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Cover photo: Black-Bellied Tern in Dibru-Saikhowa National Park. © Imon Abedin

Shark Landing Surveys at Madakkara Fishing Harbor

Introduction

Sharks are the top of the marine food chain and play an essential role in keeping ocean ecosystems healthy. By feeding on various prey, they help control the populations of other species and influence how marine life interacts. This balancing act supports biodiversity and ensures that habitats like coral reefs, seagrass beds, and open waters function properly. In this way, sharks contribute to the overall health of the ocean (Dulvy et al. 2021).

However, shark numbers are dropping around the world. The biggest reasons are overfishing which includes bycatch in small and large scales and also activities including illegal, unreported, and unregulated (IUU) fishing. At the same time, the global demand for shark fins, meat, oil, and other parts is growing creating more pressure on shark populations. Because sharks grow slowly, reproduce late in life, and reproduce a few young ones, they find it hard to recover once their numbers go down (Dulvy et al. 2021; Tyabji et al. 2021).

In India, sharks are regularly seen in catches brought to fishing harbours, but there is still very little detailed research on what kinds of sharks are being caught, how they are being fished, and how the trade works.

A recent study in the Andaman and Nicobar Islands found that many of the sharks being landed were young or female, which shows that current fishing practices may be unsustainable (Tyabji et al. 2021). Another study by Kizhakudan et al. (2024) points out that shark meat, oil, and skin are important sources of income and resources for many people living along the coast.

This report is focused on understanding which shark species are being caught, the fishing methods used, and how the shark trade supports local communities. The findings from our study glimpses at the extent of shark catches at Madakkara fishing harbour.

Methodology

The shark landing survey was conducted at Madakkara fishing harbor over a two-week period from 5 May to 17 May 2025.

Observations were made daily during the early morning landing hours, typically between 6:30 AM and 8:30 AM, when most fishing boats returned with their catch. During each visit, data were collected through direct observation of the landed catch such as- time the sharks were landed, the fishing gear used, how many sharks were caught, counting the number of individuals (abundance), their market prices,

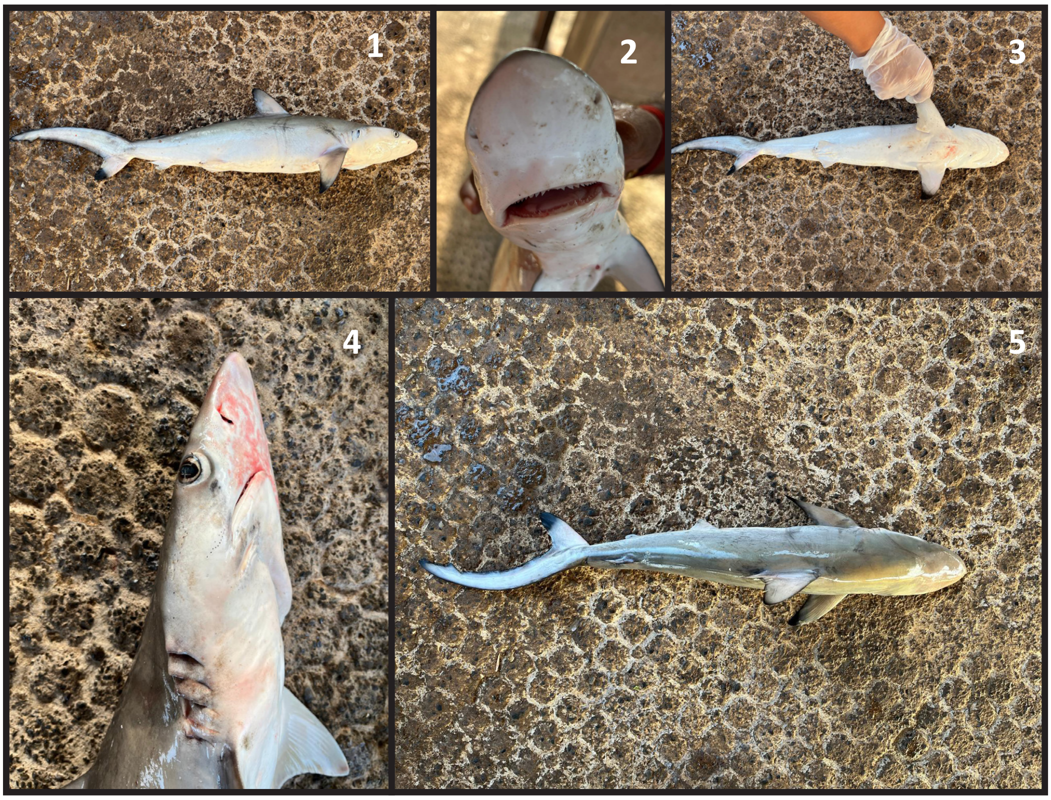

Image 1. 1—*Carcharhinus sorrah* (Spot-tail shark) | 2–5—Collective images of shark's external morphological features like lateral, dorsal, frontal, mouth, and frontal eye views. PC: Authors.

and where they were sold to Conversations with local fishers provided additional background on fishing practices and trade dynamics. The information was documented in a notebook, and photographs of landings were taken using a mobile camera for later verification. Shark species were identified from morphological features captured in photographs by Vishnu H., an elasmobranch researcher at University of Kerala.

Observation & Results

From Table 1, only one type of shark species, the Spot-tail shark Carcharhinus sorrah during the survey period was recorded. It was landed in early mornings from 05:30 to 8:30. According to the fishermen, these sharks were most frequently caught with 'net deep catch' by mechanised boats, where fishers generally went 100–300 km from shore and of depth 10 m. Number of the individuals ranged from 1–5 per day. Spot-tail sharks were either consumed locally, exported, or sold at auctions. The selling price at auctions is typically caried within ₹300–₹400/kg showing that there's a steady demand. A variety of other marine species were caught showing rich marine biodiversity but also highlighting that the fishing methods used are not species-specific. Sardines, Red snapper, Crab, Hilsa were other abundant catches. The fisheries at Madakkara focus on catching crab, squid, and mackerel (Image 2).

Bycatch species refers to marine animals that are unintentionally caught while fishing for a different target species. These are not the main species fishermen are aiming to catch, but they end up in the nets or lines anyway. Bycatch is often turned into fertilizer for farms or feed for fish in aquaculture. Image 3 shows the series of marine species caught as bycatch during the survey period.

Image 2. Miscellaneous marine species observed from 6 May 2025 to 17 May 2025. 1—Silver Pomfret | 2—Mediterranean Spearfish | 3—Crab | 4—Squid | 5—Narrow-barred Spanish mackerel | 6—Sardine | 7—Red Snapper | 8—Silver Pomfret | 9—Mediterranean Spearfish | 10—Atlantic Tripletail | 11—Hilsa | 12—Sand lances | 13—Ray fish. PC: Authors

Spot-tail Shark Carcharhinus sorrah

Common Name: Spot-tail shark

Scientific Name: *Carcharhinus sorrah*

IUCN Conservation Status: Near Threatened on the IUCN Red List of Threatened Species

Habitat: Found in coastal and offshore waters, especially in tropical and subtropical regions.

Size: Typically grows up to 1.6 meters in length

Distinctive Features: Recognizable by the black tips on its fins and a noticeable black spot on the upper lobe of the tail fin.

Diet: Feeds on small fish, cephalopods, and crustaceans.

Importance: Often caught in fisheries for its meat and fins, making it vulnerable to overfishing.

Table 1. Shark species, its abundance, use of fishing gears, and price sold in markets during survey period.

Date	Survey Duration in Market	Time of Landing	Shark Species Name	Total Length	Abundance	Fishing Gear and fishing boat used	Price (INR)	Sold to
05-05-2025	7:15–8:30	No fish landings were observed	Didn't record	Didn't record	Didn't record	Didn't record	Didn't record	Sold at harbor auction; consumed locally and exported to other states
06-05-2025	7:15–8:00	8:30 AM	*Carcharhinus sorrah*	60 cm	2 only	Net deep catch / Mechanised	300/kg	Sold at harbor auction; consumed locally and exported to other states
08-05-2025	6:30–8:00	7:00 AM	*Carcharhinus sorrah*	70 cm 56 cm	3–4	Net deep catch / Mechanised	400/kg	Sold at harbor auction; consumed locally and exported to other states
12-05-2025	6:30–8:00	6:30 AM	*Carcharhinus sorrah*	46cm 60 cm 44 cm	4–5	Net deep catch / Mechanised	400/kg	Sold at harbor auction; consumed locally and exported to other states
14-05-2025	6:30–8:00	6:30 AM	*Carcharhinus sorrah*	61cm 56 cm	3	Net deep catch / Mechanised	400/kg	Sold at harbor auction; consumed locally and exported to other states
17-05-2025	6:30–8:00	6:30 AM	*Carcharhinus sorrah*	59 cm 56 cm	3	Net deep catch / Mechanised	300/kg	Sold at harbor auction; consumed locally and exported to other states

Image 3. Species observed in bycatch piles (05 May–17 May 2025). PC: Authors

Table 2. Miscellaneous observations in harbour (identified their names with help from local fishers).

Date of survey	**Miscellaneous non-shark catches recorded in Harbor** (Identified their names with help from local fishers.)
05 May 2025	Didn't record
06 May 2025	Silver Pomfret (Aavoli), Mediterranean Spearfish (Kattakomban), squid (Koontal), crab (Njandu) found in massive abundance
08 May 2025	Squid (Koontal), crab (Njandu), Narrow-barred Spanish Mackerel (Ayakoora), Green Lipped Mussel (Kallumakkaya), Striped Bonito (Choora).
12 May 2025	Silver Pomfret (Aavoli), sardines (Mathi), squid (Koontal), Red Snapper (Chempalli) were found were in massive abundance
14 May 2025	Mediterranean Spearfish (Kattakomban), Atlantic Tripletail (Kalava), Silver Pomfret (Aavoli), Striped Bonito (Choora), crab (Njandu), hilsa (Paluva) etc. found in massive abundance.
17 May 2025	Sand lances (Natholi), crab (Njandu), hilsa (Paluva), and ray fish (Thirandi).

Reproduction: Viviparous (gives birth to young ones), with litters of 1–8 pups.

4. Takeaways

- Using visual identification and learning from local fishermen is very useful.
- The type of fishing gear and how deep it goes affects which species are caught.
- Talking to fishermen gives important background information on fishing that helps to understand the ecology of sharks better.

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References

Kizhakudan, S.J., K. Akhilesh, S. Thomas, M. Menon, S. Sen, P.U. Zacharia & R.K. Pradhan (2024). *A study of shark and ray non-fin commodities in India*. Food & Agriculture Organisation.

IUCN (2021). *Carcharhinus sorrah: The IUCN Red List of Threatened Species*. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS. T161376A173434793.en. Accessed on 02 September 2025.

Dulvy, N.K., N. Pacoureau, C.L. Rigby, R.A. Pollom, R.W. Jabado, D.A. Ebert & C.A. Simpfendorfer (2021). Overfishing drives over one-third of all sharks and rays toward a global extinction crisis. *Current Biology* 31(21): 4773–4787.

Tyabji, Z., T. Wagh, V. Patankar, R.W. Jabado & D. Sutaria (2020). Catch composition and life history characteristics of sharks and rays (Elasmobranchii) landed in the Andaman and Nicobar Islands, India. *PloS one* 15(10): e0231069.

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Spatial distribution of human–elephant negative interactions in Gudalur Forest Division in the Nilgiris

The Asian Elephant Elephas maximus is an endangered and keystone species (Ramakrishnan & Saravanamuthu 2010) categorized under Schedule I of the Indian Wildlife (Protection) Act, 1972. Over the past few decades many developmental and destructive activities of humans have severely fragmented the forests. The elephant is one of the most negative interaction-prone wildlife species in India causing large scale damage to crops and human lives. Human-Elephant negative interactions (HENI) refers to conflicts (sic) between humans and elephants. Some of the negative effects of elephants to humans include crop-raids, deaths and injuries to humans and livestock (Tchamba 1995) and similar negative impact of human being to elephants include retaliatory killings, electrocution and other fatal injuries and deaths. Such demands, developmental and agricultural activities have drastically reduced and fragmented elephant habitats, which is the key conservation problem (Baskaran et al. 2007; Daniels & Vencatesan 2008).

The settlements are located in close proximity to forest and farmer's irrevocable dependence on food crops and livestock. Since 80 per cent of the elephant's range lies outside of the protected areas, overlap with human activities is inevitable (Granados et al. 2012). HENI can include crop-raiding, damage to village infrastructure or homes and injury to or death of cattle and occasionally people. Here we present a one-sided statistics of the negative interactions in the landscape.

The Nilgiri–Wynaad is an area that had sufficient forested lands and the state could establish control by abolishing the traditional Janmam rights, and the state also wanted to counter and halt the large-scale migrations of human groups from Kerala State. Davidar (1972) stated that this forest division had sizeable elephant population during migration between the Mudumalai Wildlife Sanctuary and Silent Valley National Park through Nilambur and New Amarambalam reserve forest tracts of Kerala.

The man-made activities such as mining operations were extensively recorded during nineteenth century. Mines were abandoned when they failed but other development activities such as coffee, tea and forest plantations continued. Once there was contiguous forest cover of the Gudalur plateau which acted as a linkage between the forests of Kerala, Tamil Nadu, and Karnataka, facilitated the movement of wild animals, especially migration of elephants and to some extent of Gaur. Rapid and excessive development of plantations has resulted in the formation of forest patches which triggered the animals to go outside the forest areas in search of food creating interaction situation in this division.

With this background the present study was carried out in the Nilgiri–Wynaad Plateau to assess the status of HENI and to assess the species involved and compensation paid. The HENI is posing a major challenge to the conservation of Asian Elephants, and resolving HENI is the major concern among the conservation community (Tchamba 1995).

STUDY AREA

Gudalur division situated at the convergence of Kerala, Karnataka and Tamil Nadu, lies between 11.37 and 11.57'N and 76.53 and 76.25 E covering an area of 484.4 km². Gudalur division forms an undulating terrain with low hills and valleys. The average elevation of the area is about 1,000 m. The Nilgiris–Wayanad lies west of the Nilgiri Plateau and south-west of the Sigur plateau (which is an extension of the Mysore plateau). Steep slopes of the range of hills and peaks, e.g., The Kundah form the eastern boundary of the Nilgiris–Wayanad. This division lies west of the Nilgiris Plateau and is bound on the north by Benne R.F of Mudumalai Wildlife

Sanctuary, on the east by a range of hills with steep slopes and the Kundah peak, on the south-east by Nilgiris division, on the south and south-west by the New Amarambalam forests of Kerala State and on the west and north-west by the Kerala State. The division lies in Gudalur and Pandalur taluk of Nilgiris District. The approximate length of forest boundary of Gudalur division is 72 km.

RESULT

Human-Elephant Negative Interactions issues recorded in and around Gudalur forest division from the year 2017 to 2023.

A total of 45 human casualties were recorded caused by elephants over the past seven years (2017–2023) in Gudalur Forest Division. Of these, the year 2023 recorded highest number of human deaths (n = 9), followed by 2018 (n = 8) and seven human deaths each in 2020 and 2022.

In contrast, fewer human deaths were recorded in 2017 and 2021. A total of 61 human injuries were caused by elephants from 2017 to 2023. The highest number of human injuries were occurred in 2018 (n = 19) followed by 2019 (n = 11) and 2017 (n = 10). A total of 171 crop damage incidents were reported. The year 2023 had the highest number of crop damage incidents (n = 64). The lowest number of crop damage incidents was recorded in 2020 (n = 4).

A total of two hundred and 63 property damage incidents were caused by elephants. The highest number of property damage incidents were occurred in 2022 (n = 61) followed by 2023 (n = 59) and 2017 (n = 51). The lowest number of property damage incidences were recorded in 2019 (n = 16).

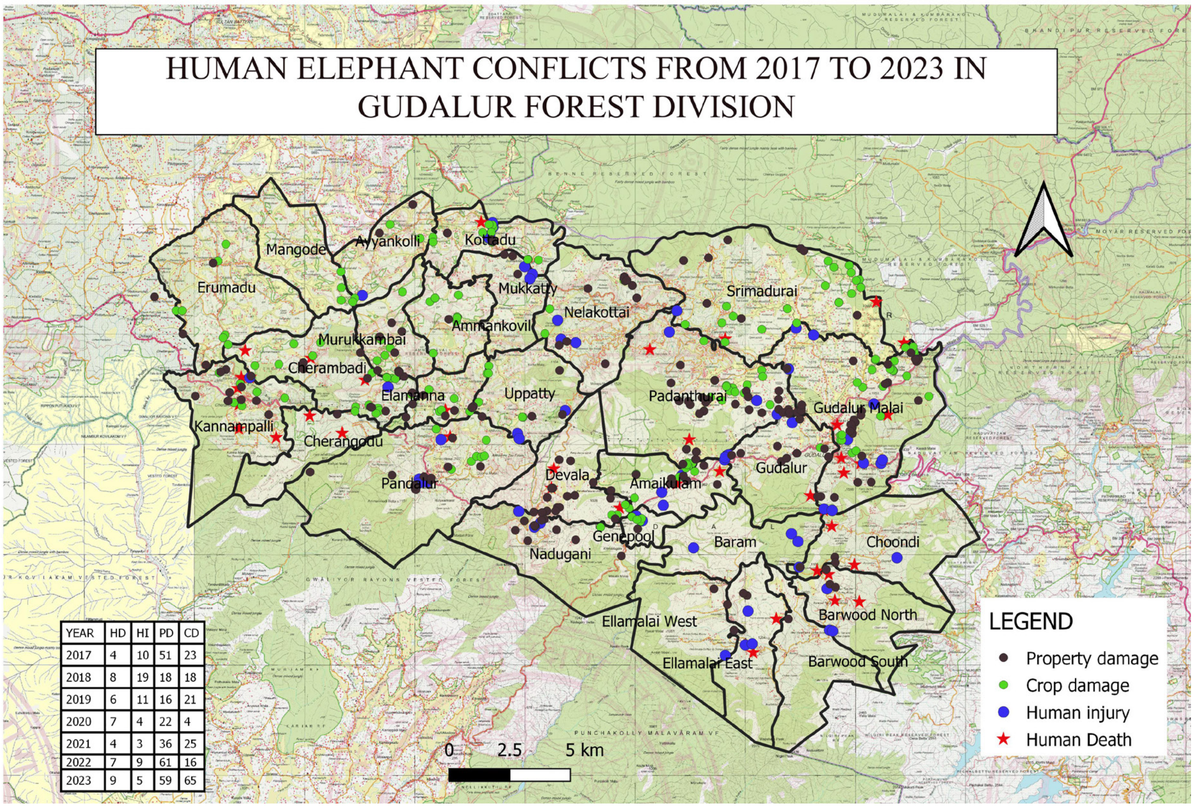
Location map of Gudalur Forest Division.

HUMAN CAUSALITIES

Totally, 45 human causalities were recorded due to HENI for the past seven years (2017–2023) in Gudalur Forest Division, of which, the year 2023 attributed highest number of human deaths (n = 09) followed by 2018 (n = 8) and each seven human causalities in 2020 and 2022. Among these years, the lowest number of human deaths (n = 4) were recorded in 2021. Among the causalities, most of the victims were male (n = 33) than females (n = 12). Totally, 44 human deaths were recorded from 2017 to

Human-Elephant Negative Interactions issues recorded in and around Gudalur forest division from the year 2017 to 2023.

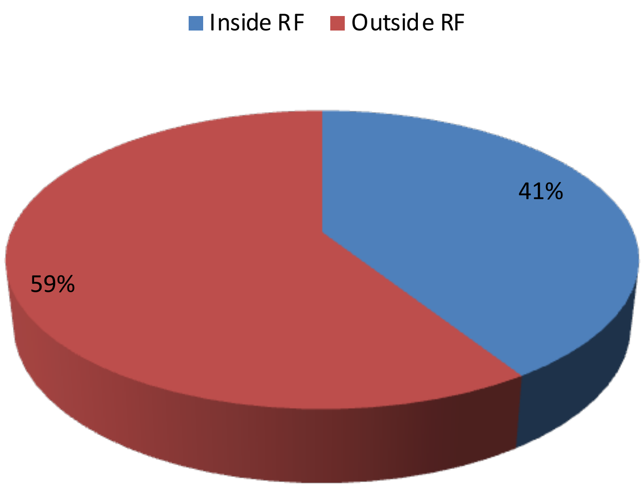
	Year	Total number of human deaths caused by elephants	Total number of human injuries caused by elephants	Total number of crop damage incidences caused by elephants	Total number of property damage incidences caused by elephants
1	2017	4	10	23	51
2	2018	8	19	18	18
3	2019	6	11	21	16
4	2020	7	4	4	22
5	2021	4	3	25	36
6	2022	7	9	16	61
7	2023	9	5	64	59
Total		45	61	171	263



YEAR	HD	HI	PD	CD
2017	4	10	51	23
2018	8	19	18	18
2019	6	11	16	21
2020	7	4	22	4
2021	4	3	36	25
2022	7	9	61	16
2023	9	5	59	65

Spatial distribution of human–elephant neghative interactions in Gudalur Forest Division.

2023 in Gudalur forest division. It is very important to note that there was not much difference noticed in human deaths that occurred between outside (51%) and inside of the forest areas (41%).



Location of human deaths occurred from 2017 to 2023

HUMAN INJURIES

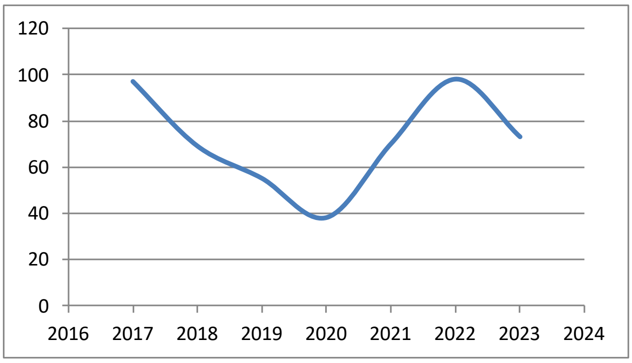
A total of 61 human injuries were caused by elephants from 2017 to 2023 in Gudalur forest division. Of which highest number of human injuries were recorded in the year 2018 (n = 19) followed by 2019 (n = 11), 2017 (n = 10), and 2022 (n = 9). On the contrary, lowest number of human injuries were recorded in the year 2020 (n = 4).

CROP DAMAGE

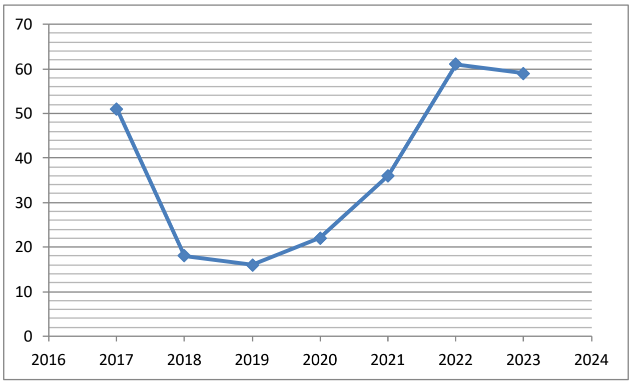
Totally, 171 crop damages were caused by elephants in the past seven years (2017–2023) in Gudalur Forest Division. Of which, the year 2023 attributed highest number of crop damages (n = 64) followed by 2021 (n = 25) and 2017 (n = 23). The lowest number of crop damages recorded in the year of 2020 (n = 4).

PROPERTY DAMAGE

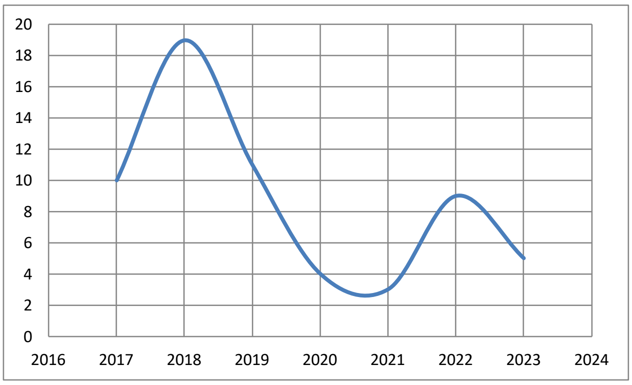
Totally, 263 property damages were caused by elephants for the past 19 years (2017–2023) in Gudalur Forest Division, of which, the year 2022 attributed highest number of crop damages (n = 61) followed by 2023 (n = 59) and 2017 (n = 51). The lowest number of property damages was recorded in the year 2019 (n = 16).



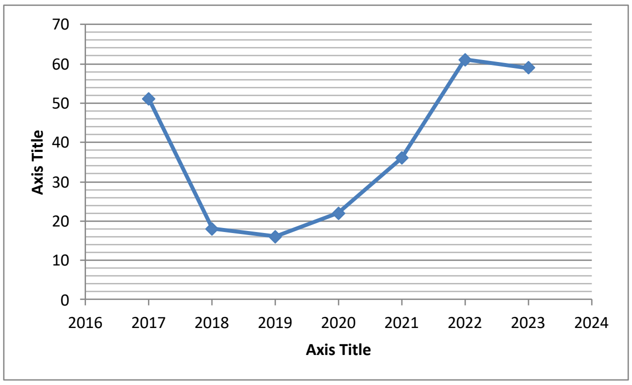
Human deaths caused by elephants from 2017 to 2023



Crop damage caused by elephants from 2017 to 2023



Human injuries caused by elephants from 2017 to 2023.



Property damages caused by elephants from 2017 to 2023.

DISCUSSION

In India, the human population has increased from 252 million in 1911 to 1200 million in the current scenario, which resulted in tremendous pressure on forestland and other produces in India. The proliferation of the human population and its ever-increasing needs would deplete the natural wealth through inappropriate development strategies to cope with the demand. Over few decades, there has been shrinkage of potential habitats due to various land use changes which forms the major cause for the loss of crucial habitats to Asian Elephant populations (Daniel 1980). Human activities are the ultimate cause of this rapid biodiversity loss, as unprecedented numbers of people compete with other species to meet the growing per capita demands for land and resources (WRI 2000; McKee 2003). Loss of human life and the property damage were the most serious form of HENI according to the ranking by local communities (Campbell et al. 2000; Sitati & Ipara 2007). Crop damage accounts for major type of interaction followed by human deaths in Asia (Lahiri-Chowdhury 1980; Sukumar 1985; Dey 1991; Balasubramanian et al. 1995; Zhang & Wang 2003; Bandara & Tisdell 2003; Ramakrishnan 2007) and Africa (Tchamba 1995; O'Connell-Rodwell et al. 2000; Smith & Kasiki 2000; Sitati et al. 2003).

The estimated 28,000 wild elephants in India are distributed over an area of about 109,500 km², about three per cent of the country's geographical area. In some of these tracts, a segment of the elephant population killed an average of 350 people annually over the last five years (2005–2010) (Lenin & Sukumar 2011). In the present study 45 human casualties were recorded due to human-elephant conflicts (HEC) over the past seven years (2017–2023) in Gudalur Forest Division. Of these, the year 2023 recorded the highest number of human deaths (n = 9), followed by 2018 (n = 8), and 2020 and 2022 (n = 7 each human deaths). In contrast, fewer human deaths were recorded in 2017 and 2021. Most of the human deaths occurred outside of the forest areas and sizeable number of human deaths were recorded inside forest areas.

Ramakrishnan (2007) pointed out that the indiscriminate growth in the construction of buildings in the forms of resorts, educational institutions, ashrams and amusement parks in the fringes of the corridors considerably affects the movement of elephants which becomes a cause for the HENI. In the present study, 61 human injuries caused by elephants were recorded from 2017 to 2023 in Gudalur Forest Division. The highest number of human injuries occurred in 2018 (n = 19), followed by 2019 (n = 11), and 2017 (n = 10). Fewer human injuries were recorded in 2021. About 171 crop damage incidents were reported in and around the Gudalur Forest Division. The year 2023 had the highest number of crop damage incidents (n = 64), followed by 2021 (n = 25). The lowest number of crop damage incidents was recorded in 2020 (n = 4).

Property damage caused by elephants is one of the criteria to evaluate the intensity of HENI in a particular area or particular place. Totally, 263 property damage incidents caused by elephants were reported in Gudalur Forest Division from 2017 to 2023. The highest number of property damage incidents occurred in 2022 (n = 61), followed by 2023 (n = 59), and 2017 (n = 51). The lowest number of property damage incidents was recorded in 2019 (n = 16).

CONCLUSION AND RECOMMENDATIONS

The present study of HEC paved a way for suggesting the following recommendations for the better management of this forest division for the long-term conservation of wildlife.

I. It is necessary to ensure and protect the Nilambur to Mudumalai via O'Valley corridor. Since the major land areas in this corridor are belonged to wealthy planters, it would be easily negotiated and secured in this corridor.

II. Awareness creation through education and some biological (eco-friendly) mitigation measures needs to be suggested for the conflict areas through participatory approach in this forest division.

III. As long-term measure, intensive management of elephant migratory routes will be needed (Ramkumar et al. 2014a). Also, management strategies in this division should be aimed at regulating land use changes in private lands at least 2 km from forest boundary, habitat improvement in forest foothill and detailed research on factors of human-elephant conflict and new techniques on control measures.

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REFERENCES

Balasubramanian, M., N. Baskaran, S. Swaminathan & A.A. Desai (1995). Crop raiding by Asian elephants *Elephas maximus* in the Nilgiri Biosphere Reserve, southern India, pp. 350–367. In: Daniel, J.C. & H.S. Datye (eds.). *A week with elephants*: *Proceedings of the International Seminar on the Conservation of Asian Elephant, June 1993.* Bombay Natural History Society, 535 pp.

Bandara, R. & C. Tisdell (2003). The economic value of conserving Asian elephant: Contingent valuation estimation for Sri Lanka. *Gajah* 22: 22–29.

Baskaran, N., G. Kannan & U. Anbarasan (2007). Conservation of the elephant population in the Anamalais-Nelliampathy and Palani Hills (Project Elephant Range: 9), southern India. Final Report to United States Fish & Wildlife Service. Asian Nature Conservation Foundation, Bangalore.

Campbell, D.J., H. Gichohi, A. Mwangi & L. Chege (2000). Land use conflict in Kajiado district, Kenya. *Land Use Policy* 17(4): 337–348.

Daniel, J.C. (1980). The Status of Asian Elephants in the Indian Sub-continent. *Elephant* 1(4): 16-28.

Daniels, R.J.R. & J. Vencatesan (2008). *Western Ghats: Biodiversity, people and Conservation*. Rupa Publications India Pvt. Ltd, 148 pp.

Davidar, E.R.C. (1972). Investigation of elephant migration paths in the Nilgiri Hills and inquiry into impediments to the free movement elephants there and 230 recommendations for the provision of corridors for their movement. Unpublished report to IUCN/SSC Asian Elephant Specialist Group, Journal of Bombay Natural History Society, 20 pp.

Dey, S.C. (1991). Depredation by wildlife in fringe areas in north Bengal with special to elephant damage. *The Indian Forester* 117(10): 901–908.

Granados, A., R.B. Weladji & M.R. Loomis (2012). Movement and occurrence of two elephant herds in a human-dominated landscape, the Be´noue´ Wildlife Conservation Area, Cameroon. *Tropical Conservation Science* 5(2): 150–162.

Lenin, J. & R. Sukumar (2011). *Action Plan for the Mitigation of Elephant-Human Conflict in India*. Final Report to the U.S. Fish and Wildlife Service. Asian Nature Conservation Foundation, Bangalore.

McKee, J.K. (2003). *Sparing nature: The conflict between human population growth and Earth's biodiversity.* Rutgers University Press, 224 pp.

O'Connell-Rodwell, C.E., T. Rodwell, M. Rice & L.A. Hart (2000). Living with the modern conservation paradigm: can agricultural communities co-exist with elephants? A pre-year case study in east Caprivi, Nambibia. *Biological Conservation* 93(3): 381–391.

Ramakrishnan, B. & K. Ramkumar (2007). Land acquisition perspectives of vital elephant corridors in the Coimbatore and Sathyamangalam Forest Divisions, Tamil Nadu, south India. Final Report. Wildlife Trust of India, New Delhi.

Ramakrishnan, B. & R. Saravanamuthu (2010). *Elephant – the key stone species.* Tamil Nadu State Council for Science and Technology and Indo American Wildlife Society, Chennai.

Ramkumar, K., B. Ramakrishnan & R. Saravanamuthu (2014). Crop damage by Asian Elephants *Elephas maximus* and effectiveness of mitigating measures in Coimbatore Forest Division, south India. *International Research Journal of Biological Sciences* 3(8): 1–11.

Sitati, N.W. & H. Ipara (2007). The role of tourism development and benefit sharing in mitigating human-elephant conflict in the Mara ecosystem, Kenya, pp. 71–80. In: Kloek E.M. & Rene van der Dium (eds.). *Tourism and nature in Africa. Thematic proceedings of Association for Tourism and Leisure Education (ATLAS) Africa conferences*.

Sitati, N.W., M.J. Walpole, R.J. Smith & N. Leader-Williams (2003). Predicting Spatial Aspects of Human-elephant conflict. *Journal of Applied Ecology* 40(4): 667–677.

Smith, R.J. & S.M. Kasiki (2000). A spatial analysis of human-elephant conflict in the Tsavo ecosystem, Kenya. A Report to the African Elephant Specialist Group,

Human-Elephant Conflict Task Force, of IUCN, Gland, Switzerland, 73 pp.

Sukumar, R. (1985). Ecology of Asian elephant *Elephas maximus* and its interaction with man in south India. Ph.D., thesis. Indian Institute of Science, Bangalore.

Tchamba, M.N. (1995). The problem elephants of Kaele: a challenge to elephant conservation in northern Cameroon. *Pachyderm* 19: 26–32.

World Resources Institute (2000). *World Resources 2000–2001*: *People and ecosystems—the fraying web of life.* World Resources Institute, Washington, DC., 389 pp.

Zhang, L. & N. Wang (2003). An initial study on habitat conservation of Asian elephant *Elephas maximus*, with a focus on human elephant conflict in Simao, China. *Biological Conservation* 112(3): 453-459.

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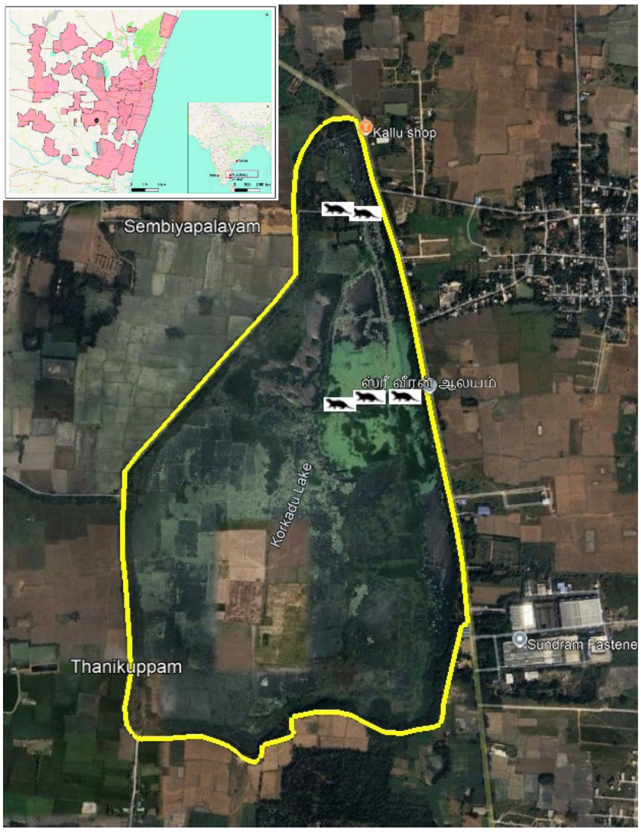
Hope for Conservation: a new sighting of Smooth-Coated Otters in Puducherry

The Smooth-coated Otter *Lutrogale perspicillata*, a sleek aquatic mammal weighing between 7 and 15 kg, is a keystone species in wetland ecosystems across southern Asia (Raha & Hussain 2016). Its range extends from Indonesia and southern China to Pakistan and India, with a unique population in Iraq. In India, these otters thrive in diverse aquatic habitats-from the Himalayan foothills to the wetlands and coasts of the south. Unfortunately, their preferred habitats-rivers, lakes, and wetlands are increasingly threatened by human activities, placing the species at risk (Baskaran et al. 2022).

The Smooth-coated Otter: a key species rediscovered in Korkadu Lake.



A map showing the location of the Korkadu Lake and Smooth-coated Otter sightings in Puducherry, southern India.

Listed as 'Vulnerable' on the IUCN Red List and protected under Schedule II Part II of the Indian Wildlife (Protection) Act, 1972, Smooth-coated Otters depend on lowland habitats with shallow waters, dense riparian vegetation, and moderate currents for foraging and grooming.

Otter Sightings in Puducherry

Five Smooth-coated Otters were directly sighted in Korkadu Lake, a vital wetland near Puducherry that covers 87.02 ha and has a water depth of 1.2–1.8 m. Interviews with local fishermen revealed additional populations, an estimated eight individuals in Korkadu Lake. These figures

Water hyacinth, an invasive plant, forms dense mats on the water's surface in the Korkadu Lake and Sankaraparani River, Puducherry.

suggest that otter populations in the region may be larger than previously recorded, underscoring the need for detailed surveys and long-term monitoring. Early sightings were recorded in the Sankaraparani River, Puducherry (Raman et al. 2019).

Challenges Facing Smooth-Coated Otters

Despite their ecological significance, smooth-coated otters face several threats:

Conservation Welfare: Interviews revealed that otters often raid fishing nets and depredate domestic fowl, leading to friction with local communities.

Invasive Species: Water Hyacinth *Eichhornia crassipes*, an invasive aquatic plant, forms dense mats on the water's surface, blocking sunlight and displacing native aquatic plants crucial for otter habitats.

Conservation Priorities

To safeguard this charismatic mammal and their habitats, the following actions are critical:
Community Education: Raising awareness about the ecological role of otters among local residents, particularly fishermen, can help Smooth-coated Otter welfare and foster coexistence.
Habitat Protection: Implementing sustainable fishing practices, controlling invasive species like Water Hyacinth, and regulating sand mining are vital to maintaining healthy ecosystems.
Monitoring and Research: Regular population surveys and ecological studies will provide valuable insights into otter behaviour, population trends, and habitat requirements.

A Call to Action

The rediscovery of Smooth-coated Otters in Korkadu Lake, Puducherry highlights the resilience of nature when ecosystems are

Map showing the early and new sightings of Smooth-coated Otter in Puducherry.

restored and protected. These findings reaffirm the critical importance of combining scientific research, local knowledge, and community involvement to conserve vulnerable species. By addressing threats and enhancing habitat protection, we can ensure that Smooth-coated Otters continue to thrive in India's wetlands.

References

Baskaran, N., R.S. Sundarraj & R. Sanil (2022). Population, distribution and diet composition of Smooth-coated Otter *Lutrogale perspicillata* Geoffroy, 1826 in Hosur and Dharmapuri Forest Divisions, India. *Journal of Threatened Taxa* 14(1): 20469–20477.

Raha, A. & S.A. Hussain (2016). Factors affecting habitat selection by three sympatric otter species in the southern Western Ghats, India. *Acta Ecologica Sinica* 36(1): 45–49.

Raman, K., S. Vimalraj, S. Kishorekumar, B. M. Krishnakumar & K. M. Selvan (2019). Occurrence of Smooth-Coated Otter *Lutrogale perspicillata* in Sankaraparani River, Puducherry, India. *IUCN/SSC Otter Specialist Group Bulletin* 36(1): 28–33.

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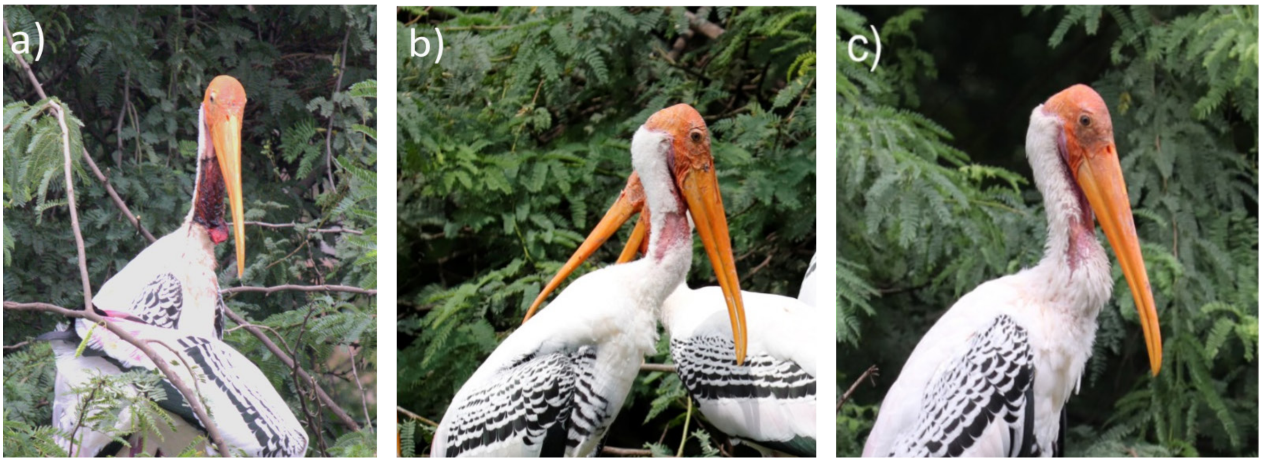
Injuries sustained by free ranging Painted Stork nesting in the National Zoological Park, Delhi by Chinese 'manjha' strings



An individually identifiable Painted Stork with an injury mark clearly visible on the neck, most likely caused by kite flying thread, observed at the nesting colonies of Delhi Zoo in three successive breeding seasons. a) 2022, b) 2023, c) 2024. Note progressive reduction of the scar and the growth of skin and feather tracts. © Paritosh Ahmed.

Kite flying has been a popular pastime in India since Chinese explorers Fa Hien and Hiuen Tsang introduced it around 600 AD (Desai 2010). Traditionally enjoyed during festivals like Lohri, Basant, and Makar Sankranti, it later evolved into the competitive sport of kite fighting during the Mughal era (Desai 2010; Singh et al. 2014). After India's independence in 1947, kite flying became a symbol of celebration. In India, primarily two types of kite strings are used, i.e., ‘*manjha*’, a glass-coated abrasive string, and ‘*saddi*’, a non-abrasive cotton string.

However, the sharpness of manjha makes it essential for kite fighting (Desai 2010). Recently, synthetic ‘*Chinese manjha*’ a glass-coated polymer line has gained popularity due to its superior cutting ability and lower cost. In the local market, 12 reels of Chinese manjha cost around Rs.350, while cotton manjha can cost up to Rs.1,150 depending on quality (Indian Express 2016).

This extensive use of Chinese manjha, has become a cause of concern in India due to the accidental injuries it causes to wild birds in flight especially in urban areas as these strings get tangled up in tall tree branches, telegraph or electricity poles, protuberances on tall buildings, roads, etc. when it is carried by the wind and drifts with the kite (Roy & Shastri 2013; Babu et al. 2015; Gupta et al. 2018). Due to the thin and near-invisible nature of the kite string, common birds in flight (which generally fly low, within a height 6–46 m) often get tangled and experience extreme stress and strain, and sustain injuries, particularly severe cuts, and bruises, and even die if not saved (Babu et al. 2015). In August

Map showing the location of the National Zoological Park where the Painted Stork nesting colony is located, and the river Yamuna where the birds fly frequently for foraging. Note extensive built-up areas between the two where birds fly low during the month of August when kite flying is at its peak. Source: Google Earth.

2024, it was reported that more than 100 birds which included pigeons, black kites, and even a cormorant got injured by kite flying in Delhi (Gandhiok & Jha 2024**)**.

Here we document a case of severe injury sustained by an adult Painted Stork *Mycteria leucocephala* nesting in the open heronries of National Zoological Park (NZP) or Delhi Zoo, Delhi.

The Painted Stork, a colonial waterbird of southern and southeastern Asia, is a regular nester at Delhi Zoo, where it has been nesting in large colonies on clumps of *Prosopis juliflora* trees growing on islands in its ponds, since 1960 (Urfi 2011). Each year, in the month of August these storks congregate in the zoo premises and usually occupy previous years' nests or repair the old nests by adding fresh twigs and leaves from nearby trees. The nesting activities in the Painted Stork nesting colonies can be studied easily from designated pathways built close to the ponds, with binoculars or a telescope, with a viewing distance of 30–50 m. During the course of our field observations in August 2022, an individual Painted Stork with prominent injury marks, likely caused by kite string, on the neck was sighted. In this individual, the entire gular area appeared to be scraped off over a length of approximately 15–20 cm, exposing the trachea. Subsequently, the injuries healed over time and left a prominent scar on the neck. The same individual with the injury scar was seen in subsequent years, 2023 and 2024, also. The particular bird was observed nesting in the same patch (in Pond 1, colony 1) in each of the three years.

The Painted Storks nesting in the Zoo are known to make foraging trips to nearby foraging areas associated with the river Yamuna nearby (Urfi 2010). Since their flight path is over residential areas and generally these storks fly low, it is quite possible the throat injury was caused by an abrasive cord, a kite string which was made of Chinese manjha. Interestingly, the time when Painted Stork start congregating at the Delhi

Zoo, i.e., in the month of August (a couple of months after the commencement of the summer monsoon) is also a period when the popular sport of kite flying is at its peak. In fact, on India's Independence Day celebrations on the 15 August kite flying activities are at their peak.

As the individual with injury marks on its throat was seen regularly each of the three years it was possible to note the healing process of the wound. Except for a slight reduction in the size of the scar, the wound remained nearly of the same size. The repeated occurrence of this bird at the site strongly suggests nest-site fidelity (Vergara et al. 2006) although other and rigorous tests would also be required to unequivocally establish the identity of the individual bird.

Injuries to birds caused by kite flying string are becoming increasingly common in India, especially as new varieties of kite string are extremely abrasive and almost invisible (Roy & Shastri 2013; Babu et al. 2015; Gupta et al. 2018). While the authorities concerned seem cognizant of the damage being caused by the free use of Chinese manjha to free flying birds and frequent notices and appeals are issued by government agencies, more stringent steps need to be taken to stop the use of this material for the harm that it causes to the environment. From a conservation viewpoint, this is fast becoming a serious issue as many types of birds are reportedly being affected, and calls for serious discussion and legislative solutions.

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References

Babu, S., S. Subramanya & M. Dilawar (2015). Kite flying: Effect of Chinese manja on birds in Bangalore, India. *Indian BIRDS* 10(1): 13–18.
Desai, N. (2010). *A Different Freedom: Kite Flying in Western India; Culture and Tradition*. Cambridge Scholars Publishing, UK, 180 pp.
Gupta, P., A. Jain, A.N. Patil, R. Thakor & S. Kumar (2018). Kite string injury: a thin line between harmless sport and grievous injury. *International Journal of Community Medicine and Public Health* 5(7): 2782–85.
Gandhiok, J. & S.K. Jha (2024) Independence Day: 100+ birds killed, wounded by kite strings. Hindustan times, 17 August. https://www.hindustantimes.com/cities/delhi-news/iday-100-birds-killed-wounded-by-kite-strings-101723829018766.html. Accessed on 12.iv.2025.
Indian Express (2016). Why Chinese manjha sells more: Cheaper, tougher, 17 August. https://indianexpress.com/article/cities/delhi/why-chinese-manjha-sells-more-cheaper-tougher-delhi-kite-killing-high-court-2979855/. Accessed on 12.iv.2025.
Roy, A. & K. Shastri (2013). Impact of kite string injuries and temporal variation in types of injuries and illnesses of White-rumped Vultures of central Gujarat, India. *Journal of Threatened Taxa* 5(14): 4887–4892.
Singh, S., N.J. Peters, C. Samuel, W. Bhatti & D.N. Ghosh (2014). Kite flying: ancient tradition or death trap?. *Emergency Medicine Australasia* 26(5): 478–480.
Urfi, A.J. (2010). Using heronry birds to monitor Urbanization Impacts: A case study of Painted Stork *Mycteria leucocephala* nesting in the Delhi Zoo, India. *Ambio* 39: 190–193.
Urfi, A.J. (2011). *The Painted Stork: Ecology and Conservation*. Springer, New York, 163 pp.
Vergara, P., J.I. Aguirre, J.A Fargallo & J.A Davila. (2006). Nest-site fidelity and breeding success in White Stork *Ciconia ciconia*. *Ibis* 148(4): 672–677.

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Largest congregation of the endangered Black-Bellied Tern in Dibru-Saikhowa National Park

The Black-bellied Tern *Sterna acuticauda* Gray, 1832 is one of 23 tern species found in the Indian subcontinent (Ali & Ripley 1983), and is currently listed as 'Endangered' in the IUCN Red List of Threatened Species (BirdLife International 2022). This species is native to countries across south and southeast Asia, including Bangladesh, Cambodia, India, Laos, Myanmar, Nepal, Pakistan, Thailand, and Vietnam, with occurrences in certain regions of southern China. The global population is estimated to range between 6,700 and 17,000 mature individuals (Kar et al. 2018). Typically inhabiting large rivers and marshes, the Black-bellied Tern prefers breeding in isolated sandy islands within expansive river systems.

Eleven individuals of the Black-bellied Tern on one side of the sandbar in Dibru-Saikhowa National Park. © Imon Abedin.

Eight individuals of the Black-bellied Tern on the other side of the sandbar (as mentioned in the text) in Dibru-Saikhowa National Park. © Imon Abedin.

However, ongoing anthropogenic pressures on these critical habitats have led to a marked decline in their numbers (Chowdhury et al. 2014). In recent decades, the global population of the Black-bellied Tern has experienced a drastic decline, leading to concerns that previous estimates may have significantly overestimated the actual numbers (BirdLife International 2024). Currently, over 90% of the remaining population is confined to India, where more than 1,400 records have been documented. Furthermore, significant populations have been reported from key locations such as the Chambal, Godavari, Ganga and the Mahanadi rivers

An adult, Black-bellied Tern. © Imon Abedin.

Bird with the characteristic of "black belly". © Imon Abedin.

An individual in flight. © Imon Abedin.

(Kar et al. 2018; Gochfeld et al. 2020).

In contrast, their presence in northeastern India is limited primarily to the Brahmaputra River basin in Assam, where sightings have been infrequent and often involve very few individuals (SoIB 2023). Despite historical accounts documenting aggregations exceeding 10 individuals during the 1970s and the species being characterized as gregarious, there is a conspicuous absence of photographic evidence in the eBird database to substantiate such group occurrences (eBird 2024).

On 19 October 2024, during a birding expedition to Dibru-Saikhowa National Park, a flock of 19 Black-bellied Terns were observed near the Aisung area (27.6655º N, 95.2765º E) at around 1330 h. The terns were basking in the sun at the two opposite sides of the sandbar: eleven on the one side and eight on the other side. This sighting is significant for northeast India, particularly for Dibru-Saikhowa National Park as prior records indicate a sparse presence of this species in the region with no documentation of such a large congregation (Choudhury 1998; Rao & Menzies 2019).

However, this species faces significant threats in the region due to dynamic land cover changes, including erosion and rising water levels. The recent sighting occurred near forest village Dadhiya, an area with notable human activity, including the presence of cattle and domestic dogs. Additionally, harmful practices such as fishing using electric generators pose further risks to fish fauna and other aquatic and terrestrial wildlife. Additionally, the sandbars are used as popular picnic-spots which can jeopardize the survival of this species. Therefore, safeguarding these sandbar habitats is essential as these provide vital refuges for the Black-bellied Tern and other sympatric species.

References

Ali, S. & D. Ripley (1983). *Handbook of the Birds of India & Pakistan*. Oxford University Press, New York, 737 pp.

BirdLife International (2024). Species factsheet: Black-bellied Tern *Sterna acuticauda*. https://datazone.birdlife.org/species/factsheet/black-bellied-tern-sterna-acuticauda. Accessed on 22.x.2024.

BirdLife International (2022). *Sterna acuticauda*. The IUCN Red List of Threatened Species 2022: e.T22694711A207933556. https://doi.org/10.2305/IUCN.UK.2022-2.RLTS.T22694711A207933556.en. Accessed on 22.x.2024.

Choudhury, A. (1998). Mammals, birds and reptiles of Dibru-Saikhowa Sanctuary, Assam, India. *Oryx* 32(3):192–200.

Chowdhury, S.U., M. Foysal, J. Sharpe & O. Shahadat (2014). A survey for Black-bellied Tern *Sterna acuticauda* and other riverine birds on the Jamuna and Padma rivers in Bangladesh. *Forktail* 30: 84–89.

eBird (2024). eBird Basic Dataset. Version: EBD_relSep-2024. Cornell Lab of Ornithology, Ithaca, New York.

Gochfeld, M., J. Burger & E. de Juana (2020). Black-bellied Tern *Sterna acuticauda*, version 1.0. In: del Hoyo, J., A. Elliott, J. Sargatal, D.A. Christie & E. de Juana (Eds.). *Birds of the World*. Cornell Lab of Ornithology, Ithaca, NY, USA.

Kar, T., H.S. Palei & S. Debata (2018). Breeding reports and conservation implications of the Endangered Black-bellied Tern *Sterna acuticauda* J.E. Gray, 1831 (Aves: Charadriiformes: Laridae) in Odisha, eastern India. *Journal of Threatened Taxa* 10(13): 12840–12843.

Rao, M. & R.K. Menzies (2019). An update on the Endangered Black-bellied Tern *Sterna acuticauda* (Gray 1832) from D'Ering Memorial Wildlife Sanctuary and Dibru-Saikhowa National Park, Assam, India. Bird-o-soar #35, In: *Zoo's Print* 34(9): 27–30.

SoIB (2023). State of India's Birds factsheet: Black-bellied Tern Sterna acuticauda (State: Assam) https://stateondiasbirds.in/species/as-blbter1/. Accessed on 22.x.2024.

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Egyptian Vultures under siege: threat of illegal trade In India

The Egyptian Vulture *Neophron percnopterus*, a scavenger listed as 'Endangered' on the IUCN Red List due to its rapidly dwindling global population, faces a new threat: illegal wildlife trafficking. This practice poses a significant risk to numerous threatened species worldwide, including Egyptian Vultures.

Vultures are experiencing a global decline, with populations plummeting over the past three decades. Egyptian Vultures face significant threats in both central Asia and southern Asia (Goranova 2014). In central Asia, habitat loss, pesticide poisoning, and human-wildlife negative interactions pose major challenges. The decline of wild ungulates, which provide a crucial food source for vultures, further exacerbates their vulnerability. In southern Asia, the widespread use of diclofenac, a non-steroidal anti-inflammatory drug, has been linked to the catastrophic decline of vulture populations.

This drug is toxic to vultures when ingested through the carcasses of treated animals. Additionally, habitat loss, human-wildlife negative interactions, and illegal trade in vulture body parts continue to threaten Egyptian Vultures in south Asia (Rastriya Samachar Samiti, 2016). This decline is primarily attributed to poisoning and electrocution incidents in Asia, where vultures have largely vanished. In Africa, illegal trade in vulture body parts has significantly impacted populations. In 2014, individuals were smuggled through Bulgaria and Greece to western Europe, targeting both adults and their young and eggs (Oppel et al, 2019).

In 2016, a disturbing incident of vulture smuggling occurred in Palpa District, Nepal. The

Smuggled Egyptian Vultures recovered from train in Khandva, Madhya Pradesh. © P. Naveen

District Forest Office discovered the carcasses of four endangered Red-headed Vulture and Egyptian Vulture hanging from a tree in Batasedanda, Tansen-13. The DFO suspected that these vultures were killed for their body parts, which are highly valued in traditional medicine and other practices. According to reports, vulture bones could fetch prices as high as Rs 5,000 in the local market (The Himalayan Times 2016).

Case study

This illegal trade poses a serious threat to the survival of Egyptian Vultures. India witnessed its first recorded vulture trade case in 2022 when railway police and forest department officials intercepted seven smuggled Egyptian Vultures on a train in Khandva (latitude 21.8235° N and longitude 76.3528° E), Madhya Pradesh (Naveen 2022). The forest department successfully apprehended a man from Uttar Pradesh who was engaged in the illegal smuggling of rare white vultures. Acting on information from passengers, railway police and forest department officials intercepted seven vultures on the 12144 Sultanpur Lokmanya Tilak Express at Khandwa station. The culprit, identified as Farid Ahmed from Unnao, Uttar Pradesh, was found carrying the vultures in a bag.

During questioning, Farid admitted to transporting the vultures from Kanpur to Malegaon for a fee of Rs 10,000. These vultures were being transported from Kanpur, Uttar Pradesh, to Malegaon, Maharashtra, with the intent of smuggling them internationally to Arabic and African countries. The Wildlife (Protection) Act, 1972, and international conventions like CITES provide legal protection for vultures. Consequently, the Khandwa Forest Department registered a case under sections 9, 39, 44, 48A, 49, and 51 of the WPA, 1972, against those involved in the illegal trade.

References

Goranova, I. (2014). The return of the Nephron: illegal wildlife trade. https://old.lifeneophron.eu/en/Traffic_accidents.html. Accessed on 12.iv.2025.

The Himalayan Times (2016). Smuggling of rare vultures bone increasing in Palpa. 06 April. https://thehimalayantimes.com/nepal/smuggling-rare-vultures-bone-increasing-palpa. Accessed on 12.iv.2025.

Oppel, S., C. Pourchier, J. Onoja, S. Adefolu & A.R. Wisdom (2019). Is the demand for vulture parts in Nigeria affecting regional vulture populations? https://www.illegalwildlifetrade.net/2019/10/28/is-the-demand-for-vulture-parts-in-nigeria-affecting-regional-vulture-populations/. Accessed on 12.iv.2025.

Naveen, P. (2022). Smuggled Endangered Egyptian Vultures from Uttar Pradesh to Maharahstra. Times of India, 06 February. http://timesofindia.indiatimes.com/articleshow/89376376.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst. Accessed on 12.iv.2025.

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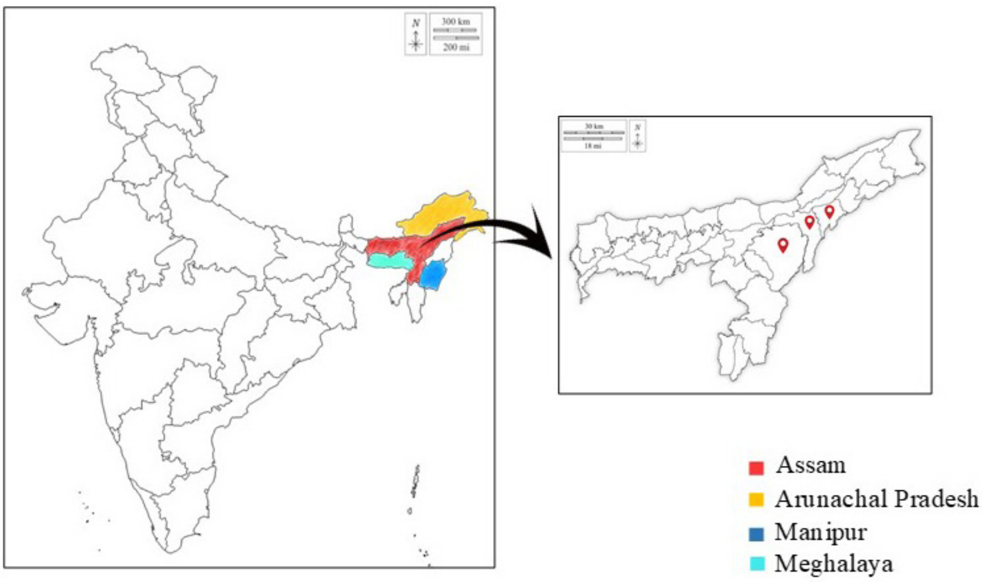
Conservation status of some endemic flora of northeastern states of India

The northeastern region of India is regarded as the home to numerous endemic plant species which fall within the demarcated regions of biodiversity hotspots of the country (Upadhaya et al. 2013). However, many of these species face threats due to habitat destruction, climate change, and anthropogenic pressures (Basnett & Ganesan 2022; Halder et al. 2024). This review explores some of the endemic plant species from northeastern region of India that fall within these categories, highlighting the urgent need for conservation efforts and further research. The primary objective of this review is to compile some endemic plant species of Assam, Arunachal Pradesh, and Meghalaya that have been assessed under various publications.

The findings include several orchid species from Assam, *Rhododendron* species from Arunachal Pradesh, and a diverse range of endemic plants from Meghalaya, along with other plant species, all classified under various threatened categories. Assam lies within the transitional zone connecting the Indian, Indo-Malayan, and Indo-Chinese biogeographical regions. Its favorable climate, along with diverse topographical and edaphic conditions, promotes the abundant growth of a wide range of plant communities. The endemic orchids of Assam, which are crucial for ecological balance, ornamental value and their pharmacological properties, face threats due to habitat loss, overharvesting and illegal collection (Tiwari et al. 2023). Arunachal Pradesh occupies a strategically significant position at the intersection of the Indo-Burma and Himalayan biodiversity hotspots. The state's distinct phytogeographical, topographical, and climatic features create an ideal environment for diverse and unique floral species (Borah et al. 2024).



Map showing the distribution of endemic plant species of northeastern of India under RET categories

Given that it harbors nearly half of India's total flowering plant species,

Arunachal Pradesh is often regarded as the "center of evolutionary development" and the "cradle of flowering plants" (Chowdhery 2008). The region supports a rich diversity of endemic and native species. *Rhododendron* species in Arunachal Pradesh, known for their ecological and aesthetic significance and it is one of the largest genera of flowering plants. It is blooming across various elevations in the Himalaya and plays a crucial role in supporting seasonal movements of insects, birds, and animals. Given its significant ecological and economic value in this mountainous region, it stands out as an important genus for further study and exploration (Basnett & Ganesan 2022). However, climate change and the growing demand for natural resources have increasingly threatened the natural habitats of Indian Himalayan *Rhododendron* over time (Basnett & Ganesan 2022; Halder et al. 2024).

Meghalaya, encompassing the Garo, Khasi, and Jaintia Hills, forms part of the Indo-Burma biodiversity hotspot. A significant proportion of India's total plant diversity, including numerous endemic, rare, and primitive flowering plant taxa have been documented within Meghalaya. The region's exceptional biodiversity is largely influenced by its varied topography, altitude

Endemic plant species status as per individual assessment.

	Family	Species	Region	Individual assessment	References
1	Orchidaceae	*Vanilla borneensis*	Assam	R and T	Baruah et al. 2017
2	Arecaceae	*Calamus nambariensis*	Assam	T	Baruah et al. 2017
3	Lauraceae	*Phoebe hainesiana*	Manipur, Assam	EN	Devajit et al. 2022
4	Ericaceae	*Rhododendron concinnoides*	Arunachal Pradesh	T	Paul et al. 2005
5	Ericaceae	*Rhodeodendron santapauii*	Arunachal Pradesh	EN	Paul et al. 2005
6	Ericaceae	*Rhodeodendron subansiriense*	Arunachal Pradesh	EN	Paul et al. 2005
7	Annonaceae	*Goniothalamus simonsii*	Meghalaya	EN	Upadhaya et al. 2013
8	Annonaceae	*Trivalvaria kanjilalii*	Meghalaya	EN	Upadhaya et al. 2013
9	Aquifoliaceae	*Ilex khasiana*	Meghalaya	CR	Upadhaya et al. 2013
10	Aquifoliaceae	*Ilex venulosa*	Meghalaya	EN	Upadhaya et al. 2013
11	Nepenthaceae	*Nepenthes khasiana*	Meghalaya	CR	Upadhaya et al. 2013
12	Orchidaceae	*Paphiopedilum insigne*	Meghalaya	VU	Upadhaya et al. 2013
13	Ranunculaceae	*Clematis apiculata*	Meghalaya	EN	Upadhaya et al. 2013
14	Rubiaceae	*Ophiorrhiza subcapitata*	Meghalaya	EN	Upadhaya et al. 2013
15	Sterculiaceae	*Sterculia khasiana*	Meghalaya	EX	Upadhaya et al. 2013

CR—Critically Endangered | EN—Endangered | VU—Vulnerable | T—Threatened | R—Rare.

differences, and distinct climatic conditions. Additionally, its sub-Himalayan location and the abrupt elevation of hills from the surrounding plains have contributed to a high degree of endemism, further emphasizing its ecological significance (Tiwari et al. 2023). However, the biodiversity of the state is increasingly threatened by shifting cultivation, deforestation, forest fragmentation and urbanization (Upadhaya et al. 2013).

Despite the rich biodiversity of northeastern India, there is a considerable research gap in the conservation assessment of its endemic flora. Strengthening conservation policies, promoting in situ and ex situ conservation efforts, and increasing research funding are essential to ensure the survival of these species. Local communities and indigenous knowledge must also be integrated into conservation frameworks to achieve sustainable outcomes. Future research should focus on evaluating the status of newly identified species and implementing conservation strategies that align with ecological sustainability and biodiversity preservation in northeastern India.

References

Baruah, P.S., K. Deka, B. Sarma, P. Das, S.K. Borthakur & B. Tanti (2017). Assessment of few unexplored RET plant wealth of Assam, India. *Journal of Advanced Plant Sciences* 9(2): 10–15.
Basnett, S. & R. Ganesan (2022). A comprehensive review on the taxonomy, ecology, reproductive biology, economic importance and conservation status of Indian Himalayan Rhododendrons. *The Botanical Review* 88(4): 505–544.
Borah, D., M. Taram, M. Tasser, E. Basar, S. Tangjang & T. Wangpan (2024). Monitoring forest biodiversity in the face of urban proximity: a case study in Nirjuli highlighting the necessity for ex-situ conservation imperative. *Research Square,* 26 pp.
Chowdhery, H.J. (2008). Arunachal Pradesh: The cradle of flowering plants, pp. 77–82. In: Rawat, G.S. (ed.). *Threatened plants and special habitats. ENVIS Bulletin* 11. Wildlife Institute of India, Dehra Dun, 239 pp.
Devajit, Y., L. Aashish, B. Wairokpam, V. Vaishnav & L. Puni (2022). Ecology and conservation status of *Phoebe hainesiana* Brandis: a data deficit timber species from Indo-Myanmar biodiversity hotspot. *bioRxiv*. https://doi.org/10.1101/2022.04.22.489227.
Halder, S., H. Tag, V.K. Rawat, A. Shenoy, A. Ghosh, S.S. Dash & A.A. Mao (2024). A review on diversity of floristic elements in the Indian state of Arunachal Pradesh. *Journal of Bioresources* 11(2): 1–18.
IUCN (2025). The IUCN Red List of Threatened Species. Version 2025-1. Available at: https://www.iucnredlist.org.
Paul, A., M.L. Khan, A. Arunachalam & K. Arunachalam (2005). Biodiversity and conservation of rhododendrons in Arunachal Pradesh in the Indo-Burma biodiversity hotspot. *Current Science* 89(4): 623–634.
Tiwari, P., S.K. Bose, A. Gautam & J.T. Chen (2023). Emerging trends and insights into the cultivation strategies, ethnomedicinal uses, and socio-economic attributes of orchids. *The Journal of Horticultural Science and Biotechnology* 98(3): 273–298.
Upadhaya, K., N. Thapa, N.J. Lakadong, S.K. Barik & K. Sarma (2013). Priority areas for conservation in northeast India: a case study in Meghalaya based on plant species diversity and endemism. *International Journal of Ecology and Environmental Sciences* 39(2): 125–136.

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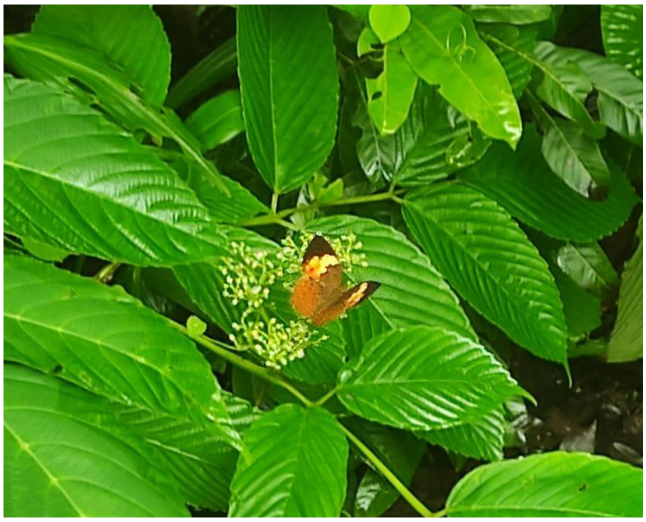
Occurrence of Sahyadri Rustic Butterfly in Mumbai and Sanjay Gandhi National Park

Sahyadri Rustic *Cupha erymanthis maja*. © Akash Mhadgut (Left); © Satish Gundgire (Right).

Sanjay Gandhi National Park (SGNP) has a spread of 104 km² in Mumbai suburban and Thane District; it has around 142 reported species and seven unconfirmed species of butterflies (Patwardhan 2014). On 13 July 2024 morning, during a nature walk in Nagla block (19.29527° N, 72.91167° E) an adult individual of Rustic Butterfly *Cupha erymanthis* nectaring on flowers of Bandicoot Berry *Leea indica* was observed. Photographs were taken for documentation.

Cupha erymanthis has a wingspan of 50–60 mm and the wings are ochre yellow with black coloured apex of forewings with a broad yellowish or white central band. The hind wings have a few black spots, with tiny white and dark brown dots and primarily yellowish-brown on the underside. The male and female have similar appearances (Kunte 2000).

India is home to four of its subspecies: Sahyadri Rustic *Cupha erymanthis maja* Fruhstorfer, 1898; Himalayan Rustic, *Cupha erymanthis lotis* (Sulzer, 1776); Andaman Rustic *Cupha erymanthis andamanica* Moore, [1900]; and Nicobar Rustic *Cupha erymanthis nicobarica* (C.Felder, 1862) (Anon 2025).

Sahyadri Rustic *Cupha erymanthis maja* is a sub-species of Nymphalidae butterfly known to be found in the entire region of Western Ghats starting from Maharashtra and further down south in India (Kumar & Tonk 2023; Kunte et al.

2024; Anon 2025). In Maharashtra the species is known to be distributed all over the western terrain, the occurrence spans from Banda and Tillari in south to Matheran in the north. This species has not been reported from Sanjay Gandhi National Park (Kasambe 2012; Rodrigues 2012; Patwardhan 2014; SGNP 2014).

Belonging to the subfamily Heliconiinae and tribe Vagrantini Rustic is weak and a restless flyer, spending much of its time in the middle layer of canopy staying near pathways and sunlit openings (Bhakare & Ogale 2018; Anon 2025). The males sometimes visit wet soil whereas the females are observed to only feed on flowers and usually prefer more shaded places, it also quite pugnacious and chases away other butterflies that may fly around its perch (Kunte 2000).

Several host plants of *Cupha erymanthis* from the *Salicaceae* family were recorded in Sanjay Gandhi National Park. *Flacourtia indica* (Wynter-Blyth 1957; Kunte 2000), *Flacourtia jangomas* (Kawthankar et al. 2025), and *Flacourtia montana* (Wynter-Blyth 1957; Kunte 2000; Kawthankar et al. 2025) were observed in several patches. In addition to these, a caterpillar was recorded by Ulla (2020).

Thus, *Cupha erymanthis maja* can be assumed as a part of local rhopaloceran diversity with a very rare occurrence, also a supporting observation from Godrej mangroves by Mhadgut, (2024) confirms a sighting from Mumbai and an observation of adult individual emerged through chrysalis by Gurjar (2022) suggest the first reported sighting on iNaturalist from Sanjay Gandhi National Park - Nagla block. This will add to the list of rhopaloceran diversity in SGNP and demonstrate the range extension of this species in the districts of Mumbai and Thane as northernmost extent of this species was previously reported only till Karnala Wildlife Sanctuary and Matheran situated in Raigad District of Maharashtra.

Insects are quite sensitive towards their surroundings and are often used as biodiversity indicators, *Cupha erymanthis* is a forest loving butterfly and thus its presence in SGNP indicates that the national park has a live thriving forest which provides an ideal habitat for species like these.

References

Anonymous (2025). *Cupha erymanthis* (Drury, [1773]) – Rustic. In: Kunte, K., S. Sondhi, & P. Roy (Chief Editors). Butterflies of India, v. 4.12. Published by the Indian Foundation for Butterflies. https://www.ifoundbutterflies.org/cupha-erymanthis. Accessed 29.iv.2025.

Bhakare, M. & H. Ogale (2018). A Guide to Butterflies of Western Ghats (India) Includes Butterflies of Kerala, Tamilnadu, Karnataka, Goa, Maharashtra and Gujarat State. Privately published by the authors, Satara and Sindhudurg, 496 pp.

SGNP (2014). *Butterflying in SGNP, A pocket guide to butterflies of the Sanjay Gandhi National Park*. CCF & Director, 90 pp

Kasambe, R. (2012). Butterfly fauna of the Sanjay Gandhi National Park and Mumbai. *Bionotes* 14(3): 76–80.

Gurjar, Y. (2022). Rustic *Cupha erymanthis*. https://www.inaturalist.org/observations/54826446. Accessed on 29.iv.2025.

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Invertebrate Conservation & Information Network of South Asia (ICINSA)

Kawthankar, N., R. Nitin, P.V. Churi & K. Kunte (2025). Larval host plants and other hosts of Indian butterflies. In: Kunte, K., S. Sondhi & P. Roy (Chief Editors). Butterflies of India, v. 4.12. Indian Foundation for Butterflies.

Kumar, A. & T. Tonk (2023). New distribution record of Nicobar rustic, *Cupha erymanthis nicobarica* Felder (Lepiodeptera: Nymphalidae) from northern India and its biology on newly recorded host plant, *Populus deltoides* Bartr. ex Marsh. https://www.researchsquare.com/article/rs-3262443/v1. Accessed on 29.iv.2025.

Kunte, K., S. Sondhi & P. Roy (Chief Editors) (**2024).** Butterflies of India, v. 4.27. Indian Foundation for Butterflies Trust. https://www.ifoundbutterflies.org.

Kunte, K. (2000). *India, a Lifescape: Butterflies of Peninsular India*. Universities Press, 254 pp.

Mhadgut, A. (2024). Rustic *Cupha erymanthis*. https://www.inaturalist.org/

Patwardhan, A. (2014). Butterflies of Sanjay Gandhi National Park, Mumbai, Maharashtra, India. *Ambient Science* 1(1): 7–15.

Rodrigues, N. (2012). *Butterflies of Mumbai.* Anitha Art Printers, 199 pp.

Wynter-Blyth, M.A. (1957). *Butterflies of the Indian Region*. Bombay Natural History Society, Mumbai, 523 pp.

Ulla, P. (2020). Rustic *Cupha erymanthis*. https://www.inaturalist.org/observations/58141869. Accessed on 29.iv.2025.

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New record of the Vespiform Thrips as a predator of the Red Spider Mite on tea

A survey on the natural enemies of tea pests, conducted in the tea gardens of Vandiperiyar (Idukki District, Kerala, India), revealed an intriguing new tri-trophic interaction within the tea ecosystem. A predatory insect, the Vespiform Thrips *Franklinothrips vespiformis* Crawford, 1909, (Thysanoptera: Aeolothripidae) collected during the survey was observed preying on the Red Spider Mite, *Oligonychus coffeae* Nietner, 1861, (Acari: Tetranychidae) both in the laboratory and in the field. *O. coffeae* is a major pest of tea that causes considerable crop losses (Muraleedharan et al. 2005). *F. vespiformis* was reared and studied in the laboratory of the UPASI Tea Research Institute, Valparai, Coimbatore, India, as part of a study on the development of integrated pest and disease management strategies for tea pests, with a special focus on non-chemical control methods. The larvae and adults of *F. vespiformis* rapidly consumed all life stages of the *O. coffeae*.

Numerous surveys conducted in tea ecosystems have documented various predatory thrips preying on a range of tea pests. These natural enemies play a significant role in regulating pest populations and contribute to sustainable pest management in tea plantations.

Being a generalist predator, as demonstrated by the studies of Radhakrishnan & Mahendran

The larva of *Franklinothrips vespiformis* feeding on Oligonychus *coffeae*. © Jasin Rahman.

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Table. Earlier record of predatory thrips in tea plantation.

	Predatory thrips	Family	Prey	Reference
1.	*Franklinothrips vespiformis* Crawford, 1909	Aeolothripidae	Scirtothrips bispinosus Bagnall, 1924	Radhakrishnan & Mahendran 2012; Mahendran & Radhakrishnan 2019.
2.	*Franklinothrips vespiformis* Crawford, 1909	Aeolothripidae	Scirtothrips *dorsalis* Hood, 1919	Varatharajan et al 2018.
3.	*Aeolothrips collaris* Priesner, 1919	Aeolothripidae	Scirtothrips *bispinosus* Bagnall, 1924 *S. dorsalis* Hood, 1919 and *Thrips hawaiiensis* Morgan, 1913	Varatharajan et al. 2018.
4.	*Scolothrips asura* Ramakrishna & Margabandhu, 1931	Thripidae	*Oligonychus coffeae* Nietner, 1861	Babu et al.2010.
5.	*Scolothrips rhagebianus* Priesner, 1950	Thripidae	*O. coffeae* Nietner, 1861	Babu et al. 2010.

(2012), Mahendran & Radhakrishnan (2019), Varatharajan et al. (2018), and the present investigation, *F. vespiformis* is likely to thrive in the tea ecosystem by preying on various tea pests across different seasons. This predatory thrips deserves further investigation, and detailed data on its biology and predatory potential against *O. coffeae* need to be generated, with the aim of harnessing it for use in biological control programmes in tea plantations.

References

Babu, A., V.J. Rahman & A.R. Kumar (2010). New record of predators of red spider mite. *Newsletter UPASI Tea Research Foundation* 20(2): 1.

Mahendran, P. & B. Radhakrishnan (2019). *Franklinothrips vespiformis* Crawford (Thysanoptera: Aeolothripidae), a potential predator of the tea thrips, *Scirtothrips bispinosus* Bagnall in south Indian tea plantations. *Entomon* 44(1): 49–55.

Muraleedharan, N., D.N.P. Sudarmani & R. Selvasundaram (2005). Bioecology and management of the red spider mite infesting tea in south India, 756–766 pp. In: Proceedings of the International Symposium on innovation in tea science and sustainable development in tea industry. China Tea Science Society, Hangzhou ,China.

Radhakrishnan, B. & P. Mahendran (2012). Life history and predatory potential of *Franklinothrips vespiformis* (Crawford) (Thysanoptera: Aeolothripidae), a potential predator of the tea thrips, *Scirtothrips bispinosus* (Bagnall) (Thysanoptera: Thripidae) in south Indian tea plantations. In: Abstracts of PLACROSYM XX. Indian Society for Plantation Crops, Kasaragod, Kerala, 107 pp.

Varatharajan, R., K.N. Singh & R.R. Rachana (2018). On the collections of predatory thrips (Insecta: Thysanoptera) from NE India. *Journal of Biological Control* 32(1): 8–13.

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Biological studies on Gmelina tree insect pest *Craspedonta leayana* (Colepotera: Chrysomelidae)

Coleoptera order belongs to the class Insecta (beetles) that comprises near about 3,50,000 species (Hammond 1992; Grove & Stork 2000) of which family Chrysomelidae is a major phytophagous group. It includes over 38,000 living species (Seeno & Wilcox 1982). *Craspedonta leayana* (Latreille) [previously known as *Calopepla leayana* (Latreille, 1807)] is a member of this Chrysomelidae family (and subfamily Cassidinae) and is eventually a serious insect pest of the economically important timber-wood *Gmelina* (*Gmelina arborea* (Roxb.). *Gmelina* is a deciduous tree belonging to family Verbenaceae (Choudhury 1953) which naturally occurs in more than 11 countries in Asia including India and in several other countries its plantation has been initiated (Dvorak 2004). Gmelina has multitude of utilities in agroforestry, industries and several others (Dvorak 2004; Seth 2004; Das & Das 2005; Swamy & Puri 2005). *C. leayana* causes immense depreciation to *Gmelina* by devouring upon leaves, young shoots, and buds thereby diminishing photosynthesizing capacity and growth of the plant. A subsequent second and third incursion is often fatal for the plant (Beeson 1941).

Life cycle of *C. leayana* involves five instar larval stages. They mostly feed on undersurfaces of leaf. Last two larval instars devour upon foliage leaving only the midrib and veins. Adults lie dormant for about 8-10 months and recur with commencement of rain and emergence of new leaf, shoot and buds. They lay eggs in conspicuous casings called 'ootheca' and are observable underneath stem-branches. Egg fertilizes giving rise to first instar larva. Larva undergoes ecdysis through five instars and becomes adult (Garthwaite 1939; Browne 1968; Ahmad & Sen-Sarma 1990). This plant is economically important for Muga silkworms in addition to medicinal properties for human being considered as tertiary host plant for Muga silkworms and distributed in Northeast India, Deccan Peninsula, Northwest Himalayan foothills, Chittagong, Sri Lanka, Malaysia, Philippines (Srivastava & Thangavelu 2005; Bindroo et al. 2006).

Materials and methods

Life cycle of *C. leayana* was observed from 2020-21 to 2023-24 in natural habitat of Rajaram College campus (16.6862666 N 74.2569966 E), Kolhapur (MS) India. Photography of life stages were done in laboratory as well as in filed by using camera (CANON 760D), Daily observations in each cycle was recorded.

Results

Craspedonta leayana (Latreille)

Some stages of the defoliator can be seen in the plate 1 that was taken during the study period inside the college campus.

Common name: Defoliator

Life Cycle: The beetles were found in group of 4-6 full grown adults feeding on the trunk of the plant. The female was larger than the male. The observation of biology and life cycle of *C. leayana* reveal that the beetles come out from hibernation. The mating period was observed for 20 to 30 minutes in the field condition and

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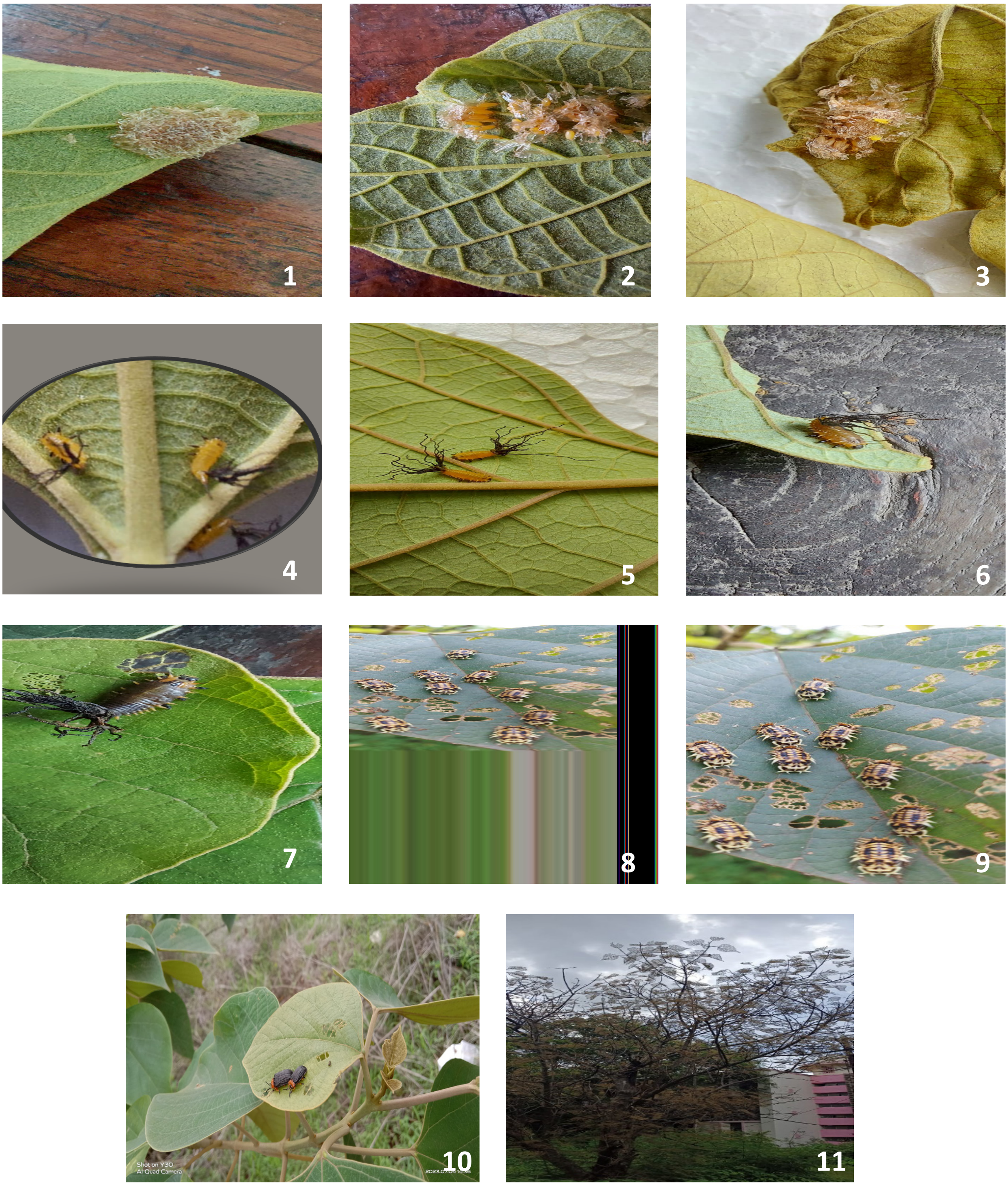
PLATE -1



Images showing different stages of *C. leayana* life-cycle that were taken during the study.
1. Distinct casings called "oothecae" where the adult C. leayana lays eggs on lower surface of leaf.
2. Embryonic development observed in eggs; 3, 4, 5, 6, 7. First to Last instar larval stage (of the total five instars).
8. Pupal stage of *C. leayana*; 9. Number of pupa on single leaf, generally pupation takes place on the leaf itself.
10. Adult *C. leayana* before it prepares for mating and subsequent events of life-cycle.
11. *Gmelina arborea* Roxb. trees with severe infestation of *C. leayana*.

eggs were laid on upper or lower surface of leaves and on small twigs also of *G. arborea* plant as an ootheca. One female lays up to 15-20 ootheca containing 30-70 eggs. Total five instars were observed in field. The pupae were observed in the field condition and found that pupae turned into cream yellow and blackish brown bands. Adults lie dormant for about 8-10 months and recur with commencement of rain and emergence of new leaf, shoot and buds. Single life cycle was observed in one year.

Feeding behaviour: The beetle and grubs feed voraciously on the leaves and leave behind veins intact.

Discussion

The insect is a serious pest in pure *Gmelina arborea* plantations in India, Myanmar (Garthwaite 1939; Beeson 1941), and Bangladesh (Baksha 1997). Major pest, *Calopepla leayana* Latr. (Coleoptera: Chrysomelidae) of *Gmelina arborea* (Roxb.) from Meghalaya and Assam (India) with emphasis on illustrated biology was also studied by Kumar et al*.* (2016).

A brief perspective on *Gmelina* tree insect pest *Craspedonta leayana* was previously reported by Barman (2014). The pest normally causes damage to about one-third of the leaf surface area in natural conditions and in small plantations. In certain places, for example pure plantations at Namtu, Myanmar where the insect appeared as epidemic, whole plantations had to be disregarded and abandoned despite vigorous control measures adopted by way of hand-picking and trapping operations (Garthwaite 1939). A similar case in monoculture plantations of *G. arborea* over a large area, abandoned because of serious defoliation by this beetle, has been reported from north-east India. In the present study, the detailed photographic illustrated diagnostic feature with biology has been reported. Single life cycle was observed in one year in present study. But Three generation has been observed in one year by Kumar et al. (2016) in Jorhat region of Asam. The difference in the number of cycles in one year in two diverse geographical regions might be result of difference in surrounding climatic conditions. Therefore, exact effect of climatic condition on longevity of life cycle stages of *C. leayana* is

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References

Ahmad, S. I. & P.K. Sen-Sarma (1990). Bionomics of *Calopepla leayana* Latr. (Coleoptera: Chrysomelidae), a serious defoliator of Gmelina arborea Roxb. plantations in India. *Indian Forester* 116(10):71-82.

Baksha, M. W. (1997). Biology, ecology and control of gamar defoliator, *Calopepla leayana* Latr. (Chrysomelidae: Coleoptera) in Bangladesh. *Bangladesh Journal of Forest Science* 26(2): 31-36.

Barman, A. (2014). A brief perspective on Gmelina tree insect pest *Craspedonta leayana Journal of Entomology and Zoology Studies* 2(4): 276-278.

Beeson, C. F. C. (1941). *The ecology and control of the forest insects of India and the neighbouring countries*. Government of India, 767 pp.

Bindroo, B. B, N.T. Singh, A.K. Sahu & R. Chakravorty (2006). Muga silkworm host plants. *Indian Silk* 4: 13-17.

Browne, F. G. (1968). *Pests and diseases of forest plantations trees: an annotated list of the principal species occurring in the British Commonwealth***.** Oxford Univeristy Press, **London,**1342 pp.

Choudhury, K. A. (1953). The role of initial parenchyma in the transformation of the structure diffuse-porous to ring porous in the secondary xylem of the genus Gmelina Linn. *Proceedings of the National Institute of Sciences of India* 19:361-369.

Das, T. & A.K. Das (2005). Inventorying plant biodiversity in homegardens: a case study in Barak Valley, Assam, North East India. *Current Science* 89(1):155-163.

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Newsletter of the
Invertebrate Conservation & Information Network of South Asia (ICINSA)

Dvorak, W. S. (2004). World view of *Gmelina arborea*: opportunities and challenges. *New Forests* 28:111- 126.

Garthwaite, P. F. (1939). On the biology of *Calopepla leayana* Latr. (Coleoptera, Chrysomelidae) and the possibilities of control. *Indian Forest Records(Entomology)* 5:237-277.

Grove, S. J. & N.E. Stork (2000). An inordinate fondness for beetles. *Invert Tax* 14:733-739.

Hammond, P. M. (1992). Species inventory, pp. 17-39. In: Groombridge, B. (editor). *Global biodiversity, status of the earth's living resources*. Chapman and Hall, London, 594 pp..

Nair, K. S. S. (2007). *Tropical forest insect pests: ecology, impact and management.* Cambridge University Press, Cambridge, 422 pp.

Kumar, R., P. Chutia & G. Rajkhowa (2016). Major pest, *Calopepla leayana* Latr. (Coleoptera: Chrysomelidae) of *Gmelina arborea* (Roxb.) from Meghalaya and Assam (India) with emphasis on illustrated biology. *Bio Bulletin* 1(2): 1-55.

Seeno, T. N. & J.A. Wilcox (1982). Leaf beetle genera (Coleoptera: Chrysomelidae). *Entomography* 1: 1-221.

Seth, M. K. (2004). Trees and their economic importance. *The Botanical Review* 69:321-376.

Srivastava, P. K. & K. Thangavelu (2005). *Sericulture and Seri-biodiversity.* Associated Publishing, New Delhi, 254 pp.

Swamy, S. L. & S. Puri (2005). Biomass production and Csequestration of *Gmelina arborea* plantation and agroforestry system in India. *Agroforestry Systems* 64:181-195.

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International Vulture Awareness Day celebration 2024

The Vulture Conservation Breeding Centre (VCBC) at Belguri hosted the International Vulture Awareness Day (IVAD) with a vibrant celebration on 7 September 2024. During the month of August, the VCBC scientists organized a district level drawing competition with the theme 'Nature and Vulture', inviting students from 50 schools, reaching about 5,000 students across the Kamrup District to showcase their artistic talents. The celebration featured a prize distribution ceremony, where outstanding participants were recognized for their efforts.

Dr. Oinam Sunanda Devi felicitating Mr. Prasanna Kolita, Banyabandhu in the presence of Mrs. Renu Deori (BDO, Rani).

The event was graced by esteemed guests, Dr. Oinam Sunanda-Devi, scientific officer of the State Biodiversity Board, Assam, Dr. Paul, anthropologist, and Mrs. Renu Deori, block development officer, Rani.

Water color painting by Samiran Deka, Sarpara High School, Sarpara.

The event was followed by a heartfelt felicitation of five individuals for their extraordinary contributions to vulture conservation. The recipients were Mr. Prasanna Kolita (for conservation efforts by local NGO), Mrs. Shahida Bibi (individual vulture rescuer), Mr. Ranjit Nath, (individual vulture rescuer), Mrs. Renu Nath (entrepreneur with

A vibrant painting of Vulture by Debashis Malakar, Rangamati High School, Kamrup.

Painting with a message to save vultures by Gulmi Jhakuria, St. Joseph's High School, Azara.

Group photo of the winners of drawing competition along with VCBC staffs.

conservation aspects), and Mrs. Mallika Gogoi (traditional artist & conservation enthusiast), showcasing the local community's commitment to protecting these vital scavengers.

A brief interactive survey showed us that all students were very much interested in wildlife but very few of them had seen vultures in nature. It is an alarming situation that points out the importance of vulture conservation and awareness. The program concluded with distribution of saplings of tall tree species such as *Bombax ceiba*, *Neolomarckia cadamba*, *Nux vomica*, and *Terminalia arjuna* to all attendees.

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ZOO'S PRINT

Communicating science for conservation

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