

Kentucky Bluegrasses for Sports Turf

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Cultivar treatments as part of the 2000 National Turfgrass Evaluation Program (NTEP) Kentucky bluegrass test were evaluated for qualities important in athletic surfaces including wear tolerance and shear strength. Wear tolerance is the ability of the turf surface to tolerate the crushing and bruising injury that is the result of foot and vehicular traffic. Shear strength is the turf surface's ability to resistance lateral (shear) forces, which in turn provides good traction and footing for athletes. These qualities can be measured and assessed by imposing artificial wear using wear simulators and by measuring shear strength qualities using a shear vane apparatus. Such equipment was used during the 2002 and 2003 growing season to identify cultivars with superior shear strength and to select wear tolerant Kentucky bluegrass for use in intensely trafficked turf.

The NTEP trial consisted of 168 commercially available and experimental cultivars seeded to 3 ft x 6 ft plots in October 2000. Wear was simulated using a differential-slip wear machine fitted with metal soccer cleats. Seventy-five passes were imposed on the bluegrass plots over a four day period in late October (2002) and early November (2003). Plots were then rated for wear injury using a 1 to 9 rating scale (9=no injury or excellent wear tolerance). Additionally, shear measurements were made in both years in early September using an apparatus that measures the force required to tear (displace) the bluegrass sod. The experimental design was a randomized complete block with three replications. All plots received 2.5 lb N/1000 ft²/yr (0.75 lb N in late May and early September, 1.0 lb N in late November), no irrigation or fungicides, and were mowed at 1.25 in. Significant differences between cultivars were detected in wear tolerance and shear strength in both 2002 and 2003. There was little year-to-year variation in cultivar wear tolerance and shear strength measurements. Accordingly, wear tolerance and shear strength data were averaged over the 2-year evaluation period (2002-2003) and then converted to a categorical rating of excellent, good, fair, and poor.

Eleven cultivars were identified as having "excellent" wear tolerance while 15 cultivars were "excellent" in their shear strength qualities (Table 1). Twenty-five cultivars were reported to have "good" shear strength and as many as thirty-four entries were classified as having "good" wear tolerance. Overall, many cultivars were identified as having either good-to-excellent wear tolerance or shear strength. However, only 10 cultivars (5-commercially available and 5-experimental) were identified as having both superior (good-to-excellent) wear and shear strength. The five commercially available cultivars included 'Baritone', 'Bedazzled', 'Blackstone', 'Brooklawn', and 'Princeton 105'. No correlation (relationship) among cultivars in wear tolerance and shear strength was detected. Therefore, cultivars with "excellent" tolerance to wear were not associated with improved shear strength indicating that wear and shear are distinctly different characteristics both physiologically and morphologically. Only one cultivar out of 168 entries, the experimental entry 'NA-K991', combined excellence in both wear and shear strength.


These results strongly suggest the need for blending 2 or 3 bluegrass cultivars for maximum wear and shear strength qualities in order to maintain safe and durable sports turf surfaces. These wear tolerant bluegrasses should be selected for mixture in combination with improved perennial ryegrass. Perennial ryegrass is the only major cool-season grass which combines both superior wear and compaction tolerance, so mixtures of bluegrass and ryegrass provide sports turf with all the qualities critical for intensely trafficked turf (good wear, compaction, and recuperative potential). For a complete summary of NTEP data available from the University of Massachusetts such as turfgrass quality, disease resistance, genetic color, leaf texture as well as other relevant information, visit NTEP on line at the website <http://www.ntep.org/>. 

Table 1. Relative wear tolerance and shear strength (traction) in 168 cultivars of Kentucky bluegrass.

Cultivar	Wear	Shear	Cultivar	Wear	Shear	Cultivar	Wear	Shear
99AN-53	G†	G	BH 00-6003	P	G	Lily	F	F
A93-200	G	F	Blackstone	G	G	Limerick	F	F
A96-402	F	G	Blue Knight	F	F	Limousine	E	F
A96-427	F	E	Bodacious	F	G	Marquis	F	G
A96-451	P	F	Boomerang	F	F	Midnight	G	P
A96-739	F	F	Bordeaux	F	F	Misty	G	F
A96-742	F	F	Boutique	G	F	Moonlight	P	F
A97-1330	G	F	Brilliant	G	F	NA-K991	E	E
A97-1336	F	G	Brooklawn	G	G	NA-K992	F	E
A97-1409	F	F	Cabemet	F	E	North Star	F	F
A97-1432	E	F	Champagne	G	F	NuGlade	F	F
A97-1439	F	F	Chateau	F	F	Odyssey	F	F
A97-1449	F	F	Chelsea	F	F	Pick 113-3	F	G
A97-1567	F	F	Chicago II	F	P	Pick 417	F	F
A97-1715	G	E	Coventry	F	F	Pick 453	F	F
A97-857	E	F	CVB-20631	F	F	Pick-232	P	E
A98-1028	G	F	DLF 76-9032	F	F	Pp H 6366	G	F
A98-1275	F	E	DLF 76-9034	P	E	Pp H 7097	F	F
A98-139	F	F	DLF 76-9036	F	G	Pp H 7832	G	F
A98-183	F	F	DLF 76-9037	F	E	Pp H 7929	G	F
A98-296	P	P	Eagleton	F	F	Princeton 105	E	G
A98-304	F	E	Envicta	F	F	Pro Seeds-453	F	F
A98-365	F	F	Everest	F	G	PST-108-79	F	F
A98-407	G	F	Everglade	F	P	PST-161	F	F
A98-739	F	F	Fairfax	F	F	PST-1701	G	E
A98-881	F	G	Freedom II	F	F	PST-1BMY	F	F
Abbey	G	F	GO-9LM9	P	F	PST-1QG-27	G	F
Allure	P	F	Goldrush	E	F	PST-222	F	P
Alpine	G	F	H92-203	F	F	PST-604	F	F
Apollo	G	F	H92-558	G	G	PST-731	F	F
Arcadia	F	G	H94-293	G	F	PST-B3-170	F	P
Ascot	G	F	Hallmark	G	F	PST-B5-125	F	F
Award	F	F	HV 140	P	F	PST-B5-89	F	G
B3-171	F	E	HV 238	F	E	PST-H5-35	F	F
B3-185	F	F	IB7-308	G	F	PST-H6-150	E	F
B4-128A	E	F	Impact	F	F	PST-York Harbor 4	P	P
B5-144	F	F	J-1368	F	F	Quantum Leap	G	F
B5-43	F	F	J-1420	F	F	Rambo	G	F
B5-45	F	F	J-1513	F	P	Raven	F	G
Ba 00-6001	F	E	J-1515	F	F	Rita	F	F
Ba 81-058	P	F	J-1648	F	F	Rugby II	F	P
Ba 82-288	F	F	J-1665	F	F	Serene	F	G
Ba 83-113	F	F	J-1838	F	F	Shamrock	P	F
Ba 84-140	G	F	J-1880	F	P	Showcase	F	F
BAR Pp 0468	E	F	J-2487	F	G	SI A96-386	F	F
BAR Pp 0471	F	F	J-2561	F	F	Sonoma	G	F
BAR Pp 0566	F	G	J-2695	F	F	SRX 2114	F	F
BAR Pp 0573	G	F	J-2885	F	G	SRX 2284	F	F
Bariris	F	F	J-2890	G	F	SRX-2394	F	F
Baritone	E	G	Jefferson	F	F	SRX-26351	F	F
Baron	F	G	Jewel	F	F	SRX-27921	F	F
Baronie	E	F	Julia	G	F	Total Eclipse	F	F
Bartitia	F	E	Julius	F	F	Unique	F	F
Barzan	F	F	Kenblue	F	F	Washington	F	F
Bedazzled	G	G	Langara	P	P	Wellington	P	F
BH 00-6002	F	G	Liberator	F	F	Wildwood	F	F

† Relative tolerance to bruising injury (wear) and sod resistance to tearing (shear strength): E=excellent, G=good, F=fair, and P=poor. Results are a summary of data averaged over a 2-year period (2002 to 2003).

