USGA® GREEN SECTION

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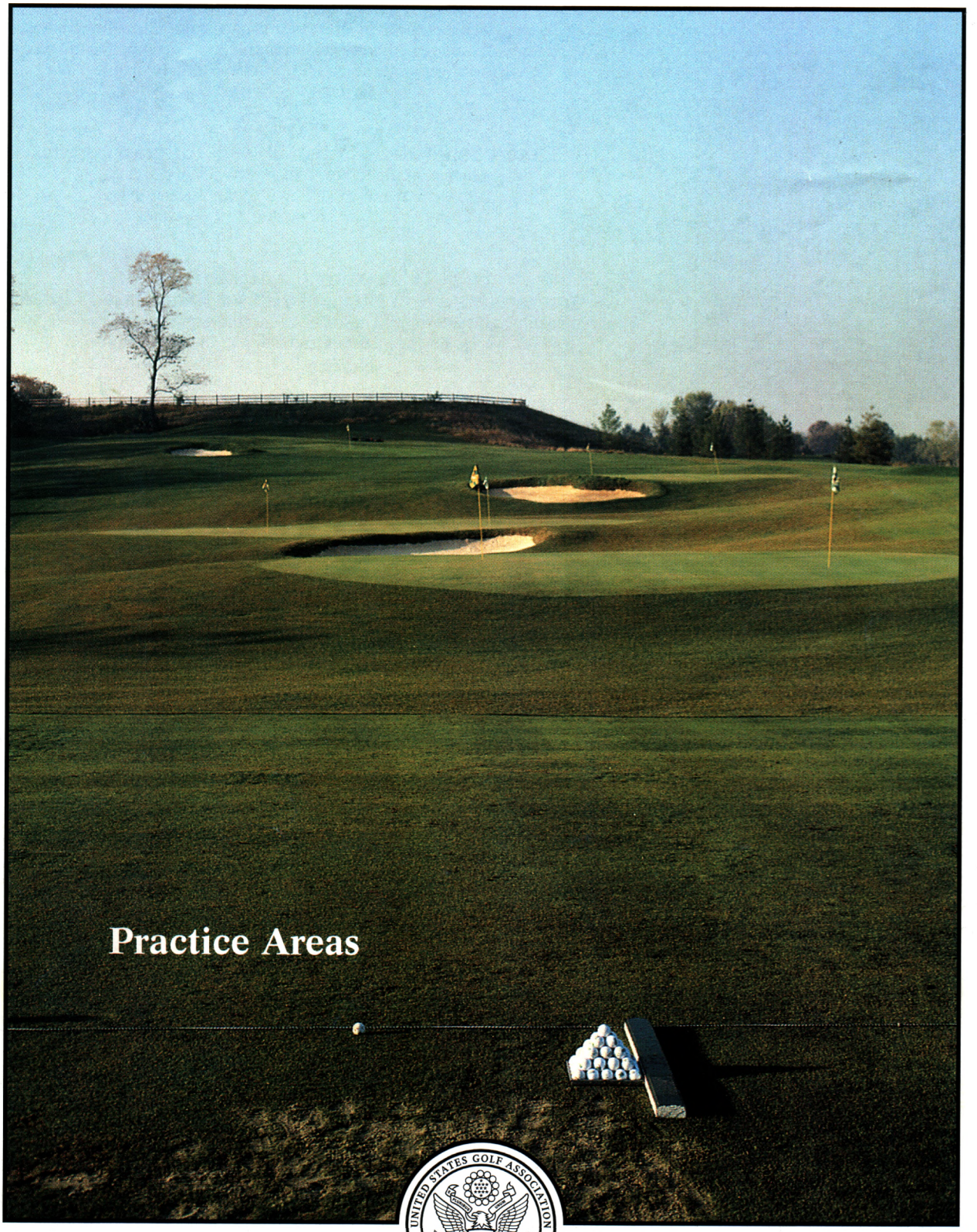

A PUBLICATION ON TURFGRASS MANAGEMENT

BY THE UNITED STATES GOLF ASSOCIATION®

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Cover Photo:
The desire of golfers to practice is changing the way that practice facilities are integrated into the golf course landscape.

As practice becomes more a part of the golf landscape, elaborate practice facilities have become more prevalent. See page 1.

Meeting turf maintenance equipment needs was one of our highest priorities. Strengthening our maintenance infrastructure allowed us to attain our turf health and conditioning goals. See page 19.

USGA® GREEN SECTION
Record

The Long and Short of Practice Areas

Practice facilities come in all different shapes and sizes. Some basic design and management considerations can make practice ranges and short game areas safe, practical, and enjoyable.

by DARIN S. BEVARD

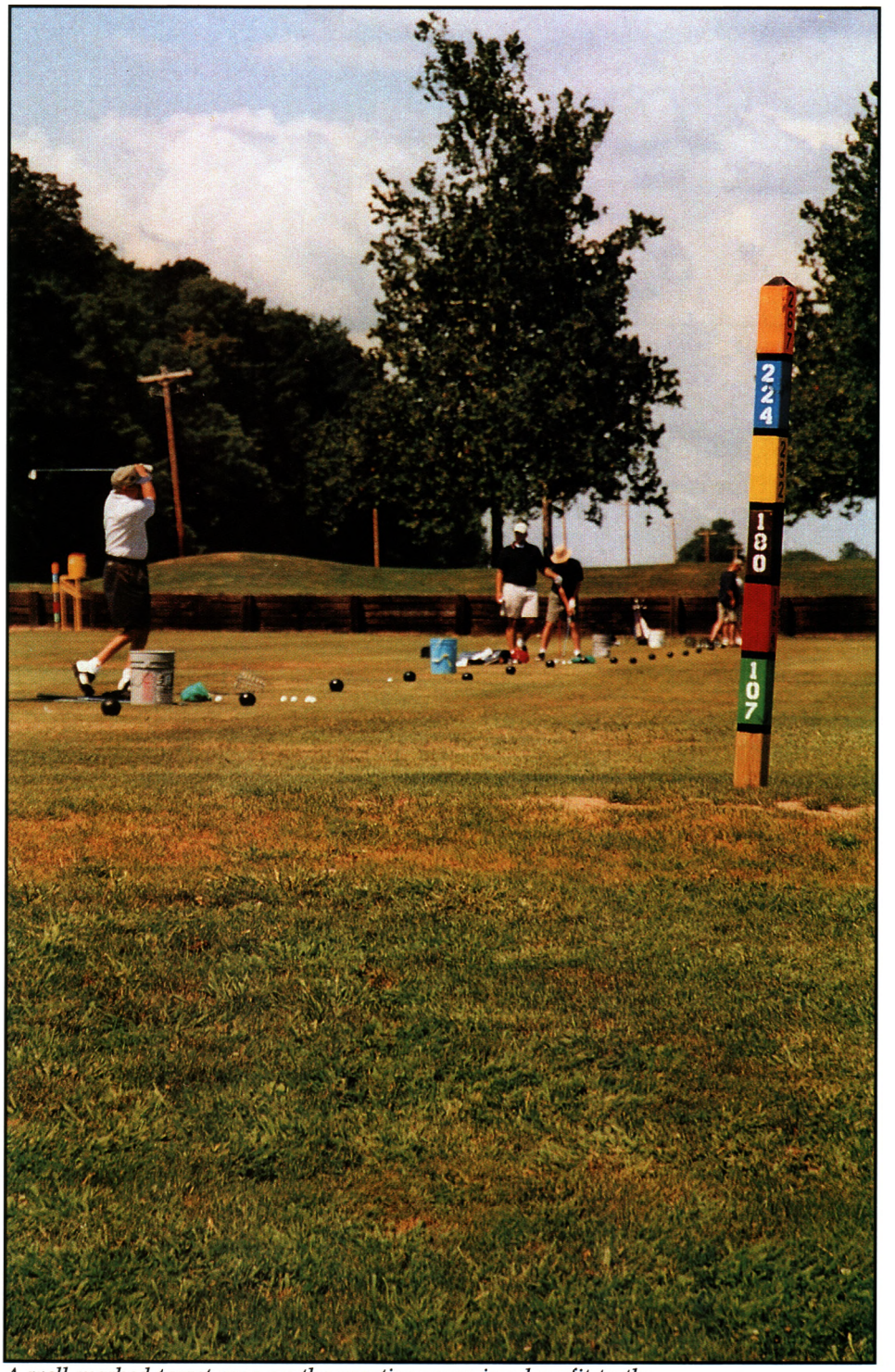
AH . . . THE PERFECT golf shot. Nothing feels quite like it. Now if I could only hit that perfect golf shot again, on purpose. This is a common refrain among many of us who love and play the game of golf. In fact, the perfect shot is what keeps us coming back.

Most golfers realize that in order to improve their games and lower their handicaps, repetition of the golf swing in the various aspects of the game is extremely important. However, most people don't have the 4 to 4½ hours needed to play a round of golf or even 2 hours to get in nine holes on a regular basis. This means that golfers must find time during lunch to hit a few chips and putts or head to the range before dinner to hit the all-important *bucket of balls* in an effort to hone their golf skills.

Golf has become a game of practice. With more than 26 million people participating in the game of golf, practice facilities will continue to be in demand for the public course and private club player. There are well over 16,000 golf courses in the United States, and most have some type of practice area. In fact, the practice facility can be crucial in attracting customers and prospective members. By combining the number of golf courses with player demand, it is easy to see that practicing golf is big business itself!

This begs the question: What makes a good practice range and short-game facility? The answer is somewhat subjective. Let's just say it would be difficult to list every factor that impacts the quality of a good practice facility. However, there are several major factors that likely define the overall quality of a practice facility.

The best practice facilities incorporate a practice range that allows players to work on their long game, while including a putting green and chipping area close by. Players need to practice putting, chipping, and even hitting bunker shots. There are certain features of each type of practice area



A well-marked target area on the practice range is a benefit to the golfers using the facility. This range uses a series of colored stakes to indicate the corresponding distance off of the tee.

With the game of golf more popular than ever, practice areas are becoming a major feature of the golf course landscape (Alpine C.C., New Jersey).

(practice range and short-game areas) that add to golfers' enjoyment. This article will focus on the factors that influence the quality of practice facilities, starting with practice ranges and moving on to practice putting greens and short-game areas.

Practice Ranges

Several major factors should be considered when evaluating the overall quality of a practice range. They include the size of the tee and landing area, tee surface (turf vs. artificial mats), quality of range targets, location, and overall presentation. This also includes distance markers and teeing area definition.

Size Requirements

Perhaps the most important factor in determining the overall quality of a practice range is its size. The size of the range tee has a direct impact on the golf course superintendent's ability to maintain high quality grass, as well as the number of people who can use the practice range at a given time. The size of the landing area and its relation to surrounding areas affects many things, with safety being the most important.

The size of a practice range is usually dictated by available space. Many older golf courses didn't consider the need for a practice range at the time they were designed. When they were built, golf was a different game. As such, these older courses often only have small driving ranges, if one exists at all. As older courses are renovated and/or restored, one area that is often reviewed is the potential for expanding the existing practice range, or building a new practice complex in a different area. Some older golf courses have even purchased adjacent parcels of land in order to construct a modern practice range. For new courses, however, the emphasis currently placed on practice dictates that such facilities should be designed in the overall scheme of the golf course.

So how big does a practice range, including tees, need to be? This is a difficult question to answer. Factors such as the number of annual rounds and public versus private membership must be considered. Many ranges are no larger than 5 or 6 acres, but they still can provide a high quality practice area. However, these small facilities rely on natural barriers such as trees, safety nets, golf club restrictions, and golfer awareness to maintain safety. Intense maintenance of the turfgrass is also needed to provide quality conditions under heavy traffic.

Where space is available, a rather nice range can be built on about 15 acres. This may sound like a lot of land, but it only provides a range approximately 320 yards in length and 150 yards in width, with room for some two acres of teeing space. In fact, some practice ranges are more than 20 acres in size when short-game areas are included, although this is the exception and not the rule. In discussions with architects, 15 acres plus or minus a couple of acres seems to be a good starting point.

It is hard to determine how large the tee must be to provide adequate teeing space for any given practice range under all circumstances. Intensity of traffic and maintenance will impact the quality of the tee. However, a larger teeing area that provides room for more players to practice at any given time is desirable. This is especially important during times of peak activity. Additionally, the more room available to distribute traffic, the better chance the golf course superintendent will have to maintain a quality stand of grass on the tee. Within reason, practice tees should be constructed as large as available space and resources permit. We never see practice tees that are too large!

One very good way to maximize teeing space is to construct tees at both ends of the range. In many instances, the tee closest to the clubhouse is used for players to warm up for their round of golf, while the tee at the far end of the range is used for hardcore practice and lessons. It is important to have adequate space between the two tees to prevent balls hit at one end of the range from hitting players on the other end of the range.

Grass Selection

When planning a practice range, anticipated tee size will have a major impact on grass selection for the practice tees. Other factors also affect the turfgrass species that is selected for a practice tee. In many instances, attempts are made to match fairway turf type with the base turf on the practice tee, but this is not always the best approach. Rather, the turfgrass species that performs the best and recovers the quickest under the climatic conditions of a given region should be selected as the base turf. Otherwise, maintaining high quality turf can be next to impossible. Generally, in the South, bermudagrass is the grass of choice for practice tees, while creeping bentgrass or perennial ryegrass performs well in northern climates. Of course, in spite of the best available agronomic information, turf selection may come down to the desires of the powers-that-be to have a certain turfgrass species in place, even though its management may be more difficult.

Maintenance

Practice tees must be intensively maintained if top quality surface conditions are the goal. Frequent rotation of the tee markers reduces concentrated wear injury from occurring. Regular aeration, topdressing, overseeding of divots, and generous fertilization are crucial. As soon as an area is taken out of use due to wear on a cool-season tee, it should be heavily overseeded and topdressed to keep the surface level and encourage turf recovery. For warm-season grasses the decision to overseed will depend on the time of year. However, topdressing remains important. Maintaining high levels of fertility on both warm- and cool-season grasses is necessary to promote turf recovery. An application of as much as 1 lb. of actual nitrogen per 1,000 sq. ft. per month from a combination of readily available and slow-release nitrogen sources is not excessive. A regimented maintenance schedule should be adhered to. Regular maintenance also should include frequent mowing and rotation of the hitting area to provide good turf conditions while preventing excessive wear in any one place.

Reliable irrigation is also an important part of practice tee maintenance. While standard overhead sprinklers can work well, we see more and more pop-up mist heads being installed. These smaller heads allow the tees to be watered when golfers are present, with less chance of splashing anyone with water. A good irrigation system is crucial for germinating seed and maintaining quality turf.

All-Weather Tees

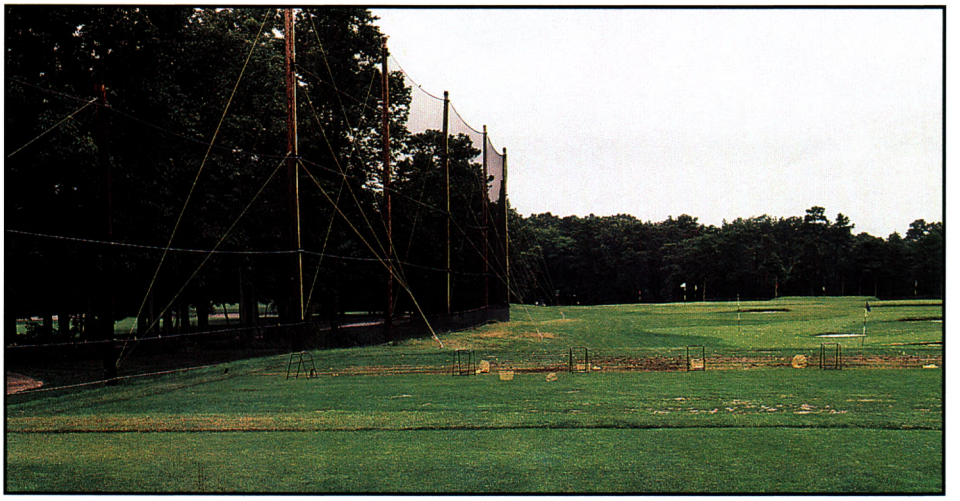
In spite of having the best available turf and adequate teeing space, it is becoming increasingly necessary to install artificial teeing surfaces in order to allow ranges to remain open under adverse weather conditions. All-weather tees provide the opportunity for the turf to recover from wear while also allowing the practice range to be used when the grass tees are too wet, during the winter months when turf is dormant, during outings, or when time is needed for renovations.

It is very important to carefully scrutinize the choices when selecting an artificial surface. Many clubs have installed artificial tees only to remove them because of player dissatisfaction or maintenance problems. Often, a variety of artificial teeing surfaces can be found at local clubs. Questions regarding maintenance of artificial tees (yes, some artificial tees require varying amounts of maintenance to be their best) should be asked. Artificial tees often represent a large capital investment. Many different surfaces can and should be tested prior to making a commitment.

Landing Areas

Many different design options exist for practice range landing areas. Some players desire to have a fancy landing area where target greens are accented with bunkers, actual fairway conditions are imitated, and the feeling of playing a regular golf hole are presented to the player. All of these features offer the chance for a spectacular appearance for a practice range. But are they really necessary? Probably not. A less expensive, less elaborate approach can be taken. So what is necessary?

First, landing areas should be contoured so players can see their balls land for all clubs that will be used. This is a very important consideration; the only way that distance and ball flight can be accurately gauged is to see the ball land. Accurate and visible markers in the landing area need to be correlated with specific spots on the practice tee to provide yardage. Finally, target greens provide a nice touch to the landing area. They set off the target for the player and make practice seem more realistic. Something as simple as a pushed-up mound of soil with good turf cover and a flagstick can be used, up to a more elaborate setup such as the one mentioned above, with bunkers and on-course conditions. The bottom line is that the player needs to be able to see where the ball goes and accurately determine how far the ball traveled to maximize the benefits of practice.



Where available space for the practice range is limited, install netting to provide a barrier to the rest of the golf course and promote player safety.

Maintenance

The degree of maintenance for practice range landing areas varies widely. Oftentimes, resources are better used on the actual golf course, not the practice range. However, the landing area should be mowed at least twice weekly. An irrigation system improves the appearance of the range and is

Sand accumulation from repeated bunker practice can make maintenance difficult around the bunker and on the adjacent green. If a separate green is not provided for bunker practice, the sand accumulation can negatively impact putting green conditions. The appearance of the area can also be an eyesore, especially if it is close to the clubhouse area.

becoming a standard feature across the country. Obviously, more elaborate landing areas require more intensive maintenance practices.

Short-Game Areas and Practice Putting Greens

For short-game practice, two distinct components of the game are involved. Putting and pitch/chip shots, including bunker play, make up the majority of short-game practice. Ideally, a separate area should exist for each type of practice. Using the same practice green for putting and short-game practice, beyond very short greenside pitch shots, can lead to safety and turf maintenance problems. Again, the all-important issue of size is a major factor in the quality that can be achieved for short-game practice areas. Working with a golf course architect who is experienced in the design of short-game areas is a wise investment.

For practice putting greens, larger size allows more room to spread traffic and distribute hole locations to prevent turf thinning and wear pattern development. For chipping and pitching areas, adequate size is needed to allow multiple players to practice with minimal concern about safety. When players are close together, there is a greater chance that someone is going to get hit with a bladed or shanked chip or pitch shot. After all, the penchant for hitting poor shots is why the practice area is being used in the first place! Errant shots should be expected.

Practice Putting Green

The amount of space needed to maintain a high quality practice green varies, depending upon traffic levels, growing environment, and management strategies. For example, a small green with heavy traffic, located in an area of poor air movement and shade, and maintained under low fertility will most certainly fail. However, that same green located in an open area with full sunlight and adequate fertility may perform well. Putting greens are often located in the shadow of the clubhouse or among trees. In these situations, a larger green is needed to provide a better opportunity for successful management. Larger size can compensate for a poor location.

Even under low traffic stress, a minimum of 10,000 sq. ft. should be provided to allow the grass to heal between hole rotations in and out of an area. Under high traffic conditions, the practice green should be constructed as large as available space and resources allow to ensure top quality conditions. Practice bunkers should not be located adjacent to the main practice putting green. This can lead to maintenance problems from repeated blasting of sand onto the putting green. Greenside bunker practice should be included in the chipping/pitching practice area, rather than at the putting green.

When planning a practice green, it is best to limit severe contours, especially if use will be heavy. Steep contours eliminate usable areas that are needed for hole locations and distribution of wear. The grassing scheme should be similar to that of the other greens on the golf course, if possible. This helps to promote consistency for the player.

Maintenance

Normally, maintenance of practice putting greens should be similar to that of the greens on the golf course.

Many golfers consider artificial teeing areas sacrilegious, but a properly installed all-weather surface can provide a rest for the natural grass tee. The use of improperly installed or poorly performing artificial tees may be short-lived if players become dissatisfied.

This helps to ensure consistency between the practice green and the regular greens. Regular aeration and topdressing are very important to maintain good turf quality. However, it may be necessary to increase fertility on practice greens above the level used on the regular golf course greens. The levels of traffic that practice greens receive dictate that more fertilizer may be necessary to promote recovery from wear. Hole locations on practice greens should be moved frequently to prevent wear areas from developing. Frequency of rotation will depend upon the amount of traffic received from day to day. However, the holes should be changed at least frequently enough so that a clean hole with proper dimensions is maintained for practice. For heavily used greens, the use of target stakes, rather than actual holes, is becoming more common. These target stakes can be moved very easily, making frequent rotation more practical.

Short-Game Area

Designing and building a short-game area can be tricky. While practicing, players will be in close proximity to one another, and often close to other areas of the golf course. Safety efforts must be ensured in these areas. Again, the best safety feature is adequate space and a thoughtful design.

Short-game areas vary from a small fairway approach with a target green, to more elaborate fairway areas of up to 100 yards in length. Ideally, fairway approach areas will be available from several different directions to provide room for a number of players to practice at one time. What's right for a given facility will depend on available space as well as available capital for construction and maintenance. Usually, the green associated with a short-game area is maintained similarly to the practice putting green. However, maintenance does not need to be as intense for surface conditions. This green should be used primarily for chip and pitch shots from longer distances, not for practice putting. Nonetheless, this green should be well constructed and properly maintained.

In addition to a fairway approach area, bunkers should be installed to provide an area for short- to medium-range bunker practice.

Integrating the Practice Area with the Golf Course

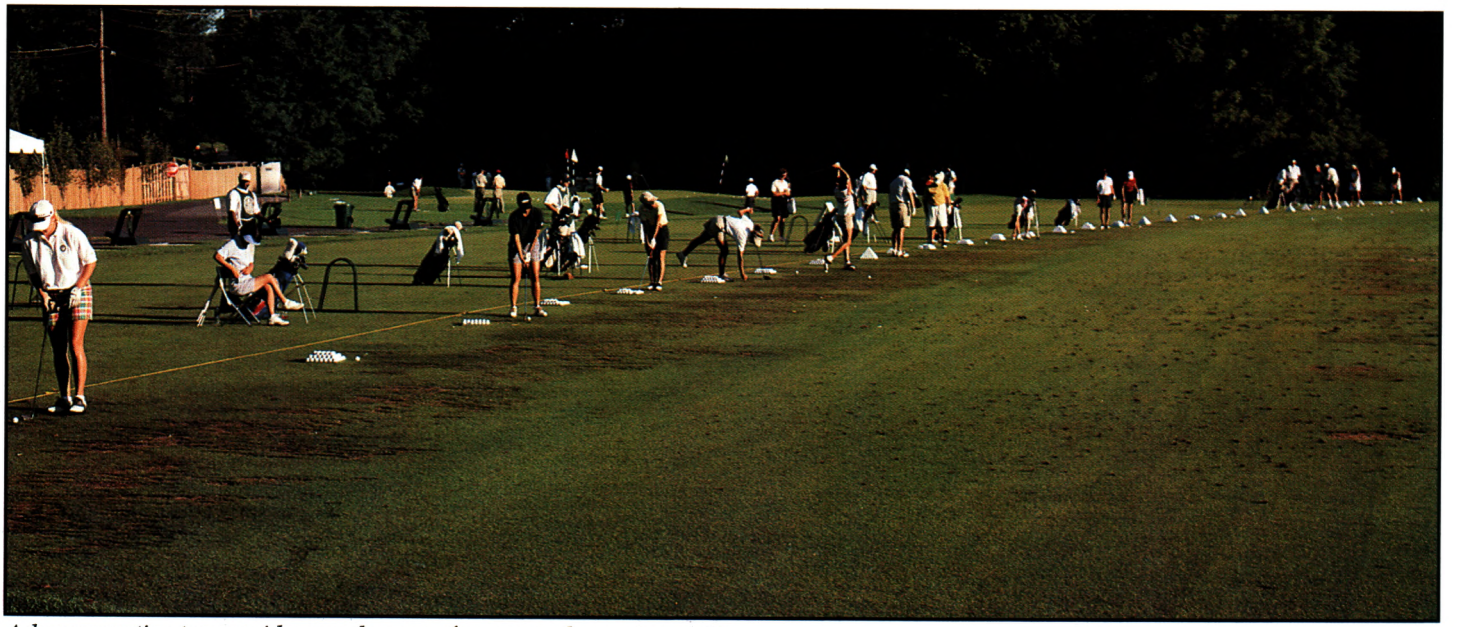
The overall integration of the entire practice complex with the rest of the golf course is very important. The starter will have an easier time of rounding up players if the practice areas are close to the golf course. Ideally, the practice tee and the practice putting green should be as close as possible to the first tee, but not in such a place that they cause a distraction to players teeing off. Having a clock at the practice complex is also a nice touch. This way, players can conveniently practice as their scheduled starting time approaches. Everyone likes to get in that last bit of practice prior to teeing up.

The short-game practice area frequently is isolated from other areas for safety reasons. A bladed sand wedge or thin pitch shot could pose a safety threat if any people are nearby. Safety should always be a consideration when designing practice areas.

For all areas of a practice facility, it is important to define what can and can't be done in the interest of safety. For example, if the range is only 75 yards wide and 200 yards long and runs parallel to a fairway or public road, it probably would be best to limit club selection to irons. This will reduce the chance for injuries.

It is difficult to cover all aspects of practice facility development and management that will be encountered in all situations, but the major issues are fairly consistent from golf course to golf course. Although the number of actual golfers has not grown significantly in the last 10 years, the desire to practice has grown. Golfers practice frequently in order to maintain and improve their overall skills. Keeping in mind the need for adequate size and safety should lead to a high quality practice facility that is properly integrated with the rest of the golf course, providing an excellent opportunity for practice.

DARIN S. BEVARD *has been an agronomist in the Mid-Atlantic Region for four years, visiting courses in Delaware, Maryland, Pennsylvania, Virginia, and West Virginia.*



A large practice tee provides ample space for many players to practice at once prior to teeing off at the 1999 USGA Girls' Junior Amateur.

DESERT SALTGRASS:
A Potential New Turfgrass Species

Always on the lookout for new types of turfgrass, researchers may have found a promising species.

by DAVID M. KOPEC and KEN MARCUM

Saltgrass (Distichlis) *plots are being evaluated for turfgrass quality at Colorado State University. Buffalograsses* (Buchloe dactyloides) *are in the foreground and saltgrass selections are in the background. After many weeks of drought and no irrigation, the color differences are dramatic.*

THE PROBLEM of adequate water availability and water quality is among the greatest issues that turfgrass managers face in the western United States. Increased population growth nationwide, with a shift in population demographics to the southwestern United States has forced potable and well water use on golf courses to become stretched to the limit.

One way golf courses meet this challenge is to minimize the acreage allotted to turf. In Arizona, all new courses designed and constructed after 1985 are 90 acres or less of turf. Still, water costs can be one third of the annual operations budget. The use of reclaimed municipal wastewater is practiced wherever feasible. However, more needs to be done in the entire scheme for water conservation.

Bermudagrass is probably the toughest all-around turfgrass in the southern United States, with low water-use rates and fast growth being key assets. Even with its relatively low rate of water use, bermudagrass (as a turf in general) is often treated as an environmental taboo, especially in desert climates and other areas that receive low rainfall. Are there any other grasses that are water efficient and tolerant of poor quality water that can grow in the desert? The answer – maybe.

The University of Arizona has been evaluating an *unused* native grass species for turfgrass adaptation that is commonly referred to as saltgrass; the genus is *Distichlis*. It should not be confused with alkaligrass, a cool-season species that includes weeping alkaligrass (*Puccinellia distans*) and Lemmon alkaligrass (*Puccinellia lemmonii*). Those grasses are bunch-type grasses that grow in cooler climates. *Distichlis* is a warm-season grass that turns brown in the winter, like bermudagrass.

There are several species of *Distichlis* (saltgrass), but two types predominate. These are coastal saltgrass (*Distichlis spicata*) and inland or desert saltgrass (*Distichlis stricta*). Botanical literature often lists conflicting species and common names for these grasses.

Distichlis produces robust, scaly underground rhizomes, found at 4- to 10-inch depths in the soil. The growth is somewhat unique, as the rhizome tip will grow far away from the mother plant and then emerge at the soil surface. From that point, new vertical shoots "fill in" between the outermost rhizome and the mother plant. In that

regard, it is very different from other rhizomatous grasses, such as zoysiagrass, Kentucky bluegrass, or even bermudagrass.

The leaves of saltgrass and the plant itself show an appearance similar to a coarse bermudagrass. These leaves typically project from the stem at 65° to 75° from horizontal. The stems of some ecotypes can be very rigid and stiff to the touch, seemingly weedy enough to "give you splinters."

Unlike bermudagrass, *Distichlis* can be found in a wide array of geographic and climatic zones, such as: Yuma and the Wilcox Playa in the southern desert of Arizona; the Oregon coast; outside Denver, Colorado; the mountains of New Mexico; and Salt Lake City, Utah. *Distichlis* also is found on Sitting Bull Monument in northern South Dakota. Work being done at Colorado State University will help define the relationships between chromosome counts and geographic locations to see if different genotypes exist (as in buffalograss). This information will improve our understanding of the grass and expedite development of improved turf types.

So why would anyone bother investigating this species for potential use as a turfgrass? Because *Distichlis* will grow in very harsh soil conditions, endures extended drought, thrives in salty soil, and tolerates high-salt-content water.

Salinity-tolerance field trials were conducted at the University of Arizona greenhouse testing facilities, comparing all the *Distichlis* genotypes to a standard of Midiron bermudagrass. The highest salinity level tested was 60,000 ppm NaCl. For comparison, full-strength seawater is about 35,000 ppm. Figure 1 shows significant variability in the percentage of green leaf canopies of five saltgrass entries vs. Midiron bermudagrass. Midiron was essentially dead at 36,000 ppm. Some saltgrass entries were still mostly green at 60,000 ppm (e.g., A-55), but others did not perform as well (e.g., C-11). This illustrates not only the tremendous salinity tolerance of this species, but also the genetic diversity present – a positive factor for turf breeders in developing this species into a useful turfgrass.

Separating the Men from the Boys

In November of 1995, the University of Arizona embarked on a *Distichlis* "hunting trip" into Colorado. Hundreds of plants were collected from roadsides, an abandoned military air base, and old lawns. The collection was narrowed down to 100 plants (individual genotypes) based on their ability to propagate readily. Each of these 100 genotypes was cut into four pieces to make identical copies. Four hundred plants were then mowed with hand clippers at 1.75 inches three times a week for four months.

At a quick glance, Distichlis *can be mistaken for bermudagrass. This warm-season native grass species can be found in a wide array of geographic and climatic zones.*

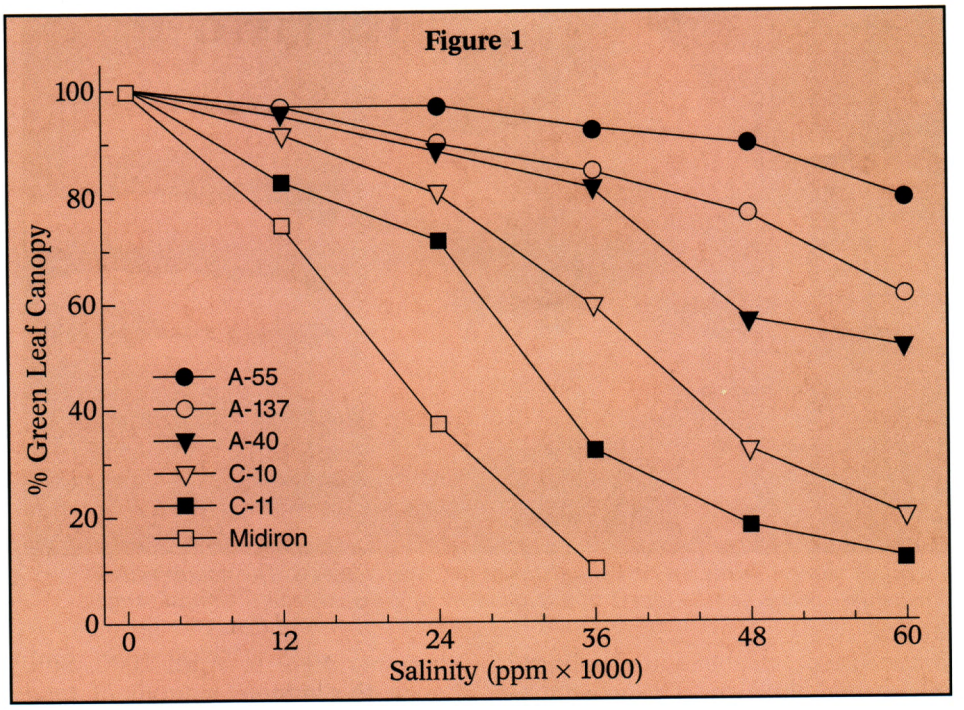
Plants that could tolerate the mowing stress filled up the pots almost completely and had high shoot densities and short leaf internodes (leaves are close together on the stem). Thus, mowing pressure demonstrated that (1) there was genetic variation in growth habit among the different plants collected and (2) the desirable turf-type growth habit was present in about 10% of the population. The test was repeated again a year later with the same plants emerging as "winners" in both tests.

Fourteen of the plants screened at the University of Arizona, along with seven from Colorado State University, have been planted as field plots. Turfs were established by placing three plants in the ground in 4 foot by 6 foot plots in August of 1998. Plywood frames were installed to provide sidewalls 24 inches deep in the soil. The frames were necessary to avoid plots from growing into one another due to the aggressive rhizome formation. Plots were mowed two to three times per week with a rotary mower at 2.0 inches.

In 1999, the turf received two spring flood irrigations. In 2000, the weather was extremely hot and dry, with less than 1.25 inches of rain from November 1999 to April 2000. Still, despite this minute amount of total water, most of the 21 entries greened up and held color. The plots were again flood-irrigated on April 11 and on May 13, 2000. Salt blocks (50 lb. animal-grade salt licks) were added to the irrigation plumes to add some stress and to help eliminate any surface weeds in the alleyways. Many of the *Distichlis* genotypes maintained green color from May 13 to June 15 under scorching temperatures of more than 100°F and arid, sunny conditions. In contrast, bermudagrass would last about a week under those conditions. From June 15 to September 1, the site received about 1.25 inches from five small rain events. The *Distichlis* did not receive any additional irrigation during that time. Under these types of field conditions we want to identify stress-hardy types that have an acceptable turf-type growth habit.

There are about five or six genotypes (single plant selections) that qualify as acceptable turf types. These plants have filled in the plots, maintained green color, have a high shoot density, and have stems with tips that are not sharp, mowed-off culms. Rather, there is a true leaf that unfurls from the stem, making for the best turf types.

Although not yet measured in tests, *Distichlis* also seems to adapt to traffic and compaction better than other warm-season grasses. *Distichlis* has been found growing on highly compacted sites, such as gravel roadways at truckstops and unpaved parking lots in Arizona and New Mexico. It remains to be seen how different selec-



tions, with different growth habits, respond to different kinds of compaction.

Since *Distichlis* is found in salty and droughty conditions where basically no other grasses grow, it probably is not a grass for areas that receive a significant amount of rainfall. However, geographical findings do support its existence from the low deserts to the high mountain areas. Casual observations of its many good characteristics warrant further investigation. It would be nice to have a grass that could go three to four weeks between irrigations, or even two weeks under heavy traffic. *Distichlis* may fit the bill.

What is in the Future?

Currently, the best turf types would be suitable for roughs, which are growing smaller in acreage on new golf courses due to water-use restrictions. No fairway types have been identified yet; however, two of the 21 entries in the existing test may tolerate closer mowing, perhaps to 7/8 inch. Further testing will be necessary.

As with any other new species, commercial propagation will be an important issue to resolve. *Distichlis* has some genetic limitations for seed production, but information from the studies at Colorado State University may help shed new knowledge on this subject. If not, then vegetative options will be investigated. *Distichlis* grows more slowly than bermudagrass, but more quickly than zoysiagrass. It *sleeps, creeps*, and then *leaps*, similar to buffalograss, when established by plugs. We have screened and maintained our selections under continuous mowing stress and devoid of water and fertilizer as much as possible. We are optimistic that *Distichlis* will be a tough grass for tough times. It takes a long time to develop a species into a new turfgrass, but *Distichlis* has shown the potential to be worth considerable effort.

Do you have any *Distichlis* on your golf course? If so, we would like to collect a sample. Contact Dr. David Kopec at dkopec@ag.arizona.edu, or call (520) 318-7142.

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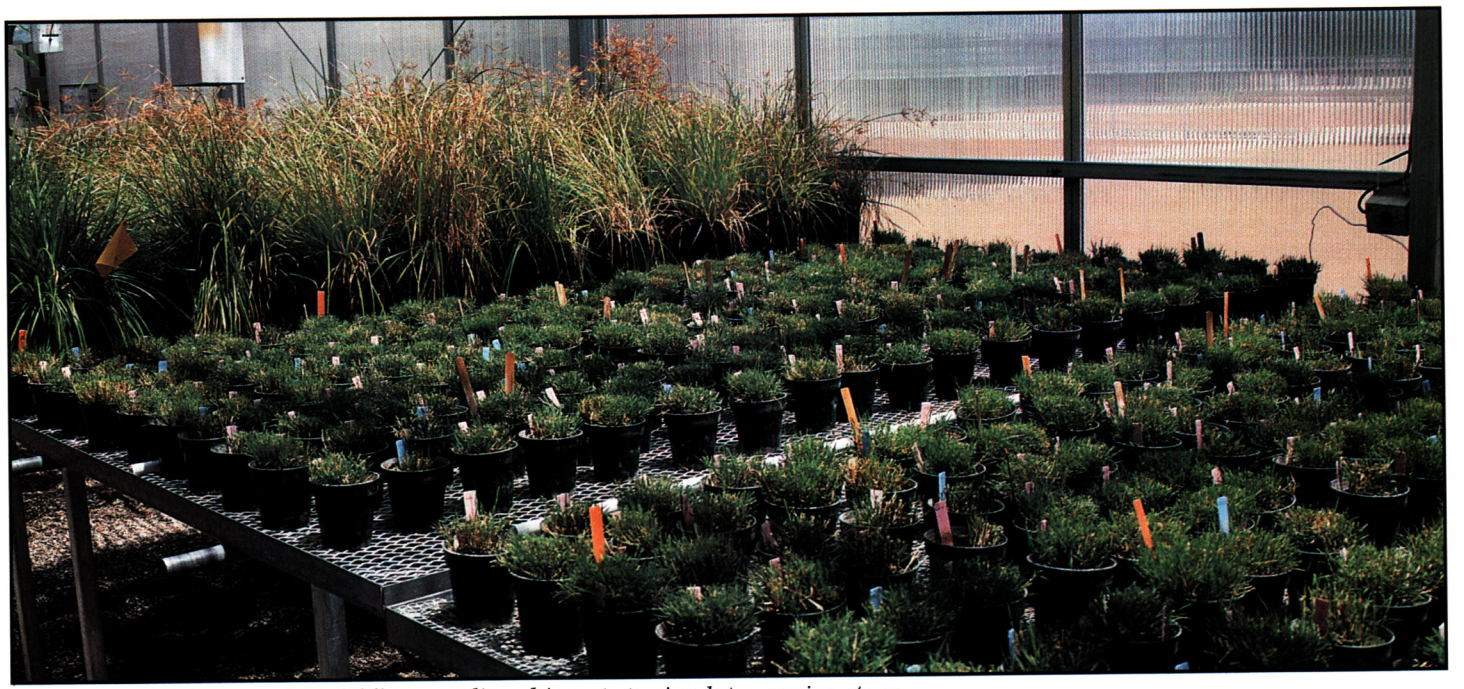


One hundred genotypes of Distichlis *were clipped in pots to simulate mowing stress. Plants that could tolerate the mowing stress filled the pots almost completely.*

Unlocking the Mysteries: Interpreting a Soil Nutrient Test for Sand-Based Greens

Reading and interpreting a soil nutrient test requires both knowledge of the testing methods and value of the information.

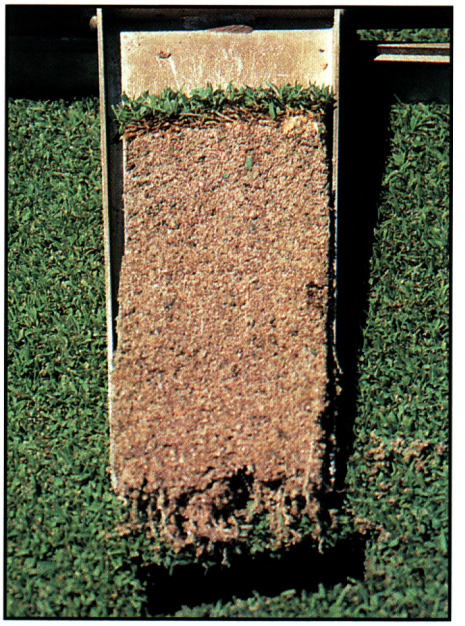
by JAMES E. SKORULSKI

SOIL NUTRIENT tests and their recommendations can be confusing and perhaps even intimidating. The confusion often arises from the methodology used to complete the tests, the terminology used in the test reports, and differing interpretation philosophies employed by the laboratories. Do not get discouraged. With a little work, you can better understand how tests are conducted, how the methodology used in the laboratory can affect the test results, and what information is most pertinent in managing fertilizer inputs for greens.

Extraction Methods

Much of the confusion and mystery surrounding soil nutrient tests arises from the multitude of extracting agents used by laboratories to determine concentrations of plant-available phosphorus (P), calcium (Ca), magnesium (Mg), potassium (K), micronutrients, and calculate total CEC (cation exchange capacity) of the rootzone mix. The two most common extracting agents used for P are the acidic Bray I, used when soil pH is below 7.2, and the alkaline Olsen, used when soil pH is higher than 7.2. The Morgan, Mehlich I, and Mehlich III are acidic extracting agents that also are used. The acidic agents will dissolve higher quantities of P from calcareous sands than may actually be available to the plant.

Neutral ammonium acetate (pH 7) is used by most soil laboratories to determine K, Ca, Mg, and Na cation concentrations on exchange sites and in soil solution. Laboratories located in the central and western states, where most soils are calcareous, may use ammonium bicarbonate or sodium bicarbonate agents. A number of laboratories choose to use more acidic ammonium acetate (pH<4.8), Mehlich I, or more universal Mehlich III (pH<2) extractants for cations. Note that using the acidic reagents on highly calcareous sands can overestimate Ca and Mg cations and the CEC value of those sands. This could adversely affect management decisions in salt-affected soils. The most commonly used extractant for micronutrients (Cu, Mn, Zn, and Fe) is DTPA. Some laboratories choose to use Mehlich III for micro-nutrients, but that extraction method is not well correlated with DTPA extractions.



Soil nutrient tests are especially critical for new sand-based greens to properly manage fertilizer programs and track the progress of those programs as the greens establish.

The fact that soil laboratories rely on different extraction agents accounts for some of the differences observed in test values and interpretations when a new laboratory is used. It is a good idea to know which extracting agents were used and decide if those agents are appropriate for your site. Laboratories base their nutrient target values and recommendations on the extractant they choose to use.

Paste Extractions

Laboratories usually use a water-saturated paste extraction to analyze salt concentration in the soil. The method involves saturating a soil sample with distilled water to form a paste. The salts dissolved in the water are determined by electrical conductivity (EC) or calculated as total dissolved salts (TDS). The saturated paste extraction technique is sometimes requested for cations with the idea that this form of extraction more closely mimics the soil water and is thus a more realistic estimate of available nutrients. The water paste extractions tend to provide lower nutrient values than other extraction methods, as they do not account for the cations bound to exchange sites or that are available as relatively soluble compounds. Saturated paste extracts may eventually be of use in sands with very low CEC. However, the lack of correlation data for turfgrass and the rapidly fluctuating state of the soil water limit the predictive value of this method at the present time.

Soil pH/Buffer pH

The soil pH values may be the most important information provided in the soil test. It is a measure of H ions in the soil solution and on available exchange sites. Hydrogen ions dominate the exchange sites in more inert acid silica sands, whereas Ca, Mg, and K will dominate sites in more alkaline or calcareous sands. The majority of laboratories determine soil pH using a 1:1 or 1:2 soil to distilled water mixture. Fewer laboratories use a 1:1 or 1:2 soil to water/salt mixture. Note that switching from water to a water/salt mixture can result in about a half point pH difference.

Sands with an acid pH are treated with a buffering solution to determine their buffer pH or acid index. The buffer pH value may or may not be included on the test report. The laboratory uses that value to develop liming recommendations. A lower buffer pH value means the soil has higher acid reserves and will require

Table 1
Nutrient Holding Capacity of Soil Based on CEC

CEC	Potassium	Magnesium	Calcium
2	39*	35	318
5	109	91	649
10	139	161	1,298

*lb/A.

larger quantities of lime to raise the pH. Applications of calcitic limestone (25-30% Ca) are recommended to raise pH if calcium is considered deficient, whereas dolomitic limestone (20-25% Ca, 10-15% Mg) will be recommended when Mg is deficient. Sands with a pH>7.2 (alkaline and often calcareous) can also be tested for free calcium carbonate (free lime). That information is used for developing recommendations for acidification or reclamation programs for sodic and saline soils.

Table 2
"Ideal" Base Saturation

Ca		65-85%
Mg		10-20%
K		2-7%
Na		0-5%
H		0-5%
Ratios:	Ca/Mg	< 6.5:1
	Ca/K	< 13:1
	Mg/K	< 2:1

Cation Exchange Capacity

The cation exchange capacity (CEC) or total exchange capacity is usually provided on a test report. It reflects the potential ability of the sand or soil to exchange cations (Ca, Mg, K, Na, and H). The number provided on the report estimates the negative charges available to bind with cations. It is determined by saturating a sample with an exchanging or extracting agent, and is measured in milliequivalents per 100 grams of soil. CEC values will vary depending on the agent used to complete the test. The CEC of a sand rootzone is termed very low or low, usually ranging from 1 to 10 meq/100g soil (often 2-5), as compared to a loam soil that may range from 15 to 28 meq/100g soil. CEC generally increases in new sand-based greens as the organic matter content and pH increase. Peat, compost, small quantities of soil, or some inorganic amendments are often added to sands used in green construction to increase water retention and CEC.

A "very low" or "low" CEC value means there are fewer negatively charged exchange sites to bind with positively charged cations. Sand mixes will also have a lower buffering and nutrient-holding capacity (see Table 1) and fertility programs become more complex. Such systems require more light and frequent applications of N and K to minimize leaching potential. Some laboratories base target nutrient ranges on the calculated CEC value.

Available Nutrients

Soil nutrient tests most often provide information on available P, Ca, Mg, K, and Na. Information on nitrate nitrogen can be requested, but is usually not provided because its levels change so rapidly. Information for nitrate-N and P will likely become more critical for environmental monitoring and "best management programs." Requests can be made to test for the availability of S, Fe, Mn, Cu, Zn, Mo, and B as well. The information is provided in pounds per acre or parts per million (multiply ppm by 2 too convert to pounds per acre). The test report may or may not provide specific target ranges for nutrients, in addition to fertilizer recommendations.

Lime and fertilizer recommendations are based on the soil pH and sufficiency level of available nutrients (SLAN), which is the traditional means of predicting the total quantity of plant-available nutrients. Many laboratories report calculated percent saturation of Ca, Mg, K, and Na on exchange sites. This is not the total quantity of cations that are available in the soil solution. Laboratories using the base cation saturation ratio (BCSR) approach develop recommendations by ranking the calculated percent cation saturation with an "ideal base saturation" (see Table 2), based on research in agricultural forage crops. Laboratories develop nutrient target values and subsequent fertilizer recommendations from the SLAN or BCSR interpretation alone or from a combination of the two methods.

The arguments as to which method is more effective are being debated by scientists and superintendents alike. The SLAN method is the more proven, traditional approach that will provide an accurate assessment of nutrient and fertilizer needs in putting greens. Percent base saturation and the ratios between Ca, Mg, and K will adjust closely to the "ideal" when pH problems are corrected and fertilizer applications are made to eliminate specific cation deficiencies.

The BCSR information can be a helpful tool to avoid any gross imbalances between cations and to track the effects of your fertility programs on the soils over time. It is also helpful for tracking Na levels on the exchange sites in salt-affected soils. However, it is not advised to become overly concerned with trying to meet the "ideal ratio," especially if pH is in a desirable range. Such efforts may result in unnecessary fertilizer applications and lead to nutrient deficiencies and an undesirable pH.

So what should you look for in regard to target values for the P, Ca, Mg, and K in sand-based greens? Target ranges developed through the SLAN approach will be effective for P and the cations. Request those values along with subsequent liming and fertilizer recommendations from the laboratory conducting the test. Remember, however, that limited exchange sites in a sand-based system will not make it possible to meet the sufficiency target values for potassium, and more frequent and light applications will be required to meet the turf's needs. Calcium deficiencies are very rare in the field. Adjusting soil pH to optimal levels should provide all the Ca required by the turf. Mg deficiencies are more likely to occur in systems built with calcium carbonate type sands. Strive to meet the Mg target values generated from SLAN interpretations and monitor BCSR data to avoid a deficiency.

Total salinity and Na saturation are also concerns in saline, sodic, or saline-sodic soils or when water quality issues exist. Total dissolved salts (TDS) and electrical conductivity (EC) are measures of soil salinity. Note

that TDS (ppm) = EC (mmhos/cm) × 640. Exchangeable sodium percentage (ESP) and sodium adsorption ratio (SAR) are measures used to determine the potential for sodium to influence soil structure and permeability. Request total salinity, ESP, SAR calculations, and concentrations of toxic ions (B, Na, Cl, and SO_4) if you are dealing with salt-affected soils. A more thorough discussion of this topic can be found in *Salt-Affected Turfgrass Sites* (see references below).

Micronutrients

The practicality of recommendations for micronutrients is also questionable in most cases. Micronutrients are usually extracted in the laboratory with the chelating agent DTPA. Mehlich I and Mehlich III extraction may also be used to extract certain micronutrients. There have been no actual micronutrient deficiencies reported for turf in the field with the exception of Fe and Mn, which can be deficient in certain parts of the country. Soil tests may also report that a micronutrient is *excessively high*, which can raise unnecessary concerns in the field, where such toxicities are very rare. A tissue test can be conducted if a micronutrient deficiency or toxicity is suspected in the field. Micronutrient deficiency or toxicity problems will be more of a concern at extreme soil pH levels.

Conclusion

The soil nutrient test is a very useful tool for managing fertility programs for your greens. It can also be misleading if extracting agents are unknowingly changed or the test results are not interpreted correctly. It is wise to choose one soil-testing laboratory that uses extractants that are appropriate for your soil type, and to use that laboratory consistently to better correlate the test values with turfgrass response and performance under your conditions.

Remember that the test only provides a "snapshot" of the nutrient status of the sand rootzone and that concentrations of specific nutrients will fluctuate rapidly, especially when CEC is low. Therefore, use the tests as a basic roadmap for your fertility practices and concentrate on the most important information of soil pH and liming recommendations, and the availability of P, K, Ca, and Mg in the rootzone. Those with salt-affected soils must also be cognizant of total dissolved salts and exchangeable sodium percentage values. It is also a good idea to test effluent or any irrigation water of questionable quality on a regular basis to better understand its influence on soil fertility.

Finally, take the time to learn more about the soil testing process, and do not be afraid to ask questions or to get an unbiased opinion when recommendations are not clear. Sometimes as managers we wish to make things more complex than is necessary. This is one case where keeping it as simple as possible will provide the best results.

References and Additional Reading

Carrow, R. N. 1995. Soil testing for fertilizer recommendations. *Golf Course Management* 63(11):1-8.

Carrow, R. N., and R. R. Duncan; 1998. *Salt-Affected Turfgrass Sites Assessment and Management.* Ann Arbor Press, Chelsea, Mich. pp. 31-43.

Christians, N. E. 1993. The fundamentals of soil testing. *Golf Course Management.* 61(6):88-99.

Darrah, C. H. Soil pH and buffer pH. *Turf Tech Topics.*

Darrah, C. H. Water extracts of soils. *Turf Tech Topics.*

Eckert, D. J. 1987. Soil Test Interpretations: Basic cation saturation ratios and sufficiency levels. p. 53-64. *In* J. R. Brown (ed.) *Soil Testing: Sampling, Correlation, Calibration, and Interpretation.* SSSA, Madison, Wis.

Hummel, N. W. 1996. Fertilizing greens with secondary elements and micronutrients. *Grounds Maintenance.* (1):17-19.

Kussow, W. R. 2000. Soil Cation Balance. *The Grass Roots.* March/April. pp. 58-61.

Recommended Soil Testing Procedures for the Northeastern United States. 1991. Bulletin 493, Agricultural Experiment Station, University of Delaware, Newark, Del.

Landschoot, P. 2000. Spoon feeding – turf nutrition primer for golf course managers. *The Keynoter.* May 28(2):5.

St. John, R. A., N. E. Christians, H. A. Tobe, and S. Shogren. 1999. Calcium response of grass grown on calcareous sands. Agronomy Abstracts. p. 127. ASA, Madison, Wis.

Stowell, L., and W. Gelernter. 1996. Soil and tissue analysis: Do they correlate? *Pace Insights.* 2(10):1-3.

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Iron deficiencies are the most common micronutrient concern in alkaline rootzone mixes, especially when P and Mn concentrations are high. The deficiency is easily corrected with an iron sulfate or chelated iron product.

TAS CAN MAKE A SIGNIFICANT DIFFERENCE

A green chairman and golf course superintendent reintroduce the Green Section Turf Advisory Service at one golf course.

by MACK SAUNDERS

Mack Saunders, green chairman at Glen Oak Country Club (Pennsylvania), and Darrin Batisky, golf course superintendent, review one of the putting green profiles during the fall aeration of putting greens.

ANYONE who reads the *Green Section Record* is likely to be familiar with the USGA's Turf Advisory Service (TAS) and the very valuable service it provides in terms of on-site visits with golf course superintendents and Green Committees. This article will attempt to relate how one Green Committee dealt with reintroducing TAS to its golf course after a 12-year hiatus, while working with a golf course superintendent who was unfamiliar with the service and was initially skeptical about the value of such a visit. In reality, I suspect this is not an uncommon occurrence when a new green chairman is interested in a second opinion.

Glen Oak Country Club is a private club in northeastern Pennsylvania with a membership of approximately 375. The 18-hole golf course was designed and built in 1951 by Jim Harrison, an associate of the late Donald Ross. While the club's objective is to grow bentgrass greens and fairways, the reality is that most of the turfgrass is *Poa annua*.

After becoming green chairman in 1992, I began a serious search of all the golf course historical records and spent many hours with the golf course superintendent to learn as much as possible about Glen Oak's agronomics. Likewise, I met with our consulting golf course architect, Geoffrey Cornish, in an attempt to get an architect's view of the golf course. It was during this time period that I first learned of the USGA Green Section and TAS visits. More specifically, I found a copy of a Green Section TAS visit report for Glen Oak Country Club dated July 1982.

After reviewing the TAS visit report several times, I began to inquire about the USGA Green Section and how the Turf Advisory Service program functioned. I was surprised to find our superintendent to be decidedly negative about the USGA and a bit nervous when I mentioned the 1982 TAS visit report and how I thought another such visit might be beneficial to our club.

I began to try to understand our superintendent's reluctance to participate in a TAS visit. I began contacting other golf courses in our area to inquire whether they were USGA member clubs and, if so, whether they participated in the Green Section TAS visit program. I found that many of the golf courses indeed scheduled TAS visits, and not merely on an occasional basis, but rather on an annual basis and sometimes more frequently. The Green Chairmen were very positive about the TAS visit program and felt that their golf courses had benefited directly from the visits.

In mid-1994, I decided that my club needed to involve the Green Section. We were experiencing problems with our greens with very thin grass with shallow rooting. Likewise, our fairways were not healthy and had high insect infestations, especially white grubs. Additionally, I found that most area golf courses completed spring and fall green aerifications, while our course only aerified greens once in early October of each year. Because of this late aerification, our greens did not have sufficient time to heal prior to the onset of winter.

We decided to schedule a TAS visit during the 1994 season. As a relatively new green chairman, I knew this visit would help me learn more about turfgrass maintenance and, secondarily, to obtain an outside, unbiased review of the agronomic status of our golf course.

On September 21, 1994, Mid-Atlantic Green Section agronomist Keith Happ visited Glen Oak Country Club. As it turned out, my club was fortunate Keith visited our golf course. He immediately set the tone for his visit by his supportive and low key demeanor. During the tour of the golf course, he frequently commended some of the cultural practices he found in place and diplomatically recommended programs we should consider for improvement. We were particularly interested in the plugs cut from randomly selected greens; we found very shallow root systems whose depth of penetration was inhibited by a clay base in the subsoil. Accordingly, Keith recommended, and we implemented, fall and spring green aerification and a more sand-based topdressing material.

Our current superintendent, Darrin Batisky, looks forward to our annual visits with the current USGA agronomist, Darin Bevard. This has become a team effort.

I would like to conclude this article with my thoughts on the lessons to

A wonderful view of the Glen Oak Country Club. Our association with the USGA agronomists has helped our golf course to realize its full potential.

be learned from my experiences as a newly appointed green chairman who was apprehensive about involving the USGA.

• If you are a newly appointed green chairman, take the time to learn all you can about the agronomics of your golf course. This means researching the existing files, spending time touring the course with your golf course superintendent, and asking questions about why and how things are done.

• Don't be shy about asking questions. Many times there are good agronomic reasons why things are done a certain way.

• View the agronomists of the USGA Green Section as your partners and schedule a TAS visit at least annually. You will find that a very positive relationship develops with the USGA agronomists who visit your course. This relationship makes it easy for our staff to telephone or e-mail questions or concerns directly to their USGA agronomists. This is a valuable added benefit.

• Do not be concerned that your golf course will be embarrassed by the TAS visit or what the report may state. Over the course of the last seven years I have never found a Green Section agronomist who is anything but fair and diplomatic, yet constructive in his feedback.

• Since the Green Section agronomists visit many golf courses every year and see varied turfgrass conditions, they are in a great position to relate their experiences from other courses they visit. In many instances, they point out new and innovative ways of doing things that are more efficient or produce better growing conditions and ultimately better playing conditions.

• Share the documented TAS visit report with your membership. It just makes good sense to let your members know how other professionals view your golf course and what they recommend for improvement. Also, it is a good idea to archive the reports, since they become a valuable historical resource about the golf course from an agronomic perspective.

• Finally, implement the recommendations contained in the TAS visit reports wherever and whenever possible. You may not see immediate improvements, but you will see a marked positive change if you have the fortitude to make changes as recommended by these professionals.

As a final note, I can state that over the course of the last seven years the condition of our golf course has improved significantly. We have complete confidence in our staff and the USGA Green Section agronomists who work with them. Now we speak with the USGA agronomists often when we encounter problems, and we also discuss opportunities to improve our golf course. Our course and our working relationships are the better for it due to our interactions with the agronomists of the USGA Green Section.

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Do You Have Green Creep?

Time marches on – and so does turfgrass. Some basic preventive maintenance procedures can keep a golf course design the way it was originally intended.

by RONALD W. FREAM

GOLF COURSES experience evolution, alteration, maturation, and aging just as all other living things do. Having the benefit of almost 35 years as a golf course architect and observing some courses for 25 years or longer, it is quite easy to notice the incremental and, at times, profound changes that time induces.

The alterations I refer to are natural and evolutionary. Golf course maintenance crews cause and enhance alteration. Technological advances have accelerated change. Plant physiology, human genetics, nutrition, television, and golf publications have expedited the demand or need for alteration. The focus of this article is on those alterations that are more or less naturally occurring as distinguished from green committee action or periodic remodeling for design sake.

Green creep is a catchall phrase I use to describe the inevitable alterations that emerge on every course. The rate of emergence, the frequency, and the extent are variable in response to the type of course, location, climate, turfgrass varieties, soil conditions, original design, and construction methods, intensity of and quality of maintenance, volume of play, and financial strength of the owner or operator of the golf course. Alterations can occur faster with tropical and warm-weather grasses than with cool-season or northern-climate grasses.

Green creep begins to emerge as maintenance commences on a new course. However, it increases in prominence as the course gets older. Green creep is part of the aging process of almost every course everywhere. There really is no easy way to avoid some component of green creep. That green creep is so prevalent and yet so unnoticed is due to the almost glacial rate of occurrence.

At its most basic, green creep is altered shapes and sizes of putting surfaces, the repositioning of bunker edges, and altered tee surfaces due to insidious, little by little, mowing changes and sand edging practices. These changes can become several to many feet of distance over time.

Maintenance personnel keep their jobs by not killing the grass. As the person mowing the putting surfaces does the job, each day a little uncut collar is kept to prevent scalping. The person mowing tends to cut inside yesterday's cut. Concurrently, straighter lines or more rounded lines of cut emerge over time. The putting green surface becomes smaller in overall sur-

An all too typical round and boring greensite. Green creep is part of the aging process of almost every golf course. Little by little, mowing changes can result in several feet of change over time.

face and rounder or more oval, more uniform, and less visually appealing in shape.

Bunker edging often does not cut back all of the growth that has occurred since the bunker edge was last trimmed. The person doing the edging often overlooks the original outline shape. The grass remaining has grown more onto the sand than before. Continued edging over time tends to cut off or ignore originally designed undulations or irregularly outlined shapes. The sand surface area becomes reduced. What were visible sand surfaces from the tee now are grass. What had been a visible bunker in the fairway is now a slightly visible sand depression, or appears from the players' view to be only grass. The aesthetic and strategic reason for the bunker has been lost. Now the sand is blind to the player and has become an unfair hazard. What was visually a nicely outlined bunker is now, 10 years on, another round, saucer-like bunker or a square or rectangular one. Excessive adding of sand over time tends to flatten and make shallower what originally was a meaningful sand hazard. Siltation has clogged the drainage system and the bunker is a pond when it rains. In some environments, the action of blowing wind can cause sand to accumulate at one prevailing edge or side of the bunker. Sand accumulates and the grass continues to grow. Now that portion is substantially higher than before. A mound or ridge now obscures what was once visible sand. This same result occurs from the use of mechanized sand bunker raking machines.

As the green surfaces become smaller and rounder, day by day and year by year, the area for hole location is reduced. The spatial distance relationship between hole location and adjacent sand bunker is expanded. The golfers' visibility of the sand basin often is reduced. Topdressing of greens, as a normal process of maintenance, will over time smooth out a green surface, remove some original contour, and perhaps not make it easier for most golfers, but make the putting surface flatter and less contoured.

Progressively smaller greens, greater distance between flagstick and sand, and less before-shot awareness of bunker locations all contribute to substantially different playing conditions than the original design possessed. Changing putting surface shapes do alter what were originally designed-in approach play strategic factors, often lessening the challenge and diversity. Smaller greensites that are flatter and rounder all begin to look the same. Reductions of 25 percent or more in hole locations is common after 10 or 15 years.

"Tree creep" has made the left side of this tee obsolete.

Smaller putting surfaces reduce hole location options. The original variety of placements now has become lost. Smaller putting surfaces concentrate golfer wear and tear and increase soil compaction even as play increases. Deteriorating putting surfaces are the result. Increased maintenance costs are a result. Missed putts are also a result.

Similar slow-motion changes occur on teeing surfaces. Day by day, mowing can change the shape, reduce the usable surface, alter the outline edge, and adversely impact play and wear and tear. Often, smaller teeing surface area is a result. Incorrect or inattentive divot repair and inadequate or incorrect tee surface topdressing will, over time, turn a flat, comfortable surface into one more crowned, bumpy, or with a surface sloping in several directions. Traffic-induced compaction problems increase. Turf quality often deteriorates. Any of these creeping changes can alter how the player addresses the ball. Inattentive mowing can lead to tee surface alignments not focused on the center of the fairway or par-3 greensite. The person setting the tee markers often then does not orient the markers correctly and perpendicular to the desired line of play. Inattentive golfers often line up their shot on this incorrect orientation, hitting inaccurate shots, wasting time, and raising scores. Miss-hit shots result at no fault of the golfer.

Changes such as these are incremental and very slow. Ten to 15 years after opening is a good time to really begin to see the difference. However, some green and bunker shape changes often can be noted by year five. When visiting older courses, the extent of change can be remarkable. These changes are so glacial that to the Green Committee, general manager, or superintendent, the changes may

not even be apparent. The players hardly notice, unless turf deterioration becomes obvious. Many players will never even think of what might have been. They play in the here and now.

A new superintendent, a new pro, or general manager taking over 10 or 20 years after opening, or a first-time player, seldom will even be aware of what might have been the original design intent. The golf course architect's name may have been lost. The original design drawings often have been lost or discarded. Unfortunately, these creeping changes tend to soften the course and remove much of the original playing strategy. This often turns what may have been visually interesting and exciting design into a course that is round, common, and boring. The fame or talent of the original architect does nothing to prevent these changes. USGA greens seedbed mixtures do not prevent green creep. A certified superintendent is not immune. The course now can be greatly different from that on opening day long ago.

Tree growth also creeps up on a course. Too often, superintendents budget little for annual tree care, particularly proper pruning. Players seldom notice the annual growth of a tree, yet overplanting of new courses in originally open areas and too gentle a clearing on wooded sites leave ample tree growth over time. Ongoing general thinning and reshaping of trees is lacking, so excessive growth results. Creeping tree expansion directly influences golf shots on the same hole differently over time if left untouched. Fairways become narrower. The strategy of play around a tree can be significantly altered. More shots are in the rough. Play is slowed. Other problems related to turfgrass maintenance also arise from encroaching shade and surface roots as the trees age.

Two of the most profound changes that have creeped rapidly in the past 10 years have been the explosion of new technology and enhanced physical well-being. An increasing number of senior players also are an evolutionary result.

Innovations in golf club heads, shafts, and grips, new shaft materials, and significantly altered golf ball designs have, in effect, shortened many courses.

Tiger Woods is not the only taller, leaner, more flexible golfer out there. Put better equipment in any player's hands and the ball will go farther, if not straighter.

Increased tee shot length has greatly affected play. Twenty-five years ago, fairway bunkers set in the 220- to 250-yard area had impact upon the better players and even the pros. No longer is this the case. Today fairway bunkers 260 yards off the back tee do not intimidate the better players. Club players or daily fee golfers expect to drive 230 or 250 yards, and often that range is beyond the fairway bunkers. Women hitting farther can almost reach the fairway bunkers when those bunkers were not originally positioned for that purpose. Green creep and bunker creep shift targets and modify bunker positions. Bunker creep alone, when extensive, can move the sand basin 10 or 20 or even 30 feet over time. Ten yards shorter or longer can incorrectly impact a shot. While smaller putting surfaces may in some ways compensate against longer tee shots, these size reductions are not design or play strategy driven. Therefore, the changes do not contribute to the benefit of the game.

Increased tee shot length also impacts tee positions. Many courses do not have much extra room to add longer back tees. Lengthening a hole by 20 or 30 yards often is not possible. Repositioning of middle and forward tees may be one partial remedy to counteract increased hitting lengths. Increasing the number of teeing positions and playing lengths from only two or three to four or five is often necessary to fully accommodate today's wider range of players, playing lengths, and ages of players. Increased volumes of play over time increase wear and tear, also necessitating larger tee surfaces. Increasing tee surface size can provide more playing diversity and ease tee maintenance demands.

An alert superintendent can regularly overcut the green or tee edge apron by a few inches. A yellowish discoloration will be visible for a few days. However, this repositioning of the putting or teeing surface can help retain the original outline shape and surface area.

Fairway mowing patterns and fairway outline shapes often have creeped over time. New machinery at least can provide visually attractive patterns, even if the width or outline shape of the fairway has changed over the years. Fairways often become narrower. Maintained or semi-maintained rough gets closer to the preferred lie. Rough areas tend to creep inward as well, partially due to inadequate maintenance staff. Recontouring and expanding fairway and maintained rough areas can help compensate for increased tree growth and more senior players. Longer hitters often will benefit from expanded fairway widths since length and accuracy are not synonymous and speed of play is always a factor. Increasing the depth and area of rough may have a place at some courses. However, increasing the area of semi-rough or more or less maintained rough only toughens any course. In today's economy, most courses seek rapid play as an economic necessity. Deep and thick roughs are counter productive. Introducing new mowing patterns can add eye appeal and make even flat fairways look better.

Evolution alters the turfgrass, too. "As long as it is green" suits some; however, what was originally a homogeneous blend or single variety has become infested with *Poa annua*, weedy broadleaf species, common bermudagrass, or worse in fairways and maintained roughs as well as putting surfaces and tees. Seedbed improvements and replanting may be the remedy. The introduction of newer turfgrass varieties by overseeding will help improve playing conditions and appearance.

Bunker creep and technology have overtaken the irrigation system, too. A new, more versatile and efficient pumping plant may be necessary. Upgrading the irrigation system controls to computer operation may save labor, improve turf quality, and help conserve water and electricity. Reshaping of greensites or repositioning of fairway bunkers can also require sprinkler head replacement, repositioning, or the addition of heads to assure uniform coverage. Recent improvements in sprinkler head operation, water distribution, and water efficiency may encourage sprinkler head replacement. Adapting to the use of sewage effluent irrigation water may be a necessity of the times in some areas. Adding additional irrigation water storage lakes may be desirable and can be an aesthetic and strategic enhancement as well.

Green creep also impacts water storage lakes and ornamental lakes, ponds, and streams. Water vegetation can expand in number and begin filling the lake. Grass from the edges

Two options are available when restoring lost area on putting greens. The area can be severely scalped back (left) in one step and the golfers endure the temporary turf stress, or the cutting height can be taken down in steps to reduce the scalping damage (right).

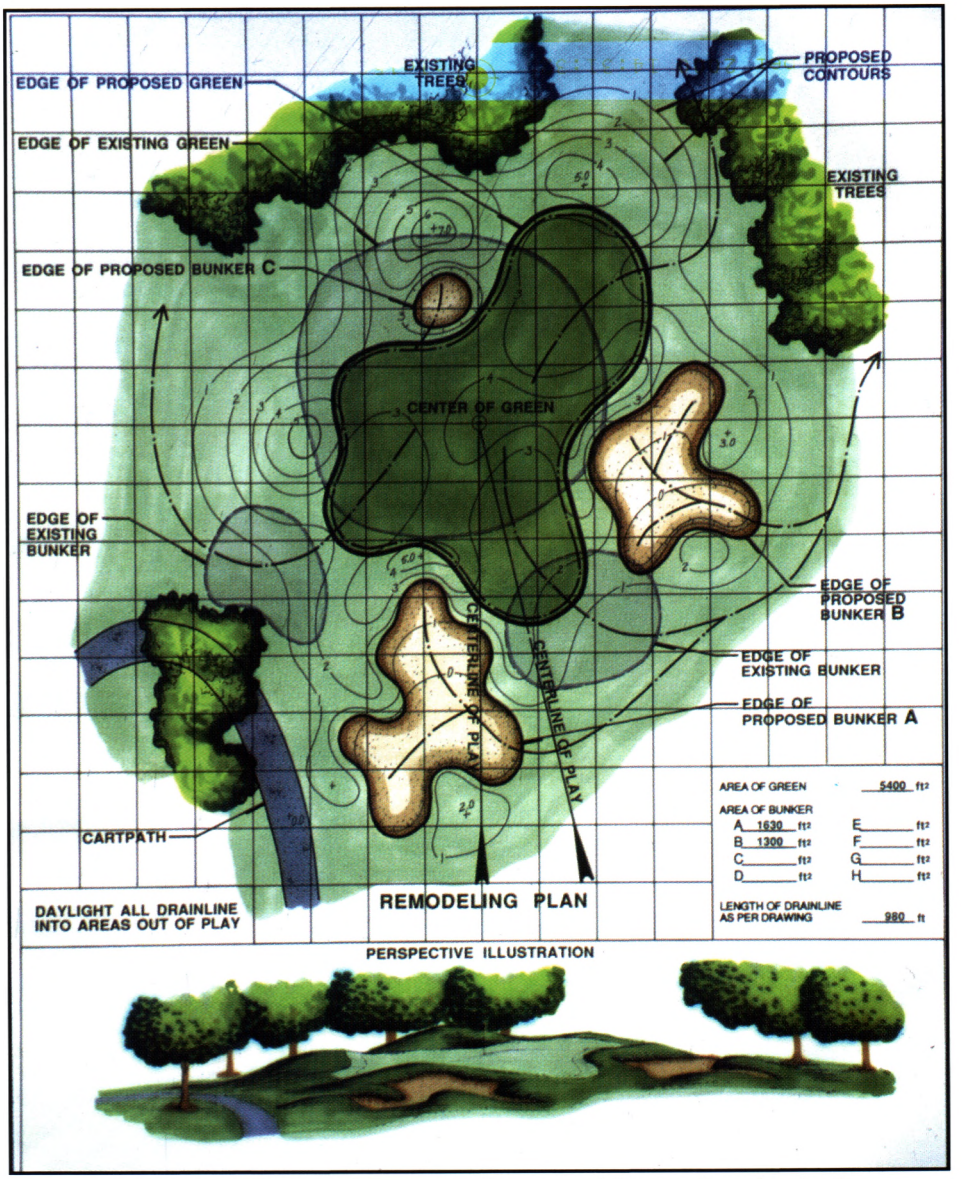
can grow into the water over time, reducing surface area. Excessive algae growth can clog a pond or lake over a few years with unrestrained growth. Uncontrolled lake edge waterweed growth can obscure ornamental walls. Irrigation storage capacity or flood control capacity may be reduced.

Time and increasing golfer traffic adversely change soil structures. Fairways once mostly dry can evolve into at first small muddy spots. As rainfall and pedestrian, cart, and maintenance traffic continue, the compacted and wet or muddy and degraded areas can migrate and spread like a cancer. Turf deterioration follows. Adding subsurface drainage or even sand capping fairways may be necessary to expand playing opportunities during wet weather. Putting surfaces can become wet sponges or brick-hard when the seedbed has deteriorated due to compaction. Tees are one of the first areas to demonstrate the impact of compaction on turfgrass quality.

The addition of golf cart pathways or the extension of existing paths often becomes necessary as the volume of play increases. Placing fairway cart traffic onto cart paths will help combat fairway compaction and seedbed deterioration. Adding expanded "lay-by" cart parking positions can ease congestion near greens and tees. Adding curbing can help control wayward drivers. Repositioning some cart paths can improve utilization and even help speed up play. Converting from gravel or dirt to concrete or asphalt will help improve maintenance and enhance the visual elements. Cart traffic always will cause compaction when not on a path.

Few old and older courses are today as they were when they first opened. Noted examples, such as Augusta National, Pine Valley, and Pebble Beach, bear little resemblance to their early years of operation, even though current owners or members believe they are holders of the original design or original product. Some changes are committee induced, not green creep, however, and still result in substantial alteration from the original design.

Green creep makes courses more homogeneous, more similar in visual and playing appearance and certainly decreases the playing challenge of the original design. Few professional golf course architects of the last half of the 20th century would have designed every green round, every fairway flat, and every bunker in the image of a peanut.



Bunker and green creep corrections are really a remodeling and modernization program, and much can be done with minor alterations and adjustments in maintenance procedures. Sometimes, however, major work is needed to recapture the lost glory of a venerable old course, and a comprehensive and precise master plan by a golf course architect is a good investment.

When I am doing bunker and green creep corrections, I feel just like a plastic surgeon. I am doing nip and tuck, wrinkle removal, a little middle-age facelift and enhancement, a few hair grafts. Pouty lips on a bunker are preferable to thin ones. Our work also involves some liposuction, taking the excess accumulated fat out of a mature golf course.

Correcting green creep really becomes a remodeling and modernization program, even if some effort is devoted to recapturing a long lost glory. Modern volumes of play, enhanced expectations for turfgrass quality, a focus on visual dynamics, and who has the toughest course will influence some remodeling efforts. Remodeling to a budget, to meet user market green fees or membership capability is certainly feasible. Revitalizing an older course to join today's standards and meet today's expectations while accommodating more play is attainable and can occur in an affordable way. Often, corrections can involve only mowing pattern changes or bunker edge recutting. A comprehensive master plan should guide more elaborate directives. The master plan for a hole or a course should be precise and comprehensive. Accurate working drawings should be utilized. Not only golf design, but also ornamental horticulture and turfgrass agronomics are part of the solution. The corrective effort can occur over an extended period of time, be sequential or priority phased, or occur quite quickly over an entire course. Bunker edge corrective changes can occur quickly and have clear, obvious, and beneficial results.

To do nothing and continue with the status quo is a continuing downward slide. From a competitive viewpoint, the slowly deteriorating course that does nothing in response certainly loses market share to newer courses in the area. Golfers today are highly attuned to the visually dynamic style of golf. Countering years of evolutionary change will have direct and positive economic benefit. To see the problem, to understand there is a problem, is not for everyone to do. Being too close, being there too long, being too new to the situation, and not being attuned to the action shields the viewer from the knowledge of what had been and often also what can be. An impartial, experienced eye brings great value.

Much of this article's focus is on easy-to-implement, relatively inexpensive actions to reclaim what once was there. This must not be confused with the more extensive makeover or upgrade and repositioning that can be very elaborate, involved, costly, and beneficial. An assessment of existing playing conditions, the members' desires, analysis of current market competition, user demographics, operational goals, economics, agronomics, local competition, and other factors becomes part of any renovation or modernization program. The restoration or modernization program must be carefully planned and correctly implemented. The results can be spectacular and the cost of implementation need not be excessive. Green creep is here to stay and we must deal with it, sooner or later.

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The Team Approach is Alive and Well!

Using communication to achieve a desired end result.

by LARRY WISE

COMMUNICATION is defined in the *Webster's New World Dictionary* as a giving and receiving of information by talk, writing, or visual presentation. Relationship is defined in the same book as a connection, as in thought or meaning. To achieve a common goal, these concepts must blend together to allow efforts and pursuits to be successful. When two parties communicate, no goal is too lofty, and the relationship, or team spirit, will prosper.

The Center Valley Club was opened for public play in June 1992. It premiered as an upscale facility that offered bentgrass greens, tees, and fairways, which at the time was a unique combination in the northeast region of Pennsylvania. The Stabler Company developed the golf course as the first phase of a 1,700-acre development known as Stabler Center.

The construction and grow-in of the course was a long, intentionally delayed process. The intent was to allow the turf to mature so a high quality experience could be offered. Once the golf course was opened, the initial golfer reaction was positive. The course was in excellent condition and posed a real challenge to golfers of all skill levels. But problems began in 1994; with increased traffic, the course began to show signs and symptoms of unusual wear, and disease activity was becoming more difficult to control.

The Stabler Company prides itself on satisfying customer needs and meeting their concerns. During the first two seasons, all staff members aggressively solicited customer feedback. Initially, playability of the golf course was a hot topic. This, for example, prompted the construction of two bridges to cover two emergency spillway channels on holes #11 and #18. The prefab custom-designed concrete structures allowed bentgrass to be maintained without interfering with emergency drainage control features. These bridges created a more favorable landing area when playing from the teeing ground. A design flaw was corrected and concerns over fairness were resolved.

There is no harder task in golf course operations than that of properly coordinating the vital concerns of the golf course superintendent and the golf professional.

In spite of all the early changes to the golf course and increases in turf maintenance expenditures, course conditions regressed during the 1994 season. For example, the 15th green was lost to disease and other greens were showing signs of black layer development. These conditions prompted research into the original construction procedures and materials. Laboratory analysis indicated that very aggressive agronomic procedures were needed to alter the soil profile. To further complicate matters, personnel changes had to be made so that short- and long-term priorities could be achieved. Corrective strategies were needed to restore turf health and quality and the integrity of the course.

By the fall of 1995, John Romig was appointed grounds supertintendent. John began as a laborer on the course in 1992 and was a crew foreman and assistant superintendent at the time of his appointment to the superintendent's position. There was a conscious effort to supply John with the necessary decision-making authority to resolve the issues at hand. Maintaining our philosophy of teamwork, cooperation, and communication among all departments and employees was essential to our success.

The USGA Green Section was asked to participate in the planning and scheduling of the necessary agronomic programs to restore uniform turf health. It was decided that turf health, not performance, needed to be restored prior to any course conditioning improvements. At times, it can be a challenging task to coordinate the

concerns of the golf course superintendent and the golf professional. The goals and responsibilities of these individuals at times can conflict, but one is dependent upon the other to achieve team success. On one hand, the golf professional, who in most instances is not trained in agronomy, knows how he or she wants the turf to look and play. For example, level teeing grounds, tightly mowed and well-defined fairways, and smooth greens are all common requests of daily playing conditions. On the other hand, the superintendent is interested in agronomic balance, turf health, and scheduling activities to accomplish his or her tasks with the least amount of inconvenience to the golfer. At times, this can be a balacing act, considering that agronomic procedures should be performed when they will deliver the best results. As director of golf, I realized that some disruption in play had to be tolerated to achieve our overall goal of offering consistent and uniform conditions on a daily basis.

Establishing Goals

There must be a goal or set of goals established and agreed to by all components of a business. These goals must be established to satisfy the customers you intend to attract with your product. Golfers have needs when they visit any facility, and they have certain expectations when they pay to play on your product. It is vital to know the customers' thoughts, concerns, and desires so goals can be established to meet the value as perceived in the golfer's mind.

A clear understanding of specific goals to achieve a very high degree of consistency for the Center Valley Club was established. The strategies and goals included:

- Establish sound, ongoing agronomic procedures.
- Meet equipment needs to produce the desired product.
- Resolve irrigation shortfalls.
- Improve employees through training and education (a turfgrass intern program was developed).
- Develop a much healthier texture on all 20 greens.
- Establish firmer and more level tee surfaces.
- Resolve problems of the #15 green complex.
- Resolve the black layer problem in the greens.
- Establish a long-term *Poa annua* control program.
- Improve the manner in which the greens receive golf ball impacts.
- Establish consistent ball roll speeds on all greens.
- Prepare and be ready for any national PGA Tour event in the future.
- Fulfill and accomplish all customer evaluations and perceptions.
- Maintain the quality, integrity, and appearance of the facility every day the course is open.

Accomplishing Goals

We established a weekly team meeting schedule to better facilitate the pro shop staff working with the turf maintenance staff. This opened a direct line of communication that stimulated an ongoing exchange of information. For example, the agronomic staff was informed of all golfing events well in advance and the pro shop staff was informed of all agronomic procedures. Knowing exactly when specific maintenance practices were to occur, such as aeration, topdressing, or vertical mowing, we were able to communicate proactively to golfers before they set foot on the course. This level of communication allowed us to plan our master calendar of events. Focusing on our primary goal of restoring plant health and maintaining it, we planned outings around essential agronomic procedures. With these goals, the turf responds and heals more rapidly and golfer inconvenience is minimized. It has truly been a win-win situation.

Monthly meeting schedules were established so that all departments of the golf course plus the executive level management could participate. It was clearly outlined that we would focus on improving turf health first and then hone course playability and aesthetic appeal. John and his staff were given full authority to accomplish the goals within a specified budget. It was agreed that full cooperation and communication between all departments of golf, food and beverage, pro shop, and executive management was vital to the future growth of the Center Valley Club.

John worked closely with the USGA Green Section agronomist and the reports submitted from the Turf Advisory Service visits. To best facilitate agronomic programs, it was agreed that John would not be made to wait for answers to proposals he made to executive management. The decisions had to come quickly after the justifications were submitted. These proposals included not only equipment and capital expenditures, but also scheduling and staffing needs. As director of golf, I acted as a conduit to expedite requests while still trying to work within the framework of our corporate structure. This allowed decisions to be returned from executive management in less than seven days so as not to delay the team's progress. With a plan intact, we could request, approve, and implement necessary agronomic and business strategies. Our progress could be measured and efficiency could be evaluated. Strong lines of communication allowed us to pinpoint and remove obstacles that hindered our efforts.

All of these goals previously described have been achieved. The Center Valley Club hosted national PGA Tour events in 1998 and 1999, and the Nike Lehigh Valley Open has been held here each year. Based on the players' post-play reports offered by the PGA Tour, the Center Valley Club was reported to have offered some of the finest, most consistent playing conditions on tour. These statements are in general a tribute to the team effort put forth by the employees of Center Valley Club and the USGA Green Section.

Conclusion

Of particular importance is the value of communication and cooperation between the pro shop staff and the golf course maintenance staff. Each plays an important role with defined responsibilities. A mutually beneficial relationship exists and thrives to achieve common goals. Roadblocks must be removed so all facets of the operation gel and function smoothly. The real key to our success is the respect that is shown by each member of the team to the other members' responsibilities, knowledge, and opinions. The team process can and does work.

LARRY WISE *is the director of golf at the Center Valley Club in Center Valley, Pennsylvania. Larry is a PGA golf professional who also serves as the vice president and general manager of golf operations. He has been with the Stabler Company since 1992. Prior to that, Larry was the head professional at Congressional CC and also played full time on the PGA Tour from 1973 to 1975.*

CLOSING FOR MAINTENANCE

Closing the course on Mondays is not the only option for performing major maintenance.

by MIKE HUCK

SUPERINTENDENTS are first to realize that their courses would benefit if only there were more time to get things done without interruption from play. There is no doubt that occasionally closing the golf course for maintenance can make a difference in course conditioning. Routine closures allow for important maintenance practices like topdressing, pest control, aeration, fertilization, drainage projects, and irrigation improvements to be performed in a timely manner. Staying on schedule with these maintenance programs, combined with one day of rest for the course each week, helps immensely to provide optimum turf conditions, especially in climates where golf is played 52 weeks a year.

Golfers do not always see it this way. They want their course available every possible day, and they offer various arguments against regular course closure. They often chant, "We can't afford it!" or "Our members would never approve it." But in the year 2000, course operators need to ask themselves if they can realistically afford not to close the course or at the very least do some creative scheduling to allow uninterrupted maintenance for specific reasons, including:

• **Pest Control Applications:** Reentry restrictions for chemical applications are becoming increasingly strict. Current regulations in some areas require pesticide applications to be watered in (when required by the label) or sprays to be dry to the touch before anyone without protective clothing may re-enter treated areas. During humid, overcast, or foggy conditions, this can require several hours or possibly an entire day to dry adequately. Future regulations could go as far as requiring a 12- to 24-hour reentry interval following chemical applications. In other words, there may soon be no escaping the need for course closure in order to apply pest controls.

• **Leaching and Poor Water Quality:** The increased use of recycled and other non-potable water sources containing high salt loads requires occasional leaching. This is necessary to keep soluble salts from accumulating in the soil and causing turfgrass stress. Placing traffic on soft, over-irrigated greens immediately following leaching increases soil compaction and disrupts surface smoothness, thereby affecting putting quality. This problem can be avoided by leaching greens the evening before course closure and allowing the next entire day for the soil to drain and return to a more reasonable firmness before traffic is allowed.

• **Satisfying Increasing Expectations:** It is easy to understand the golfers' desire to use their facilities as much as possible; however, the increased traffic can also compromise course conditioning. As an example, opening a course on Mondays in a climate where golf is played 52 weeks a year can result in a significant increase in play. Excluding the five typically observed Monday holidays, opening the remaining Mondays could increase traffic by 7,000 rounds or more each year. As difficult as it already is to satisfy rising expectations for top-quality playing conditions, the additional traffic can only make things worse!

Public and daily-fee facilities often believe they cannot afford a shutdown, but creative scheduling may help set aside time for maintenance. Private courses that host outside tournaments on Mondays to supplement income often schedule these as shotgun starts beginning at noon or later, with no early morning tee times. This allows the maintenance staff a few precious hours prior to the tournament to perform jobs that are better done without the interruption of play. With advanced planning, a municipal or daily-fee course could regularly schedule a shotgun start on a day that historically has proven to be less busy, thus allowing morning maintenance. Once the regular patrons are educated on the reasoning behind such a program and begin to see improved conditioning, they should support it entirely.

Another program that some courses in northern and mountain regions utilize is the regular scheduling of a "maintenance evening" during the longer days of summer. The first tee is closed at or shortly after noon on that particular day, allowing the staff to work uninterrupted following play. The benefit of this program is that it still accommodates players with early morning tee times, which they typically prefer.

Accommodating play around major maintenance operations is an ongoing challenge, and courses that have given up maintenance days to satisfy players tend to find it very difficult, if not impossible, to ever reverse the policy. As a final point of consideration, course officials must remember that it is their duty to serve the majority of the players and, in the long run, a greater number of golfers benefit from occasional closures than are inconvenienced.

MIKE HUCK *is the agronomist in the Southwest Region, where course closure is always a hot discussion topic.*

A Winter Shelter

Morro Bay Golf Course provides a winter home to one of the largest populations of wintering monarch butterflies on the Pacific coast.

by TOM MASSEY

EACH FALL, Morro Bay Golf Course (Morro Bay, California) is home to one of nature's most spectacular sights: 25,000 to 30,000 monarch butterflies descending on the golf course to spend the winter in a grove of eucalyptus trees. Located on the central coast of California and having a mild winter climate, our locale is perfect for the butterfly to spend the fall and winter.

The monarch butterfly is one of North America's most familiar butterflies. People readily recognize it by its large size, distinctive orange and black color, and slow, drifting flight. This small creature is a long-distance champion, often traveling thousands of miles as it migrates to wintering sites each fall. While the majority of monarchs spend the winter on a few mountaintop sites in Mexico, vast numbers of monarchs also overwinter along the Pacific coast.

Begun in 1996, our Monarch Butterfly Project is a dedicated effort to enhance habitat for monarchs on the golf course. The project is the natural outgrowth of stewardship efforts begun when we joined the Audubon Cooperative Sanctuary Program (ACSP) in 1992 and achieved full certification in 1995. Spearheaded by our ACSP resource committee, our primary objective is keep keep monarch butterflies returning year after year.

Enhancing the Site

To ensure that we continue to provide ideal conditions for monarchs, our resource committee enlisted the help of Dr. Kingston Leong, an entomologist at California Polytechnic State University in nearby San Luis Obispo, California. Dr. Leong has studied the migration patterns of the monarch butterfly throughout central California for many years and has found only a handful of sites where monarchs stop for the winter. Morro Bay is one of the largest sites he's found to date – some years sheltering as many as 150,000 butterflies.

The butterflies rest in a grove of blue gum eucalyptus trees located in the center of our golf course. Dr. Leong surveyed the site and established grids to designate its boundaries. Because butterflies rely on the sun for warmth and to raise their body temperature in order to fly, we took steps to keep climatic conditions on the site favorable for monarchs. First, we pruned eucalyptus trees on the southern border to increase the amount of sunlight that filters into the site. In addition, we planted a windrow of Monterey cypress trees to protect the site from prevailing northwesterly winds. Equally important, we protect the site by minimizing any golf course maintenance in this area and restricting pesticide use.

So that we may further enhance this habitat, Dr. Leong has applied for grant funds to purchase instruments to record and document weather patterns on site. We're excited by the possibility of generating research data that will further contribute to the conservation of this butterfly species.

Golfer Response

The unique beauty and remarkable number of monarchs on the golf course give rare distinction to the game of golf at Morro Bay during fall and winter months. Golfers love to see the butterflies, and the ladies' club even holds an annual Monarch Butterfly Tournament. I update our conservation efforts to the ACSP resource committee and the green committee, and provide information for them to take back to their respective members.

Perspectives and Recommendations

My advice to others who are considering wildlife enhancement or protection projects is to surround yourself with intelligent, hard-working volunteers, such as a resource committee. These people can provide invaluable information and assistance to turn your ideas and goals into actions and outcomes. Though I initially feared that the monarch project would increase my already full workload, I found that having our ACSP resource committee and the maintenance crew involved made all the difference.

Though efforts to increase or enhance wildlife populations do not produce results overnight, the results are well worth the wait. To watch the population of butterflies increase year after year and to see firsthand that our efforts are paying environmental dividends is most satisfying. Our Monarch Butterfly Project will continue to be a high priority for Morro Bay Golf Course for years to come.

TOM MASSEY *is the golf course superintendent at Morro Bay Golf Course in Morro Bay, California. The course has been certified as an Audubon Cooperative Sanctuary since 1995. To find out more about the Monarch Butterfly Project or other environmental projects at Morro Bay, contact Tom Massey at (805) 772-6390, or e-mail at: tmassey@co.slo.ca.us.*

Each fall, 25,000 to 30,000 monarch butterflies descend on Morro Bay Golf Course (California), where they will spend the winter in this grove of eucalyptus trees. During high population cycles, as many as 150,000 butterflies have been counted on the course.

United States Golf Association Green Section Educational Program

Sunday, February 17, 2001
Dallas, Texas

BIG CHALLENGES – UNIQUE SOLUTIONS

12:00 p.m.
Welcome
Moderator: James T. Snow, National Director, USGA Green Section

12:05 p.m.
Insights from GCSAA
R. Scott Woodhead,
President, GCSAA

12:10 p.m.
Lessons from the Lorax for the Golf Industry
Dr. Frank Rossi, Cornell University
The story of the Lorax holds lessons for the relationship between golf and the environment. Dr. Rossi will draw parallels to challenge conventional wisdom and question golf's evolving role in protecting natural resources.

12:40 p.m.
Presentation of the USGA Green Section Award

12:50 p.m.
The Best Turf Tips from the Green Section Staff
Chris Hartwiger, Agronomist, Southeast Region
Dr. Mike Kenna, Director, Green Section Research
Brian Maloy, Agronomist, Mid-Continent Region
John Foy, Director, Florida Region

1:10 p.m.
Are You Ready for Green Genes in Your Grass?
Roger Krueger, Monsanto
Mr. Krueger will discuss how scientists are genetically modifying grasses and other organisms. Can they live up to their potential without risking environmental backlash?

1:40 p.m.
More of the Best Turf Tips
Patrick Gross, Director, Southwest Region
Jim Skorulski, Agronomist, Northeast Region
Keith Happ, Agronomist, Mid-Atlantic Region
Jim Moore, Director, Construction Education Program

2:00 p.m.
Rooting Course Management in the Fertile Ground of Environmental Stewardship
Ronald Dodson, Audubon International
Celebrating individual accomplishments on the tenth anniversary of the Cooperative Sanctuary Program that point the way toward a future of new possibilities.

2:30 p.m.
The Best Turf Tips Keep on Coming
Bob Brame, Director, North-Central Region
Darin Bevard, Agronomist, Mid-Atlantic Region
Larry Gilhuly, Director, Northwest Region

2:45 p.m.
Closing Remarks

2001 USGA GREEN SECTION NATIONAL & REGIONAL CONFERENCES

NATIONAL CONFERENCE		
February 17	Dallas Convention Center	Dallas, Texas
FLORIDA REGION		
April 9	Timuquana Country Club	Jacksonville, Florida
April 11	Palm Beach Gardens Marriott	Palm Beach Gardens, Florida
MID-ATLANTIC REGION		
February 26	Radisson Hotel	Monroeville, Pennsylvania
March 22	Woodholme Country Club	Baltimore, Maryland
MID-CONTINENT REGION		
March 6	Lakeside Country Club	Houston, Texas
March 7	Dallas Athletic Club	Dallas, Texas
March 8	Oakbourne Country Club	Lafayette, Louisiana
March 14	Hyperion Field Club	Johnston, Iowa
March 27	Old Warson Country Club	St. Louis, Missouri
NORTH-CENTRAL REGION		
March 12	Kings Island Resort & Conference Center	Kings Island, Ohio
NORTHEAST REGION		
March 15	Monroe Golf Club	Rochester, New York
SOUTHEAST REGION		
March 20	Alamance Country Club	Burlington, North Carolina
NORTHWEST REGION		
March 5	Blue Lakes Country Club	Twin Falls, Idaho
March 7	Ramada Copper King	Butte, Montana
March 19	Snoqualmie Falls Golf Club	Fall City, Washington
April 23	Waialae Country Club	Honolulu, Hawaii
SOUTHWEST REGION		
March 13	*(in conjunction with SCGA)*	California
March 14	*(in conjunction with SCGA)*	California
March 20	Lakewood Country Club	Denver, Colorado
March 26	Castlewood Country Club *(in conjunction with NCGA)*	Pleasanton, California
March 29	Phoenix Country Club	Phoenix, Arizona
TBA	*To be announced*	Las Vegas, Nevada

TRICKS OF THE TRADE

If it seems too good to be true . . . it probably is.

by PATRICK GROSS

EVERYONE enjoys a good magic trick. A skilled magician seems to create something out of nothing with apparently little effort. Wouldn't it be nice if golf course maintenance were that easy?

With the demands placed on today's golf course superintendent to produce perfect conditions, it is very tempting to jump at any little trick or product that can give you an edge over the competition. Slick brochures and enthusiastic testimonials promise an end to all your problems with little or no effort. Salesmen point out that the guy down the street just bought the same equipment or product and his course has never looked better. They can't exactly explain how or why it works, but *something* is definitely happening. We all want to learn the various tricks of the trade and maybe develop a few of our own to make our jobs easier, but are we making things trickier than they need to be?

A wise man once told me, "Everyone is so busy learning the tricks of the trade, they forgot to learn the trade." While we all want to do things faster and better with less effort, our search for a shortcut often leads us away from the basics of good turf management. After all, the basics are boring. Mow, water, fertilize, aerate, and control pests – there must be something else. We start to second-guess our standard agronomic programs when presented with something a little more glamorous or mysterious. Thousands of dollars may be spent on the latest cutting-edge product with little or no results. Before long, thousands of dollars are wasted and then it is on to the next miracle cure.

When it comes to tricks of the trade, the most successful superintendents I know have mastered the basics – water management, mowing, fertility, cultivation, and pest control. It's not boring to them; in fact, it is at the core of what they do. Every employee is trained in the basics and then held accountable to high standards. When tempted to take shortcuts, the experienced superintendent reminds the staff that their job is to do things the right way, not the easy way.

One of the many challenges for today's golf course superintendent is staying on the cutting edge while avoiding the pitfalls of questionable products and technologies. With concerns over the rising cost of maintenance and affordable golf, superintendents need to stay abreast of products that can improve efficiency and quality without increasing expense. Here are a few suggestions for evaluating the merit of such products:

- Be skeptical about slick advertisements and testimonials. Seek out unbiased sources of information.
- Look for independent research to verify the product claims.
- Test products on a limited basis and include an untreated check area. A good guideline when starting out is to treat only as much area as you are willing to sod in case the material causes damage.
- Determine if the product or technology is necessary or appropriate for your situation.

Golf course management is a combination of art, science, and common sense. There is no need to get too tricky. It is important to keep the emphasis on basic agronomic programs rooted in good science and common sense. Dr. Robert Carrow, turfgrass research scientist at the University of Georgia, offered these comments in a recent *Green Section Record* article regarding the importance of sound basic agronomic programs: "The foundation of all excellent golf facilities is solid, basic turfgrass management. This starts with priority attention given to the basics – good fertilization, irrigation, mowing, pest control, and cultivation programs. The 'extra 5% to 10%' enhancement in quality from the incorporation of new products or technologies cannot compensate for the missing 90% from good 'basics.'" In the end, the tricks of the trade are no substitute for education, training, experience, and common sense.

PATRICK GROSS *is Director of the USGA Green Section's Southwest Region.*

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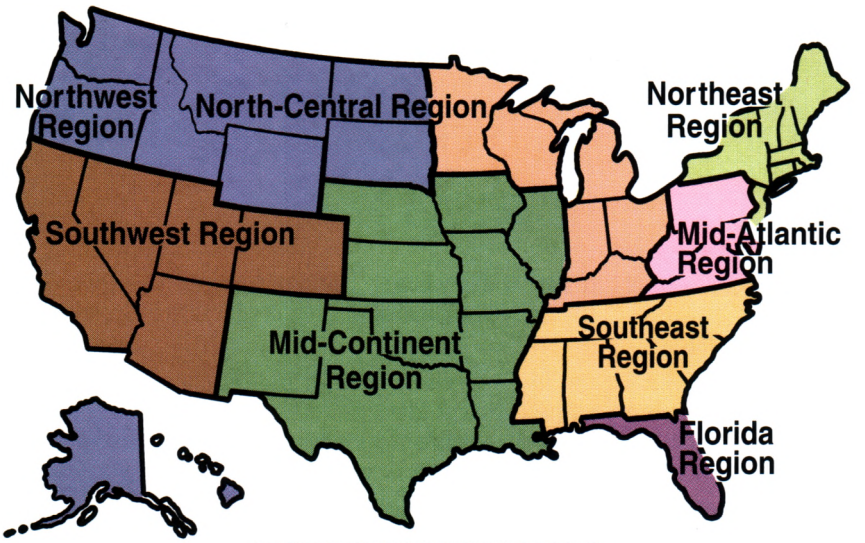

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TURF TWISTERS

RESPECT

Question: I feel like the Rodney Dangerfield of turf maintenance. The golfers never seem to appreciate the many small, but important, in-house construction projects we undertake throughout the season. Any suggestions? (Wisconsin)

Answer: Invest in a regular 35mm or digital camera, and document your projects' progress and results. Take plenty of before and after pictures of construction projects and general improvements on the golf course. A short, well-written story about the project, complete with pictures, can be posted in the pro shop. Include these stories in your newsletter to golfers. If you don't have a newsletter, start one. Your pictures also can be used in presentations to your board and at superintendents meetings, and they also serve as a great supplement for your resume.

SCIENCE-BASED

Question: What are "modified" USGA or "modified" California greens? (Louisiana)

Answer: Who knows? The word "modified" can mean anything and often does, and technically if the greens are modified, they are not USGA or California greens. There are two well-established, science-based methods of green construction – the USGA method and the California method. Both methods are agronomically sound – assuming they are followed. Modifications of either method are discouraged since such modifications are seldom (if ever) based on research and thus can yield poor results. The USGA method can be found at www.usga.org/green/coned or by calling any Green Section office. A document illustrating the California method can be obtained by calling 800-994-8849 and asking for publication number 21448.

TECHNOLOGIES

Question: Our course is in a very windy area, and we tend to lose a lot of bunker sand during wind storms. Any ideas on how to keep the sand in our bunkers? (Nevada)

Answer: Consider setting up a special irrigation program to water the bunkers to keep the sand moist and reduce wind erosion. The best approach is to use a combination of the part-circle heads pointing away from greens, along with the heads covering the putting green banks. Syringe cycles can be programmed for five to ten minutes when wind speeds exceed 15 to 20 mph. Later, you can fine-tune the system by adding smaller landscape sprinklers in key locations to avoid over-watering surrounding areas.