SCREENING OF POTATO FUNGICIDES IN 1966[1]

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Introduction

For the second consecutive year the potato fields of Prince Edward Island escaped attack by late blight, Phytophthora infestans (Mont.) de Bary, making 1966 the sixth such year in the past 45 years. Rainfalls were both light and scattered during the July-September period and, most of them being immediately followed by dry winds, there was insufficient moisture for the development of the fungus. In addition, the complete absence of the disease in 1965 suggested that probably no inoculum was present.

Materials and methods

Thirteen fungicides, most of which were repeated from the previous blightless season, were included in the 1966 Screening Test at Charlottetown. These products were as briefly described below.

1. Brestan 60. American Hoechst Corporation, California. A mixture of triphenyltin acetate (60%) and maneb (20%). 5 oz./80 gal.
2. Daconil 2787. Diamond Alkali Company, Painsville, Ohio. Tetrachloroisophthalonitrile. 1.0 lb./80 gal.
3. Difolatan 80W. Chevron Chemical (Canada) Limited, Oakville, Ontario. Cis-N-((1, 1, 2, 2-tetrachloroethyl) thio)-4-cyclohexene-1, 2-dicarboximide. 1.0 lb./80 gal.
4. Dithane M-45. Rohm and Haas Company of Canada Limited, West Hill, Ontario. Zinc coordinated manganese ethylenebis (dithiocarbamate). Mn, 16%; Zn, 2%. 1.0 lb./80 gal.
5. DuTer. Philips-Duphar, Amsterdam, Holland, Triphenyltin hydroxide (20%). 0.75 lb./80 gal.
6. Hortocritt. S.I.A.P.A., Rome, Italy. Ethylene thiuram monosulfide. 2.5 lb./80 gal.
7. M100. DuPont of Canada Limited, Montreal. Disodium cyclohexane-1, 2-dithiocarbamate and disodium hexamethylenebisdithiocarbamate. 3.3 lb. + 1.0 lb. zinc sulphate/80 gal.
8. Manzate D. DuPont of Canada Limited, Montreal. Maneb powder containing zinc sulphate in physical mix. 1.0 lb./80 gal.
9. Micene. Green Cross Products, Montreal. Zinc complex salt of dithiocarbamate acid. 1.0 lb./80 gal.
10. Organil 66. Procida, Neuilly sur Seine, France. A confidential product. 1.0 lb./80 gal.
11. Polyram 80W. Niagara Brand Chemicals, Burlington, Ontario. Zinc activated polyethylene thiuram disulfide. 1.0 lb./80 gal.
12. RH-90. Rohm and Haas Company of Canada Limited, West Hill, Ontario. A confidential product. 1.6 lb./80 gal.
13. Z.M.C.5 80W. Niagara Brand Chemicals, Burlington, Ontario. A complex containing Zn, Mn, and Cu. 1.0 lb./80 gal.

Plots of the blight-susceptible variety Green Mountain were planted on May 31, exactly 50 seed pieces being dropped in each 50-foot row. Each plot was 50 feet long by 4 rows wide and 14 plots — one for each fungicide and an unsprayed control — were set out in each of 4 ranges. Single rows of the same varietywere planted as buffers between plots and as borders for the area. These rows were not sprayed.

No insecticides were included in the spray mixtures, insect pests being controlled by spraying all rows with Thiodan at appropriate times. The fungicides were applied on July 14, 25, August 2, 11, 22, 31, September 9, 19, the mean interval being 9.6 days, by means of a tractor-sprayer unit which delivered approximately 120 gallons per acre. The boom carried 4 nozzles per potato row, 2 being above the plants and 2 on drop pipes. The test was terminated on September 26, 118 days after planting, by the application of diquat top killer. Harvesting was performed at mid-October.

The weather being generally unfavourable for the blight fungus, it was necessary to introduce the disease by sprinkling the buffer rows with water suspensions of spores. Several disseminations were made between July 19 and September 6. Even with these inoculations the disease built up very slowly and by September 14 the defoliation of the control plots showed a mean of only 24 per cent. After that date, night dews and higher relative humidities caused a more rapid advance in the controls. these plots reaching complete defoliation by September 26. On that date, eleven of the fungicides had allowed but slight infections to develop, making it exceedingly difficult to accurately record differences among them (Table 1). The fungicide Micene, which allowed 20 per cent defoliation to occur, was relatively ineffectual: M100 was of no value.

Data on yield and tuber rot are given in Table 2. The gradual defoliation of the plants caused a marked reduction in the yield of the unsprayed control plots but, because of the lack of heavy rain, tuber rot caused a further reduction of only 4.9 per cent of the volume. Differences among the yields of the treatments were not statistically significant and losses from tuber rot were small, ranging from zero to 1.1 per cent.

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Table 1. Percentage defoliation.

Treatment	Sept. 14	Sept. 19	Sept. 26
Brestan	T	1	2
Daconil 2787	O	T	1
Difolatan 80W	T	2	4
Dithane M-45	O	1	3
DuTer	T	2	3
Hortocritt	T	1	2
Manzate D	T	2	3
Micene	3	10	20
Ml00	8	36	70
Organil 66	T	1	2
Polyram 80W	T	3	4
RH-90	1	2	3
Z.M. C.5 80W	T	2	4
Check	24	85	100

Table 2. Effect of treatments on yield and rot.

Treatment	Total bu./ac.	Smalls bu./ac.	Rot bu./ac.	No. 1 bu./ac.	Rot %
Brestan	499.4	56.1	0.0	443.3	0.0
Daconil 2787	532.4	56.8	0.0	475.6	0.0
Difolatan 80W	521.0	63.4	0.0	457.6	0.0
Dithane M-45	512.6	51.7	1.1	459.8	0.2
DuTer	516.8	57.2	0.9	458.7	0.2
Hortocritt	526.9	59.4	3.3	464.2	0.6
Manzate D	517.2	63.8	0.9	452.5	0.2
Micene	508.2	57.6	0.7	449.9	0.1
MlOO	490.8	64.9	4.2	421.7	0.9
Organil 66	510.6	50.6	3.5	456.5	0.7
Polyram 80W	541.2	57.9	2.6	480.7	0.5
RH-90	518.5	51.7	2.2	464.6	0.4
Z.M. C.5 80W	517.0	55.0	5.5	456.5	1.1
Check	462.9	76.6	22.9	363.4	4.9