

Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2026.18.5.28739-29002

www.threatenedtaxa.org

26 May 2026 (Online & Print)

18(5): 28739-29002

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

Srivari Illam, No. 61, Karthik Nagar, 10th Street, Saravanampatti, Coimbatore, Tamil Nadu 641035, 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),
Coimbatore, Tamil Nadu 641006, India

Assistant Editor

Dr. Chaithra Shree J., WILD/ZOO, Coimbatore, Tamil Nadu 641006, 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

Board of Editors

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. 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

Copy Editors

Ms. Usha Madgunaki, Zooreach, Coimbatore, India

Ms. Trisa Bhattacharjee, Zooreach, Coimbatore, India

Ms. Paloma Noronha, Daman & Diu, India

Web Development

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

Typesetting

Mrs. Radhika, Zooreach, Coimbatore, India

Mrs. Geetha, Zooreach, Coimbatore, India

Fundraising/Communications

Mrs. Payal B. Molur, Coimbatore, India

Subject Editors 2021–2023

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

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 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, 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. Karthigeeyan, 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 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. Warriar, 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

continued on the back inside cover

Cover: Oil painting of Humpback Whale *Megaptera novaeangliae*. © R. Mahesh.



Occurrence and prevalence of gastrointestinal parasites in herbivores in Dampa Tiger Reserve, Mizoram, India

G.S. Solanki¹ , Lalrinkimi²  & Phoebe Lalremruati³ 

^{1–3}Department of Zoology, Mizoram University, Aizawl, Mizoram 796009, India.

¹drghanshyam.solanki@gmail.com (corresponding author), ²kimipangamte@gmail.com, ³phoebemamteii@gmail.com

Abstract: Gastrointestinal parasite (GI) infection causes serious illnesses, reproductive impairment, and fitness problems in animals. Animals in the wilderness are not given prophylactic measures against parasites. A study was undertaken to recognize the prevalence of gastrointestinal parasites in herbivores at Dampa Tiger Reserve. Different species of herbivores belonging to the families Cercopithecidae, Sciuridae, Elephantidae, Cervidae, and Bovidae were considered for this study. Fresh faecal samples were collected from individuals in the field during January–March 2019, processed to isolate various stages of GI parasites, and examined for the presence of parasite categories and stages. A total of 70 samples were collected and analyzed, 59 samples found positive for gastrointestinal parasite ova. The overall prevalence level was 84.29% of the positive samples. Thirteen parasite species were found, which belong to four groups of parasites, namely, Nematodes, Trematodes, Protozoa, and Cestodes. *Ascaris* sp. had the highest prevalence, followed by Strongyle and *Dicrocoelium* sp. exhibited the lowest prevalence. The prevalence of *Ascaris* sp. and Strongyle were 47.68% and 30.23%, respectively. The overall prevalence level was highest in family Cervidae (54.65%), followed by Cercopithecidae (43.02%), and Sciuridae (31.39%). The family Cervidae showed a high prevalence of *Ascaris* sp., whereas the family Cercopithecidae exhibited a high prevalence of Strongyle compared with other families.

Keywords: Cestodes, faecal pellet, footprint, herbivores, nematodes, parasites, protozoa, terei forest range, trematodes, zoonotic.

Editor: Lachhman Das Singla, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.

Date of publication: 26 May 2026 (online & print)

Citation: Solanki, G.S., Lalrinkimi & P. Lalremruati (2026). Occurrence and prevalence of gastrointestinal parasites in herbivores in Dampa Tiger Reserve, Mizoram, India. *Journal of Threatened Taxa* 18(5): 28886–28893. <https://doi.org/10.11609/jott.10230.18.5.28886-28893>

Copyright: © Solanki et al. 2026. 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: Funds for this study were provided through the “National Mission on Himalayan Studies”, GBPNIHESD, Almora. Sanction letter no. GBPNI/ NMHS-2017/MG-22.

Competing interests: The authors declare no competing interests.

Author details: G.S. SOLANKI, professor of Zoology, and dean, School of Life Sciences, Mizoram University, Aizawl. Thrust area for research was Biodiversity & Conservation Biology, Wildlife Ecology and Resource Management. After a long experience, he has been superannuated from active service of Mizoram University. LALRINKIMI was a PG student in the Department of Zoology and completed her M.Sc. degree. She did her dissertation under the supervision of Prof. Solanki. PHOEBE LALREMRUATI was a research scholar in the Department of Zoology and completed her PhD degree under the supervision of Prof. Solanki on captive primates.

Author contribution: GSS-conceptualization of the study, arrangement of funds, finalizing the data analysis, writing and reviewing the final draft, and correspondence with the journal. Kimi collected the data and faecal samples from the field and performed preliminary screening of the samples. PL-helped in the final sample preparation of parasites and assisted in the identification of species. She also initiated the first draft of the manuscript.

Acknowledgments: We extend sincere thanks to the authority of Mizoram University for logistic and academic support during this study, and also to the chief wildlife warden for permitting us to work in the protected area and the field director of Dampa Tiger Reserve, for on-site support and cooperation. We are also thankful to the G.B. Pant National Institute of Himalayan and Sustainable Development, Almora, India, for providing funds for this study through the NMHS.



INTRODUCTION

Parasites are integral components of ecosystems, influencing host population dynamics, regulation, and community biodiversity (Hochachka & Dhondt 2000; Hudson et al. 2002). The intensity of parasitic infection can affect host fitness by reducing survival and reproductive success (Behnke 1990; Despommier et al. 1995; van Vuren 1996; Hilser et al. 2014). Intrinsic host features, together with environmental factors and parasite transmission mechanisms, shape overall vulnerability (Gibb et al. 2020). Primates, like other species, inhabit diverse environments and are exposed to variations in temperature and rainfall (Nunn & Altizer 2006; Solanki & Parida 2022). Many parasites are sensitive to these climatic factors; for instance, the eggs and larvae of several nematodes require adequate humidity to complete their development (Anderson 2000).

Wild animals are subjected to human exploitation or interventions, such as hunting and the wildlife trade, often experience heightened stress (Clark et al. 2008; Dickens et al. 2010) and are used in therapeutic activities and sociocultural & religious purposes (Solanki & Chutia 2009; Solanki et al. 2016). The growth of human populations, particularly in herbivore habitats, has further increased the risk of zoonotic transmission (Devaux et al. 2019). Chronic stress can suppress immune function, making animals more vulnerable to parasitic infections, leading to declining health and ultimately, death (Glaser & Kiecolt-Glaser 2005; Clark et al. 2008; Coe 2011). Habitat fragmentation and the resulting inbreeding have also been linked to higher parasite prevalence (Schad et al. 2005), although fragmentation may in some cases reduce parasite diversity (Anderson & May 1982). Human encroachment in natural habitats facilitates contact between people and wild herbivores, thereby increasing the chances of disease spillover and is viewed as a potential zoonotic agent for human wellbeing (de Thoisy 2001; Graczyk et al. 2001; Johnson et al. 2015; McLennan et al. 2018; Keatts et al. 2021).

Increasing anthropogenic activities are heightening contact between humans, domestic animals, and wildlife. These increases have been linked to changing human ecology, a growing human population, and its demand for bushmeat, wild animals as pets, agricultural land, natural resources, and the shrinking of wildlife habitats (Jones et al. 2008; Herrera & Nunn 2019; Gibb et al. 2020a; Plowright et al. 2021). However, the impact of human-herbivore interactions, both legal and illegal, on zoonotic pathogens remains insufficiently explored in the

Dampa Tiger Reserve (DTR). Along the periphery of DTR, twelve villages practice shifting cultivation, which often attracts herbivores and other mammals into farmland areas (Gouda et al. 2020). Nath et al. (2021) provided a concept of “one health moment” and recognised wildlife as a major source of zoonotic infections, highlighting the need for further research in wildlife pathogen detection. In light of these implications, an attempt was made to study the occurrence and prevalence of parasites among wild herbivores in the Dampa Tiger Reserve, Mizoram, India.

MATERIALS AND METHODS

Dampa Tiger Reserve is located between 92.220–92.4566° E and 23.545–23.693° N, encompassing 500 km² of core area and 488 km² of buffer zone at elevations ranging 200–1,200 m. Situated within the Indo-Myanmar biodiversity hotspot, the reserve supports rich floral and faunal diversity, including numerous herbivore species. The climate is moderately seasonal, with winter temperatures ranging from 11–21 °C and summer temperatures from 19–37 °C. Twelve villages lie within the buffer zone, where shifting cultivation is the primary livelihood practice. The study site map is presented in Figure 1.

Dampa Tiger Reserve (DTR) supports 23 herbivore species (Table 1) representing the families Cercopithecidae, Sciuridae, Elephantidae, Cervidae, and Bovidae. Owing to this diversity, faecal samples were collected from multiple individuals within each family rather than from all species. The sampling area was the Terei range of DTR. As only one Asian Elephant was recorded, repeated samples were collected from the same individual at different time intervals. Faecal samples were identified in the field based on pellet morphology (shape, size, colour, and consistency) following Gopal (1993), with species confirmation through footprints and associated field signs (Apeldoorn et al. 1993). Fresh samples were collected between January and March 2019 from active sites within the known distribution of individuals, with assistance from the local forester. This study is a part of the fulfilment of the Master’s degree program; therefore, the study was conducted for a limited period. Approximately, 10 g of each sample was preserved in 10% formalin and transported to the laboratory (Gillespie 2006). In total, 70 samples were obtained from 21 individuals (Table 2).

Samples were processed to detect enteric parasitic eggs and oocysts using direct smear, sedimentation,

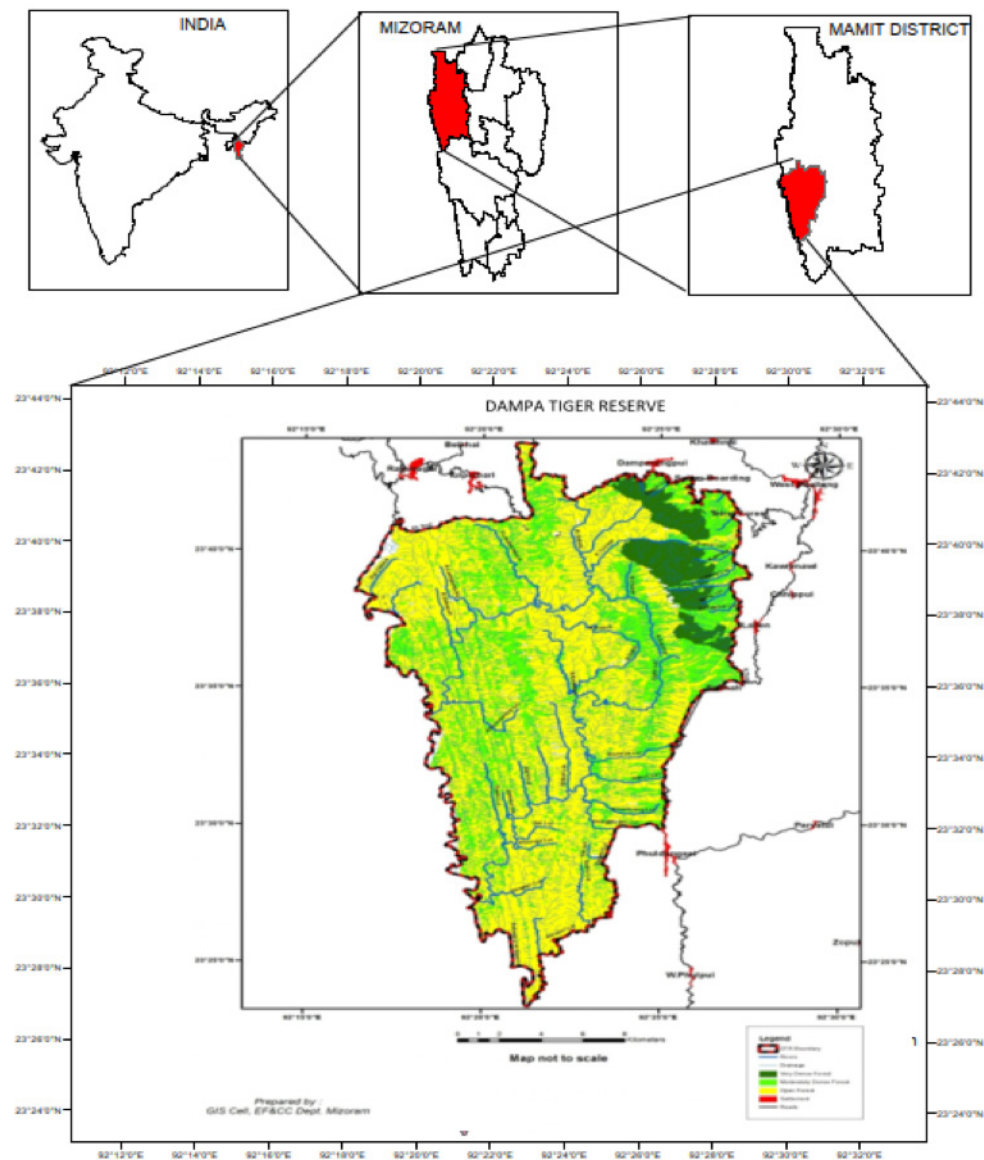


Figure 1. Map of Dampa Tiger Reserve.

and flotation techniques (Gillespie 2006). Prepared slides were systematically examined under a compound light microscope at varying magnifications. Parasite identification and confirmation were conducted at the College of Animal Husbandry and Veterinary Sciences. The data were compiled and organized for further analysis and graphical representation. Differences in gastrointestinal (GI) parasite prevalence among host families were assessed using the Kruskal-Wallis test. Pairwise comparisons between families were performed using the Mann-Whitney U test and the Wilcoxon rank sum test to evaluate variations in GI parasite prevalence.

RESULTS

Of 70 samples, 59 samples were found to be positive with ova or other stages of gastrointestinal parasites (GI). These parasite species include *Spirometra* sp., *Balantidium coli*, *Capillaria* sp., *Eimeria* sp., *Paragonimus* sp., *Giardia* sp., *Opisthorchis* sp., *Toxocara* sp., *Dicrocoelium* sp., *Trichuris* sp., *Isospora* sp., *Strongyle* and *Ascaris* sp. In total, 84.29% of samples were found to be positive for the prevalence of GI parasites, and 15.71% of the samples were found to be negative (Table 2).

Thirteen species of gastrointestinal parasites (GI) were recorded from herbivores of five different families (Table 3, Images 1 & 2). The highest level of

Table 1. List of herbivorous species present in Dampa Tiger Reserve.

Family	Common name	Scientific name
Cercopithecidae	i) Stump-tailed Macaque ii) Assamese Macaque iii) Northern Pig-tailed Macaque iv) Rhesus Macaque v) Phayre's Leaf Monkey vi) Capped Langur	i) <i>Macaca arctoides</i> ii) <i>Macaca assamensis</i> iii) <i>Macaca leonina</i> iv) <i>Macaca mulatta</i> v) <i>Trachypithecus phayrei</i> vi) <i>Trachypithecus pileatus</i>
Sciuridae	i) Hairy-footed Flying Squirrel ii) Parti-coloured Flying Squirrel iii) Red-bellied Squirrel iv) Red Giant Flying Squirrel v) Orange-bellied Himalayan Squirrel vi) Black Giant Squirrel vii) Hoary-bellied Squirrel viii) Himalayan Striped Squirrel	i) <i>Belomys pearsonii</i> ii) <i>Hylopetes alboniger</i> iii) <i>Callosciurus erythraeus</i> iv) <i>Petaurista petaurista</i> v) <i>Dremomys lokiah</i> vi) <i>Ratufa bicolor</i> vii) <i>Callosciurus pygerythrus</i> viii) <i>Tamiops maccllellandi</i>
Elephantidae	i) Asian Elephant	i) <i>Elephas maximus</i>
Cervidae	i) Hog Deer ii) Northern Red Muntjac iii) Brow-antlered Deer iv) Sambar	i) <i>Axis porcinus</i> ii) <i>Muntiacus muntjak</i> iii) <i>Rucervus eldii</i> iv) <i>Cervus unicolor</i>
Bovidae	i) Gaur ii) Red Serrow iii) Himalayan Serrow iv) Chinese Goral	i) <i>Bos gaurus</i> ii) <i>Capricornis rubidus</i> iii) <i>Capricornis thar</i> iv) <i>Naemorhedus griseus</i>

prevalence of *Ascaris* sp. was reported, followed by Strongyle whereas the prevalence of *Dicrocoelium* sp. was the least. The prevalence of *Ascaris* sp. and Strongyle was 47.68% and 30.23%, respectively (Figure 2). Among the four categories of gastrointestinal parasites, nematodes and protozoans were predominant with 38.5% and 30.8% prevalence of GI parasites, followed by trematodes with

23.1%. These two categories of parasites, nematodes, and protozoans, together showed a prevalence of 69.3%, with heavy infection in herbivores in DTR. Occurrence of the cestode (*Spirometra* sp.) was also recorded. Five species of nematodes found in herbivores were: *Ascaris* sp., Strongyle, *Capillaria* sp., *Trichuris* sp., and *Toxocara* sp. Of these species, *Ascaris* sp. and Strongyle were the most common parasites found in almost all samples. The level of prevalence of gastrointestinal parasites in herbivores in the DTR, in general, is given in Figure 2.

Parasites from different families

Ascaris sp. and Strongyle are family specific; *Ascaris* prevailed more in members of the Cervidae family, and the Strongyle exhibited high prevalence in members of the Cercopithecidae family. Gastrointestinal parasites were highest in Cervidae (54.65%) followed by Cercopithecidae (43.02%) and Sciuridae (31.39%). The overall level of GI parasites in different herbivore families is given in Figure 3. The variations in prevalence in different families of herbivores were tested using the Kruskal-Wallis test and revealed that variations in the number of parasites in different families were significant ($\chi^2 = 36.822$, $df = 5$, $P < 0.01$). The Mann-Whitney test was then performed for pairwise variation on the infection with different families. The pairwise analysis of the different families of the herbivore is given in Table 4. The pair-wise variation in GI prevalence level showed a significance at $P < 0.001$ between Cercopithecidae vs. Elephantidae, Cercopithecidae vs. Bovidae, Sciuridae vs. Elephantidae, Bovidae vs. Cervidae, and Sciuridae vs. Bovidae (Table 4. This indicates that the level of infection

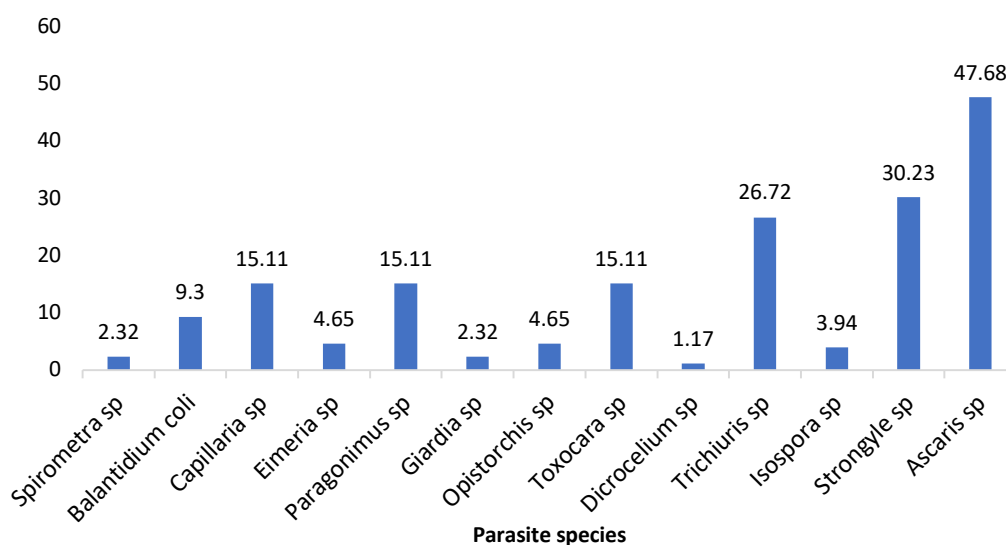
**Figure 2. Prevalence (%) of gastrointestinal parasites in herbivores.**

Table 2. Number of samples showed the prevalence of parasites in different families.

	Name of the family	No. of samples collected	No. of positive samples	No. of negative samples
1	Cercopithecidae	25	23	2
2	Sciuridae	12	12	0
3	Elephantidae	01	01	0
4	Cervidae	31	23	8
5	Bovidae	01	0	1
	Total	70	59	11
	Percentage		84.29	15.71

Table 3. Class of gastrointestinal parasites.

Nematodes	Trematodes	Protozoan	Cestode
<i>Ascaris</i> sp. Strongyle <i>Capillaria</i> sp. <i>Trichuris</i> sp. <i>Toxocara</i> sp.	<i>Opisthorchis</i> sp. <i>Paragonimus</i> sp. <i>Dicrocoelium</i> sp.	<i>Isospora</i> sp. <i>Balantidium coli</i> <i>Giardia</i> sp. <i>Eimeria</i> sp.	<i>Spirometra</i> sp.

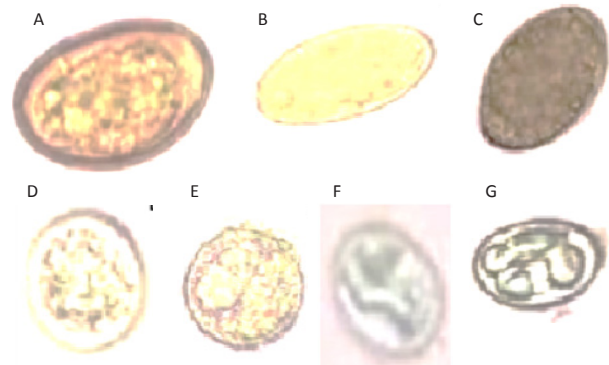
Table 4. Comparison of different families using the Mann-Whitney 'U' test.

	Different families	Mann-Whitney U	Wilcoxon W	P
1	Cercopithecidae vs. Sciuridae	136.5	227.5	0.818
2	Cercopithecidae vs. Elephantidae	23	114	0.001
3	Cercopithecidae vs. Bovidae	23	114	0.001
4	Cercopithecidae vs. Cervidae	78	169.5	0.753
5	Sciuridae vs. Elephantidae	30.5	121.5	0.001
6	Sciuridae vs. Bovidae	30.5	121.5	0.001
7	Sciuridae vs. Cervidae	69	160	0.411
8	Elephantidae vs. Bovidae	84.5	175.5	1
9	Bovidae vs. Cervidae	23	114	0.001

by GI parasites was high in family Cercopithecidae (92% [23/25 samples]), Sciuridae (100% [12/12 samples]), and Cervidae (74% [23/31 samples]) (Table 2).

DISCUSSIONS

This study provides the first systematic assessment of gastrointestinal (GI) parasite occurrence and prevalence in herbivores of Dampa Tiger Reserve. *Ascaris* sp. had the highest prevalence (47.68%), followed by Strongyle

**Image 1. Ova of gastrointestinal parasites: A—*Ascaris* sp. | B—Strongyle | C—*Trichuris* sp. | D—*Capillaria* sp. | E—*Toxocara* sp. | F—*Opisthorchis* sp.****Image 2. Ova of gastrointestinal parasites: A—*Dicrocoelium* sp. | B—*Paragonimus* sp. | C—*Spirometra* sp. | D—*Isospora* sp. | E—*Balantidium coli* | F—*Giardia* sp. | G—*Eimeria* sp.**

(30.23%), and *Trichuris* sp. (26.72%). *Capillaria* sp., *Paragonimus* sp., and *Toxocara* sp. had a prevalence level of 15.11% each. Similar patterns have been reported in herbivores across different habitat conditions by Cisek et al. (2004), Santin et al. (2004), Pilarczyk et al. (2005), and Lim et al. (2008). Although prevalence rates varied among the studies reported, the ranges were 40%–18%, 52%–27.5%, 67%–35%, and 34.5%–21.8% for helminths and protozoans, respectively. The prevalence of the cestode parasite (*Spirometra* sp.) was found in the present study (Table 3).

Nematodes are primarily transmitted through faecally contaminated soil, water, and forage, particularly in agricultural landscapes (Bethony et al. 2006). Grazing herbivores inadvertently ingest infective eggs or larvae while feeding, making them highly susceptible to infection. In DTR, primates of the family Cercopithecidae frequently forage in adjacent jhum (shifting cultivation) fields, increasing contact at the wildlife-agriculture

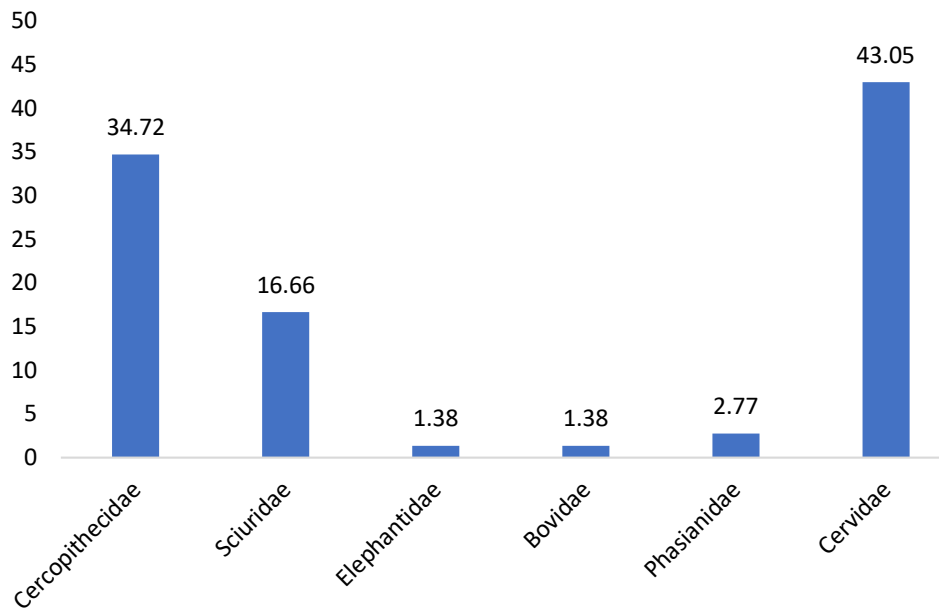


Figure 3. Overall prevalence level (%) of parasites in different families of herbivores.

interface and thereby elevating the risk of nematode and protozoan transmission (Dazak et al. 2000). Many nematodes and protozoans have direct life cycles that do not require intermediate hosts; transmission occurs via the faecal-oral route through contaminated feed, water, or soil (Thawait et al. 2014). Local communities draw untreated water directly from streams flowing through the reserve, thereby facilitating zoonotic transmission. Additionally, the reliance of approximately 21% of the local population on wild animals for bushmeat and ethnomedicinal purposes (Solanki & Chutia 2009; Solanki et al. 2016) increases the likelihood of cross-species parasite exchange between wildlife and humans (Johnson et al. 2015).

Comparable trends for prevalence of helminths and protozoans have been observed in wild captive animals, including elephants, with prevalence rates of 58% & 6% (Varadharajan & Kandasamy 2000), and 50% & 18.8% (Parasani et al. 2001), respectively. The overall prevalence of gastrointestinal parasites in this study (84.29%) (Table 2) was higher than that reported by Corden et al. (2008) at 72.5% and Dahal et al. (2023) at 47.57%. Lower prevalence rates have also been documented as 42.4% (Reddy et al. 1992), 40.4% (Chakraborty & Islam 1996), 48.1% (Modi et al. 1997), 60.7% (Parasani et al. 2001), 56.3% (Lim et al. 2008). Such variations are likely influenced by geographic, climatic, and ecological factors that affect parasite transmission and host-parasite dynamics (Lalremruati & Solanki 2020; Moustafa et al. 2021; Anusha et al. 2025). Parasitic

infections are known to be prevalent widely in warm and tropical climates where temperature, humidity, and light conditions favour parasite development and survival (Magona & Musisi 1999). These parasites, particularly trematodes and certain cestodes, require intermediate hosts for completion of their life cycles (Atanaskova et al. 2011). However, due to the limited scope of this study, life history parameters related to the identification of intermediate hosts were not examined.

Dampa Tiger Reserve hosts a rich diversity of carnivores (Singh et al. 2016; Singh & MacDonald 2017; Vandir et al. 2022), which rely on herbivores as their principal prey. This trophic relationship increases the potential for parasite transmission from herbivores to carnivores. Vandir et al. (2022) reported a gastrointestinal (GI) parasite prevalence rate of 90.47% among carnivores in DTR, with most parasite species corresponding to those identified in herbivores. Of the 13-parasite species in herbivores, 10 were common in carnivores in DTR. Frequent human-herbivore interactions also occur in and around the 12 villages adjacent to the reserve (Solanki et al. 2016), where bushmeat consumption poses a significant zoonotic risk (Keatts et al. 2021). The dependency of the local population (21%) on wild animals as sources of bushmeat and as ethnomedicines (Solanki et al. 2016) also increases the possibilities of cross-transmission of zoonotic diseases several-fold. Increasing human encroachment into wildlife habitats further heightens the risk of zoonotic disease transmission between wildlife and local communities

(Gibb et al. 2020; Recht et al. 2020). Agricultural fields surrounding protected areas often function as perihabitats for several herbivores, increasing the likelihood of exposure to zoonotic pathogens. Increasing landscape modification, greater human intrusion into wilderness areas, habitat fragmentation, the presence of free-ranging domestic animals, and seasonal ecological changes further intensify interactions among wildlife, livestock, and humans. Consequently, zoonotic parasites may eventually breach existing ecological barriers, shifting to new hosts such as livestock and ultimately humans (Otranto et al. 2015; Gibb et al. 2020a,b; Keatts et al. 2021; Plowright et al. 2021).

REFERENCES

- Anderson, R.C. (2000). *Nematode Parasites of Vertebrates. Their Development and Transmission. 2nd Edition*. CABI Publishing, Wallingford, Oxon (UK), 672 pp.
- Anderson, R.M. & R.M. May (1982). Coevolution of hosts and parasites. *Parasitology* 85: 411–426.
- Anusha, G., A.S. Khan, G. Krishnan & G. Umopathy (2025). Anthropogenic factors shape the gut microbiota of tigers in Indian tiger reserves. *Global Ecology and Conservation* 63e03874. <https://doi.org/10.1016/j.gecco.2025.e03874>
- Apeldoorn, R., M. El Daem, K. Hawley, M. Kozakiewicz, G. Merriam, W. Nieuwenhuizen & J. Wegner (1993). Footprints of small mammal. A field method of sampling data for different species. *Mammalia* 57(3): 407–422.
- Atanaskova, E., Z. Kochevski, J. Stefanovska & G. Nikolovski (2011). Endoparasites in wild animals at the zoological garden in Skopje, Macedonia. *Journal of Threatened Taxa* 3(7): 1955–1958. <https://doi.org/10.11609/JoTT.o2440.1955-8>
- Behnke, J.M. (1990). *Parasites: Immunity and Pathology: The Consequences of Parasitic Infections in Mammals*. Taylor and Francis, London, 437 pp.
- Bethony, J., S. Brooker, M. Albonico, S.M. Geiger, A. Loukas, D. Diemert & P.J. Hotez (2006). Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. *The Lancet* 367 (9521): 1521–1532. [https://doi.org/10.1016/S0140-6736\(06\)68653-4](https://doi.org/10.1016/S0140-6736(06)68653-4)
- Chakraborty, A. & S. Islam (1996). A survey of gastrointestinal parasitic infection in some free-ranging herbivores in the Kaziranga National Park. *Zoos' Print* 11: 3–5.
- Cisek, A., A. Balicka-Ramisz, A. Ramisz & B. Pilarczyk (2004). Monitoring of parasitic fauna in wild animals in the western Pomerania region. *Folia Universitatis Agriculturae Stetinensis, Zootechnica* 46: 15–20.
- Clark, J.D., K. Billington, J.M. Bumstead, R.D. Oakes, P.E. Soon, P. Sopp, F.E. Tomley & D.P. Blake (2008). A toolbox facilitating stable transfection of *Eimeria* species. *Molecular and Biochemical Parasitology* 162: 77–86. <https://doi.org/10.1016/j.molbiopara.2008.07.006>
- Coe, C.L. (2011). Immunity in primates within a psychobiological perspective, pp. 144–164. In: Demas, G. & R.J. Nelson (eds.). *Ecoimmunology*. Oxford University Press, Oxford, 656 pp.
- Corden, P., G.H. Prados, A. Romero, M.S. Sanchez, M. Pontes, A. Osuna & M.J. Rosales (2018). Intestinal parasitism in the animals of the zoological garden “Pen̄a Escrita” (Almun̄ecar, Spain). *Veterinary Parasitology* 156: 302–309. <https://doi.org/10.1016/j.vetpar.2008.05.023>
- Dahal, G., A. Sadaula, M. Gautam, A.R. Magar & S. Adhikari (2023). Prevalence of gastrointestinal parasites in endangered captive Asian Elephants (*Elephas maximus*) of Chitwan National Park in Nepal. *Archives of Agriculture and Environmental Science* 8(3): 290–294. <https://doi.org/10.26832/24566632.2023.080303>
- Daszak, P., A.A. Cunningham & A.D. Hyatt (2000). Emerging infectious diseases of wildlife- threats to biodiversity and human health. *Science* 287: 443–449.
- de Thoisy, B., I. Vogel, J.M. Reynes, J.F. Pouliquen, B. Carme, M. Kazanji & J.C. Vié (2001). Health evaluation of translocated free-ranging primates in French Guiana. *American Journal of Primatology* 54: 1–16. <https://doi.org/10.1002/ajp.1008>
- Despommier, D.D., R.W. Gwazda & P.J. Hotez (1995). *Parasitic Diseases*. Springer, NY, 345 pp.
- Devaux, C.A., O. Mediannikov, H. Medkour & D. Raoult (2019). Infectious disease risk across the growing human-nonhuman primate interface: a review of evidence. *Frontiers in Public Health* 5(7): 305. <https://doi.org/10.3389/fpubh.2019.00305>
- Dickens, M.J., D.J. Delehanty & L. Romero (2010). Stress: an inevitable component of animal translocation. *Biological Conservation* 143: 1329–1341. <https://doi.org/10.1016/j.biocon.2010.02.032>
- Gillespie, T.A. (2006). Noninvasive assessment of gastrointestinal parasite infections in free ranging primates. *International Journal of Primatology* 27(4): 1129–1143. <https://doi.org/10.1007/s10764-006-9064-x>
- Gibb, R., D. Redding, K. Chin, C. Donnelly, T. Blackburn, T. Newbold & L. Lones (2020a). Zoonotic host diversity increases in human-dominated ecosystems. *Nature* 584: 398–402. <https://doi.org/10.1038/s41586-020-2562-8>
- Gibb, R., L.H.V. Franklins, D.W. Redding & K.E. Jones (2020b). Ecosystem perspectives are needed to manage zoonotic risks in a changing climate. *BMJ* 371: 3389. <https://doi.org/10.1136/bmj.m3389>
- Glaser, R. & J.K. Kiecolt-Glaser (2005). Stress-induced immune dysfunction: Implications for health. *Nature Reviews Immunology* 5(3): 243–251. <https://doi.org/10.1038/nri1571>
- Gopal, R. (1993). *Fundamentals of Wildlife Management*. Justice Home Publication, Allahabad, 668 pp.
- Gouda, S., H. Decemson, A. Parida & G.S. Solanki (2020). Impact of shifting cultivation on mammalian diversity and distribution in fringe areas of Dampa Tiger Reserve, Mizoram, India. *Environmental Conservation Journal* 21(1&2): 103–115. <https://doi.org/10.36953/ECJ.2020.211212>
- Graczyk, J.K., R. Knight, R.H. Eilman & M.R. Grankold (2001). The role of non-biting flies in the epidemiology of human infectious diseases. *Microbes and Infection* 3(3): 231–235. [https://doi.org/10.1016/S1286-4579\(01\)01371-5](https://doi.org/10.1016/S1286-4579(01)01371-5)
- Herrera, J. & C.L. Nunn (2019). Behavioural ecology and infectious diseases: Implications for conservation of biodiversity. *Philosophical Transactions of the Royal Society B: Biological Sciences* 374: 20180054. <https://doi.org/10.1098/rstb.2018.0054>
- Hilser H., Y.C. Ehlers-Smith & D.A. Ehlers-Smith (2014). Apparent mortality as a result of an elevated parasite infection in *Presbytis rubicunda*. *Folia Primatologica* 85: 265–276. <https://doi.org/10.1159/000363740>
- Hochachka, W.M. & A.A. Dhondt (2000). Density-dependent decline of host abundance resulting from a new infectious disease. *Proceedings of National Academy of Sciences, USA* 97(10): 5303–5306. <https://doi.org/10.1073/pnas.080551197>
- Hudson, P., A. Rizzoli, B. Grenfell & J.A.P. Heesterbeek (2002). *The Ecology of Wildlife Diseases*. Oxford Press, Oxford, 216 pp.
- Johnson, C.K., P.L. Hitchens, T.S. Evans, T. Goldstein, K. Thomas & J.K. Mazet (2015). Spillover and pandemic properties of zoonotic viruses with high host plasticity. *Scientific Reports* 5: 14830. <https://doi.org/10.1038/srep14830>
- Jones, K.E., N.G. Patel, M.A. Levy, A. Storeygard, D. Balk & J.L. Gittleman (2008). Global trends in emerging infectious diseases. *Nature* 451: 990–993. <https://doi.org/10.1038/nature06536>
- Keatts, L.O., M. Robards, S.H. Olson, K. Hueffer, S.J. Insley, D.O. Joly & S. Kutz (2021). Implications of zoonoses from hunting and use of wildlife in North American Arctic and Boreal Biomes: Pandemic

- potential, monitoring, and mitigation. *Frontiers in Public Health* 9: 627–654. <https://doi.org/10.3389/fpubh.2021.627654>
- Lalremruati, P. & G.S. Solanki (2020)**. Prevalence and seasonal variation of gastrointestinal parasites among captive Northern Pig-tailed Macaque, *Macaca leonina* (Mammalia: Primates: Cercopithecidae). *Journal of Threatened Taxa* 12(3): 15370–15374. <https://doi.org/10.11609/jott.5050.12.3.15370-15374>
- Lim, Y.A.L., R. Ngui, J. Shukri, M. Rohela & N.H.R. Mat (2008)**. Intestinal parasites in various animals at a zoo in Malaysia. *Veterinary Parasitology* 157(1–2): 154–159. <https://doi.org/10.1016/j.vetpar.2008.07.015>
- Magona, W. & G. Musisi (1999)**. Prevalence and infection levels of gastrointestinal nematodes in Ugandan goats in different agro-climatic zones. *Bulletin of Animal Health and Production in Africa* 49: 49–56.
- McLennan, M.R., H. Mori, A. Mahittikorn, R. Prasertbun, K. Hagiwara & M.A. Huffman (2018)**. Zoonotic enterobacterial pathogens detected in wild chimpanzees. *EcoHealth* 15(1): 143–147. <https://doi.org/10.1007/s10393-017-1303-4>
- Modi, G.S., B.N. Prasad & B.K. Sinha (1997)**. Seasonal effects on prevalence of parasitic zoonotic diseases among zoo animals of Bihar. *Zoos' Print* 12: 8–11.
- Moustafa, M.A.M., C. Hla Myet, T.M. June, B. Saw, H. Lat, W.M. Mar, O.Z. Min, O. Natsuo, L. Mirikka, M.A.M. Wessam, I. Kimihito, N. Nariaki, N. Ryo & K. Katakura (2021)**. Anthropogenic interferences lead to gut microbiome dysbiosis in Asian elephants and may alter adaptation processes to surrounding environments. *Science Reports* 11(1): 741. <https://doi.org/10.1038/s41598-020-80537-1>
- Nath, T.C., K.S. Eom, S. Choe, S. Hm, S. Islam, B.A. Ndosi & Y. Kang (2021)**. Insight into One Health Approach: Endoparasite Infections in captive wildlife in Bangladesh. *Pathogens* 10(2): 250–264. <https://doi.org/10.3390/pathogens10020250>
- Nunn, C.L. & S. Altizer (2006)**. *Infectious Diseases in Primates*. Oxford University Press, NY, 400 pp.
- Otranto, D., C. Cantacessi, F. Dantas-Torres, E. Brianti, M. Pfeffer, C. Genchi, V. Guberti, G. Capelli & P. Deplazes (2015)**. The role of wild canids and felids in spreading parasites to dogs and cats in Europe. Part II: Helminths and arthropods. *Veterinary Parasitology* 213(1–2): 24–37. <https://doi.org/10.1016/j.vetpar.2015.04.020>
- Parasani, H.R., R.R. Momin, M.G. Maradin & S. Veer (2001)**. A survey of gastrointestinal parasites of captive animals at Rajkot Municipal Corporation Zoo, Rajkot, Gujarat. *Zoos' Print Journal* 16: 604–606. <https://doi.org/10.11609/JoTT.ZPJ.16.10.606>
- Pilarczyk, B., A. Balicka-Ramisz, A. Ramisz & S. Lachowska (2005)**. The Occurrence of intestinal parasites of roe deer and red deer in the Western Pomerania voivodeship. *Wiadomości Parazytologiczne* 51(4): 307–310.
- Plowright, R.K., J.K. Reaser, H. Locke, S.J. Woodley, J.A. Patz, D. Becker, G. Oppler, P. Hudson & G.M. Tabor (2021)**. Land use induced spillover: A call to action to safeguard environmental, animal, and human health. *The Lancet Planetary Health* 5: E237–E245. [https://doi.org/10.1016/S2542-5196\(21\)00031-0](https://doi.org/10.1016/S2542-5196(21)00031-0)
- Recht, J., V.J. Schuenemann & M.R. Sánchez-Villagra (2020)**. Host diversity and origin of Zoonoses: The Ancient and the New. *Animals* 10(9): 1672–1672. <https://doi.org/10.3390/ani10091672>
- Reddy, J.N.R., M.S. Jagannath, P.D.E. Souza & A.S. Rahman (1992)**. Prevalence of gastrointestinal parasites in mammals and captive birds at Bennaerghata National Park, Bangalore, India. *Indian Journal of Animal Science* 62: 1046–1048.
- Santin, D.M., J.M. Alunda, E.P. Hoberg & C.D.L. Fuente (2004)**. Abomasal parasites in wild sympatric cervids, red deer, *Cervus elaphus* and fallow deer, *Dama dama*, from three localities across central and western Spain: relationship to host density and park management. *Journal of Parasitology* 90(6): 1378–1386. <https://doi.org/10.1645/ge-3376>
- Schad, J., J.U. Ganzhorn & S. Sommer (2005)**. Parasite burden and constitution of major histocompatibility complex in the Malagasy mouse lemur, *Microcebus murinus*. *Evolution* 59(2): 439–450. <https://doi.org/10.1111/j.0014-3820.2005.tb01002.x>
- Singh, O.P., S.K. De & L. Cajee (2016)**. *State of Environment Report of Mizoram 2016*. Published by Department of Environmental Studies, North Eastern Hill University, Shillong, Meghalaya, 275 pp.
- Singh, P. & D.W. Macdonald (2017)**. Populations and activity patterns of Clouded leopards and Marbled cats in Dampa Tiger Reserve, India. *Journal of Mammalogy* 98(5): 1453–1462. <https://doi.org/10.1093/jmammal/gyx104>
- Solanki, G.S. (2016)**. Ecological studies on primates and evaluation of their habitat in Mizoram, India. Technical Report submitted to the Department of Science and Technology, Government of India. Department of Zoology, Mizoram University, Aizawl, Mizoram, 52 pp.
- Solanki, G.S. & P. Chutia (2009)**. Studies on ethno-medicinal aspects and zoo therapy in tribal communities in Arunachal Pradesh, India. *International Journal of Ecology and Environmental Sciences* 35(1): 67–76.
- Solanki, G.S., D. Lalchandama & Lalnunpui (2016)**. Use pattern of faunal resources by tribal and its impact on biodiversity in Dampa Tiger Reserve in Mizoram, India. *Journal of Bioresources* 3(1): 24–29.
- Solanki, G.S. & A. Parida (2022)**. Impact of altitude on population structure and distribution of Assamese macaque (*Macaca assamensis* McClelland, 1840) in Dampa Tiger Reserve in Mizoram, India. *International Journal of Ecology and Environmental Sciences* 48(6): 791–800. <https://doi.org/10.55863/ijees.2022.6791>
- Thawait, V.K., S.K. Maiti & A.A. Dixit (2014)**. Prevalence of gastrointestinal parasites in captive wild animals of Nandan Van Zoo, Raipur, Chhattisgarh. *Veterinary World* 7(7): 448–445.
- van Vuren, D. (1996)**. Ectoparasites, fitness, and social behaviour of yellow-bellied marmots. *Ethology* 102: 686–694. <https://doi.org/10.1111/j.1439-0310.1996.tb01159.x>
- Vandir, G.V., P. Lalrinkimi, A.D. Tariang & S. Gouda (2022)**. A study on the prevalence of gastrointestinal parasites in carnivores and its potential implications on human health. *Natural Resource for Human Health* 2(1): 52–61. <https://doi.org/10.53365/nrfhh/143443>
- Varadharajan, A. & A. Kandasamy (2000)**. A survey of gastrointestinal parasites of wild animals in captivity in the V.O.C. Park and Mini Zoo, Coimbatore. *Zoo's Print Journal* 15: 257–258. <https://doi.org/10.11609/JoTT.ZPJ.15.5.257-8>

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
Mr. 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. Topiltzin Contreras MacBeath, Universidad Autónoma del estado de Morelos, México
Dr. Heok Hee Ng, National University of Singapore, Science Drive, Singapore
Dr. Rajeesh 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 Vyasa, Vadodara, Gujarat, India
Dr. Pritpal S. Soorae, Environment Agency, Abu Dhabi, UAE.
Prof. Dr. Wayne J. Fuller, Near East University, Mersin, Turkey
Prof. Chandrashekhar U. Rivonker, Goa University, Taleigao Plateau, Goa, India
Dr. S.R. Ganesh, Kalinga Foundation, Agumbe, 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. 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, Sri S. Ramasamy Naidu Memorial College, Virudhunagar, 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 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,
3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore,
Tamil Nadu 641006, India
ravi@threatenedtaxa.org & ravi@zooreach.org



www.threatenedtaxa.org

OPEN ACCESS



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

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

May 2026 | Vol. 18 | No. 5 | Pages: 28739–29002

Date of Publication: 26 May 2026 (Online & Print)

DOI: 10.11609/jott.2026.18.5.28739-29002

Articles

Large mammal diversity of Vietnam's Chu Yang Sin National Park and the first experimental assessment of their vulnerability to snaring
– Minh Thi Anh Nguyen, Thuy Thi Bich Vo, Quy Tan Le, Vy Tran Nguyen, Vu Linh Nguyen, R.J. Timmins & Anthony J. Giordano, Pp. 28739–28749

Rapid camera-trap assessment of mammals in Tripura, India: new records and implications for conservation
– Omkar Patil, Ashutosh Joshi, Rutuja Digaskar & Amey Parkar, Pp. 28750–28769

Distribution, habitat use, and abundance of the Caracal *Caracal caracal* (Schreber, 1776) (Mammalia: Carnivora: Felidae) in a semi-arid Indian landscape
– Mohammad Mairaj, Dhruv Jain, Ramanand Bhakar & Ayan Sadhu, Pp. 28770–28783

Avian richness and habitat selection patterns in Jhimil Jheel Conservation Reserve, Uttarakhand, India
– Ankita Das, Soumya Dasgupta & Ramesh Krishnamurthy, Pp. 28784–28806

Herpetofauna of the Chitwan-Annapurna Landscape, Nepal: a comprehensive species checklist including occurrence in protected areas, with suggested conservation recommendations
– Santosh Bhattarai, Bishal Prasad Neupane, Bivek Gautam, Prabin Shrestha, Ashley R. Olson, Fiona Hogan & Wendy Wright, Pp. 28807–28829

Dietary assessment of tadpoles of selected rhacophorid frogs (*Polypedates*, *Rhacophorus*, *Zhangixalus*) (Amphibia: Anura: Rhacophoridae) of Kangchup, Manipur, India
– Yumkham Shelina Devi & Saibal Sengupta, Pp. 28830–28837

Eastern range record of the semiaquatic freshwater earthworm *Glyphidrilus gangeticus* Gates, 1958 (Clitellata: Crassicitellata: Almidae) from West Bengal, India, with a brief key to the Indian species of the genus
– M. Nurul Hasan, John Warren Reynolds, Hasko F. Nesemann, Shyamasree Ghosh & Chandra Kanta Mandal, Pp. 28838–28844

Succession of biofouling organisms on structural materials and their environmental drivers off the Kalpakkam coast, India
– Bandita Badakumar, D. Inbakandan & P. Sriyutha Murthy, Pp. 28845–28861

Addition of five lesser known angiosperm species from Mizoram, India
– R. Lalthantluanga, Dorothy Lalbiakhluni, Vanlalawmpuia Sailo, Rose Laldinaii Darnei, R. Lalhruaitluangi, Sanatombi Devi Yumkham & Sandhyarani Devi Khomdram, Pp. 28862–28873

Legislative and evidentiary challenges faced by the Indian law enforcement agencies in social media-enabled wildlife offences
– Pradipty Bhardwaj, Jayadevan S. Nair & H.V. Girisha, Pp. 28874–28885

Communications

Occurrence and prevalence of gastrointestinal parasites in herbivores in Dampa Tiger Reserve, Mizoram, India
– G.S. Solanki, Lalrinkimi & Phoebe Lalremruati, Pp. 28886–28893

Theileriosis in a captive Indian Gaur *Bos gaurus*: a rare encounter
– Kaushal Kumar, Vishal Kumar Sinha, Deepak Kumar, Imran Ali, Ramesh Tiwary, Pankaj Kumar & Amit Kumar, Pp. 28894–28899

Avifaunal diversity in agroecosystems: a case study from Uttar Pradesh, India
– Fatima Khan & Kaleem Ahmed, Pp. 28900–28910

First record of the Sistan Sand Boa *Eryx sistansensis* Eskandarzadeh et al., 2020 (Reptilia: Serpentes: Erycidae) from India
– Vivek Sharma & Dharmendra Khandal, Pp. 28911–28918

Population dynamics and habitat assessment of Indian Flapshell Turtle *Lissemys punctata vittata* (Reptilia: Testudines: Trionychidae) in Chawandiya, Rajasthan, India
– Mahaveer Prasad Vaishnav & Amol Arora, Pp. 28919–28925

A preliminary checklist of dragonflies and damselflies (Insecta: Odonata) of Kanyakumari District, Tamil Nadu, India
– V. Muthukrishnan, Anand Shibu, Vinod Sadhasivan & R. Amirtha Balan, Pp. 28926–28939

Documentation of dicotyledonous angiosperm diversity of Kanakamala, Kerala, India
– Marunnoli Umaiba Fitha & Puravannoor Edakkad Sreejith, Pp. 28940–28949

Diversity of dye-yielding plants traditionally used by ethnic communities of Assam, India
– Bhuvan Chandra Chutia, Hena Parbin, Abhijit Chandra Roy, Krishna Kanta Medhi & Utpal Bora, Pp. 28950–28956

Review

Ichthyofaunal diversity and conservation status of Nagaland, India: a comprehensive review
– Rejuba Pongen & Pranay Punj Pankaj, Pp. 28957–28970

Short Communications

Preliminary observations on the breeding ecology and potential threats to Bonelli's Eagle *Aquila fasciata* in Sithagiri Malai, Tamil Nadu, India
– S. Naveenkumar, H. Byju & H. Maitreyi, Pp. 28971–28975

A nesting attempt by Greater Flamingo *Phoenicopterus roseus* in an inland wetland in Kachch District, Gujarat, India
– Gaurav Sirola, Harindra Baraiya, Rajdeep Mitra, Anju Baroth & R. Suresh Kumar, Pp. 28976–28981

First time in 110 years: sighting of *Gynacantha khasiaca* MacLachlan, 1896 (Odonata: Aeshnidae) in Arunachal Pradesh, India
– R. Mahesh, Rajesh Gopinath, Gaurav Joshi & Roshan Upadhaya, Pp. 28982–28987

Notes

Evidence of Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in National Chambal Sanctuary, Uttar Pradesh, India
– Anshoo Nishad, Hiyashri Sarma, Rajib Saha, Vijay Pratap Singh, Maneesha Bhatt, Atit Rai, Qamar Qureshi & Vishnupriya Kolipakam, Pp. 28988–28990

First photographic record of Naumann's Thrush *Turdus naumanni* Temminck, 1820 from Assam, India
– Pulakeswar Basumatary, Pp. 28991–28994

New breeding record of Black-headed Ibis *Threskiornis melanocephalus* from Malappuram District, Kerala, India
– K.K. Junaina & A.P. Rashiba, Pp. 28995–28997

From the heart of Urad: records of *Cyrtodactylus bapme* Kamei & Mahony, 2021 (Reptilia: Squamata: Gekkonidae) from Assam, India, with comments on the pre-loocal region in males
– Manmath Bharali, Pranjal Swargiary, Tejas Mariswamy, Madhurima Das, Jayaditya Purkayastha & Sanath Chandra Bohra, Pp. 28998–29002

Publisher & Host



Threatened Taxa