

Evaluation of at-plant treatments for control of Rhizoctonia diseases of potato in Wisconsin, 2018.

Potatoes were planted on 10 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 24 Apr. Seed pieces were allowed to heal for 16 days at 13°C with 95% 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 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 was accomplished using standard commercial practices for the region. Plots relied upon natural inocula for disease establishment. Seed emergence data were collected on 7 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 25.5 in. Supplemental irrigation was applied 38 times during the potato production season for an additional 16.8 in. Vines were killed with a desiccant treatment of Diquat + non-ionic surfactant applied on 17 Sep. Plots were harvested and graded on 28 Sep. 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 low in this trial. Black scurf incidence on tubers at the time of harvest was low with no significant differences among treatments. Five treatments: Treatment 2 Maxim MZ 7.5DP 0.5 oz seed treatment, Treatment 3 Maxim MZ 7.5DP 0.5 oz seed treatment + Quadris 2.018SC 0.6 fl oz in-furrow, Treatment 4 Cruiser Maxx Potato Extreme 0.31 fl oz seed treatment, Treatment 5 Cruiser Maxx Vibrance Potato 0.5 fl oz seed treatment, and Treatment 6 Moncoat MZ 7.5DS 1.0 lb seed treatment, resulted in decreased emergence when compared to the non-treated control. These treatments all consisted of a seed-treatment that appeared to have delayed and/or minimized emergence. Four of these five treatment (Treatment 2 Maxim MZ 7.5DP 0.5 oz seed treatment, Treatment 3 Maxim MZ 7.5DP 0.5 oz seed treatment + Quadris 2.018SC 0.6 fl oz in-furrow, Treatment 4 Cruiser Maxx Potato Extreme 0.31 fl oz seed treatment, Treatment 5 Cruiser Maxx Vibrance Potato 0.5 fl oz seed treatment) also had significantly less yield when compared to the non-treated control. No treatment had greater yield than the non-treated control. There were no phytotoxic symptoms observed with any of the fungicide programs throughout the duration of the trial.

Treatment number, treatment, and rate ^z	Application type ^y	Emergence (%)	Marketable yield (cwt/A) ^x	Size Bs (cwt) ^w	Culls (cwt)	Black scurf incidence (%)
1 Non-treated Control		93.3	520.1	32.0 a-c ^v	22.6 a-g	17.5 de
2 Maxim MZ 7.5DP 0.5 oz	Seed Treatment	93.5	542.2	49.5 de	16.3 ab	0.0 a
3 Maxim MZ 7.5DP 0.5 oz + Quadris 2.08SC 0.6 fl oz	Seed Treatment In Furrow	92.3	545.6	37.1 c	14.7 a	0.0 a
4 Cruiser Maxx Potato Extreme 0.31 fl oz	Seed Treatment	93.5	532.4	37.6 c	17.9 a-d	0.0 a
5 Cruiser Maxx Vibrance Potato 0.5 fl oz	Seed Treatment	95.3	537.8	59.0 e	15.0 a	5.0 a-c
6 Moncoat MZ 7.5DS 1.0 lb	Seed Treatment	87.0	532.8	57.3 de	30.3 fg	5.0 a-c
7 NAI-9019 0.75 lb + NAI-9003 0.71 fl oz	Seed Treatment	91.0	524.8	48.1 d	27.2 b-g	7.5 a-c
8 Moncut SC 0.51 fl oz + NAI-9003 0.71 fl oz	Seed Treatment	88.0	510.4	51.9 de	19.3 a-e	2.5 ab
9 NAI-9020 1.0 fl oz	Seed Treatment	92.3	537.1	29.0 a-c	19.9 a-f	0.0 a
10 Emesto Silver 118FS 0.31 fl oz	Seed Treatment	97.0	547.7	30.1 a-c	20.2 a-f	5.0 a-c
11 Quadris 2.08SC 0.6 fl oz	In Furrow	93.0	515.4	26.0 ab	26.9 b-g	2.5 ab
12 Vertisan EC1.67 1.1 fl oz	In Furrow	92.3	495.0	22.8 a	32.5 g	7.5 a-c
13 Elatus 45WG .5 fl oz	In Furrow	90.5	545.5	34.7 bc	21.4 a-f	7.5 a-c
14 Priaxor 4.17SC 0.48 fl oz	In Furrow	94.5	583.5	31.4 a-c	22.0 a-g	7.5 a-c
15 Velum Prime 6.5 fl oz	In Furrow	94.5	503.7	28.0 a-c	17.9 a-d	17.5 de
16 MBI-110 AF5 8.8 fl oz	In-Furrow	89.0	467.0	33.4 bc	20.0 a-f	10.0 b-d
17 Double Nickel LC 2.2 fl oz	In-Furrow	95.8	559.8	31.4 a-c	29.0 e-g	10.0 b-d
18 MBI-110 AF5 8.8 fl oz + Regalia 5SC 4.4 fl oz	In-Furrow	95.8	516.9	30.5 a-c	25.2 a-g	12.5 cd
19 Regalia 5SC 4.4 fl oz	In Furrow	96.3	536.9	26.6 ab	27.6 c-g	7.5 a-c
20 Double Nickel LC 1.7 fl oz	In-Furrow	91.5	524.7	28.1 a-c	28.1 d-g	12.5 cd
21 AMV1033 0.28 oz	In Furrow	98.3	519.7	35.2 bc	19.7 a-f	22.5 e
22 AMV1033 0.55 oz	In Furrow	93.3	555.2	31.2 a-c	17.0 a-c	22.5 e
23 AMV1033 0.11 oz	In Furrow	99.5	552.2	30.8 a-c	19.8 a-f	10.0 b-d

^z Treatment rates applied in-furrow are given per 1000 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.