

POTATO (*Solanum tuberosum* 'Russet Burbank')
Rhizoctonia/black scurf; *Rhizoctonia solani*

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Evaluation of at-plant fungicides and pop-up fertilizer for control of Rhizoctonia diseases of potato in Wisconsin, 2020.

Potatoes were planted on 4 May at the University of Wisconsin Hancock Agricultural Research Station in central WI to evaluate seed- and in-furrow- applied fungicides for the control of Rhizoctonia diseases of potato, including seedling damping-off and tuber black scurf. In preparation for planting, US#1 seed tubers were cut into approximately 2 oz pieces on 27 Apr. Seed pieces were allowed to heal for 7 days at 55°F with 98% relative humidity and good airflow for suberization. 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 rows used for foliar and yield evaluations, drive rows for pesticide application equipment were placed adjacent to plots. Seed treatments were applied to tubers after seed cutting 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/1,000 row feet at 30 psi. Fertility, insect, and weed management was accomplished using standard commercial practices for the region. Plots relied upon natural inocula for disease establishment. Seed emergence data were collected on 9 Jun from 20 linear feet of each of the center two rows of each plot (% seed emergence = number of emerged vines /maximum possible emerged vines (40)*100). Precipitation in Hancock during the potato production season was 18.02 in. Supplemental irrigation was applied 42 times during the potato production season for an additional 15.7 in. Vines were killed with a desiccant treatment of Diquat + non-ionic surfactant applied on 21 Sep. Plots were harvested and graded on 5 Oct. At harvest, tubers from the center two, 20-ft long rows of each 4-row plot were graded for size and yield. Twenty tubers were randomly selected from each plot after washing and visually evaluated for symptoms of black scurf (% incidence = number of symptomatic tubers/20*100). All data were analyzed using ANOVA ($P = 0.05$) and Fisher's LSD at $P = 0.05$ (SAS version 9.2). Disease pressure was very low in this trial with no visible black scurf on tubers at the time of harvest.

Seed treatments of Nubark Mancozeb and Maxim MZ had significantly reduced emergence when compared to the non-treated control. Treatments of Maxim MZ + Quadris, Howler, Cruiser Maxx Vibrance Potato, Maxim MZ + Minuet, AmyProtec42 1.9 fl oz, Serenade ASO 8.8 fl oz, Serifel 1.1 fl oz, and Moncut 40SC 1.72 fl oz had significantly greater total plot yield and marketable yield when compared to the non-treated control. The treatment of Maxim MZ had significantly more B size tubers than the non-treated control. In-furrow treatments of Quadris and AmyProtec42 0.95 fl oz had significantly less B size tubers than the non-treated control. There were no significant differences across treatments for C size tuber yield and culls. There was no phytotoxicity for any of the treatments.

Treatment number, treatment, and rate ^z		Application timing ^y	Emergence (%)	Total plot yield (cwt)		Marketable yield (cwt) ^x		Bs yield (cwt) ^w		
1	Non-treated Control		97.5	c ^v	473.7	a	427.7	ab	38.3	bc
2	Maxim 4FS 0.08 fl oz	Seed Treatment	99.4	c	480.4	ab	418.1	a	56.1	d
3	Maxim 4FS 0.08 fl oz + Nubark 0.5 lb	Seed Treatment	98.8	c	485.3	ab	435.5	a-c	43.3	c
4	Nubark Mancozeb 1.0 lb	Seed treatment	92.5	ab	478.1	ab	439.7	a-c	31.7	ab
5	Maxim MZ 7.5DP 0.5 lb	Seed treatment	90.0	a	496.1	a-d	458.7	a-d	31.1	ab
6	Maxim MZ 7.5DP 0.5 lb	Seed treatment								
	Quadris 2.018 SC 0.6 fl oz	In furrow	95.0	bc	524.9	b-e	483.3	c-f	36.2	a-c
7	Quadris 2.018 SC 0.6 fl oz	In furrow	95.0	bc	488.3	a-c	453.3	a-d	28.6	a
8	Howler 5.5 oz	In furrow	96.3	bc	534.9	c-e	492.9	d-f	36.5	a-c
9	Cruiser Maxx Vibrance Potato 0.5 fl oz	In furrow	95.0	bc	570.6	e	518.4	ef	44.9	c
10	Maxim MZ 7.5DP 0.5 lb	Seed treatment								
	Minuet 24 fl oz	In furrow	97.5	c	543.2	de	499.2	d-f	38.4	bc
11	AmyProtec42 0.95 fl oz	In furrow	96.9	bc	503.9	a-d	470.9	b-e	27.3	a
12	AmyProtec42 1.9 fl oz	In furrow	96.3	bc	537.3	de	493.6	d-f	36.8	a-c
13	Serenade ASO 8.8 fl oz	In furrow	95.6	bc	560.6	e	522.5	f	32.6	ab
14	Serifel 1.1 fl oz	In furrow	98.8	c	537.0	de	495.1	d-f	35.9	a-c
15	Moncut 40SC 1.72 fl oz	In furrow	96.9	bc	561.3	e	521.5	f	33.0	ab

^z Treatment rates applied in-furrow are given per 1,000 row ft. Seed treatments are given per 100 lb seed.

^y Seed treatments and in-furrow treatments were applied at the time of planting.

^x Marketable yield refers to the weight of Size A potato tubers of a size range ≥ 2.5 in diameter in units of cwt = 100 lb.

^w Size B potato tubers are of a size range between 1.5 and 2.25 in diameter.

^v 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.