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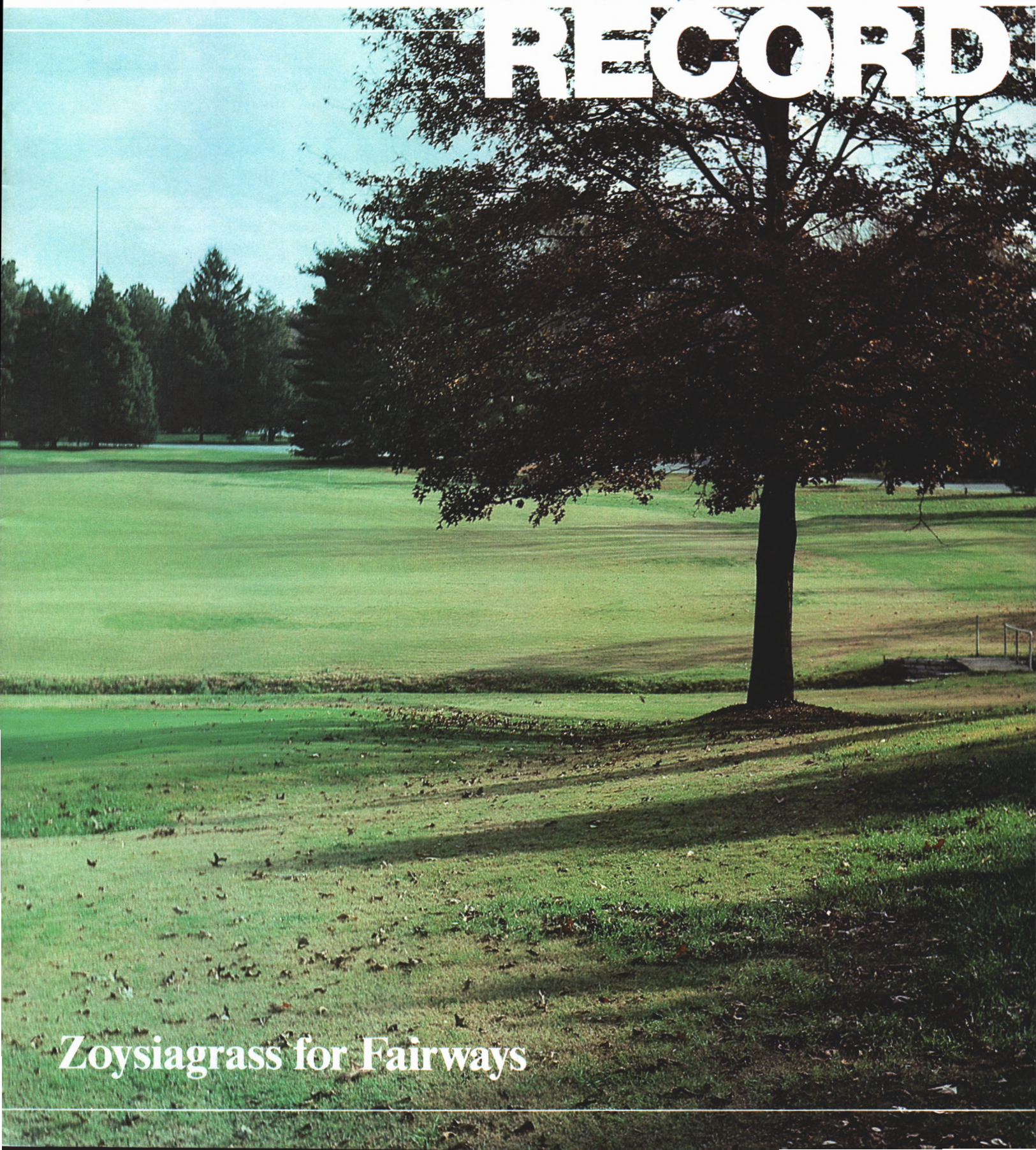

Zoysiagrass for Fairways

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Zoysiagrass for fairways.

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Figure 1. Bluegrass (left); zoysia (right).

The St. Louis Solution — Zoysiagrass for Fairways!

by STANLEY J. ZONTEK
Director, North-Central Region, USGA Green Section

NO ONE HAS ever said growing grass for golf is easy — every golf course superintendent has problems.

It is equally true that in some areas of the country it is more difficult to grow consistently good, reliable golfing turf than in others. The area in and around St. Louis, Missouri, situated right in the heart of the turfgrass transition zone,* is at the top of this list. Here, the golf course superintendent, the club official, and the everyday golfer have faced a dilemma: "What type of fairway grass will grow and succeed on my golf course?"

If cool-season grasses are chosen (mainly the improved bluegrasses and/or perennial ryegrasses), they must be cut at 1 to 1¼ inches to survive the summer heat and humidity. Fungicide and herbicide programs should be followed to protect against disease and weed invasion. But these grasses will provide good density and growth as well as good spring and fall color. At the same time, however, many golfers dislike the high summer cut and the natural tendency for them to thin out during the summer. The ball does not sit up as well.

On the other hand, the warm-season grasses such as bermudagrass and zoysia can be cut quite low and can provide excellent summer golf turf conditions when play is usually at its peak. These grasses turn off-color in the fall, however, remain off-color through the winter, and only become green during mid-spring. While it is true that dormant zoysia and bermudagrass provide a good playing surface, there is still a

*The transition zone is that part of the country where northern (cool-season) grasses are at the limit of their southern adaptation and the southern (warm-season) grasses are at the limit of their northern adaptation. St. Louis is a perfect example of such an in-between area. Weather patterns have wide and unpredictable swings. Some years the cool-season grasses thrive on fairways and the next, warm-season grasses are the only survivors. There never seems to be any compromise, and the course superintendent is caught between the forces of nature and the golfers of the transition zone.

Figure 2. Bermudagrass winterkill in row planting of zoysia. Algonquin Country Club, Missouri.

stigma attached to the off-color winter turf, especially when the golf course down the road (having cool-season grasses) is green, lush, and growing.

Farther south, dormant bermudagrass is routinely overseeded with ryegrass blends for winter color, but this practice has drawbacks in the transition zone. Here, fall renovation injures the existing warm-season turf just when it is going into dormancy and increases the possibility of winterkill. The overseeded ryegrass also can be so persistent the next spring and summer that it competes with the warm-season grasses, particularly if the summer is moderate. In some years, the overseeded ryes never die and, therefore, in the St. Louis area, overseeding causes more problems than it solves.

It boils down to a commitment to either warm-season **or** cool-season grasses, with their associated advantages and disadvantages. There is little choice in between.

Let me cite a case history. The winter and spring of 1970 were particularly severe, and a catastrophic loss of bermudagrass in general and U-3 bermuda in particular occurred. The cyclic weather pattern was again at work. A few golf courses like Bellerive Country Club, in Creve Coeur, and Old Warson Country Club, in St. Louis County, considered alternatives to the bermudagrasses then available. After some thought, these golf courses replanted and re-established their fairways to Meyer zoysiagrass. Was this to be the answer for fairway turf in the St. Louis area?

Figure 3. Zoysia plugs.

ZOYSIAGRASS HAS been around for a long time. First introduced into this country in the late 1890s, it was propagated and some work done on it by the Green Section and the USDA in the 1930s and 1940s. Work on improved turf-type zoysias resumed after World War II. Then, in 1950, Dr. William Daniel, of Purdue University, released the variety "Midwest." This was followed in 1951 by the release of Z-52, or "Meyer zoysia." Both releases were subspecies of *Zoysia japonica*. Today, by far the most used variety is Meyer.

Why zoysia? Although classified as a warm-season grass, zoysia will tolerate

Figure 4. Strip sodding (before).

Figure 5. Strip sodding (after).

and even thrive under the extremes of weather experienced in the transition zone. It shows excellent summer performance as well as outstanding winter hardiness in most of Missouri, Kansas, and Illinois. Zoysia is now being grown in Minneapolis! Zoysia not only provides exceptional playing surfaces but, once established, it is also very economical to maintain.

During the 1970s, superintendents in the St. Louis area observed that:

A. Zoysia rarely experienced winterkill, which is often a problem with bermudagrass in this part of the country.

B. Zoysia seemed to become green relatively early in the spring.

C. Zoysia required far fewer applications of fungicides, insecticides, and herbicides.

D. It required less water and fertilizer, compared to cool-season grasses and bermudagrass.

E. It provided outstanding playing turf during the peak of the summer golf season when cool-season grasses were at their weakest.

F. Zoysia was so dense it literally crowded out and eliminated most goosegrass and crabgrass problems without extensive pre-emergence or post-emergence herbicide programs.

G. When fall frosts came, zoysia went dormant at about the same time as play would normally decline, and, even when dormant and off-color, it still provided excellent playing surfaces with practically no fall care.

With zoysia, there was no overseeding, no fall fertilization, no widespread herbicide treatments or even mowing! It was less turf area for the golf course superintendent to worry about when it went dormant.

But there are never any absolutes or any panaceas in the turfgrass management business. Zoysiagrass has one outstanding negative trait; it is slow to establish, particularly when planted into an existing turf cover. Depending on management techniques and weather, it sometimes takes four to five years for zoysiagrass to spread and provide a good cover.

As one might expect, commercially grown zoysia sod is expensive. Because Meyer zoysia must be propagated vegetatively, row planting or strip sodding costs are high. The old law of supply and demand is at work. The supply of zoysia sod is limited and the demand and cost for zoysia remain high.

To reduce this cost, some courses have established their own sod nurseries.

While it takes time to establish a good zoysia nursery, there is a definite cost saving for the club. There is also a problem in finding ample area with irrigation and reasonably good soil for establishing such a nursery.

Zoysia does not perform well in areas contaminated with patches of bermudagrass. Generally, on a one-to-one basis, bermudagrass is more aggressive and will outcompete and tend to dominate zoysia in a mixed stand. Only when bermuda winterkill is experienced *(Figure 2)* or when a very careful and precise zoysia management program is followed, will zoysia tend to dominate in a mixed stand of bermudagrass. If extensive areas of bermudagrass do exist, perhaps the best planting program is one using the newer varieties of winter-hardy bermudagrass. Nevertheless, if zoysia still is desired, it may be necessary to apply non-selective herbicides, such as Roundup, to thoroughly eradicate bermudagrass before trying to establish the zoysia.

Golf courses with cool-season fairway grasses and little bermudagrass contamination are a natural for zoysia. However, zoysiagrass is clearly not for all golf courses in all situations. Careful consideration must be given before trying to establish zoysia.

IF A COURSE decides to establish zoysia fairways, five basic programs can be followed. The choice depends on how much money is to be spent each year, to what degree the golfers are to be inconvenienced, and how quickly the zoysia fairways are to be established. The basic programs are:

1. Plugging (see *Figure 3*). This technique is used mostly by home owners. On golf courses, it was used when fairways were first being established to zoysia, and it is still being used on a small scale today. Small areas can be effectively plugged by hand and even commercial companies will plug larger acreages on a contract basis. Plugs are usually two to four inches in diameter and are generally planted on approximately 12-inch centers.

2. Strip Sodding (see *Figures 4* and *5*). This procedure is widely used to establish zoysia as quickly as possible. It involves removing four- to 12-inch strips of existing turf and replacing it with a corresponding width of zoysia sod. The sod strips are planted on 12- to 16-inch centers. Obviously, the closer together the rows, the faster the coverage. Because of the amount of zoysia sod required to do an area, this techique is the most expensive, but it is one of the most sure and effective methods.

Both strip sodding and plugging can be done during the active growing season. There are also reports of success using plantings of dormant zoysia strips and plugs.

3. Row Planting. While this is a relatively new technique, results have been very encouraging. Hyde Park Golf and Country Club, of Cincinnati, and Hurstbourne Country Club, of Louisville, Kentucky, have used this method. Continuous rows on 12-inch centers, four to five inches deep, are cut into the soil using a row planting machine. Then, shredded sprigs are inserted into the groove. The groove is mechanically closed by the same planting machine, and the area is ready for post-plant care.

Row planting, a technique used to establish bermudagrass, is now being adapted for zoysiagrass. As far as can be determined, this procedure, when used on large acreages, promises to become an alternative to the more traditional programs of plugging and strip sodding. This procedure may also be used on a contract basis. *Figure 6* shows rhizome spread following row planting.

4. Hydrostolonizing. Although initially used to establish zoysia on some fairways at Bellerive Country Club and Old Warson Country Club, this technique is now used mostly when planting new golf courses, establishing zoysia nurseries, or on limited areas that can be taken out of play and given time to establish. Zoysia sprigs are shredded, mixed with water (sometimes containing fertilizer), a binder, and a mulch. This combination is sprayed onto bare soil and followed by careful post-plant care, especially irrigation. By the very nature of this program, it is quite disruptive to play, and now it is used only in specific situations.

5. Seed. Through the research efforts of Dr. Herbert Portz, of Southern Illinois University, the first steps are being taken to improve germination in the otherwise difficult-to-germinate zoysiagrass seed. The treated seed is now available, but it is expensive. The zoysia variety now available is fairly coarse and slow to establish in competition with other grasses. However, germination and seeding techniques will continue to be studied and surely improved in future years. For now, seeding of zoysiagrasses seems to have limited use.

6. Sod. A complete sodding with zoysia is obviously another establishment technique, but it is extremely expensive. It is sometimes used on a small scale for important areas or in special cases where a complete sod job and the extra cost can be justified.

IN REALITY, there are really two zoysia management programs. The first is an establishment program and the other is a regular maintenance program. The two are quite different.

When zoysia is first planted, it must be kept moist (not wet) until a rooting system develops and the grass plant can sustain itself. Drying out must be avoided during this critical period. Thus, a very careful irrigation program during the initial phase of zoysia establishment is essential.

Once a good rooting system has been developed, less frequent irrigations should be scheduled. Still, when you are attempting to establish zoysia and speed its spread, drying out of the plant and soil during the active growing months should be avoided. An automatic irrigation system, although not absolutely necessary, does make for good water control and a savings in labor during the zoysia establishment phase.

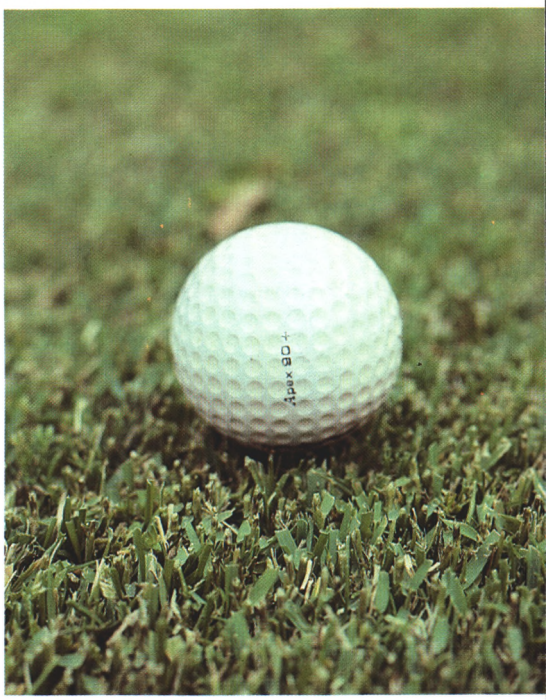
In order to stimulate the spread of zoysia, fairly liberal rates of fertilizer should be applied. Experience shows, however, that there is a point of diminishing return on nitrogen fertilizer applications. During the establishment phase, nitrogen at the rate of 6 to 8 pounds actual per 1,000 square feet annual range is used most often. Some superintendents have and are using higher rates, but the norm is in the range of 1 to 1½ pounds actual per 1,000 square feet per growing month.

As to the type of fertilizer to use during establishment, the faster-release chemical types are preferred. Also, phosphorus and potassium needs should not be overlooked. For best results, use an alternate program of straight nitrogen one time followed by a complete N-P-K fertilizer the next. As with any program, a thorough set of soil tests should be taken for establishment to identify and correct any soil deficiencies.

Experience has also shown it is advisable to schedule the last application of fertilizer from middle to late August. This gives the plant an opportunity to harden off going into the fall and winter. It is interesting to note that top growth slows in the fall, but the

Figure 6. (Left) Zoysia spread from rhizome.

Figure 7. (Below) An exceptional fairway from zoysia!



all-important rhizome system continues to develop (see *Figure 6*).

Once a solid stand of zoysia has been established, it is essential to alter this liberal water and fertilization program radically. Experienced superintendents recommend maintenance levels of one-half to just over one pound actual nitrogen per 1,000 square feet *per year* and only enough irrigation to maintain good color. Once established, zoysia is truly a very low maintenance grass. Excess fertilization and irrigation only create thatch and puffiness — something you, the grass, and the golfer do not need.

Other tips on zoysia management include:

A. A vigorous coring or vertical mowing program to keep thatch under control. Best timing is in July or early August, when the grass is growing at its best and recovery will be the quickest. This is also a good time to make a second application of fertilizer when a split application program is being used.

B. Zoysia should be cut low, in the range of ½- to ⅝-inch (see *Figure 7*).

C. Keep mowers sharp and use hydraulically driven reels rather than pull-type mowers.

D. Depending on conditions, follow a curative fungicide, insecticide, and herbicide program. If a problem is diagnosed, treat it. Generally, zoysia is a very tough grass and has few serious disease, insect, or weed problems.

E. Permit zoysia to grow a bit long in the fall. Stop cutting early enough to allow for somewhat longer grass going through the fall and into the winter. The slightly longer grass reduces the potential for winter injury and helps reduce annual weed infestation.

F. While the grass is completely dormant, apply a non-selective herbicide like Paraquat in the very early spring to control winter annual weeds. Careful timing, obviously, is extremely important when using non-selective herbicides.

In summary, an ever-increasing number of golf course superintendents in the transition zone are turning to zoysiagrass for fairways and tees. It has proven to be a reliable, low-maintenance turf that golfers like, and, once established, is relatively trouble-free. It offers a solution to an old problem.

Irrigation - How Much Is Too Much?

by JAMES T. SNOW
Director, Northeastern Region, USGA Green Section

"THE HARDEST JOB I have in trying to maintain good golfing turf is deciding when and how much to irrigate!"

This comment reflects the feeling of many golf course superintendents as they wrestle with one of the more perplexing problems in turfgrass management. With a large number of variables to consider, including terrain, soil types, grass types, rooting depth, weather factors, and the performance of the irrigation system itself, it is no wonder that irrigation has received so much attention over the years.

Despite the discussions of irrigation strategies in the classroom, at educational programs, in textbooks, and among casual groups of turf managers, a sure-fire description of how to irrigate remains as elusive as the sure-fire control for *Poa annua*. Overwatering remains a major problem on many golf courses. The superintendent who has mastered the irrigation of every corner of his course has probably done so through careful study and by trial and error. There is no teacher like experience when it comes to fine-tuning one's skills in irrigation management.

Sure, there are a few guidelines. We're all familiar with the one that says, in effect, "An average turf in an average soil during average summer weather should receive the equivalent of one inch of precipitation per week." Sounds good in principle, until you try applying it to a 150-acre golf course with swamps, flats, knolls and hills, and about as many different soil types as there are turf species and playing areas. Almost nothing is average on a golf course. If it is, it probably won't be for long!

So how does one decide when and how much to irrigate?

Starting with a knowledge of the principles of turfgrass science, taking into account the variables noted above, and considering the requirements of the game, look for visual symptoms of moisture stress (such as footprinting and gray-blue-green coloration) and check the soil profile with a soil probe. Based upon rooting depth, the moisture content of the soil, and the experience that teaches how much one can get away with, a determination can be made whether to irrigate, syringe, or do nothing at all. There's lots of room for subjective judgement in this description, but that's what it comes down to.

How does one tell whether the irrigation practices being utilized are correct or appropriate under the circumstances? Looking at the ultimate results of the program is one good way. Underwatering is usually quite easy to recognize, resulting quickly in brown, semi-dormant, or dead turf. Thus, when mistakes are made, they are usually on the side of overwatering.

OVERWATERING MIGHT BE described as applying so much water that it becomes a detriment to the health, playability, and persistence of the desired turfgrass species. Determining the point at which irrigation becomes overwatering is difficult. For example, given the imperfect nature of any irrigation system in the context of the variables noted above, there are likely to be different areas that are underwatered, correctly watered, and overwatered on nearly every golf course. Trying to achieve the most appropriate balance, preferably on the drier side, should be the goal of every irrigation program.

However, there are telltale signs of persistent overwatering that usually appear months or years after overwatering has begun. The pictures that accompany this text show potential symptoms of overwatering. Some may appear occasionally after irrigation or after heavy rains, and all could be considered normal. But if many of these symptoms appear consistently throughout the season, then overwatering is likely occurring, and a change should be made in the irrigation program.

(Top) Symptom: Water puddles in the low areas of greens after irrigation, indicating the system is applying water faster than the green can accept it.

(Opposite page) Symptom: Water regularly appears around shoes when walking across greens.

(Left) Symptom: Diseases such as Pythium (shown) and Brown Patch are more prevalent on greens which are overwatered.

(Above) Symptom: Greens are regularly spotted with deeply pitted ballmarks.

(Top, left) Symptom: Irrigation system is turned on and used regularly during the early spring, even before the trees have begun to break bud.

(Center, left) Symptom: Area around cup quickly becomes thin and spike-marked.

(Bottom, left) Symptom: Overwatered turf develops weak, shallow root systems which do not sustain the turf during periods of stress.

(Top) Symptom: Wear problems, such as triplex ring, are more likely to occur on heavily irrigated turf.

(Above) Symptom: Poa annua *is spreading and becoming widely established on bentgrass greens.*

Training for Today's and Tomorrow's Golf Course Superintendents

by **HARRY M. DuBOSE**, Chairman, Environmental & Life Sciences Division,
Catawaba Valley Technical College, Hickory, North Carolina

IN ANALYZING turf industry needs for the future, one should consider the past. The turfgrass industry has grown from a $4 billion to a $12 billion industry in the past 15 years! Maintenance costs of $200,000 for an 18-hole golf course were unheard of 15 years ago; today, they are a reality. As changes have occurred, we have witnessed the tremendous impact they have made in such areas as energy, water availability, government law and the environment, government regulations, equipment design, technology, and labor and management practices.

We have also witnessed a change in personnel administering turfgrass management programs on golf courses. Some have left because of interests in other segments of the turfgrass industry. Others have moved within the golf course industry itself, while still others have moved completely out of the field. In an effort to upgrade the turfgrass management program at Catawaba Valley Technical College, we initiated a study in 1977 of superintendents in North Carolina. The purpose was to analyze skills and attitudes required for success.

The most revealing and reinforcing component of this study is that knowledge, mechanical and manual skills, together with positive attitudes, are the keys to success for those beginning in the field. For the advanced jobs, supervisory and management skills coupled with certain attitudes are the keys to success. Most of us have seen excellent employees fail miserably when they are promoted to supervisory or management levels if they are not properly prepared.

FIRST, let us look at the prospective student, regardless of where he may be from or what his background might be. Once he expresses an interest in this field of work, he should be told what to expect. This may start with the superintendent who has a good employee who wishes to advance professionally. Let him know the good and the bad — it is his future, and therefore the future of the industry.

In my opinion, and it is a prejudiced one, the individual should be encouraged to pursue some type of formal education in turfgrass management. Although experience is still the best teacher and there is no substitute for it, a formal education will make success easier.

If the individual plans to attend a turfgrass management school, he should contact several of them and select the

The science laboratory at Catawaba Valley Technical College.

one that best fits his needs and future career goals. Important considerations include: the student/faculty ratio, training facilities available and used for instruction, a comparison of technical knowledge and acquired skills training, work experience requirements, a complete history of graduate placement statistics, reputation of the program and school, and a personal visit. During this visit, one should ask specific questions of instructors and, hopefully, students currently enrolled. The prospective student will also get a good idea of how devoted and interested the teaching personnel are in the students. Some indication of the total financial commitment the college or university has made to turfgrass management instruction should also be apparent.

Another key item that should be examined is exactly at what level of employment the college or university is preparing the student to enter. At our college, we do not claim to prepare golf course superintendents. My personal feeling is that a student is much better off to couple a formal two- or four-year education with at least two or more years of practical experience as an assistant superintendent. Naturally, there are exceptions, but based on experiences with students and graduates, the majority will have most of the needed technical knowledge and skills supported by, hopefully, a good attitude. However, graduates may lack the supervisory and management skills needed to step out of college and say, "I'm ready to be a golf course superintendent." I would much rather send a student on a job interview with the attitude that he is ready to learn this trade, as opposed to the one who wants to be in the driver's seat but is not totally prepared for the responsibility. Chances are he will be more successful in landing the job, will be happier, and will have time to develop his own skills properly.

THERE IS another group of individuals who must also play a key role in developing tomorrow's superintendents. They are the presently employed golf course superintendents and turfgrass managers. Not only should superintendents encourage good employees to attend a turfgrass school, but they should serve as a vital component of this developmental process. At our college, we try to place students with superintendents who have the technical expertise, the time and willingness to work with young people. During the process, we have found that these young people are searching for someone to set an example, and that good and bad habits shown by the superintendent will be followed by the students.

After the process is complete, we request the superintendent to grade students and provide us with information on both the student and our program. Not only is this information used, but it also serves as a college grade. To enhance positive attitudes and a competitive spirit, the Carolinas Golf Association has provided a $400 scholarship to the student with the best overall performance during his first year, with his work experience grades counting heavily.

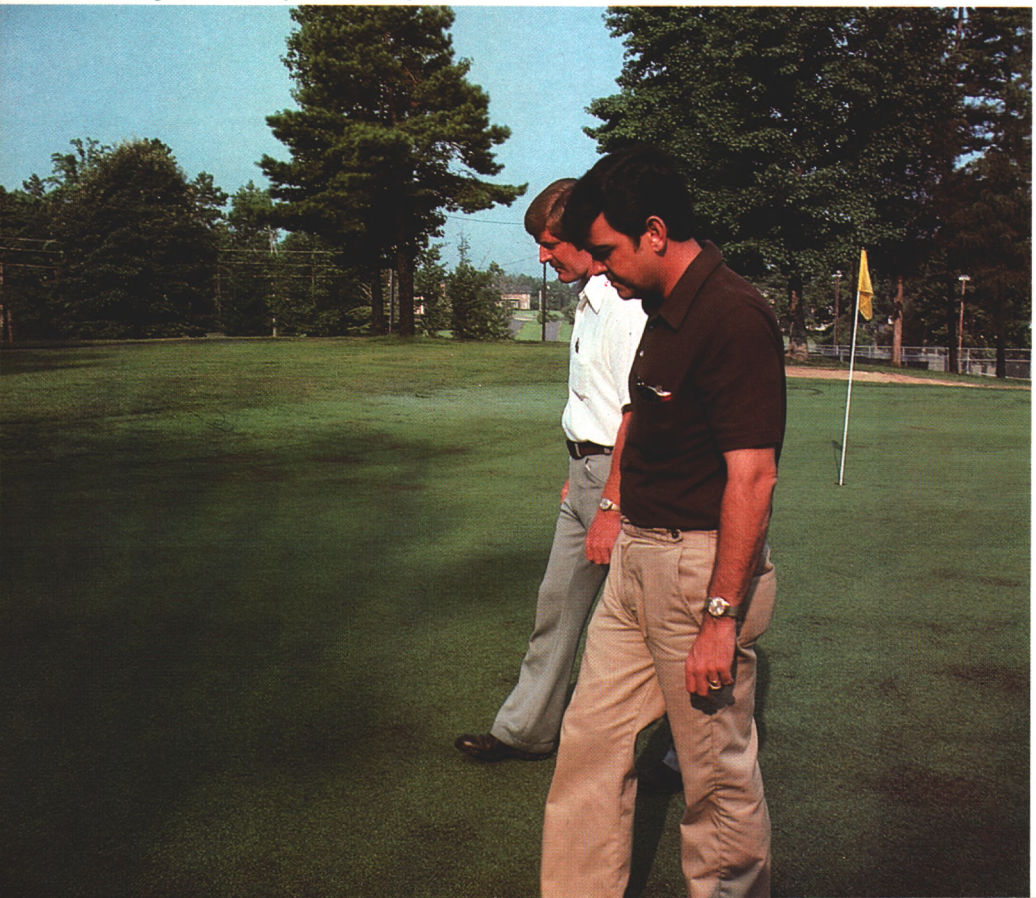
After two or four years of intensive classroom training in turfgrass management, and then several years of practical field experience, a qualified golf course superintendent emerges.

Formal education should not stop here. Professional development must continue if one wishes to be called a professional. The total area of professional development requires associations with researchers, extension personnel and educators, other superintendents, and everyone else active in the turfgrass field. As stated in the beginning, change is imminent, and the professional must adjust and cope with changes for survival and success.

I KNOW of no better way of preparing for change than to be actively involved in the change process. Apathy and noninvolvement are most detrimental. Unwarranted criticism is destructive. Do not sit back and complain about educational programs offered at the local, state, or national level. Even worse, do not stop attending! This is the surest way to early burnout. Instead, attend and get involved in the planning stages. If one is displeased, chances are there are others who feel the same way.

Participation leads to the development or refinement of those interpersonal, supervisory, and management skills needed for continued success in higher-level management jobs. Personnel at all levels of our profession will gain from attending and participating in educational conferences. By continuing the educational process today, the turfgrass manager will be better prepared for the challenges and the success of tomorrow.

Visiting an "on-the-job" training site.

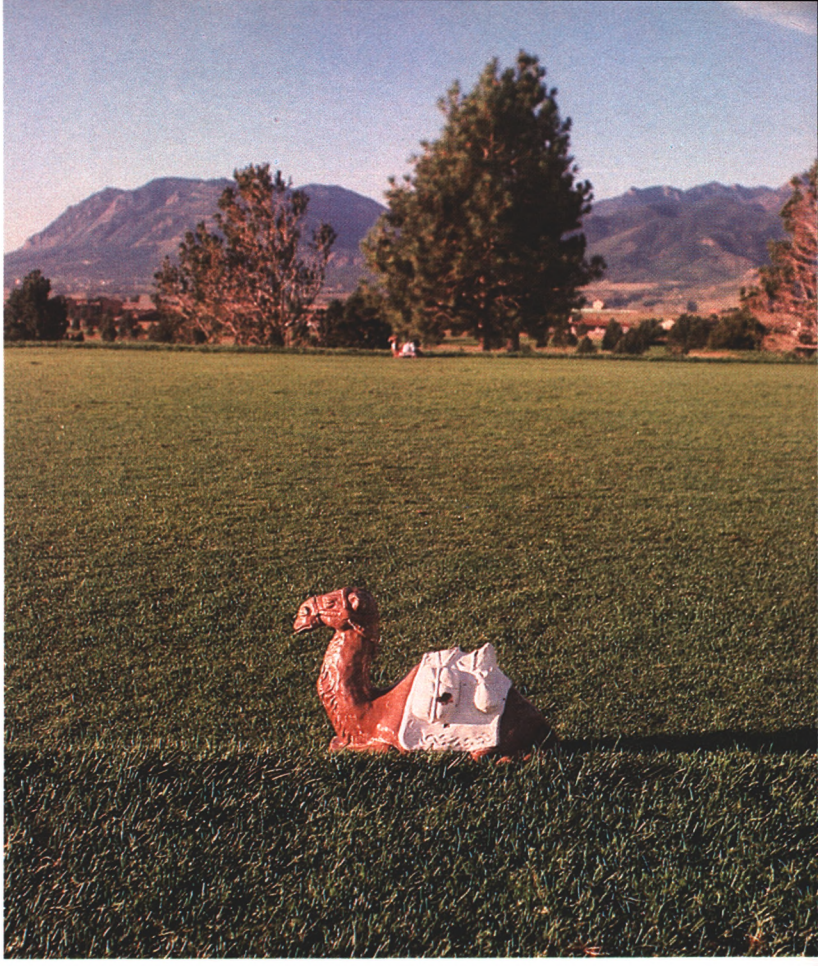


FROM CAMELS IN ARIZONA TO SKI TIPS IN NEW YORK

Tee Markers Can Be Distinctive

by DR. DOUGLAS T. HAWES
Director, Mid-Continent Region, USGA Green Section

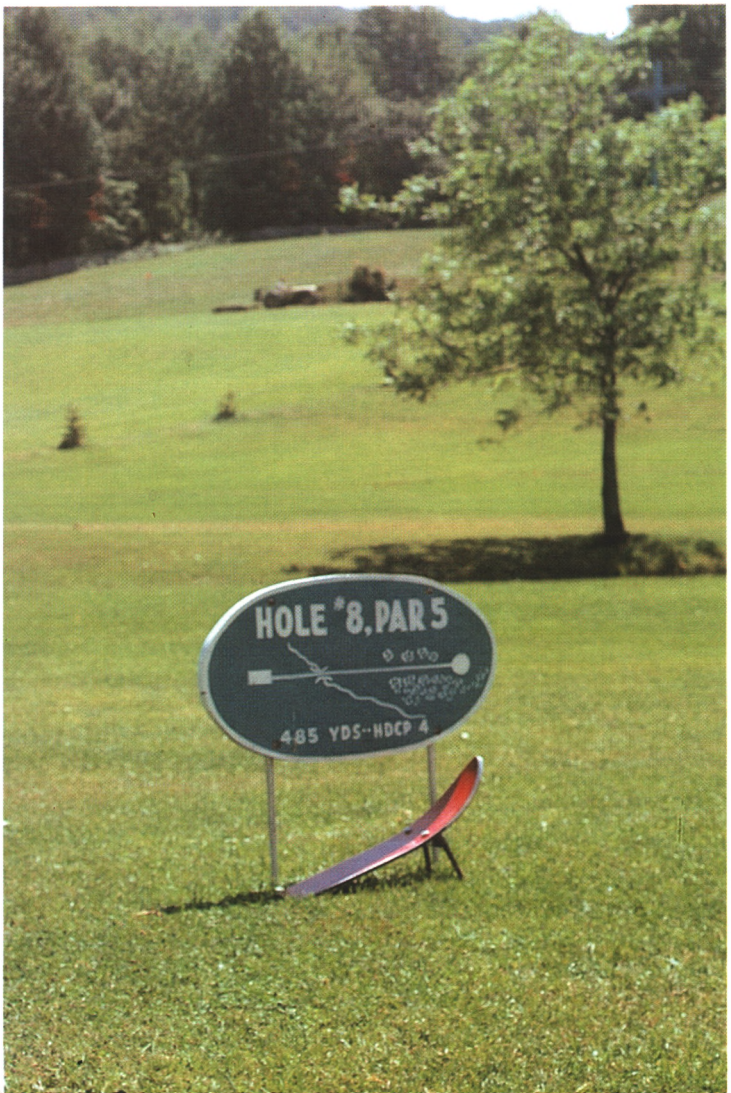
TEE MARKERS can give any club an individuality, a distinctiveness all its own. They are products of the imagination of club members, green chairmen, golf course superintendents, and professionals. A November, 1965, GREEN SECTION RECORD article by William H. Bengeyfield stimulated this collection of photographs. Hopefully this article will stimulate more interesting tee markers.



(Above) A lonely but permanent monument for the tee markers at Glenn Dale Golf Club, Maryland.

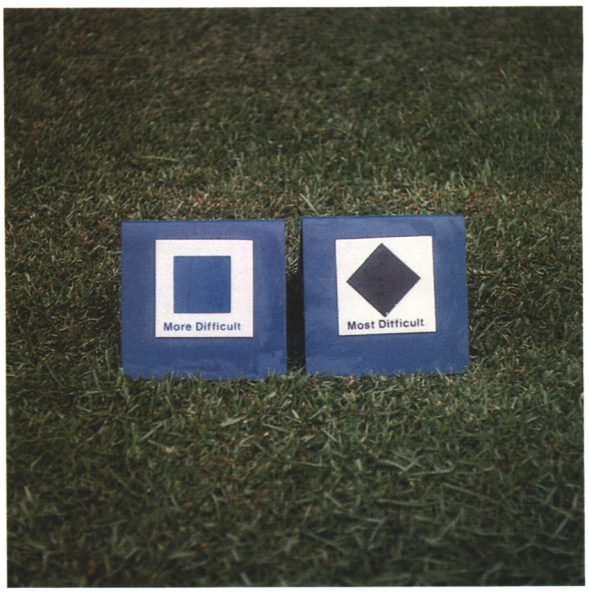
(Top, right) Camel tee markers can be found in Arizona and Colorado. Camelback Golf Club, Arizona, takes its name from a famous nearby mountain, as does Kissing Camels Golf Club, in Colorado.

(Right) Ski tips make most appropriate tee markers at Holiday Valley Golf Club, New York. The nine-hole golf course uses the beginner ski slope during the summer, near the lodge at this western New York ski and golf resort.



Santa Teresa Country Club, New Mexico, is just a few miles west of El Paso, Texas. Here, using a wooden mold and sand to create a form, they make concrete sombreros for their tee markers. These are then hand-painted with designs for championship, men's, regular, and women's tee markers.

The ducks of the Suburban Club of Baltimore County, Maryland. Duck decoys with wings and bills painted red, white, and blue mark the different tees. But don't try to fool Mother Nature!



What could be more appropriate for tee markers at Vail Golf Course at the base of those famous ski slopes in Colorado than the ski symbols indicating ski trail difficulty? Many golfers would welcome such a concept of easiest, more difficult, and most difficult for their golf course rather than women's, men's, and championship tee markers.

TURF TWISTERS

AN ERASER

Comment: (Maryland)

"You have frequently mentioned the use of activated charcoal for neutralizing the effects of preemergence herbicides. I believe you are correct in your praises. The product works! However, the effect of one activated charcoal application is to neutralize most pesticides for a substantial period of time, including applications of beneficial fungicides, etc. Therefore, activated charcoal is not a cure-all. It could even be detrimental in the long run. Certainly it is no substitute for thorough knowledge of and experience with pesticides, i.e., how they work, how long they last, etc. This knowledge begins with reading and understanding the pesticide's label and the precautions printed thereon. Perhaps other readers of the GREEN SECTION RECORD would appreciate my caution concerning the use of activated charcoal."

We tip our activated hat to CGCS Merrill J. Frank, of Baltimore Country Club, Maryland.

IS BETTER THAN NITROGEN

Question: Is iron still a good additive to tank mix with fungicides when you are spraying your greens? (Michigan)

Answer: Absolutely! Iron has many uses; foremost among them is its ability to stimulate good green color in the grass without the excessive growth of nitrogen applications. Furthermore, there is some very real evidence that using iron to maintain a good chlorophyll level helps to make the plant stronger and better able to stand the stresses of the summer. This is especially true in the northern climates where *Poa annua* exists and the superintendent wants to keep it alive during the summer. It is no cure-all, but adding iron to the spray tank is still a very good program to follow.

FOR SUMMER GREENS

Question: I have heard that spiking is helpful in reducing the persistence of localized dry spots on summer greens, but doesn't spiking add to compaction? (South Carolina)

Answer: Spiking is most beneficial in reducing dry spot formation because it opens the surface slightly and improves water infiltration. You are also correct about its effects on compaction, but a proper aeration program of two to three times per year offsets any compaction problems from the spiker.