repeat these observations with more precision and to examine the effects of iron, sulfur, lime (CaCO₃), gypsum and the common sugars found in grass tissues on proliferation of algae and the rate at which they interfere with water infiltration.

The odor's origin
Some of the odors associated with black-layered greens may come from the algae. A variety of odors are produced by the different algal species being examined. These odors also may be changed by the substratum on which the algae are growing.

The species of Oscillatoria and Nostoc being examined produce an earthy or swampy odor on the sand columns when supplied nutrient solution only.

It is interesting, however, that if a carbon source is provided, such as fructose or glucose (sugars commonly found in grasses), Oscillatoria will generate large quantities of gas with a distinct sulfur odor. The gas is generated in quantities great enough to lift the algal culture off the surface of the sand column. The nature of the gases generated by the algae and their potential importance in black layer and the turf's death is unknown.

It is suspected, however, that some hydrogen sulfide may be generated. Also, the mucilage of some algae may produce polysaccharides that contain sulphate groups. These polysaccharides also may emit a sulfur odor.

The mixed cultures of bacteria were injected into the sand columns with a syringe; 5 ml. of bacterial suspension was placed two inches below the sand's surface and the algal colony. The sand columns were maintained as previously described.

The columns were unwrapped at two-week intervals to determine if black layer was developing. Between six and eight weeks after introducing the bacteria, some uneven darkening of the sand was observed. Between 10 and 12 weeks, well developed black zones were well established in several sand columns (Photo 2). Blackening was most visible in the silica sand (due to greater color contrast). Development in calcareous sand seemed somewhat slower and was somewhat less distinct (probably due to less color contrast) (Photo 2). The substance(s) responsible for the blackening are unknown at this time.

Sensitivities
However, the black layer seems sensitive to air. When well-aerated water is flushed through the tubes in large quantities, the blackening seems to fade, but will regenerate when flushing is stopped. Formation of the black layer in the sand columns seems to require both algae and bacteria and takes between five and six months to form under laboratory conditions.

To date, blackening has not been formed by algae or bacteria alone. It is possible, however, that provided with an alternate substratum (other than algal mucilage) and poorly aerated conditions, bacteria might still function to form the black layer.

Results of these preliminary studies support the hypothesis that black layer can result from an abnormal microbiological ecosystem consisting of algae and bacteria on high-sand content greens. It is possible that other factors may also contribute to black layer formation, but the biotic system can account for the extensive viability found in black-layered greens; that is, infiltration and drainage, variations in odors, variation in developmental patterns and variations in toxicity to the turf.

Modern turf demands
Why the problem exists and has proliferated on high-sand content greens is not entirely clear. The organisms being examined in our research are not inherently damaging to turf; however, it seems that cultural systems which have evolved over the last 20 years on golf greens favor their abnormal development. Demands placed on the high-sand content green to provide the kind of surface wanted for modern turf may be greater than the turf and its growing media can provide. This intense management may be responsible for the abnormal proliferation of algae, bacteria and fungi.

The time may be upon us when we may be forced to reevaluate the demands in realistic terms of what a living turf can, or cannot provide.

In the meantime, for the superintendent plagued with the black layer problem, minimizing irrigation (provided Mother Nature cooperates), increasing aerification, and raising mowing heights to the extent that the golfers will tolerate may help slow the damage done by black layer.

ACKNOWLEDGEMENTS: Preliminary research presented in this article was supported in part by the O.J. Noer Research Foundation, the Iowa Golf Course Superintendents Association and the Iowa Turfgrass Institute.
Some cancellations even TURFLON can't prevent.

When your customers move away from you, the best herbicide in the world can't make them stay. But when more than 24% of LCO customer losses are due to poor weed control—as cited in one recent study—then it's time to take a look at your herbicide.

TURFLON*: Superior control. For outstanding control of a wide spectrum of broadleaf weeds, there's nothing like TURFLON herbicide. It even gets the stubborn Hard to Control weeds—oxalis, ground ivy, wild violet, spurge and the like—that other herbicides often miss. So your customers stay happy...and stay with you. And you have fewer complaints, fewer costly callbacks, fewer cancellations.

New herbicide chemistry. The active ingredient in TURFLON, triclopyr, is the first new herbicide chemistry to come along in years. It stays where it's sprayed, won't migrate through soil to harm ornamentals and other off-target species. It's safe to established cool-season turf, and has a proven safety record for humans and animals.

Proven in use. TURFLON herbicide performance has been thoroughly proven...in years of testing and in day-to-day use on LCO route trucks across the country. Operators who have used it find that often one treatment with TURFLON does what other products fail to achieve in two or more treatments.

Choice of formulations. Whatever you need, there's a TURFLON formulation for you. Choose an amine for broadcast use, or an ester for spot application. Whichever you select, TURFLON herbicide gives you outstanding performance, every time.

You can't keep your customers from moving away. But you can keep them from moving to your competition because of poor weed control. Keep them, and keep them happy, with TURFLON herbicide.

TURFLON*

Fewer weeds, fewer cancellations.

*Trademark of The Dow Chemical Company
SELECTING SOFTWARE

Few landscape and lawn care businesses can run effectively these days without computers. Last month, LANDSCAPE MANAGEMENT told business owners what to look for in computer hardware and software. This month, we review some of the software programs available to the green industry.

by Rudd McGary and Ed Wandtke

M
onths ago, we sent out inquiries to companies that program computer software for the green industry. Many companies were kind enough to respond by sending us their actual software for appraisal. Others sent us literature.

Here is our appraisal of the companies who sent programs. For the names of those companies who sent literature, see the accompanying list.

Landscape

Computerized Studio Management

This is a menu-driven business program for landscapers with seven main parts of the menu.

The daily activity log has sections on employee hours, customer activities, and posting daily activities to the bill log. It can also review previous work. The customer billing will print bills for all work done within the month. The printing is done on standard forms available at any computer supplies store.

The financial records section enters customer payments, changes in those payments, customer's payment history, all customers' balances, plus a section on banking and cash disbursement. It has sections on vendors and check reports.

by Rudd McGary and Ed Wandtke

Wandtke and McGary are senior consultants with All-Green Management Associates in Columbus, Ohio. Dr. McGary focuses on marketing and management issues. Wandtke focuses on operations and financial questions.

MANAGEMENT

IN BUSINESS

This covers most of your needs for A/R and A/P. Payroll computes pay for a specific employee. It does not print checks. The quarterly tax reports compile the sales, payroll and employment tax for your company. The business report prints out income, payroll, checkbook, disbursements, monthly bill, service history and customer mailing labels. The lead tracking section gives you a record of the name, address, date of visit, estimate and comments for each of the leads you enter. It doesn't have a field for source of lead.

Overall, this is a very usable program for landscapers. There are areas that aren't covered, such as marketing information and general P&L capabilities, but it does have most of the basics needed for a landscaper. A job cost analysis section would be a good addition for this software. It is easy to understand, menu-driven, and would be a good program for those companies beginning to computerize with a cost low enough that it is affordable by most landscapers.

Quintessence Computing
See lawn care review.

Landscape Computer-Aided Design

Abracadabra

Design Your Own Home/Landscape Design:
This program is a surprise, mainly because of price. It is written to be very simple, for use by almost anyone with an interest in landscape design. As with any of the computer-aided design (CAD) programs, it is used with some sort of pointing device so that you can work your designs on-screen.

The Apple II software is strictly a landscape design program, although other modules are available. The instructions are easy to follow, and persons without any prior background in computers should be able to boot it up and use it.

There are many things this program doesn't do like estimating, growth simulation for plants, job costing and plant data base. However, its price is inexpensive enough that you should consider it as a tool that can be helpful in beginning your CAD work. It is available from dealers around the country.

Landscape Business Data Manager

This is a very powerful design tool. In addition to the regular modules, a set of construction detail disks have been released recently. They sell for $399 for six or $795 for all six.

While this is a sophisticated system, it isn't hard to use. It gives a wide range of uses for the landscaper and also gives management information that can be used in bidding and cost analysis. Originally designed by an ASLA member, it takes into account almost all of the variables needed to show a very professional design. The key to its cost is the detail available and the total writing of the software. This package is available from dealers who act as the support system.

(FOR both of the above CAD programs, an additional cost will be the printer or plotter you use. These vary greatly in price, from $750 to $10,000+. It depends on the quality and speed you want from your printing peripheral.)

Vehicle maintenance and repair

Diagonal Data Corp.
Fleet maintenance

This is an extremely powerful program designed for use with multiple-vehicle companies. If you're just starting a company in landscape or lawn care, this isn't for you. But if you're getting to a size where vehicle maintenance is an important component part of your total costs, this program would be extremely valuable.

The program can be customized so that any type of company can use it. The key to its usage isn't only the number of vehicles in use but also the complexity of the types of functions that the vehicles perform. It can be upgraded from the PC configuration to a multi-task, multi-user one and this allows for growth in the company.

This may not be for all companies, but it certainly is an invaluable tool for those who want to be able to control a vital part of the cost components of operation in the green industries and who are large enough so it is a necessity.

Lawn care

There are six programs reviewed here. All six are sound and fair value. They are listed in alphabetical order.

ADS Software

ADS Residential/Commercial Services, Accounts Receivable

This is one module of a larger package written by ADS. The other packages are general ledger, accounts payable, payroll and inventory. All are integrated into the general ledger program, although not on a real time basis. ADS Software, Inc. writes business programs for use specifically for the small business, a category that fits many of
Landcadd's software program lets companies design sites in color.

The A/R program consists of several operations, including an integrated invoicing program available. It is a well-written program, which takes into account the repetitive billing systems used in the green industry. Routing information is also available on this package. The only concern is that it is a generic package, albeit well-written, and this will mean that certain types of functions found in lawn care aren't in the package as it stands. Menu-driven, it has an easy-to-learn fill-in-the-blank format. This program has good audit trail features which guard against double entry. It should be noted that other programs are available in this ADS series so that you could begin to use other parts of information control as you became comfortable with your computer system. The generic nature of the system makes it one that all small businesses could use, but it also means that you will have to adapt some of your procedures to the program. ADS is well known for its software and deserves its strong reputation. Your question is whether or not to begin with a generic program for your needs.

Comp-U-Green
Management Systems for Lawn Care Industry

While the target market for this software/hardware package is described as companies with multiple-branch locations, it can also be used by the single-location company with expectations of growth. It is a powerful program consisting of eight modules, although it isn't necessary to purchase all of them at one time. The price will depend on the modules that are purchased. It should be noted that the price includes hardware as well.

Report generator and word processing modules are only available when using the Contel Tiger mini-computer. The A/R module consists of production work and routing reports, invoice printing, daily work posting, open invoice reports, service calls, customer information screen, daily sales status, daily ledgers and daily posting. In this module are square foot and dollar amounts for all routes, work orders, a daily recap of production. and listings of all new sales and cancels for the day. These then can be translated into monthly work.

The sales system module can be used with personal sales or telemarketing systems. It shows all estimates pending with the source of the lead, estimates completed, and a mail file is used to develop your own list.

The inventory module gives you daily fill tickets and route reports showing the chemicals. miles, gas used and time needed. Reports are generated for each applicator. The usage for each chemical is updated as dollar amounts and units used. The reports can be run for any amount of time. On a periodic basis you can see inventory cost, status, adjustments (purchases), chemical use, trucks and production management reports by applicator. This module also has employee records, employee evaluation records, and time clock entries.

The accounts payable module tracks all outstanding bills, bills paid and checks written. It also has vendor analysis reports and cash flow reports based on due dates of outstanding bills. It automatically updates to the general ledger system and reconciles your bank statement.

The general ledger has daily journal entries which, if active on the other modules, are automatically done. An income statement, balance sheet, asset depreciation, and loan schedule reports are available in this module.

As you can see, this is a complete lawn care package. Don't be put off by the prices, they include hardware. This is best used by larger multiple location companies with multi-task, multi-user needs, but some of the companies currently using it are smaller. There is more to the program, but this brief overview will give you an idea of the depth of the program from Comp-U-Green.

Distribution Management
CLC1

This menu-driven program was designed for a lawn care company. More than 70 lawn care companies currently use CLC1 as their computer system. While it can be used by the smaller company, no less than 500 customers is the suggested lower limit. CLC1 focuses on companies experiencing growth over the 2000 customer number. The program has a great many features; mentioning all of them would overload the page. Here are some that specifically pertain to lawn care companies.

Many of the applicable variables in the customer file are available on both daily and a weekly list basis. This part of the program gives you control over all the standard customer interactions a lawn care company would have.

The invoice section prints invoices in generic, blank and pre-printed forms. It also shows invoices printed but not posted.

The credit/cash section gives control over your cash functions in the company. Within this program you find credit memos, cash receipts and journals for both, customer aging A/R information and an aging trial balance. In addition, this section controls your daily cash receipts and has a hold system for customers past due. A special feature is a series of "flags" that come up for specific customers, which will help in collecting receivables and avoid rendering services to non-paying customers.

The report section, a valuable set of management tools, includes reports on routing, daily...
production, application scheduling, monthly production, commission reports, customer history reports, monthly cancellations, sales report by routes, sales by salesman, a production receipts journal, and a sales tax-by-tax code report.

We believe that all of these are important areas for management to control in order to affect the profitability of the company.

What isn't here? Payroll, vehicular maintenance, marketing and financial forecasting, among others. The company provides the customer with an executive summary of functions of the program as well as documentation, approximately 300 pages in length, which is easily usable and user friendly, as most menu-driven programs are.

**Practical Solutions**

Lawn Care Management System

More than 65 companies use this popular program. It is written for both large and small companies. As with many programs, the first use is generally in the A/R area with billings and past due accounts the focus of the first-time user.

The customer module provides standard information as well as route lists, and service request lists. The information can be sorted several ways and gives a trail in information concerning individual customers as well as grouping these lists according to the owner/operator needs. This interfaces with the Word Perfect word processing program for use in designing various types of letters for use in customer communication.

The A/R section handles all billing functions and includes sections for pre-payment handling, billings, cash trails, and credit policies. Estimate continued on page 38

### PROGRAM

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>HARDWARE</th>
<th>PRICE</th>
<th>SOFTWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape Business</strong></td>
<td>Computerized Studio Mgmt.</td>
<td>IBM PC compatible (dual floppy disk, but hard drive is recommended)</td>
<td>$895</td>
</tr>
<tr>
<td><strong>Data Manager</strong></td>
<td>6143 Jericho Tpke. Suite 26 Commack, NY 11725</td>
<td>Apple II series (dual floppy); IBM PC compatible, XT, AT; used with paddles, graphics pad or joysticks</td>
<td>$69.95</td>
</tr>
<tr>
<td><strong>Design Your Own Home/ Landscape Design</strong></td>
<td>Abacadata P.O. Box 2440 Eugene, OR 97402</td>
<td>Apple II series (dual floppy); IBM PC compatible, XT, AT; used with paddles, graphics pad or joysticks</td>
<td>$99.95</td>
</tr>
<tr>
<td><strong>Landscape Business</strong></td>
<td>Landcadd 10418 E. Tanglewood Franklinton, OH 43015</td>
<td>IBM PC, AT, XT; used with pointing device</td>
<td>$4395</td>
</tr>
<tr>
<td><strong>Landcadd</strong></td>
<td>Landcadd 2000 E. Edgewood Dr. Lakeland, FL 33803</td>
<td>IBM PC, XT or IBM 36</td>
<td>$4950</td>
</tr>
<tr>
<td><strong>Fleet Maintenance</strong></td>
<td>IBM PC compatible</td>
<td>$695; $995 with general ledger</td>
<td>$8,000</td>
</tr>
<tr>
<td><strong>ADS Residential/ Commercial Services</strong></td>
<td>ADS Software 707 5th St. NE Roanoke, VA 24016</td>
<td>IBM compatible</td>
<td>$14500</td>
</tr>
<tr>
<td><strong>Accounts Receivable</strong></td>
<td>(703) 344-6818</td>
<td>IBM XT/AT with 20 mg hard drive</td>
<td>$3500</td>
</tr>
<tr>
<td><strong>Management Systems for Lawn Care Industry</strong></td>
<td>Comp-U-Green 3718 Antioch Ct. Cincinnati, OH (513) 733-0969</td>
<td>PC compatible</td>
<td>$695; $995 with general ledger</td>
</tr>
<tr>
<td><strong>ADS Software</strong></td>
<td>Distribution Management Systems 11823 Arbor St., Ste. 110 West Palm Beach, FL 33401</td>
<td>CADO</td>
<td>$695; $995 with general ledger</td>
</tr>
<tr>
<td><strong>CLC1</strong></td>
<td>3718 Antioch Ct. Cincinnati, OH (513) 733-0969</td>
<td>Data General mini-computer</td>
<td>$4500</td>
</tr>
<tr>
<td><strong>Lawn Care Management System</strong></td>
<td>Practical Solutions 500 W. Wilson Bridge Rd. Worthington, OH 43085</td>
<td>IBM compatible with 20 mg hard drive</td>
<td>$1420.00</td>
</tr>
<tr>
<td><strong>The Lawn Assistant</strong></td>
<td>Real Green 2775 Hagerty Rd. Walled Lake, MI 48086 (313) 669-1118</td>
<td>IBM XT/AT with 20 mg hard drive</td>
<td>$4000 (IBM); payroll $2500, inventory $2000, general ledger $2000, accounts payable $2000</td>
</tr>
<tr>
<td><strong>AM+</strong></td>
<td>Quintessence Computing 3001 Lake Austin Blvd. Austin, TX 78703 (512) 477-9038</td>
<td>IBM compatible or Digital PDP series</td>
<td>$4000 (IBM); payroll $2500, inventory $2000, general ledger $2000, accounts payable $2000</td>
</tr>
</tbody>
</table>
“It takes a long time to build a customer base. I wouldn’t trust my business to anything less than Lebanon quality.”


Professionals like John Van Newhyzen know that a healthy lawn—and a healthy business—depend on the premium quality of Lebanon Professional Turf Products.

Quality you can trust, because we back our blends with over 40 years of consistent optimum performance. Plus, Lebanon offers the industry's widest choice of quality fertilizers and chemical control products—economical SCU blends, premium homogeneous granular fertilizers, custom and standard liquid fertilizers for rapid and controlled release—and now, new sprayable and injection type fertilizers for special applications.

Dependable effectiveness makes Lebanon Professional Turf Products a superior value and that helps you earn a lot of that real green—and still maintain your competitive edge. Why should you trust your business to anything less?

For more information on our Professional Turf Products, call our Greenline at 1-800-233-0628, 1-800-852-5296 (PA only) or 1-717-273-1687.
Payroll and accounts payable functions are not included in this program.

Perhaps the most important part of the entire program is the number of reports available for management use. 47. While many first-time users don't use the program's total capacity (this is true of all of the programs reviewed), these reports are designed for use with multi-task, multi-user configurations. The program is designed for use with smaller operators, but the company will release programs targeting larger companies. One additional feature is an "800" phone number for users to call with questions. The program itself is menu-driven, making it usable by current clerical staff.

The management section has information concerning sales totals by customer type, geographical or employee, production statistics by employee or geographical area, advertising results, customer counts by employee and geographical area, sales by period, cancellation analysis, and the ability to produce marketing letters.

AM+ is an extremely powerful program, particularly with the addition of the extra modules of payroll, A/P, G/L and inventory. All of the modules are integrated into the general ledger package, giving a management tool which is valuable to any company. While the program is written for use with smaller companies, it has the capability to expand to large configurations of multi-location companies with multiple cost centers, budgeting and historical comparisons.

Even with all this sophistication, is usable by companies with as few as 500 customers. LM

The Lawn Assistant from Real Green focuses on the operations side of lawn care.

The AM+ program is menu-driven, making it usable by current clerical staff.

Customer information includes standard variables, service remarks, special services, payment tracking, map/route coding, beginning-date-of-service, mailing labels, and proof cards/mailers for follow-up marketing. A master customer list for mailing or phone work is available. The work order section delivers information for the work to be processed, special features and remarks for the specific customer, service descriptions, and automatic inclusion of credit balances.

The A/R includes daily sales and receipt journals for audit trailing, aging reports, sales tax liabilities, repetitive billing, and dunning notices at user-defined intervals.

The management section has information concerning sales totals by customer type, geographical or employee, production statistics by employee or geographical area, advertising results, customer counts by employee and geographical area, sales by period, cancellation analysis, and the ability to produce marketing letters.

AM+ is an extremely powerful program, particularly with the addition of the extra modules of payroll, A/P, G/L and inventory. All of the modules are integrated into the general ledger package, giving a management tool which is valuable to any company. While the program is written for use with smaller companies, it has the capability to expand to large configurations of multi-location companies with multiple cost centers, budgeting and historical comparisons.

Even with all this sophistication, it is usable by companies with as few as 500 customers. LM
LAWN CARE SPECIAL
YEAR OF THE BUY-OUT

Never before has the ownership of so many lawn care companies changed hands in 12 short months. What do these acquisitions and buy-outs mean to the average LCO? Read on.

by Jerry Roche, editor

THE YEAR OF THE BUY-OUT

The Year of the Buy-Out in professional chemical lawn care. Consider what has happened in the last 12 months:

- The ownership of ChemLawn, the country's largest lawn care company, changed hands.
- More than 20 of the nation's other largest lawn care companies were involved in buy-outs, acquisitions or mergers.
- The "Million Dollar Lawn Care List" published annually by Lawn Care Industry magazine is expected to decline by at least 10 (from 57) in 1988. This list has never previously, in its 11-year history, experienced a decline.

"If you look at other industries, what we're going through is a part of normal maturation," says Jim Brooks, executive director of the Professional Lawn Care Association of America (PLCAA).

"But it's also saying that, despite the regulatory problems and the pesticide controversy, there's still confidence in the market.

What does this mean to the little guy, the under-$500,000 business that is the backbone of the industry?

"Individuals who like doing rather than managing may want to get out now while the business is still there to get rid of," says Ed Wandtke of All-Green Management. Wandtke implies that the increasing number of large companies will use refined marketing skills to garner the market now being serviced by the small companies. "The exception is the mom-and-pop operation with just one or two routes," he adds. "The moms-and-pops will always be around."

How have these business transactions affected the lawn care operator, who has been an entrepreneur for 15 or 20 years, and who—typically—is reaching a point in his or her life where some important career decisions must be made?

"It's been my observation that anytime in life there is change, people get nervous," observes Russ Frith of Lawn Doctor. "Yes, there's a lot of concern in the industry because we're now dealing with an unknown." The unknown, of course, is the future of individual companies.

"The guy that I might have sympathy for," Frith continues, "is the guy who might panic. Before deciding to sell, a lot of soul-searching has to be done. Opportunities will be available for some people to exit the industry on very worthwhile terms. But the decision shouldn't be made just because everybody else is selling."

For Marty Erbaugh of Lawnmark, the decision not to sell was easy.

"We're interested in keeping on top of what happens in the industry. We will not sell," he says. "Demand for the services is strong. I don't see our growth slowing down. Selling is a logical thing for a lot of people to do; the prices they're offering are generous. But I really like this business. It's still fun."

Frith also thinks the acquisition/merger situation should be good for the industry, if the new companies exercise "rational judgment." That means making decisions in the best interests of the lawn care industry.

Says Brooks: "We, as sort of custodians of the industry, would not like somebody coming in for the bottom line and not being sensitive to the issues we have in the public health sector." Brooks hopes any new entries in the market would help with public education and in lobbying for safe products and safe use of those products.

Despite all the acquisitions and mergers at top levels, business goes on for most lawn care companies. Landscape Management visited two such operations, McGinty Brothers in Chicago and the Milwaukee branch of The Davey Company. Profiles of those prospering businesses follow. LM