

**POTATO** (*Solanum tuberosum*)  
**Common Scab;** *Streptomyces scabies*

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**EVALUATION OF POTATO CULTIVARS AND BREEDING SELECTIONS TO IDENTIFY RESISTANCE TO COMMON SCAB - ANTIGO, 2000.** A trial was established May 10 at the Langlade County Research Area, Antigo, WI to evaluate the reaction of potato cultivars and breeding selections to common scab. The trial was located in a field where common scab has been a persistent problem. To increase pressure for scab development, hydrated lime has been added to the area each year before planting to raise the pH. Lime was applied this year at the rate of 0.75 t/A (70-79 grade) April 27 and May 4. Tubers were cut by hand into approximately 2 oz seedpieces and were mechanically planted in a randomized complete block design with four replications. Each plot consisted of two 8-foot-long rows with spacing three feet between rows and 12 inches within the row. The soil type was Antigo silt loam, pH 5.8. Plots were fertilized with 250 lb 0-0-60 broadcast prior to planting, 570 lb/A of 8-32-16 in the row at planting, and sidedress applications of 250 lb/A of  $\text{NH}_3\text{SO}_4$  on June 22 and 250 lb/A of  $\text{NH}_3\text{NO}_4$  on June 28. Insects were controlled with Asana XL, 9.5 fl oz./A applied as a foliar spray July 14. Weeds were controlled by application of Dual 8E, 1.6 pt/A + Linex 50DF, 1.6 lb/A on May 31. A standard foliar fungicide program for early and late blight control included: Bravo Ultrex 1.2 lb/A, June 22 and 29, July 10 and 20, August 1, 7, 12, 18, 25 and September 2 and 9; Quadris 2.08SC, 10 fl oz./A July 4; Quadris 2.08SC, 12 fl oz./A + Curzate 60DF 3.3 oz/A on July 14 and 26. Vines were killed with application of Diquat, 1.0 pt/A on September 2. Plots were mechanically harvested September 20 and graded. After tubers were washed, 40 tubers from each treatment plot were chosen at random and assessed for scab severity (area covered by lesions and lesion type). Lesions were rated on a 5-point scale with: 0 = no lesions; 1 = superficial less than 10 mm; 2 = superficial, greater than 10 mm; 3 = raised, less than 10 mm; 4 = raised, greater than 10 mm; 5 = pitted scab. Then total yield from each plot was graded into US#1, undersize, scab and cull categories. Cull potatoes included misshapen, green and rotten potatoes along with tubers exhibiting pit scab. Tubers graded into the scab category had scab symptoms which would be unacceptable for fresh market, but would be acceptable for processing. Rainfall (inches) measured during the growing season was May 10-31, 3.25; June, 5.19, July, 5.0; August, 2.4 and September 1-19, 4.09. An additional 0.75 inch of irrigation was applied on July 25.

Frequent rainfall, especially during the tuberization period, was not conducive to scab development in this plot. Scab lesions were observed on all cultivars and breeding lines planted in this trial. Small differences were observed between plot entries in the lesion area index and the lesion type index. Entries T450 and C75-5-297 appeared to be the most susceptible while A8893-1 and W 1876-1 rus appeared to be the least susceptible entries. Total yields varied between 253 and 488 cwt/acre. Developing cultivars and selections with improved levels of resistance to scab is a non-chemical control measure that has importance to all sections of the potato industry.

**Table 1. Emergence, yield and evaluation of scab symptoms on potato cultivars and breeding lines.**

Cultivar or Breeding Line	% of Plants Emerged <sup>1</sup>		Lesion Area Index <sup>2</sup>	Lesion Type Index <sup>3</sup>	Yield								
	6/13	6/22			Total Yield cwt/A	US#1		Undersize <sup>4</sup>		Scab <sup>5</sup>		Culls	
						cwt/A	%	cwt/A	%	cwt/A	%	cwt/A	%
W 1348 rus <sup>6</sup>	87.5	98.4	7.5	11.1	392.3	279.7	71.0	37.7	9.6	0.0	0.0	74.9	19.4
W 1836-3 rus <sup>6</sup>	76.6	93.8	5.1	6.3	318.8	245.5	71.8	16.8	5.9	0.0	0.0	56.5	22.3
W 1876-1 rus <sup>6</sup>	59.4	90.6	1.3	1.9	311.7	219.6	69.2	18.8	6.4	0.0	0.0	73.3	24.3
Russet Burbank <sup>6</sup>	93.8	93.8	9.0	16.0	456.9	346.9	75.6	16.1	3.6	0.0	0.0	93.9	20.8
W 1355-1 <sup>6</sup>	93.8	96.9	6.0	8.0	306.3	206.5	64.0	38.1	12.2	0.0	0.0	61.7	23.8
W 1431 <sup>6</sup>	46.9	92.2	7.0	10.3	343.7	275.0	78.5	15.2	4.6	0.0	0.0	53.5	16.9
W 1443 <sup>6</sup>	96.9	100.0	7.8	10.1	277.7	213.7	72.6	22.2	9.0	0.0	0.0	41.7	18.4
W 1201 <sup>6</sup>	93.8	100.0	3.5	4.3	440.6	359.8	82.0	16.1	3.6	0.0	0.0	64.7	14.4
Snowden <sup>6</sup>	95.3	100.0	5.8	9.6	440.6	361.6	81.1	31.1	7.6	0.0	0.0	47.9	11.3
W 2275-3 R <sup>6</sup>	100.0	100.0	3.5	5.1	373.2	305.6	76.8	42.2	15.5	0.0	0.0	25.4	7.7
Norland <sup>6</sup>	96.9	98.4	6.1	7.8	253.4	193.8	72.4	27.7	11.8	0.0	0.0	32.0	15.7
A9014-2 <sup>7</sup>	89.1	100.0	7.4	12.6	443.1	309.2	68.4	17.5	4.3	0.0	0.0	116.4	27.3
A9045-7 <sup>7</sup>	89.1	98.4	11.1	18.1	488.2	365.5	67.0	19.1	5.3	0.0	0.0	103.7	27.7
A8893-1 <sup>7</sup>	84.4	96.9	1.3	2.4	379.1	321.0	74.7	14.1	6.7	0.0	0.0	44.0	18.7
C75-5-297 <sup>8</sup>	100.0	100.0	12.4	29.8	424.5	305.1	72.0	37.9	9.0	23.4	5.0	81.4	19.1
T450 <sup>8</sup>	96.9	95.3	26.9	39.9	377.5	300.4	79.4	25.9	6.9	115.0	35.1	51.3	13.7
C31-5-115 <sup>8</sup>	98.4	100.0	3.4	5.3	330.8	271.1	81.4	32.4	10.2	0.0	0.0	27.2	8.5
C31-5-120 <sup>8</sup>	92.2	95.3	11.5	19.8	301.3	195.1	64.3	84.6	27.4	0.0	0.0	21.6	8.4
<b>Pr &gt; F <sup>9</sup></b>	< 0.01	0.11	0.03	< 0.01	0.02	0.13	0.66	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.25
<b>Lsd <sup>9</sup></b>	9.7	NS	11.6	18.0	133.6	NS	NS	16.6	5.8	47.6	14.4	45.9	NS

1 Emergence based on 16 seedpieces planted in 16 ft of row.

2 Lesion area index. Lesions were rated on a 5 point scale with: 0 = no lesions; 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 = the sum for all classes of: (number of tubers in that class x the class number) x 100/(5 x total number of tubers rated). The maximum value for this index (if all tubers were rated 5) is 100.

3 Lesion type index. Lesions were rated on a 5 point scale with: 0 = no lesions; 1 = superficial less than 10 mm; 2 = superficial, greater than 10 mm; 3 = raised, less than 10 mm; 4 = raised, greater than 10 mm; 5 = pitted scab. The type lesion index was calculated by summing the number in each class times the class number x 100 / 5 times the total number of tubers rated. The maximum value for this index (if all tubers were rated 5) is 100.

4 Undersize indicates potatoes < 1 7/8 in. diam.

5 Tubers in this category had scab symptoms which would exclude their use for fresh market but not for processing. They were separated to see if there would be visible differences among treatments in yield in this category. They are included in the US#1 category (cwt/A and percentages) reported in this table.

6 Tubers obtained from H. Grozia, UW Hort Breeding Program

7 Tubers obtained from R. Novy, USDA-ARS, Potato Breeding and Genetics, University of Idaho

8 Tubers obtained from J. P. Helgeson, USDA/ARS Plant Resistance Laboratory, UW-Madison

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