

POTATO (*Solanum tuberosum* 'Russet Burbank')
Early Blight; *Alternaria solani*
Late Blight; *Phytophthora infestans*

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Evaluation of foliar fungicides for control of potato early blight in Wisconsin, 2013.

Potato seedpieces were planted 5 May to initiate a field trial at the University of Wisconsin Agriculture Research Station in Hancock, WI to evaluate fungicide programs for control of foliar potato blights. Treatments were included for early blight (*Alternaria solani*) and late blight (*Phytophthora infestans*) control, but no late blight symptoms were observed during the course of the trial. Approximately 2 oz seedpieces were cut mechanically on 22 Apr from US#1 'Russet Burbank' tubers. Seedpieces were allowed to heal prior to planting. No seed treatments were applied unless noted in the table. A randomized complete block design with four replications was used for the trial, and treatment plots consisted of four 24-ft-long rows spaced 36 in. apart with 12 in. spacing in the row. To minimize soil compaction and damage to plants in rows used for foliar and yield evaluations, drive rows for pesticide application equipment were placed adjacent to plots. Fungicide treatments were initiated on 3 Jul after the P-day value (generated from a crop physiological model used for early blight prediction and fungicide initiation) reached 300. Subsequent applications were applied on a weekly basis to all four rows of each plot on the following dates: 10 Jul, 17 Jul, 24 Jul, 31 Jul, 7 Aug, 14 Aug, 21 Aug, 28 Aug, 4 Sep for a total of ten fungicide applications. Vine kill was initiated 9 Sep with an application of Diquat E 1.5 pt/acre followed by an application on 16 Sep. Treatments were applied with a plot sprayer consisting of a tractor-mounted boom, pressurized with an air compressor, using TeeJet Hollow Disc Cone D3-23 nozzles (16 nozzles at 8-in. spacing). Fungicides were applied at a rate equivalent to 35 gal water/A at 40 psi. Plots were not inoculated but relied on natural dispersal of inocula for disease establishment. Early blight severity for 20 ft. of the two center rows was rated on 1 Aug, 20 Aug, 29 Aug, and 9 Sep using the Horsfall-Barratt rating scale (0-11 rating with 0=no disease, 11=100% disease severity). Plots were harvested and graded on 23 Sep. A subset of 12 tubers from each plot was tested for specific gravity at time of grading. Precipitation in Hancock during the potato production season was 15.0 in. Supplemental irrigation was applied 44 times during the potato production season for an additional 19.5 in.

Early blight pressure was moderate and progressed later than typical for the production region. Late blight, while present in the growing region, was not observed in the trial. The average tuber specific gravity across treatments was 1.082 with no significant differences between treatments. There were no significant differences in weight of B grade potatoes among all treatments. More than half (n=21) of the fungicide programs tested resulted in total yields that were significantly greater than the untreated control. Treatments performing statistically similar to the untreated control included programs with just one active ingredient applied season-long. The four top-yielding programs (>770 cwt/acre) included Bravo Zn (spray weeks 1,2,4,8,10) alternated with Reason + Bravo Zn (3,6) alternated with Luna Tranquility + Manzate (5,7) alternated with Previcur Flex (8) alternated with Scala + Manzate (9); Tanos + Manzate (1,3,5,7,9) alternated with Fontelis (2,4,6,8,10); Bravo Zn (1,3,5,9) alternated with Priaxor + Bravo Zn (2,6) alternated with Endura + Bravo Zn (4) alternated with Quash + Dithane (7) alternated with Dithane + Super Tin (8) alternated with Forum + Dithane (10); and the season-long (1-10) program of Bravo + Dithane. All treatments, with the exception of EF400 (1-10), had significantly less early blight disease when compared to the untreated control. No phytotoxicity was noted with any of the treatment programs tested.

Treatment and rate/acre	Application Timing ^x	Yield (cwt/acre)			
		Culls	US #1	Total	RAUDPC ^z
Untreated Control.....	NA	12.1abc ^y	571.0a	621.5a	0.364o
Bravo Zn 4.17F 2.0 pt.....	1-10	12.5abc	667.4c-f	704.8a-d	0.227h-k
Quadris 2.08SC 6.0 fl oz	1,3,5				
Bravo Zn 4.17F 2.0 pt.....	2,4,6,7-10	12.5abc	725.8d-g	768.9de	0.232h-k
Moncoat MZ 7.5DP 1.0 lb/100 lb cut seed					
Bravo Zn 4.17F 2.0 pt	1,2,4,				
Headline 2.09SC 10.0 fl oz + Bravo Zn 4.17F 2.0 pt	3,6				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	5,7				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz.....	8,9,10	32.3d	577.3ab	631.8ab	0.201c-i
EF400 12.0 fl oz.....	1-10	8.0ab	649.7a-d	690.9a-d	0.327no
Champ Formula II 37.5DF 2.0 pt.....	1-10	11.4abc	649.4a-d	688.1a-d	0.255j-m
Bravo Zn 4.17F 2.0 pt	1,3,7,9				
Reason 500SC 4.0 fl oz + Bravo Zn 4.17F 1.5 pt	2,5				
Luna Tranquility 500SC 8.0 fl oz + Manzate 75WG 24.0 oz	4,6				
Scala 60SC 7.0 fl oz + Manzate 75WG 24.0 oz	8,10				
Previcur Flex 6F 1.2 pt.....	7	15.5abc	713.8c-g	757.6cde	0.122a
Bravo Zn 4.17F 2.0 pt	1,2,4,8,10				
Reason 500SC 4.0 fl oz + Bravo Zn 4.17F 1.5 pt	3,6				
Luna Tranquility 500SC 11.0 fl oz + Manzate 75WG 24.0 oz	5,7				
Previcur Flex 6F 1.2 pt	8				
Scala 60SC 7.0 fl oz + Manzate 75WG 24.0 oz.....	9	11.4abc	755.5g	798.9e	0.163a-f
Bravo Zn 4.17F 2.0 pt	1,2,4				
Headline 2.09SC 6.0 fl oz + Bravo Zn 4.17F 2.0 pt	3,6				
Luna Tranquility 500SC 11.0 fl oz + Bravo Zn 4.17F 2.0 pt	5,7				
Manzate 75WG 24.0 oz	8				
Scala 60SC 7.0 fl oz + Manzate 75WG 24.0 oz	9				
Super Tin 80WP 2.5 fl oz.....	10	18.2abc	660.5b-e	706.7a-d	0.153a-d
Experimental #1 19.62 fl oz.....	1-10	16.7abc	691.8c-fg	735.4cde	0.230h-k

Experimental #1 57.7 fl oz.....	1-10	17.8abc	675.8c-g	724.7cde	0.201c-i
Tanos 50WG 3 oz + Manzate 75WG 18 oz	1,3,5,7,9				
Fontelis 1.67SC 3.34 fl oz.....	2,4,6,8,10	8.3ab	737.3efg	770.8de	0.207e-j
Fontelis 1.67SC 3.34 fl oz.....	1-10	17.4abc	628.5abc	672.4abc	0.272klm
Bravo Zn 4.17F 2.0 pt	1,3,5,9				
Priaxor 4.17SC 4.5 fl oz + Bravo Zn 4.17F 2.0 pt	2,4,6				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz	7,8				
Forum 4.17SC 6.0 fl oz + Dithane DF 75DF 2.0 lb.....	10	22.4cd	661.5b-e	709.1bcd	0.152a-d
Bravo Zn 4.17F 2.0 pt	1,3,5,9				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	2,6				
Priaxor 4.17SC 4.5 fl oz + Bravo Zn 4.17F 2.0 pt	4				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz	7,8				
Forum 4.17SC 6.0 fl oz + Dithane DF 75DF 2.0 lb.....	10	13.6abc	713.7c-g	755.1cde	0.160a-f
Bravo Zn 4.17F 2.0 pt	1,3,5,9				
Priaxor 4.17SC 4.5 fl oz + Bravo Zn 4.17F 2.0 pt	2,6				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	4				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz	7,8				
Forum 4.17SC 6.0 fl oz + Dithane DF 75DF 2.0 lb.....	10	15.2abc	718.9d-g	762.4de	0.157a-e
Bravo Zn 4.17F 2.0 pt	1,3,5,9				
Priaxor 4.17SC 4.5 fl oz + Bravo Zn 4.17F 2.0 pt	2,6				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	4,8				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz	7				
Forum 4.17SC 6.0 fl oz + Dithane DF 75DF 2.0 lb.....	10	14.4abc	704.7c-g	745.7cde	0.132ab
Bravo Zn 4.17F 2.0 pt	1,3,5,9				
Priaxor 4.17SC 4.5 fl oz + Bravo Zn 4.17F 2.0 pt	2,6				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	4				
Quash 50WDG 2.5 oz + Dithane 75DF 2.0 lb	7				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz	8				
Forum 4.17SC 6.0 fl oz + Dithane DF 75DF 2.0 lb.....	10	18.2abc	751.8fg	799.2e	0.142ab
Bravo WS 720SC 1.5 pt.....	1-10	8.7ab	673.8c-g	716.1b-e	0.203d-i
Bravo WS 720SC 1.5 pt	1-4,7,10				

Vanguard 75SC 7.0 oz.....	5,6,8,9	13.7abc	721.8d-g	764.0de	0.175b-g
Bravo WS 720SC 1.5 pt	1-4,7,10				
Inspire Super 2.82EW 20.0 fl oz.....	5,6,8,9	21.2cd	704.6c-g	756.6cde	0.144ab
Bravo WS 720SC 1.5 pt	1-4,7,10				
Switch 62.5 WG 11.0 oz.....	5,6,8,9	11.4abc	688.3c-g	727.1cde	0.150abc
Bravo WS 720SC 1.5 pt	1-4,7,10				
Switch 62.5 WG 14.0 oz.....	5,6,8,9	20.9c	709.6c-g	758.4de	0.131ab
A18126 45WG 5.0 fl oz + NIS 0.25%.....	1,3,5,7,9	14.8abc	708.3c-g	749.9cde	0.275klm
A18126 45WG 9.0 fl oz + NIS 0.25%.....	1,3,5,7,9	16.7abc	656.0a-e	702.0a-d	0.241i-l
Champ Formula II 37.5DF 2.0 pt.....	1,3,5,7,9	17.1abc	652.5a-e	701.3a-d	0.297mn
Kocide 3000 46.1DF 1.5 lb.....	1-10	13.7abc	640.5a-d	686.8a-d	0.284lmn
Dithane DF 75DF 2.0 lb.....	1-10	21.2cd	690.2c-g	736.3cde	0.181b-h
Bravo WS 720SC 1.5 pt	1,3,5,7,9				
Dithane DF 75DF 2.0 lb.....	2,4,6,8,10	14.0abc	687.0c-g	731.1cde	0.209f-j
Bravo WS 720SC 1.5 pt + Dithane DF 75DF 2.0 lb.....	1-10	19.0bc	724.7d-g	772.0de	0.152abcd
Bravo Zn 4.17F 2.0 pt	1				
Headline 2.09SC 10.0 fl oz + Bravo Zn 4.17F 2.0 pt	3				
Endura 70WG 3.5 oz + Bravo Zn 4.17F 2.0 pt	5				
Revus Top 4.17SC 7.0 fl oz + Bravo Zn 4.17F 2.0 pt	7				
Dithane DF 75DF 2.0 lb + Super Tin 80WP 2.5 fl oz.....	9	12.5abc	700.5c-g	734.8cde	0.214g-j

^zRAUDPC= Relative Area Under the Disease Progress Curve.

^yColumn numbers followed by the same letter are not significantly different at $P=0.05$ as determined by Fisher's Least Significant Difference (LSD) test.

^xFungicide applications were made on 10 dates: 1=3 Jul, 2 = 10 Jul, 3= 17 Jul, 4 = 24 Jul, 5 = 31 Jul, 6 = 7 Aug, 7 = 14 Aug, 8 = 21 Aug, 9 = 28 Aug, 10 = 4 Sep.