

Unsoftened water: This problem is rare because of the cost, but I have found softened water being used for irrigation (where the softening process adds salt). The solution is to quit using softened water for irrigation. Hard water is usually less damaging to plants and soils.

Water less

Practitioners of the art of diagnosing plant problems for the private home owner often feel that an automatic watering system installation is the beginning of major plant survival problems. Many systems can not be set with great enough intervals between irrigation times, nor for long enough flow periods at each of the waterings.

Increase the time between waterings: Established St. Augustine grass lawns can generally be maintained by watering once every week or ten days. In the hottest driest weather, weekly watering is needed. After long periods of shorter cycle watering, the change to the longer cycle may have to be gradual to develop a deeper root system. Sodium in the soil and high water tables from frequent watering also contribute to shallow root systems.

Increase the amount used each time you water: Always water long enough to thoroughly wet the soil (e.g. two hours) and have abundant run-off. There must be run-off to carry any accumulated salts away, and prevent surface build-up of salt where the water is removed only by evaporation.

Do not water trees where the grass is not "show place" grass in the front yard. The tree roots extend 30 to 50 feet from the trees, and will grow out into moist soil when there is less water next to them. In prolonged drouths, water once every four weeks. In narrow shady places between houses it is best to forget about growing grass and concentrate on growing trees. In such locations, the use of a rock mulch (e.g. 1½-in. gravel) will aid in preventing evaporation, absorbing rain, and preventing weeds. Line streams or drainageways that carry water from saline supplies to beyond the reach of roots with concrete. This lining must be root proof because the roots will actively grow toward a source of moisture. If this is not possible, **Cut the roots** to stop the transport of saline water from a stream to the trees. Ditch to a depth of four feet, or to shallower claypan or caliche layer that stops the deeper penetration of the roots. Ditching should be repeated every three years. Any stream whose major watershed area is watered lawns will have an augmented salt content.

Physical and chemical modification of the soil

Make physical and chemical modifications to remove the sodium from the soil and to build granular better-drained soil. Since leaching is an important part of chemical modification, good drainage must be established. Chemical changes that release sodium must be done slowly so the sudden release of large amounts of salt does not burn or kill the plants. It is best to use no more than 400 pounds of chemicals per acre per year. Slowly dissolving granular dolomite need not be included in the 400 pounds per year.

Physical modifications: Be sure the soil is as well drained as possible so the water can percolate through to leach the salts from the soil. In such cases drainage may be expensive and could re-

quire tiling or French drains into drainage pits with sump pumps or siphons. French drains leading into pits filled with coarse gravel and having siphons that start themselves at overflow times can be built at a relatively low cost, especially if you do your own labor.

Use a heavy spike toothed aerator to permit air, water, and chemicals to penetrate more deeply. Applying a top dressing of sand over the freshly spiked soil may make semi-permanent access channels.

Chemical modification:

While *sulfuric acid* treatments are used in agriculture and nurseries, there is danger of burning your perennial plants, and it should probably not be used in ornamental plantings and vegetation. Sulfur granules may be used up to 200 pounds per acre per year. Sulfur slowly changes to sulfuric acid. *Treatment with gypsum* (hydrous calcium sulfate) is the most frequently recommended treatment for alkali. The amount of gypsum required to neutralize the alkali is several tons per acre, but applying this much would cover the soil and burn the vegetation. Adding 400 pounds per acre per year should start reversing alkalization process. The addition of dolomite granules with the gypsum should help the structure, and the magnesium dislodges sodium, increases leaf retention, and improves leaf color and vigor. Potassium excesses present in most of our soils make magnesium unavailable to plants, and coastal plain soils are often deficient in magnesium. The dolomite should not be needed in the older limestone and hill country soils. *Fertilize with ammonium sulfate* to make the soil more acid, remove sodium, and to provide nitrogen. If 100 pounds of ammonium sulfate is used, then only 300 pounds of gypsum should be used per acre per year. Phosphate fertilizer is usually not needed for woody plants, and additional potassium is harmful in these alkali soils. However, if leaching is successful at removing much of the sodium, potassium can go with it. At the higher rates of sulfate use, it may be well to add some potassium to the soil in the fertilizer. At the rates recommended here, the potassium should not become in short supply in the Lufkin soils.

Physical-chemical modification with a top dressing of course sand and peat-moss will benefit the soil and roots. Add about one-half inch per year for 4-6 years. The roots will grow up into the sandy layer to get moisture, better structure, and less salt. Grass will grow much better in the sand, and the sand will increase rainfall absorption. Do not mix the sand and peat-moss into the soil, and do not add any soil with clay in it (top soil). The object of the top dressing is to provide a better soil on top of the old one so the roots can avoid the clay. Clay is the dangerous fraction of the soil where saline irrigation is used (Boyko 1968, Richards 1954).

Making these soil modifications will start to reverse the alkali trend of the saline water irrigated soils, and in a few years the conditions should be much better. Your trees should have larger healthier leaves (you will not see the difference unless you save pressed samples). If you can not do all of the ameliorating treatments, any part of these you can do will improve the health of your trees and soil. Reducing the amount of water applied by extending the time between waterings is most important.

WTT

AESCULUS AND CARYA TREES DESERVE SECOND CONSIDERATION

By Douglas Chapman, Horticulturist, Dow Gardens, Midland, MI

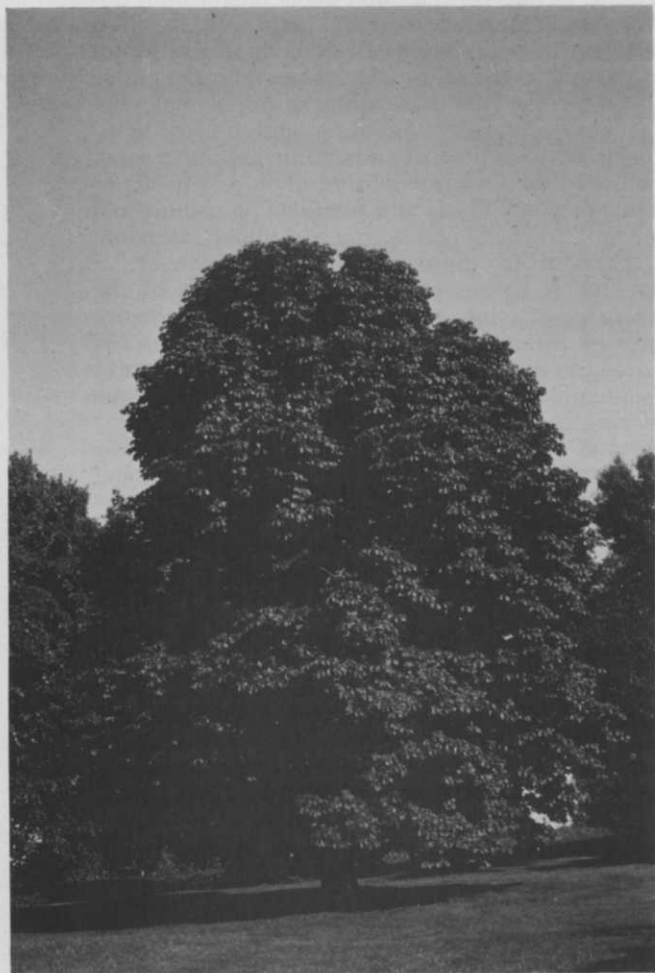
Horsechestnut, Ohio Buckeye, and hickory are trees that may have been overused in the past but deserve a second look; two for large area landscapes and the other for residential landscapes.

Common Horsechestnut (*Aesculus hippocastanum*) is a large upright, oval tree. Commonly, the landscape effective height is 50 to 75 feet, but it has been reported to reach 100 feet in height. This tree is striking when in full bloom during late May with showy yellow and red flowers borne on panicles, five to eight inches long and four to six inches wide. Normally, it is a biennial bloomer. The fruit can be a maintenance problem during the fall but children enjoy collecting and making pipes (fruit is not edible). The foliage is initially light green turning a rich dark green for the summer. The palmately compound leaves with the seven leaflets add a somewhat coarse texture to the plant. When the leaves first unfold, they are light green turning a good dark green for the summer. Fall color is not dependable, but when develops, it

ranges from a poor brown to a light yellow. This fall color, which dependably develops on a few individual trees, may be a reason to select and introduce a new cultivar into the trade.

Although Common Horsechestnut is usually propagated by seed, we have been able to propagate it by cuttage. Cuttings should be taken as soon as elongation is six to eight inches (before flowering). These cuttings are treated with Hormodin No. 3 mixed with 5% Benlate and placed under intermittent mist. Within six weeks, one can expect 80 to 90% rooting. The young trees, with their well-developed, yet coarse root system, should be potted into half-gallon containers, grown for the rest of the summer. This young tree can then be planted out the following spring after being overwintered in controlled storage.

Horsechestnut is a large tree which can be used as a landscape specimen in institutional grounds, golf courses, or parks. It thrives in well-drained, fertile soil. The reported insects or diseases of Common Horsechestnut aren't catastrophic. In



Large Common Horsechestnut normally blooms every other year with showy yellow and red flowers.



Flowers of Ruby Red Horsechestnut are bright red contrasted against a dark green leaf.

Southern Illinois, leaf blotch is a problem, but in Northern Illinois and throughout much of Michigan, leaf blotch need not be a concern. Many have reported Common Horsechestnut to be somewhat weak wooded, but during the most severe ice storm of the century to hit Central Michigan (1975), this tree was least damaged. Nino Mauro, Forester, City of Saginaw, reported that Common Horsechestnut showed little damage, while oak, elm, and Sugar Maple were broken apart due to the storm. *Aesculus hippocastanum* thrives in urban conditions and, because of its density, grass does not thrive under its canopy. Leaving these lower limbs on the tree decreases maintenance, while protecting the trunk from lawn mower damage. Further, leaving the lower branches on enhances the form of these trees.

Ruby Red Horsechestnut (*x Aesculus carnea* 'Briotti') has many of the desirable characteristics of Common Horsechestnut, but lacks fruit which



Shagbark Hickory Leaflets are bright yellow-green during late fall.

can be a maintenance problem. Ruby Red Horsechestnut has the same oval habit but is significantly smaller, reaching only 30 to 50 feet in height. The red flowers are outstanding, being contrasted by an extremely dark green leaf. This tree shows resistance to leaf blotch and isn't affected by leaf scorch (a physiological disease which often defoliates Common Horsechestnut). If a medium-sized tree, which adapts well to residential landscapes as well as parks, is desired, Ruby Red Horsechestnut is a good alternative.

Ohio Buckeye (*Aesculus glabra*) is an effective specimen tree in residential or park landscapes. Its habit is a dense, broad oval, reaching 30 to 40 feet in height. The palmately compound leaf, with five leaflets, is striking as it is one of the first to unfold in the spring. The yellow-green flowers are borne during mid-May on four to seven-inch long by two-inch wide terminal panicles. The flowers are exciting upon close inspection but add little to the



Fruitless Ruby Red Horsechestnut is smaller than the common horsechestnut, exhibits resistance to leaf blotch and scorch, and has bright red flowers.

overall landscape. The summer color is a shimmering bright green followed by a dependable yellow to orange fall color. This medium-sized tree can be effective when used in natural settings or specimens for residential or large area landscapes.

There are no catastrophic insects or diseases of Ohio Buckeye. Leaf scorch (a physiological disease often during late summer) causes defoliation of Common Horsechestnut, but rarely affects the Ohio Buckeye. Although leaf blotch, powdery mildew, and anthracnose can affect the foliage, they rarely cause severe defoliation or damage requiring control. Insects are numerous, but annual spraying isn't needed. A plantsman can watch insect populations, spraying only when necessary.

Shagbark Hickory (*Carya ovata*) is a large tree reaching 60 to 85 feet in height, with a narrow oval habit of growth. The flowers are ineffective. The fruit is edible but adds little to the landscape. It has pinnately compound leaves which are a bright yellow-green early in the spring with the five leaflets showing a brilliant yellow to brown color during late fall. The bark becomes characteristically shaggy in long platelets after the stems reach six to eight inches in diameter.

Hickory is a good companion plant for oak or horsechestnut. It thrives in fertile, yet well-drained soil, although it can adapt to many soil types. Although there are some insects and diseases that affect Shagbark Hickory, none are catastrophic. Hickory is difficult to transplant as it has a very deep taproot — this fact limits its availability in the trade. Landscape use is restricted to institutional grounds, parks, golf courses, or large natural plantings.

In general, Common Horsechestnut, Ohio Buckeye, and Shagbark Hickory are most effectively used in large area or golf course landscapes, while Ruby Red Horsechestnut and, in some instances, Ohio Buckeye fit into residential landscapes. All of these trees thrive in fertile, well-drained soil. In native situations, hickory and oak are climax forests. They require only corrective pruning when young; therefore, are relatively low maintenance. For urban conditions, Ruby Red Horsechestnut is most tolerant, followed by Common Horsechestnut, Ohio Buckeye, and lastly, Shagbark Hickory. These trees can be outstanding additions-variations to the landscape, while requiring relatively little maintenance.

WTT

NEW EVIDENCE INDICATES GREENBUG OVERWINTERS IN NORTH

By Harry D. Niemczyk, Professor of Turfgrass Entomology, OARDC, Wooster, Ohio

The greenbug, *Schizaphis graminum* (Rondani), is not a new pest. It has been responsible for injury to a number of grassy plants, including barley, oats, wheat, and sorghum, since it was first discovered in the U.S. in 1882. Significant damage occurs annually in Texas and Oklahoma and occasionally as far north as Minnesota. Perennial bluegrass is known to be a host of this aphid, but prior to 1970 the aphid rarely caused damage to turfgrasses. The reports of damage to Kentucky bluegrass in Illinois (WTT, October 1978) and recent occurrences in Indiana (Indianapolis), Missouri (St. Louis), and Kansas (Kansas City), indicate a new association with turfgrasses. This association suggests that a new biotype has evolved which prefers perennial bluegrass over other host plants

Life History Unknown

Despite the fact that the life history of the greenbug as a pest of grain plants is well known, its association with turfgrass has never been studied. A key question is how infestations originate on home lawns? One theory is that the annual spring influx of aphids from Texas or Oklahoma on southerly winds is the source. While it is known that greenbugs are carried north on such winds and probably do establish on home lawns, it seems at least highly unlikely that such migrants could reinfest the same Ohio homelawns year after year while others nearby are not infested.

A more plausible explanation is that some of the aphid population overwinters, probably in the egg stage. This theory is supported by two facts: (1) up to 8 egg-laying females per square foot were collected from infested lawns in Columbus, Dayton, Cincinnati, and Toledo, during October-December 1979; (2) greenbug nymphs (young aphids) were collected from some of these lawns April 1, 1980. Our ability to deal with this pest now and in the future requires that its life cycle on turfgrass be known. It will be studied in 1980.

Damage

The greenbug damages grasses in several ways. With piercing-sucking mouth parts, it pierces the grass blade and sucks out the sap of the phloem. This feeding by large numbers of aphids (4,000 per square foot quite common) seriously weakens plants. In addition, the greenbug secretes a salivary substance which it injects into the plant as it feeds. This substance (phytotoxin) causes the tissues to die, giving damaged plants a burnt-orange color. There is a strong possibility that the phytotoxin is translocated within the plant and may weaken the root system.

Greenbug damage to Kentucky bluegrass in Ohio was first reported by lawn care firms on a few home lawns in Dayton, Ohio in 1973. Infestations were seen in shaded areas under trees but were also noted in open locations. Infested bluegrass turned a characteristic yellow to burnt orange

color. If left uncontrolled, grass in infested areas was killed.

Since 1973, the incidence of infestation and damage from this aphid has increased steadily until it is presently considered a major pest of homelawns in Dayton, Cincinnati, and Columbus and certain areas of Toledo. Infestations now commonly occur in boulevards and turf islands in parking lots, with and without shaded areas. These areas and many homelawns become reinfested annually. Some have been infested as many as four years in succession.

Insecticide Resistance

Initially, a single liquid application of chlorpyrifos (Dursban®) or diazinon apparently gave acceptable control. However, in 1978, lawn care firms reported a resurgence of greenbug populations 2 to 3 weeks after applying chlorpyrifos or malathion at 1 lb AI/acre. Three and sometimes four applications were made to suppress the population and minimize damage. Despite these efforts, many home lawns were damaged so severely that replacement by resodding or reseeding was necessary.

The resurgence of populations after repeated applications of chlorpyrifos, diazinon or malathion strongly indicated resistance to these organophosphate (OP) insecticides had developed. Therefore, with this assumption, a "crash" program was initiated from July to November 1979 to test alternative insecticides. Funds provided by a few lawn care firms to help cover wages and travel expenses got the program started.

Tests on Home Lawns

Home lawns in Columbus and Dayton which had received liquid applications of either chlorpyrifos or diazinon during June or July, but were still heavily infested with greenbug, were used as test sites for two carefully selected test insecticides; acephate (Orthene®), a different OP; and pirimicarb (Pirimor®), a carbamate. Orthene is a systemic insecticide of known effectiveness against other species of aphids. Pirimor, a translaminar material (moves across the leaf but does not move through the plant) is known to kill aphids only, leaving other insects unaffected.

Working in a cooperative research effort, applications in Columbus and Worthington were made from a ChemLawn Corporation service truck at a volume of 4 gal. per 1,000 sq. ft. In Dayton, similar applications were made with Leisure Lawn Corporation equipment at one gal. per 1,000 sq. ft. All treatments were made by an experienced operator.

The greenbug population at each test site was sampled the day of treatment before application and at intervals thereafter. Four to eight circular samples of turf 3.75 inches in diameter by 3 inches

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WEEDS TREES & TURF

Just fill in card... (all items must be completed before inquiries can be processed).
Check one box in each category.

- 1** Check one that best describes your primary business/industry:
- 11 Aerial Applicator
 - 12 Apartment Grounds Management
 - 13 Apartment/Condominium Grounds
 - 14 Athletic Field/Sports Complex, Mgr.
 - 15 Arborist/Tree Specialist
 - 16 Cemetery Grounds Care
 - 17 Christmas Tree Farm
 - 18 Conservation District Agent
 - 19 Contract Chemical Applicator
 - 20 County Extension Agent
 - 21 Forest/Forestier
 - 22 Fertilizer/Forester
 - 23 Garden Center
 - 24 Government Grounds Maintenance
 - 25 Golf Course
 - 26 Hospital or Nursing Home
 - 27 Industrial or Office Park Grounds Mgr.
 - 28 Land Reclamation Specialist
 - 29 Landscaping Architect
 - 30 Landscape Contractor
 - 31 Lawn Care Specialist
 - 32 Lawn Maintenance Service
 - 33 Nursery/Wholesale Grower
 - 34 Parks Management
 - 35 Roads Right-of-Way Mgr.
 - 36 School/College/University Grounds Mgr.
 - 37 Seed Grower
 - 38 Soil Mgr.
 - 39 Utility Co., Railroad Right-of-Way Mgr.
 - 40 Other _____
- 2** Check one which best describes your buying responsibility:
- 21 Purchase
 - 22 Specify or recommend purchases
- 3** What is your estimated annual expenditure for each of the following:
- 3A/ Chemicals (for weed, disease and pest control)**
 - 31 Up to \$1,000
 - 32 \$1,000 to \$5,000
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PESTS

Management program fights gypsy moth

The U.S. Department of Agriculture has formulated a plan it hopes can contain the gypsy moth, which last year stripped 643,000 acres of forests in 12 states at a cost of millions of dollars.

To coordinate the plan, the USDA formed an interagency steering committee. It consists of representatives of the USDA's Animal and Plant Health Inspection Service (APHIS), Forest Service, and Science and Education Administration and affected states. Subcommittees on research, operations, and information provide backup for planning control, regulatory, detection, and other aspects of the effort.

When outlying infestations are discovered, they are wiped out in carefully planned operations by APHIS in cooperation with the affected state. State, federal, and local officials carefully consider alternatives and present their plans to residents at public meetings.

Trying to eradicate the moth from the entire United States would involve unacceptable dollar, manpower, and environmental costs and might well be impossible in any case. But the present program is buying time for the uninfested area while better pest management systems are developed to deal with the gypsy moth.

EXTENSION

Shoulders of VPI retires from turf

John Shoulders, well-known professor of agronomy and extension turf specialist at Virginia Polytechnic Institute, has retired after 28 years of service in turf and forage work.

Shoulders helped create and occupied the new position of extension turf specialist in 1966. His many

accomplishments include fall and winter nitrogen fertilization, doubling the state's alfalfa production between 1952 and 1961, and tripling corn silage production between 1952 and 1966. In 1977 he was honored as a fellow in the American Society of Agronomy, the highest honor the organization bestows upon its members.

Shoulders plans to remain in

Blacksburg and maintain an interest in turf programs.

TRENDS

Scotts research shows home fix-up to rise

A nationwide survey conducted for O.M. Scott & Sons by Home Testing

Continues on page 68

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Flail type mowers have a reputation for being safer than rotary type mowers. Mott Mowers... with their lightweight knives... are the safest of the flails.

More **VERSATILE** in mowing performance, Mott Mowers cut everything from fine lawns to high weeds.

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At the heart of our system is the Cushman 3- or 4-wheel Turf-Truckster vehicle. With a rugged 18-hp engine, and a transmission designed to allow the optional PTO to attach directly to it, the Turf-Truckster moves people, tools and equipment quickly and economically.

But the real beauty of the Turf-Truckster is that it also helps your crew finish most turf jobs fast, thanks to a full line of optional Cushman attachments.

Each attachment secures to your Turf-Truckster's chassis in minutes, through Cushman's pin-disconnect system. You don't bolt or hitch, but just put the attachment in place,

snap-in two or three pull pins and you're ready to hit the turf.

And every optional Cushman Turf-Care attachment is engineered to get its job done neatly and in as little time as possible.

1. GREENSAVER® AERATOR.

The Greensaver lets you aerate greens, tees or other turf areas up to 10 times faster than walk-type units.

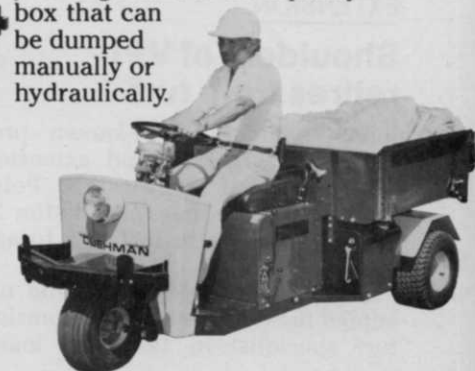


It attaches easily to either the 3- or 4-wheel Turf-Truckster. Choose the drum best suited for your turf: ½"

coring tines, ⅜" coring tines or slicing tines—they are all interchangeable. What's more, both coring drums collect cores as you aerate. Or remove the side plates and return the cores to the turf to be broken up as top dressing.

2. SHORT BOX & FLATBED/BOX.

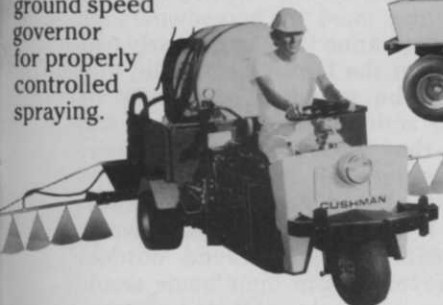
Your Turf-Truckster becomes a flatbed hauler with just two pull pins in place. Bolt on the optional side panels and tailgate to the flatbed, and you've got a 1,000-lb. capacity* box that can be dumped manually or hydraulically.



Write 121 on free information card

3. SPRAYER.

It's a 100-gallon polyethylene tank that holds liquids for spraying greens, trees, bushes or roughs quickly and accurately. Team it with the Turf-Truckster equipped with a standard 2 to 1 auxiliary transmission, optional PTO and ground speed governor for properly controlled spraying.



4. TOP DRESSER.

Compared to self-powered or walk-type top dressers, this unit pays for itself in the hours it can save your crew. A rubber fabric moving bed and rotating brush are regulated by



the vehicle's ground speed to maintain an even spreading pattern over a 31½" swath. And the hopper holds up to 1,000 lbs. of material from rock salt to powdered fertilizer.

5. SPREADER/SEEDER.

Mounted on the optional Short Box or Flatbed/Box, its cyclone action spreads up to 300 pounds of seed, sand, salt or fertilizer over areas up to 40' wide. The Spreader/Seeder is powered by the Turf-Truckster's optional PTO with extension shaft. And since all controls are operated from the driver's seat, one man can get the job done.



6. QUICK AERATOR.

We call it the Quick Aerator because its 46" wide swath lets you finish big aerating jobs fast. It can also move from job to job fast, because it can be



hydraulically lifted by controls from the driver's seat for ground transport (optional hydraulic system and dump set required). Three tine styles are available for different soil conditions: slicing, coring (2 sizes) and open spoon.

7. GRADER/SCARIFIER.

Now you can groom non-turf areas with your Cushman Turf-Care System. Attach the new Grader/Scarifier to your Turf-Truckster and you're ready to break up compacted dirt on ball diamond infields or golf car pathways. As a professional grading tool, it will keep your grounds even, or create new surfaces. There's a built-on dragmat holder, driver-operated controls and an optional scarifier replacement bar with extra-close 1½" tooth spacing.



8. POWER CONVERTER.

The Cushman Power Converter turns your Turf-Truckster into a mobile power plant for electric tools, floodlights . . . anything with a universal motor that draws up to 120 volts DC. So, instead of bringing every repair job back to the shop, your crew can handle them in the field. The Power Converter is inexpensive, easy to install and makes your Cushman System even more versatile.



9. CUSHMAN RUNABOUT.

If you need a vehicle for moving people and equipment efficiently, consider the Cushman Runabout. Either the two-man 18-hp Runabout, or the one-man 12-hp model. Both give you maneuverability and feature a big pick-up box, and 3-speed transmission. And both Runabout models let your crew get to the job without tying up a golf car that could be on the course earning a profit.



The Cushman Runabout. The Cushman Turf-Truckster. The Cushman Turf-Care System. They're all designed with the kind of quality you've come to expect from Cushman. And common sense engineering for less downtime, helping you hold down rising operating costs.

If you'd like to see our turf system in action on your grounds, return this coupon. Your Cushman Turf Dealer is ready to demonstrate our labor-saving System to you now.

*Rating for vehicle equipped with 9.50-8 rear tires.
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Irregular growth of turf in stratified soil when maintained with plain water



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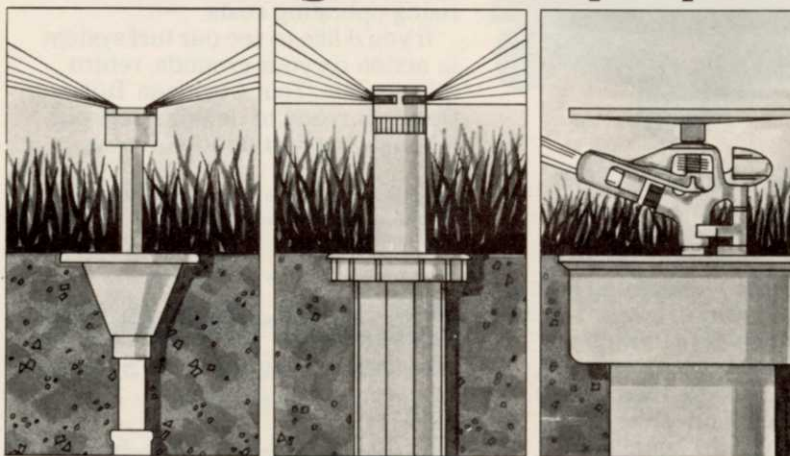
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From residential to light commercial turf installations, Champion has a pop-up to do the job! When you compare the cost, precision construction and performance, you'll buy Champion. The 18HP (2" pop-up), the P180 (2½" pop-up) and the 6178 Impulse pop-up are just three of over one-hundred fifty sprinklers,

valves, controllers and accessories featured in the new Champion, full-color catalog. Ask for your free copy.

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News from page 65

Institute indicates that homeowners will spend more time at home and spend more money on lawn and garden material.

Lawn care and gardening were the activities cited by homeowners for extra attention this year. Nearly two-thirds of the family heads said they would be spending more time on these activities and more than half said they would be spending more money on their lawns and gardens. Beside the enjoyment of an attractive lawn and garden, homeowners indicated they believed outdoor improvements to their home would increase the value of their property.

More women indicated a role in the care of lawns, nearly 40 percent, compared to 68 percent of the men. Sixty percent of women indicated a role in gardening.

Other surveys have predicted a significant increase in gardening this year, especially vegetable gardening.

TURF

Awards given at Midwest Conference

Two students, a leader in the turf industry, and the director received recognition at the Midwest Regional Turf Conference at Purdue University.

Stephen Biggers IV and David Shifley received Purdue turf scholarships and checks for \$250 from the TUCO Div. of Upjohn Co., Kalamazoo, MI. Ben and Dorothy Warren of Warren's Turf Nursery, Palos Park, IL, were recognized for their educational efforts in the sod industry and Dr. W. H. Daniel, director of the conference, was given a surprise roast and recognition for his 30 years in turf.

Stihl participates in lumberjack contests

For one week in July, the Annual Lumberjack World Championships bring the sound of axes striking wood and thousands of people to little Hayward, Wisconsin.

Stihl Inc. has decided to participate with a full sponsorship in the contest after a limited sponsorship last year. The company will be involved this way for the next three years.

Introducing the W4 Tough little mudder.

The go-anywhere articulated loader with 35 hp diesel engine.

Now you can handle more tough loading chores around the jobsite with a new breed of loader for today's construction... the Case W4!

New center-pivot steering joint means 70° articulation... plus 16° oscillation. This rugged new joint protects vital drive components from damage... means high ground-clearance. It lets W4 crawl through mud and muck. And climb over ruts and hilly areas. The front and rear wheels always follow the same track.

With 35 horses (26.4 kW) inside a stout 5-main bearing, liquid-cooled diesel engine, the W4 loader is always ready to go. And for sheer brute capacity, W4 boasts an operating load of 778 kg (1715 lbs) with the .38m³ (1/2 yd³) standard bucket.

Easy operation and articulated design make the W4 easy on the operator. Hydrostatic drive lets him work at speeds up to 7 kph (4.4 mph)... 20.4 kph (12.7 mph) in transport.

A simple hand lever selects forward, neutral or reverse — while a foot pedal controls power and speed.

The self-leveling mechanical loader automatically levels the bucket in raise cycle... lets you concentrate on maneuvering. And W4's hood swings up for easy access to all routine maintenance areas.

Check out this "Tough little mudder" soon at a Case Underground dealer near you. It's the first loader that's **doing something about it** to get more work done on the jobsite.

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W4 with new forklift option increases job versatility.



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VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *What can you tell me about Pine wilt? It was suggested as a possible cause of the death of a client's red pine, but I have not been able to find any information.*

A: Pine wilt disease was first reported in the United States in Missouri in 1979 and has now been identified in 15 states from Missouri to the East Coast. The disease is caused by the pine wood nematode *Bursaphelenchus lignicolus*. Austrian, red, Scot's, white, slash, Virginia, and Swiss stone pines are particularly susceptible.

The only external symptom is wilting, followed by yellowing, then browning of the needles, starting at their base and extending to the tips. A pine that has been killed will generally retain the needles for a period of time because death is so rapid. When infested trees are cut, the wood, rather than being pitchy, appears dry with little or no resin.

The nematodes are spread by one of the long-horned beetles or roundheaded borers. The adult beetles principally attack freshly cut, dying or recently dead trees, although when the adults first emerge they seek fresh tissues of healthy pines for their first feeding. The boring wound is inoculated with nematodes as the beetles feed. The nematodes multiply to enormous populations, migrate to the vascular system and plug the conducting cells.

Once the disease has been confirmed, remove the dead tree as soon as possible to reduce the source of nematodes. There are no other control procedures at this time.

Q: *Is it true that only the current season's wood conducts water in trees? Would this be the best area to inject chemicals for protection from insects and fungi?*

A: Angiosperms are classified as ring-porous or diffuse-porous. In ring-porous trees, such as oaks, ashes, and elms, the diameters of the xylem vessels formed early in the growing season are much larger in diameter than those formed later. In diffuse-porous trees, such as poplars, maples, and birches, the vessels generally are approximately the same diameter throughout the growing season.

There is considerable difference of opinion concerning how much of the sapwood is actually involved in water conduction. In at least some of the ring-porous trees, most of the water moves in the outermost annual ring, although some movement may occur in the late wood of the preceding year. In diffuse-porous trees and conifers, a considerable number of annual rings usually are involved in water conduction.

Injection of pesticides should be made in the outermost annual rings for best absorption and translocation. The pattern of sap ascent, that is, whether it is a spiral pattern or direct vertical as-

cent, will also affect the distribution of pesticides throughout the crown.

Q: *What cultural practices will help develop a better root system so turfgrass will be less susceptible to damage during hot, dry weather?*

A: Excessive nitrogen, close mowing, frequent light watering, compacted soils, and heavy thatch reduce rooting and/or decrease rooting depth. Any cultural practices which correct these problems will help turfgrass develop a more extensive root system.

Q: *What would make a fruit tree break off at the graft union? The tree was over 10 years old and appeared healthy.*

A: Symptoms of graft incompatibility may range from complete failure of the root stock and scion to graft to vigorous growth the first year followed by slow decline. In some cases, symptoms of incompatibility such as chlorosis and leaf shedding may not be apparent until many years after grafting.

Q: *How safe is Dipel and how effective is it against gypsy moth?*

A: Dipel contains spores and crystalline endotoxin produced by *Bacillus thuringiensis* Berlinger. It is considered harmless to humans and animals and is safe for the environment. At the present time there are no clearcut opinions on its effectiveness.

Q: *After a lawn has been sprayed with fertilizers and pesticides, is it safe to use the grass clippings on my vegetable garden?*

A: Broadleaved weeds are herbaceous dicots, and chemicals which control these weeds will also affect vegetables. Tomatoes, beans, and cucurbits are particularly susceptible. Therefore, it is not safe to apply fresh clippings from a treated lawn to a garden, although it should be safe to use the clippings after they have been composted for a season.

Q: *Can fritted trace elements be used along with fertilizers in a liquid spray system?*

A: Fritted micronutrients are special glasses that are not soluble and are very abrasive. You would not want to spray frits through conventional piston pumps.

Send your question or comments to: Vegetation Management c/o WEEDS TREES & TURF, 9800 Detroit Ave., Cleveland, OH 44102. Leave at least two months for Roger Funk's response in this column.