohol.



Carry a walking stick to tap the ground in front of you. If a snake feels threatened, it will be more likely to attack the stick.



Wear closed shoes and long pants if you expect to be walking close to bushes, tall plants, grassy, densest forest, water bodies, rain forest and other places where snakes may live, to protect your ankles.



Always check stumps, rocks and logs before sitting down and keep tents zipped shut as much as possible.



Use a torch light at night and in dark areas so you can see snakes before you have surprise encounter.



Make sure the corridors and paths are lit up in residential areas. Cover the gaps and potential

enters of buildings that may or may be built by rats. The openings in the fine wire mesh cover drain pipe.



Snakes usually don't bite you without alarm: Cobra lifts vertically, opens hood, makes hiss; Vipers make a spiral from a tail, bend zigzag front part of the body and make a strong hiss.



If you see a snake, standing still or slowly moving away gives the snake a chance to escape harmlessly.



DO NOT try to catch or kill the snake if you happened to encounter a snake. Walk slowly away from it and keep an eye on it from a safe distance (several metres away).



If it seems to be moving towards you, stamp the ground to create ground vibrations. Most snakes are scared of humans, and this vibrations are enough to drive them away.



Call snake rescuers if you see a snake in your home or in a crowded area. Please remember to have someone watching the snake if you have to leave the area when calling the rescuers. This makes searching and capturing at their arrival easier.

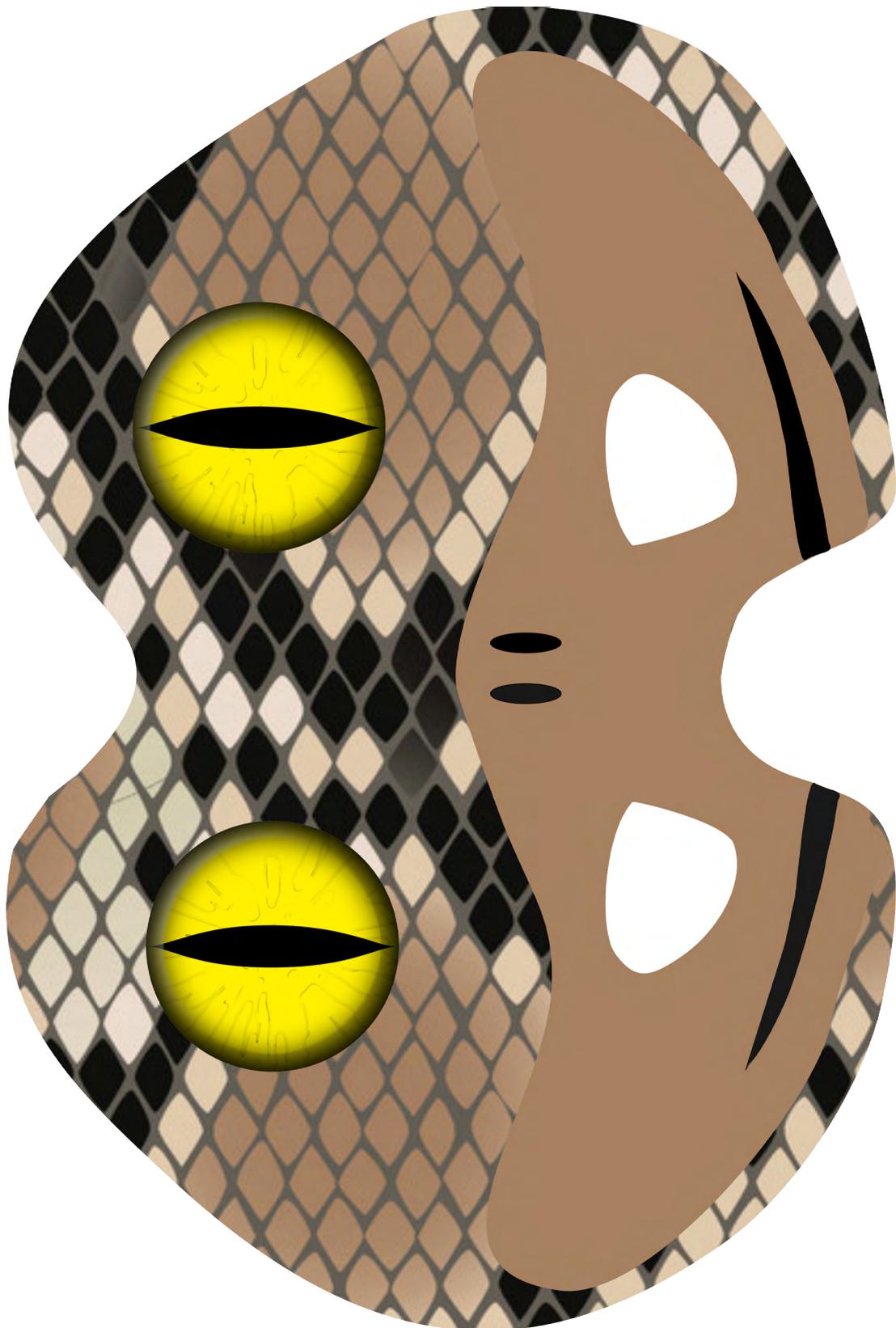


Also a brief description of length, colour and body patterns when you call them can be extremely useful.



Last but not least. **CREATE AWARENESS OF SNAKEBITE AND ITS FIRST AID MANAGEMENT IN RURAL AREAS.**

Compiled and designed by Latha G. Ravikumar,  
Zoo Outreach Organization.



Snake

Collect these masks for exciting games

# The outlying forest-dwellers: new bat subspecies found in Andaman

By Vidya Mary George. Published in Jottings on 24 November 2018



A new subspecies of the Malayan Bamboo Bat has been discovered in Andaman, India. This is the first specimen-based record of this species from the island.

## **Batty findings**

In November 2015, while surveying the North Andaman Island to study its bat diversity, a group of scientists from the Indo-UK bat survey and conservation project spotted two unusual male bamboo bats. The tiny bats stood out with their flat heads that projected forwards and downwards, triangular ears with rounded tips, and club-shaped feet.

## **New echoes**

Detailed analyses revealed the bats to be Malayan Bamboo Bats, which have a known distribution from northeastern India across mainland southeastern Asia. Their features, however, considerably differed from the mainland forms in size and colour, suggesting that the islanders may have diversified in isolation. The scientists were thus prompted to qualify the discovered specimens under a



**The newly described Malayan Bamboo Bat subspecies from North Andaman Island**

new subspecies named *Tylonycteris malayana eremtaga*, where 'eremtaga' is derived from a dialect of the Great Andamanese language, meaning 'forest-dweller'. Bamboo bats are unique night-fliers that depend on bamboos for their sustenance. Harvesting of bamboo for commercial purposes, destruction of bamboo forests, forest fires, and increased use of pesticides in fringe villages might thus have a negative impact on the survival of the species. The newly described subspecies was found to share its habitat with other bat species and is currently known only from Chipu Village in North Andaman Island. The presence of multiple males in the area suggests the existence of a colony of these bats in the near vicinity of the village.

## Reference

**Srinivasulu, C., A. Srinivasulu, B. Srinivasulu & G. Jones (2018). A new subspecies of the Malayan Bamboo Bat (Chiroptera: Vespertilionidae: *Tylonycteris malayana eremtaga*) from the Andaman Islands, India. *Journal of Threatened Taxa* 10(1): 11210–11217. <https://doi.org/10.11609/jott.3906.10.1.11210-11217>.**

This post was originally published in [Jottings](https://threatenedtaxa.org/jottings/taxonomy/the-outlying-forest-dwellers-new-bat-subspecies-found-in-andaman/) at <<https://threatenedtaxa.org/jottings/taxonomy/the-outlying-forest-dwellers-new-bat-subspecies-found-in-andaman/>>

Read the media report at <<https://india.mongabay.com/2018/03/12/a-new-subspecies-of-bamboo-bat-discovered-in-the-andamans/>>

# INSTAGRAM IMAGES



With its eye-popping carnival of colours, the flashy Black-rumped Flameback sets ablaze even the drabest of dry branches as it hops around investigating promising crevices on tree trunks, always knocking on the wood before it captures its choicest insects with its darting tongue and straight, pointed bill. This large and hardy architect of the forest has a characteristic loud, harsh, chattering call which it usually utters during its undulating flight characteristic of all woodpeckers. Shot at Coimbatore by B. Ravichandran, ZOO; posted on 08 Mar 2019.



The largest of the living lemurs of Madagascar and a rainforest inhabitant, the Indri's grasping limbs with big and opposable toes are fundamental to their lives in the trees. These gentle giants display impressive jumping skills, engage in playful wrestling, and are known for their vocal repertoire of loud, distinctive songs. Video shot at Zahamena NP by S. Molur, ZOO; posted on 03 Dec 2018.



The Seven-spotted Cockroach *Therea petiveriana* is found in the scrub forests of southern India. It burrows under leaf litter or loose soil during the heat of the day and gets active at twilight hours. The black-and-white pattern of the elegant flightless roach is presumed to deter predators and gives it its other name, Indian Domino Cockroach. Video shot at Coimbatore by S. Molur, ZOO; posted on 19 Nov 2018.



The Red Water Lily is commonly found in still or slow-flowing waters of tropical rivers and ponds. This elegant floating plant has round, sharply toothed leaves and aromatic red flowers that bloom year-round. Shot at Kozhikode by S. Molur, ZOO; posted on 29 Nov 2018.

We bring to you every week shots and tidbits of incredibly diverse species from around the natural world! Follow us on Instagram to be part of a growing community that celebrates our natural heritage: <https://www.instagram.com/threatenedtaxa/>  
Follow B. Ravichandran on Instagram: <https://www.instagram.com/discoverravi/>  
Follow S. Molur on Instagram: <https://www.instagram.com/molursanjay/>  
Captions by Vidya Mary George, ZOO.

## Caring for orphaned Northern Palm Squirrel pups



Monday mornings are always busy at work—especially the Mondays after breaks like Diwali. This year, however, the cases were getting stalled due to a commotion at our OPD Shutter. A close look ascertained the cause to be a squirrel nest above the shutter. The nest was removed and the OPD started—but left three tiny sparsely haired squirrel pups in my hand. Their survival depended on reuniting with their mother. I kept a vigil for the squirrel mummy but she never showed up... That left me with the need to care for the pups which barely moved and lay curled up in a heap.

The squirrel pups were apparently healthy and they were put up in a cardboard box lined with cotton cloth. Pups this tiny with their eyes closed could die without their mother due to hypothermia or dehydration and need immediate fluids. A 3ml disposable syringe connected to a scalp vein tube, after cutting the tube half a centimetre away from the connector, served as a makeshift feeder. I fed 0.5ml rehydrating solution (Inj DNS) orally every two hours and put a 30ml plastic bottle filled with hot water under the cloth lining of the box to keep it warm.

The squirrel pups need to be stimulated for their bowel movements, which can be done by lightly rubbing the genitals with feather-light strokes of wet cotton, taking care to be very gentle. Soon the pups started urinating drop by drop and passed yellow-coloured stools.

## ANIMAL CARE

After 12 hours of hydration, I started the pups on equal parts of pasteurized milk and water warmed together and fed it slowly drop by drop every two hours. My days started with the first feed at 5 AM and ended with the last feed at 11 PM. The pups needed to be held in my left hand using a soft clean cloth, which helped me hold the pups securely as they get so anxious and eager to feed that they move ahead and gulp the milk. We have to be very careful to let only a drop of milk fall at a time. Even if the pup is in a hurry, we need to hold back—otherwise, the pup will aspirate the milk and the milk will come out from its nostrils, which may cause lung infection. If this happens, put the pup's head down and wipe its nose and start again slowly.

It is very important to wipe the pup with moist cotton to keep them clean, as milk sticks to their skin, and also to make them urinate and defecate. Bloating was another major challenge that I faced—as squirrel milk is obviously different from cow or buffalo milk, the pups find it hard to digest the latter. Using 1–2 drops of human pediatric carminative drops containing digestive enzymes and probiotic powers like sporulac helped relieve gas and improve their digestion. Four to five days of meticulous caring bore fruits as their weight increased and short shiny fur appeared. After two weeks, their eyes opened and lower incisors erupted. I continued feeding the pups for three more weeks till they could eat soft nuts like cashews and peanuts.

The pups became increasingly rambunctious in their play and started moving about a lot, so I often took them outside to play in the garden. One fine day, all three scampered up a Neem Tree but never came back. I was poignant as I never got to say goodbye.

### **Prajwalita Sutaria**

Assistant Professor, Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, S.D. Agricultural University, Sardarkrushinagar, Gujarat 385506, India. Email: drprajwalita@gmail.com



**H\*LP**

## **CONSERVING LIVELIHOODS & THE CHAMBA SACRED LANGUR**

Join us in our amazing journey of exploration, fun, and learning as we introduce you to the Endangered Chamba Sacred Langur and walk you through its only home in the world, the Chamba District of Himachal Pradesh! Let us also talk about the critical issues that our langur friends face and how we can together H\*LP find solutions to them!



## **GAULA, CHAMBA'S PRIDE!**

The folklores of Himachal Pradesh celebrate the beauty of Chamba, a jewel nestling in the bosom of the Himalaya, nourished by the sparkling waters of the river Ravi and its tributary Sal. The lush celestial valley owes its incredible natural history to its remote peaks and rugged terrain, which also kept its unique culture intact.

At Chamba, the charming, gentle Chamba Sacred Langur is fondly called 'Gaula' by both children and adults, endearingly shortened from 'Gaula Bandhar' meaning 'plump monkey' in Chambyali, the local language of the Himalayan town. Indeed, the long, bushy, brownish-grey coat that keeps both males and females of the primate species warm in the unnerving cold does give them a puffy, fluffy appearance.

One of the most interesting and distinguishing features of the Chamba Sacred Langur is the adult male's shoulder mane. This extra layer of brownish-grey silky coat flows loosely down their flanks, almost touching the ground, as this handsome lot leaps across the mountains in their home.



Images by V. Ahuja & T.A. Shah  
Visit [facebook.com/HimLanPro/](https://www.facebook.com/HimLanPro/)



# NORTHERN PALM SQUIRREL

## Thermoregulatory behaviours of *Funambulus pennantii* in Rajasthan, India



A small group of Northern Palm Squirrels basking on a tree trunk during winter in Keoladeo Ghana National Park, Rajasthan, India (© Swati Kittur)

### IUCN Red List:

Least Concern (Nameer & Molur 2016)

### Mammalia

[Class of mammals]

### Rodentia

[Order of rodents]

### Sciuridae

[Family of true squirrels]

### *Funambulus pennantii*

[Northern Palm Squirrel]

Species described by Wroughton in 1905

Squirrels maintain their core body temperature at approximately 37–38 °C. As a result, body temperature maintenance is the primary thermoregulatory problem for many squirrels, especially in areas where the ambient temperature varies daily or seasonally (Walsberg 2000). Heat and energy regulation can vary due to pelage colouration in some species (Rowland 2009). Squirrels have developed physiological adaptations to enable body heat to remain optimal against suboptimal ambient temperatures (Muchlinski et al. 1998; Dausmann et al. 2013). Northern Palm Squirrels (NPS), *Funambulus pennantii*, have a classic pelage with countershading (with the darker side exposed most to lighting; Rowland 2009) that suggests a strong camouflage function. In this note, two behavioural observations of NPS are described,



one of which suggests that countershading also has a thermoregulatory function, while the other is a novel thermoregulatory behaviour for the species.

NPS is widely distributed in northern India ranging from the dry Thar Desert in Rajasthan State to the subtropical and wet lower Himalaya (Thorington et al. 2012). In Rajasthan, they are exposed to strong daily and seasonal variations in temperatures, ranging from  $-5^{\circ}\text{C}$  in winter to about  $50^{\circ}\text{C}$  in summer (Prakash & Ghosh 1975; Prakash 1997; Sikka 1997; Sharma et al. 2013). NPS are semi-arboreal and inhabit a range of habitats; they are strongly synanthropic even in large cities (Prater 2005). NPS are, therefore, exposed to a very large range of temperatures due to seasonal and environmental conditions, and thermoregulation is likely a very important component of the species' survival. Here we provide two behaviours where the dorsal and ventral sides were used in different seasons in different ways for thermoregulation.

**Global Distribution:**

Native: Iran, Afghanistan, Pakistan, Northern India, Nepal and Bangladesh (Nameer & Molur 2016)

In the Keoladeo Ghana National Park (27.355N & 74.641E), Bharatpur District, Rajasthan, on several occasions over two decades (1998–2018), we observed small groups of NPS basking in the morning and afternoon sun during winter (November–February). NPS basked on tree trunks, head down, splaying their feet with their dorsal side facing the sun. Some individuals were observed basking for over an hour, especially in the coldest months (January & February;  $10\text{--}16^{\circ}\text{C}$ ). Frequently, three to five NPS huddled together during the basking bouts.

One observation was made on 25 June 2017 of a NPS apparently cooling itself on damp soil that was shaded by the canopy of a clump of *Prosopis juliflora* trees. This observation



was made while birding in Nehru Talai Wetland (25.355N & 74.641E) in Bhilwara, Rajasthan. The NPS was lying down flat on the ground splaying its limbs such that the entire ventral surface of its body, limbs, and tail were in contact with

**A Northern Palm Squirrel cooling itself on damp soil during summer in Rajasthan, India (© Anil Tripathi).**



the ground. The ground was damp and was beside a temple at a site where pilgrims washed their hands. The squirrel was disturbed only momentarily when pilgrims used the area and quickly ran back to the damp ground to lay down flat after the pilgrims left. The ambient temperature during the observation was 40°C and a few rain showers on the preceding days had created a very humid condition.

Squirrels in cold areas were observed to use a variety of tactics to maintain their optimal body temperature, including basking, huddling, and torpor (Mills & Hes 1997; Thorington & Ferrell 2006; Angilletta 2009). Observations on NPS in the Keoladeo-Ghana National Park suggest that basking is a very common thermoregulatory behaviour during winter in this species. Countershading appears to be important in maximizing winter thermoregulation in the species while basking.

Squirrels are assumed to avoid heat stress by remaining in shaded areas and increasing foraging bouts during the coolest hours of the day (Wilson & Ruff 1999), while daily torpor (Angilletta 2009), use of tail (Fick et al. 2009), reducing midday activity (Bennett et al. 1984), and use of burrows at midday (Angilletta 2009) were also reported for many squirrel species from hot areas. Thermoregulatory behaviours in NPS are poorly documented from southern Asia. Basking appears to be a very common and widespread behaviour, but documentation from different areas and seasons is missing. Using damp soil to cool the body is a novel observation for the NPS. A similar behaviour, however, is known from desert-dwelling squirrels that dig shallow pits in wet soil to cool themselves. Like the observed NPS, some arboreal squirrels are known to use cool surfaces such as rocks in shade and tiles in homes to help dissipate body heat when the ambient temperature is high (Thorington & Ferrell 2006). Our observation shows that the diversity of ways in which squirrels cool themselves are likely to be higher than those currently known. More observations on NPS during the hot summer and cool winter months are likely to yield other overlooked behaviours that can aid in understanding the natural history of the species.

## References

- Angilletta, M.J. (2009).** *Thermal Adaptation: A Theoretical and Empirical Synthesis*. Oxford University Press Inc., New York, 88–125pp.
- Bennett, A.F., R.B. Huey, H. John-Alder & K.A. Nagy (1984).** The parasol tail and thermoregulatory behaviour of the Cape Ground Squirrel *Xerus inauris*. *Physiological Zoology* 57(1): 57–62.
- Dausmann, K.H., J. Wein, J.M. Turner & J. Glos (2013).** Absence of heterothermy in the European Red Squirrel (*Sciurus vulgaris*). *Mammalian Biology* 78(5): 332–335. <https://doi.org/10.1016/j.mambio.2013.01.004>
- Fick, L.G., T.A. Kucio, A. Fuller, A. Matthee & D. Mitchell (2009).** The relative roles of the parasol-like tail and burrow shuttling in the thermoregulation of free-ranging Cape Ground Squirrel, *Xerus inauris*. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* 152(3): 334–340. <https://doi.org/10.1016/j.cbpa.2008.11.004>



- Mills, M.G.L. & L. Hes (1997).** *The Complete Book of southern African Mammals*. Struik Publishers, Cape Town, 356pp.
- Muchlinski, A.E., B.C. Baldwin, D.A. Padick, B.Y. Lee, H.S. Salguero & R. Gramajo (1998).** California Ground Squirrel body temperature regulation patterns measured in the laboratory and in the natural environment. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* 120(2): 365–372. [https://doi.org/10.1016/S1095-6433\(98\)10037-5](https://doi.org/10.1016/S1095-6433(98)10037-5)
- Nameer, P.O. & S. Molur (2016).** *Funambulus pennantii* (errata version published in 2017). The IUCN Red List of Threatened Species 2016: e.T8702A115088099. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T8702A22259750.en>
- Prakash, I. (1997).** Ecology of desert mammals. *Current Science* 72(1): 31–34.
- Prakash, I. & P.K. Ghosh (1975).** *Rodents in Desert Environment*. Springer, Dordrecht, 624pp.
- Prater, S.H. (2005).** *The Book of Indian Animals*. Bombay Natural History Society and Oxford University Press, 200–201pp.
- Rowland, H.M. (2009).** From Abbott Thayer to the present day: what have we learned about the function of countershading? *Philosophical Transactions of the Royal Society B* 364: 519–527. <https://doi.org/10.1098/rstb.2008.0261>
- Sharma, B.K., S. Kulshreshtha & A.R. Rahmani (2013).** *Faunal Heritage of Rajasthan, India: General Background and Ecology of Vertebrates, Vol. 1*. Springer, New York, 643pp.
- Sikka, D.R. (1997).** Desert climate and its dynamics. *Current Science* 72(1): 35–46.
- Thorington, R.W. Jr. & K. Ferrel (2006).** *Squirrels: The Animal Answer Guide*. The John Hopkins University Press, Maryland, USA, 208pp.
- Thorington, R.W. Jr., J.L. Koprowski, M.A. Steele & J.F. Whatton (2012).** *Squirrels of the World*. Johns Hopkins University Press, Baltimore, Maryland, 459pp.
- Walsberg, G.E. (2000).** Small mammals in hot deserts: some generalizations revisited. *BioScience* 50(2): 109–120. [https://doi.org/10.1641/0006-3568\(2000\)050\[0109:SMIHDS\]2.3.CO;2](https://doi.org/10.1641/0006-3568(2000)050[0109:SMIHDS]2.3.CO;2)
- Wilson, D.E. & S. Ruff (1999).** *The Smithsonian Book of North American Mammals*. Smithsonian Institution Press and the American Society of Mammalogists, Washington, DC, 750pp.

### Vijay Kumar Koli<sup>1</sup>, Anil Tripathi<sup>2</sup> & K.S. Gopi Sundar<sup>3</sup>

<sup>1</sup> Wildlife Research Laboratory, Department of Zoology, UCOS, MLS University, Udaipur, Rajasthan 313001, India.

<sup>2</sup> Department of Zoology, MLV Government College, Bhilwara, Rajasthan 311001, India.

<sup>3</sup> Program SarusScape, International Crane Foundation, E-11376, Shady Lane Road, Baraboo, Wisconsin 53913-0447, USA.

<sup>3</sup> Cranes and Wetlands Programme, Nature Conservation Foundation, 1311, “Amritha”, 12th A Main, Opposite Kidava Samaj, Vijayanagar 1st Stage, Mysuru, Karnataka 570017, India.

Emails: <sup>1</sup>vijaykoli87@yahoo.in (Corresponding author), <sup>2</sup>aniltripathi9@gmail.com, <sup>3</sup>gopi@savingcranes.org

Citation: Koli, V.K., A. Tripathi & K.S. Gopi Sundar (2019). Northern Palm Squirrel: thermoregulatory behaviours of *Funambulus pennantii* in Rajasthan, India. *Small Mammal Mail* #421. In: *Zoo's Print* 34(4): 15-18

# MURAINA GRASS

## New distribution record of the endemic grass *Ischaemum kingii* in Karnataka



A



B



C



D



E



F



G

*Ischaemum kingii*: A - habitat, B - habit, C - raceme, D - spikelets, E - lower and upper glumes, F - lemma, palea, stamens & pistil, G - joint. (Photo: H.U. Abhijit)

**IUCN Red List:**  
Data Deficient

**Liliopsida**

[Class of monocotyledons]

**Poales**

[Order of flowering plants in the monocotyledons]

**Poaceae**

[Family of grass]

***Ischaemum kingii***

[Muraina grass]

Species described by Hook in 1896

The grass genus *Ischaemum* L. is globally represented by 81 species (including 29 annuals and 53 perennials). Among these, 58 species are disseminated in India (including 36 endemic species) and 38 in the Western Ghats (Nayar et al. 2014). This complex and diverse genus is generally distributed in tropical regions, exclusively in Asian countries (Sunil et al. 2017). *Ischaemum* is characterized by well-developed pedicelled spikelets, transversely wrinkled, furrowed lower glumes with nodules on margins (Bor 1960; Singh & Rao 2008).

The Indian endemic grass *Ischaemum kingii* Hook. f. (Poaceae) was formerly reported from the states of Maharashtra,

Madhya Pradesh, and Rajasthan; this is the first report of the species from Karnataka. This species is distinguished from others by its tuft of hairs on the margin, just above the middle of the lower glume with long bicuspidate awn of sessile spikelet and bulged joints. Though *I. diplopogon* resembles *I. kingii* in some ways, the lower glume of sessile spikelet is muticuous and shortly bicuspidate in the former (Potdar et al. 2012). The plant list displays *I. raizadae* to be synonymous to *I. kingii*.

**Global Distribution:**

India: Maharashtra,  
Madhya Pradesh,  
Rajasthan, Karnataka

The authors collected specimens from Chitramoola, Kodachadri Hills of Mookambika Wildlife Sanctuary, central Western Ghats, Karnataka. The specimen characters were matched with the Kew (K) Herbarium K000245688 (1894). The collected specimens were dried, pressed, and prepared for herbarium. The herbarium was deposited in the Western Regional Center, Botanical Survey of India, Pune, and also at the Department of Applied Botany, Kuvempu University, Shimoga.

*Ischaemum kingii* Hook. f., Fl. Brit. India 7: 129. 1896; Bor, Grass. Burma Ceylon India Pakistan 182. 1960; Laxmi. in Sharma et al. (eds.), Fl. Maharashtra, Monocot. 519. 1996; S. Moulik, Grass. Bamb. India 1:294. 1997.

Annual erect grass with 20–30 cm height. Tufted, terete culms with branches arising from the base, nodes glabrous. Semi-compressed leaf sheath 3–10 cm long, narrowly ovate, glabrous or sparsely hairy, acute-tipped leaf blades. Ligule membranous 0.6mm long. Raceme two, 3–8 cm long. Joints clavate, three-toothed tips. Sessile spikelets oblong, 4–6 mm (excluding the arista), awned. Lower glume coriaceous, narrowly ovate, 4–6 mm long (excluding the arista), two-keeled, keels sparsely ciliate above, nine-nerved with bulge in the lower third, apex long bicuspidate awn. Upper glume subcoriaceous, linear ovate-oblong, 6mm long (excluding the arista), three-nerved, with tuft of hairs on the dorsal side above the middle, cleft at apex, aristate from the sinus, arista 20–26 mm long (Singh et al. 2008). Lower lemma hyaline, oblong-elliptic 3mm long, two-keeled, obscurely nerved, glabrous. Palea hyaline. Lodicules two. Stamens three, anthers 1mm long. Upper lemma hyaline, cleft at apex into two lobes, awned from the sinus, geniculate awn 30–40 mm long. Pedicelled spikelets narrowly ovate, 7–8 mm long. Lower glume subcoriaceous, glabrous, two-keeled, 11-nerved, apex two aristate. Upper glume boat-shaped 6–8 mm long (including arista), nerved, one-keeled. Lower lemma hyaline, narrowly ovate. Palea elliptic. Upper lemma hyaline; Bhat & Nagendran 2001; Potdar et al. 2012).

**Flowering and fruiting:** September–November.

**Habitat:** Rocky areas of waterfalls.

**Specimens examined:** KUABYLK-452, 06 ex., 03.xi.2018, India, Karnataka, Shivamoga District, Mookambika Wildlife Sanctuary, Kodachadri Hills, Chitramoola, 13.857°N, 74.865°E, 1202m (error 3m), coll. H.U. Abhijit.

#### References

- Bhat, K.G. & C.R. Nagendran (2001).** *Sedges and Grasses (Dakshina Kannada and Udupi Districts)*. Bishen Singh Mahendra Pal Singh, Dehradun, 341pp.
- Bor, N.L. (1960).** *The Grasses of Burma, Ceylon, India and Pakistan (excluding Bambusae)*. Pergamon Press, Oxford, 767pp.
- Nayar, T.S., A.R. Beegam & M. Sibi (2014).** *Flowering Plants of the Western Ghats, India, Vol. 2*. Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Thiruvananthapuram, 748pp.
- Potdar, G.G., C.B. Salunkhe & S.R. Yadav (2012).** *Grasses of Maharashtra*. Shivaji University, Kolhapur, 656pp.
- Singh, R.K. & P.S.N. Rao (2008).** The genus *Ischaemum* L. (Poaceae) India. *Journal of Economic and Taxonomic Botany* 32(4): 797–827.
- Sunil, C.N., M.V. Nithya, C.R.R. Krishnan, V.V.N. Kumar, M.S. Simi & K.J. Jyothi (2017).** A new species of *Ischaemum* L. (Poaceae) from Kerala, India. *Bangladesh Journal of Plant Taxonomy* 24(1): 33–38.

**Acknowledgements:** We thank Prof K.G. Bhat, Poorna Prajna College, Udupi, and the Karnataka Forest Department for giving permission to enter the forest area. The first author thanks DST, Government of India, for awarding INSPIRE fellowship.

#### Hanchali Udayashankar Abhijit<sup>1</sup> & Yelugere Linganaik Krishnamurthy<sup>2</sup>

<sup>1,2</sup>Department of Applied Botany, Kuvempu University, Jnanasahyadri, Shankaraghatta, Karnataka 577451.  
Email: <sup>1</sup>abhijitogon@gmail.com, <sup>2</sup>murthy\_ylk@yahoo.co.in (Corresponding author)

Citation: Abhijit, H.U. & Y.L. Krishnamurthy (2019). Muraina grass: new distribution record of the endemic grass *Ischaemum kingii* in Karnataka. *Plantasia* #12, In: *Zoo's Print* 34(4): 19-21

# INDIAN GREY WOLF

## First photographic record of *Canis lupus pallipes* from Papikonda National Park in northern Eastern Ghats, India



Camera trap image of the Indian Grey Wolf *Canis lupus pallipes*

**IUCN Red List:**  
Least Concern  
(Boitani, Phillips & Jhala 2018)

**Mammalia**  
[Class of Mammals]

**Carnivora**  
[Order of Carnivorous animals]

**Canidae**  
[Family of Canids]

***Canis lupus***  
[Grey Wolf]  
***pallipes***  
[Indian Grey Wolf]

Species described by  
Linnaeus in 1758

The Grey Wolf, *Canis lupus*, is a globally widespread species with a range from the southwestern Asia to the Indian subcontinent (Boitani et al. 2018). Its range covers the Indian peninsula, where its presence is seen in pockets in the states of Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Uttar Pradesh and West Bengal (Singh & Kumara 2006). Using the information from its distributional subset, its population in the Indian subcontinent is estimated to be between 2,000 and 3,000 individuals (Jhala 2000). This population estimate is derived from the studies in Gujarat, Maharashtra, and Karnataka (Jhala & Giles 1991; Kumar & Rahmani 1997; Singh & Kumara 2006). Although the species is categorized as Least Concern in the IUCN Red List of Threatened Species (Boitani et al. 2018), it



**Table: Vegetation and species at locations, where the Indian Grey Wolf was captured in Papikonda National Park, Andhra Pradesh**

Vegetation	Captures	Date	Captured time	Prey species captured	Cattle	Free-ranging dogs
Dry deciduous forest	4	10.xi.2018	16.56h	Rhesus Macaque, Wild Pig	6	1
Moist deciduous forest	2	12.xii.2018	10.44h	Porcupine, Mouse Deer		1
Dry deciduous forest	1	24.xi.2018	10.44h	Sambar	-	-

deciduous forest (Champion & Seth 1968; Rao 2000; Reddy et al. 2010; Aditya & Ganesh 2017). During December months of 2018, non-invasive biodiversity monitoring following the camera trapping protocol (National Tiger Conservation Authority & Wildlife Institute of India, 2018) was conducted using the Cudde back c1 model, panther, cudde back attack model in PNP. Cameras were placed in 2km<sup>2</sup> grids, in 112 trapping locations, on 5,824



trap nights. From the 27,926 images, three captures of Indian Grey Wolf were identified. These captures were from three different locations that were at an average distance of ~8 km from each other. One of the photographs captured two individuals, while the other two captured single individuals.



**Camera trap image of the Indian Grey Wolf *Canis lupus pallipes***

As per Singh & Kumara (2006), domestic livestock is one of the biggest food sources of this species. Numerous captures of cattle and other prey species at capture locations (Table) suggest good prey availability in PNP for wolves. As the species was not recorded in the 2017 study, we cannot ascertain whether PNP harbours wolf population in low density or these are vagrant individuals from nearby populations. Considering the fact that wolves are generalists and are found thriving outside protected

areas (Jhala & Giles 1991), it is possible for individuals from nearby populations to range in this region. The presence of and competition from other predators, however, might be a limiting factor for their distribution. Wolves can travel substantial distances traversing diverse landscapes when leaving their birth-packs to seek mates and territories of their own (Mech & Boitani 2003). The capture images of free-ranging dogs in the same locations where the wolves were captured also raise concern about their interactions with each other, which might produce a potential threat to the survival of the wolves. Studies show that hybridization between dogs and wolves (Hindrikson et al. 2012) lead to the sprawl of diseases; canine parvovirus, canine hepatitis, canine distemper virus, and rabies are potential threats to wolves from free-ranging dogs in India (Hennelly et al. 2015). As wolves primarily inhabit in proximity to human-dominated landscapes, the reason for their presence in PNP, which was not earlier recorded, needs to be studied further. As wolf populations in India remain understudied, dedicated systematic studies are required to shed light on these issues in and around PNP.

## References

- Aditya, V. & T. Ganesh (2017).** Mammals of Papikonda Hills, northern Eastern Ghats, India. *Journal of Threatened Taxa* 9(10): 10823–10830; <https://doi.org/10.11609/jott.3021.9.10.10823-10830>
- Agarwal, M. & S. Kumar (2009).** Wolves in agricultural landscapes in western India. In: *Tropical Resources, the bulletin of the yale tropical resources institute* 28: 48–53
- Aggarwal, R., T. Kivisild, J. Ramadevi & L. Singh (2007).** Mitochondrial DNA coding region sequences support the phylogenetic distinction of two Indian wolf species. *Journal of Zoological Systematics and Evolutionary Research* 45(2): 163–172.
- Boitani, L., M. Phillips & Y. Jhala (2018).** *Canis lupus*. In: The IUCN Red List of Threatened Species: e.T3746A119623865; <http://doi.org/10.2305/IUCN.UK.20182.RLTS.T3746A119623865.en>: downloaded on 12:02:2018
- Champion, S.H. & S.K. Seth (1968).** *A Revised Survey of the Forest Types of India*. Government of India, Delhi, xxiii+404pp.
- Hennelly, L., B. Habib & S. Lyngdoh (2015).** Himalayan wolf and feral dog displaying mating behaviour in Spiti Valley, India, and potential conservation threats from sympatric feral dogs. *Canid Biology & Conservation* 18(7): 27–30.
- Hindrikson, M., P. Mannil, J. Ozolins, A. Krzywinski & U. Saarma (2012).** Bucking the trend in wolf-dog hybridization: first evidence from Europe of hybridization between female dogs and male wolves. *PLoS ONE* 7(10): e46465; <https://doi.org/10.1371/journal.pone.0046465>
- Jhala, Y.V. (2000).** Human-conflict in India. Abstract in “Beyond 2000: realities of global wolf restoration”. Symposium, Duluth, MN, USA, February 23–26
- Jhala, Y.V. (2003).** Status, ecology and conservation of the Indian Wolf *Canis lupus pallipes* Sykes. *Journal of the Bombay Natural History Society* 100(2–3): 293–307.
- Jhala, Y.V. & J.R. Giles (1991).** The status and conservation of the wolf in Gujarat and Rajasthan, India. *Conservation Biology* 5(4): 476–483.
- Kumar, S. & A. Rahmani (1997).** Status of Indian Gray Wolf *Canis lupus pallipes* and its conservation in marginal areas of Solapur District, Maharashtra. *Journal of the Bombay Natural History Society* 94: 466–472.

- Mech, L.D. & L. Boitani (eds.) (2003).** *Wolves: Behaviour, Ecology and Conservation*. University of Chicago Press, Chicago, IL, 448pp.
- Mivart, G. (1890).** *Dogs, Jackals, Wolves and Foxes: A Monograph of the Canidae*. R.H. Porter, London, 9–10pp.
- National Tiger Conservation Authority - Wildlife Institute of India (2018).** Phase III Camera Trapping Protocol. Technical Manual Number TR 2018/01. New Delhi & Dehradun, 15 pp.
- Newsome, T.M., L. Boitani, G. Chapron, P. Ciucci, C.R. Dickman, J.A. Dellinger, J.V. López-Bao, R.O. Peterson, C.R. Shores, A.J. Wirsing & W.J. Ripple (2016).** Food habits of the world's grey wolves. *Mammals Review* 46(4): 255–269. <https://doi.org/10.1111/mam.12067>
- Rao, M.V.S. (2000).** Conserving Biodiversity in the Species-Rich Forests of Andhra Pradesh in Eastern Ghats, India. *Selbyana* 2000: 52–59.
- Reddy, C.S., A. Giriraj, S.U. Babar, P. Sudhakar & S. Sudhakar (2010).** Assessment of fragmentation and disturbance patterns in Eastern Ghats: a case study in R.V. Nagar Range, Visakhapatnam District, Andhra Pradesh. *Indian Journal of Remote Sensing* 38: 633–639; <http://doi.org/10.1007/s12524-011-0077-3>
- Shahi, S.P. (1982).** Status of Gray Wolf (*Canis lupus pallipes*) in India: a preliminary survey. *Journal of the Bombay Natural History Society* 79(3): 493–502.
- Singh, M. & H.N. Kumara (2006).** Distribution, status and conservation of Indian Gray Wolf (*Canis lupus pallipes*) in Karnataka, India. *Journal of Zoology* 270(1): 164–169.
- Sykes, William H. (1831).** “Catalogue of the Mammalia of Dukun (Deccan); with observations on the habits, etc., and characters of new species”. Proceedings of the Committee of Science and Correspondence of the Zoological Society of London 1830–1831. London: Zoological Society of London. I: 101. Retrieved 21st April 2019.
- Wildlife Protection Society of India (2003).** *The Wildlife (Protection) Act, 1972*. Professional Book Publishers, New Delhi.

**Anant Shankar<sup>1</sup>, Nandani Salaria<sup>2</sup>, Kumpatla Balaji<sup>3</sup> & Thekke Thumbath Shameer<sup>4</sup>**

<sup>1,3,4</sup> Divisional Forest Office (Wildlife), Forest Circle Office Complex, Opp Arts College, Nehru nagar, Rajahmundry, Andhra Pradesh, 533103, India.

<sup>2</sup> Divisional Forest Office, Madhava Nagar, Kakinada, Andhra Pradesh, 533303, India.

Emails: <sup>1</sup>anants7s@gmail.com, <sup>2</sup>nandanisalaria@gmail.com, <sup>3</sup>biolabbalu@gmail.com, <sup>4</sup>shameerh4u@yahoo.com (Corresponding author)

Citation: Shankar, A., N. Salaria, K. Balaji & T.T. Shameer (2019). Indian Grey Wolf: first photographic record of *Canis lupus pallipes* from Papikonda National Park in northern Eastern Ghats, India. *Mammal Tales* #9, In: *Zoo's Print* 34(4): 22-26

# ASIAN ELEPHANT

## How elephants learn to cope: a camera trap study from Kodagu, India



Image: A & B - elephant crosses spike-bed to enter a coffee plantation, C - elephant returns to spike-bed, D, E & F - elephant looks at spike-bed

**IUCN Red List:**  
Endangered (Choudhury et al., 2008)

**Mammalia**  
[Class of Mammals]

**Proboscidea**  
[Order of afrotherian mammals]

**Elephantidae**  
[Family of elephants and mammoths]

***Elephas maximus***  
[Asian Elephant]

Species described by  
Linnaeus in 1758

Human-elephant negative interaction is gaining global attention due to its severity in elephant range countries. Asian Elephant is listed as an Endangered species by IUCN due to fragmentation and degradation of its habitat, scarcity of food and water in its natural habitat, and illegal killing/ poaching of the species. These unconditional reasons end up in negative interactions, resulting in hundreds of human and elephant deaths annually along with the loss of crops and property. At present, human-elephant negative interaction is the biggest conservation challenge in Asia (Choudhury et al. 2008).

In the past two decades, several preventive measures, namely, elephant-proof trench, solar fence, spike gate, and spike pillars were developed and adopted by communities

concerned to prevent the movement of wild elephants into agricultural and human settlement areas or to restrict the species within forested areas.

Elephants are known for their large complex brains (Shoshani et al. 2006) and the ability to use tools (Chevalier-Skolnikoff & Liska 1993). In general, elephants are considered highly intelligent (Byrne et al. 2009), which makes mitigation of negative interactions a complicated case. Elephant movement into agricultural fields begins late at night and goes on until early mornings. To stop problematic wild elephants from entering croplands or settlement areas, the Karnataka forest department (Kodagu Circle) placed a mobile spike-bed with the mechanism of opening for the movement of humans and vehicles. Surprisingly, we got to know that an elephant was able to overcome the spike-bed. To understand the strategy adopted by the elephant to overcome the obstacle, we deployed camera traps in one of the elephant paths where the newly designed spike-bed was installed.

**Global Distribution :**

Native: Bangladesh, Bhutan, Cambodia, China, India, Indonesia (Kalimantan, Sumatera), Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand, Viet Nam. Regionally extinct: Pakistan (Choudhury et al., 2008)



**Image: G - elephant opens spike-bed, H - elephant crosses opened spike-bed, I - elephant enters the forest**

On the first two days (12 and 13 February 2018) of setting up the camera traps, we observed a few elephants near the spike-bed, but they did not try to cross it. On the third day (14 February 2018), however, a tusker approached the spike-bed at 2.46h and, without wasting time, took the risk of crossing the spike-bed kneeling down, with the support of its tusk (Image A,B). While returning from the plantation area to the forest at 6.26h (Image C), he took around 20 minutes to understand the situation (Image D,E,F) and, at 6.44h, managed to open the spike-bed from the path by putting it vertically, and returned to the forest (Image G,H,I). These observations picture how elephants are intelligent in learning to cope with situations.

## References

- Byrne, R.W., L.A. Bates & C.J. Moss (2009). Elephant cognition in primate perspective. *Comparative Cognition & Behavior Reviews* 4: 65–79.
- Choudhury, A., D.K.L. Choudhury, A. Desai, J.W. Duckworth, P.S. Easa, A.J.T. Johnsingh, P. Fernando, S. Hedges, M. Gunawardena, F. Kurt, U. Karanth, A. Lister, V. Menon, H. Riddle, A. Rübel & E. Wikramanayake (IUCN SSC Asian Elephant Specialist Group) (2008). *Elephas maximus*. In: The IUCN Red List of Threatened Species: e.T7140A12828813. Downloaded on 25 September 2018. <https://doi.org/10.2305/IUCN.UK.2008.RLTS.T7140A12828813.en>
- Chevalier-Skolnikoff, S. & J. Liska (1993). Tool use by wild and captive elephants. *Animal Behaviour* 46(2): 209–219.
- Shoshani, J., W.J. Kupsky & G.H. Marchant (2006). Elephant brain, part I: gross morphology, functions, comparative anatomy, and evolution. *Brain Research Bulletin* 70(2): 124–157.

**Shashi B. Mishra<sup>1</sup>, Pallavi<sup>2</sup> & Anil Kumar Khaple<sup>3</sup>**

<sup>1</sup> Karnataka Forest Department, Kodagu Circle, Madikeri, Karnataka 571201, India.

<sup>1-3</sup> Western Ghats Nature Foundation, Ponnampet, Karnataka 571216, India.

<sup>2,3</sup> College of Forestry, Ponnampet, Karnataka 571216, India.

Email: <sup>1</sup>shashimishra92@gmail.com (Corresponding author), <sup>2</sup>pallavipoojari998@gmail.com, <sup>3</sup>canilkhaple@gmail.com

Citation: Mishra, S.B., Pallavi & A.K. Khaple (2019). Asian Elephant: how elephants learn to cope: a camera trap study from Kodagu, India. *Mammal Tales* #10, In: *Zoo's Print* 34(4): 27-29

# RED CAGED FUNGUS

## New record of *Clathrus ruber* from the southern Western Ghats of Tamil Nadu, India



*Clathrus ruber* in Nilgiri Biosphere Reserve, Tamil Nadu: a - egg stage, b - habit of young fruiting body, c - developing stage, d - colour change after five to ten days

**IUCN Red List:**  
Not assessed

**Agaricomycetes**  
[Class of fungi]

**Phallales**  
[Order of fungi]

**Phallaceae**  
[Family of stinkhorn mushrooms]

***Clathrus ruber***  
[Red Caged Fungus]

Species described by  
C.H. Persoon in 1801

*Clathrus ruber* was originally described by Micheli (1729) from Italy. It was first described by the 16th Century botanist Charles de l' Escluse, better known as Carolus Clusius. The species is commonly called Latticed Stinkhorn (Stijve 1997; Tattersfield 2016), Basket Stinkhorn (Phillips 2011), or Red Cage Fungus (McKnight & McKnight 1987). The genus *Clathrus* is characterized by having a latticed clathrate receptacle composed of hollow, tubular arms that arise from the basal tissue within the volva (Miller & Miller 1988). The deliquescent gleba usually develops on the inner side of the receptacle and the basidiospores are elliptical and smooth (Dring 1980). The unpleasant odour produced by the gleba attracts flies and other insects, contributing to basidiospore

dissemination (Maldonado-Ramírez & Torres-Pratts 2005). The latticed forms of the Red Cage Fungus appear in different colours, including pink, red, orange, yellow, and white, making them particularly conspicuous in forests (Pegler & Gomez 1994). *Clathrus* comprises 16 species that are mainly found in subtropical and tropical regions (Kirk et al. 2008).

Previous literature refers no more than three species of *Clathrus* recorded so far from India, which include *C. concellatus*, *C. pusillus* Berkeley, and *C. delicates* in West Bengal (Roy 1948; Pradhan et al. 2012), Meghalaya (Kumar et al. 2015), and Karnataka (Swapna 2010), *C. cancellatus* (synonym: *C. ruber*) in West Bengal (Pradhan et al. 2012, 2013), *C. delicates* in Assam (Gogoi & Parkash 2014; Gogoi & Vipin 2015) and Gujarat (Patel et al. 2018), and *C. pusillus* Berkely in Kerala (Leelavathy et al. 1981; Hosagoudar et al. 1996).

Detailed information of the species is provided based on a recent field collection from Nilgiri Biosphere Reserve, southern Western Ghats of Tamil Nadu, India. There was no publication, literature survey, or report on *C. ruber* from the state of Tamil Nadu. Hence, in this present study, we collected and identified for the first time from the state the specimens of *C. ruber* in Nilgiri Biosphere Reserve in the southern Western Ghats from different localities in longwood shola, Kothagiri North Division (11° 25.95'N & 76° 52.51'E). The altitude of the hills ranges from 1350m to 2040m. Our collected specimens show similarity with the specimens found in Costa Rica, Indonesia, Philippines, Japan, and Srilanka in having the tendency to arise in pairs from the egg. In this regard, the collected specimens concord with earlier reports (Pradhan et al. 2012; Kumar et al. 2015).

### **Character observation of *Clathrus ruber***

#### **Habitat**

Grows in soil rich in humus or on decaying wood.

#### **Egg**

Spheroid shape, diameter up to 5cm from the soil, white with rhizomorphs at the base. Carpophore globose, 5–10 cm x 5cm, red with netlike lacunose arms delimiting, polygonal holes, spores greyish, elliptical, smooth, 4–6 µm x 1.7–2 µm.

#### **Edibility status**

The edibility of this species is not well understood because of previous confusing reports. According to Marchand (1976), the eggs are edible. The report of Ramsbottom (1953), however, suggests that this species causes cancer; in parts of France, it is said to produce cutaneous eruptions or convulsions.

**Distribution**

India: West Bengal (Pradhan et al. 2012), Meghalaya (Kumar et al. 2015).

**Specimen examined**

India, West Bengal, Bangura, Chougan, 23° 02' 953"N & 087° 19.518"E; 79m, on soil mixed with wood debris, 9.viii.2009, coll. P. Pradhan, AMFH 423; Mindapur District, RamNagar-II Block, Kasaphaltala 21° 43' 322"N & 087° & 31'192"E, 11m, on forest soil mixed with leaf litter wood chips, 24.vii. 2010, coll. K. Archarya, A.K. Dutta & P. Pradhan, AMFH 341. S.Santhoshkumar et al. 16 (KCMS) longwood shola, Kotagiri from 1350m, 27.vi.2017; coll. S. Santhoshkumar et al. 21 (KCMS) Sholur beat, North Division of Nilgiris from 1700m, 24.vi.2018.

**Key to the genera and species of *Clathrus***

Arms slender, more or less circular in transverse section, meshes without gleba forming a crown -----***C. pusillus***

Receptacle red or pink composed of columns free at the base fused above, arms with spongy texture, not breaking into fragments above downwards, composed of more or less isodiametric meshes, meshes are not surrounded 'Corona'----- ***C. ruber***

Receptacle white, slender, very small, up to 2.5cm high with two or more columns united above but not anastomosing, texture spongy, arms fused at the base to form a short stipe, gleba restricted to well-defined small glebifers at the intersections without setae----- ***C. delicatus***

**References**

- Dring, D.M. (1980).** Contributions towards a rational arrangement of the Clathraceae. *Kew Bulletin* 35(1): 1–96.
- Gogoi, G. & V. Parkash (2014).** Some New Records of Stinkhorns (Phallaceae) from Hollongapar Gibbon Wildlife Sanctuary, Assam, India. *Journal of Mycology* 490847: 1–8. <https://doi.org/10.1155/2014/490847>
- Gogoi, G. & P. Vipin (2015).** Diversity of gasteroid fungi (Basidiomycota) in Hollongapar Gibbon Wildlife Sanctuary, Jorhat, Assam, India. *Current Research in Environmental & Applied Mycology* 5(3): 202–212.
- Hosagoudar, V.B., T.K. Abraham & P. Pushpangadan (1996).** *Fungi of Kerala*. Tropical Botanical Garden and Research Institute, Palode, Kerala, India, 151pp.
- Kirk, P.M., P.F. Cannon, D.W. Minter & J.A. Stalpers (2008).** *Dictionary of the Fungi. 10th Edition*. CAB International, Wallingford, 771pp.
- Kumar, R., S. Pandey, K. Giri, G. Mishra & R.R. Rishi (2015).** Unrecorded macrofungi from the Narpuh Reserve Forest of Meghalaya, India. *Current Life Sciences* 1(3): 118–123.
- Leelavathy, K.M., S. Zachariah & K.V. Sankaran (1981).** Additions to Indian fungi. *Acta Botanica Indica* 9: 144–145.
- Maldonado-Ramírez, S.L. & H. Torres-Pratts (2005).** First report of *Clathrus cf. crispus* (Basidiomycota: Clathraceae) occurring on decomposing leaves of *Rhizophora mangle* in Puerto Rico. *Caribbean Journal of Science* 41(2): 357–359.
- Marchand, A. (1976).** Champignons du Nord et du Midi, t. IV, couleurs, nombreux dessins au trait (spores et anatomie). *Bulletin mensuel de la Société linnéenne de Lyon* 45(7): 16.

- Miller, O.K. Jr. & H.H. Miller (1988).** *Gasteromycetes: Morphology and Developmental Features*. Mad River Press, Eureka, 157pp.
- McKnight, V.B. & K.H. McKnight (1987).** *A Field Guide to Mushrooms: North America*. Houghton Mifflin, Boston, Massachusetts, 345pp.
- Micheli, P.A. (1729).** *Nova plantarum genera iuxta Tournefortii methodum disposita [in Latin]*. Typis Bernardi Paperinii, Florence, Italy, 214pp.
- Pegler, D.N. & L.D. Gomez (1994).** An unusual member of the Cage fungus family. *Mycologist* 8(2): 54–59.
- Phillips, R. (2011).** *Clathrus ruber. Rogers Mushrooms*. Rogers Plants Ltd. Press, 21pp.
- Pradhan, P., A.K. Dutta, A. Roy, S.K. Basu & K. Acharya (2013).** Macrofungal diversity and habitat specificity: a case study. *Biodiversity* 14(3): 147–161.
- Pradhan, P., A.K. Dutta, S. Giri, N. Chakraborty, A. Roy & K. Acharya (2012).** Phallales of West Bengal, India, I. Clathraceae: *Aseroe* and *Clathrus*. *Science & Culture* 78(9–10): 444–447.
- Ramírez, M.S.L. & H.T. Pratts (2005).** First report of *Clathrus cf. crispus* (Basidiomycota:Clathraceae), occurring on decomposing leaves of *Rhizophora mangle* in Puerto Rico. *Caribbean Journal of Science* 41(2): 357–359.
- Kumar, R., S. Pandey, K. Giri, G. Mishra & R.R. Rishi (2015).** Unrecorded macrofungi from the Narpuh Reserve Forest of Meghalaya, India. *Current Life Sciences* 1(3): 118–123.
- Ramsbottom, J. (1953).** *Mushrooms and Toadstools*. London, Collins, 306pp.
- Patel, R.S., A.M. Vasava & K.S. Rajput (2018).** New distribution record of *Clathrus delicatus* Berk. & Broome (Phallaceae) from Gujarat. *Journal of the Indian Botanical Society* 97(1): 54–57.
- Roy, T.C. (1948).** Fungi of Bengal. *Bulletin of the Botanical Society of Bengal* 2: 134–177.
- Stijve, T. (1997).** Close encounters with *Clathrus ruber*, the Latticed Stinkhorn. *Australasian Mycological Newsletter* 16(1): 11–15.
- Swapna, S., S. Abrar, C. Manoharachary & M. Krishnappa (2010).** Development and morphology of *Clathrus delicatus* (Phallomycetidae, Phallaceae) from India. *Mycotaxon* 114: 319–328.
- Tattersfield, D. (2016).** *Crete Naturetrek*: 1–28.

**Acknowledgements:** Authors are grateful to Prof A. Rajendran, professor and head, Department of Botany, Bharathiar University, for facilitating during identification. PS is thankful to Science and Engineering Research Board (SERB), New Delhi, for financial assistance (File No. PDF/2015/000732, 10 March 2016), and the district forest officer, Udhamandalam, for permission to carry out the research work successfully.

### Sundaram Santhoshkumar<sup>1</sup>, Selvaraj Jeevith<sup>2</sup>, Ponnusamy Samyurai<sup>3</sup> & Nallasamy Nagarajan<sup>4</sup>

<sup>1</sup> Research Scholar, PG and Research Department of Botany, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu 641029, India.

<sup>2</sup> Research Scholar, Division of Forest Ecology and Climate Change (IFGTB), Coimbatore, Tamil Nadu, 641002, India.

<sup>3</sup> Post Doctoral Fellow, PG and Research Department of Botany, Bharathiar University, Coimbatore, Tamil Nadu 641046, India.

<sup>4</sup> Associate Professor, PG & Research Department of Botany, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu 641029, India.

Emails: <sup>1</sup>santhosh.biology@gmail.com (corresponding author), <sup>2</sup>jeevithbio@gmail.com, <sup>3</sup>samyurai.bio@gmail.com, <sup>4</sup>nnagaraj7@yahoo.com

Citation: Santhoshkumar, S., S. Jeevith, P. Samyurai & N. Nagarajan (2019). Red Caged Fungus: new record of *Clathrus ruber* from the southern Western Ghats of Tamil Nadu, India. *Funguy* #1, In: *Zoo's Print* 34(4): 30–33

## World Wetlands Day celebration at Government Schools in Madhya Pradesh and Uttar Pradesh: The key role of wetlands in coping with climate change



Students colouring the wetland biodiversity sheets

World Wetlands day was celebrated on 2 February 2019 at Government schools of Uttar Pradesh and Madhya Pradesh with collaborated efforts of Indian Biodiversity Conservation Society, Manav Organisation, Sarthak Pragati Prayas and Society for Scientific Research. The theme for 2019 was “Wetlands and Climate Change”. There is an increase in natural disasters such as storms, floods and droughts due to climate change. The well-managed and healthy wetlands absorb and store the excess rainfall and store it for the dry seasons; thus helping the communities to cope with extreme weathers such as floods as well as droughts.

The team members and volunteers, Abhishek Namdev, Saurabh Yadav, Rakesh Yadav and Daya Sagar participated in the field surveys so as to interact with the people and also assisted in the organization of awareness programs in schools. Lectures were delivered to students in an interactive way. Several questions were put up to them before letting them know about the wetlands around them such as what do you see when you are around a water body and have you seen people hunting the water birds? The students responded actively to the team members. Later they were provided with a poster on common water birds that included the bird names in Hindi. A colouring competition was also organized for the students. Colouring sheets were prepared so as to let the students learn about the biodiversity associated with the wetlands and the effect of climate change on them.

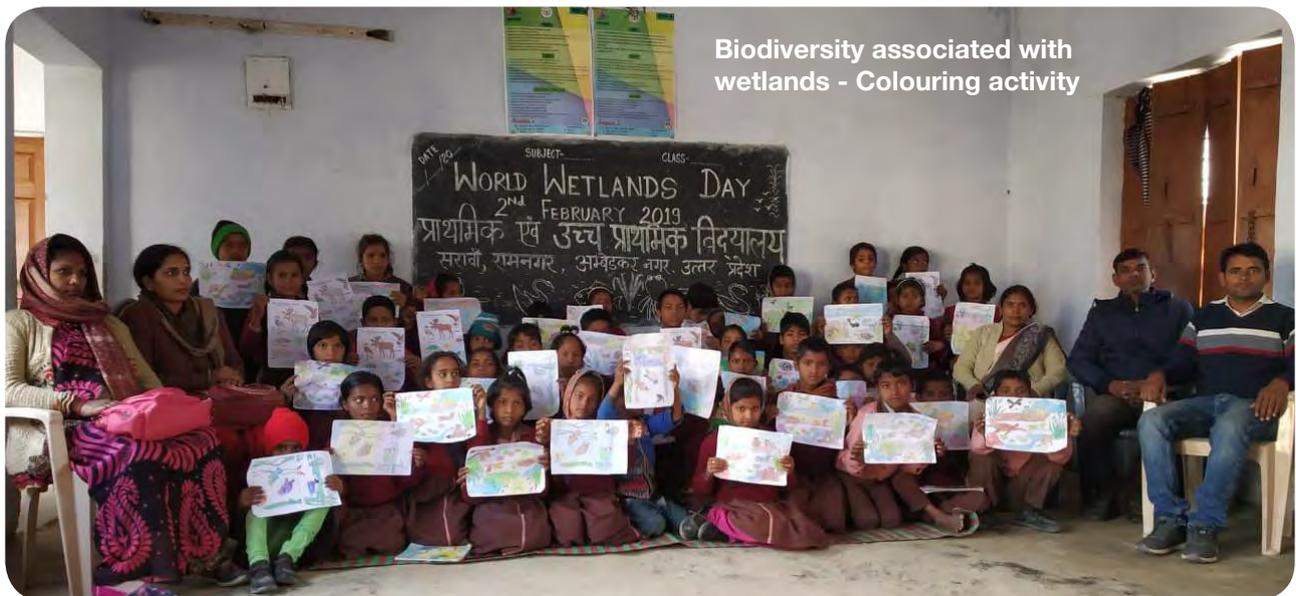


**Interactive session on wetlands**

For the primary sections, the names of the animal were written in Hindi. The students enjoyed the activity and coloured the sheets. The students were felicitated for the efforts.

The students were also provided with flyers on wetlands in Hindi. The teachers were interested in bringing awareness amongst the students so that they learn

critical thinking and problem solving skills. The team members worked closely with local teachers to pilot future activities related to wetland conservation. In spite of the truth that we are losing our diversity at an unstoppable pace, our most education system still have only indirect value for conservation, the most influential conservation efforts are those that have an apparent consideration of how their education actions unswervingly control conservation outcomes. The school staff Sarla Maurya, Mamta (Head), Tilak Ram Maurya (Head), Shailendra Yadav, Mamta Maurya, Anita Yadav, Poonam Singh Yadav, Vinay Kumar, Devendra Singh Yadav (Head), Ram Kishan Ahirwar, Ved Prakash Mishra, Mahesh Kumar Dave, Hari Shankar Kaushik, Nand Kumar Prajapati, Mangal Singh Yadav, Brijesh Yadav, Rohit Yadav and Harish Ahirwar) co-operated in the event with appreciable zeal.



**Biodiversity associated with wetlands - Colouring activity**

**Submitted by: Akhilesh Kumar and Sonika Kushwaha, Indian Biodiversity Conservation Society. Email: [ibcsforall@gmail.com](mailto:ibcsforall@gmail.com)**



# ZOO'S PRINT

Communicating science for conservation

## ZOO'S PRINT Publication Guidelines

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

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

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

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

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

## Cartoons, puzzles, crossword and stories

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

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

## Manuscript requirements

Articles should be typed into a Word 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.

## 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.

## Publication Information

### ZOO'S PRINT, ISSN 0973-2543

Published at: Coimbatore

Owner: Zoo Outreach Organisation, 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti, Coimbatore, Tamil Nadu 641035, India.

Editors: Sally R. Walker and Sanjay Molur

Associate Editor: Daniel B. Ayyachamy

Managing Editors: Lathadevi Ravikumar & B. Ravichandran

Editorial Assistants: R. Marimuthu & S. Radhika

### Zoo Outreach Organisation Trust Committee and Sr. Staff

Managing Trustee: Sally R. Walker

Executive Director Trustee: R.V. Sanjay Molur

Finance Director Trustee: Latha G. Ravikumar

Scientist: B.A. Daniel

Researcher: R. Marimuthu, Priyanka Iyer

Other staff: B. Ravichandran, K. Geetha, S. Radhika, Arul Jagadish, K. Raveendran, S. Sarojamma

ZOO'S PRINT magazine is informal and newsy as opposed to a scientific publication. ZOO'S PRINT magazine sometimes includes semi-scientific and technical articles which are reviewed only for factual errors, not peer-reviewed.

## Address

Zoo Outreach Organisation

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

Phone: +91 9385339862 & 9385339863

E-mail: [zooreach@zooreach.org](mailto:zooreach@zooreach.org)

Website: [www.zoosprint.zooreach.org](http://www.zoosprint.zooreach.org),

[www.zooreach.org](http://www.zooreach.org)



