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## DIVERSITY AND ECOLOGICAL SIGNIFICANCE OF ROADSIDE FLORA IN AKOT, MAHARASHTRA: A COMPREHENSIVE SURVEY

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**\*Mr. Bharat R. Nagare**

Assistant Professor, Department of Botany, Shri Shivaji Arts, Commerce and Science  
College, Akot, Dist. Akola, Maharashtra.444101.

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**Article Received: 31 January 2026**

**\*Corresponding Author: Mr. Bharat R. Nagare**

**Article Revised: 20 February 2026**

Assistant Professor, Department of Botany, Shri Shivaji Arts, Commerce and  
Science College, Akot, Dist. Akola, Maharashtra.444101.

**Published on: 13 March 2026**

DOI: <https://doi-doi.org/101555/ijrpa.1513>

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### ABSTRACT

This study investigates the diversity and ecological significance of roadside plant species along a **20** km stretch from Akot to Bambarda Bk, Maharashtra. A total of **30** plant species, representing a variety of plant families and functional groups, were recorded and classified into medicinal, invasive, ornamental, and food categories. The research emphasizes the contribution of these species to biodiversity conservation, environmental stability, and ecosystem services such as soil stabilization and habitat support. Plant identification was carried out using botanical keys and herbarium specimens, with references to established floristic studies. The findings underscore the positive ecological roles of roadside vegetation, while also highlighting the challenges posed by invasive species, which threaten native biodiversity. This study provides valuable insights into the sustainable management and conservation of roadside vegetation in the region, offering strategies to mitigate the spread of invasive plants and enhance the ecological balance.

**KEYWORDS:** Roadside vegetation, floral diversity, Akot, Maharashtra, medicinal plants, invasive species, ecological conservation.

### 1. INTRODUCTION

Maharashtra, a biodiversity-rich state located in western India, is home to a diverse range of flora, including those that grow along roadsides. These plants contribute significantly to ecological balance and have long been utilized in traditional medicine for their therapeutic properties (Jain, 1991; Patole, 2014). The Akot region, part of the Akola district, experiences semi-arid climatic conditions that shape the composition of roadside vegetation in the area

(Singh & Roy, 2012). Numerous studies have highlighted the importance of roadside plants in India, emphasizing their medicinal, ecological, and economic value (Jain et al., 2006; Bhogaonkar & Devarkar, 2012; Patole, 2015).

The ecological role of roadside ecosystems is often underestimated, despite their significance in maintaining biodiversity. These ecosystems support a range of plant species, including medicinal herbs, ornamental plants, and invasive species, all of which contribute to the health and stability of the environment (Forman & Alexander, 1998). Roadside habitats also function as vital corridors for seed dispersal, promoting the establishment of unique ecological niches (Tikka et al., 2001). However, the spread of invasive species along roadsides poses a growing concern, as these non-native plants can disrupt local ecosystems and threaten native biodiversity (Richardson & Pyšek, 2006).

The Akot region of Maharashtra, as a part of the state's biodiversity hotspot, provides a unique setting for the study of roadside flora. Its semi-arid climate supports a distinct set of species, adapted to the local environmental conditions (Singh & Roy, 2012). Understanding the diversity and ecological roles of roadside plants in this region is essential for the development of effective conservation strategies and sustainable management practices. This study focuses on a 20 km stretch of roadside vegetation between Akot and Bambarda Bk, aiming to document the species diversity present and assess their ecological functions. The findings of this research will inform conservation efforts, aid in the management of invasive species, and contribute to the overall understanding of roadside ecosystems in the region.

## **2. MATERIALS AND METHODS**

### **2.1 Study Area**

The study was conducted along a **20 km** stretch from Akot to Bambarda Bk, in Akola district, Maharashtra. The first **5 km** is situated along **MH SH 194**, a state highway, while the remaining **15 km** comprises rural village roads. The region is characterized by a semi-arid climate, with a mix of agricultural land and urban areas. Roadside vegetation in the area consists of both native and non-native species.

### **2.2 Data Collection**

Systematic field surveys were conducted along selected roadside stretches from 05 August 2024 to 15 January 2025. Each plant species was carefully documented and identified using botanical keys and herbarium specimens. Taxonomic verification was carried out based on the works of Dhore & Joshi (1988), Kamble & Pradhan (1988), and Jaiswal & Verma (2010), which provide extensive

### 2.3 Data Analysis

The collected data were analyzed to determine the diversity and composition of plant species along the roadsides. Species were categorized based on their medicinal, invasive, ornamental, or other ecological roles. Descriptive statistics were employed to summarize species diversity.

## 3. RESULTS AND DISCUSSION

### 3.1 Floral Composition

A total of **30 plant species** were recorded in the study area, representing diverse plant families and functional groups. These species serve various ecological roles, including medicinal, ornamental, invasive, and food-producing categories.

The study identified several medicinally significant plants such as *Azadirachta indica* (Neem) and *Moringa oleifera* (Drumstick Tree), which are widely used in traditional medicine for their antibacterial, antifungal, and therapeutic properties. Additionally, invasive species like *Lantana camara* and *Xanthium strumarium* were noted, emphasizing the need for management strategies to control their spread (Richardson & Pyšek, 2006). The presence of ornamental and food plants further highlights the ecological and economic value of the region's flora.

The **recorded medicinal species align with previous ethnobotanical studies** (Bhogaonkar & Devarkar, 2012), reinforcing their significance in traditional healing practices. Additionally, the presence of invasive species underscores the importance of conservation efforts to maintain native

**Table 1: Plant Species Recorded in Akot Region.**

S.N.	Scientific Name	Common Name	Family	Category	Other Authentic Uses
1	<i>Hyptis suaveolens</i> (L.) Poit.	Bush Mint	Lamiaceae	Medicinal, Invasive	Used in perfumes, cosmetics, and aromatherapy.
2	<i>Lantana camara</i> L.	Lantana	Verbenaceae	Ornamental, Invasive	Has medicinal properties; used in traditional medicine.
3	<i>Senna tora</i> (L.) Roxb.	Sickle Senna	Fabaceae	Medicinal, Invasive	Seeds used as a coffee substitute; leaves used in medicine.
4	<i>Sida acuta</i> Burm.f.	Common Wireweed	Malvaceae	Medicinal, Invasive	Used in traditional medicine.

5	<i>Senna uniflora</i> (Mill.) H.S.Irwin & Barneby	Single-flowered Senna	Fabaceae	Ornamental, Invasive	Used in traditional medicine.
6	<i>Trichosanthes cucumerina</i> L.	Snake Gourd	Cucurbitaceae	Food	Fruits consumed as vegetables; used in medicine.
7	<i>Abutilon indicum</i> (L.) Sweet	Indian Mallow	Malvaceae	Medicinal	Used in traditional medicine.
8	<i>Setaria faberi</i>	Giant Foxtail	Poaceae	Other, Invasive	Considered a weed; seeds used as bird feed.
9	<i>Ipomoea triloba</i> L.	Littlebell	Convolvulaceae	Ornamental, Invasive	Has medicinal properties.
10	<i>Cuscuta campestris</i>	Field Dodder	Convolvulaceae	Other, Invasive	Parasitic plant; used in medicine.
11	<i>Ziziphus jujuba</i> Mill.	Jujube	Rhamnaceae	Food	Edible fruits; used in medicine.
12	<i>Abelmoschus manihot</i> (L.) Medik.	Sunset Hibiscus	Malvaceae	Ornamental	Used in medicine.
13	<i>Malachra capitata</i> (L.) L.	Malachra	Malvaceae	Medicinal, Invasive	Used in traditional medicine.
14	<i>Tephrosia purpurea</i> (L.) Pers.	Wild Indigo	Fabaceae	Medicinal	Used in traditional medicine.
15	<i>Achyranthes aspera</i> L.	Prickly Chaff Flower	Amaranthaceae	Medicinal	Used in traditional medicine.
16	<i>Clitoria ternatea</i> L.	Butterfly Pea	Fabaceae	Ornamental	Flowers used for natural coloring; medicinal.
17	<i>Mimosa hamata</i> Willd.	Spiny Sensitive Plant	Fabaceae	Ornamental	Used in traditional medicine.
18	<i>Corchorus olitorius</i> L.	Jute	Malvaceae	Food	Leaves consumed as vegetables; fiber production.
19	<i>Alternanthera sessilis</i> (L.) DC.	Sessile Joyweed	Amaranthaceae	Food, Invasive	Leaves consumed as vegetables; medicinal.
20	<i>Ipomoea hederifolia</i> L.	Scarlet Creeper	Convolvulaceae	Ornamental, Invasive	Has medicinal properties.
21	<i>Martynia annua</i> L.	Devil's Claw	Martyniaceae	Medicinal	Used in traditional medicine.
22	<i>Luffa aegyptiaca</i> Mill.	Sponge Gourd	Cucurbitaceae	Food	Fruits used as vegetables; sponges.
23	<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Medicinal	Wood used for timber; has

					pesticidal properties.
24	<i>Pongamia pinnata</i> (L.) Pierre	Indian Beech	Fabaceae	Medicinal	Wood used for fuel; seeds yield oil for lamps.
25	<i>Bauhinia purpurea</i> L.	Purple Bauhinia	Fabaceae	Ornamental	Used in traditional medicine.
26	<i>Acacia nilotica</i> (L.) Delile	Gum Arabic Tree	Fabaceae	Medicinal	Wood used for timber; produces gum arabic.
27	<i>Ailanthus excelsa</i> Roxb.	Tree of Heaven	Simaroubaceae	Medicinal, Invasive	Wood used for timber; medicinal uses.
28	<i>Senna auriculata</i> (L.) Roxb.	Tanner's Cassia	Fabaceae	Medicinal	Used in traditional medicine.
29	<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	Siamese Senna	Fabaceae	Ornamental	Wood used for timber.
30	<i>Moringa oleifera</i> Lam.	Drumstick Tree	Moringaceae	Food, Medicinal	Edible leaves, pods, and seeds; oil extraction; water purification.

### 3.2 Ecological Significance

The roadside vegetation along the Akot to Bambarda Bk stretch in Maharashtra plays a crucial role in maintaining ecological balance, supporting biodiversity, and providing ecosystem services. The documented plant species contribute to soil stabilization, erosion control, carbon sequestration, and habitat enrichment for various pollinators and fauna. Medicinal plants such as *Azadirachta indica* and *Moringa oleifera* not only support traditional healthcare systems but also enhance biodiversity by offering food and shelter for insects and birds.

However, the presence of invasive species like *Lantana camara*, *Senna tora*, and *Ailanthus excelsa* poses a significant ecological challenge. These species compete with native flora, alter soil composition, and threaten local biodiversity. The rapid spread of these invasives highlights the need for targeted management strategies to mitigate their impact on native ecosystems. Additionally, food plants such as *Ziziphus jujuba* and *Luffa aegyptiaca* support local communities by providing nutritional and economic benefits. The coexistence of various plant categories—medicinal, ornamental, invasive, and food—underscores the complex ecological interactions within roadside habitats. Sustainable vegetation management and conservation strategies are essential to preserving the ecological integrity of these roadside ecosystems.

#### 4. CONCLUSION

This study underscores the ecological and ethnobotanical importance of roadside vegetation in the Akot region of Maharashtra. The diverse plant species identified serve essential roles in traditional medicine, food production, and environmental sustainability. However, the presence of invasive species presents a growing threat to native biodiversity and ecosystem stability. Addressing this challenge requires proactive management efforts, including ecological restoration and community engagement in conservation initiatives.

Future research should focus on understanding the ecological interactions between native and invasive species, assessing their long-term impact on local flora and fauna. Implementing sustainable roadside vegetation management strategies will be critical in balancing ecological conservation with the practical needs of local communities. By fostering biodiversity-friendly approaches, we can enhance the resilience of roadside ecosystems while preserving their cultural and medicinal value.

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