SCREENING OF POTATO FUNGICIDES IN 1964[1]

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In 1964, the fungicides listed below were compared for efficiency in the control of potato late blight, Phytophthora infestans (Mont.) de Bary, in the Screening Test at Charlottetown, P.E.I.

1. Bordeaux mixture -- 8-4-80 formula, included annually as a standard treatment.

2. Calumet 20-E -- a liquid copper derived from nabam. 15 qt./80 gal. Calumet and Hecla Inc., Calumet, Michigan, U.S.A.

3. Copper 20-M -- a liquid copper derived from sodium dimethyldithiocarbamate. 1.5 qt./80 gal, Calumet and Hecla Inc., Calumet, Michigan, U.S.A.

4. Difolatan 80W -- N-(1,1,2,2,-tetrachloroethylsulfenyl)-cis-Δ-cyclohexene-1, 2-dicarboximide. 1.0 lb./80 gal. California Chemical (Canada) Limited, Oakville, Ontario,

5. Dithane M-45 -- zinc co-ordinated manganese ethylene-bisdithiocarbamate. Mn, 16%; Zn, 2%. 1.0 lb./80 gal. Rohm and Haas Company of Canada Limited, West Hill, Ontario,

6. Dodine -- n-dodecylguanidine acetate. 68 gm. + 1364 cc of a special oil/80 gal, Imperial Oil Enterprises Ltd., Sarnia, Ontario.

7. DuTer -- triphenyl tin hydroxide (20%). 0.75 lb./80 gal, Philips-Duphar, Amsterdam, Holland.

8. F-300 -- confidential product. 1.0 lb./80 gal, Green Cross Products, Montreal.

9. Hortocritt -- ethylene thiuram monosulfide. 2.5 lb./80 gal, S.I.A.P.A., Rome, Italy.

10. Manzate Aqueous -- a slurry of manganese ethylene bis-dithiocarbamate. 1.0 U.S.A. qt./80 gal. DuPont of Canada Limited, Montreal.

11. Manzate D -- manob powder containing zinc sulphate in physical mix. 1.0 lb./80 gal. DuPont of Canada Limited, Montreal.

12. Miller 658 -- copper-zinc-chromate. 3.0 lb./80 gal. Miller Chemical and Fertilizer Corporation, Baltimore, U.S.A.

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13. NIA 11130 -- a confidential product. 1.0 lb./80 gal. Niagara Brand Chemicals, Burlington, Ontario.

14. Organil 66 — a confidential product. 1.0 lb./80 gal. Procida, Neuilly sur Seine, France.

15. Polyram 80W -- zinc activated polyethylene thiuram disulfide. 1.0 lb./80 gal. Niagara Brand Chemicals, Burlington, Ontario.

The plots were planted on June 1, exactly 50 seed pieces of the Green Mountain variety being dropped in each 50-foot row. Each plot was 50 feet long x 4 rows wide and 16 plots, being one for each fungicide and an unsprayed control, were set out in each of 5 ranges. Single rows of potatoes were planted as borders and buffers. These rows were not sprayed, their function being to equalize the epidemic over the area.

Seven applications of the fungicides were made between July 15 and September 10, the mean interval being 9.5 days. They were applied with a tractor-sprayer unit which delivered approximately 120 gallons per acre at a pressure of 375 pounds per square inch. The boom was fitted with 4 nozzles per potato row, 2 being above the plants and 2 spraying from drop pipes. Insects were controlled by spraying all rows with Thiodan, three applications being made in the season.

The season of 1964 produced very high yields of potatoes on Prince Edward Island and, in the twenty-two years that this investigator has been conducting the experiments on late blight disease, the highest plot yields were recorded. On the other hand, it was not a favourable season for working with the blight fungus, the cool weather and the few periods of high relative humidity that characterized tho season retarding its development and spread.

Because of the scarcity of natural infection, it was necessary to resort to the application of water suspensions of spores to the plants. A light sprinkling of spores was made over the buffer rows on July 22 but no lesions developed. The procedure was repeated on August 6 but only three lesions were found on the 12th. Similar-attempts were made, some being in the evenings, on August 15, 18, 23, 25, 26, September 2, 6.

Even with the persistent inoculations, the disease built up very slowly, the five unsprayed check plots showing only a 20 per cent defoliation at the end of the first week of September, at which time the Dodine and Copper 20-M plots had defoliation means of 9 and 10 per cent respectively and other plots showed mere traces of disease. By September 14 only 40 per cent of the foliage in the check plots was infected, whereas in 1963 these plants were dead several days earlier.

Under the conditions of the test, all but four of the fungicides gave satisfactory control of disease on the foliage. Two fungicides performed rather badly, Dodine, in particular, having almost no merit. Of the two liquid coppers, it is interesting to note the disparity that occurred, the plots sprayed with Calumet 20-E having a mean disease reading of 16

Table 1. Percentage Defoliation (Means of Five Plots).

Treatment	Sept. 14	Sept. 21	Sept. 25
Hortocritt	T	1	3
Organil 64	T	1	4
Manzate D	T	1	5
Manzate (Aqueous)	T	1	6
Polyram	T	2	6
DuTer	T	3	6
Dithane M45	1	2	7
Difolatan	1	4	7
NIA 11130	T	2	8
F-300	T	3	8
Bordeaux	1	4	8
Miller 658	3	6	13
Calumet 20-E	2	5	16
Copper 20-M	15	30	55
Dodine	18	38	75
Check	40	82	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
Difolatan	641.4	21.1	3.1	414.9	0.5
Manzate (Aqueous)	651.2	31.7	9.2	610.3	1.4
Polyram	644.2	24.6	10.6	609.0	1.6
Organil 66	655.2	26.0	25.1	604.1	3.8
DuTer	632.3	27.7	7.5	597.1	1.2
F-300	644.6	29.0	19.4	596.2	3.0
Manzate D	640.2	28.6	22.4	589.2	3.5
hiller 658	631.8	29.0	15.4	587.4	2.4
Bordeaux	623.0	30.3	7.5	585.2	1.2
Dithane M-45	638.9	27.7	26.0	585.2	4.1
NIA 11130	627.9	34.3	10.6	583.0	1.7
Hortocritt	627.9	29.0	18.5	580.4	2.9
Calumet 20-E	620.8	29.0	19.4	572.4	3.0
Copper 20-M	587.4	31.2	52.4	503.8	8.9
Dodine	559.2	38.7	37.8	482.7	6.8
Check	538.5	34.3	43.1	461.1	8.0
S.D. 5%	33.1			35.3	2.5
S.D. 1%	44.0			47.0	3.3

*Arranged in descending order of No. 1 tuber yields.

per cent on the and date while those sprayed with Copper 20-M had a mean of 55 per cent. These copper products were prepared respectively from disodium ethylene bisdithiocarbamate and sodium dimethyldithiocarbamate. Earlier studies have shown that ethylene salts are superior to dimethyl salts in this region. This recognized difference may account for one reason (there oould be others) for the differences in foliage blight control between 20-E and 20-M in the 1964 test,

The test was terminated by the application of a sodium arsenite top killer on September 25, 116 days after planting. The tubers were dug, graded, examined for disease, and weighed on October 13, 14.

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