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Assessment of Plant Biodiversity in Mokhada, Palghar district, Maharashtra

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Abstract

Mokhada located in Maharashtra's Palghar district, is home to a variety of vulnerable and indigenous species. This study intends to explore the plant biodiversity through analysis of floristic composition, particularly in Mokhada region of Palghar district to document its floral richness. Floristic composition was evaluated by means of field surveys in Suryamal, Deharje and Khodala village in Mokhada region. A total of 90 species belonging to 72 genera and 39 plant families were reported in the region. Out of the identified species in the selected region, *Tectona grandis* and *Aegle marmelos* have been described as an endangered and near threatened species respectively. as per IUCN red list. The current study highlights the significance of localised conservation initiatives and advance our understanding of the ecosystems connected with the Western Ghats.

Keywords: Mokhada, Western Ghats, Biodiversity, floristic composition

Introduction

Palghar district of Maharashtra hosts diverse ecosystems, including deciduous forests, grasslands, and wetlands, supporting a variety of flora and fauna. The biodiversity of this region plays a crucial role in ecological balance, soil conservation, water regulation, and climate stability. The forests here provide habitat to several plant and animal species, including medicinal plants, pollinators, and endemic species. Biodiversity also supports the livelihood of local tribal communities, who rely on forest resources for food, medicine, and traditional practices. Palghar in the northern Western Ghats holds rich plant diversity. Most deciduous species like *Tectona grandis*, *Terminalia arjuna*, and *Mitragynaparvifolia* dominate. Tribal groups like the Warlis use herbs such as *Adhatodavasica* and *Canscora pauciflora*. Invasive plants like *Lantana camara* and *Chromolaena odorata* threaten native species^[1, 2, 3]. Valsad lies in the Western Ghats region, near Dharampur and Wilson Hill's rich forest areas. Species like *Cassia fistula*, *Mangifera indica*, and *Azadirachta indica* are common^[4]. Raigad lying to the south of Palghar exhibits coastal and forested terrain that supports over 700 plant species in areas like Phansad Sanctuary. Notable species include *Saussureaobvallata*, *Woodfordiafruticosa*, and mangroves like *Xylocarpus granatum*. Traditional use of forest plants remains strong among local communities^[5]. East of Palghar which is Thane which is a mix of urban and forest zones includes parts of Sanjay Gandhi National Park. Plant species like *Careya arborea*, *Syzygiumcumini*, and *Aegle marmelos* thrive here. Tribal communities still rely on native herbs for traditional medicine. *Ficus benghalensis* and *Terminalia arjuna* are protected in sacred groves^[6].

Mokhada is a taluka in the Palghar district, known for its rich natural landscapes, tribal communities, and proximity to the Western Ghats. The region is characterized by dense forests, rivers, and hilly terrains, making it an ecologically significant area. Mokhada region, located at approximately 19.88°N latitude and 73.38°E longitude, lies at an elevation of average 1,198 ft above sea level^[7]. It experiences a tropical monsoon climate with an average annual rainfall of around 2458 mm^[8]. The predominant soil types found in the area are sandy loam soil, black coloured, lighter coloured soil which support a rich diversity of plant life^[9]. Agricultural growth, encroachments as well as infrastructural developments are contributing to the loss of these forests and forest areas. The study of floristic composition is crucial for procuring information on diversity of forests for forest management purpose and understanding its ecology.

Hence, the present study is carried out to assess the plant biodiversity through analysis of floristic composition, particularly in Mokhada region of Palghar district.

Materials and Methods

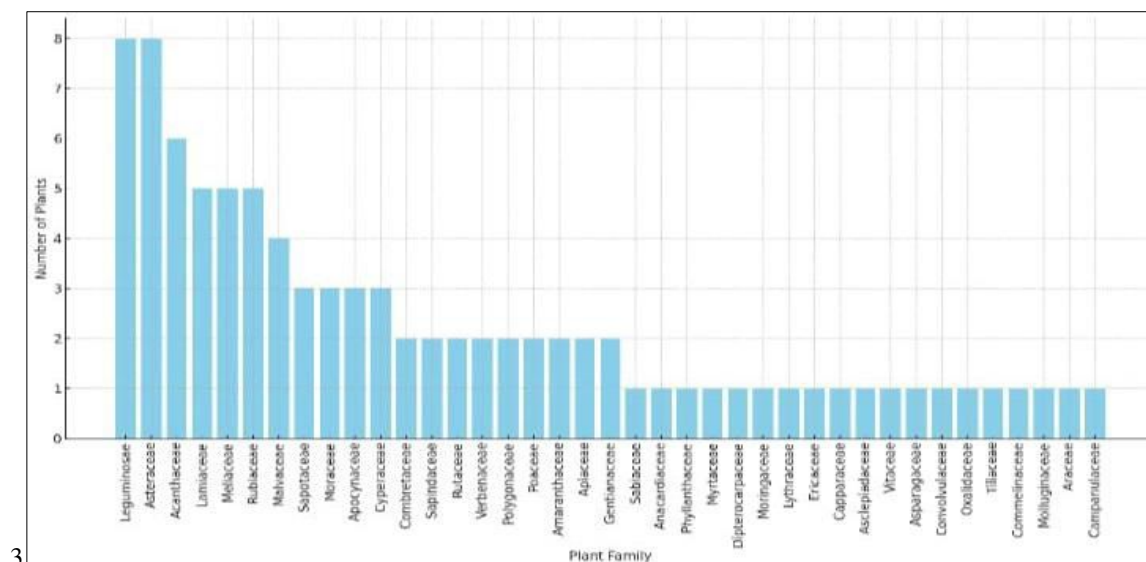
Field visit was conducted in Suryamal, Deharje and Khodala village in Mokhada region of Palghar district in the month

of February to record floristic composition. A detailed field survey was carried out to record the various species and categorising them as trees, shrubs and herbs. Plant specimens were collected from selected sites and the identification was performed using regional floras such as Flora of Maharashtra^[10] and The Flora of the Presidency of Bombay^[11].



Fig 1: Some plant species in the selected Mokhada region

Results and Discussion



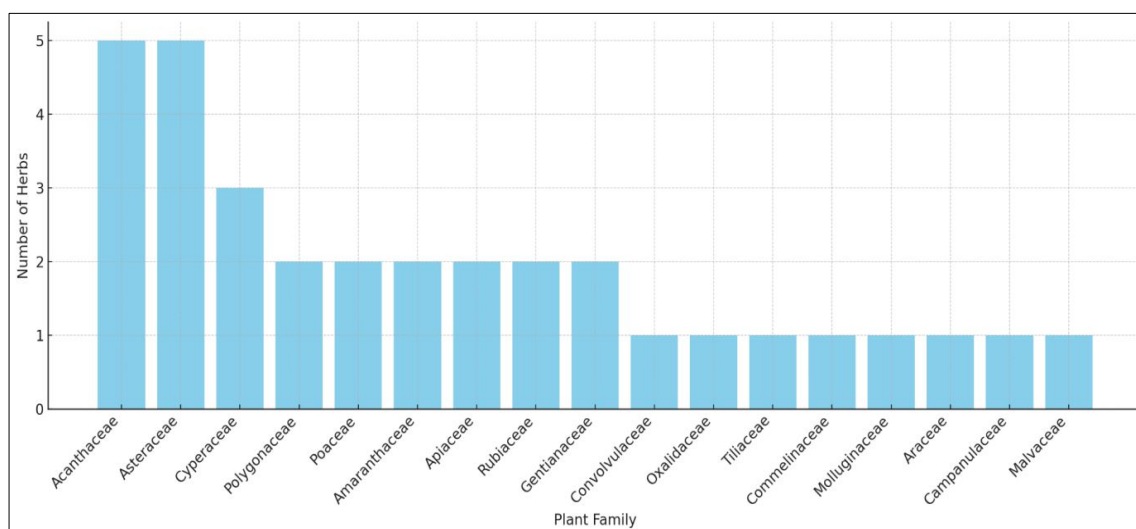
Graph 1: Families of plants with total number of plant species

Floristic composition analysis conducted in Suryamal, Deharje and Khodala village of Mokhada region of Palghar revealed the presence of total of 90 species belonging to 72 genera and 39 plant families comprising herbs, shrubs and trees, showcasing its rich botanical diversity (Graph 1). This distribution pattern reflects a mix of dominant vegetation alongside rare or habitat-specific plant groups, underlining the ecological significance of Mokhada's flora. Leguminosae and Asteraceae were the most dominant

families, each with 8 species whereas, nineteen plant families, such as Sabiaceae, Anacardiaceae, Phyllanthaceae, Dipterocarpaceae, Moringaceae, Lythraceae, Myrtaceae, Ericaceae, Capparaceae, Asclepiadaceae, Vitaceae, Asparagaceae, Convolvulaceae, Oxalidaceae, Tiliaceae, Commelinaceae, Molluginaceae, Araceae and Campanulaceae, represented single species each. The graph indicates a high diversity of plant families, but with most families having low species representation (Graph 1).

Table 1: List of Herb species with their family and IUCN status

Sr. No.	Name of the species (Herbs)	Family	IUCN Status ^[12, 13]
1	<i>Ipomoea marginata</i> Burm.f.	Convolvulaceae	Not Evaluated
2	<i>Oxalis corniculata</i> L.	Oxalidaceae	Not Evaluated
3	<i>Polygonum glabrum</i> Willd.	Polygonaceae	Not Evaluated
4	<i>Pogonatherum crinitum</i> (Thunb.) Kunth	Poaceae	Not Evaluated
5	<i>Hygrophila auriculata</i> (Schumach.) Heine	Acanthaceae	Not Evaluated
6	<i>Polygonum flaccidum</i> (R.Br.) K.L.Wilson	Polygonaceae	Not Evaluated
7	<i>Alternanthera sessilis</i> L.	Amaranthaceae	Least Concern
8	<i>Rungia pectinata</i> (L.) Nees	Acanthaceae	Not Evaluated
9	<i>Pimpinella adscendens</i> Dalzell	Apiaceae	Not Evaluated
10	<i>Spermacoce pusilla</i> Wall.	Rubiaceae	Not Evaluated
11	<i>Canscora pauciflora</i> Dalzell	Gentianaceae	Not Evaluated
12	<i>Gomphrena globosa</i> L.	Amaranthaceae	Not Evaluated
13	<i>Hygrophila polysperma</i> (Roxb.) T.Anderson	Acanthaceae	Not Evaluated
14	<i>Blumea eriantha</i> DC.	Asteraceae	Not Evaluated
15	<i>Hygrophila serpyllum</i> (Nees) T.Anderson	Acanthaceae	Not Evaluated
16	<i>Sphaeranthus indicus</i> L.	Asteraceae	Not Evaluated
17	<i>Spilanthes calva</i> DC.	Asteraceae	Not Evaluated
18	<i>Oldenlandia herbacea</i> DC.	Rubiaceae	Not Evaluated
19	<i>Corchorus aestuans</i> L.	Tiliaceae	Not Evaluated
20	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob	Asteraceae	Not Evaluated
21	<i>Cyperus pilosus</i> Vahl	Cyperaceae	Not Evaluated
22	<i>Cyanotis benghalensis</i>	Commelinaceae	Not Evaluated
23	<i>Eryngium mexicanum</i> S.Watson	Apiaceae	Not Evaluated
24	<i>Fimbristylis argentea</i> (Rottb.) Vahl	Cyperaceae	Not Evaluated
25	<i>Mollugo pentaphylla</i> L.	Molluginaceae	Not Evaluated
26	<i>Arisaema amurense</i> Maxim.	Araceae	Not Evaluated
27	<i>Exacum bicolor</i> Roxb	Gentianaceae	Not Evaluated
28	<i>Lobelia nicotianifolia</i> Roth	Campanulaceae	Not Evaluated
29	<i>Saussurea obvallata</i> DC.	Asteraceae	Not Evaluated
30	<i>Sida acuta</i> Burm.f.	Malvaceae	Not Evaluated
31	<i>Kyllinga squamulata</i> Vahl	Cyperaceae	Not Evaluated
32	<i>Haplanthodes verticillata</i> (Roxb.) R.B.Majumdar	Acanthaceae	Not Evaluated
33	<i>Dendrocalamus strictus</i> (Roxb.) Nees	Poaceae	Not Evaluated



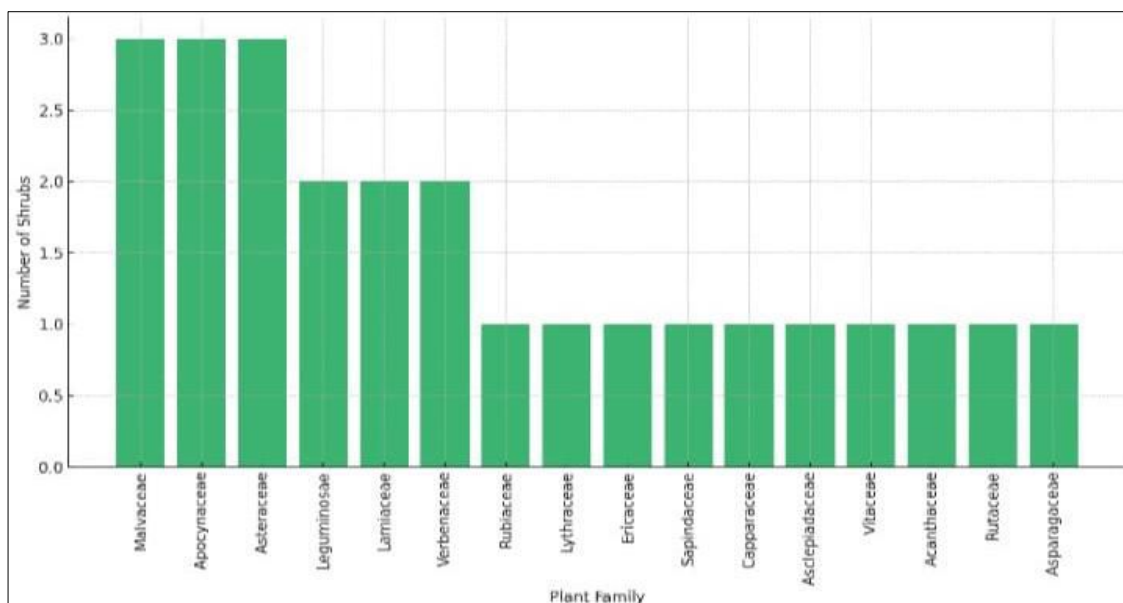
Graph 2: Families of plants with total number of herb species

Graph 2 reveals that Acanthaceae and Asteraceae exhibited highest number of herb species with each represented by five species. Eight families including Convolvulaceae,

Oxalidaceae, Tiliaceae, Commelinaceae, Molluginaceae, Araceae, Campanulaceae and Malvaceae showed single herb species (Table 1).

Table 2: List of Shrub species with their family and IUCN status

Sr. No.	Name of the species (Shrubs)	Family	IUCN Status ^[12, 13]
1	<i>Cassia tora</i> (L.) Roxb.	Leguminosae	Not Evaluated
2	<i>Urena lobata</i> L.	Malvaceae	Least Concern
3	<i>Thespesia lampas</i> (Cav.) Alef.	Malvaceae	Least Concern
4	<i>Holarrhena pubescens</i> Wall. ex G.Don	Apocynaceae	Least Concern
5	<i>Carissa carandas</i> L.	Apocynaceae	Not Evaluated
6	<i>Meyna laxiflora</i> Robyns	Rubiaceae	Not Evaluated
7	<i>Woodfordia fruticosa</i> L.	Lythraceae	Least Concern
8	<i>Rhododendron arboreum</i> Sm.	Ericaceae	Least Concern
9	<i>Wrightia tinctoria</i> (Roxb.) R.Br.	Apocynaceae	Least Concern
10	<i>Clerodendrum infortunatum</i> L.	Lamiaceae	Not Evaluated
11	<i>Dodonaea viscosa</i> Jacq.	Sapindaceae	Least Concern
12	<i>Capparis zeylanica</i> L.	Capparaceae	Not Evaluated
13	<i>Indigofera cassioides</i> Rottler ex DC.	Leguminosae	Not Evaluated
14	<i>Calotropis gigantea</i> L.	Asclepiadaceae	Not Evaluated
15	<i>Lantana camara</i> L.	Verbenaceae	Not Evaluated
16	<i>Premna serratifolia</i> L.	Lamiaceae	Least concern
17	<i>Leea indica</i> (Burm.f.) Merr.	Vitaceae	Least concern
18	<i>Vitex negundo</i> L.	Verbenaceae	Not Evaluated
19	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Not Evaluated
20	<i>Adhatoda vasica</i> Nees	Acanthaceae	Not Evaluated
21	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Asteraceae	Not Evaluated
22	<i>Murraya koenigii</i> L.	Rutaceae	Least concern
23	<i>Artemisia indica</i> Willd.	Asteraceae	Least concern
24	<i>Senecio vulgaris</i> L.	Asteraceae	Least concern
25	<i>Agave americana</i> L.	Asparagaceae	Not Evaluated



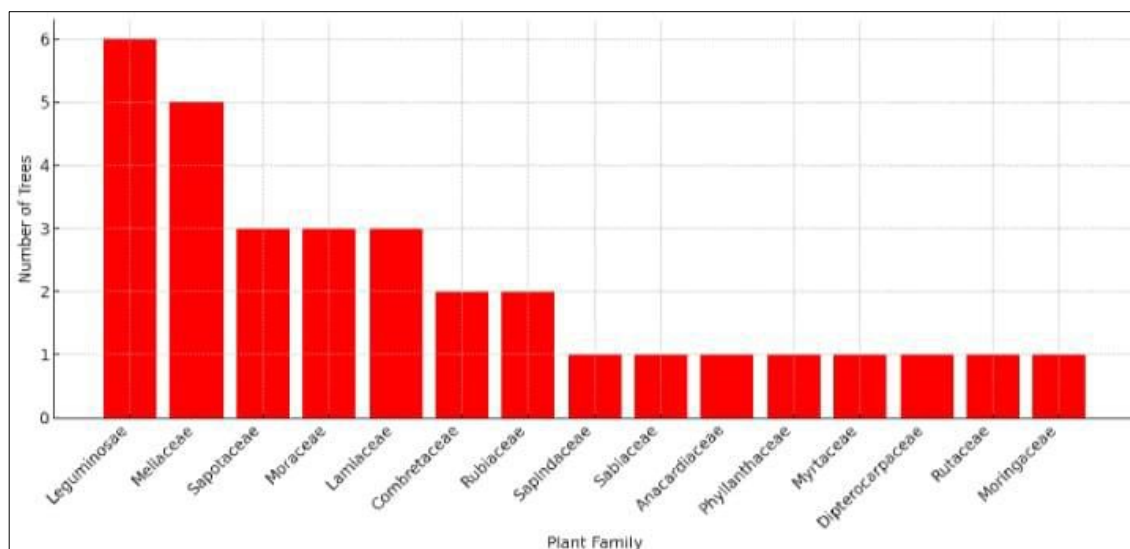
Graph 3: Families of plants with total number of shrub species

Malvaceae, Apocynaceae and Asteraceae recorded the highest number of shrub species with each having three species. Ten plant families including Rubiaceae, Lythraceae,

Ericaceae, Sapindaceae, Capparaceae, Asclepiadaceae, Vitaceae, Acanthaceae, Rutaceae and Asparagaceae were each represented by one shrub species (Graph 3) (Table 2).

Table 3: List of Tree species with their family and IUCN status

Sr. No.	Name of the species (Trees)	Family	IUCN Status ^[12, 13]
1	<i>Madhuca longifolia</i> (J.Koenig ex L.) J.F.Macbr.	Sapotaceae	Least Concern
2	<i>Terminalia tomentosa</i> Wight & Arn.	Combretaceae	Not Evaluated
3	<i>Schleichera oleosa</i> (Lour.) Merr.	Sapindaceae	Least Concern
4	<i>Ficus benjamina</i> L.	Moraceae	Least Concern
5	<i>Cassia fistula</i> L.	Leguminosae	Least Concern
6	<i>Tectona grandis</i> L.f.	Lamiaceae	Endangered
7	<i>Meliosma simplicifolia</i> (Roxb.) Walp	Sabiaceae	Not Evaluated
8	<i>Mangifera indica</i> L.	Anacardiaceae	Data Deficient
9	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Least Concern
10	<i>Ficus religiosa</i> L.	Moraceae	Least Concern
11	<i>Ficus benghalensis</i> L.	Moraceae	Not Evaluated
12	<i>Phyllanthus emblica</i> L.	Phyllanthaceae	Least Concern
13	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Least Concern
14	<i>Tectona grandis</i> L.f.	Lamiaceae	Not Evaluated
15	<i>Shorea robusta</i> Gaertn.	Dipterocarpaceae	Least Concern
16	<i>Butea monosperma</i> (Lam.) Taub.	Leguminosae	Least Concern
17	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Least Concern
18	<i>Albizia lebbek</i> (L.) Benth	Leguminosae	Least Concern
19	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Rubiaceae	Not Evaluated
20	<i>Aegle marmelos</i> (L.) Correa	Rutaceae	Near Threatened
21	<i>Moringa oleifera</i> Lam.	Moringaceae	Least Concern
22	<i>Erythrina variegata</i> L.	Leguminosae	Least Concern
23	<i>Madhuca aspera</i> H. J. Lam	Sapotaceae	Data Deficient
24	<i>Dalbergia latifolia</i> Roxb.	Leguminosae	Vulnerable
25	<i>Pongamia pinnata</i> L. (Pierre)	Leguminosae	Least Concern
26	<i>Madhuca betis</i> (Blanco) J.F.Macbr.	Sapotaceae	Vulnerable
27	<i>Cabralea canjerana</i> subsp. <i>polytricha</i> (A.Juss.) T.D.Penn.	Meliaceae	Least Concern
28	<i>Carapa guianensis</i> Aubl.	Meliaceae	Least Concern
29	<i>Xylocarpus granatum</i> J. Koenig	Meliaceae	Least Concern
30	<i>Xylocarpus moluccensis</i> (Lam.) M. Roem.	Meliaceae	Least Concern
31	<i>Mitragyna parvifolia</i> (Roxb.) Korth.	Rubiaceae	Least Concern
32	<i>Gmelina arborea</i> Roxb.	Lamiaceae	Least Concern



Graph 4: Families of plants with total number of tree species

Leguminosae showed the highest number of tree species, represented by eight species. Eight families including Sapindaceae, Sabiaceae, Anacardiaceae, Phyllanthaceae, Myrtaceae, Dipterocarpaceae, Rutaceae and Moringaceae comprised of single species each (Graph 4) (Table 3) (Figure 1). The biodiversity of the study area is essential for the preservation of native and endemic species. As per IUCN red list, *Tectona grandis* and *Aegle marmelos* recorded in the region have been described as an endangered and near threatened species respectively.

Conclusion

The present study highlights the botanical richness of Mokhada's ecosystem and contributes to baseline data for biodiversity conservation. Future studies on Mokhada's plant biodiversity should focus on documenting endemic and medicinal species while assessing ecological threats.

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