

Poa Annua And Phosphorus

(Continued from Page 8)

In the fourth study previously cited, whether or not P application truly enhanced PA in the bentgrass is difficult to judge. No statistically significant difference levels were reported. Hence, which treatment effects can reasonably be expected to be reproducible rather than the result of random events cannot be ascertained. Perhaps of even greater interest in this study is the fact that application of .1 lb S per season led to an average increase of 92% in the area infested by PA, while P application increased the PA-invaded area by only 20%.¹

The fifth study actually involved variable rates of K as well as P. Increasing K rates had as great an influence on PA populations as did P. If one takes the time to read the discussion section of this report, it becomes evident that the authors recognized factors such as dollar spot infection as being a contributing factor in PA invasion of the bentgrass.

The sixth reference suggests major increases in PA populations over one year (63 to 77% PA the first year and 75 to 83% PA the second). Three interesting features of this study are: (1) the original PA population was estimated at 95%; (2) N scheduling had as great an impact on PA populations as did P application; and (3) when averaged across the different N schedules, P applications did not significantly influence PA populations recorded at the end of the study.

References 6 and 7 provide bentgrass tissue analyses that

have been interpreted as evidence that PA has a high P requirement. In one such study, at fertilizer P rates where Kentucky bluegrass and bentgrass were still showing growth responses to the fertilizer P, leaf P contents ranged from 0.40% to 0.53%. Thus, the optimum tissue P concentrations for these two grasses appear to be as high or higher than the 0.52% optimum tissue P level reported for PA. If one studies existing literature carefully, it is not difficult to find reports of bentgrass tissue P levels ranging as high as 0.8% in plots where recommended P fertilization practices have been employed.

So what do these research data really tell us regarding the influences of soil or fertilizer P on PA encroachment into turf? My conclusion is that the effects of P have been badly overstated. The influences of P cannot be readily isolated from factors such as soil pH, N scheduling, and applications of other nutrients such as K and S. What appears to be of primary importance is the total fertilization package employed, not whether or not P application is a part of the that package.

This brings us to some recent observations on this subject. A study reported in 1986 suggests that:

1. Germination of PA in perennial rye-grass turf is determined by the numbers and sizes of invasion gaps that exist in the turf. This makes sense in that PA seed germination requires an abundance of light.

2. Survival of PA seedlings once germination has taken place is determined by their success in competing for nutrients in the root zone. Application of N overcomes the root zone competition while P and K applications have little or no effect.

A second recent study entailed meticulous recording of PA populations in a bentgrass fairway. The data presented support the authors' conclusion that "P did not exercise the dominant role that N does in determining species composition in a bentgrass-annual bluegrass community." Thus, these two recent studies compliment one another and relegate to P a secondary influence on PA invasion of turf.

Finally, I am now in the process of finalizing my report on a three-year study of N source effects on PA invasion of creeping bentgrass turf. In plots where soil test P ranged from 65 to 225 lb/acre, the soil P levels bore no relationship to PA populations in the turf. Rather, under the conditions of the study, indications were that PA invasion and spread were controlled by the combined effects of earthworm activity and the verdure of the bentgrass. Large numbers of earthworm casts and low verdure apparently created the invasion gaps required for PA encroachment in the bentgrass.

In summary, I firmly believe that the time has come to lay to rest the idea that ample supplies of P from soil or fertilizer inevitably result in higher PA populations in turf. A corollary statement is that starving turf for P is not an effective PA control measure. Rather, anything that creates invasion gaps in turf favors invasion by PA. A radical statement? Hardly. Let me end with a quote from a pioneering and classical 1937 report on PA and its growth requirements:

"The abundance of this pest in golf greens is apparently due largely to the loss of vigor or actual death of the permanent grass in critical periods, which furnishes opportunity for new plants of (annual) bluegrass to invade or completely occupy the injured area."

(This article was reprinted with the permission of The Grass Roots, an official publication of the Wisconsin Golf Course Superintendents Association.)

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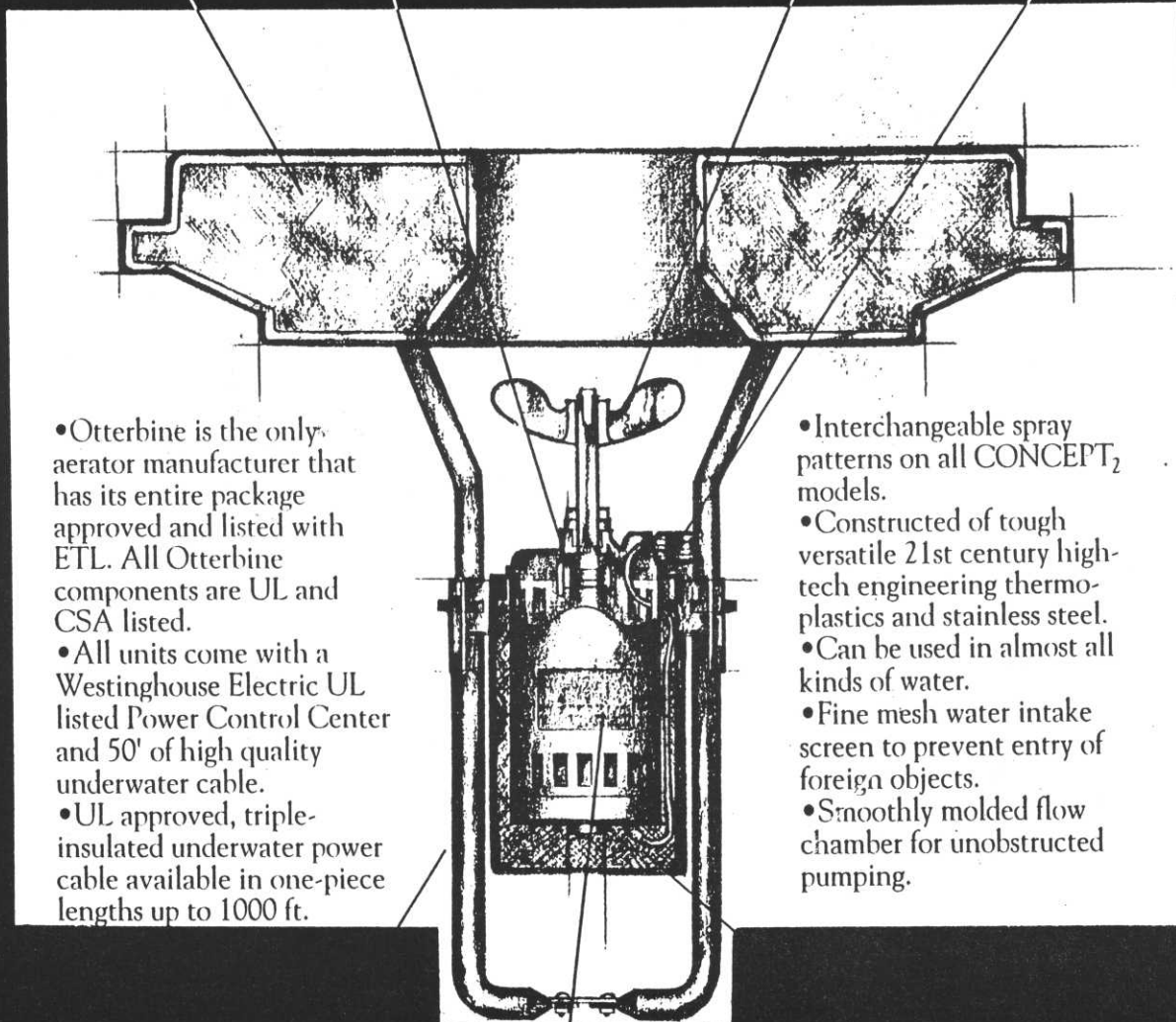
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Are You Certain Your Workers Understand Their Orders?

In the charge of the Light Brigade, in the Crimean War, six hundred British troops went into the valley of death against overwhelming Russian forces because of a misunderstanding of orders by their superior officers.

If well-trained, highly disciplined officers could misunderstand their orders, there is reason to suppose that almost anybody could misinterpret orders in an everyday golf course operation.

If an employee misunderstands his instructions, is it his fault? Probably not.

First, the superintendent may have incorrectly evaluated the employee's ability to comprehend a certain level of instructions.

Second, the instructions could have more than one interpretation-or a misleading single interpretation. Instructions or orders have to be given with due consideration of the experience and the level of comprehension of the employee who is on the receiving end.

Of course, excessively detailed instructions are time-consuming, but a presumption that can be frequently made is that *"if an instruction can be misinterpreted, it will be."*

That premise too often can be true, whether the employee is careless or conscientious in complying with his superintendent's orders. Therefore, before issuing an instruction, consider if there are any possibilities for alternative reactions on the part of subordinates.

In order to maintain optimum levels of productivity it is paramount to avoid confusion and offer good instructions.

Guidelines for Instructions To Employees

1. Who is to perform.
2. What is to be done.
3. When is it to be done.
4. What are the exceptions.
5. What is to be done with the exceptions.
6. What are the alternative methods.
7. When are alternative methods to be used.
8. Who has additional know-how.
9. Where are written instructions.
10. When should advice be sought.
11. What tools are available.
12. Which equipment is to be used.
13. Which examples should be followed.
14. What follow-through is required.
15. What checking should be done.
16. How are errors to be handled.
17. When is the task considered to be complete.
18. What is to be done after the task is over.

—Thru The Green,
Golf Course Superintendents' Association
of Northern California

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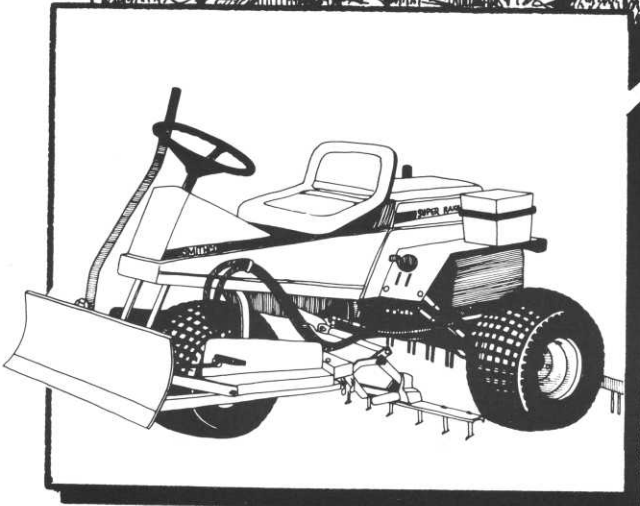
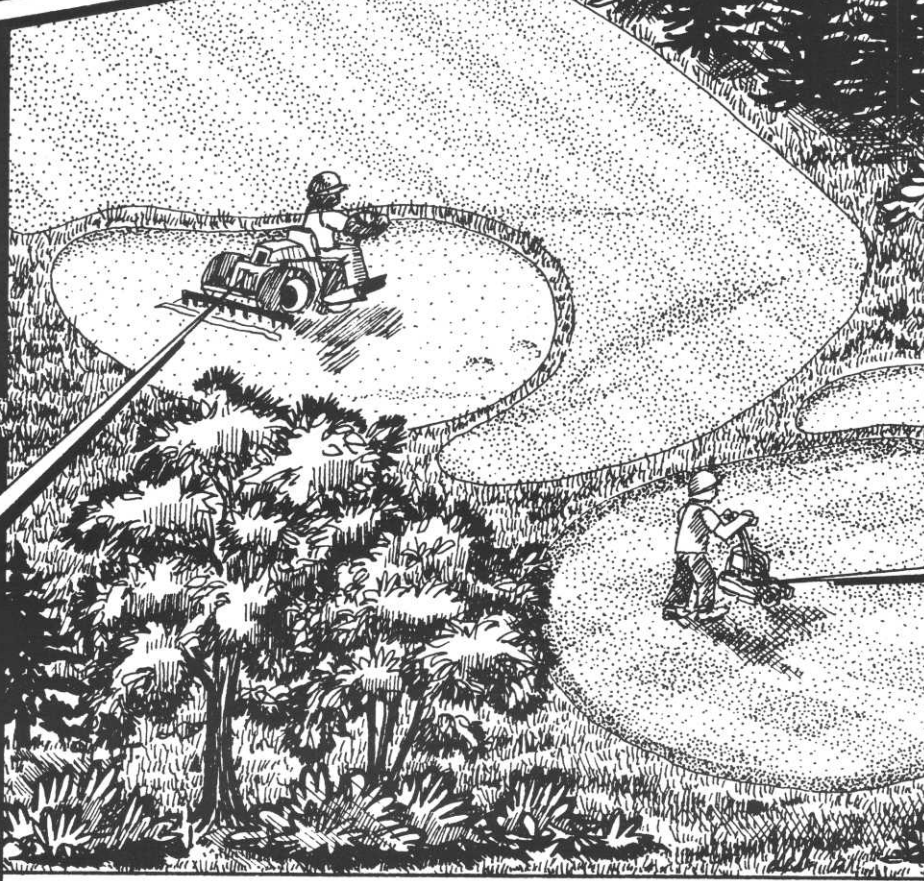
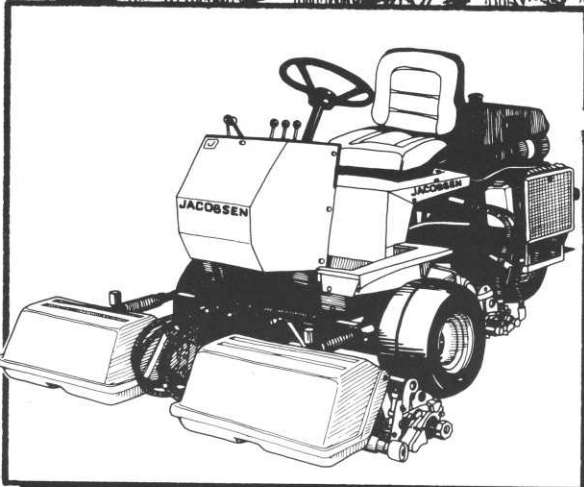
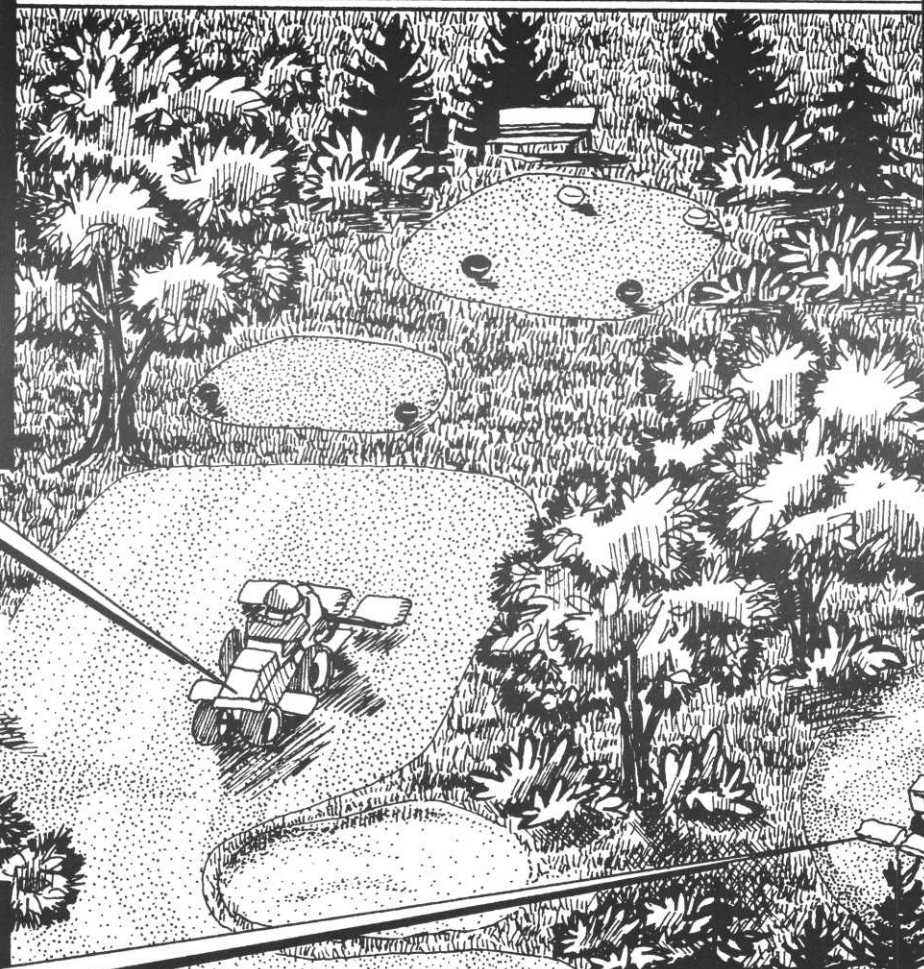
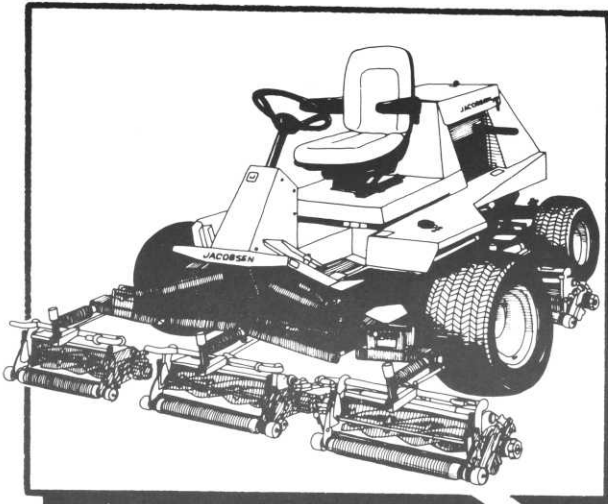
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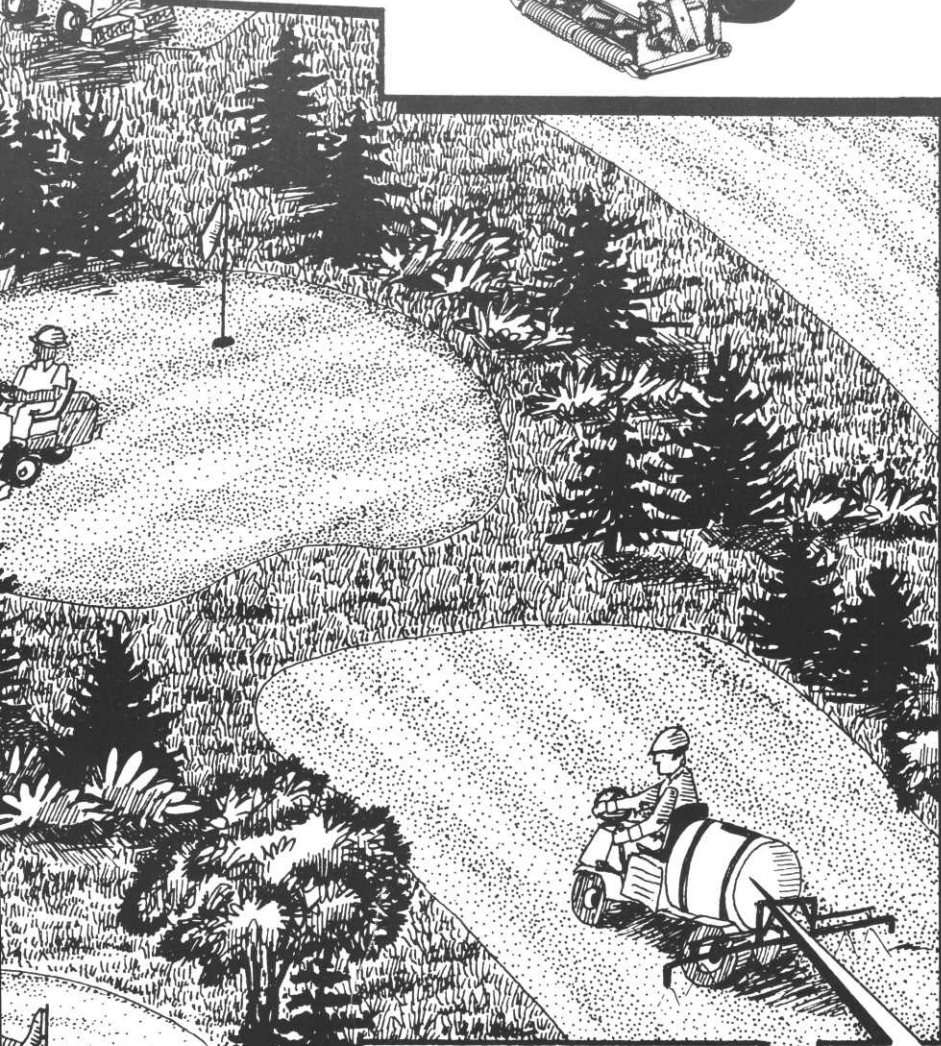
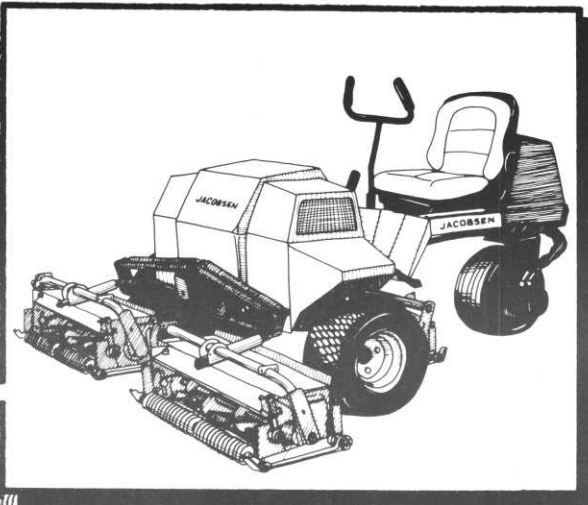
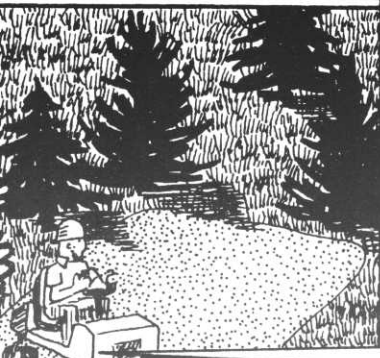
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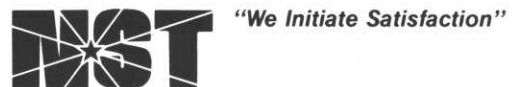




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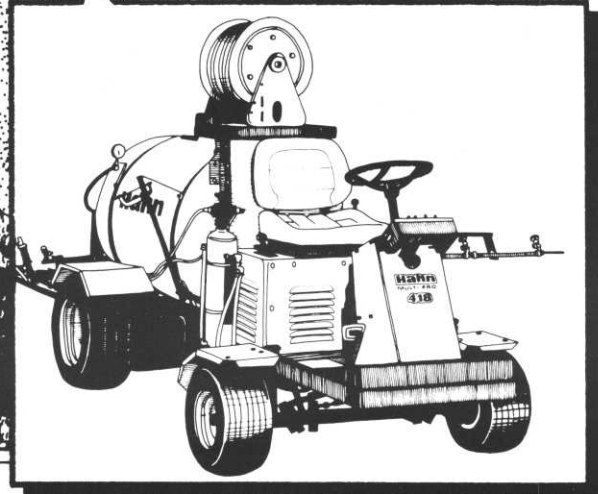
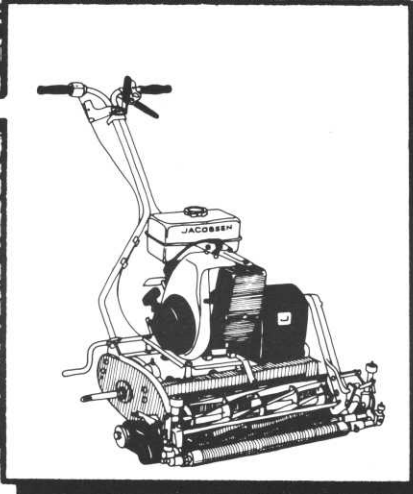


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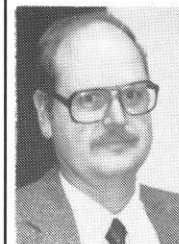


Caution: Drought Effects Can Be Confused with Oak Wilt

* * * *

Symptoms Provide Clues for Field Diagnosis*

By Bob Mugaas, Minnesota Extension Service



Even though 1990 rainfall amounts were more normal in much of the state, the effects of three drought years were still very visible. Oak trees have been hit especially hard. A bark boring insect that attacks weakened oak trees, the two-lined chestnut borer, is aggravating the problem. Many people are confusing drought mortality with oak wilt, and sometimes it can be extremely hard to tell what caused the tree to die. By recognizing the differences in the symptoms of oak wilt and drought mortality, correct diagnosis can be made.

The symptoms of drought mortality on oaks generally appear during the last half of the summer, while oak wilt symptoms are more prevalent during the first half. Both problems will cause the tree to die from the top down. If the leaves are turning brown uniformly, staying pretty much the same size as healthy leaves, and staying on the tree, suspect drought damage. If the leaves are wilting (affected crown looks thinner than the rest of the tree), turning color at the edges and tips of the leaves before the base and midrib, and falling soon after discoloration, suspect oak wilt.

Trees dying of drought often will be more random throughout a stand, although trees on south-facing slopes, in areas of recent construction, or on the edges of new openings will be more susceptible. Normally this problem will take months or years to kill a tree. During 1990, trees were dying in as little as a couple of weeks. Sprouts along the trunks of these trees are common, as are sump sprouts after the trees are removed. If other species of trees in the area are also dying, this too points to an environmental problem like drought.

Oak wilt spreads primarily through grafted root systems forming an infection center that expands as the fungus moves from diseased trees to adjacent healthy trees. In other words, trees dying of oak wilt will typically be found in groups. Red

oaks are very susceptible to oak wilt, and once symptoms appear they die within a couple of weeks, even days. White oaks are very resistant to oak wilt, and if they become infected, they can take much longer to die. If many oaks start dying in a stand all at once, this is probably oak wilt; this disease does not spread that quickly. Stump sprouts usually do not form after an oak wilt-infected tree has been removed, and if they do, the sprouts die very quickly.

If symptoms become hard to distinguish, lab sampling may be necessary. Remember that a sample from a branch showing current wilt symptoms is necessary. The twig or branch sample should be 6 - 10" long and at least one half inch in diameter. Keep the sample cool after it is cut until you mail or bring it in. If you mail it, put it in a paper envelope (don't add water) and mail it early in the week (Monday or Tuesday). Lab analysis takes 2 to 3 weeks. Send samples to the Shade Tree Lab, Minnesota Department of Agriculture, 90 West Plato Blvd., St. Paul, MN 55107-2094.

The first wave of drought mortality on oaks in 1990 occurred in the first half of July. Trees extremely low on energy (starch) reserves entering the year used it up putting out the spring flush of leaves. They simply ran out of gas. These trees leafed out and died back very quickly.

The second wave of drought mortality on oaks in 1990 started in mid-August. This was expected and the timing has to do with the life cycle of the two-lined chestnut borer. The adult borers emerge from infested trees in June, and after feeding for a few days, seek out weakened oaks to lay their eggs. The eggs hatch every couple of weeks later and land larvae burrow through the bark to begin feeding in the cambium (where the water-conducting system of the tree is located). They continue feeding throughout the summer, and by the

middle of August the water-conducting system is disrupted to the point that the crown of the tree starts drying out. Although the borer hastened the death of the tree, drought was the primary cause. The two-lined chestnut borers will only attack weakened or stressed trees.

If oak wilt is diagnosed, control may be necessary to save other nearby oaks. Brochures on oak wilt and its control are available by calling the Minnesota Department of Agriculture office at (612) 296-3349, or contact your local Extension office. If drought/two-lined chestnut borer is the problem, watering is critical. If the tree(s) are more than 50% brown, survival is unlikely. Instead, concentrate on the healthy trees. Apply mulch around the base of the tree out to about 5' away (chipping the tops of removed trees is an excellent source of mulch material). This will help retain moisture for the tree and will keep roots cooler. Water trees during periods of dry weather. Do this by laying a hose under the tree and letting it run for a couple of hours. Move the hose around from time to time. (NOTE: Larger scale irrigation methods may be more practical for golf course situations. However, the principles remain the same). The object is to get the soil moist 6-10" down. Fertilizing to promote root growth can be done in the fall or spring while the trees are dormant. Nitrogen should not be applied as it promotes crown growth and can throw the tree into a more unbalanced and stressed condition. Nothing special needs to be done with the wood from the trees that are cut down. Destroying or covering it will not significantly reduce the two-lined chestnut borer population as this insect is common throughout oak forests. It is much more important to maintain oak trees in a healthy condition so this borer cannot successfully attack it.

*Adapted from an article published in the OVERSTORY Newsletter by Dave Stephenson, Minnesota Department of Agriculture.

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EPA and GCSAA Team Up On Lawn Care Education

The nation's environmental authorities have joined forces with America's turfgrass experts to educate homeowners about ecologically responsible lawn care practices.

The U.S. Environmental Protection Agency (EPA) and the Golf Course Superintendents Association of America (GCSAA) are co-sponsoring a new campaign that features television public service announcements on the proper use of lawn care chemicals.

The 30- and 10-second commercials, entitled *Think Before You Apply*, ask homeowners to "read the directions and use only the amount needed to do the job," when applying lawn care chemicals. Both spots list a toll-free number (1-800-858-7378) that viewers may call to receive more information on proper usage of and possible alternatives to lawn chemicals.

The commercials were released in the top 40 U.S. television markets. Leading national cable television networks also received the spots.

Lewis S.W. Crampton, EPA association administrator for communications and public affairs, said "We hope these commercials will create more awareness of the need to use lawn care chemicals judiciously."

Stephen G. Cadenelli, CGCS, GCSAA president, added, "GCSAA is pleased to be part of this unique public education program. It is our pleasure to offer expertise to help America's homeowners maintain great home lawns in an environmentally responsible manner."

For more information on the *Think Before You Apply* campaign, contact the GCSAA communications department, 913/832-4470.

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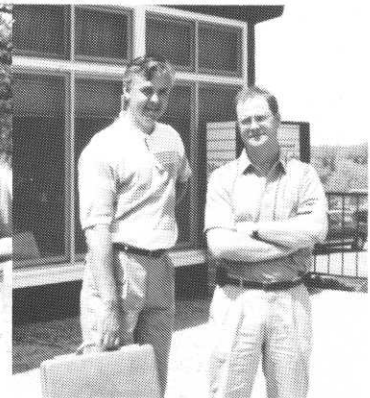
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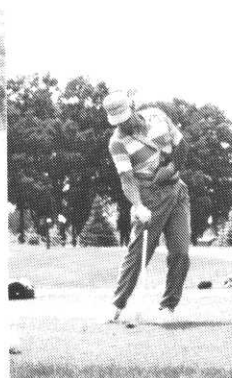
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GCSAA Vice-President Roberts Testifies At Senate Hearing

"Golf and the golf course superintendent have a very real interest in reducing pesticide use," said William R. Roberts, CGCS, in testimony before a recent Senate subcommittee hearing on toxic substances and environmental oversight.

Roberts, vice president of the Golf Course Superintendents Association of America (GCSAA), testified on behalf of the association.

Superintendent at the Lochmoor Club, Grosse Pointe Woods, Mich., Roberts was invited by the subcommittee to represent the 10,800 members of GCSAA. Subcommittee chairman Sen. Harry Reid (D-Nev.) invited Roberts and GCSAA to appear because of the association's recognized leadership in the fields of turfgrass management and professional education. Roberts also testified at last year's subcommittee hearing at Sen. Reid's invitation.

In his testimony Roberts highlighted GCSAA's ongoing education programs and the association's stance on posting and pre-notification of pesticide applications. He also reconfirmed GCSAA's "diligence in asking the hard questions and finding the right answers which will lead to a minimization of overall pesticide inputs to our environment."

Roberts' testimony touched on GCSAA's willingness to work within the regulatory process. The subcommittee was briefed on the public education/public service announcement which GCSAA produced in conjunction with the EPA. The PSA, entitled "*Think Before You Apply*", educates homeowners about environmentally responsible lawn care practices. A copy of the television PSA was entered into the official hearing record.

The May 9 hearing also included testimony from representatives of the Environmental Protection Agency, the Professional Lawn Care Association of America, the Chemical Producers and Distributors Association, the Federal Trade Commission and the General Accounting Office.

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Anyone can hold the helm when the sea is calm. —Publius Syrus

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Just the other day, one of my employees fell while getting out of the truck (just an accident), and then not more than a few hours later a paint stripper spilled on one of the guy's arms. For both of these accidents, we were ready to react.

Many times common sense will cover the situation. But you should have at your fingertips information on all your employees. They may have this information at the clubhouse, but you need this information, too. You need to know the employee's home phone number; a spouse's or relatives' numbers can be important.

Do they have allergies that you should be aware of in case of some special treatment? The person's personal doctor's name could be very helpful. This type of information is important and can save valuable minutes that could very well count.

Now is the time for you to update your records. Take

GCSAA Offers New Environmental Video

Superintendents and other members of the golf industry who have been frustrated by negative reports about golf courses now have a new tool to educate others about the many benefits of golf courses.

Links With Nature: Golf Courses and the Environment documents the positive ecological impacts of courses. The high-quality, 14-minute video was produced by the Golf Course Superintendents Association of America (GCSAA) to help the golf industry respond to "misconceptions about golf courses and how they're managed," according to John M. Schilling, GCSAA executive director.

"The video is designed to show the public how a well-managed golf course can be a tremendous ecological asset for the community," Schilling said.

Links With Nature focuses on four key aspects of the golf course ecosystem, highlighting benefits that are often overlooked and citing independent research findings that allay public concerns. The video discusses how golf courses can provide direct benefits for soil, water, air and wildlife. A final segment outlines the role that today's golf course superintendent plays in managing the property responsibly.

Copies of GCSAA's new *Greentips* fact sheet series can also be ordered with the tape. Each *Greentips* provides a short summary of educational and scientific information on a specific area of environmental interest. There are *Greentips* on 10 different topics ranging from water conservation to clippings disposal.

The videotape is \$20 for GCSAA members and \$30 for non-members (price includes shipping and handling; U.S. funds only). To order *Links*, or for more information, call the GCSAA membership department at 913/832-4480.

the time and review your system and do something about it. Go over this plan with your key personnel. Make sure they have access to this information. A back-up plan can be helpful, too.

Many of us are fortunate to have many very conscientious workers that are careful in their work habits.

So there is no need looking for problems. Just be prepared!!

—Mike Baker, *The Bull Sheet*

Lightning—Thunderstorms Safety Rules for Golfers

The recent tragic death caused by lightning on June 13 during the U.S. Open at Hazeltine National in Chaska emphasizes the importance of knowing what to do during a thunderstorm.

WHEN A THUNDERSTORM IS APPROACHING

DON'T play the next shot! Get off the course IMMEDIATELY.

DON'T seek shelter under an isolated, unprotected area.

DON'T hold on to metal-shafted clubs.

DON'T use an umbrella with a metal shaft.

DON'T be naive and play the odds and think you will never be affected by lightning on a golf course.

DO get off the course AT ONCE.

DO seek refuge in a large building or a rain shelter or other small building equipped with approved lightning protection or under a tree equipped with a certified lightning protection system.

DO get off high terrain. You are safer in a ditch, gully or depressed area.

If you feel your hair rising, immediately drop to your knees. Do not lay on the ground.

REMEMBER

You don't have to be hit by a direct stroke of lightning to be shocked, injured or killed. There is a positive charge of electricity in the ground equal to the negative charge in the thunderhead, and lightning can enter your body from the ground up, causing shock, injury or death, especially when wearing metal spikes or holding a metal-shafted club.

FURTHERMORE

If you have a competition going on at your course, have a well-developed emergency plan and distribute it to the players and others before play begins.