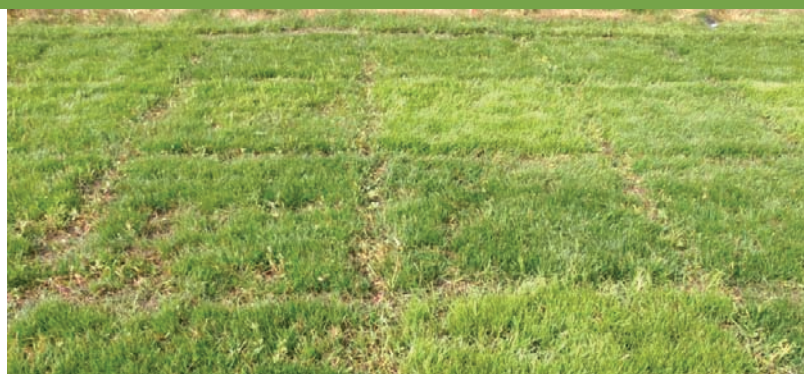

FEATURE ARTICLE I

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Turf-type Tall Fescue Variety Trial makes its debut at CDGA Sunshine Course

For the past 50 years, breeders have worked with tall fescue (Festuca arundinacea) to develop low growing, fine textured, dense, and darker color turf-types. At first there was 'Rebel,' 'Falcon,' and 'Olympic.' Now, much advancement has been made from the forage varieties 'Kentucky-31' and 'Alta.' Turf-type varieties offered now are selected for many traits such as disease resistance, wear, and drought tolerance. There is much more to come in this turf species as breeders explore new techniques and search for new material.

As with other turfgrasses, tall fescue started out as a forage grass. Many people still associate it with roadside turf and forage grasses, but in 1962 Dr. Reed Funk at the New Jersey Agriculture Experiment Station started making collections and began selecting for lower growth habit, finer texture, and reduced vertical growth. Only the best looking plants were selected to start a breeding program of turf-types. After 19 years 'Rebel,' the first turf-type variety was released. Many more varieties were released in the following years with darker color, improved tolerance to lower mowing, and disease resistance. Dwarf varieties became available by 1990, with a much shorter growth habit and dense tillering, but they may have lacked some disease resistance. 'Trailblazer,' 'Bonsai,' 'Eldorado,' 'Murietta,' and 'Silverado' all have a dwarf habit. Today, varieties with traits intermediate between turf-type and dwarf-type have performed well across the United States (Meyer and Watkins, 2003).

Figure 1.
A tall fescue breeding program at Southern Illinois University is one of many throughout the country. Different heights, colors, and textures can be found.

Tall fescue is still limited to higher cut turfgrass that can be found in golf course roughs, home lawns, and utility turfs. At Southern Illinois University and Hickory Ridge Golf Course I learned the benefits of tall fescue in golf courses and home lawns. After speaking with turfgrass researchers I realized that tall fescue could be used further north in Central Illinois and even in the Chicago area. In Southern Illinois it is evident that bluegrasses do not perform well. Tall fescue dominates the higher cut turfgrass. In Central and Northern Illinois, Kentucky bluegrasses are traditionally seeded, but can fail in dry summers. From a standpoint of reducing inputs, tall fescue can achieve this throughout Illinois and Indiana.

The benefits and disadvantages of this turf species

In his classic text, *Turfgrass Management*, A. J. Turgeon explains the benefits of tall fescue. Seventeen turf traits are ranked among popular cool and warm season species. In 11 of the 17 traits, tall fescue ranks better than Kentucky bluegrass. Traits such as establishment vigor, drought tolerance, shade tolerance, salinity tolerance, fertility requirement, disease potential, and wear resistance are all benefits of tall fescue. All these benefits help to reduce inputs from water, fertilizer, pesticides, and cultural practices. In some locations, where effluent water is used, tall fescue's tolerance of salinity and acid soil will help maintain turf quality. In fact, in those two traits, tall fescue is the top ranked among cool season turfgrasses. Tall fescue is the deepest rooting cool season turfgrass, which is the main reason for its high marks in drought tolerance. Deep roots allow tall fescue to stay green during dry spells by utilizing deep soil

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moisture. The America type bluegrasses are known to use less water, because they turn dormant during these dry spells. However, when bluegrasses go dormant, weeds have the advantage.

On the other hand, tall fescue is certainly not flawless. In severe droughts, such as in the arid climates of the west, tall fescue will actually use all the soil moisture and not recover. In Turgeon's ranking, six of the 17 traits show tall fescue at a disadvantage. These include mowing height and cold tolerance, but in golf course roughs in Illinois and Indiana this would not be a problem. Cold tolerance can be an issue north of here and possibly in the northernmost parts of Illinois. Winter survival can be compromised when sheets of ice are present. Leaf texture, shoot density, mowing quality, and recuperative capacity are also disadvantages of tall fescue. Breeding efforts have increased density and decreased leaf widths of turf-type tall fescue. For example, my research at SIU with spaced plantings of tall fescue found 'Kentucky-31' leaf blade widths averaged 0.88 cm wide, while an improved variety 'Coyote II' measured 0.48 cm wide. More data can be found on tall fescue varieties through the National Turfgrass Evaluation Program (NTEP), www.ntep.org, and also through the new Chicago District Golf Association (CDGA) Sunshine Course tall fescue trial installed this year. Research results for visual quality, texture, color, and spring greenup in our trial will be posted in field day booklets, scouting reports, and online at www.cdgaturf.com. Variety trials compare recent tall fescues to industry standards like the forage-type 'Kentucky-31.' These can be used to find varieties with desirable traits.

As mentioned earlier, poor mowing quality is one disadvantage of tall fescue. This is caused by tough leaves that can shred when mower blades are not sharp. Tall fescue, however, ranks higher than perennial ryegrass, which can also shred from mowing. One trait receiving attention in recent years is the plant's ability to spread. Recuperative capacity is lacking in tall fescue, due to the absence of strong rhizomes. In recent years, companies have offered rhizomatous tall fescue, but research from Kansas State University shows that tall fescue's ability to fill in voids is limited (St. John et al., 2009).

Figure 2.
Short rhizomes do occur in tall fescue, but vigorous spreading is not available.

Don't forget the disease issues

Of course since the CDGA is focused on disease, it is important to describe those diseases that affect tall fescue. Tall fescue is most susceptible to brown patch and leaf spot. The threat is largely limited to the hot temperatures of July and August for brown patch and to wet, shaded seedlings for leaf spot. Pythium can also occur during the hot, wet conditions of the summer months. In contrast, tall fescue does not get dollar spot, summer patch, necrotic ring spot, or red thread as Kentucky bluegrass does. Overall, the disease potential for tall fescue is the lowest of all cool season turfgrasses in Dr. Turgeon's table.

Two added benefits

Two more benefits of tall fescue deserve mentioning. First, endophytes are fungal organisms that develop a symbiotic relationship with grasses. These fungi live in the above-ground portion of the grass plant in fescue and ryegrass species. Benefits of endophyte infection include additional tolerance to drought, insect herbivory, and soil acidity (Malinowski and Belesky, 2000). Varieties differ in their levels of endophyte infection. Suppliers should have information on levels within their varieties. Another benefit of tall fescue turf is the allelopathic effects it can have on some weeds. Allelopathy is the production of chemicals by a plant that inhibit the growth of nearby plants. In short, it is similar to a weak herbicide that is produced by the tall fescue plants and released into the soil. The science of allelochemicals is relatively new, but studies have shown mature tall fescue to limit the growth of crabgrass, white clover, and other legume crops (Peters and Mohammad Zam, 1981).

Blending with bluegrass can be an option

In some cases, the best of bluegrass and tall fescue may be desired. New tall fescue varieties with darker color and finer texture are better suited to mix with bluegrass varieties. In mixes of the two species, tall fescue is generally seeded at normal rates and bluegrass is added at 10 percent. In areas where recuperative capacity is needed, this mixture will provide the bluegrass needed to fill in voids. Also, any damage from disease can then be filled in with the resistant species.

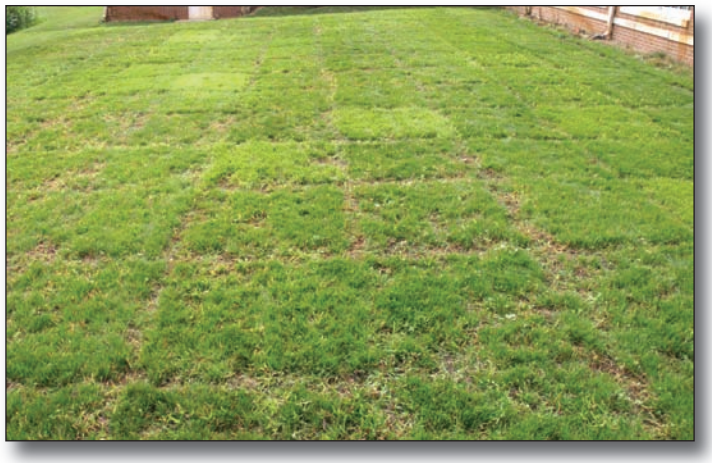

Figure 3.
Tall fescue varieties on Sunshine Course have many different shades of green.

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The CDGA variety trial

The benefits of tall fescue turf can reduce the inputs needed to provide excellent turf. With the numerous varieties available and the improvements made to turf-type varieties, we felt the addition of a variety trial would be a great asset to Sunshine Course. On May 22nd, the CDGA seeded a variety trial of 58 different tall fescues. Plots were strung out between the Midwest Golf House building and a wetland drainage ditch. The plot was planned to receive full sun and reduced wind movement in order to influence brown patch development. Each plot was seeded with 8 lbs/1000 sq. ft. Fertilizer was applied at 1 lb Nitrogen (N)/1000 sq. ft. of a balanced fertilizer. On June 23rd, an outbreak of Pythium blight occurred, and most plots were affected by only 1 to 3%. However, to prevent loss of turf coverage an application of Subdue Maxx was made at 1 fl. oz./1000 sq. ft. Drive herbicide was also used, on June 30th, to control crabgrass that germinated during establishment. On July 7th, plots were fertilized again with 0.5 lbs N/1000 sq. ft.

Germination was noticed in 10 to 12 days and plots began growing-in during June. On June 23rd before the first mowing, seedling vigor was rated on a 0-9 scale, with 9 being the greatest vigor. Many of the earlier varieties like 'Kentucky-31,' 'Southeast,' and 'Jaguar 3' have more vigor (table 1) and grow at a quicker rate than varieties that are selected for reduced vertical growth. Color differences are quickly noticed. 'Kentucky-31' has a lime green color since it was originally selected for forage rather than turf. 'Southeast' and 'Bulldog 51' have a lighter green color as well, but these varieties were selected to resist disease and perform in the warmer, humid climate of Georgia. On the other hand, varieties 'AST 1,' 'AST 2,' 'AST 3,' 'AST 4,' 'Banshee,' and 'Darlington' had the darkest green color (table 1). Seven weeks after seeding, the majority of the tall fescue plots had more than 85% coverage.

The CDGA will continue to collect more data from these tall fescues. Breeders are currently collecting plants from around the world and studying new techniques to develop varieties. For years to come, we will see more improvements out of this turfgrass species. **-OC**

Figure 4.
'Kentucky-31' tall fescue is still used extensively in utility turf. Its light color and tall growth habit can be undesirable in highly managed turf.

Figure 5.
'Jaguar 3' was top ranked in the NTEP 1992 trial. Now, many varieties have improved turf quality from those developed twenty years ago.

Figure 6.
Early testing has shown 'AST 4' to have the darkest color in our Sunshine tall fescue trial.

Acknowledgements

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Table 1.
Performance of Tall Fescue Varieties during their establishment on Sunshine Course, Lemont, IL, 2009.

Variety	Seedling vigor rating (0-9), 9 is most vigor, June 23	Percent cover, June 18	Percent cover, July 9	Color rating (0-9), 9 is darkest green, July 9
AST4	4.7 d-g	66.7 a-d	90.0 a-f	8.7 a
AST1	4.0 e-h	68.3 abc	90.7 a-e	8.3 ab
AST2	5.0 c-f	65.0 a-e	89.0 a-f	8.3 ab
AST3	3.3 gh	48.3 fgh	90.7 a-e	8.3 ab
Banshee	4.0 e-h	63.3 a-f	93.0 abc	8.3 ab
Darlington	3.7 fgh	58.3 a-g	84.0 def	8.3 ab
Fat Cat	4.3 d-g	60.0 a-f	94.0 ab	8.0 abc
AST7003	4.0 e-h	61.7 a-f	91.7 a-e	8.0 abc
Tulsa Time	4.0 e-h	55.0 b-h	86.7 b-f	8.0 abc
Wolfpack II	5.0 c-f	58.3 a-g	89.7 a-f	7.7 a-d
Inferno	4.0 e-h	60.0 a-f	89.0 a-f	7.7 a-d
Rocket	4.3 d-g	55.0 b-h	89.0 a-f	7.3 b-e
Blackwatch	4.0 e-h	56.7 a-g	86.7 b-f	7.3 b-e
Tahoe II	4.0 e-h	65.0 a-e	91.7 a-e	7.3 b-e
Shenandoah Elite	4.0 e-h	55.0 b-h	90.7 a-e	7.3 b-e
Talladega	3.7 fgh	48.3 fgh	81.7 f	7.3 b-e
SR 8550	3.7 fgh	43.3 gh	83.3 ef	7.3 b-e
Regiment II	5.7 cd	60.0 a-f	88.3 a-f	7.0 c-f
Grande II	5.7 cd	66.7 a-d	94.0 ab	7.0 c-f
Essential	5.3 cde	65.0 a-e	93.3 abc	7.0 c-f
Jamboree	5.0 c-f	58.3 a-g	93.3 abc	7.0 c-f
Dynamic II	4.7 d-g	61.7 a-f	89.7 a-f	7.0 c-f
Shenandoah III	4.7 d-g	56.7 a-g	90.0 a-f	7.0 c-f
Matador GT	4.3 d-g	60.0 a-f	91.7 a-e	7.0 c-f
3rd Millennium	4.3 d-g	56.7 a-g	94.7 ab	7.0 c-f
AST7001	4.0 e-h	51.7 d-h	91.7 a-e	7.0 c-f
Jaguar 4G	4.0 e-h	53.3 c-h	86.7 b-f	7.0 c-f
Finelawn Express	4.0 e-h	58.3 a-g	94.7 ab	7.0 c-f
SR 8650	4.0 e-h	63.3 a-f	90.0 a-f	7.0 c-f
Aggressor	3.7 fgh	60.0 a-f	93.0 abc	7.0 c-f
Traverse SRP	3.3 gh	51.7 d-h	87.3 a-f	7.0 c-f
Sitka	5.7 cd	65.0 a-e	93.0 abc	6.7 def
Lexington	5.3 cde	58.3 a-g	94.0 ab	6.7 def
AST7002	5.0 c-f	61.7 a-f	90.0 a-f	6.7 def
Quest	5.0 c-f	66.7 a-d	96.0 a	6.7 def
Coronado	4.7 d-g	68.3 abc	94.0 ab	6.7 def
Falcon V	4.0 e-h	55.0 b-h	87.3 a-f	6.7 def
Toccoa	3.3 gh	51.7 d-h	85.0 c-f	6.7 def
Guardian 21	2.7 h	40.0 h	86.7 b-f	6.7 def
SR 8600	5.0 c-f	60.0 a-f	94.7 ab	6.3 ef
Gazelle II	4.3 d-g	55.0 b-h	93.0 abc	6.3 ef
Rambler SRP	4.3 d-g	53.3 c-h	90.0 a-f	6.3 ef
Arid3	4.0 e-h	55.0 b-h	91.7 a-e	6.3 ef
Firenza	4.0 e-h	61.7 a-f	88.3 a-f	6.3 ef
Innovator	5.0 c-f	71.7 a	93.0 abc	6.0 f
Speedway	4.7 d-g	53.3 c-h	93.0 abc	6.0 f
Falcon IV	4.3 d-g	58.3 a-g	90.0 a-f	6.0 f
Endeavor2	3.7 fgh	50.0 e-h	86.3 b-f	6.0 f
Jaguar 3	7.7 ab	60.0 a-f	94.0 ab	4.7 g
Tar Heel II	6.3 bc	65.0 a-e	94.7 ab	4.7 g
Bulldog 51	7.3 ab	60.0 a-f	91.7 a-e	3.3 h
SouthEast	8.0 a	65.0 a-e	93.7 abc	3.3 h
Kentucky – 31	8.0 a	70.0 ab	90.0 a-f	3.3 h
LSD (0.05)	1.5	15.2	8.9	1.2

Varieties with the same letter within each trait are not statistically significant using Fischer's Protected LSD, P<0.05