

Dark-green Varieties Continue to Dominate Turfgrass Breeding for Color

By Melodee L. Fraser and
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Turfgrass breeders have been very successful in darkening the color of and broadening the range of color in cultivars of cool-season turfgrass species. Dark green color is often desired by turfgrass managers and homeowners in the United States because the turf is perceived to require less nitrogen fertility and to look healthier than lighter green cultivars. In Europe, lighter green colors are often preferred because of the prevalence of high populations of lighter-colored annual bluegrass (*Poa annua*).

In some turf situations, like golf courses, a combination of species and cultivars with a range of colors is often used to provide an interesting contrast throughout the property. Landscape architects may select a particular turf species or variety to complement or contrast with the colors of the other plants in the landscape.

How difficult is it to develop a darker green turfgrass variety? In tall fescue and perennial ryegrass, turfgrass breeders have made rather rapid progress in developing dark-green turf-type cultivars. In both of these species, early cultivars for turf were developed from germplasm used for forage or hay, which was very light green in color. Both species are highly heterozygous and heterogeneous, which means there is a lot of genetic variation within the species. Subsequently, it's rather easy to plant out a high number of plants in a population and select the low percentage of plants that are much darker green than the others. These darker plants can then be combined and recombined over a number of generations to develop a darker green variety. Dur-

ing the 1980s and 1990s, many breeding programs in the United States focused on developing darker green cultivars.

Rapid progress was made in the development of dark-green varieties and continues to be made. This can be illustrated by examining data from the National Turfgrass Evaluation Program (NTEP). Brightstar is an example of one of the first very dark-green perennial ryegrass cultivars. In the final report of the 1990 NTEP perennial ryegrass test (Morris, 1995), Brightstar and Palmer II tied for the top ratings for genetic color, rating 7.7 on a 1 to 9 scale, where 9 was darkest.

In the final report of the 1994 test, Brightstar averaged a 7 rating for color, but was left behind by Brightstar II, which tied for the top rating in the trial, an 8 (Morris, 1999). In the final data for the 1999 trial, Brightstar II rated a 7, but 37 other varieties had the same rating or higher (Morris, 2004).

A similar story can be told for Kentucky bluegrass. Midnight Kentucky bluegrass set the standard for dark color, beginning with the 1985 NTEP test (Morris, 1991). It continued to be the darkest variety in national trials through the end of the 1995 test (Morris, 1996; 2001). At the end of the 2000 NTEP test, Midnight rated 7.3 for genetic color, which was significantly lower than Moonlight, which rated 7.8 (Morris, 2006).

During the first year of the 2005 NTEP test, Midnight rated 7, while 30 other varieties rated the same or higher (Morris, 2007). Blueberry rated 7.8, followed by other very dark green varieties, including Emblem, Pinot, Moonlight SLT and Prosperity. In another five years, even darker Kentucky bluegrass varieties are likely to be developed.

While attention is often given to very



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PHOTO 1



Kentucky bluegrass cultivars show a wide range of genetic colors.

dark-green varieties, top-performing varieties in several species have a range of colors. Kentucky bluegrass cultivars range from light yellow-green to very dark blue-green (Photo 1).

Avalanche Kentucky bluegrass is an example of a light-green variety with outstanding turf quality, heat tolerance and wear tolerance. Fine fescue varieties come in almost every shade of green, from bright yellow-green to dark blue-green to bright blue (Photo 2). Creeping bentgrasses are sometimes chosen by golf course architects for their color, in addition to other attributes. Penn G-2 is light yellow-green; T1 is dark green; and Crystal BlueLinks is bright blue-green.

There are many colors and cultivars, to select from when turfgrass managers are choosing varieties for projects. Turfgrass breeders have been successful in developing many cultivars with excellent genetic color in all cool-season turfgrass species. For most breeders, color is now a secondary attribute of interest in variety development. More emphasis today is placed on developing cultivars with more economically and ecologically valuable traits, such as disease resistance, drought tolerance,

high and low temperature tolerance, salt tolerance, herbicide tolerance, shade tolerance and traffic tolerance. Making significant progress in improving these traits is more difficult and time consuming for turfgrass breeders. Most of these traits are controlled by multiple genes and require many cycles of selection, recombination and evaluation to obtain and confirm the stability of the trait.

Breeders are making progress in develop-
Continued on page 50

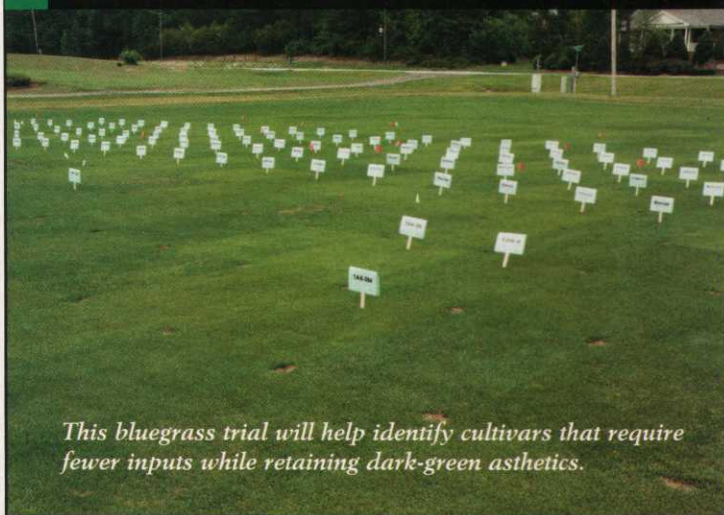
Lower-input turfgrasses are getting more emphasis today, but traits that make turf tolerant to heat, drought, herbicides and disease are controlled by multiple traits.

PHOTO 2



Fine fescue cultivars range in color from yellow-green to bright blue.

PHOTO 3



This bluegrass trial will help identify cultivars that require fewer inputs while retaining dark-green aesthetics.

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ing varieties with these valuable attributes, which require fewer inputs from the turfgrass manager, save money and are healthier for our environment.

There are now commercially available varieties with improved genetic resistance to some of the most problematic turfgrass diseases, such as brown patch, gray leaf spot, dollar spot, crown rust, stripe rust and stem rust. These varieties can dramatically decrease fungicides and herbicides applied to turf and to turfgrass seed production fields. New salt-tolerant varieties can be used in areas where non-potable water is required for turf irrigation. A turf manager with saline irrigation water likely will be pleased with a salt-tolerant variety that can survive difficult growing conditions, whether the variety is dark green or not. The use of dark-green varieties might help lower some inputs as well, as a turf manager might not apply as much nitrogen fertilizer as he would to darken a turf of a lighter green variety.

Turfgrass breeders have made major progress in developing darker green varieties and in developing varieties with a range of colors to provide choices for turfgrass managers. While color remains an important characteristic in turfgrass variety development, traits with higher environmental and economical significance are receiving

more attention from turfgrass breeders and managers alike.

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Before long, it will be time to think about cleaning up weeds on dormant bermudagrass turf. Don't forget about an old standby for taking care of tough weeds — Sencor® herbicide. This product offers highly effective, broad-spectrum weed control on both dormant and actively growing bermudagrass turf. In addition, Sencor can be tank mixed with MSMA to control crabgrass, nutsedge, barnyardgrass, common yellow woodsoorrel, sandbur and dallisgrass.

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