APRIL 1982

A PATCH of GREEN

Official Publication of the
Michigan & Border Cities Golf Course Superintendents Association

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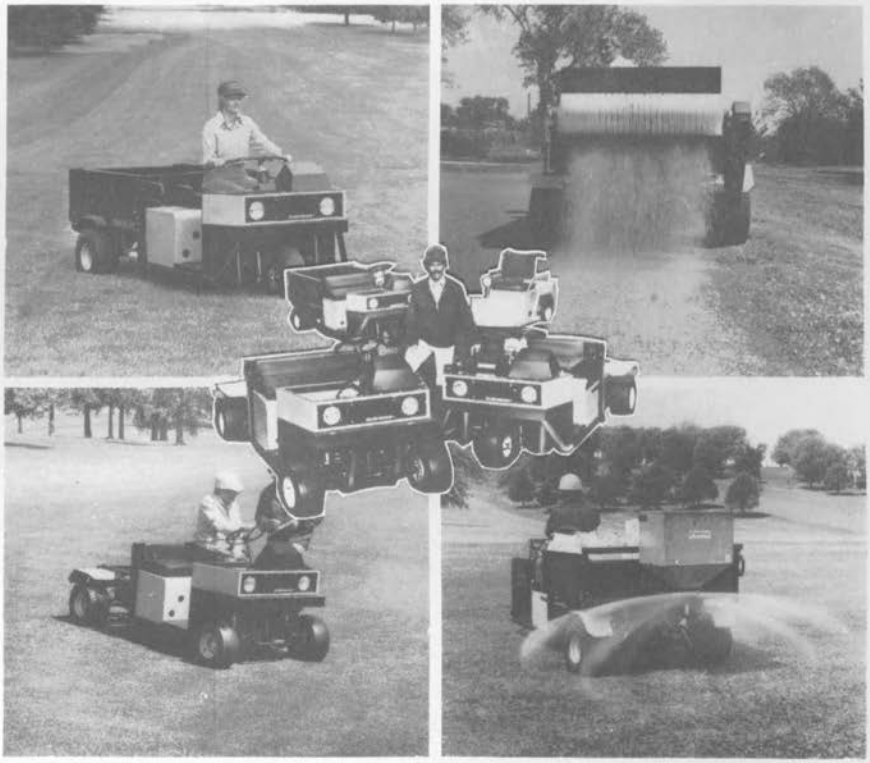

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This Month's Advertisers...

Your Office - A Reflection of Your Abilities

When your green chairman drops by your office for an unexpected chat, what does he see? Is your desk piled to eyebrow level with papers, broken parts and unsorted clutter? Do you have to search for 15 minutes to find the magazine article you need to show him? Does the dust on your filing cabinet excite his allergies?

Like it or not, the condition and appearance of your office reflect on your abilities as a manager. Granted, no one ever claimed that a golf course could be completely managed from behind a desk, and most superintendents' offices are not exactly accessible to the general public.

It's also true that many superintendents' offices, particularly at older clubs, are carved from buildings that originally housed everything from polo ponies to plows, and almost all are in the maintenance facility, which has a near-magical attraction for dust, dirt and grease.

However, the degree of order in your office and, by extension, your entire facility, reflects the degree of organization you bring to your work. You can say it's all right because you know where everything is, but what if you're not there? Does everything stop while someone tracks you down?

Even if you're limited on space and your office is at the bottom of the budgetary priorities list, there are some things you can do to bring order from chaos. Here are some suggestions.

A place for everything and everything in its place. This time-worn adage still has merit. Filing cabinets, baskets and blueprint organizers are excellent investments.

Develop a system. There is no best way to develop a filing system. The only important criterion is whether it works in your operation. It does, however, have to be based on some sort of logic.

Develop good organizational habits. Work at putting things away when you have finished with them. Develop a system for moving things from the top of your desk into some sort of permanent home and stick to it.

Try to work out some sort of schedule. It's right and proper that cleaning up your office should take a back seat to dealing with on-course emergencies and important maintenance procedures. That's your job. But take a moment at the end of the day or even at the end of the week to police your office area.

It's not only the impression your office leaves on others, it also matters how it makes you feel. Besides setting a good example for your employees, a clean, well-organized office can make you feel that you're in control and on top of things. And that's where you're supposed to be.

IDEAS ABOUT ROOTS

Dr. W. H. Daniel, Purdue University

Introduction
1. What is a root?
2. Where are the roots?
3. Roots are plant membranes
4. What is water-air balance for roots?
5. Roots are strong
6. How would you insult roots?
7. What could you do to favor roots?
Conclusion

Roots Turfwise

Our historical roots, as a family and individuals, have recently received special attention. However, the roots of concern in turf are those little white stringy things that supposedly are below the grass you see on the surface.

First, what is a root? Roots are initiated at the nodes occurring along stems. These may be concentrated in a crown or spread along a stolon. Portions of mature roots are mainly conductive tissue plus providing some storage of nutrients, especially starches.

The working part of any root is the soft, absorptive root tip and the root hairs near it. This is where the payload of water and elements are absorbed for transfer to the crown, stems and leaves known as the turf cover. And, woe is the plant which had **lost** its root tips! So, a living root is that plant tissue joined to the node and extending to and including a root cap. Although some branching is normal, when individual root tips die, the older root parts seldom initiate new root tips. Physiologically, the plant's response is to initiate a new root at the node and just start again (provided extra energy is available and time is allowed). In other words, the energy path is to start a new root, which ahs least transfer distance for nutrients. So, keeping root tips alive and active is the first challenge of turf managers.

Bud Esterline at Muncie one time said, "Bill, on Monday I cut the cups and could see roots about five inches deep. It was dry, so Monday evening we made a big effort to water the greens real good. Tuesday morning early it rained and it was so cloudy and wet that we couldn't mow Tuesday. Although still raining, we finally mowed a little Wednesday afternoon, and the rain just set in there. Brown patches began to show. We finally got our greens mowed on Friday, and on Saturday the weather cleared up, and all I had for roots were a few black strings! I lost my complete root system between Monday night and Saturday morning." Now what? Bud knew he had to lightly water those greens, to watch for wet wilt, to keep the leaves moist enough so they wouldn't wilt until new roots would generate. If he could get by for about seven days, he'd have some new roots

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CAUSES OF LATE WINTER-EARLY SPRING DAMAGE TO TURFGRASS

During late winter-early spring fluctuating temperatures and waterlogged, partially frozen soil produce conditions that cause the loss of turf. This loss may be the direct or indirect result of one or more of these phenomena. Direct damage or kill of the permanent grass may occur at any point of the freeze – frozen – thaw cycle so characteristic of this season. Indirect injury may result from attacks by disease producing organisms (mostly snow-mold and other low temperature fungi) and by traffic on frozen and partially frozen turfgrass areas.

Turfgrass may be destroyed – **at the time it freezes, during the time it's frozen, during the time it's thawing, or after it's thawed** and growth has begun. Some killing probably occurs during each of these periods. This cycle of freezing, frozen, thawing may be repeated several times during each winter and early spring. When associated with the intermittent growth in late winter-early spring, damage may be severe. Death as the plant freezes happens most often in the late fall-early winter, but may occur after a period of growth (particularly rapid growth) in the spring when a sudden drop in temperature occurs. This is most damaging when the grass plants are in a no-hardened condition. Ice crystals from **within** the cells and this disruption of the protoplasm may cause death. Too, repeated cycles in the spring will **exhaust food reserves upon which the plants must draw** to initiate growth. For this reason, Poa annua is especially vulnerable.

Death during the time the plant is frozen is unlikely to occur unless it is subjected to traffic. This will seldom occur if a good snow cover exists, which is the case most often during the winter months. However, play during the time

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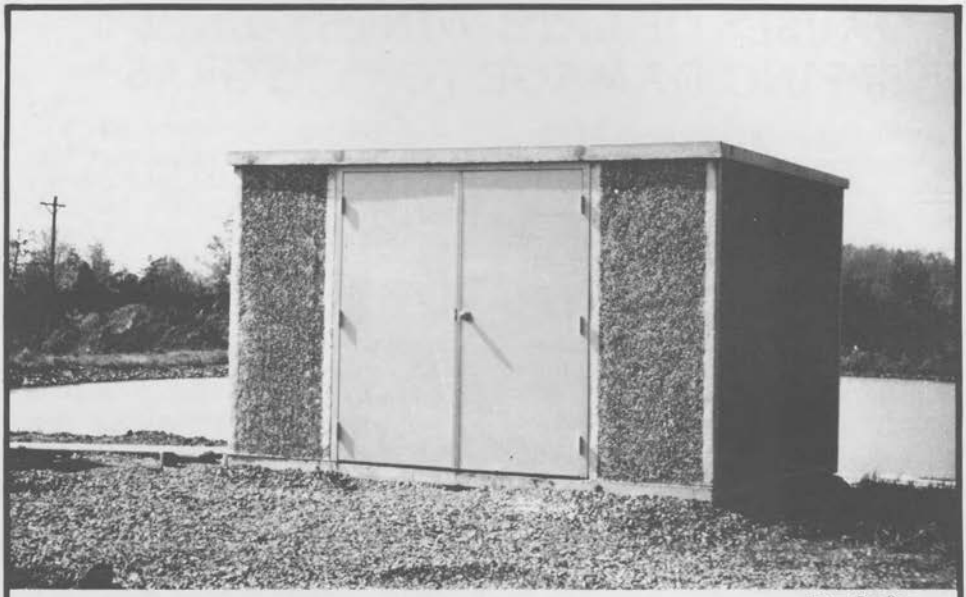

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The diagram on this page illustrates the position of these Roman numeral settings. Marking these numerals on your Lely can save a lot of time and effort and prevent a lot of application errors. They can be paitned on, scratched in the paint, labeled with a magic marker or labeling machine. Once the Roman numerals are clearly marked, you can be confident your products are being applied accurately.

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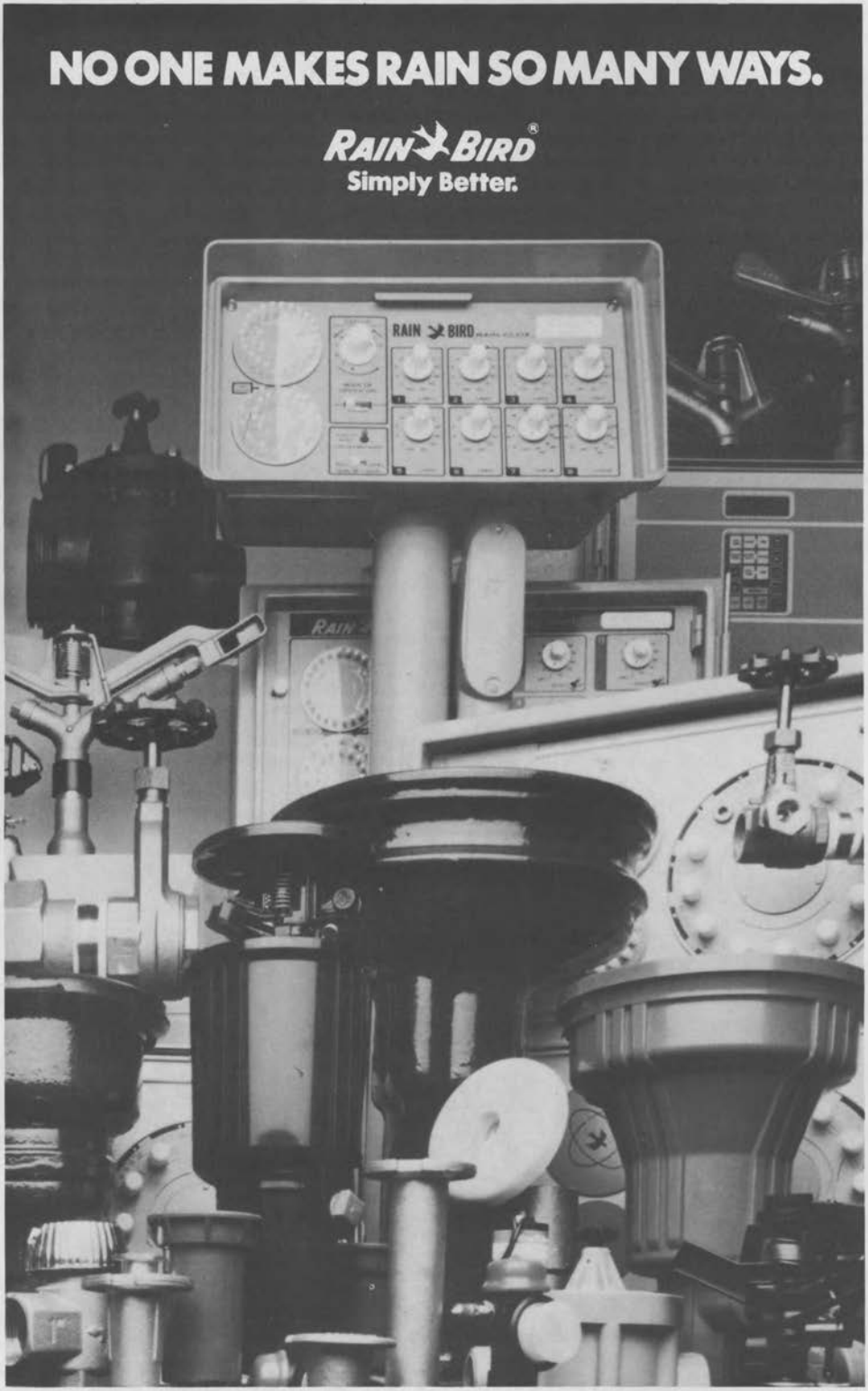
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sidered quite long. When trenches are made across roughs or tall grass areas, the long root extension in the soil profile is usually impressive.

Roots are plant membranes. "Here, you root; do this! Absorb (take in) 5000 pounds of water plus one pound of elements the plant must have. By the way, **keep out the excessive and avoid the unneeded.** Meanwhile, let's hope nematodes make no holes and rhizoctonia doesn't infect. And, while you're constantly expanding, we'll try to keep the leaves healthy, the mower sharp, the wear distributed, the drough averted, and we'll try to avoid scalping or other turf stress." After all, the top must send energy clear down to the root tip. When energy is short, the number of root hairs diminishes, the diameter reduces and the root initiation slows.

Roots are powerful absorbers. Before the plant wilts, roots will take water from soils down to 13.6 atmospheres, a pF of 4.5 or tension equivalent of 14 meters of water. The wise turf manager has every reason to utilize the reservoir of moisture within a root zone between irrigations. In other words, it is foolish to ignore the root zone moisture storage potential when managing fine turf.

What is water-air balance for roots? Incidentally, that root tip must have some oxygen as it works. Waterlogged soils are hard on roots. Being waterlogged for more than 24 hours growing, and later some good roots working again, and back to normal. Five days of wet weather cost Bud his root system, and then it took him 10 days to get partial replacement.

Where are the roots? Would you believe 90% of root length is in the upper two inches or five cm. In West Germany, my friend, Dr. Boecker, reported extensive testing.

Roots

Inches	cm	%	
0-2	0-5	90	Boeker found 81 to 91% for fescue
4	-10	5	86 to 94% for bluegrass
6	-15	3	85 to 94% for bentgrass
	below		Root distribution in June and December were near equal.

Don't fret over this distribution; just relize that it is the active root tips doing the work.

Ideally, a diffuse extension root system is desired, but for every use, management, root zone and irrigation, what is normal, adequate and necessary will vary. As turf managers, you want all the roots possible or practical.

Roots have been found over 100 inches long under Bermuda in California tests. However, roots of three feet for fescue and zoysia, two feetj for bluegrass and bentgrass would be con-

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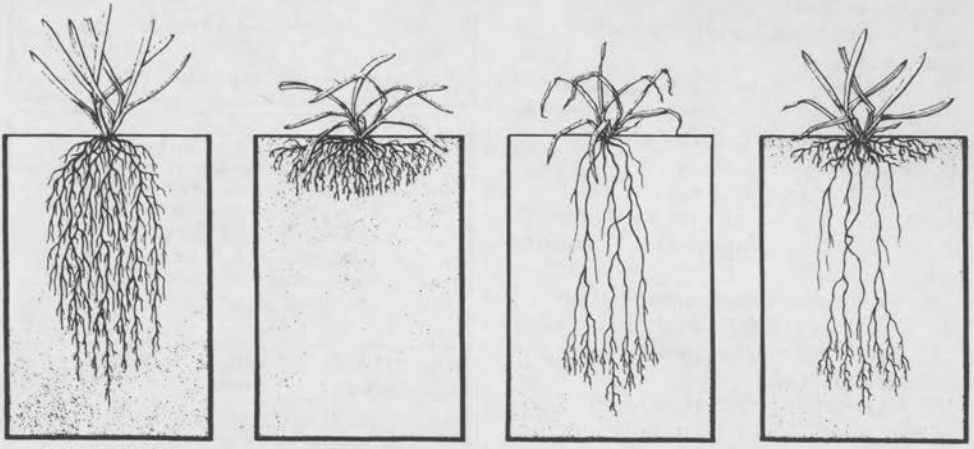

IDEAL SITUATION | SATURATION | LACK OF MOISTURE | LIGHT WATERING

under stress weather is a cause for concern. Most turf managers have seen roots growing over the surface of the ground in an attempt to be where there is aid. Roots may be deep or shallow just in response to air supply. We've seen roots grow in water when air is needed, but remember, oxygen travels through water 1000 times faster than through wet compacted soils.

Roots are strong! When roots are numerous, their combined strength is in athletic fields, tees and traffic areas. New roots in new soils always look good. A measure of success is to have sufficient roots to hold the soil mass for their entire depth of penetration when held by the surface sod.

Research on rooting of sods has been conducted to determine resistance to an upward pull after one month of growth.

How would you insult roots?

1. Reduce the air at root tips
2. Increase the water to excess
3. Compact the soil; use equipment and carts
4. Smear, seal the surface
5. Raise the temperature
6. Overcrowd the plants
7. Lose leaves to disease; lose energy
8. Reduce leaf surface
9. Shade by trees, buildings, other plants
10. Overfertilize and stress plants

What would you do to favor roots?

1. Increase oxygen in root zone
2. Avoid any overwatering or continued wetness
3. Vertically core, spike, slit open root zone surface
4. Topdress to raise cutting height
5. Topdress to minimize surface compaction and effect of thatch
6. Increase leaf surface
7. Avoid or spread wear
8. Avoid disease or turf weakening
9. Lower the temperature – cooling when possible
10. Reduce shade or competition
11. Fertilize – low to medium nitrogen
12. Provide ample potassium and minor elements

Turf managers and their crew can't make a root! You can help; let the plants make them. You can kill the root or slow it down.

Dealing With Doubts

It was a difficult decision, but you carefully weighed all the factors and did your best to make the right choice. The decision has been made, and there is nothing more you can do. So why is it keeping you awake nights?

It's a normal reaction. Psychologists say that everyone has doubts once in awhile, particularly when they begin to think about the good features of the choice they turned down. When that happens, we go back over the reasoning by which we reached our decision.

This justification process can involve some very intricate calculations. Some people can resolve the matter right there by deciding that it just isn't worth the trouble to figure it out. Another factor that can ease your mind is how easily you can reverse your decision. If it's simple, ther's no point in being uneasy. If it can't be done once the decision is made, why worry about it?

The only way to finally resolve such doubts is to accept the fact that you can never be right all the time. When you can relax and accept the fact that everyone makes mistakes, it's easier to put the matter aside and move on to a new problem.

Dear Ted,

On behalf of the membership of the Michigan and Border Cities Golf Course Superintendents Association and myself, I would like to extend our congratulations on receiving the GCSAA Award for Outstanding Chapter Newsletters. This award reminds us all of the untiring and thankless work you have put in to this publication over the past many years. We members of MBCGCSA are proud to belong to a local with such a quality publication available to us as members.

I would like to further congratulate you as a recipient of the twenty-five year pin at the national meeting this past week in New Orleans. Our local was well represented at this ceremony. We all are proud of the continuing concern by members like you to build a strong local organization and a national one which we newer members have reaped many benefits from and have relied on so heavily. Thank you,

Bruce J. Wolfrom

period under discussion may cause mechanical damage either by attrition or from pressure which forces the ice crystals through the cells, thereby puncturing them and causing death. Play during time the grass is covered with frost has the same effect.

Death at the time of thawing depends on the amount and the state of the "bound" water within the cell (intracellular water). Unless adequate bound water is present in the protoplasm, death may result if thawing is rapid or if inter-cellular water re-enters the cell too rapidly. In the latter case, the cell wall is permeable but the protoplasm is unable to absorb the water. Prolonged cold may be conducive to death because it contributes to brittleness of the protoplasm and, if contact (from traffic) is made, the plant is highly susceptible to damage.

Causes Relating to Traffic

Grass will initiate growth during the warmer periods of late winter-early spring. If the season is characterized by widely fluctuating temperatures, the grass is vulnerable to the freeze-frozen-thaw growth cycle with its attendent problems. Too, the environment produced is highly conducive to disease development. Thus, this may be the most critical phase of the turf management program facing the golf course superintendent. And, he often finds his turf management programs (and, therefore, himself) in direct conflict with the golfing membership, especially those desirous of playing a few early rounds.

Mechanical injury by traffic on partially frozen or wet soil may be immediately evident (visible) or delayed (invisible). Visible injuries (soil displacement) are the footprints and ruts caused by foot and vehicular traffic – sliding and slipping, walking or rolling – on partially frozen or saturated soil. Invisible injury stems from soil compaction.

Although this type of mechanical damage is not confined to the winter months, soil compaction may be far more damaging during this period than generally recognized. Traffic on partially frozen or wet soil, without the

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protection of living grass, will exert greater pressure (hence, more compacting force) than during the normal growing season. This results, subsequently, in poor growth and may explain "problem areas" which show up in spring and summer for no apparent reason. Cupping areas are particularly vulnerable in this respect.

Traffic on frosted turf causes the frost crystals to puncture leaf cells and kill the grass. Removal of frost, or preventing play when the grass is frosted, is essential.

Control of traffic during vulnerable periods does not always contribute to harmony between early golfing and harmony between early golfing members and the less enthusiastic golfing and non-golfing members. The responsibility for control rests with the club officials – president, green chairman, superintendent and golf professionals.

Causes Relating to Ice Sheets and Ponded Water

Turfgrasses, although essentially dormant during the winter months, nevertheless, carry on metabolic (growth) activity, particularly respiration. During late winter-early spring, as growth activity increases, the grass may **suffocate (a) if diffusion of atmospheric and soil gases is reduced or stopped; (b) if excess carbon dioxide accumulates, or (c) if oxygen supplies are reduced to a minimum. Such conditions exist under ice sheets in poorly drained areas where the soil remains saturated for extended periods and, under flooded conditions when ponded or standing water persists. The higher the temperature, the shorter the period of time the grass can survive adverse conditions.**

Under limited (and rare) conditions, ice sheets and ponded water may act as a lens. When this happens, the sun's rays are magnified to the point the excessive heat produced may cause a burning or scalding of the turfgrass.

Causes Related to Reduced Winter Water Intake

Desiccation is a "wilting" pheno-

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menon. Like wilt, which occurs during the normal growing season, desiccation occurs when evapotranspiration exceeds water intake. This inability of the roots to absorb water, or for the plant to transdpot it to or through its system, may result from a shallow, poorly branched root system, diseased vascular system, or, from a reduced or restricted soil water supply. Limited soil moisture may be the result of a "dry" soil (not enough water) or of a frozen or partially frozen soil (water unavailable to the root because of its physical state). Thus, the roots simply cannot take in enough water to offset that being lost by the plant and it "Desiccates" or cries up - it wilts. Although more serious during periods when the soil is "on the dry side" or partially frozen, desiccation on high windswept sites may occur at any time. The increased air movement causes excessive transpiration and under limited or reduced soil moisture conditions, the plants may die unless protected.

In late winter-early spring, before the irrigation system has been activated, damage from desiccation may be severe. Water hauled in spray tanks or by other means and applied to critical sites will preclude or minimize loss.

Protective Measures

Techniques and procedures that protect, avoid and correct the damage that occurs in late winter-early spring are well known to and understood by the golf course superintendent. For the most part, protective measures relate to production of a healthy vigorous grass and to the control, to the extent possible, of the soil-plant environment. When these factors are adversely impacted by anomalous conditions of weather, poor construction or inadequate equipment and supplies, the responsibility for loss of turfgrass must be shared.

J.R. Watson, Vice President
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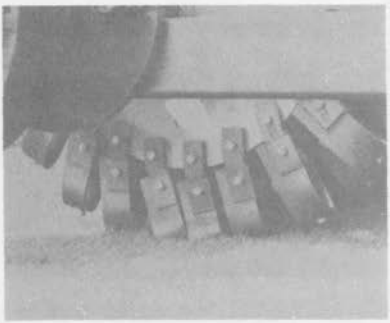

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