SCREENING OF POTATO FUNGICIDES IN 1971[1]

L.C. Callbeck[2]

Introduction

Weather conditions were frequently favorable for the development and spread of the potato late blight fungus Phytophthora infestans (Mont.) de Bary in Prince Edward Island during the July - September period of 1971. It was possible, therefore, to study the relative efficacies of nine selected fungicides under quite constant disease pressure.

Materials and methods

In the following list of the fungicides screened in 1971, the description of each is arranged in order of trade name, quaranteed active ingredient, source, and dosage rate in terms of formulated product.

1. AC 84,467. Confidential chemical composition. American Cyanamid Company, Princeton, New Jersey, U.S.A. 2.0 lb/acre.

2. Bravo W-75. 75% tetrachloroisophthalonitrile. Diamond Shamrock Corporation, Cleveland, Ohio, U.S.A. 1.25 lb/acre.

3. Bravo 6-F. 6.0 lb/U.S. gal tetrachloroisophthalonitrile. Diamond Shamrock Corporation, Cleveland, Ohio, U.S.A. 1.25 U.S. pints/acre.

4. Difolatan 4.8 F. 4.8 lb/Imp. gal N-(1,1,2,2,-tetrachloroethylsulfenyl)-cis A-cyclohexene-1, 2-dicarboximide. Chevron Chemical (Canada) Limited, Oakville, Ontario, 1.0 Imp. qt/acre.

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

6. Duter 50W. 50% fentin hydroxide. Philips-Duphar, Amsterdam, Holland. 10.0 oz/acre.

7. Manzate 200 80W. 80% zinc coordinated maneb. E. I. du Pont de Nemours & Co. (Inc.), Willmington, Delaware, U.S.A. 1.5 lb/acre.

8. OCC 188-15. Copper ammonium carbonate, 6% Cu. Occidental Chemical Company, Houston, Texas, U.S.A. 0.5 Imp. gal/acre.

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

Plots of the Green Mountain variety were planted on June 7. Each plot was 4 rows wide by 50 ft 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 four ranges.

All rows were sprayed at appropriate times with the insecticide endosulfan.

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 applications were made on July 14, 22, 29, August 6, 17, 23, 30, and September 7.

Late blight disease was introduced by lightly sprinkling plants in the border and buffer rows with a water suspension of spores of race 1, 2, 3, 4, 5, 6, 7, 8, on July 20. A few lesions were observed in these rows on July 26 and in the evening of that day a second spore dissemination was made. No further inoculations were necessary, the disease developing at a satisfactory rate and spreading out from the infected rows. By August 20 the unsprayed check plots showed 208 infection of the leaflets. The sprayed plots showed zero to trace infections.

Defoliation readings were taken at regular intervals and the mean readings, expressed as percentages, are contained in Table 1.

Top killer (diquat) was applied on September 15 and the tubers were harvested, graded, and examined for late blight rot on September 24. These data are given in Table 2.

Results and discussion

under the conditions of the test, fungicides AC 84,467 and OCC 188-15 failed to control the disease, their plots averaging 85% and 92% defoliation respectively on September 13, the last date of inspection. DuTer permitted a defoliation of 36%. This tin-containing fungicide was phytotoxic, as evidenced by a brown spotting of the leaves. It was also observed that all plots sprayed with this fungicide showed leaflet burn and some loss of leaflets after the passage of Hurricane Beth on the night of August 15-16. Other plots did not show these conditions.

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[1] Contribution No. 247, Research Station, Canada Department of Agriculture, Charlottetown, Prince Edward Island.

[2] Plant Pathologist.

Table 1. Percentage defoliation

Treatment	Aug. 27	Sept. 1	Sept. 8	Sept. 13
AC 84,467	7	25	67	85
Bravo W-75	Tr.*	2	10	16
Bravo 6-F	Tr.*	1	8	13
Difolatan 4.8F	Tr.*	3	10	19
Dithane M-45	Tr.*	1	8	14
DuTer	2	7	25	36
Manzate 200	Tr.*	2	7	14
OCC 185-15	4	24	75	92
Polyram	Tr.*	3	11	18
Check	54	100	100	100

* Tr. = trace.

Table 2. Effects of treatments on yield and rot

Treatment	Total (bu/acre)	Small* (bu/acre)	Rot (bu/acre)	NO. 1 (bu/acre)	Rot (%)
AC 84,467	384.7	112.6	2.6	269.5	0.7
Bravo W-75	466.6	81.0	0.2	385.4	Trace
Bravo 6-F	454.1	85.6	0.2	368.3	Trace
Difolatan 4.8F	465.9	87.5	0.0	378.4	0.0
Dithane M-45	460.0	80.3	0.9	378.8	0.2
DuTer	421.3	90.4	0.2	330.7	Trace
Manzate 200	465.3	80.3	0.9	384.1	0.2
OCC 185-15	386.5	81.4	2.4	302.7	0.6
Polyram	465.3	81.6	1.1	382.6	0.2
Check	283.6	93.9	19.6	170.1	6.9
LSD 0.05	33.7			43.6	
LSD 0.01	45.6			59.0	

* Diameter less than 2¼ inches