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# Evaluation of different turf grasses under Prayagraj agro-climatic conditions

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**Abstract**
The present investigation on "Evaluation of different turf grasses under prayagraj agro-climatic conditions" was conducted at Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology And Sciences, Prayagraj. The experiment was conducted in Randomized Block Design (RBD) with ten different turf grasses replicated thrice. The different turf grasses were procured from Division of Floriculture and Landscaping, IARI, Pusa, New Delhi. Different Turf grasses were *Cynodon dactylon* (Bermuda Hybrid Selection-1), *Zoyisa matrella* (Manilla grass), *Zoyisa japonica* (Mexican grass), *Cynodon dactylon* (Bermuda grass Tif-419), *Paspalum vaginatum* Swartz (Seashore paspalum, *Paspalum notatum* (Argentine Bahia grass), *Eremochloa ophiuroides* (Centipede grass), *Paspalum notatum* Flugge (Bahia grass), *Stenotaphrum secundatum* (Saint Augustine), *Dactyloctenium aegyptium* (Crowfoot grass). The results revealed that the Crowfoot grass was significantly most promising variety with respect to Days taken for establishment (10 days), Days taken for complete coverage (44 days), Frequency of mowing (22.22 days), Clipping yield (2.51 g/100cm$^2$), Recuperative ability (19.22 days), Longest root length (16.95 cm) was recorded in Bahia grass, Maximum root spread (40.07 cm) was recorded in Saint Augustine grass, Highest root biomass (2.22g/100cm$^2$) was recorded in Argentine Bahia grass, highest chlorophyll content (4.91 mg/g) was recorded in Bahia grass.

**Keywords:** turfgrasses, mowing, clipping yield, recuperative ability, visual appeal, root biomass

## Introduction
Members of the family Poaceae, grasses number 600 genera and 9000 species (Rademacher. 2003), out of which 20-25 species are used for turf production (Vengris, 1973). Lawn grasses are usually categorized as cool-season grasses and warm-season grasses (Carpenter *et al.*1975). Their utility is increasing with the emphasis on recreation, sports, outdoor living, urbanization and beautification. Lawn is called as "heart of the garden" and it adds beauty to landscape. It provides soft cushion to playgrounds in many types of games include baseball, football, golf, soccer, rugby and athletic fields. Turf grasses have a property of soil stabilization, as it has an interconnecting system of fibrous roots and aerial shoots which prevents soil erosion. It also provides cooling effect in warm weather. On roadside, it absorbs toxic emissions from vehicles. Along airport runways, it reduces dust and prolongs the engine life. One of the importance of installing natural turf is environmentally and carbon-friendly option. A lawn is an area where grass is grown as a green carpet for a landscape and is the basic feature of any garden. It serves to enhance the beauty of the garden, be it larger or smaller. Proper lawn maintenance plays a crucial part in any landscape design. A beautiful well-maintained lawn can make the entire landscape look good, whereas a lawn that is not maintained can completely ruin its beauty. The lawn not only harmonizes with a decor of the drawing room, but also sets of a suitable background for a specimen tree or a shrub, as well as for colorful beds and borders. The position of the lawn largely depends upon the layout of the garden in relation to the house. In general lawn should be wide open with access to direct sunshine, especially in front of a rockery and a water pool.

Lawn is an integral part of any landscape whose quality is determined by the management of the turf. Today the species have been defined and used as per the requirements e.g. turf species in golf courses may differ from cricket grounds or the species used only for ornamental purposes. Today, turf grass industry encompasses the development, production, and management of specialized grasses for utility, beautification, and recreational facilities. It involves science, development, and the creation and sale of turf grass products and services. According to Bertin and Weston, 2002, the lawn care industry is expanding and has annual associated revenues in excess of $ 1.5 billion in the USA. Currently in the USA, there are up to 30 million acres of maintained turf grass including lawns, parks, golf courses and highway right-of-ways.

The sport turf market includes golf courses (public and private), athletic fields (football, baseball and soccer) and other turf areas used for less common sports, including polo, lacrosse. Field hockey and rugby.

## Materials and Methods

The present studies entitled, "Evaluation of different turf grasses under Prayagraj agro-climatic conditions", were carried out at Department of Horticulture, Sam Higginbottom University of Agriculture Technology And Sciences, Prayagraj, during August, 2019 to March 2020. The ten different turf grasses were Bermuda Hybrid Selection-1, Manilla grass, Mexican grass, Bermuda grass Tif-419, Seashore paspalum, Argentine Bahia grass, Centipede grass, Bahia grass, Saint Augustine grass, Crowfoot grass. The observations recorded in the research were Days taken for establishment (Days), Days taken for complete coverage (Days), Mowing interval (Days), Clipping yield (g/100 cm²), Recuperative ability (Days), Root length (cm), Root spread (cm), Root biomass (g/100cm²), Total chlorophyll content (mg/g), Visual appeal of turf. The objective was to find the most suitable grass for growth and quality under prayagraj agro-climatic conditions. Planting materials were procured from Division of Floriculture and Landscaping, IARI, Pusa, New Delhi. The experiment was laid out in Randomized Block Design (RBD) with three replications.

## Results and Discussion

The ten different turf grasses in the present study exhibited a wide range of performances in terms of the data presented in Table 1 shows that the minimum number of days taken to establishment of grasses was observed in Crowfoot grass (10 days) followed by Bermuda grass Tif-419 (13 days) however, both Seashore paspalum and Bermuda grass Tif-419 statistically at par. Significantly the maximum days taken to establishment of grasses were observed in Saint Augustine grass (51 days).

Significantly the minimum number of days taken for complete coverage was observed in Crowfoot grass (44 days) followed by Seashore Paspalum (49 days), Bermuda Hybrid Selection-1 (49 days) and Bermuda grass var. Tif-419 (49 days). Whereas the maximum number of days taken for complete coverage was observed in Saint Augustine (151 days).

Among different turf grasses, highest mowing interval (22.22 days) was observed in Crowfoot grass followed by (23.55 days) Seashore paspalum however, Centipede grass is significantly at par and lowest mowing interval (34.22 days) was observed in Saint Augustine grass.

Significantly highest Clipping yield (3.34 g/100cm$^2$) was observed in Crowfoot grass fallowed by Bahia grass (2.92 g/100cm$^2$) and lowest Clipping yield (1.76 g/100cm$^2$) was observed in Mexican grass.

Significantly highest recuperative ability (19.22 days) was observed in Crowfoot grass fallowed by Seashore paspalum (20.67 days) however, Argentine Bahia grass is statistically at par and lowest recuperative ability (32.67 days) was observed in Saint Augustine. The longest root length was observed in Bahia grass (17.43 cm) followed by Saint Augustine (15.87 cm) however, Saint Augustine is statistically at par. Whereas non-significantly shortest root length was observed in Bermuda hybrid selection -1 (10.13 cm).

The maximum root spread was observed in Saint Augustine (40.07 cm) followed by Centipede grass (22 cm) however, Centipede grass is statistically at par. Whereas significantly minimum root spread was recorded in Argentine Bahia grass (12.76 cm). The maximum root biomass was recorded in Argentine Bahia grass (2.22 g/100cm$^2$) followed by Seashore Paspalum (1.96 g/100cm$^2$) however, Seashore paspalum is statistically at par. Whereas significantly minimum root biomass was recorded in Saint Augustine (1.11 g/100cm$^2$).

The highest chlorophyll content was observed in Bahia grass (4.91 mg/g) followed by Argentine Bahia grass (4.52 mg/g), however Argentine Bahia grass is statistically at par. Whereas significantly minimum chlorophyll content was observed in Mexican grass (2.30 mg/g).

Most pleasant colour among the different turf grasses were exhibited by Bermuda grass Var. Tif-419 (137-A), Seashore Paspalum (137-A) and Centipede grass (137-A). Least pleasant colour were exhibited by Crowfoot grass (141-A).

**Table 1:** The observations recorded in the research were Days taken for establishment (Days), Days taken for complete coverage (Days), Mowing interval (Days), Clipping yield (g/100 cm²), Recuperative ability (Days), Root length (cm), Root spread (cm), Root biomass (g/100cm²), Total chlorophyll content (mg/g), Visual appeal of turf (RHS colour chart).

| Varieties | Days taken for establishment (Days) | Days taken for complete coverage (Days) | Mowing interval (Days) | Clipping yield (g/100cm²) | Recuperative ability (Days) | Root length (cm) | Root spread (cm) | Root biomass (g/100cm²) | chlorophyll content (mg/g) | Visual appeal of turf |
|---|---|---|---|---|---|---|---|---|---|---|
| Bermuda Hybrid Selection-1 | 15 | 49 | 27.10 | 2.10 | 24.44 | 10.13 | 14.76 | 1.15 | 2.62 | 137A |
| Manilla grass | 15 | 55.33 | 26.88 | 1.93 | 24.56 | 12.83 | 18.66 | 1.45 | 2.57 | 137B |
| Mexican grass | 16 | 54.66 | 27.22 | 1.76 | 24.22 | 13.23 | 15.96 | 1.56 | 2.30 | 137B |
| Bermuda grass Tif-419 | 13 | 49 | 24.22 | 2.09 | 20.89 | 13.93 | 14.10 | 1.17 | 2.88 | 137A |
| Seashore paspalum | 13.6 | 49 | 23.55 | 2.54 | 20.67 | 11.10 | 18.76 | 1.96 | 2.82 | 137A |
| Argentine Bahia grass | 17 | 73 | 24.66 | 2.19 | 22.67 | 14.10 | 12.76 | 2.22 | 4.52 | 138A |
| Centipede grass | 14 | 57 | 25.22 | 2.56 | 22.22 | 13.40 | 22 | 1.88 | 3.47 | 137A |
| Bahia grass | 17 | 69 | 24.11 | 2.92 | 21.78 | 17.43 | 20.06 | 1.36 | 4.91 | 137B |
| Saint Augustine | 51 | 151 | 34.22 | 1.86 | 32.67 | 15.87 | 40.07 | 1.11 | 2.83 | 138B |
| Crowfoot grass | 10 | 44 | 22.22 | 3.34 | 19.22 | 14.90 | 15.5 | 1.15 | 4.24 | 141A |
| F-test | S | S | S | S | S | NS | S | S | S | |
| S.E. (m) | 0.558 | 0.529 | 1.04 | 0.07 | 1.24 | 1.79 | 2.46 | 0.076 | 0.218 | |
| $CD_{0.05}$ | 1.657 | 1.573 | 3.08 | 0.22 | 3.69 | 5.33 | 7.31 | 0.226 | 0.648 | |

## Conclusion

Based on findings of the experiment, it is concluded that under prayagraj agro-climatic conditions Crowfoot grass, Seashore paspalum which were graded as 'A' performed well with respect to days taken for establishment, days taken for complete coverage, frequency of mowing, clipping yield, recuperative ability and hence, could be recommended for lawn making. Bermuda grass Tif-419, Argentine Bahia grass

and Centipede grass were graded as ‘B’ and Saint Augustine was graded as ‘C’

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