

PROGRESS REPORT ON THE EFFECT OF SEVERAL FUNGICIDES
ON THE CONTROL OF CERCOSPORA
LEAF SPOT OF SUGAR BEETS IN ONTARIO

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Cercospora leaf spot (*Cercospora beticola*) is a fungus disease of sugar beets caused by airborne spores produced on the leaf lesions. The disease itself is not new to Southwestern Ontario in that it reached epidemic proportions in the thirties. Since that time, however, it has been suppressed by the development of blight resistant varieties.

In 1959 blight appeared in serious proportions in some areas and was evident again in 1961 and 1962. This reappearance has caused some concern regarding the amount of resistance which has been maintained in the development of the monogerm types along with the advances made in increased yield and sugar content and blackroot resistance.

Weather conditions, such as high humidity and high temperatures, over a prolonged period, tend to increase the incidence of the disease.

Dr. F. R. Forsyth of the Pesticide Research Institute, London, Ontario, along with the author, reported on protective fungicides in 1962 at the Twelfth General Meeting of the American Society of Sugar Beet Technologists. In this paper some basic work was done for two years on the control of the blight using some new materials. This work has since been transferred to the Canada Department of Agriculture Research Station at Harrow and the Soil Substation at Woodslee. The work reported represents an expansion in the form of larger replicated plots and strip tests of some of the most promising chemicals used by Dr. Forsyth, along with some new materials on trial this year.

Replicated tests were established in cooperation with the Canada Department of Agriculture Soil Substation with locations at the following places which had shown a tendency to take the disease: John VanRaay, Raleigh Township; Bradley Farms, Dover Township; and Canada & Dominion Sugar Experimental Farm, Dover, Township.

In addition to the replicated plots, strip tests were set up at the following locations: Lawrence Kerr, Raleigh Township; Robert Houston, Harwich Township; and Norman Belanger, Dover Township, as well as the Canada & Dominion Sugar Experimental Farm, Dover Township.

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and Canada Department of Agriculture, respectively.

A. Strip Tests:

A Sprayfoil Field Boom sprayer was used for the tests. This test was used to check the effectiveness of the following materials at the recommended rates per acre at 3 P.S.I. pressure and 10 gallons water per acre.

<u>Growers</u>	<u>Dates of Spraying</u>
Lawrence Kerr - Raleigh	August 8, 20, Sept. 6
Robert Houston - Harwich	July 30, August 9, 20, Sept. 6
Norman Belanger - Dover	July 30, August 9, 21, Sept. 7
C.&D. Sugar Co. - Dover	July 31, August 10, 21, Sept. 7

<u>Materials Used</u>	<u>Rate</u>	<u>Water/Acre</u>
Brestan (tin)	1/2 lb./acre	10 gal.
Manzate (manganese)	2 lbs./acre	10 gal.
Sol-U-Cop (4% Copper)	1 1/2 gal./acre	10 gal.
Imperial Oil 862 B-emul	1 1/2 gal./acre	10 gal.
Imperial Oil 862 B-emul + Manzate	1 1/2 gal. + 2 lbs./acre	10 gal.
Polyram Combi (Metiram)	2 lbs./acre	10 gal.
Dithane M-45 (manganese + zinc)	2 1/2 lbs./acre	10 gal.

Source of Material

Brestan	Hoechst Chemical Co., Toronto 5, Ont. (Niagara Brand Chemicals handling product)
Manzate	Dupont of Canada, Ltd., Montreal, Que.
Sol-U-Cop (TC-90)	Tennessee Corp., College Park, Georgia
Imperial Oil 862 B-emul	Imperial Oil Co., Sarnia, Ontario
Polyram Combi	Badische Onilin & Soda, Fabrick, Germany (Niagara Brand Chemicals handling product)
Dithane M-45	Rohm & Haas Co. of Canada, West Hill, Ontario

Strip Tests Results - (1/200th ac. plots)

The tables which follow are the average of 4 fields with 4 dates of spraying and 3 dates of spraying, respectively.

(See following page for Tables)

4 Sprays From July 31st to September 7th

<u>Treatment</u>	<u>Plant Population</u>	<u>Tops Tons/Ac.</u>	<u>Beets Tons/Ac.</u>	<u>% Sugar</u>	<u>Gross Lbs. Sugar/Ac.</u>
Manzate	21,200	12.2	19.4	14.8	5,765
Manzate Check	21,900	11.3	19.8	14.2	5,635
Brestan	21,000	15.5	23.3	15.0	6,994
Brestan Check	23,200	12.4	20.6	14.6	6,001
Polyram Combi	21,800	13.2	22.7	15.1	6,850
Polyram Combi Ck.	21,800	11.9	22.1	14.9	6,577
Sol-U-Cop	22,300	11.7	20.5	15.2	6,225
Sol-U-Cop Ck.	20,500	11.6	22.5	14.7	6,599
Imperial Oil (862 B-emul)	33,600	17.1	19.1	13.7	5,233
Imperial Oil (862 B-emul Ck.)	27,200	13.0	18.7	15.0	5,610
Imperial Oil + Manzate	35,600	16.9	20.4	13.9	5,671
Imperial Oil + Manzate Ck.	23,800	16.1	17.3	15.6	5,398

3 Sprays - August 8, 20 and September 6 (1/200th ac. plots)

<u>Material</u>	<u>Plant Population</u>	<u>Tops Tons/Ac.</u>	<u>Beets Tons/Ac.</u>	<u>% Sugar</u>	<u>Gross Lbs. Sugar/Ac.</u>
Brestan	22,200	23.6	28.8	15.2	8,755
Brestan Check	19,900	16.5	24.2	14.7	7,115
Sol-U-Cop	21,000	17.3	23.9	16.2	7,744
Sol-U-Cop Check	22,100	15.0	23.1	15.0	6,930
Dithane M-45	17,250	10.6	23.0	15.0	6,862
Dithane M-45 Ck.	17,400	8.4	19.4	14.5	5,608

The strip tests will be expanded in 1963 to include additional materials, various rates and possibly new sprayers.

B. Replicated Plots:

These plots were 35 feet long and 6 rows wide. Each treatment was replicated 6 times in 3 different locations. The materials, rates and number of sprays used were as follows:

<u>Material</u>	<u>Rate</u>	<u>Water/Acre</u>
Sol-U-Cop	1 gal./acre	12 gal.
Brestan	$\frac{1}{2}$ lb./acre	12 gal.
Manzate	2 lbs./acre	12 gal.

Number of sprays 0, 2, 4, 6 replicated 6 times.

A Sprayfoil Utilitaire sprayer specially adapted for plot work was used for the small plots.

The sprays were applied on the following dates:

<u>Growers</u>	<u>Date of Spraying</u>
John VanRaay, Raleigh	July 4, 16, 25, Aug. 7, 20, Sept. 6
Bradley Farms, Dover	July 5, 17, 26, Aug. 7, 21, Sept. 6
C.&D. Sugar Experimental Farm, Dover	July 6, 18, 27, Aug. 8, 22, Sept. 7

The center 4 rows were harvested for yield and sugar data (using 2 samples of 5 beets each selected at random for sugar analysis). The results were statistically analyzed and are as follows:

SUMMARY OF BLIGHT TESTS 1962
REPLICATED PLOT BASIS

<u>Treatment</u>	<u>Tons Beets/Ac.</u>	<u>% Sugar</u>	<u>Tons Tops/Ac.</u>	<u>Gross Returns Per Ac.</u>	<u>Spraying Costs/Ac.</u>	<u>Net Returns Per Ac.</u>
Manzate						
0	18.80	14.1	9.79	215.82	-	215.82
2	19.67	14.2	11.64*	227.39	7.60	219.79
4	21.54*	14.7*	14.53*	257.62	14.20	243.42
6	22.04*	15.0*	14.43*	268.89	22.80	246.09
TC-90						
0	19.45	13.8	10.37	218.62		
2	19.54	14.1	10.95	224.32		
4	19.69	14.6*	11.48	233.92		
6	18.59	14.7*	11.56	222.34		
Brestan						
0	20.23	14.2	10.59	233.86	-	233.86
2	21.53	14.5	13.71*	254.05	6.58	247.47
4	23.02*	15.0*	15.42*	280.84	13.16	267.68
6	23.21*	15.1*	16.56*	285.02	19.74	265.28

*Significance at 5% level

Root Yield

L.S.D. 5% = 2.18 tons/ac.

Sugar %

L.S.D. 5% = .4%

Tops

L.S.D. 5% = 1.54 tons/ac.

CERCOSPORA LEAF SPOT TEST 1962

Average of 3 Test Plots

<u>Treatment</u>	<u>Gross Returns Per Acre</u>	<u>Spraying Costs Per Acre</u>	<u>Net Returns Per Acre</u>	<u>Profit From Spraying</u>
Manzate				
0	215.82	-	215.82	-
2	227.39	7.60	219.79	3.97
4	257.62	14.20	243.42	27.60
6	268.89	22.80	246.09	30.27
Brestan				
0	233.86	-	233.86	-
2	254.05	6.58	247.47	13.61
4	280.84	13.16	267.68	33.82
6	285.02	19.74	265.28	31.42

Gross returns per acre calculated at estimated contract price for applicable sugar content and tons per acre.

Conclusion:

A. Strip Tests

The strip tests were not tested for significance, however, there seems to be a definite trend with some of the materials indicating good control. This work will be expanded and elaborated upon in 1963.

B. Replicated Plots

Some very definite results accrued from the small plots which are statistically significant, namely, the four sprays of Brestan and Manzate gave a significant increase in tons of beets, tops and sugar percent per acre.

The net returns per acre increased with the Manzate up to the 6 sprays, whereas, 4 sprays were sufficient with the Brestan to give a maximum net return.

These results represent one year's work and will be repeated in 1963.