Evaluation of in-furrow, banded at re-hill, and foliar fungicides to manage early blight and brown spot of potato in Michigan, 2024

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Commercially available fungicides were tested to determine their efficacy in managing potato early blight (*Alternaria solani*) and brown spot (*Alternaria alternata*). A field trial was established at the Montcalm Research Center in Stanton, MI. Soil type at the station is loamy sand. A randomized complete block design was used with four replicates. US#1 'Lamoka' potatoes were cut into 2-oz seed pieces and left to suberize for 14-days. The trial was hand planted 23 May, and in-furrow treatments were applied before closing rows. A CO_2-powered backpack sprayer, equipped with TJ2501E nozzles, was used to apply fungicides in-furrow at 6 gal/A. Plots were two rows wide (34-in row spacing) by 18 ft long and seeded at 1.2 seed/row-ft. Banded treatments were applied at re-hilling on 26 June using a CO_2-powered backpack sprayer, equipped with TJ2504 nozzles at 20 gal/A. Due to the trial's proximity to commercial potato fields, a blanket application of Manzate Max (1.6 qt/A) or Echo 720 (1.5 pts/A) was applied weekly after row-closure to the entire trial to reduce the risk of late blight developing near commercially grown potatoes. Beginning at 50% row closure, four foliar applications (C, D, E, and F) were made across programs on 1 July, 8 July, 22 July, and 8 August. Foliar fungicides were applied at a volume of 20 gal/A via CO_2-powered backpack sprayer (TJ8004XR nozzles). Plots were inoculated on 19 July and 30 July with *A. solani* solution (8×10^3 conidia/mL) at a volume of 20 gal/A using the previously mentioned equipment. Stand establishment was monitored and foliar disease data (combined early blight and brown spot observations) were collected regularly throughout the growing season. The trial was harvested 26 September, and both rows were dug and later graded. The final disease incidence (DI), disease severity (DS), estimated yield, and estimated marketable yield (cwt/A) were compared among treatments. A generalized linear mixed model procedure was used to conduct the ANOVA and mean separations at the α=0.05 significance level (SAS version 9.4).

Disease pressure was moderate, and differences were observed among the foliar DI ($P = 0.001$) and foliar DS ($P < 0.0001$). All treated programs had significantly lower incidence (4.0-13.8%) and severity (4.0-7.5%) than the control (DI=25%, DS=13.8%). Though not significantly different from most of the other programs, the lowest DI value was observed in program 2 and the lowest DS values were observed in programs 6 and 17. No significant differences were observed in yield or marketable yield.

No.	Treatment (Rate[v]) Timing[w]	Disease Incidence (%)[x, y]		Disease Severity (%)[y]		Total Yield (cwt/A)	Marketable Yield (cwt/A)
1	Treated Control[z]	25.0	a	13.8	a	245	226
2	Velum Rise (13 fl oz) A + Propulse (10 fl oz) D + Scala 60 SC (7 fl oz) E	4.0	d	5.0	b	229	203
3	Velum Rise (13 fl oz) A + Propulse (10 fl oz) D + Luna Tranquility (11.2 fl oz) E	11.3	b-d	5.0	b	276	247
4	Elatus 45 WG (6.4 oz) A + Miravis Prime (10 fl oz) DE	7.5	b-d	5.0	b	268	245
5	Velum Rise (13 fl oz) A + Endura (5.5 oz) DE + Provysol (4 fl oz) DE	4.3	d	7.5	b	227	202
6	Velum Rise (13 fl oz) A + Delaro (8 fl oz) C + Luna Tranquility (11.2 fl oz) E	6.3	b-d	4.0	b	243	224
7	Velum Rise (13 fl oz) A + Quadris (9 fl oz) C + Miravis Prime (10 fl oz) E	13.8	b	7.5	b	254	231
8	Elatus (6.4 oz) A + Quadris (9 fl oz) C + Omega 500F (8 fl oz) D + Miravis Prime (10 fl oz) E	7.5	b-d	5.0	b	219	200
9	Velum Rise (13 fl oz) A + Headline (9 fl oz) C + Endura (5.5 oz) DE + Provysol (4 fl oz) DE	5.3	cd	5.0	b	279	248
10	Velum Rise (13 fl oz) A + Velum Prime (6.5 fl oz) D + Scala 60 SC (7 fl oz) E	7.8	b-d	7.5	b	223	196
11	Velum Rise (13 fl oz) A + Velum Prime (6.5 fl oz) C + Scala 60 SC (7 fl oz) E	8.8	b-d	6.3	b	229	213
12	Adastrio (18 fl oz) B	8.5	b-d	5.8	b	249	222
13	Topguard EQ (28 fl oz) B	5.5	cd	5.0	b	283	258
14	Lucento (5.5 fl oz) B	7.8	b-d	6.3	b	214	194
15	Adastrio (9 fl oz) DE+ Super Tin 4L (5 fl oz) F + Endura (7 oz) F	12.5	bc	7.5	b	213	198
16	Adastrio (9 fl oz) E + Super Tin 4L (5 fl oz) F + Endura (7 oz) F	10.0	b-d	5.0	b	235	216
17	Luna Tranquility (11.2 fl oz) DE + Super Tin 4L (5 fl oz) F+ Endura (7 oz) F	9.0	b-d	4.0	b	232	211
	SE	*2.8*		*1.1*		*2.8*	*1.1*
	P-value	*0.001*		*<0.0001*		*0.001*	*<0.0001*
	LSD	*7.9*		*3.2*		*7.9*	*3.2*

[v] All rates are listed as a measure of product per acre, unless otherwise specified. MasterLock was added to all foliar tank mixes at a rate of 0.25 % v/v.

[w] Application letters code for the following dates: A=23 May (in-furrow at plant), B=26 June (re-hill), C=1 July (50% row closure), D=8 July (row closure), E=22 July, F=8 August.

[x] Column values followed by the same letter were not significantly different based on Fisher's Protected LSD (α=0.05). If no letter, then means were not significantly different.

[y] Final foliar disease incidence and severity ratings (combined early blight and brown spot) collected 13 August, two weeks post second inoculation.

[z] A blanket application of Manzate Max (1.6 qt/A) or Echo 720 (1.5 pts/A) was applied weekly to the entire trial to reduce the risk of late blight development.