



AMBIENT APPRAISAL

Dietary Preferences of the Indian Giant Squirrel, *Ratufa indica* (Erxleben, 1777) During Summer in Machkot Forest, Bastar

Mayank Bagchi¹, Sharad Nema², Siddhant Jain³

¹Wildlife Institute of India, Dehradun, India

²School of Studies in Forestry and Wildlife, Shaheed Mahendra Karma University, Jagdalpur, Bastar, Chhattisgarh, India

³Nova Nature Welfare Society, Raipur, Chhattisgarh, India

Study Area: Machkot Forest, Jagdalpur, Chhattisgarh, India

Coordinated: 19°20'25.7" N and 82°10'29.5" E

Keywords: Dietary, *Ratufa indica*, Indian Giant Squirrel, Machkot Forest, Bastar

Abstract

The Indian giant squirrel (*Ratufa indica*), a prominent arboreal sciurid endemic to peninsular India, inhabits diverse forest types including deciduous and evergreen systems, yet contends with habitat degradation despite its Least Concern IUCN status and Schedule-I protection under the Wildlife (Protection) Act, 1972. Field investigations in Machkot Forest, Bastar, Chhattisgarh (278.59 km²), featuring teak-sal mosaics at 614 m elevation, were conducted through opportunistic observations aided by binoculars, a camera, and offline Gaia GPS mapping, with identifications validated through field signs, nests, and consultations with locals and forest staff. Summer diet analysis revealed reliance on 25 plant taxa across 14 families, led by fruit consumption from 15 species (60%; e.g., *Xylia xylocarpa*, *Mangifera indica*), followed by leaves (20%; 5 spp.), flowers and twigs (each 12%; 3 spp.), and bark (4%; 1 sp.). Notably, two key species—*Ficus religiosa* and *Shorea robusta*—provided multiple plant parts (fruits, leaves, flowers, and bark), underscoring their role as critical multi-resource foraging trees. Outcomes underscore foraging dependencies on dominant flora, advocating targeted habitat management to bolster populations in Central India's protected landscape.

Introduction

The Indian Giant Squirrel (*Ratufa indica*), the world's largest squirrel, is endemic to India (Ghosh *et al.*, 2023) and locally known as "Karat Musa or Karat Chuha or Chiddra". This fascinating rodent belongs to the family Sciuridae and the subfamily Ratufinae, sharing its genus with three other *Ratufa* Species found in the Indo-Malay region. It is a striking creature, growing to between 90 - 100 cm in length, with a vivid reddish-brown and black fur coat, a creamy white tail tip, belly, and paws, and distinctive tufted ears.

The Indian Giant Squirrel always prefers to remain in the upper canopy but occasionally descends to the ground for foraging, social interactions, or territorial exploration (Baskaran *et al.*, 2011; Hamsa & Alavandi, 2023). The Indian Giant Squirrel is primarily found in the Western Ghats, Eastern Ghats, and Central India, inhabiting evergreen, moist deciduous, and dry deciduous forests (Gurjar *et al.*, 2013; Ghosh *et al.*, 2023). As a frugivore and granivore, it plays a crucial role in natural pollination (Rathod *et al.*, 2022). It constructs a globular nest using leaves and twigs (Borges *et al.*, 1989; Ramachandran *et al.*, 1992; Rathod *et*

al., 2022). Despite being classified as 'Least Concern' by the IUCN (Hamsa & Alavandi, 2023) and listed under Schedule I of the Wildlife Protection Act, 1972, its population is declining due to habitat loss and fragmentation.

Methodology

Study Area: The Machkot Forest lies in the heart of the Southern Bastar Plateau of Chhattisgarh, covering nearly 27,859 hectares of largely undisturbed forest. Nestled between 19°20'25.7" N and 82°10'29.5" E, the landscape rises to around 614 meters above sea level (Kumar, 2017), giving the entire forest a gentle but noticeable variation in elevation.

Walking through Machkot, one immediately notices the dominance of Sal trees, which create canopy across much of the area. The terrain itself is shaped by natural karst formations—rocky outcrops, uneven ground, and small elevations—that together create a mosaic of habitats. These features support a remarkable variety of plants and wildlife, making Machkot an ecologically vibrant forest landscape. Because of its healthy forest cover and natural

*Corresponding Author: mayankbagchi9@gmail.com

diversity, the Machkot forest plays an important role in the broader Bastar biodiversity. It provides ideal conditions for numerous species, especially birds and other forest-dependent wildlife, making it a valuable site for conservation efforts and ecological research. This Forest have various types of flora, including *Shorea robusta* (Sal), *Tectona grandis* (Teak), *Madhuca latifolia* (Mahua), *Pterocarpus marsupium* (Indian Kino), *Schleichera oleosa* (Kusum), *Haldina cordifolia* (Haldu), *Xylia xylocarpa* (Indian Ironwood), *Dalbergia paniculata* (Indian Rosewood), *Syzygium cumini* (Jamun), *Bombax ceiba* (Silk Cotton), *Sterculia urens* (Ghost Tree), *Buchanania lanzan* (Chironji), *Terminalia arjuna* (Arjun), *Careya arborea* (Kumbhi), *Garuga pinnata* (Garuga), *Mangifera indica* (Mango), and various *Ficus* species like *Ficus racemosa*, *Ficus religiosa*, and *Ficus rumphii*.

Opportunistic ocular surveys were conducted within the Machkot Forest using binoculars and a Nikon Coolpix P1000 camera to document the presence and behaviour of *Ratufa indica*. Species identification was confirmed through multiple lines of evidence, including direct sightings and indirect indicators such as partially consumed fruits and leaves, faecal deposits, bark-gnawing marks, vocalisations, nest structures, and traditional ecological knowledge obtained from local residents and forest officials.

Field surveys followed an opportunistic observation and random-walk sampling approach, allowing for observations across various habitat types. During each direct sighting event, the feeding preferences of *R. indica* were recorded, and high-resolution photographic documentation was obtained to support species verification and behavioural assessment.

All sightings, movement patterns, and activity locations were geo-referenced using the Gaia GPS mobile application (offline mode), ensuring precise spatial data capture throughout the study period.

Result and Discussion

During the summer phase of the study, 25 plant species belonging to 14 families were recorded in the diet of the Indian giant squirrel *Ratufa indica* in the Machkot Forest (tab. 1). Fruits from 17 species (60%) dominated the available food resources, including *Xylia xylocarpa*, *Melia dubia*, *Diospyros melanoxylon*, *Lannea coromandelica*, *Bursera serrata*, *Buchanania lanzan*, *Cassia fistula*, *Diospyros embryopteris*, *Mangifera indica*, *Pterocarpus marsupium*, *Schleichera oleosa*, *Cayratia pedata*, *Litsea monopetala*, *Ficus racemosa*, *Diospyros montana* and *Gmelina arborea*. Leaves from five species (20%), twigs from three species (12%), flowers from three species (12%), and bark from one species (4%; *Shorea robusta*) also contributed to the diet.

Notably, several key species—particularly *Ficus religiosa*, *Mangifera indica*, and *Shorea robusta*—provided multiple

plant parts such as fruits, leaves, and bark, resulting in total dietary percentages exceeding 100% when summed across all categories. This multi-resource contribution underscores their pivotal role in sustaining the species during the dry summer months.

A total of 188 feeding observations were recorded during the summer season. Fruits accounted for 88.71% of all feeding events, followed by flowers (5.92%), leaves (3.23%), twigs (1.60%) and bark (0.54%), indicating a pronounced seasonal reliance on fruit resources. When species-based diet composition is compared with actual feeding observations (Table-1), a clear pattern of selective foraging emerges: fruits are both widely available and disproportionately consumed, whereas leaves, flowers and twigs are offered by several species but contribute minimally to feeding activity. Notably, bark is provided by only a single species yet constitutes a relatively higher proportion of feeding observations, suggesting selective and disproportionate use of this resource. This highlights the potential functional importance of bark in the summer diet of *Ratufa indica*, possibly linked to moisture, minerals or other nutritional benefits during the dry season (Fig.- 1)

Table-1: Table 1. Plant species and plant parts consumed by Indian Giant Flying Squirrel during summer

#	Name	Botanical name	Family	Feeding observation
1.	Plant Parts eaten-Fruit	Feeding-88.71 (%)	Plant parts-58.62 (%)	
	BurmalIronwood	<i>Xyliaxylo carpa</i>	Fabaceae	36
	Malabarneem	<i>Melia dubia</i>	Meliaceae	42
	Tendu	<i>Diospyros elanoxyton</i>	Ebenaceae	7
	Indianash tree	<i>Lanneacoro mandelica</i>	Anacardiaceae	3
	Panikusum	<i>Bursera serrata</i>	Burseraceae	18
	Chironji	<i>Buchanania lanzan</i>	Anacardiaceae	23
	Amaltash	<i>Cassia fistula</i>	Fabaceae	2
	Ebony	<i>Diospyros embryopteris</i>	Ebenaceae	5
	Mango	<i>Mangifera indica</i>	Anacardiaceae	5
	Bijasal	<i>Pterocarpus marsupium</i>	Fabaceae	6
	Kusum	<i>Schleichera oleosa</i>	Sapindaceae	2
	Kulugum	<i>Sterculia urens</i>	Sterculiaceae	-
	Birdfoot GrapeVine	<i>Cayratia pedata</i>	Vitaceae	8
	Singraf	<i>Litsea monopetala</i>	Lauraceae	2
	Dumar/Clusterfig	<i>Ficus racemosa</i>	Moraceae	3
	Bombay Ebony	<i>Diospyros montana</i>	Ebenaceae	3
	Khamhar/Shivna	<i>Gmelina arborea</i>	Lamiaceae	2
2.	Plant Parts eaten-Leaves	Feeding-3.23 (%)	Plant parts-17.25 (%)	
	Peepal/Sacredfig	<i>Ficus religiosa</i>	Moraceae	1
	Mango	<i>Mangifera indica</i>	Anacardiaceae	1
	Tamarind/Emali	<i>Tamarindus indica</i>	Fabaceae	2
	Pilkhan	<i>Ficus rumphii</i>	Moraceae	1
	Ardisia	<i>Ardisia solanacea</i>	Myrsinaceae	1
3.	Plant Parts eaten-Twig	Feeding-1.60 (%)	Plant parts-10.34 (%)	
	Teak	<i>Tectona grandis</i>	Lamiaceae	1
	Pilkhan	<i>Ficus rumphii</i>	Moraceae	-
	Peepal/Sacredfig	<i>Ficus religiosa</i>	Moraceae	2
4.	Plant Parts eaten-Bark	Feeding-0.54 (%)	Plant parts-3.45 (%)	
	Sal	<i>Shorea robusta</i>	Dipterocarpaceae	1
5.	Plant Parts eaten-Flower	Feeding-5.92 (%)	Plant parts-10.34 (%)	
	Mahua	<i>Madhuca latifolia</i>	Sapotaceae	5
	Palash	<i>Butea monosperma</i>	Fabaceae	3
	Sal	<i>Shorea robusta</i>	Dipterocarpaceae	3

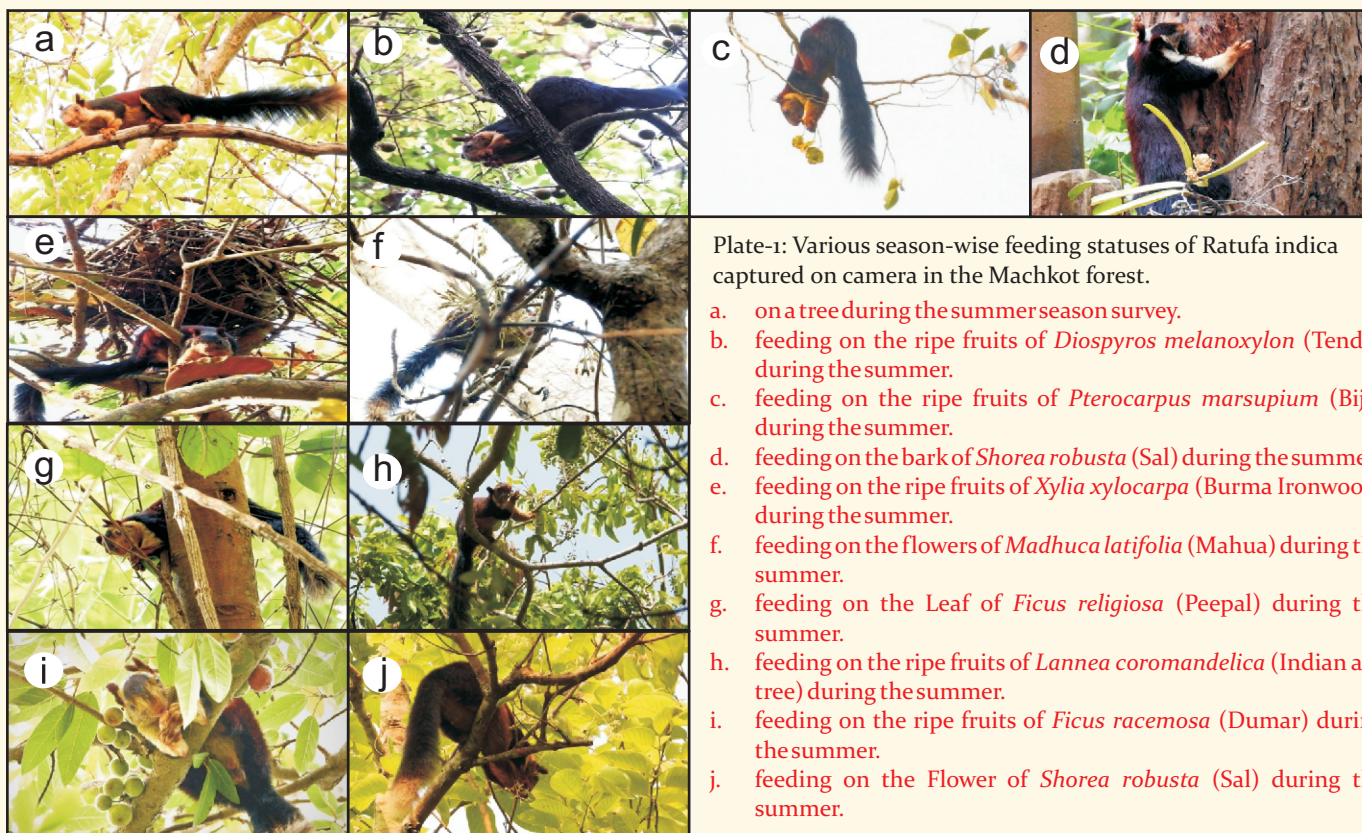


Plate-1: Various season-wise feeding statuses of *Ratufa indica* captured on camera in the Machkot forest.

- on a tree during the summer season survey.
- feeding on the ripe fruits of *Diospyros melanoxylon* (Tendu) during the summer.
- feeding on the ripe fruits of *Pterocarpus marsupium* (Bija) during the summer.
- feeding on the bark of *Shorea robusta* (Sal) during the summer.
- feeding on the ripe fruits of *Xylia xylocarpa* (Burma Ironwood) during the summer.
- feeding on the flowers of *Madhuca latifolia* (Mahua) during the summer.
- feeding on the Leaf of *Ficus religiosa* (Peepal) during the summer.
- feeding on the ripe fruits of *Lannea coromandelica* (Indian ash tree) during the summer.
- feeding on the ripe fruits of *Ficus racemosa* (Dumar) during the summer.
- feeding on the Flower of *Shorea robusta* (Sal) during the summer.

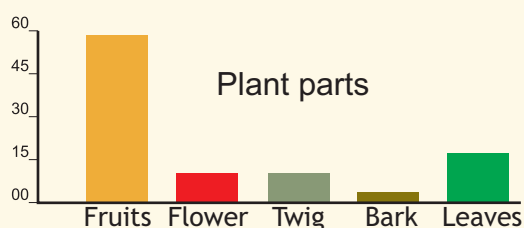


Figure-1: Relative use of different plant parts by the Indian Giant Flying Squirrel during the summer season

Collectively, these findings demonstrate that the Indian giant squirrel does not use food resources in direct proportion to their availability but instead shows marked seasonal preferences, particularly a strong dependence on fruits and a targeted use of bark.

Acknowledgment

I sincerely thank the Chhattisgarh Forest Department for their valuable field insights and on-ground support, which greatly contributed to the success of this work.

References:

- Baskaran, N., Venkatesan, S., Mani, J., Srivastava, S.K. & Desai, A.A. (2011): Some aspects of the ecology of the Indian Giant Squirrel *Ratufa indica* (Erxleben, 1777) in the tropical forests of Mudumalai Wildlife Sanctuary, southern India and their conservation implications. *J. Threat. Taxa*. 3(7):1899-1908.
- Borges, R. (1989): Resource heterogeneity and the foraging ecology of the Malabar Giant Squirrel (*Ratufa indica*).

Ph.D. Thesis, University of Miami, Florida.

- Ghosh, S., Mallick, P.H., Paria, S., Ghara, S., Al-Helak, M.A., Mardaraj, P.C. & Chakraborty, S.K. (2023): Eco-ethological attributes of the Indian Giant Squirrel *Ratufa indica* in Kuldiha Wildlife Sanctuary, Odisha, India. *Asian J. Conserv. Biol.*, 12(1):42-53
- Gurjar, R.L., Kumbhar, A.S., Jena, J., Yogesh, J.K., Dave, C., Singh, R.P. & Mishra, A. (2013): Population density of Indian Giant Squirrel *Ratufa indica centralis* (Ryley, 1913) in Satpura National Park, Madhya Pradesh, India. *J. Res. Biol.* 3(7): 1086-1092.
- Kumar, S. (2017): An assessment of diversity and population structure of Machkot Forest at Bastar in Chhattisgarh. *Int. J. Res. Analyt. Rev.*, 4(2): 312-316.
- Ramachandran, K.K. (1992): **Certain aspects of ecology and behaviour of Malabar Giant Squirrel *Ratufa indica* (Schreber)**. PhD Thesis, Department of Zoology, University of Kerala, 191pp.
- Rathod, G., Bharucha, E. & Yardi, K. (2022): Population density and nesting behaviour of Indian Giant Squirrel *Ratufa indica* (Erxleben, 1777) in Bhimashankar Wildlife Sanctuary, Western Ghats of Maharashtra, India. *J. Threat. Taxa*, 14(9):21786-21796.
- Venkatesh, H.R. & Alavandi, S. (2023): Comparison of tree species diversity and usage by *Ratufa indica indica* in Umblebyle Range Forest, Bhadravathi Division, Shimoga, Karnataka, India. *Asian J. Biol. Life Sci.*, 12(2):237-244.