SCREENING OF POTATO FUNGICIDES 1968[1]

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The fungicides listed below were compared for efficiency in the control of late blight of potato caused by Phytophthora infestans (Mont.) de Bary in the 1968 Screening Test at Charlottetown, P.E.I., Canada. The weight or volume given for a product is the dosage per acre per application.

Copertan. Copper oxychloride. 50% Cu. 2.0 lb. Green Cross Products, Montreal, Quebec

Daconil 2787. **Tetrachloroisophthalonitrile.** 1.0 lb and 1.5 lb. Diamond Alkali Company, Painesville, Ohio, U. S. A.

Decafentin. Confidential tin compound. 10 oz. Chipman Chemicals Limited, Hamilton, Ontario.

Difolatan 80W. N-(1,1,2, 2-tetrachloroethylsulfenyl) -cis-A-cyclohexene-1, 2-dicarboximide, 1.5 lb. Chevron Chemical (Canada) Limited, Oakville, Ontario.

Dithane M-45. Zinc co-ordinated manganese ethylene bis-(dithiocarbamate). 1.5 lb. Rohm and Haas Company of Canada Limited, West Hill, Ontario.

DuTer. Triphenyltin hydroxide (20%). 1.0 lb. Philips-Duphar, Amsterdam, Holland.

Kocide 101. Copper hydroxide (86%). Cu, 50%. 2.0 lb. Kennecott Copper Corporation, New **York,** N Y., U.S.A

Nabac 25EC. Hexachlorophene. 8.0 fl. oz. Nationwide Chemical Corporation, Fort Myers, Florida, U.S A.

Polyram 80W. Zinc activated polyethylene thiuram disulfide. 1.5 lb. Niagara Brand Chemicals, Burlington, Ontario

RH-90. Confidential. 2.5 lb. Rohm and Haas Company of Canada Limited, West Hill, Ontario.

Siaprit. Ethylene thiuram monosulfide. 3.5 lb. S. I. A. P. A., Rome, Italy.

Plots of 'Green Mountain' potatoes, each 4 **rows** by 50 feet, were planted on June 4, exactly 50 seed pieces being dropped in each row. The treatments were randomized and replicated in 4 ranges. Separating the plots from one another and bordering the design were single rows of the same variety. These rows received no fungicides, their function being to equalize the epidemic, should one develop.

The fungicides were applied with a tractor-mounted sprayer on July 15, 24, August 2, 13, 22, 29, September 9, 17, which schedule gave a mean interval of 9 days.

Insects were controlled by spraying all rows with endosulfan on July 4, July 29, and August 14.

The test was terminated by applying a top killer (sodium arsenite) on September 24, i.e., 112 days after planting. The tubers were dug, graded, examined for rot, and weighed at mid-October.

Table 1. Percentage defoliation*

Treatment	Sept. 13	Sept. 16	Sept. 20	Sept. 24
Copertan	4	9	19	45
Daconil 2787 (1.0 lb.)	3	4	8	18
Daconil 2787 (1.5 lb.)	T**	T	2	6
Decafentin	5	7	14	25
Difolatan 80W	3	4	10	23
Dithane M-45	T	1	3	8
DuTer	7	9	17	36
Kocide 101	9	13	33	58
Nabac 25EC	31	45	89	97
Polyram 80W	3	5	9	17
RH-90	T	T	2	5
Siaprit	3	5	9	21
Check, untreated	65	88	100	100

* Means of five plots.

** T = trace.

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Results

The season was the most unusual in the history of this annual fungicide screening program. Adequate rainfall in the early season created a water supply that maintained normal growth of the plants through the driest July on record. The precipitation for the month was only 0.48 inches and the weather continued to be unfavorable to the blight fungus through most of August. Under these conditions, potato growers throughout the province enjoyed a blight-free season, lesions being found in only two small fields of early 'Irish Cobblers'.

It being evident that a natural infection would not occur in the plots, numerous attempts were made to create one artificially by disseminating water suspensions of spores over the plants in the border and buffer rows. The first inoculation was made on July 18 and it was followed by several more, usually just before dark, through the rest of the month and August. By mid-August, only three or four lesions were observed. However, some or all the attempts made on August 23, 24, 25, 26, and 28 were effective, the humidity frequently being high, dews common, and rains of 0.15 and 1.22 inches falling on the 24th and 25th and 0.15 and 0.51 inches on the 29th and 30th.

Under these conditions the disease became well established and the defoliation of the border and buffer rows and of the check plots proceeded at a fast rate in September. In the first week of the month, 0.76 inches fell in five days and in the second there were 0.40 inches in four days.

With the test plots being showered with spores from the source rows, infections developed in them and it became possible to evaluate the relative foliar protection efficiencies of the fungicides. However, the amounts of tuber rot that were found at harvest were lower than might be anticipated; the September rains, with the exception of one of 0.68 inches on the 3rd, were not sufficiently heavy to wash many spores into the hills.

Under the conditions of the test, the best control of disease on the foliage was given by Rh-90, Daconil (at the 1.5 lb. dosage), and Dithane M-45 (Table 1). The two copper fungicides, Copertan and Kocide 101, were relatively poor, Nabac 25EC showed no merit. Difolatan 80W, as in the several previous seasons when epidemics occurred, allowed the least amount of tuber rot (Table 2). No phytotoxicities were observed.

Table 2. Effects of treatments on yield and rot

Treatment	Total (bu/acre)	Smalls (bu/acre)	Rot (bu/acre)	No. 1 (bu/acre)	Rot (%)
Copertan	571.3	62.7	11.0	497.6	1.9
Daconil 2787 (1.0 lb)	637.1	78.5	9.0	549.6	1.4
Daconil 2787 (1.5 lb)	610.9	55.4	7.0	548.5	1.1
Decafentin	593.1	63.8	18.9	510.4	3.2
Difolatan 80W	612.5	58.3	4.2	550.0	0.7
Dithane M-45	622.1	50.6	6.8	564.7	1.1
DuTer	597.0	59.8	13.6	523.6	2.3
Kocide 101	565.6	44.0	9.0	512.6	1.6
Nabac 25EC	554.9	46.2	9.7	499.0	1.7
Polyram 80W	601.3	54.6	18.7	528.0	3.1
RH-90	611.6	44.0	6.6	560.6	1.1
Siaprit	607.4	48.8	15.2	543.4	2.5
Check	496.7	46.6	19.4	430.7	3.9
L.S.D. .05	39.4			40.0	N.S.
L.S.D. .01	52.9			53.7	N.S.