

Spray Programs for Grapes

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Over a period of four years Fermate at the rate of $1\frac{1}{2}$ lbs.-100 gals. has given as good and in most cases better control of black rot of grapes than has 5-7-100 and 6-8-100 Bordeaux. It has given excellent control under conditions highly favorable for the development of the disease and with no visible injury or no more than a mere trace. On the other hand, where thorough spraying was necessary to control black rot, Bordeaux has caused more or less foliage injury. In wet seasons when protection against black rot was most needed the injury from Bordeaux has been the greatest. Bordeaux damage to the foliage has reduced the ability of the vines to properly carry and mature a load of fruit.

For these reasons it appears that Fermate is a more desirable fungicide than Bordeaux to use on Concord, Moore Early and other varieties which are resistant or moderately resistant to mildew. On mildew susceptible varieties such as Fredonia or where mildew has been troublesome 5-7-100 Bordeaux is recommended for the present. To control mildew where there has been very little black rot a 4-6-100 Bordeaux is suggested in order to reduce the risk of Bordeaux injury. For the control of mildew it is important to apply the spray to the under sides of the leaves. Except on a few varieties mildew is of economic importance in this section only in occasional years.

DDT has been found to be highly effective against the grape berry moth, leaf hopper and flea beetle. Recent studies by Lee Jenkins of the Entomology Department of the University of Missouri indicate that DDT is more effective than lead arsenate in controlling the flea beetle.

Thorough coverage is necessary to assure satisfactory insect and disease control. When spraying by hand with short rods and nozzles

by the so-called trailer method, it is suggested that approximately the following quantity of spray be applied per acre unless experience has shown that less gallonage will give satisfactory pest control:

1. Up to and including the time when the shoots are 8-12 in. long130-150 gals. per acre
2. Just before bloom160-180 gals. per acre
3. After bloom sprays200 or more gals. per acre

Lower rates of application will reduce the amount of injury from Bordeaux sprays but are likely to result in more black rot under conditions favorable to heavy infection.

Until more information is available, about the same rate of application is suggested when using spray hoods.

THE 5-SPRAY PROGRAM

Where there has been any appreciable loss from black rot in recent years a 5-spray program is suggested for one or two years or until very little fruit rot develops. Such a program more quickly eliminates black rot "carry-over" on the tendrils and canes than programs in which the earlier sprays are omitted.

Special Spray for Flea Beetles. Where flea beetles are a problem or an attack is anticipated use 50 per cent wettable DDT at 2 lbs. in 100 gals. when the buds are swelling or with the first appearance of beetles.

1. When the shoots are $\frac{1}{2}$ to $1\frac{1}{2}$ in. long. It is important that the spray be applied at this stage of shoot development. Use Fermate $1\frac{1}{2}$ lbs.-100 gals. (If there has been an attack of flea beetles add 2 lbs. of 50 per cent wettable DDT).

2. When the shoots are about 10 in. long or 10 to 12 days before expected blooming. Use Fermate $1\frac{1}{2}$ lbs.-100 gals. with 3 lbs. lead arsenate.

3. Just before blooming begins and into early bloom. Use Fermate $1\frac{1}{2}$ lbs.-100 gals. with 3 lbs. lead arsenate.

Note: Spraying in bloom is advisable should a delay in the application of the 3rd spray make this necessary. It also may be necessary to spray while the grapes are in bloom if cool weather prolongs the blooming period. The interval between sprays at this time should not be longer than two weeks. Leave out the lead arsenate when spraying in bloom.

4. As soon as blooming is over or 12 to 14 days after the last spray. Use Fermate $1\frac{1}{2}$ lbs.-100 gals. with $1\frac{1}{2}$ to 2 lbs. of 50 per cent

wettable DDT powder. The 1½ lbs. is adequate if insects have not been troublesome.

5. About 2 weeks after the no. 4 spray. Use Fermate 1½ lbs.-100 gals. with 1½ to 2 lbs. of 50 per cent wettable DDT powder.

After black rot has been brought to a low level the no. 1 spray of the 5-spray program may be dropped and a 4-spray program followed until only an occasional rotted berry can be found. A 3-spray program, for a time at least, can then be depended upon to give a high degree of control of fruit rot. If black rot increases, it is advisable to return to 4 or 5 sprays.

Where mildew is a problem and for those who wish to use Bordeaux instead of Fermate to control black rot substitute Bordeaux in the place of Fermate in the above program.

THE 3-SPRAY PROGRAM

A 3-spray program is satisfactory where there has been little or no black rot in recent years.

1. Just before blooming begins. Use Fermate 1½ lbs.-100 gals. with 3 lbs. lead arsenate.

2. When blooming is over or about 12 to 14 days after the first spray. Use Fermate 1½ lbs.-100 gals. with 1½ to 2 lbs. of 50 per cent wettable DDT powder. The 1½ lbs. is adequate if insects have not been troublesome.

3. About two weeks after the second spray. Use Fermate 1½ lbs.-100 gals. with 1½ to 2 lbs. of 50 per cent wettable DDT powder.