Ripe Fruit Rot in Tomatoes

early maturity of fruit and harvest before fall rains are factors in reducing loss

R. G. Grogan

Fruit rot in the California canning tomato crop is an important problem because state standardization laws require that fruit having 5% or more rot at the time of inspection be rejected as unfit for processing.

The fruit-rot problem in this state is considerably different from that in the Eastern and Middle Western States where the primary troubles are diseases of pathogenic origin such as Early Blight—Alternaria solani, Late Blight—Phytophthora infestans, and Anthracnose—Colletotrichum gloeosporioides.

A spray program is practically mandatory in order to harvest a normal crop in areas where these pathogens are active. In such areas rots caused by secondary fungi also occur, but are relatively unimportant as compared to the pathogenic diseases mentioned.

In California the major concern is rot caused by molds such as Alternaria, Rhizopus, Penicillium, Monilia, yeast and bacteria which only attack ripe fruit and then only through wounds or dead areas in the fruit skin.

Some loss is suffered from fruit rots in California every year. The damage is much greater in some years than in others. In 1948 the loss from fruit rot was heavy while in 1949 the loss was relatively slight.

A comparison of climatic factors of the two years, temperature and precipitation—made at Davis, which is typical of the major canning tomato area—showed a considerable difference between 1948 and 1949.

A relatively cool year was recorded for 1948. The average temperature was about 5°F, lower than normal—77 year average—for the seven months of the growing season from February through August. There was also considerable rainfall during the spring months of April, May and June. Lower temperatures caused a slower rate of growth of plants before and after transplanting and rainfall during these months caused a delay in transplanting since fields in many cases were too wet for cultivation. The two factors acted together to cause the crop to be late in maturing.

In contrast, 1949 was about normal and temperature was considerably above 1948 in March, April, May and June. There was very little rainfall after March.

Control measures must be cheap and easy to apply. Dustings are regularly made by most growers for control of insect pests. If fungicidal dusts should prove effective, they could be applied in the same operation. Sprays would require a separate operation and even if control of fruit rot was obtained by their use, the cost of materials and applications would not prove profitable in most years.

Fungicidal dusts were tested in a 5 x 5 Latin square design plot about six miles west of Davis during the 1949 season. The following dusts were used:

Dithane Z-78 .5% with pyrophyllite
Basi Cop .7% with pyrophyllite
Zerlate .10% with pyrophyllite
Fermate .10% with pyrophyllite

The dusts were applied with dusters at the estimated rate of 70 pounds to the acre. Each block consisted of a 30 foot section of three rows, but counts of fruit rot were made only on the center row dusted. The first application was made August 25th and a second application to one half of each block on September 1st.

Effect of Fungicidal Dusts on Percentage Fruit Rot in the First Picking * of Tomatoes

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Field readings</th>
<th>Stored samples</th>
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<tbody>
<tr>
<td></td>
<td>Dustings</td>
<td>Dustings</td>
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<tr>
<td></td>
<td>One</td>
<td>Two</td>
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<tr>
<td>Untreated ck.</td>
<td>3.56</td>
<td>3.22</td>
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<tr>
<td>Zerlate</td>
<td>2.96</td>
<td>2.35</td>
</tr>
<tr>
<td>Fermate</td>
<td>3.64</td>
<td>2.90</td>
</tr>
<tr>
<td>Dithane</td>
<td>3.40</td>
<td>3.94</td>
</tr>
<tr>
<td>Basi Cop.</td>
<td>3.23</td>
<td>3.02</td>
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</tbody>
</table>

* The amount of mold in the second picking was slightly less than in the first, but there was no indication of control from any treatment.

Two pickings were made at the time the remainder of the field was picked, the first on September 27th and the second on October 14th. Each fruit was examined for mold in the field immediately after picking and a 50-fruit sample of apparently clean fruit was taken and...
This hypothesis might explain why more secondary rot in fruit has been found in some instances from sprayed than from unsprayed plots. Since defoliation by leaf spotting fungi has been prevented, plants have been kept in an actively growing condition. This has caused an increase in the number of growth cracks and mechanical injury during picking, probably resulting in more secondary rots. Unsprayed, and therefore defoliated, plants produced fruit which was flaccid. This fruit probably had fewer growth cracks and less mechanical damage during picking resulting in less secondary rot.

Since fruit rots are correlated with wet weather during harvest season and since these fall rains usually come late in the season, any practice which would bring the crop to maturity earlier to escape these rains might be of some value for control. Plant breeders might also select for earliness of maturity so that the crop can be harvested before the fall rains begin.

R. G. Grogan is Instructor in Plant Pathology and Junior Plant Pathologist in the Experiment Station, Davis.

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SCALES

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Conducted near Woodside. Tests were made in late May on valley oaks and blue oaks which were heavily infested with the least pit scale. The treatments were each made on two trees while four trees were used as checks. One treatment consisted of a 2% light-medium emulsion-type foliage oil containing 4½% DDT, while the other treatment consisted of a 2% light-medium emulsion-type foliage oil along with one quart of 60% toxaphene emulsion. Counts were made of the number of scales on 30 twigs from each tree, and infestations were calculated on a basis of scales per square inch of twig surface. Pretreatment counts were based on overwintering females, while counts made four months after treatment were based only on the new generation of scales. A comparison of the results showed that excellent control was obtained with oil and toxaphene, while oil and DDT gave negligible control.

Weekly hand counts of crawlers were also made in connection with these tests. These counts indicated that practically no reproduction occurred following the oil and toxaphene spray, while crawler activity was not affected for more than one week after the oil and DDT spray.

Tests were also made in late July, 1949, on three valley oaks which were very heavily infested with the least pit scale. There was no apparent control on the tree which was sprayed with toxaphene alone at the rate of one quart of the 60% emulsion per 100 gallons of water. One hundred per cent control was obtained on a tree sprayed with 2% light-medium emulsion-type foliage oil along with one quart of 60% toxaphene emulsion per 100 gallons of diluted emulsion.

A. Earl Pritchard is Assistant Professor, Division of Entomology and Parasitology, and Assistant Entomologist in the Experiment Station, Berkeley.

Robert E. Beer was Research Assistant, Division of Entomology and Parasitology in the Experiment Station, Berkeley, when these studies were conducted.

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