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

S. A. Jordan, J. M. Hammel, and A.J. Gevens
Department of Plant Pathology
University of Wisconsin-Madison
Madison, WI 53706

Evaluation of foliar fungicides for control of potato white mold and foliar early blight in Wisconsin, 2019.

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 'Snowden' seed tubers on 29 Apr. Seed pieces were allowed to heal prior to planting on 5 May. 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, 10 Jul, with 7 subsequent applications on17 Jul, 24 Jul, 31 Jul, 7 Aug, 14 Aug, 21 Aug, and 28 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 inocula. The research plot has served as a long-term white mold pathogen nursery, with inoculum of *Sclerotinia sclerotiorum* added to the field via inoculated sunflower in previous crop rotations. White mold severity and early blight severity across 20 ft of the two center rows was rated on 5 Jul, 19 Jul, 1 Aug, 19 Aug, and 31 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. Vine kill was initiated on 3 Sep with an application of Diquat E at 1.5 pt/A followed by a second application on 9 Sep. Tubers from the center 2 rows of each 4-row plot were harvested and graded on 16 Sep. Total precipitation in Hancock during the potato production season was 22.6 in. Supplemental irrigation was applied 25 times during the potato production season for an additional 9.65 in. All data were analyzed using ANOVA ($P = 0.05$) and Fisher's LSD at $P = 0.05$ (SAS Version 9.2).

Vine emergence was significantly reduced compared to the non-treated control for treatment 10 and 11. The cause of this reduced emergence is unknown. White mold infection was very low across the entire research field, with no visible foliar symptoms during the growing season (data not shown). Environmental conditions were favorable for early blight development. Treatments 7, 8, 9 10, and 11 had a significant control of foliar early blight compared to the non-treated control. There were no significant differences in marketable yield, B size tubers (data not shown) and cull weight (data not shown). There were no phytotoxic symptoms observed with any of the fungicide programs throughout the duration of the trial.

Treatment Number, Treatment, and Rate/A		Application Timing[z]	Emergence (%)		Marketable Yield (cwt/A)[y]	Early Blight RAUDPC[x]	
1	Non-treated Control	NA	84.4	cd[w]	350.6	0.402	cd
2	Topsin-M WSB 1.0 lb	1,3	92.5	d	331.7	0.404	cd
3	Endura 70WG 3.5 oz	1,3	81.9	b-d	364.6	0.421	d
4	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Bravo WS 65SC 1.5 pt	1,3,5,7					
	Dithane DF75 2 lb	2					
	Scala 5SC 7.0 fl oz + Dithane DF75 2 lb	4,8					
	Luna Tranquility (Luna T) 4.16SC 11.2 fl oz + Dithane DF75 2 lb	6	82.5	b-d	354.1	0.361	a-d
5	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Serenade ASO 0.962 qt	1,2					
	Reason 500SC 5.5 fl oz + Movento 240SC 2.5 fl oz + MSO EC 0.5% v/v	3,5					
	Luna T 4.16SC 11.2 fl oz	4					
	Luna T 4.16SC 11.2 fl oz + Bravo WS 65SC 1.5 pt	6					
	Scala 5SC 7.0 fl oz + Bravo WS 65SC 1.5 pt	7					
	Bravo WS 65SC 1.5 pt	8	81.3	a-d	349.5	0.356	a-c
6	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Echo Zn 4.17L 2 pt	5					
	Luna T 4.16SC 11.2 fl oz + Echo Zn 4.17L 1.12 pt	6					
	Luna T 4.16SC 11.2 fl oz + Echo Zn 4.17L 2 pt	8	85.0	cd	357.1	0.363	a-d
7	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Echo Zn 4.17L 2 pt	4, 8					
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 2 lb	6	89.4	d	377.4	0.327	ab
8	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Bravo WS 65SC 1.5 pt	1,3					
	Dithane DF75 2 lb	2					
	Scala 5SC 7.0 fl oz + Dithane DF75 2 lb	4,8					
	Propulse 400SC 8.55 fl oz + Bravo WS 65SC 1.5 pt +NIS	5,7					
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 2 lb	6	79.4	a-d	352.6	0.335	ab

Treatment Number, Treatment, and Rate/A		Application Timing[z]	Emergence (%)		Marketable Yield (cwt/A)[y]	Early Blight RAUDPC[x]	
9	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Bravo WS 65SC 1.5 pt	1,3					
	Dithane DF75 2 lb	2					
	Scala 5SC 7.0 fl oz + Dithane DF75 2 lb	4,8					
	Propulse 400SC 10.26 fl oz + Bravo WS 65SC 1.5 pt +NIS	5,7					
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 2 lb	6	81.3	a-d	363.1	0.309	a
10	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Velum Prime 0.45 fl oz/1000 ft row	In-Furrow					
	Bravo WS 65SC 1.5 pt	1,3					
	Dithane DF75 2 lb	2					
	Scala 5SC 7.0 fl oz + Dithane DF75 2 lb	4,8					
	Delaro 325SC 11.7 fl oz + Bravo WS 65SC 1.5 pt +NIS	5,7					
	Luna T 4.16SC 11.2 fl oz + Dithane DF75 2 lb	6	68.1	a	324.8	0.324	ab
11	CruiserMaxx Vibrance Potato (0.5 fl oz/cwt)	Seed Trt					
	Miravis Prime 3.33SC 11.0 fl oz	1,2					
	Bravo WS 65SC 1.5 pt	3,4					
	Revus Top 48.3SC 5.5 fl oz	5	69.4	ab	309.0	0.332	ab
12	Emesto Silver 118FS 0.31 fl oz/cwt	Seed Trt					
	Luna T 4.16SC 11.2 fl oz	1,2					
	Bravo WS 65SC 1.5 pt	3-5	72.5	a-c	313.9	0.376	b-d

[z]Fungicide application dates: 1=10 Jul, 2 = 17 Jul, 3= 24 Jul, 4 = 31 Jul, 5 = 7 Aug, 6 = 14 Aug, 7 = 21 Aug, 8 = 28 Aug

[y]Marketable 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.

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

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