Velvet Offers A Low-Input Option To Creeping Bent

By John Watson and Katerina Jordan

Golf course putting greens are commonly seeded with creeping bentgrass (*Agrostis stolonifera, L.*) primarily due to its history as a high-performance turfgrass that can withstand low cutting heights. Establishment practices are well-documented for creeping bentgrass (CBG), as are management practices such as cultivation and fertility level (Beard, 1973).

Creeping bentgrass is popular with many superintendents for the aforementioned reasons, and is widely used for putting surfaces in temperate climates (Beard, 2002). However, particularly with new cultivars, CBG requires regular applications of nitrogen and fungicides after establishment to maintain acceptable putting turf quality, and therefore can be considered a high-input turfgrass (Dernoeden, 2002). Due to growing concerns over chemical fertilizer and pesticide use on turfgrass and increasing regulation of these inputs, there is rising interest in the use of alternate, low-input turfgrasses for putting greens.

Some golf courses, putting greens in particular, are targeted often by the public for their high chemical and water inputs, but some level of maintenance is necessary to achieve the quality demanded by the end-users. Velvet bentgrass (VBG) has the potential to be an excellent lower input alternative to CBG.

PHOTO 1

Studies of velvet bentgrass have shown tolerance to low levels of nitrogen, although color can suffer.

It is a dense, fine-textured turfgrass that was introduced in the early 1900s to North America from Europe in a seed mixture of bentgrasses containing creeping, velvet, colonial and redtop called South German bentgrass (Brilman and Meyer, 2000). Velvet bentgrass was used on golf courses until the 1950s when turfgrass management leaned toward increased inputs, especially with respect to pesticides and inorganic fertilizers.

As VBG showed a greater tolerance to low levels of nitrogen fertilizer, high-input management favored CBG (Torello and Lynch, Undated). However, with increased pressure from government agencies to reduce the negative impact of crop production on the environment, a reversion to lower input management of turfgrasses may be necessary.

Another reason that VBG can be a viable alternative to creeping bentgrass greens is that recent research suggests that VBG has good resistance to the fungal disease dollar spot (Chakraborty et al. 2006). This disease is of particular concern to golf courses as it is a very common problem on putting greens and in the United States. Dollar spot is the most costly disease to control when compared with the many other diseases that can affect turf (Vargas, 1994). Research also suggests that in addition to requiring reduced pesticide inputs, velvet bentgrass can perform well under reduced nitrogen fertility (Grant and Rossi, 2004). Recent research data suggests that good-quality VBG turf can be achieved with 0.48 to 1.46 kilos per 100 square meters per year on fine-textured soils (Boesch and Mitkowski, 2007). However, establishment practices for VBG are not extensively documented, and research on longer-term management including cultivation and fertility is limited, especially in Canada.

The purpose of this study is to gather information on VBG establishment by testing different establishment variables that could be altered at putting green construction or renovation, for example. The variables tested included: rootzone media type, seeding rate, phosphorus rates and nitrogen rates. The project was completed in a controlled greenhouse environment. This study is part of a large-scale project to determine the ideal establishment and management of fertility levels for velvet bentgrass, both in the greenhouse and the field.

Materials and methods

The research was conducted as a greenhouse study during a nine-week period in 2006 at the University of Guelph

Continued on page 56

ALL PHOTOS AND CHARTS BY: JOHN WATSON AND KATERINA JORDAN

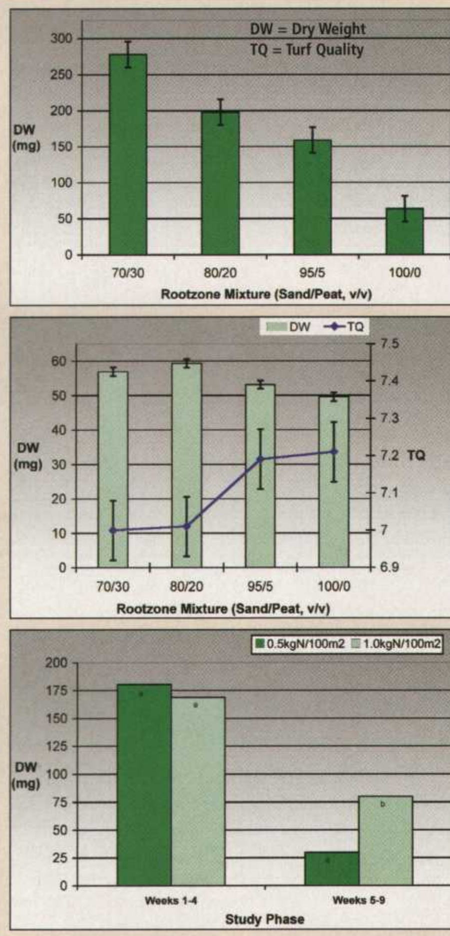
Continued from page 54

(Ontario, Canada). Treatments applied at project inception consisted of four rootzone media types (100/0, 95/5, 80/20, 70/30 Sand/Peat, by volume), three seeding rates (0.5, 1.0, 1.5 kilos per 100 square meters), three phosphorus rates (0.25, 0.75, 1.25 kilos per 100 square meters), and two nitrogen rates (0.5, 1.0 kilos per 100 square meters). Treatment parameters were examined in a full factorial randomized complete block design using 100-square-centimeter pots seeded with a specific velvet variety.

The study had two stages: establishment (weeks 1 to 4) and early fertility (weeks 5 to 9). Establishment measurements were taken at the end of week 4 and included initial clipping dry weight (DW) and estimated percent turf cover (TC). Early fertility treatments consisted of weekly liquid fertilizer applications to each treatment group at rates of 0, 0.01875, and 0.0375 kilos per 100 square meters for phosphorus, and 0.025 and 0.075 kilos per 100 square meters for nitrogen to simulate a spoon-feeding program.

Clippings (DW) and turf quality (TQ) ratings were collected weekly during this phase of the study. Initial clipping DW and TC (weeks 1-4) were analyzed using SAS Version 9.1.3 with the mixed procedure; DW and TQ (weeks 5-9) were analyzed as repeated measures, also using the mixed procedure (SAS Institute, Cary, N.C.).

TABLE 1



Results

Dry weight during the establishment phase was greatest in the 70/30 rootzone mix (Table 1), while for weeks 5-9 both 70/30 and 80/20 yielded higher DW values than 100/0 or 95/5.

However, the 95/5 and 100/0 rootzones scored significantly higher in TQ compared with the higher peat rootzones (Table 1). Seeding rate significantly affected both DW and TC for weeks 1-4 with the 1.5 kilos per 100 square meters rate being the highest in both cases (data not shown). Over time, however, seeding rate had no effect on DW through weeks 5-9 although quality ratings were consistently highest for the 1.5 kilos per 100 square meters seeding rate (data not shown).

Phosphorous rate had minimal impact on TQ, but DW was lowest during both phases of the study at the lowest phosphorous rates (data not shown). Nitrogen level initially had no significant effect on DW and TC (data not shown), but over time became a significant contributor to both variables measured. The most striking treatment effect was based on the color component of TQ.

Based on the data collected, we concluded that seeding rate is largely related to turf quality, but not dry weight over time. This is likely due to the fact that the highest seeding rate produced the most dense turf with the finest leaf texture (both components of TQ). It is also clear that nitrogen does not have an initial effect (weeks 1-4) on either parameter, but over time it becomes an important factor in determining turf quality and dry weight accumulation.

Our preliminary results suggest that the variety performed best with our high nitrogen treatment, perhaps indicating that velvet prefers a higher amount of N at establishment. A future greenhouse and field project will evaluate both higher and lower nitrogen levels than those used

Continued on page 58

PHOTO 2

Velvet bentgrass performed best with high nitrogen treatment, perhaps indicating that velvet prefers a higher amount of N at establishment.

Continued from page 56

in this experiment, and more specific nitrogen requirements of SR7200 will be determined. The 70/30 and 80/20 rootzone mixtures, perhaps due to higher nutrient and water retention ability, were able to foster more desirable conditions for early establishment (weeks 1-4).

However, over time (weeks 5-9), the 95/5 and 100/0 mixtures produced similar DW accumulations to the 70/30 and 80/20 mixtures, and had higher quality ratings. This might indicate that higher peat content becomes less important as the turf develops. Overall, our greenhouse study has provided some insight as to what factors may have an effect on VBG establishment, and what practices may be applicable for VBG establishment in the field.

John Watson has a bachelor's degree in agriculture from the University of Guelph. He is pursuing his master's degree in turfgrass science studying the fertility requirements of velvet and creeping bentgrass cultivars. The aim of the research is to provide better insight as to the exact fertility needs of velvet bentgrass in comparison to creeping bentgrass putting green turf.

Dr. Katerina Jordan is an assistant professor of turfgrass science at the University of Guelph. She earned her Ph.D. in plant sciences from the University of Rhode Island. Her research focuses on low-input management practices of golf course turf. She also oversees the Guelph Turfgrass Diagnostic Lab.

ACKNOWLEDGEMENTS:

This research is supported by the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Ontario Turfgrass Research Foundation (OTRF). The authors would like to acknowledge Nutrite Turf and Hutcheson Sand and Mixes for their project donations, as well as Alex Porter for technical assistance.

REFERENCES

Beard, J.B., 1973. Turfgrass: Science and Culture. Prentice-Hall Inc., Englewood Cliffs, New Jersey: 658p.

Beard, J.B. 2002. Turf Management For Golf Courses - 2nd Edition. Ann Arbor Press, Chelsea, Michigan: 793p.

Brilman, L.A., and W.A. Meyer. 2000. Velvet bentgrass: Rediscovering a misunderstood turfgrass. Golf Course Management. 68:70-75.

Boesch, B.P and N.A. Mitkowski. 2007. Management of velvet bentgrass putting greens. Applied Turfgrass Science doi:10.1094/ATS-2007-0125-01-RS.

Chakraborty, N., Chang, T., Casler, M.D., and G. Jung. 2006. Response of bentgrass cultivars to Sclerotinia homeocarpa isolates representing 10 vegetative compatibility groups. Crop Science. 46:1237-1244.

Dernoeden, P.H. 2002. Creeping Bentgrass Management - Summer Stresses, Weeds and Selected Maladies. John Wiley and Sons Inc. Hoboken, New Jersey: 133p.

Grant, J.A. and F.S. Rossi. 2004. Evaluation of reduced chemical management systems for putting green turf. USGA Turfgrass and Environmental Research Online. 3(4):1-13.

Torello, W.A., and S. Lynch. Undated. Velvet bentgrass management. [Online] Available: http://www.growercentral.com/UPLOADS/PDFS/velvet%20bentgrass%20management.pdf Accessed 23 Jan. 2007.

Vargas, J.M. Jr. 1994. Management of Turfgrass Diseases, Second Edition. CRC Press Inc., Boca Raton, Florida: 294p.

TURFGRASS TRENDS

SECTION STAFF

Managing Editor
Curt Harler
440-238-4556; 440-238-4116 (fax)
curt@curtharler.com

Graphic Designer
Kristen Morabito
216-706-3776; 216-706-3712 (fax)
kmorabito@questex.com

Golfdom Staff Contact
David Frabotta
216-706-3758; 216-706-3712 (fax)
dfrabotta@questex.com

CONTACT US:

Web site: *www.turfgrasstrends.com*
Reprints: *TurfgrassTrends@reprintbuyer.com*