

You are, rightly or wrongly, closely associated with what you do, and what we do is exciting, exacting and difficult work. The world needs to know that.

Unfortunately, it's a tough battle to tell the story. We are still fighting the 'Rodney Dangerfield Syndrome'. That miserable, albeit funny, movie has made the battle even more difficult and protracted. The image too many have is purely Bill Murray—unshaven face, big belly, dirty clothes, and all that. Time, fortunately, is on our side, and the movie "Caddyshack" will someday be forgotten.

And let's face it—there will always be golf players who reduce our responsibilities to no more than cutting grass.

But we are making progress. Education is part of it, both continuing education for established superintendents and college for those who aspire a place among us. The product we turn out is another part of it—quality playing conditions on golf courses have become the rule rather than the exception. And individual efforts by each of us at his own course makes the most difference and is most important of all. Communication, we have all learned, is the key. Intelligent and straightforward dealings with players, one on one, green committees and boards of directors all add to the image of a dedicated and knowledgeable professional.

GCSAA has weighed in; some things they've done have been helpful; others are insignificant; a few are exaggerations.

The best way to portray us is to portray us as we are. We are not (90% or more) a coat and tie crowd. We do not, I'd guess to almost the same percentages, dress like the golf pro, either. The latest "for sale to the highest bidder" episode in GCSAA is the superintendent golf shoe deal with Etonic. Forsaking the temptation to comment editorially, I will say they'd have served us better to offer a member "benefit" with GCSAA logo work boots, say Red Wings or Wolverines. The reality is that most of us still wear work boots, out of either choice or necessity.

A clean shirt, pair of khakis and Red Wings do not offer up a negative image. Put those on a good golf course superintendent and he is still a good golf course superintendent.

Put a \$75 Italian golf shirt, a \$100 pair of golf slacks and a \$75 pair of Etonic GCSAA golf shoes on an idiot and he is still an idiot. Fraudulent portraits are good intentions run amuck and are every bit as bad as that image of the greenskeeper from Bushwood CC.

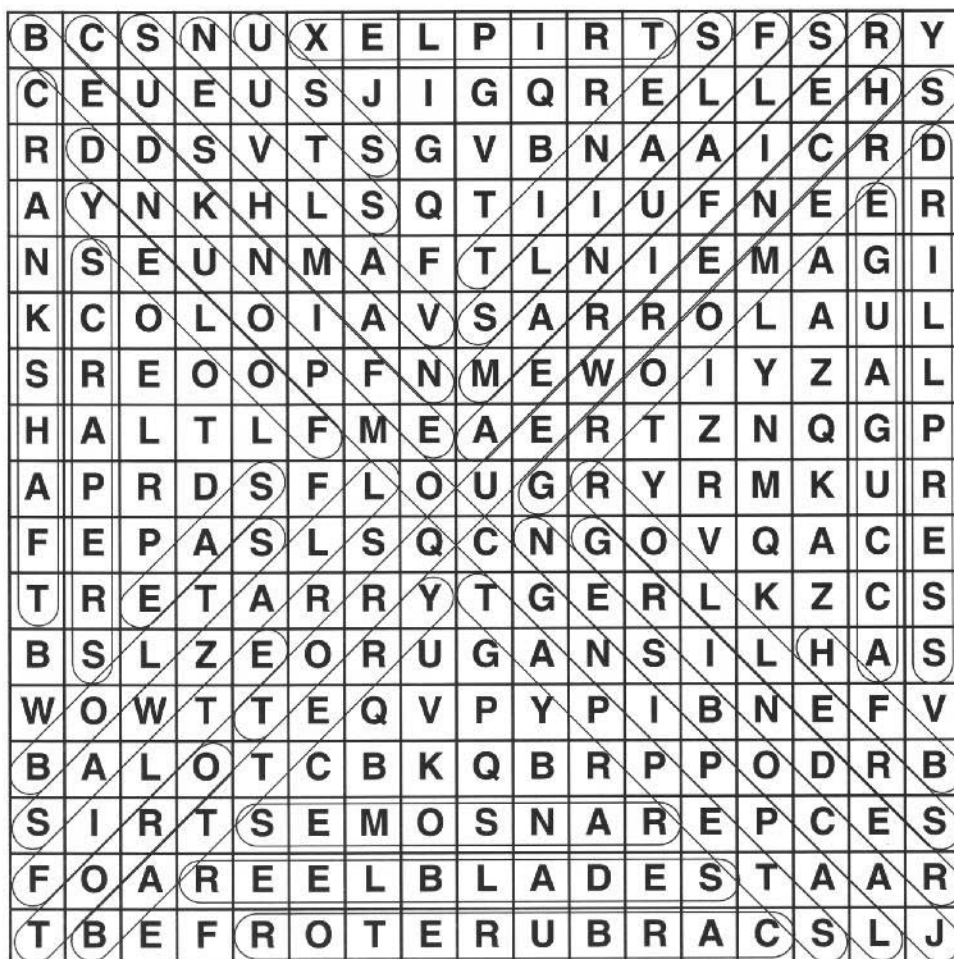
Which brings me back to Sandy's artwork. You can, if you choose, mow greens in the morning, lay sod with your crew the rest of the work

day, and attend a formal board of directors' dinner and meeting in the evening and still be viewed as the consummate professional. Each of those tasks is an honorable part of our business. In the end, what has and probably always will matter most is the substance of the person and the quality of his work. They are the well of respect.

To me, that is the way it should be. 🍷

(Answers to wordsearch and cryptogram from page 15)

MECHANICAL GALA



CRYPTOKEY WITH THE WORDSEARCH KEY

The mystery puzzler is:

Dave Noltner, Equipment Manager, Blackhawk Country Club



BACK TO THE BASICS

By Pat Norton
Nettle Creek CC

Tracing through our collective history as golf course superintendents, we can all say that we've witnessed and been a part of the huge wave of popularity that golf has enjoyed for many years. We've all certainly been a part of the evolutionary changes in golf course maintenance. Many of us, through our involvement at newly built courses, have had the good fortune to be involved in the sweeping changes in golf course design and construction during this same period.

The definite trend in golf course construction over the past fifteen years has been that of the professionally designed and built golf course...marked by extremely high design/construction costs, every possible amenity for the golfer, and a very high green fee. The result of all of this is known as the 'upscale public golf course'.

All of these courses are great... every hole, every feature is perfectly built. They are marked by USGA

greens, four or five sets of multiple tees, extensive drainage, lots and lots of earthshaping, continuous cartpaths, and other features to numerous to mention.

Sometimes though, these new golf courses are built and backed by ownership groups who, as businessmen, should really know better. They are sponsoring golf course projects that really are too expensive. How many of these new courses have gone bankrupt or been in a forced sale situation after about three-five years? How many more are struggling financially under the weight of too huge a mortgage, while year after year not reaching their financial income goals for the golf course operation? More than a few, I think!

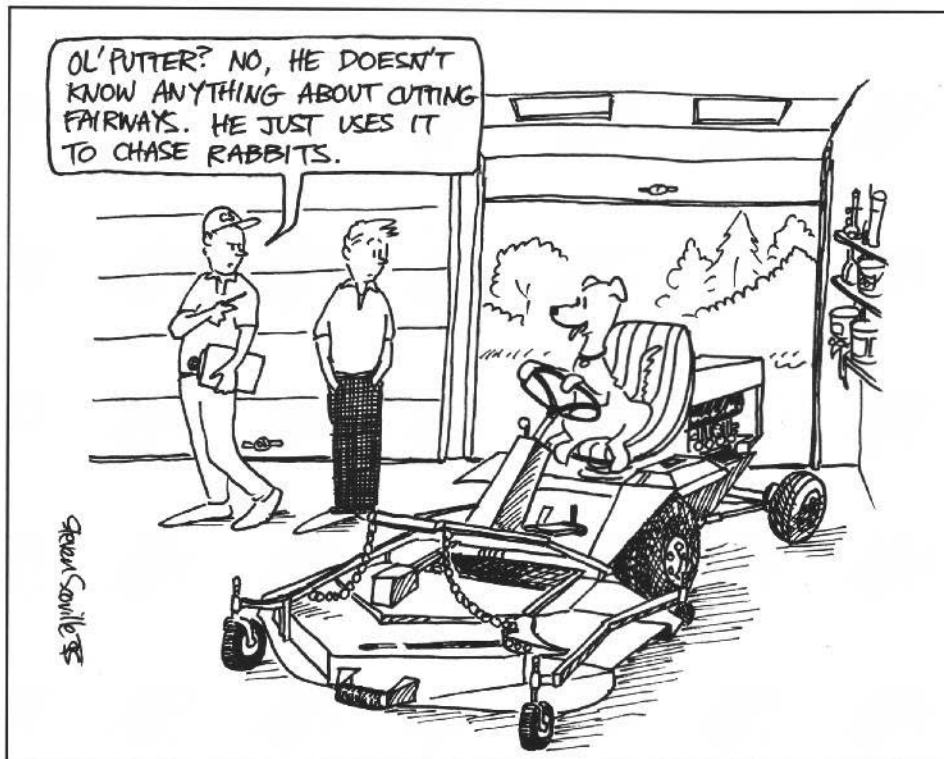
I get a chuckle out of the new courses that continue to be built for the high price tag...are these owners sure of the 'successful formula' that's vitally necessary for financial success in the public golf market? Sometimes

I really wonder!

Upon contemplating the construction of a new golf course, doesn't it make sense to downscale the scope and the intensity of the project to a financially manageable or profitable level? How many golfers are out there in ChicagoLand willing and able to pay that \$60-100 green/cart fee? Quite a few, apparently, judging by the number of upscale public golf courses in this region. The question is...how many more of these type of courses can be built before the golf market is saturated with them?

Lots of counties and park districts down here are the backers of these new courses, supposedly for the enjoyment of their core residents and citizens. Then the new golf course turns out to be both too difficult and too expensive for many people, the course struggles financially, and the government body is stuck with a boondoggle!

It seems, though, that there are some new trends in course design and construction. The trend is, and will be, towards new courses that cost



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less to build and maintain, resulting in a more affordable fee structure for all. One component of this more affordable trend will be that more and more courses will be built with native soil or modified native soil greens.

When I first began playing semi-serious golf as a high school youth in the early 70's, we of course all played the game on older courses that all had native soil greens. I will not mention that almost all of the host courses for our high school golf team had pretty lousy greens in those days...thatchy, spongy, and slow! Fortunately, at least two of those courses have upgraded with the times, and have enjoyed the fruits of the past efforts of two good superintendents...namely Tom Schwab at Monroe CC and Mike Kactro at Koshkonong Mounds)...to name but a few of such situations.

All of the golf courses in those days had native soil greens...for one very simple reason. These courses were all built in an earlier era...when courses largely followed the 'lay of the land' and were built with whatever soil happened to be on the site. Greens construction materials, such as sand and peat were incorporated into the soil profile, to be sure.

But, to think of building greens with all of the expense of the 'USGA spec' method? I don't think so!

And that is what I predict will be the wave of the future. There will be more and more greens built out of native soil materials, especially on the types of new courses that will be built to attract new golfers to the game. The economics of the situation will dictate this.

I'll bet if any of us called our favorite architect with the question of whether he has observed this trend, he'd answer in the definite affirmative! He would also undoubtedly call it the 'minimalist design' trend, which is gaining in popularity, I think.

As a matter of fact, our little old golf course down here in north central Illinois has native soil greens. This is largely the result of Buz Didier, the course architect, not believing at all in the USGA green concept. The owners/developers here were definitely on a budget, so the whole idea of native soil greens fit in perfectly with their goals and limitations.

What has resulted, somewhat by coincidence, is that we have a very heavily played golf course with very large native soil greens. They do not undulate wildly, but have great charac-

ter because of the skillfully designed and constructed green complexes.

These greens, if they had been built to USGA specs, would have been much too costly for this project. In other words, because almost all new greens are USGA spec greens, they are oftentimes too small for the amount of play that they receive!

Some of us have had the privilege of managing both types of greens. In my earlier days, I had experience with native soil greens on older courses. No big deal...it's what everybody knew and managed.

Then I switched to what I thought was the ultimate...USGA greens...80/20...choker layer...collar hot spots...localized dry spots...algae...then the dreaded black layer!

What evolved is that we had to constantly watch, worry, and try to protect the greens!

Native soil greens, on the other hand, have some very real advantages. Color and nutrient retention are much better, and moisture retention is far, far superior. Turf quality and density are also much better...resulting in greens that withstand traffic beautifully, stay dense season long, and are much more worry free!

(Continued on page 45)

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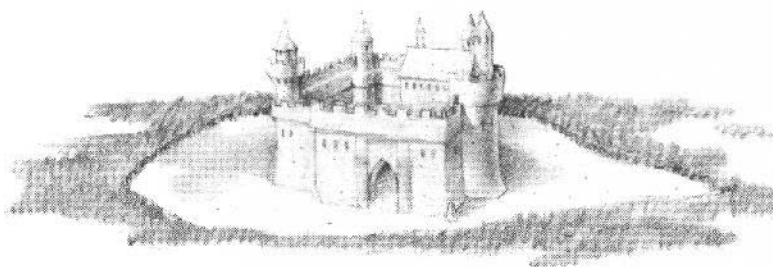
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(Continued from page 43)

Since there are always two sides to every argument, what are the disadvantages with native soil greens? Importantly, they require two regular aerifications every year (with plugs removed)...versus only one time for USGA greens (no plugs removed unless they stink with black layer). They obviously do not infiltrate and percolate water like sand based greens...we have had too many times when golfers go back out to finish their rounds on greens that are too wet.

In October 1996, we took the plunge and deep tined our greens with the Verti-Drain from Wisconsin Turf Equipment. We plan on aerifying twice this season with our GA30. We use straight sand topdressing, lots of Milorganite during spring and fall, and liquid fert, micros, and CarboAid over the summer. Those basic cultural steps have helped our greens tremendously...so it's a program that will continue here indefinitely. And our greens look and putt great...better than I ever experienced with USGA spec greens. That whole aerification concept is tried and true for native soil greens in the Midwest and elsewhere, isn't it? In a way it's been a lesson in going back to the basics.

And if I'm ever in a position to be a prospective owner of a new course, which someday soon I truly hope to be, I will build it in the following manner;

- Large, gently undulating native soil greens
- Large native soil bentgrass tees... much larger than most modern courses...one tee for white and blue, another for red (small multiple tees are a real pain in the butt)
- Minimal earthmoving...and no severe mounds or outrageous features
- Maximum length of 6600 yds (blue), 6400 (white), and 6100 (red)
- Executive length nine built adjacent as soon as possible
- Practice facility will be very junior and new golfer friendly
- All staff people will be extremely friendly and service oriented... because public golfers will patronize a less expensive, less imposing golf venue with regularity
- Tree planting and landscaping on the course proper would have to wait until cash flow permitted
- Shop facility, course equipment, and course labor would not be

excessive...in fact, operations by necessity would be run extremely tight. Here at Nettle Creek, for example, our course labor amount is \$75,500 annually...not including my salary. That isn't a lot of money, but somehow the basics get accomplished, improvements are made, and golfers are very happy with the condition of our course!

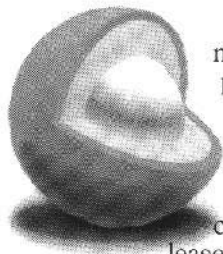
- Memberships and green fees structured on the moderate side to attract the average to good golfer...they spend a surprising amount of money if given a chance!

All of that, by the way, is how we do things here at our particular golf course.

We do not have the biggest or the best golf course, budget, or equipment...not by far. What we do have is a course that's cash flowing very nicely, funding its own improvements easily, and becoming very profitable in only our fourth year here. All of the ownership group, myself included, are quite happy with our situation!

So, as far as the basics go, it's a matter of the financial basics...and the agronomic basics. And basically speaking, that is the name of the game, isn't it?? 🌱

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Molecular Methods Aid in the Identification of Turfgrass Pathogens

By Emily Travanty, Lisa Buttonow, Jeffrey S. Gregos, and Douglas P. Maxwell
Turfgrass Disease Diagnostic Laboratory, Department of Plant Pathology,
University of Wisconsin-Madison

Rapid and accurate diagnosis of turfgrass diseases is imperative for successful disease management, but this is not always easy. A good example is the confusion surrounding the various patch diseases or disease complexes. Turf managers can either look at the symptoms and make an educated guess (this is correct many times), or they can send samples to a plant pathogen detection clinic, such as the University of Wisconsin Turfgrass Disease Diagnostic Laboratory (TDDL), where trained specialists have a variety of tools for identifying pathogens.

First they carefully inspect the turfgrass with the aid of the eye and microscopes for symptoms and for various diagnostic fungal structures. In many cases, the suspected pathogens (mainly fungi) are cultured on media specially designed to aid in identification. Unfortunately some fungi grow slowly and some fungi do not readily produce unique, identifiable diagnostic structures, such as spores, in culture. So these methods do not always lead to a timely and successful identification of the pathogen. New molecular techniques give some hope for faster and more specific diagnoses.

The molecular method the TDDL staff is currently working on to aid in the identification of turfgrass fungal pathogens is the polymerase chain reaction (PCR). PCR allows amplification (multiplication) of a specific region of a pathogen's DNA so that this DNA region can be used for identification. Without this amplification, which is over a million fold, the sample of DNA would be too small to use in any identification method.

DNA is the molecular blueprint of life. It uses four "letters" called nucleotides to form "words" that make up the instructions for all the proteins necessary to build an organism. In order to better identify fungal turfgrass pathogens we are studying a region of the DNA known to be quite different in different fun-

gal species. This region (Figure 1) contains the DNA instructions (genes) for making some of the components (such as ribosomal RNA) of ribosomes, cellular structures that function in the synthesis of proteins.

In Figure 1, the instructions (genes) for these ribosomal components are labeled small rDNA, 5.8s rDNA, and large rDNA. All organisms have these very same ribosomal genes. In between these genes, however, are areas of DNA, labeled ITS A and ITS B in Figure 1, that are quite different in different fungal species but very similar in individual

cultures of the same species. We may be able to identify fungi by amplifying one of these areas (ITS A) by polymerase chain reaction and comparing the size and DNA sequence of this area with those in known fungi.

An example might help explain this variation in this ribosomal gene region. If we compare the percent DNA similarity for one variable region (ITS A) between two sorghum plants (data from the GenBank—a national library of DNA sequences), the percent DNA similarity is >95%, just what is expected for individuals of the same species. Now, if we compare

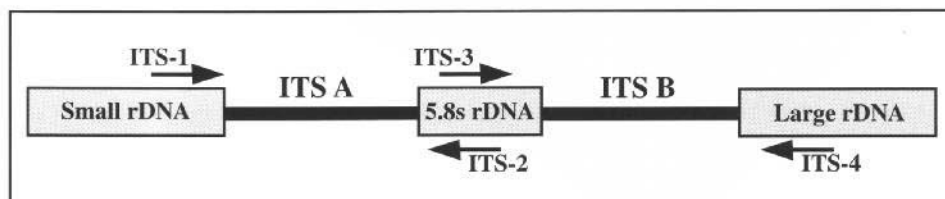


FIGURE 1. Diagram of the ribosomal gene region showing the location of the ITS polymerase chain reaction primers (e.g. arrow labeled ITS-1) used for amplification of fungal turfgrass pathogen DNA. The conserved regions, the genes, are the small, large, and 5.8s rDNAs, and the variable regions of DNA between the genes are ITS A and ITS B. The DNA fragments amplified are the regions between ITS-1 and ITS-2 (ITS-A), ITS-3 and ITS-4 (ITS-B), and ITS-1 and ITS-4 (White et al. 1990. PCR Protocols. Pp. 315-322.). (See Figure 2 for a specific example).

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the DNA sequence of this region of sorghum with that from another monocot species such as bluegrass, the percent DNA similarity is only 63%. If we compare the same regions for sorghum and an even more distantly related plant such as soybean (a dicot, data from GenBank), the percent DNA similarity is even less, 46%. Thus, the more unrelated two species are, the greater the differences in the DNA sequence for this region.

When we started to study turfgrass fungi, we wanted to see if two isolates (individual cultures) of the same species would have nearly identical DNA sequences in the ITS A region. Dr. Randy T. Kane, plant pathologist with the Chicago District Golf Association, sent us two isolates of the anthracnose fungus, *Colletotrichum graminicola*. One isolate was obtained from bentgrass and one from annual bluegrass. As expected, the percent similarity was high, 98%. This fungus is a member of the Ascomycete group. Comparison of this same region in the anthracnose fungus and in another member of this same general group, the dollar spot fungus *Sclerotinia homeocarpa*, gave a DNA similarity of 56%. When we compared the anthracnose fungus to the brown patch fungus *Rhizoctonia solani*, a fungus in a different major group, the Basidiomycetes, the DNA similarity was 37%. Thus, as in the

plant example, the more distantly related the fungi are, the greater the DNA sequence differences in this region are.

From these limited comparisons, it is evident that the differences between species of turfgrass fungal pathogens are very great, and this information can be used for developing new rapid diagnostic methods.

How do we obtain this DNA sequence data? First we must amplify the DNA from the ribosomal region (Figure 1) by the method mentioned earlier, polymerase chain reaction. To do this you must first know something about the nucleotide sequence, or "letter/word" order, of the region you are interested in. The polymerase chain reaction requires the help of a pair of primers, which are short DNA segments (about 20 nucleotides or letters) that will attach to either side of the region to be amplified (Figure 1). In this case the primers are identical to parts of those ribosomal genes that are the same in all species. The primers direct the amplification of the variable region (ITS A) between them.

So far we have used this new technology for two cases of diagnosis at the TDDL. The first case was that of an isolate of an unknown snow mold fungus called unknown #7 from Plum Lake Golf Club in Sayner, WI. This same fungus was observed on several courses in the Vilas County area and was also found on samples from the Fox River Valley. It had very large, dark sclerotia, four times the size of gray snow mold fungus and so we knew it was not the gray snow mold fungus or the speckled snow mold fungus. One possibility was the snow scald fungus, *Sclerotinia borealis*, which has been reported in Canada and Wisconsin.

For comparison, we needed a known culture of this fungus and it

was obtained from Dr. Drew Smith, a retired plant pathologist at Saskatoon, Canada. To kill the fungus before it was sent to us from Canada, Dr. Smith microwaved the sclerotia. DNA was extracted from these *S. borealis* sclerotia and from those of the unknown #7, and polymerase chain reaction amplification was performed.

The different sizes of DNA fragments produced by polymerase chain reaction were separated by gel electrophoresis and made visible with UV light. They show up as light bands as seen in the electrophoresis gel in Figure 2. The size of each DNA fragment is determined by comparing it to DNA fragments of known size. Lane 1 (Figure 2) contained a mixture of several known sizes of DNA
(Continued on page 49)

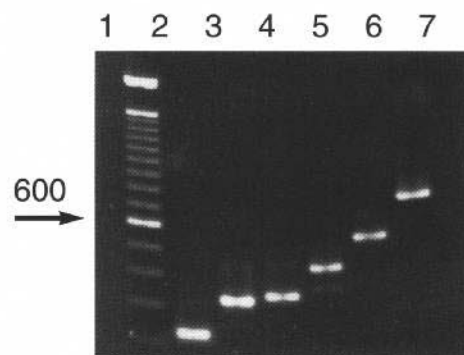


FIGURE 2. Photograph of an electrophoresis gel separating DNA fragments of different sizes. The DNA fragments are the light bands on the black background. Lanes 2-7 contain DNA from different polymerase chain reactions. Lane 1 has a mixture of DNA fragments of known size. These differ in size by 100 nucleotides or "letters" and the smallest one is 200 nucleotides. Compare the sizes of the DNA fragments in lane 2 and lane 3. They are different, so these two fungi, the unknown #7 and *S. borealis*, are different. Lane 1 = the known sizes of DNA used as a standard, Lane 2 = ITS A DNA from *S. borealis*, Lane 3 = ITS A DNA from unknown #7, Lane 4 = ITS B DNA from *S. borealis*, Lane 5 = ITS B DNA from unknown #7, Lane 6 = ITS1-4 DNA from *S. borealis*, Lane 7 = ITS1-4 from unknown #7.

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(Continued from page 47)

fragments. These were applied at the top edge of the gel and an electric current was turned on. The smallest fragment moved to the bottom and the larger ones were spread out in between. The DNA fragment from the ITS A region of the known *S. borealis* (lane 2) is smaller (moves farther down the gel) than that from the unknown #7 (lane 3). Since these two fungi had different sizes of DNA fragments from the ITS A region, they are not the same fungus, so we suspected that unknown #7 was a different pathogen.

The next step was to determine the sequence of nucleotides ("letters") in these two DNA fragments of the ribosomal variable region ITS A (Figure 1). This would be the final proof of the difference between unknown #7 and the standard *S. borealis*. After the DNA was purified, it was taken to the Biotechnology Center on campus where it was sequenced (nucleotide order determined). The percent DNA similarity for this region in these two fungi was only 42%, so they are very different fungi and probably belong to two different major fungal groups, the Ascomycetes for *S. borealis* and the Basidiomycetes for unknown #7.

These molecular techniques showed absolutely that unknown #7 is not the snow scald pathogen (*S. borealis*) and that it is in the major group of fungi, the Basidiomycetes, which contains the gray snow mold fungus. Currently, Steve Millett, a graduate student in Department of Plant Pathology, is determining how closely related unknown #7 fungus is to the gray snow mold fungus.

The second case in which polymerase chain reaction was helpful involved fungus isolate 96-112 from University Ridge Golf Course, Verona, WI. This fungus had hyphae characteristic of *Rhizoctonia solani*, the causal agent of *Rhizoctonia* brown patch, and when first grown on culture media, its growth pattern was similar to cultures of *Rhizoctonia solani*. After two weeks, however, the culture developed small orange balls (sclerotia) about the size of cabbage seeds. This is not typical for *Rhizoctonia solani*.

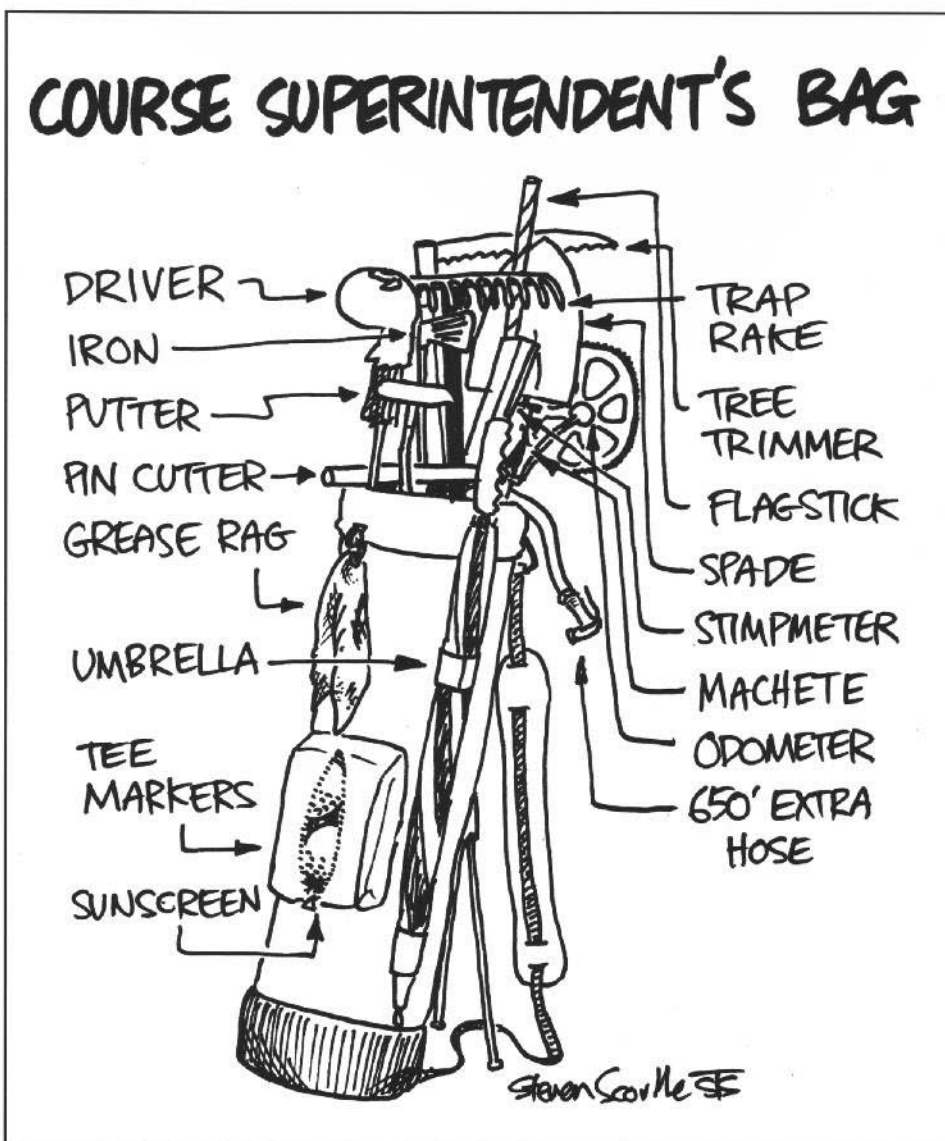
We decided to use polymerase chain reaction to help unravel this mystery. We extracted DNA from the fungus 96-112 and from a culture of *R. solani*, and used polymerase chain

reaction to obtain the ITS A fragments from both fungi. These fragments were sequenced and the percent DNA similarity between the two was found to be 46%, so we knew that these two fungi are not closely related. We currently think that this fungus, isolate 96-112, is a *Rhizoctonia zeae*. Very little research has been done with *R. zeae* and it may respond differently to environmental factors than the brown patch fungus does. Several other isolates of this *R. zeae*-like fungus were isolated in July 1997 and they were not associated with typical brown patch symptoms. In one case, the symptoms looked like a necrotic spot caused by *Pythium* sp., and in another situation this fungus was associated with dollar spots against which the DMI fungicides had not been effective.

Polymerase chain reaction methods have assisted TDDL staff in their

efforts to understand which turfgrass pathogens are present in Wisconsin. They provide a way to determine whether or not fungi that look alike really are alike by giving a view at the molecular level, the DNA sequence. We plan to expand this procedure to include a collection of standard sequences of the ITS A region for the common turfgrass pathogens found in Wisconsin. Also, it appears that because the ITS A region is very different between all the major turfgrass fungi, it will be possible to develop specific and rapid detection methods for identification of fungal pathogens in plant tissues.

The TDDL staff express their appreciation for partial research support from the Wisconsin Turfgrass Association, College of Agricultural and Life Sciences, University of Wisconsin-Madison, and gift funds to Dr. Julie Meyer. ♣





WHY I LOVE WISCONSIN

By Frank Lloyd Wright

Editor's Note: Frank Lloyd Wright was on the minds of many more Wisconsin citizens July 18-20 past than usual. The Frank Lloyd Wright Monona Terrace project was finally opened in Madison. First proposed by Wright half a century ago, it has been so controversial that it took that long (and \$70 million) to get built. Newspapers all across the country, including USA TODAY, made note of the grand opening of this beautiful building. I wouldn't be surprised if someday the Wisconsin Turfgrass Association Winter Turf EXPO was held in it.

Frank Lloyd Wright was born in Richland Center in 1867, and during his lifetime and in the years since his death at the age of 90, he's been recognized as one of the world's most prominent architects of all time. His home and farm and famed architecture school—Taliesin—is near Spring Green and the focus of visits from people the world over.

This article was penned by Wright for the publication Industrial Wisconsin in 1930. It is still good reading, especially on this eve of autumn, Wisconsin's finest season.

I love Wisconsin because my staunch old Welsh grandfather and my gentle grandmother and their 10 grandchildren settled here nearby. I see the site of their homestead and those of their offspring as I write. Offspring myself, my home and workshop are planted on the ground grandfather and his sons broke before the Indians had entirely gone away.

This Wisconsin valley with the spring-water stream winding down as its center line has been looked forward to or back upon me and mine from all over the world as home. And I come back from the distant, strange and beautiful places that I used to read about when I was a boy, and wonder about; yes, every time I come back here it is with the feeling there is nothing anywhere better than this is.

More dramatic elsewhere, perhaps more strange, more thrilling, more grand, too, but nothing that picks you up in its arms and so gently, almost lovingly, cradles you as do these southwestern Wisconsin hills. These ranges of low hills that make these fertile valleys of southwestern Wisconsin by leading down to the great sandy plain that was once the bed of a mightier Wisconsin River than any of us have ever seen.

I doubt if that vast river flood were more beautiful then, however, than this wide, slow-winding, curving stream in the broad sand bed, where gleaming and shaded shores to be overhung by masses of great greenery. Well, it is not quite like any of the more important rivers of the world. It is more what specialists in scenery would call "picturesque." It is, however, unique.

So "human" is this countryside in scale and feeling. "Pastoral" beauty, I believe, the poets call it. More like

Tuscany, perhaps, than any other land, but the Florentines that roamed those hills never saw such wild flowers as we see any spring, if the snow has been plentiful. The snow usually is plentiful and the cold too. The kind of cold that has always tempered the man of the North as a conqueror of the South.

And the Wisconsin red barn! Wisconsin barns are mostly all red, and everywhere make a feature of the landscape missing in most states. A farmstead here is somehow warmed and given life by the red of the barns as they stand about me over the green hills and among the yellow fields with the sun on them.

And then Wisconsin is a dairy state. That means herds of pure Holsteins or Guernseys, or what have you, occupying the best ground anywhere around, making pictures that go with the one made by the red barn. Wisconsin, fond of passing laws, should pass another law compelling every farmer to paint his barn red. Another that will compel him to pasture his cows by the highway and his pigs back behind the barn.

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