

The Flame of the Forest (*Butea monosperma*) and its Mutualistic Interaction with Birds in Summer from Jamkhed Tahsil, Dist. Ahmednagar.

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Abstract: The flame of the forest (*Butea monosperma*), a species native to the Indian subcontinent, play a vital role in supporting biodiversity, particularly in its interactions with avian species in rural and semi-arid areas like Jamkhed tahsil in Ahmednagar district, Maharashtra. This study aims to explore the avian fauna of Jamkhed and the importance of *butea monosperma* in sustaining bird populations during summer season. We emphasize conservation efforts and ecological significance by highlighting the relationships between the region's flora and fauna through this investigation. Field surveys were conducted during early morning and late afternoon from February-April 2024. Total 56 bird species was recorded. Through field observation explores the *butea monosperma* role as a food source, nesting and roosting habitat for birds. Result highlight that *Butea monosperma* is a keystone species in supporting avian population by providing nector during the dry season, shelter for nesting and promoting ecological balance through bird-mediated pollination. Birds contribute to the genetic diversity of *Butea monosperma* by facilitating cross-pollination between individual trees. This interaction ensures the tree's reproductive success and enhances its ability to regenerate and persist in the ecosystem.

Keywords: Birds, *Butea monosperma*, Mutualistic interactions, Jamkhed

I. INTRODUCTION

Jamkhed experiences a hot semi-arid climate with distinct seasonal variation. The region experiences dry, hot summers, followed by a monsoon season, and relatively cooler winters. The annual rainfall in the region ranges from 400-600 mm, (https://www.maharain.maharashtra.gov.in/test/maharain/previous_year_rain.php) making it a low-rainfall area. The presence of *Butea monosperma* in such conditions is significant due to its drought-tolerant nature. *Butea monosperma* is well-known for its drought tolerance and its ability to preventing soil erosion. As a result, planting and managing this tree can provide significant benefits to local farmers. (Kushwaha S, Kumar A, et al, 2017). The flowers were foraged by passerine and pollinator birds, while non-passerine birds serving as nectar thieves. (kumar SS, Raju AJS, et al, 2022). flowers of *Butea monosperma* provide food for both local and migratory forest birds, while the other parts of the tree are used by birds for roosting and nesting. (Wagh G. 2018) *Butea monosperma* has a great potential of restoring ecological balance by transform barren land into fertile, productive soil. (Rai A., Singha N., et al, 2016) Mutualistic relationship that reduces nectar theft and increases pollinator visits. (Pauw, A., and Johnson, C.M. 2018) The study of bird-plant mutualistic networks has provided valuable insights into the complex web of ecological interactions. (Garcia, D2016) coevolution, is a process in which two mutually dependent species influence each other's evolution. (Barreto, E., et al 2024) The flower display traits typical of bird pollination, with large, bright orange-red blooms, abundant nectar, and a diurnal blooming pattern. (Tandon, R., Shivanna, K.R., et al., 2003) Bird visits are crucial for successful seed production. (Anderson, S.H., Ladley, J.J., et al 2021)

II. MATERIAL AND METHOD

The study was conducted from various locations within Jamkhed taluka, Ahmednagar district, Maharashtra, where *Butea monosperma* trees are prevalent. The study sites included agricultural field, dryland farming, natural vegetation, open lands, near aquatic bodies, along roadsides. Observations were made over a period of January-April 2024. The flowering period of *Butea monosperma* peaked between late February to March and end by April. Field surveys were conducted in the early morning (6:00 AM to 10:00 AM) and late afternoon (4:00 PM to 6:00 PM). Study was conducted by visual observations method of birdwatching. The study was supported with photographs taken by Nikon D7200 DSLR Camera with 200-500mm lence. Birds were identified and enlisted with the help of available resources- The Book of Indian Birds,(Ali S., 2002) Birds of Indian subcontinent,(Grimmet R, et al., 2014) Internet, Mobile Apps: Merlin BirdIDapp(Cornell Lab of Ornithology) that helps identify birds.

III. RESULT AND DISCUSSION

The data collection focused on bird species visiting the tree for various purpose such as food, shelter, nesting and roosting etc. A total 56 bird species were observed in the vicinity of *Butea monosperma* trees from jamkhed. These include both resident and migratory species. During present study 56 species represents 34 families belonging to 12 orders viz, Passeriformes, Columbiformes, Piciformes, Cuculiformes, Coraciiformes, Accipitriformes, Pelecaniformes, Psittaciformes, Ciconiiformes, Suliformes, Galliformes, Bucerotiformes. According to the IUCN Red List, out of the 56 bird species recorded, four are classified as Near Threatened: Black-headed Ibis, Painted Stork, Asian Woolly-necked Stork, and Indian Grey Hornbill. A significant positive correlation was found between the abundance of *Butea monosperma* and bird diversity in the area. *Butea monosperma* plays a vital ecological role in Jamkhed, Maharashtra, by supporting avifauna. The tree offers shelter, nesting sites, and food, particularly through its nectar-rich flowers, which attract nectarivorous birds like the Purple Sunbird, also frower attracts Insects and insects attracts Insectivorous birds. Tree provides protection from predators, heat, and drought, benefiting avian species. In return, birds aid in pollination. This mutualistic relationship enhances biodiversity, supporting a balanced ecosystem. During migratory seasons, birds passing through Jamkhed benefit from the presence of *Butea monosperma*, as its flowering and fruiting times coincide with the arrival of many migratory species. Migratory birds, such as the Rosy starling, painted Stork (*Leptoptilos javanicus*), rely on tree for both food and shelter during their stopovers. The data is tabulated in the following Tables.

Table 1: List of Birds associated with *Butea monosperma* flower for feeding

Sr. No.	Order	Family	Scientific Name	Common Name	Residence status
1	Passeriformes	Passeridae	<i>Passer domesticus</i>	House sparrow	R
		Passeridae	<i>Gymnoris xanthocollis</i>	Yellow throated sparrow/Chestnut shoulderd petronia	R
		Corvidae	<i>Corvus splendens</i>	House Crow	R
		Sturnidae	<i>Sturnia pagodarum</i>	Brahminy starling	R
		Sturnidae	<i>Acridotheres tristis</i>	Common Myna	R
		Sturnidae	<i>Pastor roseus</i>	Rosy starling	M
		Leiothrichidae	<i>Argya malcolmi</i>	Large grey babbler	R
		Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo	R
		Pycnonotidae	<i>Pycnonotus cafer</i>	Red vented bulbul	R
		Zosteropidae	<i>Zosterops palpebrosus</i>	Indian white eye	R
		Nectariniidae	<i>Cinnyris asiaticus</i>	Purple sunbird	R
		Nectariniida	<i>Leptocoma zeylonica</i>	Purple rumped sunbird	R

		Aegithinidae	<i>Aegithina tiphila</i>	Common Iora	R
		Oriolidae	<i>Oriolus kundoo</i>	Indian golden oriole	R
2	Piciformes	Megalaimidae	<i>Psilopogon haemacephalus</i>	Coppersmith barbet	R
3	Cuculiformes	Cuculidae	<i>Eudynamys scolopaceus</i>	Asian koel	R
4	Psittaciformes	Psittaculidae	<i>Psittacula krameri</i>	Rose ringed Parakeet	R
		Psittaculidae	<i>Psittacula cyanocephala</i>	Plum headed parakeet	R
5	Galliformes	Phasianidae	<i>Pavo cristatus</i>	Indian peafowl	R
6	Bucerotiformes	Bucerotidae	<i>Ocyrceras birostris</i>	Indian grey hornbill	R

Table 2: List of Birds associated with *Butea monospermatree* for Shelter, Roosting and Nesting

Sr.No.	Order	Family	Scientific Name	Common Name	Residence status
1	Passeriformes	Muscicapidae	<i>Copsychus fulicatus</i>	Indian Robin	R
		Muscicapidae	<i>Copsychus saularis</i>	Oriental magpie Robin	R
		Muscicapidae	<i>Saxicala caprata</i>	Pied bushchat	R
		Muscicapidae	<i>Oenanthe fusca</i>	Brown rock chat	R
		Laniidae	<i>Lanius schach</i>	Long tailed shrink	R
		Motacillidae	<i>Motacilla maderaspatensis</i>	White browed wagtail	R
		Estrildidae	<i>Euodice malabarica</i>	Indian silverbill	R
		Estrildidae	<i>Lonchura punctulata</i>	Scaly -breasted munia (spotted munia)	R
		Estrildidae	<i>Lonchura malacca</i>	Tricoloured munia	R
		Alaudidae	<i>Eremopterix griseus</i>	Ashy-crowned sparrow lark	R
		Camperhagidae	<i>Pericrocotus cinnamomeus</i>	Small minivet	R
		Cisticolidae	<i>Prinia socialis</i>	Ashy prinia	R
		Cisticolidae	<i>Prinia inornata</i>	Plain prinia	R
		Cisticolidae	<i>Orthotomus sepium</i>	Tailor bird	R
		Ploceidae	<i>Ploceus philippinus</i>	Baya weaver	R
		Paridae	<i>Parus cinereus</i>	Cinereous tit	R
		Emberizidae	<i>Emberiza melanocephala</i>	Black headed bunting	M
2	Columbiformes	Columbidae	<i>Spilopelia senegalensis</i>	Laughing dove	R
		Columbidae	<i>Columba livia</i>	Blue rock pigeon	R
		Columbidae	<i>Streptopelia decaocto</i>	Eurasian collared dove	R
3	Cuculiformes	Cuculidae	<i>Centropus sinensis</i>	Greater caucal	R
4	Coraciiformes	Coraciidae	<i>Coracias benghalensis</i>	Indian Roller	R

		Meropidae	<i>Merops orientalis</i>	Asian green bee eater	R
		Alcedinidae	<i>Halcyon smyrnensis</i>	White throated kingfisher	R
5	Accipitriformes	Accipitridae	<i>Elanus caeruleus</i>	White tailed kite (Black shoulderd kite)	R
		Accipitridae	<i>Accipiter badius</i>	Shikra	R
		Accipitridae	<i>Milvus migrans</i>	Black kite	R
		Accipitridae	<i>Haliastur indus</i>	Brahminy kite	R
6	Pelecaniformes	Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret	R
		Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy ibis	R
		Threskiornithidae	<i>Threskiornis melanocephalus</i>	Black headed ibis	R
		Threskiornithidae	<i>Pseudibis papillosa</i>	Red naped ibis	R
7	Ciconiiformes	Ciconiidae	<i>Anastomus oscitans</i>	Asian openbill	M
		Ciconiidae	<i>Mysteria leucocephala</i>	Painted stork	M
		Ciconiidae	<i>Ciconia episcopus</i>	Asian wooly-necked stork	M
8	Suliformes	Phalacrocoracidae	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	R

(Abbreviation's: - R=Resident, M= Migratory)

Fig. Avifauna associated with *Butea monosperma*





(Fig:-Chestnut shoulderd petronia, purple sunbird, Indian white eye, Plum headed parakeet, black drongo, Rosy starling, purple rumped sunbird.)

IV. CONCLUSION

The ecological study of *Butea monosperma* and its interaction with bird species in Jamkhed highlighted the tree's vital role in supporting local wildlife. *Butea monosperma* proves to be a valuable ecological resource in region, supporting a variety of bird species and playing a vital role in the local ecosystem. Its interactions with birds, especially during the summer months, are crucial for both the tree's reproductive success and the survival of various bird species. The diverse bird population around the tree emphasizes its importance as a habitat. Furthermore, the results emphasize the potential of *Butea monosperma* to function as a keystone species within local ecosystems, contributing to both biodiversity conservation and the health of surrounding habitats. The study suggests the need for further conservation efforts to protect such trees, which provide ecological benefits to both flora and fauna in the region.

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