TURFGRASS BLENDS: A MIXED REVIEW

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As the number of individuals taking up golf rises, so rises the demand for new golf courses. There were 728 new golf courses scheduled to open in 1998 alone in the United States. With the development of each course, superintendents face the difficulty of deciding which of the new bentgrasses to seed and whether or not to blend.

What is a Blend?

Blends and mixtures are not the same thing! A mixture includes two or more different turfgrass species. A combination of Kentucky bluegrass and perennial ryegrass would be a mixture. A blend is a combination of two or more cultivars of the same turfgrass species. For example, planting SR1020 and Providence creeping bentgrasses together would be a blend.

Blending has been recommended for moderate to high maintenance turfs and is commonly used on golf courses. Turfgrass blends are presumed to increase the genetic diversity of the turfgrass stand and thus provide a diversified plant community that will have greater resistance to stress and disease than a single cultivar.

Different cultivars vary in their adaptation to environmental conditions such as soil type, pH, moisture, light levels, and traffic, as well as resistance to attack by insects and diseases. Therefore, blends should result in turf that can thrive under a wider range of conditions than a single species or cultivar.

Concerns with Blends

One problem with using blends is the selection of cultivars. Cultivars are not created equal. Many factors must be considered in selecting cultivars for use in blends including: compatibility, environmental and cultural requirements, potential pest problems, and costs. To achieve an acceptable level of turfgrass quality, cultivars should also have similar leaf texture, growth habit, color, shoot density, and vertical growth rate.

The next concern with blends is that the composition of the turfgrass community may be altered over time as a result of competition. The aggressiveness and competitive ability of individual cultivars in a turfgrass blend is influenced by the turfgrass environment, cultural practices, intensity and use of turf, and presence of turfgrass pests.

Most research to date has focused on competition between different species in mixtures rather than different cultivars in a blend because it is easier to distinguish turfgrass plants based on identifiable morphological features. To effectively evaluate cultivar competition in turfgrass blends, cultivar identification becomes essential. Recently, molecular markers produced from DNA extracted from turfgrass plants have been used to identify creeping bentgrass cultivars.

Blending Research Study

A research study was initiated to investigate what effect three dollar spot disease levels had on a blend of two creeping bentgrass cultivars. Plots were seeded with a 50-50 blend of Penncross and Crenshaw creeping bentgrass. Dollar spot resulting from natural infection was maintained at levels of 0, 25, and 90% by spraying Daconil 2787 when a particular disease level was reached. Visual observations were made weekly to assess disease severity.

Individual plants were sampled from each plot two months after establishment and again two years later. Results showed that the different dollar spot disease levels did not alter the composition of the blend like previously thought. One possible explanation for this is that by spraying the plots with Daconil 2787, there was never any plant kill, just injury. Without plants being eliminated from the population, one would expect that the population would not change as a result of various disease levels.

Vargas and Turgeon reported that disease incidence in Kentucky bluegrass blends was either intermediate between that of the component cultivar monostands or not significantly different from the components. They theorized that when cultivars of various disease tolerances are blended, two things happen. First, the susceptible cultivar is diluted by the resistant cultivar which modifies the overall buildup of inoculum, and second, the resistant cultivar is subjected to more

intensive levels of inoculum from adjacent shoots of the susceptible cultivar. Therefore, more severe infection is likely to occur on the resistant cultivar in a blend then if that cultivar were grown alone. The result is that the normally resistant cultivar cannot exploit the competitive disadvantage of the susceptible cultivar and consequently, the blend is more stable than predicted.

The cultivars used in our study, Penncross and Crenshaw, differed in their dollar spot susceptibility levels, but neither was resistant to the disease. The lack of significant differences among the three disease incidence levels suggests that the blend was relatively stable.

However, the ratio of Penncross to Crenshaw in the blend did change from 1:1 to 2:1 after two years. When a blend of creeping bentgrass cultivars is used, competition likely results due to the fact that most turfgrass species mainly propagate vegetatively once established. This is especially true for creeping bentgrass, which has a highly stoloniferous growth habit.

The relative aggressiveness of cultivars within a blend at maturity may substantially influence the characteristics of the resulting turf. Competition between cultivars may involve the physical crowding out of a weaker cultivar by a more vigorous one. In creeping bentgrass blends, cultivars best suited for the growing conditions will dominate, thus reducing the genetic diversity. Turf that was initially composed of several cultivars may eventually become a monostand due to an imbalance in the competitive aggressiveness of component cultivars. Therefore, the presumed advantages of blending are lost and the future capacity of the turfgrass to adapt to changing conditions is limited to the inherent characteristics of the remaining cultivar.

Final Thoughts on Blending

"Should you use a blend?" If we go back to the initial premise that blends are used to increase genetic diversity, we should redefine this because the benefits will vary depending upon the turfgrass species. Creeping bentgrass is a cross-pollinated species meaning that it contains a certain amount of genetic diversity to begin with. Bentgrass cultivars are referred to as synthetic cultivars which means they are produced by selecting several superior genotypes and intermating them to form a single cultivar which consists of a number of unique individuals that share many characteristics of the selected parents. In other words, the genetic diversity already exists within any one cultivar of creeping bentgrass.

The second reason for using blends is that cultivars with different characteristics would thrive under stress conditions. With the establishment of the National Turfgrass Evaluation Program (NTEP) in 1968, replicated field trials at different geographic locations have been used to compare the field performances of bentgrass cultivars. The NTEP with assistance from university and golf course cooperators evaluates cultivars all over the United States. Today there are approximately 30 bentgrass cultivars in the experimental evaluation program, and most of the cultivars are examined each year under a variety of environmental and cultural regimes for use on golf course putting greens, tees, and fairways..

As a result of the NTEP trials, why would you want to take a cultivar that has performed extremely well in your region of the country for a five year period of time (length of most NTEP trials) and blend it with a cultivar of inferior quality. A blend of two improperly selected cultivars may produce a less desirable turf than a single superior cultivar. You are possibly setting yourself up for more problems compared to just planting the best cultivar by itself. Anyone interested in following the performance of the bentgrass variety trials or obtaining the latest results should contact the National Turfgrass Evaluation Program at the Beltsville Agricultural Research Center, Beltsville, MD 20705.