10.11609/jott.2024.16.6.25283-25494 www.threatenedtaxa.org

conservation globally Journal of Threatened Taxa

26 June 2024 (Online & Print) 16(6): 25283-25494 ISSN 0974-79t07 (Online) ISSN 0974-7893 (Print)



Open Access



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

Publisher

Wildlife Information Liaison Development Society www.wild.zooreach.org Host Zoo Outreach Organization www.zooreach.org

43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India Ph: +91 9385339863 | www.threatenedtaxa.org

Email: sanjay@threatenedtaxa.org

EDITORS

Founder & Chief Editor

Dr. Sanjay Molur

Wildlife Information Liaison Development (WILD) Society & Zoo Outreach Organization (ZOO), 43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India

Deputy Chief Editor

Dr. Neelesh Dahanukar Noida, Uttar Pradesh, India

Managing Editor

Mr. B. Ravichandran, WILD/ZOO, Coimbatore, Tamil Nadu 641006, India

Associate Editors

Dr. Mandar Paingankar, Government Science College Gadchiroli, Maharashtra 442605, India Dr. Ulrike Streicher, Wildlife Veterinarian, Eugene, Oregon, USA Ms. Priyanka Iyer, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India Dr. B.A. Daniel, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Editorial Board

Dr. Russel Mittermeier

Executive Vice Chair, Conservation International, Arlington, Virginia 22202, USA

Prof. Mewa Singh Ph.D., FASc, FNA, FNASc, FNAPsy

Ramanna Fellow and Life-Long Distinguished Professor, Biopsychology Laboratory, and Institute of Excellence, University of Mysore, Mysuru, Karnataka 570006, India; Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore; and Adjunct Professor, National Institute of Advanced Studies, Bangalore

Stephen D. Nash

Scientific Illustrator, Conservation International, Dept. of Anatomical Sciences, Health Sciences Center, T-8, Room 045, Stony Brook University, Stony Brook, NY 11794-8081, USA

Dr. Fred Pluthero

Toronto, Canada

Dr. Priya Davidar

Sigur Nature Trust, Chadapatti, Mavinhalla PO, Nilgiris, Tamil Nadu 643223, India

Dr. Martin Fisher

Senior Associate Professor, Battcock Centre for Experimental Astrophysics, Cavendish Laboratory, JJ Thomson Avenue, Cambridge CB3 0HE, UK

Dr. John Fellowes

Honorary Assistant Professor, The Kadoorie Institute, 8/F, T.T. Tsui Building, The University of Hong Kong, Pokfulam Road, Hong Kong

Prof. Dr. Mirco Solé

Universidade Estadual de Santa Cruz, Departamento de Ciências Biológicas, Vice-coordenador do Programa de Pós-Graduação em Zoologia, Rodovia Ilhéus/Itabuna, Km 16 (45662-000) Salobrinho. Ilhéus - Bahia - Brasil

Dr. Rajeev Raghavan

Professor of Taxonomy, Kerala University of Fisheries & Ocean Studies, Kochi, Kerala, India

English Editors

Mrs. Mira Bhojwani, Pune, India Dr. Fred Pluthero, Toronto, Canada Mr. P. Ilangovan, Chennai, India Ms. Sindhura Stothra Bhashyam, Hyderabad, India

Web Development

Mrs. Latha G. Ravikumar, ZOO/WILD, Coimbatore, India

Typesetting

Mrs. Radhika, ZOO, Coimbatore, India Mrs. Geetha, ZOO, Coimbatore India Fundraising/Communications Mrs. Payal B. Molur, Coimbatore, India

Subject Editors 2020–2022

Fungi

- Dr. B. Shivaraju, Bengaluru, Karnataka, India
- Dr. R.K. Verma, Tropical Forest Research Institute, Jabalpur, India
- Dr. Vatsavaya S. Raju, Kakatiay University, Warangal, Andhra Pradesh, India Dr. M. Krishnappa, Jnana Sahyadri, Kuvempu University, Shimoga, Karnataka, India
- Dr. K.R. Sridhar, Mangalore University, Mangalagangotri, Mangalore, Karnataka, India
- Dr. Gunjan Biswas, Vidyasagar University, Midnapore, West Bengal, India
- Dr. Kiran Ramchandra Ranadive, Annasaheb Magar Mahavidyalaya, Maharashtra, India

Plants

- Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
- Dr. N.P. Balakrishnan, Ret. Joint Director, BSI, Coimbatore, India
- Dr. Shonil Bhagwat, Open University and University of Oxford, UK
- Prof. D.J. Bhat, Retd. Professor, Goa University, Goa, India
- Dr. Ferdinando Boero, Università del Salento, Lecce, Italy
- Dr. Dale R. Calder, Royal Ontaro Museum, Toronto, Ontario, Canada
- Dr. Cleofas Cervancia, Univ. of Philippines Los Baños College Laguna, Philippines
- Dr. F.B. Vincent Florens, University of Mauritius, Mauritius
- Dr. Merlin Franco, Curtin University, Malaysia
- Dr. V. Irudayaraj, St. Xavier's College, Palayamkottai, Tamil Nadu, India
- Dr. B.S. Kholia, Botanical Survey of India, Gangtok, Sikkim, India
- Dr. Pankaj Kumar, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas, USA.
- Dr. V. Sampath Kumar, Botanical Survey of India, Howrah, West Bengal, India
- Dr. A.J. Solomon Raju, Andhra University, Visakhapatnam, India
- Dr. Vijayasankar Raman, University of Mississippi, USA Dr. B. Ravi Prasad Rao, Sri Krishnadevaraya University, Anantpur, India
- Dr. K. Ravikumar, FRLHT, Bengaluru, Karnataka, India
- Dr. Aparna Watve, Pune, Maharashtra, India
- Dr. Qiang Liu, Xishuangbanna Tropical Botanical Garden, Yunnan, China
- Dr. Noor Azhar Mohamed Shazili, Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia
- Dr. M.K. Vasudeva Rao, Shiv Ranjani Housing Society, Pune, Maharashtra, India
- Prof. A.J. Solomon Raju, Andhra University, Visakhapatnam, India
- Dr. Mandar Datar, Agharkar Research Institute, Pune, Maharashtra, India
- Dr. M.K. Janarthanam, Goa University, Goa, India
- Dr. K. Karthigeyan, Botanical Survey of India, India
- Dr. Errol Vela, University of Montpellier, Montpellier, France
- Dr. P. Lakshminarasimhan, Botanical Survey of India, Howrah, India
- Dr. Larry R. Noblick, Montgomery Botanical Center, Miami, USA Dr. K. Haridasan. Pallavur. Palakkad District. Kerala. India
- Dr. Analinda Manila-Fajard, University of the Philippines Los Banos, Laguna, Philippines
- Dr. P.A. Sinu, Central University of Kerala, Kasaragod, Kerala, India
- Dr. Afroz Alam, Banasthali Vidyapith (accredited A grade by NAAC), Rajasthan, India
- Dr. K.P. Rajesh, Zamorin's Guruvayurappan College, GA College PO, Kozhikode, Kerala, India
- Dr. David E. Boufford, Harvard University Herbaria, Cambridge, MA 02138-2020, USA
- Dr. Ritesh Kumar Choudhary, Agharkar Research Institute, Pune, Maharashtra, India
- Dr. A.G. Pandurangan, Thiruvananthapuram, Kerala, India

Dr. Navendu Page, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand, India Dr. Kannan C.S. Warrier, Institute of Forest Genetics and Tree Breeding, Tamil Nadu, India

Invertebrates

- Dr. R.K. Avasthi, Rohtak University, Haryana, India
- Dr. D.B. Bastawade, Maharashtra, India
- Dr. Partha Pratim Bhattacharjee, Tripura University, Suryamaninagar, India
- Dr. Kailash Chandra, Zoological Survey of India, Jabalpur, Madhya Pradesh, India
- Dr. Ansie Dippenaar-Schoeman, University of Pretoria, Queenswood, South Africa Dr. Rory Dow, National Museum of natural History Naturalis, The Netherlands
- Dr. Brian Fisher, California Academy of Sciences, USA
- Dr. Richard Gallon, llandudno, North Wales, LL30 1UP
- Dr. Hemant V. Ghate, Modern College, Pune, India
- Dr. M. Monwar Hossain, Jahangirnagar University, Dhaka, Bangladesh

*******	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	- 1
•	continued on the back inside cove	er
Į	Cover: Emperor Tamarin Saquinus imperator: a look into a better world through the mustache lens – mixed media illustration. © Maya Santhanakrishnan.	1

.....

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 June 2024 | 16(6): 25299-25304

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print) https://doi.org/10.11609/jott.8949.16.6.25299-25304

#8949 | Received 07 February 2024 | Final received 05 April 2023 | Finally accepted 04 June 2024



Empirical evidence of Tiger *Panthera tigris* (Mammalia: Carnivora: Felidae) dispersal towards south from Similipal Tiger Reserve to Kuldiha Wildlife Sanctuary: potential implications for its conservation in the Greater Similipal Landscape

Harshvardhan Singh Rathore ¹, Jagyandatt Pati ², Samrat Gowda ³, D.N. Sai Kiran ⁴, M. Yogajayananda ⁵, Yadvendradev V. Jhala ⁶, Manoj V. Nair ⁷, Bivash Pandav ⁸, Samrat Mondol ⁹

^{1,6,8,9} Wildlife Institute of India, Chandrabani, Dehradun Uttarakhand 248001, India.

^{2,3,4,5,7} Odisha Forest Department, PCCF Office, 8R69+QQF, Maitri Vihar, Nalco Nagar, Chandrasekharpur, Bhubaneswar,

Odisha 751023, India.

¹harshrathore691@gmail.com, ²drjdifs@gmail.com, ³samrat1120@gmail.com, ⁴saikirandn21@gmail.com, ⁵yogajayanandifs@gmail.com, ⁶yvjhala@gmail.com, ⁷nairmanojvasudevan@gmail.com, ⁸bivash.pandav@wii.gov.in, ⁹samrat@wii.gov.in (corresponding author)

Abstract: India has achieved a rare global conservation success by doubling its Tiger *Panthera tigris* number since 2006. However, in India's east-central states of Odisha, Chhattisgarh, and Jharkhand the tiger numbers are declining. The tiger population in Odisha is largely confined to Similipal Tiger Reserve which represents the only known breeding population of a genetically unique wild melanistic form. We report a first empirically confirmed tiger dispersal event towards the south between Similipal Tiger Reserve and adjacent Kuldiha Wildlife Sanctuary as part of our intensive monitoring exercise conducted from 2019–2022. This evidence-based dispersal event confirms tiger presence in Kuldiha after 11 recent years and urges strong support for tiger conservation in the Greater Similipal Landscape. In order to ensure long-term tiger presence in this landscape, we suggest more rigorous management interventions like habitat restoration and management, prey recovery, intensive protection measures, conflict management, and creation of inviolate space.

Keywords: Eastern Ghats Landscape, east-central tiger population, functional corridor, habitat integrity, Hadgarh Wildlife Sanctuary, human-tiger conflict mitigation, melanistic tiger population, metapopulation dynamics, prey recovery, systematic camera-trapping

Editor: L.A.K. Singh, Bhubaneswar, Odisha, India.

Date of publication: 26 June 2024 (online & print)

Citation: Rathore, H.S., J. Pati, S. Gowda, D.N.S. Kiran, M. Yogajayananda, Y.V. Jhala, M.V. Nair, B. Pandav & S. Mondol (2024). Empirical evidence of Tiger *Panthera tigris* (Mammalia: Carnivora: Felidae) dispersal towards south from Similipal Tiger Reserve to Kuldiha Wildlife Sanctuary: potential implications for its conservation in the Greater Similipal Landscape. *Journal of Threatened Taxa* 16(6): 25299–25304. https://doi.org/10.11609/jott.8949.16.6.25299-25304

Copyright: © Rathore et al. 2024. 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: Funding for this work has been provided by the National Tiger Conservation Authority, Government of India through the Odisha Forest Department.

Competing interests: The authors declare no competing interests.

Author details: See end of this article.

Author contributions: All enlisted authors have collaborated in developing and designing the paper. Data generation, data curation, formal analysis, validation, visualization, writing original draft, writing-review and editing [Harshvardhan Singh Rathore]. Data curation, writing - review and editing [Jagyandatt Pati, Samrat Gowda, Sai Kiran DN, M. Yogajayananda, Yadvendradev V. Jhala, Manoj Nair]. Conceptualization, writing-review and editing, supervision, funding acquisition [Bivash Pandav]. Conceptualization, resources, writing - original draft, writing -review and editing, supervision, funding acquisition [Samrat Mondol].

Acknowledgements: We thank the Odisha Forest Department for providing the necessary permission (Letter no: 10451/4WL-630/2018) and logistic support during the fieldwork. We also thank the director, dean, and research co-ordinator of the Wildlife Institute of India for providing us with facilities and infrastructure. We greatly acknowledge Mr. Bidya Sagar, Mr. Diganta Sovan, Mr. Pradeep Dey, Mr. Samresh Biswal, and Mr. Susanta Jena for providing their valuable assistance in the field. A special thanks to Mr. Saifuddin Mallik and Mr. Anil Fartyal for their invaluable assistance in preparing the map. Mr. Buddhram Naik, Mr. Laxman Dalei, and the frontline staff of Similipal Tiger Reserve and Kuldiha Wildlife Sanctuary are acknowledged for their assistance in the field.



INTRODUCTION

The Tiger Panthera tigris is an endangered large carnivore (Goodrich et al. 2022) that exemplifies conservation efforts worldwide. India has achieved a rare conservation achievement by implementing a strong 50-year conservation program (MoEF&CC 2023). The tiger numbers got more than doubled from a population estimate of 1411 (1165-1675) in 2006 to 3682 (3439-3925) in 2022 (Jhala et al. 2008; Qureshi et al. 2023). However, the future of these tiger populations depends on careful management of the remaining forested habitats, where they are expected to face challenges from rapid urbanisation, increasing human density, expanding agriculture and associated infrastructure development and economic growth (Gubbi et al. 2016). In the Indian scenario, it is even more important as majority of the extant protected areas (PAs) are fragmented and all the tiger landscapes of the country have not experienced similar levels of population recovery. For example, the Central-India and Eastern Ghat landscapes currently retains ~40% of India's wild tiger population inside largely fragmented wildlife habitats (Jhala et al. 2020). This landscape has experienced substantial increase in tiger abundance from 2014 to 2022, except in the east-central states of Odisha, Chhattisgarh, and Jharkhand (Jhala et al. 2021; Qureshi et al. 2023). The small, isolated tiger populations of this landscape currently face various ecological, demographic, and genetic challenges (Seidensticker 2016).

The tiger population in Odisha, in particular, is of specific conservation interest as they represent a genetically unique lineage of melanistic form in the wild (Singh 1999; Kolipakam et al. 2019; Sagar et al. 2021). Similipal Tiger Reserve (STR- 2750 km² area) in Odisha currently reports the only known breeding population of the melanistic wild tigers globally (Rathore et al. 2021) and has been identified as one of the 42 source populations of tigers in Asia (Walston et al. 2010). Historically, tigers were found across STR along with surrounding PA's of Kuldiha Wildlife Sanctuary (KWS-272.75 km² area), Hadagarh Wildlife Sanctuary (HWS-191.40 km² area) and in Satkosia Tiger Reserve (SkTR-963 km² area). However, the tigers have gone locally extinct from KWS (the last Tiger died in 2009- Panda 2019), HWS (the last Tiger died in 2014), and SkTR (Qureshi et al. 2023). An intensive camera-trap based study conducted over a duration of eight months in 2013 failed to report tiger presence in KWS (Debata & Swain 2018), making STR as the only hope for this unique population as well as in the east-central landscape.

Such recent events of local extinctions and declining tiger occupancy (between 2006–2022) (Qureshi et al. 2023) demands appropriate long-term conservation strategies through landscape-level approaches to ensure future tiger survival. The expansion of tiger occupancy along with ensured connectivity between the remnant habitats is critical for their future persistence in this landscape. Here, we present empirical evidence of a tiger dispersal from STR to KWS and discuss potential measures to be undertaken for increasing tiger occupancy in Greater Similipal (Similipal-Hadagarh-Kuldiha) Landscape.

MATERIAL AND METHODS

Study Area

The study was conducted across STR and KWS, located within the Deccan Peninsula Biogeographic Zone (Rodgers & Panwar 1988). Both areas feature tropical moist deciduous, tropical dry deciduous, and tropical semi-evergreen forest types (Champion & Seth 1968). The major large carnivores include Tigers, Leopards Panthera pardus, Indian Wolves Canis lupus, Asiatic Wild Dogs Cuon alpinus, Sloth Bears Melursus ursinus, and Striped Hyenas Hyaena hyaena. The ungulate prey community consists of Chital Axis axis, Sambar Rusa unicolor, Gaur Bos gaurus, Northern Red Muntjac Muntiacus vaginalis, Indian Chevrotain Moschiola indica, Four-horned Antelope Tetracerus quadricornis, and Wild Boar Sus scrofa. The Asiatic Elephant Elephas maximus is also present in both protected areas (Nayak 2014; Panda 2019).

STR and KWS are connected by two corridors along the northern and southern parts of the Salandi reservoir (Nayak 2014; Menon et al. 2017; Figure 1). The Similipal-Kuldiha corridor traverses the northern part of the Salandi reservoir along HWS and connects to a thin strip of reserve forest (ranging 0.3–2 km in width). This region is part of a proposed elephant corridor and contains six densely populated villages (Nayak 2014; Menon et al. 2017) and 97 temporarily defunct stone quarries. The forest has experienced encroachment pressures from nearby villages, posing a significant conservation challenge (Menon et al. 2017; Panda 2019)

Camera Trapping

As part of an ongoing tiger assessment program, 1,526 motion sensor camera-trap stations were placed and systematically monitored in STR from 2019 to

Empírical evidence of *Panthera tigris* in Greater Similipal Landscape

Rathore et al. 🖉 🞆



Figure 1. Map of Similipal-Hadagarh-Kuldiha protected area complex along with the biological corridors and the Tiger (T21) photo-capture locations in the years 2019, and 2020 in STR and 2021–2022 in KWS.

2022. Camera trapping was conducted in the entire core of STR following the national guideline of a 2 km² grid design to cover the intensive study area (NTCA-WII 2018). All the digitally stamped (with date and time of capture inforamtion) tiger photographs were identified and seperated out from the entire data set. The individual tiger identification was performed by using the software ExtractCompare (Hiby et al. 2009). Genetalia and secondary sexual characters (such as nipples for females) were used to ascertain the gender of the individual tigers in the four-year dataset.

Initially, KWS was not part of this monitoring effort, as no tiger signs were recorded here over last decade (Panda 2019). During December 2021, local department officials reported presence of possible tiger pugmarks in KWS and immediately a monitoring exercise was planned. An intensive large carnivore sign survey was conducted across KWS based on the reports from the ground staff members. Eighteen sites (forest roads, animal trails and trail junctions etc.) were selected with high potential of tiger presence for deploying cameratraps. Subsequently, single-sided camera traps were placed in all these sites from 22 December 2021 to 27 January 2022. The cameras were kept active throughout the day and regularly monitored. The tiger photos captured in these cameras were compared with the available tiger photograph repository from STR (Rathore et al. 2021) using ExtractCompare (Hiby et al. 2009). The results were further validated by three independent trained personnel. The age-class category assessments was conducted by using all earlier camera-trap records of the individual following Sadhu et al. (2017).

RESULTS

Two tiger images were obtained from all the camera traps deployed in KWS (Image 1c,d). The images were captured on 24 December 2021 and 8 January 2022, respectively. Both images were ascertained to be from one young-adult male tiger, which later matched with a cub (named as T21, Image 1a) earlier photographed



Image 1. Images of tiger (T21): a—photo-captured as a cub in 2019 | b—juvenile in 2020 in STR | c—Right flank | d—and left flank of T21 photo-captured in KWS in 2021–2022.

in UBK range of STR in 2019. T21 was photographed till September 2020 in the same range (Image 1b) before finally photo-captured in KWS in 2021. This dispersal event confirmed tiger presence in KWS after 11 years and indicates the possibility of an active corridor between these two PAs, where STR can be considered as the source and KWS as a sink habitat.

DISCUSSION

The STR tiger population has experienced a recent population increase from 12 ± 1 individuals in 2018 (Jhala et al. 2020) to 20 \pm 2.47 individuals in 2022 (Qureshi et al. 2023). We feel that the recent tiger dispersal is possibly driven by the displacement of young individuals from STR to KWS as a result of the increase in tiger numbers. It is important to point out that although the growth of human habitation and mining activities in this space has ecologically separated Kuldiha from Similipal, but tiger movement link exists through Hadgarh WS. Our results provide empirical evidence of tiger dispersal to this protected area, which was earlier suggested by Singh (2021). If such a rise is continued then more such events can be anticipated across the Greater Similipal Landscape, and therefore appropriate steps towards managing this region need to be planned.

PAs connected through corridors in a metapopulation frameworkare currently the foundation for contemporary tiger conservation initiatives (Seidensticker 2016). Considering the evolutionary importance of the STR Tiger population, their demographic and genetic challenges, and isolated habitats, maintaining the integrity of the larger Similipal-Hadagarh-Kuldiha complex will be extremely critical. Firstly, urgent management attention is warranted toward habitat restoration of both the Similipal-Kuldiha and Hadagarh-Kuldiha corridors. One of the most effective ways to achieve this would be to include HWS, KWS, and the reserve forests (RF) in this corridor within a potential revised STR boundary, where the added areas could become part of the extended buffer area of STR, where a synchronized management

Empirical evidence of *Panthera tigris* in Greater Similipal Landscape

plan can be implemented. Further, adequate attention towards prey recovery throughout the entire region is required, where habitat management efforts aimed at increasing large ungulate densities would be beneficial for potential tiger recovery as the relative abundance of prey species is very low in KWS (Debata & Swain 2018) and HWS (Palei et al. 2021). The prey density estimation exercises should be conducted regularly in KWS and HWS to track ungulate biomass availability. Illegal hunting/poaching of ungulate prey has been reported in KWS (Panda 2019) and thus intensive monitoring of their population and protection measures will be crucial for tiger recovery. In this regard, implementation of regular anti-poaching patrolling using MSTriPES (Monitoring System of Tigers- Intensive Protection and Ecological Status; https://www.project-tiger.in/) would be essential. Similarly, government-supported incentivized voluntary human settlement relocation programs will improve the habitat productivity for ungulates and would play a vital role in successful tiger repopulation in KWS and HWS. Further, attention and necessary planning towards addressing potential human-tiger negative interactions is also needed. There are 12 villages within KWS with a human population of 17,000 and a large population of livestock (Panda 2019). Considering the fragmented nature of this area and such high human presence surrounding the PAs, increasing human-tiger interactions can be expected in the near future. Tigers are known to traverse through agricultural landscapes (Habib et al. 2021), often leading to such conflict situations. For conflict mitigation, active management efforts like timely compensation plans, participatory management efforts, etc., need to be in place to reduce any chances of retaliatory tiger deaths.

It is important to point out that our data is suggestive of this active corridor between STR and KWS, as no direct evidence was available to prove tiger use of these corridors. We suggest regular monitoring and assessment programs through intensive field surveys and camera-trapping approaches to assess the prey diversity, density, habitat use, and movement patterns across KWS, HWS, and the corridor regions.

The tiger populations in the east-central region of the central-India and Eastern Ghat landscape are facing adverse impacts from various human interventions across their habitats. The STR tigers are showing encouraging dispersal signatures with surrounding habitats. We believe that the dispersal event presented in this paper should be used to prepare an appropriate and focused management plan aiming at maintaining the source-sink population dynamics thereby assisting in long-term persistence of this evolutionary unique tiger lineage in Kuldiha and Hadgarh sanctuaries.

REFERENCES

- Champion, H.G. & S.K. Seth (1968). A Revised Survey of The Forest Types of India. Government of India Press, New Delhi, India, 404 pp.
- Debata, S. & K.K. Swain (2018). Estimating mammalian diversity and relative abundance using camera traps in a tropical deciduous forest of Kuldiha Wildlife Sanctuary, eastern India. *Mammal Study* 43(1): 45–53. https://doi.org/10.3106/ms2017-0078
- Goodrich, J., H. Wibisono, D. Miquelle, A.J. Lynam, E. Sanderson, S. Chapman, T.N.E. Gray, P. Chanchani & A. Harihar (2022). *Panthera tigris*. The IUCN Red List of Threatened Species 2022: e.T15955A214862019. https://doi.org/10.2305/IUCN.UK.2022-1. RLTS.T15955A214862019.en. Accessed on 05 October 2023.
- Gubbi, S., K. Mukherjee, M.H. Swaminath & H.C. Poornesha (2016). Providing more protected space for tigers Panthera tigris: a landscape conservation approach in the Western Ghats, southern India. Oryx 50(2): 336–343. https://doi.org/10.1017/ S0030605314000751
- Habib, B., P. Ghaskadbi, S. Khan, Z. Hussain & P. Nigam (2021). Not a cakewalk: Insights into movement of large carnivores in humandominated landscapes in India. *Ecology and Evolution* 11(4): 1653– 1666. https://doi.org/10.1002/ece3.7156
- Hiby, L., P. Lovell, N. Patil, N.S. Kumar, A.M. Gopalaswamy & K.U. Karanth (2009). A tiger cannot change its stripes: using a threedimensional model to match images of living tigers and tiger skins. *Biology Letters* 5(3): 383–386.
- Jhala, Y.V., R. Gopal & Q. Qureshi (eds.) (2008). Status of Tigers, Copredators and Prey in India by National Tiger Conservation Authority and Wildlife Institute of India. TR08/001 164 pp. https://ntca.gov. in/assets/uploads/Reports/AITM/Statusof_Tigers2008.pdf.
- Jhala, Y.V., Q. Qureshi & A.K. Nayak (eds.) (2020). Status of tigers, copredators and prey in India, 2018. National Tiger Conservation Authority, Government of India, New Delhi, and Wildlife Institute of India, Dehradun. https://ntca.gov.in/assets/uploads/Reports/ AITM/Tiger_Status_Report_2018.pdf.
- Jhala, Y.V., R. Gopal, V. Mathur, P. Ghosh, H.S. Negi, S. Narain, S.P. Yadav, A. Malik, R. Garawad & Q. Qureshi (2021). Recovery of tigers in India: Critical introspection and potential lessons. *People and Nature* 3(2): 281–293. https://doi.org/10.1002/pan3.10177
- Kolipakam, V., S. Singh, B. Pant, Q. Qureshi & Y.V. Jhala (2019). Genetic structure of tigers (Panthera tigris tigris) in India and its implications for conservation. *Global Ecology and Conservation* 20: e00710. https://doi.org/10.1016/j.gecco.2019.e00710
- Menon, V., S.K. Tiwari, K. Ramkumar, S. Kyarong, U. Ganguly & R. Sukumar (2017). The right of Passage: Elephant Corridors of India. New Delhi: Wildlife Trust of India. https://www.wti.org.in/wpcontent/uploads/2017/08/pub_right_of_passage-1.pdf.
- **MoEFCC (2023).** Achievements of National Tiger Conservation Authority (NTCA) during the year 2023. Ministry of Environment, Forest and Climate Change. 29 Dec. 2023 by PIB, Delhi. https://pib. gov.in/PressReleasePage.aspx?PRID= 1991620.
- NTCA-WII (2018). Phase III Camera Trapping Protocol. National Tiger Conservation Authority-Wildlife Institute of India Technical Manual Number TR 2018/01. New Delhi & Dehradun.
- Nayak, A.K. (2014). Tiger Conservation Plan of Similipal Tiger Reserve, Odisha (2013–14 TO 2022–23). Odisha, India, Forest Department, Government of Odisha. https://www.similipal.org/images/ publication/STR-TCP%20Final_opt-1st.pdf.
- Palei, N.C., B.P. Rath, A.K. Satpathy, S.N. Acharya & R.K. Mohalik (2021). Ecological studies on wild carnivores and herbivores through camera trap in Hadgarh Wildlife Sanctuary, Odisha, India. *e-planet* 19(2): 187–195.

Panda, B. (2019). Management Plan of Kuldiha Wildlife Sanctuary,

Empirical evidence of *Panthera tigris* in Greater Similipal Landscape

2019–20 to 2028–29. Divisional Forest Officer, Balasore Wildlife Division, Balasore, Odisha, India, Government of Odisha.

- Qureshi, Q., Y.V. Jhala, S.P. Yadav & A. Mallick (eds.) (2023). Status of tigers, co-predators and prey in India, 2022. National Tiger Conservation Authority, Government of India, New Delhi, and Wildlife Institute of India, Dehradun.
- Rathore, H.S., B. Pandav, S. Mondol, M. Nair, B. Habib, D. Swain, S.P. Yadav, M. Yogajayanand & J.D. Pati (2021). Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics. Interim Project Report. National Tiger Conservation Authority, Government of India, New Delhi, Odisha Forest Department and Wildlife Institute of India, Dehradun.
- Rodgers, W.A. & S.H. Panwar (1988). Planning a Wildlife Protected Area Network in India. Volume I. Wildlife Institute of India, New Forest, Dehra Dun, India, 339 pp.
- Sadhu, A., P.P.C. Jayam, Q. Qureshi, R.S. Shekhawat, S. Sharma & Y.V. Jhala (2017). Demography of a small, isolated tiger (Panthera tigris tigris) population in a semi-arid region of western India. *BMC Zoology* 2(1): 1–13. https://doi.org/10.1186/s40850-017-0025-y
- Sagar, V., C.B. Kaelin, M. Natesh, P.A. Reddy, R.K. Mohapatra, H. Chhattani, P. Thatte, S. Vaidyanathan, S. Biswas & S. Bhatt (2021). High frequency of an otherwise rare phenotype in a small and isolated tiger population. *Proceedings of the National Academy of Sciences* 118(39): e2025273118. https://doi. org/10.1073/pnas.2025273118
- Seidensticker, J. (2016). Biodiversity resilience in the Central Indian Highlands is contingent on maintaining and recovering landscape connectivity: the tiger as a case study. *Regional Environmental Change*. 16(Suppl 1): 167–179. https://doi.org/10.1007/s10113-015-0846-6

Singh, L.A.K. (1999). Born Black: The Melanistic tiger in India. WWF-India, New Delhi, viii+66 pp

- Singh, L.A.K. (2021). Southward Shifting of Tiger (*Panthera tigris*) Movement Areas in Similipal (1989–2002) indicating approach to Carrying Capacity. https://independent.academia.edu/ LalaAswiniKumarSingh. Downloaded on 03 June 2024.
- Walston, J., J.G. Robinson, E.L. Bennett, U. Breitenmoser, G.A. da Fonseca, J. Goodrich, M. Gumal, L. Hunter, A. Johnson & K.U. Karanth (2010). Bringing the tiger back from the brink—the six percent solution. *PLoS Biology* 8(9): e1000485. https://doi.org/10.1371/journal.pbio.1000485



Author details: HARSHVARDHAN SINGH RATHORE is a PhD scholar at the Wildlife Institute of India, Saurashtra University, Guiarat. His PhD work revolves around understanding aspects of ecology of large felids and their prey in Similipal Tiger Reserve, JAGYANDATT PATI serves as an Indian Forest Service (IFS) officer in the state of Odisha and had been the Deputy Director of Similipal Tiger Reserve. He is currently posted as Divisional Forest Officer (DFO) of Athagarh Forest Division. Odisha. SAMRAT GOWDA serves as an Indian Forest Service (IFS) officer in the state of Odisha and is currently serving as the Deputy Director of Similipal Tiger Reserve. D.N. SAI KIRAN serves as an Indian Forest Service (IFS) officer in the state of Odisha and is currently serving as the Deputy Director of Similipal Tiger Reserve. M. YOGAJAYANANDA serves as an Indian Forest Service (IFS) officer in the state of Odisha and has been the Field Director of Similipal Tiger Reserve, YADVENDRADEV V. JHALA has been the former Dean of the Wildlife Institute of India, Dehradun and is the Fellow of Indian National Science Academy. MANOJ V. NAIR serves as an Indian Forest Service (IFS) officer in the state of Odisha and is the Director of Nandankanan. He also holds additional charge of the Chief Conservator of Forests (Wildlife) and CE Chilika Development Authority. He is also one of the principal investigators of the current study and has also served as the Deputy Director of Similipal Tiger Reserve. BIVASH PANDAV serves as Scientist-G in the Wildlife Institute of India, Dehradun and has immense experience of working on large carnivores. He is also one of the principal investigator of the current study. SAMRAT MONDOL serves as Scientist-E in the Wildlife Institute of India, Dehradun and has immense experience of working on large carnivores. He specializes in molecular ecology and is also one of the principal investigator of the current study.

- Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.
- Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK
- Dr. George Mathew, Kerala Forest Research Institute, Peechi, India Dr. John Noyes, Natural History Museum, London, UK
- Dr. Albert G. Orr, Griffith University, Nathan, Australia
- Dr. Sameer Padhye, Katholieke Universiteit Leuven, Belgium
- Dr. Nancy van der Poorten, Toronto, Canada
- Dr. Kareen Schnabel, NIWA, Wellington, New Zealand
- Dr. R.M. Sharma, (Retd.) Scientist, Zoological Survey of India, Pune, India
- Dr. Manju Siliwal, WILD, Coimbatore, Tamil Nadu, India
- Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
- Dr. K.A. Subramanian, Zoological Survey of India, New Alipore, Kolkata, India Dr. P.M. Sureshan, Zoological Survey of India, Kozhikode, Kerala, India
- Dr. R. Varatharajan, Manipur University, Imphal, Manipur, India
- Dr. Eduard Vives, Museu de Ciències Naturals de Barcelona, Terrassa, Spain
- Dr. James Young, Hong Kong Lepidopterists' Society, Hong Kong
- Dr. R. Sundararaj, Institute of Wood Science & Technology, Bengaluru, India
- Dr. M. Nithyanandan, Environmental Department, La Ala Al Kuwait Real Estate. Co. K.S.C.,
- Kuwait Dr. Himender Bharti, Punjabi University, Punjab, India
- Mr. Purnendu Roy, London, UK
- Dr. Saito Motoki, The Butterfly Society of Japan, Tokyo, Japan
- Dr. Sanjay Sondhi, TITLI TRUST, Kalpavriksh, Dehradun, India
- Dr. Nguyen Thi Phuong Lien, Vietnam Academy of Science and Technology, Hanoi, Vietnam
- Dr. Nitin Kulkarni, Tropical Research Institute, Jabalpur, India
- Dr. Robin Wen Jiang Ngiam, National Parks Board, Singapore
- Dr. Lional Monod, Natural History Museum of Geneva, Genève, Switzerland.
- Dr. Asheesh Shivam, Nehru Gram Bharti University, Allahabad, India
- Dr. Rosana Moreira da Rocha, Universidade Federal do Paraná, Curitiba, Brasil Dr. Kurt R. Arnold, North Dakota State University, Saxony, Germany
- Dr. James M. Carpenter, American Museum of Natural History, New York, USA
- Dr. David M. Claborn, Missouri State University, Springfield, USA
- Dr. Kareen Schnabel, Marine Biologist, Wellington, New Zealand
- Dr. Amazonas Chagas Júnior, Universidade Federal de Mato Grosso, Cuiabá, Brasil
- Mr. Monsoon Jyoti Gogoi, Assam University, Silchar, Assam, India
- Dr. Heo Chong Chin, Universiti Teknologi MARA (UiTM), Selangor, Malaysia
- Dr. R.J. Shiel, University of Adelaide, SA 5005, Australia
- Dr. Siddharth Kulkarni, The George Washington University, Washington, USA
- Dr. Priyadarsanan Dharma Rajan, ATREE, Bengaluru, India
- Dr. Phil Alderslade, CSIRO Marine And Atmospheric Research, Hobart, Australia
- Dr. John E.N. Veron, Coral Reef Research, Townsville, Australia
- Dr. Daniel Whitmore, State Museum of Natural History Stuttgart, Rosenstein, Germany.
- Dr. Yu-Feng Hsu, National Taiwan Normal University, Taipei City, Taiwan
- Dr. Keith V. Wolfe, Antioch, California, USA Dr. Siddharth Kulkarni, The Hormiga Lab, The George Washington University, Washington,
- D.C., USA
- Dr. Tomas Ditrich, Faculty of Education, University of South Bohemia in Ceske Budejovice, Czech Republic
- Dr. Mihaly Foldvari, Natural History Museum, University of Oslo, Norway
- Dr. V.P. Uniyal, Wildlife Institute of India, Dehradun, Uttarakhand 248001, India
- Dr. John T.D. Caleb, Zoological Survey of India, Kolkata, West Bengal, India
- Dr. Priyadarsanan Dharma Rajan, Ashoka Trust for Research in Ecology and the Environment (ATREE), Royal Enclave, Bangalore, Karnataka, India

Fishes

- Dr. Neelesh Dahanukar, IISER, Pune, Maharashtra, India
- Dr. Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México
- Dr. Heok Hee Ng, National University of Singapore, Science Drive, Singapore
- Dr. Rajeev Raghavan, St. Albert's College, Kochi, Kerala, India
- Dr. Robert D. Sluka, Chiltern Gateway Project, A Rocha UK, Southall, Middlesex, UK
- Dr. E. Vivekanandan, Central Marine Fisheries Research Institute, Chennai, India
- Dr. Davor Zanella, University of Zagreb, Zagreb, Croatia
- Dr. A. Biju Kumar, University of Kerala, Thiruvananthapuram, Kerala, India
- Dr. Akhilesh K.V., ICAR-Central Marine Fisheries Research Institute, Mumbai Research Centre, Mumbai, Maharashtra, India
- Dr. J.A. Johnson, Wildlife Institute of India, Dehradun, Uttarakhand, India
- Dr. R. Ravinesh, Gujarat Institute of Desert Ecology, Gujarat, India

Amphibians

Dr. Sushil K. Dutta, Indian Institute of Science, Bengaluru, Karnataka, India Dr. Annemarie Ohler, Muséum national d'Histoire naturelle, Paris, France

- Reptiles
- Dr. Gernot Vogel, Heidelberg, Germany
- Dr. Raju Vyas, Vadodara, Gujarat, India
- Dr. Pritpal S. Soorae, Environment Agency, Abu Dubai, UAE.
- Prof. Dr. Wayne J. Fuller, Near East University, Mersin, Turkey Prof. Chandrashekher U. Rivonker, Goa University, Taleigao Plateau, Goa. India
- Dr. S.R. Ganesh, Chennai Snake Park, Chennai, Tamil Nadu, India

Dr. Himansu Sekhar Das, Terrestrial & Marine Biodiversity, Abu Dhabi, UAE

Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

Birds

- Dr. Hem Sagar Baral, Charles Sturt University, NSW Australia Mr. H. Byju, Coimbatore, Tamil Nadu, India Dr. Chris Bowden, Royal Society for the Protection of Birds, Sandy, UK Dr. Priya Davidar, Pondicherry University, Kalapet, Puducherry, India
- Dr. J.W. Duckworth, IUCN SSC, Bath, UK
- Dr. Rajah Jayapal, SACON, Coimbatore, Tamil Nadu, India
- Dr. Rajiv S. Kalsi, M.L.N. College, Yamuna Nagar, Haryana, India
- Dr. V. Santharam, Rishi Valley Education Centre, Chittoor Dt., Andhra Pradesh, India
- Dr. S. Balachandran, Bombay Natural History Society, Mumbai, India Mr. J. Praveen, Bengaluru, India
- Dr. C. Srinivasulu, Osmania University, Hyderabad, India
- Dr. K.S. Gopi Sundar, International Crane Foundation, Baraboo, USA
- Dr. Gombobaatar Sundev, Professor of Ornithology, Ulaanbaatar, Mongolia
- Prof. Reuven Yosef, International Birding & Research Centre, Eilat, Israel
- Dr. Taej Mundkur, Wetlands International, Wageningen, The Netherlands
- Dr. Carol Inskipp, Bishop Auckland Co., Durham, UK
- Dr. Tim Inskipp, Bishop Auckland Co., Durham, UK Dr. V. Gokula, National College, Tiruchirappalli, Tamil Nadu, India
- Dr. V. Gokula, National College, Tiruchirappalil, Tamii Nadu, India Dr. Arkady Lelej, Russian Academy of Sciences, Vladivostok, Russia
- Dr. Simon Dowell, Science Director, Chester Zoo, UK
- Dr. Mário Gabriel Santiago dos Santos, Universidade de Trás-os-Montes e Alto Douro,
- Quinta de Prados, Vila Real, Portugal
- Dr. Grant Connette, Smithsonian Institution, Royal, VA, USA
- Dr. P.A. Azeez, Coimbatore, Tamil Nadu, India

Mammals

- Dr. Giovanni Amori, CNR Institute of Ecosystem Studies, Rome, Italy
- Dr. Anwaruddin Chowdhury, Guwahati, India
- Dr. David Mallon, Zoological Society of London, UK
- Dr. Shomita Mukherjee, SACON, Coimbatore, Tamil Nadu, India
- Dr. Angie Appel, Wild Cat Network, Germany

Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India

Dr. Paul Bates, Harison Institute, Kent, UK

Altobello", Rome, Italy

Other Disciplines

Delhi, India

Reviewers 2021-2023

The Managing Editor, JoTT,

Tamil Nadu 641006, India ravi@threatenedtaxa.org

Dr. Mewa Singh, Mysore University, Mysore, India Dr. Paul Racey, University of Exeter, Devon, UK

Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India

Dr. Dan Challender, University of Kent, Canterbury, UK

- Dr. P.O. Nameer, Kerala Agricultural University, Thrissur, Kerala, India
- Dr. Ian Redmond, UNEP Convention on Migratory Species, Lansdown, UK
- Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA

Dr. Honnavalli N. Kumara, SACON, Anaikatty P.O., Coimbatore, Tamil Nadu, India

Dr. Justus Joshua, Green Future Foundation, Tiruchirapalli, Tamil Nadu, India

Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA

Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK

Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA

Dr. Hemanta Kafley, Wildlife Sciences, Tarleton State University, Texas, USA

Dr. Mandar S. Paingankar, University of Pune, Pune, Maharashtra, India (Molecular)

Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)

Dr. Rayanna Hellem Santos Bezerra, Universidade Federal de Sergipe, São Cristóvão, Brazil Dr. Jamie R. Wood, Landcare Research, Canterbury, New Zealand Dr. Wendy Collinson-Jonker, Endangered Wildlife Trust, Gauteng, South Africa

Dr. L.D. Singla, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India

Dr. S.S. Talmale, Zoological Survey of India, Pune, Maharashtra, India Prof. Karan Bahadur Shah, Budhanilakantha Municipality, Kathmandu, Nepal Dr. Susan Cheyne, Borneo Nature Foundation International, Palangkaraja, Indonesia

Dr. Aniruddha Belsare, Columbia MO 65203, USA (Veterinary)

Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)

Dr. Hari Balasubramanian, EcoAdvisors, Nova Scotia, Canada (Communities)

Dr. Rajeshkumar G. Jani, Anand Agricultural University, Anand, Gujarat, India Dr. O.N. Tiwari, Senior Scientist, ICAR-Indian Agricultural Research Institute (IARI), New

Dr. Rupika S. Rajakaruna, University of Peradeniya, Peradeniya, Sri Lanka Dr. Bahar Baviskar, Wild-CER, Nagpur, Maharashtra 440013, India

Due to pausity of space, the list of reviewers for 2021-2023 is available online.

The opinions expressed by the authors do not reflect the views of the

boundaries shown in the maps by the authors.

Print copies of the Journal are available at cost. Write to:

c/o Wildlife Information Liaison Development Society,

43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore,

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

Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India

Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe

Dr. Karin Schwartz, George Mason University, Fairfax, Virginia.





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 unless otherwise mentioned. JoTT allows 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 2024 | Vol. 16 | No. 6 | Pages: 25283–25494 Date of Publication: 26 June 2024 (Online & Print) DOI: 10.11609/jott.2024.16.6.25283-25494

www.threatenedtaxa.org

Articles

Measuring people's attitude towards conservation of Leopard Panthera pardus (Mammalia: Carnivora) in the foothills of Himalayan region – Megha Rani, Sujeet Kumar Singh, Maximilian L. Allen, Puneet Pandey & Randeep Singh, Pp. 25283–25298

Empirical evidence of Tiger *Panthera tigris* (Mammalia: Carnivora: Felidae) dispersal towards south from Similipal Tiger Reserve to Kuldiha Wildlife Sanctuary: potential implications for its conservation in the Greater Similipal Landscape

Harshvardhan Singh Rathore, Jagyandatt Pati, Samrat Gowda, D.N. Sai Kiran,
M. Yogajayananda, Yadvendradev V. Jhala, Manoj V. Nair, Bivash Pandav &
Samrat Mondol, Pp. 25299–25304

Philippine Warty Pig *Sus philippensis* Nehring, 1886: level of awareness and conservation practices in Datal Bad, West Lamidan, Don Marcelino, Davao Occidental, Philippines

– Pedro M. Avenido, Pp. 25305–25317

Understanding Human-Nilgai negative interactions in India: a systematic review through print media report analysis

– Chandrapratap Singh Chandel, Sangeeta Madan, Dhruv Jain, Lallianpuii Kawlni, Vishnupriya Kolipakam & Qamar Qureshi, Pp. 25318–25329

Harmonizing ecology and society: an integrated analysis of vulture

conservation in the Nilgiri Biosphere Reserve, India – S. Manigandan, H. Byju & P. Kannan, Pp. 25330–25344

Nesting habits of Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) on power and television cables in the agricultural landscape of Kallakurichi district, Tamil Nadu, India

- M. Pandian, Pp. 25345-25359

Factors influencing the occurrence of the House Sparrow Passer domesticus (Linnaeus, 1758) (Aves: Passeriformes: Passeridae) in Bhavnagar, Gujarat, India – Foram P. Patel, Pravinsang P. Dodia & Deven M. Mehta, Pp. 25360–25372

Waterbird diversity of Saman Wetland Complex in Uttar Pradesh: a crucial site for the India's National Action Plan on migratory birds – Omkar Joshi, Nisha Singh & P. Sathiyaselvam, Pp. 25373–25384

First record of two species of venomous snakes *Bungarus suzhenae* and *Ovophis zayuensis* (Serpentes: Elapidae, Viperidae) from India – Jason Dominic Gerard, Bitupan Boruah, V. Deepak & Abhijit Das, Pp. 25385–25399

Bio-ecology of the bush cricket *Tarbinskiellus portentosus* (Lichtenstein, 1796) (Insecta: Orthoptera: Gryllidae): a relished edible insect in Nagaland, India – Patricia Kiewhuo, Lirikum Jing, Bendang Ao & Lakhminandan Kakati, Pp. 25400–25409

Addition to the liverwort flora (Marchantiophyta) of Arunachal Pradesh, India – Nonya Chimyang, Pherkop Mossang, Anshul Dhyani, Heikham Evelin, Prem Lal Uniyal, Devendra Singh, Meghna Paul & S.K. Nasim Ali, Pp. 25410-25421

Communications

A preliminary assessment of the bat fauna (Mammalia: Chiroptera) of Murlen National Park, Mizoram, India: distribution, morphology, and echolocation – Uttam Saikia & Rohit Chakravarty, Pp. 25422–25432

First record of albinism in Lesser Woolly Horseshoe Bat *Rhinolophus beddomei* (Chiroptera: Rhinolophidae) with an updated list of chromatic aberrations in bats in India

- Pratiksha Sail & Manoj R. Borkar, Pp. 25433-25439

First record of *Garra kempi* Hora, 1921 (Cypriniformes: Cyprinidae) from Lohandra River of Nepal

– Jash Hang Limbu, Dipak Rajbanshi, Laxman Khanal & Ram Chandra Adhikari, Pp. 25440–25445

Earthworm (Oligochaeta) diversity of Kumaun Himalaya with a new record of *Drawida japonica* (Michaelsen, 1892) (Monaligastridae) from Nainital, Uttarakhand, India

– Shikha Bora, Deepak Chandra Melkani, Ajay Kumar, Mansi Arya, Kulbhushan Kumar, Netrapal Sharma & Satpal Singh Bisht, Pp. 25446–25452

Woody flora of Karumpuliyuthu Hill, Tenkasi, Tamil Nadu, India: a checklist – K. Lalithalakshmi, A. Selvam & M. Udayakumar, Pp. 25453–25460

Short Communications

First record of Croaking Gourami *Trichopsis vittata* (Cuvier, 1831) from West Bengal, India

- Sujal Dutta, Bakul Biswas & Bibhas Guha, Pp. 25461-25464

Lasioptera sharma, a new species of gall midge (Diptera: Cecidomyiidae) feeding on Leea indica (Vitaceae) in India

– Duraikannu Vasanthakumar, Rajiv Loganathan & Palanisamy Senthilkumar, Pp. 25465–25469

Epipogium Borkh. (Orchidaceae): a new generic record for Andhra Pradesh, India

- P. Janaki Rao, J. Prakasa Rao & S.B. Padal, Pp. 25470-25473

Physcomitrium eurystomum Sendtn. (Funariaceae): a rare species recorded for Assam, India

- Twinkle Chetia & Himu Roy, Pp. 25474-25477

Notes

First photographic evidence of Mainland Serow Capricornis sumatraensis thar (Bechstein, 1799) in Raimona National Park, Assam, India

– Dipankar Lahkar, Mohammad Firoz Ahmed, Bhanu Sinha, Pranjal Talukdar, Biswajit Basumatary, Tunu Basumatary, Ramie H. Begum, Nibir Medhi, Nitul Kalita & Abishek Harihar, Pp. 25478–25481

Design and field installation of automated electronic Asian Elephant signage for human safety

- Sanjoy Deb, Ramkumar Ravindran & Saravana Kumar Radhakrishnan, Pp. 25482-25485

First nesting record of Black-necked Stork *Ephippiorhynchus asiaticus* (Aves: Ciconiiformes) in Kumana National Park, Sri Lanka

– W.D.C.N. Gunathilaka, B.K.P.D. Rodrigo, D.M.A. Kumara, E.G.D.P. Jayasekara & W.A.D. Mahaulpatha, Pp. 25486–25488

Mugger Crocodile Crocodylus palustris (Lesson, 1831) predation on Brown Fish Owl Ketupa zeylonensis (J.F. Gmelin, 1788), with notes on existing literature regarding their predation on birds – Jon Hakim & Jack Pravin Sharma, Pp. 25489–25491

New distribution records of two jumping spiders of the genus *Stenaelurillus* Simon, 1886 (Araneae: Salticidae) from Gujarat, India

– Subhash I. Parmar, Pranav J. Pandya & Dhruv A. Prajapati, Pp. 25492–25494 Publisher & Host



Threatened Taxa