

## **Stop 1. Herbicide and Plant Growth Regulator Programs for Controlling *Poa annua* on Creeping Bentgrass Putting Greens**

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Annual bluegrass (*Poa annua*) [ABG] is one of the most cosmopolitan weeds in the world and a common invader of creeping bentgrass [CBG] putting greens. Few chemical controls exist for limiting ABG encroachment on putting greens. Most university research has focused on tee and fairway height turf due to challenges associated with measuring ABG at greens height. In 2009, a regional study was designed to evaluate the effects of herbicide and PGR programs on relatively clean (less than 15% ABG infestation) CBG greens. Programs of herbicide and PGR treatments have been made in 2009 and 2010 and will continue through 2013. ABG populations are monitored throughout the season to determine which programs will most limit the infestation of ABG in CBG putting greens.

## **Stop 2. A Study to Investigate Methods to Estimate Water Replenishment by Irrigation**

Rodney Tocco and Dr. Thomas A. Nikolai

James B. Beard wrote in his book *Turf Management for Golf Courses* that, “Proper turf irrigation is the most difficult day-to-day agronomic decision the golf course superintendent makes”. One of the main reasons that statement is true is there have been very few putting green irrigation research studies. To address this void MSU is currently performing three putting green irrigation studies. Rod Tocco is a Ph.D. candidate running a study to investigate Evapotranspiration (E.T.) and Time Domain Reflectometry (TDRs) as methods to replenish plant available water in a putting green. Rods study also investigates the impact of wetting agents and daily double cutting under three different irrigation regimes and how these combine to affect green speed, turfgrass disease, organic matter content, and microbial activity.

## **Stop 3. A New Bacterial Disease of Creeping Bentgrass**

Paul Giordano and Dr. J.M. Vargas, Jr.

In the summers of 2009 and 2010 are laboratory received samples that exhibited heavy bacterial streaming from diseased creeping bentgrass plants. The bacterium was later identified as *Acidovorax avenae* subsp. *Avenae*. Unfortunately, the bacterium has been found in many of the new low mow creeping bentgrass cultivars. Our research thus far has found significant virulence on numerous different cultivars of creeping bentgrass with select isolates of the bacterium. Additionally, DNA comparisons among isolates obtained from 9 different golf courses indicate seven with *Acidovorax avenae* subsp. *avenae* as the ubiquitous bacterium inhabiting infected host tissues. Golf courses and turf growers in the United States could face

serious economic losses if the disease is found to be easily spread and aggressively virulent. Future research will be conducted to gain a thorough understanding of the pathogen epidemiology, biology, infection mechanisms and host range, as well as effective controls.

## **Stop 4. Water Management for Sustainable Creeping Bentgrass and Poa Annua Putting Greens**

Mark Miller, Dr. Kurt Steinke, Dr. Kevin W. Frank, and Dr. Thomas A. Nikolai

Public pressure and constraints on the United States water supply will require changes in golf course putting green management. Although putting greens only represent 3% of the total maintained turf area on United States golf courses, these areas represent some of the most input-intensive managed plant systems. This research study is investigating the effects of three irrigation methods on leachate quantity and quality, irrigation volumes, and putting green performance. Plots are USGA specification putting greens plumbed with plastic lysimeters and planted to A4 creeping bentgrass (*Agrostis stolonifera* L.) and *Poa annua*. Irrigation treatments consisted of daily replacement of 80% evapotranspiration, adjusting irrigation based on root depth, and utilizing soil moisture as determined by a TDR soil moisture probe to schedule irrigation. During 2010, data showed that irrigation based on soil moisture led to significantly greater irrigation and leachate volumes. However this treatment also resulted in significantly less dollar spot during the growing season. Localized dry spot was significantly greater on the soil moisture based irrigation treated plots on 9 out of 17 dates. Ball roll was also significantly greater in July for the daily ET treatment. Preliminary data suggests that alternating between the three irrigation treatments during the growing season may lead to reduced water usage and better putting green performance.

## **Stop 5. Nitrogen Carrier Effects on Creeping Bentgrass Grown on Three Rootzones**

Miyuan Xiao, Dr. Kevin W. Frank, and Dr. Thomas A. Nikolai

Research on the multi-year effects of foliar and granular nitrogen fertilizers alone or in combination on turfgrass tissue and soil nutrient concentrations is limited. The research objective was to determine the effect of different foliar and granular nitrogen fertilizers on creeping bentgrass grown on three putting green rootzones. Research was initiated in 2009 at the Hancock Turfgrass Research Center. The fertilizer treatments were urea, methylene urea, natural organic, foliar alone, foliar + granular, and an untreated control. All fertilizer treatments were applied from May through October to Penn 'A-4' creeping bentgrass grown on three rootzones. The three rootzones were a United States Golf Association specification rootzone, sand/peat/soil rootzone (80-10-10) and a native sandy clay loam. The urea, methylene urea, and natural organic fertilizer treatments were applied at 0.5 lb N/ 1000 ft<sup>2</sup>/month. The foliar treatment was applied at two rates, 0.25 lb N/ 1000 ft<sup>2</sup>/month, and 0.5 lb N/ 1000 ft<sup>2</sup>/month. The foliar + granular treatment consisted of a granular fertilizer application once a month at 0.25 lb N/ 1000 ft<sup>2</sup> and a foliar application twice a month at 0.12 lb N/ 1000 ft<sup>2</sup>/application. Soil