

Screening and inventory of eco-morphological characters of different grasses present in University of Kota, Kota (Raj)

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Abstract

The Present study documented the diversity and ecomorphological characters of different grasses found in university campus of Kota, Kota. The Floristic surveys conducted in May to July 2026. Species were evaluated based on different morphological characters, life span and palatability, which are key indicators of rocky grassland. Total 10 Grass species of Family Poaceae were screened during the survey. Herbarium specimens of collected grasses were prepared to ensure taxonomic identification and future references. The dominance of palatable and perennial grasses suggests that among all grass species present in campus *Cyanodon dactylon* was dominant in all places followed by *Chloris virgata* and *Eragrostis tenella*, some areas of campus naturally supported few grass species and formed it productive and ecologically balanced ecosystem along with native rocky land habitat.

Keywords: Grasses, morphology, habit, inflorescence, ecology

Introduction

Angiospermic plants are the main component of the Earth. In which grasses belonging to monocotyledonous class are the typical plants of the ecosystem. Grasses are the best genera of plants kingdom, both economically and ecologically. Grasses are chosen for a variety of uses such as food, fiber and fodder. Some cultivated grasses used to make chapattis from wheat flour and consumed in both northern and southern India. While in many regions of the world, rice is a staple food. In addition, *Saccharum*, the source of sugar and fibre, is another commercially valuable type of grass (Agrawal *et al.*, 2020). Along with this several wild grasses are also utilised in form of fodder for grazing purpose of livestock. In India, livestock are essential to

agricultural expansion, environmental and nutritional security, and sustainable living. Because they provide milk, butter, meat, eggs, hides, skin, wool, and dung, livestock play a significant part in producing economic income (Bhorade *et al.*, 2023). Besides, grasses have various important ecological benefits such as restoration of plant communities, maintenance of biodiversity, landscaping, erosion control etc. (Dave, 2011). In present study some wild and cultivated grasses were collected from University of Kota, Kota campus and identified from their ecomorphological features. These grasses provide good landscaping, greenery and might be helpful in erosion control.



A



B



C



Collected grass species: A: *Chloris barbata*, B: *Chloris virgate*, C: *Cyanodon dactylon*, D: *Digitaria ciliaris*, E: *Echinochloa colona*, F: *Eragrostis cylindrifolia*, *E. tenella*, G: *Panicum sellowii*, H: *Panicum repens*, I: *Setaria pumilla*

Material and Methods

Study site- The Kota city is situated along the eastern bank of Chambal River it is the part of hadoti plateau has fertile black soil with natural deciduous vegetation. The climate is moderate to semi-arid in this area with the average rainfall, the temperature varies between 38°C to 40°C in hottest month, 5 to 8 cm coldest month. The University of Kota is situated in the southern part of Kota city. It was established in 2002 in a rocky terrain with natural water-filled ditches with very thin layers of soil deposits, with very less vegetation cover specially some herb and very few shrubs and trees such as *Cassia spp*, *Tephrosia spp*, *Acyranthus spp*, *Euphorbia spp* and *Ziziphus spp* *Dalbergia sisso*, *Terminalia arjuna*, *Anogeissus pedula*, *Butea monospermic*, *Pongamia pinnata*, etc. The administration emphasizes more on developing grasslands in the campus time to time to conserve the soil cover and enhance the esthetic beauty of the campus such as Samvidhan Park

And small grassland patches in and around every building of the campus. The present study is based on field observation, surveys and collection of sample different grass species including wild and cultivated both.

Grass species were surveyed in campus of university of Kota, Kota, Rajasthan, from May- July 2026 using sampling method. Species were recorded whenever encountered during repeated field visits conducted time to time. The plants were identified by using standard monograph and flora (Sharma, 2002). Representative specimens of selected species were collected and processed following standard herbarium preparation techniques. Herbarium specimens were preserved for taxonomic verification and future reference. Species identification was based on morphological characters and confirmed using standard regional floras (Shetty and Singh, 1991; Sharma, 2002) and Recorded species were categorized according to Morphological characters, life span (annual or perennial) and palatability, and the data were analyzed using descriptive statistics.



Fig 1: A, B, C: Study area site University of Kota campus

Table 1: List of grass species including identification, occurrence and Forage characteristics

S.No	Botanical Name	Vernacular Name	Habit	Status of Occurrence	Palatability	Vegetative Character
1.	<i>Echinochloa colona</i>	Barnyard grass	Annual	Frequent	Palatable	Tuft
2	<i>Chloris barbata</i>	Swollen finger grass	Perennial	Frequent	Palatable	Tuft
3	<i>Eragrostis cylindrifolia</i>	Love grass	Annual	Frequent	Palatable	Tuft
4	<i>Eragrostis tenella</i>	Japanese love grass	Annual	Frequent	Highly Palatable	Tuft
5.	<i>Cyanodon dactylon</i>	Doob grass, lawn grass,Barmuda	Perennial	Frequent	Highly Palatable	Stoloniferous
6.	<i>Digitaria ciliaris</i>	Wild crab grass	Annual	Frequent	Palatable	Tuft or mat
7.	<i>Panicum sellowii</i>	Panic grass	Perennial	Rare	Palatable	Rhizomatous
8	<i>Setaria pulmilla</i>	Yellow bristle grass	Annual	Frequent	Palatable	Rhizomatous
9	<i>Chloris virgata</i>	Feather finger grass	Annual	Frequent	Palatable	Tuft
10	<i>Panicum repens</i>	Torpedo grass	Perennial	Rare	Palatable	Stoloniferous

Table 2: Vegetative and Floral morphological characteristics of selected grass species in study site

S.No	Botanical Name	Grass height (cm)	Internode length in (cm)	Node colour	Leaf shape	Leaf length (cm)	Leaf sheath	Leaf tip	Ligule	Inflorescence	Spike colour	Spike length (cm)	Awned
1	<i>Echinocloa colona</i>	20-40	8	Red	Linear	8	Closed	Acute	Purple brown band	Panicle of Raceme	Red	1	Absent
2	<i>Chloris barbata</i>	22	16	Black	Linear	14	Closed	Acute	Membranous	Digitate	Black	8	Present
3	<i>Eragrostis cylindrifolia</i>	30	3	Black	Oblong	3-15	Rolled	Acute	Ciliate	Ramified	Green	4	Absent
4	<i>Eragrostis tenulla</i>	15	8	Brown	Linear	3-8	Closed	Acute	Inconspicuous	Ramified	Brown	0.2	Absent
5	<i>Cynodon dactylon</i>	15	3.5	Black	Linear	2	Closed	Acute	Rim of white hair	Digitate	Green	2	Present
6	<i>Digitaria ciliaris</i>	12	5	Green	Linear - lanceolate	5-6	Open	Acuminate	Membranous	Raceme (sub-digitate)	Green	9	Absent
7	<i>Panicum sellowii</i>	150	4-5	White	Lanceolate-ovate	5	Closed	Acute	Membranous	Open panicle	Green	8	Absent
8	<i>Setaria pumilla</i>	20-70	10	Brown	Linear	11	Open	Acute	Ciliate	Panicle	Green	6	Present
9	<i>Chloris virgata</i>	15-100	12	Black	Linear	8	Closed	Acute	Membranous	Digitate open panicle	Green	6	Present
10	<i>Panicum repens</i>	32-100	15	Green	Linear	7-25	Open	Acute	Membranous	Panicle	Green	5-20	Absent

Result and Discussion

A total of Ten grass species (Table 1) belonging to the family Poaceae, were documented from university campus. Analysis of ecomorphological characters revealed distinct patterns in terms of rare to common, palatability and life span, reflecting the functional structure of the rocky landscape ecosystem. Total eight species of grasses were frequently available in campus, among them *Cynodon dactylon* and *Chloris virgate* were excessively abundant (Fig. 2) while remaining two species of grasses namely *Panicum sellowii* and *Panicum repens* were rare in occurrence.

In terms of life span, six are annual and four are perennial grasses. The perennial grasses contribute to long-term ecosystem stability through continuous ground cover, soil binding, and sustained biomass availability (Kumar and Bairwa, 2025). Annual grasses, on the other hand, play a crucial role in seasonal productivity by rapidly colonizing open spaces during the monsoon period and enhancing short-term forage availability.

Out of the total of ten recorded species, *Eragrostis tenulla* and *Cynodon dactylon* were highly palatable. The dominance of palatable grasses indicates a high-quality forage base capable of supporting herbivorous wildlife. Similarly, Dhudiya and Yadav, 2014 have also reported palatability significance of some *Panicum* species and *C. dactylon* for livestock animals. Although some grasses such are less preferred by grazers, their ecological significance cannot be overlooked. These species contribute to habitat heterogeneity, regulate grazing pressure on highly palatable species, and provide shelter and resources for insects and other microfauna. Unpalatable grasses are also known to

function as pioneer species in disturbed habitats and play an important role in ecological succession. (Kumar and Bairwa, 2025)

Along with this tufted mat like vegetative character was seen in *E. colona*, *C. barbata*, *E. cylindrifolia*, *E. tenulla*, *D. ciliaris* and *C. virgate* whereas *P. sellowii* and *S. pumilla* were rhizomatous and *C. dactylon* and *P. repens* were stoloniferous. Ligule are the key characteristic for morphological identification of different grasses; it is basically a small outgrowth at the junction on leaf sheath and blade it also provides information of evolutionary relationships among certain species (Szabo *et al.*, 2006), In present study significant variation was observed in all ten types of grass species such as *C. barbata*, *D. ciliaris*, *P. sellowii*, membranous ligule while *E. cylindrifolia*, *C. dactylon*, *S. pumilla* has ciliated ligule.

No variation was found in respect to leaf shape and leaf apex; leaf blade was generally linear and acute. Significant colour variation was observed in Node, of the different grass species found in study site, it is important identification feature in study of grass morphology, color ranges white, green, brown, red and black in different species of grasses as mentioned in the table 2.

Out of ten studied grasses only five grass species have panicle inflorescence, three have digitate and rest two ramified inflorescence (Fig. 3). Interestingly, awned inflorescence was also observed in four grass species such as *C. barbata*, *C. dactylon*, *S. pumilla* and *C. virgate*. These species are well known for their nutritional value, grazing tolerance, and adaptability to semi-arid climatic conditions, and their prevalence suggests favorable habitat conditions. (Rawat and Adhikari, 2015; Warne, 1982).

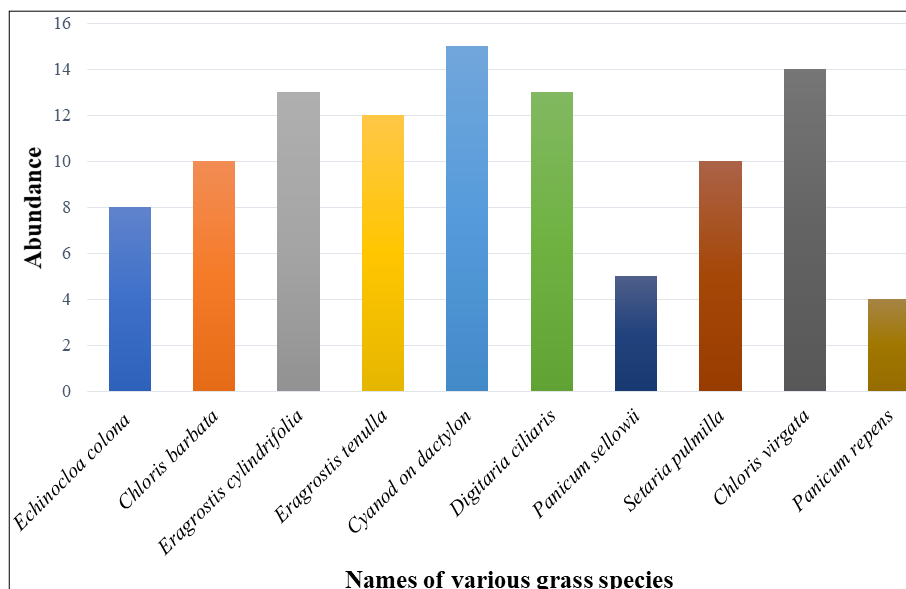


Fig 2: Abundance of various grass species found in University campus

The combined presence of palatable and unpalatable species, along with a balanced representation of annual and perennial life forms, indicates that the grassland ecosystem of university of Kota, Kota, is structurally diverse and functionally resilient. The preparation of herbarium specimens further strengthens the reliability of the inventory by ensuring accurate species identification and providing permanent reference material.

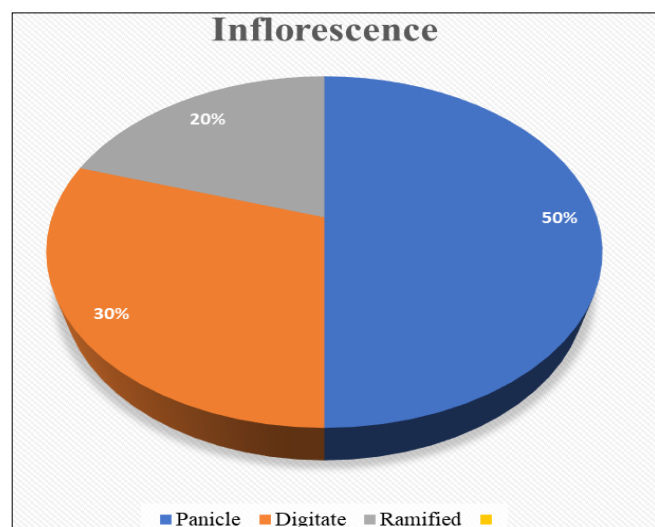


Fig 3: Percentage of various inflorescences observed in grass species

Conclusion

This study offers a detailed analysis of grass diversity and ecomorphological characteristics on a university campus. The prevalence of palatable and perennial grasses underscores the ecological stability and forage potential of the studied grasslands. The findings, corroborated by herbarium records, provide essential baseline data for grassland management, wildlife habitat enhancement, and conservation planning. It is recommended that ongoing monitoring and comprehensive studies on the seasonal biomass and nutritional properties of grasses be conducted to support long-term conservation strategies.

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