2010: Another Busy Year for UW Turf Research

By Ben Pease, Graduate Student, Department of Horticulture

Three graduate students, the addition of a Ph. D. student, sixteen student or contract research projects, and five National Turfgrass Evaluation Program (NTEP) trials were the focus of the Horticulture department's efforts for 2010. It was a busy year, with record crowds at a successful Field Day, a prominent display of UW researchers at the annual international research convention and excellent speakers at the November Symposium. Today I'd like to look back on the year and update everyone on the research freight train of UW Horticulture.

Dr. Stier's other graduate students, Rebekah Verbeten and Sabrina Ruis, continued their field and greenhouse studies that began in late 2009. Sabrina's work on carbon dioxide fluxes of biosolids amended soils during turfgrass establishment found that high application rates of biosolids resulted in a statistically greater amount of CO2 emission prior to turfgrass germination compared to two lower rates of biosolids and a no biosolid control.

The high application rate of biosolids did increase turf quality after germination so initial higher CO2 emissions may be a worthy trade-off to creating a better end product. Sabrina presented a poster on this project at the national conference of the Crop Science Society of America this past November in Long Beach, CA. Rebekah's project on the effects of mycorrhizal inoculation and varying phosphorus fertilizer rates on creeping and velvet bentgrasses began its second year this summer/fall.

For those of you who attended Field Day, she presented her first year of data during the morning research tour. While the plots were still in an establishment phase, some new information on mycorrhizae interactions with bentgrass turf is emerging. The second year of this project established very well due to grow-in weather conditions in 2010 being much better than in 2009. Additional experiments focused on the interactions of soil pH and mycorrhizal colonization of creeping and velvet bentgrasses are being conducted in a campus greenhouse. Dr. Stier's previous graduate student, Mark Garrison, returned in 2010to start his Environment and Resources Ph. D. Mark is Dr. Stier's first graduate student to be enrolled in the Nelson Institute for Environmental Studies program at UW-Madison. He is investigating carbon sequestration rates of turfgrass on subsoil and topsoil, and how varying irrigation and fertilization affects the rate of carbon accumulation in the root zone.

Mark is also investigating various fertilizer management strategies and nutrient leachate differences between seed versus sod site establishment. While it was a lot of work, preparing and establishing his plots was fun due to the use of some heavy equipment! Look forward to Mark updating us on his progress in future *The Grass Roots* articles.

In 2010, I was again privileged to travel overseas to disseminate the findings of UW-Madison turf research. I was invited, through Dr. Stier, to speak at the Scandinavian Turfgrass and Environmental Research Foundation's (STERF) first-ever velvet bentgrass (VBG) research seminar, held in Hyvinkaa, Finland. I shared the billing with Scandinavian superintendents, who presented their knowledge on VBG learned through practical experience, and with top North American professors, who presented their findings from years of university research. Drs. James Murphy (Rutgers Univ.), Katerina Jordan (Univ. of Guelph-Canada) and Michelle DaCosta (Univ. Massachusetts) all gave excellent presentations on their own VBG research programs.

I presented on Dr. Stier's previous work on VBG with graduate student Eric Koeritz, my current Masters Degree work with VBG, future research possibilities in Wisconsin, and gave the audience a solid overview of UW-Madison and our turf program. It was a wonderful opportunity to showcase our university and Wisconsin, as the audience represented nine countries, including some members of the R&A! I can honestly say I felt that I learned more from the attendees than they did from me, but hopefully the feeling was mutual. This seminar was held after a playing quality seminar (also somewhat focused on VBG) put on by Norwegian research group Bioforsk at their research station in Landvik, Norway. Bioforsk has an intensive VBG research program, focused on cultivar selection and cultural practice management. The knowledge gained and the entire visit to Scandinavia was priceless, including a boat tour of southern Norway fjords, various golf course visits (Figure 1) and two wonderful golfing opportunities.

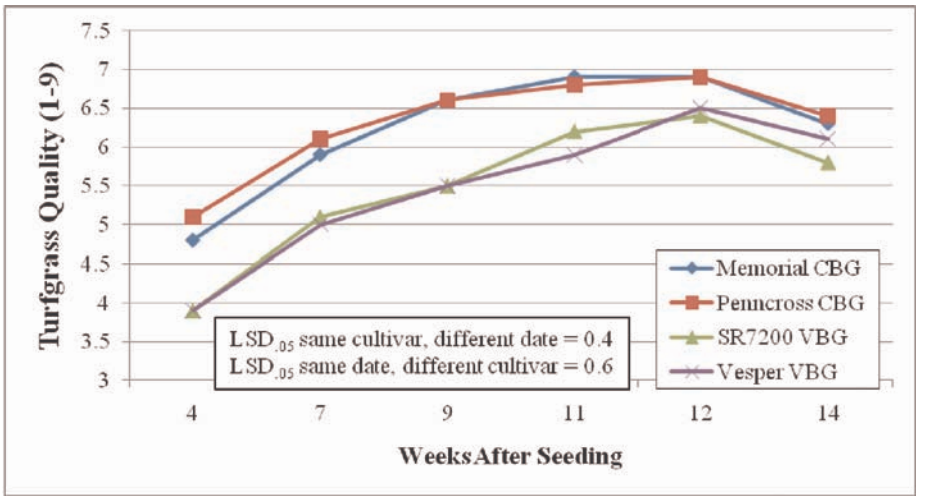


Figure 2. Quality of creeping and velvet bentgrass cultivars in Madison, WI, by date during establishment on a scale of 1-9, 6 = lowest acceptable value, 9 = ideal quality, 2009.

Back at the O.J. Noer, September was spent preparing for and establishing our new perennial ryegrass NTEP. This five-year trial will test the performance nearly 100 cultivars of perennial ryegrass, in both trafficked and non-trafficked conditions. This trial will be showcased at Field Day in years to come. Our Kentucky bluegrass NTEP has completed its run but our creeping bentgrass, fine fescue and tall fescue NTEPs are still going strong. As usual, if you would like to view any of these trials you are welcome to visit the O.J. Noer at any point during our growing season.

The University of Minnesota-Twin Cities and the University of Wisconsin-Madison joined forces last year to compare the nitrogen (N) requirements of creeping bentgrass (CBG) and VBG at establishment for fairways or tees. Velvet bentgrass is thought to be a low N turf but these claims all refer to established turf, not establishment. Our data indicate that N requirements for establishing VBG are similar to those for creeping bentgrass. The optimum cumulative N rate for the first 12-14 weeks after seeding is between 3 and 6 lbs N/M. While VBG cultivars initially established slower than CBG cultivars, both species had acceptable quality (Figure 2) and greater than 95% cover by trial end. I presented this study as a poster at our annual meeting in November and the full results will soon be published in *Applied Turfgrass Science*.

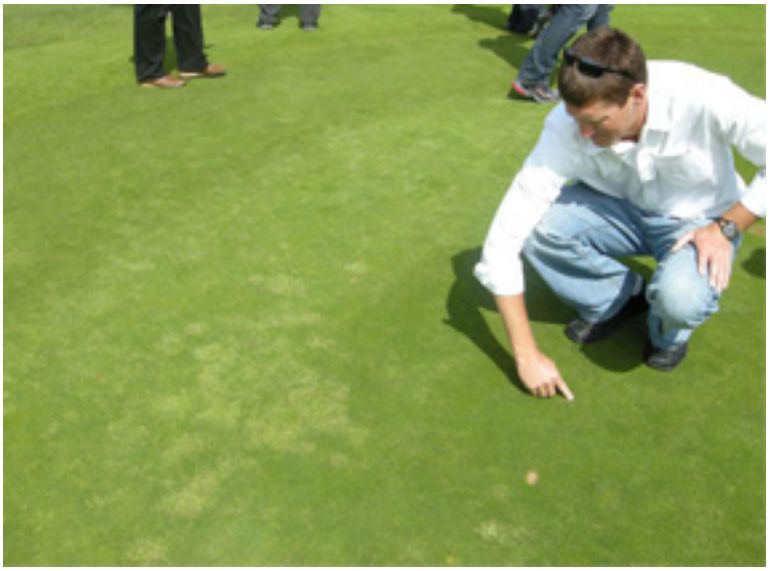
The shaded bentgrass study that I presented at 2009's Field Day was finished this fall. The objective of the study was to compare CBG and VBG in a shaded environment as affected by three N rates and two growth regulator rates. While much is known about CBG in relation to nitrogen and growth regulators (a small portion of it under shaded conditions), shade tolerance of VBG has never been quantified and the effects of growth regulators on VBG have not been investigated. Preliminary data analysis suggests that both species react similarly to N and growth regulator treatments, with low N rates and the use of a growth regulator resulting in the highest quality turf for the longest time period. With conclusion of this study, we now have a few more pieces to the Midwest VBG management puzzle. I presented this study as an oral presentation at our annual meeting in November and the full results will soon be submitted for possible publication in Crop Science.

As I mentioned before, Horticulture conducted numerous contract and student research projects. I'd like to quickly highlight one that is applicable across many different turf management situations. The objective of this trial was to compare an experimental herbicide against a negative control (no products applied) and four positive controls (established, proven products) for pre-emergent crabgrass control. This trial was conducted on a site with a history of crabgrass infestation. Management practices encouraged weed growth but did not inhibit turfgrass stand quality. Major turf species in the plot were Kentucky bluegrass and perennial ryegrass. The treatments were applied on 14 April 2010 when soil temperature reached 55F, the temperature at which crabgrass will begin to germinate. All treatments were applied using TeeJet XR8002VS nozzles at 40 psi delivering 52 gallons per acre. The trial was arranged in a randomized complete block design with four replications.

Treatments are summarized in Table 1 (experimental herbicides removed).

Treatments were evaluated for crabgrass populations on seven dates between 6 weeks after treatment and 25 weeks after treatment. On all dates, all four industry standards had significantly lower crabgrass populations than the control and all four standards were statistically similar to each other (Figure 3). While this does not seem exciting, it brings forth a good integrated weed management concept. All four products have different modes of action and all had the same effect on weed populations. This shows, in a practical setting, that you can switch products from year to year without losing sleep over potential results. Changing modes of action is most important for avoiding pest resistance to insecticides but also applies to fungicides and herbicides. This trial also reminds us that preemergent crabgrass control is often a more effective and longer-lasting method than post-emergent control. There have been numerous trials at the O.J. Noer comparing pre- and postemergent applications, including one from 2010 that will be published online in the *Wisconsin Turfgrass Research Reports*, showing that preemergent weed control results in lower weed populations by season end than postemergent weed control for some species. For further details, the full results from this trial will be published in the *Wisconsin Turfgrass Research Reports.*

As you can see from just a small sampling of our efforts, 2010 was a welcomingly busy year. I would like to thank you for your continued support of the UW turf team. Please do not hesitate to arrange a visit to the O.J. Noer to view any of our research trials. I hope to see you at the 2011 Field Day.



Ben Pease examining a velvet bentgrass green in Finland.

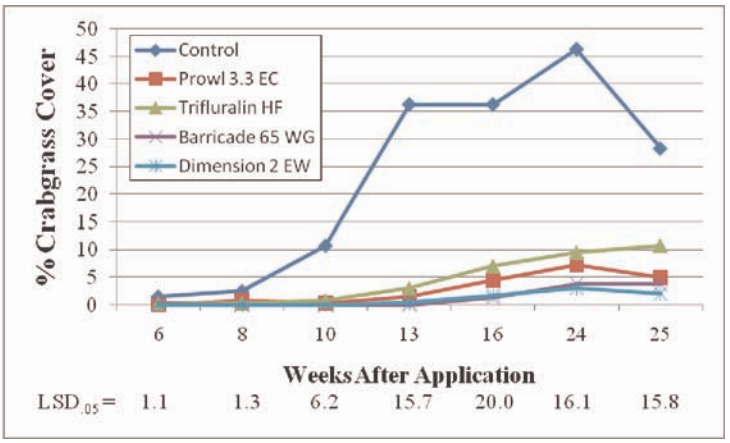


Figure 3. Percent crabgrass cover (0-100%) in Madison, WI, by treatment and weeks after application, 2010.

TABLE 1. Preemergent liquid formulations on crabgrass treatments, Madison, WI 2010

Trt#	Treatment Product	Active Substance Rate (lb AE/A)
1	Negative Control	.....
2	Positive Control: Prowl 3.3 EC	1.5
3	Positive Control: Trifluraline HF	1.0
4	Positive Control: Barricade 65 WG	1.0
5	Positive Control: Dimension 2 EW	0.38