Stolon Growth and Divot Recovery of Creeping Bentgrass Cultivars

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Objectives

The objectives of this research were to determine differences in lateral spread and recuperative potential of 24 cultivars of creeping bentgrass (*Agrostis stolonifera* L.) in mowed and non-mowed settings and to use growth analysis to identify differences in lateral spread. The results of this research would help turf managers select cultivars of creeping bentgrass to match specific site requirements.

Rationale for research

Creeping bentgrass creates a dense, high-quality playing surface and is commonly used for intensely managed turf areas on golf courses. Its popularity is partially due to its aggressive lateral growth which allows this species to recuperate in areas continuously subjected to damage from traffic and divots. A host of improved cultivars of creeping bentgrass have been released onto the market that possess improved agronomic characteristics such as vertical shoot growth, higher shoot densities, and narrower leaf blades.

While many believe these morphological characteristics create an improved playing surface there are questions about the ability of these improved varieties to spread laterally compared to older varieties such as 'Penncross'. While it is generally agreed that creeping bentgrass possesses relatively high recuperative potential, minimal research has focused on differences among cultivars of creeping bentgrass. The National Turfgrass Evaluation Program (NTEP) conducts variety trial for a wide range of turf species but evaluations typically do not include data regarding recuperative potential. Data of this nature would allow better cultivar selection for specific management regimes.

Methods

Twenty-four commercially available cultivars of creeping bentgrass were removed from established plots and transplanted into the center of a 1.0 by 1.0 m plot on June 1 (Image 1). Prior to transplant, the area was fumigated with Basamid in order to minimize weed competition. The plugs were irrigated to encourage establishment and were not subject to mowing. The second phase of the study involved creating simulated divots by removing a core of turf and soil from the same 24 cultivars with a cup cutter and backfilling the area with soil. No seed was added. The "divots" were simply allowed to grow and heal back in. The maintenance of the area was designed to simulate golf course fairway conditions. Plots were irrigated to prevent wilt and mowed two times weekly at 1.27 cm.

Digital images were taken bimonthly and semiweekly for the non-mowed and mowed plots, respectively. Lateral spread and recuperative potential of creeping bentgrass cultivars was quantified using digital image analysis (DIA) (Image 2).

Findings and Discussion

Stolon Growth. Differences among cultivars were observed for lateral spread ($p < 0.05$). Penncross had the fastest establishment rate and Bengal had the slowest (Figure 1). The cultivars SR 1150, Crenshaw, Imperial, Kingpin, L-93, MacKenzie, Crystal Bluelinks, Pennlinks II, Penn G-6, Putter, Memorial, Penn A-4, and Tyee all had establishment rates statistically similar to Penncross.

One factor influencing shoot density in creeping bentgrass is stolon internode length. Longer internodes usually yield faster growth rates and shorter internodes slower growth rates. Internode length was positively correlated with lateral spread in our study ($p = 0.0058$) (Figure 2). Therefore, the general trend was that grasses with longer internodes (lower shoot densities) spread faster than grasses with shorter internodes (higher shoot densities).

Divot Recovery. Differences among cultivars were observed for divot recovery rate ($p < 0.05$). Imperial had the fastest recovery rate and Alpha the slowest (Figure 3). The cultivars Penn G-6, Alister, SR 1150, Crystal Bluelinks, Southshore, Penncross, L-93, and Century all had divot recovery rates statistically similar to Imperial.

Image 1. The lateral spread of 24 different cultivars of creeping bentgrass was evaluated by transplanting established plugs into a fallow area. The plugs were allowed to grow and were rated throughout the season. An additional study which evaluated the divot recovery rate was conducted simultaneously.

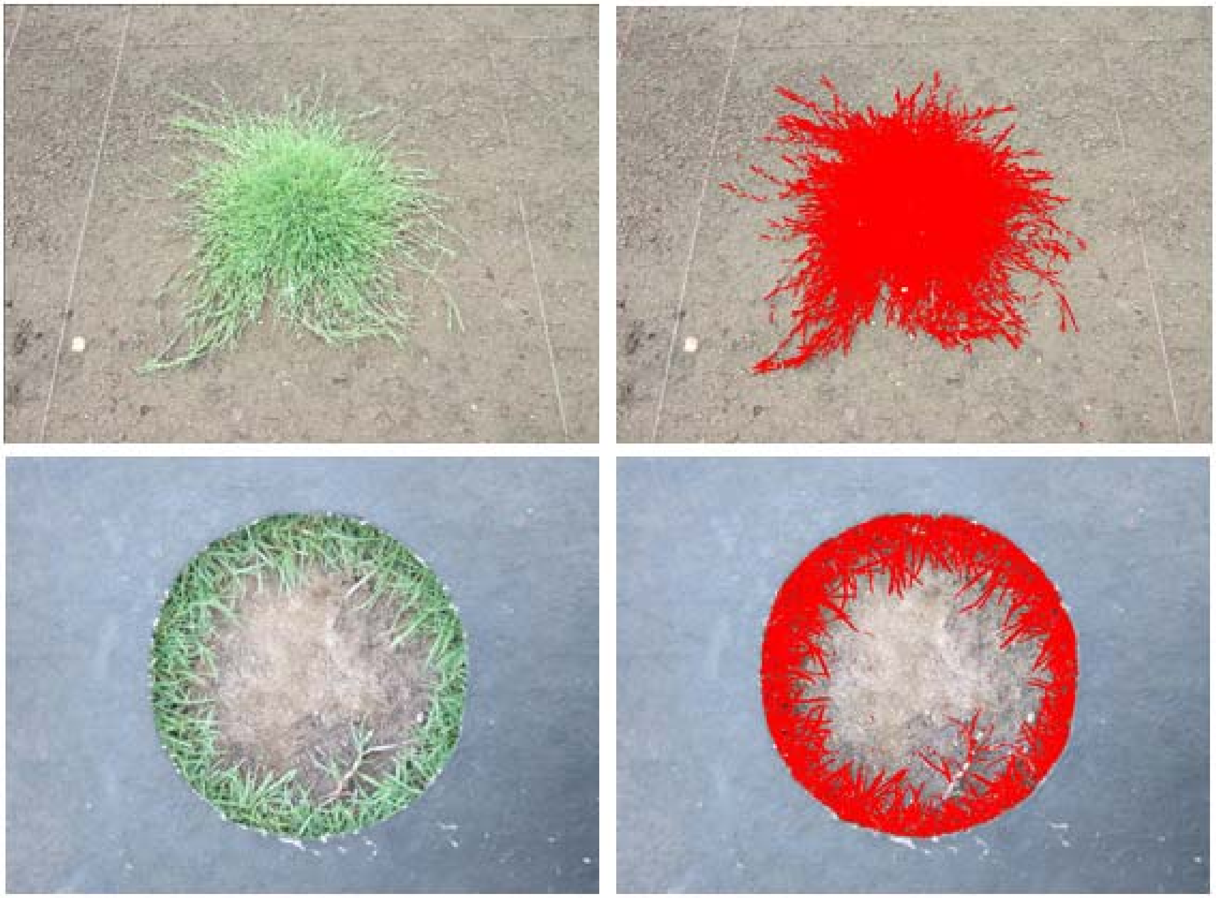

Image 2. A technique referred to as digital image analysis was used to evaluate the cultivars. Using DIA, a software package is able to quantify the coverage of turf.

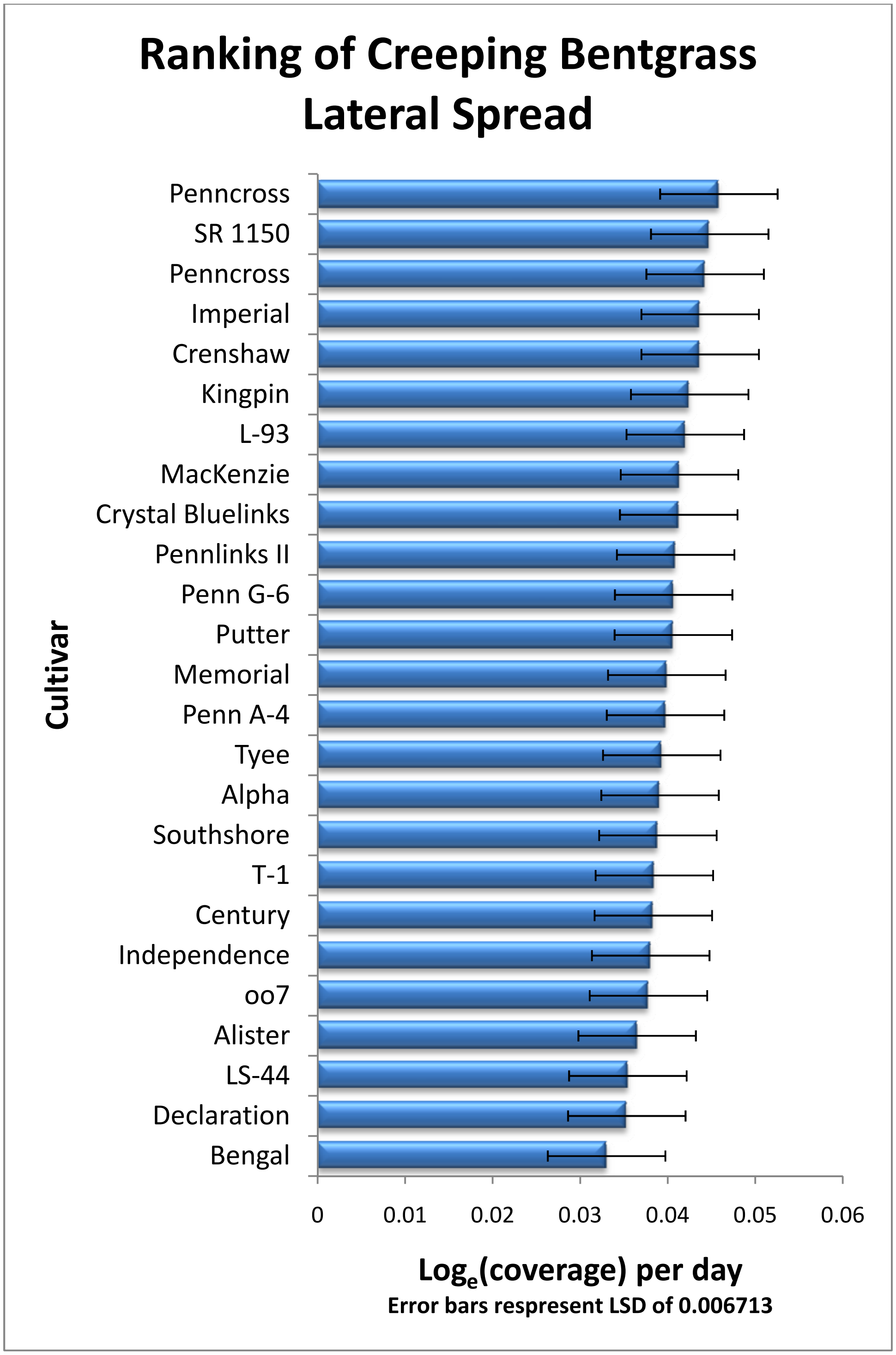

Figure 1. Relative ranking of creeping bentgrass establishment rate in 2009. Error bar represents an $LSD_{0.05}$ of 0.006713.

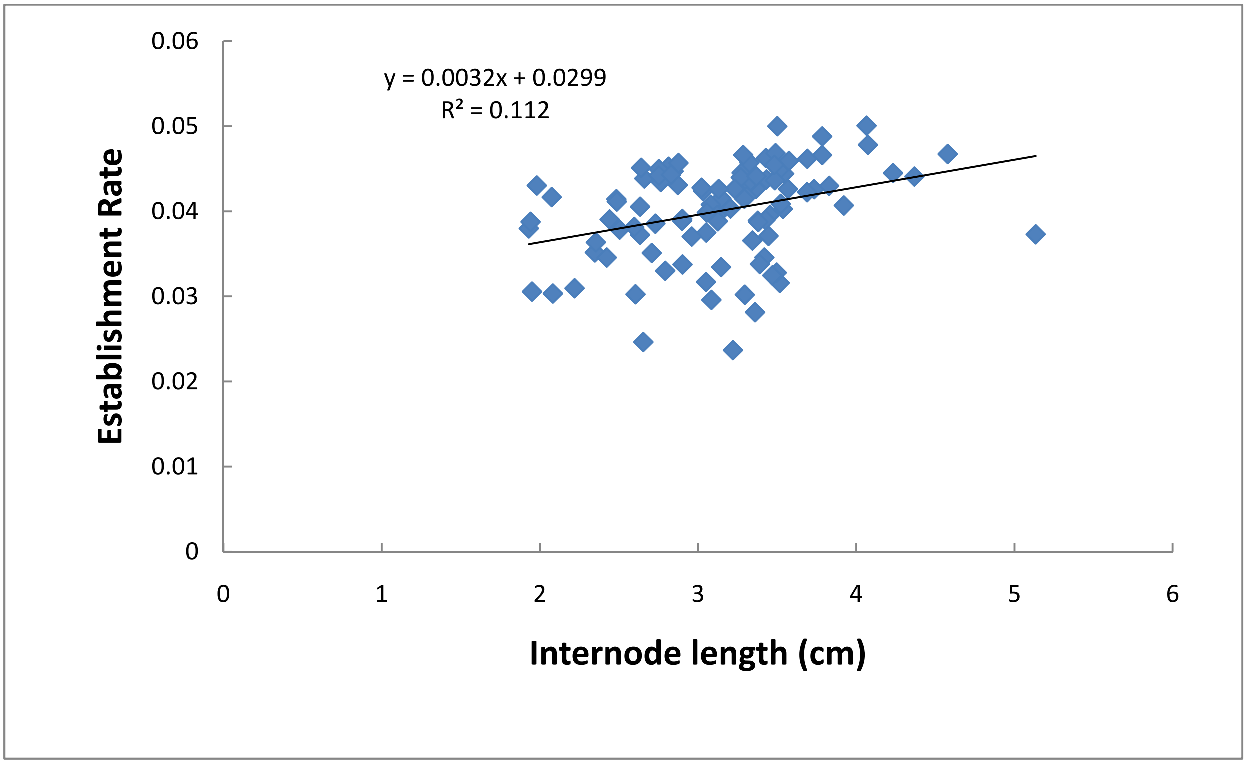

Figure 2. Relationship between internode length and establishment rate for 24 cultivars of creeping bentgrass. Internode length was positively correlated with lateral spread (p = 0.0058).

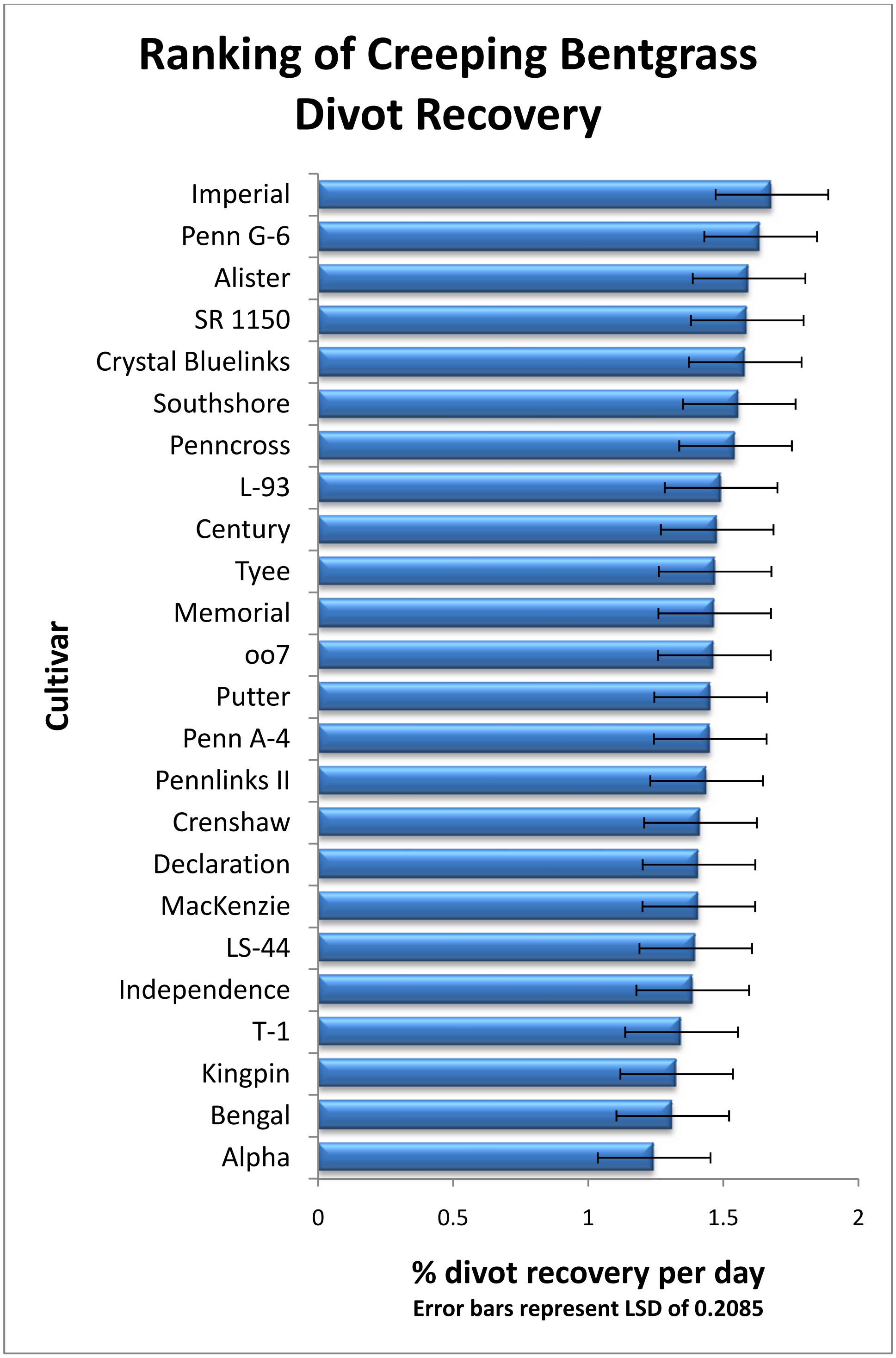

Figure 3. Relative ranking of creeping bentgrass divot recovery rate in 2009. Error bar represents an $LSD_{0.05}$ of 0.2085.