

Evaluation of fungicide programs for potato late blight control: 2014.W. W. Kirk¹, R. Schafer¹, L. Steere, S. Danghi¹, P. Somohan¹¹Department of Plant, Soil and Microbial Sciences, Michigan State University, East Lansing, MI 48824

Potatoes ('Atlantic', cut seed, treated with Maxim FS at 0.16 fl oz/cwt) were planted at Michigan State University Horticultural Experimental Station, Clarksville, MI (Capac loam soil); 42.8733, -85.2604 deg; elevation 895 ft. on 26 May into two-row by 25-ft plots (ca. 10-in between plants to give a target population of 50 plants at 34-in row spacing) replicated four times in a randomized complete block design. Plots were irrigated as needed with sprinklers and were hilled immediately before sprays began. All rows were inoculated (3.4 fl oz/25-ft row) with a zoospore suspension of *Phytophthora infestans* [US-23 biotype (sensitive to mefenoxam, A1 mating type)] on 31 Jul at 10⁴ spores/fl oz. Plots were irrigated as needed with sprinklers and were hilled immediately before sprays began. All fungicides in this trial were applied on a 7-day interval from 8 Jul to 25 Aug (8 applications) with an ATV rear-mounted R&D spray boom calibrated to deliver 25 gal (80 p.s.i.) using three XR11003VS nozzles per row. Weeds were controlled by hilling and with Dual 8E (2 pt on 5 Jun), Poast (1.5 pt on 17 Jul). Insects were controlled with Admire 2F (20 fl oz at planting), Sevin 80S (1.25 lb on 17 and 31 Jul), Thiodan 3EC (2.33 pt on 14 Aug) and Pounce 3.2EC (8 oz on 17 Jul). Plots were rated visually for percentage foliar area affected by late blight on 8, 12, 19 and 27 Aug, [9, 13, 20, and 28 days after the inoculation (DAI)] when there was about 100% foliar infection in the untreated plots. The relative area under the late blight disease progress curve was calculated for each treatment from the date of inoculation to 27 Aug, a period of 28 days. Vines were killed with Reglone 2EC (1 pt on 11 Sep). Plots (2 x 25-ft row) were harvested on 20 Oct and tubers from individual treatments were weighed and graded. A sample of 50 tubers was collected from each plot at harvest and stored at 50°F and 95% RH in the dark for 56 days and the incidence of late blight affected tubers was evaluated. Meteorological variables were measured with a Campbell weather station located at the farm from 1 Jun to the final evaluation (27 Aug). Average daily air temperature (°F) from 1 Jun was 67.6, 65.1, and 67.5 and the number of days with maximum temperature >90°F was 0, 0 and 0 (Jun, Jul, Aug, respectively). Average daily relative humidity (%) over the same period was 71.1, 71.5, and 75.6. Average daily soil temperature at 4" depth (°F) over the same period was 68.3, 72.5, and 72.4. Average daily soil moisture at 4" depth (% of field capacity) over the same period was 37.1, 39.6, and 40.1. Precipitation was 5.78, 3.58, and 6.70 in. Plots were irrigated to supplement precipitation to about 0.1 in./4 day period with overhead sprinkle irrigation. The total number of late blight disease severity values (DSV) over the disease development period from 31 Jul (inoculation date) to 27 Aug was 45 using 90%RH (ambient air) as a basis for DSV accumulation.

Late blight developed steadily after inoculation due to extended leaf wetness periods and moderate air temperature during Aug and untreated controls reached on average 100% foliar infection by 27 Aug. Up to 19 Aug, all fungicide programs had significantly less foliar late blight than the untreated control (58.9%). By 27 Aug, all programs had with less than 73.9% foliar late blight significantly better foliar late blight than the untreated control (100 %). All fungicide programs had significantly lower RAUDPC values in comparison to the untreated control (30.9). On 15 Dec (56 days after harvest) the percent incidence of infected tubers from untreated plots was 14.3% and treatments with less than 3.4% tuber blight incidence were significantly different in comparison to the untreated control. Treatments with greater than US1 yield of 171 and total yield of 242 cwt/A, respectively were significantly different from the untreated control (US1 = 171 and total yield = 242 cwt/A). Phytotoxicity was not noted in any of the treatments.

Treatment and rate	Foliar potato late blight (%)				Yield (cwt)				Tuber blight (%) ^c			
	19 Aug 20 DAI ^a	27 Aug 28 DAI	RAUDPC ^b 28 DAI		US1	Total			203 DAP ^d			
Bravo WS 6SC 6SC 1.5 pt (ACEF); Zampro 4.38SL 14 fl oz (BD).....	3.5	efg	13.9	hi	3.8	k-n	357	f-l	455	g-m	4.1	d-k
Bravo WS 6SC 6SC 1.5 pt (ACEF).....	10.1	bcd	34.2	efg	7.7	ijk	387	e-i	519	b-j	10.3	b-i
Bravo WS 6SC 6SC 1.5 pt (A-H).....	7.9	cde	75.2	abc	12.8	fgh	301	jkl	392	lm	6.2	c-k
Ranman 400SC 2.75 fl oz + Silwett L-77 100SL 2 fl oz (A-H).....	2.5	fgh	33.3	efg	5.8	j-m	390	d-i	528	b-i	7.7	c-j
Mildicut 275SC 40 fl oz (A-H).....	1.2	ghi	14.9	hi	2.7	lmn	483	ab	599	ab	5.4	c-k
Mildicut 275SC 30 fl oz (A-H).....	1.5	f-i	43.0	def	6.6	jkl	435	a-e	549	a-g	13.8	a-f
Zing! 100F 34 fl oz (A-H).....	1.7	f-i	28.1	fg	4.9	j-n	361	e-l	464	f-m	12.6	a-g
Echo 6SC 16 fl oz (A-H).....	4.3	def	57.1	cd	11.7	ghi	378	e-i	502	b-j	8.3	c-j
Bravo WS 6SC 6SC 1.5 pt (ACEGH); Ridomil Gold Bravo 3.67SC 2.5 pt (BDF)...	0.7	hi	29.0	fg	4.3	k-n	393	c-h	487	d-k	4.2	d-k
Ridomil Gold Bravo 3.67SC 2.5 pt (DEF)...	1.1	ghi	23.4	gh	3.7	k-n	509	a	639	a	0.0	k
Inoculated Check.....	59.9	a	100	a	30.9	a	171	m	242	n	14.3	a-e

^a Days after inoculation of *Phytophthora infestans* (US-23, A1 mating type, mefenoxam sensitive) on 31 Jul.

^b RAUDPC, relative area under the disease progress curve calculated from day of appearance of initial symptoms to 27 Aug (28 days).

^c Incidence of tuber late blight after storage for 28 days at 50°F (178 DAP).

^d Days after planting.

^e Application dates: A= 8 Jul; B= 15 Jul; C= 23 Jul; D= 29 Jul; E= 6 Aug F= 12 Aug; G= 19 Aug; H= 25 Aug

^f Values followed by the same letter are not significantly different at $p = 0.05$ (Fishers LSD).