

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 and seed piece decay.
- Application:** In-Furrow treatments were applied using an R & D CO₂ 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. Headline @ 6.0 fl.oz./A (In-furrow)
 3. Endura @ 5.5 oz./A (In-furrow)
 4. Headline @ 6.0 fl.oz./A (In-furrow)
Endura @ 4.5 oz./A (In-furrow)
 5. Moncut SC @ 16.0 fl.oz./A (In-furrow)
 6. PCC-3 @ 0.5 lb./cwt (On-seed)
 7. PCC-4A @ 0.22 lb./cwt (Applied as liquid prior to planting)
PCC-4B @ 0.75 lb./cwt (On-Seed)
- Planted:** May 7, 2004
- Plot Design:** Randomized complete block
- Plot Size:** 1 - 40 foot row 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 10, 2004

DATA

- Stand:** 1-40 foot row/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; 5 seed pieces/treatment/replication.
- Stem canker:** Percent stems infected; 5 plants/treatment/replication.
- Blackleg:** Percent stems infected; 5 plants/treatment/replication.
- Plant vigor:** Rated 1-5, where 1 = poor and 5 = good; 5 plants/treatment/replication.
- Stems:** Average number of stems per plant; 5 plants/treatment/replication.
- Tuber set:** Average number of tubers per plant at full set; 5 plants/treatment/replication.
- Yield:** 1-35 foot row 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 54 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	%Stems with Black Leg ⁱ	Silver Scurf ^j	Black scurf severity index ^k
1. Control, no treatment	96.3 bc	3.9 ab	3.8	23.5	21.6	9.1	32.0 ab	0.00	0.0	11.5
2. Headline @ 6.0 fl.oz./A (IF)	98.8 ab	4.0 ab	4.8	8.7	26.0	0.2	17.5 b	0.00	0.0	10.0
3. Endura @ 5.5 oz./A (IF)	89.4 d	3.1 c	4.3	0.0	21.4	1.9	54.8 a	0.04	0.0	5.3
4. Headline @ 6.0 fl.oz./A (IF) Endura @ 4.5 oz./A (IF)	97.5 abc	4.3 a	4.6	26.5	24.0	7.1	14.0 b	0.00	0.0	8.7
5. Moncut SC @ 16.0 fl.oz./A (IF)	95.0 c	3.3 bc	3.7	4.7	19.4	1.3	50.8 a	0.00	0.0	8.4
6. PCC-3 @ 0.5 lb./cwt (On-seed)	99.4 ab	4.1 a	4.2	13.8	25.1	2.9	3.8 b	0.00	0.0	6.3
7. PCC-4A @ 0.22 lb./cwt (Applied as liquid prior to planting) PCC-4B @ 0.75 lb./cwt (On-Seed)	100.0 a	4.4 a	5.0	4.8	27.7	0.4	13.0 b	0.00	0.0	1.3
LSD(P=0.05)	3.13	0.72	NS	NS	NS	NS	29.08	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; 5 plants/treatment/replication.

^d Mean number of stems per seed piece 55 days after planting; 5 plants/treatment/replication.

^e Mean percent stems with Rhizoctonia canker 55 days after planting; 5 plants/treatment/replication.

^f Mean number of stolons per seed piece 55 days after planting; 5 plants/treatment/replication.

^g Mean percent stolons with Rhizoctonia canker 55 days after planting; 5 plants/treatment/replication.

^h Mean percent incidence of disease combined soft-rot and dry-rot 55 days after planting; rated 0-100, where 0 = no decay, 100 = complete decay; 5 seed pieces/treatment/replication.

ⁱ Mean percent stems with black leg 55 days after planting; 5 plants/treatment/replication.

^j Mean percent of the affected tuber surface area, 10 8-10 oz. tubers per treatment per replication, readings taken at 54 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.

Treatment/Rate	Percent ^a												Cwt/A ^b
	< 4 oz.	No.	4-6 oz.	No.	6-10 oz.	No.	>10 oz.	No.	US #2s	No.	Culls	No.	
1. Control, no treatment	5.1	17.5	11.9	20.2	34.3	34.6	45.5	25.6	1.3	0.8	2.0	1.4	402.7 d
2. Headline @ 6.0 fl.oz./A (IF)	4.7	13.9	16.3	24.9	37.9	38.0	39.4	21.9	0.3	0.2	1.4	1.0	458.7 bc
3. Endura @ 5.5 oz./A (IF)	4.6	15.0	13.9	22.7	31.7	31.7	46.0	27.1	1.8	2.0	2.1	1.6	398.0 d
4. Headline @ 6.0 fl.oz./A (IF) Endura @ 4.5 oz./A (IF)	2.8	9.4	11.0	19.3	30.2	33.9	53.1	34.5	1.1	1.2	1.8	1.7	510.0 a
5. Moncut SC @ 16.0 fl.oz./A (IF)	3.8	13.6	12.0	21.4	34.8	35.6	47.6	27.9	0.6	0.8	1.3	0.8	440.8 cd
6. PCC-3 @ 0.5 lb./cwt (On-seed)	3.9	11.8	15.1	24.8	35.5	36.1	43.6	26.0	1.1	0.9	0.7	0.5	465.8 abc
7. PCC-4A @ 0.22 lb./cwt (Applied as liquid prior to planting) PCC-4B @ 0.75 lb./cwt (On-Seed)	3.8	11.5	14.5	23.5	37.4	38.0	42.1	25.4	0.8	0.5	1.4	1.1	500.7 ab
LSD(P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	47.08

^a Based on tuber weight in pounds and tuber number, mean of four replications.

^b Total yield expressed as hundred weight per acre, 1-35 foot row per treatment per replication, mean of four replications.