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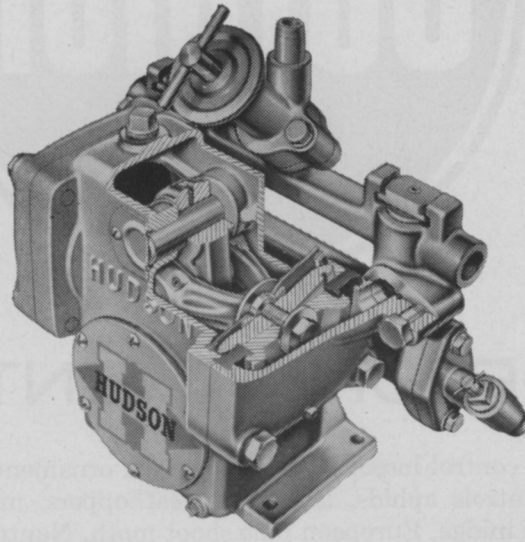
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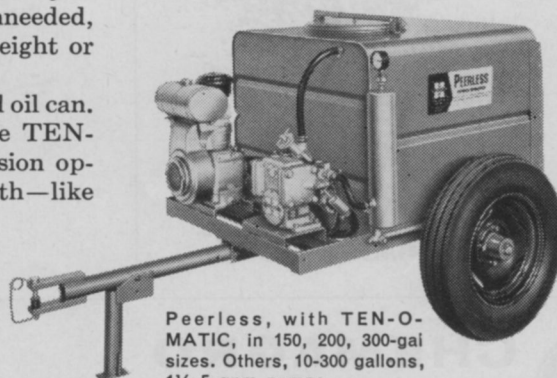
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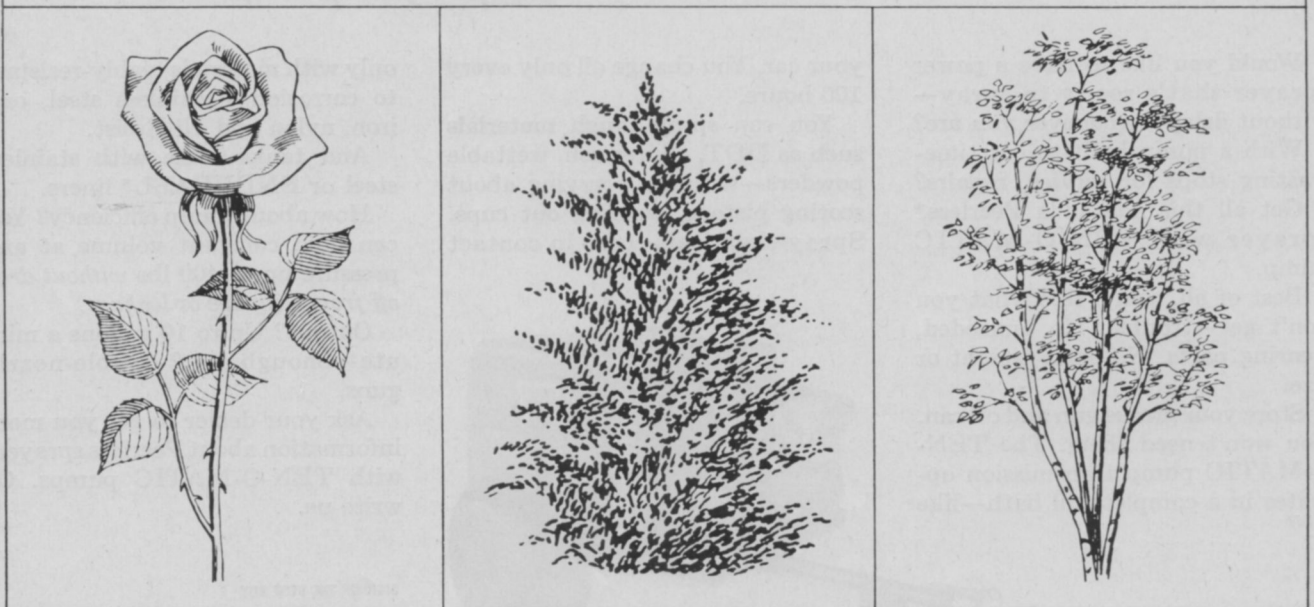
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WEEDS and TURF

PEST CONTROL

A SECTION OF PEST CONTROL MAGAZINE

August, 1963

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**How much does
it cost?**

A tight rein on what contract applicators are spending for material and labor may spell the difference between successful business management and bankruptcy.

Any businessman, to operate on a sensible basis, must insist on a sound analysis of costs. This need for cost knowledge is particularly important in service industries such as contract turf care, weed control, or tree maintenance.

Reasons for the elusive nature of cost analysis in custom application are twofold. First of all, it is doubtful that any two jobs, regardless of similarity of size, weed or insect problem, or other qualities, will ever cost the same to complete. This is because every fickle whim of the weather affects all factors involved in the job, and because few jobs ever take the same amount of time to complete.

CAs should also beware of the callback. If an operator figures his costs on a job, takes his reasonable profit, only to find he must go back a second time, there will be unrealistic figures on the analysis sheet.

For these reasons, CAs should be doubly careful when they analyze how much is being spent to operate their businesses. It might even be advisable to examine a 12-month period to get the average number of callbacks which were made, and include this factor in the price of every job.

Then, too, adverse weather conditions which might have a derogatory effect on profits should be looked at closely. In the price of each job, figure a little extra margin for the unexpected shower or windstorm which may prevent your sprayman from completing his job.

In these days of fiscal carelessness, the American businessman must be extra careful not to fall into the trap of inadequate cost analysis.

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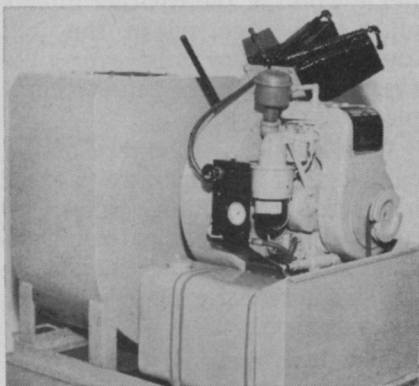
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A granule and pellet distributor is available as auxiliary equipment for each of the S. F. Potts Mist Blowers at \$50-75, for applying insecticides, herbicides, aerosols, or fertilizers, while avoiding spray drifts. Tractor P.T.O. units are also available.



Model P-24-S, with square outlets, is shown above

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—W & T Mailbox—

CA's for Golf Courses?

I have heard the remark made that at the Feb. 63 Golf and Turf Convention in San Diego a speaker (possibly a cost analyst) advised golf superintendents to throw away their costly spray rigs, supplies, and labor factors involved, and hire a CA to save money and get better results on fertilizing, pest and disease control, and soil conditioning.

Good advice, I'd say.

I wonder if you can tell me who made such a recommendation? I'd like to be able to quote this if someone did indeed so state.

James G. McClure

Custom Fertilizer Sales and Service
Vista, Calif.

Perhaps some readers who attended these sessions can let us know whether or not such a statement was made, and if so, who made it. Ed.

Which Railroad?

In connection with the article on railway weed control in the June issue of *Weeds and Turf*, there is a photo of a railwheel-mounted tank truck. Would you please advise on which railroad this equipment is used?

E. H. Waring

Chief Engineer
The Denver and Rio Grande
Western Railroad Co.
Denver, Colo.

The tank truck was specially built for the New York Central Railway, and is used by them for spreading herbicides along their rights-of-way. Ed.

Spray Boom Marker?

On the cover of your April 1963 issue there is a picture of a spray rig with something hanging from the end of the spray boom and dragging on the ground. Is this some sort of marking device to guide the operator? If so, could you please possibly advise us who sells or manufactures that device? We will be greatly obliged to you for any help at all in this respect. We have benefited from much

of the information published in your magazine. Have you ever published or considered preparing an article on how to really get uniform spray coverage of herbicides?

Frank Lichtig

Gramaslindas, Cia.
Dorado, Puerto Rico

We are considering publication of an article on how to get uniform spray coverage of herbicides, and hope that it can be scheduled in an early issue. The object in the photo is indeed a marker, and perhaps the letter below will produce additional information on its success. Ed.

Chain Marker Drag?

I am wondering if there was an article at some time on the chain marker drag on weed boom method of marking, as shown on the cover picture of the April 1963 issue of *Weeds and Turf*.

Any information which you can furnish me in this regard would be very much appreciated.

William H. Wilmot

Summit Hall Turf Farm, Inc.
Gaithersburg, Maryland

Weeds and Turf has not yet published an article on this system of marking. Perhaps some readers would like to communicate with us, or directly with Mr. Wilmot, on the value and technique of this marking method. Ed.

W&T Hits Our Interests

We enjoy reading your magazine as many articles hit right on our interests.

We've had good success with atrazine applied a week or two after verticutting St. Augustine lawns. Thought you might want to pass this on to other operators.

Art Griffes

House and Garden Lawn Service
Ft. Lauderdale, Fla.

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W-7



How to Recognize and Control Major Shade Tree Pests

By **FRANKLIN R. HALL**

Field Service Representative to Arborists
Niagara Chemical Division
FMC Corporation
Middleport, New York

Timing of application is one of many critical factors in successful control of shade tree pests, author Hall points out in this detailed analysis of proper techniques.

ANYONE who doubts the enormity of the pest problems which plague contract applicators, arborists, nurserymen, and others with an interest in growing plant life, need only glance at the figures.

Entomologists have actually classified between 600,000 and 1.5 million different species. New insects are discovered every year, and it has been estimated that between 2.5 and 10 million different kinds exist somewhere on the earth.

Shade trees in the nation's parks, yards, and forests serve as a vast target for many of these insects as well as numerous disease pests. This year many thousands of beautiful and useful trees will die due to insect or fungus injury. The purpose of this dis-

cussion is to point out how to recognize some of the more severe pests which can create havoc in trees, and to list measures for controlling them effectively.

Many factors influence the life of an insect — weather, host plants, parasites, predators, etc. Sudden rises in the number of insects in a given area may be the result of one or a combination of these factors.

Recently several insects have been noted for such cyclic appearances. Among these are gypsy moths and cankerworms, both of which are expected in large numbers again this year. A heavier than usual population of Linden looper has also been forecast for 1963. Even insects not generally regarded as economically signifi-

cant will occasionally reach epidemic proportions and become a major problem. Plant diseases, too, tend to run in cycles and, again, a complexity of factors contribute to this. Reasons for these increases are not always apparent and create interesting and challenging studies for the entomologist.

Get the Most from Pesticides

There are many factors which affect the efficiency of insect control via pesticides. Perhaps three of the most important are: (1) Use of the proper chemical for the insect or disease in question; (2) Correct timing. Habits of the pest influence the timing and frequency of the applications; (3) Sufficient pressure with the proper equipment to secure thorough coverage

of the foliage of the infested trees. Knowing where to spray is as important as how to spray.

Some further points to consider are:

- Spray coverage should be thorough so no small individual pest will be missed.
- Diseases, in particular, should be controlled by preventive treatments — insects, too, when an infestation is almost certain.
- Keep a record of treatments and schedules used from year to year.
- Always read the pesticide label carefully and fully.

All pesticide formulations available to the CA, arborist, nurseryman, and others, are packed in containers with a label attached. These labels contain information regarding the toxicity of the ingredients, recommended uses, rates and precautions. The label represents an important contribution of the manufacturer in the field of research, and frequently indicates an expenditure in excess of \$1,500,000 dollars. It is also the basis upon which USDA registrations for material usage have been obtained. Therefore it should be closely read and followed.

Chief Tree Insects to Beware

Out of the hundreds of insect and disease pests which exist, only a relative few cause significant damage to shade trees. Nevertheless, if left unchecked, one or more of these species can leave behind a costly trail of damage. Following is a brief discussion of some



Controlling tree pests is a daily task for Franklin R. Hall, arborists' field service representative from Niagara Chemical.

of the more commonly occurring tree pests — how to detect and control them:

Aphids

One of the more consistent year to year enemies of shade trees is the aphid. There is scarcely a living plant, cultivated or wild, that does not serve as a host for these prolific sucking insects.

Aphids — tiny, soft-bodied pests — fall into two principal groups, according to the type of damage they inflict. One group affects development of young shoots or leaves, while the other produces gall-like swelling on twigs.

The group which attacks shoots and leaves causes loss of vigor, curling, or growth distortion in trees. They also produce a sticky honeydew substance on which a sooty fungus often develops. Their most frequent victims are birch, linden, larch, maple, oak, elm, and various fruit trees. They overwinter as eggs and become active in the spring.

Gall-producing aphids are particularly partial to balsam fir, Douglas fir, and spruce trees, giving them a ragged appearance and destroying their ornamental value. Resulting galls also interfere with normal twig development and may cause the death of new growth. This type of aphid overwinters as an immature adult form on the twig, and matures in mid-May.

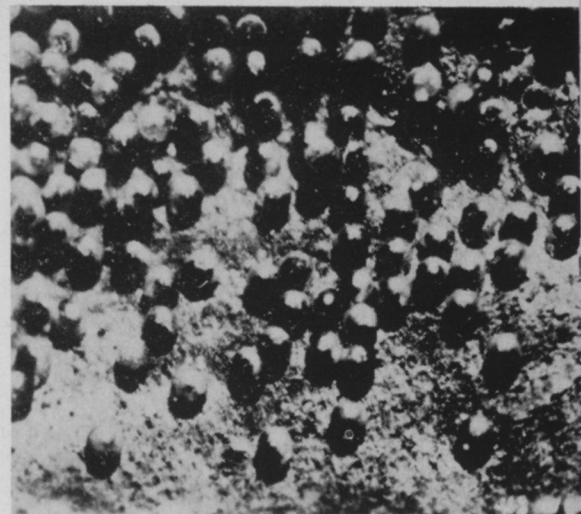
Species which overwinter in the egg stage should be sprayed early in the spring, when buds are expanding. In particular, leaf-curling species should be treated before leaves curl and the pests become less accessible to sprays.

Species which feed on main stems and branches can be sprayed once they become numerous. For gall-producing aphids, control may be effected by spraying in the spring before buds open, or fall.

Periodic inspection, to detect the presence of aphids or their eggs, should be made. Once it is decided that control measures are needed, there are several materials from which to choose. Among those most commonly used are: Thiodan, Sevin, lindane, and malathion.

Cankerworms

Spring and fall cankerworms are common native pests of most deciduous trees. The striped cater-



Red mite eggs on the bark of a tree are a sign of impending trouble; if controlled before they hatch, a major infestation and almost certain leaf damage can be prevented.

pillars (also known as measuring worms, inch worms, or loopers) when fully grown are slightly less than one inch in length. The spring cankerworm larvae vary from red to yellowish green, yellowish brown, or black, while the fall cankerworm larvae range from light green to brownish green.

Cankerworms destroy the leaves and buds of a great many of the common deciduous trees, but prefer the elm and apple. The caterpillars of both species appear in early May and feed for three weeks or a month. The young caterpillars skeletonize newly developing foliage, and when they are more mature, devour all but the midribs and larger veins. If an infestation is severe, the trees may be completely defoliated. Two or three successive years of severe defoliation can result in death of the tree.

The insecticidal control for both species of cankerworms is the same. Several materials are available. DDT, lead arsenate, methoxychlor, and more recently, Sevin, are most frequently used. If thoroughly applied in the correct proportions and at the proper time, they will give excellent results.

Mites

Brown discoloration of foliage and/or premature leaf drop indicates a likelihood of the presence of mites. These tiny pests are becoming more and more of a problem each year.

There are several kinds of mites. Those frequently found in large

numbers on deciduous trees include the two-spotted mite or common red spider, and the European red mite. On certain conifers, spruce mites are also troublesome. Conditions favoring buildups of all species are: dry periods in midsummer, crowded trees, poor soil conditions, and the absence of natural enemies.

Mites suck juices from the leaves of trees and in severe infestations can cause complete defoliation. Their minute size frequently permits them to be overlooked. Two-spotted mites and spruce mites, however, spin a conspicuous web on the foliage for protection of their young and eggs, and this webbing gives the foliage a readily detectable dusty appearance.

Foliage should be inspected periodically to forestall rapid buildup of mites. This can be done by holding a piece of white paper directly under a branch and tapping the foliage sharply. Mites, if present, will drop to the paper.

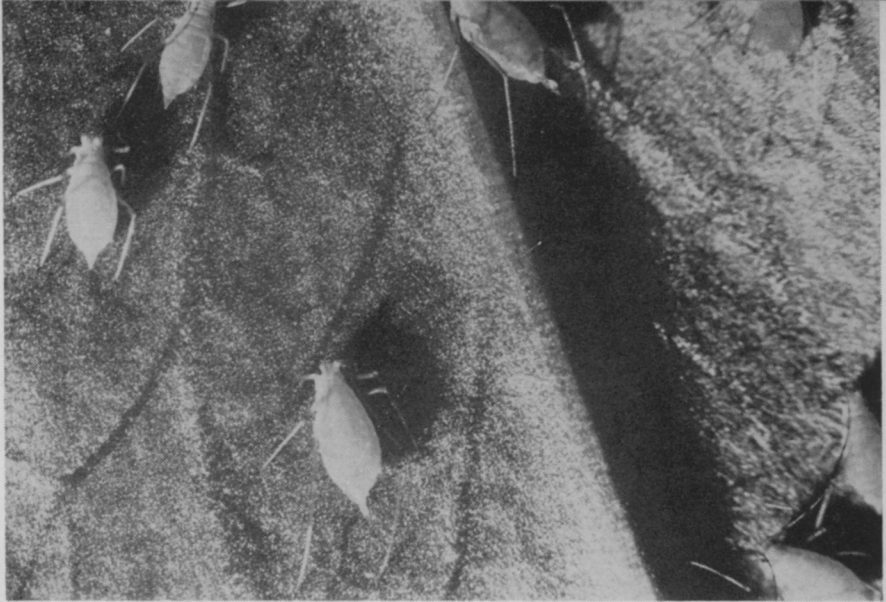
Thorough, early spraying will prevent serious mite infestations. Several effective chemicals are available for control of these pests (see Table I). Recently, new label claims on Ethion .67 Superior 60 Oil E.C. have been accepted by the USDA for control of two-spotted mites and scale on certain ornamentals. The new formulation is regarded as having a high potential for a wide usage as a summer oil.

Gypsy Moth

Oak is probably the preferred host of the gypsy moth. Other tree species favored are poplar, willow, basswood, beech, birch, cherry, larch, maple. The recreational and aesthetic value of park and forest shade trees can be seriously threatened by this pest.

Damage is caused by the larvae, which feed on foliage. When an area is heavily infested, few host species are ignored by the larger larvae. Records kept during many years have shown that oaks are damaged most severely. The trees seldom die unless leaf drop occurs in successive years, but a single defoliation causes considerable loss in normal growth.

Newly hatched larvae usually spin silken threads and swing on these while traveling through the foliage. They can be blown con-



Universally troublesome shade tree pests — aphids — are shown here attacking a leaf. This particular variety of aphid causes curling or distortion of leaves and produces a sticky honeydew substance on which fungus can develop.

siderable distances by the wind, and frequently carry an infestation over many acres.

Gypsy moth larvae are easily recognized by their size and color characteristics. Full grown, the larva is between 1½ to 2½ inches long. The body is dark gray or brown, and clothed with prominent hairs. There are eleven pairs of spots along the back. The five nearest the head are blue, the rest red. When fully grown, they spin a few strands of silk and seek a place to pupate, a period which requires from 1½ to 2 weeks. The males may be seen flying in a zigzag pattern, particularly during warm days. The nonflying females remain on the trees to lay their eggs.

In areas where the insect is known to occur and its abundance is increasing, application of one of several insecticides is an effective control measure. Solutions of DDT and oil have been used successfully in forested areas since 1946. Lead arsenate has merit. Sevin is highly effective for this use and is extremely safe where humans and wild life are involved.

Pesticide applications should take place during the early part of the feeding period — late May or early June, depending upon the climatic factors and locality.

Borers

The significance of borers is their ability to weaken and stunt the growth of trees by making numerous galleries or by girdling the cambium of the trunk and/or main branches of the tree. Their presence can often be detected by

a sparse covering of foliage at the top of the tree, wilting of the branches, and/or sap and sawdust coming from holes in trunks and branches. It has been found that old and less vigorous trees are more susceptible to attack by borers.

Borers can be divided into two basic groups: (a) those which have a caterpillar-type larval stage, and (b) those which have a grub-type larval stage. The caterpillar type is most common on ash, oak, and peach, and embraces such destructive insects as the carpenterworm and leopard moth. The grub type is most prevalent on willow, locust, maple, birch, poplar, oak, mountain ash, apple, and others. Among the grub type are "roundheaded borers" and "flatheaded" borers — so named because of the appearance of the body just behind the head of the larva.

Some species bore a gallery into the host tree to serve as a depository for eggs. The length of tunneling done by larvae can vary from a few inches to 4 or 5 feet. Most borers complete their life cycle in a year.

One of the most effective approaches to curbing borers is to enhance vigorous growing conditions. Spraying to control other insects and disease and prompt removal of weakened or dying trees are also advantageous. An effective time to spray for most borer species is when the adults are active and laying eggs. Applications should be repeated once or twice as needed at 2 to 3 week intervals.

DDT is effective in halting most caterpillar and grub-type borers,