

Building evidence for conservation globally

# Journal of Threatened TAXA



10.11609/jott.2022.14.8.21487-21750  
[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

26 August 2022 (Online & Print)  
14(8): 21487-21750  
ISSN 0974-7907 (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

No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti,  
Coimbatore, Tamil Nadu 641035, India

Ph: +91 9385339863 | [www.threatenedtaxa.org](http://www.threatenedtaxa.org)

Email: [sanjay@threatenedtaxa.org](mailto:sanjay@threatenedtaxa.org)

#### EDITORS

##### Founder & Chief Editor

**Dr. Sanjay Molur**

Wildlife Information Liaison Development (WILD) Society & Zoo Outreach Organization (ZOO),  
12 Thiruvannamalai Nagar, Saravanampatti, Coimbatore, Tamil Nadu 641035, India

##### Deputy Chief Editor

**Dr. Neelesh Dahanukar**

Noida, Uttar Pradesh, India

##### Managing Editor

**Mr. B. Ravichandran**, WILD/ZOO, Coimbatore, 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 641035, India

**Dr. B.A. Daniel**, ZOO/WILD, Coimbatore, Tamil Nadu 641035, 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, Mavinahalla 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. Ilangoan**, Chennai, India

##### Web Development

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

##### Typesetting

**Mr. Arul Jagadish**, ZOO, Coimbatore, India

**Mrs. Radhika**, ZOO, Coimbatore, India

**Mrs. Geetha**, ZOO, Coimbatore India

#### Fundraising/Communications

**Mrs. Payal B. Molur**, Coimbatore, India

#### Subject Editors 2019–2021

##### 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, Kuvempu University, Shimoga, Karnataka, India

Dr. K.R. Sridhar, Mangalore University, Mangalagangothri, Mangalore, Karnataka, India

Dr. Gunjan Biswas, Vidyasagar University, Midnapore, West Bengal, 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 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, Kadoorie Farm and Botanic Garden Corporation, Hong Kong S.A.R., China

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. Karthikeyan, 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 Baños, Laguna, Philippines

Dr. P.A. Sinu, Central University of Kerala, Kasaragod, Kerala, India

Dr. Afroz Alam, Banasthali Vidyapeeth (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. Navendu Page, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand, India

Dr. Kannan C.S. Warrior, 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. Hemant V. Ghate, Modern College, Pune, India

Dr. M. Monwar Hossain, Jahangirnagar University, Dhaka, Bangladesh

Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.

Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK

For 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: Fish species recorded in the Gowthami-Godavari Estuary, Andhra Pradesh: *Lutjanus johnii* (top left), *Triacanthus biaculeatus* (top right), *Acentrogobius cyanomos*, *Elops machnata*, *Trypauchen vagina*, *Oxyurichthys microlepis*. © Paromita Ray.



## *Eremotermes neoparadoxalis* Ahmad, 1955 (Isoptera: Termitidae: Amitermitinae) a new record from Haryana, India

Bhanupriya<sup>1</sup> , Nidhi Kakkar<sup>2</sup> & Sanjeev Kumar Gupta<sup>3</sup>

Department of Zoology, Kurukshetra University, Kurukshetra, Haryana 136119, India.

<sup>1</sup>bhanupriya46914@gmail.com (corresponding author), <sup>2</sup>nidhikakkar12@yahoo.com, <sup>3</sup>skgupta@kuk.ac.in

**Abstract:** We report a new record of *Eremotermes neoparadoxalis* from Haryana, India. *Eremotermes* Silvestri, 1911 is a highly dispersed genus epitomized by 10 species, six of which have been reported in India, including *E. paradoxalis* in Hararyana. Taxonomic descriptions provided with illustrations of general morphology and measurements of body length, head length with and without mandibles, body pigmentation, antennae segments, tibial spur, tarsal segments, head width, and body width. These keys along with photographs are prepared for both soldier and worker castes of *E. neoparadoxalis*.

**Keywords:** Antennae segments, blattaria, caste, morphological characters, phenotypic characters, pronotum, tarsal segment, tibial spur, termite.

Termites (Order: Blattaria; Infraorder: Isoptera) are highly useful insects in many ecosystems (Engel et al. 2009; Pranesh & Harini 2015; Effowe et al. 2021), where they consume cellulose-rich plant matter and facilitate recycling of waste products (Wood & Sands 1978). They also support the growth of forests and microbes while constructing their mounds (Lee & Wood 1971; Eggleton et al. 2002; Davies et al. 2014). *Eremotermes* (subfamily Amitermitinae) are found in many localities worldwide (Oriental, Ethiopian and Palaearctic zoogeographical regions), and in India they are known from the Oriental Region (Krishna et al. 2013). Ten species of

*Eremotermes* are reported globally, of which six occur in India: *dehraduni*, *fletcheri*, *madrasicus*, *neoparadoxalis*, *paradoxalis*, and *sanyuktae*, while three occur in southern India: *paradoxalis*, *madrasicus*, and *fletcheri* (Chhotani 1997; Ranjith & Kalleshwaraswamy 2021), five in Gujarat and Rajasthan: *dehraduni*, *fletcheri*, *neoparadoxalis*, *paradoxalis*, and *sanyuktae* (Rathore & Bhattacharyya 2004), and only *paradoxalis* from Haryana (Poonia 2019). The present report deals with *Eremotermes neoparadoxalis* as a new record trapped from dung cake in Palwal (Hodal), Haryana.

### METHODS

Surveys were conducted throughout southern Haryana, where most vegetation is in agricultural lands and *Acacia* forest. The sample of *E. neoparadoxalis* was collected from Hodal (Palwal), Haryana, India in July 2020. The area of sample collection is 27.40°N & 77.36°E (Figure 1; Image 1). Around 50 individuals of the soldier and worker castes were collected from a dung cake with the help of forceps, and preserved in 70% ethanol (Gupta & Kakkar 2015). For the taxonomic description photographs were captured using an Olympus CX41 microscope and Olympus Camedia C-7070 wide zoom

**Editor:** V.P. Uniyal, Wildlife Institute of India, Dehradun, India.

**Date of publication:** 26 August 2022 (online & print)

**Citation:** Bhanupriya, N. Kakkar. & S.K. Gupta (2022). *Eremotermes neoparadoxalis* Ahmad, 1955 (Isoptera: Termitidae: Amitermitinae) a new record from Haryana, India. *Journal of Threatened Taxa* 14(8): 21715–21719. https://doi.org/10.11609/jott.7776.14.8.21715-21719

**Copyright:** © Bhanupriya et al. 2022. 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:** UGC-CSIR JRF.

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

**Acknowledgements:** The authors are grateful to Biotechnology Department, Institute of Integrated & Honors Studies (IIHS), Kurukshetra University, Kurukshetra, for providing space and equipment to carry out the research work. The first author is highly indebted to University Grants Commission (UGC) for granting the financial support under the Junior Research Fellowship (JRF) scheme.





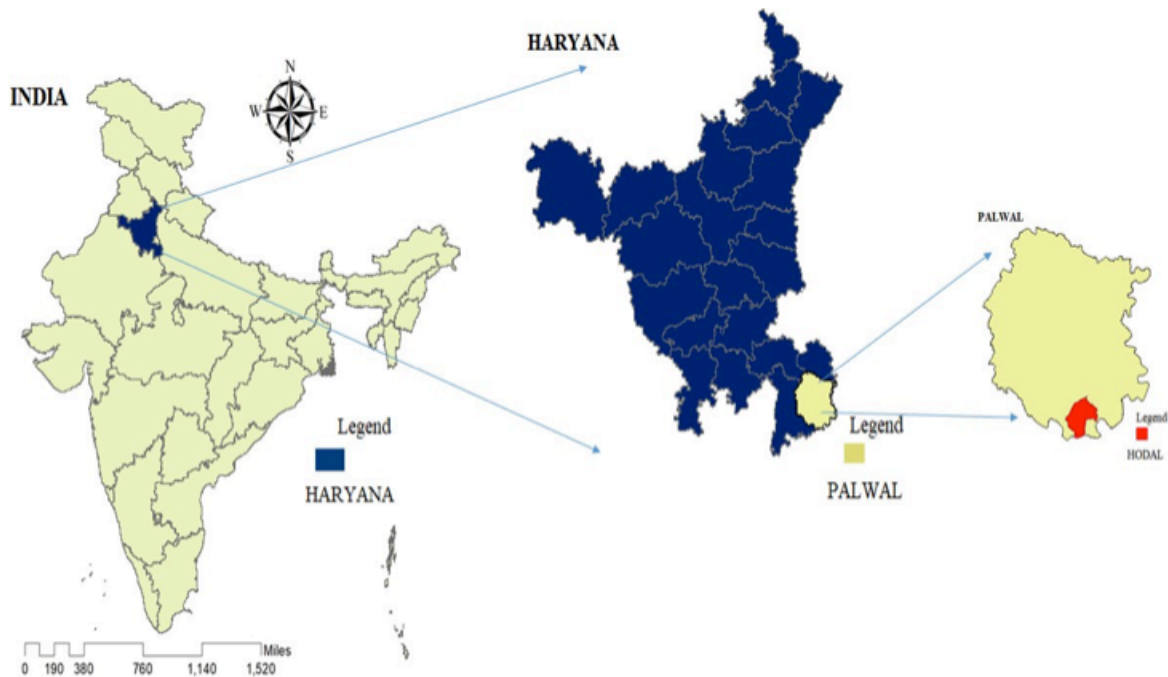


Figure 1. Study site.

digital camera. Termite characterization was done using taxonomic keys (Chhotani 1997; Rathore & Bhattacharyya 2004; Mahapatro et al. 2018) (Table 1).

Phenotypic characters assessed were:

- Head: Shape, color, size, width and length of head with and without mandibles (Table 1)
- Antennae: Number and size of the segments
- Mandible: Shape, length, arrangement of marginal teeth and size (Table 1)
- Labrum: Hyaline tip and its shape
- Legs: Tibial spur and number of tarsi segments
- Body: Color, length and width

**RESULTS AND DISCUSSION**

A total of 37 termite species were reported from Haryana (Poonia 2019). This diversity was hierarchically listed under 11 genera, six subfamilies (Macrotermitinae, Angulitermitinae, Amitermitinae, Coptotermitinae, Heterotermitinae, and Apicotermitinae) and three families (Termitidae, Rhinotermitidae, and Kalotermitidae). *Eremoterme* was previously only represented by *paradoxalis* in Haryana (Krishna et al. 2013; Poonia 2019), and we now include *neoparadoxalis*. This species is mostly found in dry zones (Roonwal & Bose 1978). For the species identification mean and standard deviation were calculated on five individuals of both castes (soldier and worker). Species of the genus *Eremoterme* generally look alike; consequently,

differences among species are noticed by different sizes of antennal segments of 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> in worker castes (Chhotani 1997).

**Keys for genus and species of *Eremoterme***

**Genus:** *Eremoterme* Silvestri (Head with short projected front protuberance. Mandibles thin, long, and somewhat incurved apically) (Image 2)

**Species:**

- 1(2) Mandibles comparative to head longer, index mandible-length/head-length 1.12–1.23. Mandibular tooth weak or indistinct ..... *neoparadoxalis*
- 2(1) Mandibles comparative to head shorter, index mandible-length/head-length 0.78–1.07 Mandibular tooth prominent
- 3(4) Mandibles almost straight; concavity on outer margin of mandibles very weak or absent ..... *madrasicus*
- 4(3) Mandibles appreciably curved; concavity on outer margin strong
- 5(6) Larger species: Head-length to base of mandibles 0.94–1.105, head-width 0.81–0.85 mm. Mandible-length equal to or slightly more than head-length, index mandible-length/head-length 1.0– 1.07 ..... *fletcheri*
- 6(5) Smaller species: Head-length to base of mandibles 0.80–0.95, head-width 0.68–0.80 mm.

Mandible-length generally less than head length, index mandible-length/head-length 0.78–0.98 7(8) Frontal protuberance prominent and frons very steeply inclined in front. Head thick, height/width index 0.81–0.93. Mandibles strongly incurved at apices ..... *dehraduni* 8(7) Frontal protuberance a little weaker and frons somewhat less so steeply inclined in front. Head thinner, height/width index 0.66–0.87. Mandibles weakly incurved at apices ..... *paradoxalis*

**Species:** *neoparadoxalis* (Mandibles with weak tooth and comparatively longer than the head)

***Eremotermes neoparadoxalis* Ahmad**

1955. Ahmad, Biologia, Lahore, 1(2): 252–253. S only. Holotype: S, in PU, Lahore. Type-locality: Shahdadpur, Sind, Pakistan.

1969. Roonwal and Bose, Rec. Zool. Surv. India, 61(3 & 4): 440, 446.

1974. Akhtar, Pakistan J. Zool., 6(1 & 2): 103. 1976. Akhtar, Pakistan J. Zool., 8(2): 163–165.

1977. Roonwal, In: Natural Resources of Rajasthan

(Ed Roonwal): 375: 3.

2013. Krishna, et al., Bull. Am. Mus. Nat. Hist., 6: 2129–2137.

This species is a small-sized termite. Body length is ranged in between 3.5–4.1 in soldier caste and 3.4–3.8 in worker caste (Table 1). Diagnostic features, measurements, distribution and remarks of the soldier and worker castes of *E. neoparadoxalis* (Image 2) were described as follows:

**Diagnostic features:**

**Soldier caste:** Head capsule is light yellow, rectangular to oval-shaped. Body is yellowish-white and mandibles are reddish-brown. Mandibles are sabre-shaped, less incurved, pointed and strongly incurved outer marginally. There is a minute tooth present little behind the middle on both the mandibles. Pronotum is saddle-shaped where labrum is smaller and pointed in shape (Image 2).

**Worker Caste:** Head capsule is straw-colored and sub-square shaped whereas body is paler. Mandibles are similar as imago caste (Image 2). Pronotum is saddle-shaped; its anterior margin weakly or generally not notched and posterior margin straight.

**Measurements (Table 1) (mm):**

**More description:**

**Soldier:** Tarsal segments: 4, Tibial spur ratio: 3:2:2, Antennae segments: 14, 3<sup>rd</sup> shortest and sub-equal to or a little longer than 4; 5 longer and broader than 4 (Image 2).

**Worker:** Tarsal segments: 4, Tibial spur ratio: 3:2:2, Antennae: 14 segmented; segment 3, 4, 5 sub-equal (Image 2).

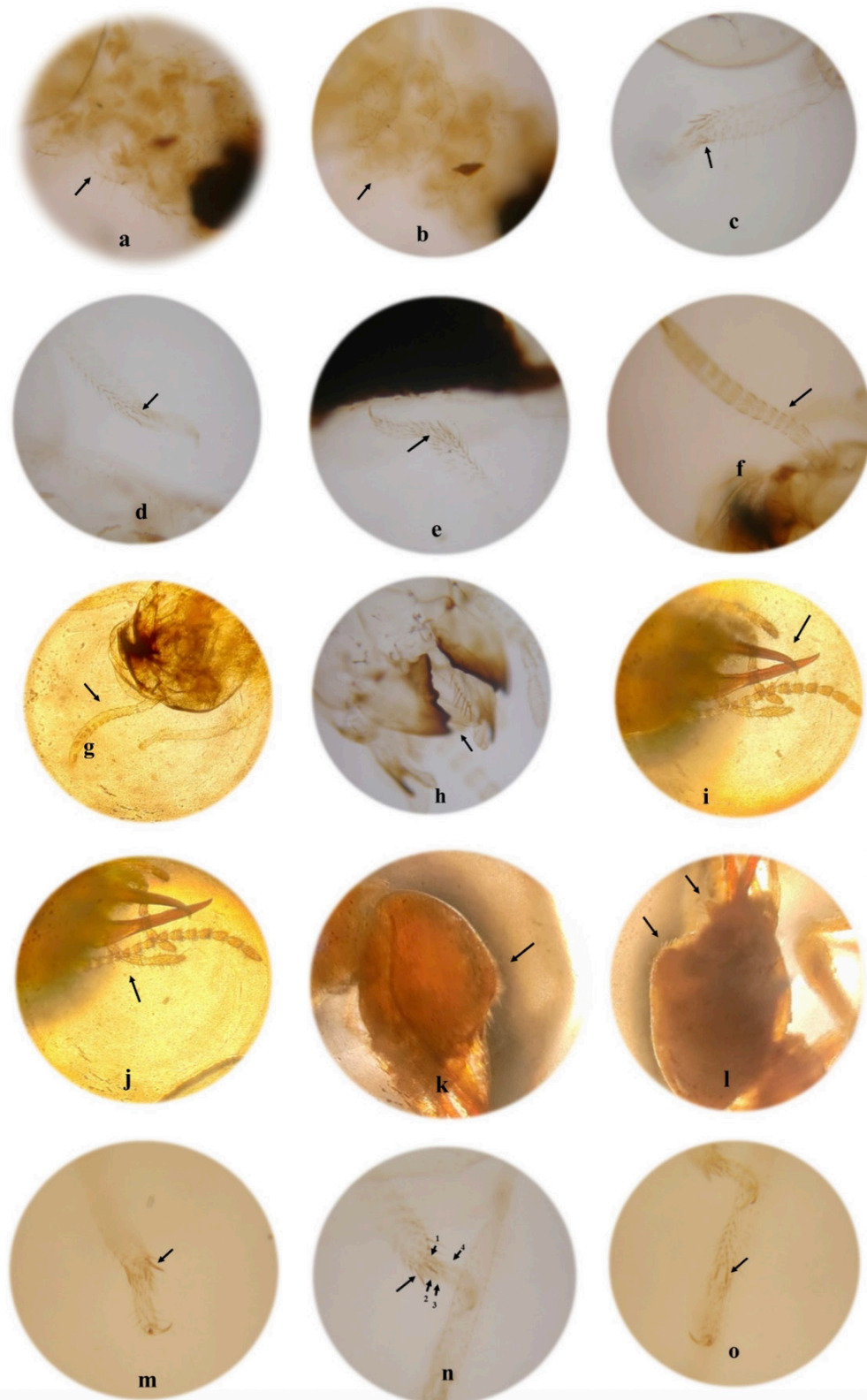
**Distribution:** India: Haryana (Nuh), Delhi, Gujarat (Dangs, Banaskantha, Valsad, Sabarkantha), Rajasthan (Bikaner, Jaisalmer, Barmer, Jodhpur, Jaipur) and Pakistan.



Image 1. Location of sample collected site. © Bhanupriya.

Table 1. Morphometric analysis of termite’s body parts (in mm) *Eremotermes neoparadoxalis*.

	Parameters (mm)	Soldier		Worker	
		Range	Mean±SD	Range	Mean±SD
1	Total body length	3.5–4.1	3.84±0.215	3.4–3.8	3.64±0.16
2	Head length without mandibles	0.7–0.85	0.77±0.06	0.5–0.65	0.56±0.058
3	Head + mandibles length	1.6–1.9	1.75±0.109	0.7–0.9	0.81±0.08
4	Mandibles length	0.8–0.9	0.86±0.04	0.2–0.35	0.27±0.06
5	Tooth distance	0.3–0.37	0.33±0.027	-	-
6	Head width	0.6–0.9	0.73±0.107	0.65–0.75	0.69±0.037
7	Body width	0.6–0.75	0.67±0.06	0.6–0.8	0.7±0.07



**Image 2.** Worker caste: a—Pronotum: saddle-shaped | b—Dorsal view of pronotum | c—Foreleg with three tibial spur | d—Mid leg with two tibial spur | e—Hind-leg with two tibial spur | f & g—14 segmented antennae, with 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> segments are sub-equal in sized and 3+4 = 2<sup>nd</sup> segment | h—shape of the mandibles;  
 Soldier caste: i—Mandible with prominent tooth and tooth distance | j—Antennae 14-segmented with 4<sup>th</sup> short segment | k—Dorsal view of head | l—Head with frontal protuberance and a pointed labrum | m—Foreleg with three tibial spur | n—Mid leg with two tibial spur and tarsal segments (4) | o—Hind-leg with two tibial spur. © Bhanupriya.

**Remarks:** In India, this species is relatively rare but generally found in Gujarat and Rajasthan. As a new record, this species is stated first time from the study site Palwal (Hodal), Haryana. This is a soil-borne species, commonly collected from damaged wooden structures, dung cake and forests as well as harvested fields (Sharma et al. 1975; Chhotani 1997; Saha & Basak 2011). The present record of this species is collected from dung cake.

## REFERENCES

- Chhotani, O.B. (1997).** *The Fauna of India and the Adjacent Countries. Isoptera (Termites): (Family Termitidae) - Vol. 2.* Zoological Survey of India, Calcutta, xx+800 pp.
- Davies, B., R. Levick, P. Asher, P. Robertson, J. Van Rensburg & L. Pair (2014).** Spatial variability and Abiotic determinants of termite mounds throughout a savanna catchment. *Journal of Applied Ecology* 49: 422–430.
- Effowe, T.Q., B.D. Kassene, A.B. Ndiaye, B.B. Sanbena, K. Amevoin & I.A. Glitho (2021).** Termites' diversity in a protected park of the northern Sudanian savanna of Togo (West Africa). *Nature Conservation* 43: 79–91.
- Eggleton, P., D.E. Bignell, S. Hauser, L. Dibog, L. Norgrove & B. Madong (2002).** Termite diversity across an anthropogenic disturbance gradient in the humid forest zone of West Africa. *Agriculture, Ecosystems and Environment* 9: 189–202.
- Engel, M.S., D.A. Grimaldi & K. Krishna (2009).** Termites (Isoptera): their phylogeny, classification, and rise to ecological dominance. *American Museum Novitates* (3650): 1–27.
- Gupta S.K. & N. Kakkar (2015).** Community composition of termites (Isoptera) in different habitats and seasons in Kurukshetra, Haryana, India, pp. 57–64. Gupta, V.K. & A.K. Verma (2015). *Animal Diversity, Natural History and Conservation 5.* Astral International (P) Ltd Daya, 435 pp.
- Krishna, K., D.A. Grimaldi, V. Krishna & M.S. Engel (2013).** Treatise on the Isoptera of the World, *Bulletin of the American Museum of Natural History* 1–7: 1–2704.
- Lee, K.E. & T.G. Wood (1971).** *Termites and Soils.* Academic Press, London, x+251 pp
- Mahapatro, G.K., S. Kumar & M. Kumar (2018).** A new record of termite *Amitermes belli* (Desneux) from Himachal Pradesh. *Indian Journal of Entomology* 80(2): 457–459.
- Poonia, A. (2019).** Termites (Insecta: Isoptera) of Haryana present state of knowledge- a review. *Agricultural Research Communication Center* 40(1): 59–64.
- Pranesh, M. & B.P. Harini (2015).** Diversity and distribution pattern of termites in relation with human interference: a study at Jnanabharathi campus, Bangalore, India. *The Ecoscan* 9: 671–676.
- Ranjith, M. & C.M. Kallelshwaraswamy (2021).** Termites (Blatodea: Isoptera) of southern India: current knowledge on distribution and systematic checklist. *Journal of Threatened Taxa* 13(6): 18598–18613. <https://doi.org/10.11609/jott.5781.13.6.18598-18613>
- Rathore, N.S. & A.K. Bhattacharyya (2004).** *Termite (Insecta: Isoptera) Fauna of Gujarat and Rajasthan: Present State of Knowledge.* Zoological Survey of India, Kolkata, 77 pp.
- Rawat, B.S. (2004).** Termite control in buildings: Indian scenario. *Pestology* 28(4):11–23.
- Roonwal, M.L. & G. Bose (1978).** Vegetational distribution of termites of Rajasthan (India) and their economic importance. *Proceedings of the Indian National Science Academy (B)* 44(5): 320–329.
- Wood, T.G. & W.A. Sands (1978).** The role of termites in ecosystems, pp. 245–292. In: Brian, M.V. (ed.). *The Production Ecology of Ants and Termites.* Cambridge University Press, Cambridge.







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. Lionel 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 Dhabi, 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

#### 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 Sunde, 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. 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. M. Zafar-ul Islam, Prince Saud Al Faisal Wildlife Research Center, Taif, Saudi Arabia

#### 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, Budhanilakantha Municipality, Kathmandu, Nepal  
Dr. Susan Cheyne, Borneo Nature Foundation International, Palangkaraja, 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 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. 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. Bahar Baviskar, Wild-CER, Nagpur, Maharashtra 440013, India

#### Reviewers 2019–2021

Due to paucity of space, the list of reviewers for 2018–2020 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.

**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

Print copies of the Journal are available at cost. Write to:  
The Managing Editor, JoTT,  
c/o Wildlife Information Liaison Development Society,  
No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road,  
Saravanampatti, Coimbatore, Tamil Nadu 641035, India  
ravi@threatenedtaxa.org



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

OPEN ACCESS



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

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

August 2022 | Vol. 14 | No. 8 | Pages: 21487–21750

Date of Publication: 26 August 2022 (Online & Print)

DOI: 10.11609/jott.2022.14.8.21487-21750

#### Article

**Dietary preference of Assamese Macaque *Macaca assamensis* McClelland, 1840 (Mammalia: Primates: Cercopithecidae) in Dampa Tiger Reserve, India**  
– Ht. Decemson, Sushanto Gouda, Zothan Siam & Hmar Tlawmte Lalremsanga, Pp. 21487–21500

#### Reviews

**Natural history notes on three bat species**  
– Dharmendra Khandal, Ishan Dhar, Dau Lal Bohra & Shyamkant S. Talmale, Pp. 21501–21507

**The checklist of birds of Rajkot district, Gujarat, India with a note on probable local extinction**  
– Neel Sureja, Hemanya Radadia, Bhavesh Trivedi, Dhavalkumar Varagiya & Mayurdan Gadhavi, Pp. 21508–21528

**Alien flora of Uttarakhand, western Himalaya: a comprehensive review**  
– Shikha Arora, Amit Kumar, Khima Nand Balodi & Kusum Arunachalam, Pp. 21529–21552

#### Communications

**New records of *Nyctalus leisleri* (Kuhl, 1817) and *Myotis nattereri* (Kuhl, 1817) (Mammalia: Chiroptera: Vespertilionidae) from National Park “Smolny” and its surroundings, Republic of Mordovia**  
– Dmitry Smirnov, Nadezhda Kirillova, Alexander Kirillov, Alexander Ruchin & Victoria Vekhnik, Pp. 21553–21560

**Avifaunal diversity in unprotected wetlands of Ayodhya District, Uttar Pradesh, India**  
– Yashmita-Ulman & Manoj Singh, Pp. 21561–21578

**Can the Sri Lankan endemic-endangered fish *Labeo fisheri* (Teleostei: Cyprinidae) adapt to a new habitat?**  
– Dinelka Thilakarathne & Gayan Hirimuthugoda, Pp. 21579–21587

**An overview of the fish diversity and their threats in the Gowthami-Godavari Estuary in Andhra Pradesh, India**  
– Paromita Ray, Giridhar Malla, J.A. Johnson & K. Sivakumar, Pp. 21588–21604

**DNA barcoding of a lesser-known catfish, *Clupisoma bastari* (Actinopterygii: Ailiidae) from Deccan Peninsula, India**  
– Boni Amin Laskar, Harikumar Adimalla, Shantanu Kundu, Deepa Jaiswal & Kailash Chandra, Pp. 21605–21611

**Description of the larva of *Vestalis melania* (Selys, 1873) (Odonata: Calopterygidae) identified through DNA barcoding**  
– Don Mark E. Guadalquivir, Olga M. Nuneza, Sharon Rose M. Tabugo & Reagan Joseph T. Villanueva, Pp. 21612–21618

**Checklist of Carabidae (Coleoptera) in the Chinnar Wildlife Sanctuary, a dry forest in the rain shadow region of the southern Western Ghats, India**  
– M.C. Sruthi & Thomas K. Sabu, Pp. 21619–21641

**Zoophily and nectar-robbing by sunbirds in *Gardenia latifolia* Ait. (Rubiaceae)**  
– A.J. Solomon Raju, S. Sravan Kumar, L. Kala Grace, K. Punny, Tebesi Peter Raliengoane & K. Prathyusha, Pp. 21642–21650

**A new population record of the Critically Endangered *Dipterocarpus bourdillonii* Brandis from the Anamalai Tiger Reserve, India**  
– Navendu Page, Srinivasan Kasinathan, Kshama Bhat, G. Moorthi, T. Sundarraj, Divya Mudappa & T.R. Shankar Raman, Pp. 21651–21659

**Checklist of the orchids of Nokrek Biosphere Reserve, Meghalaya, India**  
– Bikarma Singh & Sneha, Pp. 21660–21695

**Morphological assessment and partial genome sequencing inferred from matK and rbcL genes of the plant *Tacca chantrieri***  
– P.C. Lalbiaknii, F. Lalnunmawia, Vanlalhrui Ralte, P.C. Vanlalnunpuia, Elizabeth Vanlalruati Ngamlai & Joney Lalnunpuui Pachua, Pp. 21696–21703

#### Short Communications

**Conservation status of freshwater fishes reported from Tungabhadra Reservoir, Karnataka, India**  
– C.M. Nagabhushan, Pp. 21704–21709

**Species diversity and distribution of large centipedes (Chilopoda: Scolopendromorpha) from the biosphere reserve of the western Nghe An Province, Vietnam**  
– Son X. Le, Thuc H. Nguyen, Thinh T. Do & Binh T.T. Tran, Pp. 21710–21714

***Eremotermes neoparadoxalis* Ahmad, 1955 (Isoptera: Termitidae: Amitermitinae) a new record from Haryana, India**  
– Bhanupriya, Nidhi Kakkar & Sanjeev Kumar Gupta, Pp. 21715–21719

**New state records of longhorn beetles (Insecta: Coleoptera: Cerambycidae) from Meghalaya, India**  
– Vishwanath Duttatray Hegde, Sarita Yadav, Prerna Burathoki & Bhaskar Saikia, Pp. 21720–21726

**Range extension of lesser-known orchids to the Nilgiris of Tamil Nadu, India**  
– M. Sulaiman, K. Kiruthika & P.B. Harathi, Pp. 21727–21732

#### Notes

**Opportunistic sighting of a Sperm Whale *Physeter macrocephalus* Linnaeus, 1758 in Lakshadweep Archipelago**  
– Manokaran Kamalakannan, C.N. Abdul Raheem, Dhriti Banerjee & N. Marimuthu, Pp. 21733–21735

**An unusual morph of *Naja naja* (Linnaeus, 1758) (Squamata: Serpentes) from Goa, India**  
– Nitin Sawant, Amrut Singh, Shubham Rane, Sagar Naik & Mayur Gawas, Pp. 21736–21738

**Drape Fin Barb *Oreichthys crenuchoides* (Schäfer, 2009) (Cypriniformes: Cyprinidae) a new fish species report for Nepal**  
– Tapil Prakash Rai, Pp. 21739–21741

**New distribution record of *Gazalina chrysolopha* Kollar, 1844 (Lepidoptera: Notodontidae) in the Trans-Himalayan region of western Nepal**  
– Ashant Dewan, Bimal Raj Shrestha, Rubina Thapa Magar & Prakash Gaudel, Pp. 21742–21744

**First record of *Xanthia (Cirrha) icteritia* (Hufnagel, 1766) (Noctuidae: Xyleninae) from India**  
– Muzafar Riyaz & K. Sivasankaran, Pp. 21745–21748

**First report of the mymarid genus *Proarescon* Huber (Hymenoptera: Chalcidoidea: Mymaridae) from India**  
– Ayyavu Athithya & Sagadai Manickavasagam, Pp. 21749–21750

Publisher & Host

