

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

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Evaluation of at-plant fungicides for control of Rhizoctonia diseases of potato in Wisconsin, 2022.

Potatoes were planted on 6 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 30 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 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 (40)*100). Precipitation in Hancock during the potato production season was 20.0 in. Supplemental irrigation was applied 37 times during the potato production season for an additional 14.0 in. Vines were killed with a desiccant treatment of Diquat + non-ionic surfactant applied on 6 Sep with a subsequent application on 13 Sep. Plots were harvested and graded on 6 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).

Black scurf was present on harvested tubers, but disease severity was low with less than 5% of any tuber surface covered by black scurf (data not shown). There were no significant differences among treatment for black scurf incidence. Vine emergence was variable across the trial but there were no significant differences on emergence from any treatment. There were no significant differences among treatments in marketable yield. Two treatments, Cruiser Maxx Vibrance Potato (seed treatment) and Maxim (seed treatment) with Quadris (in-furrow), were the only treatments that had a significant increase in the yield of B size tubers compared to the non-treated control.

| No. | Treatment and rate ^z | Application timing ^y | Emergence (%) | Marketable Yield (cwt) ^x | Bs Yield (cwt) ^w | Cs Yield (cwt) ^w | Black Scurf Incidence (%) |
|-----|---------------------------------------------------------|---------------------------------|---------------|-------------------------------------|-----------------------------|-----------------------------|---------------------------|
| 1 | Non-treated Control | | 92.5 | 529.5 | 31.6 ab ^u | 5.0 bcd | 2.5 |
| 2 | Maxim MZ 7.5 DP 0.5 lb | Seed Trt | 80.0 | 505.7 | 42.7 bc | 5.2 cd | 3.8 |
| 3 | Maxim MZ 7.5 DP 0.5 lb | Seed Trt | | | | | |
| | Quadris 2.018 SC 0.6 fl oz | In-furrow | 92.5 | 459.4 | 48.4 c | 5.4 cd | 1.3 |
| 4 | Quadris 2.018 SC 0.6 fl oz | In-furrow | 81.9 | 549.5 | 41.2 bc | 5.3 cd | 10.6 |
| 5 | Howler 5.5 oz | In-furrow | 79.4 | 480.5 | 36.4 ab | 4.4 abc | 10.6 |
| 6 | Cruiser Maxx Vibrance Potato 0.5 fl oz | Seed Trt | 86.3 | 498.0 | 48.4 c | 6.3 d | 0.0 |
| 7 | Serifel 1.1 fl oz | In-furrow | 88.1 | 487.9 | 36.1 ab | 3.4 a | 11.3 |
| 8 | BIO_CNTR_0031 1.0 fl oz | In-furrow | 93.1 | 477.5 | 33.4 ab | 3.5 ab | 10.6 |
| 9 | Serenade ASO 9.8 fl oz | In-furrow | 93.8 | 484.3 | 39.6 abc | 5.2 cd | 10.0 |
| 10 | Howler 2.75 oz | In-furrow | 89.4 | 519.6 | 38.3 abc | 4.0 abc | 13.1 |
| 11 | Double Nickel LC 2.2 fl oz | In-furrow | 95.0 | 465.8 | 38.1 abc | 3.3 a | 6.3 |
| 12 | Double Nickel LC 4.4 fl oz | In-furrow | 91.9 | 480.6 | 27.9 a | 3.0 a | 9.4 |
| 13 | Quadris 2.018 SC 0.6 fl oz + Double Nickel LC 2.2 fl oz | In-furrow | 87.5 | 521.7 | 31.4 ab | 3.3 a | 8.1 |

^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.