

### **Evaluation of in-furrow and foliar treatments for the control of potato pink rot, 2012.**

Premier Russet seed potatoes were hand cut on 11 May and planted on 17 May into 2-row x 20 ft-long plots (ca. 12 in. between plants to give a target population of 40 plants at 36 in. row spacing) replicated four times in a randomized complete block design. Treatment rows were separated by 5 ft-long empty (plant free) plots. In-furrow applications were made over the seed at planting, applied with a single nozzle R&D spray boom delivering 16 gal/A (40 p.s.i) and using one XR11003VS nozzle/row. Fertilizer (220 units P<sub>2</sub>O<sub>5</sub> + 10 units Zn + 5 units Mn + 110 units N) was drilled into plots before planting, formulated according to the results of soil tests. Additional nitrogen (10-34 at 40lbs/A) was applied to the growing crop with irrigation based on the results of petiole sampling which was carried out periodically during the growing season. Insecticide (Admire, 16.9 oz/A) was applied at hilling on 13 June. Weeds were controlled with herbicide (1.5 oz/A Matrix + 0.67 lb/A Sencor) which was applied post planting on 18 June. Vines were killed with Reglone 2EC (1.0 pt/A on 24 September). Emergence was first observed on 13 June and full emergence was observed on 27 June. Emergence was rated as the number of plants breaking the soil surface or fully emerged after planting. The rate of emergence was estimated as the relative area-under-the-plant-emergence-curve (RAUEPC, with a maximum value of 100) from the day of planting until approximately 31 days after planting. Up to three foliar fungicide applications (depending on the treatment) were made on a 14-day interval starting at nickel size tubers (around full bloom) on 1, 15 and 29 August with an ATV rear-mounted R&D spray boom calibrated to deliver 25 gal/A (30 p.s.i.) using two XR8003VS nozzles per row. Plots were inoculated with pink rot shortly before hilling with pink rot-infected potato seed pieces. Infected seed pieces were placed between rows at about 1 seed piece per 2 plants and were incorporated into the soil at hilling. To encourage disease, plots were irrigated biweekly to maintain soil moisture at or above soil water retention capacity. Additional inoculations were carried out on 3 August and 20 September with inoculum suspensions as follows. Liquid cultures of the pink rot pathogen were grown in Potato Dextrose Broth for 14 days prior to inoculation. On the day of inoculation, plots were irrigated heavily for 8 hrs so that standing water was visible in the furrows and the soil was at or above water retention capacity. Concurrently, the pink rot cultures were blended to break up mycelia and oospores. The suspension was passed through cheese cloth and collected in 4 L conical flasks. The flasks were then incubated at 4 °C for 3 hrs to encourage the release of zoospores into the suspension. The concentration of zoospores in the resulting suspension was counted using a hemacytometer and adjusted to ca.  $1 \times 10^4$  zoospores ml<sup>-1</sup>. Each 4L flask of suspension was then added to a 3 gallon spray canister and adjusted to 3 gallons. One 3 gallon spray canister was then used to inoculated each treatment replicate (equivalent to 540ft per row) resulting in 12 gallons of inoculum being applied to all treatment plots. The inoculum was applied using the ATV rear mounted R&D spray boom after irrigation was completed in the late afternoon. Tubers were harvested on 8 October and graded from 1-2 November. At grading, diseased tubers were segregated and weighed and the amount of rot was calculated as a percentage of the total yield per plot. Samples of 25 healthy-looking US No.1 (6-10 oz.) tubers/plot were also retained and placed in storage at 10 °C. On 26 November, stored tubers were placed in mesh onion sacks and inoculated with pink rot by immersion in a pink rot suspension at 22 °C. Tubers were left in the pink rot suspension for 18 h before being removed and placed in storage at 22 °C. Tubers were incubated for 2 weeks and rated on 12-13 December 2012 for pink rot incidence and severity. Severity was calculated as the volume of diseased tissue per tuber, which was determined visually by cutting the tuber in half lengthwise from the stem end to the bud end. The cut tubers were allowed to sit for 30 min before rating to allow the pink color characteristic of pink rot infection to develop.

None of the fungicides applied at planting in-furrow resulted in significantly different RAUEPC compared to the untreated control plots. There were no significant differences in total yield among plots. At harvest, there were significant difference in the percentage of diseased tubers among treatments and the untreated check. All treatment had significantly less disease than the untreated control. After challenge inoculation and 2 weeks in storage, all treatments had significantly less disease severity than the untreated control. Treatments with Ridomil Gold Bravo had the lowest mean levels of disease severity in storage. However, treatments with Ridomil Gold Bravo were not significantly different from treatments with Resist57 on its own or when applied in combination with Moncoat MZ. All treatments including Resist57 had significantly less disease incidence than the untreated check. The treatment with a late season application of Gavel had the lowest level of disease incidence. Disease severity in this treatment was also not significantly different from treatments with Resist57 or Ridomil Gold Bravo.

Number	Treatment and rate/A (timing of application) <sup>z</sup>	Emergence (%) <sup>y</sup>	Stems <sup>x</sup>	Yield (cwt/a)			Postharvest disease (% weight <sup>w</sup> )	Disease severity (%) 12 Dec	Incidence (%) 12 Dec
				4-6 oz	6-10 oz	> 10 oz			
1	Resist 57 SC 10 pt (D <sup>w</sup> , E, F)	- <sup>v</sup>		60.5 a	152.9 a	103.1 a	1.4 b	21.9 de	36.0 b
2	Ridomil Gold 4SL 6.1 fl oz (B)	95.0 a	3.0 a	57.8 a	125.3 a	110.3 a	2.0 b	31.3 bcd	59.0 ab
3	Ridomil Gold Bravo SC 2.5 pt (D, E)	-	-	71.1 a	127.1 a	123.1 a	2.1 b	13.6 e	47.0 b
4	Ranman SC 6.1 fl oz (B, D, E)	96.9 a	3.1 a	43.7 a	141.4 a	155.9 a	2.6 b	36.5 bc	57.0 ab
5	Moncoat MZ DS 1 lb (A); Resist 57 SC 10 pt (D, E, F)	-	-	78.1 a	112.6 a	76.0 a	2.0 b	25.2 cde	42.0 b
6	Monocoat 70-DF 1 lb + GWN-4700 SC 4 oz (B), Resist 57 SC 10 pt (D, E, F, G)	91.9 a	3.0 a	51.3 a	122.0 a	142.1 a	2.3 b	30.2 cd	50.0 b
7	Monocoat MZ DS 1 lb (B); Resist 57 SC 10 pt (D, E, F); Gavel DF 2 lb (F, G)	-	-	77.1 a	125.0 a	92.4 a	2.1 b	21.3 de	28.0 b
8	Serenade Soil SC 2 qt (B)	93.8 a	3.1 a	42.9 a	145.7 a	177.1 a	2.3 b	35.0 bcd	60.0 ab
9	Serenade Soil SC 4 qt (B)	90.0 a	3.2 a	78.2 a	153.9 a	133.9 a	1.9 b	44.5 b	72.0 ab
10	Serenade Soil SC 2 qt + Presidio SC 0.125 lb ai (B)	83.1 a	3.1 a	61.3 a	143.4 a	145.5 a	2.0 b	36.2 bc	67.0 ab
11	Serenade Soil SC 2 qt (B); Resist 57 SC 10 pt (D)	92.5 a	3.3 a	43.4 a	133.6 a	156.0 a	1.6 b	34.1 bcd	62.0 ab
12	Untreated	97.5 a	3.3 a	42.5 a	123.0 a	125.4 a	9.1 a	63.7 a	100.0 a
	Tukey's HSD <sub>0.05</sub>	17.81	0.80	51.9	61.33	108.12	1.52	14.10	45.33

<sup>z</sup>Application dates: A = 11 May; B = 17 May; C = 25 June; D = 1 Aug; E = 15 Aug; F = 29 Aug; G = 12 Sept.

<sup>y</sup>Final emergence count taken on 27 June.

<sup>x</sup>Average stems per plant counted on 27 June. Emergence and stem counts were only taken for treatments applied in-furrow.

<sup>w</sup>Percentage weight of diseased potatoes out of the total yield.

<sup>v</sup>Note '-' denotes values that were not collected and values followed by the same letter are not significantly different at  $p = 0.05$  (Tukey's HSD).