

POTATO (*Solanum tuberosum*)

Early Blight; *Alternaria solani*

Late Blight; *Phytophthora infestans*

Black Scurf; *Rhizoctonia solani*

Silver Scurf; *Helminthosporium solani*

Pink Rot; *Phytophthora erythroseptica*

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Evaluation of the effect of foliar fungicides on development of potato tuber diseases in storage, 2003.

A field trial was conducted at the Hancock Agricultural Research Station in central Wisconsin during the summer of 2003 to evaluate the efficacy of selected foliar fungicide treatments to control early and late blight on Russet Burbank potato plants. There is always interest in whether treatments applied to the foliage during the growing season have any effect on level of tuber diseases developing in storage, so tubers from selected treatments were placed in the storage area at the Hancock Agricultural Research Station to be evaluated after several months for several tuber diseases. During the growing season, fungicide treatments were applied at weekly intervals from 25 Jun to 20 Aug, according to treatment protocol, for a total of 9 weeks. Plots were not inoculated but relied on natural dispersal of both *Phytophthora infestans* and *Alternaria solani* for disease establishment. Tubers were harvested and graded 23-26 Sep 2003. Any diseased tubers observed during the grading process were included in the cull category and were discarded. For selected treatments, a 30-40 pound sample, including tubers from the four middle size grades, ranging from 4-16 oz, was stored from each replicate plot. Tubers were stored at approximately 50° F and 90% RH.

On 12 Mar 2004 all tubers were rated for presence or absence of symptoms of late blight, soft rot, pink rot, silver scurf, black scurf and early blight. No late blight was present in the experimental plots during the growing season and there were also no symptoms of late blight on the stored tubers. There were no symptoms typical of pink rot observed on the stored tubers and only a very low level of early blight symptoms. The most serious problem in storage was development of silver scurf symptoms, but there were no residual effects of treatment applied in the field on incidence or severity of silver scurf observed after storage. Among the treatments observed, there were no significant effects of field fungicide treatment on incidence or severity of disease evaluated on tubers after five and a half month in storage.

Table 1. Hancock Fungicide Trial, 2003 - Effect of treatment on relative AUDPC, yield and quality after storage.

Treatment	Rate/Acre		Application Schedule ¹	Relative AUDPC Early blight ²	Yield (cwt/A)		% of tubers with:							Silver scurf index ³	Rhizoc-tonia index ⁴
	Product	Active Ingr.			Total	US#1	No symp-toms	Late blight	Soft rot	Pink rot	Silver scurf ONLY	Rhizoc-tonia ONLY	Early blight		
1 Untreated				0.292	481.2	407.6	51.5	0.0	0.4	0.0	47.4	7.3	0.0	19.5	3.1
2 Bravo Zn 4.17F	2.125 pt	1.11 lb	Weekly	0.208	547.2	487.5	49.3	0.0	0.0	0.0	50.4	5.9	0.0	20.0	6.3
5 Quadris 2.08 F	0.39 pt	0.1 lb	Appl 1,3,5												
Bravo Zn 4.17F	2.125pt	1.11 lb	Appl 2,4,6-9	0.265	481.9	411.7	41.3	0.0	0.0	0.0	58.2	7.8	0.3	21.5	4.4
12 Headline 2.09F (BAS500)	0.38 pt	0.1 lb	Appl 1,3,5												
Bravo Zn 4.17F	2.125pt	1.11 lb	Appl 2,4,6-9	0.244	503.9	444.3	46.2	0.0	0.0	0.0	53.3	3.0	0.0	25.8	1.3
13 Endura 70 WG (BAS510)	0.156 lb	0.11 lb	Appl 0,2,4												
Headline 2.09F (BAS500)	0.38 pt	0.1 lb	Appl 1,3												
Bravo Zn 4.17F	2.125pt	1.11 lb	Appl 5-9												
+ Acrobat 50WP	0.4 lb	0.2 lb	Appl 7,9	0.154	527.2	460.6	46.7	0.0	0.0	0.0	53.0	8.5	0.0	19.0	1.6
15 Endura 70 WG (BAS510)	0.156 lb	0.11 lb	Appl 1,3,5												
Headline 2.09F (BAS500)	0.38 pt	0.1 lb	Appl 2,4,6												
Bravo Zn 4.17F	2.125 pt	1.11 lb	Appl 7-9												
+ Acrobat 50WP	0.4 lb	0.2 lb	Appl 7,9	0.137	556.5	490.8	48.2	0.0	0.1	0.0	51.7	6.8	0.0	23.0	4.7
26 Quadris 2.08F	0.39 pt	0.1 lb	Appl 1,3,5												
Bravo Zn 4.17F	1.8 pt	0.94 lb	Appl 2,4,6												
+ Super Tin 80WP	2.5 oz	0.13 lb													
Bravo Zn 4.17F	2.125 pt	1.11 lb	Appl 7-9	0.222	525.6	456.5	62.8	0.0	0.9	0.0	36.1	3.8	0.0	13.3	3.4
33 Quadris 2.08F	0.39 pt	0.1 lb	Appl 1,3,5												
Gavel 75DF	2.0 lb	1.5 lb	Appl 2,4,6-9	0.217	520.4	464.8	36.3	0.0	0.6	0.0	62.9	23.0	0.0	27.0	13.1
<i>P</i> > <i>F</i> ⁵				< 0.01	< 0.01	0.02	0.39	---	0.16	---	0.36	0.23	0.46	0.12	0.21
LSD ⁵				0.059	59.6	60.5	NS	---	NS	---	NS	NS	NS	NS	NS

1 Application dates for our standard spray program: Application dates: 0 = 18 Jun (treatments requiring an application one week ahead of the start of our standard program); 1 = 25 Jun; 2 = 2 Jul; 3 = 9 Jul; 4 = 16 Jul; 5 = 23 Jul; 6 = 30 Jul; 7 = 6 Aug; 8 = 13 Aug; 9 = 20 Aug.

2 Relative area under the disease progress curve. Data for each observation date were plotted on a graph and the area under the line was calculated for each treatment providing a measure of the relative severity of disease throughout the season. A disease rating of 100% foliage infection for the entire season would produce a value of 1.0. All relative AUDPC values are expressed as the proportion of this value. Either decreased disease severity or later disease development will contribute to lower relative AUDPC. Only early blight was observed in this trial and AUDPC values were calculated from 16 Jun - 2 Sep.

3 Silver scurf index: Tubers were spread out and the % of the top surface area with silver scurf symptoms was rated on a 5 point scale with 0 = none; 1 = 1-10% of the surface area of the tuber affected; 2 = 10-25% affected; 3 = 25-50% affected; 4 = 50-75% affected; 5 = > 75% affected. The lesion area index was calculated by summing the number in each class times the class number / 5 times the total number of tubers rated. The index represents a percentage of the worst possible case (if all tubers were rated 5, the index would = 100).

4 Rhizoctonia index: Tubers were spread out and the severity of Rhizoctonia symptoms on the top surface was rated on a 5 point scale with 0 = none; 1 = 1-5 sclerotia; 2 = 5-10 sclerotia; 3 = 10-20 sclerotia; 4 = > 20 sclerotia. The Rhizoctonia index was calculated by summing the number in each class times the class number / 4 times the total number of tubers rated. The index represents a percentage of the worst possible case (if all tubers were rated 4, the index would = 100).

5 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at *P* = 0.05.