Vigorous Plant Growth Depends on Well-Developed Roots

A strong healthy root system is vital to a strong healthy plant. Plants with poor or marginal root systems are more susceptible to draught stress and secondary attacks by disease and insect pests. To promote vigorous root growth, you need an understanding of how and where roots grow.

Soil must provide a good environment for root growth, not just anchorage for the plant. In most soils, root systems are much more shallow and widespread than often believed. True taproots are rare in nature. Subsoils are usually not suitable for root growth, so there is little reason for a taproot to develop.

Most of the large anchoring roots of trees are located in the top two to three feet of soil. The fine roots, which are the primary site of water and mineral absorption, are usually located within the top four or eight inches of soil—the areas most conducive to root growth. The lateral spread of the root system is usually many times that of the branches. The commonly held belief that the root system mirrors the above ground portion of the plant is unfounded. This can easily be seen on trees that have been excavated by construction activity or blown over by high winds.

Root systems are dynamic. The fine roots are continually growing, dying and being replaced by other fine roots. A few of these succulent fine roots persist to eventually become woody structural roots. In nearly all plants, the fine roots form symbiotic associations with common soil fungi called mycorrhizae. These mycorrhizae roots often do not appear to be any different to the untrained eye, but are very important for nourishment of the plant. Simply stated, the mycorrhizae act as extensions of the root system and aid in absorption of nutrients from the soil, especially in infertile soils. Plants with mycorrhizae usually grow slower than those with mycorrhizae growing on the same site.

When field-grown plants are transplanted, often up to 95 percent of the root system is left behind. In other words, five percent of the root system must support 100 percent of the tree until new roots regenerate. In soils with normal drainage, this can lead to severe draught to severe draught stress, which in turn can reduce root regeneration. In this situation, regular watering is imperative. In soils with poor drainage, regular watering is imperative. In soils with poor drainage or a heavily compacted layer below the surface, the planting hole will often fill up with water from normal rainfall. Methods of removing the excess water may have to be devised and additional watering may only aggravate the situation.

When roots are cut during the transplanting process, new rootlets originate from the end of the severed roots at the edge of the root ball. In light of this, root pruning is of questionable value. It has been shown that transplanting during the period of early shoot development in the spring reduces overall root regeneration. At this time, the roots are competing with the shoots for common source of carbohydrate reserves. If transplanting is delayed until the leaves begin to expand, the leaves will be producing carbohydrates through photosynthesis, and competition for existing reserves is reduced, resulting in better root growth.

After large trees are removed, it is common to observe a long period of slow growth, often lasting many years. This extended period of reduced vigor often results in concern for the survival of the tree. To the contrary, this period of slow growth should be expected since the plant is being supported by such a limited root system. Not until the root system is once again in balance with the above ground portion of the plant will vigorous growth resume. The length of time required is closely related to the size of the plant, and is directly dependent on the original lateral root spread. Roots grow radially from the trunk in a linear fashion and at a similar rate, independent of the size of the plant. The longer the linear distance that must be covered to replace the original root system, the longer the period of slow top growth. Calculations show that the root system of a 4-inch tree would probably take four to five years, while that of a 10-inch tree could take as long as 13 years under the same growing conditions. It is important to remember that a plant is only as good as its root system. Care should be taken to provide adequate soil conditions for good root development. After transplanting, there is a period of slow growth while the root system catches up with the above ground growth of the plant.

—CREDIT: OGA Notes

How Our Turfgrass Industry Helps Others In a Variety of Ways

Turfgrass has a direct effect on the way many people live. It provides the medium for play on many recreational facilities; it modifies our environment to make life easier and more pleasant; it provides opportunity for a pleasing and functional home landscape; and, in turn, the turfgrass industry has a significant direct economic impact on our tourist economy.

Many recreational facilities depend on a uniform, vigorously growing and recuperating, well-maintained turf sward for many activities. Common examples include soccer, baseball and school grounds. Turfgrasses provide uses and also provide a safety cushion that is especially beneficial in contact and intensely physical sports.

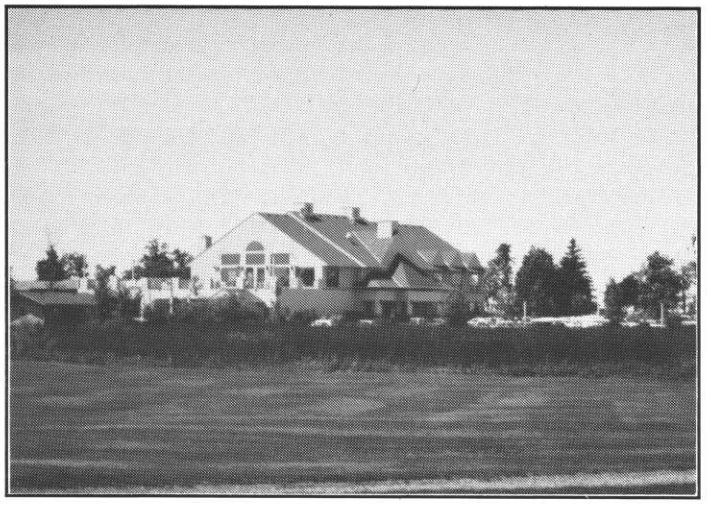
Because many people now live in urban and suburban centers where glass, steel, concrete, asphalt, buildings and cars prevail, turfgrasses directly influence our immediate environment in many positive ways. As examples, actively growing turfgrasses have been shown to reduce high summer surface temperatures because of transpirational cooling.

Turfgrasses, often with trees, shrubs and groundcovers, reduce discomforting glare and traffic noise. Soil erosion is reduced from surfaces covered with turfgrass, dust is stablized, and fire opportunity is reduced or eliminated. Turfgrasses increase infiltration of water into the soil profile and also increase the water quality when this water moves below the turfgrass system.

Turfgrasses are used extensively in most home landscapes. In many settings, they provide the functional cover for child and adult activities and household pets. A well-landscaped home adds to the economic value of the property with the recovery value at, or exceeding 100%.

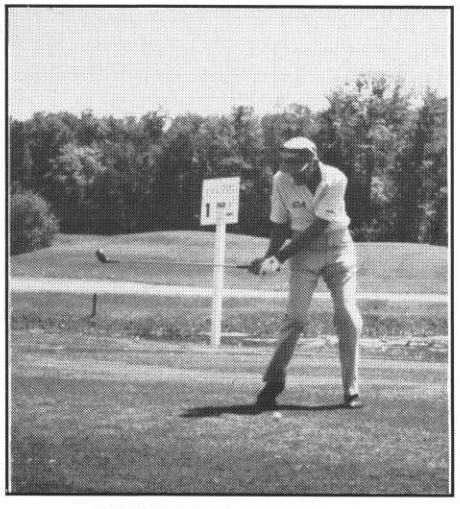
Lastly, the turfgrass industry has a sizable direct economic activity for individuals and organizations involved in the design, installation, maintenance and support services for the industry.

Izaty's Proves To Be A Great Getaway

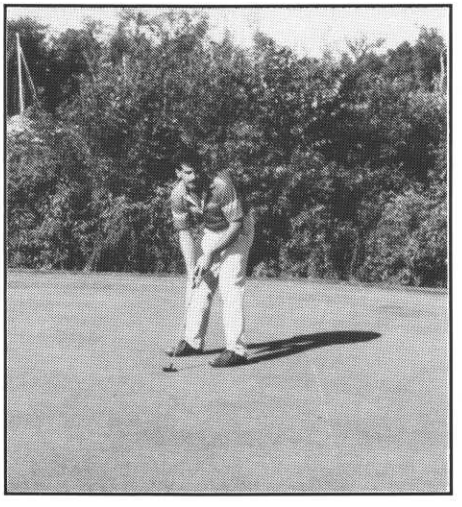


IZATY'S CLUBHOUSE

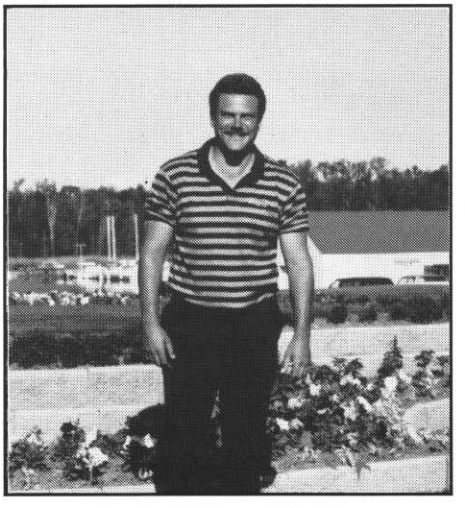
SCOTT HOFFMAN
Relaxes before golf



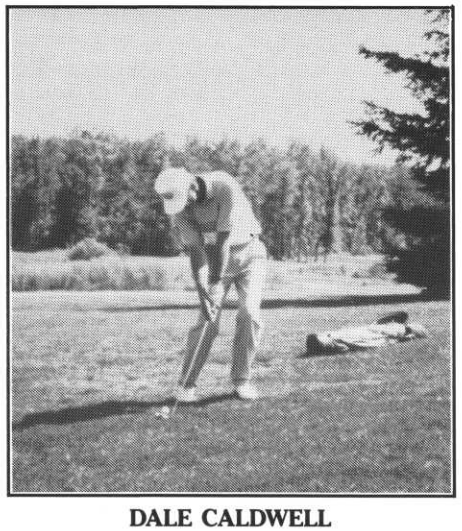
THOMAS M. KIENTZLE
Superintendent at Birch Bay



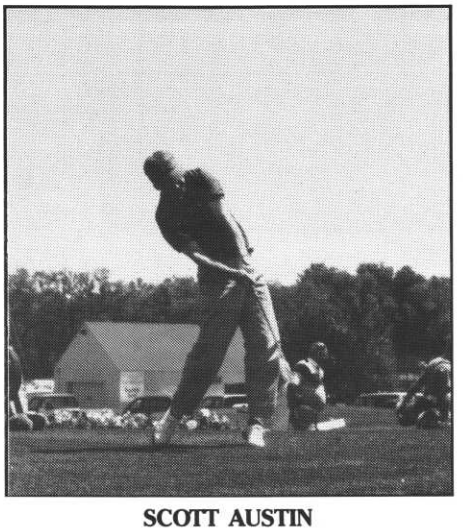
MIKE LIGDAY
Superintendent at Manitou Ridge



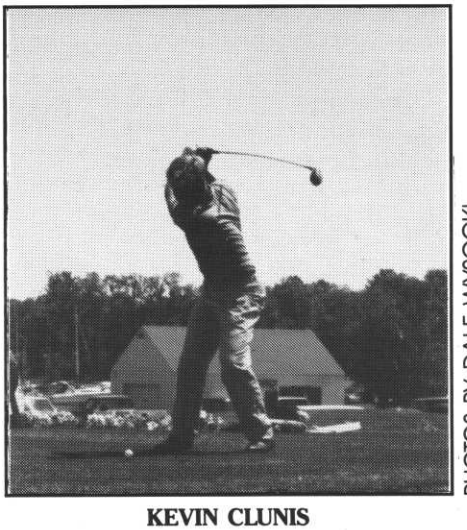
STEVE SCHUMACHER
Host Superintendent at Izaty's



DALE CALDWELL
Superintendent at Minneapolis Golf Club.

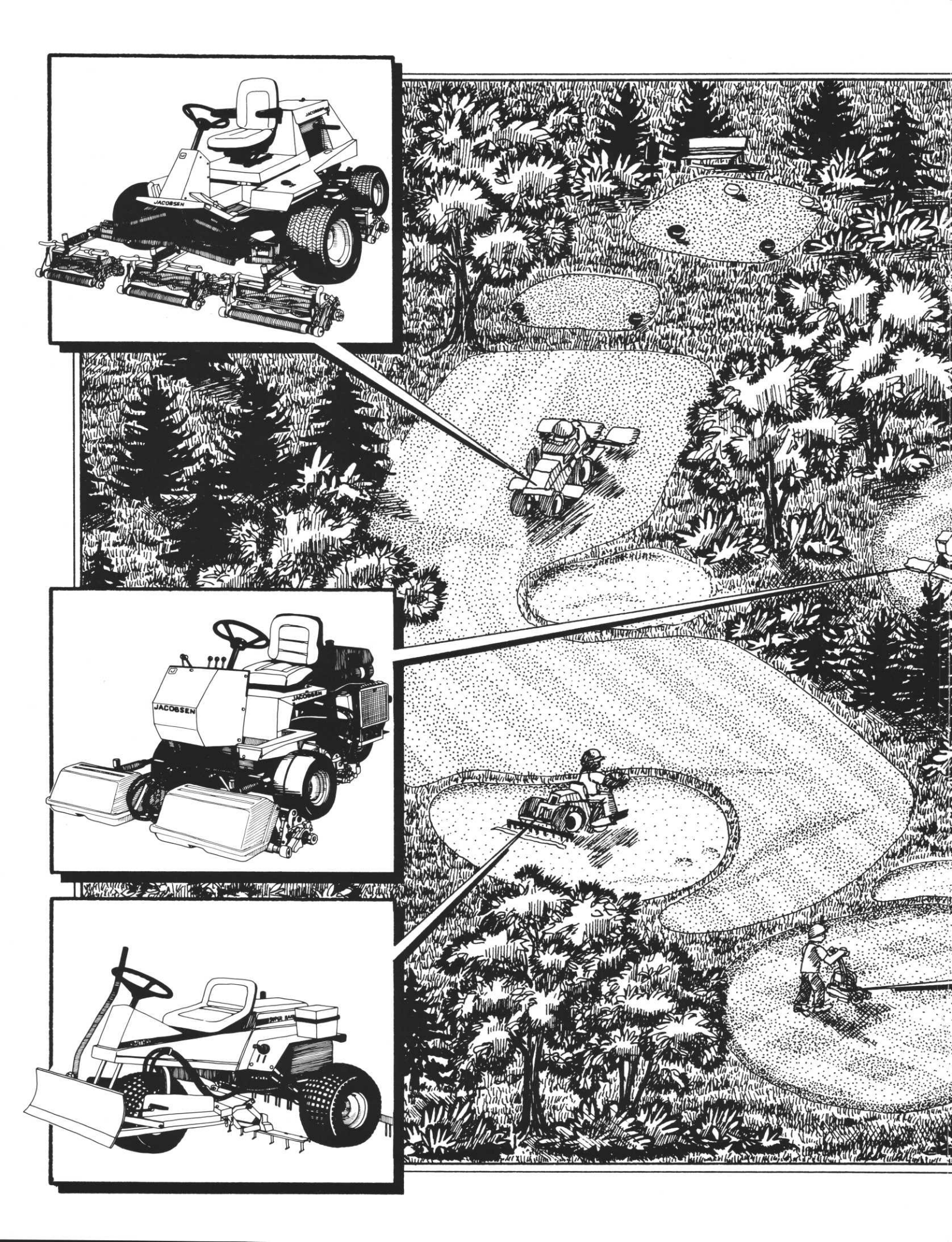


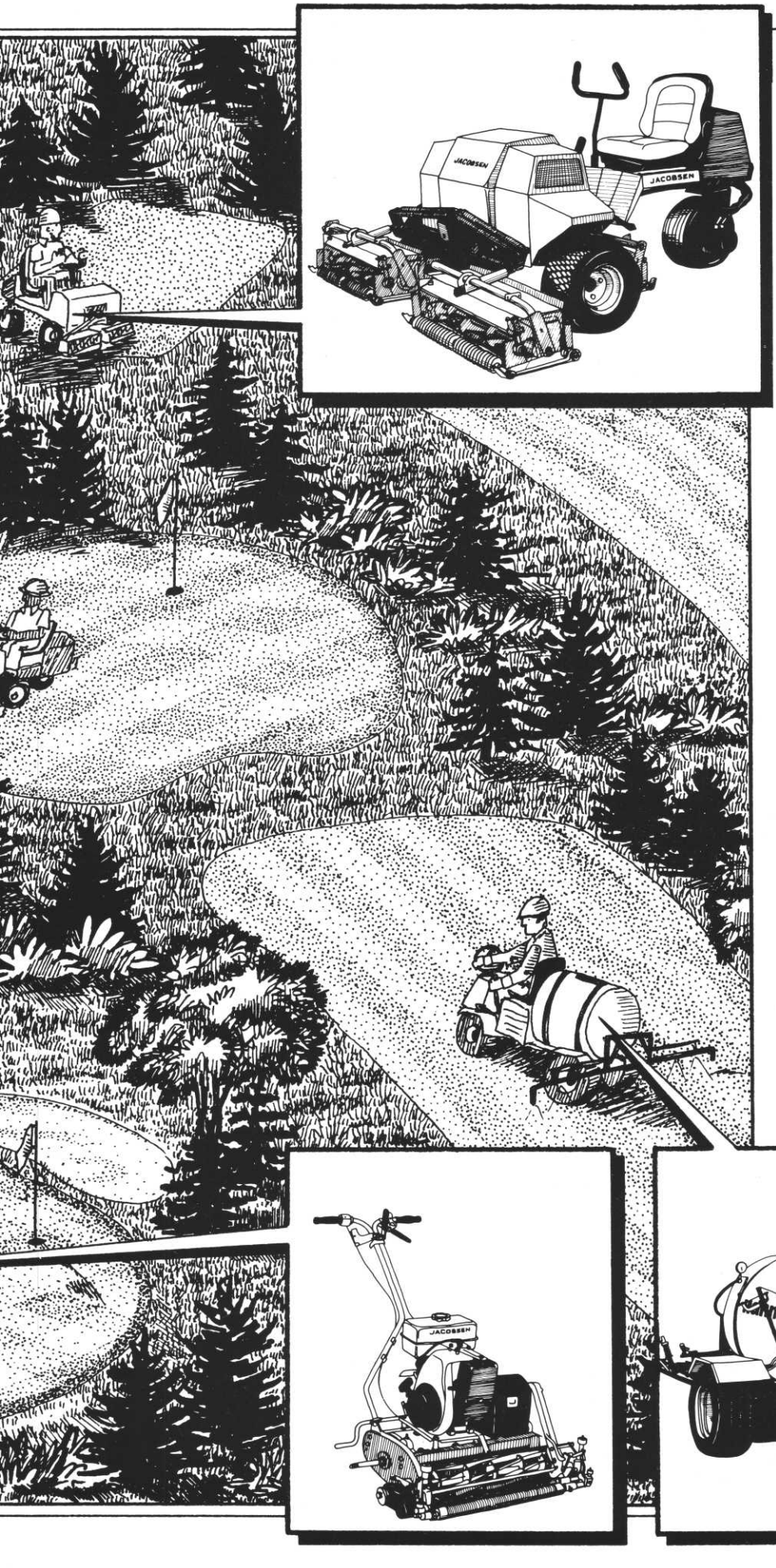
SCOTT AUSTIN
Superintendent at Midland Hills



KEVIN CLUNIS
Superintendent at Stillwater Country Club

–PHOTOS BY DALE WYSOCKI


JACOBSEN
JACOBSEN
JACOBSEN



MEET OUR TOURNAMENT PLAYERS . . . .

Whether you are preparing your course for a major tournament event or satisfying the standards of your members, NORTH STAR TURF can provide you with innovative products and services for improved grooming standards, maintenance levels and player satisfaction.

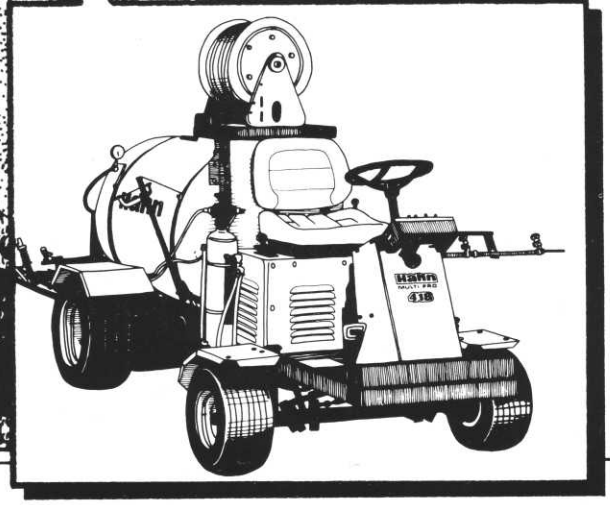
From concept to creation, call on the players at NORTH STAR TURF to provide the necessary technology to assist you in determining your most effective turf maintenance plans.

NST *"We Initiate Satisfaction"*

NORTH STAR TURF, INC.

3080 Centerville Road
St. Paul, MN 55117

(612) 484-8411
(800) 592-9513



Sunlight and Your Skin

By STEPHEN E. CHIERELLO, M.D., P.A.
Dermatology & Dermatological Surgery

Sunlight permanently damages the skin. Ordinary sun exposure during tanning and outdoor sports causes permanent skin changes. These changes build up over the years, so that even moderate, repeated sun exposure causes visible skin damage. Most of the wrinkling, roughening, freckling that appears on the face, hands and arms of white adults come from sun damage, not age. You can see this if you compare less sun exposed areas, such as your abdomen or the undersides of your arms, with sun-exposed areas such as your face, neck or upper surfaces of your arms. The natural coloration of your skin, pigment, protects you from the damaging effects of sunlight. Persons with fair skin, who have little pigment, are more prone to sun damage than dark-skinned individuals.

The Skin-Damaging Effects of Sunlight

The skin-damaging effects of sunlight gradually lead to roughening, freckling, and wrinkling. Many people in their 30s and 40s are unhappy because their wrinkled, roughened, sun-damaged skin makes them appear 10 or 15 years older. Unfortunately, there's no way to undo these changes. Young people should realize that they will ultimately pay a steep price for the temporary glamour of a deep tan.

A more serious effect of sun damage is skin cancer. Sun damage is the chief cause of skin cancer. Here again, fair skinned individuals are much more susceptible. Skin cancer rarely occurs in blacks. As you might expect, skin cancer tends to occur on overexposed areas such as the face, back, shoulders and arms. While skin cancers can usually be removed by minor surgery in a doctor's office, it's better to prevent them.

Sun-Protective Measures

There are two basic ways of protecting your skin from the damaging effects of ultraviolet rays: (1) blocking out all light with an opaque material such as clothing and (2) using a chemical sunscreen that selectively absorbs ultraviolet rays. Blocking out all light with clothing is most effective. Certain sun protectives depend on the same principle. They coat the skin with a paintlike pigment that mechanically blocks light. They work well, but they're messy and rather unsightly.

There are also many clear sunscreens that absorb ultraviolet light. These "clean" sunscreens contain either PABA (para-aminobenzoic acid) or benzophenone compound. Some of the PABA-containing sunscreens are taken up by the skin and will provide some protection in the water, provided they are applied one or two hours before swimming. An occasional person is allergic to PABA or its derivative. So please try PABA-type sunscreens on a small area of skin before spreading it all over your body. The other chemical class of sun protectives, the benzophenones, rarely cause skin allergy. Benzophenones wash off, however, and therefore do not protect swimmers. Some benzophenones have a bitter taste that can be annoying when applied near the mouth.

There are many sun protectives on the market. If they're designed and act as "sunlight blockers" and contain a PABA derivative or benzophenone, they're probably adequate. Water removes most sunscreens. Remember to put on another coat of sunscreen after swimming or bathing. If you're sweating, heavily, use some more sunscreen every hour or two. If you're in very bright sunlight, it's wise to protect your skin as much as possible with clothing (long sleeves, gloves, wide-brimmed hats) and use one of the "clean" chemical sunscreens on the parts of the skin exposed to the sun.

Protect your lips from sun damage. The darker lipstick shades are effective for women. Men—and women who don't wear lipstick—should use ultraviolet-absorbing lip pomade. Women can use makeup with a sun protective. The sun protective should be applied first, then the makeup itself—especially if heavily colored—provides some sun protection.

You should aim to minimize sun exposure, not avoid it. Being outdoors is fun and healthy; don't let fear of sun damage keep you inside during sunny weather. Do use sun protectives when enjoying sports or a walk in the sun.

Specific Sun Protection Instructions

1. Avoid the 10 a.m. to 2 p.m. sun whenever possible as 70% of the earth's harmful radiation reaches us at that time.
2. Wear protective clothing: a broad-brimmed hat and long-sleeved, tightly woven white cotton shirt.
3. Apply a sunscreen containing both PABA and Benzophenone to dry skin at least one (1) hour before sun exposure for maximum protection. Wipe or wash residue from palms. Let dry before putting on clothes.

Hydration of Skin: (Bath or Shower) immediately before application provides an increased "protection reservoir." Daily application maintains this "protective reservoir." Always reapply after swimming or excessive sweating.

Exposed areas of the skin most likely to suffer sun damage are the face (especially the ears and nose, the scalp if you are bald), the back of the neck, arms, tops of the hands and exposed parts of the chest.

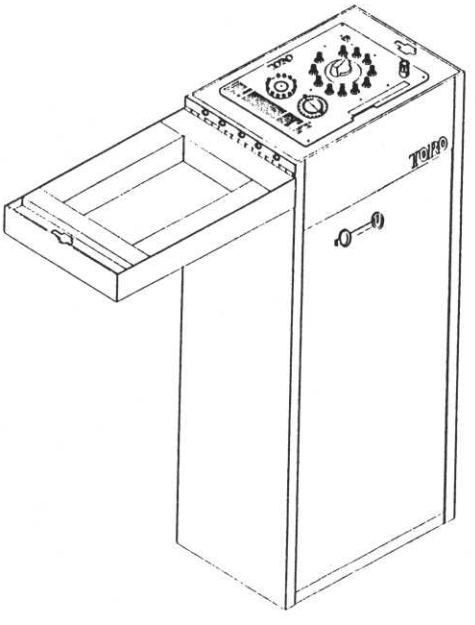
—Credit: North Ohio Turf

TORO

MTI IRRIGATION ★ ★

★ ★ ★ ★ SERVICE CENTER

- ★ **FULL TIME STAFF**
- ★ **AUTHORIZED TORO CONTROLLER REPAIR CENTER**
- ★ **AUTHORIZED OTTERBINE REPAIR CENTER**
- ★ **CLAYTON PRESSURE CONTROL VALVE MAINTENANCE**
- ★ **HYDRAULIC SYSTEM TROUBLE SHOOTING**
- ★ **WIRE TRACING**



★ ★ ★ ★ ★

MTI DISTRIBUTING CO.

14900 Twenty-first Avenue North • Plymouth, Minnesota 55441
(612) 475 - 2200 - 1 • 800 • 362 • 3665

TORO

MAPLEWOOD
225 EAST ROSELAWN AVE
MAPLEWOOD, MN 55117
612-487-2627

FRIDLEY
8041 RANCHERS ROAD
FRIDLEY, MN 55432
612-785-2430

BURNSVILLE
1103 RIVERWOOD DRIVE
BURNSVILLE, MN 55337
612-890-3720

FARGO
4310 MAIN AVE
FARGO, ND 58104
701-281-0775
1-800-782-1031

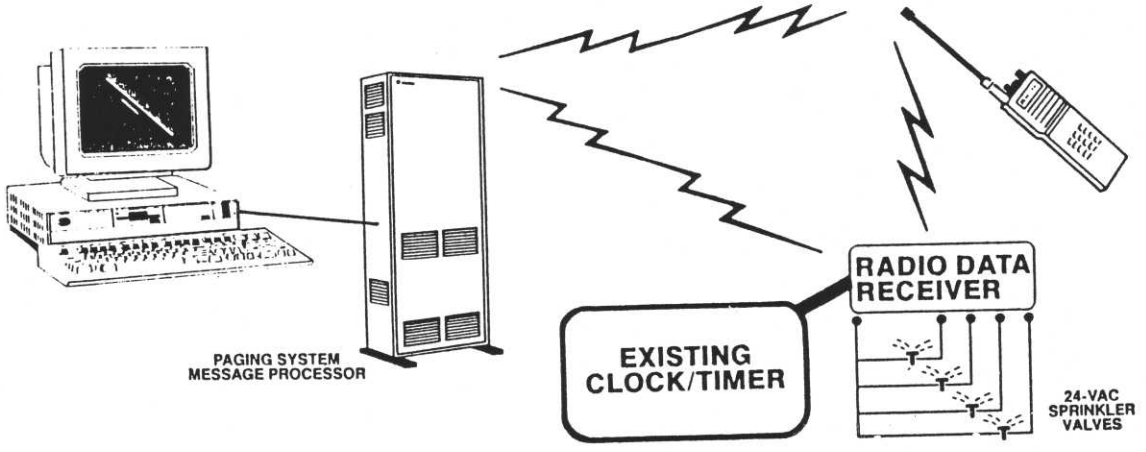
TORO

OSMAC

ON SITE MANAGEMENT and CONTROL

MOTOROLA

RADIO-CONTROLLED IRRIGATION SYSTEM



OSMAC can convert ANY irrigation control system

- ★ WIRELESS CENTRALIZED CONTROL
- ★ ALARM PAGING
- ★ PERCENTAGE ADJUST WATERING TIMES
- ★ MULTI-VALVE SYRINGE

MTI DISTRIBUTING CO.

14900 Twenty-first Avenue North • Plymouth, Minnesota 55441
(612) 475 - 2200 - 1 • 800 • 362 • 3665

TORO

MAPLEWOOD
225 EAST ROSELAWN AVE
MAPLEWOOD, MN 55117
612-487-2627

FRIDLEY
8041 RANCHERS ROAD
FRIDLEY, MN 55432
612-785-2430

BURNSVILLE
1103 RIVERWOOD DRIVE
BURNSVILLE, MN 55337
612-890-3720

FARGO
4310 MAIN AVE
FARGO, ND 58104
701-281-0775
1-800-782-1031

Correct Identification Vital to Mole Damage Control

Correct identification is vital to mole damage control. Both species of Michigan moles have large shovel-like front feet with long claws. The eastern mole has a naked red nose and a short tail; the star-nosed mole has a large red nose with 22 finger-like projections and a long tail. The eastern mole usually makes many shallow tunnels that raise the soil into long winding 2-inch high ridges. The few mounds it makes are low, rounded and often have bits of turf on them. It prefers well-drained soils. The star-nosed mole usually makes deep tunnels not evident on the surface, but it pushes up soil from these funnels into many conical mounds of raw earth. Some mounds may be more than 6 inches high and 12 inches wide. It prefers moist soils. The pattern of tunnels and hills made by both moles varies with soil conditions.

Moles frequently cause damage, but are also beneficial as they are insectivores that feed on insects, worms and other invertebrates. They also irrigate and aerate the soil by burrowing. Occasionally they eat plant seeds, roots and bulbs, but most damage is done while burrowing for insects when they uproot the plants and grass roots. They are most active in spring or fall, on cloudy days and following rainy periods during the summer. During winter and midsummer dry conditions they go deep into the ground. They have a very extensive underground tunnel system, including travel tunnels (which are used daily) and foraging tunnels (rarely re-used). When moles become a problem, the following methods can be used to control the damage.

1. Direct Killing—Although eastern moles may burrow at any time, they are usually most active at certain times, depending on the season. Note when most new activity occurs, or when flattened ridges or mounds are repaired. Once you have determined when the eastern moles are most active, look during those times to see the long, winding ridges being pushed up by the eastern mole tunneling just below the surface of the ground. With practice you can quickly and quietly approach the tunneling mole and kill it by smashing the earth down with a shovel or similar instrument just behind where the earth is being lifted up. Repeated application of this method can gradually remove eastern moles from an area. This method rarely works for the starnosed mole because it usually burrows too deeply.

2. Trapping—Eastern moles are easy to trap provided that the trap is placed on a tunnel that is actively being used every day and that problems with function of the trap are noted and resolved. Locate active tunnels of eastern moles by gently mashing a short section of every ridge that you can find with your foot and marking it in some way. Any ridge that has been pushed back up within 12 to 24 hours is over an active tunnel. Traps placed on these ridges should catch the mole every 24 to 48 hours until all using the tunnel beneath are caught. If a trap hasn't caught a mole in 3 days, it is in the wrong location, or it has caught all the moles using that particular tunnel and should be moved to a new location.

Of the three types of traps, the choker type seems to be the easiest for most people to use successfully on the eastern mole. In heavy clay soils, the frame of the harpoon trap will sometimes rise up out of the ground rather than impale the moles. If this happens, use pieces of wood or metal to stake the trap to the ground. With all types of traps, work the harpoons or jaws of the trap back and forth or up and down through the soil to ensure smooth penetration of the soil. If any trap is sprung prematurely so that the mole is not caught, remove a small piece of sod from under the trigger pan so as to delay the action of the trap. If moles burrow around a trap, then either the soil has been flattened too tightly, or part of the trap is projecting into the tunnel and alarming the mole.

To trap star-nosed moles, locate active tunnels of star-nosed moles by scattering the soil of each mound until it is flat. Mounds that are pushed back up in 24-48 hours are over active tunnels. To set the trap, it is necessary to dig a hole beneath one of the mounds of earth. The hole should extend to the bottom of the mole's tunnel, usually 4 to 6 inches below the surface of the ground. Refill the hole with enough earth to cover the top of the mole's tunnel with approximately 2 inches of earth. Set the harpoon type trap in the hole.

3. Reduction of the Mole's Food Supply—Moles feed on earthworms, insect larvae and other invertebrates. The use of insecticides to reduce insects and related invertebrates may eliminate enough of the mole's food supply, especially in sandy or light soils, so that they either starve or move elsewhere. In clay and organic soils, earthworms are usually abundant enough to make insecticide application ineffective.

4. Poison Baiting—Poison baits for moles that contain 2% zinc phosphide can be used to control moles. Place teaspoon quantities every 10-15 feet along mole travel tunnels. To place the bait in the tunnel, punch a hole in the tunnel roof with a ½-inch wood or metal rod. Pour the bait through the hole into the tunnel and then repair the hole with a piece of sod or wadded newspaper. Repeat treatment weekly until mole activity ceases. **Caution: Zinc Phosphide is TOXIC to birds and mammals. USE WITH CAUTION.**

5. Calcium Cyanide—Locate active tunnels and use a duster to blow calcium cyanide into the tunnels in both directions every 5-10 yards. Seal openings. Two to three pumps on the duster are sufficient. Note: Calcium cyanide may kill the roots of plants in the tunnels.

6. Aluminum Phosphide (Phostoxin)—Locate active tunnels and place a tablet into all tunnels every 5-15 yards during the afternoon and evening. Use as many tablets as necessary to obtain complete coverage of the entire mole system, not just the tunnels in one area, such as the yard. If the first treatment is not successful, repeat treatments eventually are. **Do not use within 15 feet of any building. Keep lid on container tightly fastened at all times.**

Experimental Materials

Several products are now being tested. Check with your County Extension Agent for current status.

—Turf Times, Northern Michigan Turf Managers Association

Cooperating with the Course Superintendent

There is no such thing as a typical day in the life of the golf course superintendent. Each day is unique. The weather is an ever-changing factor, and he or she must expect the unexpected. How do they react to a major leakage in the irrigation system? What about other equipment failures that are critical to the crew's ability to provide the ultimate in course maintenance?

Upon arrival around daybreak, the superintendent's first priority is to check the irrigation system. This includes the pump station, the wells, the water level in the ponds and making sure the computerized control system functioned properly during the night. This is done before the crew arrives. If something has gone wrong, the superintendent must react immediately. This takes priority over everything.

Following that, the superintendent gets his crew going according to the schedule posted the previous day. Projects such as fertilization and aeration are pre-planned. At this point the routine ends. He or she may have some glitches staring him or her in the face. There may be a problem with the pump station or some breaks in the irrigation lines. Prioritizing is one of the main talents a superintendent must possess.

By mid-morning, a superintendent tries to get out on the course and consult with his or her crew and supervise their projects. These include fertilizing greens, aerating fairways or the irrigation person may be performing major surgery on a water line. On a good day, superintendents will get the opportunity to monitor what everyone is doing. On a bad day, they might spend 12 hours in the pump house fixing a broken control valve.

At most golf courses, the crew is divided into sections. Six or seven new workers will hand-mow the greens, rake the bunkers and do all the trim work. Another group, with a couple years experience, will do the slightly more glamorous jobs involving tractors such as mowing the fairways and roughs, around the greens, tees and aerating the greens, tees and fairways. Four or five year-round employees with more experience will spend time on projects such as rebuilding tees, reshaping bunkers, replacing bridges over creeks and other projects.

They can be compared to pieces on a chessboard. Move them around according to their talents and skills in order to accomplish the projects and have the course in top shape. These projects are planned weeks in advance. Most courses do not have enough man-power to buff and polish the course as you see it before a major tournament.

Ninety percent of all golfers are very aware of what is going on and tolerant to such things as the aerating of the fairways or greens. But there is always that ten percent who want the golf course in perfect condition, but they never want to see a maintenance worker or hear his machinery.

Nothing affects the morale of the superintendent's crew more than when golfers complain to them while they are working. The superintendent and his crew are aware of the inconvenience their machinery may cause, and they know most golfers are playing for more than wooden nickels.

These jobs must be done or the golf course will deteriorate. Rather than complain, golfers should be delighted. The superintendents need cooperation and tolerance from all golfers.

It's obvious that golfers are expected to repair ball marks, replace divots, follow cart signs, stay behind directional ropes and display normal golf etiquette. When these laws of golf are abused, it makes the superintendent's job a lot tougher.

A real challenge for many superintendents is preparing the course for the greatest percentage of golfers. Some want the course to resemble a cemetery—green and lush. They don't care how wet the course plays, just as long as they're looking at emerald green fairways. Then there are the hardcore golfers who prefer the course to be firm and fast. That's the toughest challenge for the superintendent. He's got to compromise.

Another problem is planning how much water is necessary for the next 12-24 hours. The superintendent can never predict what the weather will do the next day. He knows how much moisture he's lost on a given day by 7 p.m. when he sets the water programs for that night. But what's it going to do the next day? Will the wind quit blowing? Will it be overcast? Will the wind start up again and dry the course out much quicker? Most golfers want the course to play the same every day. What they don't understand are the many variables that effect how the course will play.

So let's be more patient and tolerant towards the superintendent and his crew.

Credit: Golf Traveler