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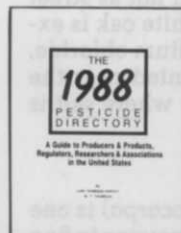
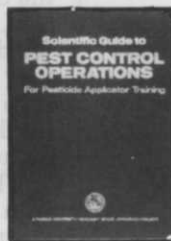


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## Oak: Shade tree with character

by Douglas Chapman, Dow Gardens

*Quercus*—a genera with one of the greatest geographic ranges—is the most important hardwood timber group in the United States. It should be one of the most important shade tree genera in production.

Many of the individual species—such as red oak, scarlet oak and white oak—have native ranges from southern Ontario to Texas with many provenances and morphological variation. When considering optimal growing, oak species are adapted to conditions varying from droughty upland sites to flood plains. *Quercus* species are variably tolerant of urban stress, air pollutants (ozone and sulfur dioxide), salt and various diseases.

The oak is botanically "accepted" in two groups—white and red oaks.

A few in the white oak group include white oak (*Quercus alba*), swamp white oak (*Quercus bicolor*) and bur oak (*Quercus macrocarpa*). This group exhibits resistance to oak wilt, being adapted to a wide-range of sites. Generally, the lobes in the leaves are obtuse, or oval, for the entire group.

### White oak

White oak is a long-lived climax forest tree (800 years). It is native to an extensive geographic range, which includes all areas east of the Great Plains. The plant is valuable for its lumber as well as an exciting landscape specimen.

It is a rapid tyloses former, thus a good compartmentalizer which calloses over quickly. The leaves are bluish-green throughout the summer, varying from a rich burgundy to a brown in fall.

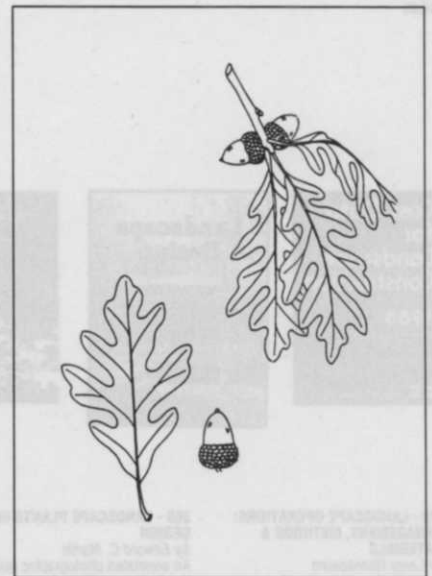
White oak transplants easily when young (under 1½ inches in diameter) into fertile, well-drained soils. When considering growing from seedlings, it is particularly important that nurserymen select seed from local sources as provenance.

Flooding, even for a short period of time, can cause root death and/or decline. The Morton Arboretum reported general decline of white oak throughout the Chicago area due to extremely wet periods early in the 1970s.

Research at the University of Illinois noted that white oak has a very shallow fibrous root system which does not compete well with turf. This indicates that white oak is not a good in-lawn species but would be a good companion plant for pachysandra or myrtle as a ground cover.

White oak is outstanding as a specimen tree which should be grown in full sun. It can be used in parks, on golf courses, or in institutional landscapes.

Advantages of white oak include resistance to ice breakage, good tolerance to sodium chloride (highway salt), a high degree of resistance to oak wilt, good longevity and relatively



White Oak

low maintenance requirements. This is such a low-maintenance tree that no more than one or two corrective prunings are needed for the life of the plant.

The main disadvantage of *Quercus alba* includes extreme susceptibility to anthracnose and a slight susceptibility to ozone and sulfur dioxide. Some white oaks are rarely affected by anthracnose. Therefore, selection and introduction of resistant cultivars would be important.

### Swamp white oak

Swamp white oak (*Quercus bicolor*) is native from southern New England to the Great Lakes. It grows well in rich, acid, wet low-oxygen soils, found in flood plains. Swamp white oak has very shallow roots. Although anthracnose can be a severe problem, spraying during mid-May can dramatically reduce infection.

The summer leaf is dark green with a slightly gray-silver underside. Swamp oak is better in large-area landscapes or parks and not as street trees. In fact, swamp white oak is extremely sensitive to sodium chloride, thus should not be planted near the coast or near highways where salt is used for snow removal.

### Bur oak

Bur oak (*Quercus macrocarpa*) is one of my favorite trees for growing in fine

### OAK TREE GROWING HABITS

Type	Height at maturity (feet)	Canopy Shape
White Oak	50-80	oval
Swamp white oak	50-60	round
Bur oak	80-90	oval
Black oak	50-60	oval
Scarlet oak	60-75	oval
Northern red oak	60-70	round
Pin oak	60-75	pyramidal

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turf situations. It is native from western New York to the Dakotas and south to central Texas, but is found most frequently on the Great Plains. It adapts well to urban conditions, being tolerant of highway salts and ozone. It thrives in calcareous, well-drained, almost droughty soils.

Bur oak does have a tap root and is extremely drought resistant. When considering use, *Quercus macrocarpa* is most effective in large-area landscapes, such as parks, golf courses and commercial situations. Bur oak does not transplant easily; therefore, the smaller the plant, the greater are your chances for success. The foliage is dark green on the upper surface with a white tomentose on the underside. The dark blue-green of summer turns yellow to brown during late fall. The massive trunk is covered with a thick (four-inch) layer of bark, making it very fire resistant—a survival mechanism.

In its native range, a tree of the Great Plains, it carries most of the desirable characteristics of white oak. It thrives in urban conditions, requiring little maintenance.

Generally, the white oak group contains trees that are slow growing. Many are difficult to find in the nursery trade. These oaks should be used more in large-area commercial landscapes. They have few catastrophic insect or disease problems, require little or no pruning, and are tolerant of a wide range of conditions, filling niches from calcareous soils to clay loams.

### Red oak

The red oak group includes black oak (*Quercus Ylina*), scarlet oak (*Quercus occinea*), northern red oak (*Quercus rubra*), English oak (*Quercus robur*), and northern pin oak (*Quercus plustris*).

In general, this group grows more rapidly with a shorter life span. In addition, it is quite susceptible to oak wilt, as compared to the white oak group.

### Black oak

Black oak (*Quercus velutina*) has a broad native range, all areas east of the Great Plains, excluding only a small portion of Texas and Florida. *Q. velutina*'s dark green leaves of summer make it a valuable specimen. It is a rapid grower in well-drained, upland sites.

In addition, it transplants with relative ease in sizes up to two inches in trunk diameter. It is intolerant; that is, a species that must grow in full sun. It can be used in large institutional grounds, parks or golf courses.

In native conditions, black oak is often found associated with scarlet oak and hybridizes readily. It exhibits many of the environmental tolerances that scarlet and northern red oak have. It should become a more valuable tree for the landscape.

### Scarlet oak

Scarlet oak (*Quercus coccinea*) is a rapid growing (2 to 2½ feet per year) upland tree species. It grows well in moist, yet well-drained soils. *Q. coccinea*, while young, has a rather upright habit of growth, becoming upright at maturity. The foliage is a glossy lime-green throughout the summer which becomes an effective scarlet to burgundy. It transplants quite easily as it has a rather shallow, fibrous root system.

Among scarlet oak's advantages are that it is rapid growing and tolerant of ozone and sodium chloride. *Q. coccinea* is effective as a street tree as well as a specimen in commercial or institutional landscapes. The disadvantages include frequent pruning (every three to four years), relatively short life span (70 to 80 years) and susceptibility to oak wilt.

### Northern red oak

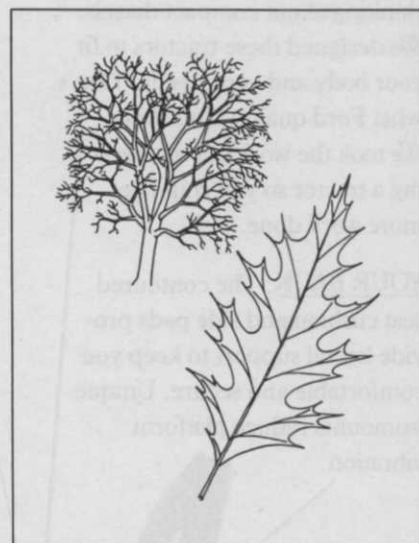
Northern red oak (*Quercus rubra*) is also a good street tree or specimen plant for park, golf course, or industrial landscapes. Its foliage is a shiny brilliant green throughout the summer, becoming a scarlet-red during the fall.

Red oak transplants readily. It grows best in moist, yet well-drained soils. *Q. rubra* is tolerant of many urban conditions, including low-oxygen soils, sodium chloride, ozone and sulfur dioxide. The main disadvantage of red oak is its susceptibility to oak wilt. When using this tree in the landscape, it should be limited to less than five percent of the street tree population to avoid catastrophic disease problems.

### Pin oak

Pin oak (*Quercus sp. lustris*) displays an upright habit of growth when young. This tree has a strong central leader and horizontal branches which at maturity become heavy and can hang down. Pin oak is a relatively short-lived tree, when considering oaks, rarely living over 60 to 80 years in the landscape or 80 to 90 years in native conditions.

Pin oak thrives in acid, clay/loam soils. It is easy to transplant and grows well as a street tree if one has acid soils. Pin oak is extremely exciting as a specimen tree in golf courses and parks or commercial landscapes, but should not be used in landscapes



Northern Red Oak

where the soil has been disturbed. Disturbed soil usually results in iron chlorosis problems and ultimate decline of the tree.

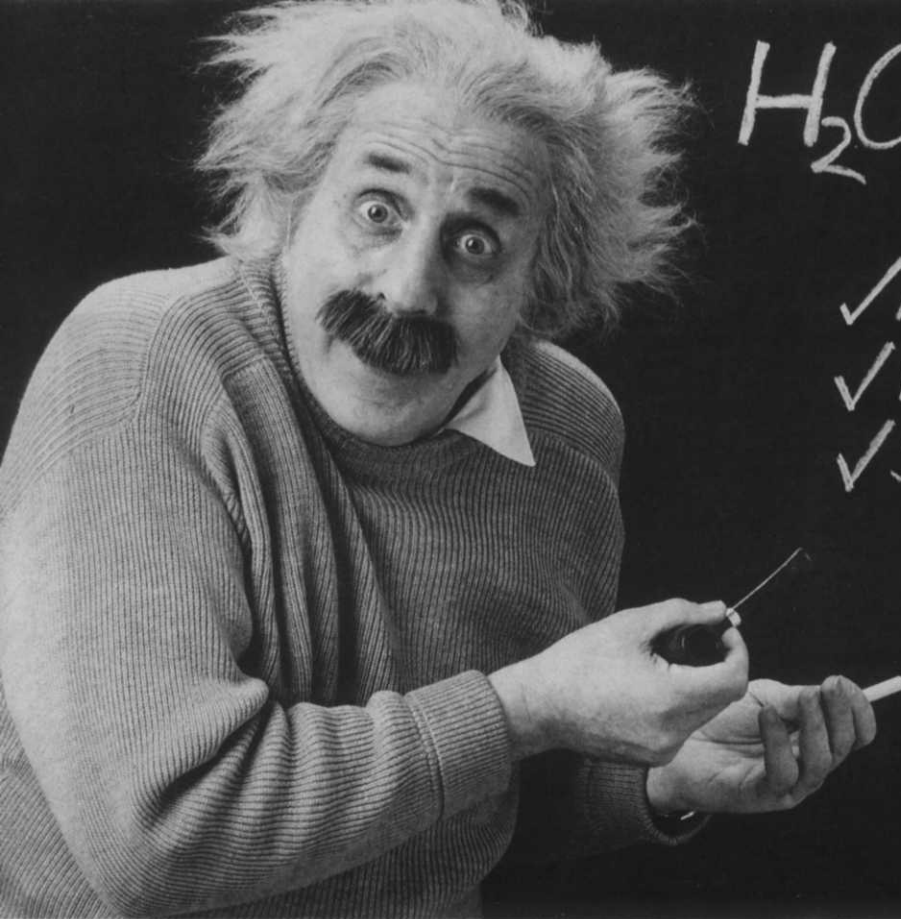
Pin oak's main disadvantages include iron chlorosis, oak wilt, and slight susceptibility to ozone and salt. (Ohio State University has reported iron citrate implants overcome the problem of iron chlorosis but, considering other maintenance requirements and disease susceptibility, this ornamental, although aesthetically exciting, should be low on the recommended list of shade trees.)

The oaks are an exciting genera which should be used more extensively in the landscape. Their native range is extensive throughout the entire eastern United States. Further, they grow in soils ranging from heavy clay to fertile, yet well-drained. Generally, many of the plants display good tolerance to urban conditions.

Most oaks are poor competitors with turf; therefore, ground covers should be used around them, such as pachysandra, myrtle or lily-of-the-valley. Bur oak (*Q. macrocarpa*) is a rare exception. It is outstanding as a tree growing in fine turf. Many of the oak species are not readily available in the trade because of reported difficulty in transplanting.

Research is appropriate to study transplanting, mycorrhiza relations, and new propagation techniques. In addition, cultivars should be selected for resistance to anthracnose or adaptation to local areas, like the Great Lakes or New England states.

We must continually remind ourselves as landscape managers that provenance (local adaptation) plays an important role in the survival of many oaks. Oak should highlight the landscape architect's palette of desirable adaptive native trees. **LM**



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MARCH 1988/LANDSCAPE MANAGEMENT 95

## Tine design improves aerification

by Tim Taagen



The CoreMaster 12's quadratine design improves aeration pattern efficiency and maintains a 3½-inch penetration depth with each pattern.

The principles of aggressive aerification are widely accepted throughout the turf management field. They are, in fact, becoming more important to the entire grass-growing industry.

At Cherry Hills Country Club in Englewood, Colo., we see it as among our most important agronomic programs.

In our pursuit of effective and efficient operations, we have found the CoreMaster from GreenCare International best accomplishes our goals: increased speed and effectiveness.

The CoreMaster 12 is a unique piece of equipment because the spacing of the tines (1x2; 2x2; 2x3; 2x5 inches) is easily changeable—yet when going from one to another, the approximate three-and-a-half inch aeration depth does not deviate greatly. Variables such as height of grass, soil structure and size of tines account for slight changes in penetration.

The unique thing here is that the speed is more than two times faster than

other popular greens aerators, which makes this an extremely effective fairway aerifier as well. At Cherry Hills, we can do 28 fairway acres with three machines in five days, including cleanup.

### Not perfect

Of course, every cloud has a silver lining.

The one problem with the CoreMaster stemmed from the fact that there was no flotation device in the original design. Only an extremely experienced operator could use it on the flattest of surfaces without the risk of tearing large areas of turf.

We turned to our mechanic for a solution. He developed a flotation device that will accommodate any undulations regardless of the severity.

The best part is that any crew member can be trained in 10 minutes to operate the aerifier safely and with no fear of turf damage.

According to Dale Hansen, turf

consultant and vice president of marketing for GreenCare, the company has installed an "undulation suspension system" which became available in October. "It solves any problems of tearing the surface," Hansen says.

The company has also added a CoreCollector attachment which collects cores during aeration and dumps them automatically when the CoreMaster 12 is raised out of the turf. When the CoreMaster is lowered again, the collector resets automatically.

In a business that is becoming more mindful of sound agronomic practices, it is very important that people be aware of every available tool.

In our opinion, the CoreMaster, with its variable spacing, three-and-a-half inch depth and the flotation device, makes it the best available unit on the market today.

Taagen is the assistant superintendent at Cherry Hills.

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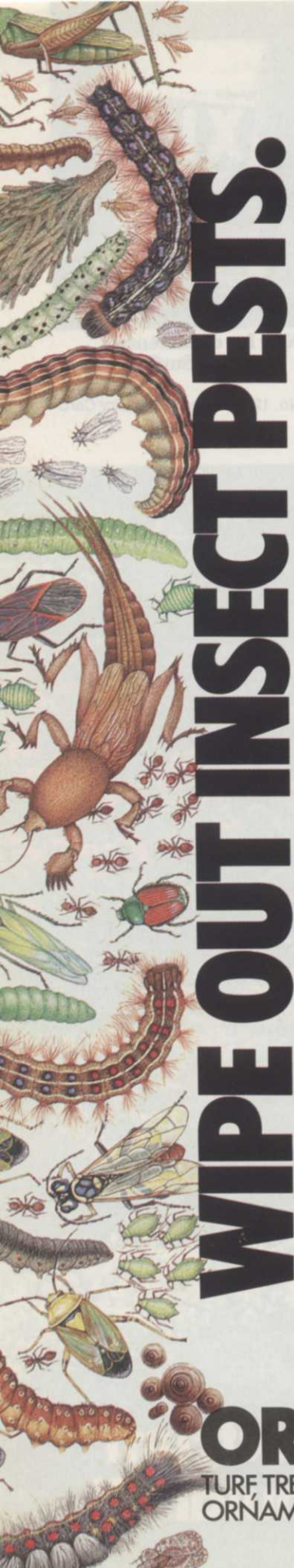
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## PROBLEM MANAGEMENT

by Balakrishna Rao, Ph.D.

### Manganese deficiency

**Problem:** You talked recently about manganese deficiency in maples. Where can I get leaves tested? My extension agent doesn't do this, at least to my knowledge. We have been applying iron sulfate, but it doesn't always work. We usually apply to the soil at the drip line. This is a major problem. (Kansas)

**Solution:** You are right in your understanding that extension agents do not perform nutrient deficiency tests. However, in most states, they send the samples to state testing labs and can help that way. Check with your county agent for this possibility. We send our samples to Ohio State University or to several other private labs such as A&L Great Lakes Agricultural Laboratories Inc., 5011 Decatur Road, Fort Wayne, IN 46806-3085, telephone (219) 456-3545.

As far as your concern about iron sulfate treatment and poor results, from your questions it is not clear whether you are dealing with a chlorosis problem on maples or other plants. If you are dealing with chlorosis on maples, most likely it is due to manganese deficiency. This may be the reason why you are experiencing variable results with iron sulfate treatments. This is what we are finding in our area.

However, it may be different in your soil type and geographical location. To determine the exact micronutrient deficiency, the best thing to do is to have the soil and foliage tested for nutrient content. Based on these results, provide corrective measures.

With manganese deficiency, the treatments should be applied in early spring before bud break. Manganese doesn't green up leaves that are already chlorotic. It greens the newer leaves.

Generally, with an iron deficiency problem, timing is not very critical. Therefore, trees can be treated any time, except during moisture stress, with good results. If the trees are already showing severe chlorosis, first try to correct this problem by trunk injections. Then follow it up with soil injections to maintain the nutrient level. We have had variable results with the use of iron sulfate as a trunk injection for iron chlorosis as compared to ferrous ammonium citrate. Therefore, for iron problem, use the latter.

### Managing grubs

**Problem:** How can I control grubs (black aetenius and Japanese beetle) in roughs without any irrigation available? (West Virginia)

**Solution:** Grub problems and their management presents a major problem to the lawn care industry. The basic problem is to get the material to the target. It is important to apply treatments during vulnerable stages of insect development. The grubs feed on roots and can cause extensive damage to turfgrass. Success in pest management depends upon proper identification, using proper materials, method and timing of control.



As you may be aware, the currently registered grub control insecticides all have short residual and some of them will have greater affinity to bind to thatch than others. Therefore, watering after treatment can definitely improve the efficacy. With some insecticides, watering may be very critical. Some manufacturers indicate watering within 24 hours after treatment. Read and follow label specifications for further details.

For Japanese beetle grubs, late summer/early fall generally is the best time for treatment and early spring would be the next best time. When you are dealing with black turfgrass aeteniis (BTA), like the Japanese grub control, timing and placement of insecticides is very important. The preventive approach would be to apply insecticides to kill the egg-laying population of adults. Overwintered adults become active in April-May, which coincides with the time when the Vanhoutte spiraea and horse chestnut will be in full bloom in Ohio. Egg laying for the second generation coincides with the blooming of Rose of Sharon. These indicator plants can be checked periodically along with monitoring for adults in spring.

With the preventive approach, it is important to post-water to move the insecticides to the first 1/2 inch of thatch—so that adults can be killed as they burrow down for egg laying.

Although it is difficult to manage treatment for larva it can be applied when larva first appear. For larva control in Ohio, applications are made around June. Without watering, it is difficult to manage either Japanese beetle grubs or black turfgrass aeteniis (BTA).

If watering is not possible, however, the following suggestions might be useful to improve results:

- Try to apply insecticides when rain is predicted.
- Apply materials uniformly at the proper time when grubs are small and easy to manage.
- Study the life cycle and apply during the most vulnerable stage of insect development.
- Proper insecticide placement at or near the soil surface (below thatch).
- Read and follow label specifications for best results.



**Balakrishna Rao is Director of Lawn Care Technical Resources for The Davey Tree Co., Kent, Ohio.**

Questions should be mailed to Problem Management, LANDSCAPE MANAGEMENT, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

Whatever sort of grounds you manage professionally, ORTHO's new TAG Herbicide T/E can help you keep them clean and trim. With its fast-acting formula, TAG gives rapid burn-down, usually within 24-48 hours, of a wide variety of annual grasses and broadleaf weeds. TAG has a proven track record for getting rid of unwanted grasses and weeds, even under less-than-ideal weather conditions. A non-selective contact herbicide, TAG will burn back or control nearly anything green to which it is applied.

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# PRODUCTS

## Manually adjusted mower secured by three pins

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The cutting height adjustment is secured by three tension-locked pins and is manually adjusted. A spring loaded deflector shield keeps flying debris headed groundward.

The left rear corner of the front-mount deck has been rounded to improve trimming capabilities. Belts operate on a flat plane with no twist to minimize wear and reduce downtime.

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## Landscape software updated with features

Abracadata, Ltd. has upgraded its landscape computer software program to include a slope option which allows the user to enter the degree of slope while the program

shifts the design accordingly.

The program now has two scales, distance finding, and pull down menus to make designing easier.

The user can create property lines, add plants, trees and other landscape features. Color text and labels can also be entered.

System requirements include any Apple II computer with at least 64K memory, mouse, paddles, joystick or graphics pad.

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## Company adds three to extensive product line

O.M. Scott & Sons has added three new products to its Proturf line. A fine particle sulphur product is for use on greens, tees, fairways and container-grown ornamentals to correct pH problems and sulphur deficiencies.

Fluid Fungicide III is designed to increase brown patch control in areas where it is a serious problem. It also prevents and controls anthracnose on Poa, leaf spot, brown patch, dollar spot, pink snow mold and rust. It is usable with fertilizers, seed and other control products.

The third product is Turf Fertilizer

with Iron, which combines iron in ferrous sulfate form and slow release encapsulated fertilizer. It is formulated for use on fairways and other large turf areas.

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## Twelve-foot hose keeps spray tank stationary

The Alter-Spray Portable Power Sprayer from K&G Enterprises features a 12-foot hose which allows the tank to remain stationary while spraying large areas. The spray unit can also be pulled along while operating in narrower areas.

The sprayer is excellent for liquid fertilizer and pesticide applications on lawns, shrubs, trees and gardens.

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## Granular herbicide gets EPA registration

The Environmental Protection Agency recently approved registration of Triamine Granular Weed Killer from Riverdale Chemical.

It is a three-way, post-emergence



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