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Circle No. 119 on Reader Inquiry Card

Building a compost pile

■ According to the Ohio Cooperative Extension Service, here is a good formula for building a compost pile. A properly made pile will reach temperatures of 140 degrees in four to five days. At this time, you'll notice the pile "settling," a good sign that it is working.

1st layer: 3 to 4 inches of chopped brush or other coarse material on top of the soil surface allows air circulation around the base of the pile.

2nd layer: 6 to 8 inches of mixed scraps, leaves, grass clippings, sawdust, etc. Materials should be "sponge damp."

3rd layer: 1 inch of soil serves as an inoculant by adding micro-organisms to the pile.

4th layer: (optional): 2 to 3 inches of manure provides the nitrogen needed by micro-organisms. Sprinkle lime, wood ash and/or rock phosphate over the layer of manure to reduce the pile's acidity. Add water if the manure is dry.

5th layer: repeat steps 1-4 until the pile is almost the recommended height, then top off with 4 to 6 inches of straw and scoop out a "basin" at the top to catch rainwater.

Planning your business around Mother Nature

■ Not even Mother Nature can slow down a good landscape company like Acres Enterprises in Wauconda, Ill.

"The secret is to start early and keep as organized as possible," says Pat McEntee, vice president of sales. "We'll sit down in June or July when it's 85 degrees outside and actually start talking about our snow-plowing business."

And when spring breaks, "we're poised and ready to go out the door," says McEntee. "Planning for spring is done at least by the prior September."

Certainly, by New Year's Day upper management knows how many foremen they'll need, what kinds of equipment will be purchased, and deadlines for various contracts.

Who's involved with the planning process? All seven managers: owner Jim Schwantz, McEntee, operations vice president Jerry McMaster, accountant Rob Reblin, landscape maintenance supervisor Dave Lett, garage manager Bob Nedli and office manager Candice Simeon.

Some landscapers would say Acres is top-heavy in management, but it's paid off. Since the company's 1983 inception, it's grown into a $4.2 million business.

Some of the innovative ideas Schwantz and his staff implement:

• A computer hook-up with a national weather service that helps minimize the effect Mother Nature has on business. With some accounts 1-1/4 driving hours away, crews can be more efficiently diverted to dry areas. "When the call comes in from the field," notes McMaster, "sometimes we can tell them to sit tight and the storm will blow over." Adds Schwantz: "And it's an awesome tool for knowing when, where and how much it's going to snow."

• A minimum of three parties or picnics per year are scheduled: two for workers and their spouses, and one more that includes children. In eight years, no staffers have been divorced. "We try to keep our families happy, and in the spring that's a challenge," McEntee notes.

• Business cards for all foremen. Besides lending an air of professionalism to the company, the cards give the foremen a sense of pride, knowing they are depended upon to help keep customers happy.

• The annual budget includes what is called a "Caring Fund," out of which comes compensation for any equipment lost, stolen or broken during the year ($18,000 budgeted for 1991). When the fiscal year ends, anything left in the fund is divided among the employees as a bonus; in the past, between $80 and $600 per employee.

"We've got a good handle on things," says Schwantz. "We're not so much a seat-of-the-pants company like a lot of others. All of us as a team have always known where we were going. We manage well; it's gotten us where we are and will keep us there."

—Jerry Roche

Members of the Acres team: (standing, left to right) Candice Simeon, Jim Schwantz, Rob Reblin, Dave Lett, Pat McEntee; (kneeling) Bob Nedli, George Kaiser, Jerry McMaster.

HOW MUCH PLANNING?

The amount of lead time Acres Enterprises of Wauconda, Ill. uses for annual planning purposes:

Job	Lead Time
Capital improvements	18 months
Selling strategy	8-12 months
Budgeting	9 months
Supply purchases	5 months
Seasonal decision-making	4 months

Source: Acres Ent.

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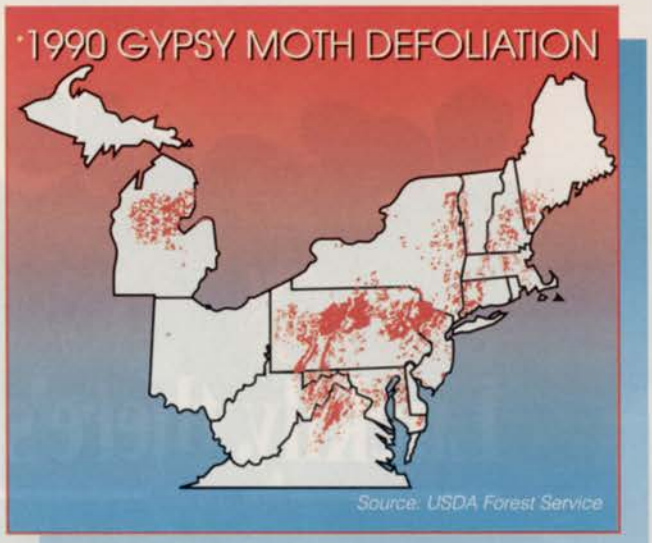
Circle No. 103 on Reader Inquiry Card

Healthy trees limit damage by gypsy moth



As these pesky varmints move across the country, steps to limiting damage are becoming more intensive.

■ An overall tree health program that includes pruning, species selection, fertilization and watering can help overcome the damaging defoliation dished out by the ever-expanding gypsy moth migration.

Last year, 7.3 million acres of trees suffered moderate to heavy defoliation because of the *Lymantria dispar* Linnaeus moth.

Besides large infestations in the Northeast (see map), the moth has also hit California, Utah, Washington, Oregon and other states, according to Dr. Jerry Hertel of the U.S. Forest Service.

A landscape manager can avoid potential problems on a property with diversified planting that includes species which the moths generally avoid.

If trees under your care are indeed hit by this pest, an aggressive program of good general tree health can help recovery efforts, says Hertel.

"One of the misconceptions is that the gypsy moth kills everything it touches," Hertel points out. "Secondary organisms actually do the killing." Armillaria fungus can attack roots, and the two-lined chestnut borer can make mincemeat out of the trunk and branches of a moth-infected tree.

"If the tree is healthy, it will maybe survive two to three years of defoliation," Hertel observes. "If the tree's sick, maybe one year of defoliation will kill it."

Here are some tips to keep the tree healthy and moth-free:

- Avoid compacting the ground or changing the surrounding grade level.
- Try not to subject the tree to lawn mower wounds.
- Make sure the tree has enough fertilizer and water.
- Remove moth shelters, such as bark flaps, dead trees and branches, boxes, cans and old tires.

Pheromone traps can be used to detect the pest's presence, though they will not drive them away, Hertel emphasizes. "(The traps) would clue you to look for the egg masses. Just because you have male moths doesn't mean you'll find the egg masses in an area."

Simple scraping will not kill an egg mass. Eggs, larvae and pupae can be destroyed with soapy water or a kerosene dip.

Skirt traps can be used to detect and trap larvae. They are made by tying an 18- to 24-inch wide piece of burlap around a tree with a string, and then draping it downward like a skirt. The caterpillars will hide there during the day, and you can then count and remove them.

Or, use barrier bands consisting of double-sided sticky materials such as Tanglefoot, petroleum jelly or grease to prevent larvae from crawling up the trunk. These materials should be applied on duct tape or tar paper to avoid contact with the bark. (Petroleum-based products can cause swelling and cankering on thin-barked trees.)

PESTICIDES FOR GYPSY MOTH CONTROL

Active ingredient	Representative trade names	Remarks
Bacillus thuringiensis	Dipel Thuricide	Registered for aerial and ground application. Available under a variety of trade names. Toxic to other moth and butterfly larvae. Can be used safely near water.
acephate	Orthene	Registered for aerial and ground application. Available under a variety of trade names. Toxic to bees and some gypsy moth parasites. Commonly used from the ground to treat individual trees.
carbaryl	Sevin	Registered for aerial and ground application. Available under a variety of trade names. Toxic to bees and gypsy moth parasites. At one time, the most widely used chemical in gypsy moth control programs.
diflubenzuron	Dimilin	A restricted-use pesticide that can be applied only by certified applicators.

Source: U.S. Forest Service

LANDSCAPE ORNAMENTALS
REACTION TO GYPSY MOTH INFESTATION

More preferred
alder
apple
aspen
basswood
river birch
boxelder
hawthorn
larch
mountain ash
oak
sweetgum
willow

Less preferred
arborvitae
ash
catalpa
E. red cedar
fir
grape
holly
honeylocust
horsechestnut
black locust
mulberry
spruce
sycamore
tuliptree

Intermediate
A. hornbeam
A. beech
black gum
buckeye
sweet birch
cherry
chestnut
cottonwood
cucumbertree
dogwood
elm
E. hophombeam
hickory
magnolia
maple
persimmon
pine
redbud
sassafrass
serviceberry
sourwood
walnut

Source: Ohio State University

Gypsy moth skirt trap (left) and milk carton trap will help monitor gypsy moth presence.

Natural enemies of the gypsy moth are parasitic and predatory insects such as wasps, flies, ground beetles and ants. Some spiders and certain birds such as chickadees, bluejays, nuthatches, towhees and robins will eat the moths, as will about 15 species of mammals like white-footed mice, shrews, chipmunks, squirrels and raccoons.

Some pesticides commonly used to control gypsy moths are *Bacillus thuringiensis*, acephate, carbaryl and diflubenzuron. Before using these products, however, check with your county extension agent, state entomologist, state forester or the U.S. Forest Service, Hertel advises.

—Jim Guyette

Positioning with customer service

by Rudd McGary, Ph.D.

■ Al Ries and Jack Trout were the people most responsible for using the concept of "positioning" in their book, "Positioning: The Battle for Your Mind."

The word means to take a place in the consumer's mind by differentiating your company from the rest.

Some examples of famous positions are "The Pepsi Generation" and "At Ford, Quality is Job One."

In the green industry, we must work just as hard to differentiate as do the large national corporations. We must first work to find ways to explain how we are different, and then be able to deliver what we have promised.

Some of the most popular positions in the green industry:

- The technically competent company: "We know how to make your grass grow" or "We have a licensed agronomist (or horticulturist or arborist) on staff."
- Low price: "No one does this for less," or "We'll meet or match any price you get."
- Local ownership: "We are your neighborhood store for green grass" or "Locally owned and operated."

What is 'positioning' and how do you use it to get more customers?

I would not recommend low price positioning; it tends to cut into profits and it's very hard to get rid of. But in some cases, local position works, most often in smaller towns and cities.

There is, however, one position that is a recurrent desire of consumers: customer service. The use of this as a position makes sense—but it isn't simply putting this on your trucks and going out to make your millions.

Certain common factors that consumers say they want that stress customer service:

1) Politeness—Both in person and on the phone, the customer wants to be treated like a human being. If your people who interact with the public are rude to them, you won't have a company very long. Almost no company has ever been accused of treating its customers too politely.

2) Problem resolution—If a customer has a problem and can get it resolved quickly, he or she will perceive the company as one which gives good customer service. This takes:

—a staff that can handle unhappy customers on the phone;

—people who are technically capable of responding to problems;

—people who can explain what the problem was to the consumer and what is being done about it; and

—follow-up to make sure the customer is satisfied.

3) Professionalism—Not only in technical matters, but also in the ways you administer the account: how your bills go out, how you collect, how you problem-solve, how you treat customers and how you look (from uniforms to stationery).

You might want to consider using another position in conjunction with customer service. The key is to understand the customer's needs and make sure your organization works on customer service every day.

Do that, and include it in your positioning, and you should prosper.

—The author is senior consultant for Strategic Consulting Group of Worthington, Ohio.

TECH CENTER

Endophytes: insurance against insects

Though insect-resistant endophytes are not confined to perennial ryegrass cultivars any more, none have been found in bluegrass—yet.

by Richard Hurley, Ph.D.

■ Genetically-improved turfgrasses containing endophytes help us as landscape managers to enhance the environment, reduce maintenance costs, and conserve and improve soil and water resources.

Here are some advantages to turfgrass containing endophytes:

1) Frequent, dramatic enhanced resistance to many insect pests that feed on plant leaves.

2) Improvements in stress tolerance.

3) Superior performance of some turfgrasses during moisture deficits.

During 1990, an estimated 13 million pounds of elite, endophyte-containing perennial ryegrass seed was used throughout the world.

Efforts are being made to find or develop and use desirable endophytes in Kentucky bluegrass, strong creeping red fescue, blue fescue and various bentgrasses.

The discovery of a relationship between an endophytic fungus, *Acremonium lolii*, and resistance to the Argentine stem weevil has led to perennial ryegrass, tall fescue, chewings fescue and hard fescue with endophyte-enhanced insect resistance and improved stress tolerance.

No researchers have reported any adverse effects of endophytes on turf performance.

Endophytes might be considered similar to insurance: of little value when conditions are favorable, but of substantial value when turf is under certain biological or environmental stresses.

Endophytes enhance resistance to many insects, including sod webworms, billbugs and chinch bugs. Modest, but often meaningful, white grub resistance is being studied in Kentucky and Rhode

Table 1

ENDOPHYTE LEVELS FOR PERENNIAL RYEGRASS

Variety	% ENDOPHYTE CONTENT IN SEED* Hi	Mod. Hi	Mod. Lo	Lo
Yorktown III	97			
Palmer II	97			
Gen-90	97			
Express	97			
Advent	97			
Seville	96			
Dandy	96			
Duet	93			
Manhattan II	93			
Prelude II	93			
Repell II	92			
Assure	92			
Pleasure	92			
Target	92			
Riviera	91			
Gettysburg	91			
Pennant	91			
Legacy	90			
4 Del. Dwarf	90			
Pinnacle	90			
Repell	89			
SR 4200	89			
Commander	88			
Regal	86			
Saturn	85			
Competitor		71		
Accolade		70		
Equal		68		
Calypso		66		
Citation II			59	
Stallion			58	
Caliente			54	
Premier			50	
Entrar			47	
Prestige			43	
Derby Supreme			38	
Lindsay			37	
Charger			34	
Envy			30	
Rodeo II			27	
Essence				20
Fiesta II				15
Cowboy II				12
Danilo				6
Ovation				5
Loretta				4
Allegro				1
Gator				1
Danaro				1
Pennfine				1

(Zero endophyte in other varieties)

** NOTE: This data from Rutgers University was obtained from seed lots submitted to the National Turfgrass Evaluation Program. Seed lots may contain lower percentages of seeds with viable endophytes because of loss of viability during seed storage.*

Source: Dr. Hurley

INSIDE

Island. In addition, reduced numbers of spiral nematodes and stubby root nematodes were found on tall fescue containing an endophyte.

David Huff of Rutgers University is studying the mechanism, genetic or endophytic, of resistance to dollar spot observed in a strong creeping red fescue plant. But with this possible exception, we are not aware of convincing examples of successful disease suppression by endophytes under field conditions.

Acremonium endophytes can produce superior performance of some turfgrass genotypes. Instances of better summer survival, enhanced fall recovery and reduced weed invasion were observed in high-endophyte perennial ryegrass, tall fescue, hard fescue and chewings fescue.

We have observed larger, more competitive tall fescue plants infected by an Acremonium endophyte.

Perennial ryegrass—Dramatic progress has occurred in genetically improving perennial ryegrass for turf. Useful endophytes are being incorporated into many new perennial ryegrass cultivars. An estimated 13 million pounds of turf-type perennial ryegrass seed containing a high percentage of endophyte were harvested in 1990.

Turfgrass managers desiring the benefits of endophyte-enhanced performance must carefully select this seed. Endophyte viability declines during seed storage, especially under hot, humid conditions. Seed harvested in June or July should maintain a high level of viable endophyte if harvested properly, stored under cool, dry conditions and used before or during the following spring.

Tall fescue—Most, but not all, seed lots and plantings of Kentucky 31 tall fescue have a high percentage of seed or plants infected with an endophyte.

Beginning with the release of Rebel tall fescue in 1980, there has been continued, dramatic genetic improvements in tall fescue for turf use. However, only a few of the newer cultivars have high percentages of plants containing endophytes.

The limited use of endophytes in turf-type tall fescues is due to:

1) the potential misuse of cultivars for pastures, where they have deleterious effects on livestock;

2) concerns about grazing seed fields and use of forage produced as a by-product in seed production; and

3) lack of identification of the most desirable endophytes for use in best enhancing turf performance.

Fine fescue—Recent research indicates that endophyte infection in hard and chewings fescue is associated with resistance to chinch bugs. Further studies with three species of aphids and fall armyworms have confirmed this association with insect resistance.

Resistance levels in endophyte-enhanced fine fescues are dramatic. Endophyte infection in strong creeping red fescue, hard fescue, chewings fescue and blue fescue are associated with significant difference in insect survival and preference. No greenbugs survive after 72 hours on endophyte-enhanced hard, blue and chewings fescues. No fall armyworms survive to pupation when feeding on hard and chewings fescue that contain endophytes.

Table 2

ENDOPHYTE LEVELS FOR FINE FESCUE

Variety	% ENDOPHYTE CONTENT IN SEED* Hi	Mod. Hi	Mod. Lo	Lo
Jamestown II	100			
Reliant	100			
Warwick	96			
Southport	94			
SR 5000	92			
SR 3000		64		
Rainbow		63		
Valda		47		
Bridgeport		26		

(Zero endophyte in other varieties)

Table 3

ENDOPHYTE LEVELS FOR TALL FESCUE

Variety	% ENDOPHYTE CONTENT IN SEED* Hi	Mod. Hi	Mod. Lo	Lo
Titan	98			
Shenandoah	86			
Mesa		70		
Tribute		58		
Aguara		50		
Arid			48	
Normark 99			42	
Rebel Jr.			37	
Trident				28
Rebel II				28
Winchester				24
Taurus				18
Apache				18
Finelawn I				16
Sundance				14
Thoroughbred				14
Murietta				14
Bonanza				12
Chieftain				6
Hubbard 87				4
Finelawn 5GL				2

(Zero endophyte in other varieties)

** NOTE: This data from Rutgers University was obtained from seed lots submitted to the National Turfgrass Evaluation Program. Seed lots may contain lower percentages of seeds with viable endophytes because of loss of viability during seed storage.*

Source: Dr. Hurley

Bentgrass—Bentgrass plants collected from old turfs of the Mid-Atlantic region of the U.S. appear to be relatively free from endophytes, based on recent work at Rutgers University. No evidence of endophytes was found in more than 500 bentgrass samples examined.

It is likely that endophyte-containing bentgrasses would be more abundant in Europe, where bentgrass strains originated. Endophyte viability can be lost rather quickly in seed, especially when stored under warm, humid conditions. Therefore, many introduced seed lots would be expected to lose endophyte viability prior to planting.

Kentucky bluegrass—At Rutgers University, we have examined more than 800 plants of Kentucky bluegrass collected primarily from old turfs of the eastern U.S. without finding an endophyte.

We are unaware of a successful inoculation of an Acremonium endophyte from other grass genera into Kentucky bluegrass. We are currently attempting to transfer an endophyte (*A. typhinum*) from big bluegrass (*P. ampla Merr.*) into Kentucky bluegrass by hybridization and inoculation.

Other grasses—Endophytes have been discovered in many other grasses

used for turf and soil protection. We examined more than 800 herbarium specimens in 93 grass genera: Agrostis, Bromus, Cinna, Elymus, Festuca, Lolium, Melica, Poa, Sitanion and Stripa. Many of these endophyte-containing species were native to the U.S., but much work is needed on the role of endophytes in these and many other grasses.

This article was developed by editing the following papers: "Importance of Acremonium Endophytes in Turfgrass Breeding and Management" by C.R. Funk and J.P. Breen of Rutgers University and R.H. White of Texas A&M University; "Endophyte Content of Cultivars and Selections in the 1990 National Perennial Ryegrass Test" by Suichang Sun, Nancy Januszka, Kelly Hollowood, Maribeth Wheeler, Carolyn Garvey and Jennifer M. Johnson-Cicalese, senior lab technician and lab assistant at Rutgers University and lab assistants and research associate at the University of Rhode Island.

TALL FESCUE SEED CONTAINING VIABLE ENDOPHYTE AS RELATED TO STORAGE ENVIRONMENT AND DURATION OF STORAGE

STORAGE ENVIRONMENT	TEMP. F°	MONTHS IN STORAGE 3	7	11	15	19	27
FREEZER	-4	100	100	100	100	90	90
REFRIGERATOR	43	100	90	85	90	95	90
SEED STORAGE RM.	50	90	100	80	75	45	25
ROOM TEMP.	70	95	55	0	0	0	0
SEED WAREHOUSE	70-95	95	60	0	0	0	0

M.C. JOHNSON 1984

—The author is director of research at Lofts Seed Inc. and an adjunct professor at Rutgers University.

Monitoring chlorine damage to plants

Even small emissions of chlorides can cause severe damage to plants near the leak, as observed in New York and Nevada.

by Dr. Robert Ll. Morris and Karen Lawson-Dyka, University of Nevada

■ Landscape managers should pay particular attention to any plant damage that may be caused by chlorine gas or hydrogen chloride. Such problems have been associated with the gases escaping from industrial sources during the manufacturing process or from accidental leaks.

(Chlorine and hydrogen chloride are used to produce pesticides and synthetic materials such as plastics and disinfectants. Emissions of chlorine have occurred around potash works, from pickling baths of hot-dip galvanizing plants, and in the combustion of PVC-containing wastes. Accidental emissions have occurred near swimming pools, sanitation plants and factories.)

Twice in Yonkers, N.Y., emissions have damaged 30 species of plants, including tree-of-heaven, apple, cherry, maple, basswood, dogwood, elm, ash, sweetgum, hemlock, oak and white pine. A more recent accident occurred in southern Nevada (see related story).

Chlorides have a herbicide-like effect on plants. Even small emissions can cause severe damage to plants near the leak. Plant damage is generally measured at about 4-1/2 feet above the ground, or at the upper limit of vegetation.

Table 1

TYPES OF DAMAGE FROM CHLORINE

Broadleaf plants

leaf and flower drop
bronzing
chlorosis
marginal and interveinal necrosis
mottling and chlorotic flecking
bleached tissue
orange-brown necrosis
dieback
stem and leaf wilting
blazing on leaf underside (not noted in Nevada, but reported in literature)

Conifers

needle tip burn
candle distortion (not in literature, but found in multiple Nevada locations)
reddish-brown necrosis
dieback

Grasses (and other monocots)

leaf tip burn
marginal leaf burn
chlorosis
twisted blades (not in literature, but found in multiple Nevada locations)

Source: The authors

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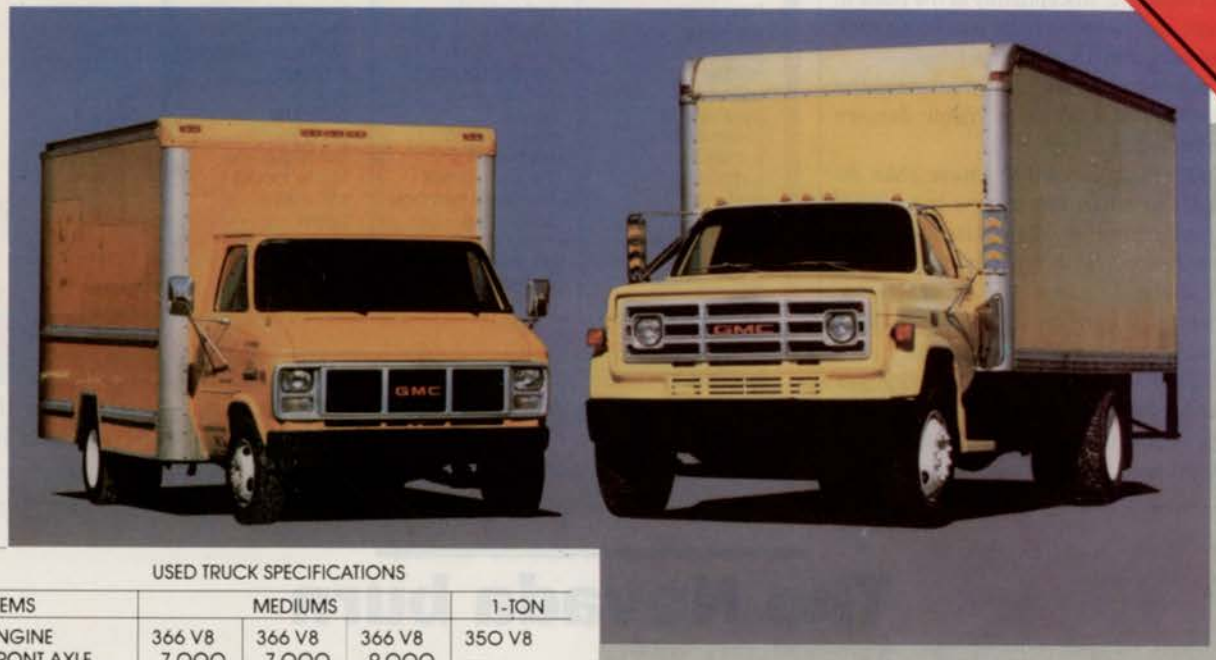

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REAR AXLE	17,000	17,000	18,500	7,500
TRANSMISSION	5-SPEED	5-SPEED	5-SPEED	AUTOMATIC
BODY	18' FRP	22' FRP	24' FRP	14' FRP
STEERING	POWER	POWER	POWER	POWER
FUEL TANK	50 GAL.	50 GAL.	50 GAL.	33 GAL.
DOORS	ROLL-UP	ROLL-UP	ROLL-UP	ROLL-UP
TIRES	10-22.5	10-22.5	11R-22.5	8.75 R16-5
WHEELS	DISC	DISC	DISC	DISC

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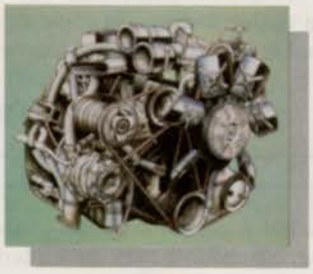

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Plant damage can be divided into four non-lethal categories:

(1) rapid leaf drop; **(2)** tissue chlorosis or discoloration; **(3)** tissue distortion and tip burn; and **(4)** marginal and interveinal necrosis.

The degree of plant damage depends on the amount of chlorine in the air, its duration of exposure, susceptibility of the plant to damage, and environmental conditions such as moisture content and temperature.

Lower concentrations of chlorine in the atmosphere will do more visible damage when humidity is high.

Under high humidity (more than 80 percent) or when fog or dew is present, chlorine combines with water vapor to form a hydrochloric acid aerosol mist on plant surfaces. Under these conditions, droplets may form on leaf surfaces, causing necrotic spots or burns to form.

Under low humidity, the chlorine gas forms an anhydrous hydrogen chloride which may cause less visual damage but has been speculated to cause more severe damage because of the dehydrating action on exposed tissue.

Acute damage happens so rapidly that chlorine is not assimilated by the plant and cannot be detected easily in tissue samples.

Table 2

SEVERITY OF DAMAGE TO PLANTS IN SOUTHERN NEVADA

NONE	SLIGHT	MODERATE	SEVERE
asparagus fern	Algerian ivy	agave dianthus	apricot
barrel cactus	ash	heavenly bamboo	bird of paradise
cholla cactus	canna	honeysuckle	chinaberry
dusty miller	bush morn. glory	stone pine	Chinese/Sib. elm
euonymus	English ivy	Jap. black pine	lilac
hesperaloe	fortnight lily	lavender	marigolds
ice plant	photinia	magnolia	nectarine
juniper	iris	Mexican primrose	olive
myrtle	pampasgrass	mulberry	peach
palms	pittosporum	mums	plum
pyracantha	salvia	oleander	poplars
rosemary	snapdragon	pansy	rose
santolina	verbena	pomegranate	
turfgrasses	Italian cypress	Idaho locust	
wisteria	heavenly bamboo	silk tree	
yucca	arborvitae	privet	
Texas ranger	almond		
athel	chrysanthemum		
star jasmine	Indian hawthorn		

Source: The authors

The Nevada burn

■ Early in the morning of May 6, 1991, a large blue-green cloud was released from a broken two-inch line that led to a 150-ton storage tank of liquid chlorine. An industrial plant in southern Nevada accidentally released 60 tons of chlorine that rapidly vaporized and caused the evacuation of 10,000 residents in a 20-square mile area. Nine people were hospitalized. In the affected area, landscape plants bathed in an unknown concentration of chlorine gas for several hours.

A team of commercial horticulture volunteers surveyed landscape plant damage in a neighborhood within 1/2 mile of the chlorine leak one week after the accident. Recorded plant damage is shown in Table 1. Table 2 lists the plants that were found to have probable chlorine emission damage.

Within 24 hours after emission, partial to total leaf drop occurred on elm, cottonwood, chinaberry, all stone fruits, some pome fruits, rose, olive, mulberry, pomegranate, Texas privet and Indian hawthorne.

Flowers were not affected and were more tolerant of exposure to chlorine with one exception: leaf and flower drop on Indian hawthorne. Chlorosis and necrosis occurred three to five days after emission. New growth began to cover damaged tissue, and refoliation occurrred in seven to 10 days.

All pines suffered some sort of damage, ranging from twisting and dieback of new growth (candles) to needle tip burn and needle drop.

Turfgrasses (tall fescue, bluegrass and bermuda) all tolerated the exposure with no visible damage. In some cases, chlorine damage was difficult to separate from previous winter damage.

—Dr. Morris, Ms. Lawson-Dyka

Treat now for pythium rots

This is the time of year to make sure pythium rots don't take away valuable turf areas.

■ Although this disease is most frequently associated with established bentgrass/annual bluegrass putting greens, it can also be a serious problem on highly managed home lawns and newly-seeded areas. It is particularly severe on ryegrasses, bentgrasses and bluegrasses.

To minimize turfgrass losses from pythium root rot (PRR), Dr.Eric Nelson of Cornell University says, manage to reduce plant stress or eliminate prolonged wet periods.

Early symptoms of PRR may be visible in the early spring immediately after snow melts, but are most common in the late spring. Symptoms may be evident any time during the growing season, and may continue into late autumn.

Symptoms:

- small diffuse yellow or reddish brown patches about two to three inches in diameter, often resembling early stages of pink snow mold;
- plants slow to come out of winter dormancy;
- less vigorous growth;