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LATE-BLIGHT OF TOMATO

Tentative Suggestions for Control in Oregon

by

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Late-blight<sup>1/</sup>, a disease which attacks potatoes in western Oregon with more or less severity from year to year, sometimes attacks tomatoes also. It is usually rare on tomatoes but occasionally during favorable seasons the disease has occurred in considerable amounts on this crop. During the last 40 years there have been recorded only two really serious outbreaks--one in 1912, the other in 1941. Since severe losses may occur when rainy weather conditions favor the development of the disease, this circular has been prepared to suggest preventive measures which growers should use in case of a threatened outbreak of blight on the tomato crop.

SYMPTOMS

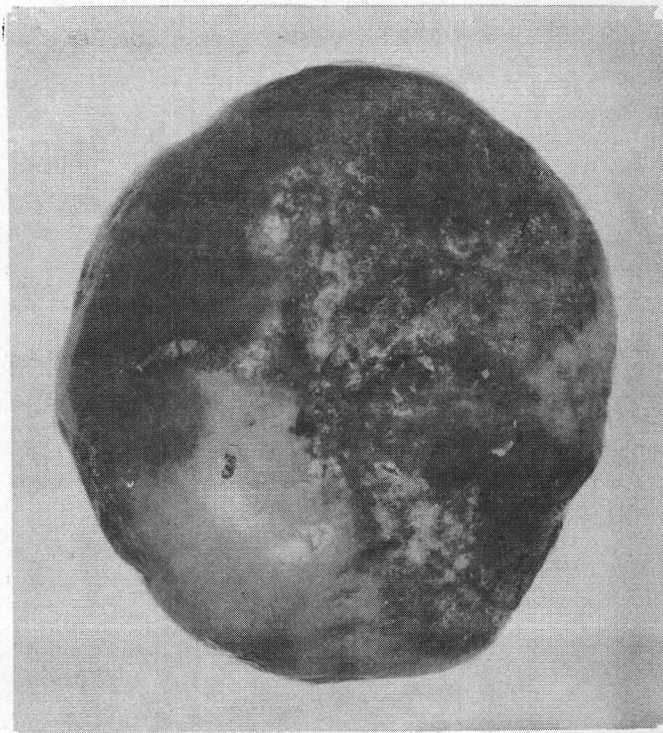
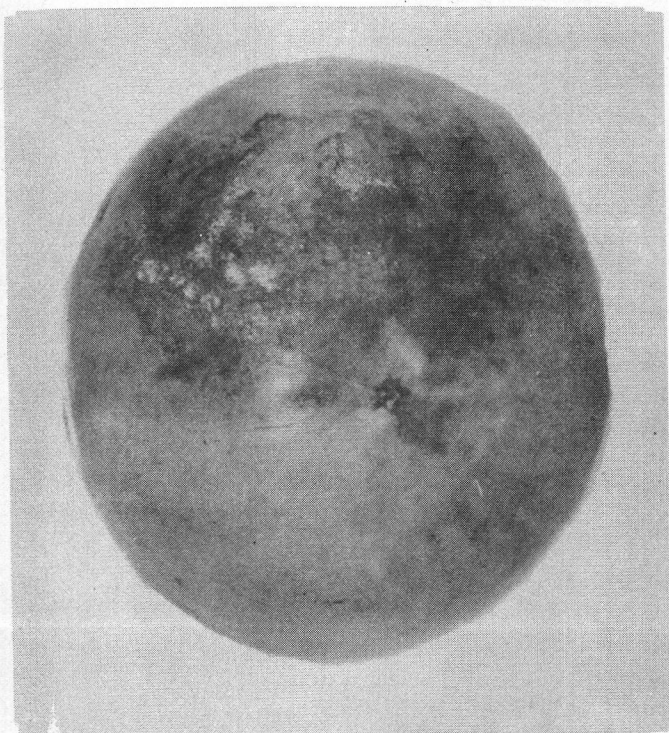
The late-blight disease affects the leaves, stems, and fruits of tomato plants.

Foliage and Stem Symptoms. The late-blight fungus usually attacks the leaves first, although sometimes symptoms may appear on the stems and fruits as soon as, or even before, they are evident on the leaves. Spots of varying size on the leaves turn brown to nearly black in color. If wet weather persists, the killed areas enlarge and increase in number until practically all the foliage may be killed. Similar dark areas develop on the stems. In advanced stages the plants appear as if they had been heavily frosted. If the weather remains wet the blighted parts have a tendency to decay, but if dry weather ensues the dead leaves dry up. Under conditions of very high humidity there develops on the surface of the blighted areas a grayish mold or mildew. On this moldy or mildewed surface there are produced large numbers of spores which serve to spread the disease to other plants.

Fruit Symptoms. Green, partially ripened, or ripened tomatoes may be invaded by the late-blight fungus. The disease appears as a rather firm rot in tomato fruits. Newly infected tomatoes show irregular, more or less sunken areas of darkened tissue. There is no sharp line of demarcation between rotted and healthy tissue. Eventually the diseased fruit may be invaded by other secondary

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<sup>1/</sup> Caused by the fungus, Phytophthora infestans



Late Blight Rot on Tomato Fruits

decay organisms which result in a soft rot, but at first tomatoes infected with the late-blight fungus are rather firm in texture. In an extremely moist atmosphere, mildew may develop on the surface of the diseased tomato fruits, as well as on the leaves, and produce more spores.

### CONTROL

Since in recent times this disease had not been a serious problem on tomatoes until the season of 1941, there is not much local experimental data available, and consequently any recommendations made at this time must be tentative. The suggestions made here are based upon (1) experience in other states and (2) the fact that the late-blight disease of tomatoes is the same as that on potatoes and, in general, should respond to the same control measures as applied to potatoes.

Before making specific recommendations for spraying or dusting, certain dangers should be emphasized.

#### CAUTIONS:

1. Do not use sulphur. Neither sulphur sprays nor sulphur dusts should be used on tomatoes.
2. Use Copper. Sprays and dusts in which copper is the active ingredient are preferred for use on tomatoes.
3. Do not spray or dust young tomato plants. Copper sprays or dusts, especially those containing lime, should not be applied to tomato foliage until really needed, since immature tomato plants are rather intolerant of such sprays and dusts. Yields and quality of tomatoes will be reduced if these control measures are applied while the plants are young. After the plants become mature and the crop is set there is much less danger of injury and copper sprays or dusts may be applied with more safety.
4. Avoid heavy deposits on fruit. As the tomato fruits approach maturity the application of any spray or dust which leaves a heavy deposit on the tomatoes may be objectionable. For this reason it is desirable to use materials which will reduce this residue to a minimum.

### WHAT SPRAY OR DUST TO USE

There are several copper preparations, both sprays and dusts, which may be used for late blight of tomato with more or less satisfactory results. The grower should be guided in his choice by availability of the material, cost, efficiency combined with safety, and spraying or dusting equipment available. A few of the better materials are listed below:

1. Bordeaux Spray. If properly made and applied, Bordeaux spray is one of the most effective controls for this disease, especially when used late in the season on mature plants. Use the following formula:

Copper sulphate - - - - -	4 lbs.
Lime - - - - -	2 lbs.
Water - - - - -	100 gals.

This formula calls for less of both ingredients, copper sulphate and lime, than is usually recommended for use on potatoes. The smaller amount of lime, especially, should contribute to the two precautionary measures mentioned above; namely, there should be less danger of harmful effect if necessary to use it on immature plants and less objectionable deposit if used when the plants are in full fruit.

Bordeaux spray should be made up very carefully according to directions. Send for Oregon Station Bulletin No. 393 on the preparation of Bordeaux mixture. (See page 16-20.) Follow this bulletin carefully and be sure to pour the lime solution into the partly filled tank first, then add the dissolved copper sulphate with constant stirring.

2. Copper-Lime Dust. If you prefer to dust instead of spray, copper-lime dust may be used. However, since this dust contains a large percentage of lime, one should observe the caution against using it on young tomato plants, because immature plants are likely to be injured by it. Purchase this dust ready prepared from a reliable dealer.

3. Other Copper Dusts. There are several other copper dust products on the market, such as copper oxide, which have given fairly satisfactory results when used for late-blight on potato. An experimental program is planned to determine the comparative value and method of application of these dusts on tomatoes under Oregon conditions.

#### WHEN TO SPRAY OR DUST

Since an outbreak of the disease depends upon weather conditions, provided a source of inoculum is present, it is evident that an exact calendar date cannot be given. Consequently, toward the end of the growing season, the grower must be on the alert and begin spraying or dusting whenever there is a threat of wet weather.

The two necessary things to remember are: (1) Begin before the disease becomes established, and (2) Repeat the applications frequently throughout the danger period.

1. First Spray. Ordinarily, in western Oregon, the summers are dry enough so that an outbreak of blight is not expected until after midsummer and the approach of the fall rains. If the weather remains dry with no threat of rain, the first application may be delayed until about the first of September. It should be applied at that time, however, even if no rain has fallen. By this date most tomato plants are mature enough so that no serious injury will result from spraying or dusting, and every day of further delay increases the danger of rain and a consequent outbreak of blight.

But on the other hand, if the rains should come earlier in the summer and blight should appear it might be necessary to spray earlier. However, do not spray or dust very young tomato plants if it can be avoided because of the injurious effects on the immature plants.

2. Subsequent Sprays. Follow-up sprays should be applied every 10 to 14 days as long as there is rain or a threat of rain in order to insure adequate protection. If dry weather ensues and the blight has been held in check it may not be necessary to spray as often, but conditions should be watched closely and spray or dust should be applied again at the first sign of danger.

3. Dusting. If dusts are used follow the schedule as outlined for sprays except that it may be necessary to apply dusts at shorter intervals than sprays in order to secure equal protection. Late in the season, after the tomato plants are well matured and especially if threatening weather persists, dusts should be applied at weekly intervals.

4. Thoroughness. Whether a spray or a dust is used thoroughness is essential. Drive the spray or dust in among the leaves so that all are completely covered.

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