SCREENING OF POTATO FUNGICIDES IN 1970"

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Introduction

Potato late blight caused by Phytophthora infestans (Mont.) de Bary was a major problem on Prince Edward Island in 1964 but was of negligible to minor importance through the five seasons of 1965 to 1969. However, except for 1965, satisfactory epidemics were created in the experimental plots by frequent inoculations.

In 1970, the disease reached epiphytotic proportions and the fungicides selected for the Screening Test were compared under an extremely severe and sustained attack.

Materials and methods

The nine fungicides described briefly below were studied in 1970. Of these, numbers 5, 6, and 9 were being tested for the first time. The description of each fungicide is arranged in order of trade name, guaranteed active ingredient, source, and dosage rate in terms of formulated product.

1. Daconil 2781 75W. 75% tetrachloroisophthalonitrile. Diamond Alkali (Canada) Ltd., Toronto, Ontario. 1.0 and 1.5 lb/acre.

2. Difolatan 4.8F. 4.8 lb/gal N-(1,1,2,2-tetrachloroethylsulfenyl)-cis-Δ-cyclohexene-1, 2-dicarboximide. Chevron Chemical (Canada) Limited, Oakville, Ontario. 0.8 and 1.25 Imp. qt/acre.

3. Dithane M-45 80W. 80% zinc coordinated maneb. Kohm and Haas Company of Canada Limited, West Hill, Ontario.' 1.5 lb/acre.

4. DuTer 50W. 50% fentin hydroxide. Philips-Duphar, Amsterdam, Holland. 7.0 oz/acre.

5. Kocide 101. 86% cupric hydroxide. Kennecott Copper Corporation, Houston, Texas, U.S.A. 3.0 lb/acre.

6. MBR 6886 50WP. Confidential. 3M Company, St. Paul, Minnesota, U.S.A. 1.5 lb/acre.

7. Polyram 80W. 80% zinc activated polyethylene thiuram disulfide. Niagara Brand Chemicals, Burlington, Ontario. 1.5 lb/acre.

8. Siaprit. 47% zineb. S.I.A.P.A., Rome, Italy. 3.5 lb/acre. (Available from Green Cross Products, Montreal, Que.)

9. Sperlox M. A zinc coordinated maneb (mancozeb) formulation. Olin Corporation, Fresno, California, U.S.A. 1.5 lb/acre.

Plots of the blight-susceptible variety Green Mountain were planted on June 12, several days later than normal because of wet weather. Each plot was 4 rows wide by 50 feet long and 50 seed pieces were planted in each row. Single rows of the same variety were planted as borders and as buffers between plots. The treatments were randomized and replicated in five ranges.

All rows were sprayed with endosulfan at appropriate times to control insect pests.

The fungicides were applied by a tractor-sprayer unit, the 4-row boom of which carried four nozzles per potato row, two being above the plants and two on drop pipes. The dates of application were July 15, 23, 31; August 10, 17, 25; September 1, 8.

Late blight disease was introduced by sprinkling the border and buffer rows with a water suspension of spores of race 1, 2, 3, 4 late in the evening of July 24 and again early the following morning when the foliage was wet with dew. Lesions were found in these rows on July 28 and in the five unsprayed check plots on August 4. Further inoculations were unnecessary.

During the 30-day period of August 10 (spray 4) to September 8 (final spray), recordable amounts of rain fell on 18 days, totalling 6.32 inches, and trace amounts fell on 4 days. Day and night temperatures were ideal for sporulation of the late blight fungus, humidity was often high, and heavy night dews occurred. Under these conditions the fungus was fruiting almost constantly and the sprayed plots were therefore under an equally constant bombardment by spores. From September 9 until the test was terminated by the application of top killer on September 18, the maximum humidity was over 90 percent on 6 days and there was rain on 4 days. September had the least sunshine ever recorded here for that month.

Defoliation readings were taken regularly and the mean readings, expressed as percentages, are shown in Table 1.

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Table 1. Percentage defoliation

Treatment	Aug. 23	Sept. 8	Sept. 11	Sept. 14
Daconil 2787 (1.5 lb)	4	10	16	20
Dithane M-45	5	12	18	22
Siaprit	9	20	26	30
Polyram	10	24	28	32
Daconil 2787 (1.0 lb)	7	21	30	34
Difolatan 4.8F (1.25 qt)	8	22	33	35
Difolatan 4.8F (0.8 qt)	9	27	37	40
MBR 6866	16	42	53	58
DuTer	13	40	52	60
Kocide 101	18	45	59	75
Sperlox M	28	50	63	80
Check	40	95	100	100

The tubers were dug, graded, and examined for late blight rot on October 13–14. These data are given in Table 2.

Results and discussion

Daconil 2707 75W, at the 1.5 pound per acre dosage, was the leading fungicide and was followed closely by Dithane M-45 at the same dosage. Plots treated with Daconil at this dosage also produced the highest mean yield, giving the greatest weight of tubers in four of the five replicates. In replicate 5 it was surpassed by a small margin by the same product at the 1.0 pound per acre dosage.

The fungicides being tested for the first time--MBR 6866, Kocide 101, and Sperlox M--were much less effective than the other materials. Kocide 101 and Sperlox M both resulted in low yields and relatively high losses from rot. DuTer, tested in several years, appears to fall into the less effective group.

Table 2. Effects of treatments on yield and rot

Treatment	Total (bu/acre)	Small* (bu/acre)	Rot (bu/acre)	No. 1 (bu/acre)	Rot (%)
Daconil 2787 (1.5 lb)	400.6	75.5	3.9	321.2	1.0
Dithane M-45	379.9	90.8	7.9	281.2	2.1
Daconil 2787 (1.0 lb)	390.7	101.0	9.9	279.8	2.5
Difolatan 4.8F (1.25 qt)	379.7	98.6	5.7	275.4	1.5
Siaprit	360.4	81.6	11.7	267.1	3.2
Difolatan 4.8F (0.8 qt)	359.0	96.1	4.6	258.3	1.3
Polyram	342.3	84.5	9.2	248.6	2.7
DuTer	340.1	99.0	4.8	236.3	1.4
MBR 6866	335.3	90.4	9.9	235.0	2.9
Kocide 101	308.2	95.9	14.5	197.8	4.7
Sperlox M	265.3	78.8	14.5	172.0	5.5
Check	201.5	101.2	7.0	93.3	3.5
LSD 0.05	38.1			29.5	1.6
LSD 0.01	50.8			39.4	2.1

* Below 2¼ inches.