

Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2024.16.5.25119-25282

www.threatenedtaxa.org

26 May 2024 (Online & Print)

16(5): 25119-25282

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

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

EDITORS

Founder & Chief Editor

Dr. Sanjay Molur

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

Deputy Chief Editor

Dr. Neelesh Dahanukar

Noida, Uttar Pradesh, India

Managing Editor

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

Associate Editors

Dr. Mandar Paingankar, Government Science College Gadchiroli, Maharashtra 442605, India

Dr. Ulrike Streicher, Wildlife Veterinarian, Eugene, Oregon, USA

Ms. Priyanka Iyer, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Dr. B.A. Daniel, ZOO/WILD, Coimbatore, Tamil Nadu 641006, India

Editorial Board

Dr. Russel Mittermeier

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

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

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

Stephen D. Nash

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

Dr. Fred Pluthero

Toronto, Canada

Dr. Priya Davidar

Sigur Nature Trust, Chadapatti, 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

Ms. Sindhura Stothra Bhashyam, Hyderabad, India

Web Development

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

Typesetting

Mrs. Radhika, ZOO, Coimbatore, India

Mrs. Geetha, ZOO, Coimbatore India

Fundraising/Communications

Mrs. Payal B. Molur, Coimbatore, India

Subject Editors 2020–2022

Fungi

Dr. B. Shivaraju, Bengaluru, Karnataka, India

Dr. R.K. Verma, Tropical Forest Research Institute, Jabalpur, India

Dr. Vatsavaya S. Raju, Kakatiya University, Warangal, Andhra Pradesh, India

Dr. M. Krishnappa, Jnana Sahyadri, 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. 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 Banos, Laguna, Philippines

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

Dr. Afroz Alam, Banasthali Vidyapith (accredited A grade by NAAC), Rajasthan, India

Dr. K.P. Rajesh, Zamorin's Guruvayurappan College, GA College PO, Kozhikode, Kerala, India

Dr. David E. Boufford, Harvard University Herbaria, Cambridge, MA 02138-2020, USA

Dr. Ritesh Kumar Choudhary, Agharkar Research Institute, Pune, Maharashtra, India

Dr. A.G. Pandurangan, Thiruvananthapuram, Kerala, India

Dr. Navendu Page, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand, India

Dr. Kannan C.S. 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: Rose-breasted Grosbeak *Pheucticus ludovicianus*, pen & ink with colour pencil. © Lucille Betti-Nash.



Post-tsunami status, distribution, and way forward for the conservation of Andaman Teal *Anas albogularis* Hume, 1873 (Aves: Anatidae) in the Andaman Islands

Anoop Raj Singh¹ , Gaurav Sirola² , Sipu Kumar³ & Nehru Prabakaran⁴

^{1–4} Post box 18, Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand 248001, India.

¹ Department of Zoology and Environmental Science, Gurukula Kangri (deemed to be) University, Haridwar, Uttarakhand 249404, India.

¹anooprajasingh23@gmail.com, ²gaurav1096@gmail.com, ³sipuwildlife@gmail.com, ⁴nehrumcc@gmail.com (corresponding author)

Abstract: Historically, Andaman Teal *Anas albogularis* have been primarily found in South Andaman. However, the land uplifts and subsidence resulting from the 2004 tsunami and the earthquake have created new wetlands across the island. These wetlands became suitable habitats for the Andaman Teal, leading to population expansion within South Andaman and a range shift to North Andaman.

Keywords: Avian ecology, distribution extension, land reclamation, mangrove colonization, new intertidal, new wetland.

The avifauna family Anatidae constitutes 53 genera and 174 species. They are widely distributed across the globe, from the colder regions in the Northern Hemisphere to the tropical regions in the Southern Hemisphere (Gilbert et al. 2006). Among 53 genera, the genus *Anas* is the most species-rich with 31 species, of which 11 are categorized as threatened (1 Extinct, 1 Critically Endangered, 3 Endangered, 4 Vulnerable, 2 Near Threatened), and remaining 20 categorized as 'Least Concern' as per the IUCN Red List (IUCN 2017;

Winkler et al. 2020). Of the six *Anas* species reported from India (19%), two are distributed in the Andaman Islands, namely *A. albogularis* (Andaman Teal) and *A. acuta* (Northern Pintail) (eBird Basic Dataset 2023). The Andaman Teal is endemic to the Andaman Islands of India and the Great Coco Island of Myanmar in the Bay of Bengal. It currently falls under the 'Vulnerable' category (BirdLife International 2024).

Earlier, the taxonomic position of Andaman Teal was problematic, as ornithologists misplaced them in the *Nettion* genus. Later, it was misidentified as conspecific with another 'Near Threatened' species, *A. gibberifrons* (Sunda Teal). However, in 2014, the taxonomic confusion was resolved to accept the Andaman Teal as a monotypic species based on their differences in the color pattern around the eyes and the speculum (BirdLife International 2024). Further, the Andaman Teal's prime habitats to roost, feed, and breed are inland water bodies ranging from freshwater streams, ponds, agriculture fields,

Editor: P.A. Azeez, Coimbatore, Tamil Nadu, India.

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

Citation: Singh, A.R., G. Sirola, S. Kumar & N. Prabakaran (2024). Post-tsunami status, distribution, and way forward for the conservation of Andaman Teal *Anas albogularis* Hume, 1873 (Aves: Anatidae) in the Andaman Islands. *Journal of Threatened Taxa* 16(5): 25256–25260. <https://doi.org/10.11609/jott.8938.16.5.25256-25260>

Copyright: © Singh et al. 2024. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use, reproduction, and distribution of this article in any medium by providing adequate credit to the author(s) and the source of publication.

Funding: The Rufford Foundation: (1st Rufford Small Grant-32387-1) & The DST-Inspire Programme (DST/INSPIRE/04/2018/001071).

Competing interests: The authors declare no competing interests.

Acknowledgements: We acknowledge all the professional and amateur bird watchers from the islands for reporting Andaman Teal sightings on the e-bird platform. The financial support from the DST-Inspire Programme (DST/INSPIRE/04/2018/001071) and The Rufford Foundation is highly appreciated. We are thankful to the Forest Department of Andaman & Nicobar Islands for the continuous logistic support. We also thank the director, dean, faculties, colleagues, and friends from the Wildlife Institute of India for motivation and encouragement.



mangroves, lagoons, brackish swamps, tidal creeks, estuaries, and open sea (Grimmett et al. 1998). Natural catastrophic events like cyclones and tsunamis could directly impact these habitats, devastatingly affecting the island's vulnerable Andaman Teal population (Sutherland et al. 2012).

The 2004 Sumatra-Andaman earthquake, epicentred 200 km from Andaman & Nicobar Islands (hereafter ANI), produced large tsunami waves that severely destructed the coastal forest ecosystem, including wetlands and creeks (Sankaran 2005). Additionally, the earthquake of 9.1 intensity on the Richter scale permanently altered the island's geomorphology, leading to vertical movement of the island (Meltzner et al. 2006). The northern part of the Island (North Andaman) experienced a coastal uplift of up to 1.35 m, while the southern part (South Andaman) subsided by ~1 m (Meltzner et al. 2006). The altered geomorphology resulted in the degradation of around 150 km² of coastal forest habitat (largely mangroves) across Andaman Islands (135 km² in uplift sites of North Andaman and 15 km² in subsided sites of South Andaman) (Ramakrishnan et al. 2020; ShivaShankar et al. 2020). The impacts of Tsunami, coastal uplift, and subsidence on the water birds remain under-studied in the Andaman Islands. A study by Mamannan & Vijayan (2009) reported a 60% decline in the Andaman Teal population from ~136 individuals in 2004 to ~58 individuals in 2007 from South Andaman (Mohanty & Padmavati 2022).

The coastal uplift and subsidence have also created new intertidal habitats across the Andaman Islands suitable for the colonization of wetland flora and fauna (Ramakrishnan et al. 2020; ShivaShankar et al. 2020). The land uplift created new intertidal zones towards the seaward zone along North Andaman, previously colonized by corals and reef beds (Images 1A & B) (Ramakrishnan et al. 2020). Meanwhile, the subsidence created around 25 new wetlands (30 km²) towards the landward zone in South Andaman, previously agriculture fields, terrestrial forests, or coconut plantations (Images 1E & F) (ShivaShankar et al. 2020; Purti et al. 2022). In addition to mangrove colonization, these new wetlands offer suitable habitats for waterbirds, including the vulnerable Andaman Teal, to relocate and colonize. These new habitats often exposed rocks and mudflats with molluscs, arthropods, and insects during the low tide, providing perfect roosting and feeding ground for the Andaman Teal. The formation of new habitats (Images 1B, D, E, & F) with ample food resources might be the paramount factor for the increase in Andaman Teal population in the islands by 48%, from 674 individuals in

2005 to ~1000 individuals in 2014 (Vijayan et al. 2006; Rahmani 2012; Rajan & Pramod 2017; Purti et al. 2022).

Andaman Teal, despite being endemic to the entire Andaman Island, their distribution within the island group was historically reported sporadic (Image 2A). For instance, their distribution before the 2004 tsunami was mostly in and around the wetlands of South Andaman (Kulkarni & Chandi 2003; Vijayan et al. 2006; Rahmani 2012; Rajan & Pramod 2017; Purti et al. 2022). Some literature also suggests that Andaman Teals were residents of the wetlands of South Andaman, rarely migrating to North Andaman (North Reef and Interview Island) in groups of 20–30 individuals as visitor birds (Andrews & Whitaker 1994; Vijayan 1996; Vijayan et al. 2000). Further, on accessing the location of point count of Andaman Teal before and after 2004 tsunami from the e-bird database, we found their distribution and abundance were mostly restricted to South Andaman before the tsunami (Image 2A). Their sighting reports and abundance extended to the North and Middle Andaman post-2004 tsunami (Images 2A & B). The reporting of bird sightings on the e-bird database before the 2004 tsunami from the islands would be scarce mostly due to the remoteness and inaccessibility of the Islands. Meantime, while conducting the mangrove survey in the new intertidal habitat of North Andaman, we observed 30–40 individuals (including young ones) of Andaman Teal for three consecutive years (2021–2023) at two locations, namely Chipipo (Caren Basti—13.5478°N & 93.0104°E), and Beach Dera (13.4645°N & 93.0167°E) (Image 2A & B). These observations were further inquired with the village head of Beach Dera (Gabriel Toppo) and Chipipo (Saw Solomon & Saw Lakapow), who confirmed that these ducks (vernacular name: Paani Batak) were not present before the 2004 tsunami but seen permanently residing here for around the last 5–6 years.

Even though Andaman Teal's population status and distribution show an increasing trend in Andaman Island (Vijayan et al. 2006; Rahmani 2012; Rajan & Pramod 2017; Purti et al. 2022) (Image 2B), they are under threat from various natural and anthropogenic disturbances. The new intertidal habitat is currently under succession from unvegetated (post-tsunami event) to gradual colonization by mangroves and associates. Mangroves would eventually occupy the new wetlands and intertidal habitats, leading to Andaman Teal and other waterbird populations shrinking in the future. Further, the new wetlands formed in subsided sites of South Andaman, where a large proportion of the Andaman Teal population resides, are largely privately owned farmlands (Images



Image 1. Formation of new wetlands and intertidal habitats with water bird and mangrove colonization in Andaman Island: A & B—Andaman Teal using the wetlands in the uplifted site in Chippo of North Andaman Island | C & D—Andaman Teal using the wetlands in the uplifted site at Beach Dera of North Andaman Island | E & F—Andaman Teal in the new wetland at the subsided site of South Andaman with land reclamation from behind. © A & C—Google Earth | B & D—Anoop Raj Singh | E & F—Vishnu Thavara.

1E & F) (Purti et al. 2022). Now, these lands (currently new wetlands) are undergoing reclamation by the landowners (Images 1E & F), which will again endanger the population status of Andaman Teal in the near future.

Hence, identifying and mapping potential habitats and management of land under private ownership will be a crucial step towards sustaining the Andaman Teal population in the Andaman Islands. Moreover, long-

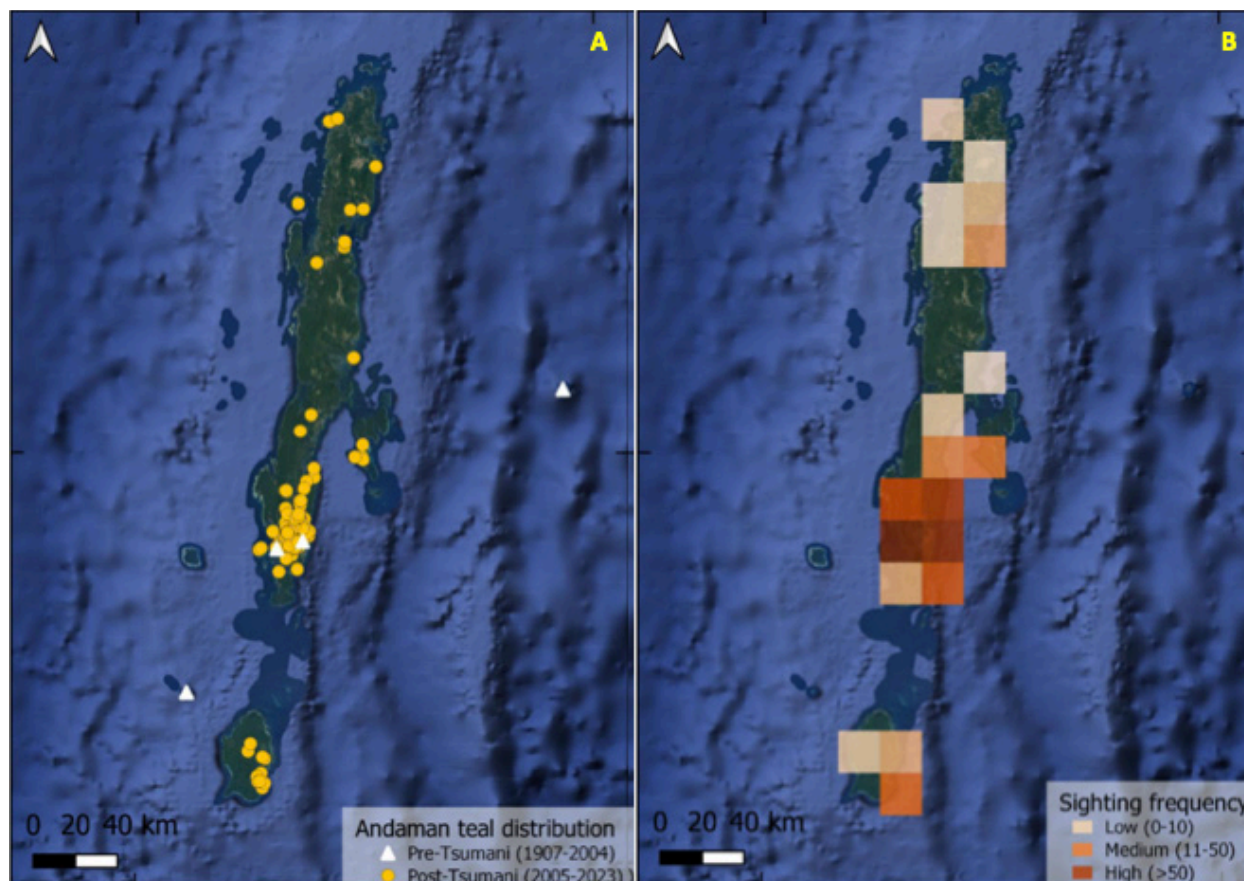


Image 2. Spatial distribution of *A. albogularis* (Andaman Teal) in the Andaman Group of Islands based on ebird data (eBird Basic Dataset 2023): A—distribution of Andaman Teal in the islands before and after the 2004 tsunami | B—sighting frequency of Andaman Teal in the islands after the 2004 Tsunami. (Map prepared in ArcMap Version 10.5).

term monitoring of these new wetlands with continuous population estimation should be a priority to conserve Andaman Teal and other water birds on the island. To strengthen our baseline information, focused research on Andaman Teal movement ecology, habitat use, diet, and breeding ecology is of utmost importance, which will help the managers and policymakers to conserve the species upon any futuristic catastrophic events.

REFERENCES

- Andrews, H.V. & R. Whitaker (1994). Preliminary observation on the Andaman Teal (*Anas gibberifrons albogularis*) in North Andaman Island and North of Middle Andaman. Report submitted to the Asian Wetlands Bureau and Centre for Herpetology, Madras Crocodile Bank Trust (no pagination).
- BirdLife International (2024). Species factsheet: *Anas albogularis*. <http://datazone.birdlife.org/species/factsheet/andaman-teal-anas-albogularis>. Electronic version accessed on 04 January 2024.
- eBird Basic Dataset (2023). Version: EBD_relNov-2023. Cornell Lab of Ornithology, Ithaca, New York. Downloaded on 02 January 2024.
- Gilbert, M., X. Xiao, J. Domenech, J. Lubroth, V. Martin & J. Slingenberg (2006). Anatidae migration in the western Palearctic and spread of highly pathogenic avian influenza H5N1 virus. *Emergency Infectious Disease* 12(11): 1650–1656. <https://doi.org/10.3201/eid1211.060223>
- Grimmett, R., C. Inskipp & T. Inskipp (1998). *Birds of Indian Subcontinent*. Oxford University Press, New Delhi, 888 pp.
- IUCN (2017). The IUCN Red List of Threatened Species. Version 2017-1. www.iucnredlist.org. Electronic version accessed 01 January 2024.
- Kulkarni, S. & M. Chandi (2003). Note on breeding of Andaman teal *Anas gibberifrons* in south Andaman Islands, India. *Journal of the Bombay Natural History Society* 100(1): 112–112.
- Mamannan, R. & L. Vijayan (2009). *Impact of coastal habitat changes on the population of the Andaman Teal*. Conference poster: BNHS International Conference 'Conserving Nature in a Globalizing India'.
- Meltzner, A.J., K. Sieh, M. Abrams, D.C. Agnew, K.W. Hudnut, J.P. Avouac & D.H. Natawidjaja (2006). Uplift and subsidence associated with the great Aceh- Andaman earthquake of 2004. *Journal of Geophysical Research: Solid Earth* 111: B02407. <https://doi.org/10.1029/2005JB003891>
- Mohanty, F. & G. Padmavati (2022). Distribution and Diversity of Coastal Birds with Special Emphasis on the Foraging Behaviour of *Tringa totanus* in Andaman and Nicobar Islands. *Journal of the Andaman Science Association* 27(2): 256–265.
- Purti, N., V.S. Shankar, G. Narshimulu, S. Halder, C. Ramayya & R.P. Singh (2022). Study on the diversity of birds in the new abode of wetlands created by the 2004 tsunami in South Andaman. *Journal of Threatened Taxa* 14(4): 20811–20820. <https://doi.org/10.11609/jott.6804.14.4.20811-20820>

- Rahmani, A.R. (2012). *Threatened Birds of India – Their Conservation Requirements*. Indian Bird Conservation Network: Bombay Natural History Society, Royal Society for the Protection of Birds and BirdLife International. Oxford, UK: Oxford University Press, xvi + 864pp.
- Rajan, P. & P. Pramod (2017). Bird community response to Tsunami-affected wetlands of South Andaman Island, India. *Indian Birds* 13(5): 125–131.
- Ramakrishnan, R., Y. Gladston, N.L. Kumar, P. Rajput, R.M. Murali & A.S. Rajawat (2020). Impact of 2004 co-seismic coastal uplift on the mangrove cover along the North Andaman Islands. *Regional Environmental Change* 20(1): 1–12. <https://doi.org/10.1007/s10113-020-01608-7>
- Sankaran, R. (2005). Impact of the earthquake and the Tsunami on the Nicobar Islands, pp. 10–77. In: Kaul, R. & V. Menon (Eds.). *The ground beneath the waves: post-tsunami impact assessment of wildlife and their habitats in India. Volume-2 The Islands*. Wildlife Trust of India, New Delhi.
- ShivaShankar, V., G. Narshimulu, T. Kaviarasan, S. Narayani, K. Dharanirajan, R.A. James & R.P. Singh (2020). 2004 Post Tsunami resilience and recolonization of mangroves in South Andaman, India. *Wetlands* 40: 619–635. <https://doi.org/10.1007/s13157-019-01211-5>
- Sutherland, W.J., J.A. Alves, T. Amano, C.H. Chang, N.C. Davidson, C.M. Finlayson, J.A. Gill, R.E. Gill Jr, P.M. González, T.G. Gunnarsson & D. Kleijn (2012). A horizon scanning assessment of current and potential future threats to migratory shorebirds. *Ibis* 154(4): 663–679. <https://doi.org/10.1111/j.1474-919X.2012.01261>
- Vijayan, L. (1996). Status and conservation of the Andaman teal *Anas gibberifrons albogularis*. In: Proc Anatidae 2000 Conference, Strasbourg, France, 5-9 December 1994. *Gibier Faune Sauvage, Game Wildlife* 13(1): 831–842.
- Vijayan, L., V. Murugan & M.A.R. Mamannan (2006). Conservation of Andaman Teal. *Threatened Waterfowl Specialist Group News bulletin* 15: 55–59.
- Vijayan, L., R. Sankaran, K. Sivakumar & V. Murugan (2000). A study on the ecology, status and conservation prospectives of certain rare endemic avifauna of the Andaman & Nicobar Islands. Salim Ali Centre for Ornithology and Natural History Coimbatore, 184 pp.
- Winkler, D.W., S.M. Billerman & I.J. Lovette (2020). Ducks, Geese, & Waterfowl (*Anatidae*), version 1.0. In: Billerman, M., B.K. Keeney, P.G. Rodewald & T.S. Schulenberg (eds.). *Birds of the World*. Cornell Lab of Ornithology, Ithaca, New York, USA. <https://doi.org/10.2173/bow.anatid1.01>



Mr. Jatishwor Singh Irungbam, Biology Centre CAS, Branišovská, Czech Republic.
Dr. Ian J. Kitching, Natural History Museum, Cromwell Road, UK
Dr. George Mathew, Kerala Forest Research Institute, Peechi, India
Dr. John Noyes, Natural History Museum, London, UK
Dr. Albert G. Orr, Griffith University, Nathan, Australia
Dr. Sameer Padhye, Katholieke Universiteit Leuven, Belgium
Dr. Nancy van der Poorten, Toronto, Canada
Dr. Kareen Schnabel, NIWA, Wellington, New Zealand
Dr. R.M. Sharma, (Retd.) Scientist, Zoological Survey of India, Pune, India
Dr. Manju Siliwal, WILD, Coimbatore, Tamil Nadu, India
Dr. G.P. Sinha, Botanical Survey of India, Allahabad, India
Dr. K.A. Subramanian, Zoological Survey of India, New Alipore, Kolkata, India
Dr. P.M. Sureshan, Zoological Survey of India, Kozhikode, Kerala, India
Dr. R. Varatharajan, Manipur University, Imphal, Manipur, India
Dr. Eduard Vives, Museu de Ciències Naturals de Barcelona, Terrassa, Spain
Dr. James Young, Hong Kong Lepidopterists' Society, Hong Kong
Dr. R. Sundararaj, Institute of Wood Science & Technology, Bengaluru, India
Dr. M. Nithyanandan, Environmental Department, La Ala Al Kuwait Real Estate. Co. K.S.C., Kuwait
Dr. Himender Bharti, Punjabi University, Punjab, India
Mr. Purnendu Roy, London, UK
Dr. Saito Motoki, The Butterfly Society of Japan, Tokyo, Japan
Dr. Sanjay Sondhi, TITLI TRUST, Kalpavriksh, Dehradun, India
Dr. Nguyen Thi Phuong Lien, Vietnam Academy of Science and Technology, Hanoi, Vietnam
Dr. Nitin Kulkarni, Tropical Research Institute, Jabalpur, India
Dr. Robin Wen Jiang Ngiam, National Parks Board, Singapore
Dr. 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 Dubai, 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, 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. P.A. Azeez, Coimbatore, Tamil Nadu, India

Mammals

Dr. Giovanni Amori, CNR - Institute of Ecosystem Studies, Rome, Italy
Dr. Anwaruddin Chowdhury, Guwahati, India
Dr. David Mallon, Zoological Society of London, UK
Dr. Shomita Mukherjee, SACON, Coimbatore, Tamil Nadu, India
Dr. Angie Appel, Wild Cat Network, Germany
Dr. P.O. Nameer, Kerala Agricultural University, Thrissur, Kerala, India
Dr. Ian Redmond, UNEP Convention on Migratory Species, Lansdown, UK
Dr. Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA
Dr. Karin Schwartz, George Mason University, Fairfax, Virginia.
Dr. Lala A.K. Singh, Bhubaneswar, Orissa, India
Dr. Mewa Singh, Mysore University, Mysore, India
Dr. Paul Racey, University of Exeter, Devon, UK
Dr. Honnavalli N. Kumara, SACON, Anaikatty P.O., Coimbatore, Tamil Nadu, India
Dr. Nishith Dharaiya, HNG University, Patan, Gujarat, India
Dr. Spartaco Gippoliti, Socio Onorario Società Italiana per la Storia della Fauna "Giuseppe Altobello", Rome, Italy
Dr. Justus Joshua, Green Future Foundation, Tiruchirappalli, Tamil Nadu, India
Dr. H. Raghuram, The American College, Madurai, Tamil Nadu, India
Dr. Paul Bates, Harison Institute, Kent, UK
Dr. Jim Sanderson, Small Wild Cat Conservation Foundation, Hartford, USA
Dr. Dan Challender, University of Kent, Canterbury, UK
Dr. David Mallon, Manchester Metropolitan University, Derbyshire, UK
Dr. Brian L. Cypher, California State University-Stanislaus, Bakersfield, CA
Dr. S.S. Talmale, Zoological Survey of India, Pune, Maharashtra, India
Prof. Karan Bahadur Shah, 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 pausity of space, the list of reviewers for 2021–2023 is available online.

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

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

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



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 2024 | Vol. 16 | No. 5 | Pages: 25119–25282

Date of Publication: 26 May 2024 (Online & Print)

DOI: 10.11609/jott.2024.16.5.25119-25282

Articles

Tree architecture model of Sumatran Orangutan *Pongo abelii* Lesson, 1827 (Mammalia: Primates: Hominidae) nests at Soraya Research Station, Leuser Ecosystem, Indonesia

– Anugrah Gilang Permana Lubis & Nursahara Pasaribu, Pp. 25119–25128

Diet of Rusty-spotted Cat *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831) (Mammalia: Carnivora: Felidae) in Sanjay Gandhi National Park, Mumbai, India

– Shomita Mukherjee, Arati Ramdas Gawari, Kartik Pillai, Pankaj Koparde, P.V. Karunakaran & Nayan Khanolkar, Pp. 25129–25136

An avifaunal checklist of the Bani Wildlife Sanctuary, Jammu & Kashmir, India

– Iyaz Quyum, Bilal A. Bhat, Wasim Sajad Malik, Taslima Sheikh & Arif Nabi Lone, Pp. 25137–25146

Traditional harvesting practices employed for freshwater turtles by the indigenous communities along Shilabati River, West Bengal, India

– Prasun Mandal, Pathik Kumar Jana, Priyanka Halder Mallick, Shailendra Singh & Tanmay Bhattacharya, Pp. 25147–25156

Diversity and abundance of mayflies (Insecta: Ephemeroptera) in Achenkovil River, southern Western Ghats, Kerala, India

– S. Sujitha, R. Sreejai & C. Selvakumar, Pp. 25157–25165

Legumes (Angiosperm: Fabaceae) of Birbhum District, West Bengal, India

– Shamim Alam & Adani Lokho, Pp. 25166–25187

Floristic diversity of mangroves and mangrove associate species of Kali River Estuary, Karwar, Karnataka, India

– Amruta G. Hondappanavar, Shivanand S. Bhat & Praveen Kumar Verma, Pp. 25188–25197

Reproductive biology of *Senna spectabilis* (DC.) H.S.Irwin & Barneby (Fabaceae) - an invasive tree species in the tropical forests of the Western Ghats, India

– K. Muraleekrishnan, Sanal C. Viswanath & T.K. Hrideek, Pp. 25198–25208

Communications

Diversity and status of butterfly fauna at Kurukshetra University campus, Haryana, India

– Vidisha Gupta & Parmesh Kumar, Pp. 25209–25219

First report of *Lutevula hortensia* (Distant) (Heteroptera: Reduviidae: Emesinae) from India

– Vijay Anand Ismavel & Hemant V. Ghate, Pp. 25220–25226

Diversity of mosses (Bryophyta) in Pangi valley (Himachal Pradesh, India): an unexplored domain of northwestern Himalaya

– Anshul Dhyani, Kumar Shantanu, Rajender Kumar Sharma & Prem Lal Uniyal, Pp. 25227–25234

Morphological characterization and distribution of four corticioid fungi species (Basidiomycota) in India

– Tanya Joshi, Ellu Ram, Avneet Kaur & Avneet Pal Singh, Pp. 25235–25242

Taxonomy and molecular systematics of marasmioid fungi occurring (Basidiomycetes: Agaricales: Marasmiaceae) in Puducherry, India

– Yuvarani Krishnan, Thokur Sreepathy Murali, Gunasekaran Senthilarasu & Vadivelu Kumaresan, Pp. 25243–25251

Short Communications

First photo evidence of Siberian Weasel *Mustela sibirica* Pallas, 1773 (Mammalia: Carnivora: Mustelidae) in Gaurishankar Conservation Area, Nepal

– Madhu Chetri, Purna Bahadur Ale & Morten Odden, Pp. 25252–25255

Post-tsunami status, distribution, and way forward for the conservation of Andaman Teal *Anas albogularis* Hume, 1873 (Aves: Anatidae) in the Andaman Islands

– Anoop Raj Singh, Gaurav Sirola, Sipu Kumar & Nehru Prabakaran, Pp. 25256–25260

A preliminary checklist of Copepoda in the mangrove areas of Munroe Island, adjacent to Ashtamudi estuary, Kerala, India

– M.S. Arya, A. Biju & Dani Benchamin, Pp. 25261–25264

Notes

First photographic record of Asiatic Brush-tailed Porcupine *Atherurus macrourus* Linnaeus, 1758 from Sonai Rupai Wildlife Sanctuary, Assam, India

– B. Piraisoodan, Asish Immanuel Baglary & Bibhuti Mazumder, Pp. 25265–25267

New country record of *Trimeresurus uetzi* Vogel, Nguyen & David, 2023 (Reptilia: Squamata: Viperidae) from India

– Lal Biakzuala, Lal Muansanga, Fanai Malsawmdawngliana, Lalrinnunga Hmar & Hmar Tlawmte Lalremsanga, Pp. 25268–25272

New record of Giant Redeye *Gangara thyrsis thyrsis* (Fabricius, 1775) (Lepidoptera: Hesperidae) from Garhwal region of western Himalaya, India

– Ankita Singh Sajwan & Arun Pratap Singh, Pp. 25273–25275

***Strobilanthes khasyana* (Acanthaceae): an addition to the flora of Nagaland, India**

– Pfüchüpe-ü Mero, Kazhuhrii Eshuo & Neizo Puro, Pp. 25276–25278

***Sonerila konkanensis* Resmi & Nampy (Melastomataceae)**

– an addition to the flora of Karnataka, India

– Prashant Karadakatti & Siddappa B. Kakkalameli, Pp. 25279–25282

Publisher & Host



Threatened Taxa