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BioBlitz of Dalma Wildlife Sanctuary, Jharkhand, India

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ABSTRACT

Jharkhand state, located at eastern India, known for the diverse cultural heritage along with its rich mineral deposits. Jharkhand shares its border with Bihar, Odisha, Chhattisgarh, West Bengal and Uttar Pradesh. It is the 15th largest state in India by the area along with 14th largest by the population. Jharkhand state has a varied landscape, waterfalls, featuring hills, and forests. This state is a leading producer of copper ore, iron, uranium, coal, granite, limestone, graphite, bauxite, magnetite, silver, dolomite, and mica. Jharkhand is the only state in India that produces uranium, pyrite, and cooking coal. In Jharkhand state, Dalma Wildlife Sanctuary is located on ranges of Dalma Hills, height of 3000 feet above the sea level with tropical moist & dry deciduous forests, tropical semi-evergreen forests, dense forest in addition to Subarnarekha River. Dalma Wildlife Sanctuary is about 15 kms from the Steel City, Jamshedpur and 100 kms from the Capital City, Ranchi. This Sanctuary is the home to diverse range of flora and fauna, complemented by the population of Indian Elephants too. A field survey was conducted with team of 3 members, within the Dalma Wildlife Sanctuary in between September 2023 to August 2024 which reveals the status of biodiversity together with man and forests. The aim of this research paper is to protect the unique floristic & faunistic of Dalma Wildlife Sanctuary with maintaining and protecting the ecological balance of the region.

Key Words - Steel City Jamshedpur, Leading producer, Subarnarekha River, Floristic & Faunistic.

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INTRODUCTION

Forests are one of the most vital and awe-inspiring ecosystems on the planet. Often referred as "Lungs of the Earth," it absorbs carbon dioxide, produce oxygen, along with regulating the climate. Forests are home to staggering array of biodiversity, providing food, shelter, and habitat for countless species of animals, plants, and microorganisms. Beyond their ecological significance, forests have profound cultural, spiritual importance, and economic. They provide fuelwood, timber, and other essential resources, supporting the livelihoods of millions of people worldwide. It also holds deep spiritual and cultural meaning for many indigenous communities, who have lived in harmony with these ecosystems for centuries. Despite their importance, forests face numerous threats, including deforestation, climate change, and habitat fragmentation. As a result, it is essential to recognize the value of forests and work towards their sustainable management, conservation, and

restoration. By doing so, we can help preserve the health of our planet, support the well-being of forest communities, and ensure a thriving future for generations to come. The forest of deciduous nature is not very likely considered as species rich (Gentry, 1995) but very rich in diverse life forms (Medina, 1995).

Biological diversity refers to the vast array of different animals, plants, microorganism, etc, that inhabit our planet. Biodiversity encompasses not only the variability of species present in an ecosystem but also the genetic diversity within each species, the variety of ecosystems, and the interactions between different species and their environment. The cornerstone of life on Earth, commonly called Biodiversity, providing essential services like climate regulation, soil formation, water purification and air. This is the foundation of many industries, including forestry, pharmaceuticals, and agriculture. The rich tapestry of biodiversity provides numerous benefits to humans, from recreation and tourism to food and medicine.

Since, deciduous forests occur in such zones in India where the inhabitants heavily depend on forests for fuel wood hence, they are most used and threatened ecosystem (Sagar and Singh, 2004) and is changing into dry deciduous scrub, dry savannah and dry grasslands (Champion and Seth, 1968; Singh and Singh, 1989). As we all know that fauna & flora are the two fundamental components of our planet's biodiversity. Fauna refers to, encompasses the incredible diversity of animal life, ranging from the majestic lions, tigers, or elephants to the tiny insects that buzz around us. Flora, on the other hand, refers to the vast array of plant species that inhabit our world, from the towering trees of the forest to the tiny microorganisms that live in the soil. Together, flora & fauna form the delicate web of life that sustains our planet. They are interdependent, and interconnected with plants providing oxygen, food, and shelter for animals, and animals helping to pollinate plants, disperse seeds, and maintain the balance of ecosystems. Floristic and Faunistic diversity varies greatly across different ecosystems and regions, from the lush rainforests of the tropics to the arid deserts of the world. Each region has its unique animal species and set of plant that have adapted to the local climate, soil, and environmental conditions. By understanding and conserving flora & fauna is essential for maintaining the health of our planet and ensuring the long-term survival of our species. By preserving and protecting the natural world, we can help maintain the balance of ecosystems, support biodiversity, and ensure a thriving future for generations to come.

In the picturesque hills of Jharkhand, India, Dalma Wildlife Sanctuary is nestled near Jamshedpur, The Steel City of India. Dalma Wildlife Sanctuary is a tranquil oasis amidst into the industrial landscape. This sanctuary is also a haven for wildlife enthusiasts, nature lovers, and adventure seekers, which offers breathtaking views of the beautiful surrounding landscape, along with its lush forests, sparkling waterfalls, caves, and rolling hills, it's a nature lover's paradise. It is spread over an area of approximately 195 square kilometres, Dalma is one of the most popular wildlife sanctuaries in eastern India, perched on the Dalma Hills. Paradise home to a diverse range of flora & fauna, this sanctuary is renowned for its diverse range of flora including medicinal plants, grasslands, orchids, forest trees. On the other hand, with its fauna diverse including Indian Elephant population accompanied by bears, deers, wild boars, leopards, tigers, and a varieties of bird species.

With its lavish biodiversity, together with stunning natural beauty, Dalma Wildlife Sanctuary is an unmissable destination, for somebody fascinated in exploring the truly blessed natural wonders of Jharkhand. Afterall, Jharkhand is a state with a rich diversity of flora and fauna.

METHODS & MATERIALS

Study Area

Dalma Wildlife Sanctuary, fig. 1-2 (https://www.dalmawildlife.in). was inaugurated by Sanjay Gandhi in the year of 1975. It is located 15 km from the steel city Jamshedpur in the state of Jharkhand, India. Situated around the Hills of Dalma, and it

extends over 193 sq. km in the thick forest of the Dalma mountain range (Mallick, 2020; Verma, 2011). This sanctuary is blessed with a nearby flowing Subarnarekha River as well as Dimna Lake that is located down to the Dalma Hills, which provides an excellent habitat for the resident and migratory birds (Mallick, 2020). The present study was conducted in Dalma Wildlife Sanctuary, that was named as "Dalma" to commemorate the Tribal Girl, "Dalma", worshipped by the local tribal peoples as the goddess, known as "Dalma Maa". This sanctuary lies between 22'46'30" to 22'57" North and 86'3'15" to 86'26'30" East in Chota Nagpur Plateau of South Jharkhand, India. The sanctuary area is also an abode of native tribe, 'Santhals', who occupy an extreme large area of Dalma forest. The soils of this area are generally sandy or clay loam. Depth of soils greatly varies, and moderate in the plains and very minimum in hillocks, often at the places, pure laterite. On hills and slopes, due to erosion, the soil is generally wanting or very shallow. Although, the existence of clay-loam and clay into the valleys sustain better quality of Dalma forests. Sanctuary area has three distinct seasons likely summer, rainy, and winter (Lal *et al*., 2019).

Fig. 1-2: Showing map of Dalma Wildlife Sanctuary (Map source: https://www.dalmawildlife.in)

Field Survey work

Field Survey work, conducted from September 2023 to August 2024 while seasonal visits to the sanctuary. To carry out our field survey work, the three members worked together to understand the diversity of the life and for the documentation of the biodiversity of the Dalma Wildlife Sanctuary. The work was conducted in the villages of Dalma, with the help of semi-structured interview. With local tribal peoples the qualitative data was gathered. Knowledgeable people, elderly people, tribal people, were included, for the interview of the floras ethnomedicinal studies. Later, the self-identification was made with the help of flora "The Botany of Bihar and Orissa" by H. H. Haines Vol I – VI (Haines, 1925). The information as well as necessary data were generated for preparing a report of the biological diversity of our study area with capturing photographs and noting down important data on a notebook. Together created a mitigation plan that addresses any problems stemming from above mentioned activities.

RESULT & DISCUSSION

Throughout the survey study in Dalma Wildlife Sanctuary huge numbers of floristic along with faunistic were recorded near Chakulia Naka, Makulakocha, Pindrabera, Tulin, Kadamjhor, and Kathjhor area. The complete forest of Dalma Wildlife Sanctuary falls into the catchment area of Subarnarekha River and Dimna Lake of Jamshedpur, Jharkhand.

Flora data of the Dalma Wildlife Sanctuary was recorded with the identified 76 tree species belonging to 31 families, which are shown in the given Table 1 from the study area. These plants have ethnomedical properties and could be beneficial for the living beings. Fauna data of the Dalma Wildlife Sanctuary were recorded and has faunal species like Indian Elephants, Deers, Barking deers, Sambhars, Sloth bear, Mouse deer, Indian giant squirrel, Common Palm Civet, etc as the inhabitants in the sanctuary along with frequently seen birds like Golden oriole, Paradise flycatchers, Indian treepie, Indian peafowl, Grey hornbills, Kingfishers, Racket tailed drongo, Alexandrine

Parakeet, Mottled Wood-owl, Indian Nightjar, Yellow-crowned Woodpecker, Brown-headed Barbet, Grey-headed Starling, Dusky Eagle-Owl, etc. Total 11 inhabitants' fauna of 10 families along with 30 avifauna species of 22 families were identified and the data are shown in Table 2 and Table 3.

Jharkhand state is a part of the biodiversity rich regions of India, Since, of its climatic conditions and rich diverse physiographic. The flora and fauna, both found to represent a wide range of taxa, that can be attributed to a variety of terrain and landforms. Several ethnic groups such as Ho, Paharia, Munda, Oraon, Chero, Santhal, Asura, and other have influenced their eco-system in varying practices of pasture and agriculture (http://www. Protected planet.net/sites/Hazaribagh Sanctuary). Biodiversity of Jharkhand state is under some threat, due to a variety of adverse factors including overlapping of mineral mapping and forests for majority of minerals (Vagholekar, 2015); Community-based economic activities; Unauthorized use of biological resources such as animals, plants, and microorganisms, by an organization or individuals, often for the commercial gain; Occupancy and utilization of land for housing and commercial projects; Environmental harm caused by overgrazing and unsustainable medicinal plant use; Water storage and extraction activities; Agricultural modernization and land use change; Extreme poaching and unsustainable tourism; etc.

Table 1- Showing the identified flora of the Dalma Wildlife Sanctuary with their Botanical name and Family.

Sl. No	Family	Botanical Name	Common Name
1	Anacardiaceae	*Buchanania cochinchinensis*	Chironji Tree
2	Anacardiaceae	*Buchanania lanzan*	Charoli Nut, Chironji
3	Anacardiaceae	*Lannea coromandelica*	Indian Ash Tree, Jhingini, Jhingam
4	Anacardiaceae	*Mangifera indica*	Aam, Mango
5	Anacardiaceae	*Spondias pinnata*	Hog Plum, Wild Mango
6	Anacardiaceae	*Spondias mangifera*	Amra
7	Annonaceae	*Miliusa tomentosa*	Kirua
8	Apocynaceae	*Alstonia scholaris*	Devil's Tree, Chatim
9	Apocynaceae	*Wrightia arborea*	Daira, Dharauli
10	Apocynaceae	*Wrightia tinctoria*	Dudhi, Khirn
11	Arecaceae	*Phoenix acaulis*	Dwarf Date Palm, Khajur
12	Aracaceae	*Phoenix sylvestris*	Khajur
13	Bignoniaceae	*Oroxylum indicum*	Indian Trumpet Flower, Broken Bones, Bhut-Vriksha, Sonapatha, Talwar Fali
14	Bixaceae	*Cochlospermum gossypium*	Yellow Silk-Cotton Tree, Sonali Simul, Ganeri, Galgal
15	Bombacaceae	*Bombax ceiba*	Red Silk-Cotton Tree, Semal, Shimul,
16	Boraginaceae	*Cordia macleodii*	Dahiman, Sitapatra, Shikari, Belwajan
17	Burseraceae	*Boswellia serrata*	Shallaki, Salia Guggul, Dhoop, Luban
18	Burseraceae	*Garuga pinnata*	Garuga, Karnikarha, Kharpat
19	Combretaceae	*Terminalia arjuna*	White Murdh, Arjhan, Arjun, Kumbuk, Kahwa
20	Combretaceae	*Terminalia bellerica*	Bastard Myrobalan, Behada, Baheda
21	Combretaceae	*Terminalia chebula*	Chebulic Myrobalan, Haritaki, Harida Harra, Harad
22	Combretaceae	*Terminalia tomentosa*	Indian Laurel Tree, Crocodile Bark Tree, Saaj, Asan
23	Cornaceae	*Alangium salviifolium*	Sage-Leaved Alangium, Ankol, Akola
24	Dilleniaceae	*Dillenia pentagyna*	Karval, Karmal, Nepali Elephant Apple, Ban Chalta
25	Dipterocarpaceae	*Shorea robusta*	Sal, Sakhua, Sakher
26	Ebenaceae	*Diospyros melanoxylon*	Malabar Ebony, Kendu, Temburini
27	Euphorbiaceae	*Croton persimilis*	Devil's Goad, Gunsur, Hakuma, Baragachh, Mashimud, Ghansar
28	Euphorbiaceae	*Mallotus philippensis*	Kamala Tree, Kumkum Tree, Shendri, Kapila
29	Fabaceae	*Acacia arabica*	Thorn Mimosa, Indian Gun Arabic Tree, Babool
30	Fabaceae	*Acacia auriculiformis*	Earleaf Acacia, Earpod Wattle, Acacia, Akashmoni, Sonajhuri, Australian Babool
31	Fabaceae	*Albizia odoratissima*	Ceylon Rosewood, Kala Siris, Tinia,
32	Fabaceae	*Albizia procera*	Safed Siris, Karoi
33	Fabaceae	*Albizia lebbeck*	Indian Siris, Siris, Sitapuspa, Shiris
34	Fabaceae	*Bauhinia variegata*	Orchid Tree, Camel's Foot Tree, Kachnar, Rakta Kanchan

35	Fabaceae	*Bauhinia malabarica*	Malabar Orchid, Ampti, Amlosa, Gumbati, Arampuli
36	Fabaceae	*Butea monosperma*	Flame of the Forest, Bastard Teak, Palash, Dhak, Bengal Kino
37	Fabaceae	*Cassia fistula*	Golden Shower Tree, Pudding Pipe Tree, Amaltas, Amaltash, Swarn-Pushpi, Sonali
38	Fabaceae	*Dalbergia lanceolaria*	Lanceleaf Rosewood, Hardi, Takoli, Bithua
39	Fabaceae	*Dalbergia sissoo*	Indian Rosewood, Shisham, Biradi
40	Fabaceae	*Dalbergia latifolia*	Black Rosewood, Kala Shisham, Sitsal, Paharisi
41	Fabaceae	*Erythrina variegata*	Tiger's Claw, Indian Coral Tree, Dadap, Pangara
42	Fabaceae	*Pongamia pinnata*	Seashore Mempari, Indian Beech Tree, Karanj
43	Fabaceae	*Pterocarpus marsupium*	Malabar Kino, Indian Kino, Bijasal, Piyasal, Vijaysar
44	Fabaceae	*Tamarindus indica*	Imli, Indian Date
45	Lamiaceae	*Gmelina arborea*	White Teak, Gamhar, Goomar Teak
46	Lamiaceae	*Tectona grandis*	Teak, Sagwan, Saguan
47	Magnoliaceae	*Magnolia champaca*	Yellow Magnolia, Golden Champa, Son Champa, Champak
48	Malvaceae	*Sterculia urens*	Ghost Tree, Gum Karaya, Kateera Gum, Kulu, Indian Tragacanth, Gular, Gulu
49	Malvaceae	*Thespesia populnea*	Pacific Rosewood, Indian Tulip Tree, Pacific Shisham, Portia Tree, Milo, Paras Pipal
50	Meliaceae	*Azadirachta indica*	Indian Lilac, Margosa, Neem, Nimba Tree
51	Moraceae	*Artocarpus heterophyllus*	Jackfruit, Kathal
52	Moraceae	*Artocarpus integer*	Chempedak, Baroh
53	Moraceae	*Artocarpus lacucha*	Monkey Jack, Airawata, Barhal, Barrar
54	Moraceae	*Ficus benghalensis*	Weeping Chinese Banyan, Banyan, Bargad
55	Moraceae	*Ficus cunia*	Drooping Fig, Bainchi, Bhui Goolar, Parho
56	Moraceae	*Ficus glomerata*	Cluster Fig, Gular Fig, Indian Fig Tree, Audumbar, Goolar
57	Moraceae	*Ficus racemosa*	Red River Fig, Cluster Fig, Atti, Gular
58	Moraceae	*Ficus religiosa*	Sacred Fig, Bodhi Tree, Peepal, Ashvattha Tree
59	Moraceae	*Ficus semicordata*	Drooping Fig, Khaina
60	Moraceae	*Ficus tomentosa*	Soft Fig, Gadbar, Jari, Kamarup, Banpipal
61	Moringaceae	*Moringa oleifera*	Drumstick Tree, Tree of Life, Munga, Sahjan
62	Myrtaceae	*Eucalyptus globulus*	Blue Gum, Nilgiri Tasmanian Blue Gum
63	Myrtaceae	*Syzygium heyneanum*	Simpi Nerale, Kath Jamun, River Plum
64	Myrtaceae	*Syzygium nervosum*	Rai Jamun, Paiman, Satyam, Bawal
65	Myrtaceae	*Syzygium cumini*	Malabar Plum, Black Plum, Jamun
66	Phyllanthaceae	*Bridelia retusa*	Spinous Kino Tree, Khaja, Asan, Geio
67	Phyllanthaceae	*Phyllanthus emblica*	Indian Gooseberry, Amla
68	Rhamnaceae	*Ziziphus jujuba*	Indian Plum, Chinese Date, Ber
69	Rhamnaceae	*Ziziphus oenopolia*	Jackal Jujube, Wild Jujube, Karkandhu, Makkaya, Chee Mullu
70	Rubiaceae	*Anthocephalus cadamba*	Bur-Flower Tree, Kadamba, Kadam
71	Rubiaceae	*Haldia cordifolia*	Yellow Teak, Kurum, Haldu, Karam, Kadami, Haldi
72	Rutaceae	*Aegle marmelos*	Stone Apple, Indian Bael, Bael, Wood Apple
73	Salicaceae	*Flacourtia indica*	Governor's Plum, Bilangada, Aghori
74	Sapindaceae	*Sapindus mukorossi*	Indian Soapberry, Washnut, Reetha, Arishta
75	Sapotaceae	*Madhuca longifolia*	Butter Tree, Mahua, Mahuwa, Lluppai
76	Simaroubaceae	*Ailanthus excelsa*	Tree Of Heaven, Ghodaneem, Maharukh, Mahaneem

Table 2- Showing the identified inhabitant's fauna of the Dalma Wildlife Sanctuary with their Scientific name and Family.

Sl. No	Family	Scientific Name	Common Name
1	Cervidae	*Cervus muntjak*	Barking Deer, Rib-Faced Deer
2	Cervidae	*Rusa unicolor*	Sambhar Deer
3	Cercopithecidae	*Semnopithecus entellus*	Common Langur
4	Elephantidae	*Elephas maximus indicus*	Indian Elephant
5	Erethizontidae	Hystrix indica	Porcupine
6	*Herpestidae*	*Urva edwardsii*	Indian Grey Mongooses
7	Manidae	*Manis crassicaudata*	Pangolin
8	Ursidae	*Melursus ursinus*	Sloth Bear
9	Sciuridae	*Ratufa indica*	Indian Giant Squirrel
10	Suidae	*Sus scrofa*	Wild Boar
11	Viverridae	*Paradoxurus hermaphroditus*	Common Palm Civet

Table 3- Showing the identified avifauna of the Dalma Wildlife Sanctuary with their Scientific name and Family.

Sl. No	Family	Scientific Name	Common Name
1	Accipitridae	*Accipiter trivirgatus*	Crested Goshawk
2	Accipitridae	*Circaetus gallicus*	Short-Toed Snake Eagle
3	Accipitridae	*Pernis ptilorhynchus*	Crested Honey Buzzard
4	Accipitridae	*Spilornis cheela*	Crested Serpent Eagle
5	Alcedinidae	*Halcyon smyrnensis*	White-Breasted Kingfisher
6	Bucerotidae	*Ocyceros birostris*	Indian Grey Hornbill
7	Burhinidae	*Burhinus indicus*	Indian Thick-Knee
8	Campephagidae	*Pericrocotus cinnamomeus*	Small Minivet
9	Caprimulgidae	*Caprimulgus asiaticus*	Indian Nightjar
10	Caprimulgidae	*Caprimulgus indicus*	Jungle Nightjar
11	Columbidae	*Columba livia*	Rock Pigeon
12	Columbidae	*Spilopelia chinensis*	Spotted Dove
13	Corvidae	*Dendrocitta vagabunda*	Indian Treepie
14	Dicruridae	*Dicrurus paradiseus*	Racket Tailed Drongo
15	Hemiprocnidae	*Hemiprocne coronata*	Crested Treeswift
16	Megalaimidae	*Megalaima zeylanica*	Brown-Headed Barbet
17	Monarchidae	*Hypothymis azurea*	Black Naped Monarch
18	Monarchidae	*Terpsiphone paradisi*	Asian Paradise Flycatcher
19	Muscicapidae	*Luscinia brunnea*	Indian Blue Robin
20	Oriolidae	*Oriolus kundoo*	Golden Oriole
21	Pellorneidae	*Pellorneum ruficeps*	Puff Throated Babbler
22	Phasianidae	*Pavo cristatus*	Indian Peafowl
23	Picidae	*Leiopicus mahrattensis*	Yellow-Crowned Woodpecker
24	Pittidae	*Pitta brachyura*	Indian Pitta
25	Psittaculidae	*Psittacula cyanocephala*	Plum-Headed Parakeet
26	Psittaculidae	*Psittacula eupatria*	Alexandrine Parakeet
27	Sturnidae	*Acridotheres tristis*	Common Myna
28	Sturnidae	*Sturnia malabarica*	Chestnut Starling
29	Turdidae	*Turdus unicolour*	Tickel's Thrush
30	Zosteropidae	*Zosterops palpebrosus*	White-Eye Oriental

CONCLUSION

The findings of the study reveals that the forest of Dalma Wildlife Sanctuary includes many taxa which represents a good ethnomedicinal properties. The tribal peoples of sanctuary use a wide range of herbal medicines for several ailments. Knowledge of these medicinal plants were learned from their fore fathers from one generation to another. These ethnomedicinal plants distributed into the Dalma Wildlife Sanctuary were categorized, based on their medicinal properties and utility at the local level. The identified fauna and avifauna species gives a peaceful, beautiful, and mesmerizing environment to the sanctuary, where one can get refresh into the canopy. The sanctuary forest was under the risk due to fragmentation, deforestation, and the increased fire risk, thus an appropriate protection actions should be significant. Grasping the dynamics of forest changes along with their underlying causes is essential for crafting effective conservation plans that protect the Dalma Wildlife Sanctuary's biodiversity and ecosystems. On the other hand, fire regimes in transitional and open forests were more responsive to changes in ignition sources and forest architecture. Due to the synergistic effects of human activities and climate change, forest degradation driven by fire and fragmentation was anticipated to escalate in the region. Human involvement, forest ecology, forest fire, and the influence on inhabitants, were all complicated topics into Dalma Wildlife Sanctuary,

along with there was much space for many more research in the sanctuary. Therefore, detailed research and survey studies are required. Nevertheless, it is mandatory for future studies ought to be concentrated on learning more about the protection of forest along with forest fire severity with climatic trends in addition to the age of the biodiversity.

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