AMERICAN LAWNAPPLICATOR

July/August 1980
Volume 1, No. 2

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AGROCHEMICAL DIVISION

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Circle No. 1 on Reader Reply Card

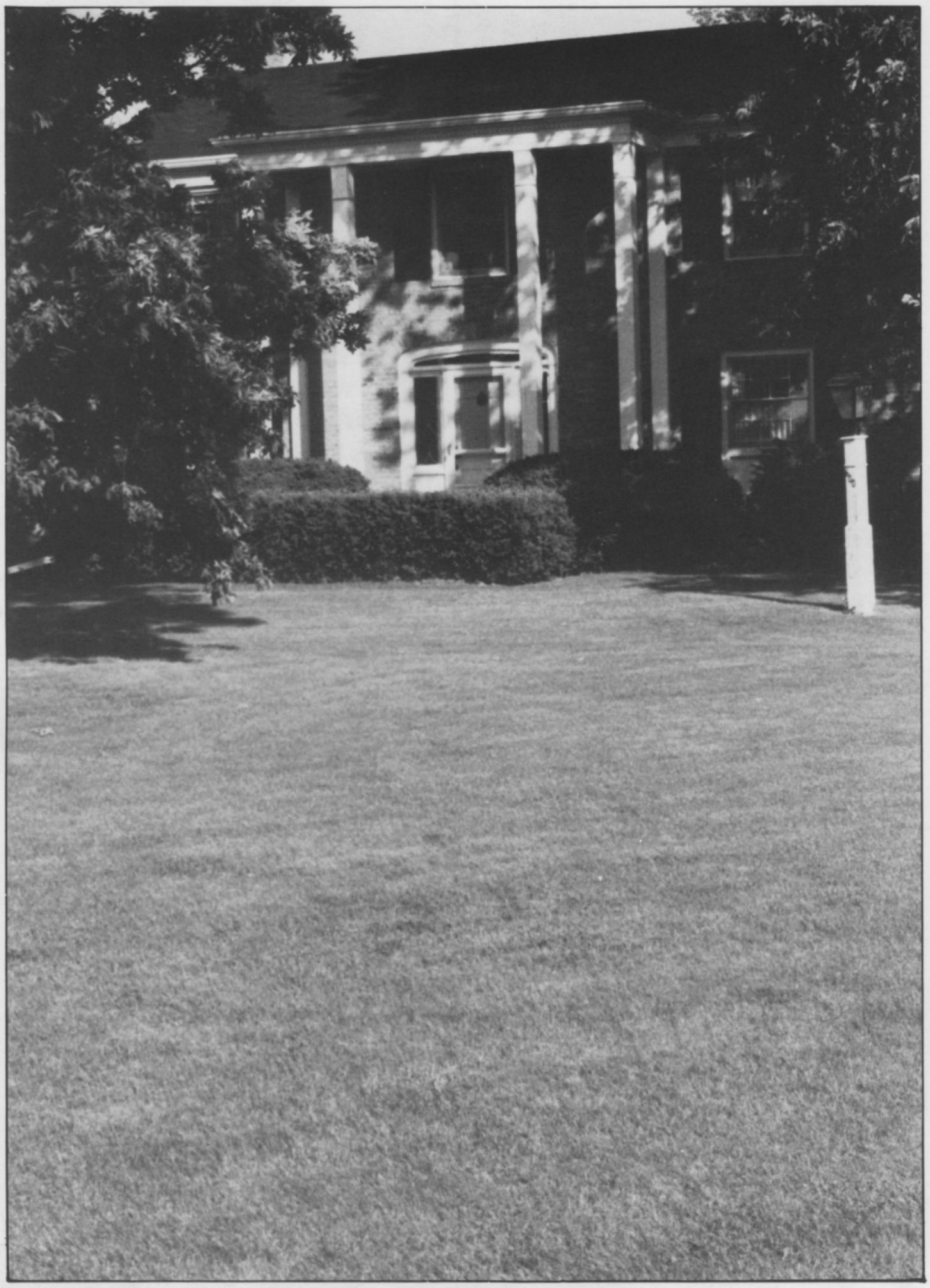
Editorial

Stephen Brown

"Summertime, and the living is easy . . ."

DuBose Hayward
Porgy and Bess
1935

This is the time of year when you may be pardoned if you occasionally wonder why you ever got into this business. Chinch bugs have taken up residence in the most conspicuous locations. Fusarium blight covers whole subdivisions where "lawns" consist of scalped sod resting on baked clay. Areas which were speckled by leaf spot during the wet, chilly spring have begun to "melt out" in distressingly large patches. Customers who haven't watered their lawns this year demand to know why your fertilizer isn't working. A 23 year-old, beloved family pet dies of heart failure and the owner calls to tell you that it was your insecticide application that caused it. A crabapple tree, which has been thoroughly infected with insects and disease, finally gives up the ghost and the homeowner is certain your "careless" application of herbicides is responsible. Clouds of lawn moths flutter ahead of you and you know that another generation of sod webworms is on its way. The insecticide you ordered 30 days ago hasn't arrived and the trucking company thinks it may have been delivered to Albuquerque. Your best worker has decided he has to "see the world" and is leaving next week to hitch-hike through southeast Asia. Your receivables are piling up at a rate surpassed only by your payables and your service calls. Your secretary, who is the only one who really understands your accounting system, got married last week and hasn't been seen since. You have nightmares about being covered by brown patch and attacked by cutworms. You haven't had dinner with your family for sixty days and your children ask where you are living now. It's 94° and your newest employee mentions that he saw a few weeds on his route today so he gave them an "extra heavy" shot of herbicide.



As the problems mount and there seem to be so many emergencies, it is difficult to maintain the proper perspective. That's why it is important, once in a while, to back away from the day-to-day crises and get a broader view. Take a moment to appreciate your successes: those thick, green, weed-free lawns for which you are responsible. There is indeed a sense of satisfaction in having contributed to something as beautiful as a healthy, well-maintained turf area. We have, more than most people, an opportunity to make our world a more beautiful place and, hard as it is to do during this season, we really should admire our handiwork and take the time to be proud.

* * * *

We would like to thank all of you who had nice things to say about the first issue of **ALA**. Like many first ventures, it had its rough spots. However, your response has made us more convinced than ever that there is a place in our industry for a serious trade journal. There were, in particular, many comments about Dr. Christians' potassium research. We know of several lawn care professionals who are now conducting their own experiments with N/K ratios, and we look forward to hearing about their conclusions.

Septoria

A number of Ohio, Indiana, Michigan, and Illinois chemical lawn care companies have reported an unusually high incidence of Septoria leaf blight during May and early June. This disease, which has been quite rare on home lawns in the midwest, caused some confusion in its early stages.

In some cases, Septoria resembles Dollar Spot as it can produce small, bleached, circular areas. Other times it will appear in large, irregular patches which look very much like tip burn.

Septoria leaf blight is associated with cool, wet weather and reduced soil fertility. In all cases reported, the disease has cleared up quickly, following an application of fertilizer and a period of warmer weather.

Herbicide Volatilization

Professor of Weed Science at Michigan State University, Dr. William Meggitt, reminds lawn specialists that, under certain circumstances, herbicides can volatilize after they have been applied to turf and cause damage to nearby ornamentals.

When herbicides are sprayed on warm, dry soil, especially in areas where air drainage is limited, there is a potential for the temporary accumulation of herbicide vapors. Meggitt advises applicators to be wary of spraying the phenoxy herbicides such as 2,4-D, MCPP, and dicamba in confined spaces during hot weather and periods of drought.

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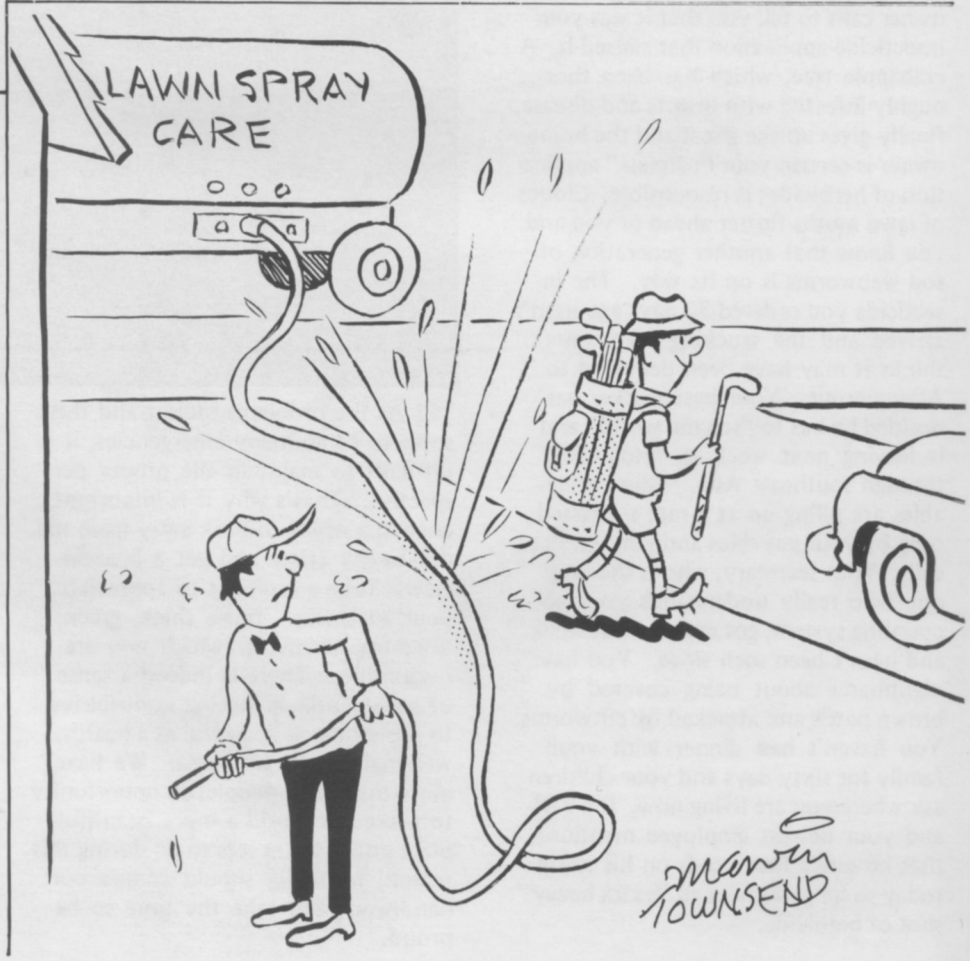
Lawn Care Conference

A program for lawn care professionals is being added to the management schedule for the coming 10th National Institute on Park and Grounds Management which will be held at the Sheraton Twin Towers, Orlando, FL, November 9-13. A number of firms supplying other phases of the market in addition to lawn care firms, have been added to the approximately 85 exhibit booths already reserved for the conference. Principal delegates represent parks, campuses, private areas and other large outdoor area management. A good number of lawn care professionals have attended past National Institutes. To receive future mailings with conference details, write: National Institute, Box 1936, Appleton, WI 54913.



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Computers: Part 2

Businessmen Find Computer To Be Invaluable Tool

by Stephen Brown

In the last issue of **ALA**, Tom Brune, of Atwood Lawn Spray; Jim Kelly, Keystone Lawn Spray; Bob Brown, Michigan Lawn Spray; and Allen Dall, Lawnco, Inc. discussed their experiences with computers. They talked about why they bought their equipment, the ways they use that equipment, and how they obtained the necessary software. In this article we will get their opinions on such questions as: Who should have a computer? Will you save money by computerizing? What should you consider before purchasing a computer?

One of the interesting points about computers is that, while the price of almost everything else has gone up substantially in the past decade, the cost of a computer has continued to drop.

"...customer volume is the key to determining need."

Allen Dall says, "The IBM 5110 that we have cost about $20,000 when we bought it. Today the 5120, which is an updated model, sells for something like $13,700."

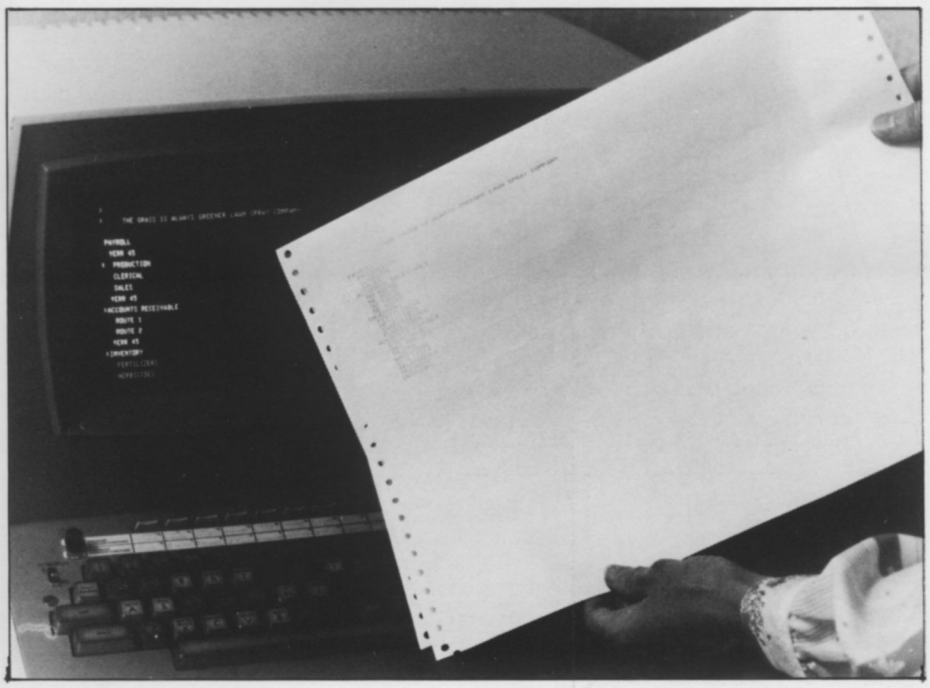
If price is a problem, however, Bob Brown believes he has found a solution. "What I had heard of the costs, I didn't feel that I could justify a computer. However, I was in a Radio Shack store and saw a computer. I asked for a demonstration because the price seemed to be reasonable for that equipment. Apparently, in the last two or three years, the costs of computers have come down tremendously. The cost for the same computer three years ago would have been $15,000 to $20,000 but this computer was, with all of the Radio Shack equipment that I purchased, around $4,000," says Brown.

"We got into it slowly," he continues. "I didn't jump in with both feet. We bought their basic computer, which is around $500, did some work with it, and found that we could make programs that were helpful– such as the payroll program and the estimating program. We then went into the additional equipment within 30 to 60 days after the initial purchase. Since then, I've added two more disc drives of another brand and that was an additional $1,200."

If a computer costs several thousand dollars and the software is expensive (as we learned last time), can a small lawn care company justify the investment? Apparently that depends on what the company's plans are.

"Typical" accounting department, without a computer, overflows with paperwork.

Computers: Part 2



Computer readout sheets reduce office paperwork.

"If a business has about 3,000 customers and plans to stay in that range, they probably don't need a computer. But if you plan to grow beyond, say, 4,000 customers and especially if you plan to grow rapidly, it is invaluable," says Keystone's Jim Kelly.

The question of expansion is on Bob Brown's mind also but he feels that the numbers are different. "I think you'd have to have over 600 or 800 active customers to justify the expense of the computer. If your intentions are to grow and you need facilities to handle the high number of accounts, a computer might be the way to go. It has been an asset for us," says Brown.

Allen Dall has a similar notion. "I think that customer volume is the key to determining need. If you have more than 2,000 customers, you probably do need a computer. If you have 5,000 to 10,000 customers and are doing the paperwork manually, a computer could save you money," says Dall.

Saving money is a subject about which Tom Brune has some thoughts. "We've grown quite a bit and we still operate our business with one office girl. That's got to be worth some money right there. However, I'd be very wary of making any claims about money saved. I think the savings that we have realized have been in the manner of keeping track of our business. That has probably made us money by

"...we can service more customers"

the fact that we can service more customers than we might otherwise been able to."

Brune continues, "During the season when we are operating, we see that the machine is saving us one or two additional persons' labor. As a result of the computer, we don't have a great deal of paperwork to push around. And yet the problem is that the payments on the machine go on even after the season's over and the help is sent home."

Did Bob Brown save any money by computerizing? "It's really hard to measure. We hired a full-time office girl, where we only had a part-time girl previously. But then we increased our business by 80% and that justifies having a girl work full time. Our office work has increased considerably because we used to have our truck drivers make out all the invoices by hand. Taking that work away from the drivers seems to have increased our volume of business. Our trucks produced three times as many jobs last year as in the past.

Computers: Part 2

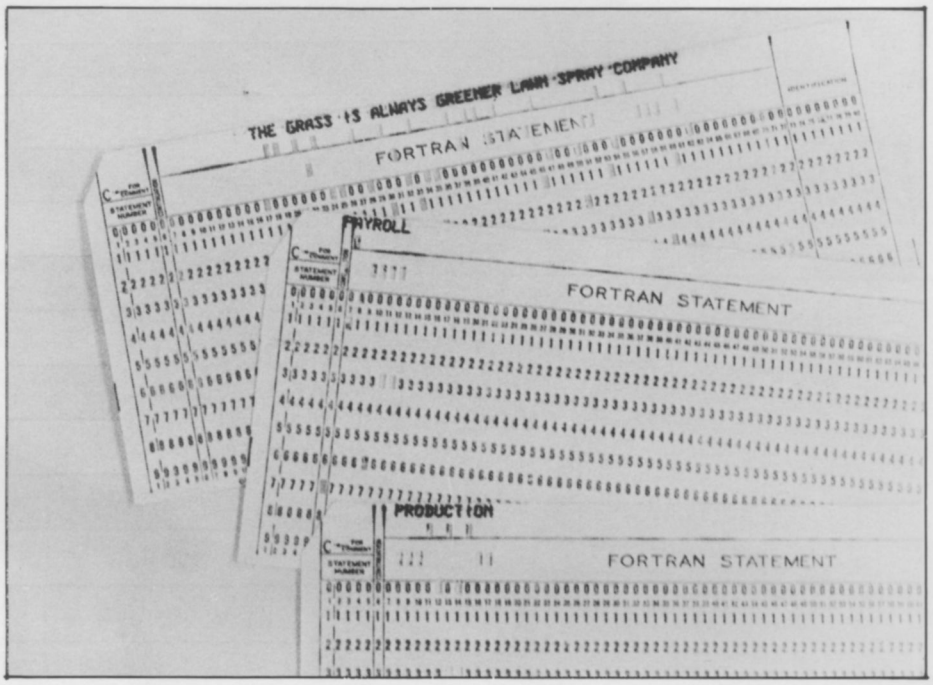
We increased business 80% and reduced the number of trucks 30%. You have to be able to measure what that is worth to you, to do all your work with 30% fewer trucks. Also, the business has a value. If we were to sell the business, it is worth considerably more. The increase in the number of customers certainly increases your assets."

Jim Kelly has a final observation on the relationship between using computers and saving money. "The computer required the addition of a key-punch person. We now have a 2-2½ girl operation to keep up with our computer work. So, I don't know if we save money by having the computer but I do know we couldn't do with it today."

Advice

If, by now, you have decided that a computer is exactly what your business needs, and you are ready to head for your nearest dealer, hold on for just a minute. It is extremely important to take a close look at your company and decide exactly what your goals are for the next few years. If substantial growth is in your plans, now is the time to determine what sort of computer system you will need once that growth is achieved.

Allen Dall stresses, "You have got to think ahead about the capacity of the computer. The amount of information per customer is the key consideration. Know what information you will eventually need about each customer before you purchase a computer. Because of the cost involved, it is important to be able to handle a larger customer base without changing computers."



Data cards

Jim Kelly's advice is identical. "Plan ahead constantly. You've got to try to determine what you will need to do when your business is much larger. That way, your hardware can be updated but won't have to be replaced."

Bob Brown's experience with the computer is probably typical. "When I got into this, I knew absolutely nothing about computers. I didn't know how much we could do with the disc drives or what capacity this computer had until we actually sat down and made the programs and then did some calculating as to how far we could go with the discs we had. Last year we had all of our accounts stored on eleven discs and they were full. We had to keep interchanging discs and that was very time-consuming. Now we have all of our customers on two discs, and we have enough room left over on those two discs to triple our business. If I had it to do again, I would purchase those new discs initially because of their higher storage capacity."

And, speaking of having it to do over again, we asked our four lawn care businessmen if they would still computerize if they were facing the decision today.

Tom Brune replies, "I would do it sooner than I did before. It has been phenominal."

"Absolutely," says Jim Kelly.

"We definitely would do it again," responded Allen Dall.

And Bob Brown? "Certainly!"

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Calendar of events:

August

August 6
1980 Rutgers Turfgrass Research Day. Rutgers University, New Brunswick, New Jersey. Contact: Dr. Ralph Engel, P. O. Box 201, New Brunswick, New Jersey 08903.

August 12
Iowa State University Turfgrass Field Day. Horticultural Research Station, Ames, Iowa. Contact: Mr. A. E. Cott, Dept. of Horticulture, Iowa State University, Ames, Iowa 50011.

August 20
Rhode Island Turfgrass Field Day. Turf Research Farm, University of Rhode Island, Kingston, Rhode Island. Contact: C. R. Skogley, Plant & Soil Science Dept., University of Rhode Island, Kingston, Rhode Island 02881.

September

September 16-19
National Lawn and Garden Distributors' Annual Convention. Century Plaza Hotel, Los Angeles, CA. Contact: Nancy Irving, Executive Director, NLGDA; 1900 Arch St., Philadelphia, PA 19103.

September 22-25
Northwest Turfgrass Annual Conference. Sunriver Lodge, Sunriver, Oregon. Contact: Dr. Roy Goss, Northwest Turf Association, Western Washington Research and Extension Center, Puyallup, Washington 98371.

Sept. 30
Kansas State University Turf Conference. Kansas State University Union, Manhattan, Kansas. Contact: R. N. Carrow, Horticulture Dept., Waters Hall, Kansas State University, Manhattan, Kansas 66506.

October

Oct. 7-9
Kentucky Turfgrass Conference and Field Day. Eastern Kentucky University, Richmond, Kentucky. Contact: Kenneth B. Rue, Kentucky Turfgrass Council, 3110 Brownboro Road, Louisville, KY 40206.

Oct. 14-15
Symposium on Turfgrass Insects. Holiday Inn, Columbus, Ohio. Contact: Dr. B. G. Joyner, Plant Diagnostic Labs, Chemlawn Corp., 6969 Worthington-Galenda Rd., Suite L, Worthington, Ohio 43085.

Oct. 16-17
Southwest Turfgrass Association Conference. New Mexico State University, Las Cruces, New Mexico. Contact: Arden Baltensperger, Southwest Turfgrass Association, New Mexico State University, P. O. Box 3-Q, Las Cruces, New Mexico 88003.

Oct. 21-22
Green Industry Seminar. Oct. 21— Turfgrass, Oct. 22— Ornamentals. Community Arts Bldg., Michigan State Fairgrounds, Detroit, MI. Contact: Phil Goulding, Number 1, Public Works Drive, Pontiac, MI 48054.

November

Nov. 5-7
Missouri Lawn and Turf Conference. University of Missouri, Columbia, Missouri. Contact: Dr. John Dunn, I-43 Agriculture Bldg., Columbia, Missouri 65211.

Nov. 9-12
Southern Turfgrass Conference. Birmingham Hyatt House, Birmingham, Alabama. Contact: Dr. Evel Coats, Southern Turfgrass Association, Drawer CP, Mississippi State University, 39762.

Nov. 11-12
National Lawn Care Business Conference. Sheraton Twin Towers, Orlando, FL. Contact: Lawn Care, Box 1936, Appleton, WI 54913.

Nov. 12-14
First Professional Lawn Care Association of America Convention. Commonwealth Convention Center, Louisville, Kentucky. Contact: Glenn Bostrom, PLCAA, Suite 1717, 435 N. Michigan Ave., Chicago, IL 60611.

December

Dec. 1-4
National Fertilizer Solutions Association 26th Annual Convention & Chemical/Equipment Exhibition. Las Vegas, Nevada. Contact: Jerry Eisele, NFSA, 8823 N. Industrial Rd., Peoria, IL 61615.

Soil Compaction - the Invisible Lawn Problem

by Dr. A. Martin Petrovic

Doctor A. Martin Petrovic, Assistant Professor of Turfgrass Science in the Department of Floriculture and Ornamental Horticulture at Cornell University. He received his B.S. and M.S. in Turfgrass Management at the University of Massachusetts, Amherst. Dr. Petrovic completed his PHD degree in 1979 at Michigan State University in Turfgrass Soil Science. Presently he is overall Turfgrass Program Leader at Cornell and is involved in teaching, research and extension.

Lawn problems associated with compacted soil conditions are very difficult to determine. This is mainly due to the fact that compaction causes a reduction in both root and shoot growth. Many other factors are also responsible for poor plant growth such as excesses or deficiencies of nutrients, pest damage, very acid soils, poor drainage and others.

The basic nature of soil changes considerably when compacted. The biggest changes occur in the movement of water into and through the soil, in aeration, and mechanical resistance to root penetration. Water supplied as irrigation or by rainfall will penetrate and move slower through compacted soils. This can result in considerable runoff on slopes or ponding of water on flat or depressed areas. The net result will either be a loss of valuable water or a potential for wet wilt conditions during the summer, or ice damage during the winter.

Poor soil aeration and high mechanical resistance to root penetration eventually lead to a decline in the turfgrass root system. A poorly rooted turfgrass plant is:

1. less able to utilize fertilizer and water,
2. more susceptible to disease and insect damage,
3. more prone to injury from drought, high and low temperatures, and wear, and
4. much more likely to be invaded by weeds.

The latter is especially true for weeds like knotweed, annual bluegrass and goosegrass which tolerate and thrive in compacted soils.

Compaction of lawn soils usually occurs in two ways. First, during the construction of the lawn, heavy equipment is used to grade and prepare the site for establishment. This is especially true for non-sandy soils which are worked during a wet period. This can result in a very smooth but highly compacted surface which can lead to poor seedling survival or poor sod rooting.

The second way in which a lawn is compacted is from traffic from people and maintenance equipment. Compaction of this nature is generally confined to the surface three to four inches and is at its greatest point within the top inch of the soil. This fact has lead to the development of numerous specialty equipment (see Table1) which attempt to reduce surface soil compaction caused by traffic.

There are several options available to turfgrass managers to help alleviate the compaction problem. They are as follows:

1. follow good preplanting procedures;
2. reduce and/or change traffic patterns;
3. add physical or chemical amendments to improve soil structure; and
4. periodically cultivate heavily trafficked areas.

Soil changes considerably when compacted

Prior to establishment is the best time to do something about compaction since inherent problems in the site can be eliminated. This is especially true for drainage and soil physical problems. Proper grading can help improve surface drainage while drainage lines aid in subsurface water removal. Soils that have a naturally poor soil structure or will be heavily trafficked may need to be modified. Additions of sand and/or organic matter can improve drainage and aeration and make the site less susceptible to compaction. Poor soil structure is sometimes associated with a lack of calcium which is responsible for aggregating or granulating heavier soils. Liming materials can be added to supply calcium for both the improvement of soil structure and to raise soil pH. If

Soil Compaction

soil pH is in the proper range and the calcium content is low, gypsum can be applied to supply the needed calcium to heavy soils.

Whenever possible reducing traffic or changing traffic flow patterns can go a long way in minimizing compaction. Installation of fences, walks, trees and grassy knobs will help divert flow. With the recent development of the concrete-soil grid systems (turfgrass paver) many heavily trafficked areas can now be maintained largely in turfgrass.

Cultivation helps in heavily trafficked areas

Cultivation has been widely used for decades on golf course putting greens and tees to help alleviate surface compaction. As seen in Table 1, there are numerous cultivators commercially available today which can be used on residential turfs. The list varies from small self-propelled models to very large tractor drawn units which require a power take-off. Turfgrass cultivators are classified by their tine type, corer, slicer or spiker. A "typical" cultivation pattern of coring, slicing and spiking is shown in Figure 1.

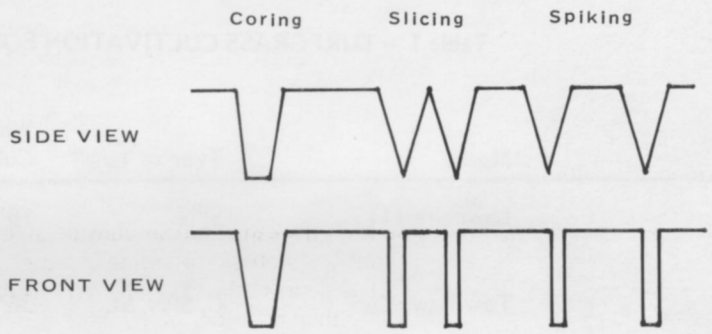

Figure 1: Cultivation pattern of soil following coring, slicing, and spiking.

Several points should be considered before you cultivate an area. First, cultivation cannot overcome any problem that is outside the depth of cultivation. That is to say, cultivation cannot alleviate poor soil conditions below a depth three to four inches. Second, cultivation should only be done on areas that receive traffic. In most cases little or no improvement in turfgrass quality can be expected on non-trafficked sites that are cultivated. Third, select the time of the year most conducive for root growth to cultivate. For cool season grasses this is generally late spring and early fall. Cultivation at this time can further enhance development of a strong, deep root system. Last, cultivation is required more often on heavily trafficked sites.

In summary, compaction of a lawn can be a serious problem. It can lead to poor fertilizer utilization, susceptibility to drought, high and low temperature injury, greater damage from insects and diseases and a turf more easily invaded by weeds. Compaction problems can be minimized by proper site preparation, reducing and/or changing traffic patterns, and by periodic cultivation.

Soil Compaction

Table 1 – TURFGRASS CULTIVATION EQUIPMENT

Manufacturer	Model	Type of Tine*	Width of Cultivation	Comments
Ryan Turf-Care Equipment Co.,	Lawnaire 111	SPN	19"	self-propelled unit, good for tight confined areas
	Tow Lawnaire	C, SPN, SL	36"	requires a 7 hp or larger garden tractor
Dedoes	TCA-500	C, SL, SP	42"	Drum type, with ability to collect cores, must be attached to utility vehicle or tractor
	TCA - 600	C, SL, SP	6'	
Cushman	Greensaver Aerator	C, SL, SP	23"	same as Dedoes
	Quick Aerator	C, SPN, SL	46"	must be attached to utility vehicle
	Quick Spiker	SP	57"	
	Trailing Spiker	SP	57"	
Hahn	JR - 3 Aerifier	C	20"	self-propelled for use on smaller areas
	TM-140	SPN	6'	Tractor mounted
	AB-1 Aeri-boy		4'	
Howard Rotovator Co.	Turf-Quaker	SL	6'	Tractor mounted, requires a PTO
Jacobsen	590	C, SL, SP	7'	Tractor mounted unit.
	595	C, SL, SP	5'	

* C - Corer; SL - Slicer; SP - Spiker and SPN - Spoon

BlueBird Lawn Combers

BlueBird International, a pioneer in the lawn comber industry, manufacturers a full line of lawn combers for all types of power raking applications. Built extra-rugged for rough use by the rental industry, BlueBirds are available in four easy-to-use models.

The Model F-20, ideal for medium size lawns, is BlueBird's standard size basic model. It is hard-working and dependable even with rough usage, and has special convenience features for efficient and easy operation.

For small lawns, the compact F-20 B can be stowed in the trunk of a car or stored in a small space. It is light weight, highly maneuverable and can be easily lifted by one person.

The time-saving Model 400 lawn comber from BlueBird comes with a catcher to catch and hold the thatch it rakes up, eliminating the need to hand rake after thatching. The Model 400 is great for medium and large lawns.

The towable Model TLC lawn comber is for really large areas such as parks, recreation areas, golf courses, estates and apartment complexes, and is easily towable behind any riding mower or garden tractor.

For more information on how BlueBird's complete line of lawn combers can work for you, contact BlueBird International, 2778 South Tejon, Englewood, CO 80110, or use reply card.

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of things whose absence
would incredibly change our lives.

Without grass there would be vast and constant
dust storms, erosion problems of tremendous
magnitude, a rise of sea levels, a change of
climate and atmospheric conditions, the immediate
demise of a half million species of animals,
and the virtual destruction of agriculture
and possibly mankind.

Turfgrass represents a large, practical and aesthetic
portion of the industry of grass. Those who have
the good fortune to be caretakers of these
humble plants understand with both pride and
reverence the given responsibility. The joy of life
springs from our heritage of the grasses of the earth.

8th annual

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This year's Seminar will be held October 21 at the Community Arts Building, Michigan State Fairgrounds, Detroit, Michigan and will feature many exhibits and lecturers on current turfgrass subjects. Pre-registration is only $7.50 per person, including lunch. Booth space rental (10 x 20) only $95.00. Use form below. October 21st–Turfgrass. October 22nd–Ornamentals

GREEN INDUSTRY SEMINAR
Pre-registration Form

I WANT TO BE A HERO and get ahead of my competition!

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☐ Enclosed is a check for $_____to pre-register ___ persons at $7.50 each per day

☐ Send data on local hotel/motel accommodations

☐ Oct. 21st– Turfgrass ☐ Oct. 22nd– Ornamental

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Booth Space Rental Form

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☐ Please reserve booth space (10 x 20) $95

☐ Check enclosed ☐ invoice above address

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Mail to: Phil Goulding, Number 1, Public Works Drive, Pontiac, MI 48054. Registration Deadline October 6, 1980

The Microscope in Turfgrass Disease Diagnosis

by Patricia L. Sanders

Pat is Research Associate in the Department of Plant Pathology at Penn State. She is responsible for the Research Program in Causes and Control of Turfgrass Diseases. She directs Laboratory, Greenhouse, and Field Testing of Fungicides for the Control of Diseases of Turfgrass. She is also responsible for clinical diagnosis of disease on turf samples submitted by golf course superintendents and home owners during the growing season. Pat holds a Bachelors Degree from West Virginia University and a Masters degree from Penn State.

Introduction

The clinical diagnosis of turfgrass diseases is presently carried out in a rather peculiar fashion. The turf manager, who is on-site, knows the environmental and management history of his particular piece of diseased turf. When a disease appears, he attempts to make a diagnosis from the appearance of the symptoms on the grass. This method of diagnosis is fine if the complex of symptoms is classical, that is, if it looks just like it's supposed to. If it is unusual because of environmental factors or because of the presence of more than one pathogen, then the fun begins.

A grass plant has only a limited number of ways of responding to pathogen attack. It can get spots, it can turn yellow, or it can just drop dead. Sometimes, dollarspot can look like Pythium blight or red thread, or brown patch can look like fairy ring, or Typhula snow mold can look like Fusarium. So the person in charge of "grass beautiful" makes an educated guess and runs for the fungicide shelf, because he usually has nothing more to go on than what the symptom pattern looks like and what the weather has been. Sometimes he's lucky and the weather changes or the chemical really works, and calm returns– until the next onslaught. If the first chemical he applies doesn't check the disease, he tries another and another and another – usually with rising panic as his grass disappears.

Finally, in desperation, he takes a cup cutter, removes a 4-inch plug of his suffering sod, and sends it to an "expert" for diagnosis. Now, this "expert" is usually miles away and has none of the on-site manager's knowledge about how this grass has been managed or what it has been subjected to by the elements. He doesn't even know what the whole symptom pattern looks like. All he has is a 4-inch plug of suffering sod, which by now is really suffering, since it has spent up to a week in a dark, dank box on its journey to the "expert".

If the "expert" is lucky and there's any grass left, he may recognize the symptom just by looking and can bail out the poor waiting manager. More often, though, an attempt must be made to culture the pathogen from the diseased grass (2 or 3 more days). Now the black magic really starts! Any grass plug– whether showing symptoms or not– will probably yield on culture, at least three turf pathogens. So even after all of this examination, the "expert" still must make an educated guess about what is ailing this poor grass.

With a minimum of equipment, you can be the expert

As a sometimes "expert," I know how easy it is to be one. I think that with a minimum of equipment and a few sign-posts to go by, any turf manager can become his own "expert." Indeed, he can be better than someone off-site, because he knows the history of his turf and he sees the symptom pattern. With a little bit of know-how, he can often make a diagnosis within a few minutes by examining a few blades of his ailing grass under a microscope. It is really quite easy, much quicker than the distant "expert," much surer

Microscopic Diagnosis

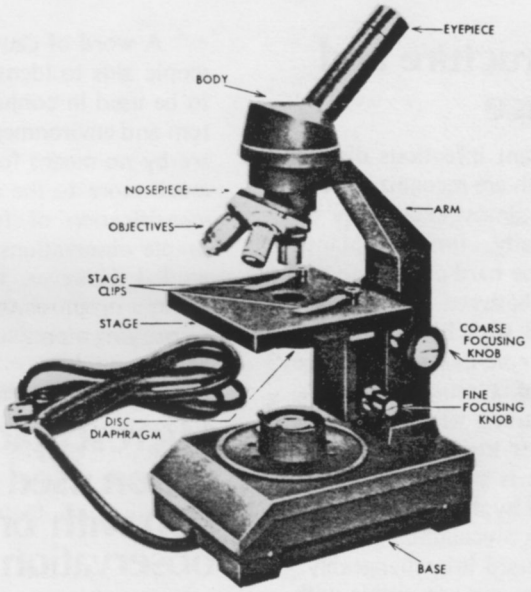
than just looking at the symptom pattern, and, in the long run, probably a lot cheaper.

There are three very important aspects to the identification of turfgrass diseases:

(1) Knowledge of the ENVIRONMENT under which the disease developed. Has it been hot or cold? Wet or dry? What management practices have been used? Nitrogen? Fungicides? Insecticides? Herbicides?

(2) Careful observation of the SYMPTOMS ON THE GRASS. This involves getting down on your knees, preferably with a magnifying lens of some sort, and closely examining the diseased grass. Does it have spots on the leaves? What do they look like? Are the leaves blighted? Is there crown or root rot? Can you see the cottony growth of fungi on the affected grass?

(3) What kinds of FUNGUS STRUCTURES can be seen by examining the diseased grass under the microscope?



MICROSCOPE DIAGRAM

Necessary Equipment

The only items that are truly necessary to do microscopic examination and diagnosis of turf diseases are an adequate compound microscope, some microscope slides and cover slips. You can get set up with these for as little as $200 to $300.

The most expensive piece of equipment needed is, of course, a microscope. An adequate microscope with three objectives (different magnifications) and a built-in, substage light can be purchased for $200 to $250. This may seem expensive, but you'll probably save that much very quickly in fungicides which you don't use unnecessarily. This price is for a single-eyepiece scope. For a compound binocular scope (two eyepieces for easier looking), you will probably have to pay about $250 more. A mechanical stage, if you want one, is an additional $100. A mechanical stage is a gadget which moves the slide with knobs, so you don't have to slide it around with your fingers. Neither of these additional-cost items is really necessary, but they do make slide examination easier and more convenient. Since you will only be examining an occasional slide, they should be considered luxury items. If you are really on a tight budget and want to try a cheaper microscope to start, there are some available for under $100. Before buying one of them, get one on a trial basis to see if you feel it is adequate for your purposes.

A box of glass microscope slides ($4.00/gross), a box of cover slips ($1.00/100), and a dropper-bottle of water complete your lab, and you are ready to examine your first slide.

An additional help, but also an additional expense, is some sort of magnifier to examine your turf plug so that you can select a blade of grass with fungal mycelium or lesions for microscopic examination. This can be anything from a simple 10X magnifying lens for $10–$15 to a stereo-microscope for $150. Again, this is not necessary, but can be a great aid.

For nematode counts and identifications, some very simple and inexpensive equipment is needed to extract the nematodes from your turf sample: several 4-inch-diameter glass or plastic funnels ($1.50 each), a wooden funnel support for 2 funnels ($4.00), 2 pinch clamps and rubber tubing ($4.00), some small centrifuge tubes ($4.00/10), a ¼ cup measure, some formaldehyde, and 2 small pieces of screen.

Microscopic Diagnosis

Fungal Structure and Appearance

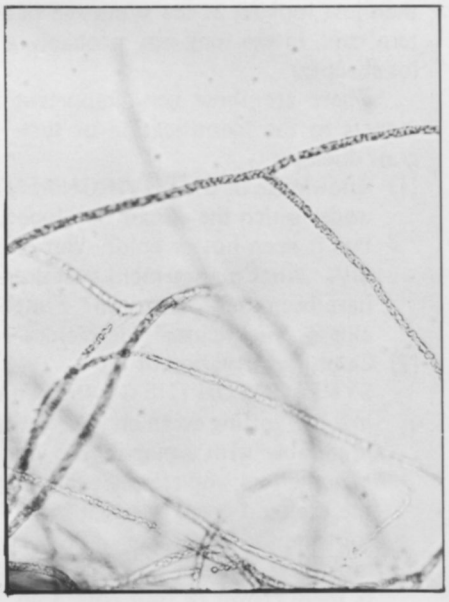
The important infectious diseases of turfgrass which are recognized at this time are caused almost exclusively by fungi. Technically, fungi are plants, but one would be hard-pressed to see much similarity between a fungus and a tree. Compared with higher plants, fungi are very simple in structure. They are composed of a much-branched system of thin tubes, which resemble branching roots or tree limbs. One of these thin tubes is called a hypha, several are called hyphae, and a mass of them is called a mycelium. Sometimes these terms are used interchangeably. Individual hyphae are not visible without magnification, but a mycelium can be seen with the naked eye. Under conditions of high moisture, mycelium of the fungi which cause Pythium blight, Fusarium patch, dollar spot, brown patch, and other turfgrass diseases can often be seen on infected grass. These masses of hyphae on grass, when observed with the naked eye, look very similar, regardless of which fungus is involved. However, when a blade of grass which has mycelium growing on it is put under a microscope and examined, there are often noticeable differences. It is these differences, together with careful observation of the symptom pattern and the environment during symptom development, which make it possible to identify certain fungi.

A word of caution– these microscopic aids to identification are meant to be used in conjunction with symptom and environmental observation, and are by no means fool-proof. There is much more to the accurate scientific identification of fungi than these simple observations. If used as intended, however, they will greatly increase your chances of accurately identifying a particular disease.

Microscopic identification used in conjunction with on-site observation

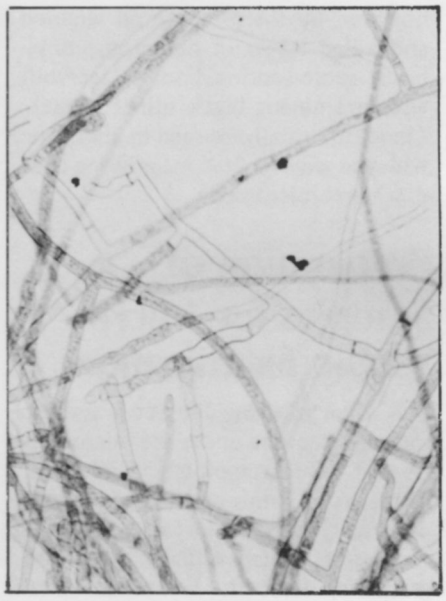
Pythium may often be distinguished from Sclerotinia (the dollar spot fungus) or Rhizoctonia (the brown patch fungus) by the appearance of the hyphae under the microscope. The hyphae of some fungi have cross walls which separate the hyphae into individual cells. Sclerotinia and Rhizoctonia both have such cross walls. Other fungi have no cross walls in their hyphae. Pythium is an example of a fungus with no cross walls.

The way the hyphae branch can often give clues to help identify fungi. In most fungi, the hyphae branch in V's, much like tree branches. Rhizoctonia, however, usually has a characteristic branching which helps to identify it. The branches in Rhizoctonia are usually at right angles, and, in addition, the hyphae have little constrictions or pinched-in places at the origin of the branches. As you can see, just by making a simple microscopic examination for the presence or absence of cross walls and the type of branching, one can make an educated guess about whether the fungus in question is Pythium, Sclerotina, or Rhizoctonia.



Pythium hyphae– 225x

Microscopic Diagnosis



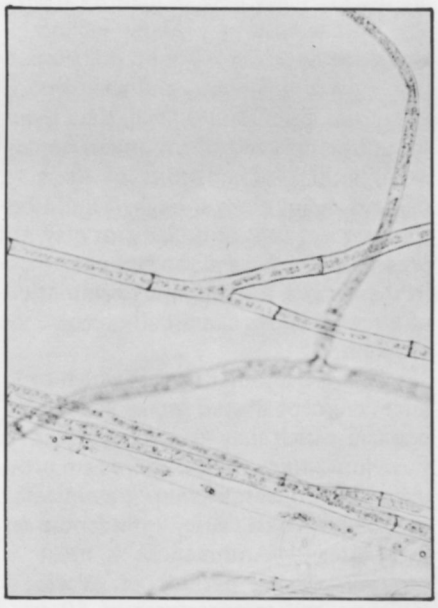
Rhizoctonia hyphae– 220x

Another word of caution– these observations of hyphal structure provide CLUES to the identity of fungi. ALL fungi without cross walls in their hyphae are NOT Pythium– so just because you see hyphae without cross walls, you cannot say you are looking at Pythium. All you can say is that the fungus you see MAY be Pythium. You must put together all of your 'clues'– microscopic, environmental, and symptom observation. The same is true of the branching type which you observe. ALL fungi with right-angle branching are NOT Rhizoctonia, nor are ALL fungi with V-branching Sclerotinia. Do not make the mistake of believing you can positively identify fungi so easily.

Another feature of the mycelium of certain fungi which can aid in identification is a structure called a clamp connection. These unique, donut-like structures occur in hyphae which have cross walls. They appear as little branches which originate on one side of a cross wall, bend around, and attach to the hypha on the other side of the cross wall, so that the "clamp" forms a little bridge between the two cells on either side of the cross wall. These structures are very distinctive, and once you know what they look like, there is little difficulty in spotting them. Three common pathogens of turfgrass have clamp connections: Typhula (the gray snow mold fungus), Corticium (the red thread fungus), and most fairy ring fungi. Here, again, symptoms and environment can serve to separate these three fungi from one another.

There are two other mycelial structures which can be seen with the naked eye and which are quite diagnostic. These are the brown to black sclerotia of Typhula (the gray snow mold fungus) and the coral red stroma of Corticium (the red thread fungus). The sclerotia of Typhula are found embedded in leaf tissue, and are hard, resistant structures which enable the fungus to survive unfavorable conditions. The red stroma of Corticium are masses of hyphae adhering together, and appear as red threads on the ends of the grass leaves. The disease gets its name from these red stroma. Both of these structures area easily seen with the naked eye, but often don't appear until the late stages of the disease. In these cases, they aren't too helpful in early diagnosis, since damage may be severe before these structures appear. As you will recall, both of these fungi form clamp connections, which can be observed with a microscope long before the sclerotia or "red threads" may appear.

Many fungi form some kind of spores. Spores are somewhat like the seeds of higher plants and serve much



Sclerotinia hyphae– 225x

Nematode– 105x

Microscopic Diagnosis

the same purposes. They help the fungus to survive periods of unfavorable environment that may kill the mycelium, and they serve to multiply and spread the fungus from place to place. Spores are found in a great variety of sizes and shapes, and are often quite distinctive. A distinctive spore can be quite valuable as an identification aid. Such spores are produced by four common turfgrass pathogens, Helminthosporium (the leaf spot/melting-out fungus), Curvularia (the fading-out fungus), and Fusarium (the Fusarium blight and Fusarium patch fungi).

A distinctive spore can be a valuable identification aid

The spores of Helminthosporium and Curvularia look somewhat alike, but with some practice you can learn to tell them apart. They are large, dark, cigar-shaped spores with three or more cells. Helminthosporium spores are uniformly dark and are generally straighter than Curvularia spores. Curvularia spores may be slightly curved and the middle cell in the spore is sometimes keystone-shaped. In addition, the cells on either end of the Curvularia spore are usually lighter in color than the center cells.

Fusarium spores are also quite distinctive. They are long, slender canoe- or crescent-shaped spores, with 2 or more cells. It can be a little tricky to distinguish the spores of the Fusarium blight fungus from the Fusarium patch fungus, but you won't have to do this since the environments under which these two diseases occur are very different.

Fusarium spores— 240x

The diseases of turfgrass which have leaf spot phases or typical leaf lesions are usually fairly easy to identify from the leaf symptoms. These include Helminthosporium leaf spot, dollar spot, rust, powdery mildew, and strip smut. If the leaf lesions are typical, then there should be no need to use microscopic examination for diagnosis of these diseases. Sometimes, though, Helminthosporium leaf spot or dollar spot may not present the typical symptom pattern. In these cases, microscopic examination of affected leaves can usually resolve the problem.

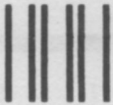
There is another fungus which produces crescent-shaped spores with only one cell which may be confused with Fusarium spores. These spores are produced by Collectotrichum graminicola, the fungus which causes anthracnose on turfgrasses. Anthracnose is most common during periods of excess moisture and temperatures of 80 to 90 F. Anthracnose can be recognized, however, by the presence on blighted and killed leaves of numerous, tiny, black spore-bearing bodies (acervuli) with prominent black spines (setae). These can usually be seen in abundance with the aid of a 10X magnifying lens or a stereomicroscope.

Preparation of Samples for Microscopic Examination

When selecting diseased grass specimens to examine under the microscope, do not select completely dead grass. There are all kinds of fungi which grow on dead grass, and this can make finding the fungus which actually killed the grass very difficult. Try to find areas where the disease is working, and the grass is just beginning to show symptoms. If you can, select blades which have mycelium on them. Early morning or humid, overcast days are good times to select blades which have mycelium on them. This is the point at which a magnifying lens can be very helpful. With it, you can see the symptom close up, and may be able to see strands of fungal hyphae, or even insects, which you have not seen without magnification.

Do not select completely dead grass as a sample

When you have selected some grass which you think may have your culprit on it, put a drop or two of water on a 1 x 3 inch microscope slide. Place several pieces of grass which show symp-



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JULY/AUGUST 1980 ISSUE

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Microscopic Diagnosis

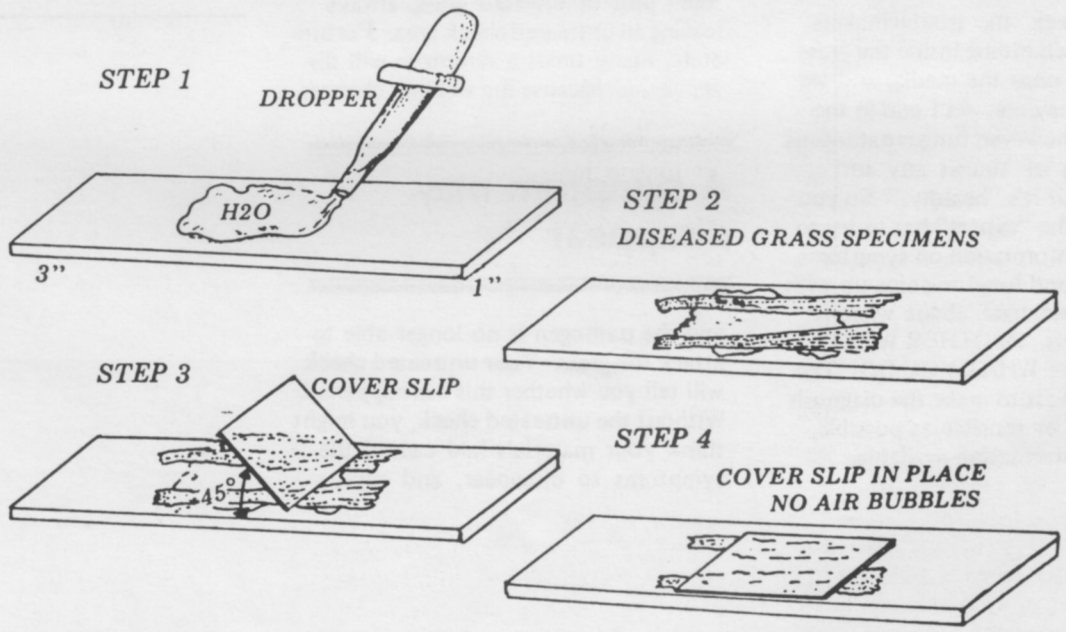
toms or mycelium in the water and cover the whole business with a cover slip. Don't just drop the cover slip on the water and grass, because this will trap air bubbles around the grass blades. It is very difficult to see properly when a slide is full of air bubbles, so try to avoid as many as possible. Holding the cover slip at about a 45° angle with the slide, place one edge in the water and gently lower it until it is totally in contact with the water and grass. Now you can examine the grass under the microscope for the presence of spores and the features of the hyphae. You may have to make several slides before you get a good one where you can really see the mycelium and spores which may be there. I usually make two or three to begin with. If you have a lot of mycelium on the grass, and it tends to stick together when it gets in the water, take the corner of the cover slip and tease the mycelium apart so that you can examine individual strands of hyphae for structure.

You may have to make several slides

Examine your slides thoroughly and carefully. Don't stop as soon as you have identified your first spore or piece of mycelium. Begin at one corner of your slide and move back and forth until you have covered the entire slide. Do this back and forth scanning with a low power objective, and, when you see hyphae or spores, switch to a higher power objective to examine the structure carefully. It is not uncommon to find two or three different fungal pathogens present in a turf sample. Your problem may be due to all of them, one of them, or none of them! Part of your job as a manager is to put all your evidence together, and make your best estimate about what is causing your problem. Remember, that's what the "experts" do, too. They are very seldom completely sure, either!

What To Do With Your Findings

There will be times when, no matter how long or how carefully you examine grass from certain symptoms, you will not be able to find anything



Preparation of slide

Microscopic Diagnosis

which will help you decide what is ailing your grass. This is particularly true when symptoms are a result of root injury caused by fungi. This happens to the "experts," too. Sometimes there just isn't anything obvious to pin the problem on. Depending on the season, though, you should be able to come up with an answer with your microscopic examination at least 50% of the time. When you can't, this is the time to seek the help of the distant "expert." When "expert" microscopic examination turns up nothing, your grass will be cultured. To do this, little bits of grass are placed on various kinds of growth media.

Put together all the information you have

In about a week, the troublemakers which have been hiding inside the grass will grow out onto the media, and we can see who they are. As I said in the introduction, however, fungus pathogens will grow out of almost any turf sample— even if it's "healthy." So you can see, even the "expert" has to try to put together information on symptoms, environment, and fungi to come up with an educated estimate about what is ailing your grass. IN OTHER WORDS, HE DOES JUST WHAT YOU DO! The important thing is to make the diagnosis as "educated" or sensible as possible, using all the information available.

Let us assume that you have found one or more pathogenic fungi or a high count of parasitic nematodes in your turf sample. Does this mean that you have found the cause of the symptom which is present on your grass? It may— but it is by no means certain. You must now put together all of your information about (1) the ENVIRONMENT under which the disease developed, (2) the appearance and severity of the SYMPTOMS, and (3) the PATHOGENS which you have seen. You can then make a more educated decision about whether or not to use a fungicide or nematicide, and which one to use.

If you have a choice of several materials to use, it may be advisable, and, in the end, more economical to run a small field trial of your own to find out which one may control the disease best. This is not difficult to do. Apply strips of your test materials across a small plot of diseased grass, always leaving an untreated check area. Fortunately, many times a symptom will disappear just because the weather changes,

A symptom may disappear

and the pathogen is no longer able to attack the grass. Your untreated check will tell you whether this has happened. Without the untreated check, you might think your materials had caused the symptoms to disappear, and apply chemicals which you don't need. If the materials in your trial are going to control the symptom, you should be able to see some response within a short time. You can then pick the best material from the ones which you have tested, and treat the entire affected area with the best material.

This may seem like a lot of time to invest when something is chewing on your grass, but remember, it's probably a lot faster to do your own examination and on-site testing of control chemicals, than to wait for your sample to reach some "expert" by mail, have them do what you could have done, and then mail the results back to you. You, the on-site manager, are in a position to do the job much more quickly, and, with a little practice, much more accurately than the distant "expert." After all, you are there where the action is.

Lightweight Clinton Pump Feaures Compact Pumping Action

It's been said that 'small is beautiful' but in the case of Clinton "Chief Pro Pump", small is definitely powerful. Weighing only 41 lbs., and with compact dimensions of 21 - 1/4 in. long, 13 in. wide, and 17 in. high, this self-priming centrifugal pump has an output capacity of 8,400 gal. and hour.

Powered by an efficient Clinton single cylinder, air-cooled, two-cycle gasoline engine, the Chief Pro pump is appropriate for a wide variety of situations, such as irrigation, fire fighting, flooded basements, construction excavations, swimming pools, etc. Operating at full capacity, the unit will move large quantities of water, while consuming a mere 2 - 3/8 quarts of fuel an hour.

Durably designed and constructed, pump features include a glass-filled reinforced Noryl material impeller, impeller housing, wear plate and end housing, stainless steel fasteners, and a shaft seal of ceramic graphite for extended wear. The pump impeller is mounted directly on the engine crankshaft, which is supported by heavy duty ball bearings. Intake and discharge fittings are 2 - in. standard N. P. T. thread, and a removable see-through lexan cover permits easy inspection and servicing of the strainer basket.

Standard features on the Clinton engine include an automatic rewind starter, high voltage flywheel type magneto ignition, three-quart fuel tank, a combined fixed and variable speed control, and full float feed carburetor with idle and high power mixture adjustment. Suggested retail price of the Clinton Chief Pro pump is $275.35. For further information contact Clinton Engines Corporation, Clark & Maple Sts., Maquoketa, IA 52060, or use reply card.

Circle No. 3 on Reader Reply Card

Association Offers Slide Sets

The Florida Turf-Grass Association has an audio/visual library available to its members. The slides are available in sets only and include the following subjects: nematodes, ornamental insects, turf insects and turfgrass diseases.

General anatomy and mode of action serve to introduce the set on nematodes. They are grouped according to how and where they feed on roots. Also covered are affected grasses, above and below ground symptoms and possible chemical controls as well as equipment for various means of application.

The ornamental insect set also classifies them according to mode of action with the major categories being: sucking insects, mites, chewing insects, leaf miners and boring insects. Detailed information concerning life cycle, susceptible hosts, time of year of major infestations and plant symptoms are also discussed. General insecticide application information is described.

Turf Insects, such as chinch bugs, sod webworms, armyworms, mole crickets, white grub, ground pearls, and Bermudagrass mites, are discussed. Details concerning their life cycle, host susceptibility, symptoms of injury and causal agent determination are presented. Special attention is directed towards methods of determining the insect involved in an area of injured turf. General insecticide application rules are given.

The fourth set examines diseases of Turfgrass. Of the over 100 turf diseases, there are approximately twelve which are considered serious in terms of damage caused and frequency of appearance. Within this dozen, dollar spot, pythium, and fairy ring are grouped together as diseases that most frequently affect turf plantings in distinct areas and patches. Leaf spot diseases, rust diseases and slime molds are classified as diseases that affect the entire plantings.

For more information concerning these slide presentations, please contact the Florida Turf-Grass Association, 1520 Edgewater Drive, Suite E, Orlando, Florida 32804.

Michigan Lawnsprayers Benefit From Workers' Comp Reclassification

A concerted effort by members of the Lawn Sprayers Association of Michigan has resulted in a reclassification which will save employers thousands of dollars in worker's compensation premiums. A May 29th ruling by the Workers' Compensation Rating and Inspection Association placed lawnsprayers in the "Nurserymen and Drivers" category at a premium rate of $6.70 per $100 of payroll. Up to that time, Michigan lawnsprayers were classified as "Landscapers" and paid premiums of $8.55 for each $100 of payroll.

"Circular Letter No. 945" has been sent to Michigan insurance companies notifying them of the reclassification. However, according to Workers' Compensation Rating and Inspection Association representative Jim Corbin, all employers should take a copy of the letter to their individual insurance carriers to be certain that the proper premiums are now being charged.

Lawnsprayers placed in "Nurserymen and Drivers" catagory

The Michigan campaign for reclassification was spearheaded by Carol Nowak, office manager for Village Green, a lawn spray company in St. Clair Shores. She discovered last February that a sub-committee of the United States House of Representatives was to hold hearings on a bill which would standardize state workers' compensation programs. Nowak contacted Earl Passbach, the Chairman of the subcommittee, and was referred to David E. Bonior, Representative for Michigan's 12th District, for assistance. Claudia Elliot, Bonior's legislative aide, provided Nowak with information and statistics regarding the various workers' compensation classifications. A report was prepared, and, in March, Bob Brown, owner of Michigan Lawn Spray Service, and Gus Cramer, of Cramer & Nightingale, delivered the report to Passbach's subcommittee in Washington, DC.

A written version of that report was forwarded to the Workers' Compensation Rating and Inspection Association of Michigan. This association, a group of over 200 insurance companies, is authorized by the State Insurance Commissioner to determine worker's compensation classifications and rates in Michigan.

On May 20th representatives of the Workers' Compensation Rating and Inspection Association and the Lawn Sprayers Association of Michigan met to discuss the workers' compensation classification system. Following that meeting it was announced that the reclassification would be in effect May 29th for all "new, renewal, and outstanding" workers' compensation policies. The text of "Circular Letter No. 945" appears in its entirety.

One lawncare company official, who preferred not to be identified, felt that, while the reclassification is a step in the right direction, the system still needs adjustment. He pointed out that, as an example, his company's employees have received in workers' comp benefits just 1.13% of the total workers' compensation premiums the company has paid in the last four years. The most benefits received in any one year during that period was 1.84% of the premium paid while the smallest amount returned for one year was .35% of the yearly workers' comp premium.

System still needs adjustment

The most common method of providing workers' compensation insurance is through an insurance company. However, individuals or associations who meet certain requirements have the option of being self-insured.

Many lawn spray companies would not have the necessary assets or number of employees but groups of companies might very well qualify for this option. For specific information regarding self insurance under the State's workers' compensation program, contact the Bureau of Workers' Disability Compensation, P. O. Box 30016, Lansing, MI 48909.

Workers' Compensation Rating and Inspection Association

of Michigan

R. J. VAN VONDEREN, President
GARY M. WOOD, General Manager
JERRY J. STAGE, Financial Administrative Manager

P. O. BOX 2036
SOUTHFIELD, MICHIGAN 48037
(313) 354-3750

May 29, 1980

CIRCULAR LETTER NO. 945

TO ALL MEMBERS AND SUBSCRIBERS

Re: Lawnspraying

Gentlemen:

A group of employers that are members of an association which represents the majority of lawnsprayers in the State, appeared before the Classification and Rating Committee at the 116th meeting.

The group was seeking relief from assignment of their operations to Code 0042 which is applied to employers engaged in landscaping.

The appeal resulted in the Classification and Rating Committee instructing the staff to apply Classification Code 0005 "Nurserymen and Drivers" to the operations of employers engaged in lawnspraying.

Effective immediately on new, renewal and outstanding business, Code 0005 "Nurserymen and Drivers" will become assignable to the operation of applying fertilizer, insecticide/herbicide and various other water soluble nutrients to lawns.

The rules of the Manual will prevail as respects the division of a single employee's payroll in the event the employer is engaged in a multiple enterprise.

Very truly yours,

Gary Wood

Gary Wood
General Manager

GW/bas

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Rhone-Poulen Offers New CHIPCO Brochure

Rhone-Pulenc offers a new informative 19 page pamphlet "Guide for Control of Turfgrass Diseases". The most common turfgrass diseases are discussed and each is accompanied by a picutre of an affected lawn, the individual grass blade and what affect the disease has on it, and a rendering of the microscopic organism causing the disease, and how the disease may be treated.

Suggested control of these turf diseases is related to Rhone-Poulenc's product, Chipco 26019, along with information on how and when to use it. For a free pamphlet write to Rhone-Poulenc Chemical Company, Agrochemical Division, Monmouth Junction, New Jersey 08852, or use reply card.

Circle No. 4 on Reader Reply Card

INTRODUCING COMPUTER SOFTWARE DEVELOPED ESPECIALLY FOR LAWN CARE COMPANIES

How to unlock your growth potential

Do you have at least 3,000 customers?
Are you and your staff overwhelmed with paperwork?
Wish you had time to manage and plan for growth — instead of constantly "putting out fires"?

Then it's time for you to think computer! Business growth is out there waiting — but to unlock this potential, you need a computer and softwear developed *especially* for *your* needs.

Or perhaps you're already computerized with a "canned" system but what your company needs is "specialized" programs. Either way, based on our own experience, we at Mobile Automation can provide a *customized total system* for you.

What Is Mobile Automation's Customized Total System?

Accounting: Accounts Receivable, Accounts Payable, Payroll, General Ledger

Management Reports: Production, Cost and Revenue, Sales and Marketing, Commissions, Special Customer Service

Management Control Programs: Invoice Printing, Reminders and Overdue Notices, Customer Status Reports, Treatment Scheduling and Analysis, Selective Mailing Lists including Labels

You don't need specialized knowledge. Your present personnel can use our softwear programs, which are compatible with most computers. (Sperry Univac BC7-700 and Sperry Univac BC7-800, IBM-32, and IBM-34)

Mobile Automation's expertise comes from on-the-job development of a total system for Keystone Lawn Spray, Inc. that has enabled this Pennsylvania-based corporation to grow to the second largest chemical lawn care company in the tri-state area of Pennsylvania, New Jersey and Delaware with *unlimited* future *growth* potential.

Their growing pains were the same as yours. Mobile Automation's *solutions* to these problems will work for *your* business too.

Please call or write Tony Ciarlone for more information:

1051 RADNOR ROAD, WAYNE, PENNSYLVANIA 19087 (215) 687-6007

mobile automation

Lescosan, the name you remember for crabgrass control. LESCO Sulfur-Coated Fertilizer, the name to remember for greener lawns

I've told you about our Lescosan (Betasan*), the best selling pre-emergence crabgrass control on the market. You've proven its effectiveness. I'm here to tell you now that Lakeshore Equipment & Supply produces an equally effective line of sulfur-coated fertilizers.

LESCO Sulfur-Coated Urea and 100% Sulfur-Coated Fertilizers provide the perfect ingredients for denser, greener lawn. The sulfur coating, applied to the fertilizer components, provides controlled release of nutrients for prompt and sustained feeding for safe, efficient and economical fertilization of lawn in all areas of the country.

As supplier of the most effective full-season crabgrass control on the market — Lescosan (Betasan*) — and of the latest in controlled-release (sulfur-coated) fertilizers, manufactured by our subsidiary, Ag Industries Manufacturing, we have a special interest in the lawn care market. Lakeshore carries a complete line of lawn supplies made and distributed with you in mind. The full family of fine LESCO Products mean quality at affordable prices.

Call Lakeshore today and ask about Lescosan, Sulfur-Coated Fertilizers and our other lawn supplies. Ask for Barb — she'll have one of our lawn specialists give you the full story and work out a complete program tailored to meet your specific needs.

Ask about our Lescopex (MCPP) and LESCO 2,4-D.

*(Betasan—registered TM of the Stauffer Chemical Company.)

Get the most for your Lescosan dollar. Use the patented ChemLawn Gun.

BEARD COLLECTION

LESCO PRODUCTS

Division of Lakeshore Equipment & Supply Co.
300 South Abbe Road, Elyria, Ohio 44035
(216) 323-7544

1-800-321-5325—Nationwide 1-800-362-7413—In Ohio 1-216-323-7544—Call Collect

A Family of Fine Products: Lescosan 12.5G—Lescorene—Lesco 4—Lescobor—Lescopar—Lescopex—Lesco Non-Selective Herbicide—Lesco MSMA—Lesco Thiram 75W—Lescozyme—Lakeshore Chinch Bug & Sod Webworm Control.

Circle No. 6 on Reader Reply Card