LATE BLIGHT OF TOMATO

Tentative Suggestions for Control in Oregon

by

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During the late summer and early autumn of 1941 a disease resembling late blight of potatoes attacked tomatoes in western Oregon and caused serious damage. This disease on tomatoes in the Willamette Valley and coastal regions of Oregon is closely related to, if not identical with, the more commonly occurring late-blight disease of potatoes. The disease on potatoes has been more or less prevalent in localized sections of western Oregon for many years, being worse in those seasons when there is considerable rainfall in late summer and early fall, and less prevalent when there is little or no rainfall until the end of the growing season. On tomatoes the disease has been seen occasionally in past years but, since the rather severe outbreak in 1912, there are no records of its appearance in alarming degree until the season of 1941 when there was an unusual amount of rain from about the middle of August until the end of the growing season. In seasons of unusual rainfall outbreaks of blight on tomatoes may be expected. If considerable rain should fall in midsummer or earlier, outbreaks of blight may occur correspondingly earlier.

SYMPTOMS

The late blight disease affects both the foliage and the fruits of tomato plants.

Foliage Symptoms. The late-blight fungus usually attacks the leaves first, causing areas of the leaflets to turn brown to nearly black in color. If wet weather persists the killed areas enlarge and increase in number until practically all the foliage and even the vines may be killed. 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 greyish, filmy mildew. On this mildewed surface large numbers of spores are produced 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, and the discolored areas do not display the zonate or "buckeye"
Late Blight Rot on Tomato Fruits
pattern characteristic of a related disease which occurs in some other sections of 
the country. Eventually the diseased fruit may be invaded by other secondary 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 this disease has not been a problem on tomatoes in Oregon until the 
season of 1941 there is not much local experimental data available, and consequently 
any recommendations made at this time must necessarily be tentative. The suggest-
ions made here are based upon (1) small scale tests conducted in Oregon last year, 
(2) experience in other states, and (3) the fact that the late blight on tomatoes 
is similar to that on potatoes and, in general, should respond to the same spray 
treatment as applied to potatoes. Before making specific recommendations for 
spraying, certain dangers must be emphasized.

Cautions:

1. Neither sulfur sprays nor sulfur dusts should be used on 
tomatoes.

2. Sprays and dusts in which copper is the active ingredient are 
preferred.

3. Copper sprays or dusts, especially those containing lime, should 
not be applied to tomato foliage until they are really needed since immature tomato 
plants are rather intolerant of such sprays and yields and quality of tomatoes will 
be reduced if they 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 
and dusts may be applied with more safety.

4. As the tomatoes approach maturity the application of any 
spray or dust which leaves a heavy deposit on the fruits is objectionable. For this 
reason it is desirable to use material which will reduce this objectionable deposit 
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 pages 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 have dusting equipment but no sprayer, copper-lime dust may be used. This is a mixture of copper sulphate and lime. Purchase it ready prepared from your dealer. Insist that he supply a dust containing a very finely ground copper sulphate.

3. Other Copper Dusts. There are several proprietary dust products on the market which have given fairly satisfactory results when used for late blight. If necessary these may be tried as substitutes for Bordeaux or copper-lime dust. If any of these dusts are used they should be purchased from a reliable dealer and used according to the directions given by the manufacturers.

4. Yellow Cuprous Oxide. A spray made of yellow cuprous oxide (yellow copper oxide) may be substituted for Bordeaux, both to conserve copper sulphate and because it may be somewhat safer than Bordeaux to use on immature tomato plants in case an early outbreak of blight should make it absolutely necessary to spray. If this material is used it should be made up and applied according to directions given by the manufacturers.

WHEN TO SPRAY

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 whenever there is a threat of rainy weather.

1. First Spray. Ordinarily, in western Oregon, the summers are dry enough so that an outbreak of blight is not expected until after mid-summer 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, because the plants are mature enough so that no serious injury will result from spraying, 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 very young tomato plants if it can be avoided because of the injurious effects of the spray 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 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 dusts may have to be applied at shorter intervals than sprays to secure equal protection. They should always be applied very early in the morning. Dusts may be more easily washed off than Bordeaux spray provided the latter dries thoroughly on the plants before it rains. Once Bordeaux is completely dry it does not wash off easily in rainy weather.

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.