Morphological Diversity Of Selected Grass Species From Akola District, Maharashtra, India

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Abstract
Grasses (family Poaceae) constitute an important component of natural and agricultural ecosystems and exhibit considerable morphological variation in response to environmental conditions. The present study focuses on the morphological diversity of selected grass species occurring in Akola District of Maharashtra, India. Field observations were carried out to document morphological characters such as habit, culm, leaf arrangement, leaf shape, ligule, inflorescence, spikelet characteristics, awns and other diagnostic features. Selected grass species were identified using standard taxonomic literature and their distinguishing morphological characters were compared. The study highlights the diversity of grass forms occurring in the region and emphasizes the importance of morphological characters for species identification and documentation. The findings provide useful baseline information for understanding the grass flora of Akola District and may contribute to biodiversity assessment, ecological studies and conservation planning.
***Keywords**: Poaceae, grasses, morphological diversity, morphology, species identification, Akola District, Maharashtra.*

1. Introduction

Akola District is one of the districts of Vidarbha, Maharashtra. It includes seven tahsils: Akola, Akot, Balapur, Patur, Murtizapur, Telhara and Barshitakli. The district has an area of about 5,428 km². It is surrounded by Amravati District to the north, Washim to the south, Buldhana to the west and parts of Amravati and Washim to the east. A major part of the district is a plain area, while hilly regions occur mainly in Akot and Patur tahsils. Several rivers and their tributaries cross the district, including the Purna, Wan, Katepurna, Morna, Uma and Shahnur. The district also has several large and small water bodies. The climate is generally hot and dry, and tropical dry deciduous vegetation occurs in the region.

In earlier times, when the human population was smaller and less land was under cultivation, large areas were covered with grasses. With increasing population, shrinking open land and growing numbers of cattle, greater attention to grasses has become necessary. Grass resources are threatened by overgrazing, expanding agriculture, excessive use of herbicides, mining, construction of dams, road widening, land clearing, and trampling by people and cattle. Development of grazing lands around villages and a reduction in excessive herbicide use are therefore important for maintaining grass resources.

Grasses play an important role in the life of humans and animals. The family Poaceae is of major economic and ecological importance. About 10,000–11,000 species belonging to nearly 700 genera occur in the world, while India has more than 1,200 species belonging to about 268 genera. Maharashtra has about 415 species belonging to 125 genera (Potdar et al., 2012). Grasses contribute to soil formation and stabilization, and many birds and animals depend on grassland habitats for food, shelter and completion of their life cycles (Gould, 1968).

Grasslands occupy a considerable part of the earth's vegetation. Grasses are widely distributed on all continents and occur under diverse climatic conditions, including cold and Arctic regions. A high proportion of grasses is also found in hilly regions and open habitats.

The present study was undertaken to examine the morphological diversity of selected grasses from Akola District, using floristic and taxonomic sources as the basis for identification and comparison.

2. Review of Literature

Regional floristic studies and works on Poaceae have contributed substantially to the documentation of grass diversity in Maharashtra and adjoining regions.

Hooker (1872–1897) described the grasses of British India in the *Flora of British India*, and Bor (1960) provided detailed taxonomic information on the grasses of Burma, Ceylon, India and

Pakistan, useful for the identification and comparison of grass taxa. Cooke (1958) documented the flowering plants, including grasses, of the former Bombay Presidency and provided useful floristic descriptions for the region. Gould (1968) discussed grass systematics and emphasized the importance of morphological characters in the classification and identification of Poaceae. Clayton and Renvoize (1986) dealt with the genera of grasses of the world.

Moulik (1997) presented detailed information on the grasses and bamboos of India, including morphological and taxonomic features useful for grass identification. Karthikeyan et al. (1989) provided an enumeration of Indian monocotyledons useful for understanding grass diversity. Potdar et al. (2012) documented the grasses of Maharashtra, providing a state-level account of grass diversity.

Kamble and Pradhan (1988) published the *Flora of Akola District, Maharashtra*, an important regional floristic reference for identification of plants occurring in Akola District. Floras of neighbouring districts and areas include those of Amravati (Dhore, 1986), Melghat Tiger Reserve (Dhore and Joshi, 1988), Buldhana (Diwakar and Sharma, 2000), Yavatmal (Karthikeyan and Kumar, 1993) and Washim (Deore and Bhogaonkar, 2023). Bhogaonkar and Devarkar (1999) reported additions to the flora of Melghat. Other floristic works from Maharashtra include those on Nashik (Lakshminarasimhan and Sharma, 1991), Gondia (Kahalkar, 2009) and Gadchiroli (Govekar, 2016), while Masatkar (2018) carried out morphotaxonomic studies of wild members of Poaceae from Amravati District.

3. Objectives

- To document selected grass species occurring in Akola District.
- To study and compare their important vegetative morphological characters.
- To examine reproductive characters, particularly inflorescence and spikelet morphology.
- To identify useful diagnostic characters for distinguishing the selected taxa.
- To contribute baseline information to the grass flora of Akola District.

4. Materials and Methods

4.1 Study Area

The study was conducted in selected localities of Akola District, Maharashtra, India. Akola District is situated in the Vidarbha region of Maharashtra and represents a predominantly agricultural landscape with cultivated fields, fallow lands, grazing areas, open spaces and wastelands. The district also has rivers and water bodies that provide varied habitats. The climate is generally hot and dry, with tropical dry deciduous vegetation in suitable areas. These conditions support the occurrence of annual and perennial grasses.

4.2 Field Survey

Field observations were carried out during the active growth and reproductive periods of the selected grass species. Representative plants were examined in their natural habitats and relevant morphological characters were recorded. Observations focused on vegetative and reproductive characters useful for comparison and identification.

4.3 Identification

Identification was carried out using standard taxonomic and floristic literature, particularly the *Flora of Akola District* (Kamble and Pradhan, 1988). The observed morphological characters were compared with descriptions in the relevant literature. Reproductive characters, especially inflorescence and spikelet structure, were given particular emphasis in distinguishing closely related taxa.

5. Results

The morphological examination revealed considerable variation among the five selected grass taxa (Table 1). Both vegetative and reproductive characters showed differences that were useful for comparative identification.

The five grass taxa studied were:

- *Cynodon dactylon* (L.) Pers.
- *Digitaria ciliaris* (Retz.) Koeler
- *Themeda laxa* (Andersson) A. Camus
- *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.
- *Cymbopogon martini* (Roxb.) W. Watson

Table 1. Comparative morphological characters of selected grass species from Akola District

Sr. No.	Species	Habit	Culm	Leaf blade	Ligule	Inflorescence
1	*Cynodon dactylon*	Perennial	Slender, branched; rooting at nodes	Linear, narrow	Membranous, hairy	Digitate
2	*Digitaria ciliaris*	Annual	Slender, erect to ascending	Linear-lanceolate	Membranous, short	Digitate
3	*Themeda laxa*	Perennial	Erect, robust	Linear, narrow	Membranous	Panicle
4	*Heteropogon contortus*	Perennial	Erect, slender	Linear, narrow	Membranous	Racemose
5	*Cymbopogon martini*	Perennial	Erect, robust	Long, linear	Membranous	Panicle

6. Discussion

The present study indicates that the selected grass species of Akola District possess distinct morphological characteristics that can be used for identification and comparative analysis. The observed differences in growth habit, culm structure, leaf morphology and reproductive features demonstrate the morphological diversity present within the selected members of Poaceae.

The comparative characters presented in Table 1 show differences in habit, culm, leaf blade, ligule and inflorescence among the five taxa. Reproductive features, particularly inflorescence and spikelet characters, provide useful diagnostic information for distinguishing the selected grasses.

7. Conclusion

The present investigation highlights the morphological diversity of selected grass species occurring in Akola District, Maharashtra. Five taxa, namely *Cynodon dactylon*, *Digitaria ciliaris*, *Themeda laxa*, *Heteropogon contortus* and *Cymbopogon martini*, were compared on the basis of important vegetative and reproductive characters.

Clear differences were observed in growth habit, culm structure, leaf morphology, ligule, inflorescence and awn characteristics. Among these characters, reproductive features such as inflorescence architecture and awn morphology were particularly valuable for distinguishing the selected taxa. The study therefore provides baseline morphological information useful for identification and documentation of selected grasses of Akola District.

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