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New trends in cool-season turfgrasses

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New trends in cool-season turfgrasses. Mike Richardson, Professor, University and Visiting Professor, University of Padova, Italy

Organized turfgrass breeding programs have been very active around the world since the 1950s. Although several key programs began releasing cultivars of turfgrass in the 1960s, there was a large increase in breeding efforts in the 1970s and 1980s that eventually resulted in hundreds of cultivars for the major cool-season turfgrass species such as Kentucky bluegrass (*Poa pratensis*), tall fescue (*Festuca arundinacea*) and (*Lolium perenne*). Much of the early breeding with these species was focused on improving the turf performance (turf quality) by selecting grasses with dark green color, high density, fine leaf texture, and good uniformity. While many advances were seen in the 1980s and 1990s, breeders eventually reached a point with these performance traits that it was difficult to make further advances. As such, the turfgrass market became saturated with many cultivars that were similar in their performance and hard to distinguish from each other.

Over the past decade, turfgrass breeders have begun to focus more of their efforts into areas of specialization for turfgrasses in an attempt to develop grasses that have unique traits that allow the companies that market them to distinguish their product from other available products in the marketplace. There are several traits and even new species that I think will be important in the turfgrass market in the coming years.

Drought tolerance

The turfgrass industry will continue to face great challenges in the decades ahead as water resources become more restrictive for use on landscape plants. In an effort to address these problems, numerous turfgrass breeders have been actively selecting and screening cool-season turfgrasses for improved drought tolerance performance. At the University of Arkansas, we have developed, in cooperation with turfgrass breeders such as Kenneth Hignight of Nexgen Research in Oregon, a screening method that allows a wide range of turfgrass cultivars to be screened for performance under a zero irrigation program. Using this method, we have identified cultivars of all the major cool-season species that have far superior drought tolerance to the existing cultivars that are available on the market. In species such as Kentucky bluegrass, we have identified cultivars that can stay green for more than 3 weeks longer than traditional cultivars without irrigation. As part of this screening effort, a not-for-profit group has been formed called the Turfgrass Water Conservation Alliance (www.tgwca.org) whose mission is to identify superior drought-tolerance cultivars and then brand those cultivars so they can be distinguished in the marketplace.

Rhizomatous tall fescue

Tall fescue is generally classified as a bunch-type grass that only produces tillers. However, it has long been recognized that rhizomes (underground stems similar to what is seen on Kentucky bluegrass) can be occasionally found on tall fescue. Within the last decade, several breeders have developed turf-type tall fescue cultivars that had a higher percentage of rhizomes than traditional cultivars. Although many of the early cultivars that were developed had more rhizomes, research indicated that there was not enough rhizome material produced and the rhizomes were so small, that recovery from damage was not significantly enhanced with these new cultivars. However, breeders have continued to improved rhizomatous tall fescue cultivars and some of the more recent cultivars, such as Rhambler SRP and Traverse SRP, appear to have a greater competitive ability and may have good function in turfgrass mixtures. Research that was reported at the Padana Sementi field day by Dr. Stefano

Macolino of the University of Padova, has demonstrated that these rhizomatous tall fescue cultivars have the ability to maintain the amount of Kentucky bluegrass in a mixed stand better than non-rhizomatous types. These findings should encourage their use when mixtures of the two species are being used.

Spreading ryegrass

Perennial ryegrass is another cool-season turfgrass that has traditionally been considered a bunch-type grass. However, cultivars have been recently developed that have a more lateral growth and even appear to produce structures that could be classified as stolons (above-ground stems). If ryegrasses have an improved ability to spread, especially when injured, their use on athletic fields, golf courses, and other turfgrass sites could be greatly enhanced. We conducted research in Arkansas that demonstrated that spreading ryegrasses were able to recover from injury faster than non-spreading types, but they were still not as effective at spreading as traditional species such as Kentucky bluegrass. We also observed that these spreading ryegrass, with their more horizontal growth, could be maintained at lower heights of cut (down to 6mm) better than non-spreading types, which suggests they have potential in very high-maintenance sites such as found on golf course fairways or tees. There is much to still be learned about these grasses, but they have good potential in the turfgrass market.

Tetraploid perennial ryegrass

Perennial ryegrass is considered a diploid plant, meaning it has 2 sets of chromosomes. In forage breeding programs, breeders have often used a chromosome doubling technique to make tetraploid cultivars, which have 4 sets of chromosomes. This is typically done to increase the vigor and biomass produced by the plant which makes it a better producer of forage. About a decade ago, breeders began to attempt this practice with turf-type perennial ryegrass plants to see what the potential results might yield. A couple of early cultivars were developed and we began to investigate their use in turfgrass systems, especially as an overseeding grass for dormant bermudagrass sports fields and golf courses.

What we found was that the tetraploid varieties performed very similarly to traditional diploid perennial ryegrasses, with good color and texture and very high turfgrass quality. They also responded similarly to diploid ryegrass when placed under traffic and over various mowing heights. However, the most interesting thing about these grasses was that they would naturally disappear from overseeded sites in the late spring when the bermudagrass began to appear, which is superior to diploid ryegrasses, which normally can persist long into the growing season and damage the bermudagrass if not controlled. This trait makes tetraploid perennial ryegrass an ideal grass to use in countries like Italy where there are limited chemicals that can be used to remove the diploid ryegrass at the end of the overseeding period.

A couple of words of caution need to be given about tetraploid perennial ryegrass. First, if you are considering this species, make sure that it is a “turf-type” tetraploid. There are only a few cultivars such as ‘Double Time’ and ‘T3’ that we have tested and it would be possible to buy a forage type tetraploid that would probably not work in turf. Secondly, one characteristic of tetraploid ryegrass is that the seeds are slightly larger than a diploid ryegrass, so seeding rates may need to be slightly increased to achieve the same plant density. Finally, we have found in our research that tetraploid

ryegrass is more persistent when the mowing height is above 2.0 cm, so it may not transition completely if used in a lawn or garden.

Figure 1 – demonstration plots of screening grasses for drought tolerance at the University of Arkansas

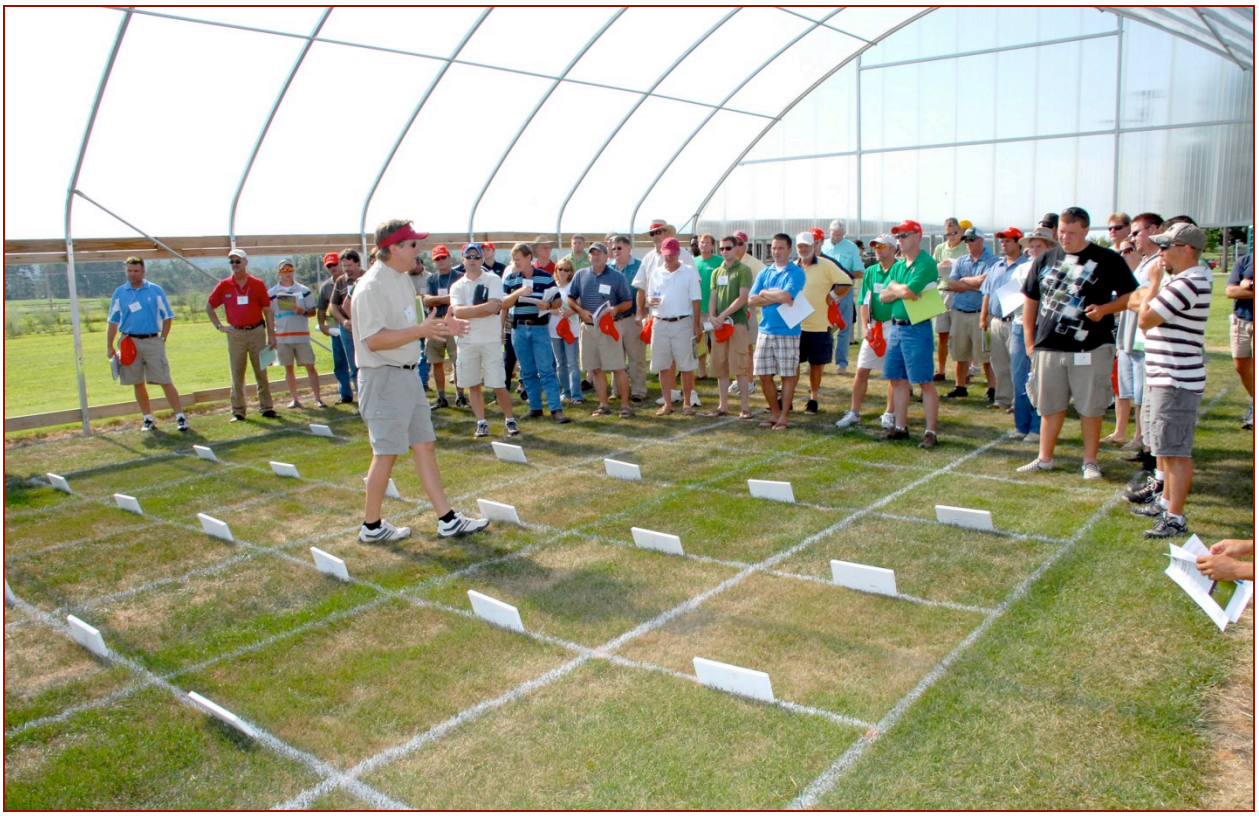

Figure 2 – Spreading ryegrass (top) and nonspreading ryegrass (bottom) recovery from injury at 6 weeks after injury

Figure 3 – survival of overseeded ryegrasses after the first season. Picture was taken in the winter at over 1 year after the original overseeding.