Back to the Basics: Soils Influence on Turf Selection and Management

By Shane Griffith, Graduate Student, Department of Soil Science, University of Wisconsin - Madison

Editors Note: This month we welcome Shane Griffith a Graduate Student under Dr. Doug Soldat. Shane is researching the use of biosolids to produce Kentucky bluegrass sod and anticipates graduating in December.

One of the most important components of successfully maintaining a home lawn is selecting the best grass for the location. Are there shade issues? Is there a steep slope? Did the developer only cover the subsoil with two inches of good topsoil? Will my kids invite half the neighborhood over and trample everything in sight?

Once the proper grass is selected, the next key is adequate mowing, fertilizing, watering, etc. Unfortunately, new homeowners are often uninformed or even misguided when making decisions about what grass to plant. For example, my sister recently purchased a new house and went to Home Depot to buy grass seed. She selected annual ryegrass because the bag said it's great for a seasonal lawn, and in Wisconsin the lawns are always seasonal, right? Even educated turf managers can fall into the trap of choosing the wrong grass for a location. Often decisions may be made after consulting the UW-Madison Kentucky bluegrass NTEP trials. However, these plots are maintained as a golf course fairway at a 0.75 inch height of cut, watered three times weekly, and are well fertilized. Therefore, grasses that look to be the right choice in the NTEP, may not be the best choice for a minimally managed home lawn or golf course rough.

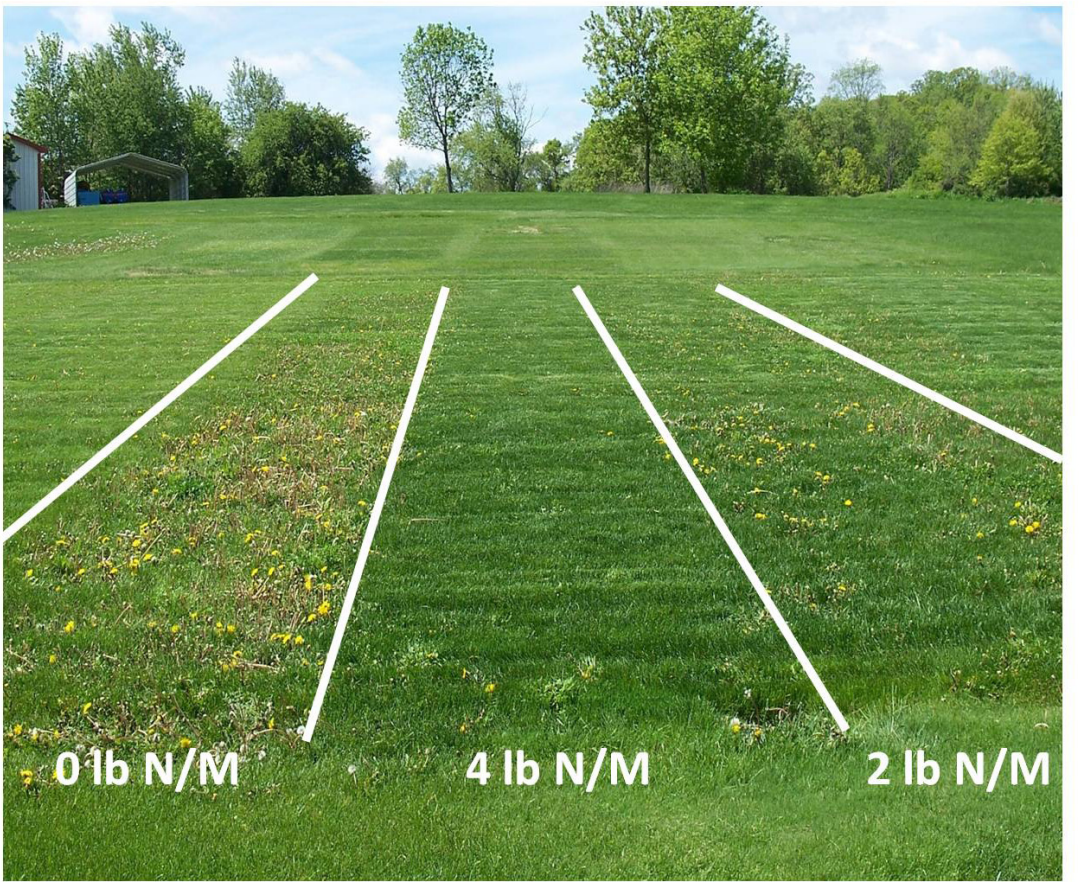
A multi-year study was just finished at the OJ Noer Turfgrass Research and Education Facility that investigated common home lawn grasses maintained with different mowing heights and fertilizer rates. An elite and common variety of Kentucky bluegrass, fine fescue, tall fescue, perennial ryegrass, and the Madison Parks mix (KBG, FF, and PRG) were all established in fall of 2007. Plots were mowed at 1.5, 2.5, or 3.5 inches and fertilized with 0, 2, or 4 lbs N/M/year. Q4® Turf Herbicide was applied during establishment, but no further chemical applications were made to manage weeds or diseases.

Results of the study take us back to Turf Management 101. Regardless of what grass was planted, plots mowed at 1.5 inches were full of weeds by the 2010 season (crabgrass, creeping bentgrass, and dandelion). Once again my sister (I hope she never reads this) serves as a great example of how this plays out in the real world. I watched her mow her new lawn with a rotary set as low as it can go (she claimed it was one click above the lowest setting!). A year later she was asking me for the best way to kill the crabgrass in her lawn…it was a good teaching moment. A second, not surprising, result was that fertilized grass had fewer weeds than unfertilized grass. However, no difference was found between 2 and 4 lb N/M suggesting that some fertilizer is necessary, but more is not necessarily better when growing a lightly-trafficked lawn.

Back to the title 'Soils influence on turf selection', we lucked out and had a difference in soil quality from one replication of the study to the other. One set of plots is on a slope that was subject to erosion of the top soil when it was under a corn/soybean rotation over 20 years ago. The other set of plots were at the bottom of this slope, and had good black top soil to a two foot depth. This gave us the opportunity to see how different grasses performed based on inherent soil fertility. On a low fertility soil elite Kentucky bluegrass had a big response to applied fertilizers, with 0 lb N/M resulting in weak turf and 4 lb N/M resulting in dark green color and little weed pressure **(Fig. 1)**.

On a high fertility soil, bluegrass looked weak at 0 but fantastic at 2 and 4 lb N/M. Tall fescue on the other hand looked fantastic on both the low and high fertility soils independent of fertilizer application rate **(Fig. 2).**

Fig. 1. Elite Kentucky bluegrass ('Kingfisher') grown on eroded top soil needs 4 lb N/M/yr to maintain density and keep weeds out.

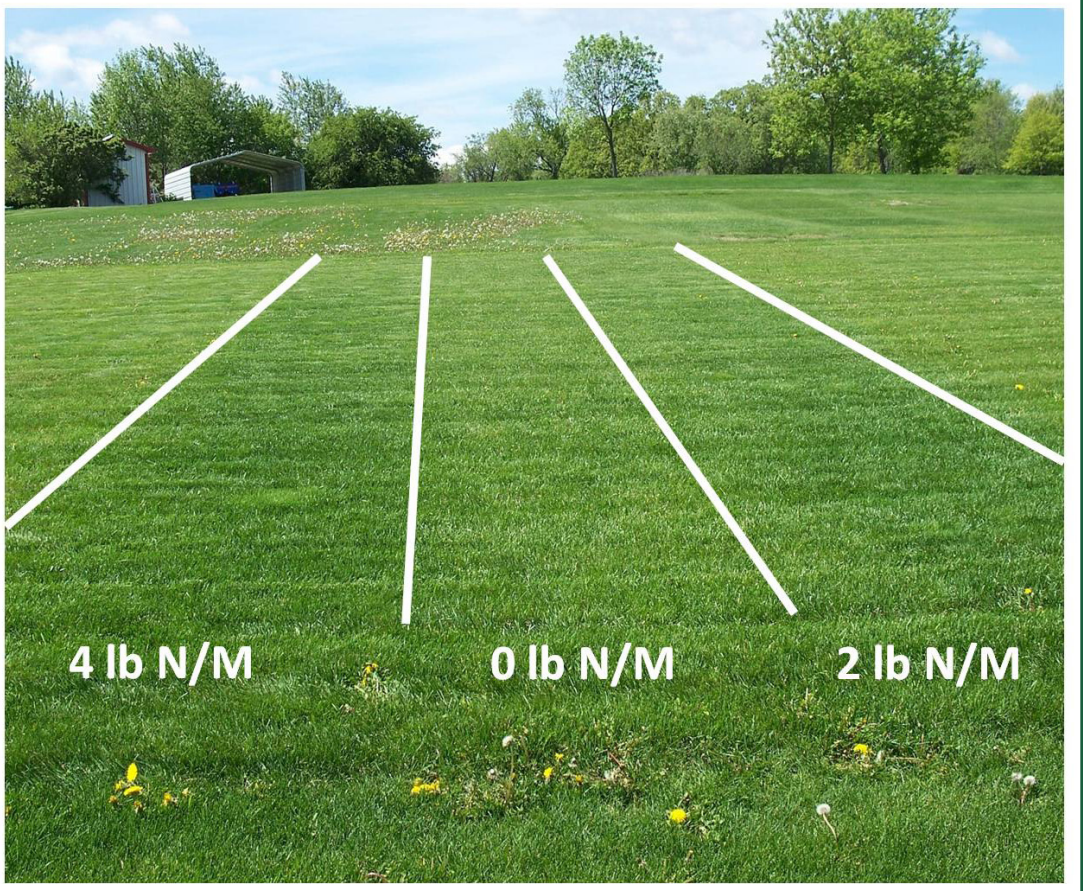


Notice the green color of tall fescue and limited weeds in the photograph taken three years after establishment at 0 lb N/M.

So what's the point? More often than not new home lawns are established on a thin layer of nutrient rich topsoil (2 inches?). More information is needed about home lawn fertilization practices in Wisconsin, but a study in Maryland has showed that 24-48% of lawns are do-it-yourself, 20-31% are fertilized by a professional company, and 32-44% of lawns are unfertilized (Law et al., 2004). This says that approximately 1/3 of lawns are unfertilized and another 1/3 are self-fertilized. Most homeowners I know say they fertilize, but only actually do it once per year, usually in late fall when recent studies suggest fertilizer uptake may not be optimal (Lloyd et al., 2011). In Wisconsin, lawns established from sod are almost exclusively composed of elite Kentucky bluegrass cultivars. Lawns established from seed are usually a contractor's mix similar to the Madison Parks mix (KBG, FF, PRG). Our results suggest that it is time to reconsider the use of elite Kentucky bluegrass when homeowners are not going to put the time, money, and effort into proper maintenance of their lawn. Instead, tall fescue should be considered. Of course, the great equalizer is soil quality. If lawns are established on lots of good topsoil, the chances of success are always greater.

The lawn industry should reconsider grass selection as a majority of home owners will not care for elite Kentucky bluegrass lawns with needed maintenance inputs, often leading to weak, weed-infested lawns. Tall fescue appears to be a great option for low-maintenance sites in Wisconsin. Of course, like any plant, tall fescue has its weaknesses such as poor winter survival if ice cover is present and high susceptibility to brown patch in the summer. Therefore, remember to step back, consider each lawns unique characteristic's (including likely management inputs), and make the decision that gives the best chance for a healthy lawn.

Fig. 2. Tall fescue ('Grande II') grown on eroded top soil shows little response to applied fertilizer and keeps out weeds with no fertility. Photos taken by B. Kreuser.



A special thanks to Brad DeBels, Mark Garrison, Bill Kreuser, Eric Melby, and Dr. Doug Soldat who all dedicated time to make this project a success. If interested in finding out more about what turf species performed the best in this study please contact segriffith@wisc.edu.

Refrences:

Law, N.L., L.E. Band, and J.M Grove. 2004. *Nitrogen input from residential lawn care practices in suburban watersheds in Baltimore county, MD.* Journal of Environmental Planning and Management. 47:737-755.

Lloyd, D.T., D.J. Soldat, and J.C. Stier. 2011. *Low-temperature N uptake and utilization of three cool-season turfgrasses under controlled environments.* HortScience. In Press.

Merry Christmas & Happy New Year!