SCREENING OF POTATO FUNGICIDES IN 1962[1]

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The fungicides listed below were compared for efficiency in controlling potato late blight, Phytophthora infestans (Mont,) de Bary, in the Screening Test at Charlottetown in 1962.

1. Aarado-Supra -- Copper oxycarbonate,
   Source: Imported from Europe by Green Cross Products, Montreal,
   Concentration: 2.5 pounds/80 Imperial gallons,

2. Delan-Copper -- Dithianon and copper oxychloride,
   Source: E. Merk, Darmstadt, Germany,
   Concentration: 2/3 quarts/80 gal,

3. Difolatan -- N-(1, 1, 2, 2-tetrachloroethylsulfenyl)-cis-A-cyclohexene-1, 2-dicarboximide.
   Source: California Chemical Company, Richmond, Calif., U, S.A,
   Concentration: 1.0 pound/80 gal,

4, Dithane A-40 -- Nabam powder t zinc sulphate,
   Source: Rohm and Haas Company of Canada, Limited, West Hill, Ont.
   Concentration: 1.0 pound t 1.5 pounds/80 gal.

5. Dithane M-45 -- Zinc ion and maneb. Mn, 16%; Zn, 2%.
   Source: Rohm and Haas Company of Canada, Limited, West Hill, Ont,
   Concentration: 1,0 pound/80 gal,

6. EPS 203/1 -- A copper product (confidential),
   Source: Fisons Pest Control Limited, Chesterford Park Research Station, nr. Saffron Walden, Essex, England,
   Concentration: 4. 0 pounds/80 gal.

7. F 328 -- 3,3[1]-ethylenebis (tetrahydro-4, 6-dimethyl-2H-I, 3, 5-thiadiazine-2-thione,
   Source: DuPont of Canada Limited, Montreal, P.Q.
   Concentration: 1.0 pound/80 gal,

8. Manzate t Thylate -- Maneb t thiram.
   Source: DuPont of Canada Limited, Montreal, P.Q.
   Concentration: 0.75 t 0.75 pounds/80 gal.

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9. MCOM -- 35% maneb; 25% Cu as copper oxychloride; 0.3% Hg as phenyl mercury chloride.
Source: Green Cross Products, Montreal.
Concentration: 2. 5 pounds/80 gal.

10. Miller 658 -- Copper-zinc-chromate. Cu, 29.6%; Zn, 20.4%; Cr, 9.7%.
Source: Miller Chemical and Fertilizer Corporation, Baltimore, Md. U.S.A.
Concentration: 1.5 pounds/80 gal.

11. Polyram-Combi -- Zinc activated polyethylene thirame disulphide.
Source: A German product introduced by Niagara Brand Chemicals, Burlington, Ont.
Concentration: 1.0 pound/80 gal.

12. TD 225 -- A confidential product.
Source: Pennsalt Chemicals of Canada Limited, Vancouver, B. C.
Concentration: 0.4 pints/80 gal.

13. Bordeaux mixture, 8-4-80. Included annually as a standard treatment.

The plots were planted by hand on June 5, exactly 50 Green Mountain seed pieces being dropped in each 50-foot row. Each plot was 4 rows wide x 50 feet long and 14 plots (one for each treatment and an unsprayed control) were laid out in each of 4 ranges. Single rows of potatoes were planted as borders and buffers. All data were taken from the two center rows.

The treatments were applied with a tractor-sprayer unit which delivered approximately 120 gallons per acre at a pressure of 375 pounds per square inch, The nozzles were so arranged on the boom that each row received a 4-nozzle application, 2 nozzles being directly over the plants and 2 being on drop pipes. Insects were controlled by spraying all rows with Thiodan, three treatments being applied during the season,

The fungicides were applied on July 19, 28, August 6, 14, 21, 28, September 4, 10. Thus 8 treatments were given, the mean interval being 7.6 days. On September 21 the experiment was terminated by spraying the plants with the top killer Reglone. The tubers were harvested, graded, examined for blight rot, arid weighed on October 4 and 5,

The 1962 test of fungicides was carried out under extremely severe disease conditions, the weather being almost constantly favourable to the development and spread of Phytophthora infestans, During the July-September period a measurable amount of rain fell on 44 days to give a total of 16.38 inches. In addition, there were eleven days in which trace amounts were observed. This precipitation was exceeded but once in this area, the July-September period of 1942 having had about 4 inches more. However, July and August of 1942 were not so wet as the same months in 1962, September of the earlier year showing a fall of over 12 inches of which 2.53 inches and 6.45 inches fell on the 21st and 22nd of the month,

The 1962 season was also very humid, the lowest mean weekly relative humidity being 81.4 per cent. There were three weeks in which the mean relative humidities were over 90 per cent, the highest being the week of July 8-14 which showed a mean of 95.1 per cent. The mean for the three-month period was 86.4 per cent or considerably higher than normal.

Because of the frequent rains it was impossible to make applications of fungicides on a regular schedule and no time table could be set up and adhered to. It is probable, too, that the rains played a major role in the performances of the fungicides, those with poor adhesive ability being washed from the foliage at the greatest rate,

The following examples will illustrate the manner in which rains interfered with spray applications. The third spray, applied on August 6, was followed by recorded precipitations on August 7, 8, 9, 10, 11, (12th, a trace), 13, a total of 2.11 inches. It was fine in the morning of August 14 and the fourth application was made; but later in the day clouds moved in and a 0.51 inch fall occurred, A rain of 2.10 inches was recorded for August 20 and the fifth application was postponed until the 21st, the morning of that day being sunny and dry. However, a 0.35 inch rain came in the afternoon. The treatments applied on August 28 were followed by a total of 0.63 inches of rain on August 29 and 30. Four days of rain (1.86 inches) followed the last application which was made on September 10.

The first blight lesions were found in some of the unsprayed border and buffer rows near the end of July and on August 1 the disease was present in all these rows and in the control plots. The plants in these rows and plots were completely defoliated at the beginning of September.

The rapid build-up of late blight on the untreated plants, the long periods of abundant sporulation, and the frequently wet condition of the plants provided an extremely severe test for the fungicides, The result was that all sprayed plots became infected, Under these conditions, the worst in many years, some fungicides did rather well,

Defoliation readings were taken at regular intervals, and mean defoliations, expressed as percentages, are given for selected dates in Table 1. Data on yield and tuber rot are presented in Table 2.

Table 1 - Percentage of defoliation.

Treatment	Aug. 24	Sept. 4	Sept. 12	Sept. 17
Dithane M-45	3	12	15	20
Manzate t Thylate	5	19	22	30
Dithane A-40	5	20	22	30
F 328	4	19	23	30
Difolatan	7	27	47	55
Polyram-Combi	9	29	40	55
EPS 203/1	8	31	44	60
MCOM	7	32	42	60
Bordeaux	8	30	39	65
Delan-Copper	7	37	52	75
Aarado-Supra	9	42	55	85
Miller 658	12	46	64	90
TD 225	33	93	100	100
Check	70	100	100	100

Table 2 - Effect of treatments on vield and rot,

Treatment	Total bu/ac	Smalls bu/ac	Rot bu/ac	No. 1 bu/ac	% Rot
Dithane M-45	390.0	42.3	18.2	329.5	4.7
Dithane A-40	385.2	35.4	33.0	316.8	8.5
Manzate t Thylate	354.8	49.0	25.3	280.5	7.2
F 328	349.3	39.6	44.0	265.7	12.6
Difolatan	311.4	51.2	13.8	246.4	4.4
Bordeaux	317.7	57.9	15.6	244.2	4.9
MCOM	320.1	54.4	40.2	225.5	12.6
Polyram-Combi.	309.1	39.9	49.5	221.7	16.0
Delan-Copper	302.0	54.5	28.6	218.9	9.5
EPS 203/1	301.4	50.0	38.5	212.9	12.8
Aarado-Supra	269.0	47.3	30.8	190.9	11.4
Miller 658	261.3	50,1	31.9	179.3	12.2
TD 225	166.1	61.0	22.6	82.5	13.6
Check	162.6	58.8	26.2	77.6	16.1
S.D. 5%	33.6			40.5	6.3
S.D. 1%	45.0			54.2	8.4

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