Bermudagrass Evaluation Trial in Italy

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Keywords: *Cynodon*, ground cover, quality, colour, cultivar comparison

Introduction

In the past decade, in many regions of Mediterranean Europe, bermudagrasses (*Cynodon* spp.) have increased in use for lawns, sport fields and golf courses. This is because the warm-season *Cynodon* species have superior drought resistance, dehydration avoidance, rooting depth, heat stress resistance and wear tolerance respect to the traditional cool-season turfgrasses. Thus, expanded use of bermudagrasses could play a key role in making turfs more environmentally friendly and sustainable. The first extensive experimental trial on warm-season turfgrasses in Europe was carried out in Rome in the years 1996-2000 (Croce et al., 2001) comparing 16 cultivars of *Cynodon*. The objective of this research was to evaluate the adaptation of standard Tifway versus new vegetatively propagated and seeded cultivars of *Cynodon* species for the Mediterranean area.

Materials and methods

A field trial was carried out from 2003 to 2006 at San Domenico Golf Club, Savelletri di Fasano (Brindisi, Italy) (40°51'N, 17°24'E). The native root zone was composed of 45.8 % sand, 30.0 % silt and 24.2 % clay. Soil pH was 7.8 and organic matter content 3.4 %. *Cynodon* L. C. Rich. entries were 4 seeded cultivars (Common, Princess 77, Riviera and Yukon) and 12 vegetatively propagated cultivars (Santa Ana, Tifdwarf, Tifway, Barazur, Tifsport, Tift 00-01, Tift 00-02, Tift 00-07, Tift 00-10, Tift 00-18, Tift 00-24 and Tift 00-27). Plot size was 3 m ×2 m with 4 replications and 0.5 m alleyways between the plots. Planting date: August 8, 2003 by seeding (15 g m^{-2} seed rate) or sprigging (2 litre m^{-2} sprig rate). Plots were covered with a germination blanket (20 g m^{-2} specific weight) for two weeks. Mowing height: 15 mm during establishment and 10 mm during maintenance. Fertilization (kg ha^{-1}): 300 N, 200 P_2O_5 and 250 K_2O from August to October 2003 and 300 N and 250 K_2O from April to October 2004. In both years the total amount was subdivided in four equal applications. Irrigation was applied as needed to encourage seed germination and sprig rooting and to prevent wilt after complete establishment. Invading weeds were hand removed during the establishment period. No verticutting and sand topdressing were carried out. Percentage of ground cover was assessed weekly from planting to complete plot cover; turf colour (9=dark green and 1=light green) and turf quality (9=best, 6=acceptable and 1=poorest) were assessed monthly from April to October 2004. Shoot density (one 25

cm^2 core sample per plot) and leaf blade width (20 fully expanded leaves per plot) were determined on September 12, 2004. All data were subject to ANOVA and LSD ($P \leq 0.05$) was used to detect differences between means.

Results

Data reported in this paper are ground cover at 63 Days After Planting (DAP) when full plot cover was first reached by some of the cultivars, 2004 mean of colour and quality observations, shoot density and leaf blade width as measured on September 12th, 2004.

Ground Cover. Seed propagated cultivars gave a more rapid ground cover compared to vegetatively propagated entries. 63 DAP the cultivars Common, Princess 77 and Riviera reached the complete ground cover (Tab.1), while ground cover of Yukon was only 88 %. Among vegetatively propagated cultivars Santa Ana and Tifway, were the fastest in establishment while the best performances among the recently developed cultivars were those of Tift 00-27 and Tift 00-24.

Colour. Among seed propagated entries, the newer cultivars showed a darker colour compared to the Common bermudagrass. All the vegetatively propagated entries scored higher values for colour compared to the seed propagated cultivars. The darkest colour was observed for Barazur (8.4).

Quality. 2004 mean quality of Common was low (5.4) and under the acceptable threshold, while values recorded for the other seed propagated cultivars fell in the range 6.8 - 7.3. All the vegetatively propagated cultivars reached a quality score higher than that of seed propagated ones with values ranging from 7.5 to 8.3.

Shoot density and *leaf blade width*. At the end of the 2004 growing season, shoot density of vegetatively propagated cultivars was higher than of seed propagated cultivars, with the only exception of Tifway showing a value (5.9 shoots cm^{-2}) similar to those of seeded cultivars. Common gave the least dense turf with 3.6 shoots cm^{-2}, while some of the best performing cultivars reached densities above 11 shoots cm^{-2}. Common and Barazur had the coarser texture with a leaf width of 1.5 and 1.8 mm respectively.

Discussion

Results of the first two years of the trial period showed a good establishment rate for seed propagated cultivars with the improved cultivars leading to better turf quality compared to Common.

The best vegetatively propagated cultivars show superior quality traits compared to seed propagated cultivars. Among the recently developed entries Tift 00-27 is the most similar to Tifway considered as a standard cultivar, while the general impression of the other tested cultivars, despite a good general quality, is negatively affected by their slow establishment rate.

Table 1. Comparative ground cover (%), turf colour (9=dark green, 1=light green), turf quality (9 = best, 6= acceptable turf and 1= poorest), shoot density and leaf blade width.

	Cultivar	Ground cover	Colour	Quality	Shoot density	Leaf blade width
		63 DAP[1]	2004 mean	2004 mean	2004 Sep. 12	2004 Sep. 12
		(%)	1-9 scale	1-9 scale	(shoots cm^{-2})	(mm)
Seed	Common	100	5.3	5.4	3.6	1.5
	Princess 77	99	7.0	7.1	6.6	1.4
	Riviera	100	6.8	6.8	6.7	1.3
	Yukon	88	6.8	7.3	5.1	1.4
Vegetative	Barazur	40	8.4	8.3	7.3	1.8
	Santa Ana	71	7.5	7.5	8.2	1.1
	Tifdwarf	30	7.8	7.8	9.4	1.2
	Tifsport	33	8.0	7.8	11.2	1.2
	Tifway	69	7.6	7.8	5.9	1.3
	Tift 00-01	9	7.8	8.0	11.9	1.1
	Tift 00-02	39	7.5	7.6	11.5	1.2
	Tift 00-07	9	8.0	8.3	13.6	1.1
	Tift 00-10	21	7.8	7.8	9.8	1.1
	Tift 00-18	21	7.9	7.8	10.7	1.2
	Tift 00-24	43	7.9	8.0	10.9	1.2
	Tift 00-27	56	7.4	7.5	7.6	1.3
	$LSD_{0.05}$	*21*	*0.4*	*0.4*	*2.7*	*0.2*

[1] Days After Planting

Acknowledgements

The authors wish to thank Dr. Wayne Hanna for providing the "Tift" cultivars used in this research.

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