evergreens fortunately do not appear frequently, for once a root disease becomes established, it is usually impossible to save or cure the infected plant. Control measures must be designed to prevent initial infection. Plants subject to root diseases should be handled with care to prevent root wounding. Only resistant species or varieties should be placed in a site which has a history of root infection, since root disease fungi are usually soil-borne and difficult, if not impossible, to eradicate. Under certain conditions soil fungicides can be of value in controlling root diseases.

Root Rot Of Pine Usually Only In Forests

Although considered a disease which is usually confined to forest plantings, root rot of pine caused by the fungus *Fomes annosus* has been found on a wide range of hosts and may eventually appear in ornamental plantings. The disease causes extensive damage in thinned pine plantations, but is rarely a problem in the Midwest on unthinned plantings. The disease fungus enters the host through wounds or cut stumps and spreads readily to adjacent healthy plants through root contacts or grafts. Trees affected by this disease appear suddenly to turn brown and die, although the fungus may have been present in the trees for one or more years before symptoms showed up. In late fall, fruiting bodies or conks of *F. annosus* may appear around the base of diseased trees beneath the duff or leaf litter.

Some control has been achieved in affected pine plantings by treating cut stumps with urea at the time of thinning. This practice promotes the growth of other fungi which colonize cut stumps and are antagonistic to *F. annosus*. If root rot appears in an ornamental planting, it is advisable to treat all wounds on susceptible evergreens with a good wound dressing and to remove all diseased plants and all slash and dead wood from the area.

In recent years the fungus *Phytophthora cinnamomi* has been identified as the cause of wilting and death of several ornamental species, particularly yews and azaleas. In Indiana, where considerable loss of yews in nursery fields has been observed, diseased plants became light green at first, and then dried out and died. In most cases brown streaking was found in the sapwood of the crown and larger roots.

In southern areas of the Midwest where azaleas are grown in the field and in greenhouses where potted azaleas are grown, *Phytophthora* root rot can become a serious problem. The foliage of affected plants becomes sparse and thin and tends to wilt with increasing frequency until permanent wilting and death occur. The wood of diseased plants usually show brown discoloration.

Potted plants may be kept free of *P. cinnamomi* with sterilized soil and disease-free planting stock. In addition, all benches and implements should be kept clean, and tools should be sterilized frequently wherever possible. If *P. cinnamomi* is found, all diseased plants should be destroyed, and all benches and the soil of apparently healthy plants should be drenched immediately at the rate of 2 pounds in 100 gallons of water with a Dexon-Terraclor fungicide mixture. Some control of root rot in the field with Dexon or Dexon-Terraclor has been reported. All diseased plants in the field should be destroyed, root wounding should be kept to a minimum, and only resistant species or varieties of ornamentals should be planted in fields where *P. cinnamomi* is present. Diseased plants cannot be cured by any method now known.

Fungi Cause Damping-Off

Several fungi cause damping-off or seedling blights. The most common ones are species of *Fusarium, Pythium, Phytophthora, Rhizoctonia,* and *Botrytis*. These organisms most frequently attack seedlings or cuttings, killing the tissue of roots and stems near the ground line and often causing affected plants to fall over. The standard control procedure for these diseases is soil sterilization, either by steam or fungicidal chemicals. Damping-off and seedling blights are common in seedling and cutting beds but occur only rarely under field conditions.

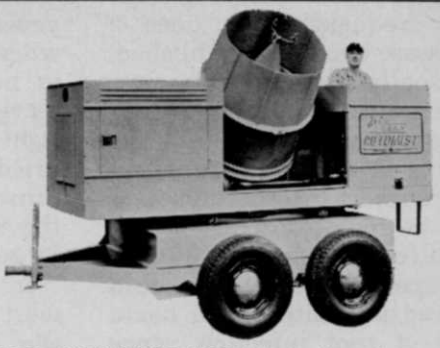
A fungus which can cause not only seedling blight but also death of young conifers in the field is *Cylindrocladium scoparium*. Spruce and red pine are most commonly affected. Symptoms appear as root rot, discoloration of crown and root tissues, and crown cankers resembling those of heat injury. Since the fungus is soil-borne, sterilization of seedling beds is recommended. Control in the field is more difficult, and resistant species or varieties of conifers should be used where this fungus is present.

Many Types Of Trees Hurt

The fungus *Armilaria melea* attacks a wide range of plants including many deciduous species and a few evergreens such as Douglas fir, pine, rhododendron, and yew. Affected trees are usually stag-headed and are easily blown over or uprooted by high winds because of their rotted roots. Black fungus strands called shoestrings may be found in the duff or soil around diseased trees, and white fungus fans or dark red, rootlike strands are present beneath the bark. Since weakened and injured plants are most susceptible to this disease, such plants should be fertilized and watered to protect them from *Armilaria* infection. No control is known to be effective once infection has taken place.

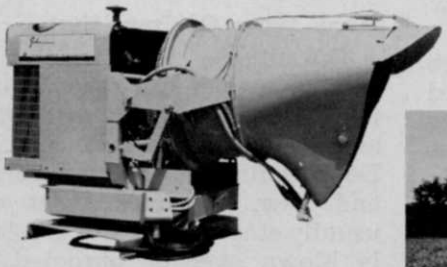
Wilting, dieback, and decline of a large number of plant species and varieties is caused by the fungus *Verticillium alboatrum*. Although most of the hosts are deciduous, occasionally an evergreen such as *Viburnum lentago* may be seriously damaged. The most obvious symptoms of Verticillium wilt are wilting and dieback, usually occurring over a period of several years. Most plant species infected with this fungus show discoloration in the sapwood. Since the fungus is soil-borne, control measures in the field are difficult. Root wounding should be kept to a minimum to prevent infection, and resistant species should be

MODEL 100G ROTOMIST® shade tree, sanitation, mosquito control, leaf windrowing. 29" fan delivers 28,000 CFM at 100 mph.



MODEL 303T ROTOMIST biggest performer among mist-type shade tree sprayers. 40" fan, 60,000 CFM air volume.

when it's shrubs or trees,

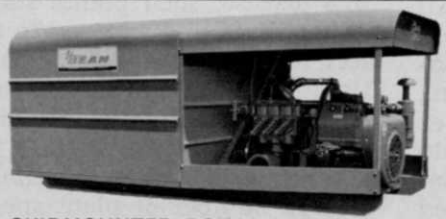


ROTOCAST® specially designed for roadside weed control. Teardrop discharge head provides reach plus close-in coverage.

Contourmatic boom provides maximum flexibility to follow roadside ground or brush line configurations.

TURFKEEPER handles high pressure spraying applications of liquid fertilizer, weed or brush control chemicals. 17-nozzle, 3-section boom, wide flotation tires.

roadside spraying or any other spraying job



SKIDMOUNTED ROYAL heavy-duty high-pressure sprayer models. 25, 35 and 60 GPM @ pressures to 800 PSI. Plus Royalette and Royalier models.

MODEL 1010G SPRAYER designed for golf course operation on a Cushman. 13-nozzle hinged boom, 100-gallon Fiber Glass tank, full-flotation tires.

...select JOHN BEAN

John Bean sprayers offer the widest selection, in air-type or high-pressure models, each one is job-designed for maximum efficiency. Send for free product catalogs, Dutch Elm and mosquito control kits.

fmc CORPORATION

POWER SPRAYING EQUIPMENT

JOHN BEAN

DIVISION

Lansing, Mich. - Orlando, Fla. - San Jose, Calif.

planted where Verticillium wilt has become a problem. In some cases diseased plants may recover following fertilization.

Practically all plants, including evergreens, may be damaged by a group of microscopic roundworms known as nematodes. In the past if a plant did not show symptoms of the nematode disease known as root knot, it was thought to be nematode-free. Recent investigations have shown, however, that many species of nematodes other than those causing root knot feed on the roots of ornamental plants and can cause damage. Symptoms of nematode attack may range from almost undetectable stunting to chlorosis; slow decline; increased susceptibility to diseases, insects, and winter injury; and death of affected plants.

The importance of nematodes is increased by the fact that injury or wounds caused by their attack may provide points of entrance for soil-borne disease organisms. In addition, some nematode species have been shown to transmit virus diseases. The true significance of nematodes in the culture of evergreens and other ornamental plants awaits further investigation, but all the facts point to nematodes as a cause of considerable concern to the entire ornamental plant industry. Increasing research in this field is already under way.

In addition to losses caused by disease organisms, many evergreen troubles are caused by adverse weather, nutrient deficiency, mechanical damage, and chemical injury. No standard set of procedures can prevent or control such a variety of troubles; consequently each has its own control recommendations.

Yellowing or chlorosis of evergreens may result from many different causes. Any disease, insect, or mechanical injury may bring about yellowing of foliage, but in most cases other symptoms are also present.

Chlorosis Remedied By N

Chlorosis most frequently results from the lack of an adequate amount of some nutrient, such as nitrogen or iron, in the soil. Nitrogen deficiency usually appears as a general yellowing and stunting of the plant and is easily remedied by the application of a standard high-nitrogen fertilizer.

Iron deficiency, on the other hand, appears as chlorosis or yellowing of interveinal tissues, while veins remain green. Iron deficiency chlorosis is most pronounced on the youngest growth and increases in severity with each new flush of growth. Although iron may be present in a soil, it becomes chemically bound under alkaline conditions, and some species of plants are not able to obtain it from the soil. For example, yews may be dark green and healthy in a soil with a pH rating of 7 or higher, whereas adjacent azaleas in the same soil are highly chlorotic. The ability to obtain iron is genetically controlled and the process is not well understood.

To combat iron-deficiency chlorosis, iron-containing com-

pounds may be applied either to the soil or directly to the chlorotic foliage. Foliage treatment may be adequate if the plant is to be transplanted within a year, but this treatment is not long lasting and would have to be repeated, since iron is not translocated from leaves to other parts of the plant or to new growth. In the case of a home or industrial landscape planting of the permanent type, applying iron-containing compounds to the soil will give more lasting results. Iron sulfate may be applied to the soil alone or in combination with sulfur to acidify the soil. In highly alkaline soils, compounds known as chelated iron are usually more effective than other materials. A good way to avoid iron deficiency chlorosis is to check the acidity of the soil and not to plant in alkaline soil varieties known to become chlorotic easily.

With the increasing use of weed killers and pesticides, the improper application of these materials has also increased. Too many people feel that if one pound will do the job, two pounds will do it twice as well; consequently chemical injury occurs frequently. Damage due to excessive or improper use of weed killers, such as 2,4-D; 2,4,5-T; or amino triazol, usually appears as curling and distortion of foliage and succulent shoots, sometimes accompanied by chlorosis, and browning and death of tissues in severe cases. Little can be done to correct the damage on injured plants except to prune out dead material and to keep the plants well watered. Fertilizer applications to injured plants may increase the amount of damage. The best way to avoid injury by weed killers is to use them with caution, try to keep them away from ornamental plants, and above all, follow the manufacturer's recommendations.

Excessive application of fungicides, insecticides, or fertilizers can result in damage to evergreens as well as deciduous species. Foliage burn, dieback, and occasionally death of the plant are typical symptoms. Plants injured by these materials should be pruned and watered. Again the best control is to use any agricultural chemical as recommended by the manufacturer at the rate specified on the package.

Although many people find it hard to believe that mature trees, shrubs, and evergreens are subject to injury during dry periods, such is not the case. The small feeder roots of most plants are succulent and tender and may be injured or killed when soil moisture becomes depleted. Soils differ in their moisture-holding capacity, and root damage may occur more rapidly in sandy soils than in clay or loam soils. Most ornamental plants will be more vigorous and less susceptible to insects, diseases, and winter injury if they are watered periodically during dry periods. The volume of water applied and the frequency of watering should depend on the species and size of the plant, the soil type, and the quality of drainage at the planting site.

Symptoms Are Similar

Oddly enough, the symptoms of drought can result from an excess of water as well as a deficiency of water. Where excess water or poor drainage is a problem, the lack of proper aeration necessary for normal functions of the root system prevents the uptake of water, causing wilting and browning of aerial parts of the plant just as lack of water does. Control in one case involves more frequent watering; and in the other, providing better drainage is the answer.

Many evergreen varieties in the Midwest are injured as a result of unfavorable climatic conditions during the winter. Two main types of injury are common: drying or desiccation of foliage and tissue-kill from a severe drop in temperature.

During the winter when water in the soil and roots of evergreens is frozen and not available to the plants, the loss of moisture from the foliage caused by drying winds frequently results in browning and drying of foliage or small twigs. Desiccation can be prevented by mulching, watering up to the time the ground freezes, and spraying very sensitive varieties with an

antidesiccant. After the injury has occurred, little can be done to correct the damage except to prune or shear all dead materials and fertilize and water to restore vigorous growth.

A more severe type of injury may occur as a result of a rapid and extensive drop in temperature, either in late fall following a period of warm weather and before tissues have matured and hardened, or in early spring following a warm period which has caused tissues to break dormancy or at least to resume metabolic activity. The symptoms of low-temperature injury may be similar to desiccation or they may appear as twig or branch dieback or splitting of bark near the ground line. Another symptom is wilting and death of new shoots during the growing season as a result of stem injury or girdling which occurred during the previous winter.

This type of injury is common on evergreen varieties which are planted north of their normal range of distribution. Low-temperature injury can be avoided to some extent by selecting plants which have been grown locally for one or more years and by avoiding any practice, such as early fall fertilization, which will tend to delay maturation or hardening of tissues.

Needle drop is quite common on some evergreens, particularly spruce, fir, and hemlock, and to a lesser extent on pines and yews, as a result of climatic shock or adverse growing conditions. Protection of sensitive plants from winter injury by mulching, watering, and selecting protected planting sites are the most practical and effective control measures for this type of injury.

Wounds or breaks of any type on plants provide entrance for disease and insect pests and result in weakened tissues which are more susceptible to attack by parasitic organisms. Even a small wound or scar on the stem of a sensitive plant such as a yew can cause the injured stem to weaken or die. All ornamental plants should be handled with care to prevent mechanical injury, and all wounded branches

(Continued on page 38)

Insect Report

WTT'S compilation of insect problems occurring in turfgrasses, trees, and ornamentals throughout the country.

Turf Insects

A BILLBUG

(Sphenophorous venatus vestitus)

Florida: Adults, probably this species, active at night and causing very light damage to zoyia grass golf greens in Miami, Dade County.

GRASS BUGS

Utah: *Irbisia pacifica* ranges 25-300 per sweep on severely discolored Great Basin wildrye at Beaver Dam, Box Elder County. *Irbisia* sp. badly discolored 200 acres of intermediate wheatgrass at 7,000 feet elevation above Peterson; this area severely damaged in 1966.

A MILLIPED

(Pleuroloma brunnes)

Arkansas: Taken in st. augustinegrass in Desha County. This is same species that has been very heavy in city of Paragould, Greene County.

TWO-LINED SPITTLEBUG

(Prosapia bicincta)

Alabama: First adults noted throughout central and southern areas. Becoming common on lawn and other grasses; no damage reported.

Insects of Ornamentals

BAGWORM

(Thyridopteryx ephemeraeformis)

Oklahoma: Heavy on juniper at Stillwater, Payne County, and Perry, Noble County; moderate in Beckham and Cleveland Counties.

SPIDER MITES

California: *Eurytetranychus buxi* heavy on boxwood hedges generally in Ontario, San Bernardino County. *Tetranychus telarius* medium on boxwood nursery stock in Escondido, San Diego County.

A FLATID PLANTHOPPER

(Anormenis septentrionalis)

Alabama: Numerous nymphs feeding on new growth of azaleas, camellias, dahlias, and many other plants throughout southern, central, and much of northern areas; damage not serious. Growers and homeowners concerned for several weeks in Mobile, Lee, Bibb, Franklin, Winston, and other counties. Mostly adults as far north as Winston County.

ARMORED SCALES

California: *Hemiberlesia lataniae* adults heavy on Japanese maple nursery stock in San Diego, San Diego County. **Florida:** *Pinnaspis aspidistrae* adults severe on 15 percent of 2,000 liriope plants at nursery in Dover, Hillsborough County.

GLOBOSE SCALE

(Lecanium prunastri)

Delaware: Young crawlers on ornamental plum in New Castle County area.

WEEVILS

Maryland: *Apion longirostre* adults heavy on hollyhock at University Park, Prince Georges County. **Rhode Island:** *Brachyrhinus sulcatus* pupating in North Kingstown, Washington County.

Tree Insects

A SHIELD BEARER

(Coptodisca sp.)

Arizona: Larvae severely defoliated many cottonwood trees in Yuma and Maricopa Counties.

BLACK TURPENTINE BEETLE

(Dendroctonus terebrans)

Alabama: Adults and larvae active on isolated pine trees in Lee, Baldwin, and other counties.

ENGRAVER BEETLES

(Ips spp.)

Maine: Numbers and damage of *I. pini* heavy on white pine at Falmouth Foreside, Cumberland County; injured trees transplanted last fall. Heavy sap flow prevents insects from being established. **Nebraska:** Heavy in Nebraska National Forest near Halsey.

ELM BORER

(Saperda tridentata)

North Dakota: Heavy larval populations damaged elm at Walhalla, Pembina County; pupae present.

CANKERWORMS

New York: Peak descent from trees at Riverhead, Suffolk County. Numbers medium in Nassau County. **Pennsylvania:** Mainly *Alsophila pometaria* heavily defoliated oak and other hardwoods at Schickshinny, Luzerne County.

TENT CATERPILLARS

(Malacosoma spp.)

Maine: *M. americanum* infestations and damage evident in most areas. **New Hampshire:** Pupating at Durham. **Utah:** *M. disstria* damaged bitterbush, serviceberry, chokecherry and wild rose in ranch area of Blacksmith Fork Canyon, Cache County.

A SPIDER MITE

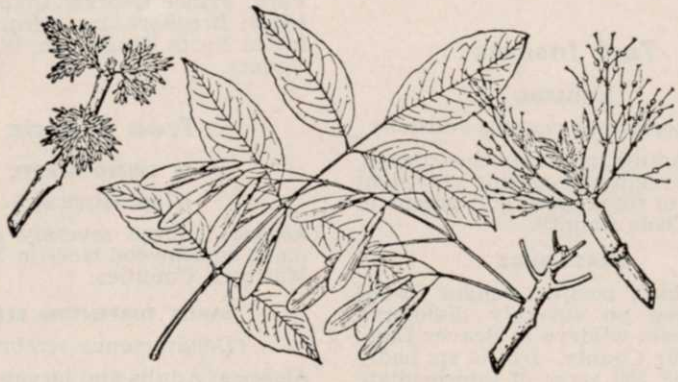
(Oligonychus milleri)

Missouri: Collected and det., at Columbia, Boone County. Light to heavy on new growth of shortleaf pine.

Compiled from information furnished by the U. S. Department of Agriculture, university staffs, and WTT readers. Turf and tree specialists are urged to send reports of insect problems noted in their areas to: Insect Reports, WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.

WHITE ASH

(Fraxinus Americana)



Drawing from: Manual of the Trees of North America, by Charles S. Sargent, Dover Publications, Inc. Reprinted through permission of the publisher.

Prepared by J. H. Kirch, forester and horticulturist serving as Marketing Manager, Industrial Chemicals, for Amchem Products, Inc.

Whether a plant species is desirable or undesirable often depends on the situation in which it occurs. This is true of all the trees to be discussed in this series of articles on identification. For example, maple (Acer rubrum) is a useful ornamental in landscape plantings because of its early red flowers, pleasing growth habit, and spectacular autumn foliage coloring. It is a nuisance on the right-of-way because of its resistance to chemical treatment. Similar comments could be made about the other species to be described. They have ornamental, and economic value, but not on a utility right-of-way which must be kept clear of tall vegetation. Strong resistance to treatment makes it especially important that a few "problem" species be clearly recognized when they are encountered in clearance work. Otherwise there may be needless disappointment, and waste of time and material through inappropriate treatment. J. H. Kirch.

The genus Fraxinus includes about 60 species of trees and shrubs found mostly in the temperate regions of the Northern Hemisphere and also in the tropical forests of Java and Cuba.

White ash, also known as Canadian ash, is the most abundant and important of the American ashes. It is found growing on deep, moist, fertile soils from Minnesota to Texas and east to New Brunswick and Florida. It grows to 80 feet in height and reaches a diameter of 2 to 3 feet. The bole is long, straight and clear. The wood is used in the manufacture of furniture, but is known most for its usefulness in sporting equipment such as baseball bats and rockets.

White ash is probably one of the most chemical-resistant species found in North American rights-of-way. After a clearing operation, usually two or more sprouts develop from each stump. These sprouts grow very rapidly, sometimes as much as six feet in one year.

White ash is readily recognized by its opposite compound leaves about 10 inches long, with 5 to 9 leaflets. The leaflets are 3 to 5 inches long, about 1½ inches broad, slightly serrate on the margin, and have definite pedicels or stalks at the base. When full grown, the leaf is usually smooth and dark green above and pale below. Separating white ash from its closely related species, green ash *(Fraxinus pennsylvanica)*, is often a problem on the right-of-way. It can be distinguished from green ash by its smooth leaves and twigs. Those of red ash are often pubescent. The leaf-scars of white ash are markedly indented across the top while those of green ash are fairly straight with at most only a slight indentation. The seeds of white ash have wings fastened only to the apex of the seed while the wings are fastened to the apex and extend down over the sides of green ash.

Both species are readily distinguished from black ash *(Fraxinus nigra)* by their stalked leaflets. Black ash leaflets are sessile. Also, the wings on the seed of black ash usually cover the entire seed. The buds of white ash are usually obtuse and brown, while those of black ash are acute and black.

The above species of ash are often found with blue ash *(Fraxinus quadrangulata)* particularly in Ohio, Indiana, Illinois, Kentucky, and Michigan, but are easily separated by the characteristic four-angled stem of blue ash.

Most ash species are controlled by dormant applications of brushkiller mixtures of 2,4-D and 2,4,5-T or 2,4,5-T alone in oil. Applications are generally made with the basal spray or dormant cane technique. Water-borne foliar applications of 2,4-D and 2,4,5-T are not as effective as dormant oil sprays. Water-borne foliage sprays of amitrole have been effective in controlling white ash, but less effective on green, blue and black ash.

Helicopter applications of most available chemicals have not controlled white ash. Recently the addition of amitrole or monosodium methane arsonate to the water phase of 2,4-D/2,4,5-T invert emulsions has offered some promise for heavy stands of white ash on the right-of-way.

Where ash and maple species are found with root suckering species such as black locust *(Robinia pseudacacia)* and sassafras *(Sassafras albidum)* on the right-of-way, a program of helicopter invert sprays of 2,4-D/2,4,5-T followed by a ground-applied dormant cane spray one year later has given nearly complete kill.

Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 1900 Euclid Avenue, Cleveland, Ohio 44115.

Rates: "Position Wanted" 5c per word, minimum $2.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment.

FOR SALE

1 LXCA 60-GPM HARDIE with 500-gal. tank, hose reel with approx. 300 ft. of hose. Self-powered with 6-cyl. Waukesha engine. Unit mounted on 1½-ton '57 Dodge. With or without truck, $3,100.00. 1 LCXA 60-GPM Hardie with 1,000-gal. round tank. Self-powered with large 4 cyl. International UD-9 engine skid mounted. One hose reel unattached with unit. $3,500.00. Fred Vallarelli, Northeast Spray Service, 4935 E. 1st Ave., Hialeah, Fla.

2-100 gal. Hardie Towne & Country sprayers, $200.00. 1-50 gal. Hardie Towne & Country Sprayer, $150.00. 1-100 gal. Hudson Matador sprayer, $150.00. All on skids with 150-ft. ⅜" hose. Azo Chemical Co., 715-9th St., N.E., Canton, Ohio.

Weeds Trees and Turf
Classified Ads Get Results.
Use Them.

McCulloch Introduces Self-Starting Chain Saw

The McCulloch Corp., Los Angeles, Calif., has recently introduced what it calls the world's first electric-starting chain saw. For the first time, according to McCulloch, a small, hand-held gasoline engine can be started electrically by a totally self-contained starter, generator, and battery.

The electric-starting MAC 3-10E chain saw weighs less than 15 lbs., and is designed for tree trimming, land clearing, and felling and bucking timber and pulpwood. Easy starting of the saw while the operator is working in a tree or other precarious location is an important safety factor, McCulloch explains. Electric-starting components are the starter-generator, integrated into the flywheel of the engine; the nickel-cadmium battery pack, contained in the handle of the saw; and the solid state voltage regulator, concealed in the pistol grip.

Another feature of the MAC 3-10E is a de-stroking port, which the company claims enables the engine to be started with half the effort required for an ordinary engine. McCulloch Corp., 6101 W. Century Boulevard, Los Angeles, Calif. 90045, will provide further details on the electric-starting chain saw.

Tree Disease Damage Spotted From Air

Infrared color photography is now being used to spot diseased trees from the air.

University of Minnesota researchers Merle Meyer and David French explain that infrared light waves are reflected by healthy, summer foliage as bright, raspberry red. Off color foliage appears blue to green on the film. The film picks up damage which the eye many times fails to spot.

Black spruce stands infected with dwarfmistletoe stand out as bright blue-green. Trees with Dutch elm disease and oak wilt have been spotted which defied detection at ground level.

Research is continuing, particularly to determine the best altitude for flights and the prime times of the year for detection. To date, flight levels of about one mile appear best and summer foliage must be photographed before changing color in the fall. The research also indicates that this type detection may be helpful in spotting crop diseases. Meyer reports that the technique was used to identify water levels and soil moisture at the Carlos Avery wildlife refuge in Minnesota last summer.

Antibiotic Effect Possible

Suggestions have been made, according to Dr. Philip L. Rusden, plant pathologist at Bartlett Tree Research Laboratories, that mulches may produce an antibiotic effect on trees. They may help arrest certain diseases. Research is now underway by the Bartlett Lab to determine if this is the case.

Advertisers

INDEX TO ADVERTISEMENTS

John Bean Introduces Two Ground Sprayers

The Royalette 1010, a general purpose grounds sprayer that features a 100-gal. tank with mechanical agitation, and the Trojan 2025 small estate and park sprayer, have joined the line of spray equipment from the John Bean Division, FMC Corp.

Royalette, intended for weed and pest control on turf and shade trees, is said to be a complete spray unit with PTO drive and is designed to be mounted on a Cushman Truckster or light truck bed. Chemical can be applied with hose and gun or with the three-section 15-ft. boom that has 10 in. nozzle spacing. A 10 g.p.m. positive displacement, plunger-type pump provides pressures up to 400 p.s.i.

Trojan, claimed to be ideal for spraying weeds, shrubs, trees, lawns, and mosquito-infested areas, has a 20-gal. porcelanized steel tank and a self-lubricating, fiberglas pump with only one moving part. Trojan delivers a constant spray of 3 g.p.m. at 60 p.s.i. and is also available with 10-gal. tank and with boom. Spray gun unit is equipped with 15 ft. of hose.

John Bean Division, Box 9490, Lansing, Mich. 48909, offers further data on these and other sprayers in its line.

Meeting Dates

Penn State 1967 Field Day, Pennsylvania State University, University Park, Aug. 16-17.

Nursery and Garden Supply Show, Texas Association of Nurserymen Annual Convention, City Auditorium, Austin, Aug. 20-23.

International Shade Tree Conference, 43rd Annual Convention, Marriott Motor Hotel, Philadelphia, Pa., Aug. 27-31.

National Arborists Association Annual Meeting, Marriott Motor Hotel, Philadelphia, Pa., Aug. 27-31.

American Society for Horticultural Science, Annual Meeting, Texas A. & M. University, College Station, Aug. 27-Sept. 1.

Annual Turfgrass Field Days, Virginia Polytechnic Institute, Blacksburg, Va. Noon Sept. 6-Noon Sept. 7.

Annual Turfgrass Short Course, Ala.-Northwest Florida Turfgrass Association, Auburn University, Auburn, Ala., Sept. 7-8.

Lawn and Ornamental Days, Ohio Agricultural Research and Development Center, Wooster, O., Sept. 12-13.

Pacific Northwest Spraymen's Association, Annual Conference, Seattle Center, Seattle, Wash., Sept. 15-16.

Northwest Turfgrass Conference, Annual Meeting, Harrison Hot Springs, British Columbia, Sept. 19-21.

National Agricultural Chemicals Association, Annual Meeting, Holiday Inn, Palm Springs, Calif., Nov. 5-8.

American Society of Agronomy, Annual Meeting, Sheraton-Park and Shoreham Hotels, Washington, D. C., Nov. 5-10.

Texas Fertilizer Association's 1967 Agricultural Exposition, KoKo Inn, Lubbock, Nov. 9-10.

Fertilizer Industry Round Table, 17th Annual Meeting, Hotel Mayflower, Washington, D. C., Nov. 15-17.

Entomological Society of America, Annual Meeting, Hotel New Yorker, N.Y.C., Nov. 27-30.

National Fertilizer Solutions Association, Annual Convention, Denver-Hilton Hotel, Denver, Colo., Nov. 28-30.

National Aerial Applicators Association, Annual Conference, Marriott Hotel, Dallas, Tex., Dec. 3-5.

North Central Weed Control Conference, Civic Auditorium, Fargo, No. Dak., Dec. 5-7.

Ohio Turfgrass Foundation Turfgrass Conference, Sheraton-Cleveland Hotel, Cleveland, O., Dec. 11-13.

Evergreen Diseases

(from page 35)

should be removed and the wounds treated with wound dressing.

Ice storms which cause thick deposits of ice to form on branches occur occasionally in the Midwest. The ice itself does not usually cause damage, but the extra weight can result in twig or branch breakage. Fortunately, ice damage is rare for little can be done to prevent it. Ice injury should be treated like any mechanical injury on evergreens. Injured plants should be pruned, watered, and fertilized; and wounds should be painted with wound dressing.

In addition to the diseases and other types of damage already mentioned, there are many troubles of evergreens for which the causes are unknown; and other problems are continually arising. Evergreen diseases have not received the attention that diseases of other plants have had; and much research is needed to solve not only the new problems which arise, but also some of the problems which have been with us for many years.

Aquatic Vegetation Control

(from page 18)

at commercial use of water hyacinths have had little success to date, he reported.

Officers elected for the new year by the Society which met June 18-21 are: Robert D. Blackburn, research botanist for the Crops Research Division, USDA, Fort Lauderdale, Fla., president; James Gorman, who served this past year as president, vice-president; Paul R. Cohee, technical sales representative for Hercules Incorporated, Orlando, Fla., secretary-treasurer; and Dr. Lyle Weldon, research agronomist, Crops Research Division, USDA, Fort Lauderdale, Fla., reelected as editor. Dierctors for the coming year are: Frank Wilson, Polk County Mosquito Control Unit, Eaton Park, Fla.; Dr. F. W. Zur Burg, University of Southwestern Louisiana, Lafayette, La.; and Fred W. John, Southern Florida Conservancy District, Belle Glade, Fla.

Trimmings

Greenskeeper Knows His Turf. A stolen golf green at Teigmouth, Eng., turned up as a new lawn at the home of Ivan Hitchcock who, incidentally, is now serving 3 years probation for the theft. Greenskeeper Edward Yeo said he had no trouble spotting his green because there was no other turf in the area like it.

* * *

Elm Blight On Run. *Kansas City lost 13,200 elms from Dutch elm disease in 1963 which was 10% of the city's elm population. The city then hired Frank Vaydik, Detroit forester, who started a 3-pronged program in which diseased trees were removed as quickly as possible, dead or dying branches trimmed, and the 100,000 elms of the city sprayed yearly. Result was a loss of only 4578 trees in '64, 3744 in '65 and only 2912 last year, cutting losses to less than 3%. At the same time 7000 new trees are being planted each year to replace former elm loss.*

* * *

Irrigation Protects Against Hot and Cold Weather. Researchers now tell us irrigation can protect crops from frost damage. Seems that in the freezing process, water releases heat. A pound of water gives off 144 BTU's of heat. The increased moisture in the air serves as a blanket and reduces the amount of heat given off by the crop through radiation. Crops can be protected down to 20° temperatures by irrigating. During hot weather, light irrigation can be used to cool crops when temperatures are above 85° F. And all the time we thought irrigation just guaranteed the proper transpiration rate.

* * *

Big Business. Virginia Tech researchers at Blacksburg point out that weed control accounts for heavy spending throughout the state. They estimate that weed losses cost citizens $14 million in lawns and $11 million in industrial sites and rights-of-way every year.

* * *

"Grass" Contract to Monsanto. We hear that Monsanto Chemical Company was just awarded a $174,468 contract to install synthetic grass on the Memorial High School Stadium football field at Seattle, Wash. Monsanto's bid was accepted over a lower bid of $162,000 by virtue of a 5-year guarantee. Gate receipts plus stadium parking and rental fees will finance the installation. At the price, it has to be superior to Kentucky blue.

* * *

Customer Credit. J. R. Stiffler of Borden Chemical offered his company's dealers a bit of timely advice in a recent newsletter. He urged them to arrange for customers to charge for purchases in order to increase sales. Stiffler says a number of dealers don't like the idea of the collection fee, but he feels that customers understand that the merchant has to be reimbursed by a direct charge or markup. Stiffler points to bank credit cards as a popular type aimed at practically every type of business. Seems to us it might be a good step for the service segments of the vegetation control industry.

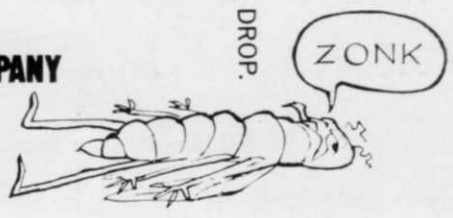
TURF PESTS

HIT THE TURF

WHEN YOU SPRAY WITH

DE-PESTER®
MALATHION

NOW YOU CAN USE LOW-COST, LOW-ODOR DE-PESTER MALATHION TO BOMBARD MOSQUITOES AND ALMOST ALL OTHER TURF PESTS. DE-PESTER MALATHION WORKS ABOUT AS QUICKLY AS IT'S TAKING YOU TO READ THIS MESSAGE—LASTS LONGER. KILLS INSECT PESTS IN ALL STAGES. AND WITH NO OBNOXIOUS ODOR. TRY IT. AND WATCH 'EM DROP.



DE-PESTER MALATHION is a product of

THOMPSON-HAYWARD CHEMICAL COMPANY

Subsidiary of Philips Electronics & Pharmaceutical Industries Corp.

T-H TM P.O. Box 2383, Kansas City, Kansas 66110