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propelled, walk-behind Fairway Flail is ideal to use for parks, highways, institutions, and other areas. Rover Mowers, a major Australian power equipment manufacturer, has introduced the mower to the U.S. market.

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**Vertical turbine irrigation pumps** from Western Land Roller Co. come with many options for different conditions and pumping requirements. These include vertical hollowshaft electric motor drive, right angle gear drive, or V-belt drive; flanged or threaded column; water or oil lubricated line shaft; column and discharge head sizes of 4, 6, 8, and 10 inches; bowl diameters of 6, 8, 10, 12, and 14 inches; semi-open or enclosed impellers; low or high total head design; and capacities from 100 to 3,200 gallons per minute.

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traces the path of the station control wires. It is easy to use and easy to operate. Progressive Inc., makes it.

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**A broad-spectrum plant growth regulator, Atrinal**, has been registered for use on 17 additional species of landscape plantings and 11 additional species grown in the greenhouse and nursery. Landscape plants include oleander, elaeagnus,

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juniper, honeysuckle, and photinia. Greenhouse species include miniature crepe-myrtle, fuchsia, kalanchoe, and euonymus. The liquid concentrate, made by Maag Agrochemicals Marketing, can be diluted for different species. In landscape maintenance it retards hedges, shrubs, and ground covers. In the greenhouse, it works to pinch many species, promoting lateral

branching and suppressing long shoots.

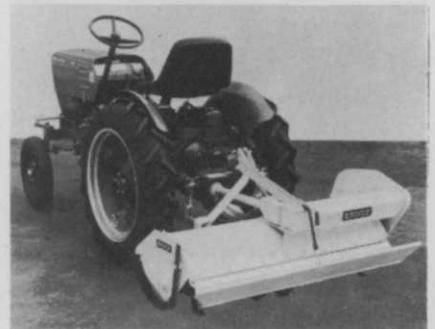
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**Sightguard single lens goggles** help protect eyes from the impact of flying particles, chemical splash, and intense glare. The lightweight goggles can be worn alone or over plastic or metal-framed industrial

safety spectacles. Five types of goggles are available from Mine Safety Appliances Co.: softframe, chemical splash, wide vision, rubber frame, and visor.

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**A heavy-duty 48-inch rotary tiller** covers a 4-foot swath and is equipped with 24 heat-treated Bolo tines which provide ground contact 200 times a minute to completely break up the soil without pulverization. A chain drive at the end of the shaft assures an unbroken tilling swath with no center void. Heavy-duty



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The tiller can be used with 14-, 16-, or 18-horsepower Power King tractors equipped with a tandem transmission and rear PTO. Engineering Products Co. makes them and the tiller.

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**Hydraulic assisted, gravity-flow drum rack** allows for storing and dispensing of 55-gallon drums as well as other cylindrical objects. The design of Drum-Runner saves floor space, reduces handling time, and improves inventory control and less stock damage. It comes in five standard models for inside or outside storage of full or empty drums from Storage Architects, Inc.

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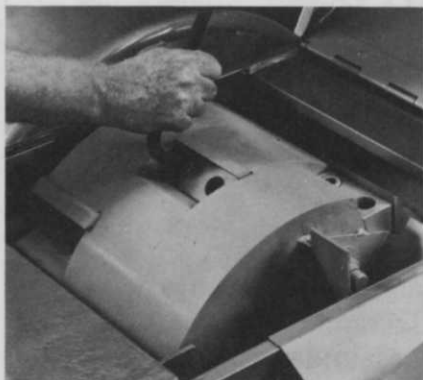
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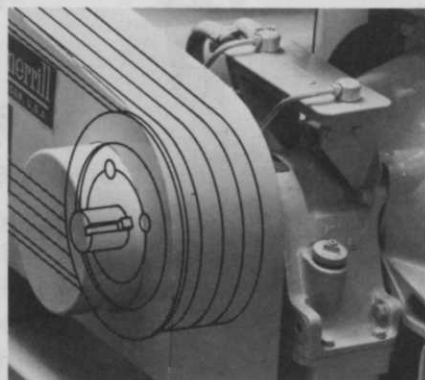
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## Herbicides from page 20

below 50°F. Similarly, we might cite chlorpropham (CIPC) as an herbicide which can cause a great deal of damage if applied at the wrong time of the year. This material is labelled for use on dormant plants, and if applied during periods of active growth, can cause severe injury.

Likewise, time of application in terms of weed seed germination can greatly influence the degree of control achieved from an herbicide application. For example, simazine (Princep) applications during the late fall or early winter after the emergence of the cool-season broadleaf weeds will be less effective than if it had been applied in the early fall prior to their germination. Thus, using the proper herbicide at the proper time can help insure good weed control.

### Amount of herbicide used

As we all know, herbicides in contrast to fungicides and insecticides, generally have a very narrow range of activity, between acceptable weed control and crop injury. Few herbicides can be used at higher than recommended rates to insure weed control without causing excessive crop injury to cultivated ornamental plants.

### Soil type

More than any other factor, soil type has great influence on herbicidal activity. While herbicides are sold nationwide, no two soil types react exactly the same when it comes to herbicide performance. For example, triazine herbicides (Simazine and Atrazine) are generally considered to be more effective on soils with a higher content of clay, while materials like trifluralin (Treflan) are more effective on sandy soils.

In addition, weed control with preemergent herbicides can be influenced by the surface condition of the soil at the time of application, but the soil should be freshly tilled or disced. Also, if granular preemergent herbicides are being used, the soil surface should be relatively smooth at the time of application in order to achieve a uniform distribution.

**Table 2. Rate of trifluralin (Treflan) required to achieve desired weed control in soils with varying organic matter levels.<sup>1</sup>**

Percent organic matter in soil	Trifluralin Required/acre (lbs/active)
1	¼
2	½
3	¾
4	1
6	1½
16	4

<sup>1</sup> Adapted from G.F. Warren, 1973. Action of herbicides in soil affected by organic matter. Weeds Today, Vol. 4(2): 10:12.

### Soil organic matter

More than any other soil constituent, the level of soil organic matter determines the activity of herbicides. If in the selection of the herbicide or in the calculation of the rate to apply, soil organic matter is ignored, be prepared to observe some erratic results.

The importance of soil organic matter lies in its capacity to attract and hold a variety of molecules on its surface through the process of absorption, or more simply, the sticking of the herbicide to the surface of the organic matter such that it is not free to move in the soil solution and is thus less available to be absorbed by plants.

Generally, if soils have been amended with large amounts of organic matter, the rate of herbicide application will need to be increased. For example, trifluralin (Treflan) must be increased in its rate of application in order to achieve weed control in soils with high amounts of organic matter. Specifically, studies on nursery crops grown in media with varying organic matter levels require higher than recommended rates of trifluralin in order to achieve satisfactory weed control in comparison to similar crops grown in low organic matter medium (Table 2). These studies have shown that with container grown nursery crops, a range of 1-2 lb aia of trifluralin is necessary to achieve satisfactory weed control.

**Table 1. Weed Species Responses to Herbicides<sup>1</sup>**

Herbicides (Common name — Trade name)	COMMON WEED FAMILIES					
	Amaranthaceae (Pigweed Family)	Compositae (Daisy Family)	Cruciferae (Mustard Family)	Gramineae (Grass Family)	Leguminosae (Pea Family)	Euphorbiaceae (Spurge Family)
Alachlor (Lasso)	*	O	O	*	O	X
DCPA (Dacthal)	X	O	O	*	O	*
Dichlobenil (Casoron)	*	*	X	X	X	X
Diphenamid (Enide)	*	X	O	*	O	O
EPTC (Eptam)	*	X	O	*	O	*
Simazine (Princep)	X	*	*	O	?	O
Trifluralin (Treflan)	*	O	O	*	O	X

Key: O = not controlled; X = partially or erratically controlled; \* = controlled.

<sup>1</sup> Reprinted in part from Lange, O.H., 1971. Agrichemical Age 14(4):5.

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### Weather conditions

Generally, weather conditions during and immediately after application of the herbicide have a great deal to do with the success or failure of a herbicide program. Of all of the environmental factors that influence herbicidal activity, temperature and moisture play a major role in determining the success or failure of the program.

Actually when we realize the great diversity of conditions under which herbicides are applied in the nursery or landscape situation, it's a wonder that there are so many weed control successes. At the time of herbicidal application, soil temperature may vary from 40-100°F.; soil moisture from air-dried to flooded; relative humidity from 10-100%; sunlight from 500-10,000 ft candles; and a wind-speed from 0-30 mph. Under such a wide range of possible weather conditions at the time of application, we spray a few ounces of herbicide on a half million or more weed seeds per acre and the majority of the time are rewarded with excellent weed control.

### Temperature

Preemergent herbicides perform best at soil temperatures that promote rapid, uniform weed seed germination. Cool soil temperatures that delay weed germination can reduce the effectiveness of preemergent herbicide activity.

Also preemergent herbicides such as EPTC and Trifluralin (Eptam and Treflan) volatilize rapidly as soil temperatures increase, and as such, weed control effectiveness is reduced. In the case of Eptam and Treflan, these volatilization losses can be reduced by cultural practices, such as incorporation into the soil immediately following application.

Temperature also influences the performance of postemergence herbicides. In general, these materials work better at warmer air temperatures. The major influence of temperature on postemergent herbicides is on the rate of uptake into the plant. This effort is offset to some extent by the increased rate of drying of the herbicide on the leaf surface at higher temperatures, as once the spray dries, the penetration of the herbicide into the plant is reduced. Generally with the postemergent herbicides, fast movement into the plant is favored by high temperatures, and as a result more favorable weed control can be obtained if the temperature is high at the time of application.

In addition, the thickness and chemical composition of the cuticle of the leaf is influenced by temperature. Cool nights and moderate day temperatures often favor this increased cuticle thickness in some weed species, thereby reducing postemergent herbicide penetration into the plant, and ultimately effecting herbicidal activity.

### Moisture

Adequate soil moisture prior to the time of herbicide application stimulates uniform and vigorous growth of weeds. Dry soil conditions cause uneven weed seed germination, and often result in poor weed control following herbicide application. As a result, proper timing of preemergent herbicide ap-

*Continues on page 76*

## Arborists from page 18

ment to overcome a production lag. Although experienced personnel have become more available in many parts of the country, not in Texas. His turnover of trainees is too high, about two out of 50. Texas A&M has begun teaching forestry. "They come from there and think they'll sit behind a desk and cut trees," he says. "Most college students don't like to sweat."

A search for an experienced supervisor has been unsuccessful. The right man could help double business, Brook thinks. Getting a person with the right attitude is the most difficult task.

To cut fuel costs, Brook leaves his equipment at the site of a fairly large job instead of driving it back and forth. He thinks that because money is a little tighter, people are taking advantage of pay delays, paying in 45 instead of 10 days.

Brook built his business from scratch and has seen people become much more conscious of taking care of trees over the last 18 years. "The environmental groups are a thorn in the side, but are making people more aware," he says. He worries that the arborist societies may be their own worse enemies.

"I don't believe the National Arborist Association, the International Society of Arboriculture, and the American Society of Consulting Arborists are doing enough to sell our expertise and the value of tree care. Eighty to ninety percent of the people who claim they are arborists are line clearers. Many are installing cables. They don't want the public to know of good standards for tree care. The premise they're working on is build the volume of business. The push is clear the lines, hell with the trees. If the public knew what damage they were causing, they'd have to revise their whole approach."

Fewer companies will be doing pure arboriculture in the future, Brook thinks. "The work being done on public institutions is not being supervised by professionals. The general public thinks this is what good tree care is. Unless we, as a profession, take the bull by the horns and teach the public what good tree care is and get professional public relations in back of it, they never will."

A couple arborists in Colorado see the recession but haven't been much affected by it. Jerry Morris, who runs Rocky Mountain Tree Experts, Inc., has found work very strong throughout Colorado and adjoining states. His crew of 70 has become a solid force after much trouble finding experienced help.

The best way to promote business, Morris thinks, is by knocking on doors and speaking to groups about trees, lawns, and yards and how to maintain them. He also solicits by mail and puts out a calendar each year.

Accounts receivable is higher than Morris likes it, but it doesn't look threatening to him. Customers wait more time between billing and payment, some up to the full 30 days.

What does threaten Morris is the EPA. The agency is especially active in Colorado because the state voted not to certify spray applicators and all are under federal jurisdiction. "The word is get Colorado and they're going to do it," says Morris. "It's a matter of time before they get after us. There isn't anybody in the EPA who's got a head for the practical use of chemicals. People who regulate

should have a knowledge of the business."

Bob Schulhoff, a neighbor in Golden, CO, owns Arborist Service Inc., which operates in the western suburbs of Denver. New business is a hair down but old business is steady. He has steadily increased business this year 18-20 percent, although the May wind and rain storms slowed things down.

Although he must be more careful of spraying, his spraying business has actually increased. His attitude about the EPA action differs slightly from Morris's. He realizes that regulation will probably spell the end to ground spraying over the next 10-20 years. But this will force the need for injections and systemics, which would be "fantastic — only the certified can handle it," he says, "and it will be harder to get certified." He thinks work may turn to more consulting, which would also be more profitable. "People will call us for advice, like attorneys and doctors."

Schulhoff has cut back the number of employees, but has more experienced help. His payroll is higher, paying more for the experience, but he gets the work done more efficiently. His best advertisement is doing gift work, such as for a YMCA, church, or other non-profit organization.

In Rockville, MD, close to Washington, DC, Walt Money and his Guardian Tree Experts are finding business ahead of last year and a little more than inflation. Money is more concerned in skyrocketing labor costs. Spraying and feeding customers are opting for these jobs over pruning.

"It's not a bread and butter industry," says Money. "When something is going to be cut out, it could be us. He is not eliciting a super increase in work, but a moderate one."

Instead of a spring or fall letter to customers, Money and his six reps call and visit every one, every year. "During the 74-75 recession we were calling people to tell them their trees won't wait until next year." He thinks it's important to call people in good times as well as bad. "They get used to hearing from you."

When cash flow is slow and people take longer to pay bills, Money's crew calls and asks the problem. He thinks this helps to read the pulse of the times.

Money echoes many arborist's comments that business is recession proof. "People we are working for are in the upper income and won't feel the brunt of recession as much. They'll feel a slow-down but not a stop."

This arborist sees wider interest in technology and management seminars. "There seems to be a hunger and thirst for knowledge in the profession," Money says.

Managing efficiently and utilizing valuable information provided by the arborists' societies and industry representatives is becoming very important to the arborist in the 80's. Competition as well as regulation will grow, forcing the professional arborist to be a standout in his field.

As the country slows its pace a bit, people will notice their environment more and demand it be maintained. Not only will the arborist continually have to upgrade his technical skills, he will need to promote his profession to the public as well as his clients. Since what he does will be inspected closely, the professional arborist, like a doctor or lawyer, will often be consulted.

**WTT**

plication in regard to soil moisture levels can help insure good weed control.

In addition, rainfall or irrigation is essential for successful preemergent weed control. Water is necessary to carry the herbicide into the top 1/2 inch of the soil where the maximum number of weed seeds will germinate. A delay in rainfall of more than a few days following application may severely reduce the degree of weed control achieved. Of course, with irrigation this is not a problem.

For many preemergent herbicides, a period of 10-14 days without moisture to incorporate them into the soil following application, is often the cause for complete failure. During this period without rainfall, the herbicide may actually be destroyed by exposure to sunlight while it lies on the soil surface, or weeds may germinate and emerge without taking up the herbicide.

In contrast, heavy rainfall of several inches or more soon after preemergent applications can be detrimental in regard to herbicidal activity, in that it may carry the herbicide beyond the zone of major concentration of weed seeds in the soil or may actually remove the herbicide from the site of application in runoff water.

#### Herbicide programs

The ideas conveyed so far have dealt with the

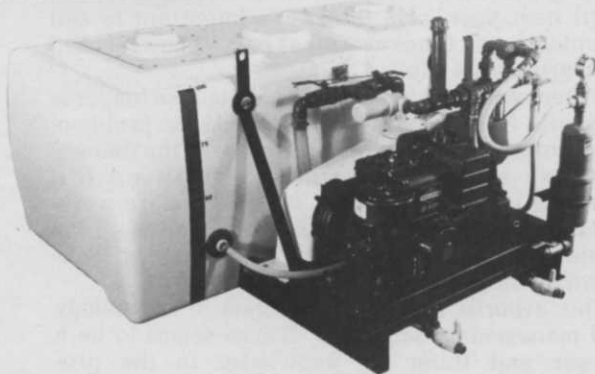
reasons for success or failures with herbicide applications. Nurserymen and landscape contractors must strive for a program utilizing selected materials applied singly or in combination in order to achieve year-round weed control. In most nursery and landscape situations there is a need for fall or early winter applications in order to reduce winter broadleaf weeds, followed by spring and summer applications to control annual and perennial weeds.

In addition, it should be pointed out that observation and good record keeping is a key to a successful weed control program. The nurseryman or landscape contractor should not be looking for 100% control with his weed control program since this could ultimately result in soil sterilization, but rather for control in the 90-95% range. Thus, by carefully observing when weeds are beginning to reinfest a treated area, the nurseryman or landscape contractor can carefully plan and time his reapplications to suit his herbicide program in order to insure success.

Also, each user should use the material under test conditions for 2 to 3 years on small areas in order to better understand its use. Remember that all of the above factors we have discussed will affect the degree of weed control achieved. **WTT**



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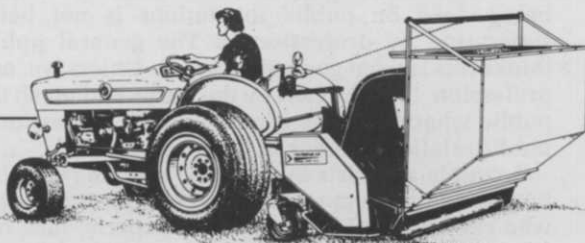
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# SOD PRODUCER NEWS

## Mallinckrodt, Rhone-Poulenc establish turf fungicides

Duosan, a broad-spectrum turf fungicide which combines both systemic and contact control, has been introduced by the Specialty Agricultural Products Div. of Mallinckrodt, Inc.

The scientifically formulated combination results in a synergistic effect with the two ingredients complementing and magnifying each other. It controls most major spring and summer diseases except Pythium.

Chipco 26019, Rhone-Poulenc's registered fungicide for many diseases, has recently received EPA registration for the control of Fusarium Blight on all common turf grasses.

## Lofts releases tall fescue for turf

Lofts Pedigreed Seed, Inc. has introduced the first turf-type tall fescue for commercial use.

In performance tests with other tall fescues, Rebel has provided up to 30 percent finer leaf width and over 188 percent more tillers, providing a denser, finer turf, its manufacturer claims. In addition, Rebel exhibits a good green color when compared with other tall fescue varieties.

Rebel performs well under heavy traffic yet requires low maintenance. It maintains a solid stand even when mowed at 1¼ inches, and is recommended for use on athletic fields, parks, home lawns, and industrial parks located in transition zones where conventional cool-season grasses do not perform well in summer.

## Workshops on use of land wastes scheduled for MD, Los Angeles

The Cooperative Extension Service, USDA and the Extension Committee on Planning Subcommittee on Agriculture, Forestry and Related Industries are sponsoring two workshops this summer on the "Utilization of Wastes on Land: Emphasis on Municipal Sewage."

The workshops will be held July 15-17 at the University of Maryland and at the Sheraton-Anaheim Hotel in Los Angeles on Aug. 12-14. Speakers will discuss management for lands receiving wastes, composting, waste utilization options, and sludge and wastewater application techniques.

For more information and registration forms, contact Hunter Follett, Agronomy Dept., Kansas State University, Manhattan, KS 66506.

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News from page 13

ment theft problem included discussions with the FBI, Law Enforcement Assistance Assn., International Assn. of Chiefs of Police, National Sheriffs Assn., and several local, state, and regional enforcement officials.

RECLAMATION

OSM seeks cleanup of prime farmland rule

The Office of Surface Mining has proposed to define "contiguous land," which would satisfy a "grandfather" exemption for the mining of coal on prime farmland.

The proposed regulation would allow coal removal to continue on prime farmlands without meeting special performance requirements if they were being mined (1) under a permit prior to August 3,1977, the date of the Surface Mining Control and Reclamation Act; (2) under a revision or renewal of that mining permit, as these terms are used in

the Act, or (3) are continuations of existing permitted mining in the same contiguous pit on lands on which the operator had the right to mine prior to Aug. 3,1977.

In addition, the proposed regulation sets June 3,1982, for ending prime farmland grandfather exceptions allowed by the Act.

GOLF

James Long named NGF President

James M. Long, senior vice president with Spalding Worldwide, was elected president of the National Golf Foundation during its semi-annual Board of Directors meeting held in late April at the Doral Hotel and Club in Miami, FL.

Long joined Spalding's engineering department in 1932. He has held many management positions with Spalding, including vice president of manufacturing and vice president of engineering.

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## EVENTS

The current issue of **WEEDS TREES & TURF** carries meeting dates beginning with the following month. To insure that your event is included, please forward it, 90 days in advance, to: **WEEDS TREES & TURF Events**, 9800 Detroit Ave., Cleveland, OH 44102.

**2nd Exhibition for Horticulture and Landscape Construction**, "Gruen 80," Basel, Switzerland, **thru Oct. 12** Contact Beat Baechler, 104 South Michigan Ave., Chicago, IL 60603, 312/641-0050.

**Southern Nurserymen's Trade Show**, Atlanta Convention Center, Atlanta, GA, **Aug. 2-6**. Contact Tommy Henegar, Southern Nurserymen's Assn., 3813 Hillsboro Rd., Nashville, TN 37215, 615/383-5674.

**Green Pro Executive Newsletter** 1980 summer conference, Tamiment Resort and Country Club, Pocono Mountains, PA, **Aug. 3-5**. Contact Mrs. Rice, 380 S. Franklin St., Hempstead, NY 11550, 516/483-0100.

**Roadside Vegetation Management and Manipulation Program**, San Antonio, TX, **Aug. 4-8**. Contact Robert

Guinn, Engineer of Maintenance, Texas Department of Highways and Public Transportation, Highway Building, Austin, TX 78701.

**Ohio State University Turf Field Day**, OSU Turfgrass Research Facility, Columbus, OH, **Aug. 5**. Contact Keith Karnok, OSU Dept. of Agronomy, 1827 Neil Ave., Columbus, OH 43210, 614/422-2591.

**Fertilizer Institute Trade Fair**, Roe Vartle Hall, Kansas City, MO, **Aug. 5-6**. Contact Barbara Schoen, 1015 18th St., NW., Washington, DC 20036, 202/466-2700.

**Rutgers Turfgrass Research Day**, New Brunswick, NJ, **Aug. 6**. Contact Ralph E. Engel, Research Professor of Turfgrass Management, Rutgers University, P.O. Box 231, New Brunswick, NJ 08903, 201/932-9427.

**Illinois Landscape Contractors Association** annual summer field day, Chicago Horticultural Society Botanic Gardens, Glencoe, IL, **Aug. 6**. Contact Lucile Little, 202 W. Main,

Box 1049, St. Charles, IL 60174, 312/584-5770.

**Penn State Turfgrass Field Days**, Joseph Valentine Turfgrass Research Center, Pennsylvania State University, University Park, PA, **Aug. 6-7**. Contact Dr. Joseph Duich, 21 Tyson Building, Dept. of Agronomy, University Park, PA 16802.

**Residential Landscape Design Course I**, Seattle, WA, **Aug. 7-9**. Contact John Shaw, Executive Director, ALCA, 1750 Old Meadow Rd., McLean VA 22101, 703/821-8611.

**International Society of Arboriculture**, Sheraton-Hartford Hotel, Hartford, CT, **Aug. 10-14**. Contact Ervin C. Bundy, ISA Executive Director, P.O. Box 71, 5 Lincoln Square, Urbana, IL 61801, 217/320-2032.

**American Association of Nurserymen** management seminar, St. Louis, MO, **Aug. 10-15**. Contact Robert S. Fortna, 230 Southern Building, Washington, DC 20005, 202/737-4060.

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**Residential Landscape Design Course II**, Seattle, WA, **Aug. 11-13**. Contact John Shaw, Executive Director, ALCA, 1750 Old Meadow Road, McLean, VA 22101, 703/821-8611.

**Iowa State University Turfgrass Field Day**, Horticulture Research Station, Ames, IA, **Aug. 12**. Contact A.E. Cott, Extension Horticulturist, Dept. of Horticulture, Iowa State University, Ames, IA 50011, 515/294-1870.

**Central Plains Turfgrass Foundation Field Day**, Kansas State University Turf Conference, KSU Union, Manhattan, KS, **Aug. 13**. Contact Dr. R.N. Carrow, Secretary/Treasurer, Horticulture Dept., Waters Hall, Kansas State University, Manhattan, KS 66506, 913/532-6170.

**Massachusetts Nurserymen's Association** and the New England Nurserymen's Association summer meeting, Weston Nurseries, Hopkinton, MA, **Aug. 13**. Contact Deborah M. Fanning, Associate Director, MNA, 715 Boylston Street, Boston, MA 02116, 617/266-6800.

**Minnesota Park Supervisors Associ-**

**ation** summer meeting, Duluth, MN, **Aug. 15-16**; fall meeting, Red Wing, MN, **Oct. 10-11**; and winter meeting, Washington County Park Dept., **Dec. 2**. Contact Thomas Feltl, M.P.S.A. Secretary, 8200 Wayzata Blvd., Golden Valley, MN 55427.

**Lawn, Garden Outdoor Living**, Div. National Hardware Show, McCormick Place, Chicago, IL, **Aug. 13-16**. Contact National Hardware Show, Charles Snitow, 331 Madison Ave., New York, NY 10017, 212/682-4802.

**Tan-Misslark Trade Show**, Astro Hall, Houston, TX, **Aug. 16-19**. Contact Bill Fullingim, Texas Assn. of Nurserymen, 512 E. Riverside Dr., Austin, TX 78704, 512/444-7489.

**International Arboricultural Conference**, University of Sussex, Brighton, England, **Aug. 18-21**. Contact Mrs. Moira Allan, Latchetts, 23 Portsmouth Lane, Haywards Heath, Sussex. RH 16 1SE, England, Tel: 04447-3344.

**Rhode Island Turfgrass Field Day**, Turf Research Farm, University of Rhode Island, Kingston, RI, **Aug. 20**.

3500 Ridge Road, P.O. Box 6900, Colorado Springs, CO 80934. Contact Professor C.R. Skogley, Plant and Soil Science Dept., University of Rhode Island, Kingston, RI 02881, 401/792-2570.

**Irrigation Association of New Jersey** Annual Field Day, Reed's Sod Farm, Princeton, NJ, **Aug. 20**. Contact Irrigation Assn. of New Jersey, P.O. Box 128, Dayton, NJ 08810.

**Residential Landscape Design Course I**, Albany, NY, **Aug. 20-22**. Contact John Shaw, Executive Director, Associated Landscape Contractors of America, 1750 Old Meadow Rd., McLean, VA 22101, 703/821-8611.

**Farwest Nursery Garden & Supply Show**, Seattle Center Coliseum, Seattle, WA, **Aug. 24-26**. Contact Dan Barnhart, Farwest Nursery Show, 224 S.W. Hamilton St., Portland, OR 97201, 503/221-1182.

**Western Regional Grounds Maintenance and Equipment Show**, Bear Creek Park, Colorado Springs, CO, **Aug. 26**. Contact Frank Cosgrove,



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