EVALUATION OF FUNGICIDES APPLIED AT PLANTING FOR CONTROL OF RHIZOCTONIA ON POTATO, 2004

Researchers: Richard T. Zink and Andrew Houser, Colorado State University, SLVRC

Location: San Luis Valley Research Center, Center, CO

Cultivar: Russet Norkotah selection 8, cut seed, 2-4 oz.

Objective: To evaluate the efficacy of various In-furrow and seed treatments in controlling disease.

Application: In-Furrow treatments were applied using an R & D CO_2 charged backpack sprayer at 35 PSI, with one XR 8002VS nozzle, at 10 gallons/acre as a directed in-furrow application. On seed treatments were applied directly to fresh cut seed and planted within twenty-four hours.

Treatments:
1. Control, no treatment
2. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed)
3. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed)
   Amistar 80WG @ 1.0 g.ai./100 rowM (In-furrow)
4. Moncoat MZ 7.5DP @ 56.25 g.ai./100kg seed (On seed)
5. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed)
   Quadris 2.08SC @ 1.0 g.ai./100 rowM (In-furrow)
6. Mancozeb 80WG @ 2800.0 g.ai./Ha (On seed)
   Amistar 80WG @ 1.0 g.ai./100 rowM (In-furrow)
7. Mancozeb 80WG @ 2800.0 g.ai./Ha (On-seed)
   Headline 2.09SC @ 1.0 g.ai./100 rowM (In-furrow)

Planted: May 7, 2004
Plot Design: Randomized complete block
Plot Size: 2 - 40 foot rows per treatment per replication
Plant Spacing: 12 inches
Row Spacing: 34 inches
Replications: Four
Irrigation: Solid set sprinkler, rate based on ET
Fertilizer: 80N-60P-40K-25S-2.5Zn, preplant, 20N through sprinkler after tuber set
Herbicide: Sencor, 0.66 lb./A + Dual Magnum, 1.5 pt./A + Spartan, 2.66 oz./A
Insecticide: None
Fungicide: None
Vine Killer: Mechanically removed on September 2, 2004
Harvested: September 9 & 10, 2004

DATA

Stand: 2-40 foot rows/treatment/replication, counts taken 48 days after planting.
Seed piece decay: Soft-rot and dry-rot combined rated 0-100, where 0 = no decay and 100 = complete decay; 10 seed pieces/treatment/replication.
Stem canker: Percent stems infected; 10 plants/treatment/replication.
Blackleg: Percent stems infected; 10 plants/treatment/replication.
Plant vigor: Rated 1-5, where 1 = poor and 5 = good; 10 plants/treatment/replication.
Stems: Average number of stems per plant; 10 plants/treatment/replication.
Tuber set: Average number of tubers per plant at full set; 10 plants/treatment/replication.
Yield: 2-35 foot rows per treatment per replication, total yield expressed in cwt/A.
Grade: By hand, percent tubers by weight in pounds and tuber no. < 4 oz., 4-6 oz., 6-10 oz., > 10 oz., US #2's, and culls.
Silver scurf: Mean percent of the affected tuber surface area, 10 8-10 oz. tubers per treatment per replication**,** readings taken at 56 and 110 days after harvest.
Black scurf severity index: Mean percent of the affected tuber surface area, 10 8-10 oz. tubers per treatment per replication multiplied by the severity of the sclerotia, where 1= small sclerotia and 3 = large sclerotia.

Table 1. Effects of seed treatments on plant development and incidence of disease in the cultivar Russet Norkotah Selection 8, San Luis Valley, Colorado, 2004.

Treatment/Rate[a]	Stand[b]	Vigor[c]	Stems[d]	%Stems with Rhizoctonia[e]	Stolons[f]	%Stolons with Rhizoctonia[g]	Seed piece decay[h]	No. tubers per plant[i]	Silver scurf[j]	Black scurf severity index[k]
1. Control, no treatment	90.9 c	3.5 bc	4.0 b	21.2	22.3 c	5.4	61.9 ab	28.5	0.0	9.5
2. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed)	88.1 c	3.1 c	3.8 b	11.6	21.6 c	1.8	62.9 a	28.9	0.0	6.4
3. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed) Amistar 80WG @ 1.0 g.ai./100 rowM (IF)	93.8 bc	4.0 ab	4.5 ab	5.8	25.4 bc	1.3	40.6 abc	34.5	0.0	1.4
4. Moncoat MZ 7.5DP @ 56.25 g.ai./100kg seed (On seed)	99.1 ab	4.4 a	4.6 ab	17.6	30.0 ab	6.9	10.6 d	35.6	0.0	0.9
5. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed) Quadris 2.08SC @ 1.0 g.ai./100 rowM (IF)	93.1 c	4.3 a	4.5 ab	18.5	28.0 ab	3.7	32.5 cd	32.0	0.0	2.0
6. Mancozeb 80WG @ 2800.0 g.ai./Ha (On seed) Amistar 80WG @ 1.0 g.ai./100 rowM (IF)	99.1 ab	4.4 a	5.3 a	9.3	30.8 a	2.5	34.5 bcd	33.8	0.0	3.3
7. Mancozeb 80WG @ 2800.0 g.ai./Ha (On-seed) Headline 2.09SC @ 1.0 g.ai./100 rowM (IF)	100.6 a	4.4 a	5.3 a	7.5	31.6 a	2.5	26.8 cd	36.3	0.0	7.5
LSD(P=0.05)	5.71	0.57	0.97	NS	5.41	NS	27.43	NS	NS	NS

[a] All treatments were applied according to the manufacturer's recommendations.
[b] Percentage of plants emerged 48 days after planting; four replications.
[c] Mean percent vigor, where 1 = poor, 5 = good; 10 plants/treatment/replication.
[d] Mean number of stems per seed piece 62 days after planting; 10 plants/treatment/replication.
[e] Mean percent stems with Rhizoctonia canker 62 days after planting; 10 plants/treatment/replication.
[f] Mean number of stolons per seed piece 62 days after planting; 10 plants/treatment/replication.
[g] Mean percent stolons with Rhizoctonia canker 62 days after planting; 10 plants/treatment/replication.
[h] Mean percent incidence of disease combined soft-rot and dry-rot 62 days after planting; rated 0-100, where 0 = no decay, 100 = complete decay; 10 seed pieces/treatment/replication.
[i] Mean number of tubers per plant 62 days after planting; 10 plants/treatment/replication.
[j] Mean percent of the affected tuber surface area, 10 8-10 oz. tubers per treatment per replication, readings taken at 56 and 110 days after harvest.
[k] Mean percent of the affected tuber surface area, 10 8-10 oz. tubers per treatment per replication multiplied by the severity of the sclerotia, where 1 = small sclerotia and 3 = large sclerotia.
Means followed by the same letters are not significantly different at P=0.05.

Table 2. Effects of seed treatments on tuber yield and quality in the cultivar Russet Norkotah Selection 8, San Luis Valley, Colorado, 2004.

	Percent[a]												
Treatment/Rate	< 4 oz.	No.	4-6 oz.	No.	6-10 oz.	No.	>10 oz.	No.	US #2s	No.	Culls	No.	Cwt/A[b]
1. Control, no treatment	4.7	15.6	13.2 d	22.1 c	35.0	34.9	45.5 a	25.9 a	0.5	0.5	1.1	1.0	322.9 bc
2. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed)	4.9	16.0	13.5 cd	22.1 c	36.9	36.1	40.6 ab	22.5 abc	1.9	1.0	2.2	2.3	307.4 c
3. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed) + Amistar 80WG @ 1.0 g.ai./100 rowM (IF)	3.6	12.3	16.9 bc	26.8 b	36.3	35.3	40.3 ab	23.3 ab	1.7	1.4	1.2	0.8	393.3 a
4. Moncoat MZ 7.5DP @ 56.25 g.ai./100kg seed (On seed)	4.6	13.1	18.1 b	27.3 b	45.0	40.7	30.1 c	17.3 cd	0.7	0.4	1.5	1.1	382.9 ab
5. Maxim 4FS @ 1.25 g.ai./100kg seed (On seed) + Quadris 2.08SC @ 1.0 g.ai./100 rowM (IF)	4.2	14.6	16.4 bcd	26.0 bc	35.2	33.7	41.5 a	24.0 ab	0.9	0.6	1.6	1.1	393.9 a
6. Mancozeb 80WG @ 2800.0 g.ai./Ha (On seed) + Amistar 80WG @ 1.0 g.ai./100 rowM (IF)	4.6	12.8	19.3 b	28.8 ab	40.9	37.6	32.8 bc	18.8 bcd	0.9	0.7	1.5	1.3	421.1 a
7. Mancozeb 80WG @ 2800.0 g.ai./Ha (On-seed) + Headline 2.09SC @ 1.0 g.ai./100 rowM (IF)	4.8	13.6	23.0 a	32.3 a	41.2	36.6	27.9 c	15.4 d	1.2	0.8	1.9	1.3	412.9 a
LSD(P=0.05)	NS	NS	3.50	4.23	NS	NS	8.22	5.57	NS	NS	NS	NS	65.49

[a] Based on tuber weight in pounds and tuber number, mean of four replications.
[b] Total yield expressed as hundred weight per acre, 2-35 foot rows per treatment per replication, mean of four replications.
Means followed by the same letters are not significantly different at P=0.05.