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THE MAKING OF THE GREEN INDUSTRY EXPO

*Has the three-year-old idea evolved into
the maintenance industry's premier turf show?*

In this issue:

**Look
Who's
Composting**

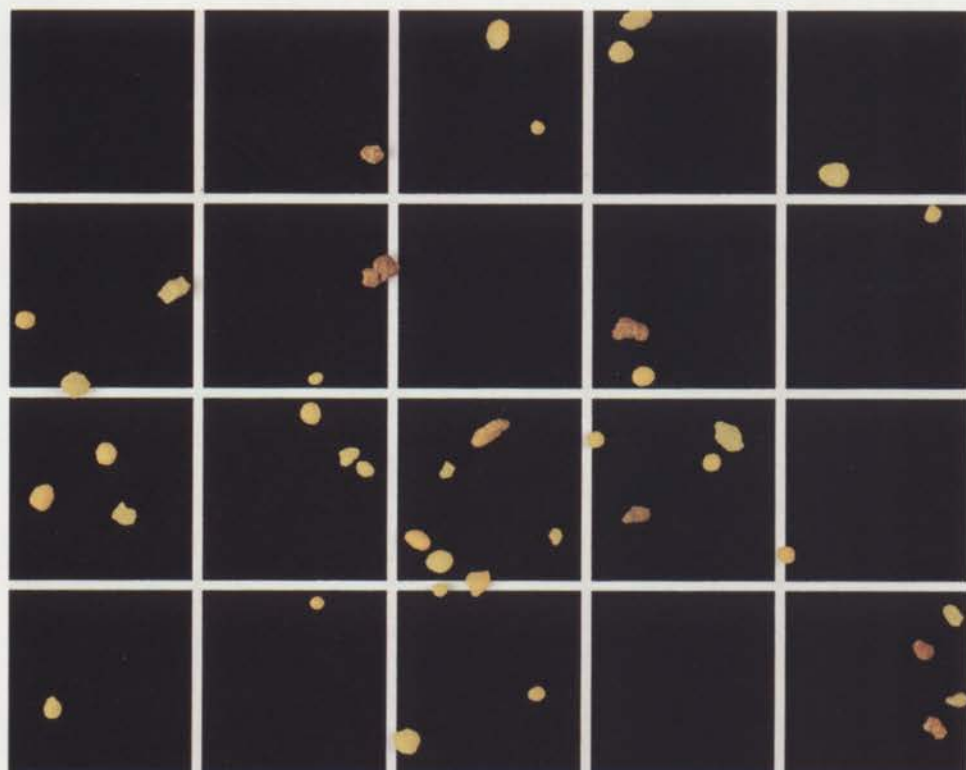
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Quality
Trucks**

**Is Low-Volume
Spraying
For You?**

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Particle distribution pattern for typical blended product.

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● The particles are smaller and more consistently sized than typical competitive physical blends, reducing segregation potential while providing up to 8 times the coverage per square inch. That better coverage means

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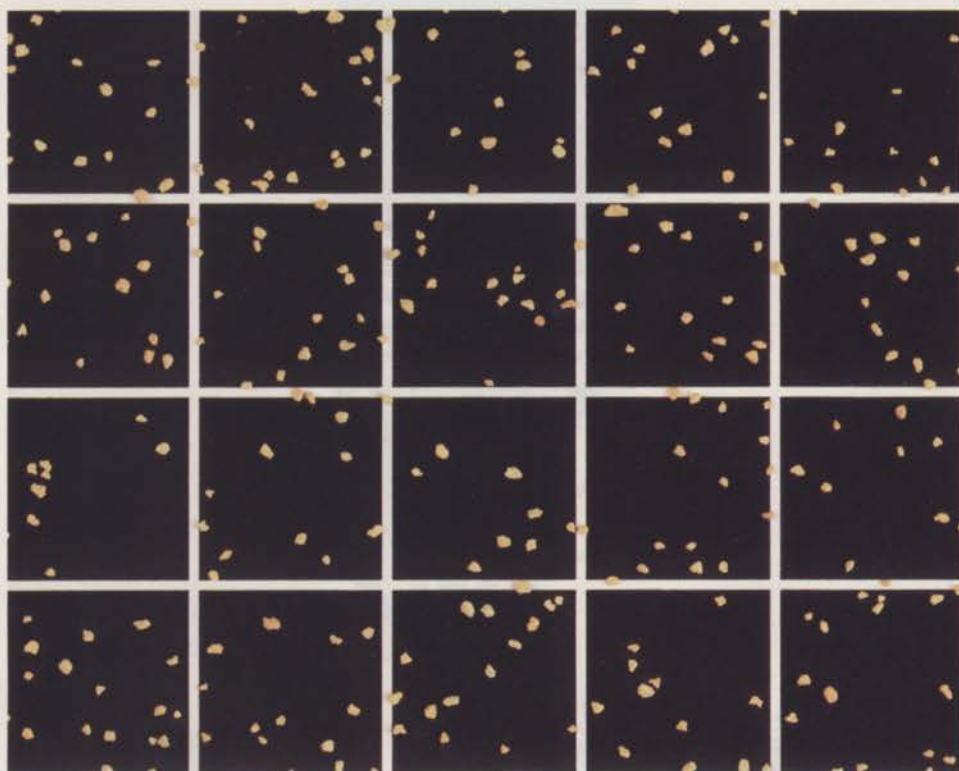
● No other preemergent herbicide can match pendimethalin's combination of broad spectrum weed control, control effectiveness and season-long performance.

Preemergent Control Comparison

	Crabgrass	Goosegrass	Foxtail	Poa Annua	Oxalis	Spurge	Henbit	Chickweed
pendimethalin	H	H	H	M	H	M	H	H
prodiamine (Barricade)*	H	M	H	M	NR	M	M	M
dithiopyr (Dimension)*	H	M	H	M	H	M	M	M

H - High M - Medium NR - Not registered (Based on SCOTTS/university data)

* Barricade and Dimension are trademarks of Sandoz Limited and Monsanto Company respectively.



Particle distribution pattern for SCOTT'S methylene urea fertilizer/pendimethalin product.

weed control, particles money can buy.

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Lawn & Landscape MAINTENANCE

VOLUME 13, NUMBER 11

NOVEMBER 1992

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Chuck Wimmer, Brecksville, Ohio

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Editor's Focus

IN THE MID-80s, not many people were talking about yard waste composting. If anything, leaf facilities were the only business avenue around resembling true recyclers of yard waste.

Today, that's a different story. With about 20 states across the country addressing current or impending yard waste disposal legislation, compost awareness is and should be on the increase.

Sludge composting plants came into existence about a decade ago and increased in popularity as a method of stabilizing disposal prices. So, too, do landscapers and other generators of yard waste need new outlets for the disposal of their business waste.

Yard waste represents only 20 percent to 25 percent of the waste stream, yet it is said that upon separation, 60 percent to 70 percent of the waste stream is compostable. That spells a huge window of opportunity for those venturing into the compost venue.

While most landscape contractors won't attempt to open a full-fledged compost operation, it's a service diversification which should be considered by all; if not for the ecological aspects then for increased profitability.

A recent Roper Poll examining the future of composting indicated that it is an increasingly important method of solid-waste management and 96 percent of those surveyed said they believe composting will increase. Of seven solid-waste management possibilities, 38 percent said they believe composting will experience the most growth and 37 percent said they believe recycling will experience the most growth.

Another key finding of the poll is that consumer education and understanding of composting is preventing more rapid development. This is also true of the professional market.

It's estimated that less than 30 percent of the maintenance market has a working knowledge of composting. Yet the avalanche of legislative activity over the next several years will require contractors to look for alternative disposal sources and subsequent outlet for the composted materials.

As we were putting together our exclusive market report on composting which appears in this issue, I was amazed at the possibilities the industry can experience with compost and at the enthusiasm with which composters view their profession. One compost guru even likened the growth of compost to the growth of the lawn care industry in its heyday.

It makes sense to me. As lawn care operators and landscape contractors begin



incorporating products derived from composted materials, word will spread and both professionals and customers alike will jump on the bandwagon.

That was true in the early 1970s as ChemLawn trucks paraded down suburban thoroughfares turning average lawns into green, weed-free stretches of turf. Neighbors began talking and spreading the word about this new business that was providing attractive green lawns and, naturally, wanted to be a part of it.

Next came aeration. About eight to 10 years ago, the consumer wasn't aware of aeration and the benefits the service could provide to a lawn. But, again, through word of mouth and visibly improved turf, the news got around. Today, lawn care and aeration go hand-in-hand.

With education, the same will be true of compost as a topdressing option, as a peat alternative and so on.

Legislation, awareness, education and profitability will all play a role in the growth of green industry composting this decade, a developing service arena you'll want to be a part of. If you're already selling your clients lawn care, aeration, renovation, mowing and related services, why not add composted materials to your service arsenal?

Be sure and read our valuable compost market report covering a wide spectrum of compost quality issues. It appears on pages 21 through 36 of this issue.

Our thoughts and best wishes go out to Tom Garber, president of Colorado Landscape Enterprises in Westminster, Colo. Garber, a member of the LLM advisory board, underwent a heart procedure last month and is recuperating at his home in Golden. -- *Cindy Code*

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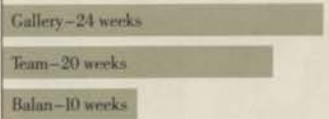
If applying herbicide is something you'd like to do less often, we have good news for you. We can show you how to make fewer herbicide applications and get weed

grass. And it's available on fertilizer or in a granular form for accurate application.

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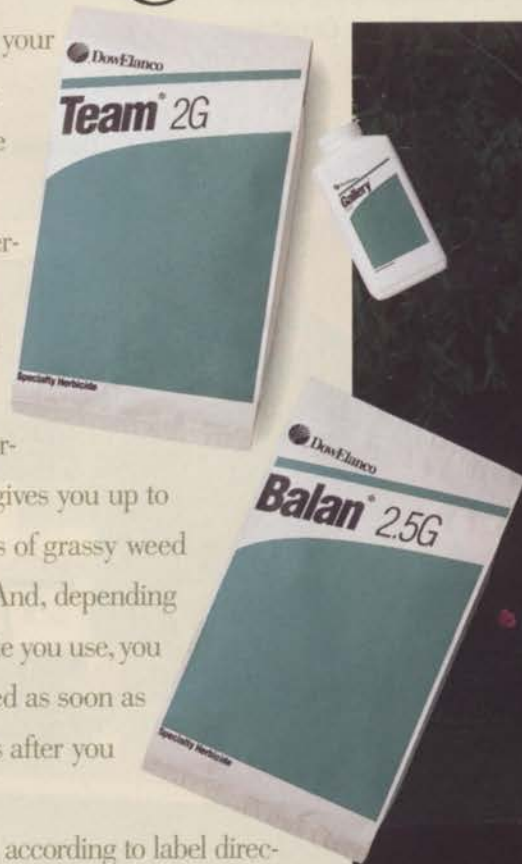
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Crabgrass

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for people interested in



Business Watch

ECONOMIC ACTIVITY is increasing slowly throughout most of the United States, but remains weak in the Chicago area and California, according to a recent report by the Federal Reserve Bank of San Francisco.

A report by the American Production and Inventory Control Society shows the major sectors of the U.S. economy remaining weak, particularly consumer spending and housing, both of which rose in the first quarter of 1992 and since have steadily declined.

In the natural resources sector, foliage plant prices have remained relatively stable in Florida, despite damage caused by Hurricane Andrew.

A leading economist with the APICS forecasts that the nation's manufacturing sector will continue to limp through year's end, but that in early 1993 fiscal stimulus should boost the growth rate from near zero to 2 or 3 percent. New orders, production and sales should start to rise at that time.

CONSUMER PRICE INDEX*

JUNE	JULY	AUG	SEPT
+0.3	+0.1	+0.3	+0.2

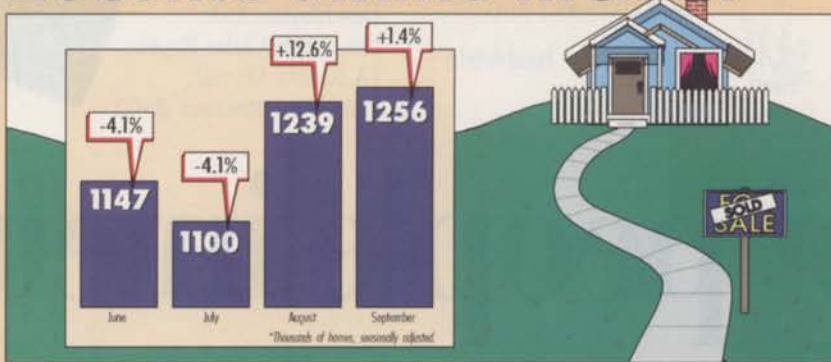
*Percent change from preceding month, seasonally adjusted.

PRODUCER PRICE INDEX*

JUNE	JULY	AUG	SEPT
+0.2	+0.1	+0.1	+0.3

*Percent change from preceding month, seasonally adjusted.

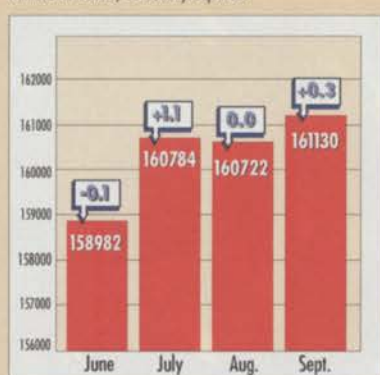
HOUSING STARTS INCH UP



Source: Bureau of the Census

RETAIL SALES*

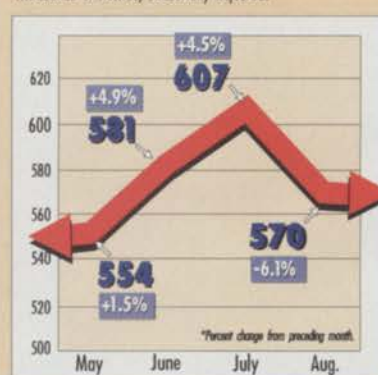
Millions of dollars, seasonally adjusted.



Source: Bureau of the Census

NEW HOME SALES

Thousands of homes, seasonally adjusted.



Source: Bureau of the Census

ECONOMIC REPORT: BUSINESS OPTIMISM

DESPITE DODGING the claws of an economic recession the past two years, landscape maintenance firms nationwide claim to be optimistic about the future. According to a recent survey, 83.6 percent of 155 responding firms believe their businesses will pick up in the next six months to one year. Similarly, 89.7 percent anticipate a bright future in the long-term.

David Davies at Landscape Images, a midsize company based in El Toro, Calif., said his company's short-term future holds some promise. "It seems business is turning up and staying up for longer than it has in the past," he said. "Let's put it this way, we have our fingers crossed but we're not going to the bank with it."

Davies suggested that Hurricane Andrew, which destroyed crops in Florida in late August, is now forcing East Coast landscapers to vie for foliage, particularly bromeliad and ficus, in the Californian and Hawaiian markets.

"Right now there's no guarantee we can have our first selection of what we want or even know what bloom stage the bromeliads are in," he said. "The low availability is forcing companies to take some things in low color, and some companies to buy from secondary markets."

Frank Reynolds of Reynolds Lawn Care, North Branford, Conn., described his approach to staying afloat as "damage control," from both the economy and the environmental movement.

"It's been very ugly for about three years. We've been very, very lucky, as a company, that we have been able to maintain what I call damage control. If you can say at this time of year, we will still be here this time next year, that in itself is success. And we can say that," he said.

Reynolds does not anticipate any net gain in the next year. "If we can maintain par without experiencing any attrition, I will be very happy," he said.

In the Midwest, Phil Fogarty, owner of Crowley Lawn Service, Cleveland, Ohio, said his company experienced an unexpected 10 percent growth in the past year, but that with tax increases and raised prices, "the money was not quite 10 percent. I'm hoping next year with ChemLawn merging, that's going to be a window for smaller companies to take a step up in growth," he said.

Fogarty, who plans to increase business 15 to 20 percent next year, believes tree and shrub divisions of the industry holds the most promise. "The larger companies have mostly grown in specialty areas -- trees and shrubs, mulching and flowers -- the last seven years or so."

Joe Parr, regional operations manager for ISS Landscape Maintenance based in Tampa, Fla., said the company is doing extraordinarily well. ISS, which handles five types of landscaping jobs on the southern East Coast, plans to double its business by the year 2000. ■

NEWS DIGEST

EPA Weighs Halting Pesticide Review

The U.S. Environmental Protection Agency has proposed ending a special review of amitrole after determining that the pesticide's risks outweigh its benefits.

Amitrole, a postemergence herbicide for controlling broadleaf weeds, grasses and woody species, is used primarily for highway rights-of-way. It is not registered for crop uses.

Since 1984, Rhone-Poulenc, the sole registrant of the herbicide, has worked to reduce exposure to workers. In 1991, the company canceled all uses of amitrole in California, where it estimated that 90 percent of the pesticide's market share existed.

Bill Proposed To Protect Minor Crops

The 104th U.S. Congress will consider companion bills that would preserve the availability of safe minor-use pesticides and encourage development of non-chemical pest management tools.

The proposed bills would establish a new minor-use program within the U.S. Department of Agriculture, and direct the EPA to grant conditional registrations of environmentally safe pesticides. In the case of voluntary cancellations, manufacturers could use data from previous registrations when applying for a similar minor use.

'93 EXPO Celebrates 10th Year in July

The International Lawn, Garden & Power Equipment Expo, planned for July 25-27 at the Kentucky Exposition Center in Louisville, Ky., celebrates its 10th anniversary next year.

EXPO officials plan to recognize 10-year exhibitors during the show and to highlight them in the directory and show daily. Show managers are calling on exhibitors who have participated every year since 1984 to contact them by fax, at 502/473-1999.

EPA Studies Mowers Emission Standards

The Environmental Protection Agency and a band of electric utilities have initiated a program to replace gas-powered mowers with battery-powered ones. The program aims to reduce the amount of smog-causing hydrocarbon spewed by gas-run equipment.

DuPont Halts Benlate Settlements; Claims Weather, Misuse to Blame

SEVERAL NURSERY owners in Homestead, Fla., for months complained Du Pont took advantage of damage caused by Hurricane Andrew to freeze or reduce settlement claims over Benlate, the company's fungicide alleged to have destroyed plants in 40 states. Growers nationwide now have to face the fact that Du Pont will not pay the remaining 10 percent of outstanding claims since Benlate is not to blame, according to Du Pont officials.

Dale Smith, vice president of Native Hammock Nursery, said he scrambled for a year to meet Du Pont's demands for invoices and other documents needed to settle Native Hammock's claim that Du Pont's fungicide destroyed \$1.5 million worth of its crops.

Then, in September, Smith filed suit against Du Pont for fraud and damages caused by Du Pont's selling and advertising a product allegedly known to destroy plants.

Du Pont never admitted its product was at fault, although an internal memo from Du Pont reportedly suggested company officials knew more than a year ago that Benlate DF could damage crops even when properly applied, according to *The Miami Herald*. The memo, written by Du Pont scientist Michael Duffy, stated that older batches of Benlate stored in hot, moist conditions could decompose and create harmful compounds.

A Du Pont official claims Duffy's theory "was subsequently disproved by research." The company now concludes claimants' damage was caused by bad weather, nutrient imbalances, plant diseases, nematode infestations and misuse of herbicides. "If you believe this (claim), then you must believe that 1,900 growers simultaneously forgot how to deal with these normal problems," said Smith.

Du Pont started testing six-inch Janet Craigs and other foliage plants at Tropical Ornamentals, a nursery in Delray Beach, last April. For three plantings of Janet Craigs, Du Pont used dosages "of more than four times the recommended rates" of fungicide, "repeated a number of times way beyond what any grower would ever do. There's not a single sign on any plant in any treatment that shows any injury at all," said nursery owner Joe Cialone. "The question now is how many crops of Janet Craigs do you need to keep testing to be able to draw (Du Pont's) conclusions?" It's not known if Benlate will be returned to the market.

Claims settled with Du Pont prior to this month's announcement are final. The 680 pending claims will not be paid, said Pat Getter, Du Pont representative.

Du Pont earlier this year acknowledged damage done to Smith's crops, accepted his claim and issued him two preliminary assistance checks totaling \$300,000. Two days after the hurricane, a group of adjusters representing Du Pont traveled to Homestead to videotape the damage. Du Pont's settlement offer "was then withdrawn altogether," Smith said.

Du Pont denied refusing to settle Benlate claims based on damage done by the hurricane, and declined to comment on specifics of individual claims, including Smith's. "Du Pont would not take advantage of victims of the hurricane," said Getter.

It remains unclear how many nurserymen and growers believe Du Pont is trying to get out of paying for damage allegedly caused by its Benlate product.

"I have not been barraged by calls from people that indicated that Du Pont was rejecting their claims now that the hurricane came," said Earl Wells, executive vice president of the Florida Nurserymen and Growers Association, Orlando. "I'm sure there are probably some strange developments going on out there as a result of the hurricane. But I was told the policy at Du Pont was that if they had a recognized claim before the hurricane, they continued to recognize the claim, but they discounted the amount of the claim because of possible differences in the future of production."

Neither Smith nor Maria Costa-Smith, owner of Costa Nursery Farms, Homestead, who also openly criticizes Du Pont's handling of settlement claims, could verify that Du Pont officials have said outright that the company would not settle with growers after the hurricane. Both claim that although the company never informed them as such, other growers have told them their claims were rejected. Neither would furnish names.



(continued on page 16)



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News in Brief

(continued from page 13)

Biosys, Sandoz, Form Partnership

Biosys of Palo Alto, Calif., and Sandoz Agro Inc. of Des Plaines, Ill., have joined research efforts to develop an insect-specific viral insecticide.

Called baculoviruses, the bioinsecticides are safe to humans, wildlife, water, soil and plants, according to Biosys. The insecticides also protect against leaf-eating pests estimated

to cause more than \$100 million worth of damage annually in the United States.

The two companies expect to complete development of the first baculovirus products by year's end 1994.

Worldwide target markets for baculovirus products total more than \$1 billion. If the products are successful, Biosys will become baculovirus' exclusive producer and Sandoz, the exclusive worldwide distributor and marketer.

Biosys also recently expanded an existing partnership with Archer Daniels Midland's BioProducts Division. The move gives

Biosys access to Archer's fermentation capacity, which reaches well beyond its own core nematode-based biopesticides.

NTG Toughens Turf-Type Grass

The Native Turf Group, Phoenix, Ariz., is evaluating some new seeded turf-type buffalograss cultivars in Nebraska and Oklahoma. The company hopes the cultivars will produce higher quality, dark green, low-maintenance strains.

NTG planted cultivars of different parentage at each location: one cultivar that is widely adaptable to cooler climates, the other better suited for warm regions.

IA Elects New Officers

The Irrigation Association elected a new treasurer and three new directors at its annual meeting in New Orleans.

Sam Duke, president of Russell Daniel Irrigation, Athens, Ga., is treasurer. Duke previously served a three-year term on the board of directors.

New directors, each serving a three-year
(continued on page 18)



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Benlate Settlements

(continued from page 13)

Du Pont recalled all of its dry flowable formulations of Benlate 50 DF, Benlate 1991 DF and Tersan 1991 DF fungicides in March 1991 because tests detected small traces of atrazine herbicide in some production batches. Du Pont recalled the same fungicides in 1989 for the same reason.

Atrazine was produced at the same contract formulation plant sites as Benlate DF, but the source for the trace of atrazine never surfaced, said a Du Pont representative. Subsequent research indicated plant damage observed could not be attributed to atrazine.

Duffy's memo suggested that excessive amounts of benomyl, an active ingredient, may have been put in certain batches of Benlate, and that farmers may have over-applied the fungicide, causing damage to their own crops.

As of Oct. 1, there were 1,900 settlement claims nationwide, reaching \$500 million. Nearly 90 percent of claims have been resolved, said Pat Getter, a representative of Du Pont. In Florida alone, there were 1,210 claims, 90 percent of which have been resolved, to the tune of \$395 million, said Getter.



“The summer of 1990 brought several tree and shrub problems to the Atlanta area — many of which were corrected with the help of ROOTS™. Dozens of Dogwoods on our properties were stressed and leafscorched from the hot, dry weather in July and August. A soil drench with ROOTS™ helped these trees bounce back to life. Another problem situation was a large planting of English Ivy that was chlorotic, leaf-spotted and growing poorly. A combination spray of ROOTS™, iron and an appropriate fungicide dramatically improved the condition of these plants.

We are also considering the use of ROOTS™ on our spring-planted flower beds. And on my own landscape, the fescue turf, which received very little irrigation, was green all summer because of two timely applications of ROOTS™.”

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News in Brief

(continued from page 16)

term beginning in January, are David Ransburg, chairman of L.R. Nelson Corp., Peoria, Ill.; Michael Donahue, president of Aquamaster Irrigation Products, Thornhill, Ontario, Canada; and Michael Muffett, vice president of Muffett & Sons, Zillah, Wash.

Ransburg has been with L.R. Nelson for 20 years and served as chairman of the IA Public Affairs Council from 1978-79. Donahue served for three years on the IA long-range planning council, of which he is now chairman.

The IA's annual meeting was held in conjunction with its international expo.

PLCAA Selects 1993 Officers

New officers for the Professional Lawn Care Association of America were recently accepted by the board.

The new association leaders are: John Robinson, president; Lou Wierichs Jr., president-elect; Ed McGuire, vice president; and Pat Norton, secretary/treasurer.

The board also approved the appointment of Bob Tracinski of John Deere to the new associate director seat. The PLCAA now has three associate director positions instead of two, and the length of each associate director's term was increased from two to three years. ■

Green Industry Mergers, Acquisitions & Agreements

WARRENS ACQUIRES TURF MERCHANTS. There wasn't much anyone could do about the weather's effect on this year's seed harvest, but Warren's Turf Nurseries of Crystal Lake, Ill., is taking steps to shore up its presence in the seed industry.

With this summer's purchase of Turf Merchants from The Genesis Group, Warrens accomplished its goal of improving its marketing and providing increased stability to the products it offers, according to Mike Holmes, general manager.

Previously, Warrens contracted for seed for most of its own sod production, but three years ago acquired Davenport Seed, a production/processing business. Then, to add a marketing bent to its capabilities, Warrens began scouting other firms and acquired Turf Merchants.

Both Davenport and Turf Merchants operate as subsidiaries of Warrens. They are independent, yet work closely together, Holmes said. Warrens, which has been in business since 1954, doesn't foresee any changes to operations at Turf Merchants.

AQUASHADE SOLD. Applied Biochemists of Milwaukee, Wis., recently purchased Aquashade of Eldred, N.Y. Aquashade products and headquarters were moved to Milwaukee. Product inquiries should now be made to 800/558-5106.

NEW MARKETING AGREEMENT. AgriDyne Technologies, Salt Lake City, Utah, established a marketing and development agreement with O.M. Scott & Sons Co., Marysville, Ohio, for its Turplex TM bioinsecticide giving Scotts exclusive rights to market the product to the professional turf and golf markets.

AgriDyne retains the rights to market the product internationally and to a select group of national lawn service companies. Turplex is expected to be available for commercial use in early 1993.

The insecticide, with the active ingredient azadirachtin (a compound extracted from the seed of the Neem tree), is said to have shown good control of cutworms, armyworms and sod webworms.

EVERGREEN ACQUIRES EASYRAKE. Since the late summer sale of EasyRake to Evergreen International, four new products have been added to the line of vacuums, dethatchers, sprayers and power blowers.

Mark Gramelspacher and Mark Schafer bought the 30-year-old firm from the founding family for an undisclosed amount. They plan to keep manufacturing facilities in Lebanon, Ind.

The new products -- a chipper/vac, a chipper/shredder, a vertical slicer and Easy-Vac Model 43 -- are currently in production.

WHEELABRATOR BUYS ENVIRO-GRO. Wheelabrator, known for its waste to energy plants, recently completed the first stage of its buy out of Enviro-Gro, maker of Terrene™ and Granulite™ organic fertilizers.

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Association News

The **American Association of Nurserymen** developed a 25-page guide to help business owners comply with the Americans with Disabilities Act, put into effect last summer, which prohibits businesses with 25 or more employees from discriminating against disabled people.

The guide, which includes a 10-page supplement, costs \$15 for members and \$30 for non-members. For more information or to order a copy, contact AAN Publications.

The AAN also can access the Small Business Research and Education Council hotline which provides detailed information about ADA implementation and regulations, as well as referrals to ADA compliance specialists.

The **California Landscape Contractors Association** changed the time frame of its Landscape Industry Show, usually held in April, to Feb. 24-25, 1993. The show, formerly called GreenTECH, takes place at the Long Beach Convention Center.

"The jump forward on the calendar should result in maximum attendance," said Greg Meyer of Pacific Arbor Nurseries and show chairman. "The earlier in the year the show

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takes place, the more chance we have of rain. And whenever it rains, we can count on attendance skyrocketing."

Wednesday, Feb. 24's seminars include: Creating a Comprehensive Residential Lighting System, Seven Key Management Issues Facing California Companies in the 1990s, Total Quality Management and The Basics of an Estimating System.

Thursday's seminars cover Three Ways to Recover Your Overhead, Cultural Practices to Reduce Pest and Disease Problems and

Common Landscape Litigation and Consequences.

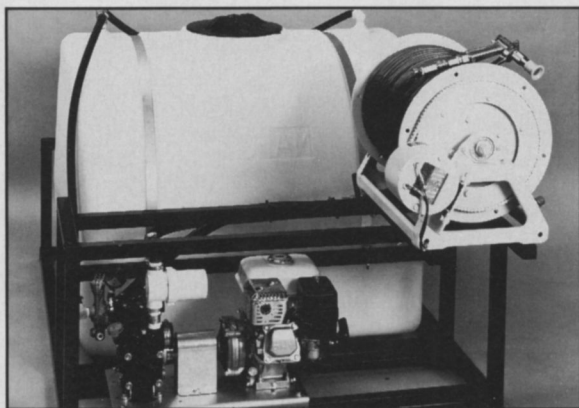
The **Golf Course Superintendents Association of America** is considering conducting a human pesticide exposure study to determine possible effects of chronic pesticide exposure.

Pat Jones, GCSAA director of development, plans to call on pesticide experts to discuss the scope of the proposed study.

(continued on page 37)

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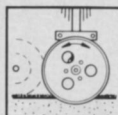
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USE READER SERVICE #59



Lawn & Landscape MAINTENANCE

*EXCLUSIVE
MARKET REPORT*

LOOK WHO'S COMPOSTING

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USE READER SERVICE #63



Using Compost Successfully



Landscape contractors and their customers will require proof of high quality, environmentally safe products before purchase.

Composts are being produced out of many feedstocks with the use of various bulking agents and under various environmental, chemical and biological conditions. Consequently, finished composts exhibit a range of characteristics and varying qualities.

It is important that compost manufacturers, marketers and end-users understand this variability exists, and that individual composts possessing specific characteristics are more likely suited to specific applications under specific

Composts of various quality and characteristics have been used in numerous applications, but what type of compost is really best for you and the properties you're managing?

*By Ronald Alexander and
Rod Tyler*

conditions. Understanding these facts can help manufacturers produce higher quality composts, marketers distribute their products to the appropriate end-users and end-users purchase and use the compost products best suited for their specific use.

In order to better address this concept, we will describe the major markets for compost use, including landscaping, nursery growers and sports turf, offer an explanation of product uses within each particular market and outline the desired compost characteristics for those uses.

LANDSCAPERS

Landscapers have been using composted products for many years and in many applications. So it should be no surprise that landscapers are currently using large quantities of composts produced from various municipal and agricultural wastes. Composts of varying qualities and with varying characteristics have been used in soil upgrading; turf establishment and maintenance; mulching; and in the establishment and maintenance of ornamental plants.

The type of compost used by an individual depends on product availability, the specific application and customer preference.

SOIL INCORPORATION/UPGRADING. Compost is an excellent amendment for soils low in organic matter content, those suffering from poor nutrient retention properties, highly compacted soils or those lacking water holding capacity. The addition of compost improves the soil both physically and chemically, allowing for healthy growth of turf and ornamentals.

Research has shown that the application of sludge compost at a rate of 260 metric tons per hectare (approximately 235 cubic yards/acre) enhances the establishment of turfgrass from seed. The application of 180 metric tons per hectare (approximately 160 cubic yards/acre) of compost was adequate for the establishment of turfgrass sod. In experiments, compost significantly improved the rate of establishment and general appearance of the turfgrass (Angle 1981).

The application of a 1- to 2-inch layer of compost is often cited as a general application rate

for upgrading soil for the establishment of turf from seed or sod. This layer of compost should then be incorporated to a depth of 5 to 8 inches for maximum effectiveness.

Compost used in soil upgrading should be rich in organic matter (more than 50 percent), free of weed seeds and possess a texture and moisture content allowing for easy spreading.

Most states have legislation governing landscaping loading limits for various fertilizer and organic materials. Chemical analysis of composts will be required to satisfy these laws. The pH and soluble salt content of the compost depends on the characteristics of the soil being amended and the plant materials to be established.

In turfgrass situations, these characteristics are not as critical as when improving a garden area for annual or perennial plants. In these latter applications, the soluble salt content of the compost is significant in that excessive levels in the soil mixture may be damaging to certain species (i.e., geraniums and asters).

It has been shown that various annuals and herbaceous perennials respond favorably to compost applications at a rate of 10 percent to 30 percent of a garden soil mixture (Smith 1991). A 1-inch application rate of compost tilled to a depth of 5 inches is a 20 percent inclusion rate. It is also important that compost used in this manner is stable (well cured), so that nitrogen immobilization does not occur.

Higher quality and more refined composts, up to this point, have proven to be more popular in soil incorporation projects for garden areas and on home lawns. Less refined products, such as composts containing foreign matter and ones

which are odorous, are more acceptable in commercial and/or industrial applications.

TOPDRESSING. Topdressing has long been a reliable turf maintenance practice in the golf course industry and has grown in popularity for commercial and home lawn applications. The practice entails applying a thin layer (approximately 1/8- to 1/2-inch) of topdressing material over an established and usually declining turf area. Topdressing is usually done in conjunction with aeration and reseeding.

Compost used as a topdressing must not only be consistent in its chemical characteristics, but also in its physical characteristics. The materials used must have a texture making it easy to handle and one that is finely screened. It must also be free of foreign matter and objectionable odors, since much of the material will be left on the soil surface.

This market is expected to grow with the popularity of low input landscaping and/or maintenance practices which use organic materials. The chemical and biological characteristics of compost have also been suggested to improve the degradation of thatch which may be a nuisance in some established turf areas.

PLANTING MIXES. Composts have been used as a component of various landscape growing mixes such as those for roof tops, raised planters, planter boxes and backfill mixes. These mixes may include topsoil, peat moss, sand, styrofoam, vermiculite, perlite and compost usually at a rate of 25 percent to 33 percent of the mixture.

Compost in these applications will improve drainage and water holding capacity of the mixes, encourage deep rooting and will supply a rich source of organic matter and nutrients. The organic matter supplied by compost will also increase the cation exchange capacity of the mix and supply valuable humic acid, which aids plant uptake of some nutrients. The compost used in these applications must have a pH and soluble salt content which, when mixed with the other planting components, are acceptable to the growing plants. This material must be weed free, have a workable texture and must be stable to avoid nitrogen immobilization.

MULCHING. Some composts have been successfully used as a decorative mulch in garden beds. They are usually applied to the soil surface at a depth of 2 to 3 inches. Compost mulches are used to conserve moisture, lower soil temperature, reduce erosion, provide nutrients and discourage the establishment of weeds.



Using backfill mixes with 10 percent to 30 percent compost improves the performance of trees in the landscape environment.

The compost must have a uniform appearance, possess a dark color and should readily absorb moisture. The compost must also be free of weed seeds and have a pH and soluble salt content which will not negatively affect the growth of the plant materials being mulched. Composts produced from both sludge and leaf/yard waste are currently being used successfully as decorative mulches, while composts produced from municipal solid waste have not been as popular in this application because they often contain foreign matter, giving it a non-uniform appearance.

SPORTS TURF

Each year a tremendous and ever growing amount of acreage is maintained as sports turf. New golf courses continue to be built as the popularity of the game increases. At the same time, the popularity of many other field-played sports has forced the construction of new fields and has increased the use intensity of existing fields. Compost used in the construction and maintenance of sports turf has both a proven track record and bright future in this market.

The golf course industry has a great appreciation for the importance of organic matter and for this reason the use of many composted products is commonplace. New uses for compost on golf courses are also gaining momentum, but have not gained total acceptance by this conservative industry. The most popular of these uses are discussed below.

TOPDRESSING. This market niche is slightly different than previously noted in the landscape section. Golf courses historically have less margin for error in the maintenance of turf as a result of high intensity management programs. Therefore, the compost products used in topdressing mixes will normally be of high quality, possess a high organic matter content, a low odor potential and be low in heavy metals and soluble salts.

Composts used in topdressing mixes may have a pH of six to eight and will need to be fully mature with minimal inert contaminants. Particle size of compost used for topdressing should be less than one-quarter inch since most mixes are screened at least to this size.

Typical topdressing mixes for golf courses are comprised of 70 to 90 percent sand and organic material. Peat moss is the reliable organic standard, but some research indicates compost may be an acceptable substitute (Nelson 1992).

Fairways, although not currently topdressed as frequently as greens, comprise the largest

STEP-BY-STEP USE OF COMPOST ON ATHLETIC FIELDS

→ TOPDRESSING

1. Heavily core aerate entire athletic field, concentrating on most heavily trafficked areas.
2. Apply approximately a half-inch layer of compost or 50/50 sand/compost mixture. The most uniform and efficient way to apply the compost is with a topdressing unit or manure spreader.
3. Smooth the surface using a raking device or using a weighted drag mat. The raking/dragging will break up the soil plugs, mix it with the compost and backfill the holes.
4. Seed and water the topdressed area. It is important not to leave the grass seed on the soil surface. It should be mixed into the soil/compost layer.

→ RENOVATING

1. Mechanically till the entire field, turning the soil and destroying the remaining vegetation. A rototiller or farm disk are the best pieces of equipment to use. Killing the existing turf cover with a non-selective herbicide may be worthwhile if weed infestation is significant.
2. Apply two to three inches of compost over the entire field. More product can be used in areas on the fields which have received the most wear. (e.g., center of football fields).
3. Incorporate the compost into the field to a depth of six to 10 inches. Normally, the deeper you can incorporate the product, the better. Work the soil until it is thoroughly mixed and clump free.
4. Shape and smooth the field using a raking device. Firm the field using a light roller. Establish a crown on the field if desired.
5. Seed and water the field. Make sure the seed is incorporated into the top one quarter inch of modified soil.

→ CONSTRUCTING

1. Using front-end loaders or other bulk blending machinery, manufacture your field mix. To ensure uniformity, manufacture the mix in small, controllable batches. Mixing should be done off the construction site.
2. Spread the athletic field construction mix using a grading blade over the entire field, starting from the center of the field and working out. For optimum results, the mix should be spread to a depth of 12 inches.
3. Shape and smooth the field using a raking device. Firm the field using a light roller. Establish a crown on the field if desired.
4. Seed and water the field. To improve seed germination, incorporate the grass seed into the top one-quarter inch of construction mix.

Source: Ron Alexander

Table 1.

potential percentage of the total topdressing budget. Golf courses have used finely screened compost alone as a topdressing on fairways, or as a component in a mix.

The future for compost use through topdress-

ing mixes looks extremely promising. Early research indicates compost may have disease suppressive properties. Therefore, future topdressing programs may use funds from current disease control budgets giving increased value to

compost products offered to support this avenue of golf course management.

CONSTRUCTION MIXES/RENOVATION. The same general guidelines for product quality apply to golf course construction mixes, although larger amounts of product are used more quickly, especially in whole course construction. As many as 250 to 500 yards of a mix may be used for each green, indicating a large initial outlay of compost for an 18-hole course. Additionally, greater amounts of compost can be used in bed preparation and landscaping of the grounds. (Refer to the landscape section.)

ATHLETIC FIELDS. As the desire and need to create more resilient, more attractive and safer athletic fields has increased, so too has the need grown for an inexpensive, versatile product. The need for an organic product which can be used in the maintenance, renovation and construction of athletic fields will help fill this void, and help a market strapped by shrinking budgets.

As discussed earlier, the addition of compost to soils high in sand or clay content will improve the structure and friability of the soil. The use of compost will also improve the drainage in athletic field soils, and the addition of organic matter will slow the rate of compaction. The use of compost in the maintenance (topdressing), renovation (soil amendment) and construction (mix component) is explained in more detail in Table 1 (Alexander 1991).

The use of compost on athletic fields will continue to grow as long as the product stays price competitive and consistent in quality compared to peat moss and commercially available topdressings. Compost used in athletic field maintenance (topdressing) must fit the specifications outlined earlier in the landscape section. Again, the material must also be finely screened in order to be easily backfilled into aeration holes, and so as not to smother existing growth.

The compost must be mature and free from significant foreign matter since traces of the material may be visible on the soil surface. Compost used in the renovation or construction of athletic fields may be slightly coarser than material used in topdressing.

Compost screened through a three-eighths to one-half-inch screen is acceptable for use in the renovation and construction of athletic fields, while materials used as a turf topdressing should be screened through a one-fourth to three-eighths screen. Compost used in the construction of athletic fields must have a texture which allows it to be easily mixed with other athletic field

mix components like silica sands. Ratios and possible combinations of topdressing mixes are determined on a case by case basis, depending on native soil test data.

Material with a moisture content of 55 percent or more may be difficult to spread or mix efficiently. Since the majority of athletic fields are located at heavily populated schools and universities, the use of materials with objectionable odors or a significant amount of foreign material is not recommended.

TOPSOIL BLENDERS

Topsoil blenders are not actually an end-market for composted products because most materials produced are sold to other green industry professionals that use the soils. Landscapers, garden centers, nurseries and homeowners are often the end-markets where compost products end up after being professionally blended by a topsoil company. Many believe that the future of topsoil blending lies in the manufacturing of special blends to suit specific growing needs of specific plant families.

Adding compost to soils usually reduces potential runoff and erosion (Kashmanian 1992). Urban soils in most major metropolitan areas have had their soil structure destroyed from pulverization or multiple handling by large equipment (McCoy 1990). Research has shown that the addition of organic matter to these soils in a blending situation helps the resulting mix set up new structure when placed on the job site.

Recommended additions of compost to soils can vary greatly depending on what types of soils are used, however, a general guideline of 20 percent has been shown to be effective in the lab and field (McCoy 1990). Many composts also exhibit a wide particle size distribution which may or may not be beneficial in a blend, depending on the objective of each mix.

Composts used for topsoil production theoretically may be coarse as long as the final mix is screened. If a blend is made without final screening, compost should be supplied as three-quarter-inch or less in particle size. Heavy metals are less of a concern for horticultural applications. However, considering that many homeowners will purchase products for vegetable production, safety standards for food chain production should be followed.

Organic content should be consistent with the source of compost (i.e., if the feedstock materials do not regularly change, the end-product should be consistent in organic matter content). Changing compost sources midseason may alter blend-

ed topsoil appearance and create market confusion unless creative blending measures are taken.

Compost needs to be fully mature and low in soluble salts for most soil blend end-markets. The pH of composts used in blends may vary from six to eight. The pH of the final soil blend will depend greatly on the buffering capacity of the soil and the pH of ingredients. Many current topsoil mixes are manufactured to meet growing specifications per plant family, and pH may be adjusted accordingly by adding lime or ammonium sulfate.

SPECIAL BLENDS. There is a growing demand for special blends of soils for all types of horticultural applications. The specialization trend taking place across the United States is also predicted to occur in growing medias as well. The concept of offering blueberry mixes, azalea mixes, annual mixes, perennial mixes, etc., for future markets is very strong. However, the amount of research and documentation that needs to be done to support these budding markets is vast.

Currently, landscape architects specify potential compost products in their plans for new construction based on their knowledge of growing medias and the existing soils. It is vitally important that any new mix be studied and the addition of compost to this mix be compared to a standard such as peat moss, hardwood bark, etc.

Because many state laws mandate composting yard waste, sludge and other organic medias it seems only natural that local blending and specialized custom blends will some day be a large market for compost products.

Criteria for compost used in this market sector is highly variable with respect to pH and soluble salts due to the variable responses of plants. However, it is likely that consistent, mature, medium-textured composts with little or no inert contamination will be ideal for marketing through special blends.

RECLAMATION

The reclamation and revegetation of highly degraded sites is an excellent use for compost. Compost has been used with great success in the reclamation of strip mines and sand/gravel pits, and in the closure and vegetation of landfills. Compost has unique chemical, physical and biological characteristics which make it well-suited for use on sites that are difficult to re-establish with plant life. Compost has even been used to remediate soils which have been polluted and were unable to sustain plant growth. This market

also shows a great potential as a means to use lower quality compost.

STRIP MINES/SAND AND GRAVEL PITS. The potential quantities of compost used in renovating of surface mines, sand and gravel pits is tremendous. Compost can be used as a soil amendment at a quantity of 250 to 500 cubic yards per acre (approximately 2- to 4-inch layer) in order to help support vegetative growth. This vegetative growth stabilizes the soil surface and reduces the chance of soil erosion and runoff.

Previous work has shown that the use of sludge and other composted products applied in a large one-time application can be used to revegetate abandoned mines (Sopper 1991). Vegetating abandoned mine sites may be difficult because high levels of contaminants often found at many sites are toxic to plant growth.

In sand and gravel pits, the physical characteristics of the site may also make it difficult to vegetate. These sites are often low in organic matter and have a low water holding capacity, buffering capacity and cation exchange capacity.

The addition of organic matter, such as compost, improves these characteristics making the area habitable for vegetation and soil biota. When applying compost to mine sites in which high levels of heavy metals exist, the addition of compost has been shown to help "tie up" these contaminants, making them less available for plant uptake and allowing healthy plant growth.

A dense vegetative cover may also reduce the chances of heavy metal transport through surface runoff. These sites are considered to be a nuisance and have long been ignored in the past. Keeping this in mind, and knowing that these sites are not easily accessible to the public, it seems feasible that even low quality composts could be used in the renovation of these sites. Even compost containing large quantities of foreign material, excluding large quantities of film plastic, are probably acceptable for use.

Film plastic may remain on the soil surface and be ingested by animals. Compost which contains a large amount of weed seeds and is considered unstable may also be acceptable for this use. In this application, any product that is low in cost and rich in organic matter is acceptable. Large quantities of compost have not been used, to date, on either of these types of sites because of economic, regulatory and environmental constraints.

LANDFILLS. Compost has been used successfully in landfill reclamation, closure and in daily cover. Many special mixes have been identified,



Compost is normally used in containers at 10 to 30 percent (top), and can provide many benefits. Golf courses are considering increased disease suppression by using compost as an organic component in blended topdressings (bottom).

used and tested, including a compost/sand mix, compost/soil mix and compost alone. Although quality control may be slightly less important for landfills, the compost still has to be of high enough quality to support plant life. After all, establishment of vegetation is a key objective for final closure of landfills.

Some municipal solid waste composting companies have planned from the outset to use their compost as daily cover in adjacent landfills

and have opted not to take an aggressive marketing approach. This strategy works well because by composting the organic fraction of the solid-waste stream, a large volume of solid waste can be diverted from the landfill. The composting process itself will then significantly reduce the volume of that organic material through biodegradation. As a result, this strategy can extend the life of the landfill and create a ready market for municipal solid waste composts.

Consulting engineers can usually lend a hand in identifying and quantifying slopes so that compost mixtures used for closure can be mixed accordingly. Compost still should be mature enough to support plant growth, low enough in heavy metals to meet state standards and possess physical properties which allow it to be easily spread or blended.

Composts which do not support vegetation may be used for daily cover or mixed with other material such as sand or soil and then used as daily cover depending on state regulations.

NURSERY GROWERS

Greenhouse, container and field nursery growers have a long history of using composted products, such as wood barks, peat moss and various other organic amendments in the production of their ornamented crops. Because research has shown that composts of various feedstocks perform well in conjunction with these products, its use in commercial operations has grown.

Compost has proven to be a cost benefit to growers in that it can often be purchased at a

lower cost than other organic amendments used in the industry. Compost manufacturers have proven that they can produce a product which is of high enough quality and which is consistent enough for use in this industry.

The quality and consistency of the product used by growers is important because of the valuable crops they grow and because these crops are grown in a closed system.

GREENHOUSES. Greenhouse growers have been using more composted materials since the industry shifted toward using soil-less growing media several years ago. Compost is used as one of the organic components to soil-less mixes, usually at a rate of 10 percent to 33 percent of the mix depending on the crops being grown. A significant amount of research has been performed demonstrating the use of sewage sludge compost in potting mixes; therefore, composted sewage sludge is probably the most popular compost used in growing operations.

Compost has also been used because it is a local, high quality source of organic matter and is usually less expensive than other organic components used in growing mixes. The compost used by growers must be very consistent, stable, have a pH preferably between 5 and 6.5, be low in soluble salts and free of weed seeds.

Compost has been found to contain naturally occurring disease suppressive properties which have the ability to help control many soilborne diseases. Because growing mixes are often adjusted to suit the pH needs of the crops being

produced, compost which has had lime added to it during the production process is often not used. The addition of lime to compost makes it much more difficult to buffer (its pH), and the use of this material may cause trace elements in the growing mix to be immobilized (Gouin 1992).

CONTAINERS. Compost has been widely used in the production of container-grown nursery stock. Normal compost inclusion rates vary but, generally, a 10 percent to 30 percent inclusion rate is average. It is imperative that any extra labor required to add compost as an additional ingredient to the container mix be offset by savings in the overall cost of the mix. Research with sludge compost indicates a good success rate in the replacement of peat moss in the production of woody ornamentals (Smith 1990).

Some suppression of disease associated with the production of specific plant species has also been documented when compost has been added to container medias (Hoitink 1986). Although market potential for large volumes of compost used through container production is not great, it does represent a specific niche market that may be capitalized on through successful marketing programs. The possibility of providing special pH and nutrient adjusted composts as organic amendments to container mixes may be a very specialized area for future market development.

Using compost successfully in container medias includes using medium to coarse, well-drained, low soluble salt, mature composts. Due

to the hands-on nature of many container operations, contamination of composts with inerts will not likely be tolerated in the marketplace. Composts have been known to add valuable micronutrients and improve plant vigor due to water retention properties. However, dangers of rapid material decomposition and shrinkage also exist which may create slow draining, anaerobic growing conditions if mixes are improperly formulated.

FIELD. Field nursery growers are currently using compost in two ways: field incorporation and mulching. These methods are discussed below.

Nurserymen are a significant market for composts, but are quite geographically dependent. For instance, Ohio has an approximately \$1 billion nursery-related business compared to other states with limited nursery production.

Field-harvested nursery stock (ball and burlap) remove significant amounts of soil mass and nutrients. As much as 50 to 250 tons of soil per acre may be lost at harvest (Tyler 1991). Additionally, the normal soil loss from erosion makes replenishing the soil (and especially organic matter) a necessity to maintain productivity.

Often, farmers will take their fields out of production in order to grow a cover crop, a vegetative cover which is plowed into the soil, in order to return valuable humus and nutrients back to the soil. This loss is estimated at just under 3 billion tons per year for all agricultural erosion, or about 6.7 tons per acre, per year (Kashmanian 1992). Losses in the nursery may be slightly less due to reduced tillage practices over the life of each crop. Costs associated with using compost cover cropping are competitive when all factors are considered (Logsdon 1991).

Applications of 2 inches of compost, plowed to a depth of 6 to 8 inches significantly increases organic matter in native soils. Native clay soils break up easier and form new aggregation as organic matter decomposition takes place. Sandy soils generally hold 25 percent of their weight in water while many composts hold up to 180 percent of their weight in water (Seattle 1990). Consequently, sandy soils retain more moisture with additions of compost and give plants a better chance for survival during drought conditions.

Compost applications profitably replace normal cover cropping at nurseries by allowing applications, tillage and planting of a new crop to occur in a short window of time. Approximately one full growing season can be saved by using this approach, and the amount of organic matter returned to the soil is at least 10 times the amount delivered by cover crops (Tyler 1991).



Various feedstocks of organically compostable materials with various chemical and physical properties requires a greater understanding of quality control.

Compost used in field incorporation programs must be fully mature, high in organic content, low in heavy metals and low in soluble salts. Concerns with heavy metals usually arise when the land may be used for future food or animal production.

The level of acceptable contamination of the compost with inerts will depend on what loading limits are acceptable to nurserymen using multiple applications. However, since most field crops have growing cycles of two to seven years, a buildup of inert materials in their soils is less likely to occur than fields receiving yearly compost applications.

The pH of a compost may be adjusted after application to suit specific needs for various families of crops or soils. Many nurserymen prefer a coarse grade product because of the resistance to decomposition over time, which helps increase field soil friability and provides adequate aeration for tender roots.

Nurseries can use large quantities of compost by mulching plant rows in field situations. Applications usually range from 1 to 2 inches. Mulch primarily conserves moisture, but also helps reduce weed growth, reduce soil temperatures and eventually add significant amounts of organic matter to the native soils when incorporated into the soil post harvest. This is especially handy when another planting is planned for the same field immediately after harvest.

Compost used for mulch can be coarse, but must still be able to be worked in and around individual plants if needed. Nurserymen have noticed using compost as a mulch in place of normal hardwood bark mulch has increased growth and reduced injuries to plants associated with stringier hard-wood bark mulches. Compost processed with a 2-inch screener works especially well (Hendricks 1992).

Heavy metals need to be within acceptable food chain levels unless the land is never again

intended to be used for food production. Organic contents should be high to aid in the absorption and conservation of water. The compost should be fully mature and may possess a slightly elevated level of soluble salts due to the high leaching potential of mulch. However, many salt-sensitive crops such as those planted as bare-root cuttings, may react negatively to high salt levels. The pH of the mulch will also depend on the needs of the individual crop being cultivated, but generally may be between six and eight.

ROADSIDE

The use of compost on roadside development and maintenance projects continues to grow as more waste derived composts are produced. Composts are being "specified" as "approved equals" to other organic products such as topsoil or peat moss used in these projects. The need to create markets for the large volumes of waste-



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derived composts being produced have lead some states to develop research programs aimed at determining the optimal methods for using compost on roadside projects.

The roadside environment is often hostile. Lack of irrigation, minimum fertilization and the use of road salts often makes it too difficult for vegetation to persist. The use of compost can improve the environment for roadside vegetation, giving it a better chance of survival.

Currently, compost is being used on roadsides as a soil amendment in the establishment of planting beds and as a component of backfill mixes for trees and shrubs. In several states, compost is included to improve the organic matter content of soils used on roadside construction projects, or similarly, in the production of manufactured soils used for the same purpose.

In Europe, compost has been accepted as the growing media in "living walls" which border roadsides and have been shown to perform well

in sound minimization. Compost used in these applications should meet the specifications described earlier, for similar purposes. However, characteristics which affect product handling, such as moisture content, may not be as pertinent in projects where mechanical equipment is used to apply and incorporate the compost.

Additionally, characteristics which deal with aesthetics, such as foreign matter content and color, may not deter use—especially if the product is used as a soil amendment rather than for surface application.

The application of compost for weed and erosion control on roadsides warrants more discussion because of the promising results being documented on an ongoing basis.

WEED CONTROL. In many states, coarse composts are approved for use on roadside maintenance projects as a mulch for weed control. Even though the materials are high in organic matter

and hold moisture well, they have also been found to be effective in controlling weed growth. This is probably due to the dark color of the products which absorb heat, causing its' surface to readily dry out (Kilbourn 1991).

This hot, dry surface makes it difficult for weeds to establish and, as long as the product is properly composted before its use, the compost itself should be weed-free. Compost used in this application should be coarse in texture, weed-free and low in inerts, as well as aesthetically appealing. The product should also possess characteristics which make it easy to handle and spread. It is possible that the product could be mechanically blown onto areas that are difficult to access (i.e., steep slopes).

EROSION CONTROL. Compost may also be used as a surface application to slopes and embankments in order to control erosion. Once again, coarse composts have been shown to work well in this

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Compost used as a mulch for landscape plants during a research at The Ohio State University.

application as have some municipal solid waste composts because of their absorbent nature. Coarse, sludge-based composts (containing a high percentage of wood chips) have shown excellent results applied as a surface application on 2:1 slopes (Rattie 1992).

A mixture of coarse compost and sand, used in similar conditions, has shown similar results. The erosion reduction capabilities of this mix have been attributed to its ability to allow for improved water infiltration. The erosion controlling effects of coarser composts, applied as a surface application, have been attributed to the ability of the product to "knit together," creating excellent coverage over the soil surface and having the density and physical structure which resists surface erosion.

According to research, the addition of compost reduces erosion in three ways (Tietjen 1969). First, soil structural strength is increased leading to heightened resistance to erosional forces. Sec-

ond, the compost mulch near the soil surface absorbs the energy of raindrop impact and third, soil water holding capacity is increased, providing less water for runoff (Tietjen 1969).

In both weed control and erosion control, further research is and will be required to prove theories regarding the effectiveness of these products. Compost used in erosion control should have similar characteristics to products used in weed control, except for one major difference—its ability to grow vegetation.

In specific applications, where erosion control is desired, a compost which is considered unstable or contains substances which may be detrimental to plant growth, may actually prove to be a benefit in this application. However, in many erosion control practices, the growth of weeds on the soil surface may not be considered negative in that the most practical and effective method for controlling erosion is by densely vegetating the soil surface.

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GROWTH MARKETS

Although there are many other potentially large markets for compost use, two in particular may prove to be the most important to develop as more organic residuals are transformed into compost. Both the agricultural sector (food production) and the general public are large potential markets for composts of various feedstocks.

The potential acreage and resources controlled by these groups may make them the key to solving our country's solid-waste management situation. Composting will be used as a means to manage a large portion of the residential, commercial and agricultural organic waste stream. The industry's growth will be closely related to our success in developing large, long-term markets for the resultant products.

AGRICULTURE. The agriculture market has been considered by some to be the "dumping grounds" for composts which are not of the highest quality. It should be noted that farmers are usually in tune with their soils, often working with agronomists to determine fertilizer loading capacities, etc. Although many perceive that composts used by this market sector may be lower in quality than in other sectors, lower quality products which contain inert materials (i.e., glass, plastics, etc.) will be more recognizable in soil over time. Whether American farmers will allow this to take place is yet to be seen.

Market potential in agriculture is by far the largest (Slivka 1992), but many farmers are also turning to composting as a safe way to handle conventional farm wastes. Given the option, it will be interesting to see whether a farmer will produce his own compost or buy (or be paid to receive) compost produced from waste products.

One thing is for sure, the value of compost when used in sustainable agriculture proposals is significant. It may also be possible to reduce traditional fertilizer and pesticide applications due to benefits associated with composts.

Composts used in agriculture must be safe enough to avoid permanent contamination of soils with inerts or heavy metals. Some composts may be applied in an immature state, however, they are usually less effective than fully mature composts. It is wise not to plant immediately following the application of immature composts due to nitrogen immobilization or low oxygen concentrations that prevail in soil immediately after incorporation of such composts.

The use of composts in agriculture has been shown to offer a variety of benefits, one of the largest being reduction of erosion (Kashmanian



Topsoil blends have become a highly specialized market to address individual growing needs of various families of plants.

1992). High intensity farming erodes valuable topsoil faster than it can accumulate naturally (Kashmanian 1992). By adding compost on a regular basis, farmers can maintain healthy soils and remain profitable.

Loading limits need to be established for agricultural uses of all types of composts with respect to macro- and micronutrients, heavy metals, salts and inert contaminants. The potential amount of compost generated from source separated organic wastes, about 180 million tons, is dwarfed by the amounts of farm manures (and, therefore, possible compost) which may be produced. About 1.4 billion tons of manure are disposed of annually (Kashmanian 1992).

Although many studies have been performed illustrating the benefits of compost use on agricultural land, the market still refuses to pay high costs for these materials. In general, normal farming practices can deplete more than 50 percent of a native soil's organic matter over time (Lucas 1978). Also, losses of humus and other soil nutrients from erosion are significant in agriculture, but compost can help replenish these by being added on a regular basis.

Studies show that the regular application of raw agricultural materials, such as manure, do not readily change the organic matter content in soil over many years (Lucas 1978). Soil humus is lost on a regular basis to soil erosion and soil micro flora, and is also converted to carbon dioxide and water through natural processes. In the United States alone, 3.6 billion metric tons of topsoil are lost to erosion annually, some of that

being natural humus (Lucas 1978).

Most farms, in an attempt to rectify soil losses from erosion, land apply the majority of their manures. However, many of the manures currently being applied may contribute to non-point source pollution because they are more easily eroded and leached than products which are composted prior to application.

Composted manures and farm wastes may help reduce non-point source pollution by converting nutrients into less leachable forms.

Compaction may be reduced by the addition of compost or organic matter to the soil, thus helping reduce runoff and erosion from farm fields. Depending on application rates, the addition of compost to agricultural lands can increase organic matter dramatically, whereas applications of raw manures or green manures usually add less total organic matter.

Benefits associated with the addition of compost to agricultural fields seem to far outweigh the extra effort and associated costs. However, an educational system is needed to lead the way for market development in this large area.

By looking at compost products as natural resources which can be used to help offset losses of soil from erosion, we cannot forget that the base soils that receive applications are also one of our largest natural resources. Thoughts of permanent damage or contamination to these vast markets should lead quality control planners to stand strong on high quality standards to ensure adequate land is indefinitely available for these applications.

HOMEOWNERS. As the general public becomes more educated about the benefits of using compost, its acceptance within this market segment will grow. Public interest in organic gardening and sustainable agriculture will also improve the marketability of composted products. Teaching the general public what is fact and what is fiction about compost, especially when it comes to health and safety issues, is of utmost importance.

Currently, the most popular composts being used by homeowners are leaf/yard waste and various animal manure composts. In specific areas, sludge compost has also been marketed to homeowners with great success, however, it has proven to be more difficult due to the natural stigma attached.

Municipal solid-waste compost will, no doubt, be more difficult to market to homeowners than other types of compost. This is because many MSW composts are not as aestheti-

cally appealing as other types of compost. Most likely, only the MSW composts which are of the highest quality will gain wide acceptance with 'John and Jane Q. Public'. It has many of the same benefits as other composted materials possess and can be used in much the same way.

Composts which are marketed to homeowners must have a texture which makes them easy to work with and must have an attractive look. They must be consistent, free of weed seeds and objectionable odor. If the material is high in soluble salts or is unstable and causes a plant kill, homeowners will be turned off to the product for a long time.

Since homeowners do not have a technical background in the production or use of compost, the product we market to them must be of the highest quality. It is widely believed that the key to creating long-term markets for compost depends upon creating acceptance with the general public (homeowners).

As the popularity of compost application grows, it becomes increasingly more important that we understand how various composts are best used, as well as understand how specific end-users use the product and for what reasons. For this knowledge to grow, continued monies must be made available for appropriate research to develop new uses for our compost products.

As the production of composts increase, largely due to more scrutiny of our waste management practices, the need for knowledge and public support becomes a national and international issue, rather than a regional one. This fact makes it extremely important that as more research is completed and information obtained, that the data is shared throughout the industry in a way which will benefit all interested parties. Accomplishing this goal will benefit us in many ways from avoiding the duplication of research, to improving public relations.



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SPECIAL REPORT



Compost, when meeting the proper standards and applied correctly, can result in enhanced annual and perennial flower plantings.

Alexander is product marketing/utilization specialist for E&A Environmental/EMCON Inc., Cary, N.C., and Tyler is manager of product and market development for Kurtz Brothers Inc., Cuyahoga Heights, Ohio.

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Association News

(continued from page 20)

The study will compare mortality records of GCSAA-member superintendents to "people in similar work environments without the chronic exposure, to determine any unusual patterns," Jones said. He expects the study to begin by late December.

The National Cancer Institute and the United States Environmental Protection Agency are conducting a similar study to analyze human exposure to pesticides through crop residue.

California lawn and garden sales fell 5 percent to \$4.2 billion in 1991, down from \$4.4 billion the previous year, according to the **California Association of Nurserymen**.

The horticulture industry will recapture lost sales and grow steadily as the economy slowly recovers and consumers invest in landscaping to protect and improve property values, said Tom Courtright, CAN president. A 1991 survey of real estate brokers and agents and landscape appraisers indicates landscaping improves California property values an average of 7 1/2 percent.

"Gardening and landscaping still offer

the greatest return on investment dollar for dollar," said Courtright.

The Integrated Pest Management research project initiated by the **National Arborist Association** is complete and available. Titled "Guide to the Plant Health Care Management System," the manual is based on a two-year research effort by the Illinois Natural History Survey and Communications Research Associates.

The manual provides marketing and sales strategies, operational techniques and a compendium of plant health care resources. NAA initiated the project to enable arborists to better care for trees using fewer pesticides.

The NAA offers the manual, as well as consumer and practitioner orientation videos, to members at no charge. The book and videos package costs ISA members \$35 and non-members \$50.

IN BRIEF... The Independent Turf and Ornamental Distributors Association

appointed Robert Davis its first executive director. The two-year-old, non-profit incorporated association represents independent distributors whose total annual chemical purchases exceed \$45

million...**The Illinois Landscape Contractors Association** held its 31st Summer Field Day at the Chicago Botanic Garden in Glencoe. 1,900 were in attendance. Exhibitors displayed the latest in plants, equipment, tools and green industry services in 200 booths. Next year's Field Day will be held Aug. 4 at Shemin Nurseries, Addison...A computerized database of more than 8,000 references relating to compost and composting is being completed for the **Solid Waste Composting Council**. Upon completion, the database will be made available to both members and non-members through the council at the cost of materials. It will be distributed on about 10 floppy disks. Call SWCC, 703/739-2401...**The Midwest Chapter of the Sports Turf Managers Association** is planning future programs and activities. For information on the chapter, its activities and its goals, contact: Mike Trigg, Waukegan Park District, 708/360-4750...**The Professional Lawn Care Association of Mid-America** will host the 1993 Mid-America Green Industry Convention in Kansas City, Mo., Feb. 3-5, at the Hilton Plaza Inn. Contact: Olivia Golden, Executive Director, PLCAMA, P.O. Box 35184, Kansas City, MO 64134. ■

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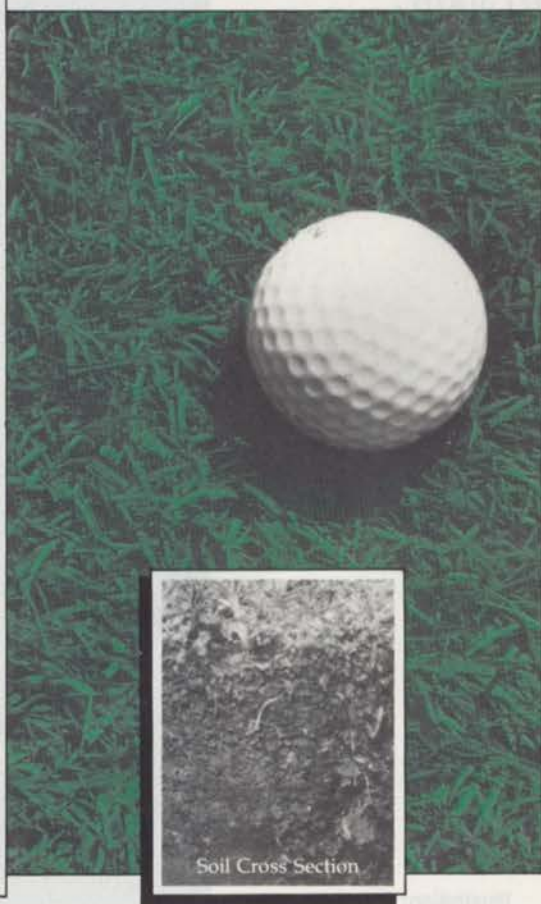
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Has the three-year-old joint trade show idea evolved into the maintenance industry's premier turf show?

By Cindy Code

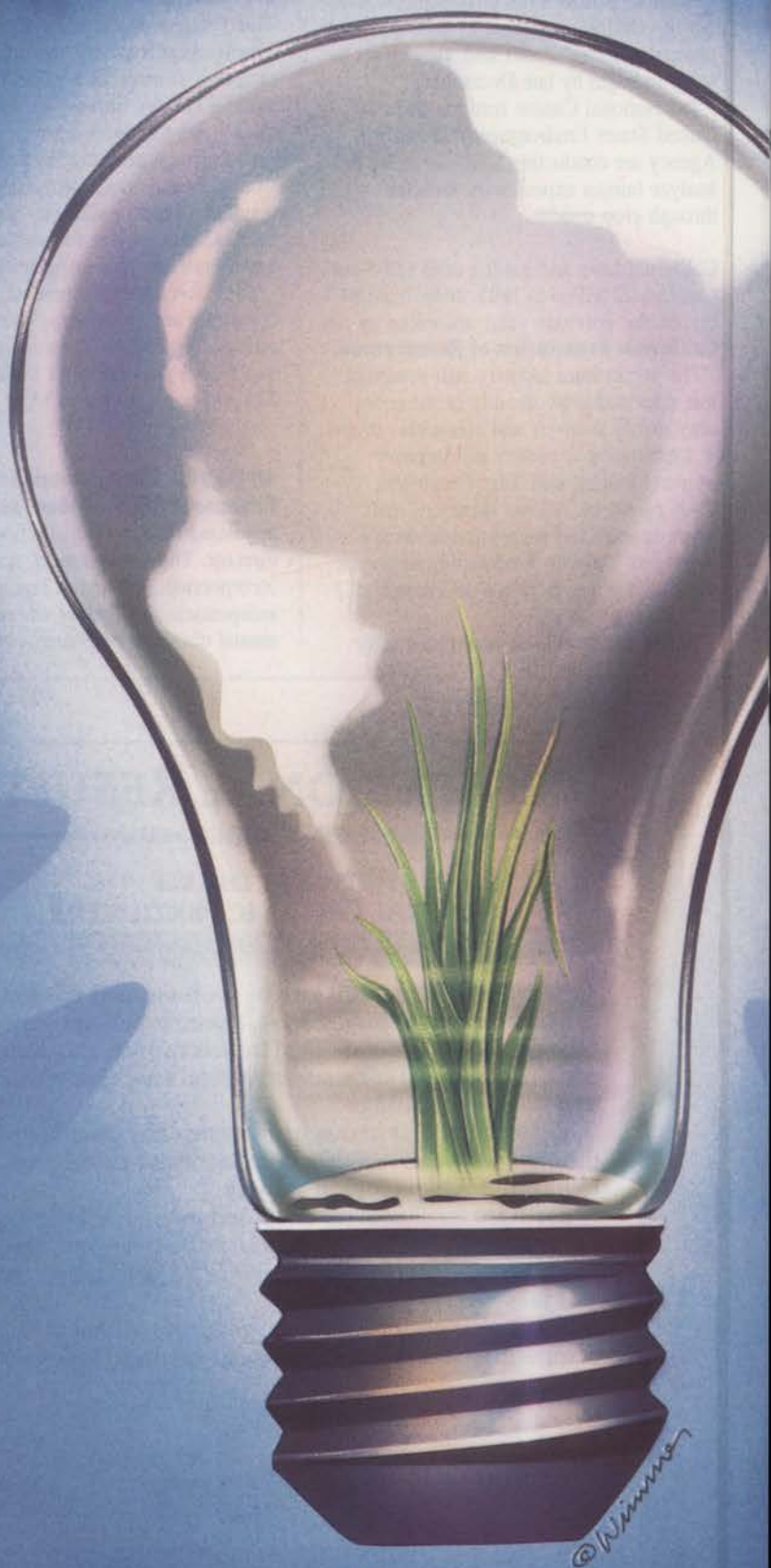


Illustration: Chuck Wimmer

The Making of the Green Industry Expo

IS THE GREEN Industry Expo the premier trade show for the professional lawn/landscape maintenance industry?

"Absolutely," said Dick Ficco of Partners Quality Lawn Service, South Easton, Mass.

"It's the only game in town," said Rick Steinau of Greenlon Lawn Care Services, Cincinnati, Ohio.

"If it's not today, it will be. There's too many good people committed to making it happen," said Bob Andrews, The Greenskeeper, Carmel, Ind.

Whether it is or it isn't, the Green Industry Expo, now in its third year, has strong support in its corner; cooperation reflective of the mood of the green industry which is in the midst of shedding itself of excesses and poisoning itself for a fortified future.

"We're assuming it's not premier now, but it will be when we attract some significant numbers," said Dave Duncan of Monsanto, St. Louis, Mo. "We're just now getting into the task of quantifying that."

With a show agreement extending through 1995, members of the GIE board are not content to rest on their laurels, but are actively seeking to improve and strengthen the show.

Duncan is one of nine board members, three from each steering association — the Associated Landscape Contractors of America, the Professional Grounds Management Society and the Professional Lawn Care Association of America — who are participating in strategic planning for the GIE.

"It's difficult to pull off a show with one organization. And with the three of the varied interests and needs we have, it's a monumental task," he said.

Although the board has existed since the GIE merger in 1989, (the faces on the board have changed), the intensity of the meetings have taken on a decidedly different tact. Eager to put old animosities and complexities behind them, the board agreed to hire professional strategist Jim Perrone to a one-year contract in an attempt to solidify the future of the only national,

non-golf show serving the needs of the professional maintenance market.

"What we've done is good, but we can improve it. We obviously all would like to see it bigger," said Mike Guthrie of Ground Control Landscaping, Orlando, Fla. "We need focus and commitment to be a functional group."

And focus is what the board did in a recent two-day meeting in Chicago.

"It's the very best session these three groups ever had. For the first time, we put yesterday behind us and looked at tomorrow," Andrews said.

Although the future of the show has never been in any real jeopardy, the trio supporting the GIE has had to overcome some gridlock and identity concerns to give attendees and exhibitors what they desire.

One step was taken this year by combining the keynote sessions of the three associations into one. The educational side to the GIE will further coalesce in 1993 when it's expected that three educational conferences will be more of a joint effort rather than individual association efforts.

The idea is to share certain educational tracks such as business management, but maintain the identity of each association concerning specialty interests.

"It's a reflection of the change in the attitudes of the associations," Andrews said. "We know the show is a go; we see the acceptance within the industry. We felt having a good show is not enough. It has to be a good conference and show."

"It's definitely a move toward amalgamation," said Ann McClure, PLCAA executive vice president. "We're still individuals, yet we've decided to combine where it makes sense."

McClure, who through PLCAA also serves as show manager, said there is a new commitment and willingness by the three associations to sell the show.

GOALS. Subtle differences will be seen at the 1993

show in Baltimore with more dramatic changes in store for 1994 when the GIE heads to St. Louis.

No one expects astounding growth overnight, but many liken the importance of the GIE show in the lawn/landscape maintenance industry to that of the Golf Course Superintendents' show in the golf industry.

Over the next five years, the GIE board would like to see attendance grow from about 2,000 to 3,500, a 15 percent annual growth rate. The same growth is expected of the show's exhibitor base and, hopefully, of the show's revenues.

"It's aggressive, but doable," Duncan said. "We have to create a product that overcomes the economy."

The diversity of the associations, personal relationships developed over the years and the desire by association executives and members alike to create a valuable show must also be tapped.

"We have a lot of strengths which to date have been untapped," Andrews said. "Attendance at this show provides you with varied experiences than what you find at strong regional shows."

Exhibitors have generally been pleased with the show.

"The quality is good at the GIE and people will travel to attend a show of a better quality," said Bob Walker of Walker Manufacturing, Fort Collins, Colo. "The most

satisfying aspect for us is that these are our customers or potential customers."

Others, including John Smith of Exmark, Beatrice, Neb., and Allen Haws of Miles, Kansas City, Mo., said the quality of the attendee, namely the decision makers in the maintenance industry, is a positive for the show.

"John Deere sees the growth potential in the commercial business," said Bob Tracinski of the firm's Raleigh, N.C., office. "We're taking it seriously and as far as the GIE goes, we feel we have to be there."

"This show is a result of the dedicated effort on the associations' part to get the show up to the highest standards," said John Madia, DowElanco group marketing manager, Indianapolis, Ind. "These people are entrepreneurs running their own businesses...and the entrepreneurial spirit is the real purpose at this show."

SPREADING THE WORD. Promotion is key for this show which has been viewed by both exhibitors and attendees as a brand new industry show rather than a continuation of the PLCAA or Green Team trade shows.

It's often been compared to strong regional shows such as the Ohio Turfgrass Show or the Mid-Am shows, even to the nine-year-old national Outdoor Power

Equipment show which, although trying to appeal more to the commercial contractor market, remains largely dealer/distributor-oriented.

"The GIE is very strong in comparison to other shows. It blends all facets of the industry at once," Guthrie said.

The one-stop shop mentality, occurring through consolidation, is pervasive among many groups and should not be considered a negative, but a positive with the right combination of groups and people coming together.

The GIE, averaging about 2,000 attendees (a number which does not include the more than 1,000 in exhibitor personnel), 270 exhibitors and 55,000 net square feet of trade show space, is the best mix of products for an ever diversifying lawn/landscape market. With a wide array of iron, specialty pesticides and related support products, the board is actively seeking ancillary products such as those relating to irrigation, nursery, safety, trucks and snow removal, among others.

"Strong evidence suggests the traditional trade show exhibitors have peaked out as far as participation," Andrews said. "They are going to continue to be there and play an important role, but we've begun researching other shows and industries we haven't generally gone to for exhibitors."

On the education side, a broad educational curriculum to aid attendees with keeping costs down, and one that is enticing to husband and wife teams, is important to the show's growth, Ficco suggested.

And peer interaction cannot be discounted.

"The most satisfying aspect of the GIE show is the opportunity at the tail end of the season for comradery," Ficco said.

ATTENDANCE BASE. Perhaps the most critical aspect of the GIE is continued increase in attendance. While attendance holds steady at 2,000, the combined membership of the three associations is about 3,500 (including membership overlap). So not only does there need to be active solicitation of association members not attending the show, but an aggressive effort to attract new members to each of the associations.

"We don't want to limit our attendance to members only," McClure said. "We're reaching way beyond our membership with our marketing efforts."

The show, which travels from one location to another year to year, has narrowed its city selection down to about six spots which have attracted heavy attendance in past years: Baltimore, St. Louis, Dallas, Tampa, Charlotte, N.C., and Nashville.

This move is expected to keep attendance up and allow for the greatest drive-in traffic. But there are a lot of people in the industry who aren't sold on the need to come to a national conference.

Lawn and landscape contractors attend the conference and trade show for a variety of reasons. Seminars offering the all-important certification credit seem to be a major drawing card, as is the opportunity to view equipment, and specialty products.

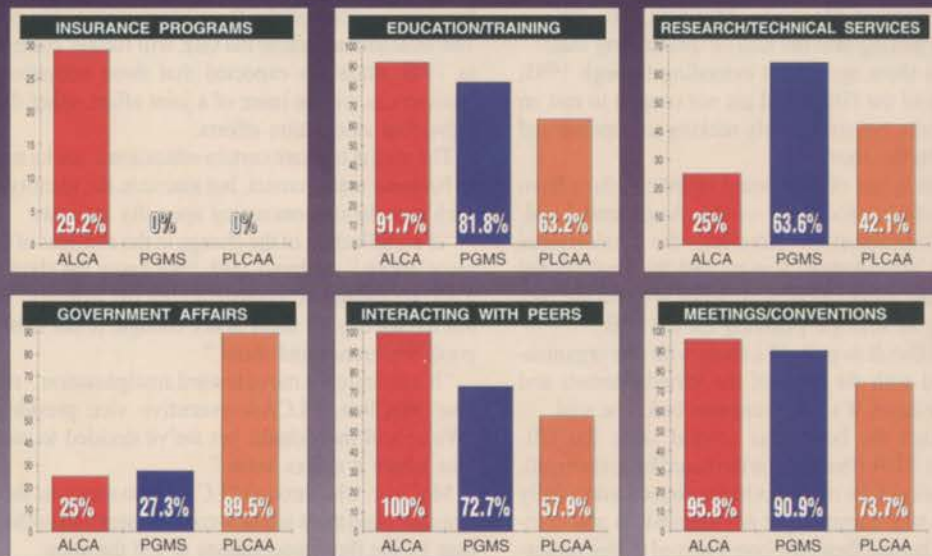
But the show should be considered a valuable service brought to the industry by the sponsoring associations; reason enough for lawn/landscape contractors to join one or several of the associations.

In a recent, informal survey, association members were asked why contractors joined and participated in national associations and what they found to be the most valuable service offered by associations.

Although it varied slightly from ALCA to PGMS to PLCAA, most

MEMBERSHIP SERVICES

These services are most likely to attract people to join national associations.



Source: LLM Fax Survey

members agreed that education/training, meetings/conventions and interaction with peers were the top reasons for joining a national association.

Other services, such as an insurance program, research/technical services and public relations were marginally attractive to joining the associations but, in most cases, not overwhelming.

It was a little more difficult for those surveyed to select the most valuable service offered by their respective associations. The majority of ALCA respondents said interacting with peers was the most valuable service, while the majority of PGMS respondents said education/training was the most valuable service. The majority of PLCAA respondents said government affairs was their most valuable member service.

It's interesting to note that 86 percent of those responding to the survey said they belonged to a state association in addition to their national association.

Membership dues, an issue which is often the determining

MISSION

To make the Green Industry Expo the premier trade show event and educational opportunity within the industry.

- ☀ Continued joint keynote session and further amalgamation of educational tracks for ALCA, PGMS and PLCAA attendees.
- ☀ Take advantage of the diversity of the three groups . . . Aggressively sell the show and conference on the varied experiences to be uncovered at one national location.
- ☀ Diversify trade show's exhibitors, making it a one-stop shop.
- ☀ 15 percent annual trade show growth and show and conference participation.

*Goals disseminated from conversations with Green Industry Expo board members.

factor when joining an association, elicits varied reaction. Among ALCA members, 63 percent said their dues were just right, 37 percent said they were too high and no one reported the dues as being too low. Among PGMS members, 56.2 percent said their dues were just right, 18.8 percent said they were too high and a surprising 25 percent said their

dues were too low. Among PLCAA members, 40 percent said their dues were just right, 55 percent said they were too high and 5 percent said they were too low.

The majority, nearly 100 percent in two out of the three associations, had attended an association-sponsored meeting or convention in the last three years.

Almost all were pleased with

the work their national associations were doing to meet their needs. About 96.2 percent of ALCA members responding said the association was working hard to meet their needs, 87.5 percent of PGMS members said the association was working hard, and 82.4 percent said PLCAA was working hard to meeting their needs.

Overwhelmingly, those responding to the survey agreed that the Green Industry Expo is preferable to individual association conference and trade shows.

Based on the initial success of the GIE and the apparent desire for the show to strengthen and grow, the GIE should become a feature attraction. As has been identified in strategy sessions and industry surveys, the GIE needs to be more aggressive in its marketing efforts, deliver a substantive product to attendees; and continue to be sensitive to the needs of exhibitors. ■

The author is Editor of Lawn & Landscape Maintenance.

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USE READER SERVICE #21

Midsize Walk-Behinds Making a Stand

Whether you're looking for cost savings, maneuverability or simply some exercise, midsize walk-behinds add value to just about every mowing operation.

By Bob Gitlin

IT'S A TRADEOFF between cost and employee morale. Some maintenance contractors are taking their crews off riding mowers for economic reasons and making their men walk behind 61-inch mowers. Others, particularly those in brutally hot climates, have taken pity on severely fatigued crews and switched back over to riders.

But whatever the case, midsize walk-behind mowers do a very valuable job, and they have cut quite a hole in sales of 21-inch mowers which formerly were the only available tool for maneuverability. Loosely defined as being between 35 and 61 inches, midsize walk-behinds are becoming less and less unwieldy, especially with the new hydrostatic models offering zero-turning radius.

"It's an economics thing," said Larry Antey of Hermes Landscaping, Lenexa, Kan. "It's more cost-effective to buy a walk-behind."

There are even functional advantages, he said. "The power ratio for actual cutting of turf is much greater in the walk-behind. You get more power that's actually used to cut the turf and spin the blades, because you're not carrying an extra 200 pounds

around, plus the riding mower is going to be heavier to begin with."

Even traditional gear-driven models are fairly maneuverable, Antey said. At one time, only a 21-inch walk-behind could handle problem areas such as around trees and going through fence gates. Now a midsize mower can do the same job.

What about maintenance? An-

"Walk-behind mowers can maneuver in a lot of situations where you can't get a rider."

tey said his firm has had pretty good luck in this area, even using seven-year-old mowers.

Like many contractors, Antey has some concern about brake controls. Whereas regulations require mower manufacturers to

include automatic shutoff devices on models sold to home owners, no such rules apply to those sold to commercial mowing contractors (though more and more manufacturers seem to be offering this capability).

"If they're in gear and you let go of the brakes, the walk-behind continues to travel," Antey said of what has traditionally been the bulk of available machines.

Not that they haven't been built tough enough to take it.

"We've been rough on a lot of things. We've had them in lakes. We had a 36-inch walk-behind go off an eight-foot cliff, hit a concrete spillway below and keep on going. It was pretty twisted. We had to do a lot of work on it, but I was amazed it hit the bottom and kept going."

His pet option on midsize walk-behinds are the high vacuum blades, whose non-cutting edges are beveled up higher. "It's like tilting a fan blade a little more. You get more air flow. It really sucks up grass."

FIRM CHOICE. Rick Hearn of Reinhold & Vidosh, Pontiac, Mich., said at least half his mowers are midsize walk-behinds.



Every one of his various types of crews has at least one at its disposal, in 36-, 48- and 54-inch models.

"Walk behinds can mow in a lot of situations where you can't get a rider," he said, "such as slopes and small hard-to-get-at or subdivided areas (such as fast-food accounts). There's a lot more maneuverability in tight areas, around trees, beds, small grass areas. Also, they give a finely manicured, groomed look; you can put down some very nice lines."

"We have always used them for steep slopes," said Steve Coffey of Scapes, Atlanta. "We use them for small areas where you need a good cut a lot of riders won't give you." In theory, he said, midsize walk-behinds mow 1.75 to 2.5 acres an hour.

Largely because of hot working conditions, however, Coffey thinks mostly in terms of riding mowers. He recently visited a branch manager in Scapes' Wash-



Whether working in open areas, in tight spots or on sloped properties, walk-behind mowers are gaining popularity in every facet of the mowing operation. Photos: John Deere (top) and Bunton (bottom).

A man walking behind a self-propelled 36- or 48-inch walk-behind mows more grass and does less damage than a man on a 36- or 48-inch rider, he said. There's less danger of hitting trees and other obstacles.

Midsized walk-behinds probably mow somewhere between 10,000 and 20,000 feet an hour, he estimated. They are definitely in the ascendancy throughout the industry.

"If you had surveyed our branch operations and looked at our equipment in the mid- to late-70s, you would have found predominantly 21- to 30-inch mowers. Now you find a higher percentage of 36- and 48-inch walk-behinds."

ington, D.C., office. They watched crews work in heat rivaling Atlanta's. It became apparent that, in 95 degree humidity, the supposedly 3 or 4 mile-an-hour walk-behind was being used somewhat less expeditiously.

"We work our guys 10 hours a day," Coffey said. "That's 30 to 40 miles per day. I asked him, 'You really think they're walking 30 to 40 miles per day?' He answered no."

After lunch, in peak heat, the crews were putting the mowers on 1 or 2 mph settings, finding a lot of shade trees and taking a lot of breaks. And Coffey didn't blame them. He tried putting sulkies on the walk-behinds. This trailing stand, much like what is used by harness racing jockeys, is offered by a number of manufacturers. But the sulkies didn't work out. "Our operators didn't like them. They said they were a hassle to take on and off."

Finally, he decided all new big



mowers would be riders. The walk-behinds are retained for backups, slopes and other areas where riders would be clumsy and impractical.

For Environmental Care, Calabasas, Calif., all decks up to 48

inches are walk-behinds, said Bob Scofield. "We use them in landscapes that, for topography or size, show it doesn't make sense to try riding the area. A lot of landscapes in Southern California are not large; land is at a premium."

MIDSIZED QUALITY. Today's equipment is made better. "On some of the early 26- and 48-inch machines, the drive mechanisms were so flimsy that after you used it a month the clutch would go out, the things wouldn't drive well and there was no way you could push a 36- or a 48-inch mower."

New models are lighter but have greater horsepower. The decks are no longer oversized. "Some of these big machines were cumbersome before. But now you can use that size machine in limited areas. With zero-turning radius you can go into a small area with a 36 or 48. When you had to make a big circle or back up, you lost too much time."

At all six of its locations, crews of Four Seasons Landscape & Maintenance, based in San Jose, Calif., carry 36-inch walk-behinds, said Hal Cranston. In a company this big, riders tend to be the first line of attack. Walk-behinds are

(continued on page 46)



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USE READER SERVICE #101



Midsize Walk-Behinds

(continued from page 43)

used where riders won't fit or are otherwise impractical. The purely economic decision to phase out riders and replace them with 61-, 54- or even 48-inch walk-behinds does not apply here.

"Although a rider costs more than twice what a walk-behind costs, a good rider can do twice what a 36 can. We look at savings from the standpoint not so much of capital expenditure, as of labor."

"We have noticed a trend toward purchasing wider decks, 52 and 61," said Jim Butchart of Bunton, Louisville, Ky., a manufacturer of mowers. Hydrostatics are raising a lot of eyebrows.

"One wheel motor can go forward while the other goes backward. You can spin the unit on its axis. With a conventional belt drive unit, sometimes it's a little difficult to hold your traction. With the hydrostatic drive you can have the lower traction wheel turning faster than the other wheel, to



compensate for the tendency to slide."

One expert who noted a friend switching from riders to walk-

behinds to cut costs is Bob Brophy of Cushman, a Lincoln, Neb.-based subsidiary of Ransomes America Corp.

The environment and climate often determine whether walk-behinds or riders are best for the job. Photo: Kubota

"A friend of mine here in town maintains over 1,000 acres of grass," explained Brophy. "He said, 'My people are just going to have to bite the bullet next year and walk. I can't afford to put them on a \$14,000 mower anymore.' The price of big equipment is escalating faster than contractors can raise their costs for mowing. They're getting caught in a squeeze that's forcing them down the ladder instead of up."

It's hard to spit out a flat acreage mowing figure for midsize walk-behinds.

"There are so many variables. If you're cutting wet ryegrass it will have to go slow. Dry bluegrass, you can go fast. There's a lot of cellulose in bluegrass, which there isn't in ryegrass."

There are several convincing reasons to opt for a walk-behind over a rider, said Peggy Hoffman of Scag Power Equipment,



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Mayville, Wis. "Sometimes a mowing contractor is looking to save money. Riders take more room to maneuver," she said.

(It must be noted, however, that zero-turning-radius riding mowers are out now, and they're fairly hot. These are considered the Cadillacs of mowing and, because of price, may be limited only to large contractors.)

"Depending on what you need as far as trailer space, you can fit more walk-behinds than riders. And a lot of operators prefer walk-behinds for the exercise. Some almost run behind them."

Bob Tracinski of John Deere, Raleigh, N.C., recently attended a dealer meeting at which he was made aware that contractors were clamoring for a walk-behind that could shoot through fence gates. "So we came up with a 38 that has become very popular," he said. "Generally speaking, though, I would have to say, particularly for big companies and big spaces, that you're more productive riding."

John Smith of Exmark, Beatrice,

Neb., calls walk-behinds "utility" type machines. "Your midsize can mow productively large areas as well as heavily landscaped areas. You're combining the functions

Hydros increase user productivity 30 to 40 percent due to better maneuverability.

of a trim mower with a wide area mower."

Hydrostatic zero-turning radius is becoming gradually more popular. "There's getting to be a demand. You don't slip in wet mowing. Also, they increase user productivity by 30 or 40 percent, because of better maneuverability."

The competition has heated up

in supply of midsize walk-behinds, said Dick Tegtmeier of Encore, Beatrice, Neb. "This is my third company. I was with two others that also made commercial turf equipment. In 1982 we had about eight competitors; today, I think it's 19. Next year we'll probably see six or seven fewer."

Target mowing hours for his models are in the 2,500 to 2,800 range, he said. In Florida, that could mean two and a half years of use; in Minnesota, maybe five.

"On a lot of these multiple housing complexes, the architect has a lot of berms and other obstacles to wide-area mowing. This almost rules out the rider. In the last five to eight years, midsize walk-behinds have become so maneuverable, they've cut into the 21-inch mower business. You can't get a 48-inch mower through a 21-inch hole, but that's where they bring the trimmers in."

The hydros, which hit the market last year, are basically the same this year, said Jim Wallace of Toro, Minneapolis. And soft sales definitely have an explana-

tion in a struggling economy. One selling point in this tough market is offering the convenience and safety assurance of the automatic shutoff switch, even though it's not required by the American National Standards Institute.

Toro distinguishes itself by making this feature standard. A growing number of manufacturers are doing so as well. Generally speaking, a hydrostatic costs \$1,000 more than the old belt drive kind, he said. The midsize mower is part of the mowing fleet of just about every conceivable operation, except perhaps the one-to-three-man operation that might get by with a 21.

"I think almost every crew out there has a midsized mower. To the little guy, it may be his biggest mower, his large area mower, whereas the big guy has the bigger riders for large areas and uses the midsize for trim." ■

Gitlin, based in Shaker Heights, Ohio, is a contributing author to Lawn & Landscape Maintenance magazine.



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USE READER SERVICE #10

Searching for Trucks with Guts

Although most trucks in the landscape industry are ultimately customized, contractors are looking for basic models which stand the test of time.

By Lynn Novelli

THIS IS THE time of year when contractors are paging through catalogs and poring over spec sheets, planning their vehicle purchases for next spring.

The catalogs are loaded with four-color glamour shots of trucks, but landscape contractors are likely to ignore the glitz and go for the guts when buying a truck. Quality, durability, toughness — however you say it, that's the most desired but elusive feature they want in their trucks.

"The main problem is that below the two-ton size, trucks are built like cars. Their construction is just not heavy-duty enough. Salt goes right through the bodies, for example," said Bruce Church, president, D.R. Church Landscape, Lombard, Ill.

Church Landscape owns some 70 trucks, 65 percent of which are one-ton pickups for maintenance or supervisory use. Prior to 1991, the firm relied on Chevy and GMC trucks, but Bruce has since switched his alliance to Ford.

With careful maintenance, a new one-ton pickup will last a maximum of seven to nine years, Church said. "Even with regular maintenance, the bodies go super-quick."

Interior durability is also an issue, said Dan Foley, president, D. Foley Landscape, Wallpole, Mass. "The interiors just don't hold up

to crews jumping in and out of them all day. Everything from the door handles down is plastic any more, even the dash."

Foley, who rates the expected life of his vehicles at six to eight years, likewise cites the importance of a regular preventive maintenance program to add to a truck's lifespan.

"We are more into preventive maintenance than ever. We are finding that all those little tips, whether we get them from magazines, the dealer or whatever, do seem to help."

BUYING TRENDS. According to *Lawn & Landscape Maintenance's* 1990 truck survey, the

Big Three domestic manufacturers are clearly the lawn maintenance industry's preference, accounting for more than 80 percent of those vehicles in use.

One exception is with medium-duty trucks used for spray rigs, where the domestics account for 69 percent of vehicles in use.

Looking at the broader picture, Ford's F series trucks dominate the commercial truck market, holding an overall 30 percent market share. The figures reflect Ford's marketing strategy in appealing to landscape contractors and other commercial truck buyers, said Woody Haines, assistant manager, Ford Truck Operations Public Affairs.

"Ford has concentrated on durability, toughness and dependability in the F series pickups. We have made some significant breakthroughs in the past few years and are always looking for more ways to improve," he said.

Ford's wide selection of models, engines and cabs also contributes to the maker's popularity with landscapers. The four basic F series trucks are available with at least five different engine sizes in gas or diesel, standard cab, additional seating and crew cab in the F 350, with a choice of two transmissions. All trucks are available in a 4 x 4 version for off-road.

Chevrolet trucks are second to

(continued on page 52)



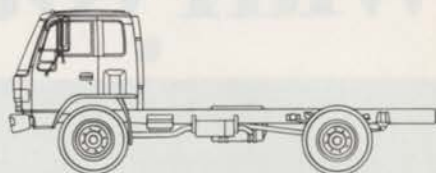
Trucks are integral to the livelihood of the maintenance contractor especially when transporting plants from the nursery to the jobsite.

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USE READER SERVICE #79



You might think using less insecticide means you'll have to put up with more insects. But that's not necessarily the case. Because *how* you use your insecticide is as important as *how much* you use. With

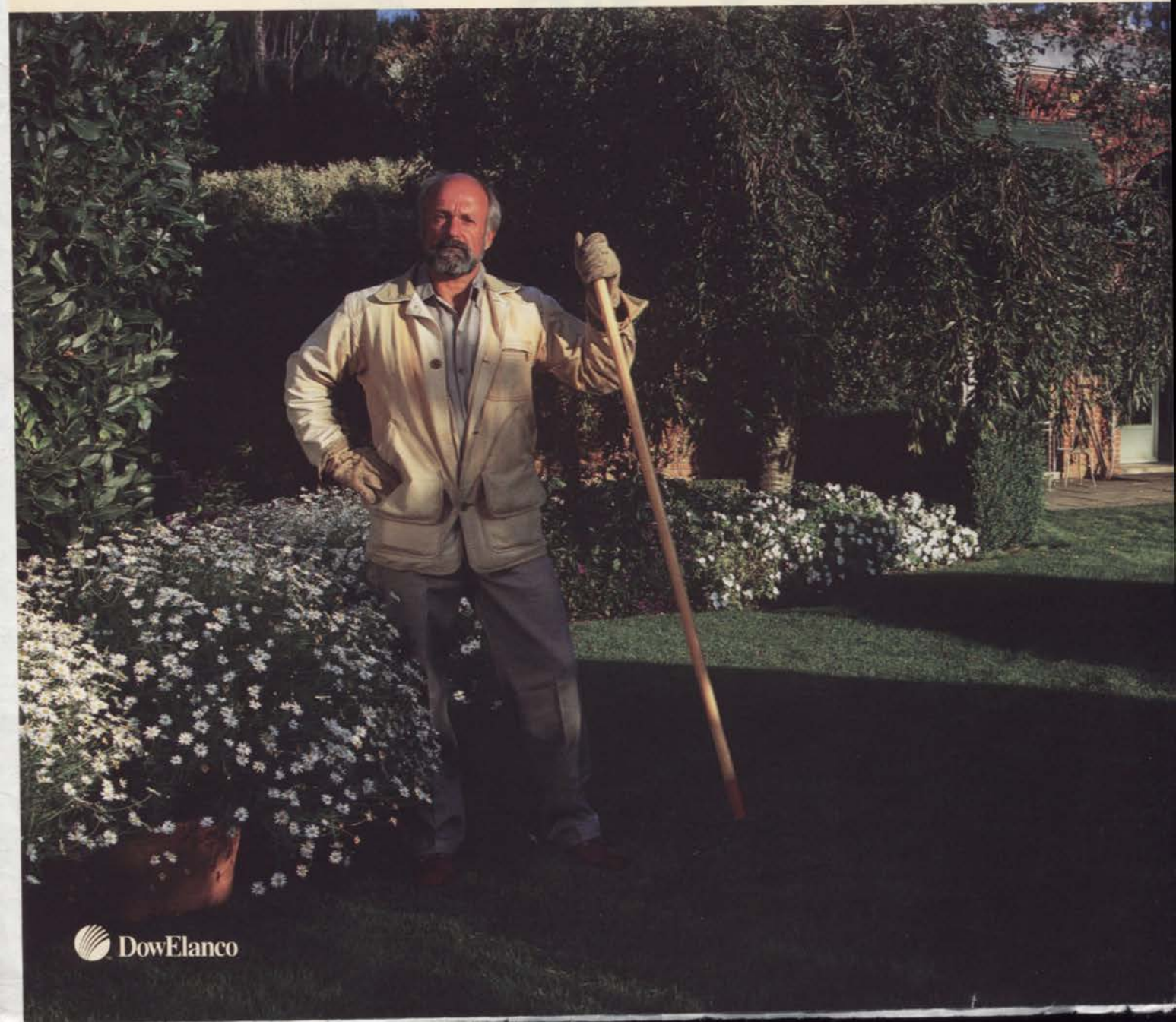
the right tactics, you can use a lot less and still get excellent results.

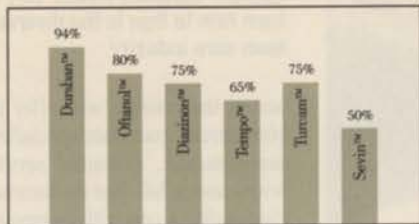
Here's a good example. By mixing insecticide with insecticidal soap, you can reduce the amount of insecticide you need on your

ornamentals by about fifty percent. Insecticidal soap controls most soft-bodied insects and mites. By adding insecticide, you'll also take care of tougher insects, like scales and worms. University studies



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Studies show that Dursban delivers better chinch bug control at lower rates than other insecticides.

suggest you may get better control than you get with insecticide alone.

Knowing exactly when to apply insecticide helps, too. For example, adult black turfgrass actinurus are

cide gives you so much control at such a low rate. It's available in water-soluble packets. And it can be bio-monitored, which can reduce the likelihood of over-exposure.

Now, we realize you probably

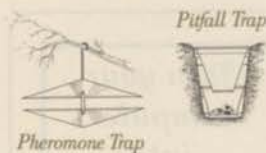
ance your hate for insects ironment.

first present at the same time the black locust tree blooms. Make your insecticide application then, and you'll get the most efficient, effective control.

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self can also make a difference. After all, different insecticides work at different rates. Which is why Dursban[®] insecticide could be your best choice.

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Trucks with Guts

(continued from page 48)

Ford in popularity with landscapers, reflecting the company's overall position in the commercial truck market. Chevy is consciously trying to catch the leader, with all-out marketing efforts targeting specific industries, including the lawn and landscape maintenance industry, said Frank Jensen, manager, marketing/product development for Chevy's newly created Commercial/Specialty Vehicles Division.

What about Church's charge that light-duty trucks are built like cars? He's partially right, Jensen said. "Nowadays, trucks are used for both work applications and for private, residential purposes. We try to satisfy both — you get a comfortable ride and have the hauling and towing capacity you need," he explained.

Chevy offers medium-duty pickups, marketed by GMC, and the C/K series of lighter pickups, with C being two-wheel drive and K the four-wheel drive models.



Available in payload capacities from a half-ton to one-ton, the C/K series maxes out at 15,000 pounds GVW. With six engine choices, including a turbo-charged 6.5 liter V-8 and regular, extended or crew cab in the 3500 series, the selection rivals Ford's. New for 1993 is a four-speed automatic overdrive electronic transmission, available in trucks under 8,500 pounds GVW.

Three years ago, Chevy mounted an aggressive marketing campaign to attract more land-

scape contractor buyers. In combination with a direct mail campaign, Chevy reps hand out coupons at trade shows for an additional discount on Chevy trucks.

"Last year, we sold about 5,000 units as a result of this effort, and half of those were sales to people who previously bought other makes," Jensen said.

The newest piece in Chevy's strategy will be the announcement of Chevy Commercial and Specialty Vehicle dealers. This core group of 400 selected dealers

Custom-designed trucks vary from firm to firm in the diverse lawn care industry.

across the country will offer the commercial customer specialized maintenance, extended service hours and a full line of commercial trucks, along with aggressive incentives to the commercial buyer. Chevy starts selecting dealers this month for the new program, Jensen said.

Meanwhile, Dodge Truck, a distant third to the other two, is getting ready to give them a run for their money, according to Keith Helfrich, Dodge Truck merchandising manager.

Through extensive marketing research, Dodge has selected the quality/durability issue as the most important concern of commercial truck users like landscape contractors. The company has deliberately repositioned its trucks, segmenting the truck market into commercial users and "people who want to drive a truck like a second car," Helfrich explained.

With this new approach, Dodge

grassroots marketing

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USE READER SERVICE #40

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is actively wooing commercial customers like Dan Foley and Bruce Church, hoping to entice them away from Chevy and Ford.

"We're considering the needs of the work truck buyer separately from those of the customer who buys a truck as a second car. The work truck buyer's main interest is in how much can I haul and how much can I tow," said Helfrich.

Dodge is exclusively in the light-truck market with its compact Ram 50, Dakota and full-size Ram series trucks. The full-size Ram will be replaced in 1993 with the new T-300 trucks. All three are available in short- or long-bed models, two-wheel or four-wheel drive, and the Dakota and full-size Ram offer standard or club cab versions. Engine options range from the 3.9-liter V-6 and 5.2- or 5.9-liter V-8 up to the Cummins 5.9-liter diesel available in the full-size Ram.

In 1992, Dodge re-engineered all of its truck engines, dubbing the new multi-point fuel injection versions the "Magnum" series. In response to the commercial truck

buyer's needs, the new engines offer more power, greater fuel economy and fewer working parts, Helfrich said. "They tend to have longer cycles between scheduled maintenance, due to the parts' design for improved wearability."

Whether customized to suit the needs of an individual firm (right) or for heavy-duty applications (below), contractors want trucks with grit.

Dodge hopes to compete seriously with Ford's 600 and 700 series medium-duty trucks with



its Ram Cab and Chassis line. This configuration represents the upper end of the Ram trucks, on the border between light- and medium-duty, with a GVW of 10,000 to 11,000 pounds. The basic chassis is designed to be outfitted with the buyer's choice of bodies, such as stake bed or dump.

"With a Cummins diesel, a cab and chassis provides a solution for heavy hauling and towing in a truck that still drives and handles like a smaller pickup, and the driver doesn't need a commercial license," Helfrich said.

Mitsubishi, like other foreign makers, concentrates on the mini-truck market, with their two two-wheel drive and one four-wheel drive models. Payloads on these little trucks vary with the standard or macro cab, but generally hover in the 1,400 to 1,500 pound range.

"Basic trucks" is how Jerry Burwell, manager, product marketing, describes Mitsubishi's line. "We don't recommend converting them to dual rear wheels, but as a basic pickup, they work

THE BOSS

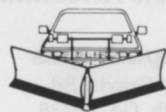
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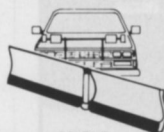
- Multi-position blades allow you to change from a straight to a "V" Blade or the scoop position at the touch of a finger.
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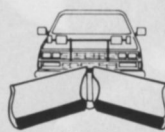
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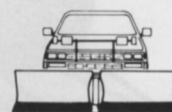
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real well," he said. Contractors seem to like them as supervisory vehicles and tool trucks, Burwell added.

The relatively low price of these mini-trucks makes them attractive to landscape contractors, topping out at under \$13,000 for a top-of-the-line truck with a V-6 motor and five-speed manual transmission. Equally appealing are their low operating costs and load-sensing proportioning valve that adjusts braking pressure to the load.

QUALITY DEMANDS. Models and marketing strategies aside, the essential question for landscape contractors still comes down to whether Detroit is addressing their needs for quality construction. The fairest answer is probably that the Big Three automakers are trying to be responsive.

Their effectiveness, however, is limited in part by technology, said Chevy's Jensen. And, he pointed out, there is more to the strength and durability of a truck body than the thickness of the



steel. "For example, we have come a long way in paint and rust-proofing technology for improved corrosion-resistance," he said.

In recent years, all three domestic automakers have gone to double wall, galvanized steel for the cargo box, a change Ford's Haines classifies as a "major breakthrough." Ford also boasts a twin I-beam suspension in all its trucks for added strength.

Beyond the dollars and cents considerations of longevity, maintenance and operating costs, ma-

terial handling needs are the next consideration, Foley said. Although his fleet is small, Foley's trucks are virtually completely custom vehicles. He buys a cab and a chassis, then has a local truck equipment company custom make the bodies to his specifications. The trucks are finished off with tool boxes, two-way radios, mud flaps and some special tarps.

Material handling and storage are two of the most important aftermarket alterations, said

Tree moving, requiring specialized trucks, is a large profit center for some firms.

Church. He has outfitted one truck with special compartments for tool storage and several others with side lift gates to facilitate unloading without requiring a tractor.

Because every contractor's needs for storage and material handling equipment are individual, it is unlikely any of these elements will move out of the

(continued on page 56)

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after-market realm, according to Ford's Haines. That doesn't concern contractors, however, who are content to buy basic trucks and outfit them according to their specific needs.

What they would like to see from the Big Three are sturdier towing packages and, for those contractors who plow in the winter, front end improvements.

"Towing packages just need to be stronger. The suspension and bumpers are never adequate," said Wayne Richards, chief operating officer, landscape maintenance department, Cagwin and Dorward, Novato, Calif.

Fifteen of Wayne's 105 trucks are one-ton pickups used for towing trenchers. "I am always looking for improvements in quality, and I prefer to buy American," he added.

Contractors who plow in the winter face similar strength problems with front ends. "If you don't plow, it might not be a factor. But,

MOST STATES have adopted the U.S. Department of Transportation's interstate trucking safety regulations for trucks operating within the state. Driver requirements, mainly related to obtaining and maintaining a commercial driver's license, apply to vehicles over 25,000 pounds GVW and do not apply to most landscapers, according to John Satagaj, tax and horticultural law consultant to the American Association of Nurserymen.

What may apply to contractors are federal and state vehicle safety rules, which regulate any vehicle over 10,000 pounds GVW. The 100-plus pages of federal regulations are condensed to 40 pages in the AAN's "Guide to Motor Carrier Safety Rules for the Horticultural Industry."

Here's a quick checklist of some of the basic requirements for compliance:

1. DRIVERS.

Are all your drivers at least 21 years old?

Do you maintain records of all drivers for three years following the time they leave your employment? Records must include name, social security number, driver's license number, type of license and state in which it was issued.

Do you conduct annual reviews of each driver's driving record?

2. CARGO.

Is all material being hauled evenly distributed and secured at all times?

Does any material obstruct the driver's view?

Do your drivers know that they are responsible for making sure the load is secure during the trip?

3. MARKINGS.

Are your trucks clearly identified with your company name, city and state? Markings must be on both sides of the truck and legible from 50 feet away.

For a copy of the complete guide, contact the AAN at 202/789-1893.

if you want to hang a plow in the front, we find you've got to get a beefed-up front end," said Church. His operation uses the Ford 450 with a 5.7-liter engine for plow-

ing. "Even with the 450, the front end could be stronger," he commented.

"My ideal truck?" he asked. "A truck that really stands up to the

elements and whatever we contractors put it through." ■

The author is a free-lance writer based in Russell, Ohio.

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Low-Volume Spraying: Is It For You?

By analyzing your turf maintenance program and thoroughly investigating sprayer options, you can determine if low-volume spraying is the right choice for your firm.

By Steve and Suz Trusty

LOW-VOLUME spraying is basically a method of applying specific materials using less water in the spray solution.

According to Bill Japp, manager of specialty products for Big Bear Equipment Inc., Omaha, Neb., low-volume spraying in the turf maintenance market generally refers to methods of application which distribute three-quarters to one gallon of material per 1,000 square feet.

In contrast, high-volume spraying delivers four to five gallons of material per 1,000 square feet. In the agricultural field, low-volume applications could be in the one-quarter gallon per 1,000 square feet range.

MARKET INFLUENCES. Sprayer options for the commercial applicator are extensive and expanding every year. Choices range from the hand-held tank sprayer to the towed spray units to vehicle-mounted units.

With 20 years experience at Big Bear, Japp has watched the development of low-volume spraying and its growing acceptance in the turf industry, especially during the last five to six years. Environmental concerns, linked to Environmental Protection Agency regulations; advancing technology in equipment design; and development of specialized chemical formulations have combined to raise the level of precision available to the commercial applicator.

Rather than one element of this trio leading the way, all three have interacted to advance spraying technology. This advanced technology extends across the broad spectrum of spray applications. High-volume and low-volume spraying can both be performed with a high degree of accuracy, but deciding which method to use requires analysis of your needs and assessment of the op-



Many lawn and landscape maintenance operators have turned to low-volume spraying for greater accuracy and, often, more efficiency.

tions available to fill those needs.

The percentage of lawn maintenance operators, school systems, municipalities, sports turf facilities and golf courses using high-volume vs. low-volume spraying will vary by region, even by city, throughout the United States. Local suppliers can give you a breakdown of the most popular sprayers sold to their customers, and the effectiveness of the various products.

For example, in the Omaha market, there are four large national lawn maintenance firms using high-volume applications and approximately 200 independent maintenance firms using a combination of granular and low-volume applications. Some com-

panies have upgraded existing equipment, some have gradually replaced older units and others have started over with newer technology. This kind of feedback will help in the decision-making process.

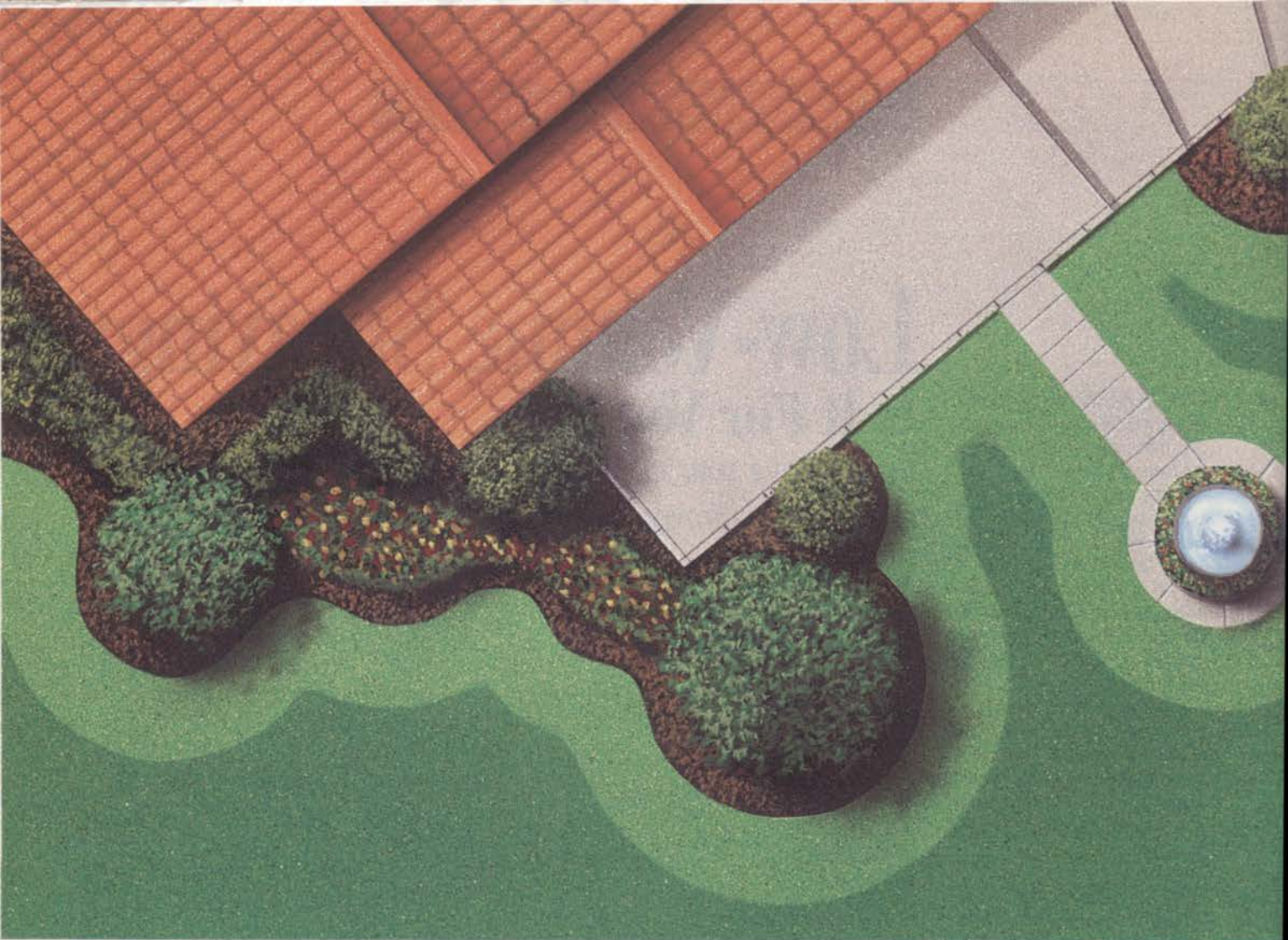
Consider the effect of low-volume spraying on compliance with EPA regulations. At a low-volume application rate of one gallon per 1,000 square feet, a 200-gallon tank will hold enough material to treat 200,000 square feet. At a high-volume application rate of five gallons per 1,000 square feet, it will take a 1,000-gallon tank to hold the material to treat the same 200,000 square feet.

Under EPA regulations, when

a controlled or monitored substance is mixed with water, the volume of that substance increases proportionally. That is, with low-volume spraying you have 200 gallons of material to keep track of and with high-volume spraying you have 1,000 gallons. In case of an accident or spill with the 1,000-gallon tank, you would be accountable for five times the volume of material as you would be using a 200-gallon tank.

Using a large tank means that more time is needed for each tank fill. Again, it takes five times longer to run in 1,000 gallons of water than it does to run in 200 gallons. Depending on the mate-

(continued on page 60)



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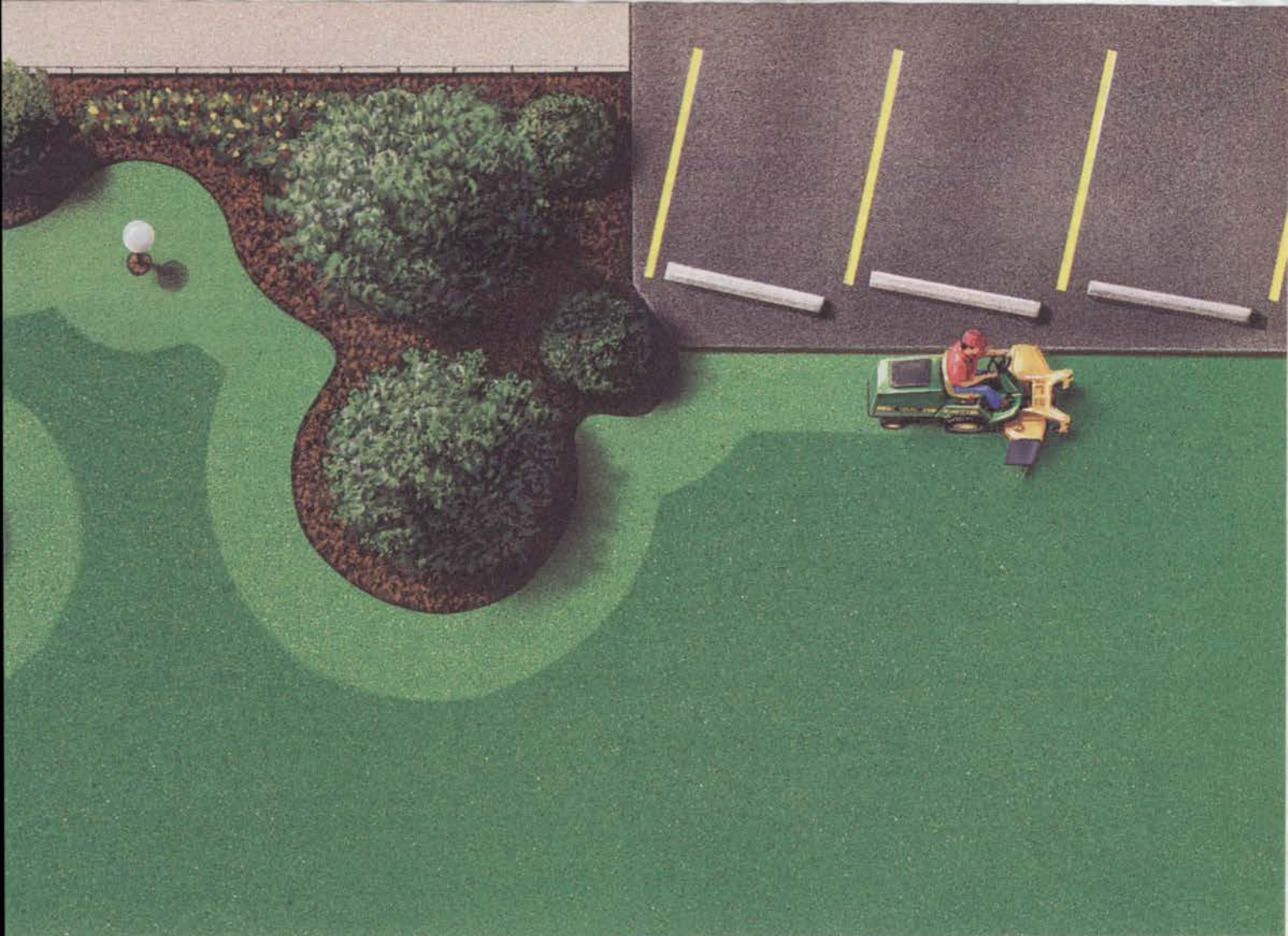
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Low-Volume Spraying

(continued from page 57)

rials used and the type of agitation equipment involved, it can take longer to mix substances in the larger tank. It also takes more water and more time to clean the tank after use. The costs of water can also affect the overall cost of spraying.

There is also the visibility factor to consider. A 1,000- to 1,200-gallon tank mounted on a full-size truck attracts attention. That can be both a plus and a minus. The company name on that unit acts as a form of advertising, reminding customers and potential customers that your firm is in the plant care business. But no matter what you have in that tank, even if it is only water, people seeing the unit automatically think "chemicals".

TRUCK OPTIONS. The size of the tank is merely one of the many decisions to be made when comparing low-volume and high-volume spraying.

The size and weight of the 1,000- to 1,200-gallon tank for high-volume spraying requires a two-ton truck. A tank for low-volume spraying in the 200-gallon range can be carried easily by an intermediate size truck. Obviously, the initial purchase price will be greater with the larger truck. If you are considering a purchase, use the outright cost, plus the cost of financing, spread over the financing period to get a direct comparison.

The small truck will not only cost less initially, it will get better mileage and cost less to operate. Use the miles per gallon figures of the two trucks and the average number of miles your trucks travel in a day or week to compute the cost differences. You may also want to compare the operating costs of current vehicles and the costs of purchasing upgraded equipment to the costs of purchasing new equipment.

Depending on the areas under your care, the total weight of the truck, equipment and filled tank may be an important factor. The overall maneuverability of the total unit also should be

considered in relation to your needs.

The additional water required for high-volume spraying will add to the weight of the spray unit and increase the fuel consumption of the truck.

High-volume spraying must use higher pressure for pumping. If the truck's PTO is used to operate the tank's pump, the additional fuel costs for this portion of the engine operation must also be considered. The pump to operate the smaller output of the low-volume spraying unit usually can be run much more economically.

FORECASTING. You will need to figure the frequency of spraying and the amount of area to be sprayed in order to decide what equipment is best. If your turf maintenance program will combine granular and low-volume spraying, what proportion of each will be used?

Some maintenance operators apply granular fertilizers, but use liquid herbicides, insecticides and fungicides. These operators make only one or two blanket sprayings of their properties with low volume, using integrated pest management practices to identify areas in need of spot treatment.

In this instance, even with 10 to 15 bags of 50-pound granular material and a filled 200-gallon spray tank, an intermediate-sized truck is sufficient to carry the load.

The question of possible turf burning with low-volume fertilizer applications still sparks controversy. We were told by some that the source and amount of active ingredient in the fertilizer product applied, not the volume of water used, were the critical factors in burn potential. Others felt that no matter what the source and amount of active ingredient, fertilizer applications should always be made with high volume.

Others felt that adjusting the source and amount of active ingredient makes low-volume fertilizer applications practical during optimum growing conditions, but that high-volume applications should be used in high risk periods, such as intense heat, drought or a combination of the two.

In addition to the fertilizer components and amount of active ingredient applied per 1,000 square feet, soil type, pH, topography, weather factors and the type or types of grasses will all have a bearing on your decision. Local university turf specialists, researchers and suppliers will be the best sources of information on the effects of low-volume fertilizer spray applications in your area.

Advancements in specialty pesticide technology also have expanded the options for spray applications. Even 10 years ago, most chemical manufacturers' products were labeled for application of a minimum of 2 to 2 1/2 gallons of mixed material per 1,000 square feet. Today's product labels frequently list one gallon or less of mixed material to be applied per 1,000 square feet. (We're using ounces of active ingredient per acre, instead of pounds.)

(continued on page 77)

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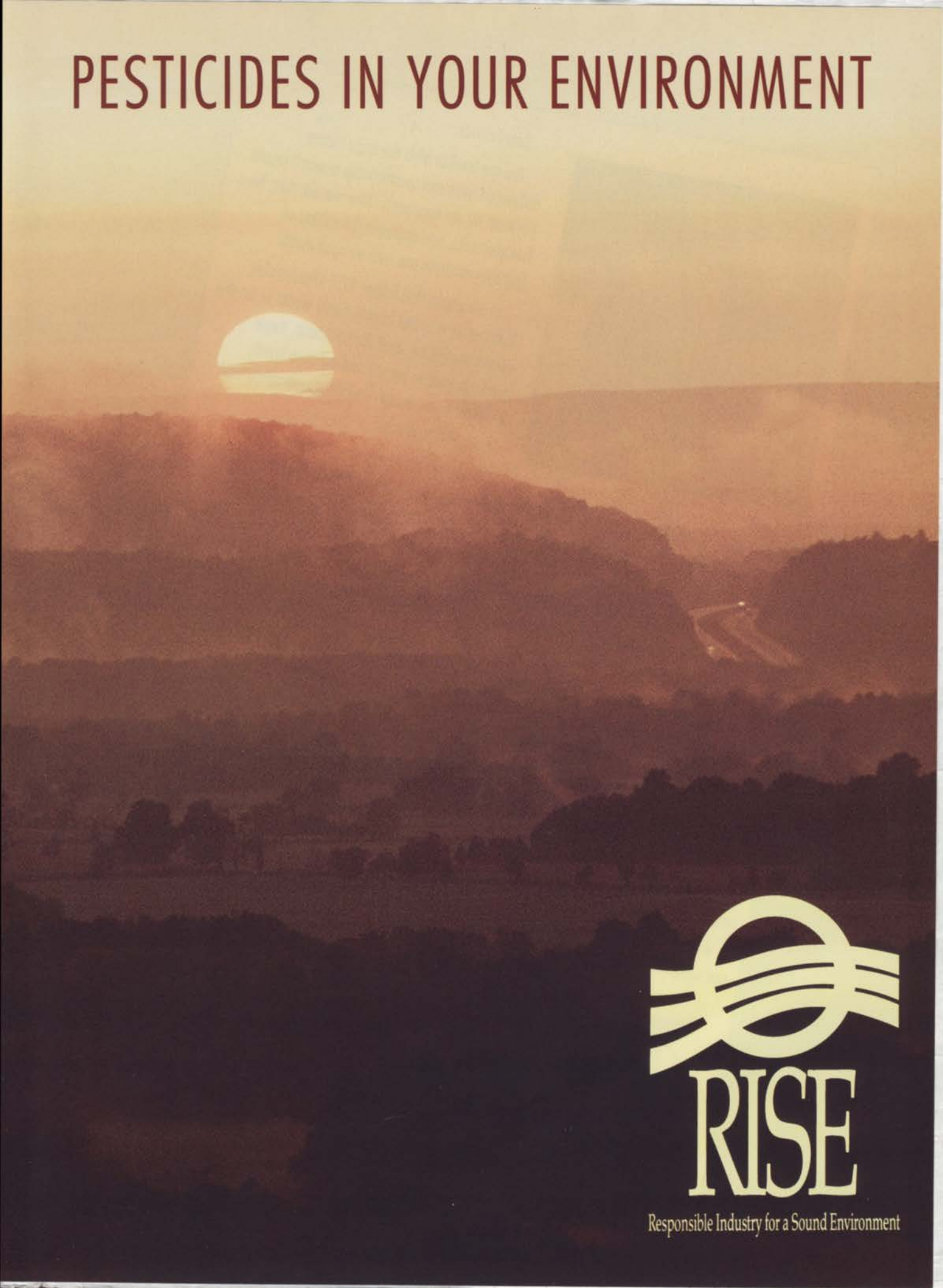
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Dear Friends:

You are familiar with the scare tactics, Hollywood hype and questionable research results put forth by our opponents. Now we ask that, for a few moments, you approach the subject of specialty pesticide use with an open mind.

In the pages that follow, RISE (Responsible Industry for a Sound Environment) wants to set the record straight on specialty pesticides, those products used to protect and enhance lawns, gardens, trees, homes and other non-agricultural areas, like roadsides.

This project represents an industry first — editors of usually competitive publications worked in cooperation to present the facts. Their mission is straightforward: Define the benefits of specialty pesticides and put the risks in proper perspective.

Homeowners and professional applicators can use specialty pesticides with confidence. The specialty pesticide industry tests and re-tests all products to ensure they pose no unreasonable effects for humans, animals or the environment when used properly.

As a result of the strict testing standards imposed by manufacturers, the Environmental Protection Agency and various state regulatory agencies, only one in approximately 20,000 products makes it from the chemist's laboratory to the marketplace.

But even these impressive numbers don't let us rest on our laurels. Our industry continually works to discover and develop new products to protect human health, improve the environment and, in general, better our quality of life.

The specialty pesticide industry is dedicated to bringing you the safest and most effective products possible. Our goal is simple: Control undesirable pests and diseases in your neighborhood and our nation.

We want you to take heart in knowing the world is a safer, healthier, prettier place in which to live and work — thanks to specialty pesticides.

Sincerely,

Allen James
Executive Director

THE OTHER SIDE OF THE STORY

SPECIALTY PESTICIDES: SOCIETY'S UNSUNG HEROES

You've read it in the newspapers. You've heard it on TV. The decade of the 1990s is the decade Americans are embracing traditional values. Tired of the race to overachieve, Americans are rediscovering the pleasures their immediate environments provide.

Many Americans don't give a second thought to a kitchen cupboard free from cockroaches, a front lawn minus weeds, a nearby pond teeming with fish. Such benefits — all part of a clean, healthy living environment — are taken for granted. They're as American as mom and apple pie.

Without the use of specialty pesticides, however, the story would be radically different. Disease-infested trees? Shade is scarce. Vegetation-choked waterways? Fish don't flourish. Roach-infested kitchens? Forget the food.

Specialty pesticides rid homes and workplaces of annoying and damaging insects, noxious weeds and plant diseases. They work selectively, like antibiotics work to rid the human body of only the undesirable bacteria and germs.

Properly used, specialty pesticides play a big role in helping this nation maintain one of the highest standards of living in the world. However, the road isn't always smooth. Specialty pesticides are under fire from several sectors, both public and private, but their value to society is proven.

While risks must be considered, the benefits of specialty pesticides can't be denied. Any medicine used properly and according to label instructions can do much good. Used improperly or abused, it becomes a poison. The dose makes the poison. The tests that specialty pesticides undergo

during the registration process are similar to those for pharmaceuticals. But, in most cases, specialty pesticides must undergo even more tests to prove they can interact with the environment, as well as humans, without undue risk.



Specialty pesticides help deliver a pest-free living environment for Americans.

Former U.S. Surgeon General C. Everett Koop encourages the public to recognize the difference between real risk and hypothetical risk: "The risk, for example, of being killed by an automobile (1 in 6,000) is much greater than any hypothetical risk of a pesticide. Yet that doesn't keep us off the road, either as passengers or as pedestrians.

"By focusing on a hypothetical risk, like that from pesticides, not only do people find their anxiety levels elevated, but by focusing on a straw man, they also feel that they are doing something to improve their health. In so doing, they often neglect all the other things that they could be doing more readily, more legitimately, and with greater effect, such as paying attention to smoking, alcohol, exercise, balanced diet and so on."

The lesson is simple: Everything has risks, but risks must be weighed against benefits. Americans use potentially toxic products — from cleansers to gasoline — every day. Used properly, they serve their purpose and improve our quality of life. Specialty pesticides do, too.

Thanks for a job well done to the editors and publishers of *Arbor Age*, *Grounds Maintenance*, *Landscape & Irrigation*, *Landscape Management*, *Lawn & Landscape Maintenance*, *Pest Control*, *Pest Control Technology*, *SportsTURF* and *Tree Care Industry*. Thanks also to the National Roadside Vegetation Management Association and others who contributed information and graphics.

SPARING THE PLANET OF PESTS AND DISEASE

There was a time when pest-borne diseases — malaria, yellow fever and typhus — were feared by every American.

There was a time when nearly one-fourth of Europe's population was wiped out by bubonic plague. There was a time when the constant biting of bed bugs prevented a good night's sleep.

Before widespread mosquito control, as recently as 1935, 4,000 Americans a year died of malaria. Further back, during the summer of 1878, a yellow fever epidemic affected 132 U.S. cities and 75,000 Americans. Of those, 16,000 people died of the mosquito-carried disease.



Close inspection inside a structure leads the pest control operator to actual and potential problems. Early identification of a termite infestation can save the homeowner money and headaches. It's estimated termites and carpenter ants cause \$2.5 billion in structural damage annually worldwide.



And it was in 1845 that the Honorable John Randolph addressed Congress and declared that Florida would never be developed nor would it ever be a fit place to live. He described Florida, one of today's most popular tourist destinations, as "a land of swamps or quagmires of frogs and alligators and mosquitoes."

Today, we live in a country where plagues and epidemics are a vague memory. "Americans no longer worry about getting malaria, yellow fever or dengue fever," says Norman Cooper of the National Pest Control Association. Once common and greatly feared problems in America, these diseases were transmitted to humans by insects and rodents.

D I D Y O U K N O W ?

Few Americans worry about health threats posed by insects. That's because pest populations are held in check by pest-management programs, which include responsible use of specialty pesticides. A pest-free living environment:

- Wards off disease. Pests, such as mosquitoes, no longer pose the disease threats of the past, when whole cities and nations were wracked by outbreaks of malaria, yellow fever and typhus.
- Allows the public to enjoy outdoor recreation. Some of today's popular tourist destinations, such as Florida and other tropical locales, once were seen as unfit places for humans to live or visit. Pest control cleared the way for development and commercialization of recreational facilities.
- Protects the food supply. Without pest control, rodents and insects would dine on much of the food meant for human consumption.
- Enhances property values. Homes and offices, free from wood-infesting and other pests, enjoy a longer life span and maintain more of their original value.

"Fortunately, we no longer must fear pest-borne diseases — not only because of great advances in modern medicine but because of modern pest control, too," Cooper says.

Even President George Bush recognizes the important role the pest control industry plays in protecting public health and property. In a letter recognizing National Pest Control Month, he wrote: "We Americans have come to expect pest-free homes, places of employment and food supplies. Yet we know that we could not enjoy living in a clean, healthy environment if it were not for the efforts of pest control professionals."

PAYOFFS FOR THE PUBLIC

The payoff for this commitment to pest control and public health programs is a dramatic increase in life expectancy. In 1940, the average American lived to age 63. Today, the average American lives to age 75.

Unfortunately, the media has been slow to spread a positive message to the public. "The overwhelming majority of the news we get from radio, television and print media about health and the environment is bad news...despite the fact that national health statistics indicate we have never been healthier," says Dr. Elizabeth Whelan of the American Council on Science and Health, a consumer education and advocacy group.



Pest control operators and technicians take time to review problem spots with homeowners and business operators.

The control and monitoring of public health pests through integrated pest management (IPM), including the use of specialty chemicals, is a key reason for America's improved health. Pest control professionals keep fleas, ticks, cockroaches, rats and other pests from reproducing in large numbers. But it's a constant battle. Consider these statistics:

- Rats bite more than 45,000 people annually, mostly infants and children.
- Seven to eight percent of the U.S. population is allergic to cockroaches. Studies of inner-city children in Atlanta with chronic wheezing, runny eyes and noses revealed that 44 percent were allergic to cockroaches.
- Rodents are responsible for, or implicated in, the spread of numerous diseases, including plague, acute food poisoning, rat-bite fever and typhus.
- Lyme disease, transmitted to humans by the deer tick, infects thousands of Americans annually — and the numbers are rising.
- Cockroaches transmit a variety of digestive tract disorders, including food poisoning, dysentery and diarrhea.
- Mosquitoes are prime carriers of several types of encephalitis, a devastating illness that attacks the central nervous system of humans.



Precise application of specialty pesticides keeps living environments pest-free.

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PEST CONTROL

ENVIRONMENTAL DAMAGE

Public health isn't all that suffers when pests reproduce in large numbers. Wood-destroying insects, including termites and carpenter ants, cause nearly \$2.5 billion in structural damage annually. In the United States alone, termites cause an estimated \$800 million worth of damage to more than 600,000 structures.

And termites aren't the only villains. Rodents eat or contaminate millions of dollars of food daily. The National Pest Control Association



Americans largely take a pest-free home for granted. Specialty pesticides have eliminated the threat of many diseases that wracked humans in decades past.

estimates a single rat in the United States may contaminate up to \$1,000 worth of food annually. Worldwide, experts estimate rats and mice destroy enough food each year to feed 200 million people! By damaging electrical wiring, rats are suspected of causing up to 25 percent of all fires of unknown origin.

Fully one-fifth of all U.S. households have had a pest problem in the past year. Yet, despite the risk of disease and structural damage, many Americans still fear the use of specialty pesticides to control pests. Why? Experts say the general public doesn't understand the relationship between benefits and risks.

Part of the reason for the pesticide phobia, says former U.S. Surgeon General Dr. C. Everett Koop, is "the public doesn't have a very good grasp of the relationship between the dose of a toxic substance and its risk in human beings." Information often comes from those who use scare tactics rather than science when warning the public.

But the truth is hard to deny. Professional pest management programs improve the nation's standard of living. Widespread outbreaks of yellow fever, malaria and similar maladies — plagues that once swept the nation and the globe — have thankfully been committed to the history books.

BUG OFF

SPECIALTY PESTICIDES LESSEN THREATS TO HUMAN HEALTH

While the threat to human health from harmful insects has been greatly reduced, it hasn't disappeared. Insects and other pests pose many common and not-so-common health problems. Each of the following problems can be and is being controlled through efficient and effective pest control methods, including use of specialty pesticides.

Ants	Bite and sting Infest stored food
Bats	Associated with rabies, histoplasmosis and other diseases
Bees	Bite and sting Infest stored food
Beetles	Infest stored food Cause dermatitis
Cockroaches	Cause food poisoning Associated with gastroenteritis, dysentery, allergies and skin infections
Fleas	Cause dermatitis Transmit plague, typhus and tapeworm
Flies	Transmit typhoid, cholera, dysentery, infantile diarrhea, tularemia and other diseases Some species bite
Hornets	Bite and sting Infest stored food
Lice	Cause dermatitis Transmit epidemic typhus, trench fever and relapsing fever
Mites	Can cause dermatitis Transmit rickettsialpox and hemorrhagic fever
Mosquitoes	Transmit malaria, encephalitis, yellow fever and dengue fever
Nuisance birds	Associated with histoplasmosis, ornithosis and other diseases
Rodents	Bite Transmit leptospirosis and lymphocytic choriomeningitis
Ticks	Transmit Lyme disease, Rocky Mountain spotted fever and tularemia
Wasps	Bite and sting Infest stored food

Source: National Pest Control Association

T R E E S

IMPROVING THE VIEW FROM ABOVE

Trees beautify the environment through colorful flowers, showy fruit and rustic winter bark and twigs. Trees also offer practical benefits, such as screening high winds, buffering sound, hiding unsightly views and providing cooling shade.

In fact, tree plantings significantly reduce temperatures in urban areas, which, on average, are 10 degrees warmer than the surrounding countryside. Tree plantings and light-colored surfaces can cut home energy bills by \$100 to \$200 a year, according to the American Forestry Association.

An admiring but busy public takes trees' value largely for granted. Few probably realize urban areas are losing trees at a record pace. According to the National Arbor Day Foundation, in some U.S. cities, up to four trees die or are removed for every one tree planted.

The full value of trees would not be realized without the benefits of specialty pesticides. Specialty pesticides are to tree health what medicines are to human health. When applied knowledgeably and responsibly, tree-care medicines are invaluable tools that make a positive contribution to our environment and to our health. Healthy trees improve our quality of life.

Unfortunately, trees are subject to insect attack. The gypsy moth, for example, has destroyed hundreds of thousands of acres of trees, mainly from the Carolinas up through Michigan. Favored hosts include oak, birch, apple and cottonwood trees.

However, biological and conventional specialty pesticides can control the gypsy moth caterpillar. Community spray programs and tree care firms are working to control the pest — and save trees.

No one wants those trees to go the way of the American elm, which once formed cool, green archways over streets in U.S. cities. Since the 1940s, thousands of the mighty elms have fallen victim to Dutch elm disease. Today, few are left.

A tiny insect, the elm bark beetle, carries the deadly disease from tree to tree. U.S. Forest Service research, however, has found that specialty pesticides, properly applied to the top of the tree, will reduce beetle feeding and limit introduction of the disease.

An integrated approach to control — pruning, specialty pesticide spraying and fertilizing — can save trees. Removing any segment of the three-part control program weakens the cure. The use of pest-specific specialty pesticide products, as part of an integrated approach, contributes to a better environment for today and tomorrow.



Top: Healthy trees provide cooling shade, protection from the wind and other benefits to society. Right: The gypsy moth has devastated trees across the nation. The pest's expanding presence has left trees defoliated and property values diminished.



D I D Y O U K N O W ?

Trees bring beauty and practical benefits to modern society. They provide shade, beautify properties, strip pollutants from the air and much more. Kept healthy by specialty pesticides and mechanical controls, trees:

- Save energy. One large tree has the same cooling effect as 15 room-size air conditioners. Mature trees shading homes cut energy costs by 18 percent to 50 percent.
- Increase property value. Trees can add up to 20 percent to the value of a home. However, without proper maintenance, the value of trees declines. Timely use of specialty pesticides controls disease and insect damage.
- Clean the air. One acre of trees removes 5 tons of carbon dioxide from the air annually. According to the American Forestry Association, one average, mature tree absorbs 26 pounds of carbon dioxide per year. The same tree cleans up pollution created by a car driven 11,300 miles, as well as gives off enough oxygen for a family of four to breathe for a year.

TURF

PUTTING SPRING IN YOUR STEP



Turf does more than just look pretty. It's estimated that a well-maintained landscape can add up to 15 percent to a home's value.

The rain has ended, and you're ready to head to work. If you hurry, you can run the bills to your mailbox and still make it to work on time. You grab the stack of envelopes, dash out the front door — and sink in mud up to your ankles.

That's what life would be like if you didn't have a lawn.

It's easy to overlook the obvious, and turf is obvious. It's everywhere — home lawns, parks, roadsides, building grounds and more. People forget the main purposes of turf are to hold soil in place and offer solid footing. The beauty of turf overpowers its function.

FUNCTIONAL BENEFITS

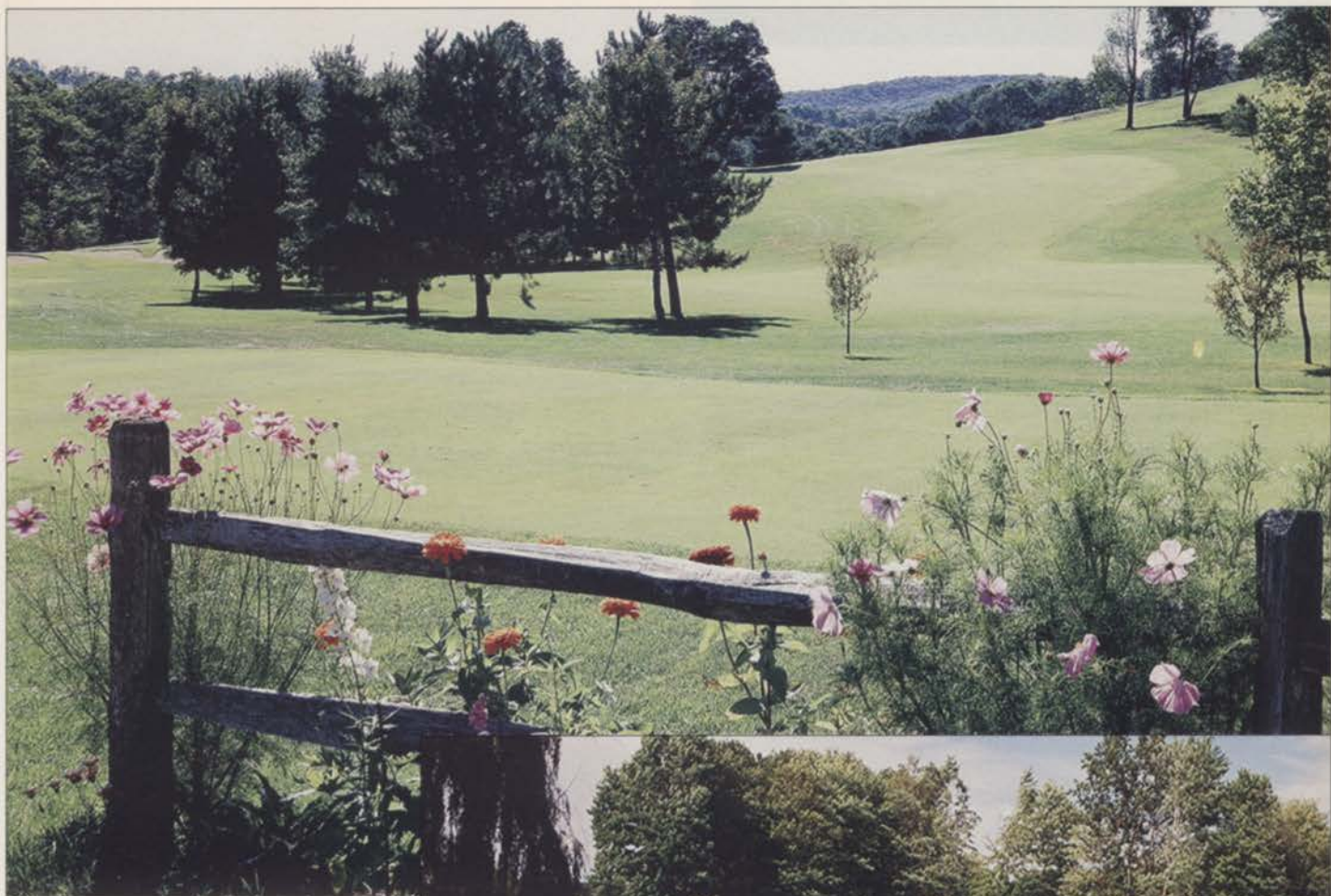
In addition to stabilizing the soil, lawns offer many other benefits as well. Each makes life more enjoyable.

Turf moderates the climate. It cools city streets and reduces energy costs of cooling homes and businesses. Concrete and other hard building materials often cause urban areas to be 10 degrees warmer than nearby rural areas. According to The Lawn Institute, eight average-sized lawns have the cooling effect of 70 tons of air conditioning; the average home-size air conditioner has just a 3- to 4-ton capacity.

DID YOU KNOW?

The role of turf often is overlooked by the public. Healthy turf provides a number of benefits, and specialty pesticides play a key role in keeping turf in top condition. Well-groomed turf:

- Promotes safety and health. Turf reduces fire hazard, reduces injury to children or athletes and provides a safety buffer for roadsides, airport runways and agricultural fields.
- Improves the environment. Turf tempers the climate around homes, as well as stabilizes the soil and prevents runoff.
- Beautifies and improves the value of property. Turf is critical in landscape design. Its green color accents and frames plantings of ornamentals. Well-maintained landscaping typically adds up to 15 percent to a home's value.
- Provides recreational opportunities. Turf provides the safest, least expensive and most resilient outdoor surface for sports. No other surface of vegetation tolerates as much abuse.



Turf also reduces noise levels by as much as 30 percent, and cuts glare along roadsides, which poses a hazard to drivers and an annoyance to those in homes and offices. Turf's rough surface breaks up incoming sunlight.

As with ornamentals, healthy turf provides a zone of protection that slows the spread of wildfires around buildings. Northern California residents learned this lesson in 1991. Because of their healthy lawns, many homes survived the Oakland fires.

In addition to helping save lives, a thick lawn improves quality of life. A healthy lawn averages six turfgrass plants per square inch and 850 plants per square foot. There are 8 million plants in an average 10,000 square foot yard. Each plant converts carbon dioxide from the air into the oxygen we breathe. A turf area 50 feet by 50 feet releases enough oxygen to meet the needs of a family of four. Turfgrass also absorbs smog-produced ozone and sulfur dioxide.

When it intercepts rain, turf prevents hardening of the soil. If turfgrass leaves didn't take the brunt of the downward force, driving rain would wash away soil and leave the top layer hardened. Turf's root system helps the soil breathe and allows water to enter the soil.



Golf greens wouldn't be "green" if not for natural turf. A diligent weed control, aeration and fertilization program keeps turf healthy, dense and attractive.

Similarly, turf reduces runoff of water and nutrients. In fact, agricultural extension agents recommend grass buffer strips around crop land and feedlots to reduce runoff and keep nutrients from entering waterways.

Because of its ability to remove nutrients from water, turf is used as a living filter to clean up sewage waste. Waste water is applied to turf and soil to be purified before entering ground-water systems.

On another safety front, turf is required along airport runways to prevent dust from flying into aircraft engines. Along highway roadsides, turf serves the same purpose. Turf also serves as a safety strip in case a plane strays from the runway or a car runs off the highway.

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TURF



Natural turf is preferred for athletic fields. Turf takes abuse and bounces back, providing sports enthusiasts with solid footing and cushioning.

HUMAN HEALTH AND SAFETY

Family health and safety is a prime concern. Surprisingly, many dangers exist around the home. Despite its appearance as a beautiful, lush carpet of green, a lawn plays a vital role in minimizing dangers. Many Americans seem to have forgotten turf's role in maintaining the health and safety of families and pets.

Turf that is free of weeds and mowed regularly provides a safe haven for allergy sufferers. Pollen from noxious weeds, such as ragweed, greatly bothers hay fever sufferers. The National Institute of Allergy and Infectious Disease reports 35 million Americans suffer from allergies, and 9 million of those have asthma. Although allergic reactions rarely are fatal, asthma causes about 5,000 deaths per year. By stopping seedhead formation with specialty pesticides and regular mowing, the source of pollen problems is eliminated.

Healthy turf also reduces allergic reactions caused by dust and other particles in the air. It's estimated turfgrasses trap much of the 12 million tons of dust and dirt released each year into the atmosphere.

Similarly, weeds such as clover and dandelion attract insects that can be fatal to humans who experience reactions. Various insects, including bees, wasps, hornets, yellow jackets, fire ants and Africanized killer bees, are responsible for about 40 deaths a year. Severe reactions to stings occur in 0.4 percent of those stung. Controlling insects and insect-attracting weeds with specialty pesticides helps prevent unnecessary deaths.

In daily life, turf provides a clean cushion on which children can walk and play. Turf cushions toddlers' falls. Children stay cleaner in grass, too.

Turf provides solid footing and cushion on sports fields. A study by the Sports Research Institute, the National Athletic Injury/Illness Reporting Service and The Pennsylvania State University found that one in five injuries and about 44 percent of ankle, foot and knee injuries are field-related. Fields in better playing condition are safer. The study also found that although practice fields were used much more than game fields, they received less care.

This safety message has not been highly publicized. A timely weed control, aeration and fertilization program promotes dense, healthy turf, which, in turn, promotes field safety.

RECREATIONAL BENEFITS

Where would sports be without turf? No other plant takes such abuse and still provides solid footing and cushioning. While artificial turf is used on some athletic fields, players generally say it's too hot and it leads to injuries. Managers of athletic fields dislike its maintenance headaches and hefty costs compared with natural turf.

Natural turf usually is used on sports fields because:

- It provides the safest, strongest and least expensive surface for sports.
- It is resilient. Turf absorbs shock without altering the playing surface. Turfgrass leaves and shoots, thatch and soil allow the surface to bounce back.
- It recuperates quickly from injury when cared for properly.
- It provides a natural surface for walking, running and sports.

A variety of sports are played on turf: baseball, cricket, croquet, field hockey, football, golf, lacrosse, lawn bowling, polo, rugby, soccer, softball, and tennis.

EYE APPEAL

How can one judge the beauty turf adds to a landscape? One good way is to walk down a street and compare the eye appeal of nicely manicured lawns to lawns that are unkempt, thin and full of weeds. Note the connection between turf quality and your general impression of the property.

The public recognizes turf's value in home sales. A Gallup Survey found 62 percent of all U.S. homeowners believe investing in lawns and landscaping is as good or better an investment as other home improvements. Proper and well-maintained landscaping can add up to 15 percent to a home's value, according to the survey.

From a design standpoint, turf is a critical part of the landscape. It breaks up plantings. Its green color accents and offers a frame for plantings. Turf is an alternative to concrete and asphalt in urban areas.

THE NEED FOR SPECIALTY PESTICIDES

Proper care is the key that unlocks the benefits of turf. A healthy lawn provides all the benefits already discussed, but a poorly maintained lawn falls short.

Keeping a lawn in top shape requires a combination of pest control and cultural practices, such as mowing, aeration, irrigation and fertilization. All aspects affect lawn quality. If improperly fertilized, irrigated or aerated, turf will be stressed and soon will give way to weed, disease and insect problems.

Timely identification of the cause of problems and beginning treatment, such as correcting fertility, pH or compaction, are key. Next, control measures should be combined with cultural practices and a preventive pest control program.

The best guarantee for a successful lawn is use of specialty pesticides when needed. Without proper controls, you'll miss out on the health and safety benefits turf has to offer.



Managers of athletic fields say natural turf is easier and less costly to maintain than artificial turf.

HEALTHY PLANTS FOR A HEALTHY LIFESTYLE

Landscaping brings a natural calm to the hurried urban sprawl. For millions of Americans worn from days spent in sterile business centers, our parks, golf courses and recreational areas lend a breath of fresh air. Businesses increasingly recognize the benefits of providing ornamentals — trees, shrubs, plants and flowers — in and around work areas. Attractive landscapes are linked to above-average labor productivity, lower absenteeism and easier recruitment.

In addition, homeowners view money spent on gardening and landscaping as an investment in their property and personal well-being.

To achieve healthy, thriving ornamental plants, a combination of cultural practices and specialty pesticides is key. Proper application of specialty pesticides increases the benefits gained by timely irrigation, weeding and aeration of the soil.

Plants do more than create an attractive landscape. They absorb heat and provide shade, reducing solar radiation and reflection. Plants can reduce or increase wind speed and enhance dew formation, says Richard Harris of the Department of Environmental Horticulture at the University of California-Davis.

Plants also modify wind patterns by blocking, guiding, deflecting and filtering air flow. Shrubs and ornamentals moderate cold temperatures; they also reduce heat loss and build an insulating buffer of air around buildings.

Well-designed and maintained landscapes provide the benefits of a natural environment with limited worry. Fertilizer applications encourage ground cover growth on slopes, while specialty pesticides keep insect and disease problems in check.

Flowers, shrubs and other ornamental plants add beauty to the landscape, prevent erosion, save energy, help prevent fire damage and increase property values.

EROSION AND POLLUTION CONTROL

Plants intercept rain, softening the impact that might otherwise loosen soil particles and wash them away. Mulch, commonly used in bedding areas, allows water to filter into the soil and slows surface movement; water enters the soil close to where it falls. Plant roots hold soil and further reduce erosion.

Indoor and outdoor plants also reduce air pollutants. Plant tissue, primarily leaves, absorbs gaseous pollutants.

"Plants not only absorb carbon dioxide and release oxygen into the atmo-



Plants, flowers and shrubs planted alongside business centers, such as this shopping mall, lend diversity to the landscape.

D I D Y O U K N O W ?

An attractive landscape, complete with shrubs, trees and flowering plants, delivers a number of benefits to property and people alike. Aided by insect- and weed-control measures, healthy ornamentals and plant beds:

- Positively impact the environment. Plants absorb heat and provide shade, as well as modify wind speed and air flow. They filter air pollutants and reduce soil erosion. A well-maintained landscape aids in fire prevention and control.
- Improve people's moods. Studies have found plants positively affect human health by reducing stress and increasing a sense of well-being.
- Increase property values. When selling a home, homeowners can expect to recoup 100 percent to 200 percent of their investment in landscaping. Home buyers pay close attention to landscaping.



Research has found that plants have a positive impact on human health and mood. They serve as stress-reducers and spirit boosters.

sphere, but the plant leaves, roots and soil combine to act as a highly effective air scrubber and cleaning machine," reports Dr. Bill Wolverton of the Plants for Clean Air Council, an advocacy group based in Reston, Va.

PEOPLE AND PLANTS

Humans experience a sense of well-being when around plants, research indicates. Psychologists have found an attractive landscape reduces stress significantly. A Kansas State University study found people begin to relax within five to eight minutes of being placed in a room with a foliage plant.

The positive influence of plants on hospitalized or confined patients is well-documented. One study found hospitalized patients with a view of plants recovered in 7.9 days, compared with 8.7 days for a control group. They also required less potent painkillers, experienced fewer complications and reported a much more positive hospital stay.

Other studies found significant increases in conversation among patients, time spent in the dining room and food intake when flowering plants were placed in hospital dining rooms.

PROPERTY ADVANTAGES

The desire to live closer to nature has prompted many Americans to move to wooded areas. Such scenic places, however, often are prone to wildfires. A well-maintained landscape helps protect residences bordering wooded areas.

"The greener your landscaping is...the better chance it has of stopping a fire from spreading," says T.G. Tomberg, battalion chief of the Santa Barbara, Calif., fire department. "Healthy, green trees, shrubs and lawns are one (defense) that could prevent a house from catching fire."

Additionally, especially in a soft economy, landscaping can raise property values. According to a recent survey of nearly 200 California apprais-



Landscaping, complete with a variety of ornamentals, increases property values and can speed up selling a home by five to six weeks. Attractive landscapes have curb appeal, real estate agents say.

ers and real estate professionals, a well-landscaped home increases property values significantly and can speed up selling time by five to six weeks.

When prospective buyers approach a home, the landscape is among the first things they notice. Real estate agents estimate 95 percent of house shoppers won't even get out of their cars if the home lacks curb appeal. The same applies to business centers trying to lease office space.

Money magazine estimates homeowners can expect to recover 100 percent to 200 percent of landscaping investment when selling their homes.

In addition to visual and environmental benefits, plants handle a variety of other tasks. They can direct pedestrian and vehicular traffic, as well as enhance the appearance of roadways. Likewise, shrubs screen headlight glare from oncoming traffic.

But for many, the greatest benefit is the personal enjoyment landscaping provides. Strategic use of specialty pesticides and mechanical controls ensures healthy plants for today's healthy lifestyles.



VEGETATION MANAGEMENT

APPEALING TO SIGHT AND SAFETY

Traveling cross-country, we revel in the scenery — the majestic redwoods of the Pacific Northwest, the mighty peaks of the Rocky Mountains, and the beauty of our sculptured roadsides.

While vegetation management, better known as weed and brush control, may not capture the sightseer's fancy, its role in improving efficiency, effectiveness and safety cannot be denied. It is a must for roadsides, plant sites, government installations, railroads and utilities.

At utility sites, for example, vegetation growth controls reduce the number of power outages and shortages, particularly in rainy, windy weather. While mowing and other mechanical methods keep weeds in check, specialty pesticides help achieve the desired results without undue hazard to valuable plants, the public or wildlife — at a cost much lower than mechanical methods alone. In Lowndes County, Miss., for example, a 4-year combination mowing/specialty pesticide roadside program saved the county \$110 per mile annually, compared to mowing alone. In a program that encompassed 650 miles of right-of-way, the annual savings totaled \$71,500.

However, the advantages of specialty pesticide vegetation management go beyond dollars and cents. Reduced frequency of mowing means fewer damaged windshields from flying debris and fewer traveler and worker injuries.

Specialty pesticides, used properly, control noxious weeds that threaten nearby crops and native vegetation. Their appropriate use in controlling undesirable weed growth also allows wildflowers and desired grasses to take root along right-of-ways.

Weed control also enhances travel conditions for the driving public.

Studies indicate fewer collisions with wildlife occur when roadsides are clear. When vehicles accidentally leave the road, properly maintained roadsides provide needed space for emergency stops. Attractive median plantings also help drivers overcome the tendency to doze during long trips.

Vegetation management makes signs easier to see and lengthens sight distance. Road signs serve as safety warnings and travel guides. Safety hazards occur when such signs are hidden by trees and overgrown vegetation.

Likewise, drivers need good sight distance for safe stops and passing.

Vegetation management improves drainage, helps roads last longer and improves snow drift management. Overgrown weeds along the road shoulder prevent water from draining off rapidly.

While the absence of overgrown weeds may go unnoticed, the public safety and environmental benefits of vegetation management, bolstered by the use of specialty pesticides, are hard to miss.



Specialty pesticides have allowed roadside managers to control noxious weeds and establish eye-catching wildflower programs.

D I D Y O U K N O W ?

Overgrown vegetation, whether alongside roads, railroads or public utilities, is unsightly and often unsafe. Aided by specialty pesticides and mechanical control methods, vegetation management:

- Eliminates noxious weeds. Many weeds, including bindweed, Canadian thistle, johnsongrass and kudzu, pose a serious threat to crops and other valuable plants. Some are poisonous to livestock. Specialty pesticides prevent overgrowth of problem weeds.
- Protects public safety. When well-maintained, vegetation in medians along city streets and highways provides a buffer zone against oncoming traffic. It also improves the scenery and breaks the monotony of a lengthy trip. Road signs are more readily visible when weeds are under control.
- Allows workers easy access to work sites. Controlling weed growth along railroad tracks and plant sites increases worker effectiveness and efficiency.

PUTTING A CHOKE HOLD ON PROBLEM PLANTS

A water system is a uniquely balanced and sensitive environment. The vast majority of plant species growing in waters are considered beneficial and only rarely become problems. Natural forces limit the abundance of most native plants.

Many major aquatic weeds, however, have been introduced from foreign lands. In the absence of natural enemies, exotic weeds, such as hydrilla and water hyacinth, grow uncontrolled and rapidly invade new areas. When overgrown weeds interrupt a water system's balance, problems inevitably surface.

Joe Hinkle, environmental specialist, Florida Department of Natural Resources, estimates aquatic plants and algae in natural systems should cover 10 percent to 40 percent of a water body to provide the best habitat for fish and wildlife.

But when much more than 40 percent is covered, the natural water environment often is turned inside out. Overgrown aquatic weeds:

- Clog intake screens and turbines that produce hydroelectric power;
- Provide a breeding site for mosquitoes, carriers of human and animal disease;
- Hinder, or even close, navigation ways;
- Crowd out native vegetation essential for wildlife habitat;
- Restrict recreational activities like fishing, swimming and water skiing;
- Reduce or restrict water flow by as much as 90 percent in irrigation canals needed for crop production and in drainage ditches for flood control; and
- Reduce the value of properties and businesses nearby.

When aquatic problem weeds are managed, the environment responds positively.

Using specialty pesticides, as part of an integrated pest management system, to control unwanted water weeds gives other vegetation — types preferred by fish and beneficial aquatic insects — a better chance to compete. In fact, before aquatic products are registered, they undergo a myriad of tests to ensure no negative impact on fish and other aquatic species.

A well-balanced water body provides food, open areas and cover for waterfowl and other wildlife. Fish populations increase, and invertebrate foods, such as insects, snails and grass shrimp, thrive. A balanced aquatic environment produces oxygen vital to the survival of animal species.



Fish, birds and other animals thrive when bodies of water are free from overgrown vegetation.

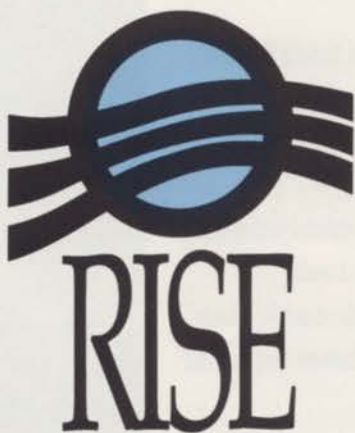
D I D Y O U K N O W ?

Specialty pesticides contribute to a cleaner, healthier aquatic environment. By using specialty pesticides to keep aquatic weed growth in check, an aquatic maintenance program:

- Reduces management costs. Managed weed control allows a consistent flow of water into hydroelectric turbines, irrigation canals and drainage ditches. It keeps navigation ways open.
- Reduces complaints from the public. Weed control helps maintain strong property values for lakefront property owners.
- Increases recreational use and revenues. Weed control reduces fluctuations in water temperature, oxygen and pH levels, thus preventing fish kills.

Sport fish populations thrive in well-maintained bodies of water. Lake residents and their guests welcome the opportunity to swim, ski and enjoy other activities in weed-free water.

PUTTING A CHOKE HOLD ON PROBLEM PLANTS



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Low-Volume Spraying

(continued from page 56)

Advanced technology has resulted in dry materials with increased water solubility properties which dissolve more quickly and more completely; in containers that can be reused or recycled; in materials effective at much lower rates; and in products that break down quickly after application to their target.

New product formulations may be more highly concentrated than in the past, allowing manufacturers to package the same amount of active ingredient in a smaller container. This change has reduced the shipping costs for the manufacturer as well as the storage costs for the distributor and commercial applicator. It also has increased the cost of material per ounce and made accuracy in measurement, mixing and application more of a monetary concern.

New formulations such as dry flowables and types of packaging such as pre-packaged bags of pre-measured product, have made

measuring and mixing easier. Safety and environmental concerns are also affected by these changes. A spill of dry flowable material can be contained and cleaned up more easily and more

Operators can document wind direction and velocity with today's improved sprayer technology.

safely than a liquid product spill. These changes allow more flexibility in how much material is mixed at any one time and in where that mixing occurs.

Equipment technology has kept pace with chemical improvements. Better agitation and sprayer designs allow for effective product use in high- and low-volume applications. Tank mate-

rial choices include polyethylene, fiberglass, molded plastic or stainless steel. Multiple nozzle designs, sprayer sizes and pressure configurations offer nearly custom-choice sprayer options.

Various hose and sprayer gun options are available. Choices are offered in sprayer boom lengths; computer or mechanically operated boom height adjustments; and breakaway booms to work around obstacles. Extended range nozzles can operate with little drift. Boom covers can help to control drift in windy conditions.

Obviously the options must be chosen to fit the needs of the program. For example, a 30-foot boom may be excellent for covering open turf areas, but would be inefficient in highly landscaped situations or on uneven terrain.

Computerized systems, gauges and monitoring equipment can be so thoroughly controlled -- to a plus or minus 1 percent to 2 percent accuracy rate -- that the chances of error are greatly reduced. Maintenance operators

can even document wind direction and velocity along with the type and amount of material used for each application. In some cases this information is being noted on customers' statements, so that any question of possible damage can be addressed accurately.

Lawn maintenance professionals are striving to select the best method of application to control the quantity, placement and accuracy of their spray programs. The equipment must fit the needs of the spray program and have the flexibility to operate efficiently on the properties that will be treated under the conditions of that region. Additionally, the costs of the spray equipment must fit the business budget. By analyzing your turf maintenance program and thoroughly investigating the sprayer options, you can determine if low-volume spraying is for you. ■

The authors are partners in Trusty & Associates, Council Bluffs, Iowa.

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New Product Showcase

Manufacturers and suppliers to the lawn and landscape maintenance industry are gearing up for 1993 with new product offerings. To help you plan for the new year, Lawn & Landscape Maintenance magazine has expanded its new product section to present you with the latest equipment, turf, tree and ornamental products available.

MOWERS

Ransomes' newest riding mower, the Lynx 2000, features zero-turning radius and a 9.2-bushel grass collection system. The Lynx 2000 allows the operator to catch or throw clippings back to the turf. It takes just a few minutes to change the mower from grass-collection to side-discharge mode. **Circle 125 on reader service card**

The Model-T tractor powered by a 20-h.p. Kohler Command V-Twin engine is now available from **Walker Manufacturing Co.** Designed for commercial service, the Model T packs a powerful engine into a midsize tractor to provide high productivity without sacrificing maneuverability.

Also new from Walker are larger mowing decks (48 inches to 60 inches) which work with more powerful models, and a parking brake option. **Circle 126 on reader service card**

Gravely International is offering two new zero-turning-radius commercial mowers: the Promaster 100 and 200 Series, which place the operator over the mower, with castor wheels out-front and drive wheels and engine



behind.

The Promaster 200, the larger of the two units, has a 20-h.p. Kohler Command horizontal shaft engine and an 8.75-gallon fuel tank. It accepts either a 50- or a 60-inch fabricated mower with

floating suspension. The smaller Promaster 100 comes with optional 16-, 18- or 20-h.p. Kohler Magnum vertical-shaft engines, a 3.5-gallon fuel tank and a 50-inch fabricated mower with floating suspension. **Circle 127 on reader service card**

The Wegele Scooter from **Midwest Mower Manufacturing Inc.** maneuvers easily and trims within half an inch of vertical edges or walls. Its offset design undercuts shrubbery and rail fences. The Wegele is available in 36-inch, 30-inch and 24-inch blade sizes and a variety of horsepower capacities. **Circle 128 on reader service card**

BCS America offers a 30-inch, heavy-duty rotary motor which makes easy work of leveling weeds and tall brush. This mower is for BCS models with differentials, and is designed to reach areas where conventional tractors cannot. The motor is designed for BCS models 605 and 737, with 8-, 10- and 12-h.p. engines. **Circle 129 on reader service card**

The **Encore** Pro-Line of intermediate mowers has expanded its selection of power units and decks to include 22 models of commercial mowers. The new mowers, both the conventional and hydrostatic-driven, provide reinforcement channels positioned under the belt shields on top of the deck to assure blade alignment and to reduce vibration. The mowers also feature yoke-style casters on the front wheels, large grass chute openings and an optional mulching kit. **Circle 130 on reader service card**

Now available from **John Deere** is the F925 front mower powered by a 22-h.p., liquid-cooled, 3-cylinder diesel engine with a 12-volt positive engagement gear-driven starter. The starter system has three glow plugs, each with three varied pre-heating time settings. Crankcase capacity is 3.3 U.S. quarts.

The company is also offering a 38-inch commercial walk-behind mower designed for hill-sides and fenced-in areas. The mower is powered by either a 12.5-h.p. or a 14-h.p. K-series overhead valve engine. **Circle 131 on reader service card**

PESTICIDES FERTILIZERS SPECIALTY PRODUCTS

HydroGel from **Finn Corp.** is designed to eliminate plant stress or loss caused by lack of moisture. It absorbs up to 400 times its weight in water and releases it as the soil dries. The process, which continues as additional moisture becomes available from rain or irrigation, lasts up to one year. **Circle 132 on reader service card**

LESCO adds the Professional Plant Biostimulant, a multiple plant hormone biostimulant containing a chelated source of essential nutrients, to its BioChoice biorational product line.

The Professional Plant Biostimulant is an EPA-registered formulation of two major plant hormones contained in a nutrient solution. The bio-stimulant, designed to enhance plant growth and improve stress tolerance, supplements essential plant chemicals whose normal production can be disrupted by less than optimal growing conditions. **Circle 133 on reader service card**

Turf Nitrogen from **O.M. Scott & Sons Co.** uses the company's Poly-S fertilizer coating and has a 40-0-0 analysis. Part of the Proturf line of products, the improved fertilizer provides controlled-release Poly-S nitrogen for good initial green-up and sustained greening response.

Scotts offers a variety of weed-control products with Poly-S fertilizer coating which prevent six annual grassy weeds and nine annual dicots. **Circle 134 on reader service card**

(continued on page 80)



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February 12, Kansas City
February 27, Denver
March 26, Bloomington, MN
March 12, Elkhorn, NE

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January 22, Cincinnati, OH

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N. GA, MS, AR
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January 28, Macon, GA
January 29, Birmingham
(Homewood), AL
February 4, Memphis, TN
February 5, Little Rock, AR
March 5, Atlanta (Tucker), GA
March 26, Chattanooga, TN
April 27, Knoxville, TN

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Michigan
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February 23, Twin Falls
February 24, Boise
February 25, Lewiston

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February 23, Indianapolis

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February 26, Raleigh

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Poulson Tree Service
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Montana
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March 5, Billings

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New Products

(continued from page 78)

Harmony Products adds a fertilizer to its line of professional bridge products, featuring 3 percent iron and high potash content. Each 50-pound bag of Harmony 6-2-12 covers 10,000 square feet and can be used in late-season application.

Circle 135 on reader service card

The Ro-Pel Garbage Protector which prevents animals from making a mess of the trash heap, is now available from **Burlington Scientific Corp.** The spray, formulated with a citrus-like scent, leaves a bitter taste that is completely harmless yet repulsive to animals. Ro-Pel resists rain, snow, dust, wind or dirt and repels rats, mice, squirrels, dogs and cats.

One thorough application of Ro-Pel lasts three to four months.

Circle 136 on reader service card

Earthgro Inc. has blended organic compost with naturally occurring minerals to create its Natu-



ral Organic & Mineral Lawn Food. This product combines a water-soluble mineral form of nitrogen that provides grass with a quick green-up, with an organic nitrogen that is water-insoluble for sustained feeding throughout the season. It also contains important microorganisms and organic matter.

Circle 137 on reader service card

Monsanto Co. now has two new formulations of Dimension turf herbicide including fertilizer and 0.25-percent clay granule formulation.

The active ingredient in Dimension, dithiopyr, has low-application rates, proven turf safety and season-long control of

crabgrass and other weeds. Dimension is expected to be available in a variety of fertilizers.

Circle 138 on reader service card

Blazon E-Z Pak Spray Pattern Indicator, from **Milliken Chemical**, is now available in water-soluble packets. E-Z combines the solubility and non-staining property of liquid Blazon with the convenience of water-soluble pre-measured packaging. Each packet treats 25 gallons or more of tank solution.

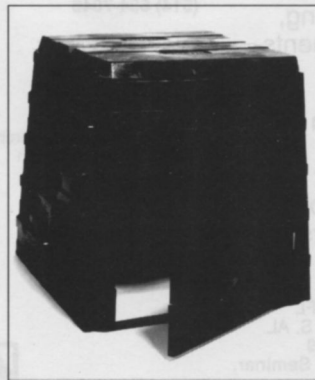
Circle 139 on reader service card

COMPOST BINS

Shape Plastics Corp. offers three compost bin models. The TBL-62 Tumblefeed is a round bin which creates compost from organic matter in just a few weeks when tumbled every few days. The Grass Eliminator-I is black for heat retention. The OWR2830 Organic Waste Recycler is durable and has a swing-away door for easy handling.

Circle 140 on reader service card

The Model CB-40 composting bin from **Flowtron Outdoor Products** measures 30 inches square by 30 inches high and is made of recycled, UV-stabilized plastic. Two hinged doors, located at the bottom of opposite side panels provide easy access to finished



compost. The black exterior retains heat for proper decomposition in six to eight weeks.

Circle 141 on reader service card

SPRINKLERS

The E-Z Stake from **Olson Irrigation Systems** provides a simple method of positioning spray heads when using swing pipe. The E-Z Stake slips over and engages the teeth on a swing ell, locking the stake in place.

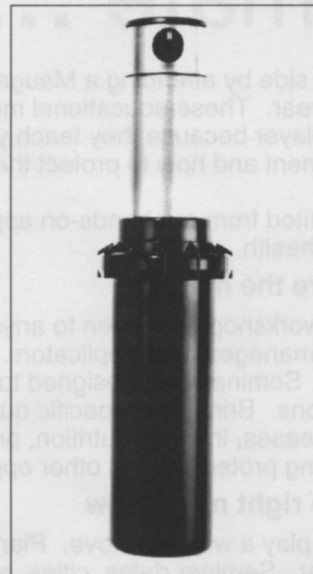
Designed for use with side- or bottom-mounted spray heads, the fitting can be staked vertically into the base of the trench or horizontally into the wall.

Circle 142 on reader service card

Salco Products offers pre-assembled PVC flexible-joint assemblies for standard sprinkler installation. The units quickly attach to sprinkler heads and underground piping. Flexible heavy-duty PVC, available in cut lengths of 24 inches and IPS diameters of 3/8-inch to 1 inch, welds to PVC pipe fittings. The flexible PVC pipe is also available in rolls of 100 feet to 250 feet. The complete unit comes with swivel fittings.

Circle 143 on reader service card

Hunter's G-Type sprinkler provides a range of features geared to improve irrigation efficiency and



extend sprinkler life. Each sprinkler comes with 12 interchangeable nozzles to vary the discharge rate.

All sprinklers include dirty-water filter screens, but offer optional low-angle nozzles with 13-degree trajectories as well, for use on slopes, windy areas or locations where a smaller-radius sprinkler is required.

Circle 144 on reader service card

COMPUTER SOFTWARE

L-W Software released an improved version of CLIP management software. The new version, 4.0 has been tested in the industry since the beginning of the year.

New features include ease of

data entry, unlimited reports and better control over job costing. This is the second improvement in the program since its initial release in 1988.

The price of the product will not change: \$695 for the small business package accommodating up to 125 customers and \$1,190 for the unlimited package accommodating up to 99,999 customers.

Circle 145 on reader service card

Wedge Maintenance Tracker, recently released by **OmniComp, Inc.**, is a microcomputer program for scheduling, tracking and printing corrective and preventive



maintenance work orders. The wedge program features a highlighted bar menu, mouse support and "point and shoot" creation of work orders.

Circle 146 on reader service card

Dillaware Inc. released an updated version of The Billing Clerk. The new version provides 64 new features and is menu-driven, making it user-friendly. The program provides one-time invoicing for service, proposals or work orders, which can be saved on disk for later recall and batch printing.

Circle 147 on reader service card

VEHICLES

Taylor-Dunn is offering the Electruck, a full-sized electric utility vehicle capable of managing loads up to 1,500 pounds in its cargo area. The new truck has a 60-inch width, a 153-inch length,



can travel at speeds up to 30 miles per hour and has a range of 50 miles before battery recharging is required.

Circle 148 on reader service card

Cushman's Super Runabout four-wheel vehicle transports turf-care equipment and personnel with the quiet power of a three-cylinder, 27-h.p., liquid-cooled engine. The vehicle's maximum speed is 20 mph; its hauling capacity is 2,000 pounds, including one vehicle operator and one passenger; and its cargo space measures 62 by 53 by 14 inches.

Circle 149 on reader service card

SEED

BrightStar Perennial Ryegrass from **Turf-Seed Inc.** sets a new standard for dark color, according to the firm. BrightStar claims to have a high endophyte level, low vertical growth, good disease resistance and a reduced need for fertilizers and chemicals.

Turf-Seed also offers Four Aces, a Kentucky bluegrass variety produced by combining four apomictic, improved Kentucky bluegrass lines. It features leaf spot and other disease resistance, a dark green color and good heat tolerance.

Circle 150 on reader service card

The Georgia Seed Development Commission named **Pennington Seed Inc.** the exclusive licensee for a new class of tall fescue. The fescue is formulated to survive in pastures and lawns where dry soil, heat and sun previously deterred its growth. It only needs to be sod seeded into existing sod-seeded pastures and should persist for several years. Dark green in color, the fescue has lower seed height than many dwarf fescues.

Circle 151 on reader service card

Medalist America recently announced Plant Variety Protection approval for NuBlue Kentucky bluegrass. NuBlue is said to have outstanding resistance to serious bluegrass diseases, including leaf rust, leaf spot, melting out and pink snow mold.

NuBlue is a medium dark-green in color, shows good early spring green-up and has a moderately fine leaf texture and high density. It blends well with perennial ryegrass and maintains its color and density for much of the growing season.

Circle 152 on reader service card

ENGINES

Deutz has developed a family of water-cooled, direct-injected diesel engines designated the FM 1012 and FM 1013. Displacement of the FM 1012 is 0.8 l/cyl. and the FM 1013, 1.2 l/cyl. There are four- and six-cylinder in-line models in each series with turbo-charged and intercooled versions covering a total output range of 40- to 260-h.p.

Circle 153 on reader service card

Peugeot is offering several gasoline and diesel engines for original equipment manufacturers. The XU10 gasoline engine has a displacement of two liters and a maximum DIN 70020 rating of 115-130 horsepower depending on equipment.

The XUD11ATE diesel engine has multi-valves, a turbocharger and an intercooler. With 2.1-liter displacement, it is rated at 110 horsepower with a maximum torque of 250 Nm at 2000 rpm. Both the diesel and gasoline-fueled engines are rigid, durable and lightweight.

Circle 154 on reader service card

Briggs & Stratton upgraded its 3-h.p. horizontal shaft engine to offer increased displacement and lower sound levels, made possible through revised piston positioning. Noise levels will be lowered two decibels at 3,600 rpm and three decibels at 2,400 rpm.



Circle 155 on reader service card

VACUUMS

The combination of the **Excel** Hi-Lift BAC-VAC grass vacuum and a **Hustler** allows operators to vacuum grass, leaves and debris in one easy pass. The Hustler uses either a 60-inch or a 72-inch rotary mowing deck.

The 15-bushel capacity hopper

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reduces the number of unloading stops; once full, the catcher raises hydraulically to dump into a pickup bed.

The Hi-Lift BAC-VAC mounts on any of five Hustler models. The hopper mounts behind the driver for improved maneuverability.



All units feature true zero-radius turning.
Circle 156 on reader service card

Mounted on a pickup truck, the **Anthony Groundskeeper's** 18-h.p. vacuum sucks leaves at more than 5,000 cubic feet per minute into a 1,500-pound-capacity steel dump body. Simple electrical controls allow easy operation of the dual-cylinder hydraulic dump bed and vacuum motor by lawn maintenance firms, municipalities, composters and landscape contractors.

Circle 157 on reader service card

SNOWTHROWER

The model ST-4100 snowthrower from **Echo Inc.** combines heavy-duty performance with easy starting. The new snowthrower has a powerful 4.5-h.p. engine and a 21-inch auger that cuts a path through the heaviest snow, throwing it a distance of up to 30 feet.

Circle 158 on reader service card

SPRAYERS

Northeastern Associates has developed the Safe Wash sprayer, a self-contained unit that makes fresh water available to operators in case of chemical exposure. Safe Wash comes with a 12-volt pump, 30-foot hose, a spray gun and the option of a 15- or 25-gallon tank.

Northeastern also offers the Spray Boss backpack sprayer, which weighs 18 pounds dry, has a 4-gallon capacity and sprays up to 29 feet with up to 60 pounds PSI of pressure. The Spray Boss features a rechargeable battery and a durable spray wand with adjustable cone tip.

Circle 159 on reader service card

Several new developments from **LESCO** include a sprayer and a pump pack. The portable 25-gallon Electric Spot Sprayer features a polyethylene tank with a 5-inch fill well, bottom sump and tank sprayer coupled to a 12-volt diaphragm pump.

LESCO bills its Silent Spray Pump Pack as a cost-efficient way to upgrade a sprayer without replacing the complete sprayer assembly. The Pump Pack offers a 4.8 gpm at 25 psi Quad-4 Series 12-volt pump and a corrosion-resistant manifold assembly with a heavy-duty pressure cutoff switch.

Circle 160 on reader service card

SPREADERS

The new C series Ev-N-Spred commercial spreaders from **Earthway Products** are equipped with extra-large, 13-inch-diameter turf tread tires, poly rims that will not rust, twin handle shafts for extra strength and a curved, height-adjustable handle for maximum operator comfort.

Circle 161 on reader service card

BACKHOE LOADERS

JCB Inc. offers several new developments in backhoe loaders. The first is the 214S SiteMaster, featuring four equal-sized wheels, four-wheel drive and four-wheel steer, which give the 214S SiteMaster maneuverability, traction and ground clearance.

The second development from JCB is an air-conditioning system for the company's 200 Series range of backhoe loaders. The system is headliner-mounted and provides cool air through front and rear vents so the operator stays cool while operating the backhoe or driving the machine.

Circle 162 on reader service card

(continued on page 84)

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With DISSOLVE there's...

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DISSOLVE is available in 40 oz. and 10 oz. sizes. For more information contact your Riverdale Distributor.

DISSOLVE™

Riverdale Chemical Company
425 West 194th Street, Glenwood, Illinois 60425-1584

USE READER SERVICE #38

New Products

(continued from page 82)

Dig-It Manufacturing is offering its Model 158N towable backhoe powered by compressed natu-



ral gas. The unit, believed to be the first production CNG underground construction equipment available on the market, has a 3,000 PSI capacity cylinder over the rear-hydraulic reservoir, which enables it to run continuously for six hours. Hydraulically propelled, the backhoe is capable of 8-1/2 feet of digging depth, 5,000 pounds of digging force and 11-1/2 feet of horizontal reach.

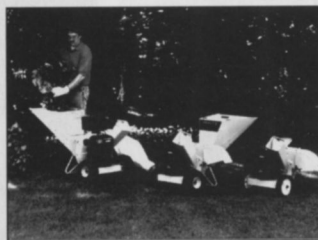
The Model 158N has 5,000 lbs. of digging force with 11-1/2 feet of horizontal reach.

Circle 163 on reader service card

CHIPPERS/SHREDDERS

The new chipper/shredder line from **White** features three models: a 5-h.p., a 5-h.p. commercial and an 8-h.p. commercial. The 5-h.p. model has a Briggs & Stratton engine, fixed-top hopper design and a chipper chute for branches up to 3 inches in diameter. The special S-shaped design prevents clogging.

The versatile three-way feed on the 5- and 8-h.p. commercial models allow clippings and leaves to be fed into the waist-high top hopper or raked in the chute right



off the lawn. The one-piece hopper design creates a vacuum effect to pull leaves in for quick, easy shredding. Both models feature hardened chromium chipper

knives that reduces branches up to 3 inches in diameter.

Circle 164 on reader service card

W-W Grinder PTO Apache chipper/shredder is now available from **Garden Way Inc.** When attached to a category 1, 540RPM PTO tractor, the chipper/shredder's 12 reversible fixed steel hammers provide ample airflow through the shredding chamber to quickly shred material. Two heat-treated chipper blades also quickly reduce three-inch-thick hardwood limbs into evenly sized wood chips.

Circle 165 on reader service card

The Mighty Bandit II PTO driven chipper from **Mighty Bandit Industries** comes trailerized or with a 3-point hitch. The disc-style chipper combines a gravity feed with a reversible hydraulic feed system. The unit effectively reduces trees and brush up to 5 inches in diameter into dimensional wood chips. The unit features a rear feed with a 360-degree swivel discharge spout and a self-



contained hydraulic system.

Circle 166 on reader service card

EasyRake is offering the EasyRake Chipper/Shredder featuring a self-feeding chipper and large bin shredder, a Briggs & Stratton engine, removable chute for simple exchange and sharpening of knives, 3-inch-diameter shredding capacity, 8-inch pneumatic tires and a three-year warranty.

EasyRake also adds a Vertical Slicer to its product line. The Slicer features heavy-duty blades, a 3-h.p. Briggs & Stratton engine with a 6:1 gear reduction for powerful slicing and aeration and 8-inch

(continued on page 88)



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USE READER SERVICE #47

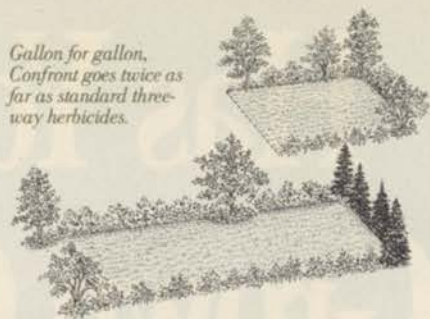
The thing we're trying to help you avoid is overkill. Because if you can control weeds, isn't that enough?

So here's a less

EPA), and you'll get very good results. It sounds simple, but it's one of the most effective ways to use less herbicide.

Also, calibrate your equipment frequently, and use the correct

Gallon for gallon, Confront goes twice as far as standard three-way herbicides.



At last. A herbicide as like eradicate, eliminate

aggressive approach to managing weeds. A few things you can do to use less postemergence herbicide to get the weed control you need.

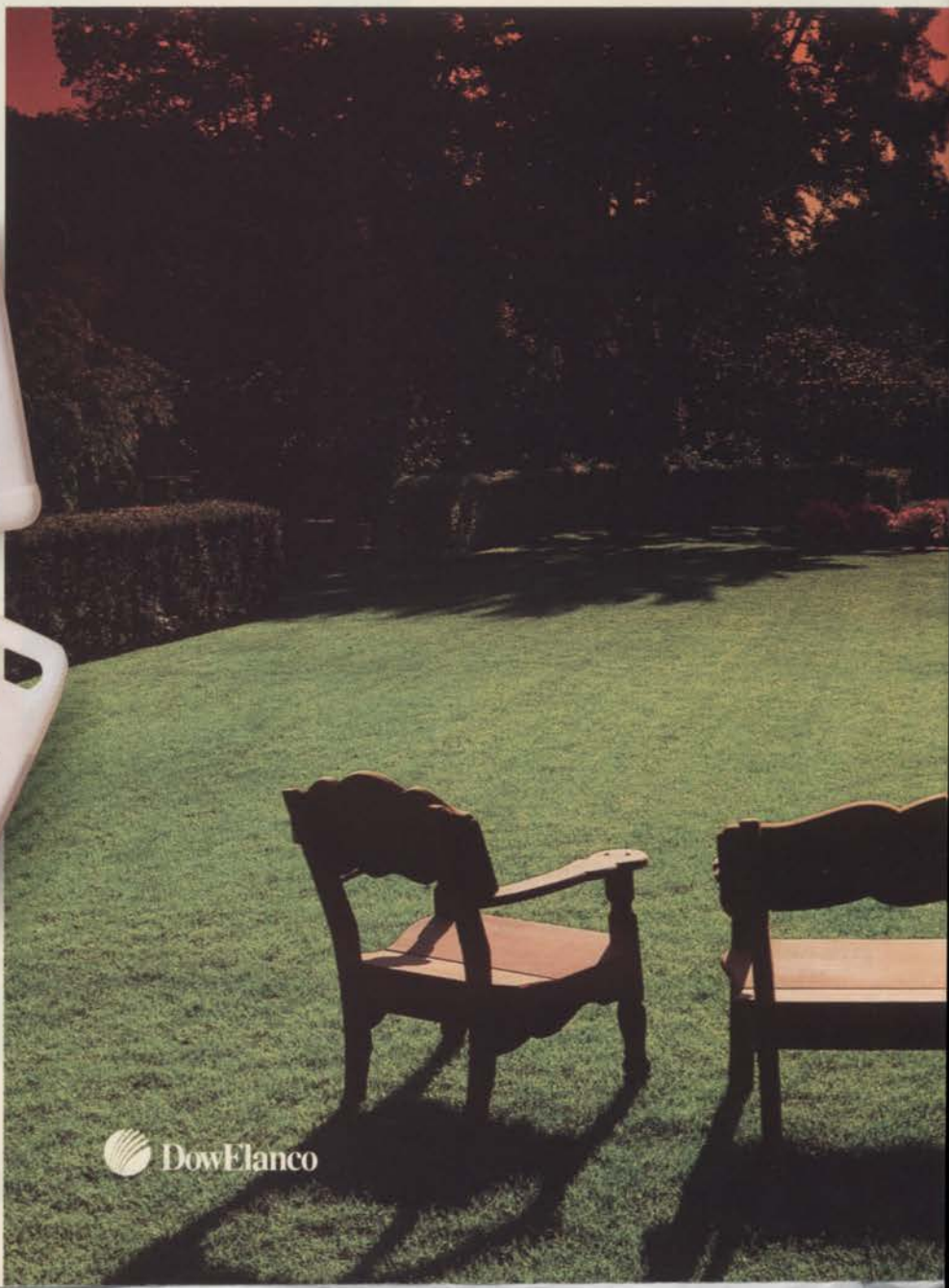
First, look for weedy areas

A Young
Weed Is
A Vulnerable
Weed.

The best time to apply your postemergence herbicide is early—when you first see weeds emerge. This is when weeds are the most vulnerable to herbicides. You'll get better results from your application, and you'll reduce the need for treating hardened weeds later.



before applying herbicide. That way, you can use spot treatments instead of broadcast applications (a practice recommended by the



 DowElanco

rate of herbicide for the weed you want to control. You'll get better results from your application, and reduce the chances you'll have to re-apply.

And it's important to select a

postemergence herbicide that does the job the first time you apply it. For stubborn broadleaf weeds,

Careful scouting helps you get effective weed control using less herbicide.



herbicides often miss, giving you excellent results from your application. Confront® herbicide is also a good choice. Confront gets to the roots to keep weeds from coming back. It's very effective on

d that doesn't use words or destroy.

Turflon® herbicide is a good choice. It controls weeds other

clover. And perfect for turfgrass where you prefer a herbicide without dicamba, 2,4-D or MCPP



Of course, there isn't room here to outline an entire weed control program. That's why we created The Turf Manager's Guide To Responsible Pest Management. It's 44 pages on the latest techniques for controlling weeds, insects and turf diseases.

For a free copy return the coupon, or call our toll-free number. After all, why use any more herbicide than it takes to do the job?

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- Warm Season,
- Nursery and Landscape.

Mail To: DowElanco, P.O. Box 3064, Cedar Rapids, IA 52406. Or call: 1-800-729-3693 ext. 2592.



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Company _____ Title _____

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Zip _____ Phone (_____) _____

The chemistry is right.™

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New Products

(continued from page 84)

semi-pneumatic tires. The unit comes in both 18-inch and 24-inch models.

Circle 167 on reader service card

MISCELLANEOUS

Lawn Turf from **Putting Greens International** is an artificial turf used in hard-to-maintain areas, particularly where property owners would like to eliminate maintenance.

The turf is made of a durable polypropylene fiber that is UV stabilized. Once in position, sand is worked into the turf to weigh it down. Sod staples are also placed around the perimeter to keep the edges from being kicked up.

The turf is a solution for hard to maintain areas, not as a complete cover. The turf is available wholesale, \$1.65 per square foot, to landscapers.

Circle 168 on reader service card

The model 757, 4.5-cube production chain saw from **Shindaiwa Inc.** cranks out 5.6 h.p. at

9,500 rpm and is said to deliver high torque and a broad powerband.

The Shindaiwa 757 includes a high-capacity filter that needs cleaning once a week. The saw has an improved cooling system that makes it ideal for hot restarts.

Circle 169 on reader service card

Calculated Industries upgraded its Scale Master multi-scale digital measure. Called the Scale Master Plus, the new unit offers seven more scales than the original model, including 12 architectural, 11 engineering, 14 map/engineering and 12 metric scales.

Circle 170 on reader service card

The 1993 "Green Side Up" gift calendar from **Focal Point Communications** depicts the lighter side of everyday life, particularly in lawn care and landscaping.

The calendar is printed on recycled paper and has space available for placement of company logos, names and phone numbers.

Circle 171 on reader service card

The TEMP-100 and TEMP-200 combination moisture and temperature meters are now available from **Aquaterr Instruments**. The portable probes provide an instant reading of



soil moisture and soil temperature. The two models differ only in their respective use of analog and digital readouts. Both are self-contained and powered by a 9-volt battery.

Circle 172 on reader service card

Westmac Inc. offers three machines in one with its durable Westmac. The core aerator covers 5,000 square feet in 15 minutes. The optional seed spiker attachment allows for overseeding or planting of new lawns. Tiller tines are also available. Both the spiker and tiller assemblies attach and detach in 60 seconds.

Circle 173 on reader service card

(continued on page 90)

Put Henderson Chief behind you and extend your season.

The people at Henderson know how important it is for you to keep busy in the winter, too. So we design and build pickup-mounted sand and salt spreaders that are rugged and dependable. Dependable spreaders for accurate spreading; self-powered and cab-controlled; quick, easy mounting.

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New
for 1993.

"The choice for all seasons, the herbicide for all reasons." That's how Sandoz describes it's new

Barricade[®]

herbicide, and The Andersons has expertly incorporated it with several results—getting fertilizer formulas to provide you with great new combination products.

▶ Come see us at The Green Industry Expo in Indianapolis, IN; Nov. 17-19; Booth #'s 509 and 511.

▶ And visit us at the OTF show in Cincinnati, OH; Dec. 7-9; Booth #'s 521-523 and 620-622

New
for 1993.

According to Monsanto,

DIMENSION[®]

is "The toughest thing to emerge since crabgrass." This powerful new herbicide, in combination with one of The Andersons proven fertilizer formulations provides you with a high-performance product that gets two jobs done with a single application.

the professional's partner[®]

The Andersons

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New
for 1993.

The Andersons proudly welcomes a proven performer into its combination product line. From DowElanco, makers of TEAM* and BALAN*, comes

GALLERY^{*}

Incorporated with The Andersons famous fertilizer formulations, turf professionals can expect to get great looking weed-free lawns for their customers.



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New Products

(continued from page 88)

Safety-Curb Line Markers from **Oly-Ola Recreational Edgings** are now available in orange, yellow, red, brown, black and white, as well as in custom colors.

These line markers are designed for athletic fields, school tracks, playgrounds and running trails. They lay flush with the ground and are secured underground with steel stakes, preventing landscape maintenance problems and frost-heave.

Circle 174 on reader service card

The Hitch-in-One trailer hitch target assembly from **Powertech Equipment Inc.** is designed to indicate the exact centers of the vehicle and trailer hitch components for quick and easy hook-ups. Five models are available to fit all popular hitch configurations.

Circle 175 on reader service card

Aquarium Pharmaceuticals produces the Pond Care Pond

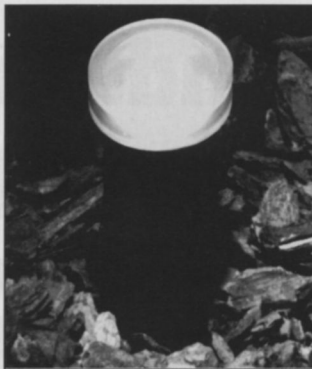
Pack, a shrink-wrapped corrugated displayer that contains seven products, including the chlorine and heavy metal neutralizer, stress coat for pond fish, accu-clear, aquatic pond stimulant, pond-zyme, pond feeder signal blocks for fish and dry-tab master test kit for ponds.

Circle 176 on reader service card

The RMXL series Type 5 Area light introduced by **Stonco Lighting** includes primary applications for parking lots, roadways and general-area lighting. Installation includes a slip-fitter for the top, mounting over a standard 2-3/8-inch tenon. Models are available to accommodate 250- and 400-watt high-pressure sodium and 175-, 250- and 400-watt metal halide.

Circle 177 on reader service card

Contemporary mixture styles hallmark a line of halogen, low-voltage landscape lights introduced by **Intermatic's** professional landscape lighting products division. The fixtures, constructed of heavy-duty cast aluminum for



optimum performance, use a high-intensity, 20-watt halogen MR 11 bulb.

Circle 178 on reader service card

Rolatape offers the MM 12-D measuring wheel for pegboard or countertop display. The compact 16-inch-high unit has a three-piece interlocking handle that extends 35 inches for easy measuring. It comes with a two-year written guarantee.

Circle 179 on reader service card

The Granite Specialties Division of **Cold Spring Granite Co.**

offers Tumblestone granite pavers, a line of weathered, cobbled pavers designed for commercial and residential applications. Offered in traditional cobblestone sizes including 3- to 8-inch widths and 3- to 12-inch lengths, the pavers are available in colors such as rockville white, charcoal and carnelian. Tumblestone pavers are made from post-production stock.

Circle 180 on reader service card

G. Sneddon Importers & Exporters offers the E-Z Lift, a lightweight hoist that bolts onto the back of any domestic pickup truck. Weighing only 140 pounds, it is capable of lifting 4,000 pounds at a 45-degree angle in 20 seconds. The E-Z Lift automatically rejects overloads and can be removed for reinstallation on another pickup truck.

Circle 181 on reader service card

Grade-Tek offers Jiffy-Grade, Model GT-100, a grading implement for use with all types of skid loaders. The unit is designed for a

(continued on page 92)



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WEED

through the paperwork!

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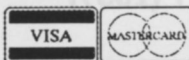
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— Dacthal doesn't let you down. It means healthier turf and a difference you can see. And that makes you look good with your customers.

— Dacthal doesn't leach, because it isn't water soluble, and it's biodegradable, too.

— Dacthal doesn't damage roots regrowing after drought. And don't worry about newly sprouted turf* either. Dacthal is the right choice in high stress situations.



— Dacthal doesn't let weeds get out of control. On crabgrass, annual chickweed, spurge, foxtail, Poa annua, and over 15 other annual grasses and broadleaf weeds, Dacthal is the proven preemergent herbicide performer.

— Dacthal doesn't stress or damage roots, because turfgrass root systems have a high tolerance for it. And that means less stress and worry for you.

ISK Biotech Corporation,
Turf & Specialty Products Division
5966 Heisley Road, P.O. Box 8000,
Mentor, OH 44061-8000.



*Of uniform greening and 1 to 2 inches in height.
Always follow label directions carefully when using turf chemicals.
® Registered trademark of ISK Biotech Corporation.

New Products

(continued from page 90)

variety of landscaping applications, including sod preparation; slope, ditch and berm contouring; scarifying and harrowing. Jiffy-Grade features a hydraulically controlled grading platform which allows the operator to position it at almost any angle for accurate contouring.

Circle 182 on reader service card

Hi-Lift Jack Co.'s Fold-A-Way Ramp eliminates problems associated with loading and unloading heavy items on and off a truck or trailer. The eight-foot ramps fold to half-size and have a load capacity of 1,500 pounds. A single ramp holds 750 pounds.

Circle 183 on reader service card

The Tiger Pro 300 shovel from **Ames Lawn & Garden Tools** has a contoured, ergonomically shaped solid fiberglass handle to provide high strength with less fatigue. It also features a molded safety orange polypropylene pro-

TECTIVE SKIN and a 14-gauge, heat-treated and tempered carbon steel blade.

Circle 184 on reader service card

Midland LMR offers a compact PC-programmable VHF and UHF portable, two-way FM radios with function keypads and LCD display. The 32-channel models are expandable to 64 channels with an inexpensive plug-in option.



Models with 16 channels come without keypad or LCD. All versions feature built-in programmable tone, digitally coded

scquelch and 20-channel-per-second priority scan.

Circle 185 on reader service card

Hanix America Inc. presents its mounted hydraulic breakers to the North American market. Ten models from 125 ft. pounds to 8,000 ft. pounds are available including 550, 850 and 1,400 ft. pound sizes to match all models of wheel loader backhoes.

Circle 186 on reader service card

The **Melroe Co.** offers a low-cost grading attachment for its Bobcat 500 through 800, 1600 and 2400 Series loaders. The Bobcat Econo-Grader features a 7-foot manually adjustable moldboard which can be side-shifted 12 inches to either direction from the center.

Circle 187 on reader service card

B&K Installations builds greenhouses with specific motorized cartways to go between gutter-connected greenhouses. The cartways are generally pebble rock, asphalt or regular concrete to hold the regular daily growing

traffic and to provide access for outgoing and incoming plants.

Circle 188 on reader service card

Honda has added the new WMP20X to its comprehensive line of water pumps. The WMP20X is suitable for both water and chemical applications. Powered by Honda's 5.5-h.p. OHV commercial engine, the WMP20X has 2-inch suction-discharge ports and EPDM seals.

Circle 189 on reader service card

R.N.D. Signs offers the Slim-Jim plastic stake with a 4- by 5-inch poly-coated sign. The recycled plastic stake is designed to hold the sign in place. Priced at about 5 cents each in quantities of 20,000, the Slim-Jim is compactly packaged for efficient truck storage.

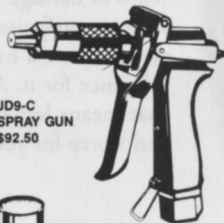
Circle 190 on reader service card

This listing is not all inclusive. If you have a new product for 1993 that is not mentioned here, please send the information to LLM, 4012 Bridge Ave., Cleveland, OH 44113.

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USE READER SERVICE #22

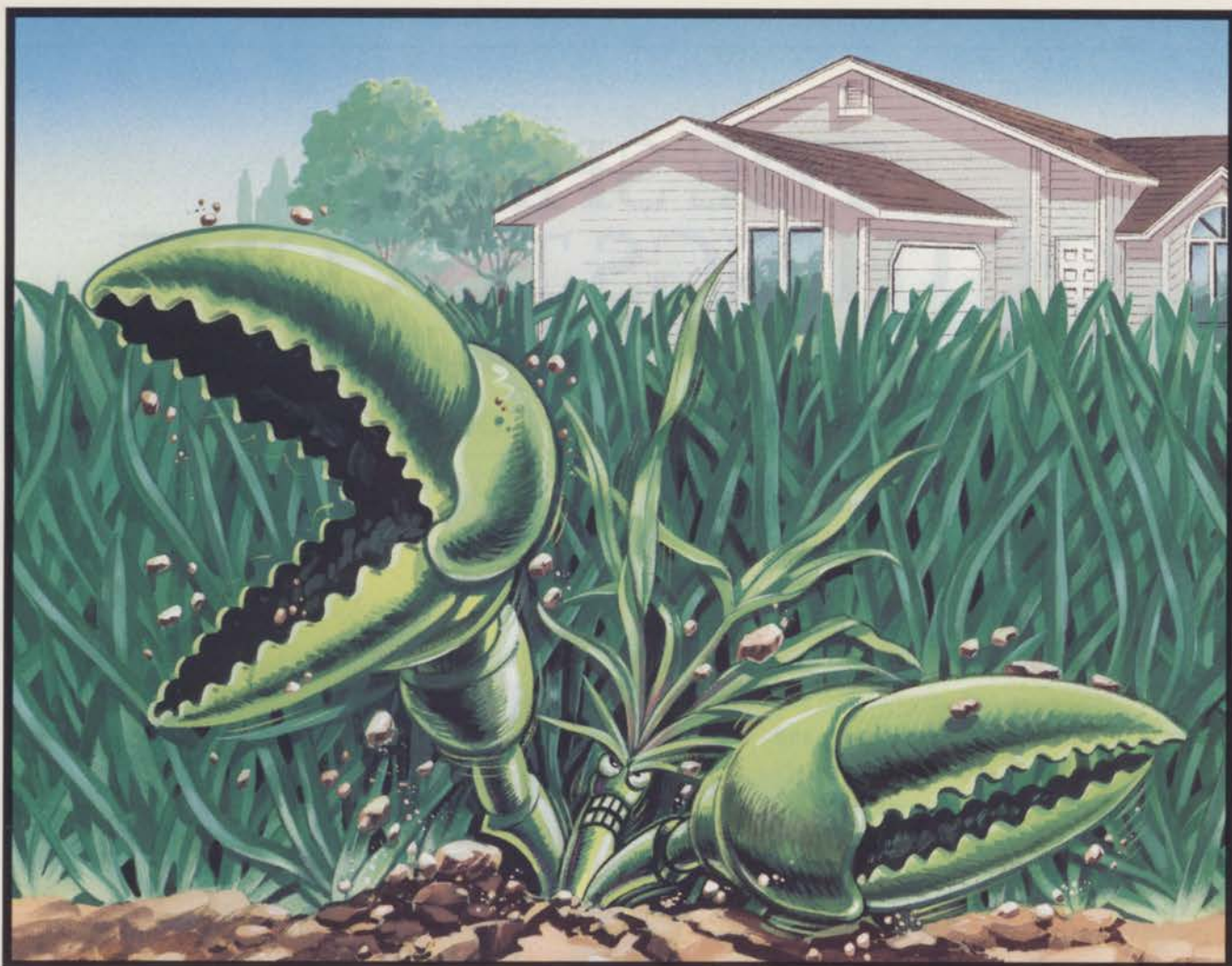
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USE READER SERVICE #23



Dimension® gives you more time to keep crabgrass from raising its ugly head.

If you get behind schedule during your busy spring season, crabgrass is bound to pop up before you can prevent it. But that's not a problem if you use Dimension® turf herbicide.

Dimension is the only herbicide that gives you season-long crabgrass control with the flexibility of either a pre- or postemergence application. With more time to apply it, you can treat emerged

crabgrass and still count on effective results.

Better yet, you get this excellent control using low rates. And you don't have to worry about turf injury or staining.

So now you can stay ahead, even after crabgrass raises its ugly head. For the name of your nearest agent, or for more information about Dimension, call us at: 1-800-323-1421.



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Turf Herbicide
by Monsanto

The toughest thing to emerge since crabgrass.

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR DIMENSION TURF HERBICIDE. Dimension® is a registered trademark of Monsanto Company. © Monsanto Company 1992 8-92 DMP-25701B

USE READER SERVICE #64

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The nation's largest regional turf show is happening December 7-10 in Cincinnati, Ohio. You won't want to miss this 26th annual event sponsored by The Ohio Turfgrass Foundation.

Professionals from across the country will gather in Cincinnati to exchange ideas, catch up on the latest green industry research and news from the nation's top experts, and view one of the country's largest displays of turf equipment, products, and supplies.

Whatever your specialty, the OTF Conference & Show has plenty for you. Seminars, workshops, and exhibitors will cater to **Lawn Care, Golf Turf, Grounds Maintenance, and Sports Turf** professionals.

So, mark your calendar now and plan on attending the Ohio Turfgrass Conference & Show in Cincinnati, December 7-10. For more information, return the form below or call 216-292-2601.



CINCINNATI, OHIO • DECEMBER 7-10, 1992

YES! PLEASE SEND MORE INFORMATION ABOUT THE 1992 OTF CONFERENCE & SHOW

- I'm interested in exhibiting I'm interested in attending
 I'm interested in OTF Membership

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Detach and mail to: The Ohio Turfgrass Foundation, 2021 Coffey Road, Columbus, OH 43210 Phone: 614-292-2601 FAX: 614-292-1626

1993

February 1993 will see the publication of the first professional turf management text devoted to advanced environmental ecology. This pioneering work addresses the wave of the future, and is a must for all professionals.

TURFGRASS ECOLOGY AND MANAGEMENT

By **Dr. T. Karl Dannenberger**
Associate Professor of Turfgrass Science
Department of Agronomy
The Ohio State University

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For registration information, contact:
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USE READER SERVICE #94



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Water efficient irrigation systems with low maintenance factors demand clean water, requiring designs with improved performance.

By Larry Keesen

DURING THE NEXT six months, we will focus on irrigation system design. Topics will include water sources, how to select the right equipment for a specific project, sprinkler head layout, zoning for control, hydraulics, sizing, designing drip irrigation and more.

Here at Keesen Water Management, irrigation design is a major portion of our business. Our design criteria are a result of many evaluations of existing systems, the installations we observe and the feedback we receive from installation and maintenance contractors. We also monitor some of our design projects for water use and maintenance costs over the years.

Photo: Matthew Shooner, Cincinnati, Ohio

ALL OF THIS information is used to determine better methods for designing systems with improved performance. I'll discuss all the basics of design with emphasis on what works, why it works, your liability position and xerigation, another term for efficient irrigation.

Why be concerned about water quality? Sand and other sediments can be very abrasive, enlarging nozzle sizes, increasing equipment tolerances and plugging nozzles and valve orifices. Chemicals in the water can cause deposits and scaling in equipment. Additionally, weed seeds, leaves and sticks can create maintenance headaches; and iron, as well as other minerals in the water, can stain sidewalks, structures, fences, etc.

The shallow wells in Florida produce water that contains iron and other chemicals that corrode brass components, stain the concrete surfaces and structures and dramatically reduce the life expectancy of an irrigation system.

Water efficient irrigation systems with low maintenance factors demand clean water. Most landscape irrigation water comes from potable water supplies which may not be as clean as you think. Flaking of rust particles inside steel and cast-iron pipe used to deliver the potable water to the irrigation system can plug orifices. This is reason enough to stay away from galvanized or steel pipe in an irrigation system, especially where the system is drained in the winter and air enters the pipe accelerating the corrosive process.

Other sources such as wells, lakes, rivers and ditches supply the balance of water for landscape irrigation. Those

areas adjacent to oceans where irrigation water is pumped from wells should watch for salt water intrusion into the aquifer. When this occurs, the methods for filtration we are discussing will not remove the salt from the water.

Water pumped from streams or ditches often contain suspended solids and organic matter which can damage or plug the system. Water pumped from ponds and lakes may be high in organic content with algae, snails, bacterial slime, fish and clams. All of these elements can damage irrigation system components and reduce life expectancy, kill plants and stain structures.

FILTERING. How do you solve these problems and provide for adequate filtration? In almost any irrigation pumping

system it makes more sense to filter the water before it enters the pump. This will extend the life of the pump impellers, bearings and bowls from two to eight years. The restriction of water flowing through this intake filter must be minimal. Pump efficiency drops and energy costs increase when there is friction loss or water pressure loss through the intake filter. Electrical energy savings will soon pay for the cost of an intake filter that has little or no flow loss.

Filtration for irrigation systems should be self-cleaning in order to cut maintenance costs and accommodate varying filtration demands. Secondary filtration downstream of the pump may be required to eliminate organic matter and suspended solids. Filtration of the potable water supply immediately

Salt Lake County Parks use the LAKOS RTS series separators so they can re-use wastewater for irrigating park landscapes. Photo: LAKOS



In Detroit, a landscape irrigation system depends on the LAKOS in-line sand separator to keep sand and silt out of sprinkler lines. Photo: LAKOS



downstream of the backflow preventer can protect the system from rust scale.

The most common type of filtration is the screen- or cartridge-type filter. The screen filter is used for landscape irrigation systems and drip equipment, even when connected to the potable water supply. It works well for light-duty filtration where occasional particles may plug the drip emitters or electric control valves.

Screen filters are also used on the intake line of a pump. The Lakos Plum Creek screen is an excellent example of a self-cleaning pump intake screen with no flow loss. A small water line from the downstream side of the pump provides high pressure to blow debris off of the outside of a drum-like screen that rotates. The unrestricted water intake

of this screen does not affect pump efficiency and performance.

Centrifugal-type filtration systems are widely used for secondary filtration in pumping systems. I have also used this type of filtration on the intake of submersible and turbine pumps. Centrifugal filters force the water into a downward spiral motion against the inside of the screen moving the sand toward the bottom. Many of these filters have self-cleaning devices requiring less

maintenance.

Sand media filters are excellent for the removal of organic material, fine sand and other floating matter. Water is forced through a tank partially filled with specially sized sand depending on the type and size of particle to be filtered. The sand is cleaned by backwashing water through the tank. Sand media filters may not work well where a high amount of particles must be removed from the water. This will result in frequent backwashing which will reduce efficiency and performance.

Over-filtration costs money. Specifying finer filtration than necessary causes greater pressure loss, reduced flow rate and more frequent cleaning. Greater pressure loss may result in a higher initial investment and higher pumping costs. A safe recommendation is to remove all particles larger than 1/6th the size of the smallest orifice in the system. If the bleed orifice in an electric control valve is 1/16 inch or 0.0625 inch, then the size of the filter screen would be 0.0104 inch or 0.26416 mm (millimeters) or 50 mesh screen which is a U.S. designator for filter screen size.

Screen sizing is usually described as mesh size, but may be indicated as inches, millimeters or microns, etc. The following are some common mesh sizes and their equivalents in inches and metric terms:

MESH SCREEN SIZE	INCHES	METRIC
200	0.0328	850 microns
1,000	0.0058	150 microns
1,500	0.0041	106 microns
2,000	0.0029	75 microns

Test the water to be filtered for organic material, suspended solids and sand to determine the type of filtration required and the mesh screen size. Use a media filter depending on the size and type of sand. (See table one.)

FIELD TIPS. Years ago, when I was in the installation business, my foreman called me in a panic because the sprinkler heads would not pop up when the water was turned on. I went to the residence and found he was right; the heads were not working. If we all pulled up a head then we could get the rest to seat. The static pressure was about 70 PSI, so I knew that wasn't the problem. We

Table 1.

checked all the valves in the system and the service line to see if they were closed, I was convinced we had a restriction some place.

After several days we finally had to dig up the service connection to the main in the street and found that the 3/4-inch "K" copper line was kinked, restricting the water flow. Needless to say, we lost money on that job. If you want to avoid this problem, perform a flow test at the point of connection or at the inlet to the backflow preventer prior to installation of the backflow and the rest of the system.

If you can fill a 5-gallon bucket in 60 seconds the rate of flow is 5 gallons per minute, GPM.







Site water requirements must be determined prior to designing the system in order to size the system for adequate capacity. Operating time constraints, turf traffic and the capability of the system to provide sufficient water for adequate plant growth during the summer when ET is highest (peak demand) are important considerations.

Last year, I performed an irrigation system evaluation for a homeowners' association. They had 12 acres of irrigated bluegrass turf and the only way they could keep it green during the heat of the summer was to operate the system every day, 24 hours per day. My first thought was that the water taps and meters were too small for this size area. One 2-inch and four 1 1/2-inch water meters were interconnected with a 2-inch looped mainline. The static pressure was high at 98 PSI. Using the formula in table 2, we calculated the peak weekly water demand for this site:

Table 2.

CHEAPER IS NOT ALWAYS BETTER.

Don't let price be the determining factor for filter selection. When you select a filter, look for maximum efficiency and make your selection based on the following criteria:

-  Reliability
-  Maintenance costs
-  Particulate to be filtered
-  Pressure loss through the filter
-  Effect of water chemistry on filter equipment
-  Pressure & volume required by the irrigation system

The above water requirement of 339 GPM is correct if all zone valves had the same flow rates. We know that this rarely occurs in landscape irrigation systems so we added a 30 percent safety factor for variation in valve/zone flow rate. Add 30 percent to the 339 GPM and there is a maximum flow requirement of 441 GPM.

The next step is to determine the capacity of the water meters. I use the AWWA manual *M-22, Sizing Lines & Meters*, (page 45, column two) "Recommended Design Criteria -- 80 Percent of Maximum Capacity". The flow rate is 128 GPM for a 2-inch meter and 80 GPM for a 1 1/2-inch meter. Four 1 1/2-inch meters could provide 320 GPM plus 128 GPM from the 2-inch meter equaling 448 GPM. The formula that was used indicated a requirement of 339 GPM and a safety factor of 30 percent for a total of 441 GPM. It appears that the water source is adequate.

Next I must question if the water pressure is adequate. With 92 PSI of static

pressure the operating pressure downstream of the backflow preventer would be about 25 PSI less, or 67 PSI. Pressure requirement at the heads for this system will not exceed 45 PSI. That leaves 22 PSI available pressure loss for the mainline, valves and lateral lines.

I suspected that the 2-inch PVC mainline was too small, resulting in high pressure losses. The average distance between water meters was more than 2,400 feet. The average flow per meter is 1/5 of 441 GPM or 88 GPM. With a looped system I assumed that half of the water would flow in each direction, resulting in an average flow of 44 GPM in the 2-inch pipe.

Class 200 PVC 2-inch pipe with a flow rate of 44 GPM, has a pressure loss of 1.18 PSI per 100 feet of pipe. Half the distance between the meters was about 1,200 feet times the pressure loss of 1.18 per hundred equaled 14.16 PSI of pressure loss in the mainlines. Add losses of 18 PSI for fittings, valves and lateral lines and it

appeared that portions of the system were operating below recommended pressures at 35 PSI.

The major problem with the system was the size of the mainline which greatly restricted the flow of

(continued on page 102)

$$Q \text{ in GPM} = \frac{\text{Area} \times 0.6234 \times \text{Weekly Water Requirement}}{\text{Days per week} \times \text{Hours per day} \times 60 \text{ minutes}}$$

Where: Q = Flow in gallons per minute (GPM)
 A = Area in square feet
 0.6234 gallons = Volume of water in 1 square foot, 1 inch deep.
 WR (in inches) = Weekly turf water requirement divided by system application uniformity/efficiency
 D = Number of days per week available for irrigation
 OH = Operating hours per day

...using the following site information:

Area = 12 acres x 43560 sq. ft. = 522,720
 WR = 1.2 inch/0.40 = 3.0 inch (Estimated system efficiency of 40 percent) Difference between amount used and applied.
 D = Six days per week
 OH = Eight hours per day

$$Q = \frac{522,720 \times 0.6234 \times 3.0}{6 \times 8 \times 60} = \frac{977,590.92}{2,880} = 339.44 \text{ GPM}$$



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Table 3.

Here's how you can check your systems capacity by making the following determinations:

- The size of the area in sq. ft. (50,000)
- Maximum weekly turf water requirement divided by system application uniformity/efficiency. Generally, the maximum weekly turf water requirement will range from 1 to 2 inches. Check with your county extension agent or other expert in the area for your requirements. If you're not sure, use 1.5 inches to start with. Use an efficiency range of 30 percent at the low end for systems with poor efficiency and up to 80 percent if the system was well designed and maintained. If you're not sure start with 50 percent. Using a weekly plant water demand of 1.5 inches and a 50 percent efficiency factor, the WR would be 1.5 inches/0.50 = 3 inches of water applied per week.
- Days of the week available for watering 5
- Operating hours available each day 8

$$Q = \frac{50,000 \times .6234 \times 3.0}{5 \times 8 \times 60} = \frac{93,510}{2,400} = 38.96 \text{ GPM}$$

(continued from page 100) water and reduced pressure. As you can see in table three, restrictions in capacity can result in longer operating schedules.

Always check the static pressure at the site prior to design. If this is not possible, contact the local water department for pressure at the site. If your pressure is too low, you may want to consider using sprinkler heads that have low operating pressure requirements and/or installing a booster pump if allowed by the water purveyor.

For the average system, if your static pressure is more than 70 PSI, install a pressure reducing valve immediately downstream of the backflow preventer to control pressure and protect the system from damage. ■

The author is president of Keesen Water Management Inc., Denver, Colo.

IRRIGATION QUESTIONS

1. Which filtration screen size would be the most appropriate for most types of drip irrigation, 20 mesh or 200 mesh?
2. What is the required system capacity for a 6-acre site where the peak demand is 1.6 inches per week, the system efficiency is 60 percent and watering must be completed within 6 hours per day, three days per week?
3. Does the municipal potable water supply ever require filtration?
4. Will system flows increase over time when pumping large quantities of sand through the system?
5. What size opening in inches does a 100-mesh screen have?
6. Where do you find information on safe water flows through water meters?

Answers appear on page 118 of November LLM.

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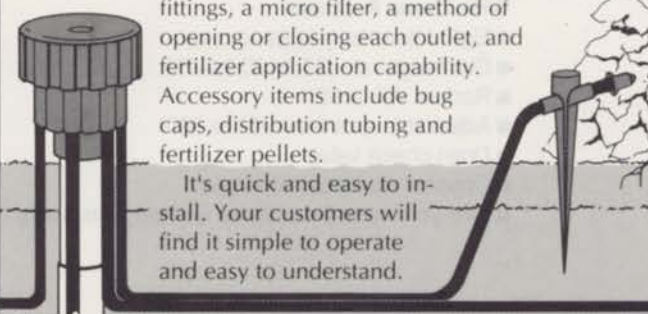
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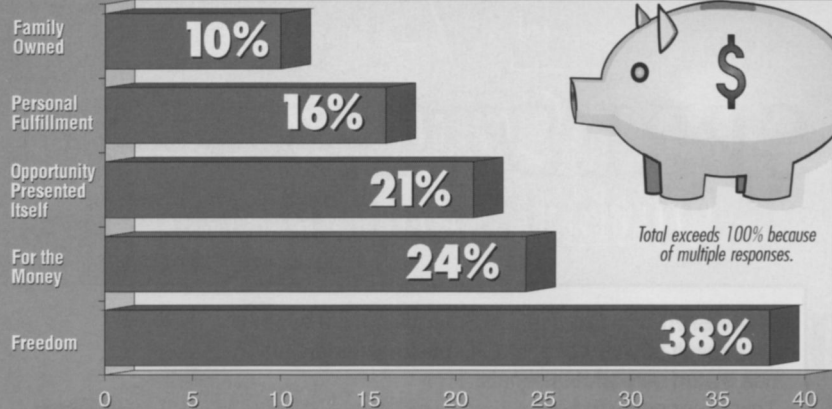
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Wear comfortable, appropriate shoes and clothing. Get the most out of your day by being there when the show opens. If supplied in advance, bring your name badge with you. It saves time and money.

A copy of the floor plan, generally available at the registration area, is a helpful guide to finding your way through the exhibit hall. Use a trade show guide to find the location of your favorite supplier or to locate new sources. Use this book to plan visits to vendors you must see, those you should see and those you may not need to

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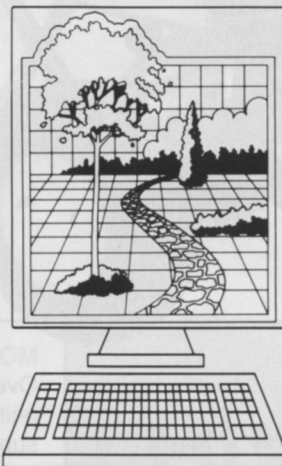
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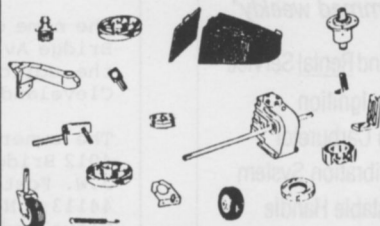
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(continued on page 108)

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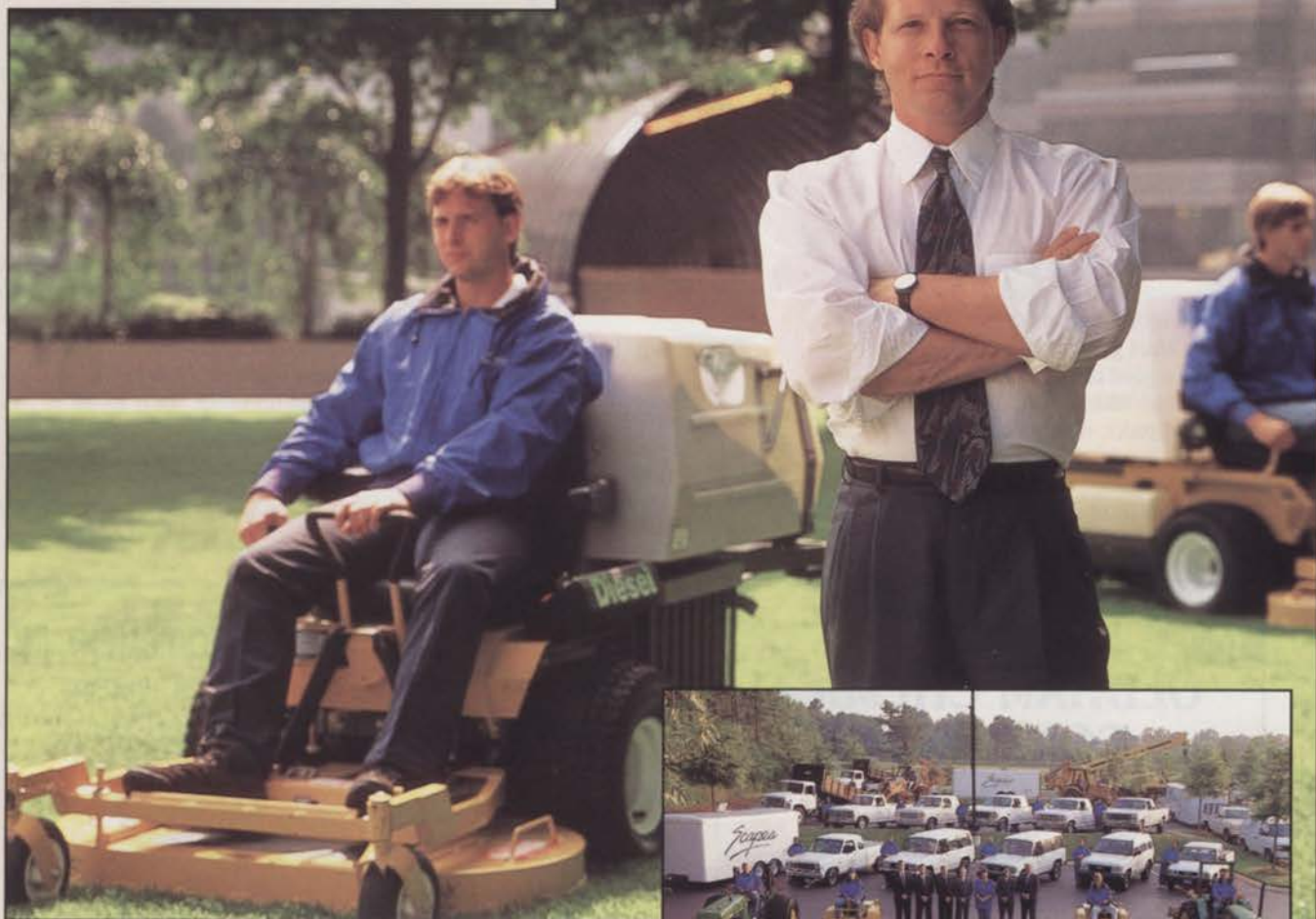
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USE READER SERVICE #35

Focus on Seed

(continued from page 106)

- spreads by underground rhizomes
- moderate to high maintenance required
- fall seeding works best

For quicker germination, perennial ryegrasses are attractive, durable and easy to establish. Ryegrasses perform well on golf courses, sports fields, home lawns and industrial sites.

Prominent characteristics include:

- germinates in 7 days
- moderate maintenance required
- bunch-type growth habit
- commonly added to bluegrass mixtures for quicker establishment
- ideal for overseeding or establishing new lawns
- ideal to seed anytime during the season, even in the summer if irrigated

In the transition zone, where heat, drought and wear tolerant grasses are needed, tall fescues are a good choice. Tall fescues perform well on athletic fields, home lawns, roadsides and parks; whether in the sun or shade.

Prominent characteristics include:

- germinates in 14 days

- low maintenance bunch-type turfgrass
- can be seeded 100 percent or as part of a mixture (no less than 60 percent of the mix being tall fescue)
- used for establishing new lawns or renovating old ones

**A broader range
of seed varieties makes
selection more
challenging to today's
turfgrass
manager.**

- plant in the spring (April 1 to May 31) or fall (Aug. 15 to Oct. 1)
- tolerates a wide range of soil conditions

- available in sod form

An extremely fine-textured low maintenance grass that is well adapted to shady conditions is fine fescue.

Fine fescues including chewings, hard and creeping red fescue types are well-adapted for use on parks, home lawns, roadsides, golf courses and reclamation areas. Its low growth habit — 10 to 12 inches — makes it perfect for slopes and other hard to mow areas.

Prominent characteristics include:

- germinates in 14 days
- low maintenance bunch-type turfgrass (chewings and hard)
- tolerates poor soils
- can be seeded 100 percent or part of a mixture plant in the spring (April 1 to May 31) or fall (Aug. 15 to Oct. 15)
- prefers well-drained soils

Rough bluegrasses — poa trivialis — turfgrass suited for damp, shady areas on golf courses, home lawns and parks.

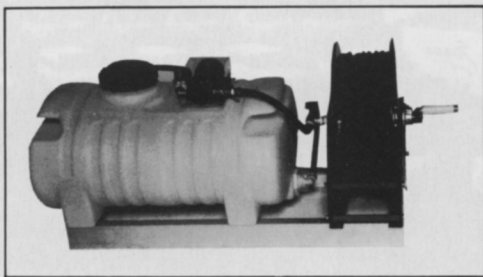
Prominent characteristics include:

- germinates in 21 days
- requires damp, shady locations for best growth
- can be combined with fine fescues or used 100 percent

-- *Lofts Seed Inc., Bound Brook, N.J.*

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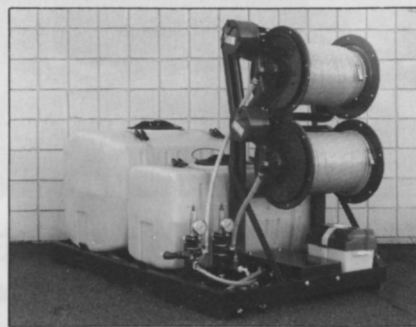
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USE READER SERVICE #71

Landscape News

COLORED MULCH IS AN ECOLOGICAL, AESTHETIC PROCESS

THEY SAY THE downfall of one business is the spawning of another. There's definitely some truth to that statement as one group's efforts to recycle wood-waste byproducts has produced a windfall for the landscape contracting industry.

Wood waste that once cost an arm and a leg to dump at a landfill has been given a new lease on life. What was once waste is now being ground into wood chips, colored into six distinct shades and turned into affordable landscape mulch. Sounds simple? Maybe, but the revolutionary process is responsible for diverting, to date, more than 200,000 cubic yards of wood waste from landfills and producing about 60,000 cubic yards of finished mulch.

Heartwood Mulch,TM as it's called, is being sold by Kurtz Brothers of Cuyahoga Heights, Ohio, as an environmental alternative to traditional mulch.

And the process came about because Greg Rondy, a one-time generator of wood waste noticed an increase in tipping fees to dispose of waste. In 1989, he opened the Wood Disposal Co. and began accepting wood waste at a tipping fee of 20 percent less than what landfills were charging.

But collection was only the first step. Rondy shredded the waste with hammer-mills, removed the metal and stacked the chips. But he had yet to find an outlet for the wood waste. So he hired Scott Zimmerman to find lucrative outlets for the 30,000 cubic yards of chips he amassed.

Landscapers and garden centers were open to the idea of shredded, recycled wood waste, but were not pleased with the color. After all, the public is used to dark, rather than blond mulch.

Not one to be discouraged, Rondy developed a machine which could apply colorants to the converted wood mulch, formed an alliance with a national dye firm headquartered in Akron and began marketing the Heartwood brand mulch in three basic colors. Over time, gold, orange, rust, brown, black and red were produced from the mixture of the three base pigments.

Wood Disposal Co. and Kurtz Brothers joined forces about one year ago, and the



Recycled wood waste is being converted to decorative mulch for the landscape, and is responsible for diverting tons of waste from landfills.

mulch is now produced by Kurtz Brothers Wood Recycling Division. Kurtz holds the national and world patents to the coloring process. Zimmerman markets the coloring process and colorants as KBI Coloring Systems,TM and Rondy is the manager of the Wood Recycling Division at Kurtz.

"Before we sold any mulch I contacted all of our competitors to see if they would buy the mulch," Zimmerman said. "At first, people laughed at us, believing no one would buy our painted pallets. We then sold 30,000 yards in the next four months and they began to take notice."

Since they began marketing the coloring process one year ago, six companies across North America, including one in Canada, have bought the process. Ten more are slated to produce product by spring.

The firm's goal is to sell only one system in each geographic area, more or less guaranteeing continued market share for the owner. Within three years, somewhere between 20 and 30 systems will be operating across the country.

The base pigments in the colors are FDA approved for food contact, yet long lasting. The color is bound to lighten up but is said to take longer to silver or gray out than others.

"We've had a lot of interest from both the retail as well as wholesale markets," said Joe Super, a Kurtz salesman.

From a design point of view, the variety of colors offers flexibility to accent the decor of many landscaping applications. It doesn't have a traditional mulch smell and since it's kiln-dried wood, it doesn't have any fungus spores that ultimately cause disease in beds, he said.

Super said the environmental assets of the product may present the primary attraction to the mulch, but it's also economically viable.

In a nutshell, Kurtz grinds wood scrap year-round creating wood chips which are piled in conical stacks enabling water to run off the sides. In the spring, one employee uses the KBI Coloring System to color the wood chips on demand. The system colors 75 cubic yards per hour.

The process is completely automated and color

production rates and costs are guaranteed. The coloring system can accurately reproduce the color of bark hardwood, cypress, hemlock, cedar, redwood or any other real mulch indigenous to North America.

"In addition to selling the system, it's important to note that we do all this ourselves," Zimmerman said. "Every day we overcome possible problems that our customers may face. This experience carries a lot of weight with potential customers."

On average, Kurtz has found that first-year color-enhanced mulch producers gain market acceptance, usually selling about 10,000 cubic yards of mulch. Dramatic growth occurs in the second year when, on the conservative side, it doubles.

"If 20 systems are producing 20,000 cubic yards of mulch, that is 400,000 cubic yards of finished product," Zimmerman said. "That is the equivalent of nearly 1.5 million cubic yards of wood waste diverted annually in North America."

And that's critical as future federal mandating will continue to require alternative solutions for the disposal of wood waste, clippings, leaves and other horticultural wastes. — Cindy Code

People

THE GARICK CORP. announced several promotions including **Bob Kristoff** to Midwest sales manager. His responsibilities include all landscape contractors, garden centers and nurseries in the Midwest, including Kansas and Missouri.

Others promoted: **Joe Traudt** was named Southwestern sales manager. He will introduce Garick's newly established southwest ports and solicit new accounts in western Kansas, Oklahoma and Texas.

Steve Lendvay was promoted to sales manager of Northeastern Ohio. Lendvay will handle all contractors, garden centers, nurseries, municipalities, etc., in his territory.

Mike Gozelanczyk is now general manager of Horticultural Distribution Centers. Gozelanczyk is overseeing operations at both Landscapers Wholesale, Inc. locations, Garfield Hts., and Avon, Ohio.

Ingersoll Equipment Co. appointed **Thomas Lopina Sr.** president and chief executive officer. He had been president and chief executive officer of Gravely International, a subsidiary of the Ariens Co., since 1984.

Frans Jager joined LESCO as director

of purchasing. Formerly, he was vice president and general manager of the fertilizer division of Continental Grain Co. Earlier, he served in various capacities with a number of international companies involved in the fertilizer business.

Jeffrey Sims also joined LESCO in the newly created position of vice president-logistics. He previously was with The Scotts Co. where he served as director of logistics and operations for three years.

Paul Vikner is vice president/general manager of Isuzu Truck of America. Vikner's duties will be expanded to include the management and operation of the company, and he will be the senior executive responsible for Isuzu Truck activities. He will retain responsibility for sales, marketing and field organizations, and will also oversee parts and service activities.

Koos Inc. and Shore Fertilizer Co. have appointed **Ron Mau** as director of commercial fertilizer sales. Mau brings more than 27 years of professional lawn care and golf course market experience to the company. At Koos/Shore Mau is respon-



Vikner



Hines

sible for further developing the national sales of commercial fertilizer products.

Rain Bird announced the following appointments to its staff: **James Hines** to area specifications manager for the commercial division covering Colorado, Utah, Arizona and New Mexico; **Mark Mullikin** to distributor contractor support specialist for the contractor division responsible for implementing training and education programs for counter personnel, assisting customers with product and service questions; and **Chris Davey** to quality systems program manager for the contractor division responsible for providing customers with quality products and exceptional customer service. ■

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USE READER SERVICE #72

DEC. 2-4 39th Rocky Mountain Turf Conference and Trade Show, Currigan Hall, Denver. Contact: RMRTA, P.O. Box 29, Franktown, CO 80116; 303/688-3440.

DEC. 7-10 The Ohio Turfgrass Conference & Regional Show, Cincinnati Convention/Exposition Center, Cincinnati. Contact: OTF, 2021 Coffey Road, Columbus, OH 43210; 614/292-2601.

DEC. 8-10 Georgia Turfgrass Conference & Show, Georgia International Convention and Trade Center, Atlanta. Contact: Sarah Bundschuh, GTA, 5198 Ross Road, Acworth, GA 30101; 404/975-4123.

DEC. 15-16 Turfgrass and Ornamental Pest Control Workshop, Turfgrass Technology Center, Marion County Extension Office, Indianapolis. Contact: Jeff Lefton, P.O. Box 688, Carmel, IN 46032; 317/846-7020.

JAN. 3-8 Advanced Landscape Plant IPM Short Course. Contact: David Laughlin, University of Maryland, Dept. of Entomology, Symons Hall, College Park, MD 20742; 301/405-3913.

JAN. 4-6 Ontario Turfgrass Symposium, University of Guelph, Guelph, Ontario. Contact: University of Guelph, Office of Continuing Education, Room 160 Johnston Hall, Guelph, Ontario N1G 2W1; 519/767-5000.

JAN. 5-7 63rd Annual Michigan Turfgrass Conference, Holiday Inn - South Convention Center, Lansing. Contact: Kay, MTF, P.O. Box 80071, Lansing, MI 48908.

JAN. 5-8 Eastern Regional Nurserymen's Association Trade Show, The Concord Resort Hotel, Kiamesha Lake, N.Y. Contact: 203/872-2095.

JAN. 6 The Sacramento Valley's Landscape & Nursery Expo 93, Sacramento Convention Center, Sacramento. Contact: Kenny Kakutani, P.O. Box 160244, Sacramento, CA 95816-0244; 916/442-4470.

JAN. 11-14 Advanced Turfgrass IPM Short Course. Contact: David Laughlin, University of Maryland, Dept. of Entomology, Symons Hall, College Park, MD 20742; 301/405-3913.

JAN. 11-15 & 18-22 Cornell Cooperative Extension Turfgrass Short Course, sponsored by Maryland Cooperative Extension Service, Cornell University, Ithaca, N.Y. Contact: Joann Gruttadaurio, 607/255-1792.

JAN. 14-16 The Mid-Am Trade Show, Hyatt Regency, Chicago, Ill. Contact: Mid-Am, 1000 N. Rand Road, Suite 214, Wauconda, IL 60084; 708/526-2010.

JAN. 15 8th Annual Mid-Florida Turfgrass Conference, sponsored by the University of Florida Cooperative Extension Service, Sanford, Fla. Contact: Uday K. Yadav, 407/323-2500 ext. 5559.

JAN. 17-19 Empire State Tree Conference, Holiday Inn, Suffern, N.Y. Contact: New-York State Arborists Association, 518/783-1322.

JAN. 18-21 33rd Virginia Turf & Landscape Conference & Trade Show, Richmond Centre and Richmond Marriott, Richmond. Contact: Randeem Tharp, 804/340-3473.

JAN. 18-21 Eastern Pa. Turf Conference & Trade Show, Valley Forge Convention Center, King of Prussia. Contact: PTC, P.O. Box 1078, Lemont, Pa. 16851-1078; 814/863-3475.

JAN. 20 Landscape Contractors & Grounds Maintenance Conference and Trade Show, Sheraton Columbia Northwest, Columbia, S.C. Contact: SCLTA, P.O. Box 325, Clemson, SC 29633; 803/656-2459.

JAN. 21-23 1993 Idaho Horticulture Convention and Trade Show, Boise Centre on the Grove, Boise. Contact: Idaho Nursery Assoc., 2104 Floating Feather Rd., Eagle, ID 83616; 800/INA-GROW.

JAN. 21-24 1st Turfgrass Management/Park Maintenance Training School, Hilton Hotel, Albany, N.Y. Contact: NYSTA, 800/873-TURF or 518/783-1229.

JAN. 25-28 Central Environmental Nursery Trade Show and The Ohio State University Nursery Short Course, Columbus Convention Center and Hyatt Regency Hotel, Columbus. Contact: ONA, 2021 East Dublin-Granville Rd., Columbus, OH 43229; 614/431-2452.

JAN. 27-29 Wyoming Groundskeepers and Growers Association's Annual Conference and Trade Show, The Casper Events Center, Casper, Wyo. Contact: Bruce Potter, 307-637-7060 or Chuck Kostboth, 307/265-1870.

JAN. 29-30 Jacksonville Horticultural Trade Show, Jacksonville Agricultural Fairgrounds. Sponsored by Northeast Florida Nurserymen and Growers Association and Professional Landscape Services Association. Contact: Terry DelValle, 1010 N. McDuff Ave., Jacksonville, FL 32254; 904/387-8850.

JAN. 31-FEB. 3 ALCA's Executive Forum, Sheraton Tucson El Conquistador Resort. Contact: ALCA, 12200 Sunrise Valley Dr., Suite 150, Reston, VA 22091; 703/620-6363

(continued on page 116)

A Recent Survey Asked Turf and Ornamental Professionals to Rate Overall Usefulness.

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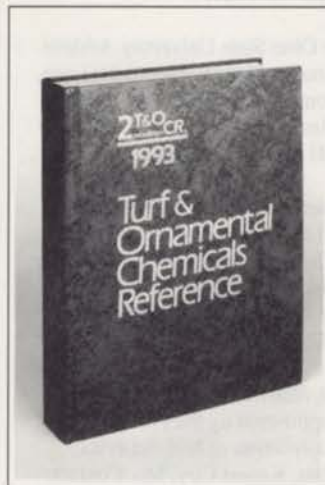
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T. vaporariorum



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Referus chemicalus



82%

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*The Center for Golf Course Management, T&OCR User Survey, March 1992

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Calendar

(continued from page 114)

FEB. 2 Annuals Plant Program, sponsored by the Ohio Cooperative Extension Service, Tom's Country Place, Avon, Ohio. Contact: Charles Behnke, 42110 Russia Rd., Elyria, OH 44035; 216/322-0127.

FEB. 3-4 The Ohio State University Athletic Field Short Course, Holiday Inn on the Lane, Columbus. Contact: The Department of Conferences and Institutes, 2021 Coffey Rd., Columbus, OH 43210-1086; 614/292-4230.

FEB. 3-5 American Sod Producers Association's 1993 Midwinter Conference and Exposition, The Fairmont Hotel at University Place, New Orleans, La. Contact: ASPA, 1855-A Hicks Rd., Rolling Meadows, IL 60008; 708/705-9898.

FEB. 3-5 Mid-America Green Industry Convention, sponsored by the Professional Lawn Care Association of Mid-America, Hilton Plaza Inn, Kansas City, Mo. Contact: Olivia Golden, P.O. Box 35184, Kansas City, MO 64134.

FEB. 8-9 28th Annual Shade Tree Symposium, sponsored by Penn-Del Chapter International Society of Arboriculture and Penn State University Cooperative Extension,

Lancaster Host Resort and Conference Center, Lancaster, Pa. Contact: Elizabeth Wertz, P.O. Box 293, Bedminster, PA 18910; 215/795-2096.

FEB. 9-13 NAA Annual Meeting and Management Conference, Don Cesar Hotel, St. Petersburg Beach, Fla. Contact: NAA, Route 101, P.O. Box 1094, Amherst, NH 03031-1094; 603/673-3311.

FEB. 11 Urban Tree Conference, sponsored by the University of Florida Cooperative Extension Service, Extension Service Auditorium, Sanford, Fla. Contact: Uday K. Yadav, 407/323-2500, ext. 5559.

FEB. 23-25 Western Pa. Turf Conference & Trade Show, Pittsburgh Expo Mart/Radisson, Monroeville. Contact: PTC, P.O. Box 1078, Lemont, PA 16851-1078; 814/863-3475.

FEB. 23-26 International Erosion Control Association's 24th Annual Conference and Trade Expo, Westin Hotel, Indianapolis. Contact: IECA, P.O. Box 4904, Steamboat Springs, CO 80477-4904; 303/879-3010.

FEB. 24 New Jersey Landscape '93, co-sponsored by the Associated Landscape Contractors of New Jersey and the Bergen County Landscape Contractors Association, Meadowlands Convention Center, Secaucus.

Contact: Mark Graser, 630 Valley Court, Westwood, NJ 07675; 201/664-6310.

FEB. 26- MARCH 7 New Jersey Flower and Garden Show, Garden State Exhibit Center, Somerset. Contact: Todd Jameson, 141 Union Ave., Suite 1, Middlesex, NJ 08846-1049; 908/560-9020.

MARCH 1-3 62nd Massachusetts Turfgrass Conference and 17th Industrial Show, Springfield Civic Center, Springfield, Mass. Contact: Dr. Joseph Troll, P.O. Box 489, Hadley, MA 01035; 413/549-5295.

MARCH 2 25th Annual Professional Turf & Plant Conference, Huntington Town House, Huntington, N.Y. Contact: Nassau/Suffolk Landscape Gardeners Association, P.O. Box 489, Brightwaters, NY 11718; 516/665-2250.

MARCH 12 4th Annual Turf Management Seminar, Sponsored by the Cuyamaca College Botanical Society & University of California Cooperative Extension, El Cajon. Contact: Diana Landis, 2950 Jamacha Rd., El Cajon, CA 92020; 619/670-1980.

MARCH 15-17 3rd Annual New England Landscape Exposition, Holiday Inn and Convention Center, Manchester, N.H. Contact: Guy Hodgdon; 800/639-5601. ■

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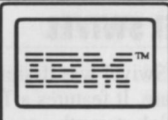
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Answers to questions on page 102.

1. 200 mesh screen.
2. $261,360 \text{ sq. ft.} \times 0.6234$
 $\times (1.6/0.6=2.66) 433,398.6$
 $3 \times 6 \times 60 1080 = 401.3 \text{ gm}$
3. Yes, whenever rust or scale is present in the supply.
4. Yes
5. 0.0058 inches
6. AWWA manual M-22

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