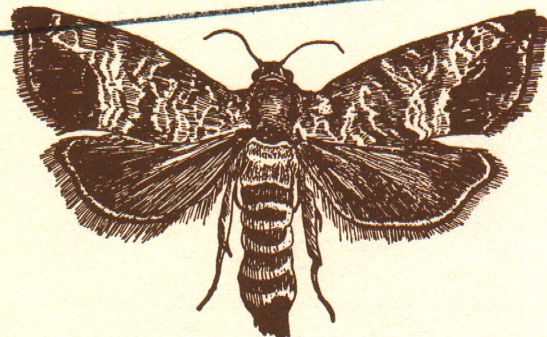


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PEST CONTROL PROGRAM FOR

HOME GROWN FRUIT



MICHIGAN STATE UNIVERSITY
COOPERATIVE EXTENSION SERVICE

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Disease and insect control measures given in this bulletin are recommended for home fruit production. Research and experience have shown that when these measures are practiced, an abundance of unblemished fruit may be expected in Michigan plantings during most years. A combination of pest control sprays, sanitation, and good cultural practices are equally important in growing clean fruit.

Chemicals to Use

Within recent years several excellent pest control chemicals have been developed. Those suggested in this bulletin are among the safest and most effective discovered to date. In addition to giving good results on both tree and small fruits, these chemical mixtures have given protection to many vegetable and ornamental plants.

Captan has a wide range of effectiveness against plant diseases. Major fruit diseases it controls include apple scab, brown rot of stone fruits, and cherry leaf spot. Control of many diseases is especially important early in the season.

Malathion is a comparatively safe phosphate insecticide effective against sucking pests (aphids, plant bugs, leafhoppers, etc.) and many chewing types. Insects are killed by its contact and stomach poison action. Sprays remain effective on fruit and foliage for about 3 days.

Methoxychlor is a chlorinated hydrocarbon insecticide related to, but safer than, DDT. Its effectiveness lasts about 7 days. During this time, chewing insects (caterpillars and pests that cause worms inside fruit) are controlled by its contact and stomach poison action.

Sevin is similar in action to the phosphate insecticides. However, it is not suggested for use before mid-June because, if used early in the season, it sometimes causes certain trees to drop their fruit. Sevin remains effective against susceptible pests for about 14 days. The use of Sevin may result in an increase of aphids and mites.

Kelthane is a specific material against mites, the minute pests often found on the foliage of trees. Residues of kelthane remain effective for about two weeks. If a magnifying glass reveals that mites average fewer than five per leaf, kelthane may be omitted from the spray mixture. (Mite populations often build up rapidly during warm dry weather and become especially hard to control then.) Trees sprayed with methoxychlor and sevin are especially subject to mite attack.

Diazinon is a phosphate insecticide similar to malathion in action and safety. It readily controls the insects commonly found in home orchards and its effectiveness lasts about 14 days. Diazinon should be used when scale insects are a problem.

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Using Chemicals

If you have several trees and/or small fruits you will find it most economical to buy separate chemicals and use them according to Table 1. This schedule has given outstanding results in Michigan State University trials on practically all fruits raised in Michigan. If you get poor results after following this schedule, be sure to check two important items before blaming the chemicals; (1), **did you make sure your trees got good spray coverage?**; (2), **did you omit any of your sprays?**

In other words, if you are willing to **provide good coverage using these chemicals at the times** indicated, you are practically assured of fruit favorable for home use.

When only a few trees are involved, it may be convenient to buy a prepared "trade-name" mixture. These are ordinarily sold by garden supply dealers in states or areas where they are formulated.

Several "trade-name" mixtures containing the suggested ingredients have given satisfactory results in Michigan trials. These include "Acme Fruit Tree Spray," "E-Z Flo Fruit Guard," "F. and B. Multi-purpose Spray," "Green Gro Home Garden Fruit Spray," "Ortho Home Orchard Spray," and "Miller's New Fruit Spray or Dust."

Other products containing at least 4 percent malathion, 6 percent methoxychlor, and 4 percent captan should perform satisfactorily when used as suggested by the manufacturer.

Many "trade-name" mixtures contain ingredients other than those suggested in this folder. These may perform satisfactorily. However, before buying such a mixture, you should be sure that it will cause no harmful side-effects such as off-flavors in harvested fruit or excessive residues of chemical at harvest time.

Equipment Needed

Many types and sizes of sprayers are suitable for spraying fruit plants. Compressed air sprayers of 3- to 5-gallon capacity have wide adaptability and are quite suitable for small plantings of only a few trees. Trombone or slide-type sprayers are suitable for plantings of only 3 or 4 trees. Wheelbarrow sprayers can be used on plantings of up to 12 trees. For larger plantings, it is best to use some type of power sprayer.

Some of the newer types of sprayers which are hooked to a garden hose have not performed satisfactorily because of such troubles as incomplete and non-uniform mixing of the spray materials, poor spray distribution, and insufficient water pressure.

Although several types of dusting equipment are available, dusts have not generally been as good as sprays. The dust mixtures of malathion, methoxychlor,

and captan do not give as good control of some of the fruit pests as sprays with these same materials.

When to Spray

When using the chemicals suggested in this folder, begin spraying apples and pears at the very first sign of new growth. The starting time is usually between April 15 and May 1. Follow the schedule in Table 1 up to 1 week before harvest for each fruit. **Do not apply insecticide sprays when the trees are in full bloom.** (See section on special diseases for in-bloom sprays.) Persons using a prepared "trade-name" mixture will have to follow the spray schedule suggested by the manufacturer. Growers who have more than 25 trees and are prepared to use more toxic chemicals should consult Michigan State University Extension Bulletin 154, "Fruit Spraying Calendar."

Table 1. Spray Schedule for all Backyard Friuts

EARLY SPRAYS — Beginning at Green-tip apply once or twice per week through Bloom — Twice each week during rainy weather (ordinarily necessary for apples and pears only)

	Amount of Water		
	1 Gal.	10 Gals.	100 Gals.
Captan (50% wettable powder)	1 Gal. 2 Tbls.	10 Gals. 1 ¼ cups	100 Gals. 2 lbs.
Note: Tbls. = tablespoons			

SPRING SPRAYS — Beginning at Petal-fall apply once each week until about June 5. (All tree fruits*)

	1 Gal.	10 Gals.	100 Gals.
Captan (50% wettable powder)	1 Gal. 2 Tbls.	10 Gals. 1 ¼ cups	100 Gals. 2 lbs.
plus			
Malathion (25% wettable powder)	2 Tbls.	1 ¼ cups	2 lbs.
plus			
Methoxychlor (50% wettable powder)	3 Tbls.	2 cups	3 lbs.

SUMMER SPRAYS — Beginning about June 10 apply every 10 to 14 days until one week before harvest. (All tree fruits*)

	1 Gal.	10 Gals.	100 Gals.
Captan (50% wettable powder)	1 Gal. 2 Tbls.	10 Gals. 1 ¼ cups	100 Gals. 2 lbs.
plus			
Malathion (25% wettable powder)	2 Tbls.	1 ¼ cups	2 lbs.
plus			
Sevin (50% wettable powder)	3 Tbls.	2 cups	2 lbs.
plus			
Kelthane† (35% wettable powder)	1 Tbl.	¾ cup	1 ¼ lbs.
plus			
Diazinon (25% emulsion concentrate)	2 Tsp.	½ cup	1 qt.

*These chemicals are effective against pests of small fruits also; however, small fruits ordinarily require only about half as many sprays as tree fruits.

†Use kelthane only once per month beginning about June 10. This means kelthane should be omitted in the second spray each month and used only three times (approximately June 10, July 8, and August 5).

How Much Spray to Apply

Spray the tree thoroughly, making sure you cover all parts of the tree, inside and out. Continue spraying until a noticeable amount is dripping from the tree. The following table gives the approximate amount of spray needed for various sizes of fruit trees in full leaf.

Approximate age of tree	Height (feet)	Spread (feet)	Gallons to apply
1-4	5-8	3-6	½-1
5-10	8-12	4-9	1-3
10-15	12-18	8-15	4-8
Over 15	18+	15+	8-10

The Value of Good Cultural Practices

Plant only good plants, keep the plants growing vigorously, and keep the plantings clean. When starting new plantings, use only plants which are certified and disease-free.

Prune your trees. A young tree should be pruned only enough to train it. As the tree becomes older, more pruning is necessary to keep the tree within bounds so that it can be sprayed or dusted more easily.

Do not be afraid of overpruning a large bearing tree. Remove all the weak and dead wood within the tree. Lower the height when it becomes so tall as to make spraying difficult.

When lowering the height, always cut back to a side limb. This tends to reduce the number of suckers the following year. Remove undesirable suckers from apple trees in July, before they become woody. This eliminates a breeding place for insects and reduces the problem of pest control.

Peach trees require heavier pruning than apples in order to maintain a productive type of fruiting wood.

For more information on pruning, see Extension Folder F-122, "Pruning Young Fruit Trees."

Protect your trees from mice. In most cases, you can prevent mouse damage to your trees by simple mechanical means. You can form hardware cloth (4 or 5 wires to the inch) into a cylinder and place it around the tree. Set the cylinder into the soil around the tree so mice can't get under it. The cylinder should extend a foot or more up the tree trunk.

Mounding gravel or cinders around the base of the tree will help keep mice away. Also keep an area for 2 to 3 feet around the tree free from grass and other cover that could shelter mice.

In your fruit planting, dispose of dropped fruit, trash, and debris near the trees where pests can live and overwinter. Insect infested apples start dropping before harvest. It is important to collect and destroy

all "drops" twice weekly after mid-July to minimize apple maggot damage the following year.

Remove and destroy all fruit mummies (dried fruit) hanging in the trees when you prune them each spring.

Keep weeds and other plant competition away from young trees. Bearing trees can grow well in sod or grass.

In your strawberries, follow such practices as mowing after harvest, clean tillage, removal of weeds and rubbish from borders, using healthy planting stock, and short rotations. They are just as important as spraying for control of strawberry pests.

In your raspberries, remove and burn old fruiting canes immediately after harvest. Remove and burn all portions of canes injured by tree crickets, borers, or other cane insects when you prune in the spring.

If you find raspberry plants affected by such diseases as curl, mosaic, and orange rust, dig out and burn them immediately. Remove and burn all "handles" or portions of the old cane from black and purple raspberry tip plants after planting.

In your currants and gooseberries, watch for signs of cane borers (hollow stems with black centers) when you are pruning. If you find them, cut the stem back to fresh green pith. Burn all prunings immediately.

Special Insect Problems

Peach tree borers are serious peach tree pests. They tunnel between the bark and wood of the crown, trunk, and upper parts of the tree. To control borers, thoroughly spray the trunk and lower limbs of the peach trees each time you spray during July and August.

Rose chafers often damage many fruits. Early and frequent sprays (every day or two) are often needed for adequate control. Use malathion and sevin.

Climbing cutworms occasionally attack grape and tree buds early in the spring. If you find any injury from cutworms, spray immediately. Be sure to spray the base of the plants and the ground, as well as other parts of the plant. Use only malathion.

Scale insects are sometimes troublesome on backyard fruit plants. When you find an infestation, apply a dormant oil spray at manufacturer's recommendations. Apply on a warm day in the spring before any growth takes place. Be sure to spray tops well.

Soil pests (white grubs and strawberry root weevils), are occasionally troublesome in plantings of small fruits. To control such pests, treat the soil with chlordane at the rate of 10 pounds active ingredient per acre. For 1,000 square feet, you can apply 2.5 pounds of 10 percent granules and water the chemical

in well. Another alternative is to mix the chemical with water and apply the solution with a sprinkling can. Use these rates of chlordane only for the purpose discussed here.

Where you have had troubles or where the sod is plowed under, it is best to treat new strawberry beds by mixing the chemical with the soil before setting out the plants.

Special Disease Problems

Peach leaf curl, a fungus disease, is common on peaches in home orchards. Infected leaves become curled, puckered, and swollen. They vary in color from light green to red. For control, use 2 tablespoonsful of ferbam per gallon of water in the spring before the buds swell or after leaf drop in the fall. For further information, see Extension Folder F-235, "Peach Leaf Curl."

Black knot of plum and cherry describes, in its name, the symptoms of this fungus disease. This fungus attacks the woody parts of the tree. The best control is to cut out and burn the knots before growth starts in the spring. Destroy any nearby wild plum or cherry trees harboring this disease. For more help, see Extension Bulletin E-469, "Black Knot of Plum and Cherry."

Peach scab shows up on fruit as small, dark colored spots usually found on the upper portion of the fruit. Include wettable sulfur, 3 tablespoons per gallon of water, in two of your regular sprays (2 and 4 weeks after petal fall) if you have had trouble with this disease in the past.

Brown rot of stone fruits is favored by warm, humid weather at bloom and in the period 3 weeks before harvest. If the weather is warm and wet, spray with captan (2 tablespoons per gallon of water), every 2 to 4 days during bloom; do not use an insecticide. Spray once a week with captan beginning 3 weeks before harvest. If the weather during this period is warm and wet, increase the number of sprays to 2 a week. Insecticides should not be used more than once weekly up to one week before harvest. Good insect control and sanitary measures help to control this disease.

Cherry leaf spot control requires an additional spray immediately after harvest.

Other Suggestions

- Make certain you give all plants good pesticide coverage. If in doubt, climb a tree and check the top for spray deposit on both leaf surfaces.
- For maximum protection from diseases, it is desirable to apply a spray before a predicted rain.

However, avoid applying pesticides during a rain or during windy weather. Unless drying has taken place, rains will dilute the spray mixture. Once dry, most materials stick to the foliage quite well.

- Prepare a fresh spray mixture each time you make an application. Pesticides left standing in water soon lose their strength and may harm sprayer parts.
- Unless your sprayer has a mechanical agitator, the spray materials may tend to settle out. Shake or stir the spray mixture often during application.
- Read the labels. Be sure to follow all safety precautions.
- When using pesticides, avoid getting chemicals on your skin or breathing the mist. Pesticides suggested in this folder should not be used later than 7 days before harvest. This waiting period allows sufficient time for chemicals to deteriorate. Even after waiting the time indicated, wash all fruit thoroughly before eating.

Defruiting Bearing Ornamental Trees

Bearing apple trees can be prevented from fruiting by applying a combination of Sevin (50% wettable powder) at 2 pounds per 100 gallons of water plus naphthaleneacetic acid at 20 parts per million when $\frac{3}{4}$ of the blossom petals have fallen. The two chemicals should be used together in the same tank of water. Spray trees to the point of run-off.

For those making up only 1 to 2 gallons of spray, 2 level tablespoons of Sevin per 1 gallon of water equals the dilution of 2 pounds per 100 gallons. With naphthaleneacetic acid formulated as a wettable powder—so that $\frac{1}{4}$ pound per 100 gallons of water equals 10 parts per million— $1\frac{1}{2}$ level teaspoons in 1 gallon of water equals approximately 20 parts per million. If formulated differently then ask your druggist or supplier to measure the ingredients to fit your requirements.

In some instances, the leaves of sprayed trees may be twisted and curled to some degree 3 to 5 days after spraying. However, this will not injure the trees and the foliage will return to normal.

If after 2 weeks, some fruits continue to develop and enlarge, a second spray application may be made. However, only Sevin at 2 pounds per 100 gallons of water or its equivalent should be used at this time.

Note: This procedure for defruiting apple trees is for trial purposes only and you must accept the possibility of slight injury to the trees.

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