
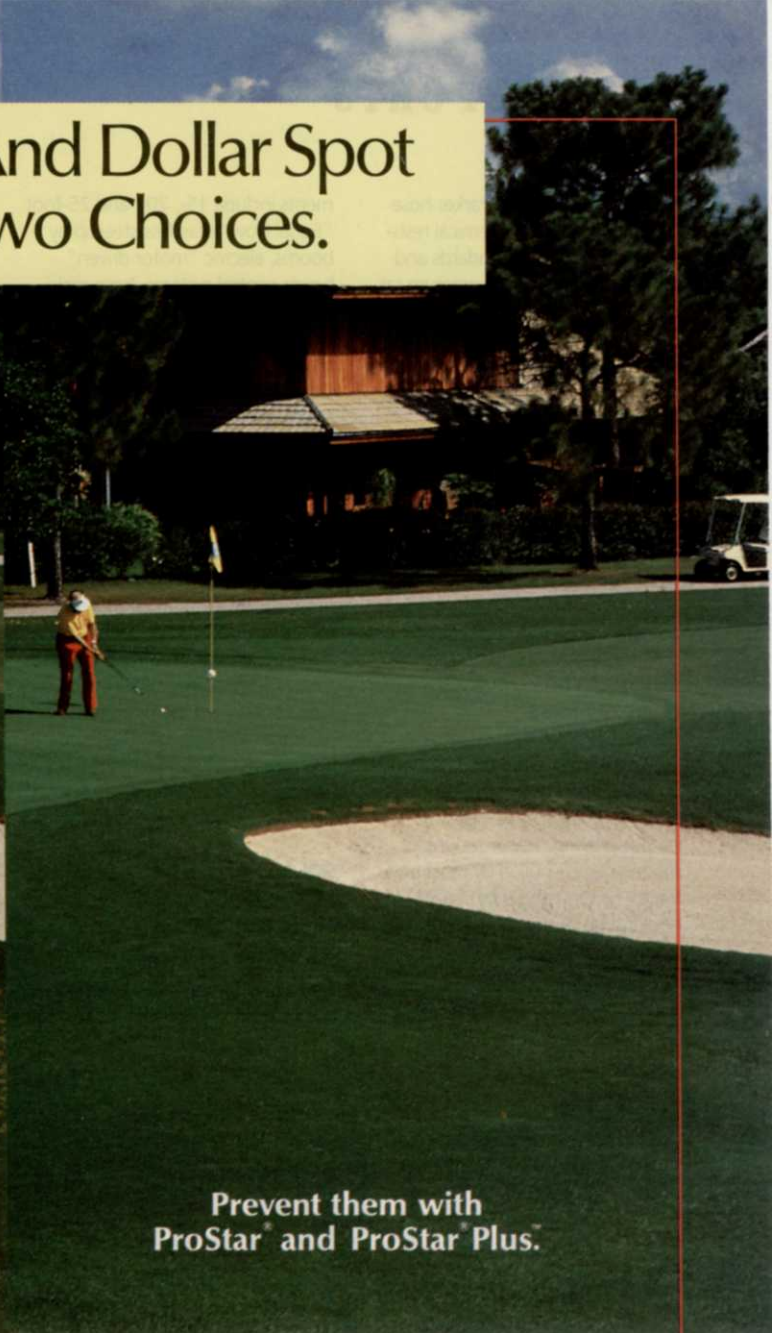



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tion for working with Parker hose products, including chemical resistance information, standards and specifications for hose, pressure rating tables and charts, metric conversion information, hose installation tips, a safety guide and more.

RAVEN IND.
(605) 336-2750
Circle No. 293

The company manufactures sprayer flow control systems, chemical injection systems and an automatic liquid/dry control system for agriculture, turf and roadside applications.

SDI/SPRAYING DEVICES
(209) 734-5555
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Vehicle-mounted models can be quickly pinned onto Jacobsen, Toro and Cushman Turf Vehicles for dedicated spraying. Trailer-mounted models can be pulled by most any tractor or turf vehicle by simply hooking up to the sprayer drawbar when ready to spray. Other attach-

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SHINDAIWA
(503) 692-3070
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The SP415 sprayer features a high-efficiency piston pump with built-in agitator to minimize operator effort. Viton seals are chemical resistant. An in-tank pump system means a reduced chance of leaks during operation. The flat bottom tank resists tipping, and a concave tank contour fits the operator's back for maximum comfort. Standard equipment includes four nozzles, field service kit and tools for normal periodic maintenance requirements.

SOLO
(804) 225-4228
Circle No. 296

Sprayers feature ergonomically-

designed pump and carrying handle, comfortable backpack carrying frames and large openings for easy filling. Complete emptying and cleaning of the pressure sprayers is easy. The sprayers are equipped with easy moving pumps with large cylinder capacity for extended but comfortable operation. Lightweight shut-off valves and rugged spray tubes fit nicely in the operator's hand.

SP SYSTEMS
(310) 449-1492
Circle No. 297

The SP0 four-gallon Knapsack Sprayer comes equipped with a new, patented triple function pump. The pump—with piston/diaphragm agitation—offers incredible spraying pressure, safety from leaks and the ability to agitate wettable powders all at the same time. The unit is easy to use, simple to maintain.

SPECTRUM ELECTRO-STATIC SPRAYERS
(210) 822-8479
Circle No. 298

The Spectrum 3010 Electrostatic Spray Head converts motorized backpack mistblowers to electrostatic operation. According to the company, advantages are significant increase in spray deposition, uniform coverage on both the top and undersides of leaves, and reduced chemical requirements, worker exposure, drift and run-off.

SPRAYING SYSTEMS
(708) 665-5000
Circle No. 299

The makers of TeeJet products supply a wide variety of spray tips, nozzle bodies, pressure regulating valves, spray guns and sprayer control, calibration and adjustment accessories. Regional offices are located across the U.S.

TUFLEX
(800) 327-9005; (305) 785-6402 in Florida
Circle No. 306

Tuflex makes handcrafted fiberglass tanks for the lawn care and pest control industries. Truck-mounted spray systems range in capacities from 300 to 2000 gallons. Trailer units include a 30-gallon en-

closed system, a 100-gallon nursery sprayer and a 400-gallon two-compartment system. The Injecto-Matic chemical injector system is a 600-gallon seamless fiberglass tank with dual reels for turf, trees and shrubs; tip-n-pour containment; tool racks; handwash port; dry product storage; an external tank fill port and other features. Tank mix systems with auxiliary pumps and engine are also available.

WESTHEFFER
(800) 362-3110
Circle No. 307

This distributor offers parts and repair kits for "just about everything" related to spray systems. A BF 12-volt sprayer unit is a compact,



The SP0 from SP Systems has a triple function pump.

quiet and cost-effective herbicide and pesticide sprayer. A 200-gallon poly tank has a D30 Diaphragm Pump, Honda 5.5 engine, Hannay electric reel, 300-foot, half-inch 600 psi hose and ChemLawn spray gun. Other units available.

WYLIE
(800) 722-4001
Circle No. 308

The Wylie Road-way Spray System is an affordable solution to right-of-way weed control for roadways and waterways. Designed to adapt to most any flatbed vehicle, with a one-ton capacity, the 500-gallon unit is durable dependable and simple to operate. The SK-110 Sprayer is assembled with a 5 hp Briggs & Stratton engine and comes with a high-pressure spray hose.

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Circle 109

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Make the most of shop space

by ABBY McNEAL / Pleasant View Fields

Whatever sort of turf facility you maintain, you need a place for the equipment. Too often, the group that plans the athletic facility, golf course or commercial site forgets to provide

ample room for equipment storage and maintenance.

A more efficient and economical approach would be to determine:

1) What equipment do we need to keep this facility in top condition?

2) How much space is needed to store it properly?

For crews that work out of shops with limited space, however, the motto must be, "make the most of what you have."

Storage, transport tips

Pleasant View Fields is a seven-field soccer complex, in its first full year of play. Two fields are to be built at a later date. The city of Boulder, Colo., has three athletic turf departments: parks, recreation and a golf course. Initially, the three departments had no on-site equipment storage. Everything was transported on an 18-foot trailer from the golf course, which is four miles away.

We now have a 25x25-foot rock-base storage area surrounded by a wire fence and locked gate. There is limited covered storage in one section of the restroom building. We've also acquired a 28-foot trailer which we use to haul two large mowers—or one mower and one other large piece of equipment—in one trip.

The paint machine, walk-behind mower, shovels and other assorted small tools are kept in the covered storage. The paint machine is kept there because it's used most often, and has to be kept in a dust-free

area. The smaller tools are kept there to prevent theft.

The complex has two Toro 325D tractors with 72-inch recycling-deck Groundsmaster mowers, a Ransomes 72-inch mower and a Toro 216 Reelmaster Triplex mower. We also



have a large topdresser and tractor, a small seeder and aerifier and a utility cart.

Assigned equipment space needs to be allocated to avoid shuffling equipment. Mowers earn more or less permanent spots based on frequency of use. The mower that is used three times per week is easier to get to than the mower used once a week or for special field grooming before a game. Equipment that's needed for the next day's maintenance chores is moved to the front, while the current

◀ **Mowers: have them cleaned and stored right every night.**

day's equipment is put into overnight storage.

A tarping system is being developed to protect equipment from the weather during our active months.

Share the space

Some equipment is shared with the golf course and parks department, so we take advantage of their covered storage space whenever possible. For example, if the golf course crew needs the topdresser, it is left there until needed at the complex. During winter, covered storage is available at the golf course.

► Keep entrances to garage area clean and clear.

As the person responsible for equipment maintenance, I am in charge of blade sharpening. With no assigned work space, the blades must be changed in the parking lot or on the small, paved area behind the restroom building. The golf course technician allows me to use one of the service bays there when necessary. This does have advantages. I call him my "on-site mentor," thanks to his expertise and years of experience.



The disadvantage is getting the equipment there and back, and planning for my own off-site time. Generally, I'll take the unit to the course at the end of the day and start there the next morning.

Besides the good communication and cooperative relationship between our complex and the golf course, we both have good working relationships with our equipment distributors. This allows me to call on either of them if we experience a major equipment breakdown.

Equipment out of sight

The security of our outside storage is helped by limited visibility from the main road. The fenced area is located off a side street that is used mostly by those coming to the soccer complex. Though relatively close to the parking lot, it's par-

tially hidden from view on one side by a wooden shed used by the soccer associations.

The fenced area is about 1500 feet from a day-care school which has frequent outdoor activity at various times during the day.

I'd like a small maintenance building, if the budget permits, even if it's only a three-sided barn. At least, I'd like a covered area for equipment storage, a wash bay, and a covered area for materials storage. With a little higher budget, I'd move up to a totally enclosed building for better protection and add working space for routine maintenance procedures. **LM**

—The author is turfgrass manager for Pleasant View Fields, Boulder, Colo.



The storage/maintenance shop at Collier's Reserve golf course, Naples, Fla. is a model of what every facility should be—or at least come close to—in terms of order and cleanliness.

A place for everything...

A neat, organized shop shows professionalism, and will help to instill confidence in others that you can do the job as an equipment manager, says Fred Peck, equipment manager at Fox Hollow at Lake-wood (Colo.) Golf Course and director of the Rocky Mountain Golf Course Equipment Managers Association.

Peck advocates regular shop cleaning.

"Establish daily, weekly, monthly and annual cleaning schedules," says Peck, "and your shop will become a place you can be proud of, not a place to be avoided.

"Ongoing repair projects should be neat and organized," which will eliminate lost parts and lost time, says Peck.

Peck has learned that people who use equipment take better

care of equipment that clearly shows a history of proper use and care. Ask your crews to rate equipment on ease of use and how well it does the job it is intended to do.

And *do not*, insists Peck, let crew persons have a "favorite" mower that they all prefer to ride. This causes one piece of equipment to be over-used, which leads to uneven wear within the fleet.

The equipment manager needs a designated work station and office, with all manuals in one place and file cabinets for paperwork. Use equipment logs to hold all information about equipment: make, model, manuals, what you paid for it, and all maintenance receipts.

Take pride in calling yourself an equipment manager, says Peck.

"What better term for someone in charge of \$350,000 worth of equipment, who sets up training, cleaning and record-keeping methods?"

—Terry McIver

Don't get sued

FOR WHAT A WORKER DOES

by PHILLIP M. PERRY

The six bucks it costs to psychologically test an applicant could save you mega-bucks down the road. 'Better safe than sorry,' as they say.

Suppose one of your employees drives a fellow worker home after drinking alcohol in the parking lot, and injures his passenger in a car wreck.

Or he gets mad and slugs a customer or golfer.

Or burglarizes a home during his

lunch hour.

In any of those cases, are you and your business liable for damages?

Too often, the answer is yes! Even if an employee's criminal act is outside the workplace, you may be liable for damages.

Why? Two new business-eating beasts have been born in the field of employment law: "negligent hiring" and "negligent supervision."

The former charge claims that you failed to perform diligent background checks when you hired an employee. The latter claims that you failed to investigate allegations that an employee was performing acts that would indicate a tendency to harm others in the future.

"This whole area has taken on more urgency for employers," says Richard J. Reibstein, a partner with McDermott, Will & Emery in New York City.

"Over the past five years, plaintiff's attorneys have become

more familiar with the doctrine of negligent hiring and retention. The doctrine is now being applied with full vigor."

You are at a disadvantage in defending yourself, since most of these suits—if pursued to the bitter end in the court system—end up as jury trials. And most jury members are employees rather than employers. They often identify with a victim and look upon a company as a "deep pockets" source of cash to right a wrong.

Forget insurance, too. You can insure against negligence, say brokers, but not against willful misconduct. "In all general liability policies, there are exclusions for willful acts of employees," says Deane K. Felter of Arthur A. Watson & Co. business insurance of Wethersfield, Conn.

A way out

Yet there are steps you can take to protect yourself and your organization from such suits:

1) Do background checks for each job applicant, and write down the steps you take.

"You must consider every hiring decision as if it represented potential litigation," says Reibstein. "When you are dealing with a position where you have reason to believe the individual you are hiring may come into contact with the public, with clientele, or with co-workers, do a full background check—even for a temporary worker."

Ask why each period of former employment ended. Ask about

Sources for integrity tests

McGraw-Hill London House

9701 West Higgins Rd.
Rosemont, IL 60018
(708) 292-1900

Reid Psychological Systems

200 S. Michigan Ave.
Chicago, IL 60604

Pinkerton Services Group

6100 Fairview Rd. #900
Charlotte, NC 28210
(800) 528-5745

any problems with drugs, alcoholism or violent behavior. Remember that it is the act of asking for such information from applicants and their former employers that provides your defense against a negligent hiring charge. Write down all of the questions you asked, even if you got no helpful answers.

2) Have each applicant take a written integrity test.

Tests can be selected in many areas critical to personnel management, such as integrity, drug use, and attitudes toward theft. Price per test typically ranges from \$5.75 to \$17.50, depending on quantity ordered and depth of testing desired.

"Model Guidelines for Pre-Employment Integrity Testing" is available for \$10 from the Association of Test Publishers, 655 15th St. NW, Suite 320, Washington, DC 20005; phone (202) 857-8444.

You do need to make sure that such tests do not conflict with any of your state discrimination laws, or invade employee

privacy. Run it by your attorney first.

Take the test results seriously. In one example, an applicant had been given the tests, and it predicted violence and emotional instability. The applicant was hired, anyway. The fact that a test was given increased the employer's liability when the person committed an act of violence.

3) Perform criminal background checks where appropriate.

In one recent Florida case, an employer was found guilty of negligent hiring when an employee broke into a nearby home. The employer had failed to discover that the applicant had been previously convicted of breaking, entering and assault with intent to kill.

Criminal background checks are usually time-consuming, and a new employee may commit a crime long before the results of the check land on your desk. The fact you requested such a check provides evidence of conscientious hiring procedures, even if it

turns up no information.

4) Respond appropriately to allegations of wrongdoing or suspicious behavior by the employee.

Investigate to the fullest extent possible and document what you do. If, later on, the employee commits an act for which you are sued, you have the written evidence that you were supervising correctly. You can show that you operated in a reasonably prudent fashion, which is a significant defense.

5) Test for drug use.

"Drug testing is being done by more and more of the larger employers," says Peter A. Susser of Littler, Mendelson, Fastiff, Tichey & Mathiason of Washington, D.C. "The courts have, in most instances, upheld their use. But state laws vary widely and can restrict their use, so you need to check with your attorney." **LM**

—The author is a freelance business writer based in New York City.

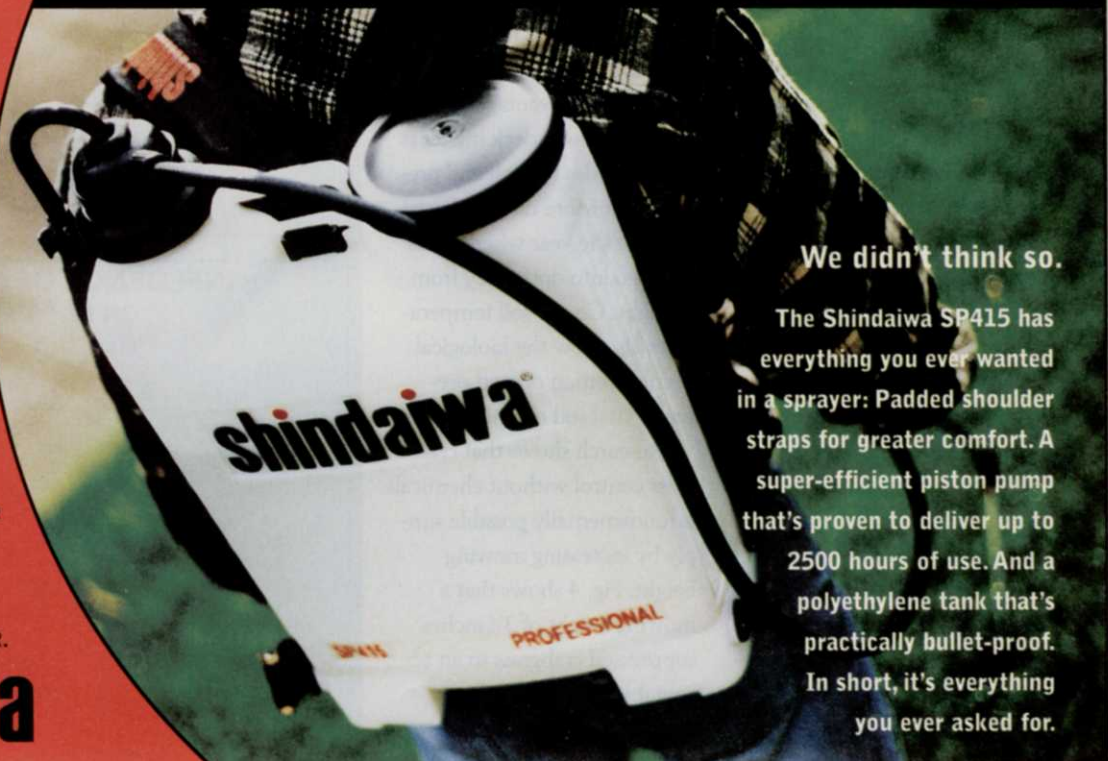
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Circle 120

The right HEIGHT

Fertilizer, pesticide, seed and other treatments will accomplish little if lawns are not mowed at a height that is healthy for the grass plant.

by PAUL SACHS

Low mowing heights weaken turfgrass. More surface area on the leaves of the plant mean more photosynthetic production of nutrients for the roots. More extensive roots mean better access to water and nutrients.

And that results in a healthier and heartier plant.

Fig. 1 shows that for each eighth of an inch the mower is raised, the amount of leaf surface exposed to the sun increases by 30 percent. When a mower is raised from $\frac{3}{8}$ inch to 3 inches, the leaf surface area is increased by more than 10,000 percent.

Turf root systems are generally annual. They die off every year and new roots grow the next spring from the plant's crown. Old roots contribute and distribute organic matter to the soil. This organic material improves the turf's water and nutrient retention, lowers soil density, and significantly increases beneficial biological activity.

Container experiments at the University of Maryland show a significant increase in organic matter produced from root growth (see Fig. 2) when the mowing height is raised. What is even more impressive is the increase in rhizome development (see Fig. 3): more than 1000 percent when the mowing height is raised from $1\frac{1}{8}$ to $2\frac{1}{2}$ inches.

Another advantage of setting the mower deck higher is that it shades the soil and preserves moisture during crucial times of the year when lawns often go into dormancy from drought. Cooler soil temperatures also slow the biological decomposition of, and preserve, vital soil organic matter.

Research shows that crabgrass control without chemicals is fundamentally possible simply by increasing mowing height. Fig. 4 shows that a mowing height of $3\frac{1}{2}$ inches suppressed crabgrass to an acceptable level—actually, as well as any of the herbicides.

The one-third rule

Removing more than one third of the top growth can cause turf to stop growing for up to 28 days. If too much leaf surface is removed, photosynthesis is diminished to the point where the plant must use nutrient reserves. When new top-growth exposes itself to the sun, photosynthesis will begin to produce nutrients for the roots again, but will first have to replenish the reserves used when the leaves were too short. The energy needed for normal functions plus the restocking of reserves can stop root growth for almost a month.

Root growth is relative to how a plant fares through many different types of stresses such as heat, cold and drought. Root production of organic matter in the soil is a long-term asset that can benefit many future generations of turf plants. Loss of root growth during crucial times of the season can make the difference between a lawn with problems and one without problems, in both the short and long term.

Wrong!

For years, the classic response to questions about lawn clippings has been that they

cont. on page 30

INFLUENCE OF MOWING HEIGHT ON PHOTOSYNTHESIS BY TURFGRASSES

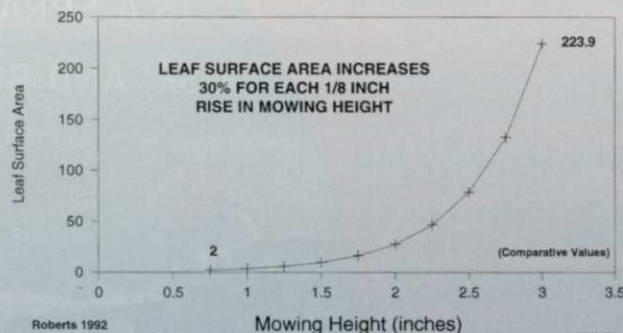


FIG. 1

INFLUENCE OF MOWING HEIGHT ON ROOT PRODUCTION (KENTUCKY BLUEGRASS)

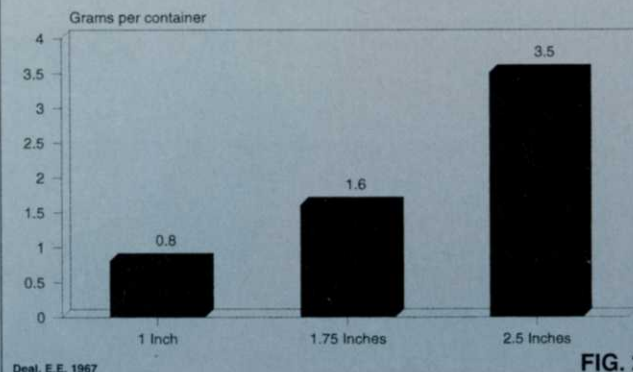


FIG. 2

You can't buy a more productive plow.



Rugged, reliable and versatile, the **Ditch Witch® 410sx** brings a powerful new meaning to the word production.

The 40-hp-class 410sx is loaded with fully-integrated features that make it the most productive articulated-steer vibratory drop plow on the market today. Four-wheel drive and an oscillating rear axle give it all-terrain access. Its unique plow linkage and improved unitrrolley design assure maximum breakout force. And its optional trenching attachment is designed for full-production digging.

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Circle No. 107 on Reader Inquiry Card

cont. from page 28

must be removed because they can cause thatch, turf diseases and an unsightly appearance. Research tells us that this advice is wrong. In fact, clippings contain 58 percent of the nitrogen that we apply to our lawns. Removing them is equivalent to sweeping up most of the fertilizer that you have just applied. Leaving the clipping adds about 2 lbs. N/1000/sq. ft./year.

According to research, returned lawn clippings have other benefits:

- crabgrass suppression,
- increased earthworm populations,
- improved water infiltration into the soil,
- improved turfgrass color,
- disease suppression,
- thatch reduction, and
- acting as a temporary mulch to preserve soil moisture.

Mowing without the bag will produce a quality lawn if it is done at proper intervals. Infrequent or inconsistent mowing can produce clumps of clippings that can block necessary sunlight from grass plants.

The new mulching mowers are designed to chop clippings into smaller particles, shortening the time it takes for them to decompose. They do not work well, however, if you're not mowing often enough. These machines also consume more energy than conventional mowers. Many experts in the field say that the clippings from conventional mowers disappear quickly enough without using a mulching mower.

The nutrients and organic matter contained in grass clippings should be replaced to

compensate for the loss generated by mowing. If practical, annual topdressing of compost should be applied to lawns where clippings are removed.

'Cold' composting

Clipping disposal can become a problem, especially in municipalities where they are not allowed in landfills. Composting is a good idea if you've got the time and carbon-based materials needed to do it right.

An alternative to standard composting is "cold" composting. A golf course superintendent in Maine discovered that clippings could be effectively recycled into compost by tilling them into the soil. He chose one site where all the clippings from the entire course are incorporated into the soil. There were no odors, and the vastly improved soil could be used in numerous applications around the course.

Mowing frequency

Mowing frequency should depend on the growth of the plants, but is often based on a service contract, or when the opportunity presents itself, such as whatever day of the week you service a particular neighborhood.

During rapid growth periods—after fertilization or heavy rain—grass should be mowed more often, so that no more than one third of the plant is removed at one time. This may only amount to one or two extra cuttings per year.

Mowing techniques have more to do with producing a quality lawn than all other treatments combined.

A tremendous amount of

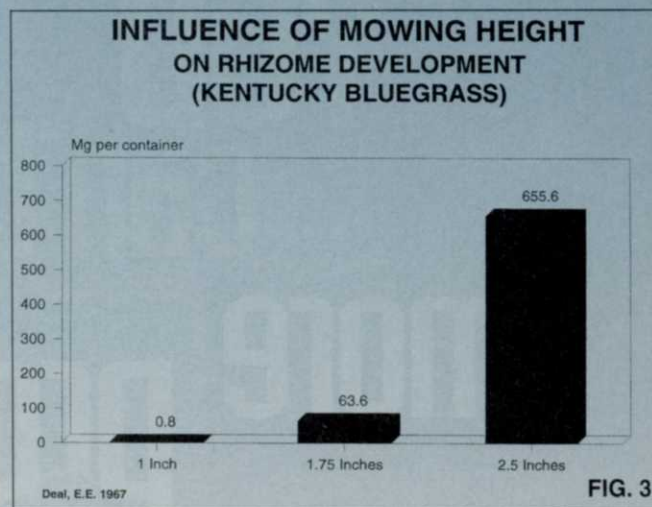


FIG. 3

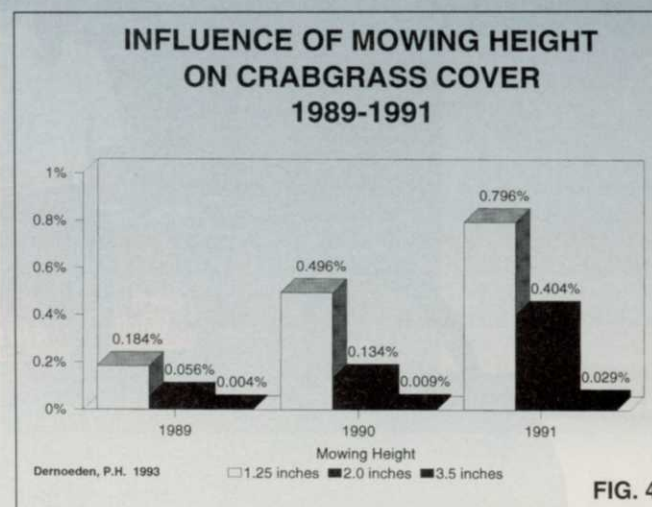


FIG. 4

damage and stress can be caused by improper mowing. Most lawns, especially residential lawns, do not serve a specific purpose such as sport recreation. The need is usually only an aesthetic one that includes uniform color and height. There is rarely a good reason for mowing a lawn short or for removing the clippings.

Lawns mowed at or near maximum mower height during the hottest part of the year can often weather the summer months without going into dormancy, or at least have a much shorter dormant period. Clippings returned to the lawn are rarely noticed and literally dis-

appear in a day or two. The benefits that are eliminated when the clippings are removed can be more easily noticed. Finally, the sharpness of the mower's blade can make a big difference between a lawn with problems and one without. **LM**

—The author is founder of North Country Organics, a Bradford, Vermont-based supplier of natural fertilizers and soil amendments for commercial use. This article is excerpted from his second and latest book, "Handbook of Successful Ecological Lawn Care," published by Edaphic Press, P.O. Box 107, Newbury, VT 05051; (802) 222-4277.