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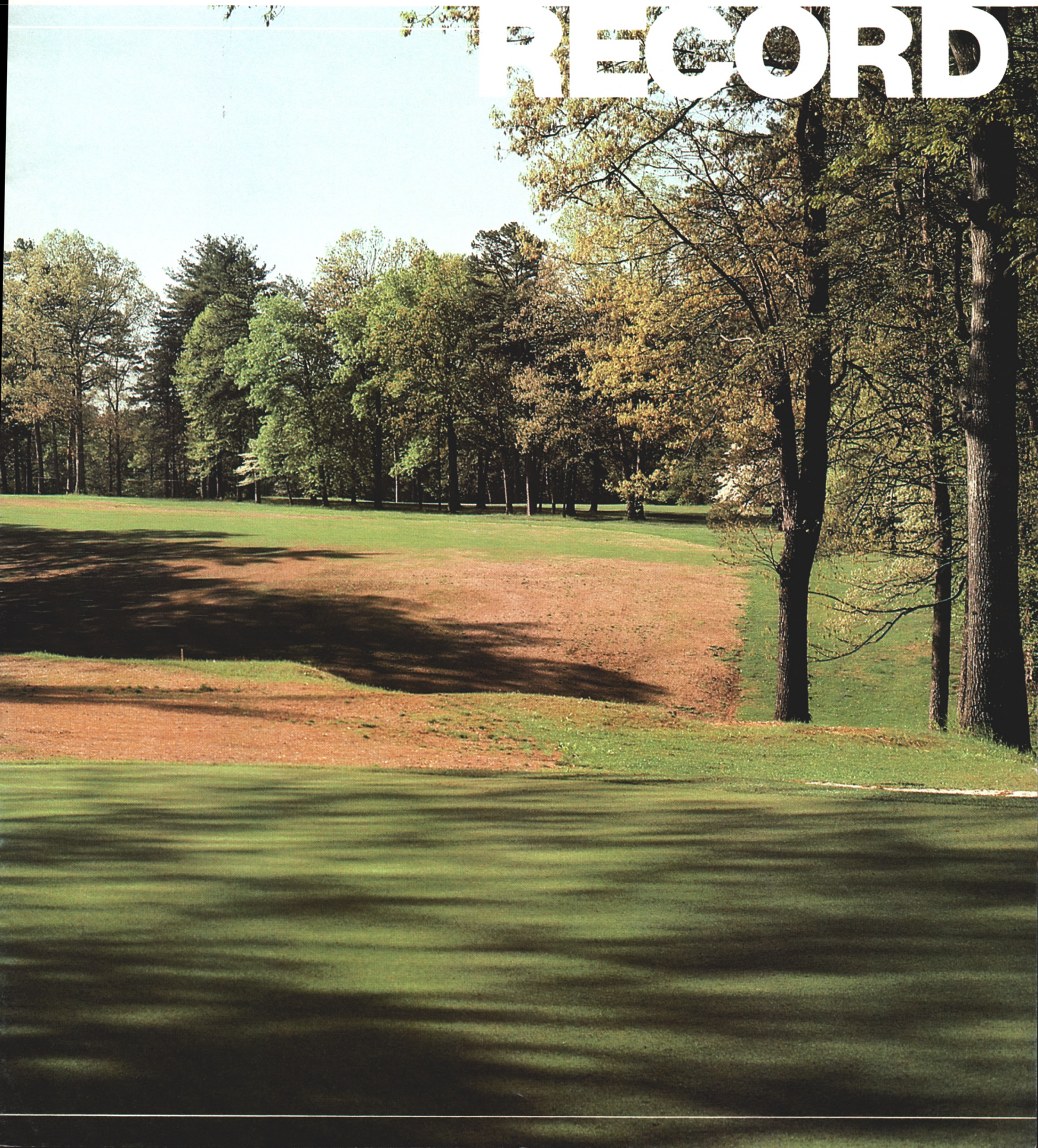
# USGA® Green Section RECORD



USGA®

# Green Section RECORD

**EDITOR:**
William H. Bengeyfield

**MANAGING EDITOR:**
Robert Sommers

**ART EDITOR:**
Diane Chrenko

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*Cover Photo:*
*Shade — Traffic — and Golfing Turf.*



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# Shady Characters

**by CHARLES B. WHITE**
Director, Southeastern Region, USGA Green Section

NEARLY EVERY golf course has some shady characters hanging around — big trees that shade out good quality turf. It's not a new problem, and yet not everyone seems to understand the factors associated with growing turfgrasses in shade. A host of components are involved; the trick is to adjust management programs to offset the factors inhibiting growth.

Oftentimes tree root competition is as much of a problem if not more than the shade itself. And other factors must be considered when evaluating poor turf areas surrounded by trees:

**1.** Shade exposure — morning, afternoon, duration of shade cover?

**2.** Are the trees deciduous or evergreen?

**3.** Do the trees affect air circulation?

**4.** What type root system (shallow or deep) do the trees produce?

**5.** What is the degree of canopy or overhang in relation to the troubled turf area?

It is impossible to determine the best means of correcting a tree/turf problem until each of these questions is considered, and when the weather is at its worst, these factors are the most troublesome. During the winter, shade greatly extends the period when the soil is frozen or when frost remains on the turf. This can induce a tremendous amount of winterkill in warm-season grasses. It can intensify winter damage and desiccation in cool-season grasses.

Even in winter, deciduous trees frequently cast enough shade to damage closely mown turf areas. On collars and putting green perimeters, adequate cutting height usually is enough to offset the slight shade from deciduous trees.

*Figure 1. (Top, right) Shade cover 2 p.m. on May 1.*

*Figure 2. (Right) Shade cover at 2 p.m. on January 15.*

*Figure 3. (Above) Foot traffic on and off a green plus tree root competition can be devastating to the turf.*

*Figures 4 and 5. (Top, left) Root pruning can be as thin as a knife blade . . . or as wide as a ditch digger (left).*

The relationship between cutting height, shade, and root competition will be discussed later.

SHADE, especially in the morning, reduces the photosynthetic processes within the grass plant. Growth is greatest in the morning, and so morning shade is more detrimental to overall grass health than afternoon shade. Thus, the need for shade evaluation in terms of morning or afternoon coverage is vital before considering tree thinning or removal. If adequate morning light can reach putting green surfaces, then some afternoon shade can be dealt with using other management techniques.

Because of the closer cut, putting surfaces are more affected by shade and tree root competition than collars and approach areas. Frequently when trees surround greens, the shade alone is enough to put the grass in a borderline stress condition. Add the stress of a very low cutting height and the grass usually cannot survive. If putting surfaces become thin from shade and/or root competition, adding increased height can once again create an acceptable grass cover. Raising the cut allows the grass to withstand the shade conditions because of the increased leaf area. In other words, there is now more leaf area to assimilate the filtered sunlight, and photosynthesis is again at an acceptable level. One must weigh the good versus the bad growing conditions and tip the scales to the side of good management.

It is no secret that higher height of cut on grasses must be maintained under shady or root competition conditions. The increased leaf area and resultant photosynthetic rate make better root development possible. Proper soil pH as well as phosphorus and potassium levels must also be maintained to keep the turf as vigorous as possible. Providing the proper management techniques to an environmentally stressed area keeps the scales tipped to the favorable side.

Trees adjacent to putting greens often cause poor air circulation, and we know air circulation is essential to the health of all turfgrasses. Stagnant air pockets on golf courses increase disease and insect infestations. The lack of air circulation causes humidity to increase, which favors disease development. Good air circulation also allows the plant to reduce heat buildup by increasing evapotranspiration rates.

A GOOD TREE maintenance practice around greens is to raise the canopy to a minimum of 15 feet. Higher canopies provide improved air circulation and additional sunlight in the winter when the sun's declination is much lower. Shadow lengths vary considerably from summer to winter. This is illustrated in *Figures 1* and *2*. In the winter, raised canopies allow sunlight to penetrate to frozen areas and significantly increase thawing.

While tree root competition is a real problem, it's frequently ignored. Trees remove tremendous amounts of moisture from the soil and take nutrients along with it. Tree roots have a much greater power to absorb than turfgrasses. Tree root pruning is an effective means of controlling invasion into putting greens, collars, or tees. It must be repeated routinely, however, because of regrowth and reinvasion.

One of the best tree root pruning devices is a subsoiler or vibratory plow. Its use every two to three years will keep root boundaries in check. If a trencher is used, one wall of the trench should be lined with some type of sheeting (heavy plastic or building tar paper) to provide a more permanent barrier. Tree roots often extend well beyond the foliage canopy of the trees; their small feeder roots have all the absorptive power. Keeping them out of putting greens, collars, and tees will eliminate moisture and nutrient loss from the soil and give the turfgrass a chance for survival.

Additional P and K fertilizations and water applications are needed on turf infested with tree roots. A plant physiologist once stated that an oak tree three feet in diameter at chest height can move over 1,000 gallons of water up its trunk in a day if the transpiration rate is high. With this type of ground water removal, it is no wonder that turfgrasses quickly show sparse or even droughty conditions under or around trees.

A TREE-THINNING program is often the best, perhaps the only answer to better turf in dense, heavily wooded areas. Panicky members believe tree-thinning is a clear-cut operation (we've all seen tree-thinning in power line rights-of-way), but this is not the case when we speak of golf courses. Each tree that is to be removed or kept must be carefully studied and carefully selected. Terminology is important. Instead of "thinning," "selective pruning" or "selective thinning" might be a better choice of words. "Tree clearing" is definitely out!

Removing a percentage of small trees in a given area may make healthier growing conditions for the remaining ones while eliminating severe shade and air circulation problems in the future. Also, by selectively pruning strategic limbs on larger trees, specific shade problems may be eliminated without tree removal. No one likes to remove trees, but on the golf course, someone must decide whether trees or grass are more important. Try selectively pruning, limbing, root pruning, and other means of tree/grass management. These practices alone often will allow the trees and turf to live compatibly together.

During golf course construction, carefully select the trees that will remain or trees to be planted on the course. Anticipate their mature size and shape, their influence on growing conditions for the turf, and the playability of each hole. Considerations for selecting trees for golf courses include the type and vigor of the root system and the density of the canopy they produce. These factors are important in determining the distance from a green that a tree should be planted and the shade the tree will create for a green or tee. If morning shade problems are eliminated, there will be little possibility that removal or significant thinning of the tree will be necessary in years to come. Again, remember the difference in winter arc versus the summer arc of the sun's path across the sky. An upright tree such as a poplar is less of a problem in the winter than a wide-spreading tree such as an evergreen or certain deciduous trees.

Tree shapes also affect the aesthetic qualities of each golf hole. Placing trees near approach areas requires an understanding of canopy overhang, shade/root competition, and how the mature tree size will affect the approach shot.

If a green is to be highlighted with a particular tree, then that tree must be fitted to its particular needs, be it a low, wide-spreading canopy or a tall tree producing a narrow canopy. Giving these considerations to tree placement and planting means significantly fewer tree problems and grass problems in the future.

LONG-RANGE landscape programs should be established for every golf course. They will insure proper selection and placement of plant materials. How many times have you seen a tree overhanging a bunker or preventing direct advancement of the ball from a bunker? This happens because mature tree size was not given consideration at planting time. Thus, an unfair situation is created when, with proper planning, it need not have occurred.

The most efficient way to insure proper landscape design is to consult with an architect regarding the shape and stature of various trees and how they will enhance the playability of the golf course. A reputable landscape architect will provide specimens of trees that have those characteristics and are adapted to your area. Other landscape values such as spring or fall color, leaf drop, or evergreen color should also be worked into the tree planting program.

Debris from trees grown in close proximity to putting greens presents another turfgrass maintenance problem. Leaves, seed pods, twigs, etc., must be blown off the putting surface every morning before mowing in the spring and fall, or any time a wind storm passes. Maintenance around and on such greens is also increased because of decreased efficiency in mowing, increased time needed to mow perimeters, and increased equipment damage caused by exposed tree roots.

While tree competition with closely mown turf is a tremendous problem, it can be eliminated by proper planning, selection, and placement. Word selection is a key in establishing a good tree maintenance program. The membership must be assured that the superintendent's intention is to prune and thin trees selectively to improve the golf course — not to destroy the trees so the grass may grow. Use strategy to sell the idea! Tree thinning and pruning do not have to be nighttime jobs!

If your golf course does not have a comprehensive, well-designed tree program, consider starting one soon and prevent tree and turf problems in the future.

# Potassium - A Miracle Element?

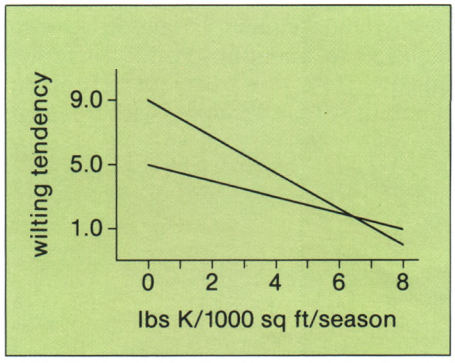
by **ROBERT C. SHEARMAN,** Associate Professor,
Department of Horticulture, University of Nebraska, Lincoln, Nebraska

EVIDENCE gathered in surveys of turfgrass nutrition programs shows that golf course superintendents are taking more interest in the role of potassium in their turfgrass nutrition programs. The surveys were conducted at GCSAA Nutrition Seminars. Further evidence came from superintendents attending regional turfgrass conferences. The growing interest in potassium nutrition has also coincided with the increased use of light, frequent sand topdressing, and with the use of higher sand concentrations in rootzone media.

Potassium is one of 16 essential elements required by plants for growth and development. Though it is an essential element, potassium is not a constituent of turfgrass tissues. It is found in plants only in the elemental form ($K^+$). Potassium enhances carbohydrate synthesis and translocation, protein and amino acid synthesis, and enzyme activity. It controls transpiration, respiration, and uptake of certain nutrients, like nitrogen and magnesium. It has been reported to enhance rooting and stress tolerance of turfs.

Turfgrasses require fairly large quantities of potassium, second only to nitrogen, and there is growing evidence that potassium may be useful to turfgrasses in equal amounts to nitrogen, particularly in relation to environmental stress tolerance. The term "luxury consumption" has often been associated with potassium, since it may be taken up by plants in greater quantities than that required for growth and development. Luxury consumption of potassium has been associated with crop production and subsequently has been related to turfgrass management. This association may not be fair or realistic, since clipping yield and dry matter production are not of primary concern to superintendents, but increased turfgrass stress tolerance is. Tolerance for heat, cold, drought, and wear grows with increased potassium fertilization of turfs. Therefore, luxury consumption of potassium likely does not occur in relationship to turfgrass stress tolerance.

*(Below) Wilting tendency of Kentucky bluegrass increased with higher nitrogen rates (2 versus 8 lbs N/1000 sq ft/season) but declined with addition of potassium ranging from 0 to 8 lbs K/1000 sq ft/season. (Bottom) Potassium nutrition is important in minimizing turfgrass wilt and enhancing drought avoidance.*




A DROUGHT avoidance study conducted at Nebraska on a Kentucky bluegrass turf growing on a soil that was high in potassium (i.e., greater than 500 pounds available per acre) demonstrated that wilting tendency decreased with

increasing potassium, ranging from zero to eight pounds per 1,000 square feet during the growing season. Recovery from drought injury was also enhanced by potassium fertilization. The evapotranspiration rate declined and turfgrass depth and extent of rooting increased with potassium fertilization in this Nebraska study. Wear tolerance increased and desiccation injury decreased with potassium treatment in a Michigan study conducted on a Penncross creeping bentgrass green. These responses were observed even though soil potassium levels were considered to be high. Similar reports of stress exist for warm-season turfgrass species like St. Augustinegrass and bermudagrass.

Potassium deficiency symptoms are usually subtle and not seen as easily as in nitrogen-deficient turf. Deficiency symptoms often show up as reduced tolerance to environmental stress and to disease. Potassium deficiencies occur most often on sandy soils that receive frequent irrigation. Daily irrigation on a seaside creeping bentgrass green growing on a sandy rootzone resulted in a soil potassium level only 79% of a similar grass growing on the same rootzone, but given the same amount of water in three installments per week. In this study, potassium content of turfgrass tissues showed a similar trend as the soil levels; lower levels were found in the frequently irrigated turf.

*(Above) Turfs with adequate potassium levels hold up to traffic better than those that are potassium deficient. (Below) Potassium deficiencies occur most readily on sandy rootzones that receive frequent irrigation.*

ON SANDY SOILS with low nutrient retention capabilities, it is better to apply potassium in light and frequent rather than heavy and less-frequent applications. This is particularly the case when frequent irrigation is also required to maintain desired turfgrass quality. The low nutrient retention capability of sand coupled with frequent irrigation results in much of the potassium being leached from the rootzone and a subsequent reduction in potassium uptake by the plant. Light, frequent topdressing with sand results in similar potassium management problems as those encountered with high sand content rootzones. Superintendents need to be aware of these relationships and to adjust their nutrition programs accordingly.

Potassium is not a miracle element; it is an essential nutrient, and superintendents should keep its role in perspective. A fair degree of evidence supports potassium's role in turfgrass stress tolerance, but controversy exists among turfgrass researchers regarding its potential benefits. For example, concern has been raised about high potassium levels increasing *Poa pratensis* competition in turfs, but little research evidence supports this concern.

More work is needed to further delineate the role of potassium in golf course fertilization programs, and superintendents should be willing to approach its use for enhancing stress tolerance in a reasonable manner. A concerted research effort with potassium is being conducted at the University of Nebraska. This research is part of an extensive cultural practice research project supported by the USGA.

*The Ridgewood Country Club, Ridgewood, New Jersey.*

# Selling an Irrigation System

**by ED WALSH**
CGCS, Ridgewood Country Club, Ridgewood, New Jersey

THE IRRIGATION system provides the lifeblood to most golf courses; this is certainly the case at the Ridgewood Country Club, in northern New Jersey. Much of the original irrigation system, which was installed in 1935, is still in use, although it had become clear by the late 1970s that the system was suffering from hardening of the arteries. The cast-iron main lines were deteriorating, the pumphouse was a Rube Goldberg special, and the holding pond was inadequate. As time passed, the continuing deterioration of the irrigation system was causing turf problems and taking time away from other important projects. It finally became clear that our system needed major work.

Unless he is involved in the construction of a new golf course, the average superintendent will never go to his board of directors with a larger financial request than what he needs for a new irrigation system. With costs ranging upward from $150,000, it is best to be prepared for the hardest selling job of your career. The one common denominator that every member of the board of directors and every golf course superintendent possesses is a respect for the value of the dollar. If you keep this in mind and attempt to develop a sales plan along these lines, you can be successful.

It is most important first to determine whether the need is for complete replacement or for major updating of the existing system. Records can be a most important tool. Some of the questions we considered:

How many hours has the staff spent on irrigation repairs?

Have repair costs increased yearly?

Has there been an increase in hand-watering time?

Have renovation needs increased due to turf loss?

Have electricity and/or fuel costs risen due to inefficient pumping operations?

Has the condition of the course suffered because of the decline of the present irrigation system?

Have other projects been put off due to the additional time spent on a deteriorating system?

If you answer yes to some or most of these questions, you have undoubtedly already sold *yourself* on the need for replacement; now it's time to go to the decision makers.

I found it most helpful to inform the membership gradually of the worsening

problems. Our club newsletter (*Tee Leaf*) allows me to place an article in each issue, and throughout the past few years many of those articles touched on the faults of the irrigation system. This was done when the course was in good shape, not just when poor conditions existed. This, I found, was paramount in the general membership's understanding of the problems.

We constantly fed information both to our green and grounds committee and the board of directors relating to expenses and conditions as they pertained to the system. Before too long, both groups knew what to expect before conditions changed. This was important to the sale of the new system and to the average club member who might otherwise have been critical of poor conditions under stress situations.

With the irrigation system change imminent, we began testing various available equipment. We used sprinkler heads of different sizes, shapes, and capacities, and we checked information on control systems and company backup assistance.

AT THIS POINT we suggested to the board, through our committee, that we retain a consultant and consider a full evaluation of our system. This was approved unanimously. Through our golf course architectural consultant, we were introduced to a specialist who has designed irrigation systems for the past 15 years. His experience suited our needs perfectly. We spent much time examining our existing system. Hydraulics, pumping capacities, and existing equipment were scrutinized to determine possible use in a new operation. We also looked at the possibilities of relining the larger cast-iron main lines, which were installed in 1935. Every direction was considered before a presentation was made.

Within two months we were able to present options to our board of directors. We recommended that we install an entirely new system, including a pumping station. The existing cast-iron and galvanized pipe would be useless in a new installment, but in one instance it could be used to carry water from an existing deep well to our holding pond to be used as a reservoir for the new system. We also recommended we use a system that could utilize an IBM PC computer as its central programmer. The ability to have access to prospective improvements in our course record-keeping procedures was important in our final decision. After close and careful consideration, our board of directors authorized us to design the new system and examine available contractors. Again, the design specialist and I spent hours altering, changing, contacting information sources, and finally deciding on a plan that was workable and, hopefully, acceptable to the club.

With the plans completed, we went back to our board of directors with estimated costs. While the board was determining the financing aspect of the project, we contacted irrigation contractors in our area. Both our golf course architect and the local irrigation distributor were most helpful in this area. Both had used companies from the northeast and were not reluctant to share their experiences.

The club requested that we have four bids for our project, and we set our sights on meeting that requirement. We initially made contact with eight contractors who were recommended by our sources. Each was asked to submit a list of all the completed irrigation installations he had done in the last three years. We also required that each submit proof of his ability to be bonded for the estimated cost of our installation, approximately $500,000.

AFTER EACH CONTRACTOR presented his list of completed installations, I sent a questionnaire to the superintendents at those clubs. We were most interested in on-the-job cooperation, interference with play, clean-up after installation time, and quality of work. Without question, these responses were most helpful to us and our board of directors.

With this information in hand, our committee decided to allow the top four contractors to bid on the installation. Job specs, general conditions, a design map, and an approximate material quantity list were sent to the four and a date was set before which bids must be submitted. It is also important to note that all four contractors were required to visit our course, look over the site, and meet with the committee members who were available when they visited. This also proved helpful in familiarizing the committee with the personalities of the prospective installers. Even though these visits took place during the week, it was surprising how many of our committee members were available to meet and, more importantly, question the contractors.

Immediately after the bid date, the committee met to choose the contractor. A checklist was developed to rate each contractor, taking into consideration his years in business, total installations in the immediate past three years, responses from our questionnaires, and finally his bid.

It is especially important to note that our board of directors did not require us to necessarily recommend the lowest bidder, but rather the contractor we felt would do the best job for Ridgewood Country Club. As it turned out, we did choose the contractor with the lowest bid, but only after we saw his qualifications met the high standards our club had set.

WITH THE BID established, our committee, the design specialist, and I examined the additional costs of the system that were not in the bid specs. Still needed was the cost of the IBM PC computer, the pump house, dredging of our holding pond, and increases to our electrical service at the new pump house area. Within three weeks we were able to present a total package to our members at a general membership meeting. The board of directors had previously decided to seek a membership assessment for the cost of the irrigation project. This meeting was scheduled for a vote on that assessment.

Although we spent many years informing our members of the deteriorating conditions of our existing irrigation system, it wasn't until that meeting that I would find out if I had done my job properly.

Questions were asked, answers were given, and a vote was taken. The final tally was approximately 85% positive. We had done our job.

And now our irrigation installation is complete and we are all looking forward to our finest golfing season in recent history. Although much time was spent selling the irrigation system, that time will prove invaluable in future years as we work with a completely reliable irrigation operation.

There is no question that few jobs require more work than convincing your membership of the need to replace a deteriorating, costly irrigation system. But likewise, you will rest just that much easier once a new system is installed. It is certainly worth the effort.

*(Top) Enlarging the reservoir was a vital step in insuring an adequate supply of water.*

*(Above) Superintendent Ed Walsh with the new pumping unit at Ridgewood. "It is certainly worth the effort."*

*(Right) The new system goes in.*

*Some of the earth-moving equipment and haul-road culvert used during rough grading for the Kelso course.*

# Some Recent and Unusual Experiences in Golf Course Design

**by ROBERT MUIR GRAVES**
Past President, American Society of Golf Course Architects

IT IS A RARE DAY indeed when a golf course architect finds he can actually cut construction costs, provide for lower long-term maintenance costs, and still produce a new golf course close to what he had originally in mind on his design board. Rare, but not impossible!

That's exactly what happened to the Three Rivers Golf Course, owned by the Elks Club, in Kelso, Washington, just a few years ago. I don't think there is another golf course like it.

As a golf course architect, I initially faced the problems of a low-lying, boggy site that would have been difficult to drain and would surely have had high maintenance costs and continuing problems. We wound up instead with pleasantly hilly, well-drained land (made up of a turf-growing medium that an eminent agronomist called "perfect" for a golf course), contoured just as designed, and with relatively easy maintenance.

How did this happen? Because we were able to use the ash that scattered over Washington State after Mount St. Helens erupted several years ago. We obtained the material because the Army Corps of Engineers needed a place to dump the ash to be dredged from the bottom of the Cowlitz River, which borders the golf course.

Several years earlier, we had picked that site as the best of the three available, after the Elks Club sold its original course for a shopping center, but we knew we had potential problems.

The area didn't drain well because it was in a basin adjacent to the river bank. Within that basin was a deep drain ditch with a pump system that collected and retained water from off the site. The soil promised to be troublesome because of a low percolation rate and a high water table. As if that wasn't enough, a small portion of the site, under the future 13th hole, was a former garbage dump.

Everyone connected with the site selection recognized that maintenance could be costly, but the other available locations had more serious problems, so this one was it.

THE WATERING procedures would be difficult because irrigating the higher areas that needed water would inevitably result in water reaching the already saturated lower areas. We would then have high drainage system costs, and I wasn't certain that even this would allow play throughout the year. Rainfall is particularly heavy between October and May in that region.

Our office was considering how best to proceed with the project when Mount St. Helens blew apart. A few weeks later I got a call from Fred Bader, the golf professional and manager of the old course, advising me that the Corps of Engineers wanted to pump the sediment from the Cowlitz River bottom onto the new golf course site. Later I was informed

that the ash that settled on the bottom of the Cowlitz had created a threat of flooding, which is why the Corps needed a nearby dump site quickly.

While I frantically tried to determine the quality of the material and how much there would be, the pumping started. It was a great relief to learn from Dr. Roy Gross, agronomist and turf specialist at Washington State University, that the ash was more like sand and was comparable to the material used for green construction. What we were going to have was an entire golf course with a high-quality, unusually deep soil.

When the Corps finished the pumping and the rough grading it agreed to do, our golf course site was covered with thousands of cubic yards of gray sand, in some areas to a depth of 35 feet, or as tall as a four-story building. It was leveled and contoured to my design and specifications, and you may be certain that the potential cost of maintenance was reduced substantially, because we could sculpt the course completely out of this excellent soil. We had our choice of golf course feature shapes, sizes, and gradients.

We had humps and hollows where we wanted them, with good percolation, making it easier (almost too easy) to get water and nutrients to the rootzone, and we didn't require a very expensive drainage system. The course, which was opened two years ago, is 6,777 yards from the back tees, 6,265 yards from the middle tees, and 5,463 yards from the forward tees. We included three man-made lakes and extensive tree planting, mounding, and bunkering. The result is a course that challenges all levels of golfers.

We were fortunate with the ash from the river, but many aspects of golf course design are beyond the soils and terrain. It is always important that the architect seek solutions that will provide the lowest possible maintenance costs commensurate with the client's program and budget for golf course operations.

AT ANOTHER course in Murray, Utah, we're getting all of the fill soil from a nearby state highway construction project. The fill soil is not well suited for turf growth, so we first scraped off the existing topsoil and stockpiled it.

The site project engineers designed a system that will collect surface drainage water from the many adjacent acres of land as well as the paved freeway itself. They then directed the water onto the golf course site and through a series of retention basins, drainpipes and swales. Ultimately, it is deposited into the nearby Jordan River.

Our job is to use the basins and swales to enhance the attractiveness and playability of the course as lakes and streams. We'll put back the topsoil after the fill soil is in place.

For another golf course, in Santa Clara, California, we're building on top of a sanitary landfill, where we must import all of the soil to be used for the cap that seals the site. You can imagine that a cap of soil selected and placed to prevent water from draining through is not the best material to grow grass on. So, on top of this cap we will place topsoil.

But whether reusing topsoil or having it hauled in, it is both possible and advisable for the golf course architect to plan for course maintenance so that this cost can be minimized and the work easily done. In all three of these diverse situations, our major effort was to assure we had the best possible medium for turfgrass growth. Since the ultimate cost of maintenance was a serious concern, we created golf course features with shapes, sizes, and gradients that allow cost-effective maintenance procedures.

That, in my judgement, is as important as the design and placement of a picturesque green or an ominously beautiful bunker.

*(Above) This is a comparison of the native soil with the grey ash which was the fallout from Mount St. Helens and was dredged from the Cowlitz River. (Right) Green Number 13 built on top of a former garbage dump. Recapping with the same sand fill worked very effectively.*

# Golf Shoes and Turf Wear — A Story that Won't Go Away!

**by WILLIAM H. BENGEYFIELD**
National Director, USGA Green Section

IT WAS EXACTLY two years ago at Industry Hills Golf Club, California, that the extensive USGA Green Section's Golf Shoe II Study was conducted. The results were published in the September/October, 1983, issue of the USGA GREEN SECTION RECORD to the gratification of some and the chagrin of others. Since then, it has been a story that will not go away! In brief review, the study touched on the history of spiked shoes in golf and compared present-day metal spiked golf shoes with the new rubber nubs or stud "spikeless shoes" and modern spikeless teaching shoes that are almost flat. Of the three shoe types tested, the metal spike golf shoe caused the greatest damage to bentgrass putting green turf. The rubber studded shoes were next and the teaching shoe produced the least amount of wear. The tests were conducted under both good weather and wet weather conditions. The relative ratings remained the same throughout both tests, although the rubber studded shoes seemed to cause a greater degree of surface disturbance and damage under wet conditions than on dry surfaces. Overall, the conclusion was, "spikes are detrimental to putting green turf and the putting quality of greens."

Since the study, even greater numbers and varieties of rubber-soled studded athletic shoes have appeared on the market. They have followed the trend created by more and more joggers, runners, walkers, coaches, and soccer enthusiasts. The lugs or studs have become more pronounced, deeper, and in various patterns. Their manufacturers do not claim them to be "golf shoes." Nevertheless, they have found their way, in increasing numbers, mostly on the feet of public-course golfers. After all, golf is a form of athletics and these are "athletic shoes." Unfortunately, that reasoning is not good for our putting green grasses. Observations and field

experience with these shoes, i.e., with longer, deeper, more pointed studs and especially under wet conditions, indicate that they do harm to our putting green turf and the putting quality of our greens. As concluded in the Golf Shoe Study II, "spikes are detrimental to turf." Apparently, the longer and more pronounced a spike, the more the damage.

WILL THIS STATEMENT put an end to the golf shoe controversy? I doubt it. For example, here is a notice from the golf committee of a prominent eastern club to its membership:

> To Golfing Members: In a letter this summer, your attention was called to the injury that is done to the putting greens by certain types of golf shoes, and your committee believes the time has come when golfers should discontinue the use of shoes with nails. This is not only for the sake of the greens and tees, but because players are finding to their great satisfaction that their game is improved by the various forms of rubber soles. Injury to the clubhouse floor is also obviated. We assume that it is understood that spikes are prohibited.
>
> We, therefore, suggest that when buying new shoes, or having your present ones repaired, you get some one of the various makes of vacuum treads or rubber soles.
>
> Golf Committee
> January 21, 1921

Obviously, the controversy has been raging for at least 65 years.

As to the first reference of spikes worn on golf shoes, Janet Seagle, USGA Librarian and Curator of the Golf Museum, in Far Hills, New Jersey, came up with this 1857 passage from "The Golfer's Manual," a publication from Scotland:

> Let the novice invest in a pair of stout shoes (boots constrain the ankles too much), roughed with small nails or sprigs, and he will march comfortably and safely over the most slippery ground that can be turned out by the meridian sun in the dog days.

And so it goes. The story will not go away. Indications are that the PGA Tour does not permit any of its players to wear the rubber studded so-called "spikeless shoes" during their events, even though several of their players are endorsing certain types of these shoes.

It is not possible to run a new series of wear tests every time a new spikeless shoe comes on the market, but it does seem safe and necessary to say that not all athletic shoes should be permitted on golf greens. The Green Section has always had a driving interest in quality putting green turf maintained at the lowest possible cost. Eliminating all spiked or studded shoes from golf would be a giant step forward in reducing maintenance costs and improving putting qualities. Since this does not seem possible, minimizing the effect of spikes on turf is the best available second choice.

# News Notes for Mid-Summer

**GCSAA Sponsors New Mid-Year Turfgrass Conference and Show — September 19-24, 1985 Indianapolis, Indiana.**

For the first time in history, the Golf Course Superintendents Association of America is offering a unique and exceptional opportunity to everyone in golf or affiliated with the turfgrass industry. It is a Mid-Year Turfgrass Conference and Show. It will include seminar courses in turfgrass science, golf course design, business management and computers. There will be staff technician hands-on training courses, a two-day buying and selling equipment trade show, and outside equipment demonstration areas. On Friday, September 20, Bart Starr, former quarterback and coach of the Green Bay Packers, will give the keynote address at the luncheon banquet.

Most significantly, there will be a Turfgrass Research Conference with the latest update on research from the scientists actually doing the investigations. These are the men involved with the USGA Green Section/GCSAA Long Range Research Program for Development of Minimal Maintenance Turfgrasses.

Equally important, Crooked Stick Golf Club, in Indianapolis, will host the GCSAA Turfgrass Research Benefit Golf Tournament on Tuesday, September 24. Proceeds from the Golf Tournament will be donated to the USGA/GCSAA-sponsored research program.

This is a new Turfgrass Conference that will benefit every attendee and everyone having a stake in the future of turfgrass research. For full details and registration information, call 1-800-GSA-SUPT toll free. You will not want to miss it!

**Purple Martin Condos**

At Vesper Country Club, Massachusetts, Superintendent Bert A. Fredericks's father built these pert purple martin houses and located them at various places throughout the golf course. At one time, they were even considered for 150 yard markers. Apparently someone considered them too obvious for that purpose, but they have been used effectively around the course, especially in conjunction with colorful flowerbeds. This one is at the sixth tee and is obviously enjoyed by both golfers and purple martins of Tyngsboro, Massachusetts.

**New Equipment for Water Removal**

A new piece of equipment is on the horizon for fast and effective removal of water from greens, bunkers, fairways or wherever standing water is a problem. The machine (the Water Hog) causes very little compaction and can effectively eliminate water under nearly any condition in a matter of minutes. The machine is currently being tested throughout the United States on golf courses, parks, baseball and football fields with good success. It is a machine that, sooner or later, every golf tournament official will wish he had.

# TURF TWISTERS

## GEESE AND DOGS

**Question:** Geese are making a mess of my golf course, not to mention their being noisy and disruptive to play. Plastic swans don't seem to bother them much. What, if anything, can I do to get rid of these unwanted visitors? (Connecticut)

**Answer:** Turning the course into a goose hunting club is probably out of the question. You might try borrowing one or more good bird dogs to worry and pester the geese off your property. Once the geese know they will be bothered on the course, hopefully they won't want to return.

## LONG IN THE TOOTH

**Question:** I am trying to convince my committee of the need to replace our 15-year-old fairway tractor. It is "long in the tooth" and in constant need of repair. (Oregon)

**Answer:** Quite often, members do not understand how many hours certain pieces of equipment are used in a year's time. If a fairway tractor operates seven hours a day for approximately 200 days per year, it would have 1400 hours of operation annually. An automobile driven the equivalent amount of time at 60 mph would accumulate approximately 84,000 miles of wear on its engine. From this analogy, one can see that maintenance equipment should be depreciated on a fixed schedule and replaced before maintenance problems and down time become excessive. Many times golf course maintenance operations can be one or two pieces of equipment away from making a dramatic difference in the golf course.

## CHECK THE pH

**Question:** We have noticed that our fungicide treatments often fail to live up to their billing on efficacy or longevity. We are confident that our application rates and sprayer operations are correct. What can be wrong? (Minnesota)

**Answer:** Check the pH of the water being used. Some water supplies are alkaline and may react with some chemicals to reduce their effectiveness. Use an acidic additive such as vinegar to reduce the pH to 6 or 6.5 (just slightly acidic). You can check the pH with a swimming pool test kit, litmus paper, etc.