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WHERE GREAT IDEAS START

Circle No. 241 on Reader Inquiry Card



growing. Sod and soil were carefully removed from the tree's base, so as not to scrape or injure the elm. The fungicide was injected into the tree's root flares. It flows evenly through the xylem throughout the tree's crown and branches.

The amount of Arbotect injected varies with each tree's diameter at breast height, 4½ feet from the ground. The diameter determines the number of injection sites—1½ to 2, each one inch deep for each inch in diameter.

Shortly after the injection sites are

drilled, tees are inserted and connected with short lengths of tubing. This "harness" is attached to a supply hose that is connected to a container of Arbotect and water. After trapped air is removed from the lines, the fungicide is injected under 5 to 15 lbs. of pressure.

Following injection, the tees are removed and the excavation is refilled. Equipment is cleaned and sanitized between trees.

Two elm bark beetles—the smaller European elm bark beetle and the native elm bark beetle—spread DED.

Spores stick to hatching beetles and are carried to new trees as beetles emerge in May and June and begin feeding.

The European beetle feeds in the crotches of living elm twigs; the native beetle feeds in bark of two- to four-inch branches. They usually feed within 1,000 to 1,500 feet of where they hatch. However, beetles may rise to altitudes of several hundred feet and be carried by air currents for many miles.

Infected trees first show wilting, curling and leaf yellowing on one or more branches in the upper portion of the tree. Large trees may show symptoms of DED for one or more years before dying. Ideally, newly-infected trees should be removed within two weeks of disease identification.

The fungus also spreads through the adjoining roots of elm trees within 40 feet of each other. According to experts, the likelihood of root graft increases with delays in removal of infected elms.

Once a tree is removed, unremoved roots will continue to live and send up new shoots. "As long as the roots are alive, the fungus is alive," says D.W. French, Ph.D., plant pathologist at the University of Minnesota. Trees infected through root graft wilt and die rapidly, he says. Ideally, roots of infected trees should be severed mechanically 36 to 48 inches below ground.

#### Lines of defense

Sanitation is the first line of defense against DED, according to French. "Eliminate all dead and dying elms where beetles reproduce and the fungus resides."

Pruning may be the next line of defense if the main stem isn't infected, according to Dr. French, but pruning may not be popular. "My experience in Eau Claire," Schmidt says, "is the more cuts on a tree, the more likely you'll lose it. We sanitize as fast as we can and encourage treatment with Arbotect to protect against infection."

"We're really limited in our selection of replacement trees for the elms because of the zone 3 climate, soil and urban setting here," he says.

Because American elms are no longer available at nurseries, city residents settle for Marshall seedless ash, summit green seedless ash, Norway maple, linden and a few honey locust, flowering crabs and Canada red cherry trees. French recommends native oak trees, but not the pin oak.

"But, there's nothing close to the remaining elms, especially those in Owen Park," says Schmidt. **LM**



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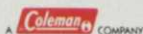
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**E**ntry forms are now being accepted by the Professional Grounds Management Society and Landscape Management magazine for their second annual "Landscape Manager of the Year" award.

Purpose of the award is to recognize superior job performance among landscape managers, to challenge those involved in the industry to achieve higher standards of excellence, and to bring national recognition to deserving managers.

**A**ny person directly responsible for the professional maintenance of one or more landscapes is eligible to enter. Applicants will be judged according to job performance, honors and awards, procedures and philosophies, and contributions to the green industry. Applicants will be asked, at the time of entry, to submit four 5 x 7 black-and-white glossy photos and 10 color 35mm slides of current work areas with a short narrative on each.

(clip and mail)

Applicant's name

Title

Applicant's company

Official entry form should be sent to:

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Title

Company

Address

City/State

Zip Code

Mail to: PGMS, Landscape Manager of the Year, 1201 Galloway Ave., Suite 1E, Cockeysville, MD 21030



# PRODUCTS

## Computer program benefits golf course superintendent

Parr Plus computer programs from Leisure Time aim at helping various management aspects of the golf course superintendent.

Six programs are currently available: employee management; budget control; inventory control; chemical/pesticide use; equipment management; and labor tracking.

All programs are written in DBASE and are IBM-compatible.

Circle No. 190 on Reader Inquiry Card

## Barge maneuvers for aquatic weed control

Aquatics Unlimited's Aquamog multi-purpose maintenance rig is a self-powered maneuverable barge with a backhoe type arm for dredging and emergent and subemergent aquatic weed control.

The storage deck can be used to transport cut weed growth. The Aquamog works in water as shallow as two feet and the arm can reach 18 feet out of the water to trim shore vegetation with attachments like a

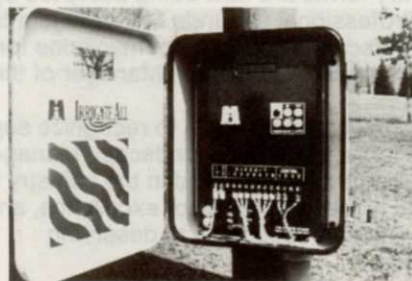


flail mower.

Circle No. 191 on Reader Inquiry Card

## Programmable controller uses 'word-type' display

Marcom Industries' new Irrigate-All irrigation controller is field-programmable, using a "word-type" display and six keys. Automatic, semi-auto-



matic and manual controls are available for all circuits.

Features include control inputs from sensors and instruments for more precise irrigation, restricted access, and programming times absolute or adjustable for sunrise and sunset.

Programming can be reviewed and changed sequentially or by circuit number, which allows programming that affects a specific irrigation zone. Programming can control any of eight available circuits with no minimum or maximum number of programs per zone. All circuits are capable of directly driving motors, pumps or valves.

Circle No. 192 on Reader Inquiry Card

## Reinforced plastic grid supports heavy traffic

Presto Products' Geoblock Landscaping System is a lightweight, reinforced plastic which interlocks to create a strong, flexible pavement to support vehicular and heavy pedestrian traffic while maintaining turf quality.

Geoblock can be used on access roads, parking lots, footpaths and golf car paths. It is available in 12 x 36 x 1<sup>1</sup>/<sub>8</sub>

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-inch and 12 x 36 x 2-inch sizes. The block can be cut with hand or power saw for custom fit around corners or objects.

**Circle No. 193 on Reader Inquiry Card**

### Subsurface irrigation works at the root zone

The Aquapore system from Moisture Systems uses a porous commercial grade rubber tubing with a sweating system that dispenses water evenly with wick-like action. Capillary action of the soil draws moisture from the tubing, replacing water used by trees, turf and other plant material. This method takes water, oxygen and nutrients uniformly through the soil

directly to the roots.

The system is totally underground and automatic. According to the company, the system cuts replacement plantings and callbacks due to improper watering by 70 percent. Watering directly in the root zone encourages deeper root growth and eliminates wet/dry cycles and reduces stress.

**Circle No. 194 on Reader Inquiry Card**

### Bar secures payloads in truck, trailer beds

The Holdit bar from Hunt-Davis is engineered to secure loads in the back of pickup trucks, trailers and vans within seconds.



The bar works with opposing screws to secure itself like a turn-buckle without springs. It is constructed of galvanized steel with right and left thread nuts and bolts for quick expansion. Neoprene pads on the ends provide cushion and add friction for a better hold.

It is installed by placing the bar where desired and twisting to the necessary compression, which ranges between 600 and 800 psi without the help of tools. According to the company, this is adequate to secure a load between 800 and 1,250 pounds.

**Circle No. 195 on Reader Inquiry Card**

### Helper springs smooth out light truck ride

Ride-Rite air-adjustable helper springs from Firestone Industrial Products are mounted between the frame and axle of the vehicle.

As payload is added to the truck, the inflatable springs can be pressurized to level the load both front-to-back and side-to-side. The suspension assist springs come complete with a kit for do-it-yourself installation.

**Circle No. 196 on Reader Inquiry Card**

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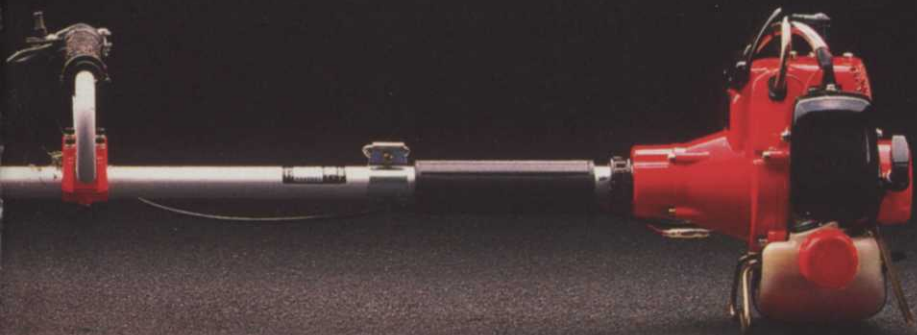
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**Circle No. 266 on Reader Inquiry Card**

**Soil texture and rooting depth effects on water available to turf.**

Texture	Available soil water, inches		
	Rooting depth		
	12 inches	6 inches	2 inches
Medium sand	0.4	0.20	.07
Fine sand	0.7	0.35	.12
Loamy sand	1.0	0.50	.17
Sandy loam	1.3	0.65	.21
Loam	1.8	0.90	.30
Silt loam	2.4	1.20	.40
Clay loam	2.2	1.10	.36
Clay	1.9	0.95	.31

precisely through modeling, we are already able to reduce the use of chemicals for certain diseases. This should help us reduce pesticide use. Using biological pest control will further reduce our dependence on chemicals, though some use of chemicals will surely be necessary in the future.

The residue of chemical applications ends up in the soil for the most

part. Thus, when using pesticides, knowledge of soil effects on their longevity and activity is important. Maintaining a "high" level of activity of the desired organisms in the soil should be the objective of biological soil management.

Theoretically, this should limit the activity of the undesired organisms. The question is, how can this

be accomplished?

We know that proper pH, moisture, oxygen and food sources are needed for soil microorganisms to be active. In this regard, using sand provides a medium less conducive to maintaining desired organisms. Extensive use of certain pesticides may control the target organism(s); but questions can be raised about how they affect non-target organisms.

Little research has been conducted on these effects. But work by Joe Vargas, Ph.D, and his staff at Michigan State University indicates that some organic materials amended with selected organisms can reduce activity of certain diseases. And our work indicates that thatch may be reduced by applying certain organic products. It is clear, then, that enhancing desired biological activities with selected products offers great promise.

The turf/soil environment is a very dynamic and complex system. Knowledge of the soil's physical, chemical and biological properties and how they interact with each other and the turf can help us make better management decisions. The result should be better quality and more stress-tolerant turf. **LM**

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102	116	130	144	158	172	186	200	214	228	242	256	270	284	298	312	326
103	117	131	145	159	173	187	201	215	229	243	257	271	285	299	313	327
104	118	132	146	160	174	188	202	216	230	244	258	272	286	300	314	328
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106	120	134	148	162	176	190	204	218	232	246	260	274	288	302	316	330
107	121	135	149	163	177	191	205	219	233	247	261	275	289	303	317	331
108	122	136	150	164	178	192	206	220	234	248	262	276	290	304	318	332
109	123	137	151	165	179	193	207	221	235	249	263	277	291	305	319	333
110	124	138	152	166	180	194	208	222	236	250	264	278	292	306	320	334
111	125	139	153	167	181	195	209	223	237	251	265	279	293	307	321	335
112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336
113	127	141	155	169	183	197	211	225	239	253	267	281	295	309	323	337
114	128	142	156	170	184	198	212	226	240	254	268	282	296	310	324	338

## LANDSCAPE MANAGEMENT

APRIL 1988  
This card expires  
June 15, 1988

MY PRIMARY BUSINESS AT THIS LOCATION IS:  
(PLEASE CHECK ONE ONLY IN EITHER

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# PROBLEM MANAGEMENT

by Balakrishna Rao, Ph.D.

## In-between fertilization

**Problem:** Besides fall and spring fertilization, how often should you fertilize turfgrass in between? (Washington D.C.)

**Solution:** An important objective of turfgrass fertilization should be to build carbohydrate reserves and promote root development. Richard Rathjens, senior agronomist at Davey, recommends that a fertilizer program emphasize fall (September-early October) and late fall (time of last mowing of season) applications of fertilizer for cool-season turfgrasses (depending on the area). If a season-long turf of optimum appearance is desired, fall and late fall treatments will need to be supplemented with spring and summer fertilization.

Spring and summer treatments should apply only enough fertilizer to maintain color and density without promoting succulent growth. The annual rate of nitrogen may vary from 2 to 8 lbs./1,000 sq. ft., depending on the species, length of growing season, levels of quality desired, purpose for which turf is used and cultural practices. However, many lawn care companies in your area use approximately 4 lbs./1,000 sq. ft. in four to five applications per season and are able to provide the color and density desired by their customers.

## Betasan control

**Problem:** Many of our lawn care customers have a rich organic loam soil, and because of this our pre-emergent (Betasan) doesn't do a good job of controlling crabgrass. Do you know of any other products that may be able to help us with this situation? (Wisconsin)

**Solution:** Stauffer Chemical, the manufacturer of Betasan, indicated in its publication that, "Betasan is more residual in clay soils high in organic matter than in predominately sandy soils or sandy loams." Based on this information, it is difficult to believe that soils rich in organic loam content are the cause of poor results with Betasan.

The Lescosan label (same as Betasan) suggests not to apply peatmoss to lawns or ground covers before applying Lescosan. However, it is difficult to believe that your soils contain so much organic matter to deactivate the pre-emergence material.

Consider the following possible contributing factors for poor performance—pH hydrolysis, photodegradation of pre-emergent in lawns, mechanical disturbance of chemical barrier after pre-emergence material application, poor timing, and amount of moisture received after application (reports suggest

*continued on page 90*

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## MANAGEMENT from page 86

that light irrigation after treatment would improve effectiveness).

Poor crabgrass control was reported in many areas of the U.S. last year, presumably due to the environmental conditions, since several pre-emergence herbicides were used.

As far as other products, consider using pre-emergence material like Pre-M or Dacthal, and make sure that the conditions for crabgrass control are ideal. Read and follow label specifications.

## More on moss

**Problem:** The August issue of *LANDSCAPE MANAGEMENT* contains an article on "Managing Moss." I was a bit surprised to learn that moss grows in both acid and alkaline soil. My confusion comes from the fact that one of my professors at a local agricultural school has a lawn completely grown of moss. He has always advocated the use of copper sulfate to promote the growth of his moss by making the soil more sour or acidic. My only conclusion is that his moss is a type best suited for acidic conditions. However, the article suggests that copper sulfate inhibits moss growth. Could you please clear this up? (Pennsylvania)

**Solution:** Infestation of moss is generally associated with factors such as low fertility, poor drainage, too much shade, soil compaction, wet conditions, poor air circulation or a combination of these factors. Con-

trary to popular opinion, low soil pH is seldom responsible for moss establishment. Most moss species grow under a wide range of soil pH.

There are more than 13,000 types of mosses, with about 50 common to your area. Some appear to be associated with acidic soil and others associated with alkaline soil conditions.

Copper sulfate is one of the products recommended for managing the moss problem, although copper sulfate alone will not take care of it. Along with treatments, other contributing factors should be corrected to minimize moss growth.

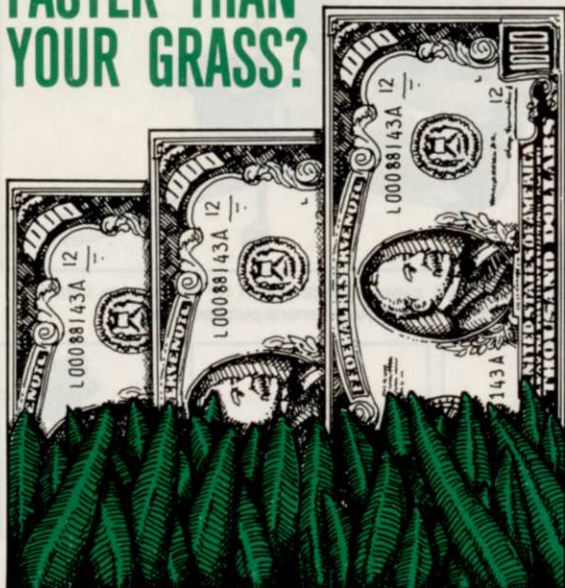
I am not sure how this treatment would promote moss growth. One explanation is that moss is growing in an area where it can flourish and establish well. Perhaps the growing conditions were very conducive for moss growth in the property questioned. The soil might have been alkaline to start with and response to copper sulfate treatment was not very visible.



Balakrishna Rao is Director of Lawn Care Technical Resources for The Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Management, Landscape Management, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

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