Plant diseases - Downy mildew of onions - Results of further spray trial

R. F. Doepel

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FURTHER spray experiments conducted this season have confirmed the value of zineb fungicides for controlling the serious downy mildew disease of onions. In these experiments plants sprayed with zineb yielded 20% more marketable onions than unsprayed plants and the disease was also greatly reduced in seed crops.

Although downy mildew develops each year in spring and early summer onion crops and causes considerable losses, growers have seldom applied fungicidal sprays as a routine measure. Where sprays have been applied, lime sulphur-resin soap has been the most widely used material.

In preliminary tests conducted on a summer crop at Spearwood during the 1954 season, the organic fungicide zineb proved superior to a number of spray materials, including lime sulphur-resin soap, for mildew control.*

SYMPTOMS AND EFFECTS

Leaves affected with mildew turn yellowish green and wither back from the tips (Fig. 1). The disease is most noticeable on the older leaves but the younger leaves are also attacked as they develop. The fungus can often be seen as a grey-violet downy covering on the leaves in the early morning after rain or dew (Fig. 2). If leaf damage is severe, bulb development is retarded and yields are lowered.

Seedstalks are also attacked by mildew (Fig. 3) and commonly bend over or break at the site of infection (Fig. 4). As a result, seed quality and yields are greatly reduced.

**TESTING OF SPRAYS, 1955**

Further experiments were conducted this season on both field crops and onions grown for seed. Zineb and copper oxychloride were the only fungicides tested, each material being used with and without Triton B 1956, an additional wetting and spreading agent.

<table>
<thead>
<tr>
<th>Material</th>
<th>Strength (in 100 gallons water)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper oxychloride</td>
<td>3.5</td>
</tr>
<tr>
<td>Zineb</td>
<td>1.5</td>
</tr>
<tr>
<td>Triton B1956</td>
<td>6 fluid oz.</td>
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</tbody>
</table>

Field Crop.—Eight beds of onions were selected from a very uniform stand in a late July planting in the Spearwood district. The experiment was of a random block design with eight replications of each treatment. The plots were two beds in width (four rows of plants per bed), and 12 links in length. Unsprayed strips of onions were left between the plots to encourage mildew development.

Spray strengths of the fungicides and spreader used were as follows:

Commencing on September 13, five spray applications were made with a knapsack sprayer to be the experimental plots at 10 to 14 day intervals. The control plots were left unsprayed as a check on the performance of the fungicides.
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Seed Crop.—The zineb + Triton spray was also tested on a seed crop of onions at Spearwood. Seven applications were made at 10-14 day intervals. An unsprayed section of the crop was left as a control.

DISEASE DEVELOPMENT
Mildew developed in all experimental plots and caused dying back of the leaves, particularly on the unsprayed plants.

Fig. 3.—Onion seedstalk affected with mildew—early stage. The portion of the stalk showing white has been girdled by the fungus.

Seedstalks were affected by the mildew at a late stage of growth, many of them withering and falling over at the site of attack.

PLOT RECORDS
Field Crop.—An assessment was made a week prior to harvest, of mildew damage to the foliage in each treatment plot. The following table gives the average estimates of leaf tissue killed for each treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Leaf Tissue killed (Average of 8 plots, 5 plant per plot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Control—unsprayed</td>
<td>38.75</td>
</tr>
<tr>
<td>(2) Copper oxychloride</td>
<td>35.00</td>
</tr>
<tr>
<td>(3) Copper oxychloride + Triton</td>
<td>37.88</td>
</tr>
<tr>
<td>(4) Zineb</td>
<td>31.00</td>
</tr>
<tr>
<td>(5) Zineb + Triton</td>
<td>28.75</td>
</tr>
</tbody>
</table>

Least significant difference 5% level: 6.26
Least significant difference 1% level: 8.43

DISCUSSION
The zineb sprays were the only treatments that significantly reduced leaf damage from mildew and increased yields of marketable onions. Plots sprayed with zineb gave approximate 20 per cent increases in yields above those of the copper oxychloride and control treatments. Improved coverage of plants was obtained by using Triton spreader with the fungicidal sprays.
Outstanding control of mildew on the seedstalks was also obtained with the zineb + Triton spray.

RECOMMENDATIONS

1. Spraying.

From the results obtained during the past two seasons experiments a zineb spray is recommended for controlling downy mildew on both field and seed crops of onions. The fungicide should be used at a strength of $1\frac{1}{2}$ lb. in 100 gallons water. To obtain good coverage, an efficient wetting and spreading agent, such as Triton B1956 or Agral LN, should be added to the spray at the rate of 4 to 6 fluid ounces in 100 gallons spray.

The first sprays should be applied before mildew develops and then at 10 to 14 day intervals during the season.

Zineb is marketed under such trade names as Dithane Z-78, Zebtox, Zineb 65, etc., and can be obtained from leading seedsmen and stock firms.

2. Sanitation.

As crop remains may serve to carry over the mildew fungus from season to season, all dead leaves and discarded bulbs should be burnt after harvesting has been completed.

3. Rotation.

Onions should not be grown more frequently than once every three years on the same land. This will help prevent infection of seedlings, field and seed crops from diseased refuse in the soil.

ACKNOWLEDGMENTS

Grateful appreciation is expressed to Messrs. Rudan and Gaspar of Spearwood for making available onion crops for the experiments.

Acknowledgment is also made of the assistance given by Messrs. M. Hardie, T. Wachtel and H. Leitch, of the Vegetable Branch in applying the sprays and harvesting the plots, and by Mr. N. Shorter, of the Horticultural Division for analysing the experimental results.

KANGAROO DESTRUCTION

Although kangaroos are protected in some parts of the State, they are classed as vermin in the pastoral areas where vast numbers are eating out valuable feed needed for sheep.

The Chairman of the Agriculture Protection Board (Mr. G. K. Baron Hay), said that some pastoralists were making strenuous efforts to reduce the numbers of the pests, but still more co-operation was needed to produce worthwhile results.

In the Wiluna area, 600 kangaroos were poisoned on Mt. Keith Station, and at Albion Downs Station 2,200 had been destroyed in three weeks.

In the Meekatharra area where a bonus of 1s. 6d. a head was declared in August, 1954, a total of 10,780 kangaroos have been destroyed to date. Poisons used include, strychnine, arsenic and cyanide and methods recommended are designed to prevent loss of bird life.
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<td>2½&quot;</td>
<td>1/2¾d.</td>
<td>1½&quot;</td>
<td>2/8d.</td>
<td>1&quot;</td>
<td>2&quot;</td>
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