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Division of Christensen Power Equipment Inc. 9506 W. Manhattan Rd., Frankfort, IL 60423 areas. Most years, we get enough precipitation (even without supplemental irrigation) for many weedy species to thrive and for unmowed sites to be densely vegetated.

Three questions, then, beg answering.

1) What species should we be planting—natives, fescues?

2) How are we going to keep weeds out of a naturalized rough that is planted to a low density of desirable grasses/forbs?

3) What seeding rates and final plant densities will be required to establish a rough from which you can find and extricate your golf ball?

All good (tough) questions! In work started this autumn at the Midwest Golf House Complex, we have initiated research and demonstration areas in an attempt to identify grasses and management techniques better suited to long roughs or out-of-play areas. For example, we recently established a study in which (reportedly) Roundup-tolerant hard fescue and tall fescue varieties were planted at varied seeding rates. Our objective is to create a rough that is tall and rarely mowed, but is also "open" and

Table 2. Seeded grasses for rough areas.		
Agrostis palustris	Creeping Bentgrass	
Agrostis tenuis	Colonial Bentgrass	
Buchloe dactyloides	Buffalograss	
Dactylis glomerata	Orchardgrass	
Festuca arundinacea	Tall Fescue	
Festuca longifolia	Hard Fescue	
Festuca ovina	Sheep Fescue	
Festuca rubra	Creeping Red Fescue	
Festuca rubra ssp. commutata	Chewings Fescue	
Lolium perenne	Perennial Ryegrass	
Phleum pratense	Timothy	
Poa compressa	Canada Bluegrass	
Poa pratensis	Kentucky Bluegrass	
Poa trivialis	Rough Bluegrass	

"playable." Roundup will be applied to control weeds that invade the plots, hopefully without killing the desired grasses. As the study unfolds, we will determine the species, planting density and herbicide-application schedule for an acceptable tall rough.

We also started planting a large demonstration area to display more than 40 turf and ornamental grasses (both natives and "exotics"—see Tables 1 and 2) in a long-rough or unmowed, naturalized setting. These grass plots will be 10×15 feet, and easily accessible for viewing along the first hole of the course. In September, we seeded 10 of the turfgrasses; the

remainder will be planted next spring and early summer (seed and plugs). Along with the grass demonstrations, we also hope to install two areas of short, native prairie mixes available from a Wisconsin nursery. All of these areas will be available for viewing by golf turf managers and other personnel once established.

Finally, other unmowed rough areas at the Midwest Golf House's three-hole Short Course will be planted to a fine fescue blend and will provide an opportunity to initiate management studies in the future. Is there a management scheme that will allow these long-rough areas to be playable? While it remains to be seen, we do intend to try a few different fertility, mowing and PGR regimes.

Other opportunities abound. One creative suburban superintendent suggested using PGRs on tall native grasses in an attempt to create a playable rough. Others have suggested unusual native species, as well as plant mixes, to include in future plantings. If you have used a plant mix that works well in your roughs, or have devised a management scheme that is successful, please let us know.





"The Look" does not come without some perils, namely, weeds (thistle) and a tough lie to play from!



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SPEAKER – N – SITE John Gurke, CGCS Aurora C.C.

Dr. A. J. Turgeon –N– The 50th Annual MAGCS Turf Clinic

Dr. A. J. Turgeon.

Over the years, Dr. A. J. "Al" Turgeon, now professor of turfgrass management in Penn State University's Department of Agronomy, has been a speaker at many of our educational seminars, including the 25th Annual Midwest Turf Clinic. We look forward to celebrating our 50th installment of the annual Midwest Turf Clinic with Dr. Al Turgeon once again providing us with his wisdom and unique experience.

Dr. Turgeon has to his credit nearly 300 publications, including a popular textbook, Turfgrass Management, that we all carried with us in our backpacks during our college years. This "bible" is now in its sixth edition. Dr. Turgeon grew up on a golf course and worked at Metropolis Country Club in White Plains, NY through his high school and college years. He majored in turfgrass management at Rutgers University, where he earned his B.S. degree in 1965. Graduating with an ROTC commission, he then served a three-year tour in the U.S. Army (including one year in Vietnam) as an infantry officer, helicopter pilot and meteorology instructor. He resumed his graduate study at Michigan State University, where he earned his Ph.D. in 1971. His first professional position was at the University of Illinois as assistant, then associate, professor of turfgrass management. He then moved to Texas, where he was professor and resident director of research at the Texas A&M Research and Extension Center at Dallas from 1980 to 1983.

When life as an Aggie became dull, Dr. Turgeon moved to the private sector and joined the Tru Green Corporation as vice president for research and technical services from 1983 to 1986. His next move was to Penn State, where he served as professor and head of the Department of Agronomy (he turned down an offer to become head coach of the Nittany Lions football team, explaining that Joe-Pa, in his opinion, still had a few good years left). In 1994, he resigned from his administrative position to devote full-time efforts to turf-grass education and associated pedagogical (say that three times fast) research and development, with emphasis on innovative computer-based and inquiry-based learning resources and techniques.

Dr. Turgeon has to his credit nearly 300 publications, including a popular textbook, *Turfgrass Management*, that we all carried with us in our backpacks during our college years. This "bible" is now in its sixth edition. He currently serves as senior faculty coordinator of the Penn State World Campus' Turfgrass Certificate Program, a Web-based series of undergraduate courses with students enrolled from all over the world.

The MAGCS looks forward to a compelling presentation by Dr. Turgeon and thanks him for sharing another milestone moment with the members of the Midwest.



FEATURE ARTICLE Dr. Andy Hamblin & Karen Simmons University of Illinois

Do Blends Provide Better Disease Resistance?

Imagine Kentucky bluegrass varieties 50 years ago. The variety 'Merion' was really the only one sold as seed that was available at the time. Today, consider the National Turfgrass Evaluation Program that includes 173 Kentucky bluegrass varieties measured over 31 locations across the United States. What a marvelous opportunity we have as turfgrass managers to select the most suitable grasses specific to our unique needs. In addition, we are learning more and more about turfgrass genetics and physiology to build better grasses. We have come a long way since then.

> Over the past several years, we have been studying the true nature of blends of Kentucky bluegrass. The results we have found may surprise you. This research brings to question our reasons and theories regarding the use of blends and their potential application for the future.

Let us begin with a few simple questions.



1) How many turfgrass managers use blends of Kentucky bluegrass? Why do we use blends?

Actually, it is unlikely that many use monocultures of KBG. Almost all use blends. Blends are supposed to provide plasticity so a turf can withstand both biotic and abiotic environmental stresses. Because Kentucky bluegrass is apomictic, that is, it forms seed without fertilization, plants are virtually clones of one another, making them highly genetically uniform. Therefore, we use blends to encourage greater genetic diversity. The most important reason for blending has been for disease resistance. The general idea is to include a complement of varieties that encompass the diseases endemic to our areas. This is the old don't put all your eggs in one basket approach.

2) How many use blends of creeping bentgrass? Is this a good idea?

Few golf course superintendents, if any, use blends of bentgrass

A scene from the University of Illinois Turfgrass Research Farm.

(continued on page 18)

Do Blends Provide Better Disease Resistance? (continued from page 17)

on their greens and fairways. But why not? Your first response may be: How are we going to manage a bentgrass blend? It is hard enough to learn about a single variety and then manage it properly over all the different environments that are present on a golf course. So, why not apply the same reasoning to Kentucky bluegrass? The diversity of Kentucky bluegrass is getting broader, especially for characteristics like color, texture, disease resistance and aggressiveness. Most of our reasons probably come back to the adage: but we've always done it that way. We have advanced too far in our technical knowledge to leave it there.

Let us review some of the results from our previous studies:

All seed is not created equally. Depending on the genetics of a variety, pollination efficiency, seed set and storage conditions, there are inherent differences in seed before it ever leaves the bag. Some seed will not be viable, and this may be different between seed lots. Some years simply yield better than others.

Like the Sooners of Oklahoma, whoever gets there first— WINS. Seed of some varieties will germinate and grow faster than others. Once a plant gets a stronghold, it is difficult to compete with it. The same is true with overseeding. It is futile for a new little seed to compete with a plant that has an extensive root system, crown and rhizome carbohydrate stores, and vast aboveground photosynthetic mechanisms.

Over time, the most aggressive variety will continue to fill space until an equilibrium is reached. For example, once the most aggressive variety reaches a certain





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percentage, maybe 60 or 70% of the blend, it will remain at that percentage unless drastically disturbed.

The bottom line: Why plant the weaker variety in the first place if it doesn't remain there to the end? This completely undermines the theory of blending where the diversity that is intended cannot possibly live up to its full potential.

How Diseases Affect Blends

At the University of Illinois, we are currently studying the effects of several diseases on Kentucky bluegrass blends. Our studies include Bipolaris leaf spot, powdery mildew, pink snow mold, Drechslera leaf spot, Pythium blight and leaf rusts. The reason we are studying so many diseases is to not make assumptions that all diseases are alike. Each disease has specific mechanisms for attacking plants. In turn, each plant has specific ways to provide resistance. The epidemiology, or process by which diseases are spread, is highly variable among diseases. For instance, the dollar spot fungus spreads by mycelial threadlike structures that move short distances leaf-to-leaf and longer distances by mechanical or foot traffic. On the other hand, most leaf spots move by conidia that are spread by wind, splashing rain and traffic.

Our current research identifying the effects of Bipolaris leaf spot on

⁽continued on page 20)



Do Blends Provide Better Disease Resistance? (continued from page 18)

blends of Kentucky bluegrass shows a linear or *additive effect*. That is, adding more of the resistant variety gives a corresponding level of disease resistance. No more or no less. **The bottom line:** for this particular disease, if you include 30% of a resistant variety in a blend, you get 30% resistance. The other 70%, if susceptible, will get disease.

Our research on powdery mildew was a bit more variable. However, we can hypothesize that with more disease pressure, powdery mildew would affect blends in more of an *inoculum overload* manner. **The bottom line:** if you add susceptible varieties to a blend, they will undermine the resistant varieties that are included.

This illustrates why the only acceptable blend is one in which the barrier effect is actively protecting plants. This means that when a susceptible plant gets infected, the surrounding resistant plants will impede the spread of disease. For most turfgrass diseases, this is not realistic. Turfgrass plants are crowded too close together. Frequent mowing, cart and foot traffic, daily irrigation and wind movement completely undermine resistant barriers to disease progress. It is more likely that both the additive and inoculum overload concepts are present. The bottom line: if you include a resistant variety at 30% of the blend, then you'll get either 30% resistance or less. So, for disease resistance, blends are simply not an effective means for minimizing disease.

We have so many varieties to choose from and plenty of resources to help us select the best varieties. If you look at most trials, few actually evaluate blends of grasses. Instead, they are planted as monocultures and then we piece together (by supposition) what varieties we should include in a blend. We've come a long way since 'Merion' and the other old standbys. If you are looking for a quality stand of grass, just like what is expected with a monoculture of creeping bentgrass, why not choose the best single variety of Kentucky bluegrass for your purposes.

There are some great varieties of Kentucky bluegrass on the market right now with many choices that fit your specific locations and needs. If you decide to choose a monoculture, there are many resources at your disposal:

- The proof is in the pudding: Look at your neighbor's grass. Ask how it is managed; ask what problems they've had; look at its quality; and ask the name of the variety.
- Take a look at university or other demonstration and research plots. You can see firsthand how varieties perform in your area.
- Use regional and national trials like the National Turfgrass Evaluation Program (www.ntep.org). You can ask for a specific analysis that factors in the regions closest to your conditions. Never expect a grass that is rated high nationally to perform as



This illustrates why the only acceptable blend is one in which the barrier effect is actively protecting plants. This means that when a susceptible plant gets infected, the surrounding resistant plants will impede the spread of disease. For most turfgrass diseases, this is not realistic.

well in your location. I hope to never hear anyone say, "I want a blend of the top five nationally."

• Ask your local extension person or turfgrass specialist to recommend a variety specific to your needs. You may actually need to find different grasses for each situation.

In relation to diseases in particular, be sure to concentrate on diseases that are common to your area. If you don't commonly see copper spot or bacterial wilt, don't worry about those diseases. Concentrate on diseases like summer patch, brown patch and leaf spots that are endemic to your area. If the grass is deficient in one particular disease, make sure it is an easy one to control. For instance, you wouldn't want a variety that is susceptible to Pythium blight. Not only can it be costly to control, the disease can have devastating effects. Diseases like leaf rust are easy to control on mowed turfgrass and usually don't kill the plants. If this is the only weakness in your variety, your job as a turf manager will be that much easier. -Vestowed

20 November 2002 **On Course**