

EVALUATION OF FUNGICIDE APPLICATION METHODS A) PROPTEC AND HYDRAULIC SPRAYERS
COMPARISON OF DITHANE AND GAVEL B) PIVOT APPLICATION OF MANZATE, BRAVO AND ACROBAT MZ
FOR POTATO LATE BLIGHT CONTROL, 2000:

A) Potatoes (cut seed) were planted at the Michigan State University Muck Soils Experimental Station, Bath, MI on 15 Jun into 50-ft x 200 -ft blocks (34-in row spacing). Each block was split into four sections for disease and yield analysis. Plots were irrigated as needed with sprinklers and were hilled immediately before sprays began. These plots were not directly inoculated. However, adjacent plots were inoculated (3.4 fl oz/25-ft row) with a zoospore suspension of *Phytophthora infestans* US8 biotype (insensitive to metalaxyl, A2 mating type) at 10^4 spores/fl oz on 23 Jul. Fungicides, Gavel 75WP or Dithane 75WP were applied weekly from 25 Jun to 13 Aug (9 applications) with a conventional hydraulic spray boom delivering 25 gal/A (80 p.s.i.) and using three XR11003VS nozzles per row or a Proptec sprayer delivering 5 gal/A (xxx p.s.i.). The design was not a true randomization and results should therefore be interpreted with caution.

B) Potatoes (cut seed) were planted at the Michigan State University Muck Soils Experimental Station, Bath, MI on 15 Jun into 16 blocks 50-ft x 50-ft (34-in row spacing). Groups of four blocks were planted around a center pivot water source. Four fungicide treatments were assigned at random to each of the four blocks, Manzate 75DF, Bravo WS 6SC, Acrobat MZ 69WP or untreated. The fungicides were applied weekly through a central pivot from 25 Jun to 13 Aug (9 applications). The central pivot was set up with nozzles spaced to deliver xxx gal H₂O/A at xxx mph and was calibrated to deliver xxx gal H₂O/A. Plots were separated by a 20-ft unplanted buffer zone. At approximately 11 weeks after planting, a point-source inoculation was made by placing into each of the plots a mature, potted potato plant (cv. Snowden) with approximately 50% foliar infection of potato late blight. The inoculum source plants were inoculated in controlled environments with *P. infestans* 10 days prior to positioning in the plots [MI95-7 (US8 biotype, A2 mating type, metalaxyl-resistant)].

General: Weeds were controlled by hilling and with Dual 8E (2 pt/A on 20 Jun), Basagran (2 pt/A on 20 Jun and 15 Jul) and Poast (1.5 pt/A on 28 Jul). Insects were controlled with Admire 2F (20 fl oz/A at planting on 15 Jun), Sevin 80S (1.25 lb/A on 1 and 28 Jul), Thiodan 3EC (2.33 pt/A on 1 and 21 Aug) and Pounce 3.2EC (8 oz/A on 28 Jul). Plots were rated visually for percentage foliar area affected by late blight on 23, Jul; 22, 27 Aug and 6 and 15 Sep when there was 100% foliar infection in the untreated plots. The relative area under the disease progress curve was calculated for each treatment from date of inoculation, 23 Jul to 15 Sep, a period of 48 days. Vines were killed with Diquat 2EC (1 pt/A on 16 Sep). Plots (25-ft row) were harvested on 5 Oct and individual treatments were weighed and graded.

General: Late blight initially developed slowly after adjacent plots were inoculated then rapidly during Aug, and untreated controls reached 85 - 95% foliar infection by 15 Sep. Over the period from 50% emergence to harvest, 109 late blight disease severity values were accumulated. The bulk of these DSV were accumulated between inoculation and desiccation. In general yields were low due to early vine senescence.

A) All treatments had significantly less foliar late blight than the untreated control 46 days after inoculation (DAI) of adjacent plots. Proptec applied Gavel 75WP 2.0 lb/A and Dithane RS 75DF 2.0 lb/A had significantly lower foliar late blight than either product applied by hydraulic sprayer 46 DAI. Averaged over the period from inoculation of adjacent plots to 100% defoliation of untreated controls (RAUDPC) all treatments had significantly less foliar late blight than the untreated control and were not significantly different from each other.

Yield: Proptec applied Gavel 75WP 2.0 lb/A and Dithane RS 75DF 2.0 lb/A had significantly higher marketable yield (US1 grade) than either product applied by hydraulic sprayer and the untreated control. Hydraulic applied Gavel 75WP 2.0 lb/A and Dithane RS 75DF 2.0 lb/A were not significantly different from the untreated control in terms of marketable yield (US1 grade). In terms of total yield, there was a high proportion of tubers below 2.5" diameter in any plane due to late planting. Proptec applied Gavel 75WP 2.0 lb/A had significantly greater total yield than hydraulic applied Gavel 75WP 2.0 lb/A and Dithane RS 75DF and the untreated control but was not significantly different from the Proptec applied Dithane RS 75DF 2.0 lb/A. Proptec applied Dithane RS 75DF 2.0 lb/A was not significantly different in terms of total yield from hydraulic applied Dithane RS 75DF 2.0 lb/A or the untreated control but had significantly higher total yield than hydraulic applied Gavel 75WP 2.0 lb/A.

B) All treatments applied through the central pivot irrigation system had significantly less foliar late blight than the untreated control 46 days after inoculation (DAI) of adjacent plots. Acrobat MZ 69WP 2.25 lb/A and Manzate 2.0 lb/A had significantly less foliar late blight than Bravo WS 6SC 1.5 pt/A. In terms of the RAUDPC, all treatments had significantly less foliar late blight than the untreated control but were not significantly different from each other.

Yield: Manzate 2.0 lb/A had significantly higher marketable yield (US1 grade) than the untreated control but was not significantly different from the other treatments. In terms of total yield there no significant differences between any treatments.

A) Hydraulic and Proptec sprayer evaluation trial.

Treatment and rate/acre	foliar disease (%)		RAUDPC ²		Yield (cwt/acre)			
	46 dai ¹		max = 100 0 - 48 dai		US1	Total		
Hydraulic applied Dithane RS 75DF 2.0 lb ³	14.3	b	1.6	b	111.4	b	293.8	bc
Proptec applied Dithane RS 75DF 2.0 lb	5.8	c	0.8	b	179.6	a	367.3	ab
Hydraulic applied Gavel 75WDG 2.0 lb	12.3	b	1.4	b	108.3	b	279.3	c
Proptec applied Gavel 75WDG 2.0 lb	6.5	c	0.8	b	210.3	a	394.5	a
Untreated	98.0	a	20.2	a	95.5	b	296.0	bc
sem p = 0.05	1.1		0.2		12.3		17.95	

¹ Days after inoculation with *Phytophthora infestans*, US8, A2.

² RAUDPC, relative area under the disease progress curve calculated from the day of inoculation to the last evaluation of late blight.

³ Application dates: 23 Jun; 1 Jul; 8 Jul; 15 Jul; 22 Jul; 30 Jul; 7 Aug; 14 Aug; 21 Aug.

⁴ Values followed by the same letter are not significantly different at P = 0.05 (Tukey Multiple Comparison).

B) Pivot fungicide application trial.

Treatment and rate/acre	foliar disease (%)		RAUDPC ²		Yield (cwt/acre)			
	46 dai ¹		max = 100 0 - 48 dai		US1	Total		
Acrobat MZ 69WP 2.25 lb ³	12.0	c	1.3	b	157	ab	330	a
Bravo WS 6SC 1.5 pt	16.3	b	1.7	b	177	ab	352	a
Manzate 75DF 2.0 lb	10.8	c	1.2	b	205	a	388	a
Untreated	98.0	a	20.2	a	66	b	243	a
sem p = 0.05	0.96		0.21		28.4		31.6	

¹ Days after inoculation with *Phytophthora infestans*, US8, A2.

² RAUDPC, relative area under the disease progress curve calculated from the day of inoculation to the last evaluation of late blight.

³ Application dates: 22 Jun; 2 Jul; 9 Jul; 16 Jul; 23 Jul; 31 Jul; 8 Aug; 15 Aug; 22 Aug.

⁴ Values followed by the same letter are not significantly different at P = 0.05 (Tukey Multiple Comparison).