FEATURE ARTICLE

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To Blend or Not to Blend . . . Questioning the Common Practice of Using Turfgrass Mixes

How often do we question the management practices that have been used over the years? Are the original data supporting these practices still valid, considering the use of more modern equipment and improved plant varieties? Maybe some common practices deserve a second look. One issue is the use of blends and mixes for turfgrass stands. Do they really provide the benefits we expect compared to newer, superior-performing varieties planted in monoculture? In the past, distinguishing between turfgrass varieties has been fairly subjective. Today, with the aid of modern biotechnological tools, we are able to differentiate varieties based on DNA fingerprints. Using these tools may allow us to revisit the usefulness of management practices of the past.

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Why blend?

Grass species, such as perennial ryegrass, are often mixed with Kentucky bluegrass to provide faster stand establishment and soil stabilization during the long bluegrass germination period. Fine fescues are mixed with Kentucky bluegrass to improve shade tolerance. But what about limiting a stand to one species and blending three to five varieties? Do grass varieties differ that greatly in their characteristics to gain any benefit from blending?

- Research being conducted at the University of Illinois will soon determine if blending still makes sense.
- The usefulness of blending several varieties together in a turfgrass stand is largely an untested theory.
- If one out of three varieties originally seeded into a blend predominates time and time again, why don't we use that single variety by itself?
- Varieties differ greatly in their performance from one environment to the next, and not knowing the composition of a blended stand is a handicap preventing optimal turf performance.

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Our parents told us "not to put all of your eggs in one basket." Our financial advisors stress the importance of diversification of our investments. The diversification of grasses included in a blend is largely an untested theory. Turfgrass breeding efforts have been accelerated in the last 25 years to bring varieties that are resistant to disease and tolerant of stress while also improving aesthetic quality. Why not use the NTEP (National Turfgrass Evaluation Program) data for our region and select one "improved" variety with all of the characteristics we desire? Many superintendents established monostands of 'Merion' Kentucky bluegrass when this "leaf-spot-resistant" variety was released, only to find susceptibility to summer patch (*Magnaporthe poae*).

We blend out of habit and in support of an untested theory that blending provides a sense of security. Many people include bonds in a portfolio of investments to provide protection and security against drastic downturns in the stock market. After all, it is better to lose a little than lose everything. Including a variety that is resistant to disease in a blend with other susceptible varieties may protect against complete loss of a stand after a major disease outbreak. Alternatively, not all turfgrass stands are created equal and they are usually not uniform. Therefore, including varieties in a blend that are more disease-, heat-, cold-, shade- and traffic-tolerant suggests we will cover all of our bases. The shady areas will see the shade-tolerant variety excel, while the heavily trafficked areas will see the traffic-tolerant species excel. Again, this practice is largely untested.

DNA fingerprinting

You may ask why this theory is untested. Quite simply, the identification of grass varieties in a blended stand after the stand has matured is very difficult. Yes, turfgrass varieties differ in color, density and leaf texture, but how confident would you be in distinguishing between varieties in a blended stand using these subjective traits? Early research used proteins to distinguish between varieties because most varieties usually produced slightly different proteins from one another. The problem with this method was consistency. Proteins are the products of gene expression and expression can vary from one day to the next and from one environment to the next.

At the University of Illinois, we are using DNA to identify the variety of individual bluegrass plants. Essentially, DNA can be extracted and manipulated in such a way as to create a fingerprint, which is unique for each bluegrass variety. Humans can be identified from one another not only by the unique ink prints made by their fingers, but also by DNA analysis. You had to be unconscious in 1994 and 1995 to not be bombarded with the hype surrounding the O.J. Simpson trial. Remember how DNA from blood samples was used to determine that O.J.'s blood was spread throughout the crime scene? The investigators used DNA technology. Here in Illinois, DNA is being used to determine whether prisoners on death row are indeed guilty of their alleged crimes. The great value in DNA fingerprinting is reproducibility. DNA does not change with time or environment unless it has been mutated in one form or another and the DNA from any particular Kentucky bluegrass variety does not change drastically over time or from one environment to another.

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Once the DNA fingerprint for a Kentucky bluegrass variety has been determined, individual bluegrass plants can be identified in blended stands. The development of this method allows for the tracking of shifts in the population over time. We can also determine if, after several years of growth, a given variety is distributed evenly in a blend or if certain varieties are clumped together in patches. If one out of three varieties originally seeded into a blend predominates time and time again, the next question is, "Why use the weaker varieties in the first

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A Look at GCSAA's Limited Budget Outreach Program *(continued from page 11)*

4. Publicize the program at most meetings and encourage participation of volunteers.

5. Encourage meeting attendance by those superintendents employed by limited-budget facilities.

I hope that you can find the time to assist in the program's implementation. If you have any questions please contact me, Don Ferreri or GCSAA directly.

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place?" What characteristics allow for one grass variety to outcompete others in a blended stand? Is rhizome or root aggressiveness more important? Do disease-resistant varieties flourish in stands following disease outbreaks? Furthermore, what factors should be considered in selecting seed to use in a blend? Since the number of seeds per pound and percent germination differ from one variety to the next, and even between two seed lots of the same variety, we should be blending turfgrass seed based on seeds per pound and percent germination to achieve our desired percentages of varieties in a mature stand.

Clearly, a lot of questions remain to be answered concerning turfgrass ecology now that the technology for identifying individual plants has been developed. Some of these questions will be answered soon, but using blends may still have some usefulness until we learn more about the subject. Determine the worst threats to turfgrass survival at your site and then choose grasses that have improved resistance or tolerance of those forms of stress. Make sure you consider the number of seeds per pound, percent of germination and aggressiveness of the variety before choosing your blend. A turfgrass manager must know what species are present in a given stand to achieve optimum performance. The same is true for varieties. Varieties differ greatly in their performance from one environment to the next, and not knowing the composition of a blended stand is a handicap preventing management from optimizing turf performance.