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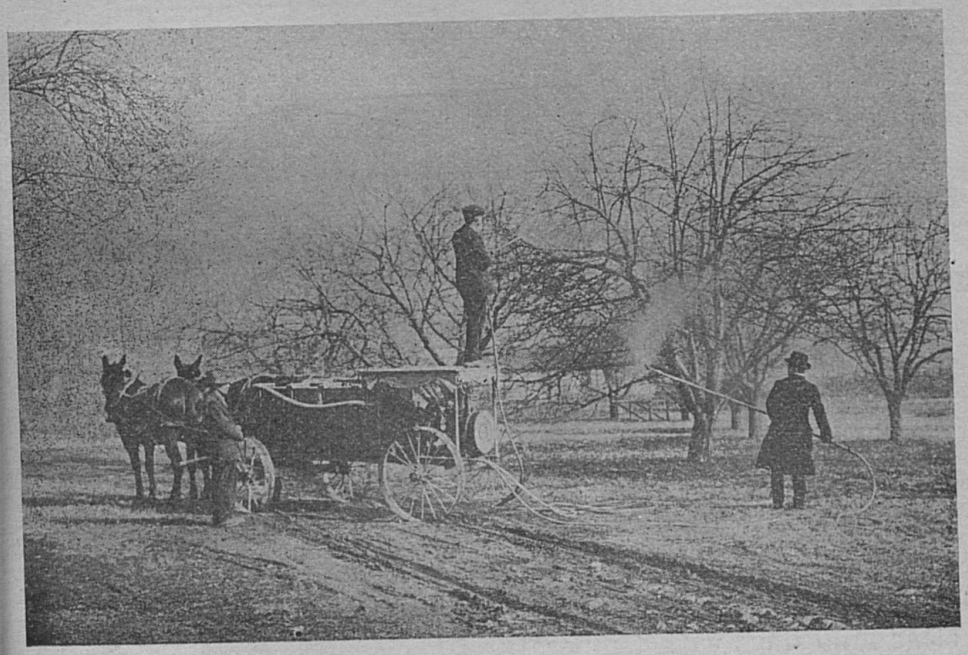
CIRCULAR NO. 176

SPRAYING FRUIT IN KENTUCKY



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EXTENSION CIRCULAR NO. 176

Spraying Fruit in Kentucky

By THE HORTICULTURE DEPARTMENT

Successful orchardists now consider an efficient spray program a necessity. All sprays should be applied in a systematic manner. For successful results it is necessary to (1) use the correct material, (2) apply at the proper time and (3) apply very thoroly.

The spray schedules in this publication are arranged to meet average conditions. For the best results in commercial orchards, it is often desirable to make more frequent applications than are recommended in these pages.

Many commercial orchards have suffered in recent years from San Jose scale, and growers have been eager to learn of spray materials which would have greater killing efficiency than the ordinary lime-sulfur solution.

Some have used for this purpose the oil preparations known as "miscible oils" successfully. Others have used effectively the lubricating oil emulsion known as government oil emulsion, which is on sale by dealers in most commercial apple growing districts in prepared form ready for dilution. Oil emulsions should be freshly prepared each season, and should not be allowed to freeze as this may cause a separation of the oil, and result in injury to the trees. These sprays should be applied on clear mild days with temperatures above 40 degrees Fahrenheit, when there is no danger of freezing temperatures for several hours following.

In orchards practically free from scale, and particularly for peach orchards, the standard liquid lime-sulfur can be recommended.

NOTE: Acknowledgments are due to the State Horticultural Society, commercial growers thruout the state, the plant pathologist and entomologist of the Kentucky Agricultural Experiment Station and others for their valuable suggestions in preparing this circular.

SPRAY SCHEDULE FOR APPLES.

SPRAY FOR	TIME TO APPLY	WHAT TO USE (Use one of the formulas)
1. San Jose Scale	Dormant season; fall of year after leaves have dropped, mild winter weather, or in spring before buds open.	(a) Standard lime-sulfur testing 32 degrees, 6 gals. Add water to make 50 gals. (b) Lubricating oil emulsion (government formula) 1½ gals. Add water to make 50 gals. (c) Commercial miscible oils or oil emulsions diluted according to the manufacturer's recommendations.
*2. Apple scab	Just before blossoms open, when the flower buds are showing pink.	(a) Lime-sulfur, 32 degrees, 1¼ gals. to 50 gals. water or (b) Dry lime-sulfur, 4 lbs. to 50 gal. water and 1½ lbs. arsenate of lead. If aphis be present, add ½ pt. 40% nicotine sulfate to 50 gal.
*3. Apple worm (codling moth), scab, bud moth, curculio.	When three-fourths of blossoms have fallen.	(a) Lime-sulfur 1¼ gal. to 50 gal. or (b) Dry lime-sulfur, 4 lbs. to 50 gal. water and 1½ lbs. arsenate of lead.
4. Codling moth, scab, blotch	Two weeks after Spray No. 3	Bordeaux mixture 3-4-50 and 1½ lbs. arsenate of lead.
5. Blotch, scab, codling moth, rots	Two weeks after Spray No. 4	Same as Spray No. 4.
*6. Blotch, rots, codling moth, sooty blotch	Two weeks after Spray No. 5	Same as No. 5.
7. Codling moth, blotch, rots, bitter rot	About one month after Spray No. 6	Same as No. 5.

Concerning dry lime-sulfur, orchard experiments and laboratory tests in Kentucky and elsewhere in this latitude, have not yielded results to convince this Station of its full efficacy when used at the strengths recommended by the manufacturers. If used as a substitute for standard liquid lime-sulfur for the dormant spray in Kentucky, probably nearly or quite twice the 12 or 15 lbs. usually recommended per barrel will be needed.

NOTES ON APPLE SPRAYING.

1. Where arsenate of lead is mentioned, the reference is made to the powdered form. Where paste is used, double the amount.

2. With varieties such as Delicious, Winesap or Stayman, which are especially susceptible to apple scab, some growers add a pre-pink spray to the schedule, making this application from three to five days ahead of Spray No. 2, using same material as Spray No. 2.

3. Where lime-sulfur is used for spraying in Kentucky, most commercial growers are buying it in the liquid form.

4. Owners of farm orchards and amateur growers may not see fit to apply the regular seven or more sprays. Probably the three most important sprays are Nos. 2, 3 and 6. Note they are marked with a (*). If only one spray is applied, use No. 3 to control the worms.

5. There is a tendency during the last two years to decrease the amount of bluestone in the Bordeaux. Some growers have obtained satisfactory results using a 2-4-50 formula. This is especially true with tender skinned varieties, such as the Grimes and Jonathan.

6. The lime-sulfur (summer strength) may be used in sprays Nos. 4, 5, 6 and 7 in place of Bordeaux on varieties which are not very susceptible to blotch, such as Winesap, Stayman, Delicious, Grimes.

7. "Two weeks later" should be interpreted to mean two weeks from the time the grower begins to make the application, rather than from the time the spray is finished.

8. In diluting stock of "government oil emulsion," the water used should be soft. If only hard water is available, add ¼ lb. of copper sulfate and ¼ lb. of lime to each 50 gals. of diluted mixture, as in making Bordeaux.

9. BORDEAUX MIXTURES: 3-4-50. Preparation of one barrel (50 gals.).

Dissolve 3 lbs. of bluestone (copper sulfate) in a wooden or "granite iron" bucket of hot water, by suspending the bluestone in a cloth sack so it will hang two or three inches into the water.

Slake 4 lbs. of good stone lime, dilute and strain it into the spray tank or barrel and add 25 or 30 gals. of water. Dilute bluestone

SPRAY SCHEDULE FOR PEACHES.

SPRAY FOR	TIME TO APPLY	WHAT TO USE
1. San Jose scale; leaf curl	Dormant season	Lime-sulfur 6 gal. Add water to make 50 gals. (The various oil preparations will not control leaf curl). Where scale is spreading use an oil spray, also, for its control.
2. Curculio	Ten days after blossoms fall, when the shucks are being pushed off by young fruit	1 lb. arsenate of lead, 4 lbs. hydrated lime, 50 gal. water.
3. Scab, brown rot, curculio	A month after blossoms fall	Self-boiled lime-sulfur 8-8-50 or Sulfur lime dry mix 8-4-½-50 and 1 lb. arsenate of lead.
4. Brown rot	A month before fruit is due to ripen	Self-boiled lime-sulfur 8-8-50 or Sulfur lime dry mix 8-4-½-50.
5. Brown rot	In damp weather. Two weeks before fruit is to ripen	Same as Spray No. 4.

solution with 8 or 10 gals. of water and add it to the lime water, stirring well as this is done, finally adding water sufficient to make 50 gals. in all. Apply at once. If good stone lime is not available, substitute 6 lbs. of a good grade of hydrated lime in the above formula.

If much spraying is to be done, it is often more convenient to make up in advance separate stock solutions of both bluestone and lime at the rate of one pound to each gallon of water. If these stock solutions are kept covered to prevent evaporation, they can be kept for weeks ready for quick dilution and mixing as needed.

Bordeaux mixture should always be used when fresh.

SPRAY SCHEDULE FOR PEARS.

Use apple sprays No. 1, 2, 3, and 5.

SPRAY SCHEDULE FOR SOUR CHERRIES.

Use apple sprays No. 1, 2, and 3.

NOTES.

1. Scale insects seldom attack sour cherries and if none are present, spray No. 1 may be omitted.
2. If serious infestation of leaf spot occurs, it may be controlled by applying apple sprays No. 4, 5 and 6, using Bordeaux but omitting the arsenate of lead.

SPRAY SCHEDULE FOR PLUMS.

Use same schedule as for peaches, with the addition of one important spray applied as soon as blossoms fall, using same solution as peach spray No. 2.

NOTES.

1. Dry lime-sulfur, liquid lime-sulfur, or Bordeaux should NEVER be applied to the peach orchard during the summer.
2. For spray No. 2 some growers add the fungicide to the solution, for additional control of brown rot.
3. On account of not being able to purchase a high grade of active lump lime for making self-boiled lime-sulfur, the "dry mix sulfur lime" is being much used. This can be prepared at home or purchased from commercial firms. It is made from 8 lbs. sulfur, 4 lbs. hydrated lime, and ½ lb. calcium caseinate (frequently sold under such trade names as Kayso, Spreado, etc.) This is thoroly mixed in the dry form, and used at the rate of 12½ lbs. to 50 gals. of water. First add a small quantity of water gradually to the powder while stirring, until it becomes a paste, then dilute to make 50 gals. of spray mixture.

4. Preparation of SELF-BOLED LIME-SULFUR 8-8-50.

Slake 8 lbs. of the best stone or lump lime in a barrel or tight box. Use hot water when available, but only enough to start slaking.

When slaking begins add 8 lbs. of flowers of sulfur (previously mixed to a paste with a small quantity of water) to the slaking lime, stirring constantly. Continue to add water in small quantities, sufficient to keep the lime in a soft, pasty condition.

As soon as the slaking is over (usually within 15 minutes) add sufficient cold water to cool the mixture and stop the cooking of the sulfur. Stir vigorously and strain into spray barrel or tank, adding water to make 50 gals. of spray material.

If required, larger quantities may be made up at one time in the same proportion, as 32-32-200.

SPRAY SCHEDULE FOR GRAPES.

SPRAY FOR	TIME TO APPLY	WHAT TO USE
1. Grape berry moth, black rot, mildew	Just before blossoms appear	3-4-50 Bordeaux, 1½ lbs. arsenate of lead.
2. Grape berry moth, black rot, mildew	As soon as bloom falls	Same as Spray No. 1.
3. Black rot, mildew, grape root worm, rose chafer	Two weeks after Spray No. 2	Same as Spray No. 1.
4. Black rot, leaf chafer	Two weeks after Spray No. 3	Same as Spray No. 1.

NOTE: If the rot is very bad, later sprays of Bordeaux may be necessary.