SCREENING OF POTATO FUNGICIDES IN 1969[1]

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Introduction

Although weather conditions were often suitable to the development and spread of late blight fungus, Phytophthora infestans (Mont.) de Bary, potato gravers of the province of Prince Edward Island enjoyed a relatively disease-free season in 1969. Because there had been almost no disease in the dry summer of 1968, sources of inoculum were probably few in the spring of 1969, thus limiting the number of fields initially attacked. This, coupled with adequate spray schedules, held the disease in check and losses were negligible.

A severe epidemic developed in the test plots following inoculations made in late July, making it possible to obtain relative comparisons on the efficacies of the several products in controlling the disease.

Materials and methods

The nine fungicides briefly described below were entered in the 1969 Screening Test at Charlottetown. Of these, numbers 1, 6, and 7 were being studied for the first time.

1. CA 6904. Cela, Ingelheim, Germany. Confidential. 1.0 and 1.5 lb/acre.
2. Daconil 2787 75W. Diamond Shamrock Chemical Company, Painesville, Ohio, U.S.A. Tetrachloroisophthalonitrile. 1.5 lb/acre.
3. Difolatan 4 Flowable. Chevron Chemical Company, Cherry Hill, N.J., U.S.A. N(1,1,2,2, tetrachloroethyl) sulfenyl-cis-4-cyclohexene-1, 2-dicarboximide. 0.8 Imp. qts/acre.
4. Dithane M-45 80W. Rohm and Haas Company of Canada Limited, West Hill, Ontario,, Canada. Zinc coordinated manganese ethylenebis-(dithiocarbamate). 1.5 lb/acre.
5. Du-Ter 50W. Philips-Duphar, Amsterdam, Holland.. Triphenyltin hydroxide. 7.0 oz/acre.
6. MBR 4880 50W. 3M Company, St. Paul, Minnesota, U.S.A. Confidential. 1.5 lb/acre.
7. NF-35. Nippon Soda Company Limited, Tokyo, Japan. 1,2-bis(3-ethoxycarbonyl-2-thioureido) benzene. 1.75 lb/acre.
8. Polyram 80W. Niagara Brand Chemicals, Burlington, Ontario, Canada. Zinc activated polyethylene thiuram disulfide. 1.5 lb/acre.
9. Siaprit. S.I.A.P.A., Rome, Italy. Ethylene thiuram monosulfide. 3.5 lb/acre.

The plots, each 50 feet long by four rows wide, were planted on June 6, 50 seed pieces of the blight-susceptible variety Green Mountain being dropped in each row. Single rows of the same variety were planted as buffers between plots and as borders for the area. The treatments were randomized and replicated in five ranges.

Insects were controlled by spraying all the rows with endosulfan on July 10 and August 11 and 29.

The fungicides were applied by means of a tractor-sprayer unit, the boom of which carried four nozzles per potato row, two being above the plants and two on drop pipes. The dates of the applications were July 16 and 24, August 1, 8, 15, and 22, and September 4 and 11. The test was terminated by spraying the plants with a sodium arsenite top killer on September 23.

An epidemic of late blight was introduced by sprinkling the buffer and border rows with a water suspension of spores of race 1, 2, 3, 4, 5, 6, 7 in the evening of July 25 when dew was accumulating and in the morning of July 27 following a rain of 0.42 inches. There was a trace of rain on the 28th and a recordable amount on each of the next 3 days. A few lesions were observed on July 30. By mid-August the unsprayed check plots had reached a mean defoliation of 20 percent and the means of the treated plots varied from a trace to 10 percent. The disease was rather inactive during the dry period of August 21 - September 5 but developed well under the influence of later rains. Rains of 1.40, 0.06, 0.44, and 0.08 inches were recorded for the 4 days of September 6-9 and of 0.02, 0.04, 0.96, and 0.04 inches for the 4 days of September 15-18.

Defoliation readings were taken at appropriate intervals until September 18, after which an unusually early frost (September 20) caused some injury and made further accurate readings impossible. On

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Table 1. Percentage defoliation

Treatment	Aug. 18	Aug. 27	Sept. 10	Sept. 18
Daconil 2787	Trace	Trace	1	3
Dithane M-45	Trace	1	1.5	3
Polyram	Trace	1	2	4
CA 6904 (1.5 lb.)	Trace	Trace	1	5
Siaprit	0.5	2	4	7
Difolatan 4F	0.5	2	5	7
CA 6904 (1.0 lb.)	0.5	1	3	8
MBR 4880	4	6	14	24
Du-Ter	4	10	16	24
NF-35	10	16	35	67
Check	20	25	60	97

Table 2. Effects of treatments on yield and rot

Treatment	Total (bu/acre)	Smalls (bu/acre)	Rot (bu/acre)	No. 1 (bu/acre)	Rot (%)
Daconil 2787	510.2	63.6	0.0	446.6	0.0
Dithane M-45	506.0	65.5	1.8	438.7	0.4
Polyram	502.9	66.2	1.1	435.6	0.2
Siaprit	500.5	70.6	5.3	424.6	1.1
CA 6904 (1.5 lb.)	483.7	64.0	0.4	419.3	0.1
Difolatan 4F	490.1	71.7	0.0	418.4	0.0
CA 6904 (1.0 lb.)	489.7	73.5	1.3	414.9	0.3
MBR 4880	427.1	75.0	2.4	350.2	0.6
Du-Ter	426.1	77.2	3.5	345.4	0.8
NF-35	351.1	82.7	1.8	266.6	0.3
Check	338.1	93.0	3.5	241.6	1.0
LSD 0.05	56.4			57.3	0.5
LSD 0.01	75.1			76.3	0.7

this basis, the relative performances of the fungicides are shown in Table 1.

The tubers were lifted, graded, and examined for late blight rot on October 16–17. These data are presented in Table 2.

Results and discussion

Under the conditions of the test, the fungicides Daconil 2181, Dithane M-45, Polyram, CA 6904, Siaprit, and Difolatan 4F gave good control of late blight on the foliage, MBR 4880, Du–Ter, and NF-35 gave poor control, the last named showing no merit. In general, the effectiveness of the fungicides in controlling boliage blight was reflected in the yields of tubers; yields of the plots treated with the three inferior fungicides were significantly lower than those of the plots treated with the six that provided good protection.

The losses from tuber rot were small in 1969 and two of 'the fungicides, Daconil 2181 and Difolatan 4F, gave complete control.

None of the fungicides showed phytotoxic effects.