

POTATO (*Solanum tuberosum* 'Atlantic')
White Mold; *Sclerotinia sclerotiorum*
Early blight; *Alternaria solani*

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Evaluation of foliar fungicides for control of potato white mold and foliar early blight in Wisconsin, 2020.

A field trial was conducted at the University of Wisconsin Agricultural Research Station in Hancock, WI to evaluate fungicide programs for control of white mold and foliar early blight on potato. Seed pieces, approximately 2 oz in size, were cut mechanically from US#1 'Atlantic' seed tubers on 29 Apr. Seed pieces were allowed to heal prior to planting on 5 May by maintaining cut seed under conditions of 55°F and 98% relative humidity. A randomized complete block design with four replications was used for the trial, and treatment plots consisted of four 20-ft-long rows spaced 36 in. apart with 12 in. spacing in the row. To minimize soil compaction and damage to plants in the treatment rows, drive rows for pesticide application equipment were placed adjacent to the plots. Seed treatments were applied to tubers within 24 hours of planting using a 1.06 qt Solo Hand Pump Sprayer at a rate equivalent to 3.70 L water/ton seed. In-furrow treatments were applied over the top of seed pieces in open furrows in a 12-in. band using a plot sprayer consisting of a tractor-mounted boom, pressurized with an air compressor, using TeeJet Twin Jet Flat Spray Tip nozzles TJ-60 11003VS. In-furrow applied fungicides were applied at a rate equivalent to 9.50 L water/1000 row feet at 30 psi. Fertility, insect, and weed management were accomplished using standard commercial practices for the region. Fungicide treatments were initiated at row closure, 8 Jul, with 7 subsequent applications on 15, 22, 29 Jul, and 5, 12, 19, and 26 Aug. 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 for early blight, but relied on natural dispersal of inocula. Plots were not inoculated for white mold in the trial year, but inoculum had previously been introduced in this white mold field nursery in each of subsequent past 10 years. Early blight severity across 20 ft of the two center rows was rated on 23 June, 7 Jul, 21 Jul, 8 Aug, and 21 Aug using the Horsfall-Barratt rating scale (0-11 rating with 0=no disease, 11=100% disease severity). The Area Under the Disease Progress Curve (AUDPC) was determined by trapezoidal integration and then converted into Relative AUDPC (RAUDPC), i.e. percentage of the maximum possible AUDPC for the whole period of the experiment. The number of white mold strikes for each plot was counted on 6 Aug. Vine kill was initiated on 3 Sep with an application of Diquat E at 1.5 pt/A followed by a second application on 8 Sep. Tubers from the center 2 rows of each 4-row plot were harvested and graded on 15 Sep. Total precipitation in Hancock during the potato production season was 17.51 in. Supplemental irrigation was applied 33 times during the potato production season for an additional 12.45 in. All data were analyzed using ANOVA ($P = 0.05$) and Fisher's LSD at $P = 0.05$ (SAS Version 9.2).

Three treatment programs significantly reduced emergence compared to the non-treated control (Treatments 2, 7, and 9). All treatments had numerically greater marketable yield when compared to the non-treated control. Treatments 7, 8, and 9, had significantly greater marketable yields than the non-treated control. These treatments featured a season-long early blight program with a higher rate of protectant fungicide (Dithane 75DF 3.0 lb). These treatments, along with the other season-long early blight programs (Treatments 2 and 3) also had significantly better disease control than the shorter, white mold programs and the non-treated control. Early blight pressure was strong throughout the trial season with relatively early onset of disease symptoms. There were no significant differences in white mold strikes (data not shown) and white mold pressure was low overall for the trial season. There was no phytotoxicity for any of the treatments.

Treatment Number, Treatment, and Rate/A		Application Timing ^z	Emergence (%)	Marketable Yield (cwt/A) ^y	Early Blight RAUDPC ^x
1	Non-treated Control	NA	95.3 de ^w	417.2 a	0.286 de
	Maxim MZ 0.5D 0.5 lb/cwt	Seed Trt			
2	Bravo WS 6SC 1.5 pt	1,2,4,8			
	Priaxor 4.17SC 4.5 fl oz + Bravo WS 6SC 1.5 pt	3,6			
	Endura 70WG 3.5 oz + Bravo WS 6SC 1.5 pt	5,7	86.5 a-c	453.4 ab	0.213 ab
	Maxim MZ 0.5D 0.5 lb/cwt	Seed Trt			
	Minuet 24 fl oz	In-Furrow			
3	Bravo WS 65SC 1.5 pt	1,2,4,8			
	Priaxor 4.17SC 4.5 fl oz + Bravo WS 6SC 1.5 pt	3,6			
	Endura 70WG 3.5 oz + Bravo WS 6SC 1.5 pt	5,7	97.8 e	451.2 ab	0.233 a-c
	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt			
4	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow			
	Luna Tranquility (Luna T) 4.16SC 11.2 fl oz	1,3	93.0 c-e	445.1 ab	0.252 b-d
5	Topsin-M WSB 1.0 lb	1,3	89.0 b-d	443.3 ab	0.299 e
6	Endura 70WG 3.5 oz	1,3	90.3 b-e	443.0 ab	0.283 de
	Flint Extra 4.05SE 3.0 fl oz + Dithane DF75 3 lb + Bond 0.10% v/v	1,3			
	Echo Zn 4.17L 1.3 pt	2			
7	Echo Zn 4.17L 2.12 pt	4,6,8			
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 3 lb	5			
	Scala 5SC 7.0 fl oz + Dithane DF75 3 lb	7	84.0 ab	535.3 d	0.206 a
	Flint Extra 4.05SE 3.0 fl oz + Dithane DF75 3 lb + Bond 0.10% v/v	1			
	Echo Zn 4.17L 1.3 pt	2			
8	Flint Extra 4.05SE 3.0 fl oz + Quash 50WG 2.5 oz + Bond 0.10% v/v	3			
	Echo Zn 4.17L 2.12 pt	4,6,8			
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 3 lb	5			
	Scala 5SC 7.0 fl oz + Dithane DF75 3 lb	7	93.3 c-e	487.0 b-d	0.228 a-c
	Echo Zn 4.17L 2.12 pt	1,3,4,6,8			
9	Headline 2.08SC 9.0 fl oz + Dithane DF75 3 lb	2			
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 3 lb	5			
	Scala 5SC 7.0 fl oz + Dithane DF75 3 lb	7	79.8 a	517.3 cd	0.216 ab
10	Luna T 4.16SC 11.2 fl oz + Dithane DF75 3 lb	1,2			
	Echo Zn 4.17L 2.0 pt	3,4	88.5 b-d	468.4 a-c	0.233 a-c
	Luna T 4.16SC 11.2 fl oz + Quash 50WG 2.5 oz	1,2			
11	Flint Extra 4.05SE 3.0 fl oz + Echo Zn 4.17L 2.0 pt	3			
	Echo Zn 4.17L 2.0 pt	4	90.3 b-e	471.3 a-c	0.259 cd

^zFungicide application dates: 1=8 Jul, 2 = 15 Jul, 3= 22 Jul, 4 = 29 Jul, 5 = 5 Aug, 6 = 12 Aug, 7 = 19 Aug, 8 = 26 Aug

^yMarketable yield refers to weight of Size A potato tubers of a size range ≥ 2.5 in diameter measured in hundredweight or 100 lb per acre or cwt/A.

^xRAUDPC= Relative Area Under the Disease Progress Curve determined by trapezoidal integration and then converted into Relative AUDPC (RAUDPC).

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