Roost tree ecology and habitat use in shergarh wildlife sanctuary, Kota, Rajasthan

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Abstract

A field-based assessment of roost trees was conducted across Barapati, Chota Dungar, Tikli, Amlawda, and Bada Dungar forest blocks of Shergarh Wildlife Sanctuary. A total of 281 roost-tree observations belonging to 56 tree/shrub species were documented. Structural parameters including GBH and height were analyzed along with roosting associations of birds and mammals. IVI analysis identified dominant ecological roost species, while Shannon and Simpson diversity indices revealed high habitat heterogeneity across forest blocks. Statistical analysis indicated significant variation in GBH among blocks (ANOVA F=0.19, p=0.9449). Large canopy species such as *Terminalia bellirica, Mitragyna parvifolia, Ficus benghalensis*, and *Anogeissus pendula* emerged as keystone roost trees supporting raptors, owls, hornbills, parakeets, and passerines.

Keywords: Habitat selection, Fruit bats, Peafowl, Wildlife, Roosting, Structural parameters, GBH

Introduction

Roost trees provide shelter, thermoregulation sites, predator avoidance opportunities, and social congregation habitats for birds and mammals. In tropical dry deciduous ecosystems, large native trees with cavities, broad canopies, and structural complexity function as critical biodiversity resources. Roosting sites are essential habitats for breeding, social interaction, offspring development, and population survival. For *Pteropus medius* (giganteus), choosing a roosting tree is crucial because these animals spend the majority of their life in such regions (Kerth et al., 2003) [4]. According to Tsang (2020) [9] and Kumar & Elangovan (2019) [6], they have a predilection for a variety of roosting locations, including both rural and urban settings, close to farms, water bodies, and pathways. Additionally, *Pteropus medius* (giganteus) prefers to roost on large trees such as *Mangifera indica, Eucalyptus sp., Tamarindus indica, Ficus religiosa,* and *Ficus benghalensis* (Vendan, 2003) [10]. For protection from predators and harsh weather, this species needs the deeper canopies of tall, stable trees (Kingston et al., 2023) [5]. Roosting site selection depends on their abundance, risk of predation, availability and distribution of food resources and physical environment. The population of bird species or wildlife population is greatly impacted by anthropogenic events such as extensive deforestation linked to urban growth, water shortages in food, route formation, construction projects, habitat destruction and subdivision, perturbations, and hunting techniques (Chakraborty & Chakraborty, 2021) [2].

Shergarh Wildlife Sanctuary forms an important landscape within the Mukundra-Chambal ecological region of Rajasthan and supports rich avifaunal diversity.

This study evaluates the diversity, structural characteristics, and ecological significance of roost trees used by avifauna and associated wildlife in Shergarh Wildlife Sanctuary, Rajasthan. The investigation integrates vegetation ecology, wildlife association data, statistical analysis, and GIS-oriented spatial interpretation.

Materials and Methods

Study area

The Shergarh wildlife sanctuary lies between 24°35′ & 24°45′ North latitude and 70°27′ & 70°35′ East longitude. It is located 65 km. from Baran and 120 Km. from Kota.

Shergarh was declared as a sanctuary vides Govt. of Rajasthan notification no. P 11(35) Raj Group-8/83 dated 30 July, 1983. Further modified notification was issued vide State Government Number F 11 (10) Forest/92 Jaipur dated 25 May 1992.

There are 5 forest blocks in the sanctuary comprising an area of 98.806 sq km. The forest blocks in the sanctuary are (Table 1):

Table 1: Study area blocks

Name of forest block (Area in heactares)				
S. No.	**Forest block**	**R.F.**	**P.F.**	**Total (in Hec.)**
1	Barapati "A"	-	1602.13	1602.13
2	Chhota Dunger	-	2438.77	2438.77
3	Bada Dunger	-	2949.03	2949.03
4	Naharia	-	2596.28	2596.28
5	Teekly	-	294.39	294.39
Total			9880.60	9880.60

The Northern and Western boundaries of the area are defined by agricultural fields and revenue forest lands, encompassing village territories such as Surpa and Ancholi.
Towards the South and East, the sanctuary is bordered by the Parvan River, which serves as a natural boundary along several stretches. Beyond the river, the landscape gradually rises into rugged hills that frequently delineate the outer limits of the sanctuary.
The elevation of the area varies from approximately 250 to 500 meters above sea level and is characterized by a mosaic of low hills, valleys, and rocky ridges, contributing to its diverse topography.

Results and Discussion

A common animal behavior is roosting, in which a number of animals gather in one place for a few hours. When choosing a roost place, safety was determined to be a crucial consideration. The choice of roosting locations is influenced by a variety of factors, including the site's physical attributes, low levels of human disturbance, and anti-predation strategies. However, the most important consideration for choosing a roost is its distance from the foraging ground. We observed 287 trees belonging to 29 genera during the course of our investigation. Tree height, the distance to the closest tree, and the percentage of canopy closure were also calculated. The sanctuary exhibited strong dependence of wildlife on mature deciduous tree assemblages. *Terminalia bellirica, Anogeissus pendula, Mitragyna parvifolia*, *Butea monosperma*, and *Lannea coromandelica* represented major roost-supporting species (Table-2, Fig.1). Large emergent trees were frequently associated with owls, hornbills, parakeets, raptors, and cavity nesting birds.

Table 2: Main tree species for roosting in the sanctuary area

Species	Density	Rel density	Rel dominance	IVI
Terminalia bellirica	28.0	9.96	22.66	36.7
Anogeissus pendula	63.0	22.42	6.02	33.54
Ficus benghalensis	3.0	1.07	28.36	32.49
Butea monosperma	28.0	9.96	5.52	20.59
Mitragyna parvifolia	17.0	6.05	9.97	20.11
Lannea coromandelica	27.0	9.61	3.49	17.18
Diospyros melanoxylon	15.0	5.34	1.42	9.82
Holoptelea integrifolia	4.0	1.42	3.8	8.28
Carissa congesta	10.0	3.56	0.02	7.66
Ficus religiosa	5.0	1.78	2.57	6.39

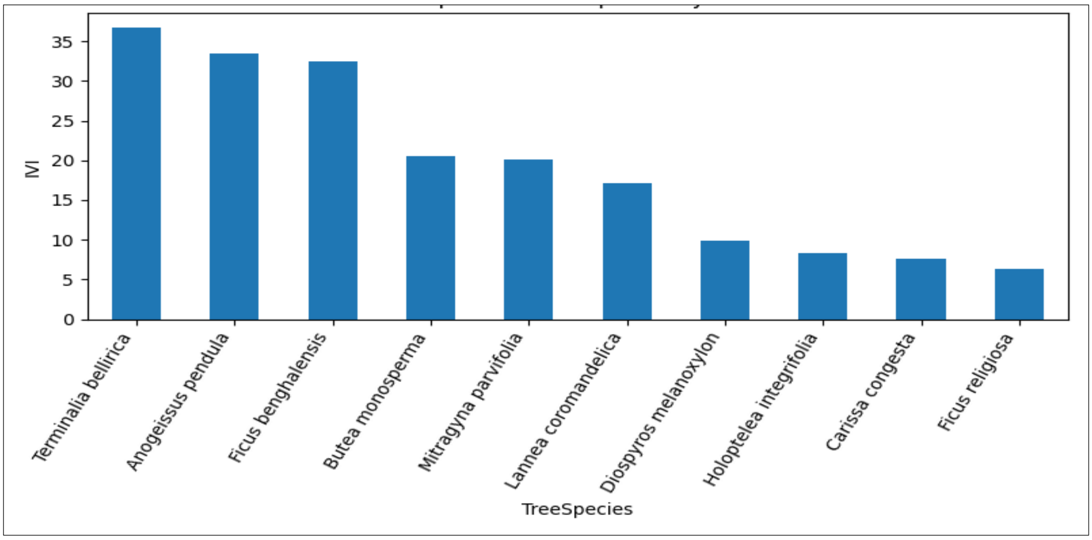

Fig 1: Top roosting tree species by IVI

Table 3: Diversity indices in studied forest blocks

Block	Species richness	Shannon index	Simpson index
Amlawda	29	2.871	0.91
Bada Dungar	21	2.671	0.904
Barapati	30	2.621	0.877
Chota Dungar	10	1.812	0.765
Tikli	8	1.909	0.827

Amlawda and Barapati forest blocks exhibited the highest tree richness and structural complexity, indicating greater ecological suitability for mixed avifaunal roosting communities (Table-3).

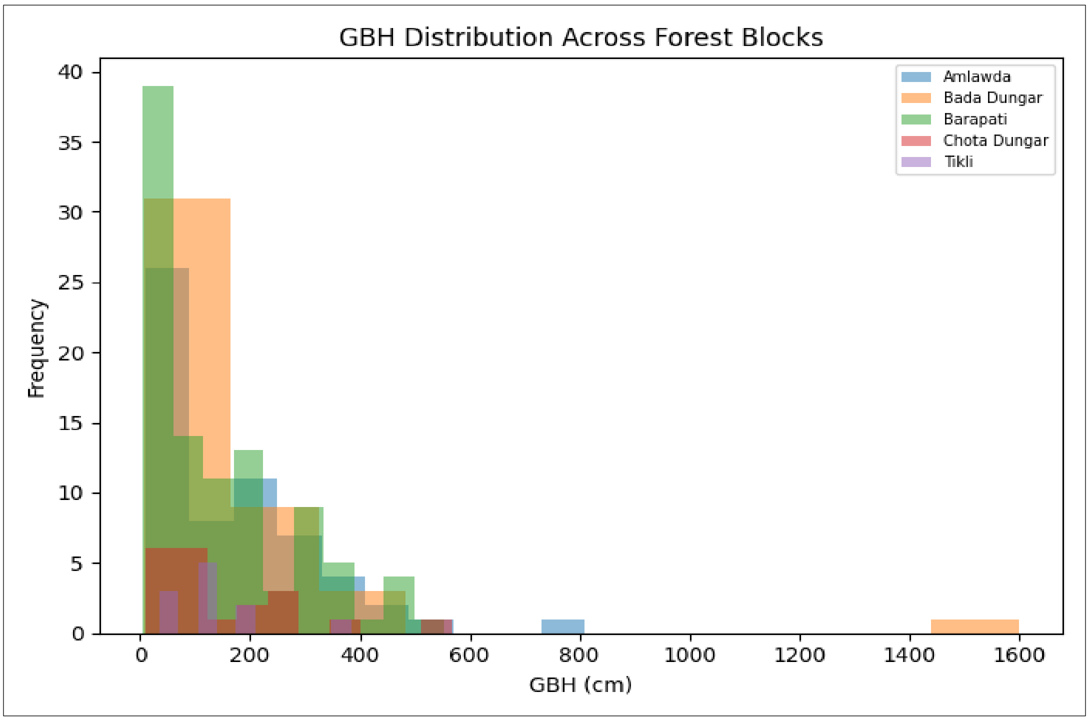

Fig 2: GBH distribution across forest blocks

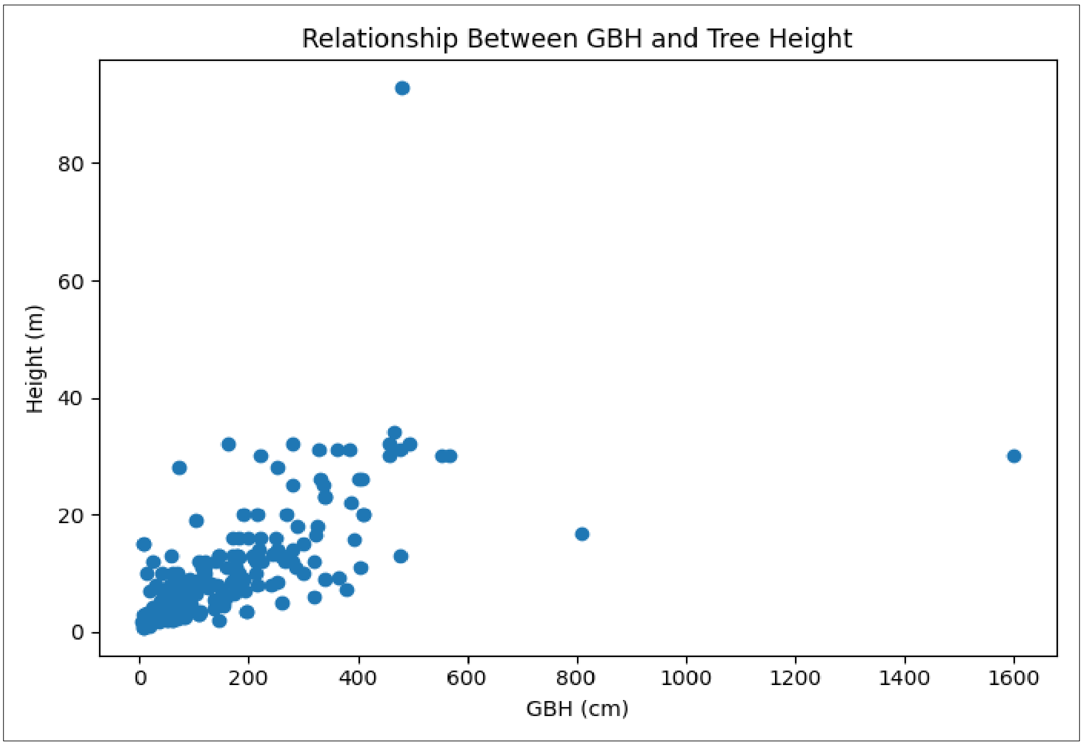

Fig 3: Relationship between GBH and tree height

Conservation of old-growth trees, cavity-bearing trunks, bamboo clumps, and riparian woodland patches is essential for sustaining avifaunal diversity. Selective protection of keystone roost species such as *Terminalia bellirica, Ficus benghalensis, Mitragyna parvifolia*, and *Bombax ceiba* should be prioritized within habitat management plans. Anthropogenic disturbance near known roost clusters should be minimized. In order to protect vital roosting sites, the study emphasizes the necessity of conservation techniques that are founded on community involvement and promote a fuller awareness of the ecological roles fruit bats play in seed dissemination and pollination. These results are in line with earlier records.

Conclusion

Shergarh Wildlife Sanctuary supports a highly heterogeneous roost-tree assemblage with significant ecological value for resident and migratory fauna. Structural complexity, canopy spread, and cavity availability strongly influence roost selection. The present study provides a baseline ecological framework for habitat management, long-term avifaunal monitoring, and GIS-based conservation planning.

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