SEEDING DATE AND CULTIVAR INFLUENCE WINTER SURVIVAL OF SEEDED BERMUDAGRASS

Michael Richardson[1], Douglas Karcher[1], John McCalla[1], and John Boyd[2]

IMPACT STATEMENT

Seeded bermudagrasses have been improved for turfgrass quality parameters, but very little is known about their establishment and performance under the cold winters of the upper transition zone. The cultivar Yukon has superior cold tolerance to other seeded bermudagrasses currently on the market. Early planting dates were important for first-season survival under cold weather conditions.

BACKGROUND

Several high-quality seeded bermudagrass (*Cynodon dactylon*) cultivars have recently been introduced to the turf market. These genetic advances will likely increase the utilization of seeded bermudagrasses on golf turf surfaces. This research effort addresses a significant problem impeding the wide-spread use of seeded bermudagrass cultivars in the transition zone, that of first-year winter survival. Seeded bermudagrasses failed to produce rhizomes during their first growing season (Hensler et al., 1998). This lack of rhizome production predisposes the seeded grasses to winter injury, as rhizomes are generally considered a major morphological feature associated with winter survival. Our objective was to determine the effects of seeding date and cultivar on morphology and freeze tolerance of newly seeded bermudagrass.

RESEARCH DESCRIPTION

This study was conducted at the University of Arkansas Research and Extension Center, Fayetteville, Ark. on a Captina silt loam soil, with a pH of 6.2. The seeded bermudagrass cultivars Princess, Jackpot, Mirage, Mohawk, Nu-Mex Sahara, and Yukon were used. A replicated trial of the six cultivars was planted on or near 15 April, 15 May, 15 June, and 15 July 2000. Each plot was seeded at 1.0 lb of seed per 1000 ft^2. A uniform stand was attained for each planting date and data collected on germination, stand establishment, and turf quality (data not shown). These plots were evaluated during the winter of 2000-2001 for morphological development, and field evaluations of winter injury and spring recovery were determined in the spring of 2001. Recovery from winter injury was assessed using digital image analysis of the amount of green turf present in a plot at three observation dates during April and May of 2001 (Richardson et al., 2001).

FINDINGS

Morphological analysis included evaluations of stolon density, stolon weight, and weight per stolon. In addition, rhizome quantification was attempted in these plots, but no differences were observed for any cultivar across all seeding dates. Weight per stolon was affected by both cultivar and planting date (Fig. 1). 'Yukon' had the highest weight/stolon of any seeded cultivar across all planting dates, while an April seeding resulted in significantly higher wt/stolon than any of the other planting dates. Stolon number was more affected by planting date than by cultivar, but 'Yukon','Mohawk', and 'Jackpot' were able to maintain more uniform stolon densities across all planting dates than did 'Mirage', 'Sahara', and 'Princess' (data not shown).

The most important data obtained from this study were the recovery of the plots from the significant winter injury that occurred during the harsh 2000-2001 winter (Fig. 2). During the months of December and January, temperatures at the Fayetteville location routinely dropped into the low single digits Fahrenheit (Fig. 2) and the plots experienced a snow/ice cover for more than 40 days during that period. 'Yukon' had much higher recovery from winter injury compared to any other seeded bermudagrasses, followed by 'Jackpot' (Fig. 3) . 'Princess' had the lowest overall recovery from winter injury, with less than 20% recovery by early May. Planting date also had a significant effect on winter survival and recovery, with April and May seeding dates producing much higher recovery from winter injury than June or July seedings (Fig. 3).

Early seeding dates were critical in the upper zones of bermudagrass use. Genetic advances in cold tolerance have been made in recent years and the cultivar Yukon will have great potential in regions where other bermudagrasses have not been adapted.

LITERATURE CITED

Hensler, K.L., M.D. Richardson, and J.R. Bailey III. 1999. Implications of seeded bermudagrass planting date on morphology and cold tolerance. In J.R. Clark and M.D. Richardson (eds.), Horticultural Studies 98, Arkansas Agricultural Experiment Station, Research Series 466:69-71.

[1] Department of Horticulture, Fayetteville

[2] Cooperative Extension Service, Little Rock

Richardson, M.D., D.E. Karcher, and L.A. Purcell. 2001. Using digital image analysis to quantify percentage turfgrass cover. Crop Sci. 41:1884-1888.

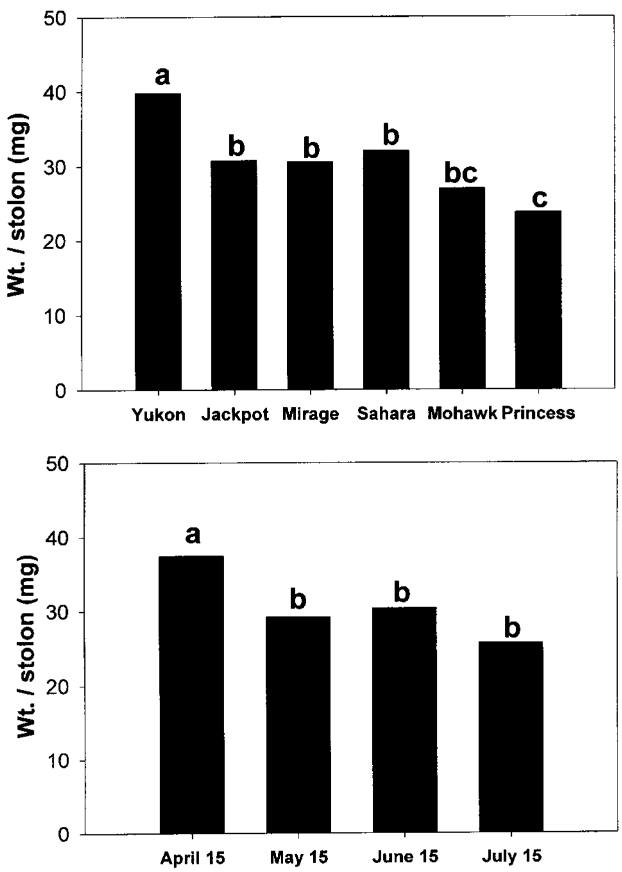

Fig. 1. Weight per stolon of seeded bermudagrasses, as affect by cultivar (top) and seeding date (bottom). Different letters indicate a significant difference (P = 0.05) between treatments, as determined by analysis of variance.

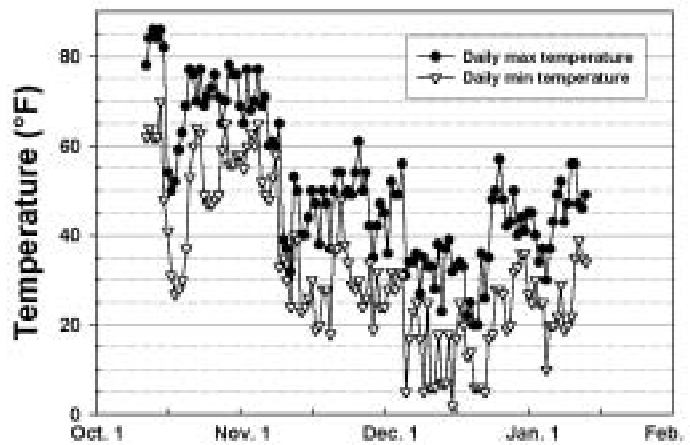

Fig. 2. Maximum and minimum temperatures at the University of Arkansas Research and Extension Center, Fayetteville, during the 2000-2001 winter.

Fig. 3. Winter recovery of seeded bermduagrass, as affected by cultivar (top) and seeding date (bottom). Different letters indicate a significant difference (P = 0.05) between treatments, as determined by analysis of variance.