

OPEN ACCESS



The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATION

FIRST PHOTOGRAPHIC EVIDENCE AND DISTRIBUTION OF THE INDIAN PANGOLIN *MANIS CRASSICAUDATA* (MAMMALIA: PHOLIDOTA: MANIDAE) IN SARISKA TIGER RESERVE, RAJASTHAN, INDIA

Hemant Singh, Gobind Sagar Bhardwaj, N. Gokulakannan, Saket Agasti & K. Aditya

26 June 2021 | Vol. 13 | No. 7 | Pages: 18888–18893

DOI: [10.11609/jott.6290.13.7.18888-18893](https://doi.org/10.11609/jott.6290.13.7.18888-18893)



For Focus, Scope, Aims, and Policies, visit https://threatenedtaxa.org/index.php/JoTT/aims_scope

For Article Submission Guidelines, visit <https://threatenedtaxa.org/index.php/JoTT/about/submissions>

For Policies against Scientific Misconduct, visit https://threatenedtaxa.org/index.php/JoTT/policies_various

For reprints, contact [<ravi@threatenedtaxa.org>](mailto:ravi@threatenedtaxa.org)

The opinions expressed by the authors do not reflect the views of the Journal of Threatened Taxa, Wildlife Information Liaison Development Society, Zoo Outreach Organization, or any of the partners. The journal, the publisher, the host, and the partners are not responsible for the accuracy of the political boundaries shown in the maps by the authors.

Publisher & Host





First photographic evidence and distribution of the Indian Pangolin *Manis crassicaudata* (Mammalia: Pholidota: Manidae) in Sariska Tiger Reserve, Rajasthan, India

Hemant Singh¹ , Gobind Sagar Bhardwaj² , N. Gokulakannan³ , Saket Agasti⁴ & K. Aditya⁵

^{1–5} Rajasthan Forest Department, Jaipur, Rajasthan, India.

¹ Divisional Forest Office Jhalawar, Near ITI, Jhalawar, Rajasthan 326001, India.

² Rajasthan Pollution Control Board, Jhalana Institutional Area, Jaipur, Rajasthan 302004, India.

^{3–5} Deputy Conservator of Forest Office, Sariska, Alwar, Rajasthan 301022, India.

¹ hemant.shekhawat6@gmail.com (corresponding author), ² gobindsagarbhardwaj@gmail.com, ³ gogulselvi@gmail.com,

⁴ saket.agasti@gmail.com, ⁵ adityak2025@gmail.com

Abstract: The Indian Pangolin, although considered to be widely distributed due to its elusive nature and low detection probability its status and distribution records are very limited. Rampant hunting for local consumption, and illegal wildlife trade for medicinal and ornamental purposes has pushed the species towards serious decline. Herein, we report the first photographic records of the Indian Pangolin in Sariska Tiger Reserve (STR), Rajasthan, India. During our camera trapping study from June 2018 to April 2019, out of 29,220 camera trapping nights the species was recorded on four occasions, at two different locations in STR. The species was recorded in the open forest areas near natural water bodies situated in the middle of dense *Anogeissus pendula* forests.

Keywords: Endangered, illegal wildlife trade, camera trap.

The order Pholidota is represented by eight species in a single family Manidae distributed from Africa to Asia. Out of eight, two species occur in India—the Indian Pangolin *Manis crassicaudata* (E. Geoffroy, 1803) is widely distributed across most parts of the country starting from the southern part of the Himalaya, also in southern Nepal, Bangladesh, Pakistan, and Sri Lanka

(Tikader 1983; Srinivasulu & Srinivasulu 2012; Mahmood et al. 2020); and the Chinese Pangolin *Manis pentadactyla* is mainly distributed across the northeastern states of the country and Nepal (Srinivasulu & Srinivasulu 2012; Challender et al. 2019). The two are morphologically similar however they can be differentiated based on the size of the scales, the Indian pangolin's scales are relatively larger than those of the Chinese Pangolin; rows of scales, Indian Pangolin have scales 11–13 rows across the back while Chinese Pangolin have 15–18 rows across the back (Pocock 1924). Indian Pangolins are quite adaptive to modified habitats having abundant prey and less exploitation pressure (Mahmood et al. 2020). The Indian Pangolin is nocturnal and rests in burrows during the daytime. Two types of burrows have been reported for Indian Pangolins, i.e., feeding burrows and living burrows (Mahmood et al. 2020). It uses its long protrusible and glutinous tongue to predate on ants and termites; consuming the eggs, young and adults of ants and termites, also ingests grit, sand and small stones that

Editor: Honnavalli N. Kumara, Salim Ali Centre for Ornithology and Natural History, Coimbatore, India.

Date of publication: 26 June 2021 (online & print)

Citation: Singh, H., G.S. Bhardwaj, N. Gokulakannan, S. Agasti & K. Aditya (2021). First photographic evidence and distribution of the Indian Pangolin *Manis crassicaudata* (Mammalia: Pholidota: Manidae) in Sariska Tiger Reserve, Rajasthan, India. *Journal of Threatened Taxa* 13(7): 18888–18893. <https://doi.org/10.11609/jott.6290.13.7.18888-18893>

Copyright: © Singh et al. 2021. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use, reproduction, and distribution of this article in any medium by providing adequate credit to the author(s) and the source of publication.

Funding: Government of India and Government of Rajasthan.

Competing interests: The authors declare no competing interests.

Acknowledgements: We thank Dr. G.V. Reddy, Principal Chief Conservator of Forests (Head of Forest Force), Rajasthan for support and guidance, the frontline staff of STR for their effort in the field and Rajesh, Ratan and Sachin Kumar (Ranthambore Tiger Reserve-II) for help with the data analysis.



aid mastication (Prater 2005). Thus, the species plays an important ecological role by consuming termites which are a serious insect pest for agricultural crops and buildings (Roberts 1997). Indian Pangolins are typically solitary in nature, except during the mating and rearing of the young ones; It is believed that scent markings by males using urine, scat or anal glands are the means to maintain territory and social relations (Mahmood et al. 2020). The species inhabits wide varieties of habitat and recorded from Indian subcontinent in both forested and non-forest areas (Roberts 1977; Mahmood et al. 2020). Pangolins occurs in very low densities, few available studies estimating densities for various species of Pangolins suggests density of 0.0001 individual per km² for the Indian Pangolin, 0.001 individuals per km² for the Chinese Pangolin and 0.8 individuals per km² for the White-bellied Pangolin *Phataginus tricuspis* in Africa (Wu et al. 2004; Akpona et al. 2008; Mahmood et al. 2014, 2018).

The Indian Pangolin is protected under Appendix I of the Convention on International Trade in Endangered Species (CITES) and Schedule I species in the Wildlife (Protection) Act 1972, it is also listed as 'Endangered' in the IUCN Red List of Threatened Species due to its rapid decline in their numbers (Mahmood et al. 2020). Despite being protected under many regimes of the law, the population of this species is declining rapidly; mainly because of hunting for local use as meat, for traditional medicines and rampant illegal international trade for medicinal and ornamental purposes (Mahmood et al. 2012; Mohapatra et al. 2015). The scales of the species are used as a whole, or in powdered form in the preparation of traditional medicines in southeastern Asia, mainly China and Vietnam (Baillie et al. 2014; Mohapatra et al. 2015; Challender & Waterman 2017; Mahmood et al. 2019). In India, hunting and illegal trade of 119 pangolin seizures were recorded from year 2009 to 2018 and an estimated 7,500 individuals were killed (Kumar et al. 2020). Additionally, the Indian Pangolins in their habitat were killed due to the belief that they dig up graves and pull out the buried dead bodies. In addition, farmers kill the animal allegedly for damaging their crops and agricultural lands by digging the burrows (Mahmood et al. 2018).

In Rajasthan, the pangolin was once believed to be widely distributed but now it has become rare (Sharma et al. 2003). The species is recorded from Ajmer, Bikaner, Churu, and Nagaur districts in the state (Sharma et al. 2003; Dookia & Jakher 2004). It is also reported in three protected areas in the state namely Sajjangerh Wildlife Sanctuary, Mukundra Hills Tiger Reserve and Keoladeo

National Park (Bhatnagar et al. 2013; Latafat & Sadhu 2016; Singh et al. 2017); one individual was rescued in Dhani Talai area of Pratapgarh forests in southern Rajasthan in 2007.

Study Area

The Sariska Tiger Reserve (STR) is situated in the Aravalli Hills in Alwar District of the Indian State of Rajasthan between 76.241°–76.545°N & 27.095°–27.648°E. The climate is subtropical, with distinct summer, monsoon and winter seasons; temperature ranges 2–47 °C with an average rainfall of 621 mm (Shekhawat 2015). The total area of the reserve is 1,213.31 km², with 881 km² critical tiger habitat (CTH) and 332 km² buffer area (Shekhawat 2015). In STR the altitude varies 240–777 m rugged terrain, numerous narrow to large valleys, and plateaus are main characteristic feature of habitat; Kankwari (524 m) and Kiraska (592 m) are two main plateaus. In vastly scattered forest has various geological formations and soil depth varies from few centimetres on hill slopes to 1 m in valleys (Yadav & Gupta 2006). The vegetation is tropical dry deciduous forest (Champion & Seth 1968) with Dhonk *Anogeissus pendula* as the dominant tree species, other species include *Butea monosperma*, *Boswellia serrata* and *Ziziphus mauritiana*. Apart from reintroduced Tigers *Panthera tigris*, Leopard *P. pardus*, Striped Hyena *Hyaena hyaena*, Jackal *Canis aureus*, and the Jungle Cat *Felis chaus* are the major carnivores in the reserve; while Chital *Axis axis*, Sambar *Rusa unicolor*, Nilgai *Boselaphus tragocamelus*, and Wild Boar *Sus scrofa* are major prey species (Shankar et al. 2010). STR is subjected to an extensive anthropogenic pressure, as 2,254 families reside in 26 villages situated in the area (Shekhawat 2015). In addition to that very high pilgrimage inside the reserve, habitat fragmentation due to state highways passing through the STR, increasing human-wildlife interactions and low staff strength for law enforcement are other major problems in the reserve (Bhardwaj 2018).

MATERIALS AND METHODS

This record was obtained as part of a camera trapping exercise that was being undertaken by the authors for monitoring of tigers in STR in three different phases. For camera trapping, the STR was divided into 440 grids of 2 km² each, the grids are equally distributed into two blocks (north block and south block) having 220 grids each covering an area of 440 km² for management purpose. Among all, 84 grids, distributed randomly among both the blocks, were identified and used as

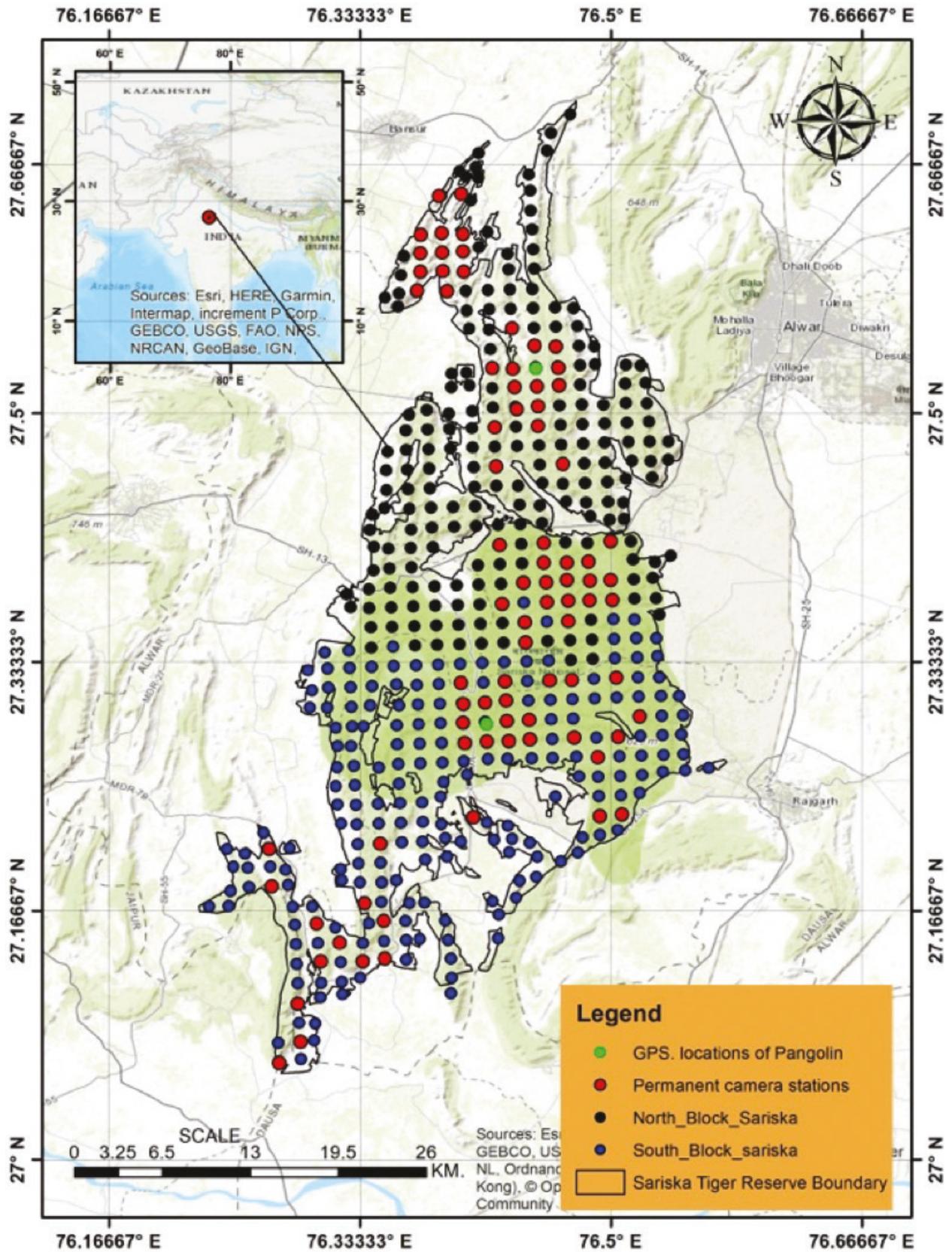


Image 1. GPS locations (shown as green dot) of Indian Pangolin camera trap captures in Sariska Tiger Reserve.

permanent camera trap stations (Image 1). The details of camera trap study is provided in Table 1. Camera traps were deployed in each block with at least one pair of camera deployed in each grid. Cuddeback 1279 20 Mega-pixel trail cameras were used for the exercise. The camera traps were deployed 40–50 cm above ground at a distance of 5–6 m on both sides from the centre of the trail. The delay between subsequent photographs was kept at 5 seconds so that young ones with mother don't get missed. Cameras were operated on a 24-hour basis. All the cameras were regularly checked in the field for proper functioning and status of the batteries. Geo coordinates of the location were recorded using handheld GPS (Garmin eTrex 20x) device set to datum WGS 84.

RESULTS

The Indian Pangolin was recorded on four occasions at two different locations from an effort of 29,220 trap nights. Three occasions of the four was in a single camera trap location in Jahaj beat of Tehla range (27.286°N, 76.418°E) (Images 1–3), which was located in a valley near a water body. The observed habitat of the camera trap location was undulating with moderately dense vegetation *Zizyphus mauritiana* and *Butea monosperma* vegetation in the valley and dense undisturbed *Anogeissus pendula* forest on the upper regions. We also recorded one active burrow in the area based on fresh signs of digging and another inactive burrow (Image7). The burrows were deeper, the inactive burrow had a depth of 1.6 m while the active burrow was 2.8 m deep. Both the burrows had round openings. The second site of Indian Pangolin capture location was in Bija forest area near Panidhal Village (27.524° N 76.440° E).

In addition, one Indian Pangolin was observed in a moderately dense *Anogeissus* forest on a small hillock in Loj Beat of Talvriksh range during the morning hours on 29 August 2019 (Image 6). It tried to hide itself among the shrubs sensing the presence of humans in close vicinity and ultimately it disappeared into a thicket. All the camera trap images of Indian Pangolins were captured during the late night hours from 2348 h to 0219 h that demonstrates the fact that the species is active in



Image 2. Camera trap image of Indian Pangolin in Beat Jahaj, Tehla.



Image 3. Camera trap image of Indian Pangolin in Beat Jahaj, Tehla.



Image 4. Camera trap image of Indian Pangolin in Beat Jahaj, Tehla.

Table 1. Details of camera trapping survey design used in the study.

Period of Survey session	Extent of study area	Survey effort
01.vi.2018 to 30.xi.2018	84 grids (2km ²) permanent camera trap locations in both north and south block	10,080 camera trap nights
17.xii.2018 to 16.i.2019	220 grids (2km ²) of south block	6,820 camera trap nights
04.ii.2019 to 01.iv.2019	220 grids (2km ²) of north block	12,320 camera trap nights



Image 5. Camera trap image of Indian Pangolin in Loj Beat, Talvriksh.



Image 6. Image clicked through mobile phone of Indian Pangolin, in Beat Loj, Talvriksha. © Vinod Dulariya



Image 7. Living burrows of Indian Pangolin: A—active burrow | B—inactive burrow in beat Jahaj, Tehla. © Rajesh Kumar

night except for one individual which was observed in the morning.

DISCUSSION

Despite being one of the most traded species throughout the globe, very little is known about the distribution and current status of the pangolin in most of its range including Rajasthan. This can be attributed to its elusive nature and low density, as evident from the study that the species was captured only four times out of 29,920 camera nights. STR is one of the most researched protected areas (Bhardwaj 2018), but there are no published records barring a single mention in text on Indian Pangolin in the STR (Bhardwaj 2018). The camera trap pictures of the Indian Pangolin confirm its presence in the STR and adds to its biological diversity. Further, this will aid in formulating robust strategies for the conservation of the species in STR. Although the effort was intensive, the cameras were mainly installed on trails and areas for capturing the big cats, as big cats have larger home ranges and they prefer regular trails and paths for walking to avoid injuries, but the same cannot be assumed for the smaller vertebrates like the Indian Pangolin so a little bias in less detection of pangolin during the study cannot be ruled out. Since the species inhabits wide varieties of habitats and outside protected areas (Mahmood et al. 2020), the comprehensive study in STR as well as adjoining areas on the ecological aspects and population dynamics of the species would give more insight on the Indian Pangolin. The measures like creating awareness among the local people and frontline staff, including local communities to protect the Indian Pangolin from traditional hunting would help in conserving the species.

REFERENCES

- Akpona, H. A., C. A. Djagoun & B. Sinsin (2008). Ecology and ethnozoology of the three-cusped pangolin *Manis tricuspis* (Mammalia, Pholidota) in the Lama forest reserve, Benin. *Mammalia* 72: 198–202.
- Baillie, J., D. Challender, P. Kaspal, A. Khatiwada, R. Mohapatra & H. Nash (2014). *Manis crassicaudata*. *The IUCN Red List of Threatened Species* 2014: e.T12761A45221874. Downloaded on 09 May 2020. <https://doi.org/10.2305/IUCN.UK.2014-2.RLTS.T12761A45221874.en>
- Bhardwaj, G.S. (2018). Sariska Tiger Reserve: A Managerial Approach to the Problems of Landscape. *Indian Forester* 144: 900–910.
- Bhatnagar, C., V. Sharma & K. Jani (2013). An annotated study of mammalian fauna of the Sajjangerh Wildlife Sanctuary, Udaipur, Rajasthan (India). Department of Zoology, University College of Science, Mohanlal Sukhadia University, Udaipur, Rajasthan, India, 4pp.
- Challender, D. & C. Waterman (2017). Implementation of CITES Decisions 17.239 b) and 17.240 on Pangolins (*Manis* spp.), CITES SC 69 Doc. 57 Annex. Available from, <https://cites.org/sites/default/>



- files/eng/com/sc/69/E-SC69-57-A.pdf
- Challender, D., S. Wu, P. Kaspal, A. Khatiwada, A. Ghose, N. Ching-Min Sun, R.K. Mohapatra & T.L. Suwal (2019).** *Manis pentadactyla* (errata version published in 2020). *The IUCN Red List of Threatened Species* 2019: e.T12764A168392151. Downloaded on 25 May 2020. <https://doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12764A168392151.en>
- Dookia, S. & G. R. Jakher (2004).** Status of Indian Pangolin (*Manis crassicaudata*) in the arid part of Thar desert of Rajasthan. *Tiger paper*, 31: 9–10.
- Kumar, V.P., A. Rajpoot & S.S. Rasaily (2020).** Peril for pangolins: an evaluation the status of the last decade in India. *Forensic Science International: Reports* 2: 100058. <https://doi.org/10.1016/j.fsr.2020.100058>
- Latafat, K. & A. Sadhu (2016).** First Photographic Evidence of Indian Pangolin *Manis crassicaudata* E. Geoffroy, 1803 in Mukundara Hills Tiger Reserve (MHTR), Rajasthan, India. *Journal of the Bombay Natural History Society* 113: 21–22.
- Macdonald, E.A., D. Burnham, A.E. Hinks, A.J. Dickman, Y. Malhi & D.W. Macdonald (2015).** Conservation inequality and the charismatic cat: *Felis felis*. *Global Ecology and Conservation* 3: 851–866.
- Mahmood, T., R. Hussain, N. Irshad, F. Akrim & M. S. Nadeem (2012).** Illegal mass killing of Indian Pangolin (*Manis crassicaudata*) on Potohar Region, Pakistan. *Pakistan Journal of Zoology* 44: 1457–1461.
- Mahmood, T., N. Irshad & R. Hussain (2014).** Habitat preference and population estimates of Indian Pangolin (*Manis crassicaudata*) in District Chakwal of Potohar Plateau, Pakistan. *Russian Journal of Ecology* 45: 70–75.
- Mahmood, T., K. Kanwal & I. U. Zaman (2018).** Records of the Indian Pangolin (Mammalia: Pholidota: Manidae: *Manis crassicaudata*) from Mansehra District, Pakistan. *Journal of Threatened Taxa* 10(2): 11254–11261. <https://doi.org/10.11609/jott.3314.10.2.11254-11261>
- Mahmood, T., D. Challender, A. Khatiwada, S. Andleeb, P. Perera, S. Trageser, A. Ghose & R. Mohapatra (2019).** *Manis crassicaudata*. *The IUCN Red List of Threatened Species* 2019: e.T12761A123583998. Downloaded on 16 May 2020. <https://doi.org/10.2305/IUCN.UK.2019-3.RLTS.T12761A123583998.en>
- Mahmood, T., R.K. Mohapatra, P. Perera, N. Irshad, F. Akrim, S. Andleeb, M. Waseem, S. Sharma & S. Panda (2020).** Indian Pangolin *Manis crassicaudata* (Geoffroy, 1803), pp.71–88. In: *Pangolins: Science, Society and Conservation*. Academic Press, 658pp.
- Mohapatra, R.K., S. Panda, L.N. Acharjyo, M.V. Nair & D.W.S. Challender (2015).** A note on the illegal trade and use of Pangolin body parts in India. *TRAFFIC Bulletin* 27: 33–40.
- Pocock, R.I. (1924).** The External Characters of: the Pangolins (Manidae). In: *Proceedings of the Zoological Society of London* 94(Sep): 707–723.
- Prater, H.S. (2005).** *The Book of Indian Animals*. Oxford University Press, New Delhi, 348pp+67pls.
- Roberts, T.J. (1977).** *The Mammals of Pakistan*. Ernest Benn, London, UK, 361pp.
- Roberts, T.J. (1997).** Pholidota, pp. 131–135. In: *The Mammals of Pakistan. Revised Edition*. Oxford University Press, Karachi, 525pp.
- Sankar, K., Q. Qureshi, P. Nigam, P.K. Malik, P. R. Sinha, R.N. Mehrotra, R. Gopal, S. Bhattacharjee, K. Mondal & S. Gupta (2010).** Monitoring of reintroduced tigers in Sariska Tiger Reserve, Western India: preliminary findings on home range, prey selection and food habits. *Tropical Conservation Science* 3: 301–318.
- Sharma, S., S. K. Sharma & S. Sharma (2003).** Notes on mammalian fauna of Rajasthan. *Zoos' Print Journal* 18(4): 1085–1088. <https://doi.org/10.11609/JoTT.ZPJ.18.4.1085-8>
- Shekhawat, R.S. (2015).** Tiger Conservation Plan of Sariska Tiger Reserve, Sariska, Alwar, Rajasthan (India). Rajasthan Forest Department, Government of Rajasthan, Jaipur, 378pp.
- Singh, A., A. Mukherjee, S. Dookia & H.N. Kumara (2017).** An updated account of mammal species and population status of ungulates in Keoladeo National Park, Bharatpur, Rajasthan. *Current Science* 113: 103.
- Srinivasulu, C. & B. Srinivasulu (2012).** *South Asian Mammals. Their Diversity, Distribution, and Status*. Springer, New York, 468pp+xii.
- Tikader, B.K. (1983).** *Threatened Animals of India*. Zoological Survey of India, Calcutta, 307pp.
- Wu, S.B., N. Lui, Y. Zhang & G. Ma (2004).** Assessment of threatened status of Chinese Pangolin (*Manis pentadactyla*). *Chinese Journal of Applied Environmental Biology* 10: 456–461.
- Yadav, A.S. & S.K. Gupta (2006).** Effect of micro-environment and human disturbance on the diversity of woody species in the Sariska Tiger Project in India. *Forest Ecology and Management* 225: 178–189.





www.threatenedtaxa.org

OPEN ACCESS



The Journal of Threatened Taxa (JoTT) is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use, reproduction, and distribution of articles in any medium by providing adequate credit to the author(s) and the source of publication.

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

June 2021 | Vol. 13 | No. 7 | Pages: 18679–18958
Date of Publication: 26 June 2021 (Online & Print)
DOI: 10.11609/jott.2021.13.7.18679-18958

Communications

Persistence of *Trachypithecus geei* (Mammalia: Primates: Cercopithecidae) in a rubber plantation in Assam, India

– Joydeep Shil, Jihosuo Biswas, Sudipta Nag & Honnavalli N. Kumara, Pp. 18679–18686

Population assessment of the endangered Western Hoolock Gibbon *Hoolock hoolock* Harlan, 1834 at Sheikh Jamal Inani National Park, Bangladesh, and conservation significance of this site for threatened wildlife species

– M. Tarik Kabir, M. Farid Ahsan, Susan M. Cheyne, Shahrul Anuar Mohd Sah, Susan Lappan, Thad Q. Bartlett & Nadine Ruppert, Pp. 18687–18694

Assessment of changes over a decade in the patterns of livestock depredation by the Himalayan Brown Bear in Ladakh, India

– Aishwarya Maheshwari, A. Arun Kumar & Sambandam Sathyakumar, Pp. 18695–18702

Habitat selection of Himalayan Musk Deer *Moschus leucogaster* (Mammalia: Artiodactyla: Moschidae) with respect to biophysical attributes in Annapurna Conservation Area of Nepal

– Bijaya Neupane, Nar Bahadur Chhetri & Bijaya Dhimi, Pp. 18703–18712

Sero-diagnosis of tuberculosis in elephants in Maharashtra, India

– Utkarsh Rajhans, Gayatri Wankhede, Balaji Ambore, Sandeep Chaudhari, Navnath Nighot, Vitthal Dhaygude & Chhaya Sonekar, Pp. 18713–18718

Avian species richness in traditional rice ecosystems: a case study from upper Myanmar

– Steven G. Platt, Myo Min Win, Naing Lin, Swann Htet Naing Aung, Ashish John & Thomas R. Rainwater, Pp. 18719–18737

Conservation status, feeding guilds, and diversity of birds in Daroji Sloth Bear Sanctuary, Karnataka, India

– M.N. Harisha, K.S. Abdul Samad & B.B. Hosetti, Pp. 18738–18751

Birds of Surat-Dangs: a consolidated checklist of 75 years (1944–2020) with special emphasis on noteworthy bird records and bird hotspots from northern Western Ghats of Gujarat, India

– Nikunj Jambu & Kaushal G. Patel, Pp. 18752–18780

Identification of a unique barb from the dorsal body contour feathers of the Indian Pitta *Pitta brachyura* (Aves: Passeriformes: Pittidae)

– Prateek Dey, Swapna Devi Ray, Sanjeev Kumar Sharma, Padmanabhan Pramod & Ram Pratap Singh, Pp. 18781–18791

Underestimated diversity of *Cnemaspis* Strauch, 1887 (Sauria: Gekkonidae) on karst landscapes in Sarawak, East Malaysia, Borneo

– Izneil Nashriq & Indraneil Das, Pp. 18792–18799

***Aborichthys barapensis*, a new species of river loach (Cypriniformes: Nemacheilidae) from Arunachal Pradesh, the eastern Himalaya, India**

– P. Nanda & L. Tamang, Pp. 18800–18808

A study on the community structure of damselflies (Insecta: Odonata: Zygoptera) in Paschim Medinipur, West Bengal, India

– Pathik Kumar Jana, Priyanka Halder Mallick & Tanmay Bhattacharya, Pp. 18809–18816

New distribution and range extension records of geometrid moths (Lepidoptera: Geometridae) from two western Himalayan protected areas

– Pritha Dey & Axel Hausmann, Pp. 18817–18826

Butterfly diversity of Putalibazar Municipality, Syangja District, Gandaki Province, Nepal

– Kismat Neupane & Mahamad Sayab Miya, Pp. 18827–18845

New records and distribution extension of *Nassarius persicus* (Martens, 1874) and *N. tadajillii* Moolenbeek, 2007 (Mollusca: Gastropoda: Nassariidae) to India

– Sayali Nerurkar & Deepak Apte, Pp. 18846–18852

Flowering plants of Agumbe region, central Western Ghats, Karnataka, India

– G.S. Adithya Rao & Y.L. Krishnamurthy, Pp. 18853–18867

Population assessment and habitat distribution modelling of the threatened medicinal plant *Picrorhiza kurroa* Royle ex Benth. in the Kumaun Himalaya, India

– Naveen Chandra, Gajendra Singh, Shashank Lingwal, M.P.S. Bisht & Lalit Mohan Tewari, Pp. 18868–18877

Occurrence of gilled fungi in Puducherry, India

– Vadivelu Kumaresan, Chakravarthy Sariha, Thokur Sreepathy Murali & Gunasekaran Senthilarasu, Pp. 18878–18887

Short Communications

First photographic evidence and distribution of the Indian Pangolin *Manis crassicaudata* (Mammalia: Pholidota: Manidae) in Sariska Tiger Reserve, Rajasthan, India

– Hemant Singh, Gobind Sagar Bhardwaj, N. Gokulakannan, Saket Agasti & K. Aditya, Pp. 18888–18893

Population and conservation threats to the Greater Flamingos *Phoenicopterus roseus* (Aves: Phoenicopteriformes: Phoenicopteridae) at Basai Wetland and Najafgarh Jheel Bird Sanctuary, Haryana, India

– Amit Kumar & Sarita Rana, Pp. 18894–18898

First report on the occurrence of Sargassum Weed Fish *Histrio histrio* (Lophiliformes: Antennariidae) in Nigeria deep water, Gulf of Guinea

– Abdul-Rahman Dirisu, Hanson S. Uyi & Meshack Uyi, Pp. 18899–18902

A new distribution record of stomatopods *Odontodactylus japonicus* (De Haan, 1844) and *Lysiosquilla tredecimdentata* (Holthuis, 1941) from the Puducherry coastal waters, east coast of India

– S. Nithya Mary, V. Ravitchandirane & B. Gunalan, Pp. 18903–18907

New records of *Agriocnemis keralensis* Peters, 1981 and *Gynacantha khasiaca* MacLachlan, 1896 (Insecta: Odonata) from Maharashtra, India

– Yogesh Koli, Akshay Dalvi & Dattaprasad Sawant, Pp. 18908–18919

A new distribution record of the Horn Coral *Caryophyllia grandis* Gardiner & Waugh, 1938 (Anthozoa: Scleractinia) from the Karnataka Coast, India

– J.S. Yogesh Kumar & C. Raghunathan, Pp. 18920–18924

Re-collection, extended distribution, and amplified description of *Vaccinium paucicrenatum* Sleumer (Ericaceae) from the Arunachal Himalaya in India

– Subhasis Panda, Pp. 18925–18932

Notes

Photographic record of the Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in southern Western Ghats, India

– Devika Sanghamithra & P.O. Nameer, Pp. 18933–18935

Natural history notes on the highly threatened Pinto's Chachalaca *Ortalis remota* (Aves: Cracidae)

– Carlos Otávio Araujo Gussoni & Marco Aurélio Galvão da Silva, Pp. 18936–18938

Black-bellied Coral Snake *Sinomicrurus nigriventer* (Wall, 1908) (Elapidae): an extended distribution in the western Himalaya, India

– Sipu Kumar, Jignasu Dolia, Vartika Chaudhary, Amit Kumar & Abhijit Das, Pp. 18939–18942

First record of the Afghan Poplar Hawkmoth *Loathoe witti* Eitschberger et al., 1998 (Sphingidae: Smerinthinae) from India: a notable range extension for the genus

– Muzafar Riyaz, Pratheesh Mathew, Taslima Shiekh, S. Ignacimuthu & K. Sivasankaran, Pp. 18943–18946

The tribe Cnodalonini (Coleoptera: Tenebrionidae: Stenochiinae) from Maharashtra with two new records

– V.D. Hegde & D. Vasanthakumar, Pp. 18947–18948

Do predatory adult odonates estimate their adult prey odonates' body size and dispersal ability to proceed with a successful attack?

– Tharaka Sudesh Priyadarshana, Pp. 18949–18952

Rediscovery of *Ophiorrhiza incarnata* C.E.C. Fisch. (Rubiaceae) from the Western Ghats of India after a lapse of 83 years

– Perumal Murugan, Vellingiri Ravichandran & Chidambaram Murugan, Pp. 18953–18955

Response

Comments on the "A checklist of mammals with historical records from Darjeeling-Sikkim Himalaya landscape, India"

– P.O. Nameer, Pp. 18956–18958

Publisher & Host

