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## EC1277 Pest Control in the Home Fruit Planting

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Wayne C. Whitney

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# Pest Control

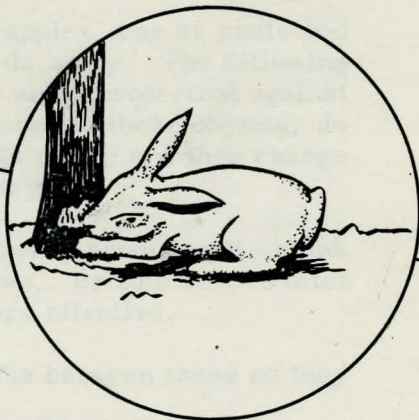
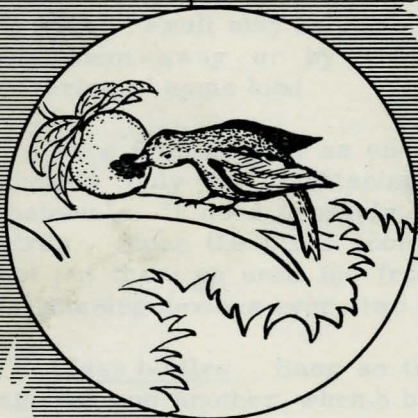
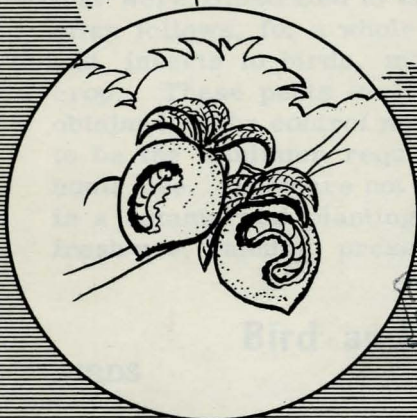
in the

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# Pest Control In The Home Fruit Planting

V. J. Miller and Wayne C. Whitney

## INTRODUCTION

The home fruit grower usually plants his trees with the expectation that soon they will produce the same luscious fruits that were illustrated in the nursery catalogue. Disappointment often follows, for a whole host of pests - ranging from diseases and insects to birds, mice and rabbits - play havoc with his crop. These pests must be controlled if usable fruit is to be obtained. The control measures described here are considered to be the minimum required to produce fruits satisfactory for home use. They are not designed to give the control necessary in a commercial planting, but will insure fruit satisfactory for fresh use, canning, preserving and freezing.

## Bird and Rodent Control

### BIRDS

Birds benefit the fruit grower by eating many insects which damage his crop, but a grower with only one cherry tree cannot appreciate this if all of his fruit is eaten before it is ripe enough to pick. Fruit may be protected from birds either by frightening them away or by mechanically protecting the fruit with a covering of some kind.

Tree fruits, such as cherries and apples, can be protected cheaply only by frightening the birds away. The following materials, if used properly, will give some protection against birds. Since the birds soon become used to these objects, do not put them up until the fruit begins to ripen; and then change frightening devices every two or three days.

Glass bottles: Hang so they will swing around and clank against one another when a breeze blows. Broken bottles often glisten more in the sun and thus are more effective.

Twisted aluminum foil strips: Tie between trees so they will twirl in the breeze.



Fox and squirrel tails: Hang in the tree top where clearly visible and where the wind will make them move.

White cloth strips: Tie several in the tree where they will blow in the wind.

A mulberry tree or a Juneberry bush may lessen bird damage on cherries by furnishing a favorite food at the same season.

Strawberries may be given some protection by tying white cloth strips to stakes; or by running a string the length of the patch on stakes and hanging white cloth strips or waxed paper strips to it.

Grapes may be fully protected by covering the bunches with small paper sacks held on by folding down the corners and fastening with paper clips. A corner at the bottom should be cut off so that any water which gets inside will run out.

Raspberry bushes may be completely protected by covering with cheesecloth placed on a light frame.

## RODENTS

Mice damage a tree by gnawing off the bark from slightly above to some distance below the surface of the soil. Rabbits do the same thing, but at some distance above ground, the height varying with the snow depth. Mice may injure trees of any age, while rabbits attack only rather young trees. Apple and pear trees are attacked most, and if the injury is severe enough the trees will die about a year later.

A cylinder of 1/4-inch mesh hardware cloth placed around the trunk and pushed well into the soil will protect against both kinds of rodents. The wire may be left in place for several years; but it should be inspected annually to make sure it is still loose and not girdling the tree.

Where mice are not a problem, the tree trunks can be protected from rabbits by wrapping in the fall with heavy paper, burlap or aluminum foil. These coverings also protect the trunks from sun scald. Painting or spraying the trunks and the base of the main branches with undiluted liquid lime-sulfur will usually repel the rabbits all winter, too.

## Disease and Insect Control

### GENERAL COMMENTS

The problems of controlling diseases and insects are the major ones which the fruit grower must solve. There are many of these, but only a few are of major importance in Nebraska on any one fruit. These will be discussed in detail later, but it should be mentioned that no amount of spraying will succeed unless proper cultural methods are used. Trees must be kept open by pruning so that sprays can penetrate to all parts; and so that air can move through the trees. This is necessary to give quick drying after rains, for most fungus diseases thrive best when humidity is high. Sanitation should be practiced around the fruit planting. Trash and weeds harbor insects over winter and should be removed, as should all wormy or diseased dropped fruit. Thoroughness of application, proper timing and the correct choice of spray materials are the essentials of good spray practice.

### GENERAL-PURPOSE SPRAYS

Fortunately for the home fruit grower, several satisfactory all-purpose spray mixtures have been put on the market in recent years. These mixtures can safely be used on all of the fruits and they control a wide range of diseases and insects. They are put up in consumer-sized packages which have information on them telling how much to use and when to spray the various fruits. They should contain at least 40% active ingredients, including one or two fungicides and two or three insecticides. The most common fungicides in them are ferbam<sup>1</sup> and sulfur. The main insecticides used are lead arsenate, DDT, DDD (rhothane), lindane (gamma isomer of benzene hexachloride), methoxychlor and aramite.

Weather conditions, such as frequent rains, may make it necessary to apply sprays oftener than the directions indicate. Not only does rain wash off the spray material, but it also makes conditions more favorable for fungus infections.

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<sup>1</sup>Ferbam is ferric dimethyl dithiocarbamate, often listed under trade names as fermate, ferradow or karbam black.



## APPLES

The main pests attacking apples are (1) scab, (2) codling moth, (3) mites, (4) cedar-apple rust, and (5) scale insects. Fire blight, which may also be very serious, is discussed under pear diseases.

(1) Apple scab is a disease primarily of the fruit and foliage. It makes rough, blackish, scab-like spots on the fruit. When very young fruit is infected, it often grows quite misshapen and usually cracks through the infected area. The disease appears on the leaves as definite brownish spots or as diffuse browning, mostly along the veins of the leaf on the underside.

(2) The codling moth is the insect responsible for most wormy apples. The female moths lay their eggs on the foliage and after hatching the young worms crawl to the fruit and enter it.

(3) Cedar-apple rust is a disease which passes one part of its life cycle on cedar trees, primarily red cedar, and the other on apple trees or related plants. On the cedar it makes galls up to an inch or more in diameter. In the spring after a rain these galls send out many long, orange, gelatinous "horns". Spores from these horns blow to the apple trees, germinate and cause infection. Spores may blow a mile or more, but the closer the apple and cedar trees the more severe will be the infection. The disease attacks the leaves, fruit and even the twigs of very susceptible varieties. On the leaves the infected spots usually have an orange border around them. Small projections may come out of the center of the spots on the underside of the leaf. On the fruit the spots are orange colored with small pimple-like projections near the center. Infections are most frequent on the bottom sides of the fruits where drops of water often hang for some time after rains. If apples are to be planted near red cedars, avoid very susceptible varieties as Jonathan, Wealthy, Grimes Golden or Secor. Common varieties most resistant are Delicious, Sharon and Early McIntosh.

(4) Mites have become very severe on apple trees in the last few years. They are so small that often their presence goes unnoticed. Foliage on infested trees is not a good green color.

The upper surface of the leaves is flecked with light spots. Close examination of the lower surface of the leaves reveals a rather webby appearance with many tiny mites crawling about. A severe infestation seriously weakens the trees, and they may fail to bloom the following year.

(5) Scale insects are characterized by the waxy scale they secrete over their bodies. They do not move after this is formed. They attack all aerial parts of a tree, the branches, leaves and fruit. They overwinter on the branches, at which time they can be most satisfactorily controlled. On the fruit, the insects are most numerous near the calyx end of the apple. The skin of the fruit usually turns red in a circle around each insect, even on yellow-fruited varieties.

To control these diseases and insects, use the following materials at the time indicated. The amount of material to use in spraying is shown in the table in two different ways. The first column gives a conversion number. This one number tells how many teaspoonfuls of material to use to make one gallon of spray, how many tablespoonfuls of material to use to make three gallons of spray, and how many cupfuls to use to make fifty gallons of spray mixture. The second column tells how many pounds to use to make 100 gallons of spray mixture. Amounts of liquids are specified in the table\*.

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#### SPRAY SCHEDULE FOR APPLES AND PEARS

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	Conversion number	Pounds per 100 gallons
Dormant spray, before buds open in spring. Needed only if scale is a problem.		
Dormant oil	32	4 gallons
Petal fall, when most of the petals have fallen.		
Dry lime-sulfur	8	6
Arsenate of lead	8	3
Hydrated lime	5	3

\*3 teaspoonfuls = 1 tablespoonful; 16 tablespoonfuls = 1 cup = 1/2 pint.



If cedar-apple rust is a problem, use instead:

Wettable sulfur	4	4
Ferbam	5	2
Arsenate of lead	8	3

First cover spray, 10 days or 2 weeks after the petal fall spray.

Wettable sulfur	6	6
Arsenate of lead	5	2
DDT, 50% wettable powder	3	1

If cedar-apple rust is a problem, use only half of the amount of wettable sulfur listed and add the amount of ferbam used in the petal fall spray.

Second cover spray, 2 weeks later. Use same materials as in the first cover spray.

If mites are present, add aramite 6 2

Second brood codling moth spray, apply about the middle of July

Lead arsenate	8	3
Aramite for mites	6	2

#### ALTERNATE SPRAY MATERIALS WHICH MAY BE SUBSTITUTED IN THE PRECEDING SCHEDULE ARE:

1. Puratized Apple Spray. Conversion No. 1 1/2, (1/2 pint per 100 gallons.) An organic mercury compound in liquid form which may be substituted for dry lime-sulfur and wettable sulfur in the petal fall and first cover sprays. This is quite effective against apple scab but does not control cedar-apple rust. Do not use after the first cover spray as some residue might be left at harvest time.

2. Captan, 50% wettable powder. Use at the rate of 1 1/2 to 2 pounds per 100 gallons or according to directions on small packages. Controls apple scab and gives a better finish on Golden Delicious apples than other fungicides do. Substitute for wettable sulfur in the preceding schedule or use puratized in the first two sprays and Captan in any later ones.

3. Miticides. Although Aramite is mentioned in the schedule, Malathion or other materials used according to directions on the package will give good control of



mites. Generally two sprays should be applied about 10 days or 2 weeks apart.

## PEARS

The sprays listed for apples are also recommended for pears. The petal-fall and first cover sprays are usually sufficient.

Fire blight is a serious disease of pears and apples. It is caused by bacteria. The disease may attack any part of a plant, but its greatest damage is usually done on the wood of the tree. New growth is killed back from the tip. On the pear, the leaves turn black on killed branches as if they had been scorched. Large cankers on main limbs or on the trunk may girdle them completely, killing everything above. Most infections take place in the spring and early summer while the plants are growing vigorously.

Recent experiments indicate that fire blight can be controlled by spraying with antibiotic sprays. The material which has been most successful is streptomycin. This is available under the trade name Phytomycin. Another product Agrimycin, contains streptomycin in combination with another antibiotic. These materials should be applied at least three times: (1) when blooms are just starting to open; (2) at full bloom; (3) when most of the petals have fallen. The amount of material to use in mixing the spray will be found on the consumer-size packages. Our experience indicates that a concentration of 100 to 200 parts per million of streptomycin, somewhat higher than recommended by manufacturers and other experiment stations, may be most effective.

## CHERRIES

The main diseases and insects infesting cherry trees are (1) cherry leaf spot, (2) brown rot, and (3) plum curculio.

(1) Cherry leaf spot is a fungus disease which is often very serious in Nebraska. The disease overwinters in fallen infected leaves. In the spring, spores from these leaves on the ground infect the new foliage on the trees. The first symptom the home fruit grower usually sees is a few leaves on his trees turning yellow and falling. Soon more and more leaves turn yellow and

fall until the tree may be completely defoliated. This may happen before the fruit is ripe, in which case it never ripens properly and is a total loss. If infection is severe two or three years in a row, the tree usually dies.

(2) Brown rot is another fungus disease which may cause considerable losses of sweet cherries but is not severe on sour cherries under our conditions. Sprays applied for cherry leaf spot will control brown rot also. Symptoms of the disease are discussed in the list of plum diseases.

(3) Plum curculio is the main insect pest of the cherry fruits. The female curculio makes a crescent shaped cut in the skin of the young fruit and lays an egg in the flap of tissue thus partially cut around. The egg hatches into a worm which eats in the fruit for a few weeks. This insect attacks plums, peaches and apples as well as cherries. Controlling the insect also aids greatly in brown rot control, for the insects aid the spread of this disease by making punctures in healthy fruit when they are feeding. These punctures are an excellent place for the brown rot spores to start a new infection.

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#### SPRAY SCHEDULE FOR SOUR CHERRIES

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	Conversion number <sup>1</sup>	Pounds per 100 gallons
Petal fall, when most of the petals have fallen		
Lead arsenate	8	3
Hydrated lime	5	3
Dry lime-sulfur	14	10
First cover, 10 to 14 days after petal fall		
Lead arsenate	8	3
Hydrated lime	5	3
Dry lime-sulfur	11	8
Second cover, 10 to 14 days after 1st cover		
Dry lime-sulfur	11	8
Post harvest spray, immediately after fruit is harvested		
Copper sulfate	4	4
Hydrated lime	9	6
(4-6-100 Bordeaux, see page 14)		

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<sup>1</sup>See page 5 for explanation of conversion number.



## PLUMS

Plums may be attacked by (1) scale insects, (2) plum curculio, (3) brown rot, and (4) plum pockets.

(1) Scale insects are discussed under apples.

(2) Plum curculio does the same damage on plums as is described under cherries.

(3) Brown rot is the most destructive fungus disease that attacks stone fruits. Spores are produced in the spring from diseased fruits infected in previous years. These spores infect blossoms, young fruits and sometimes leaves. The symptom most commonly observed by fruit growers is the rotting of the fruit about the time it ripens. Small, brownish soft spots appear which rapidly enlarge until the entire fruit is rotten. The fruit then shrivels into a "mummy" which may hang on the tree all winter or may fall to the ground. It is the brown rot fungus in these "mummies" which produces spores the following spring. Keeping the "mummies" picked up off the ground and off the tree will aid greatly in controlling the disease. Burying them at least two feet deep is the best way to dispose of them, although plowing them under will help.

(4) Plum pockets is another fungus disease of plums. It is closely related to peach leaf curl. The most striking symptom is distorted and hollow fruit.

### SPRAY SCHEDULE FOR PLUMS

	Conversion number <sup>1</sup>	Pounds per 100 gallons
Dormant spray, before buds break in the spring, to control scale in- sects and plum pockets.		
Dry lime-sulfur	33	24
First cover, when the shucks, or old flower parts, fall off of the enlarging young fruit.		
Wettable sulfur	8	8
Methoxychlor (50% wettable powder)	12	4
Second cover, about 2 weeks after 1st cover; same materials as 1st cover spray.		
Harvest spray, about two weeks before harvest.		
Wettable sulfur	8	8

<sup>1</sup>See page 5 for explanation of conversion number.

## PEACHES

Peaches suffer from (1) plum curculio and brown rot, (2) peach leaf curl, (3) scab, and (4) borers.

(1) Plum curculio and brown rot damage are discussed under cherries and plums, respectively.

(2) Peach leaf curl is a fungus disease characterized by the effect it has on the peach foliage. The leaves are either paler than normal or reddened. They are curled, puckered, and distorted and usually fall in late June or early July. This may result in almost complete defoliation of the tree.

(3) Peach scab or "freckles" is a fungus disease which materially lowers the value of infected fruit. It makes small, black spots on the upper or more exposed side of the fruits.

(4) The peach tree borer causes damage and death to peach trees by feeding in the bark of the trunk and upper roots. Their presence can be detected by masses of exuded gum mixed with sawdust from 2 or 3 inches below to a foot above ground. Kill the borers by scraping grass and trash away from the base of the tree and sprinkling para-dichlorobenzene (PDB) crystals all around the trunk in a band an inch from the trunk. Then mound dirt around the trunk a few inches deep over the crystals. Fumes from the PDB enter the burrows of the borers and kill them. For trees under three years of age use 1/2 ounce per tree, for trees three to six years old use 3/4 ounce, and for older trees use 1 to 1 1/2 ounces, depending on the size. Make the application about the first of October.

Infestation may be prevented by spraying or painting the trunks with 1/2 cup of 50% wettable DDT powder mixed in one gallon of water. Three applications are necessary. The first should be during the first week of July, the second during the last week in July, and the third about the 25th of August.



## SPRAY SCHEDULE FOR PEACHES AND APRICOTS

	Conversion number <sup>1</sup>	Pounds per 100 gallons
Dormant, before the buds break.		
For peach leaf curl.		
Dry lime-sulfur	33	24
First summer, when the shucks or dried flower parts begin to fall from the young fruits.		
Wettable sulfur	8	8
Methoxychlor (50% wettable powder)	12	4
Second summer, 10 to 14 days later.		
Use the same materials.		
Third summer, one month before harvest.		
Wettable sulfur	8	8
DDT, 50% wettable powder	6	2
Fourth summer, ten days before harvest.		
Wettable sulfur	8	8

<sup>1</sup> See page 5 for explanation of conversion number.

## APRICOTS

Apricots suffer from the same diseases and insects as do peaches, except for peach leaf curl. Spray with the same materials recommended for peaches, omitting the dormant spray.

## NOTES ON SPRAY MATERIALS

In the preceding spray programs, when wettable sulfur is specified, sulfur of the finest particle size obtainable should be used. Either microfine wettable sulfurs, sulfur pastes or sulfur products such as Kolofog are satisfactory.

When copper sulfate and hydrated lime are specified, the product of these is bordeaux mixture. The copper sulfate should be dissolved in the water before the lime is added. Copper sulfate powder dissolves much faster than crystals. Commercially prepared Bordeaux mixtures may be used in place of copper sulfate and lime. Directions on such packages tell how much of the Bordeaux mixture to use.

## Spray Machinery

Knowing what pests are present and what to spray with to control them does no good unless a sprayer of some kind is available. The size of sprayer to get depends on the size of the fruit planting together with what other work the sprayer might be used for. Nurseries and pest control operators often do custom spraying of trees in town for a moderate fee.

Warning: It is dangerous to plants to spray them with a sprayer in which 2, 4-D has been used.

Garden hose sprayers: Fruit growers with a few trees that are close to a pressure water system can get a small sprayer which attaches to a garden hose. A concentrated mixture of spray material is placed in the sprayer and suction pulls it into the stream of water. This type of sprayer can also be used on ornamentals around the yard and on garden vegetables.

Hand compressed air sprayers: Many people have a small 3-gallon sprayer for use on their garden, ornamentals and lawn. This may be used for spraying one or two trees, but that is about all. An apple tree only ten years old requires about seven gallons of spray at one time when in full leaf. Only five such trees would take about twelve sprayerfuls, and that is probably more work than the fruit would justify.

Wheelbarrow sprayers: Wheelbarrow sprayers with tanks holding 14 or 16 gallons of spray mixture are about the smallest size practical for a grower with a half dozen or more trees. These may be had with only a pump. This necessitates one man pumping and another spraying. Wheelbarrow sprayers can also be obtained with pressure tanks. These can be pumped up once and will spray several gallons before they need to be pumped up again. This type is sometimes equipped with a gasoline motor for operating the pump.

Barrel sprayers: On a farm with other equipment available, a barrel sprayer may be used. This is a pump mounted in a barrel and carried about on a truck bed, wagon or trailer. One man is required to pump and another to spray. A sizeable home orchard can be sprayed with the barrel sprayer.

Small power sprayers: Small power sprayers of about 15 gallons capacity are available. These are high pressure sprayers but are small enough to go in the trunk of a car. They cost about \$150. If enough other uses are available to justify this cost, they are ideal for spraying home orchards.