A Study on The Floristic Composition of Nagzira Wildlife Sanctuary, Maharashtra, India

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***Abstract*—The vegetation of Nagzira Wildlife Sanctuary is classified as South Indian moist deciduous forest according to Champion and Seth (1968). The plant communities are arranged into three distinct layers. The upper storey consists of tall, well-spaced trees forming a dense canopy. Dominant deciduous species in this layer include *Albizia lebbeck*, *Albizia odoratissima*, *Anogeissus latifolia*, *Butea monosperma*, *Cleistanthus collinus*, *Diospyros melanoxylon*, *Mitragyna parvifolia*, *Pterocarpus marsupium*, and *Tectona grandis*. The middle storey is composed of smaller trees and a variety of shrubs such as *Bridelia retusa*, *Holarrhena pubescens*, and *Maytenus senegalensis*. This layer also supports several climbers, including slender species like *Abrus precatorius*, as well as lianas such as *Butea superba*, *Olax psittacorum*, and *Ventilago denticulata*. Additionally, stem parasites like *Dendrophthoe falcata* and epiphytic orchids such as *Vanda tessellata* are present. The ground layer comprises shrubs and herbs including *Carissa congesta*, *Lavandula bipinnata*, and *Woodfordia fruticosa*, along with numerous grasses and sedges, particularly *Cyperus* species. Aquatic plants are found in stagnant water bodies, including *Bacopa monnieri*, *Limnophila indica*, *Nymphaea nouchali*, and *Nymphoides hydrophylla*.**

***Index Terms*—Deciduous Forest, canopy, sanctuary, climbers.**

I. INTRODUCTION

Despite India's rich floristic diversity, approximately 1,700 species of flowering plants are currently threatened with extinction, representing about 7% of the 26,106 globally threatened species. Over the past 400 years, nearly 654 species have become extinct (WCMC, 1992). In the last two centuries alone, India has lost around 17 species, including *Sterculia khasiana*, while several others have not been relocated due to both natural (abiotic) and human-induced (biotic) factors.

To address this concern, India has developed an extensive network of protected areas for in-situ conservation under Article 8, comprising about 578 protected areas covering approximately 155,508.54 sq. km. This network includes 13 Biosphere Reserves, 89 National Parks, and 489 Wildlife Sanctuaries (Rodgers et al., 2002). In Maharashtra, this system encompasses 5 National Parks and 35 Wildlife Sanctuaries. However, unregulated exploitation of natural resources and the impacts of climate change continue to threaten biodiversity, potentially leading to resource depletion. The genetic diversity of wild relatives of cultivated plants holds significant potential for developing new adaptive and high-yielding crop varieties through plant breeding, which is essential to meet the food demands of a growing human population.

II.MATERIALS AND METHODS

Plant diversity was assessed through field surveys conducted across different seasons. The study area was explored systematically through both extensive and intensive surveys. Specimens of flowering and fruiting plants were collected, and detailed field data were recorded, including plant habit, habitat, flower colour, local names, abundance, and associated species. Photographs of plants, particularly their reproductive parts, were taken in their natural habitats. Information on the medicinal uses of plants was obtained from local inhabitants and verified with standard literature. The collected specimens were processed following conventional herbarium methods and identified with the assistance of the Botanical Survey of India (BSI) herbarium in Pune.

III. RESULTS AND DISCUSSION

The Nagzira Wildlife Sanctuary (Biogeographical Province 6D) was established through Government

Notification No. WLP/1669/22860/Y dated 3 June 1970, covering an area of 152.81 sq. km. It is remarkably conserved as a "green oasis" in the easternmost part of Maharashtra and holds significant importance for biodiversity conservation. The sanctuary derives its name from the deity Nagdev and the Nagzira Lake.

Location:
The sanctuary is located in Sakoli tehsil and extends across the tahsils of Arjuni (Sadak), Goregaon, and Tiroda in Gondia district of Maharashtra. Geographically, it lies between 79°58′ to 80°11′ East longitude and 21°12′ to 21°21′ North latitude.

IV. BIOGEOGRAPHICAL CLASSIFICATION

According to the Wildlife Institute of India, Dehradun, the sanctuary falls under the Paleotropical Kingdom and Indo-Malayan Sub-kingdom. It is part of Biogeographical Zone 6 (Deccan Peninsula) and belongs to the Central Deccan (6B) biotic province. Although this zone is rich in floral and faunal diversity, it remains one of the least protected regions in India and therefore requires a high level of conservation priority. The sanctuary area (152.81 sq. km), formerly reserved forest, is mapped across four toposheets: 55(O/15), 55(O/16), 64(C/3), and 64(C/4).

Boundaries:
The total external boundary of the sanctuary measures 104.53 km, of which 74.93 km is artificial and 29.60 km is natural.

- North: Bordered by revenue villages such as Kursipar, Berdipar, Belapur, Hamesha, Kodebarra, and Mangezari.
- East: Defined by the Gondia–Chandrapur broad gauge railway line of the South Eastern Railway.
- South: Includes Pitezari Fazal forests, Sakoli range, and village boundaries of Jamdi and Kosamtondi, along with reserved forest areas.
- West: Bordered by villages such as Bhajepar and Chorkhamara, the Chorkhamara–Pangdi cart track, and reserved forest limits.

The sanctuary is surrounded by reserved forests of the Gondia Forest Division and Bhandara Forest Division on the northern and eastern sides, and by the Forest Development Corporation of Maharashtra (FDCM) forests of Bhandara Division on the southern and western sides. The internal boundary length is also 104.53 km. Thadezari is the only village located within the sanctuary, situated along a compartment boundary. Ecologically, the surrounding forest forms a self-sustaining ecosystem supporting diverse flora and fauna.
Following its declaration as a wildlife sanctuary, forest exploitation activities such as tree felling were halted as per official directives, and grazing within the sanctuary was prohibited. Additionally, hunting, including the shooting of tigers, was banned through government resolutions issued in July 1970.

Geology:
The sanctuary displays considerable variation in terrain, with altitudes ranging from about 30 m to 560 m above sea level. Geologically, it is characterized by formations of the Sakoli series, which include phyllites, slates, chiovites, and Sausar series rocks. These rock groups differ in their chemical composition, particularly in lime content, contributing to a diverse landscape marked by steep ridges, narrow valleys, deep gorges, and varying elevations.

Soil:
The soils in the sanctuary are predominantly lateritic, varying from sandy-to-sandy loam in plains and lower slopes. Steeper slopes are characterized by sandy to murram soils, while precipitous areas are rocky. Calcareous soils occur in patches, especially in foothills and near villages where topsoil has been removed. Lateritic soils are particularly suitable for the growth of *Tectona grandis*.

Climate:
The sanctuary offers a scenic landscape with clean and refreshing air. The climate remains generally pleasant for most of the year, with temperatures ranging from about 6°C in December to 46°C in May. The average annual rainfall is around 1200 mm, with peak rainfall (up to 1600 mm) occurring during July and August. Drought conditions typically occur once every decade, with the last recorded drought in 1997. Frost is absent in this region, and except during the monsoon season, most days are sunny due to high insolation. Maximum wind velocity is observed during the months of June to August.

Drainage:
The surrounding region contains seven major lakes: Chorkhamara, Bodalkasa, Balapur, Lendezari, Malujunga, Murpar, and Rangepar. Within the sanctuary itself, two prominent water reservoirs are present—Nagzira Lake and Thadezari Lake.

Fauna:
Nagzira Wildlife Sanctuary supports rich faunal diversity, including numerous fish species, about 34 species of mammals, 166 species of birds, 36 species of reptiles, and four species of amphibians. Prominent wildlife includes tigers, panthers, bison, sambar, nilgai, chital, wild boar, sloth bear, and wild dogs.

Vegetation:
The vegetation of the sanctuary belongs to the South Indian moist deciduous type (Champion & Seth, 1968) and is organized into three layers. The upper canopy consists of tree species such as *Anogeissus latifolia*, *Bridelia retusa*, *Cleistanthus collinus*, *Diospyros melanoxylon*, *Sterculia urens*, and *Xylia xylocarpa*.
The middle layer comprises smaller trees and shrubs including *Clerodendrum serratum*, *Gardenia latifolia*, *Holarrhena pubescens*, and *Lagerstroemia parviflora*. This layer also supports numerous climbers and lianas such as *Acacia pennata*, *Aristolochia indica*, *Aspidopterys cordata*, *Cocculus hirsutus*, *Dioscorea bulbifera*, *Hemidesmus indicus*, and *Smilax zeylanica*.

V. FLORISTIC FEATURES OF NAGZIRA WILDLIFE SANCTUARY

The ground vegetation becomes particularly luxuriant after the monsoon season, supporting a diverse array of herbs, grasses, and undershrubs. Common species include *Abutilon indicum*, *Achyranthes aspera*, *Alternanthera sessilis*, *Alysicarpus vaginalis*, *Buchnera hispida*, *Crotalaria linifolia*, *Cyanotis cristata*, *Elephantopus scaber*, *Euphorbia hirta*, *Heteropogon contortus*, *Thespesia lampas*, and *Peristrophe paniculata*.
In disturbed or waste areas, plants such as *Amaranthus spinosus*, *Cassia absus*, *Corchorus aestuans*, *Cyperus tenuispica*, *Datura inoxia*, *Sida cordata*, and *Triumfetta rhomboidea* are commonly observed. Marshy habitats within the sanctuary support species like *Ammannia baccifera*, *Commelina benghalensis*, *Hygrophila schulli*, and *Polygonum plebeium*.
The present study focuses primarily on the angiospermic flora of the sanctuary, documenting 715 species distributed across 440 genera and 122 families. In addition to these flowering plants, 7 species of pteridophytes were also recorded from the study area.
The survey further identified 12 species representing wild relatives of cultivated plants, including *Amorphophallus paeoniifolius*, *Cajanus scarabaeoides*, *Canavalia ensiformis*, *Dioscorea bulbifera*, *Ensete superbum*, *Jasminum malabaricum*, *Mucuna pruriens*, *Rauvolfia serpentina*, *Sphenostylis bracteatus*, *Thespesia populnea*, *Vigna vexillata*, and *Ziziphus oenoplia*. Previous studies by Arora and Nayar (1983) and Rao and Hajra (1986) have indicated that these wild relatives are under threat due to shifting cultivation and developmental activities. Singh and Rethy (1995) suggested that adopting agroforestry systems based on native species could serve as an effective alternative to shifting cultivation, thereby reducing land pressure and conserving plant diversity in the region.

VI. DISCUSSION

To protect the biodiversity of Nagzira Wildlife Sanctuary from anthropogenic pressures such as excessive harvesting of edible and medicinal plants, collection of bidi leaves, forest fires, overgrazing, and infrastructural expansion—as well as natural challenges like heavy rainfall and landslides—there is a strong need to enhance public awareness. This can be effectively accomplished through mass communication channels such as radio, television, and newspapers, along with educational programs initiated at the school level. Contributions from institutions like the Botanical Survey of India, particularly through the publication of the four volumes of the *Red Data Books of Indian Plants* (Singh & Singh, 2002), are crucial in fostering awareness and encouraging conservation efforts.

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