

EVALUATION OF FUNGICIDE TREATMENTS APPLIED TO POTATOES AT PLANTING OR AT HILLING FOR DISEASE CONTROL - SPOONER, 2000: A field trial was established May 3 at the Spooner Agricultural Research Station, in northwestern WI to evaluate the effect of selected fungicides applied as seed treatments, in the furrow at planting, or at hilling. This trial was designed to compare the performance of Maxim, TOPS and azoxystrobin for control of *Rhizoctonia* stem canker and effect on plant stand, vigor and yield. US#1 Russet Burbank tubers were mechanically cut at the Hancock Agricultural Research Station into approximately 2 oz. seedpieces and treated as described. All treatments were cut and treated the morning of planting before transport to Spooner. The experiment was designed as a randomized complete block with four replications, each plot consisting of two 25-foot-long rows spaced 36 inches apart with tubers 12 inches apart in the row. All seedpiece treatments were applied to 40 lb samples of freshly cut potatoes in large plastic bags. The bags were then rolled to shake seedpieces and uniformly distribute the chemicals. Seedpieces were planted by hand. In-furrow treatments were applied in an 8-inch-wide band over the seedpieces at a rate equivalent to 29 gal water/A at 40 psi, using a hand-held boom with a single HC-2 70° hollow disc cone nozzle. After treatment, all seedpieces were mechanically covered using hilling disks. The soil type was Cress sandy loam, pH 6.7. At planting, air temperature was 82 F with clear skies, the soil was slightly moist with a temperature of 73 F, and the seedpiece temperature was 73 F. At-hilling treatments were applied to the soil surface in an 8-inch-wide band immediately before hilling, at a rate equivalent to 29 gal water/A at 40 psi with the hand-held boom described above. Fertilizer included: 6-24-24, 200 lb/A + 5-10-31, 200 lb/A broadcast preplant; 6-24-24, 450 lb/A, banded in the row at planting, and sidedress applications on June 5 (21-0-0-24S, 300 lb/A) and June 17 (33-0-0, 275 lb/A). Insects were controlled with foliar applications of Admire 2F, 0.9 pt/A, June 3; Thiodan 3 EC, 1.0 qt/A, Jun 27; and Baythroid 2EC, 2.8 fl oz./A on August 8. Sencor 4F, 1.5 pt/A + Prowl 3.3 EC, 1.8 pt/A was applied May 23 for weed control. All treatments received the same foliar fungicide program to control foliar blight: Quadris (0.38 pt/A, Jun 22, 0.76 pt/A, July 6 and 20); Bravo Zn (1.5 pt/A, Jun 30, July 13 and 27, August 3, 10, 18 and 25 and September 1). The number of emerged plants was counted for each plot on June 2, 6, 9, 13, 16, 20, 26 and 30. On June 30 the height of each plant in the trial was recorded and then 5 feet from each row (10 feet/plot) was dug by hand and plants were rated for *Rhizoctonia*, black leg and seedpiece decay. The number of stems per plant, fresh weight of leaves and stems, and weight of daughter tubers were recorded. The remaining portion of each plot (a total of 40 feet of row) was left to mature and provide yield data. Vines were killed with application of Diquat, 1.0 pt/A + Preference, 1.0 pt/A on September 5 and 11. Plots were machine harvested on September 19. Tubers were graded into US#1, undersize, and cull categories. Rainfall measured during the growing season (inches) included 4.45 (May), 4.82 (Jun), 7.48 (Jul), 4.81 (Aug), 0.65 (Sep). An additional 4.4 inches of irrigation was applied for a total of 26.6 inches of rainfall and irrigation during the growing season.

Weather conditions during the emergence period favored rapid emergence. Lowest emergence was observed in plots where the seedpieces were treated with Maxim at the time of seed cutting. On the June 30 rating and at harvest, data collected on several parameters were variable and observed differences between treatments were generally not significant at $Pr > F = 0.05$. However, some of the lowest levels of seedpiece decay, blackleg and *Rhizoctonia* stem infection were observed in plots where Quadris SC was applied in-furrow at planting. The average fresh weight of foliage on June 30 and the total tuber yield at harvest were highest while the yield of cull potatoes was lowest in plots treated with Quadris SC in-furrow at planting.

Footnotes for Table 1.

1. All treatments received the same foliar fungicide program: Quadris 2SC, 0.38 pt/A (application 1), 0.76 pt/A (applications 3, 5); Bravo Zn, 1.5 pt/A - remaining sprays
2. Based on 50 seedpieces planted/50 feet of row.
3. The average number of days to emergence was calculated for all plants which grew.
4. Avg. height per plant includes only those plants which grew. To calculate avg. height per hill, a height of 0 is included in the average for hills where no plant grew.
5. Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at $P = 0.10$. * indicates differences between treatments were significant at $P = 0.10$, but not at $P = 0.05$.

Table 1. Effect of potato seedpiece treatment on field emergence, stand and height of Russet Burbank potatoes.

Treatment Chemicals ¹	Rate		Application schedule	Percentage of plants emerged on: ²								Avg. days to emergence ³	Height 6/30 ⁴	
	Formulated product	Active ingredient		6/2	6/6	6/9	6/13	6/16	6/20	6/26	6/30		Per plant	Per hill
1. Untreated Seed				68.0	80.5	80.0	80.0	79.5	80.5	80.5	72.5	34.7	44.1	32.1
2. L1036	0.75 lb/ cwt seed		Seedpiece trt	73.5	89.0	92.5	93.5	94.0	94.5	95.0	89.0	33.2	48.0	42.8
3. Untreated Seed Quadris SC	0.96 fl oz/1000 rft	0.25 oz/1000rft	Appl. in-furrow	76.0	91.0	91.0	91.0	91.5	92.5	94.5	90.5	32.6	48.8	44.2
4. Untreated Seed Quadris SC	1.15 pt/A	0.3 lb/A	Appl. at hilling	64.5	78.5	80.0	81.0	82.5	83.0	84.5	82.0	32.5	45.1	37.0
5. L1036 Quadris SC	0.75 lb/ cwt seed 1.15 pt/A	0.3 lb/A	Seedpiece trt Appl. at hilling	44.5	72.0	81.0	85.5	85.5	86.5	88.0	85.0	33.9	37.2	31.9
6. Untreated Seed Quadris SC Quadris SC	0.96 fl oz/1000 rft 1.15 pt/A	0.25 oz/1000rft 0.3 lb/A	Appl. in-furrow Appl. at hilling	66.5	85.5	90.0	92.0	91.0	92.5	93.5	85.5	35.7	47.4	40.5
7. Maxim	0.08 oz/lb seed	0.0004 ozai/lb	Seedpiece trt	51.0	55.5	55.0	55.5	56.0	56.5	57.0	58.0	34.3	40.6	23.8
8. TOPS MZ	0.08 oz/lb seed	0.0068 ozai/lb	Seedpiece trt	63.5	79.5	82.5	84.0	83.0	85.5	87.0	75.0	37.5	39.4	29.8
Pr > F ⁵				0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.50	< 0.01	< 0.01
LSD (P = 0.05)				NS	17.3	14.3	12.7	12.5	13.1	13.4	17.0	NS	5.7	10.4

Table 2. Effect of potato seedpiece treatment on decay, black leg and Rhizoctonia symptoms, growth and yield (Treatment numbers as listed in Table 1).

Trt No.	June 30 Evaluation of 10 hills per replication								Total yield cwt/A	US#1		Undersize ³		Culls	
	% decay ¹	% of Plants with black leg	% of Total stems with black leg	% Rhizoc-tonia infection ²	No. of stems per plant	Avg. fresh weight (g)		cwt/A		%	cwt/A	%	cwt/A	%	
						Leaves + stems per hill	Daughter tubers per hill								
1.	85.5	10.0	4.8	12.9	4.2	537.5	77.6	382.5	238.7	62.5	103.0	27.3	40.8	10.2	
2.	70.5	12.5	9.3	6.7	4.4	559.1	84.2	392.5	240.6	61.3	125.1	32.0	26.8	6.8	
3.	50.2	2.5	0.8	3.4	4.5	615.2	65.5	417.3	276.3	66.0	119.0	28.8	22.0	5.2	
4.	70.5	2.5	0.7	10.8	3.9	550.6	79.3	384.9	242.5	62.7	113.3	29.4	29.1	7.8	
5.	90.2	22.5	12.7	5.6	3.6	341.3	46.4	375.4	247.7	65.9	99.0	26.5	28.7	7.6	
6.	45.2	10.0	2.9	2.0	4.7	569.8	59.1	358.5	226.3	63.1	104.0	28.9	28.2	8.0	
7.	80.1	7.5	1.9	6.6	4.2	441.7	53.4	319.0	198.7	61.6	78.3	24.2	42.0	14.2	
8.	88.1	17.5	7.8	1.6	3.4	395.2	41.0	360.2	218.3	60.5	84.1	23.1	57.9	16.4	
Pr > F ⁴	< 0.01	0.08	0.02	0.31	0.37	0.14	0.07	0.38	0.42	0.38	< 0.01	0.08	< 0.01	< 0.01	
LSD	21.7	13.7*	7.2	NS	NS	NS	31.4*	NS	NS	NS	24.8	5.8*	16.9	5.1	

¹ Severity of seedpiece decay rated on a Horsfall-Barratt scale of 0 (no decay) to 11 (100% decay). Ratings were converted to percentages.

² Severity rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (death of all stems due to Rhizoctonia infection). Ratings were converted to percentages.

³ Undersize is defined as potatoes less than 1 7/8 inches in diameter.

⁴ Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at P = 0.10. * indicates differences between treatments were significant at P = 0.10, but not at P = 0.05.