does not regulate specifics, such as irrigation equipment. Currently, only commercial customers using 100,000 gallons or more per day must file for a "withdrawal permit" from the Georgia Environmental Protection Division, but a bill to

lower that threshold has been introduced as H.B. 528.

Drought conditions of 1988 brought about the formation of the Georgia Water Wise Council.

Jeff Jordan board member and professor of Agricultural Economics

at the University of Georgia. recalls Water-Wise's beginning as "one contentious meeting." The water utility had proposed shutting off the supply to landscaping completely. Today, the council brings together university faculty, the state EPA, municipal and water utility personnel and members of the Georgia Green Industry Association. The post of council president is shared on a rotating basis between representatives of each interest group.

The result of council's interaction is the development of a cooperative approach for Georgia, to conserve water without limits on landscapes.

#### California 'BMP' revision

Water utilities, environmental groups and "other interested parties" (the category green industry associations fall into) signed a "Memorandum of Understanding" in California in 1991. Signatories of this document pledged themselves to certain "Best Management

Practices" if they proved cost effective.

The BMPs, a voluntary effort, are now under revision because they weren't specific enough and water savings could not be quantified.

The most recent set of revi-

sions do not offer the changes the California Landscape Contractor's Association hoped to see. says CLCA's Director of Governmental Affairs, Larry Rohlfes.

CLCA supports self-regulation, such as water budgets for landscapes, based on

100 percent ET values for turfgrass and water rate structures that penalize waste.

Jeff Jordan: 'Water

working in Georgia.

Wise' council is

Otay Water District in Spring Valley, Calif. and Irvine Ranch in Southern California have already adopted these strategies, but older utilities faced with the cost of retrofitting meters, in addition to political considerations, have delayed making a change.

"Another factor to consider," adds Jan Tubiolo, water conservation coordinator for the Otay Water District, "is the financial or staffing capability of an agency to implement the sophisticated computer data base tracking system required." Smaller agencies, says Tubiolo, have limited revenue.

The Otay Water District developed a budget-based Water-Efficient Landscape Irrigation Ordinance to assist commercial irrigation customers in their efforts to reduce water consumption and to achieve savings through reduced water demand. A one-year study used base-year consumption data and 30 years of weather data, based upon a reference evapotranspiration (ET) for the area.

"Commercial irrigation accounts have water use allotments set by their reported square footage. The annual allocation is seasonalized," says Tubiolo, "and unused water is banked, to allow them to avoid incurring overuse penalties while using their allocation during brief hot spells, or while establishing new plantings or in the event of system breaks.

with irrigation accounts an annual allocation of water. Monthly water use for irrigation needs is monitored by computer.

"Over-use penalties are automatically set and compliance is enforced through the billing system."

Tubiolo says the water demand on the district was reduced 23 percent the first year.

"Landscape water management is now certainly practiced as more of a science than as an art," says Dave Hanson, vice

presiden, regional manager and director of technical support, Environmental Care, Inc. ECI is a division of Environmental Industries, Calabasas, Calif. As new regulations dictate how new landscapes will be

designed and irrigated, landscape managers have responded by combining common sense with new technology, says Hanson, a specialist in issues concerning chemical technology and turfgrass science.

Says Hanson, "Common sense changes include eliminating small, difficult-to-irrigate areas; separating plant material into irrigation zones (hydrozones) based on water use requirements; reducing the amount of turf in non-functional areas; and utilizing reclaimed water when possible."

#### Hardware solutions

Lynda Wightman and Eric Bescoby are involved in the issue from the product manufacturers' point of view. Wightman as sales education manager for Hunter Industries, and Bescoby as general manager of Rain Bird's Golf Division.

"As I talk to people, I find water conservation concerns are everywhere, even in places you wouldn't expect to find them," says Wightman.

"It's not confined to Southern California."

Equipment makers are doing what they can, says

> Wightman, to invent the technology needed to save every extra gallon.

"In today's equipment, you see more specialty features: adjustable arcs; more versatile pop-up strokes; efficient swing joints; adjustable sprinkler



Tubiolo: law sets water budgets.

Water budgets, explains Tubiolo, give customers

Hanson: common-

sense changes can

be made.

### Ways to conserve

Forward-looking manufacturers are always looking at ways to make their equipment better address the following key areas of opportunity for good irrigation management practices.

1. Education of industry professionals. Irrigation product manufacturers, along with landscape architects and irrigation consultants have taken the lead in educating industry professionals about the basics of irrigation design. Rain Bird has taken a pro-active role with the Irrigation Association in promoting water conservation.

2. Placement of irrigation water. The design and installation must put water only where it is needed, not on street, sidewalks or walls.

3. Application rate of irrigation zone needs to match soil absorption rate.

4. Apply water in an irrigation zone uniformly. Note how evenly water is applied.

> 5. Use 'deficit watering'. Apply water today based only on the amount of water that was evapotranspirated the day before. In order to replace water that has been evapotranspirated, do I have to add 10 percent more (90 percent efficiency); 20 percent more (80 percent efficiency) or 50 percent more (50 percent efficiency) water through my irrigation system? Uniform water distribution can be a big factor in irrigation system efficiency.

Evaporation, misting, overspray, high pressure fogging and misadjusted sprinklers. mean that an irrigation system's efficiency will always be less than 100 percent.

Landscape drip watering is by far the most efficient way to water non-grass areas because pressure regulation, filtration and very slow application rates that are lower than the

soil absorption rate are standard when it comes to landscape drip system.

6. Control zones: move from electromechanical to 100 percent solid state and hybrid controllers, to increase precision.

7. Improve watering efficiencies: control water pressure or water flow at the point of water distribution; use pressure compensating emitters, pressure compensating modules and pressure compensating bubblers; improve the evenness of the water coverage through technological improvements in nozzle design. Karima Lalji, marketing coordinator, Rain Bird Sales, Inc. heads; and precipitation rates matched to different soil mixes.

"As a manufacturer," says Wightman, "[Hunter] works with customers, public agencies, designers, installers and maintenance personnel." to conserve more water.

"Even though 80-85 percent of California's water is used for agriculture, golf courses get a lot of public and press attention," says Bescoby. "They're easy targets for environmental and water use issues."

Bescoby cites an Irrigation Association study that says average water use on a California

golf course is 250,000 gallons per day.

"Reclaimed water is becoming the trend, and it can be done with a high degree of professionalism," says Bescoby. Other ways to save include reducing

runoff; more frequent turf aeration; drought tolerant grasses; weather stations: drip irrigation systems; and mulch.

#### Home of xeriscaping

The word "xeriscape" was coined in Colorado, when local green industry professionals first brought the idea of "water conservation through creative landscaping" to Denver Water's attention. (Denver gets less than 15 inches of rain a year.)

In 1982, they designed and constructed a demonstration garden on ½ acre of the water utility's land. Denver Water has sought to teach by example ever since. Eight years ago, it adopted a 10-year capital im-

provement plan to convert all of Denver Water's landscaped areas to a more water-efficient style. Now, even the turfed areas are irrigated supplements.

Denver Water sees potable water security as a global problem, that will only grow more difficult to solve, and has prioritized its strategy to meet demand. The plan includes conservation, use of reclaimed water and the development of a new supply.

Ken Ball, landscape architect and Conservation Analyst for Denver Water says the utility supports the use of alterna-

tive water sources

for commercial users

(such as by captur-

ing runoff), and pro-

vides engineering as-

sistance to projects

during the design

process to help de-

velop these outside

Denver Water's

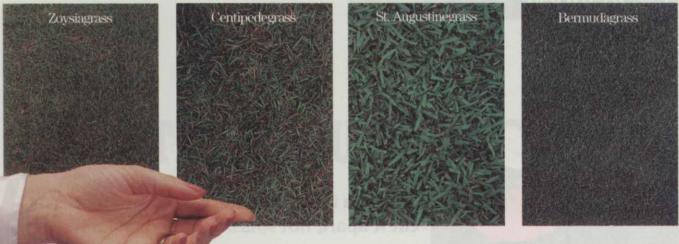
water sources.

Wightman: water issues nationwide

> overt restrictions on landscape irrigation are reserved for "crisis situations" only, and have been used in 1955 and 1977. LM

The author is a horticultural and irrigation consultant based in San Diego. "Xeriscape" and the phrase "water conservation through creative landscaping" are trademarked properties of the National Xeriscape Council, Inc. Additional reporting by Terry McIver.





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Husqvarna's 272S is a lightweight stump grinder with an 8-inch steel blade and anti-vibration technology. It folds and stores compactly.

# **STUMP CUTTERS**

## The idea is to grind the stump into pieces or cut it apart, not smash it into oblivion.

#### by CURT HARLER

To get the best use out of a stump cutter, make sure the teeth are sharp. A good set of carbide cutting teeth will last from two to four hours with normal operation. Of course, an old oak stump will be tougher to remove than freshlycut pine. Teeth should be sharpened after every four hours or after each job, whichever is sooner.

First, and foremost, say engineers with Vermeer, Pella, IA, keep safety in mind when sharpening teeth. Disengage the clutch, stop the engine and be sure all motion is fully stopped.

Engineers at **Crary Co.**, West Fargo, ND, recommend dry grinding when sharpening carbide teeth. It reduces the chance of cracking from insufficient coolants. It also allows better visibility and longer wheel life because you will have better control of the grinding action.

Be sure to move cutting teeth constantly whenever they are in contact with the grinding wheel. This has two advantages: it reduces the chance of uneven wear on the teeth, and it reduces heat concentration which often will damage

> the tooth. Carbide will retain its sharpness longer, cut faster and smoother, and will withstand the heat of use, but carbide teeth will wear.

> Engineers at MacKissic, Parker Ford, PA, note that keeping the teeth sharp will prevent frustration at the job site. The "digger" teeth on their cutters must be sharpened constantly because they are the most abused of the teeth. The diggers are the teeth set at a 45-degree angle. Other teeth are set at 25 degrees or straight.

> Sharpen the carbide portions of the teeth with a silicon carbide grinding wheel, the green-colored wheels. Steel sections should be cut with an aluminum oxide wheel. Steel can be ground with a carbide wheel (the gray ones), but the wheel will last longer if aluminum oxide is used. Carbide is a bit like the Wicked Witch of the West...although it's really tough, it can't tolerate water. Putting carbide cutter teeth into water immediately after grinding will crack the carbide tip. Avoid grinding on the face of the carbide which will reduce its thickness and weaken it, making it susceptible to chipping. Lastly, be certain the teeth or cutter wheel get bolted back on the machine at the recommended tightness. Don't over-torque. It is a good idea to retorque screws after running the machine for a couple of hours.



One of two models from Mackissic, Inc. Both with reversible handle bars. Automatic, self-aligning cutter head-to-shaft. Units require only two inches of clearance from walls, fences, trees.

#### **STUMP CUTTERS**

#### J. P. CARLTON (800) 243-9335 Circle No. 250

Models range from a 25 hp Kohler-powered unit,—the Model 2500-4—to a 106 hp turbocharged Deutz Diesel. An economical tow behind unit, the Model 3500 has an optional remote control. The Model 7500 is built with a 1½-inch thick, 31-inch diameter cutter wheel with 48 teeth.

#### CRARY BEAR CAT (800) 247-7335 Circle No. 251

Two tough units - the Bear Cat 71755 and 71785 - make guick work of stumps. The 71785 features a 7-inch diameter cutter head and a large enclosed drive shaft which prevents chips from building up in the belts and pulleys. The two-belt cutter-head drive system assures more positive power transfer. Unit runs on a Briggs & Stratton 8.5 hp industrial/commercial engine. The 71785 will remove an 8-inch diameter stump, 8-inches tall (four above ground, four below) in four minutes. A 15-inch diameter stump the same height is gone in 14 minutes. A single wheel brake allows the grinder to pivot and keep in position while grinding the stump.

#### HECKENDORN EQUIPMENT CO.

#### (800) 835-7805 Circle No. 252

Mounted on their own towable trailers, the Heckendorn Stump Remover line's depth of cut is controlled by a hand screw that makes it easy to adjust for maximum removal on each pass. Units come with four or six replaceable carbide teeth which can cut stumps standing 12 to 14 inches above ground and down to four to six inches below grade in minutes. The full 45 inch swing on the cutter disk ensures that even multiple stumps can be cut cleanly and simply. These are hefty units: the smallest, the 80301 with a 8 hp Kohler recoil start engine, weighs 350 pounds; the 80307-1 is 480 pounds and powered by a 13 hp Honda with electric start. Several models are in between. All have 2-inch trailer hitch balls. Just 32 inches wide.

#### HODGES MANUFACTURING CO. (501) 492-6116 Circle No. 253

The Bull and the Rhino stump cutters from Hodges Manufacturing, Mountain Home, AK, both are powered by 25 hp Kohler engines, and both feature standard carbide teeth. The Bull features a 15.25-inch cutter wheel and digs down 10 inches below the ground surface. It will handle stumps up to 24 inches above grade. The machine is less than a yard wide and weighs 715 pounds. The Rhino paws down 16 inches below grade and can handle stumps up to three feet high. It comes equipped with a hitch for easy transportation, and its sliding axle (from 34 inches to 52 inches) allows it to move through standard gates. Both units feature key start.

#### HUSQVARNA (704) 597-5000 Circle No. 254

The 272S is a lightweight stump grinder with the latest in anti-vibration and decompression valve technology. The unit uses an 8-inch steel blade with tungsten carbide tips. It is ideal for tree services. landscape contractors and companies that offer stump removal services, says the company. The unit folds and stores compactly for easy tranport. with "Smart Start" decompression valve, a simple push of a button opens a cylinder valve that reduces pressure during the piston upstroke, making the starter cord easier to pull. LowVib, two-mass antivibration system completely separates the engine section from the handle to dampen vibration.

#### LEVCO MANUFACTURERS, INC. (800) 524-9252

#### Circle No. 255

The HD45 grinder from Levco is a self-propelled model that fits through tight places. Its hydraulic drive makes operation safe for the operator and the unit is easy to keep running — there are no grease fittings, no gears to replace, no Vbelts to align, no chains to break. The larger TM540 works with any 30-80 hp tractor equipped with a 540 rpm pto. Optional chip curtain contains chips and sawdust produced by the spinning cutter drum. The TM540 will cut stumps of any diameter from 12 inches above grade to 12 inches below. The



The SG50 stump grinder with the 763H Bobcat. Its 3-inch wide cutting head has 34 teeth, and cuts down 20 inches below grade.

HD47D is a self-contained grinder that's pulled behind a pickup truck. Operating off a John Deere 40 hp diesel engine, it can cut stumps from 44 inches above grade to 22 inches below.

#### MACKISSIC, INC. (610) 495-7181 Circle No. 256

Handle even the toughest stump removal jobs with the Mighty Mac stump cutters from MacKissic, Parker Ford, PA. The new CPSC9V, with 9 hp Vanguard gas engine, joins the 5.5 hp CPSC5.5V. Both have reversible handle bars for front or rear cutting. The hefty 14-pound patented cutter head has the weight and speed for fast, smooth cutting. The cutter head is set 30 degrees off vertical, allowing it to work like a router. With teeth positioned at 45, 25 and zero-degree angles, the units require lower horsepower to cut through stumps. The automatic, self-aligning cutter head-to-shaft assures correct balance. These units require only two inches of clearance from walls, fences or other trees.

#### MELROE BOBCAT (701) 241-8700 Circle No. 257

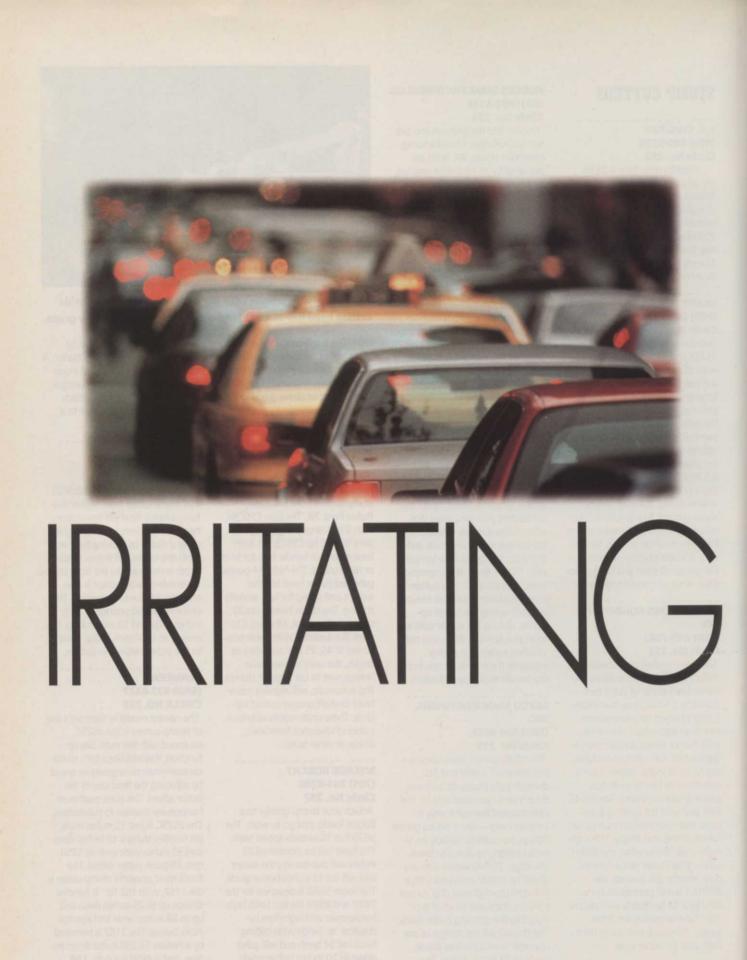
Attach your stump grinder to a Bobcat loader and go to work. The SG25 has 16 carbide-tipped teeth. The head can be sideshifted 25 inches without moving the loader and will cut 12 inches below grade. The larger SG50 is designed for the 763H and 853H loaders (with high horsepower and high-flow hydraulics). Its 3-inch wide cutting head has 34 teeth and will grind down to 20 inches below grade. The head can be sideshifted 50 inches without moving the loader. A control kit must be installed inside the skid-steer's cab before using a stump cutter. The whole system makes it easy to switch over to a bucket to pick up debris.

#### STEINER (216) 828-0200 CIRCLE NO. 258

The front-mounted quick hitch SC 101 stump cutter from Steiner features a heavy flywheel type cutterhead and hardened cutters. It chips away a stump by moving back-andforth at a controlled depth. Cutter depth is managed by the front lift while side-to-side motion is governed by the tractor's steering. The unit weighs 250 pounds, is 34.5 inches wide and 18 inches long. Operating at 1600 rpm, it digs down to five inches below the surface.

#### VERMEER (8880 837-6337 CIRCLE NO. 259

The newest model in Vermeer's line of stump cutters is the 252SC, equipped with the Auto Sweep function. It works like a car's cruise control-maintaining engine speed by adjusting the feed rate of the cutter wheel. This gives maximum horsepower needed to cut stumps. The 252SC is just 35 inches wide. vet handles stumps 13 inches deep and 39 inches wide with its 1250 rpm 16-tooth cutter wheel. The firm's most powerful stump cutter is the 1102, with 102 hp. It handles stumps up to 25 inches deep and up to 88 inches wide and also has Auto Sweep. The 1102 is powered by a Perkins T4.236 turbo diesel engine, and is 4650 pounds. LM



# RRITATING

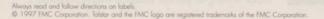
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Circle No. 115 on Reader Inquiry Card

# Disease control in cool-season ornamentals

By JOHN E. WATKINS/ University of Nebraska



Apple scab (above) is identifiable by its scablike, olive-colored lesions. Right: black spot on rose leaves appear as circular, black lesions with fringed or feathery margins.



mamentals, because of their versatility, are the basis of any landscape design. Unfortunately a number of plant pathogens attack ornamentals, and when a disease gets out of hand the popularity of an ornamental falls rapidly. Ornamentals require proper care, including

disease control, during the growing season. This article focuses on general groups of ornamental diseases and uses specific examples for illustration.

#### **Rust diseases**

Yellow to orange to reddish brown pustules form on leaves, twigs and fruits. Rust fungi have interesting life cycles and many, like cedar-apple rust, require two different plant species to complete their life cycles. The bright orange gelatinous swellings with finger-like tendrils on junipers in May signal the presence of cedar-apple rust for another season. Spores produced within these tendrils infect crabapple leaves where orange spots appear on the upper leaf surface with finger-like tubular structures projecting from the lower leaf surface. Other rust diseases occur on roses, hollyhocks, snapdragons, asters and geraniums. **Powdery mildew** 

Powdery mildew is the name for the grayish white powdery coating consisting of fungus mycelium and masses of spores growing on plant leaves, shoots and flowers. This disease is caused by a distinct group of similar fungi that attack lilac, zinnia, phlox, rose and many other flowers, shrubs and trees. Although powdery mildew-infected plants rarely die, the disease detracts from the natural beauty of ornamentals. Damage ranges from an unsightly white powdery coating on the foliage to malformation of leaves, destruction of flowers and stunted growth.

#### **Bacterial diseases**

Fire blight and crown gall are serious diseases of woody ornamentals. With fire blight, infected twigs of crabapple, hawthorn, cotoneaster, pyracantha, mountain ash or other hosts form a cane-like shepard's crook at the tips. Leaves rapidly wilt and turn brown to black, hence the name 'fire blight'. Crown gall causes rounded galls with irregular rough surfaces on stems and roots of a great number of plant species. Euonymous, honeysuckle, rose and wisteria are common shrub hosts. Infected plants lack vigor and fail to produce quality flowers. Another important bacterial disease is bacterial blight or wilt of geranium which in the landscape actually starts with infected cuttings in the greenhouse. Symptoms include wilting at the leaf margins which produces a pronounced V-shaped, yellow lesion bounded by veins. Infected stems blacken and shrivel. Scab, spot & blight diseases

Scab diseases of pyracantha and crabapple, although caused by different fungi, have similar symptoms. These are scab-like, olive-colored lesions on leaves and fruits. Black spot of rose is a prime example of a destructive leaf spot disease. The spots are roughly circular, black lesions with fringed or feathery margins. Infected leaves yellow and drop off throughout the growing season leaving the rose unsightly and prone to winter kill. Phomopsis twig blight causes a progressive die-back of landscape junipers and arborvitae which severely detracts from the landscape when junipers are used as focus plants. **Mosaics & aster yellows** 

Symptoms of rose mosaic are a light green to bright yellow mosaic patterns on the leaves. The viruses that cause rose mosaic diseases are carried in buds, scions and root stocks. There is no known cure for rose mosaic. However, symptoms are usually not severe enough to require removal of the plant from the landscape. One of the most striking symptoms of aster yellows is the abnormal production of secondary shoots. These shoots are deformed, yellowed and often brittle. The internodes of the main stem are shortened and the flower heads dwarfed and deformed. Aster yellows is common on many annual flowers such as asters and strawflower.

Approach disease management in the landscape from a holistic plant health view point which includes the categories of :

exclusion which concentrates on preventing pathogens from entering the landscape and involves sanitary and regulatory practices.

eradication removes the pathogen from the landscape by removing and destroying infected plants and plant debris and by treating annual beds with a soil-applied fungicide.

▶ immunization. Although you cannot immunize plants in the same manner that animals are immunized against disease, you can immunize them by using disease resistant cultivars, by treating roots with biological control agents or by applying a systemic fungicide.

▶ protection involves treating disease-susceptible plants with a fungicide before infection occurs. Although these practices sound somewhat theoretical, they do work when used in an integrated disease management program. LM



Rust diseases are characterized by yellow to orange to reddish brown pustules on leaves, twigs and fruit. There are many rust diseases.

## Fungicides for disease management in landscape ornamentals

#### Bordeaux mixture

Dormant application for anthracnose and other diseases.

Triforine (Funginex) Rusts, powdery mildews and certain leaf spot diseases.

Mancozeb and Maneb Protectant fungicides for various foliar diseases. Triadimefon (Bayleton) Powdery mildews. Sulfur Organic fungicide for powdery mildew and other diseases.

Chlorothalonil (Daconil 2787) General purpose protectant fungicide.

Metalaxyl (Subdue) Phytophthora and Pythium root rots.

Fosetyl-Al (Aliette) Phytophthora root rot diseases.

Myclobutanil (Eagle) Systemic fungicide for rusts and powdery mildews.

**Iprodione (Chipco 26019)** Botrytis blight and Rhizoctonia root and stem diseases. Thiophanate-methyl (Cleary's 3336) Rhizoctonia root and stem diseases and certain foliar blights.

Propiconazole (Banner) Powdery mildew and leaf spots on certain ornamentals.

Fenarimol (Rubigan) Powdery mildew on certain ornamentals.

Agrobacterium radiobacter (Galtrol) Biological control of crown gall.

Streptomycin (Agri-Strep) Antibiotic for control of fire blight.

Captan General purpose foliar fungicide.

Lime Sulfur Dormant application for certain diseases.

Phaltan General purpose foliar fungicide.

\*PRESENTED FOR INFORMATION PURPOSES ONLY; NO ENDORSEMENT IS INTENDED FOR PRODUCTS LISTED, NOR CRITICISM FOR PRODUCTS OMITTED. CHECK WITH LOCAL SPECIALISTS FOR SPECIFIC RECOMMENDATIONS. READ AND FOLLOW LABEL INSTRUCTIONS. If 15 years of being the foremost fungicide isn't enough, might we snare you with our drum?

