

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

than you get with insecticide alone.

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

Once your hate for insects ironment.

gallons of water and sprinkling it on a four-foot area of turf. If eggs have hatched, this soapy mixture will flush insects to the surface, and you can apply insecticide

Now, we realize you probably have some questions. That's why we created The Turf Manager's Guide To Responsible Pest Management.

It's 44 pages packed with comprehensive information on the latest techniques for controlling insects, weeds and

turf diseases. For a free copy return the coupon, or call our toll-free telephone number. Because when you apply a little knowledge, you don't need to apply as much insecticide.



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University studies show that Pageant DF* insecticide (which contains the same active ingredient as Dursban) provides excellent mole cricket control. Apply two weeks after egg hatch and irrigate turf 24 hours before and after application. This moves mole crickets near the soil surface and



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Mole Cricket

accordingly.

Your insecticide itself 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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- Cool Season, Warm Season, Nursery and Landscape.

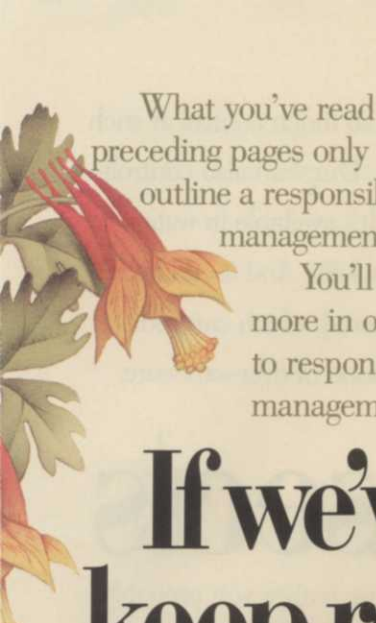
Mail To: DowElanco, P.O. Box 3064, Cedar Rapids, IA 52406. Or call: 1-800-729-3693 ext. 2492.

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The chemistry is right.™

Dursban is available in liquid, dry flowable, granular and fertilizer formulations. *Trademark of DowElanco.
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What you've read on the preceding pages only begins to outline a responsible pest management program.


You'll find a lot more in our guides to responsible pest management (see

coupon on previous page), and in the literature listed below.

If you have questions on our products, call one of our technical specialists at 1-800-352-6776. We'll be happy to help you out.



Because at DowElanco, we believe that when it comes to responsible pest management, knowledge is your most powerful tool.

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The chemistry is right.™

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If we've piqued your interest, keep reading.

The literature below is some of the best information you can get on responsible pest management. Check your state university or write the publisher to find out where it's available.

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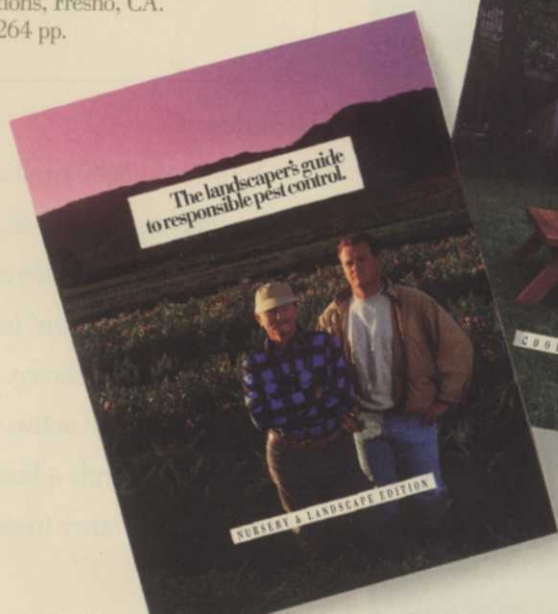
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Price, R.P. 1986. Nursery and Landscape Weed Control Manual. Thomson Publications, Fresno, CA. 264 pp.



COVER STORY

Early-season turf fertilization concepts

Some turf managers have found that they can substantially reduce annual N rates by using iron, without sacrificing turf quality.

Judicious, well-timed spring fertilization can aid in disease and weed prevention and enhance overall turf quality.

by Tony Koski, Ph.D.,
Colorado State University

■ Late-season fertilization is commonplace in most cool-season turfgrass fertilization programs, and even with warm-season species in the transition zone and southern regions. However, quality turf cannot be sustained without some kind of early-season fertilization.

Certainly, applying too much N in spring causes more mowings and increases the likelihood of turf diseases. Concerns about the potential for water contamination via runoff and leaching force us to more closely consider N sources, application rates, and in which situations we should—or should not—be using that fertilizer.

Stimulate color, not growth—This is a good rule-of-thumb for the average turf that is not subjected to intensive wear. On a heavily used soccer field, however, N

TABLE 1

TURFGRASS N REQUIREMENTS

(lbs. N/1000 sq. ft.)

	Desired quality and management level	
	Lower	Higher
Cool-season species		
Bentgrass	1-3*	3-8
Fine fescues	0.5-2	2-4
Common Kentucky bluegrass	1-2	2-4
Improved Kentucky bluegrass	1.5-3	3-6
Perennial ryegrass	2-4	4-6
Tall fescue	1-2	3-5
Wheatgrass	0-2	2-4
Warm-season species		
Bahlagrass	0-1	2-4
Bermudagrass	1-4	3-8
Buffalograss/blue grama	0-1	2-3
Carpetgrass	1.5-3	4-6
Centipedegrass	0-1	2-4
St. Augustinegrass	2-4	5-7
Zoysiagrass	2-4	5-7

* Lower rates for shorter growing seasons and/or on heavy soils. Higher rates used where growing season is longer; soils are sandy; precipitation rates are high; clippings are routinely removed.

Source: Dr. Koski

must be applied more frequently to stimulate the growth that promotes better wear tolerance and speeds recovery from intense foot traffic. Common sense must be used in determining frequency and amount of fertilizer to apply. The proper amount will vary with species, desired quality level, and what the turf is used for. (Annual N requirements for cool- and warm-season lawns, Table 1.)

Some turf managers rely on residual activity of fertilizer sources to carry them from one application to the next. In Table 2, note that those fertilizers which promote rapid greening possess short residual activity, and that the potential for fertilizer burn is higher with these quickly-available sources. On the other hand, the quickly-available N sources are less affected by temperature and are less expensive per pound of N. Slowly-available N fertilizers provide more even feeding and longer residual activity than fertilizers like urea or ammonium sulfate. However, some

TABLE 2
INFLUENCE OF NITROGEN FERTILIZATION ON DISEASE INCIDENCE

Severity increases with under-fertilization	Severity increases with over-fertilization
Cool-season turfgrass diseases	
Anthracnose	Brown patch
Dollar spot	Leaf spot
Red thread	Melting out
Rust	Pythium blight
	Pythium blight
Warm-season turfgrass diseases	
Anthracnose	Brown patch
Cercospora leaf spot	Gray leaf spot
Dollar spot	Leaf spot
Rust	Melting out
	Pythium blight
	Spring dead spot

Source: Dr. Koski

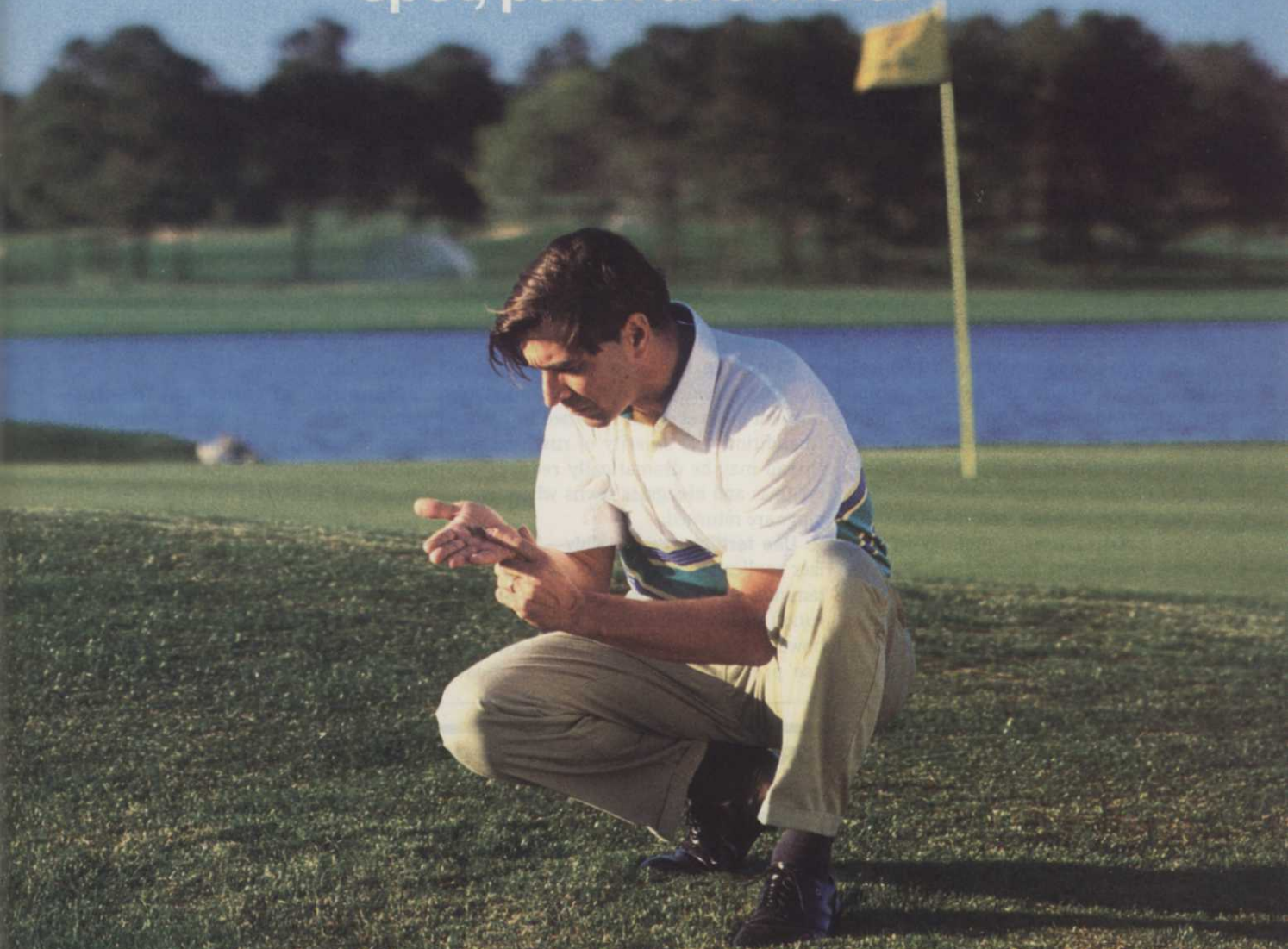
TABLE 3
CHARACTERISTICS OF NITROGEN FERTILIZERS

Fertilizer name	Analysis	Source of N	Moisture dependence	Low temperature response	Residual N activity	Salt index (per N unit)	Leaching potential
Quickly-available N fertilizers							
Ammonium nitrate	33-0-0	ammonium nitrate	minimum	rapid	4-6 weeks	3.2	high
Ammonium sulfate	21-0-0	ammonium sulfate	minimum	rapid	4-6 weeks	3.3	high
Ammonium phosphate	18-46-0	diammonium phosphate	minimum	rapid	4-6 weeks	1.6	high
Urea	46-0-0	urea	minimum	rapid	4-6 weeks	1.6	moderate
Slowly-available N fertilizers							
Slow-release sources							
Sulfur-coated urea	22-38% N	urea	moderate	mod. rapid	10-15 weeks	NA	low
ONCE	24-35% N	urea, nitrate, ammon. N	moderate	mod. rapid	15-36 weeks	NA	low
Slow-soluble sources							
IBDU	31-0-0	isobutylidene diurea	high	mod. rapid	10-16 weeks	0.2	mod.-low
Ureaform reaction fertilizers							
Nirtoform	38-0-0	ureaformaldehyde	high	slow	10-30 weeks+	0.3	very low
FLUF	18-0-0	urea/ureaformaldehyde	moderate	medium	6-10 weeks	NA	low
Nutralene	40-0-0	methylene ureas	moderate	medium	7-9 weeks	NA	low
Methylene urea	39-0-0	methylene ureas	moderate	medium	7-9 weeks	0.7	low
Coron	28-0-0	urea/methylene ureas	minimal	mod. rapid	7-9 weeks	NA	moderate
N-Sure	28-0-0	triazole/urea sol.	minimal	mod. rapid	6-9 weeks	NA	moderate
Natural organic fertilizers							
Ringer	6-1-3	blood, bone, seed meals	high	medium	10-12 weeks	0.7	low
Sustaine	5-2-4	composted turkey waste	high	medium	10-12 weeks	0.7	low
Milorganite	6-2-0	activated sludge	high	slow	10-12 weeks	0.7	low

Inclusion of products does not imply endorsement, nor does exclusion imply criticism.

Source: Dr. Koski

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slowly-available fertilizers may provide a slow initial green-up, especially under cool, dry spring conditions.

Slow response can be offset with high rates (1.5 to 2 lbs. actual N per 1000 sq. ft.) of the slowly-available sources, as is often done with straight ureaform and natural organics.

This is one of those rare instances in which more than 1 lb. of N per 1000 sq. ft. can be safely applied. Unless you wish to adhere to a strictly natural organic program, it is wiser and easier to apply a blend of quickly- and slowly-available N sources in the early season.

The resin-coated product called "Once" allows you to fertilize once in the spring and yet provide even greening throughout the growing season. This fertilizer has performed impressively in three years of testing at Colorado State University.

Use N for disease control—Over- or under-fertilization, especially in the spring, can result in turfgrass disease problems (Table 2). Red thread can be a problem during moist, cool springs on fine fescue and perennial ryes if they are under-fertilized and not growing at a satis-

factory rate. On the other hand, diseases like stripe smut can become severe if susceptible Kentucky bluegrass cultivars get too much fertilizer during the spring.

Research at Cornell University and other universities shows that nitrogen sources may also play an important role in suppressing certain diseases. That work suggests that natural organic fertilizers and composts, when used as turf fertilizers, can sometimes reduce the incidence or severity of diseases like brown patch, necrotic ring spot, red thread, dollar spot and pythium root rot. Success may vary depending on fertilizer and location.

Clippings return nutrients—Grass clippings provide legitimate and important nutrient sources when returned to lawns. In addition, the severity of rust and red thread may be dramatically reduced on ryegrass and bluegrass lawns where clippings are returned.

Use fertilizer responsibly—Any fertilizer application has the *potential* to contaminate water resources through surface runoff or leaching. Continuing research, however, indicates that careful fertilizer use presents negligible risk to most

ground and surface water sources.

Using water-soluble fertilizers on sandy soils with high precipitation or irrigation rates greatly increases the potential for groundwater contamination.

Runoff from turf sites probably presents little hazard to water quality. However, sloppy application of fertilizer onto hard surfaces like driveways and streets will obviously present a problem when that fertilizer (which often is a pesticide carrier) is carried into storm drains with precipitation. The responsible applicator will guard against this altogether, or clean up any mistakes by sweeping up the mis-applied material.

Benefits of other nutrients—Remember to test for and maintain adequate potassium levels for your soil type. Research shows that potassium can be an important enhancer of wear, heat and drought stress on both cool- and warm-season species. Try reducing the amount of N you use by making iron a more important part of your standard fertility program.

—Dr. Koski is an extension turfgrass specialist at Colorado State University's Department of Horticulture.

LM REPORTS: IRRIGATION COMPONENTS

Today's technology means savings on water and money

■ Why the interest in centralized irrigation? The reason is water—or, more precisely, the cost of water—which spouts ever higher as its availability evaporates with more frequent droughts.

Today's irrigation technology gives turf managers near-psychoic ability to forecast plant water requirements and compensate for dry spells. By combining weather stations with moisture sensors and irrigation controllers, the odds against over- or under-watering are minimized.

And you no longer need to have massive acreage to take advantage of the technology.

Stephen Smith, of Aqua Engineering in



MORE INFO, PAGES 30, 33

Ft. Collins, Colo., predicts even more site-specific irrigation controls and monitoring systems in the next two to three years. "Your imagination is the only hindrance," says Smith.

The money you can save is considerable. By coordinating evapotranspiration (ET) rates with centralized irrigation controls, Smith says the city of Pueblo, Colo., saved \$125,000 in water costs in one year, far exceeding its investment in central controls, data collection, a weather station and implementation. Smith calls it "a cost-effective way to approach large-scale landscape irrigation."

Dorothy Borland, water conservation analyst for Denver, Colo., parks and recreation, reports millions of gallons of water being saved by the city, thanks to a rain shut-off feature found in the best controllers.

—Terry McIver

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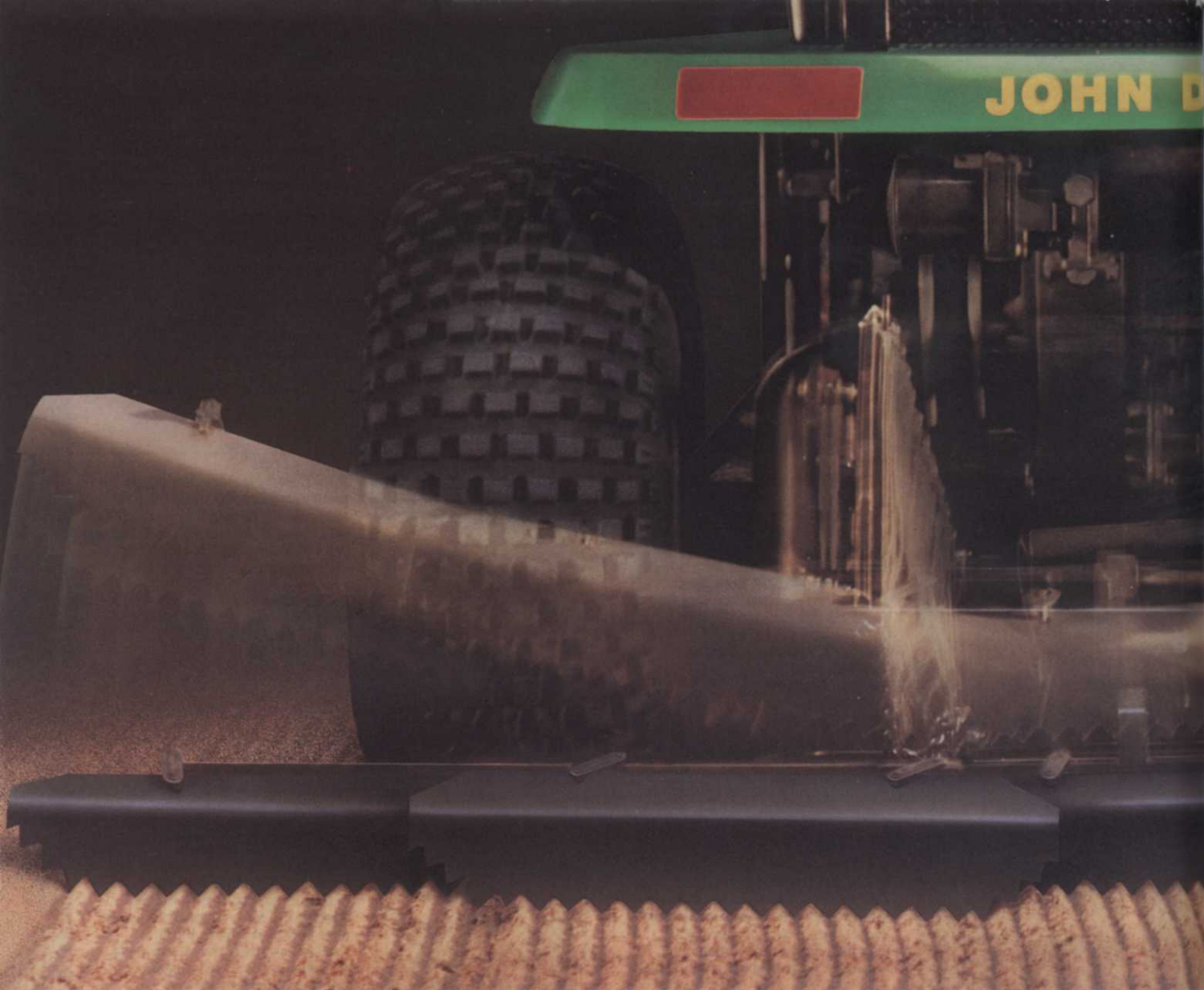
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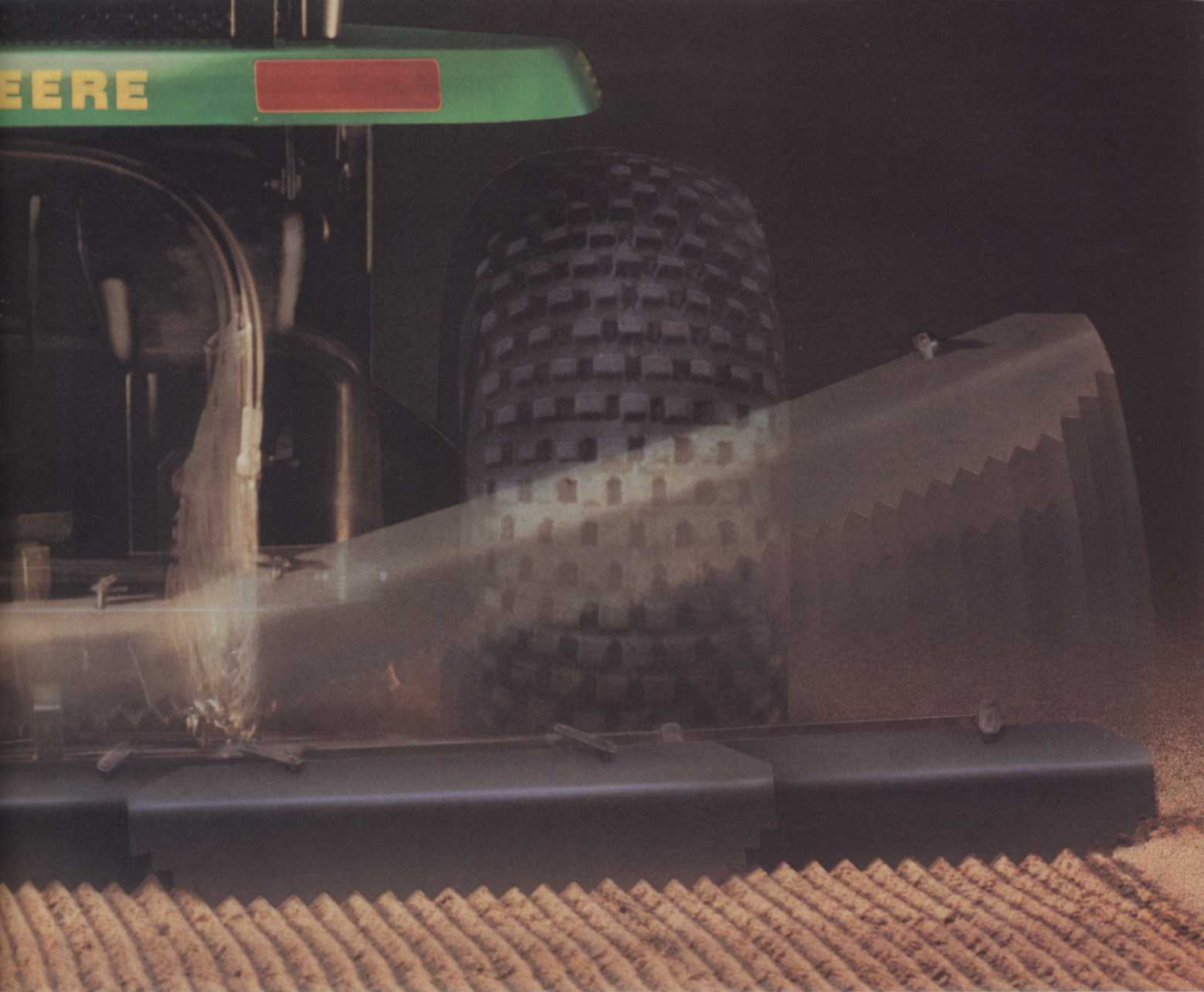
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The following is a listing of some of the companies marketing irrigation controllers and sprinklers obtained from literature on hand at LANDSCAPE MANAGEMENT offices at press time. Exclusion of any product or company is unintended. For a complete listing of irrigation product manufacturers, consult LM's 1991 September Buyers' Guide.

CONTROLLERS

COMPANY	PRODUCT	FEATURES
Buckner Fresno, Calif. (209) 275-0500	C.O.P.S. Universal	Operate and monitor field controllers from a central computer using a radio interface. Can be used with new or existing field controller system. Any number of systems can operate up to 999 field units; each field unit runs up to 42 stations. Can retro-fit existing systems.
Champion Los Angeles, Calif. (213) 221-2108	Pro Series	Three start times per program; selectable seven day/skip day function; timer settings from one minute to 5 hours, 59 minutes; manual program start or manual station operation; independent dual programs; auto/off rain switch; solid state design; fuse protected circuitry; master valve/remote pump start circuit.
Griswold Controls Irvine, Calif. (714) 559-6000	GD Series	Automatic manual shutdown; rainy weather shutdown; drip irrigation control; master valve output; universal radio interface allows you to turn valves on and off from any location with standard transmitter; dual seven-day programs; 12 start and repeat hours; timing from 30-seconds to 30-minutes
Hardie Irrigation Carson City, Nev. (800) 634-8873	Total Control	Modular design; day clock/calendar for true odd/even day programming; three independent programs that can run concurrently; programmable rain-off to seven days; water budgeting feature. Self-diagnostic electronic circuit breaker with valve 'short' detector.
Hydro-Electronics Deer Park, N.Y. (516) 667-7852	Hydro-Saver Pro-Line	8-, 12- and 16-station dual program microprocessor controllers; 365-day built-in calendars for odd/even water restrictions and other complex watering schedules; dual programming; drip irrigation feature; up to three start times per day; flexible-zone timing; water budgeting feature.
Motorola Schaumburg, Ill. (708) 397-1000	MIR 5000	Independent programming of each station or sprinkler group; field satellites can perform up to eight independent irrigation functions simultaneously; central control operates several different types of sprinkler heads independently; field interface unit hooks up to most IBM PC-compatible computers.
Rain Bird Glendora, Calif. (818) 963-9311	Maxi System IV	"Cycle and Soak" feature saves water by automatically preventing the unwanted evaporation, flooding/pooling and run-off that occur when water is applied faster than it can be absorbed by the soil. ET-sensitive scheduling; communicates directly with optional on-site weather station
Toro Irrigation Riverside, Calif. (714) 688-9221	O.S.M.A.C. System	Designed in cooperation with Motorola; can run as a low-cost upgrade to existing system or as a complete control system for new golf installations. Expandable from eight to 48 stations; central or remote control; multi-valve syringe; alarm paging capability from key sensors monitoring flow, power, pumps.
Weather-Matic Garland, Texas	Lawn Mate	Nine volt standard alkaline battery automatically starts in event of power failures. Programs and clock time are uninterrupted for a week with the back-up system. Easy installation, thanks to removable lower panel, which allows access to field wiring terminal block. Two models are designed for seven and 12 stations.

Continued on page 33