

Building evidence for conservation globally

10.11609/jott.2024.16.8.25639-25790

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

# Journal of Threatened TAXA

26 August 2024 (Online & Print)

16(8): 25639-25790

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)



Open Access





43/2 Varadarajulu Nagar, 5<sup>th</sup> 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](http://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, 5<sup>th</sup> 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, Mavinahalli 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 &amp; 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**, Kakatiya University, Warangal, Andhra Pradesh, India**Dr. M. Krishnappa**, Jnana Sahyadri, Kuvenpu 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. Ferdinand Boero**, Università del Salento, Lecce, Italy**Dr. Dale R. Calder**, Royal Ontario 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, Anantapur, 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 Ranjan Housing Society, Pune, Maharashtra, India**Prof. A.J. Solomon Raju**, Andhra University, Visakhapatnam, India**Dr. Mander 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. Lakshminarasiham**, 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 Baños, Laguna, Philippines**Dr. P.A. Siru**, 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**, Ilandudno, North Wales, LL30 1UP**Dr. Hemanth V. Ghate**, Modern College, Pune, India**Dr. M. Monwar Hossain**, Jahangirnagar University, Dhaka, BangladeshFor Focus, Scope, Aims, and Policies, visit [https://threatenedtaxa.org/index.php/JoTT/aims\\_scope](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](https://threatenedtaxa.org/index.php/JoTT/policies_various)

continued on the back inside cover

Cover: Watercolour illustrations—Striped Tiger *Danaus genutia*, Common Silverline *Cigaritis vulcanus*, Tamil Lacewing *Cethosia mahratta*. © Mayur Nandikar.



## Occurrence of a female melanistic leopard *Panthera pardus delacouri* (Linnaeus, 1758) (Mammalia: Carnivora: Felidae) in Ulu Sat Permanent Forest Reserve, Machang, Kelantan, Peninsular Malaysia from camera traps reconnaissance survey 2023

Wan Hafizin Idzni Wan Mohammad Hizam<sup>1</sup> , Muhammad Hamirul Shah Ab Razak<sup>2</sup> , Hazizi Husain<sup>3</sup> , Aainaa Amir<sup>4</sup>  & Kamarul Hambali<sup>5</sup> 

<sup>1–5</sup> Faculty of Earth Science, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

<sup>3</sup> Jabatan PERHILITAN Negeri Kelantan, Tingkat 12, Wisma Persekutuan, Jalan Bayam, 15664 Kota Bharu, Kelantan, Malaysia..

<sup>4,5</sup> Animal and Wildlife Research Group, Faculty of Earth Science, Universiti Malaysia Kelantan, Jeli Campus, 17600 Jeli, Kelantan, Malaysia.

<sup>5</sup> UMK-Tropical Rainforest Research Centre (UMK-TRaCe), Faculty of Earth Science, Pulau Banding, 33300, Gerik, Perak, Malaysia.

<sup>1</sup> e20a0509@siswa.umk.edu.my, <sup>2</sup> muhammadhamirulshah@yahoo.com, <sup>3</sup> hazizi@wildlife.gov.my, <sup>4</sup> syazwani@umk.edu.my,

<sup>5</sup> kamarul@umk.edu.my (corresponding author)

**Abstract:** The Indochinese leopard, *Panthera pardus delacouri* is classified as Critically Endangered in the Red List of Threatened Species by the International Union for Conservation of Nature (IUCN). The subspecies has been recorded for the first time in Ulu Sat Permanent Forest Reserve (USPFR). Camera trap records show the presence of a female melanistic leopard, which is of additional biological interest. It is hoped that these observations will stimulate long-term studies on leopards of USPFR and promote conservation efforts in the area.

**Keywords:** Biodiversity, camera trapping, carnivores, conservation, ecosystem, endangered species, felid conservation, forest ecology, habitat, monitoring, predators, wildlife.

**Malay abstrak:** Harimau bintang Indochina, *Panthera pardus delacouri* diklasifikasi sebagai Terancam Teruk dalam Senarai Merah Spesies Terancam oleh Kesatuan Antarabangsa bagi Pemuliharaan Alam Semula Jadi (IUCN). Subspesies ini telah direkodkan buat kali pertama di Hutan Simpan Kekal Ulu Sat (HSKUS). Rekod perangkap kamera menunjukkan kehadiran harimau bintang melanistik betina, yang mempunyai kepentingan biologi tambahan. Pemerhatian ini diharapkan dapat merangsang kajian jangka panjang mengenai harimau bintang di HSKUS dan menggalakkan usaha pemuliharaan di kawasan tersebut.

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

**Date of publication:** 26 August 2024 (online & print)

**Citation:** Hizam, W.H.I.W.M., M.H.S.A. Razak, H. Husain, A. Amir & K. Hambali (2024). Occurrence of a female melanistic leopard *Panthera pardus delacouri* (Linnaeus, 1758) (Mammalia: Carnivora: Felidae) in Ulu Sat Permanent Forest Reserve, Machang, Kelantan, Peninsular Malaysia from camera traps reconnaissance survey 2023. *Journal of Threatened Taxa* 16(8): 25737–25741. <https://doi.org/10.11609/jott.8981.16.8.25737-25741>

**Copyright:** © Hizam 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:** The Conservation, Food & Health Foundation (R/CFHF/A0800/00386A/005/2022/01062).

**Competing interests:** The authors declare no competing interests.

**Author details:** WAN HAFIZIN IDZNI WAN MOHAMMAD HIZAM is a graduate of the Natural Resource Science program at Universiti Malaysia Kelantan (UMK). He is currently working with an eco-tourism company. MUHAMMAD HAMIRUL SHAH AB RAZAK is a doctoral student at UMK, conducting research on felid species in the Chabang Tongkat and Ulu Sat Forest Reserves. HAZIZI HUSAIN is also a doctoral student at UMK and a staff member at the Department of Wildlife and National Parks (DWNP). AAINAA AMIR is a lecturer at UMK with an interest in conducting research on biodiversity, while KAMARUL HAMBALI is also a lecturer at UMK with an interest in conducting research on wildlife management and ecology.

**Author contributions:** WHIWMH, MHSAR and HH collected data, analysed and wrote the initial draft of the manuscript. AA and KH read and revised the final manuscript.

**Acknowledgements:** We would like to thank the funder, The Conservation, Food & Health Foundation (R/CFHF/A0800/00386A/005/2022/01062). Thanks also to the Department of Wildlife and National Parks (DWNP), and the Forestry Department of Peninsular Malaysia for approving this study. Not forgetting the faculty of Earth Sciences, Universiti Malaysia Kelantan who always provided support and assistance in terms of services, equipment, and facilities throughout the course of this study. We also thank Joe James Figel for his insightful comments in improving the writing of this manuscript.



## INTRODUCTION

The leopard is one of the most adaptable large carnivores on the planet (Sunquist & Sunquist 2002). It is present in a wide range of habitats, from deserts to rainforests, from humid tropics to temperate zones (Jacobson et al. 2016; da Silva et al. 2017). The natural habitat for leopards in Malaysia had decreased substantially when 14% of Malaysia's forest cover had been lost from years 2000 to 2012 (Hedges et al. 2015). Paved roads have been constructed in the remaining forest blocks in the Peninsula Malaysia (Hedges et al. 2015). The leopard's geographic range extends from Africa, central Asia, and the Indian subcontinent, including Sri Lanka, to much of eastern Asia, and the Russian Far East (Chew 2019). In Southeast Asia, it occurs from Myanmar to Thailand and Vietnam, south to Peninsular Malaysia, and the Indonesian island of Java (Stein et al. 2016).

Indochinese leopard (*P. p. delacouri*) might be extinct in Lao PDR, Vietnam, and Singapore and may occur in small fragmented populations in Cambodia, southeastern China, Malaysia, Myanmar, and Thailand. The Indochinese Leopard is classified as 'Critically Endangered'. At present, this species is at high risk of extinction due to poaching and high deforestation rates in southeastern Asia (Rostro-García et al. 2016). Due to prey depletion, the leopard is restricted to a few small fragmented areas and protected areas (Forbes 2024).

Melanistic leopards can be distinguished by their intense black pigments which almost obscure the rosettes. Melanistic leopards or black panthers can be found mostly in the southern part of Isthmus Kra encompassing Peninsular Malaysia and southern Thailand (Kawanishi et al. 2010; Hedges et al. 2015).

Ulu Sat Forest Reserve is one of the 12,000 ha of permanent forest reserve (PFR) in Kelantan and is under the management of the Forestry Department of Peninsula Malaysia which had been protected and reserved from any illegal logging activities. In this article, the presence of a melanistic leopard was reported in Ulu Sat Permanent Forest Reserve, Machang District, Kelantan, Peninsular Malaysia. The leopard was recorded by a camera trap installed between 9 April 2023 and 26 May 2023. Camera traps were placed in the area for reconnaissance survey prior to an extensive camera trapping survey targeting wild felids in the study area and also Chabang Tongkat Forest Reserve.

## Study area

The study area is located in Ulu Sat Permanent Forest Reserve (USPFR) (5.717 °N & 102.317 °E), an approximately 148 km<sup>2</sup> protected area located in Machang District, eastern Kelantan, Peninsular Malaysia (Image 1). This site is an ecologically important forest habitat for water catchments in producing, maintaining, and reserving water for natural and human consumption. It makes the area very significant for the nearby local community (Samsudin et al. 2020; Abas et al. 2021). Ulu Sat Forest Reserve's natural vegetation is still intact and covered with approximately over 0.65 p/pet and the forest is classed as tropical wet with a tropical moist forest biozone (Abas et al. 2021). Ulu Sat Forest Reserve and Chabang Tongkat Forest Reserve together with Temangan Forest Reserve are put under secondary linkage (D-SL 3: Chabang Tongkat FR–Ulu Sat FR–Temangan FR). The types of forest in the USPFR are lowland and the hill is of dipterocarp forest. The area is undulating, and the full elevation range of USPFR is 60–600 m.

## MATERIALS AND METHODS

In this study, two camera trap units (Reconyx Hyperfire) were installed at two random locations in USPFR. The main purpose of the study was to have prior information on the presence of wild felid species. Camera traps were mounted on the trees bordering forest trails at a height of about 0.5 m above the ground to permit the detection of medium and large-sized mammals without using any bait (Jansen et al. 2014). The camera traps were programmed at a one-second interval between three series of images to maximize the chance to capture wildlife photos. The location of each camera was recorded with a global positioning system (Garmin GPSMAP 64s) to record their local information such as date of installation, the coordinates, and elevation range. The GPS units also made it easy for colleagues to return to the area to retrieve the cameras. Precautions were taken to minimize the risk of letting the cameras be stolen or damaged by wildlife. The reconnaissance survey lasted from 9 April 2023 until 26 May 2023. The surveyors visited the camera traps only twice, during their setting up and retrieval. All images have been extracted, sorted, and identified accordingly. Images that phantom or remain unidentified due to blurry images were excluded from the results. The cameras and memory card were tagged and identified with unique camera trap numbers for reference.



Image 1. Map of the study area, camera traps location and camera detected leopard.

## RESULTS

From this study, a total of 603 photos of terrestrial vertebrates were captured during the sampling period. The camera traps operated between 9 April to 26 May 2023 and the images were obtained from a total of 94 trap nights. The 603 photos yielded 41 independent photos of wildlife, and 13 phantom images were discarded. The image of the melanistic leopard clearly shows it to be a female, with traces of torn skin on the back of the body. The image was recorded on 11 May 2023 at 0701 h (Image 2). This leopard was detected at the old logging road built on the ridge at 0701 h at 428 m elevation. This discovery is expected to arouse interest in leopards in Malaysia and their habitat in the Ulu Sat Permanent Forest Reserve.

Besides melanistic leopard, other wildlife which were detected consisted of wild boar *Sus scrofa*, Asiatic Brush-tailed Porcupine *Atherurus macrourus*, Barking Deer *Muntiacus muntjak*, Malayan Tapir *Tapirus indicus*, Asiatic Leopard Cat *Prionailurus bengalensis*, Malayan Porcupine *Hystrix brachyura*, Southern Serow *Capricornis sumatraensis*, Malayan Sunbear *Helarctos malayanus*, Yellow-throated Marten *Martes flagivula*, White-thighed Surili *Presbytis siamensis*, and Crestless Fireback *Lophura erythrophthalma*.

## DISCUSSION

In 2018, a Biological Diversity Scientific Expedition program in the Ulu Sat Forest Reserve was organized by the Kelantan State Forestry Department in collaboration with Universiti Malaysia Kelantan. On the expedition, a preliminary study of the installation of camera traps was carried out to assess the presence of terrestrial vertebrates. The results of the study have recorded eight species of terrestrial vertebrates, namely Wild Boar *Sus scrofa*, Malayan Sun Bear *Helarctos malayanus*, Malayan Tapir *Tapirus indicus*, Southern Red Muntjac *Muntiacus muntjak*, Clouded Leopard *Neofelis nebulosa*, Leopard Cat *Prionailurus bengalensis*, Dhole *Cuon alpinus*, and Asiatic Golden Cat *Catopuma temminckii* (Hazizi et al. 2020). The study was not intensive on the Ulu Sat Forest Reserve. Apart from the eight species above, a rare felid species was also recorded for the first time, the Marbled Cat *Pardofelis marmorata* on the same expedition but in a different location (Hambali et al. 2019).

The present research has been able to make a first-time record of the remarkable morphological variation, the melanistic leopard *Panthera pardus delacouri* in USPFR. Previously in Malaysia, leopards were recorded in Belum-Temengor, Taman Negara, Endau Rompin, Krau Wildlife Reserve, Pasoh, Ayer Hitam Forest Reserves (Chew 2019), Jeli and Ulu Muda (Hambali et al. 2021). This discovery is considered important as the leopard subspecies is classified as 'Critically Endangered' in the



Image 2. A female melanistic leopard was photographed at 0701 h on 11 May 2023.

IUCN Red List of Threatened Species (Rostro-García et al. 2019). According to the Red List of Mammals for Peninsular Malaysia Version 2.0, this animal species is categorized as endangered (PERHILITAN 2017). *Panthera pardus* has been placed in Schedule 2 where it is a protected animal (Wildlife Conservation Act 2010). This protected animal requires a special permit to carry out any activity against it and if there are no special permits strict measures such as summons, and imprisonment can be imposed.

The Indochinese leopard faces multiple threats that contribute to its dwindling and endangered status. These threats include habitat loss, fragmentation, and degradation due to factors such as agriculture (Sodhi et al. 2010; Miettinen et al. 2011; Wilcove et al. 2013) and infrastructure development especially roads (Clements et al. 2014). As the human population expands and exploits natural resources, the leopard's habitat is encroached upon and diminished. From 2011 to 2018 a total of 54,224 human-wildlife negative interaction cases were recorded. In these, a total of 207 cases of human-leopard conflicts occurred from 2011 to 2018 (Xin et al. 2024). From the total of leopard cases, it was stated that 104 cases come from black panthers and the rest from non-melanistic leopards (Xin et al. 2024).

Ulu Sat is known for its rich biodiversity and dense tropical rainforest. Preserving the integrity of USPFR is

essential for safeguarding its unique biodiversity of flora including rafflesia, araceae (*A. cochinchinense* and *A. puber*), and fauna such as the leopard, Malayan tapir, and Sumatran serow in supporting sustainable ecosystem services in the area (Meisery et al. 2020). The discovery of a melanistic leopard within the boundaries of Ulu Sat Forest Reserve highlights the importance of this protected area in safeguarding rare and elusive wildlife species amidst the challenges posed by deforestation and illegal wildlife trade in southeastern Asia. The melanistic leopard found in the present study shows that further study is needed to determine their population, their basic ecology, activity pattern, and distribution. In the future, it is expected that conservation actions for leopards in the study area and the state of Kelantan can be developed. To protect the leopard population in Malaysia, collaboration and cooperation between governmental and non-governmental organizations will be imperative. Also, by integrating conservation education into the curriculums and research programs of local schools and universities, larger audiences can be reached to strengthen conservation efforts for leopards in Malaysia and their habitat which is the Ulu Sat Permanent Forest Reserve. Residents living around the study area need to be given exposure and awareness about the species and the importance of conserving them in their natural habitat.

## REFERENCES

Abas, M.A., N.L.M.M. Lukman, N. Fitriani, Z. Hamzah & S.T. Wee (2021). The importance of Ulu Sat Forest Reserve to socio-economic activity of local community. *IOP Conference Series: Earth and Environmental Science* 842: 012052. <https://doi.org/10.1088/1755-1315/842/1/012052>

Chew, S.Y. (2019). Natural history of the leopard (*Panthera pardus*) in Peninsular Malaysia. *Malayan Nature Journal* 71(2): 127–137.

Clements, G.R., A.J. Lynam, D. Gaveau, W.L. Yap, S. Lhota, M. Gooseem, S. Laurance & W.F. Laurance (2014). Where and how are roads endangering mammals in Southeast Asia's forests? *PLoS ONE* 9(12): e115376. <https://doi.org/10.1371/journal.pone.0115376>

da Silva, L.G., K. Kawanishi, P. Henschel, A. Kittle, A. Sanei, A. Reebin, D. Miquelle, A.B. Stein, A. Watson, L.B. Kekule, R.B. Machado & E. Eizirik (2017). Mapping black panthers: Macroecological modeling of melanism in Leopards (*Panthera pardus*). *PLoS ONE* 12(4): e0170378. <https://doi.org/10.1371/journal.pone.0170378>

Forbes, R.E. (2024). Lion and leopard diet and dispersal in human-dominated landscapes. Master thesis. Department? Nelson Mandela University. [https://www.researchgate.net/publication/378969524\\_Lion\\_and\\_leopard\\_diet\\_and\\_dispersal\\_in\\_human-dominated\\_landscapes/citations](https://www.researchgate.net/publication/378969524_Lion_and_leopard_diet_and_dispersal_in_human-dominated_landscapes/citations)

Hambali, K., M.H.S.A. Razak, M.S. Abdullah & M.A.A. Aziz (2019). First camera trap photo of marbled cat in Ulu Sat Permanent Forest Reserve, Malaysia. CAT News 69: 38–40.

Hambali, K., N.F.M. Fazli, A. Amir, N. Fauzi, N.H. Hassin, M.A. Abas, M.F.A. Karim & A.Y. Sow (2021). The discovery of a melanistic Leopard *Panthera pardus delacouri* (Linnaeus, 1758) (Mammalia: Carnivora: Felidae) at Bukit Kudung in Jeli, Kelantan, Peninsular Malaysia: conservation and ecotourism. *Journal of Threatened Taxa* 13(1): 17513–17516. <https://doi.org/10.11609/jott.6060.13.1.17513-17516>

Hazizi, H., F.M.N. Mohd, Z.I. Mohd, K.R. Ahmad, N. Aznan & H. Kamarul (2020). A Preliminary Camera Trap Assessment of Terrestrial Vertebrates in Ulu Sat Forest Reserve, Kelantan, Malaysia, pp. 175–182. In: *Ulu Sat Forest: The Heart of Kelantan's Nature Conservation*. Jabatan Perhutanan Negeri Kelantan, Kota Bharu.

Hedges, L., W.Y. Lam, A. Campos-Arceiz, D.M. Rayan, W.F. Laurance, C.J. Latham, S. Saaban & G.R. Clements (2015). Melanistic leopards reveal their spots: Infrared camera traps provide a population density estimate of leopards in Malaysia. *The Journal of Wildlife Management* 79(5): 846–853. <https://doi.org/10.1002/jwmg.901>

Jacobson, A.P., P. Gerngross, Jr. J.R. Lemeris, R.F. Schoonover, C. Anco, C. Breitenmoser-Würsten, S.M. Durant, M.S. Farhadinia, P. Henschel, J.F. Kamler, A. Laguardia, S. Rostro-García, A.B. Stein & L. Dollar (2016). Leopard (*Panthera pardus*) status, distribution, and the research efforts across its range. *PeerJ* 4: e1974. <https://doi.org/10.7717/peerj.1974>

Jansen, P.A., T.D. Forrester & W.J. McShea (2014). Protocol for camera-trap surveys of mammals at CTFS-Forest GEO sites. Smithsonian Tropical Research Institute.

Kawanishi, K., M.E. Sunquist, E. Eizirik, A.J. Lynam, D. Ngoprasert, W.N.W. Shahruddin, M.R. Darmaraj, S.K.S. Dionysius & R. Steinmetz (2010). Near fixation of melanism in leopards of the Malay Peninsula. *Journal of Zoology* 282(3): 201–206. <https://doi.org/10.1111/j.1469-7998.2010.00731.x>

Meisery, A.A.H.A., M.S. Fauzi, M.S. Ridzuan, M. Sainuddin & A.H.H. Rafhan (2020). Mammals of Ulu Sat-Tembat forest complex. *Journal of Wildlife and Parks* 35: 139–143.

Miettinen, J., C. Shi & S.C. Liew (2011). Deforestation rates in insular Southeast Asia between 2000 and 2010. *Global Change Biology* 17(7): 2261– 2270. <https://doi.org/10.1111/j.1365-2486.2011.02398.x>

PERHILITAN (2017). *Red List of Mammals for Peninsular Malaysia Version 2.0*. Kuala Lumpur. Department of Wildlife and National Parks (PERHILITAN) Peninsular Malaysia, 206 pp. [https://www.wildlife.gov.my/images/document/penerbitan/lainlain/REDLIST\\_Ol%20%28M%29\\_2018%20edited.pdf](https://www.wildlife.gov.my/images/document/penerbitan/lainlain/REDLIST_Ol%20%28M%29_2018%20edited.pdf)

Rostro-García, S., J.F. Kamler, E. Ash, G.R. Clements, L. Gibson, A.J. Lynam, R. McEwing, H. Naing & S. Paglia (2016). Endangered leopards: range collapse of the Indochinese leopard (*Panthera pardus delacouri*) in Southeast Asia. *Biological Conservation* 201: 293–300. <https://doi.org/10.1016/j.biocon.2016.07.001>

Rostro-García, S., J.F. Kamler, G.R. Clements, A.J. Lynam & H. Naing (2019). *Panthera pardus* ssp. *delacouri* (errata version published in 2020). *The IUCN Red List of Threatened Species* 2019: 2023.e.T124159083A163986056. <https://doi.org/10.2305/IUCN.UK.2019-3.RLTS.T124159083A163986056.en>. Accessed on 24 August 2024.

Samsudin, M.F., M.F.M. Amin, S.A.S. Omar, A.H. Yusoff & M.S. Sulaiman (2020). Water quality status of Pergau Reservoir water catchment and Lake, Jeli, Kelantan. *IOP Conference Series: Earth and Environmental Science* 549: 012009. <https://doi.org/10.1088/1755-1315/549/1/012009>

Sodhi, N.S., M.R.C. Posa, T.M. Lee, D. Bickford, L.P. Koh & B.W. Brook (2010). The state and conservation of Southeast Asian biodiversity. *Biodiversity and Conservation* 19(2): 317–328. <https://doi.org/10.1007/s10531-009-9607-5>

Stein, A.B., V. Athreya, P. Gerngross, G. Balme, P. Henschel, U. Karanth, D. Miquelle, S. Rostro-García, J.F. Kamler, A. Laguardia, I. Khorozyan & A. Ghoddousi (2016). *Panthera pardus*. The IUCN Red List of Threatened Species 2016: e.T15954A102421779. <https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T15954A50659089.en>. Accessed on 31 July 2019.

Sunquist, M. & F. Sunquist (2002). *Wild Cats of the World*. University of Chicago Press, Chicago and London, 452 pp.

Wilcove, D.S., X. Giam, D.P. Edwards, B. Fisher & L.P. Koh (2013). Navjot's nightmare revisited: logging, agriculture, and biodiversity in Southeast Asia. *Trends in Ecology & Evolution* 28(9): 531–540. <https://doi.org/10.1016/j.tree.2013.04.005>

Wildlife Conservation Act (2010). *Laws of Malaysia Act 716*. Percetakan Nasional Malaysia Berhad, Kuala Lumpur, 137 pp. [https://sherloc.unodc.org/cld/uploads/res/document/wildlife-conservation-act-2010\\_html/Wildlife\\_Conservation\\_Act\\_2010.pdf](https://sherloc.unodc.org/cld/uploads/res/document/wildlife-conservation-act-2010_html/Wildlife_Conservation_Act_2010.pdf)

Xin, L.Q., S.N.A.M. Ghani, N.S. Rasudin, N.A. Ghafar, N.H. Abd Rashid, D.C.Y. Ten, S. Saaban, H.A. Edinur & M.T. Abdullah (2024). Characterisation of human-wildlife conflict and casualties caused by wildlife attacks in Peninsular Malaysia. *IIUM Medical Journal Malaysia* 23(01): 83–90. <https://doi.org/10.31436/imjm.v23i01.2283>



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. Karen 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 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. Karen 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. Priyadarshan 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. Priyadarshan 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. Rironker, 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. Biju, 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 Jayopal, 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 Inskip, Bishop Auckland Co., Durham, UK  
Dr. Tim Inskip, Bishop Auckland Co., Durham, UK  
Dr. V. Gokula, National College, Tiruchirappalli, Tamil 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. 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. Karin Schwartz, George Mason University, Fairfax, Virginia.  
Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India  
Dr. Mewa Singh, Mysore University, Mysore, India  
Dr. Paul Racey, University of Exeter, Devon, UK  
Dr. Honnavalli N. Kumara, SACON, Anaikatty P.O., Coimbatore, Tamil Nadu, India  
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India  
Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy  
Dr. Justus Joshua, Green Future Foundation, Tiruchirappalli, Tamil Nadu, India  
Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India  
Dr. Paul Bates, Harison Institute, Kent, UK  
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA  
Dr. Dan Challender, University of Kent, Canterbury, UK  
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK  
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA  
Dr. S.S. Talmale, Zoological Survey of India, Pune, Maharashtra, India  
Prof. Karan Bahadur Shah, Budhanilkantha Municipality, Kathmandu, Nepal  
Dr. Susan Cheyne, Borneo Nature Foundation International, Palangkaraya, Indonesia  
Dr. Hemanta Kafley, Wildlife Sciences, Tarleton State University, Texas, USA

#### Other Disciplines

Dr. Aniruddha Belsare, Columbia MO 65203, USA (Veterinary)  
Dr. Mandar S. Paingankar, University of Pune, Pune, Maharashtra, India (Molecular)  
Dr. Jack Tordoff, Critical Ecosystem Partnership Fund, Arlington, USA (Communities)  
Dr. Ulrike Streicher, University of Oregon, Eugene, USA (Veterinary)  
Dr. Hari Balasubramanian, EcoAdvisors, Nova Scotia, Canada (Communities)  
Dr. Rayanna Helleni 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. Rajeshkumar G. Jani, Anand Agricultural University, Anand, Gujarat, India  
Dr. O.N. Tiwari, Senior Scientist, ICAR-Indian Agricultural Research Institute (IARI), New Delhi, India  
Dr. L.D. Singla, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India  
Dr. Rupika S. Rajakaruna, University of Peradeniya, Peradeniya, Sri Lanka  
Dr. Bharat Baviskar, Wild-CER, Nagpur, Maharashtra 440013, India

#### Reviewers 2021–2023

Due to paucity 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 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.

Print copies of the Journal are available at cost. Write to:  
The Managing Editor, JoTT,  
c/o Wildlife Information Liaison Development Society,  
43/2 Varadarajulu Nagar, 5<sup>th</sup> Street West, Ganapathy, Coimbatore,  
Tamil Nadu 641006, India  
ravi@threatenedtaxa.org

## Articles

### The past and current distribution of the lesser-known Indian endemic Madras Hedgehog *Paraechinus nudiventris* (Mammalia: Eulipotyphla: Erinaceidae)

– R. Brawn Kumar & Willam T. Bean, Pp. 25639–25650

### Declining trends of over-summering shorebird populations along the southeastern coasts of Tamil Nadu, India

– H. Byju, H. Maitreyi, N. Raveendran & S. Ravichandran, Pp. 25651–25662

### Seasonal changes in waterbird assemblages in Chambal River at Mukundra Hills National Park, Rajasthan, India

– Arun George, Megha Sharma, Kavin Duraisamy, P.C. Sreelekha Suresh, Bijo Joy, Govindan Veeraswami Gopi, S.A. Hussain & J.A. Johnson, Pp. 25663–25674

### An updated checklist of the skippers (Lepidoptera: Hesperiidae) of Bhutan

– Karma Wangdi, Piet van der Poel & K.C. Sajan, Pp. 25675–25688

### Conservation imperatives for swallowtail butterflies (Lepidoptera: Papilionidae): a case study in the north bank landscape of river Brahmaputra, Bodoland Territorial Region, India

– Kushal Choudhury, Pp. 25689–25699

### The present state of leech fauna (Annelida: Hirudinea) in Dal Lake, Jammu & Kashmir, India

– Niyaz Ali Khan, Zahoor Ahmad Mir & Yahya Bakhtiyar, Pp. 25700–25711

### First report of five monogonont rotifers from Jammu, J&K UT, India, with remarks on their distribution

– Nidhi Sharma, Sarjeet Kour & Aayushi Dogra, Pp. 25712–25719

### Diversity of vascular epiphytes on preferred shade trees in tea gardens of sub-Himalayan tracts in West Bengal, India

– Roshni Chowdhury & M. Chowdhury, Pp. 25720–25729

## Communications

### Identification and chemical composition analysis of salt licks used by Sumatran Elephants *Elephas maximus sumatranus* in Tangkahan, Indonesia

– Kaniwa Berliani, Pindi Patana, Wahdi Azmi, Novita Sari Mastiur Manullang & Cynthia Gozali, Pp. 25730–25736

### Occurrence of a female melanistic leopard *Panthera pardus delacouri* (Linnaeus, 1758) (Mammalia: Carnivora: Felidae) in Ulu Sat Permanent Forest Reserve, Machang, Kelantan, Peninsular Malaysia from camera traps reconnaissance survey 2023

– Wan Hafizin Idzni Wan Mohammad Hizam, Muhammad Hamirul Shah Ab Razak, Hazizi Husain, Aainaa Amir & Kamarul Hambali, Pp. 25737–25741

### Diversity and distribution of large centipedes (Chilopoda: Scolopendromorpha) in Nui Chua National Park, Vietnam

– Son X. Le, Thinh T. Do, Thuc H. Nguyen & Binh T.T. Tran, Pp. 25742–25747

### Diversity of butterfly habitats in and around Udanti-Sitanadi Tiger Reserve, Chhattisgarh, India

– H.N. Tandan, Gulshan Kumar Sahu, Kavita Das, Gulab Chand, Ravi Naidu & Ramanand Agrawal, Pp. 25748–25757

### A short-term impact of enriched CO<sub>2</sub> [eCO<sub>2</sub>] on select growth performance of *Spodoptera littoralis* (Boisd.) (Lepidoptera: Noctuidae) and its host plant *Gossypium barbadense* L. (Malvaceae)

– A.A. Abu ElEla Shahenda & Wael M. ElSayed, Pp. 25758–25764

### Diversity and distribution of springtails (Collembola) from Jharkhand, India

– Koushik Kumar Roy, Guru Pada Mandal & Kusumendra Kumar Suman, Pp. 25765–25773

## Short Communications

### *Lindernia tamilnadensis* (Linderniaceae) from Indo-Gangetic plains: no more endemic to the Deccan

– Umama Khan, Revan Yogesh Chaudhari, Bhupendra Singh Adhikari, Syed Ainul Hussain & Ruchi Badola, Pp. 25774–25778

### Discovery of a new *Myristica* swamp in the northern Western Ghats of India

– Pravin Desai, Vishal Sadekar & Shital Desai, Pp. 25779–25786

## Note

### *Ophioglossum jaykrishnae* S.M.Patil et al. (Pteridophyta: Polypodiophyta: Ophioglossaceae): a new distribution record from Kanha National Park, Madhya Pradesh, India

– Tarun Nayi, Mayur Bhagwat, Sanjay Saini, Soham Haldikar, Ishtayaque Patel, Shivaji Chavan, Nudrat Zawar Sayed & Sunil Kumar Singh, Pp. 25787–25790

## Publisher & Host



Threatened Taxa