



Annual Bluegrass Is Prone To Winter Injury

February 2014

Warm-season grasses, better adapted to the South, will have a tough time surviving the arctic cold that has crept across the United States. However, improvements in bermudagrass varieties such as ‘Latitude 36’, ‘Northbridge’ and ‘Patriot’ should be up to the challenge. With financial support from the USGA, plant breeders at Oklahoma State University have specifically developed these varieties to survive periods of sub-freezing temperatures.

The cold-hardy bermudagrasses are ideal for use in parts of the eastern, western and southern United States for golf course fairways and tees, sports fields, commercial grounds and residential lawns, in part, because of its excellent traffic tolerance and recuperation rate once it is damaged.

Tested for seven years at Oklahoma State University before entering a national testing phase, Latitude 36 and Northbridge then underwent rigorous independent evaluation by researchers at land-grant universities across the southern and central transition zone of the United States. At the conclusion of the 2007-2012 [National Turfgrass Evaluation Program \(NTEP\)](#) bermudagrass trials, Latitude 36 claimed overall top honors, beating out many strong competitors.

Field observations suggest that annual bluegrass and creeping bentgrass differ in their capacity to resist deacclimation, which can contribute to observed

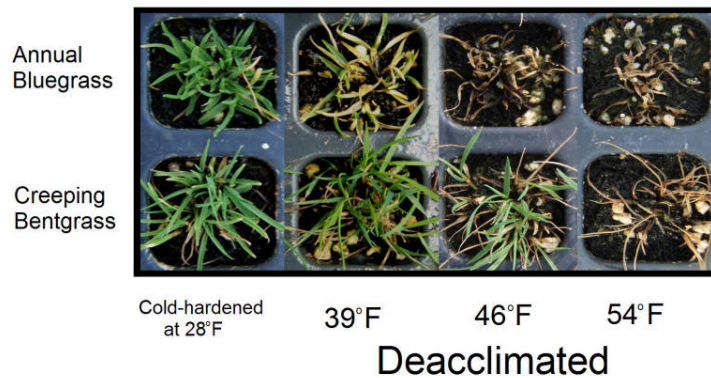


Figure 1: Field observations suggest that annual bluegrass and creeping bentgrass differ in their capacity to resist deacclimation.

differences in winter injury. The researchers would like to understand the factors that trigger deacclimation in grasses and to identify plant traits that contribute to enhanced deacclimation resistance and freezing tolerance. They are focusing on the effects of different above-freezing temperature combinations that result in deacclimation of creeping bentgrass and annual bluegrass, as well as changes in sugar and protein amounts within the plants.

The two grasses were cold acclimated at 36°F followed by 28°F in growth chambers. Then various deacclimation treatments consisting of different temperatures and durations tested the grasses. Researchers found better freeze tolerance for bentgrass (-6°F) compared to annual bluegrass (0°F). Along with less cold acclimation, annual bluegrass exhibited a greater loss in freezing tolerance in response to 39°F temperatures (Figure 1). The temperature required to induce greater losses in freezing tolerance was lower for annual bluegrass compared to creeping bentgrass.

Total soluble sugars increased during cold acclimation for both grasses, with higher levels found in bentgrass. In response to deacclimation, bentgrass maintained better freezing tolerance compared to annual bluegrass, which was associated with the maintenance of higher concentrations of soluble sugars.

Better freeze tolerance (LT50) occurred for creeping bentgrass compared to annual bluegrass. Along with less cold acclimation, annual bluegrass exhibited a greater loss in freezing tolerance in response to 39°F temperatures. Annual bluegrass lost freezing tolerance at lower temperatures compared to creeping bentgrass. Observed results followed by the same letter are not significantly different from each other.