The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 3 | Issue 5 | May 2025
ISSN: 2583-973X (Online)
Website: www.theacademic.in

Survey of Ornamental Flora Diversity in Bhandara District, Maharashtra

Aakash A. Kohapare and Sanjay W. Patil
Department of Botany, Dr. Ambedkar College of Arts, Commerce & Science, Chandrapur (M.S.), India
**Corresponding Author Email: Kohapareaakash1234@gmail.com*

ARTICLE DETAILS

Research Paper

Accepted: 17-04-2025

Published: 10-05-2025

Keywords:

Plant diversity, Evapotranspiration, Soil microorganisms, Nutritional value.

ABSTRACT

The present study aims to document and analyse the diversity of ornamental plants cultivated across various gardens in Bhandara District, Maharashtra. Field surveys were conducted at multiple urban and rural locations, with particular focus on public parks, institutional landscapes, and private gardens. Data collection included plant identification using digital plant libraries, regional floras, and inputs from local horticulturists. Each species was recorded with its botanical and common names, morphological characteristics, habitat details, and ornamental value. Photographic documentation accompanied the observations to ensure accurate visual reference. a total of 28 plant families, comprising 59 individual plant species were recorded. The study highlights the rich diversity of ornamental flora in the district and underscores their ecological, aesthetic, and potential economic significance in enhancing urban and rural landscapes. Findings from this survey may serve as a useful reference for landscape planning, conservation efforts, and promotion of sustainable horticultural practices in the region.

DOI : https://doi.org/10.5281/zenodo.15642403

Introduction

Since the origin of life, plants have played a fundamental role in supporting human civilization by serving as sources of fuel, food, clothing, shelter, and medicinal compounds. They synthesize a wide array of chemical substances through complex metabolic pathways. These compounds may function as essential elements for plant growth or as secondary metabolites, some of which possess significant pharmacological

or nutritional value. While many plant species are cultivated for their floral attributes, ornamental value is often also derived from other morphological features such as foliage, fruit, stems, and bark. Ornamental plants encompass a wide range of aesthetically appealing features, including flowers, foliage, texture, fruits, and bark. These plants are primarily cultivated for decorative purposes, aiming to provide visual enjoyment to gardeners, visitors, and the general public, particularly within institutional and recreational settings. The term "ornamental trees" refers to tree species planted in gardens, parks, or landscape designs for their visual or structural appeal. Ornamental plants serve a vital role in the green industry and are widely used for landscaping in contexts such as recreational areas, conservation projects, and urban beautification. The green industry includes commercial nurseries, floriculture enterprises, park authorities, and organizations involved in roadside and landscape design, installation, and maintenance.

Ornamental plants also play a significant role in improving urban environmental quality. They contribute to air purification, regulate ambient temperature through evaporative cooling, and aid in the cycling and utilization of essential soil nutrients. By supporting the activity of beneficial soil microorganisms such as bacteria and fungi, these plants enhance soil health and fertility. Furthermore, the process of evapotranspiration from their leaves and other parts helps in reducing atmospheric heat, thereby mitigating potential health risks associated with urban heat islands.

Ornamental plants are plants selected for cultivation in a garden primarily because of their aesthetic values. Operators of such gardens may depend on its success for subsistence and income security. (Osawaru et al., 2014)

In the year 2021–22, approximately 283 thousand hectares of land in India were under cultivation for floriculture. During 2022–23, the country exported 21,024.41 metric tonnes of floriculture products, valued at ₹707.81 crores (USD 88.38 million). The major export destinations for Indian floriculture during this period included the United States, the Netherlands, the United Arab Emirates, the United Kingdom, Germany, and Malaysia.(*Floriculture | APEDA*, n.d.)

Material and methods

Bhandara district covers an area of 3,716.65 square kilometers, located between latitudes 20.39° to 21.38° and longitudes 79.27° to 80.42°. The urban sector occupies 49.34 square kilometers, while the rural sector spans 3,667.31 square kilometers. The district has a forest cover of 1,343.7 square kilometers. Bhandara

accounts for approximately 1.21% of the total geographical area of Maharashtra State. (*District Bhandara, Government of Maharashtra | The District of Ponds | India*, n.d.)

Various sites and localities across the Bhandara district were visited during the course of the investigation. The primary objective of the survey was to document ornamental flowering plants through systematic field observations. Data collection included detailed field notes and the identification of plant species using digital plant libraries, regional floras, and ethnobotanical knowledge obtained from local residents. Each species was recorded with its botanical and common names, locality, economic significance, and general morphological features. Photographic documentation of all flowering plants was also conducted to aid in verification and future reference.

Results

The present botanical survey recorded a total of 28 plant families, comprising 59 individual plant species. This reflects a moderate level of plant diversity within the surveyed area. The presence of multiple families with only one or two representative species suggests a wide ecological range, though limited representation in certain groups.

Among the recorded families, Apocynaceae emerged as the most dominant, contributing 7 individuals, which accounts for approximately 11.86% of the total flora. This dominance may be attributed to the family's adaptability to diverse environmental conditions and its prevalence in ornamental, medicinal, and wild flora. Asteraceae and Rubiaceae followed with 5 species each (approximately 8.47%), both known for their ecological versatility and widespread distribution.

Other notable families include Malvaceae (4 species), and Agavaceae, Euphorbiaceae, Nyctaginaceae, and Solanaceae, each with 3 species. These dominant families together represent more than 55% of the total plant count, indicating a concentration of diversity in a relatively small number of families. Such a pattern is common in ecosystems where certain families are better adapted or more extensively cultivated.

The remaining 20 families had only one or two species each, highlighting a presence of rare or less dominant taxa. This mix of common and rare families underscores the ecological richness of the area and may warrant further exploration to assess the conservation value of the habitat.

Overall, the dominance of a few families alongside a wide representation of others suggests a relatively balanced but specialized plant community structure. Future surveys could focus on species-level

identification, seasonal variation, and habitat-specific distribution to further understand the ecological dynamics of the surveyed area.

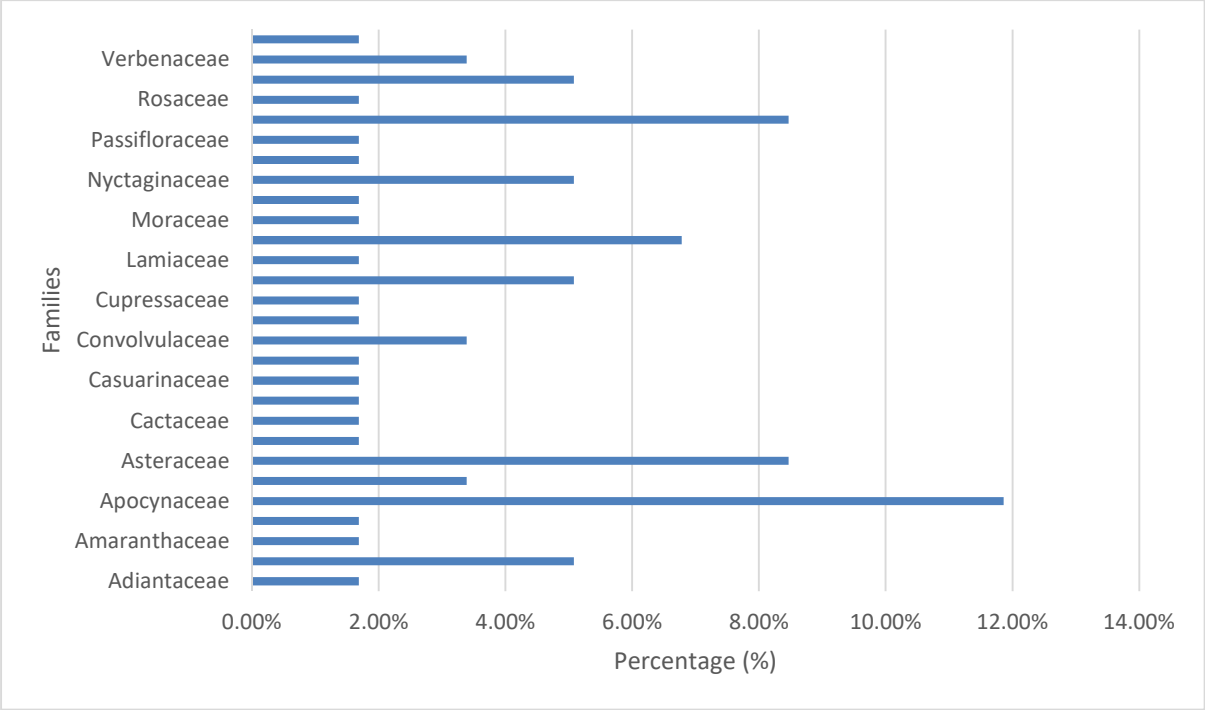
Table.1 plants identified in the study area are as :

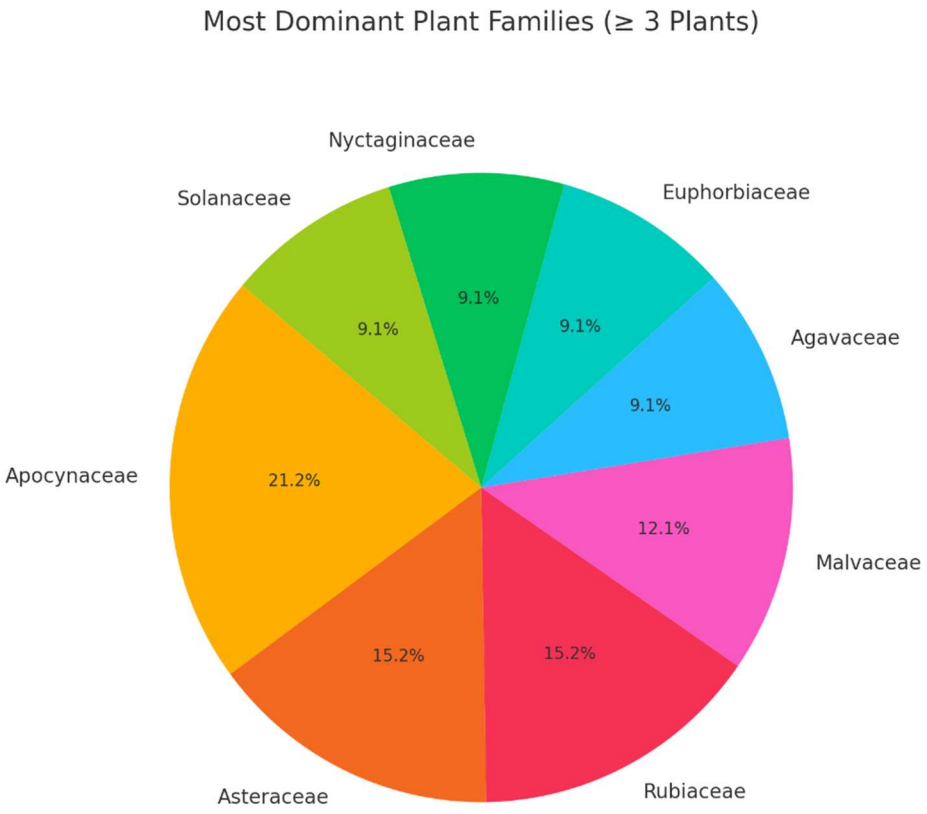
Sr No.	Family	Species	Habit
1	Adiantaceae	*Adiantum pedatum*	Fern
2	Agavaceae	*Agave vera, Dracaena sp., Furcraea foetida*	Monocot
3	Amaranthaceae	*Celosia argentea*	Dicot
4	Annonaceae	*Polyalthia longifolia*	Dicot
5	Apocynaceae	*Nerium indicum, Plumeria alba, Plumeria rubra, Tabernaemontana citrifolia, Tabernaemontana divaricata, Adenium obesum, Catharanthus roseus*	Shrub/Dicot
6	Arecaceae	*Cocos nucifera, Caryota mitis*	Monocot
7	Asteraceae	*Dahlia pinnata, Chrysanthemum indicum, Tagetes erecta, Dianthus chinensis, Cosmos bipinnatus*	Dicot
8	Bignoniaceae	*Tecoma stans*	Shrub/Dicot
9	Cactaceae	*Opuntia rhodantha*	Shrub/Dicot
10	Caesalpiniaceae	*Cassia fistula*	Dicot
11	Casuarinaceae	*Casuarina equisetafolia*	Tree/Shrub
12	Combretaceae	*Quisqualis indica*	Shrub/Dicot
13	Convolvulaceae	*Ipomoea alba, Ipomoea palmata*	Dicot
14	Crassulaceae	*Bryophyllum pinnatum*	Dicot
15	Cupressaceae	*Thuja sp.*	Tree
16	Euphorbiaceae	*Pedilanthus tithymaloides, Euphorbia milli, Acalypha wilkesiana*	Shrub/Dicot
17	Lamiaceae	*Coleus scutellariodes*	Shrub/Dicot
18	Malvaceae	*Hibiscus talbotii, Hibiscus rosa-sinensis, Hibiscus mutabilis, Alcea rosea*	Shrub/Dicot
19	Moraceae	*Ficus benjamina*	Tree/Shrub
20	Myrtaceae	*Lawsonia inermis*	Shrub/Dicot
21	Nyctaginaceae	*Bougainvillea spectabilis, Bougainvillea glabra, Bougainvillea buttiana*	Shrub/Dicot
22	Oleaceae	*Jasminium sambac*	Shrub/Dicot
23	Passifloraceae	*Passiflora sp.*	Shrub/Dicot
24	Rubiaceae	*Hamelia patens, Ixora alba, Mussaenda erythrophylla, Ixora coccinia*	Shrub/Dicot
25	Rosaceae	*Rosa sp.*	Shrub/Dicot

26	Solanaceae	*Petunia hybrida, Petunia axillaris, Cestrum nocturnum*	Shrub/Dicot
27	Verbenaceae	*Duranta erecta, Clerodendrum spendens*	Shrub/Dicot
28	Violaceae	*Viola tricolour*	Herb/Dicot

Table. 2: Dominant Families are as follows :

Sr	Family	Total Plants	% composition
1	Adiantaceae	1	1.69%
2	Agavaceae	3	5.08%
3	Amaranthaceae	1	1.69%
4	Annonaceae	1	1.69%
5	Apocynaceae	7	11.86%
6	Arecaceae	2	3.39%
7	Asteraceae	5	8.47%
8	Bignoniaceae	1	1.69%
9	Cactaceae	1	1.69%
10	Caesalpiniaceae	1	1.69%
11	Casuarinaceae	1	1.69%
12	Combretaceae	1	1.69%
13	Convolvulaceae	2	3.39%
14	Crassulaceae	1	1.69%
15	Cupressaceae	1	1.69%
16	Euphorbiaceae	3	5.08%
17	Lamiaceae	1	1.69%
18	Malvaceae	4	6.78%
19	Moraceae	1	1.69%
20	Myrtaceae	1	1.69%
21	Nyctaginaceae	3	5.08%
22	Oleaceae	1	1.69%
23	Passifloraceae	1	1.69%
24	Rubiaceae	5	8.47%
25	Rosaceae	1	1.69%
26	Solanaceae	3	5.08%
27	Verbenaceae	2	3.39%
28	Violaceae	1	1.69%


Verbenaceae
Rosaceae
Passifloraceae
Nyctaginaceae
Moraceae
Lamiaceae
Cupressaceae
Convolvulaceae
Casuarinaceae
Cactaceae
Asteraceae
Apocynaceae
Amaranthaceae
Adiantaceae
Families
0.00%
2.00%
4.00%
6.00%
8.00%
10.00%
12.00%
14.00%
Percentage (%)


Most Dominant Plant Families (≥ 3 Plants)
Nyctaginaceae
Solanaceae
Euphorbiaceae
Agavaceae
Malvaceae
Rubiaceae
Asteraceae
Apocynaceae
9.1%
9.1%
9.1%
9.1%
12.1%
15.2%
15.2%
21.2%

Discussion and conclusion

Ornamental plants are primarily cultivated for their stunning blooms, which serve as a major attraction in many gardens. These gardens often aim to feature a diverse range of flowering plants, ensuring continuous blooms throughout the year across all seasons—spring, summer, monsoon, and winter. The most commonly grown ornamental plants are chosen for their vibrant flowers, attractive foliage, unique shapes, pleasing fragrance, and striking morphological characteristics. These plants can be herbs, shrubs, trees, lianas, or creepers, and may thrive in both terrestrial and aquatic environments. They are often native to a variety of habitats, representing different ecosystems. Notable ornamental plants known for their exquisite beauty include *Polyalthia longifolia*, *Bougainvillea spectabilis*, *Duranta erecta*, *Jasminium sambac*, and *Hibiscus rosa-sinensis*.

Agavaceae exemplifies dual utility, being both an ornamental and a medicinal plant, traditionally used to treat jaundice and produce sugar-rich beverages with potential nutritional benefits. Celosia argentea demonstrates a broad pharmacological profile, including anti-diabetic, anti-cancer, anti-inflammatory, and wound healing properties (N et al., 2018).highlighting its potential as a source of therapeutic agents.

Similarly, *Polyalthia longifolia* (Annonaceae) is extensively used in traditional medicine for treating fever, skin diseases, and hypertension, among other ailments(Jothy L Subramanion et al., 2013) The Apocynaceae family members *Catharanthus roseus* and *Nerium indicum* are notable not only for their decorative use but also for treating dysentery, hypertension, scabies, and even envenomations, such as snake and scorpion bites.

Asteraceae members such as *Chrysanthemum indicum* and *Tagetes erecta* are valued in folk medicine for managing diabetes, obesity, and kidney disorders while enhancing immunity and vitality (Sharma et al., 2022), *Pedilanthus tithymaloides* and *Euphorbia milii* (Euphorbiaceae) are traditionally employed to treat a variety of ailments including skin infections, migraine, and intestinal parasites(Sharma et al., 2022) The Malvaceae family also plays a vital role in ethnomedicine, with several species used for treating respiratory issues, gastrointestinal disorders, and inflammatory conditions(Abat et al., 2017) Finally, *Ipomoea palmata* (Convolvulaceae) is another example of a multifunctional ornamental species, exhibiting strong antimicrobial, antioxidant, anti-inflammatory, and mosquito larvicidal activities(Kishore S, 2014).

The present study reveals that ornamental plants are not only valued for their aesthetic appeal or used to decorate homes, gardens, and parks, but are also utilized for medicinal purposes. The survey indicates that

people are well-informed about the various medicinal uses of ornamental plants. Some individuals even grow wild plants as ornamental species in their homes, carefully tending to them due to their medicinal properties. It is important to note that both rural and urban populations contribute to the conservation of biodiversity.

These findings emphasize the pharmacological significance of ornamental plants beyond their visual appeal, supporting their integration into ethnobotanical and pharmaceutical research. Further scientific validation and phytochemical studies are essential to isolate active compounds and understand their mechanisms, ensuring safe and effective use in modern medicine.

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