

Evaluation of at-plant fungicides for control of Rhizoctonia diseases of potato in Wisconsin, 2023.

Potatoes were planted on 3 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 at 55°F (12.8°C) 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 (6.1 m) rows spaced 36 in. (0.91 m) apart with 12 in. (0.30 m) spacing in the row. Seed treatments were applied to tubers after seed cutting using a 1.06 qt (1003 ml) Solo Hand Pump Sprayer at a rate equivalent to 3.70 L water/ton (or 907.2 kg) 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 from seed and field sources for disease establishment. Seed emergence data were collected on 10 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) *100). Precipitation in Hancock during the potato production season was 7.75 in. Supplemental irrigation was applied 50 times during the potato production season for an additional 21.4 in. Vines were killed with a desiccant treatment of Diquat + non-ionic surfactant applied on 13 Sep with a subsequent application on 19 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 were 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).

There were no significant differences among treatments for emergence, C size yield (data not shown) and cull weight (data not shown). Six treatments (4, 5, 6, 8, 19, and 25) had a significant reduction in marketable yield when compared to the non-treated control. No treatment had a significantly greater marketable yield when compared to the non-treated control. Five treatments (4, 5, 6, 10, and 11) had a significant increase in the yield of B size tubers when compared to the non-treated control. Treatment 14, had a significantly reduced yield of B size tubers when compared to the non-treated control. All treatments, except 21 and 25, had a significant reduction in both black scurf incidence and severity when compared to the non-treated control. There was no phytotoxicity during the growing season associated with any treatment.

No.	Treatment and rate ^z	Application timing ^y	Emergence (%)	Marketable Yield (cwt) ^x	Bs Yield (cwt) ^w	Black Scurf Incidence (%)	Black Scurf Severity (%)
1	Non-treated Control	Seed Trt	100.0	562.3 ef	43.2 b-e	17.5 f	0.61 f
2	Maxim MZ 0.5 lb	Seed Trt	98.8	508.7 a-e	52.6 e-j	0.0 a	0.00 a
3	Maxim 4FS 0.08 fl oz	Seed Trt	95.0	511.5 a-e	47.7 d-h	1.3 ab	0.01 ab
4	Maxim 4FS 0.08 fl oz + Nubark 0.5 lb	Seed Trt	92.5	492.9 a-d	57.0 g-j	0.0 a	0.00 a
5	Nubark 0.5 lb	Seed Trt	98.1	489.5 a-c	61.0 ij	0.0 a	0.00 a
6	Cruiser Maxx Vibrance Potato 0.5 fl oz	Seed Trt	95.0	490.2 a-c	56.7 g-j	0.0 a	0.00 a
7	NAI-9071 1.0 fl oz	Seed Trt	98.8	547.0 c-f	50.9 d-h	0.0 a	0.00 a
8	Convoy 0.51 fl oz + Proline 0.012 fl oz	Seed Trt	94.4	484.2 a-c	51.2 d-h	2.5 a-c	0.05 a-c
9	Convoy 0.51 fl oz+ Hydrovent 0.1% v/v	Seed Trt	95.6	512.8 a-f	55.2 f-j	1.3 ab	0.04 a-c
10	Convoy 0.51 fl oz	Seed Trt	97.5	509.7 a-e	63.1 j	0.0 a	0.00 a
11	Emesto Silver 0.31 fl oz	Seed Trt	98.1	531.1 b-f	45.4 c-f	3.8 a-d	0.06 a-d
12	Maxim MZ 0.5 lb Quadris 2.018 SC 0.6 fl oz	Seed Trt In Furrow	98.1	525.6 a-f	58.0 h-j	0.0 a	0.00 a
13	Quadris 2.018 SC 0.6 fl oz	In Furrow	99.4	507.8 a-e	44.4 b-f	2.5 a-c	0.08 a-d
14	Velum Prime 0.45 fl oz	In Furrow	96.9	562.3 ef	31.6 a	7.5 c-e	0.15 a-d
15	Experimental 1 0.90 fl oz	In Furrow	98.8	560.9 ef	36.6 a-c	0.0 a	0.00 a
16	Elatus 45WG 0.64 oz	In Furrow	96.9	540.5 b-f	45.2 b-f	1.3 ab	0.01 ab
17	Quadris 2.018 SC 0.8 fl oz	In Furrow	98.8	556.1 d-f	41.5 a-d	3.8 a-d	0.25 b-d
18	Velum Prime 0.45 fl oz + Elatus 45WG 0.64 oz	In Furrow	96.3	516.5 a-f	40.6 a-d	0.0 a	0.00 a
19	Companion Maxx WP 0.55 oz	In Furrow	98.1	481.3 ab	43.9 b-e	2.5 a-c	0.05 a-c
20	Experimental 2 0.55 oz	In Furrow	95.0	512.3 a-f	44.5 b-f	6.3 b-e	0.23 a-d
21	SP-1 Biofert 0.26 L + Companion Maxx 0.55 oz	In Furrow	96.9	539.0 b-f	40.3 a-d	17.5 f	0.55 f
22	SP-1 Biofert 0.26 L + Experimental 2 0.55 oz	In Furrow	98.1	524.4 a-f	40.3 a-d	6.3 b-e	0.30 de
23	Companion Maxx WP 0.55 oz + Quadris 2.018 SC 0.6 fl oz	In Furrow	97.5	577.7 f	47.0 c-g	5.0 a-d	0.08 a-d
24	SP-1 Biofert 0.26 L + Companion Maxx WP 0.55 oz + Quadris 0.6 fl oz	In Furrow	98.8	509.5 a-e	50.5 d-h	8.8 de	0.26 cd
25	Ethos XB 25.5 fl oz	In Furrow	96.3	464.6 a	50.5 d-h	11.3 e	0.53 ef

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

^ySeed 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 Size C potato tubers are of a size less than 1.5 inch in diameter.

^u 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.