

Improved Turfgrass Varieties Can Reduce Your Environmental Impact

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Turfgrasses have many benefits, but oftentimes people question if pesticides, fertilizers, and water are justified to sustain a quality turfed area. Although these inputs have long been required to produce thick and dark green turfgrass, some turfgrass breeders have focused on improving the genetics of turfgrasses to produce high quality turf with fewer inputs. Improved turfgrass varieties with increased density, better color, deeper rooting, and improved disease resistance through improved breeding can reduce the overall environmental footprint.

Beneficial Turfgrass Features

Many people select a turfgrass species and variety based on cost, but choosing an improved variety can reduce environment risk and overall maintenance costs in the long-run. Look for the following characteristics when selecting a turfgrass variety.

Require Less Water

Not all grasses use water equally. For example, warm-season turfgrasses such as bermudagrass and zoysiagrass access water from greater soil volumes because they have deeper root systems compared to many cool-season turfgrasses. Further, warm-season grasses are able to reduce the aperture of leaf pores (called stomata) to reduce water losses, using less water than cool-season grasses during warm weather. Unfortunately, due to the cold winters experienced in the transition zone (includes KY, TN, VA, southern IN and OH, etc.), warm-season turfgrasses are not the best fit for our area as these grasses can winterkill.

Cool-season grasses are used frequently throughout the transition zone for lawns, parks, golf courses, and sports fields. However, cool-season grasses vary greatly in water use efficiency. For instance, Kentucky bluegrasses typically require more water to remain green and growing than tall fescues, as bluegrasses generally have a more shallow root



Figure 1. Improvements in varieties have resulted in significant water savings due to drought tolerance. The lawn on the right is an improved tall fescue variety, while the lawn on the left is a mixed tall fescue/Kentucky bluegrass stand with inferior drought tolerance. Neither lawn was irrigated.



Figure 2. Water wasted from a home irrigation system watering sidewalks and driveways.

system. Even within a variety, large differences in drought tolerance can exist. Some varieties are being bred specifically for water savings while others may be bred for aesthetic qualities (Figure 1).

Irrigation systems (or hose and sprinklers) are also quite often improperly in-

stalled and end up watering hard surfaces such as driveways (Figure 2), potentially wasting vast quantities of water. By planting drought tolerant varieties, irrigation systems can remain off for longer periods of time.



Figure 3. Varietal improvements include factors such as color, density, texture, and growth rate. The plot in the middle is Kentucky 31 tall fescue and is surrounded by improved turf-type tall fescues.

Require Less Fertilizer

The application of nitrogen based fertilizers results in a turf with darker green color, which most Americans appreciate. Further, the use of some fertilizer typically keeps the turf healthy and able to recover from wear and tear. Additional applications for aesthetic purposes should be minimized and, in some cases, not needed by improved cultivars. Many new turfgrass varieties have been bred to include, among other improvements, a darker green color (Figure 3). Because newer varieties naturally exhibit improved color, nitrogen applications can be reduced or in some cases eliminated while still maintaining a good quality lawn. Further, excessive nitrogen applications can have a negative impact on root production, which can directly influence water access by the plant. Excessive nitrogen applications have also been shown to lead to lush growth and less stress tolerance which can increase disease and insect susceptibility. Finally, excessive nitrogen applications have also been shown to increase the potential for scalping (removal of too much leaf tissue at one time), which also has a negative influence on root production.



Figure 4. Pesticide signs are helpful for warning of potentially dangerous situations, but may frighten the general public, regardless of the level of safety of the product used.



Figure 5. A perennial ryegrass trial showing differences in levels of resistance to the pathogen *Pyricularia grisea*, the causal organism for the disease gray leaf spot. Breeders have focused significant attention to producing varieties that are less susceptible to diseases.

Require Fewer Pesticides

Pesticides are used to reduce populations of insects, weeds, and diseases that may interfere with the aesthetics or use of a turfed area. When people see or smell signs of pesticide use, some become concerned about their personal safety (Figure 4). Professional turfgrass managers are taught how, where, and why to use pesticides effectively and safely to reduce pest pressure and to protect themselves

and the environment. However, homeowners may lack the knowledge and the necessary equipment for proper pesticide applications; and they may not realize the potential injury that could occur with misapplications. By improving pest tolerance as well as density of turfgrass stands, the need for pesticide applications decreases. Improved varieties have shown great reductions in severity of common turfgrass diseases (Figure 5). Further,

many new varieties have improved density which reduces weed populations due to increased competition between species for space, nutrients, light, and water (Figure 6).

Require Less Mowing

Several newer varieties have slower rates of growth compared to older varieties (Figure 7). Some growth is beneficial as the turf occasionally will need to recover following wear and tear. However, excessive amounts of top growth does not increase turfgrass health. Over-fertilizing, especially with nitrogen can lead to excessive top growth, shorter root system, and less disease tolerance. The benefits of a slower growing turf include less frequent mowing, which allows for more time doing other things; less mower maintenance and potentially less emissions from running the mower infrequently. Further, according to the Environmental Protection Agency, an estimated 17 million gallons of fuel is spilled while filling mowers each year—fuel that can run directly into the storm system or contaminate soils and ground water.

Save Money

Reducing your environmental impact and saving money don't always go hand-in-hand. The initial investment to purchase improved varieties that are more sustainable will likely be higher than for older varieties. Keep in mind the old adage—you get what you pay for. With inexpensive seed, the costs to maintain and improve the turf stand in the long run will likely be much higher than that if sustainable varieties had been used. These costs could include higher pesticide expenses to control weeds, diseases, and insects; the need to mow more frequently (in some cases); higher fertilizer expenses, and greater water needs. Keep in mind, however, with older varieties it is completely acceptable to not use chemicals, fertilizer or water to improve the aesthetics, as long as you can tolerate a lighter green color, potential weediness, etc.



Figure 6. Low-density turf results in space for weeds to germinate and establish, whereas high density turf increases competition between species and results in fewer weed problems.



Figure 7. A newly seeded tall fescue variety trial showing a much taller plot of Kentucky 31 tall fescue in the background, surrounded by slower growing turf-type tall fescues.

Finding Improved Varieties

You will have to do some homework to make sure you are purchasing quality seed. Try to purchase varieties with as many of these sustainable characteristics as possible, i.e. find a variety that has improved pest tolerance, and reduced fertilizer and water needs. A good place to look is on the National Turfgrass Evaluation Program's website (www.NTEP.org) for varieties that show these improvements (Figure 8). Another great resource for information on improved varieties is your local County Agent. By taking your time to identify and purchase improved varieties, you can have a better-looking lawn and reduce your environmental footprint.

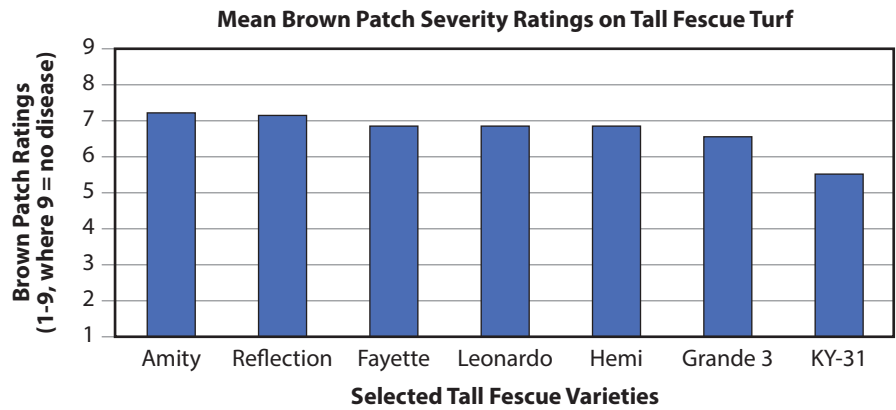


Figure 8. An excerpt from the most recent national tall fescue trial showing mean differences in brown patch disease tolerance between tall fescue varieties. KY-31 had significantly more brown patch when compared to the varieties listed (LSD=1.1). The complete table can be found at https://www.ntep.org/data/tf12/tf12_18-13f/tf1218ft33.txt.