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J. H. LONGWELL, *Director*

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General-Purpose Spray Mixtures For Home Fruit Plantings

H. G. SWARTWOUT AND LEE JENKINS

Using the more recently introduced organic insecticides and fungicides, combination sprays have been developed which are reasonably safe on all the major fruit crops of Missouri and which are reasonably effective against most of the important pests of this area. Such general-purpose spray mixtures are especially useful for small mixed fruit plantings where spraying with materials specifically suited to each crop is impractical. Usually, rather than spray each crop with a different combination of materials no spraying at all is done.

General-purpose formulations are not ideal and cannot be expected to equal the control obtained in commercial spraying but when correctly applied they usually give an acceptable product for home use. As new pesticides are introduced continued improvements in the combinations of materials are made.

EXPERIMENTAL WORK

General-purpose fruit spray combinations for Missouri conditions were first reported in 1950 in Missouri Agricultural Experiment Station Bulletin 530. In 1951 a miticide was added to the combination and reported in Missouri Agricultural Extension Circular 592. Since ferbam is not always as effective as desirable, the new fungicide "captan" has been tested the past two years in two general-purpose formulations as a substitute in whole or in part for ferbam. With no new insecticides or miticides superior for general-purpose formulation to those suggested for 1951 and 1952 the captan was tested in combination without change in these materials. In one case captan was used on the basis of 2 lbs. for 100 gallons of dilute spray, without ferbam; in the other captan was used at 1-100 plus ¾ lb. ferbam. The two formulations were as follows:

MATERIALS	Quantities for 100 Gallons of Dilute Spray FORMULA 1	FORMULA 2
Captan, 50% wettable powder	2 lbs.	1 lb.
Ferbam, 76% wettable powder	none	¾ lb.
TDE (DDD) 50% wettable powder	1½ lbs.	1½ lbs.
Methoxychlor, 50% wettable powder	2 lbs.	2 lbs.
88R (Aramite, etc.) 15% wettable powder	¾ lb.	¾ lb.

The two combinations containing captan were more effective against cherry leaf spot, peach scab and downy mildew of grapes and appear to be more effective against brown rot of peaches and plums than a combination containing 1½ lbs. of ferbam and no captan.

These combinations were applied to the following fruit crops in a home fruit planting:

Apples — several varieties including Transparent, Jonathan, Golden Delicious, Stayman, Winesap, Wealthy and Turley.
Peaches — Hale Haven, Belle of Georgia, Mikado and Indian Cling.
Plums — varieties of European plums, damsons and several American-Japanese hybrids.
Cherries — Montmorency.
Gooseberries — Pixwell.
Currants — Red Lake.
Grapes — Concord and varieties quite susceptible to mildew as Fredonia, Herbert and Niagara.
Blackberries — Early Harvest.
Pears — Duchess, Worden Seckel, Kieffer, Bierschmitt
Raspberries — Latham and Sodus.

There was no evidence of injury from either of the mixtures on any variety or crop.

Since captan does not appear to be adequate against cedar rust on apples under conditions favorable for this disease, the formula containing both captan and ferbam has the wider application. It certainly would be the more desirable one to use on apples unless one is certain that cedar rust is not a hazard.

SUGGESTED GENERAL-PURPOSE SPRAY FORMULA

On the basis of studies to date, the most satisfactory general-purpose spray mixture for general use on home plantings of fruit in Missouri is therefore as follows:

	For 100 Gallons of Dilute Spray	
Ferbam (Fermate, Ferradow, Niagara, Carbamate, etc.)	¾ lb.	(actual toxicant 0.57 lb.)
Captan (formerly "406") 50% wettable powder	1 lb.	(actual toxicant 0.50 lb.)
TDE (DDD) 50% wettable such as Rhothane WP-50	1½ lbs.	(actual toxicant 0.75 lb.)
Methoxychlor, 50% wettable powder	2 lbs.	(actual toxicant 1.00 lb.)
88R (Aramite, Ortho-mite, Niagaramite)	¾ lb.	(actual toxicant 0.11 lb.)

This combination is for use during the growing season as it is of little value as a dormant spray except on peaches for leaf curl control. In our tests this combination has been effective against most of the major fruit pests in Missouri. On peaches and plums it should be supplemented with microfine wettable sulfur at those times when it would be undesirable to apply the general-purpose mixture. On peaches special trunk sprays of DDT or methoxychlor should be applied for borer control.

Warning — The use of this combination of insecticides generally encourages the rapid build-up of Forbes scale on apples, peaches, plums and cherries. In order to prevent serious injury and possible loss of the trees, a dormant spray should be applied to these crops every year (see Special Sprays).

Purpose of the Materials

Ferbam is included in the mixture especially for the control of cedar rust. It has been found more effective against cedar rust on apples than any other fungicide, except some closely related compounds which are not safe on fruits in general. It has been more effective against black rot of grapes than captan and its effectiveness against apple blotch and raspberry anthracnose is at present more definitely established than for captan.

Captan is the more effective against apple scab, peach scab, cherry leaf spot and downy mildew of grapes and appears to be the more effective against brown rot of peaches, cherries and plums.

Methoxychlor is quite effective against codling moth, plum curculio and leaf hoppers on apples and berry moth, leaf hoppers, leaf folders and flea beetles on grapes. It will control plum curculio and to some extent oriental fruit moth on peaches and plums.

TDE (DDD) is included for the control of red-banded leaf roller which is sometimes a serious pest on apples. It also may attack several other fruit crops.

The 88R (Aramite, Ortho-mite, Niagaramite) is highly effective against mites which can become serious on most of our fruit crops.

SPECIAL SPRAYS

Dormant for Scale — Dormant sprays should be applied every year to apples, pears, peaches, plums, cherries and currants for the control of scale. Use miscible type dormant spray oil (specially prepared for fruit spraying) at the rate of 3 gallons in 100 gallons of dilute spray or 2½ cups in 5 gallons of spray. Apply before growth starts in the spring during a period of mild weather when the spray will dry before freez-

ing. If possible, spray when there will be a period of at least 24 hours above freezing following the application.

Caution: Do not use miscible oil fortified with dinitro compounds or special chemicals for aphid control etc., because of risk of injury when used on all the fruit crops.

Dormant for Peach Leaf Curl — Add ferbam (Fermate, Ferradow, Niagara Carbamate) to the oil spray at the rate of 2 lbs. in 100 gallons, or ½ cup in 5 gallons.

Summer for Peach Tree Borer — Use 4 lbs. of 50% wettable DDT powder to 100 gallons of water (2¾ lbs. of 75% DDT) applied either as a spray or with a brush to the trunks from ground level to the first limb. These treatments should be given — the last week in June, the last week in July and the last week in August.

Methoxychlor is almost as effective as DDT and may be used at the same rate if one so desires.

For small quantities of spray use the DDT (50%) as follows: ½ lb. to 12½ gallons of water; 11 level tablespoons to 4 gallons; and 3 level tablespoons to 1 gallon. Use the methoxychlor at ½ lb. to 12½ gallons of water; 14 tablespoons to 4 gallons and 4 tablespoons to 1 gallon.

Special Sprays for Brown Rot on Peaches and Plums — These will be given under the regular schedule for peaches and plums.

SUGGESTED SUMMER SPRAY SCHEDULES

Use the general-purpose spray when mixed as given in this publication, at 6 lbs. to 100 gallons of water. For smaller quantities use 1 lb. to 16 gallons of water; ¼ lb. to 4 gallons of water; 9 level tablespoons to two gallons and 5 level tablespoons to 1 gallon.

To mix the spray first add enough water to make a paste, then thin with more water to a slurry or until it will pour into the sprayer after which add the remainder of the water.

Warning.— Be sure to use the quantity of pesticides recommended. Less of the actual toxicant per 100 gallons of spray than given in the formula on page 2 cannot be depended upon for satisfactory control.

Also it is important that all parts of the plants be sprayed until dripping begins.

Apples

Apply a spray when most of the blossom buds show pink; when most of the petals have fallen; about 10 days after petal fall; and continue at about 2-week intervals until mid- or late-July. If insects are present another spray should be applied to later ripening varieties early in August. Usually, this will be a total of seven or eight sprays.

Spraying late into the season is more likely to be necessary in hot dry summers.

Do not apply these sprays within three weeks of harvest time. With the earlier ripening (summer varieties) the number of sprays to be applied will be fewer than given above.

Pears

Spray when most of the petals have fallen. Apply three more applications at about 2-week intervals.

Peaches, Plums and Apricots

Where there has been considerable loss in the past from rotting of the fruit (brown rot), apply a spray of microfine wettable sulfur when about one-fourth of the blossoms are open. Use microfine wettable sulfur at 6 lbs. to 100 gallons of water. For smaller quantities use 1 lb. to 16 gallons of water; ¼ lb. to 4 gallons of water; 1½ level cupfuls to 5 gallons of water and 4 level tablespoons to 1 gallon.

Do not use the general-purpose spray when the trees are in bloom as it will kill bees.

Begin the general-purpose sprays as soon as the petals have fallen. Apply three more sprays after the petal fall spray at about 12- to 14-day intervals. Apply another general-purpose spray the latter part of June, but not within a month of ripening time.

Special sulfur sprays should be applied beginning between 2 and 3 weeks before expected time of ripening and repeated every 7 to 10 days unless the weather is quite dry. Use microfine wettable sulfur at the rate of 4 lbs. to 100 gallons of water; 1 level cupful to 5 gallons; and 3 level tablespoons to 1 gallon. *Do not use the general-purpose spray within one month of harvest.*

Cherries

Apply the first spray when most of the petals have fallen and make two more applications at about 10-day intervals. But, do not apply the general-purpose mixture after the fruit begins to turn red.

Apply a spray after the fruit has been harvested to protect against leaf spot (yellow leaf followed by leaf fall). Make another after harvest spray about one month later.

Grapes

Start spraying when most of the new shoots are ½ to 1 inch long and continue spraying at about 14-day intervals until two to three weeks after bloom. Avoid, if possible, spraying when in full bloom although trouble from spraying grapes in bloom is not great.

Raspberries, Dewberries, Boysenberries, Gooseberries, Currants

Start spraying when the first leaves begin to emerge from the buds and repeat at 10-day intervals until blooming begins. *Do not apply these sprays after the fruit has started to develop.*

A GENERAL PROGRAM

By varying a few days the time of applying some of the sprays on certain crops it is possible to spray many of the fruits on the same spraying date. When present in the planting, use the apple as the guide to each spraying date since apple spraying starts early and is continued well into the summer. However, here are the exceptions:

(1) Stop spraying gooseberries, currants and raspberries as soon as the young fruits appear.
(2) Stop spraying cherries when the fruit begins to turn red.
(3) Do not spray peaches, plums, apricots and grapes with the general-purpose mixture within a month of harvest.