AIWC

Conservation Snippets

Volume: 3 (51-75) || September-October 2025

Tamil Nadu Forest Department

Advanced Institute for Wildlife Conservation

(Research, Education & Training)

Vandalur, Chennai - 600 048

Preface

The Advanced Institute for Wildlife Conservation initiated a series titled **"Conservation Snippets"** in May 2025, which summarizes recent key research findings related to conservation. The snippets focus on species, ecosystems, population assessments, and conservation-related challenges such as habitat loss, degradation, fragmentation, poaching, illegal trade, and human-wildlife conflicts.

So far, the AIWC has circulated a total of seventy five "Conservation Snippets." For ease of access, we have compiled the snippets into three volumes: Conservation Snippets, Volume 1 (snippets 1–25), Volume 2 (snippets 26–50), and Volume 3 (snippets 51-75).

Volume 3 is presented here.

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TAMILNADU BIODIVERSITY CONSERVATION AND GREENING PROJECT FOR CLIMATE CHANGE RESPONSE

Declaration

The artwork and graphics featured in this book are sourced from Canva Pro.

Conservation Snippets

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Conservation Snippets Vol 3, 51 (IX, 2025)

Marine Copepod Diversity in the Mandapam Region, Gulf of Mannar Biosphere Reserve, TN

- Copepods represent the largest and most diverse group among crustaceans (14,485 species) and primarily inhabit marine bodies.
- Influenced by currents, they are important zooplankton and are good indicators due to their environmental sensitivity.
- A study (February 2021–January 2022) in the Gulf of Mannar assessed physicochemical water quality parameters and copepod diversity.
- 34 copepod species were recorded, including 12 calanoids, and 11 each from cyclopoid and harpacticoid groups.
- Copepod diversity, richness, and evenness fluctuated through the year, and Mandapam coastal waters showed the highest copepod diversity.
- The study highlights ecological connectivity between the Palk Bay, Indian Ocean, and Gulf of Mannar, emphasising the need for marine conservation in this biodiverse region.

Gunabal, S., Santhanam, P., Kaviyarasan, M., Kumar, S. D., Prabhu, K., Manickam, N., ... & Perumal, P. Ecological Diversity of Marine Copepods of Mandapam Region, Southeast Coast of India.

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Conservation Snippets Vol 3, 52 (IX, 2025)

Impact of linear infrastructure and landscape characteristics on wildlife roadkill in the Nelliyampathy Hills, Kerala

- With rapid road development, road accidents are among the leading direct human causes of animal death worldwide.
- Roads also result in habitat loss and fragmentation, and affect distribution, movement, breeding, population density, and gene flow in animals.
- 22 systematic roadkill surveys along 50 kms of roads in Nelliyampathy hills (June 2023 to May 2024) recorded 330 roadkill vertebrate individuals of 72 species.
- Included 228 reptiles (43 sps), 70 amphibians (11 sps), 23 mammals (10 sp), and 9 birds (8 sps).
- Mode of locomotion, thermoregulation habit, and feeding behaviour seem to make reptiles, especially snakes, more vulnerable to roadkill.
- Environmental factors, including plantations, road pavement, water sources, terrain, and undergrowth, were found to influence roadkill occurrences significantly.
- The annual roadkill estimate of 5,490 along a 50 km transect (overall roadkill rate of 0.3 roadkills/km/day) signals the need for sustainable infrastructure development in wildlife-rich areas.

Sushanth, S., Praphul, G., Ganesh, S. R., Molur, S., Kumara, H. N., & Singh, M. (2025). Impact of linear infrastructure and landscape characteristics on wildlife roadkill in the Nelliyampathy Hills, Western Ghats, India. *Scientific Reports*, 15(1), 25333.

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Conservation Snippets Vol 3, 53 (IX, 2025)

State of India's Birds 2023: A framework to leverage semi-structured citizen science for bird conservation

- Birds are rapidly declining worldwide, and regional assessments are a vital means to prioritize data-driven conservation action.
- Though standardized surveys should be the basis of 'State of Birds' reports, they are resource and training-intensive, and hence detection/non-detection data from citizen science platforms like eBird have been used to estimate trends.
- Using eBird data, SoIB 2023 assessed the status of 942 bird species by evaluating each species on a) long-term change b) current annual trend and c) distribution range size. 178 were in high conservation priority and 323 were in moderate.
- Also, 204 species have declined in the long term, and 142 species are currently in decline.
- Birds that have vertebrate, carrion or invertebrate diets have declined most rapidly in the long term, whereas those that feed on fruits and nectar have been stable.
- Grassland/scrub birds like harriers have declined most rapidly, indicating that conservation of such habitats is critical.
- Species with low detectability, like owls, nightjars, mountain pheasants, and sea birds were not assessed for abundance trends.

Viswanathan, A., Thrikkadeeri, K., Koulgi, P., Deomurari, A., Jha, A., Warudkar, A., ... & Ramachandran, V. (2025). State of India's Birds 2023: A framework to leverage semi-structured citizen science for bird conservation. Ecosphere, 16(7), e70290.

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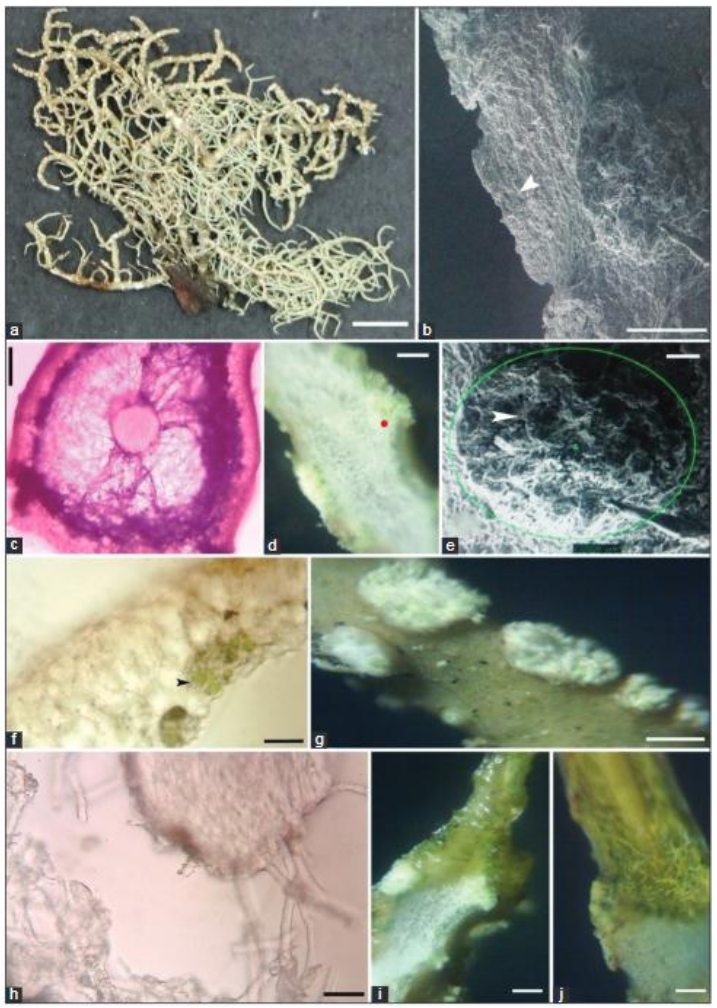
Conservation Snippets Vol 3, 54 (IX, 2025)

Usnea dasaea, a further new addition to the Lichen Flora of Tamil Nadu

- The Western Ghats of Tamil Nadu are known for the presence of over 785 lichen species, and literature suggests more species yet to be discovered.
- The genus *Usnea* consists of more than 350 species, with the lichen compound usnic acid, a secondary metabolite, responsible for biological activities.
- *Usnea dasaea* is reported for the first time in Tamil Nadu (Kodaikanal hills), expanding the known distribution of this fruticose lichen.
- It is distinguished by an erect thallus with tapering, curved apices, soralia elliptic longitudinally, and isidiomorphs present on younger soralia but absent on mature ones.
- Several compounds like tannin, depsidone, and dibenzofurane are reported from *Usnea dasaea*.
- Specimens are stored at the NBRI, Lucknow and Bharathiar University for future research.



Usnea dasaea (a) Thallus, (b) SEM Image of soralia, (c) C.S. of thallus, (d) T.S. of thallus, (e) SEM Image of soredia, (f) Algal cells of Trebouxia, (g) Punctiform of soredia, (h) Magnified structure of central stalk, (i-j) Spot test result of K–ive and PD+ive. (Scale bar A-5mm; B-200µm; C-50µm;E-20µm;G-30µm; F&H-5µm;D,I,J-25µm).

Photos Adapted from the Current Botany 2020, 11: 138-141

Mariraj, M., Kalidoss, R., Vinayaka, K. S., Nayaka, S., & Ponmurugan, P. (2020). Usnea dasaea, a further new addition to the Lichen Flora of Tamil Nadu State, India. *Current Botany,* 11, 138-141.

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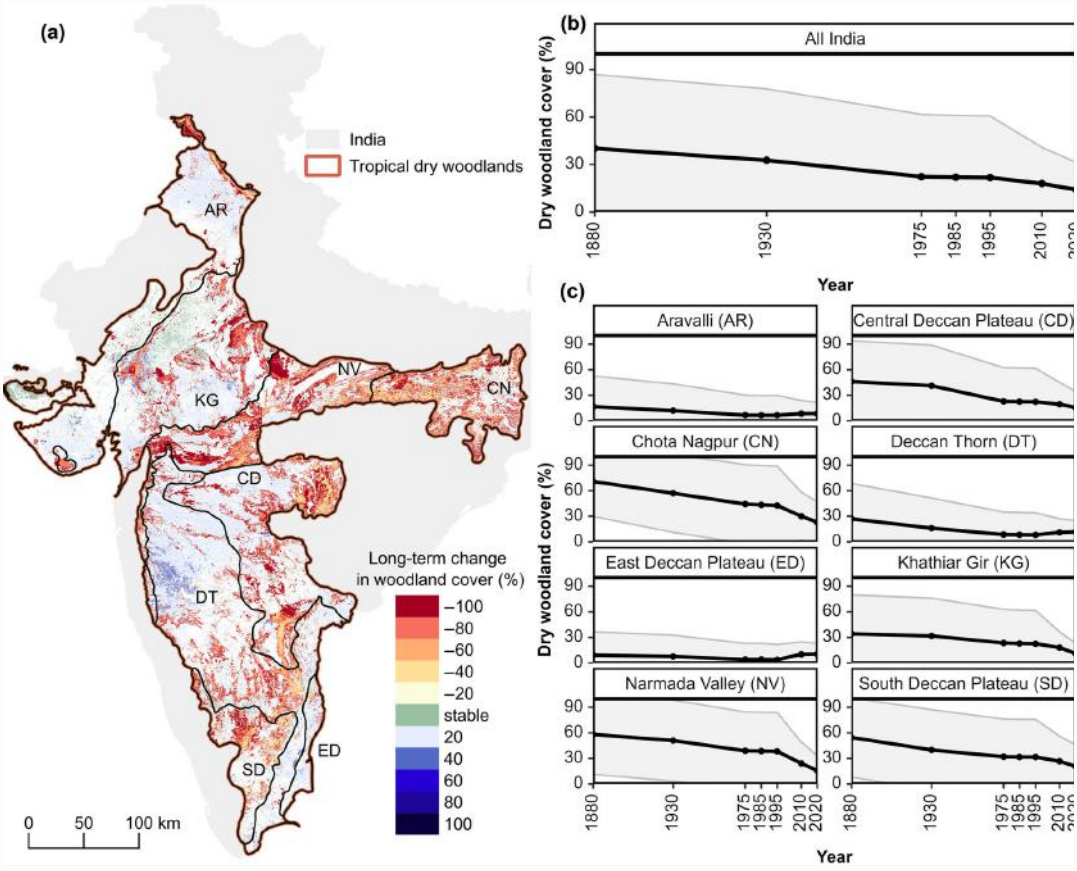
Conservation Snippets Vol 3, 55 (IX, 2025)

Tropical dry woodland loss in India since 1880

- Though supporting high levels of biodiversity and known for ecosystem services, tropical dry woodland (dry evergreen, dry deciduous & thorn) has severely declined.
- A study reconstructed dry woodland changes in India from 1880 using historical and satellite-based maps.
- It revealed a 65% loss—over 22 million hectares—of dry woodlands since the 19th century.
- Current megafauna distributions of 14 species are positively linked to high woodland cover (r = 0.43, $p < 0.05$).
- Since 1995, an additional 6.5 million hectares have been lost, and this requires urgent conservation attention.



Photos Adapted from the Ecological Applications, 35(5), e70054.

Tropical dry woodland change in India. ***(a)*** *Geographical distribution of Indian tropical dry woodlands.* ***(b)*** *Historical changes in dry woodland cover over 140 years, represented in absolute percent change in woodland cover.* ***(c)*** *Historical changes in the eight dry woodland ecoregions in India, as well as for the entire country, where lines represent the trajectory of change in mean woodland cover and the shaded area indicates SD. Black circles represent the year for which we had a woodland cover map.*

Kalam, T., Baumann, M., Pötzschner, F., Reddy, C. S., Ghoddousi, A., Roy, P. S., & Kuemmerle, T. (2025). Tropical dry woodland loss in India since 1880 and its relation to current megafauna distributions. *Ecological Applications*, 35(5), e70054.

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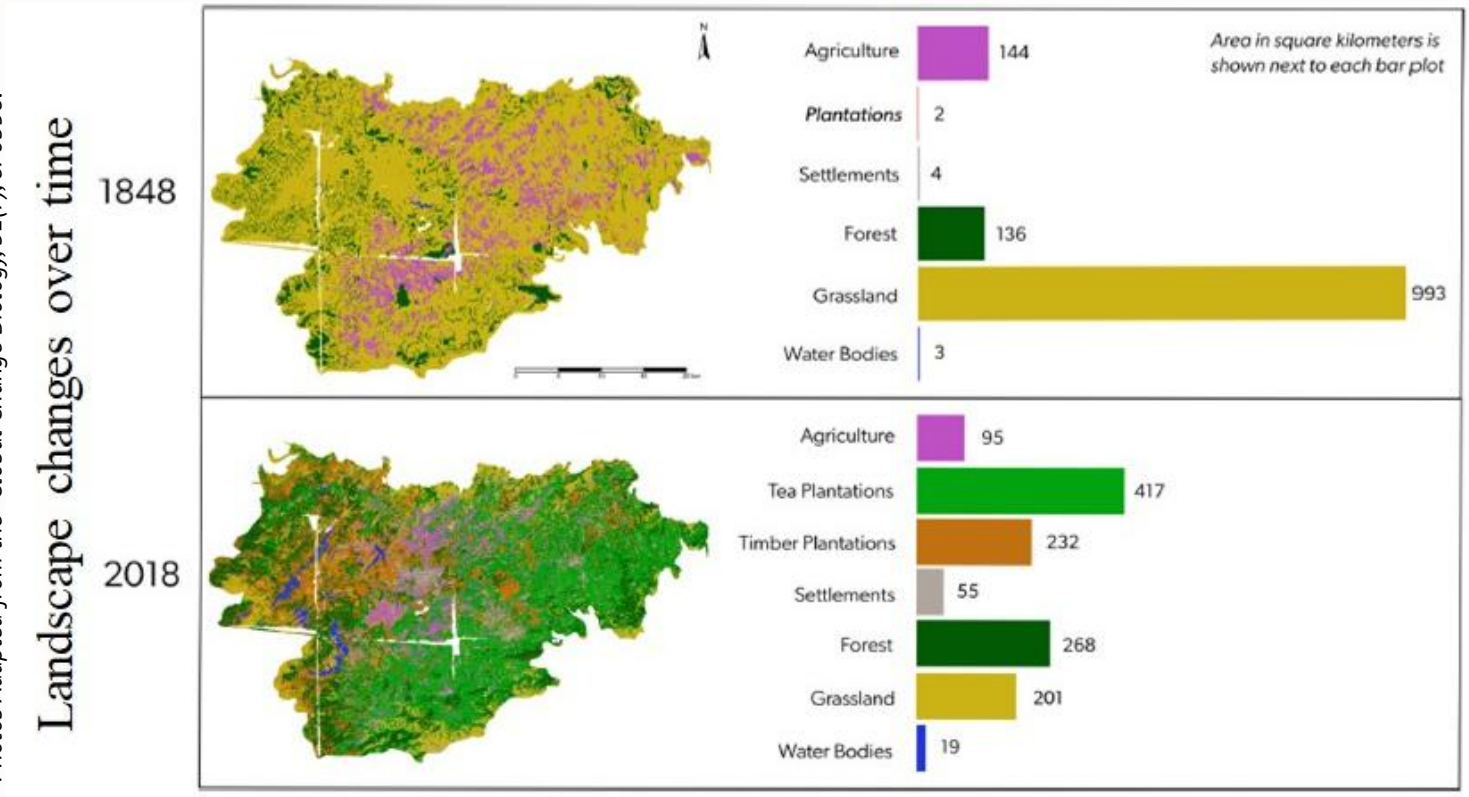
Conservation Snippets Vol 3, 56 (IX, 2025)

Grassland Bird Species Decline With Colonial-Era Landscape Change in a Tropical Montane Ecosystem

- A study analyzed a 170-year dataset on land cover and bird observations in the Nilgiris to determine how historical landscape changes have impacted 85 bird species.
- The comparison of historical land cover and satellite imagery (1848–2018) revealed approximately an 80% decrease in grassland area and a concomitant increase in tea and timber plantations.
- Relative species abundances of approximately 90% of grassland birds have declined significantly. In comparison, around 53% of forest bird species remained stable or even increased in relative abundance.
- Over 74% of generalist bird species have become more common, possibly due to reduced habitat specialization.



Photos Adapted from the Global Change Biology, 31(7), e70358.

Ramesh, V., Hariharan, P., Gupte, P. R., Mohan, A. V., Akshay, V. A., Rajan, A., ... & DeFries, R. (2025). Grassland Bird Species Decline With Colonial-Era Landscape Change in a Tropical Montane Ecosystem. *Global Change Biology*, 31(7), e70358.

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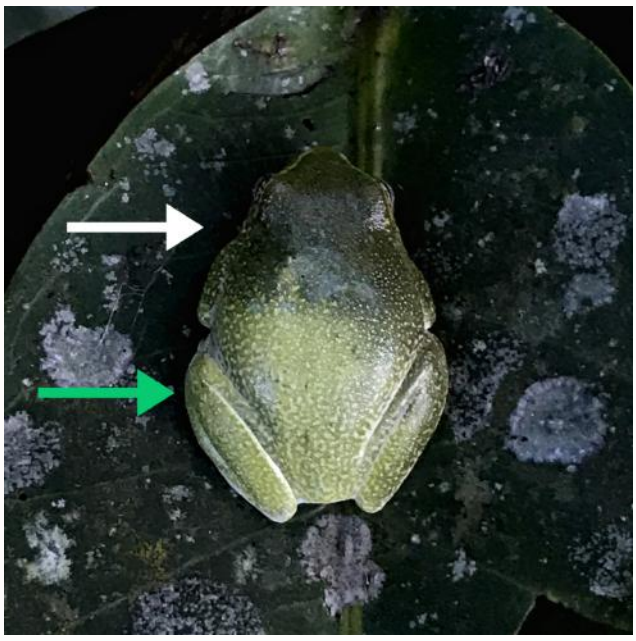
Conservation Snippets

Vol 3, 57 (IX, 2025)

Detection of light through skin and colour change for camouflage by tropical bush frog

- Various animals can rapidly change body colour for reasons like UV protection, thermoregulation, predator evasion, and sexual communication.
- The process of sense organs receiving stimuli and changing colour can be through the hormonal/neural system (secondary response, for ecological functions) or by the skin independently (primary response, for physiological functions).
- A study found the nocturnal bush frog *Raorchestes jayarami* (endangered, endemic to the Western Ghats) using an unconscious bypass system (primary response) for an ecological colour change!
- During the daytime, the inactive frog was found detecting changes in light intensity through its skin and matching its body colour to the substrate leaf for camouflage.
- The hypothesis was supported by correlating with environmental variables and experimentally induced colour change.



Photos Adapted from the Biotropica, 57(5), e70067

The nocturnal bush frog *Raorchestes jayarami* was inactive and resting during the daytime. We exposed its upper body to sunlight ***(white arrow)*** while keeping the lower half in shadow ***(green arrow)***, resulting in a distinct two-tone green coloration. The sunlit area darkened, blending with the leaf, while the shaded part remained paler.

For details scan

Narayanan, J., Subashchandran, D., Embalil Mathachan, A., Irumpanath Cleetus, R., Jabeen, N., Swapna Lohithakshan, A., ... & Das, S. (2025). Inactive Tropical Bush Frog Detects Light Through Skin to Adjust Body Color Intensity for Camouflage. *Biotropica*, 57(5), e70067.

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Vol 3, 58 (IX, 2025)

Sympatric carnivores in fragmented landscapes: multi-species genetic connectivity assessment

- With serious habitat loss and fragmentation, maintaining functional connectivity is critical for large carnivores.
- A study in six PAs of Maharashtra determined the multispecies genetic connectivity of tiger, leopard, and dhole by examining the relationship between genetic distance and landscape resistance (through the collection of 1156 scats from 2016 to 2019).
- Genetic differentiation (indicating less gene flow) was highest in dholes and lowest in leopards as a result of habitat fragmentation.
- Dholes, a habitat specialist, require continuous forest patches for a well-connected genetic population due to their comparatively shorter dispersal range.
- Isolation by distance affected the felids, while for dholes, agricultural expansion was a major impediment.
- Connectivity mapping revealed higher movement of dholes and tigers only in areas surrounded by forest patches, whereas it was not a major limitation for leopard movement across the landscape.

Modi, S., Mondol, S., Nigam, P., & Habib, B. (2025). Sympatric carnivores in fragmented landscapes: multi-species genetic connectivity assessment and implications for conservation prioritization. Landscape Ecology, 40(8), 162.

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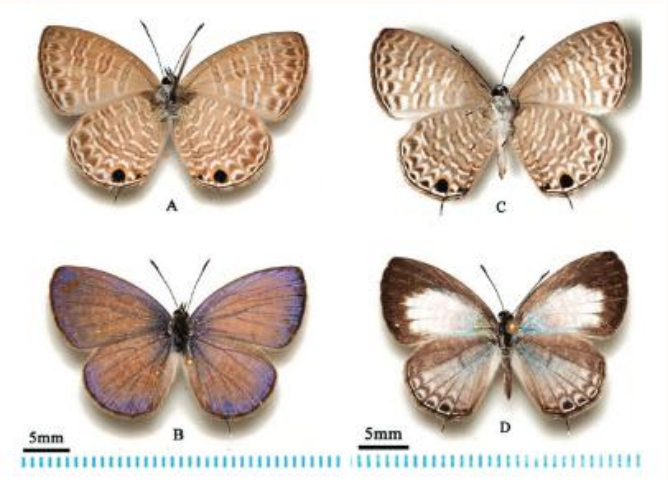
A new taxon of *Nacaduba* Moore, 1881 (Lepidoptera: Lycaenidae: Polyommatini) from Agasthyamalais

- Line blues are small butterflies of the subfamily Lycaenidae.
- Eight species of the *Nacaduba* genus (a line blue genus) are recorded in peninsular India. Wing markings, male genitalia and ribbon scales are used in identifying species.
- The study revealed a new subspecies, *Nacaduba Sinhala ramaswamii* ssp. nov., from Agasthyamalais, distinguished from all other *Nacaduba* species in southern India and *N. Sinhala Ormiston* by its unique male genitalia.
- It appears to breed from September to January, with peak in October.
- The study includes descriptions of early life stages, larval host plants, and flight periods of this taxon, and provides a revised key to Nacaduba line blues of the Western Ghats.



N. sinhalaramaswamii ssp. nov. Holotype male NCBS-BH870: **A**—Upperside | **B**—Underside. Allotype female NCBS-BH873: **C**—Upperside | **D**—Underside | © Kalesh Sadasivan.

Sadasivan, K., Kochunarayanan, B., Khot, R., & Naicker, R. K. (2021). A new taxon of Nacaduba Moore, 1881 (Lepidoptera: Lycaenidae: Polyommatini) from Agasthyamalais of the Western Ghats, India. *Journal of Threatened Taxa*, 13(3), 17939-17949.

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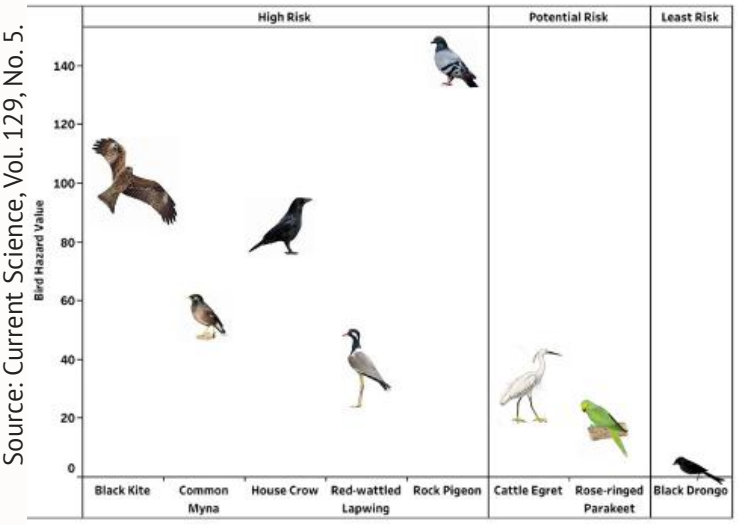
Conservation Snippets Vol 3, 60 (IX, 2025)

Birds of Indian airfields: an ecological approach to aviation safety assessment

- 74% of all bird strikes occur at or below 500 feet above runways. Habitat management, infrastructure modification, and resource inhibition in and around airfields are tried to reduce bird strikes.
- The study (2018-21) at seven Indian civil airfields recorded 137 bird species, of which 21 were reported in a minimum of five airfields, while 14 were classified as most dominant in terms of numbers.
- A novel Bird Hazard Value (BHV) has been proposed, which combines factors such as bird activity count, body mass, and runway crossing behaviour to categorize birds into various risk levels to cause bird strikes.
- Of the prioritised eight potentially problematic species, the Rock Pigeon, Black Kite, House Crow, Common Myna, and Red-wattled Lapwing were identified as high-risk species; the potential-risk birds were the Cattle Egret and Rose-ringed Parakeet; and the low-risk was the Black Drongo.
- The study helps in understanding the bird species inhabiting Indian civil airfields, their threat levels and in developing bird hazard management strategies to reduce hazard levels.



Source: Current Science, Vol. 129, No. 5.

Bird hazard value (BHV) of different bird species in Indian civil airfields. The three categories of risk species are separated column-wise, and the birds within each category are placed according to their BHV.

For details scan

P. P. Ashiq, P. N. Anoop Raj, S. Jeevith, M. Sri Sowmiya, Angel Joy, P. V. Karunakaran and P. Pramod (2025). Birds of Indian airfields: an ecological approach to aviation safety assessment, *Current Science*, Vol. 129, No. 5.

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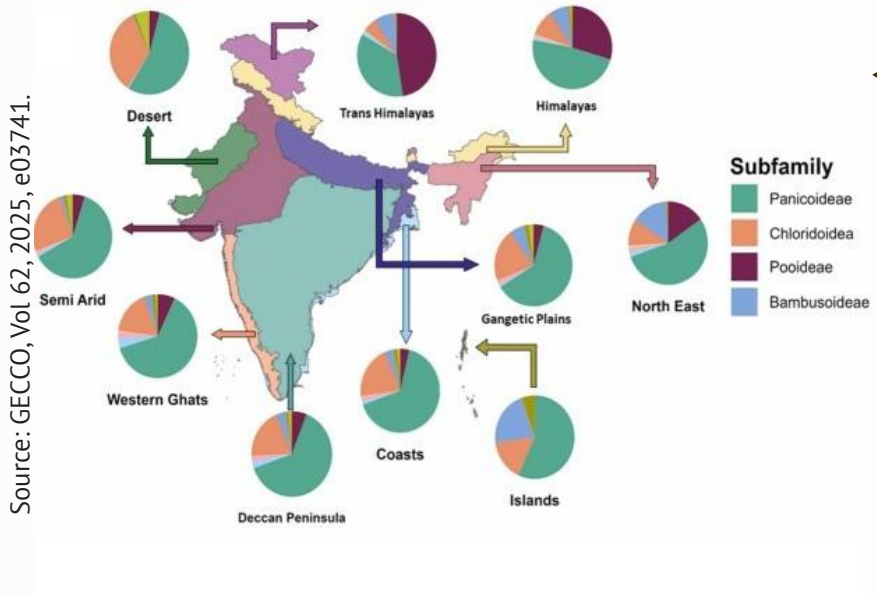
Conservation Snippets

Vol 3, 61 (IX, 2025)

Patterns of Grass (Poaceae) species distribution and richness across India

- Despite the importance of tropical grassy biomes for biodiversity and human livelihoods, they have been ecologically and economically undervalued, and hence, converted to other land uses.
- The study maps the diversity of grasses across India using regional floras and links their distribution to climate and geography.
- India harbours over 1,100 grass species (~ about 10% of the world's grasses), with more than half of these being perennial C4 grasses; Panicoideae is the most speciose subfamily.
- C4 species richness was greater in warmer districts with high moisture availability, while cooler and wetter districts with low precipitation seasonality supported greater C3 species richness.
- The C3 subfamilies of Pooideae and Bambusoideae had the highest species richness in the Himalayas (including trans-Himalayas) and the North-East region, respectively.
- Unexpectedly high range-restricted grass diversity found in NW India and the Deccan Plateau biogeographic zones calls for conservation beyond PAs.



Source: GECCO, Vol 62, 2025, e03741.

Species richness of different subfamilies of Poaceae across the Indian subcontinent.

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Mande, M., Joshi, A. A., Paramjyothi, H., Ratnam, J., & Sankaran, M. (2025). Patterns of grass (Poaceae) species distribution and richness across India., *CGECCO, Vol 62, 2025, e03741.*

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Conservation Snippets Vol 3, 62 (IX, 2025)

Global threat of wire snare poaching: A review of impacts and research priorities

- Wire snare poaching is indiscriminate and pervasive, posing a significant threat to global biodiversity, but research attention is generally lacking.
- 304 peer-reviewed studies were used to identify five core wire snare research themes: *1.* Direct Effects, *2.* Indirect Effects, *3.* Optimized Detection, *4.* Socio-economic Dimensions, and *5.* Management Interventions.
- ***Direct effect*** – mortality & injuries, ***Indirect effect*** – Altered prey-predator dynamics & behaviourial shifts.
- ***Socio-economic dimensions*** (poverty, bushmeat demand, and community perceptions) and ***Management interventions*** (law enforcement and community participation) act as key drivers, shaping where, why, and how snaring occurs.
- ***Optimized detection*** influences both the extent of snaring and the success of mitigation threats.
- Snaring as a form of sit-and-wait predation needs more attention to understanding its broader ecological consequences.
- Greater geographic representation, advancing interdisciplinary research, and refining intervention strategies are essential to mitigating the threat of snaring and improving conservation policies globally.

Feldmeier, D. E., Schmitz, O. J., Dickman, A. J., Kasozi, H., & Montgomery, R. A. (2025). The global threat of wire snare poaching: A comprehensive review of impacts and research priorities. *Biological Conservation*, 310, 111406.

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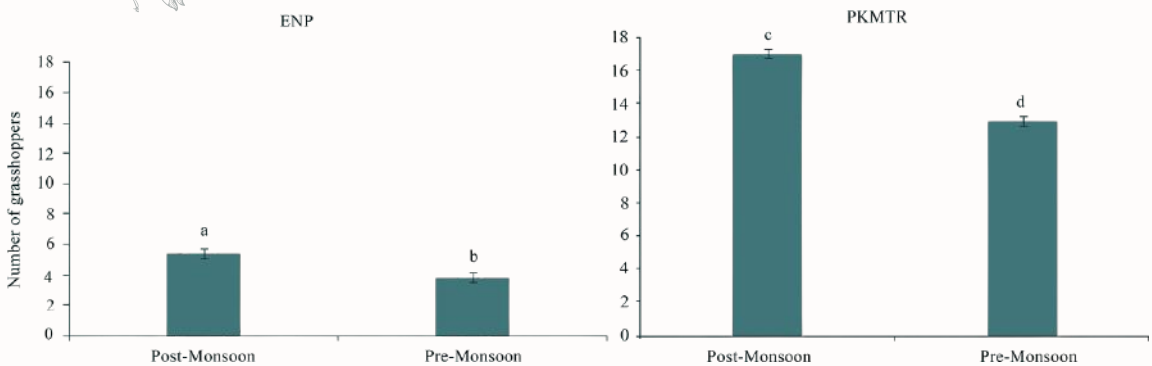
Conservation Snippets Vol 3, 63 (X, 2025)

Large scale burning for Nilgiri tahr and impact on grasshoppers (Orthoptera: Caelifera)

- Prescribed cold-season burning (3-year cycle) has been practised on 50 ha plots since colonial times to manage open habitats for the Nilgiri tahr in Eravikulam NP, but the impact on other biota has yet to be documented.
- Researchers (2015-2018) compared the impact of such burning on grasshoppers (an indicator species of grassland health) with small-scale mosaic burning (10 × 10 m) in Parambikulam Tiger Reserve.
- 54 and 18 grasshopper species were recorded in Parambikulam TR and Eravikulam NP, respectively.
- Grasshopper recovery was slower in large burns but rapid in mosaic-burned patches.
- This suggests invertebrate communities are more resilient to patchy, low-intensity fire regimes.
- Optimizing fire management may support both flagship mammals and insect biodiversity.



Mean total grasshopper abundance per plot in Eravikulam National Park (ENP) and Parambikulam Tiger Reserve (PKMTR), Kerala, India, during pre-monsoon and post-monsoon seasons (Error bars are standard errors).

Bhaskar, D., Easa, P. S., Sreejith, K. A., Skejo, J., & Hochkirch, A. (2019). Large scale burning for a threatened ungulate in a biodiversity hotspot is detrimental for grasshoppers (Orthoptera: Caelifera). *Biodiversity and conservation,* 28(12), 3221-3237.

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Conservation Snippets Vol 3, 64 (X, 2025)

Landscape Ecological Urbanism for Restoration of Pallikaranai Marsh, Chennai

- Integrating wetland habitat fragments inside and on the edges of urban areas is critical to both wetlands and the city.
- Encroachments and other human activities have severely decayed the biodiverse Pallikaranai marsh and its 31 connected tanks (on three sides).
- Landscape Ecological Urbanism synthesizes technological advances advocated by landscape urbanism and the human-nature interrelationships of Urban Ecology.
- Using its principles, the study outlines a restoration model for the Pallikaranai marsh:
    - Stop the dumping of wastes and clean the existing polluted water.
    - Ensure water flow (disrupted by encroachments) by widening Okkiyamkadavu, and line the drain networks with geosynthetic material.
    - Based on stormwater runoff directions, an Eco-corridor to connect low-development areas and eco-sensitive regions, which would revitalize the tanks with enhanced rainwater collection.
    - Recreation zones, along with subsurface drainage systems, eco-bridges, and a network of shallow water bodies, to improve bird diversity.

Surya, S. (2016). Landscape ecological urbanism for restoration of Pallikaranai marsh land, Chennai, Tamil Nadu. *Procedia Technology*, 24, 1819-1826.

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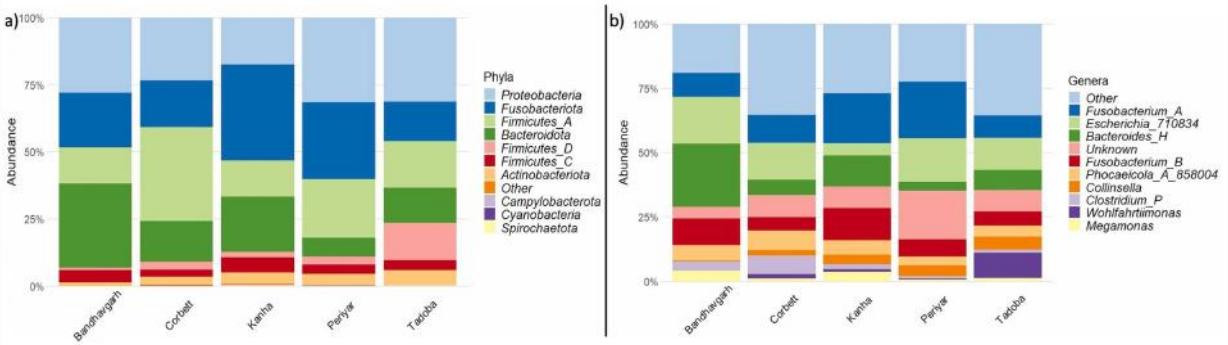
Conservation Snippets Vol 3, 65 (X, 2025)

Influence of human disturbance on the gut health of Tigers

- It is known that anthropogenic activities affect the gut microbiome and gut health, and thereby the wild mammal host health.
- Tiger gut microbiome profiling was conducted using 43 faecal samples from five Tiger Reserves (Corbett, Tadoba-Andhari, Kanha, Bandhavgarh and Periyar TRs).
- Thirty-six core bacterial genera (more than 90% of samples) were identified from all the samples.
- Tiger gut microbiome abundance varied across TRs, and bacterial community structures varied due to habitats and seasons.
- Kanha (KTR) exhibited the highest bacterial richness, while PTR showed the lowest.
- Periyar (PTR) had the highest number of unique bacterial genera, whereas TATR had none, showing the possible influence of environmental and ecological factors.
- The functional composition of the tiger gut was screened for host-disease associations (diabetes, systemic lupus erythematosus, Alzheimer's, and amoebiasis), and it was most abundant in KTR, indicating greater human interference from villages and tourism.



a) Top 10 most abundant phyla of gut bacteria of Panthera tigris in 5 tiger reserves.
b) Top 10 most abundant genera of gut bacteria of Panthera tigris in five tiger reserves.

Anusha, G., Khan, A. S., Krishnan, G., & Umapathy, G. (2025). Anthropogenic Factors Shape the Gut Microbiota of Tigers in Indian Tiger Reserves. *Global Ecology and Conservation*, e03874.

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Conservation Snippets Vol 3, 66 (X, 2025)

Vertebrates outperform invertebrates and microbes at removing carrion

- Vertebrate scavengers perform essential ecosystem functions, such as nutrient cycling, sanitation, and disease moderation, through the removal of carrion.
- A study in a deciduous forest near Panna TR, Madhya Pradesh, compared the carrion utilization by vertebrate scavengers, invertebrates, and microbes (decomposers).
- Experiments involved the placement of 17 chicken carcasses during daytime with four set treatments, which excluded either or all of the scavenging guilds (vertebrates, invertebrates, microbes, and a control to account for moisture loss).
- Daily exponential removal rates of biomass (chicken carcass) were 99.9% for vertebrates, 13.8% for invertebrates, 5.8% for microbes, and 4.9% due to desiccation.
- Vertebrates consumed chicken carcasses (less than 2 kg) within a day, whereas carcasses without vertebrate access persisted for over 15 days.
- Red-headed vultures, Egyptian vulture, striped hyaena and leopards were among the first to discover and consume carcasses.

Iyer, B., Dutta, S., Qureshi, Q., & Jhala, Y. (2023). Super-scavengers: Vertebrates outperform invertebrates and microbes at removing carrion from a tropical forest. *Authorea Preprints*.

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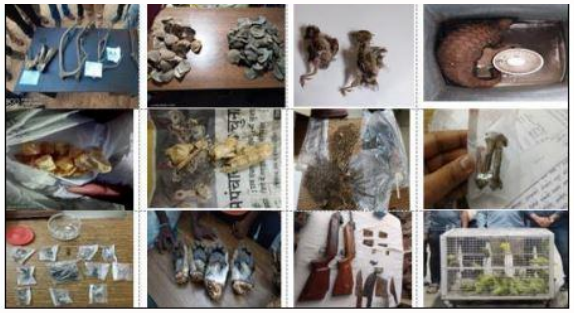
Conservation Snippets Vol 3, 67 (X, 2025)

Wildlife trafficking, poaching methods and law enforcement strategies in Vidarbha region, Central India

- Thirty-three cases detected by the Nagpur Division were studied (July 2021 to July 2023) to analyze wildlife trafficking and poaching methods in the Vidarbha region (11 districts), Maharashtra.
- One hundred sixty-three accused were nabbed, and poaching methods used were snare and trap, electrocution, poisoning, shooting by gun, spear, direct capture, starvation victims, and other methods.
- The live wild animals' trafficking of pangolins, red sand boas, star tortoises, parakeets, and munias was detected.
- Body parts/articles detected included skins, canines, teeth, claws, bones, scales, whiskers, ambergris, porcupines, peafowls, owls, sea fans, skinks, and monitor lizards.
- Several cases of tiger (12 cases, 73 accused) and leopard (5 cases, 36 accused) body part smuggling, Pangolin trafficking (5 cases, 19 accused), and star tortoise trade in this region is alarming.
- Poaching for traditional medicine, pet trade, cultural beliefs, and supply to regional and international trade routes were the reasons, and online marketplaces, social media platforms and illicit websites facilitated trade.
- Proactive conservation efforts and stringent law enforcement were recommended.

Source: Int. J. Criminal Common Statutory Law



Images of seized material in Vidarbha region, Central India.

For details scan

Chandewar, N. G. (2024). Uncovering wildlife trafficking, poaching methods and law enforcement strategies in vidarbha region of central India: A comprehensive analysis. *International Journal of Criminal, Common and Statutory Law* **2024; 4(2): 51-59**

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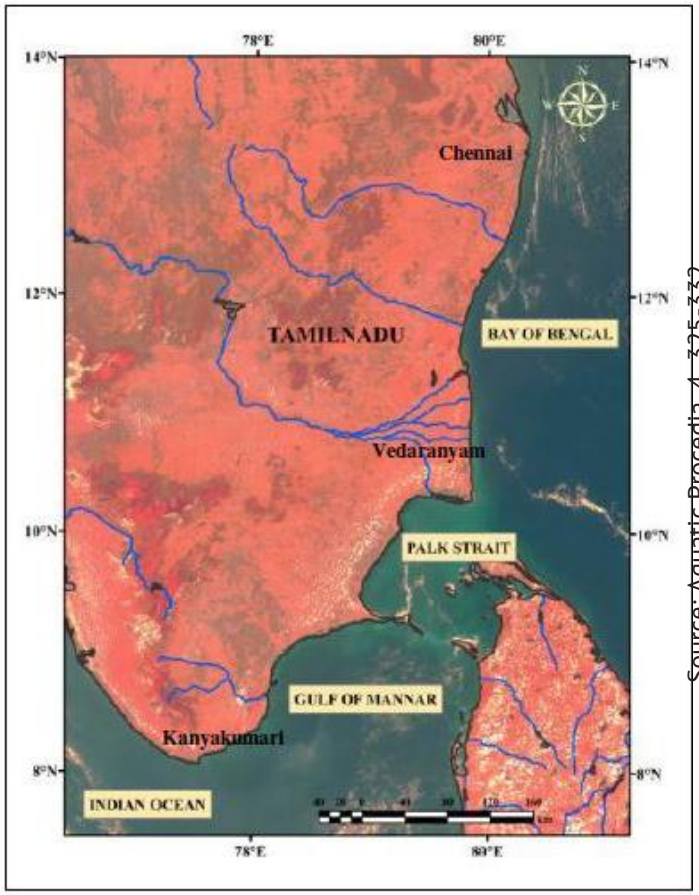
Conservation Snippets Vol 3, 68 (X, 2025)

Monitoring long-term shoreline changes along Tamil Nadu using geospatial techniques

- While shoreline change is influenced by natural factors such as waves, currents, tides, and winds, anthropogenic effects include artificial structures (seawalls, groynes), port/harbour development, mining of beach sand, offshore dredging, and dams.
- The study assesses long-term shoreline changes (between 1978 and 2014 using Landsat MSS, TM, ETM+, and OLI datasets) along the Tamil Nadu coast to identify and quantify areas of erosion and accretion.
- Maximum accretion/erosion rates of 34.3 and -26.4 m/yr are observed at the South of Pulicat mouth and Ennore.
- Eroding shorelines are observed at Pulicat, Royapuram, Besant Nagar, Parangipettai, Poompuhar, Manamelkudi, Vaippar, Manapad, Kanyakumari, Colachel, and Neerodi.
- In contrast, accretion shorelines are observed at Marina Beach, Cuddalore, Vedaranyam, Athirampattinam, Muthupet, Thondi, Tuticorin, and Tiruchendur.
- Shoreline assessment is essential to protect its natural integrity, coastal resources, and for Environmental monitoring and Integrated Coastal Zone Management.



Source: Aquatic Procedia, 4, 325-332.

Fig.1. Study Area

For details scan

Natesan, U., Parthasarathy, A., Vishnunath, R., Kumar, G. E. J., & Ferrer, V. A. (2015). Monitoring longterm shoreline changes along Tamil Nadu, India using geospatial techniques. *Aquatic Procedia*, 4, 325-332.

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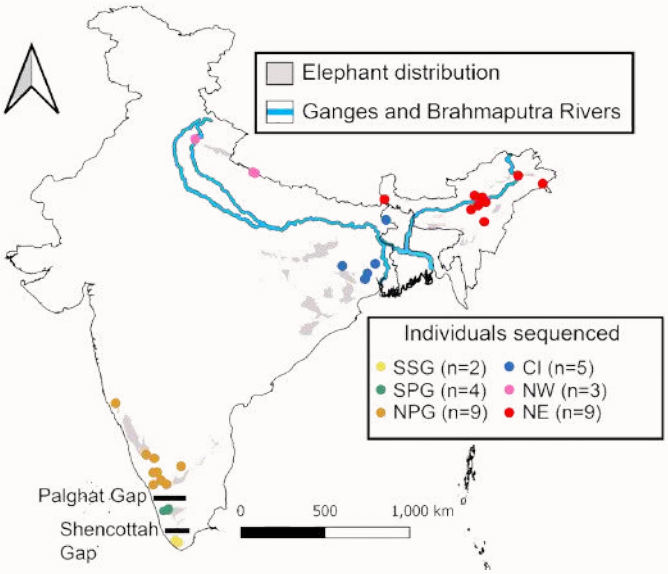
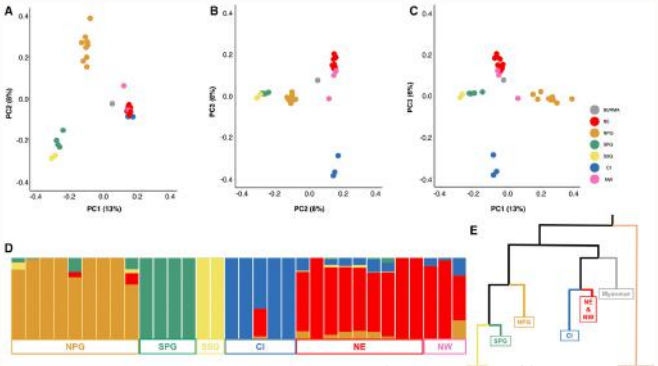
Conservation Snippets Vol 3, 69 (X, 2025)

Divergence and serial colonization shape genetic variation and define conservation units in Asian elephants

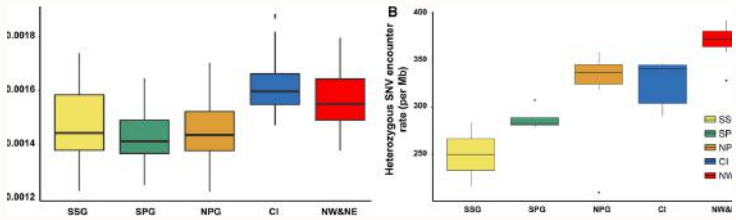
- Whole-genome sequencing data (between 11× and 32×) of 32 individuals from known Indian elephant landscapes revealed five genetic clusters:
  - Northern India (Northwest-Northeast combined).
  - Central India.
  - Three in Southern India: North of Palghat Gap (NPG), South of Palghat Gap (SPG) and South of Shencottah Gap (SSG).
- The Ganges, Brahmaputra, and mountain gaps (Palghat and Shencottah) seem to act as barriers to the gene flow.
- Northern India populations have high genetic diversity and low inbreeding and seem to have diverged from others more than 70,000 years ago.
- SPG and SSG populations have low diversity, signs of inbreeding, and exhibit low effective population sizes.
- Focus on the protection of the remaining habitat, maintaining connectivity and minimising unnatural deaths should be the priority.
- F3 statistics indicate no significant gene flow among the five clusters, supporting the idea of serial colonization from the north and long-term genetic separation.



Sampling locations and potential geographic barriers to elephant dispersal.



Population structure based on 2.7 million SNPs.



Genetic diversity.

Source: Current Biology, 34(20), 4692-4703.

Khan, A., Sil, M., Thekaekara, T., Garg, K. M., Sinha, I., Khurana, R., ... & Ramakrishnan, U. (2024). Divergence and serial colonization shape genetic variation and define conservation units in Asian elephants. *Current Biology*, 34(20), 4692-4703.

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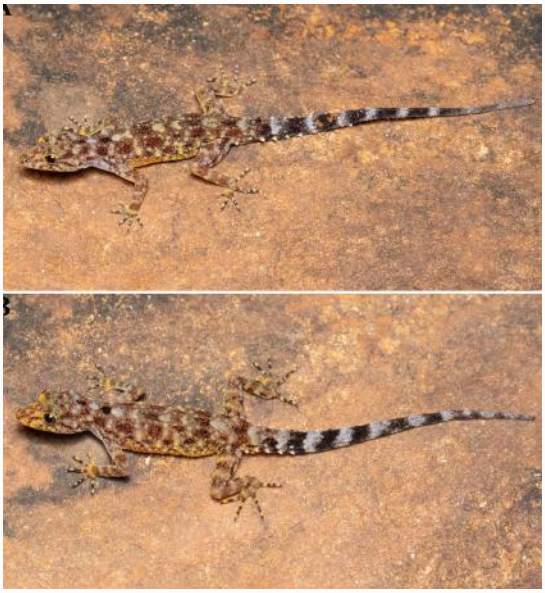
Conservation Snippets Vol 3, 70 (X, 2025)

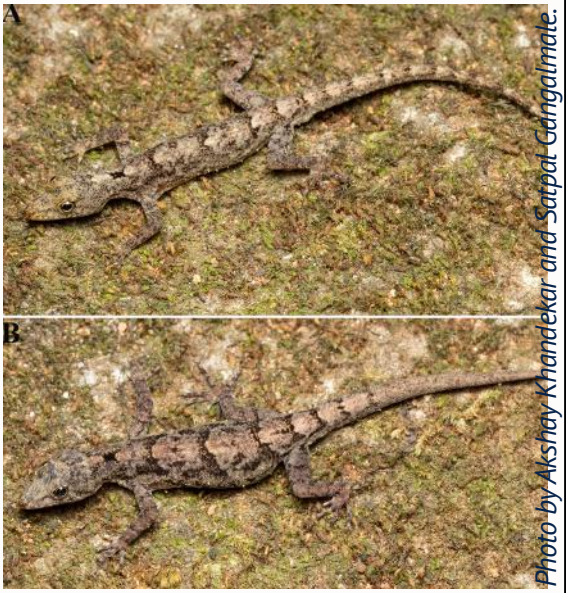
Three more novel species of South Asian *Cnemaspis* Strauch, 1887 (Squamata, Gekkonidae) from Kalakad Mundanthurai TR

- The study identified three new small-bodied, climbing geckos, *Cnemaspis azhagu sp. nov.*, *Cnemaspis mundanthuraiensis sp. nov.*, and *Cnemaspis kalakadensis sp. nov.*, from different forest ranges in KMTR.
- Genetic (ND2 gene) and morphological analysis placed the new species in three different clades: beddomei, gracilis, and littoralis, respectively (out of 10 broad Cnemaspis clades in peninsular India).
- Each species is distinguished by a unique set of characteristics, such as snout length, tubercle patterns, scale counts, lamellae, pore presence, and colouration.
- The study also highlights novel features of tail tuberculation in these species, aiding further identification and classification.
- With these discoveries, KMTR now hosts eight endemic gecko species, including five Cnemaspis species, underscoring its rich biodiversity.

*Colouration in the life of Cnemaspis azhagu sp. nov.: **A** adult male and **B** adult female.*



*Colouration in life of Cnemaspis mundanthuraiensis sp. nov.: **A** adult male and **B** adult male.*



*Colouration in life of Cnemaspis kalakadensis sp. nov.: **A** adult male, and **B** adult female.*

Photo by Akshay Khandekar and Satpal Gangalmale.

Khandekar, A., Thackeray, T., & Agarwal, I. (2022). Three more novel species of South Asian Cnemaspis Strauch, 1887 (Squamata, Gekkonidae) from Kalakad Mundanthurai Tiger Reserve, Tamil Nadu, India. *Vertebrate Zoology,* 72, 385-422.

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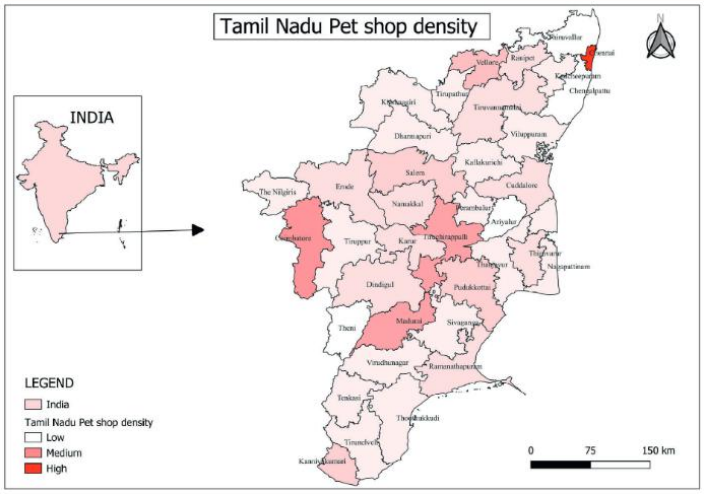
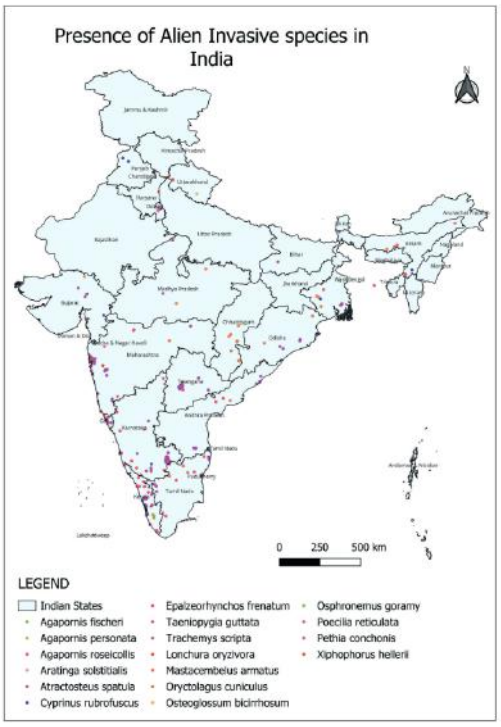
Conservation Snippets
Vol 3, 71 (X, 2025)

Exotic pet trade in Tamil Nadu and ecosystem risks

- The wild animal pet trade accounts for nearly 20% of global wildlife trade, posing a significant challenge to biodiversity conservation, animal welfare, and ecosystem stability.
- A study investigated the exotic pet trade in Tamil Nadu by analyzing 115 shops covering 140 YouTube videos.
- 148 pet species dominated by fishes, birds and reptiles, were found to be sold in the pet shops, of which 12 were endangered.
- Species distribution modelling, using MaxEnt for the green iguana (Iguana iguana), a globally spread invasive species, indicated a high potential for the species to establish and proliferate in India, posing a serious ecological threat.
- A questionnaire survey among pet shop owners indicated limited awareness of pet trade regulations and breeding practices.
- Findings suggest an urgent need for stricter enforcement of pet trade laws, increased public awareness, and proactive measures to prevent potential invasions by exotic species.



Illustrates the density of pet shops in Tamil Nadu based on videos.



Illustrates the mapping of alien invasive species recorded in India.

Kesavan, R., Abinesh, A., Saran, M., Vignesh, E., Shree, A., Shahir, M., ... & Ali, S. (2025). Silent Invaders: Biodiversity at Risk, Social Media findings into Exotic Pet Trade in Tamil Nadu and Invasion Modeling of Iguana iguana (Linnaeus, 1758). Acta Zoológica Lilloana, 633-671.

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Conservation Snippets

Vol 3, 72 (X, 2025)

Physiological responses in free-ranging Asian elephant populations living across human-production landscapes

- A 64% reduction has been reported in potential elephant habitats across Asia since c.1700 CE, pushing more elephants into human-altered landscapes.
- The study monitored the physiology of such elephants to understand how they cope with stress and energy challenges.
- Faecal glucocorticoid metabolite (fGCM) level for stress assessment and faecal triiodothyronine (fT3) level for metabolic states were assessed in three Asian elephant populations in Central (one) and Northeastern India (two), and results were compared by including an earlier South-India population study.
- The Faecal C/N ratio as a surrogate for dietary quality and landscape disturbance metrics were also assessed.
- Elephants in fragmented Central Indian habitats exhibited higher stress (fGCM) and lower metabolism (fT3) compared to those in NE India, and indicated a compromised health status (higher adrenal activity and reduced metabolic rates) due to higher anthropogenic stress.
- Poor diet quality (characterised by a higher C/N ratio) was generally associated with higher stress, except in the Central Indian population, probably due to severe anthropogenic disturbances.
- The study highlights the need for systematic assessments of stress levels in Asian elephants and a reevaluation of conflict management practices.

Pokharel, S. S., Chettri, A. K., Chatterjee, S., Seshagiri, P. B., & Sukumar, R. (2025). Physiological responses in free-ranging Asian elephant populations living across human-production landscapes. *Scientific Reports*, 15(1), 32365.

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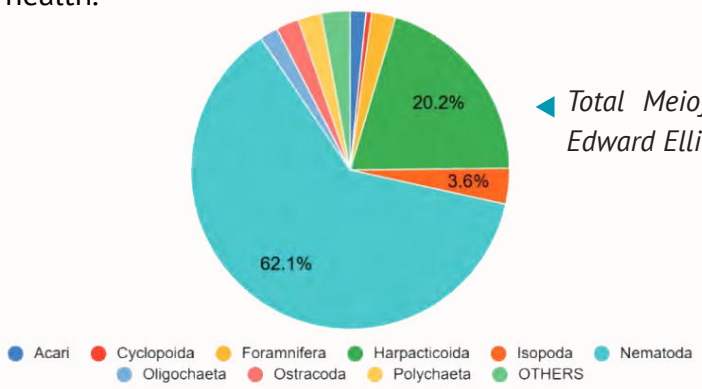
Conservation Snippets Vol 3, 73 (X, 2025)

Meiofaunal Diversity as reliable indicators of coastal pollution along the Chennai coast

- Biomonitoring using bioindicators is a powerful, cost-effective, and essential tool to assess marine pollution.
- Meiofauna, the smallest metazoans (63–1000 µm) in oceanic sediments, including nematodes and copepods, are ideal bioindicators.
- A high nematode/copepod (N/C) ratio indicates environmental stress (pollution), as nematodes tolerate stress while copepods are sensitive.
- 16 sediment samples along the Chennai coast documented meiofaunal diversity and heavy metal (Cd, Cr, Zn & Cu) levels and found nematodes dominant (62.1%), followed by copepods (20%) and other groups (17.9%).
- Kasimedu sites (influenced by industrial and port activities) showed extremely high N/C ratios, reflecting severe pollution, while Foreshore Estate had the lowest N/C ratios, indicating the least pollution.
- A higher meiofaunal count in the upper sediment strata (0–5 cm) compared to deeper sediment strata (5–10 cm) was observed.
- The study recommends incorporating meiofaunal monitoring as an early-warning system for coastal health.



Total Meiofaunal Abundance, across four stations: Marina Beach, Edward Elliot's Beach, Foreshore Estate Beach, and Kasimedu Beach.

Nivedhitha, K. S., Milton, M. J., Sivaleela, G., & Suganya, F. (2025). Diversity and Distribution of Meiofauna along the Chennai Coast and Their Role as Pollution Indicators (using the N/C ratio). *Records of the Zoological Survey of India*, 187-200.

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Conservation Snippets
Vol 3, 74 (X, 2025)

Serious loss of Western ghat montane grasslands to invasive alien species and afforestation

- Loss of montane grasslands severely affects hydrology, microclimate and leads to loss of the native species.
- The study indicated that between 1973 to 2017, 516 km² and 63 km² of grasslands and sholas were lost in the Western Ghats.
- Grasslands loss: 340 km² (23%) to the expansion of exotic trees, 107 km² (21%) to agriculture, and 34 km² (7%) to tea plantations.
- Rapid grassland loss was noticed recently (2014 to 2017) in the Palnis due to exotic tree invasion.
- Grassland loss is highest in RFs, while older Protected Areas have experienced less loss, but are now increasingly threatened by invasions from nearby degraded zones.
- The study underscores the complexity of conservation in the Shola Sky Islands and highlights active conservation approaches to protect the rapidly disappearing native grasslands.

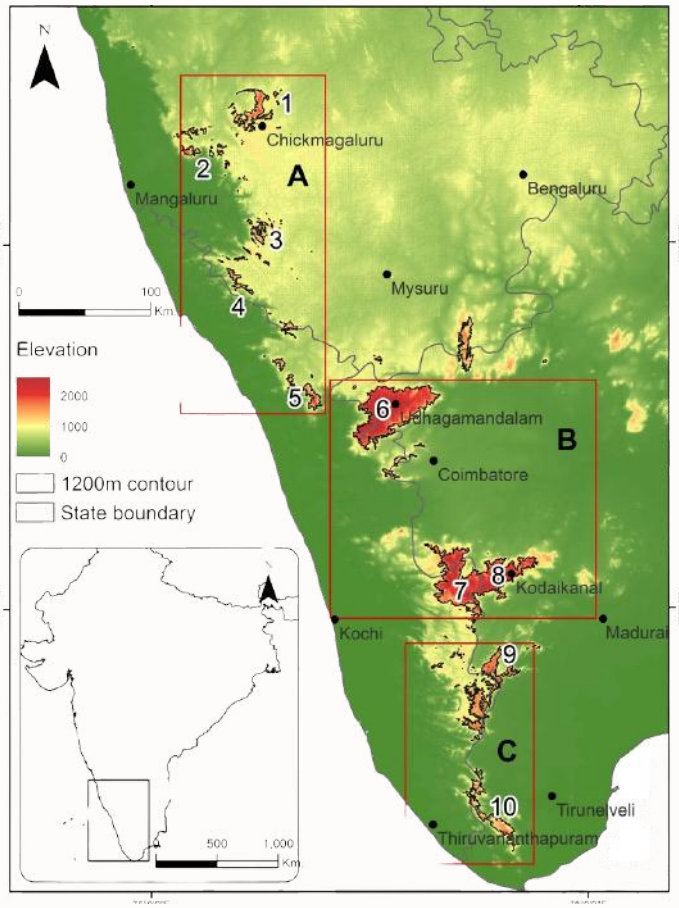

Photo from Biological Conservation 230 (2019) 141–150

The Shola Sky Islands of the Western Ghats consist of several major mountain-tops (1 to 10). ***A:*** *The northern sky islands include the Baba budan Hills (1), Kudremukh (2), Pushpagiri (3), Brahmagiri (4), and Wayanad (5).* ***B:*** *The large, highest elevation plateaus form the central sky islands comprised of the Nilgiri mountains (6), and across the deep Palghat Gap the Anamalai Hills (7) and Palani Hills (8), which form a single high-elevation plateau.* ***C:*** *The southern sky islands are comprised of the High Wavys or Meghamalai hills (9) and the Agasthyamalai or Ashambu hills (10).*

Arasumani, M., Khan, D., Vishnudas, C. K., Muthukumar, M., Bunyan, M., & Robin, V. V. (2019). Invasion compounds an ecosystem-wide loss to afforestation in the tropical grasslands of the Shola Sky Islands. *Biological conservation*, 230, 141-150.

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Conservation Snippets
Vol 3, 75 (X, 2025)

Barriers can alter gene flow of Asian Elephant populations

- Primarily confined to mountainous ranges, the Asian elephant faces population fragmentation due to steep slopes and hard Reserve boundaries, such as fences, trenches, etc.
- Across the Western Ghats, pairwise, individual-by-individual genetic distances were calculated for 176 unique dung-derived genotypes generated with 6 microsatellite markers.
- Thirty-six slope-based landscape distance matrices were obtained from resistance rasters, and this was correlated with the genetic distance matrix among 176 individuals.
- Gene flow was partially controlled by terrain slope, as expected for heavy animals.
- Analysis in the Nilgiri Biosphere Reserve revealed that fencing PAs in hilly terrain reduces core areas and disrupts vital corridors.
- In cases of digitated Reserve boundary, i.e., forms finger-like protrusions into the matrix, the land between protrusions has high connectivity and contains least-cost passages.
- Access for elephants to adjacent flatter terrain/valleys outside the reserves can mitigate fragmentation risks and maintain connectivity for elephant populations.

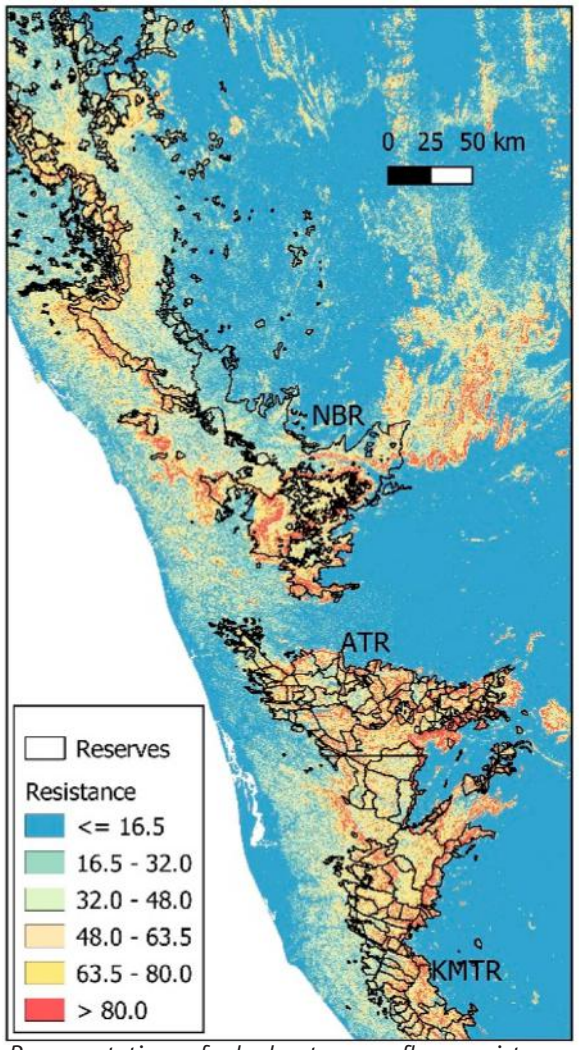

Photo from Conservation, 2(4), 709-725.

Representation of elephant gene flow resistance over the Western Ghats of India relative to slope (see full article for details). Gene flow resistance would be very high beyond the reserve limits if other factors, such as land use, had been taken into consideration. Reserve boundaries were obtained from the India Biodiversity Portal.

Puyravaud, J. P., Cushman, S. A., Reddy, P. A., Boominathan, D., Sharma, R., Arumugam, N., ... & Davidar, P. (2022). Fencing can alter gene flow of Asian elephant populations within protected areas. Conservation, 2 (4), 709–725.

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