SCREENING OF POTATO FUNGICIDES IN 1965[1]

L.C.Callbeck[2]

Introduction

Weather conditions over Prince Edward Island in 1965 were so contrary to those required by the late blight fungus that no disease was observed. It was, therefore, an unusual season, being the first in 30 years that late blight disease was unrecorded. Our weather and disease records, which have been maintained since 1922, show that in the past 44 years late blight was not observed in only 5 years, 1922, 1923, 1930, 1935, 1965. There were 13 years in which trace to very light epidemics were recorded and 3 of these occurred in the present decade, 1960, 1961, and 1964. In 260f the years late blight was regarded as severe to extremely severe.

Materials and methods

Twelve fungicides for use against late blight of potatoes, Phytophthora infestans (Mont.) de Bary, were included in the 1965 Screening Test at Charlottetown, P. E. I. These products were as briefly outlined below.

1. Brestan 60. American Hoechst Corporation, California. A combination of triphenyltin acetate and maneb. 6 oz/80 gal.

2. Daconil 2787. Diamond Alkali Company, Painsvillc, Ohio. Tetrachloroisophthalonitrile. 1.0 lb./80 gal.

3. Dithane M-45. Rohm and Haas Company of Canada Limited, West Hill, Ontario. Zinc coordinated manganese ethylenebisdithiocarbamate. Mn, 16%; Zn, 2%. 1.0 lb./80 gal.

4. Duter. Philips-Duphar, Amsterdam, Holland. Triphenyltin hydroxide (20%). 0.75 lb./80 gal.

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

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

7. Hortocritt. S. I. A. P. A., Rome, Italy. Ethylene thiuram monosulfide. 2.5 lb./80 gal.

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

9. Organil 66. Procida, Neuilly sur Seine, France. A confidential product. 1.0 lb./80 gal.

10. Polyram 80W. Niagara Brand Chemicals, Burlington, Ontario. Designated as "milled". Zihc activated polyethylene thiuram disulfide. 1.0 lb./80 gal.

11. Polyram 80W. As above but designated "retentive".

12. RH-90. Rohm and Haas Company of Canada Limited, West Hill, Ontario. A confidential product. 1.6 lb./80 gal.

Table 1. Effect of treatments on yield

Treatment	Total bu./ac.	Smalls bu./ac.	No. 1 bu./ac.
Organil 66	413.6	24.2	389.4
RH-90	412.0	25.3	386.7
Manzate D	405.9	27.5	378.4
Check	398.2	20.9	377.3
Hortocritt	396.0	25.3	370.7
Dithane M-45	393.8	26.4	367.4
Daconil 2787	387.2	25.8	361.4
Difolatan	383.4	22.0	361.4
Polyram (Milled)	386.1	25.3	360.8
Polyram (Retentive)	383.5	24.8	358.6
Duter	370.7	24.2	346.5
F-300	365.2	25.3	339.9
Brestan 60	331.0	26.8	304.2

[1] Contribution No. 149, Experimental Farm, Research Branch, Canada Department of Agriculture, Charlottetown, Prince Edward Island.

[2] Plant Pathologist

The plots, using the blight-susceptible cultivar 'Green Mountain', were planted on June 9, exactly 50 seed pieces being dropped in each 50-foot row. Each plot was 4 rows wide by 50 feet long and 13 plots, one for each chemical and an unsprayed control, were set out in each of four ranges. Single rows of potatoes were planted as buffers between plots and as borders for the area. These rows were not sprayed.

No insecticides were included in the spray mixtures, insects being controled by spraying all rows with Thiodan at appropriate times. The fungicides were applied on July 16, 26, August 5, 13, 24, September 2, 10; the mean interval was 9.3 days; by means of a tractor-sprayer unit which delivered approximately 120 gallons of liquid per acre at a constant pressure of 375 pounds per square inch. The boom carried 4 nozzles per potato row, 2 being above the plants and 2 on drop pipes.

Results and discussion

The season of 1965 was very dry, only 5.77 inches of rain being recordedon the plot areas for the July-September period. Of this amount, 1.07 inches fell after September 17, the day on which the plants were killed by spraying them with sodium arsenite. In addition, periods in which the relative humidity rose to 90 percent or higherwere few and those that occurred were of such short duration as to be ineffectual in stimulating the fungus. Because of these unusual conditions, it was not possible to evaluate the fungicides on their relative efficiencies in the control of late blight of potato.

The yield date are presented in Table 1 in which the fungicides are placed indescending order according to the volumes of No. 1 tubers. Here it may be observed that yield differences are not significant and that the check or control falls in fourth place, a position that may have been attained, at least in part, by the fact that little or no wheel damage was inflicted on the unsprayed plots. The lower yield for the plots treated with Brestan 60 is probably a reflection of the phytotoxicity of this product. In 1961, a product designated as OSN-539, which, like Brestan 60, contained triphenyltin acetate, gave a similar bronzing of the foliage and plots treated with it produced the lowest yield. On the other hand, no phytotoxicity or yield depression have been observed for fungicides containing triphenyltin hydroxide.