

Short Communications

<https://doi.org/10.20546/ijcmas.2020.912.303>

Economic Analysis of Profitability in Turf Grasses for Different Methods of Planting

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ABSTRACT

Keywords

Mexican grass,
Bermuda grass, B:
C ratio, Net income

Article Info

Accepted:
18 November 2020
Available Online:
10 December 2020

The profit of turf (lawn) cultivation depends on method of establishment, maintenance and durability of grasses in the field. Among the treatments highest benefit to cost ratio was obtained with chemical weeded plots which were planted with Mexican grass by seed sowing at 5g/m² (4.16) and net income of Rs. 1519759, followed by hand weeded plots which were planted with Mexican grass by seed sowing at 5g/m² (4.03 and net income Rs. 1503759). Whereas, lowest B:C ratio was obtained with hand weeded plots planted with Bermuda grass var. ‘Tif dwarf’ by seed sowing method at 10 g/m² (2.72) and net income of Rs.1265759.

Introduction

United States turfgrass industry in 2002 generated total output (revenue) impacts of \$57.9 billion (Bn), employment impacts of 822,849 jobs, value added impacts of \$35.1 Bn, labor income of \$23.0 Bn, and \$2.4 Bn in indirect business taxes to local and state governments (John *et al.*, 2006). Turf grass industry is often known as “Hidden agriculture industry” because of its immense potential to create income and very less survey has been done on turf grasses (Janakiram *et al.*, 2015). An estimated 32,000

golf courses worldwide (approximately 25,600 km²), provide ecosystem goods, services and support as an industry contributing over \$124 billion globally (Roshini *et al.*, 2017).

Factors which affect the profit of lawn cultivation are its high cost of establishment and maintenance, like cost of mowing, rolling, aeration, de thatching etc. Among them cost of establishment is of prime importance. Weed management in an established lawn is very challenging due to dense cover of grasses and less scope of using

chemical herbicides. Hence use of pre-emergent herbicides and soil fumigants are preferred to apply before planting to prevent weed growth.

This experiment was carried out at Department of Floriculture and Landscape Architecture Kittur Rani Channamma College of Horticulture, Arabhavi, UHS, Bagalkot during 2018-2019. The experiment was laid out with three replications with net plot size of 3 m x 3 m by leaving a spacing of 0.5 m between plots.

Table 1 reflects the unit cost of all the materials used in the study. Digging (3 times) and double digging (1 time) was done (Total 12 male labors) before planting to bring the soil to fine tilt. Well decomposed Farm Yard Manure was brought from farm office of KRCCH Arabhavi campus and applied at 5 kg/m².

Total 45 kg of FYM was applied on each plot (1620 kg total), as a basal dose of fertilizer (5 labour 1 day), Chlorpyrifos (2.5 ml/L/ per meter square) was applied before planting as soil drenching for the control of termites and Phorate granules were broadcasted along the borders of the plot to control white ants entry in to the plots. Pre-emergent herbicide Dizomet 98 MZ (650 Rs. / Kg) was applied on the field at 50 g/m² (total 8.1 kg) rate (2 labors half day).

Among two genotypes studied seeds of *Cynodon dactylon* (Bermuda grass - 4000 Rs. /Kg) and *Zoysia japonica* (Mexican grass - 3000 Rs. /Kg) were collected from a nursery in Hospet taluk of Bellary district in Karnataka. Dibbles of *Cynodon dactylon* (750 Rs. /Bag) was collected from Pooja nursery in Bengaluru, Karnataka and stolons of *Zoysia japonica* (80 Rs. /m²) was collected from the nursery nearer to K.R.C.C.H, Arabhavi college.

Rooted slips of two turf grass species viz., *Cynodon dactylon* and *Zoysia japonica* planted at an escapement of about 10 – 15 cm apart on a leveled ground in Zig-Zag rows when the soil was wet after raining or irrigation (3 labors 1 day). It took 40 minutes for completing dibbling in one plot (10 m²) for a single person, likewise for 324 m² area it took around one full day for three labors. Seeds of both grasses were uniformly broadcasted on the field after mixing with sand at 8:1 ratio followed by sprinkling of soil up to one-centimeter thickness over the seeds (3 labors half day). Mowing (Cutting of grasses) was followed three times for seeded Bermuda grass and Mexican grass (5 labors 2 day) and one time for dibbled grass of both varieties (3 labour 1 day). Irrigation was given at alternate days (2 hours for 1 labor for each irrigation).

The benefit to cost ratio was worked out by using the following formula (Kothari *et al.*, 2006)

$$\text{B:C ratio} = \frac{\text{Gross income (Rs./ha)}}{\text{Cost of cultivation (Rs. /ha)}} \times 100$$

The cost of planting material (Table 2) was highest (Rs. 4,00,000) in Bermuda grass planted by seed sowing at 10 g/m² because of high cost of Bermuda grass seeds (Rs. 4000/ Kg). The treatment combinations which used Dizomet 98 MZ recorded lowest cost of cultivation (123241 Rs. /ha) due to less labour engagement due to controlled weed population. Cost of cultivation included total labour costs (250 Rs. / day) for, digging, FYM application, Dizomet application, planting, weeding, irrigation, mowing. Mexican grass seeds and dibbles costed less (3000 Rs for seeds and 80 Rs/m² for dibbles). By considering less time for planting and low cost of seeds made Mexican grass more profitable compared to all other methods.

Lawn establishment by dibbling is the costliest method compared to all other methods (Velmurugan *et al.*, 2012). Trenholm (2019) reported that seed sowing is the easiest

and most economical way to establish a lawn, but the Success depends on seed quality, proper seeding time, rate and method of seeding.

Table.1 Unit cost of all the materials used in the study

Sl. No.	Item	Mexican grass		Bermuda grass	
		Seeds (Rs.)	Dibbles (Rs.)	Seeds (Rs.)	Dibbles (Rs.)
1	Plant material (/Kg)	3000 /Kg	80 /m ²	4000 /Kg	750 /Bag
2	Transportation cost	1000	500	1000	1200
3	FYM (/ton)	1500 /ton	1500 /ton	1500 /ton	1500 /ton
4	Plant protection (/m ²)	50 /m ²	50 /m ²	50 /m ²	50 /m ²
5	Chemical weeding (Dizomet) (/Kg)	650 /Kg	650 /Kg	650 /Kg	650 /Kg
5	Labour cost	250 /labour	250 /labour	250 /labour	250 /labour

Table.2 Economics of lawn grasses influenced by weed management methods and method of planting

Treatments	Cost of planting material (Rs/ha)	Cost of herbicide (Rs/ha)	Cost of cultivation (Rs/ha)	Total cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C Ratio
W ₁ P ₁ T ₁	3,24,000	1,95,000	123,241	642,241	20,00,000	13,57,759	3.11
W ₁ P ₁ T ₂	4,00,000	1,95,000	123,241	718,241	20,00,000	12,81,759	2.78
W ₁ P ₂ T ₁	1,62,000	1,95,000	123,241	480,241	20,00,000	15,19,759	4.16
W ₁ P ₂ T ₂	2,00,000	1,95,000	123,241	518,241	20,00,000	14,81,759	3.85
W ₁ P ₃ T ₁	1,80,000	1,95,000	1,95,616	5,70,616	20,00,000	14,29,384	3.50
W ₁ P ₃ T ₂	1,65,000	1,95,000	1,95,616	5,55,616	20,00,000	14,44,384	3.59
W ₂ P ₁ T ₁	3,24,000	-	3,34,241	6,58,241	20,00,000	13,41,759	3.03
W ₂ P ₁ T ₂	4,00,000	-	3,34,241	7,34,241	20,00,000	12,65,759	2.72
W ₂ P ₂ T ₁	1,62,000	-	3,34,241	4,96,241	20,00,000	15,03,759	4.03
W ₂ P ₂ T ₂	2,00,000	-	3,34,241	5,34,241	20,00,000	14,65,759	3.74
W ₂ P ₃ T ₁	1,80,000	-	3,95,616	5,75,616	20,00,000	14,24,384	3.47
W ₂ P ₃ T ₂	1,65,000	-	3,95,616	5,60,616	20,00,000	14,39,384	3.56

*Turf grass selling rate @ Rs. 100 per m²

W₁ : Chemical weeding, W₂ : Hand weeding, P₁ : Seed sowing at 10 g/m², P₂ : Seed sowing at 5 g/m², P₃ : Stolon dibbling, T₁ : Mexican grass, T₂ : Bermuda grass

Mexican grass when planted at 5 g/m² shown less ground coverage due to poor germination of Mexican grass seeds, whereas, Bermuda grass recorded very good germination hence Bermuda grass can be planted even low seed rates like 3.5 g/m² or 2.5 g/m². Then Bermuda grass establishment through seed sowing can be the most profitable lawn establishment.

The initial costs of a prairie seeding are often a little higher but significant long-term savings result due to greatly reduced maintenance requirements. Seed cost per acre can vary from \$500 to \$1500 per acre. The cost per acre will be reduced significantly for larger projects of 10 acres or more (Neil, D., 2008).

The ratio of gross income and total cost of cultivation is expressed as Benefit to cost ratio. Grasses are marketed at 100 Rs. Per m² hence for 1-hectare area total gross income of Rs. 20,00,000 is obtained. When gross income is subtracted with total cost of cultivation net income is obtained which is also is an important parameter. Among the treatments highest benefit to cost ratio was obtained with chemical weeded plots which were planted with Mexican grass by seed sowing at 5g/m² (4.16) and net income of Rs. 1519759, followed by hand weeded plots which were planted with Mexican grass by seed sowing at 5g/m² (4.03 and net income Rs. 1503759). Whereas, lowest B:C ratio was obtained with hand weeded plots planted with Bermuda grass var. 'Tif dwarf' by seed sowing method at 10 g/m² (2.72) and net income of Rs. 1265759.

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How to cite this article:

Sithin Mathew, G. K. Seetharamu, B. C. Patil, M. Dileepkumar, S. B. Amruta, D. Satish and Mukund, S. 2020. Economic Analysis of Profitability in Turf Grasses for Different Methods of Planting. *Int.J.Curr.Microbiol.App.Sci.* 9(12): 2551-2554.
doi: <https://doi.org/10.20546/ijcmas.2020.912.303>