

# **The Effects of Wetting Agents on Drought Resistance and Recovery of Cool-Season Fairway Grasses**

**Michelle DaCosta**

Bentgrass species are widely utilized on golf course fairways in cool climatic regions. Among the 200 species of bentgrass that exist, creeping (*A. stolonifera*), colonial (*A. capillaris*), and velvet (*A. canina*) bentgrasses have received the greatest breeding improvements and are the most widely utilized *Agrostis* species for turf. Each bentgrass species retains particular qualities relating to density, color, and resistance to biotic and abiotic stresses. Of the three species, creeping bentgrass is by far the most widely utilized bentgrass, particularly for golf course putting green and fairway turf. Recent research suggests that colonial and velvet bentgrasses may require fewer inputs, including water, fertilizer, and/or pesticides. As a result, efforts have been aimed at developing improved cultivars of colonial and velvet bentgrasses for low-input environments.

One of the most important challenges facing the golf-turf industry is dealing with drought stress and water conservation. Because fairways comprise a majority of irrigated turfgrass on golf courses, the ability to maintain quality fairways with minimum irrigation is crucial. Previous research identified significant difference in drought tolerance, irrigation requirements, and water use among creeping, colonial, and velvet bentgrasses. However, greater information is required to examine cultural practices that may reduce irrigation requirements and improve turf quality of fairway grasses under reduced irrigation. Some studies have demonstrated an improvement in turf quality under reduced irrigation with the use of wetting agents. To date, however, there have not been any field studies to quantify the influence of wetting agents on improving turf performance of cool-season fairway species that vary in drought sensitivity and irrigation requirements. Therefore, the objectives of this research are to: (i) quantify the effects of two wetting agents on the drought performance and irrigation requirements of annual bluegrass and three bentgrass species when water is completely withheld; and (ii) evaluate the effects of wetting agents on recovery of these species from drought stress when water is available through irrigation/rainfall.

The project will be conducted in a fully automated, mobile rainout shelter (35' x 66') at the Joseph Troll Turf Research Facility in South Deerfield, MA. Powered by an electric motor and set on rails, the shelter will automatically move over the plot area when rain begins to fall and returns back to its original position when rain stops. The shelter excludes unwanted rainfall from test plot areas and allows quantitative control of soil moisture and irrigation while retaining the advantages of practical field conditions.

## **Grass species and establishment**

The following bentgrass cultivars were selected based on contrasting drought tolerance and turf performance in field trials in the Northeast:

<b>Creeping</b>	<b>Colonial</b>	<b>Velvet</b>
L-93	Tiger II	Greenwich
Penncross	Revere	Legendary
T-1		
13M		

Grasses were seeded at a rate of 1 lb per 1000 ft<sup>2</sup> into plots measuring 14 ft<sup>2</sup> (3.5 x 4 ft.) in October 2008. Turf plots will be managed following typical cultural practices for fairways in the northeast and mown at 3/8 inch.

## **Treatments**

The experiment will consist of four treatments:

- (i) Well-watered control, irrigated three times per week to field capacity
- (ii) Drought, irrigation completely withheld
- (iii) Drought + Wetting Agent 1
- (iv) Drought + Wetting Agent 2

The experiment will be conducted from June 1 through the end of October in 2010 and will be repeated in 2011 and 2012.