

**Progress Report to the Agriculture Research Foundation
Oregon Potato Commission
1998-1999**

Title: Reducing Storage Losses Due to Silver Scurf and Pythium Leak and/or Pink Rot

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Funding History:

New project
\$9,000 for 1998

Objectives:

1. Test currently available and new materials for the control of Silver Scurf in potato production areas not previously tested for control of that pathogen
2. Confirm the usefulness of field testing tubers to measure levels of Silver Scurf prior to harvest to help growers make reasonable decisions as to whether lots could be stored or should be marketed immediately.
3. Identify levels of Silver Scurf on Russet Norkotah seed lots planted in the seed lot trial at HAREC and determine the subsequent level of infection to daughter tubers.
4. Begin to identify seed production areas with reduced levels of Silver Scurf.
5. Test the effectiveness of new materials that may be effective in controlling Silver Scurf for seed growers use.
6. Test the usefulness of Ozone for controlling Silver Scurf in storage.
7. Determine whether resistance to metalaxyl by organisms causing Pythium Leak and Pink rot occur in the Columbia Basin.
8. Test the possible use of section 18 materials for the prevention of tuber rot by Pythium Leak and Pink Rot.

Procedures:

1. Field trials were established in Hermiston, Central Oregon, and Klamath Falls to test the efficacy of chemical seed treatments for controlling this disease. Tubers with known levels of Silver Scurf were used and treated prior to planting. Daughter tubers were put through a three week procedure to encourage Silver Scurf development and then read for occurrence and level of infection.
2. Tuber samples were taken 3 weeks prior to harvest from Russet Norkotah fields and evaluated for the level of Silver Scurf. These same lots will be tested 6 months after storage (those still available) to check Silver Scurf levels to see if they correlate with levels seen from the field sample.
3. Seed lots of Russet Norkotah were assayed for Silver Scurf before planting and again after kill down. The level of infection on seed was compared to the level of infection found on daughter tubers.
4. From seed lots used in number 3 above and other lots tested for Silver Scurf that are part of this proposal, we begun to develop a map of origins to help identify risk levels due to Silver Scurf when buying seed.
5. Similar to number 1 above but in this case test materials that can be used for seed growers.
6. Compare side by side storages, one with and one without ozone generation, for reduce levels of spores of the fungus and reduce levels of Silver Scurf on tubers.
7. During storage filling, a number of tubers that appear to be infected by pink rot or Pythium Leak were collected from at least 10 storages from throughout the lower Columbia Basin and assayed for resistance to metalaxyl (Ridomil). Resistance will be based on growth characteristics in agar media amended with metalaxyl.
8. Three of circles were treated three times from mid to late season, half with metalaxyl and the other half with section 18 materials by chemigation, to encourage root and tuber uptake by these materials. Lots were individually assayed at harvest by counting rotted tubers. Lots were also separated in the storage and will be qualitatively viewed for different levels of "wet" potatoes in storage after 6 months.

Results and Discussion:

The regional test to control silver scurf provided several interesting and important aspects related to the control of this important pathogen. First, the disease did not behave the same in all of the locations tested. Significantly higher levels were seen in Central Oregon (Table 1), next in Pullman, with the least amounts found in Hermiston and Klamath Falls. Using a symptom index system, identical results were obtained as using the percentage of

tubers with infection. All locations had been planted with the same seed lot and therefore the same level of silver scurf infection was in the seed and infection in the daughter was expected to be similar. Secondly, even though Central Oregon had the highest percent of infected daughter tubers, the area silver scurf covered on only infected tubers was equal at all locations. Third, TopsMZ, Maxim, Quadris, and New TopsMZ were equally effective in controlling silver scurf across all locations, but there were differences in these and other treatments in their level of control between locations (only Hermiston data shown Table 2). Tops alone did not have any effect, nor did several salts shown to have some benefit when applied prior to storage. Lastly, chemical treatments to control silver scurf were not equal in their efficacy to control the disease in all locations, hence the significant interaction found between location and treatment.

Yield was apparently not impacted greatly regardless of what seed treatment was used (Table 3). A number of treatments had higher yields in most yield categories than the untreated control but these were not significantly higher. Only tubers in the 4-12 oz categories showed any differences, and as above, these were not consistent across all locations so a significant interaction occurred. Having levels of silver scurf that are different at the four locations as described above and yield differences in the 4-12 oz by location may be an indication that the control of silver scurf may not be as easy in all areas where potatoes are grown. Only yield data from Hermiston is shown in table 4. Other observations were also done. Since silver scurf impacts the skin of potatoes, tubers from the Hermiston site were also evaluated for surface appearance. While a rougher surface may be an effect due to this disease, there were no significant differences between the treatments (Table 5).

Table 6 describes plant vigor and emergence information from the planting at the Hermiston site. Differences in emergence and vigor occurred but since yield was not effected, the importance of this data is unclear.

Levels of silver scurf in seed differed between seed lots. For the regional test, a seed lot with moderate-high levels was used. Another experiment on the Hermiston station looked at how well silver scurf was controlled by the two products most likely to be used as a seed treatment, Maxim and TopsMZ, when three levels of infection were present in the seed, low, medium, and high. Table 7 and 8 report what was found. Table 7 shows that both materials equally control silver scurf, regardless of level of infection in the seed, and were significantly better than the untreated controls. However, when the same kinds of comparisons are made in Table 8, TopsMZ did not control the disease as well when the levels of infection were high. In addition, these tables show that the level of infection in the seed at planting may not relate to the level of infection at harvest. The seed lot with the lowest beginning amount had the highest level of infection at digging. Lastly, the higher the infection rate at planting may relate to the appearance of the surface of the tuber at harvest. While not significant, the surface appearance ratings progressively increased with higher infection rates (2.3, 2.8, and 3.0 respectively for low, medium, and high levels respectively). Clearly a lot of additional work needs to be done in these areas.

Silver scurf is known to be seedborne but how this relates to the amount of infection that occurs in daughter tubers is unclear. Seed treatments clearly reduce levels of disease which would be evidence supporting the fact that seed infection levels are important. However, when 26 lots of Norkotah were planted on the Hermiston station with varying levels of infection, no relationship was found between the starting levels and the amount found at harvest. Other researchers have either found or not found a relationship between seed and daughter tuber infection. Clearly more work needs to be done in this area.

Purchasing seed without silver scurf, or at least reduced levels, would seem to be a good idea. With that in mind, we began to quantify levels of silver scurf in seed lots shipped to the Columbia Basin. After one year of study, there seems to be as much variation in the amount disease on the seed by lots from the same regions as there is between regions. Another year of investigation would help determine if there are seed production areas with reduced levels of infection.

Seed producers have been at some disadvantage to producing seed with no or reduced levels of silver scurf since the seed treatment options are limited for seed growers compared to commercial producers. In particular is the fact that Maxim is not registered for seed use. No specific work was done with seed growers this year but Norvartis, the maker of Maxim, did request a label change for that material for use by seed growers. We supported that label change and sent supporting documentation.

Over the last two or three years a large number of fresh growers have begun using ozone in storages for the control of silver scurf. No real data exists as to whether or not this practice has any real benefit. Our tests during this period in side by side comparisons in a commercial storage did not show any significant benefit. There may have been a reduction in spore numbers in the ozone treated side but there was no reduction in the level of tuber infection. This test is being repeated in an all steel storage for two reasons. The first storage was an all wood structure which may have reduced the efficacy of the ozone. In addition, because of problems with the machine producing ozone, the level of ozone required to control silver scurf may not have been attained. In the new test a much larger machine is being used which should develop a higher ozone level.

Tuber disease problems associated with Pythium Leak and Pink rot seem to be on the increase. This could be due to higher rainfall levels during the crop season the past several years, or potentially due to the development of resistance to the commonly used fungicide Ridomil. Resistance has been found in Maine, and some level of reduced sensitivity in at least one other state. Isolates collected of both pathogens has been done but actual testing of these strains for Ridomil sensitivity has not been completed.

As mentioned above, Ridomil containing products are used to control wet rots of potato. However, because of the systemic nature of the section 18 products (now most have section 3 labeling), and the chance of possible resistance to Ridomil, testing the possible reduction in tuber rots by these materials was justified. All three applications by chemigation, beginning in mid-season and continuing until September, was expected but

the first two applications was done by air. Of the three fields, one was harvested before tuber counts could be made so data is only available from two fields. Overall, not much rot occurred in any tested field. When Ridomil was compared to Tattoo C, average number of rotted tubers per acre was 20 and 1.62, for Ridomil and Tattoo C, respectively. Likewise, when Ridomil MZ 72 was compared to Manex C-8, 2.47 and 1.62 rotted tubers per acre were observed, respectively. No data was obtained for the Ridomil MZ 72 compared with Acrobat MZ. This test needs to be repeated in field situation where wet rot is more of a problem

Table 1. Incidence and severity of Silver Scurf in daughter tubers following treatment of infected seed grown at four locations in the Northwest.

	Percent Tubers with Symptoms at Harvest ¹	Harvest1 Percentage of Tuber Area Covered with Symptoms at Harvest		Disease Symptom Index ⁴ at Harvest
		Diseased Tubers ²	All Tubers ³	
LOCATION				
Klamath Falls	12.3 a ⁷	5.5 a	0.79 a	3.2 a
Central Oregon	32.4 c	5.1 a	2.27 b	8.8 c
Hermiston	12.2 a	4.7 a	0.75 a	3.2 a
WSU	26.1 b	NA	NA	5.7 b
TREATMENT				
Tops 5 (1/2 lbs./cwt)	32.3 c	3.7 abc	1.29 bc	8.4 c
Maven (1/2 lbs/cwt)	12.5 a	1.6 ab	0.44 ab	3.2 b
Tops MZ (1 lbs./cwt)	14.8 a	5.3 bed	0.66 ab	4.2 b
Quadris (1/2 lbs/cwt.)	10.8 a	2.6 abc	0.19 a	3.2 b
New Tops MZ (12 oz./cwt)	12.9 a	3.6 abc	0.43 ab	3.2 b
Dithane 8°-0 (1 lbs./cwt)	31.0 c	7.7 de	2.39 d	8.5 c
Sorbic Acid Potassium Salt Dust (1.6% a. i.) (1 lbs./cwt.)	23.5 h	8.2 de	2.23 cd	6.8 c
Sodium Carbonate Dust (2.3% a.i.) (1 lbs 'cwt.)	30.6 c	6.5 cde	2.57 d	8.5 c
Maxim (1/2 lbs./cwt) - PCNB (1.65 lbs./1000ft row in furrow)	10.3 a	0.8 a	0.09 a	0.90 a
Untreated Control	28.7 bc	10.9 e	2.41 d	8.3 c
SIGNIFICANT Treatment X	YES	YES	YES	YES

1. Average percentage of tubers showing symptoms after 3 weeks of post-harvest incubation at 20°C in the dark at high humidity (Klamath Falls, Central Oregon, and Hermiston) or 2-3 weeks of post-harvest storage at 9° followed by washing in tap water and immersion in a 58°C, 10% bleach solution for 5-10 minutes
2. Average percentage of tuber area covered by symptoms after 3 weeks of incubation at 20°C in the dark at high humidity calculated using the number of tubers showing symptoms.
3. Average percentage of tuber area covered by symptoms after 3 weeks of incubation at 20°C in the dark at high humidity calculated using the total number of tubers.
4. Formula based on percent tuber area showing symptoms after 3 weeks of incubation at 20°C in the dark at high humidity or 2-3 weeks of post-harvest storage at 9° followed by washing in tap water and immersion in a 58°C, 10% bleach-water solution for 5-10 minutes employing five weighted symptom categories.
5. Six months of storage at 4°C or 9°C in the dark Storage will conclude in March of 1999.
6. Average percentage of tubers showing symptoms after 3 weeks of incubation at 20°C in the dark at high humidity or 2-3 weeks of post-harvest storage at 9° followed by washing in tap water and immersion in a 58°C, 10% bleach solution for 5-10 minutes after 6 months of storage at 4°C (Klamath Falls, Central Oregon, and Hermiston) or 9° C (WSU)
7. Values followed by the same letter within an analysis are not significantly different from each other. Fisher's LSD (P=0.05)

Table 2. Measurements of Silver Scurf incidence and severity on daughter tubers from infected potato seed pieces treated with various chemicals before planting at the Hermiston Agricultural Research and Extension Center

Treatment	Percent Tubers with Symptoms at Harvest ¹	Average Percentage of Tuber Area Covered with Symptoms at Harvest		Disease Symptom Index ⁴ at Harvest
		Diseased Tubers ²	All Tubers ³	
Tops 5 (½ lbs./cwt)	21.8 d ⁷	3.8 a	0.76 ab	5.1 bc
Maxim (½ lbs. /cwt)	9.5 abc	0.8 a	0.10 a	1.9 ab
Tops MZ (1 lbs./cwt)	9.5 abc	11.9 a	1.49 bc	3.4 abc
Quadris (½ lbs /c++1.)	8.5 ab	1.6 a	0.23 ab	1.9 ab
New Tops MZ (12 oz./cwt.)	9.5 abc	5.5 a	0.68 ab	2.7 ab
Dithane 8% (1 lbs /cwt)	23.4 d	9.6 a	2.05 c	6.7 c
Sorbic Acid Potassium Salt Dust (1.6% a.i.) (1 lbs /cwt)	10.8 abc	1.9 a	0.30 ab	2.4 ab
Sodium Carbonate Dust (2.3% a.i.) (1 lbs /cwt)	11.5 abcd	2.1 a	0.45 ab	3.0 ab
Maxus (½ lbs./cwt.) + PCNB (1.65 lbs./1000 ft. row in furrow)	1.1 a	0.3 a	0.01 a	0.2 a
Untreated Control	16.7 bcd	9.7 a	1.43 bc	5.0 bc

1. Average percentage of tubers showing symptoms after 3 weeks of post-harvest incubation at 20°C in the dark at high humidor
2. Average percentage of tuber area covered by symptoms after 3 weeks of incubation at 20°C in the dark at high humidity calculated using the number of tubers showing symptoms When no symptoms were present zero was used.
3. Average percentage of tuber area covered by symptoms after 3 weeks of incubation at 20°C in the dark at high humidity calculated using the total number of tubers.
4. Formula based on percent tuber area showing symptoms after 3 weeks of incubation at 20°C in the dark at high humidity employing five weighted symptom categories.
6. Average percentage of tubers showing infection after 3 weeks of incubation at 20°C in the dark at high humidity after 6 months of storage at 4°C.
7. Values followed by the same letter arc not significantly different. Fisher's LSD (P=0.05).

Table 3. Tuber yields from potato seed pieces treated with various seed treatments at four locations in the Pacific Northwest for the control of silver scurf.

	Size Categories ¹				Total Yield ² (cwt./A)
	Culls and No.2's (cwt./A)	Under 4 oz. (cwt./A)	4 to 12 oz. (cwt./A)	Over 12 oz. (cwt./A)	
LOCATION					
Klamath Falls	40.9 b ³	68.1 b	256.5 b	60.9 a	426.4 a
Central Oregon	13.5 a	40.2 a	98.3 a	33.6 a	401.7 a
Hermiston	5.7 a	43.2 a	266.0 b	56.7 a	371.6 a
WSU	105.3 c	46.0 a	330.7 c	139.4 a	490.1 a
TREATMENT					
Tops 5 (½ lbs./cwt)	34.5 a	53.8 a	233.5 bcd	60.0 a	431.3 a
Maxim (½ lbs./cwt)	42.3 a	40.9 a	191.3 a	68.2 a	393.5 a
Tops MZ (1 lbs./cwt)	37.9 a	45.2 a	242.7 cd	100.1 a	478.2 a
Quadris (½ lbs./cwt.)	45.7 a	45.0 a	236.5 cd	82.9 a	465.6 a
New Tops MZ (12 oz./cwt)	32.9 a	52.3 a	251.9 d	72.8 a	469.0 a
Dithane 8% (1 lbs./cwt.)	32.4 a	51.1 a	254.0 d	68.2 a	459.5 a
Sorbic Acid	42.7 a	47.3 a	207.0 ab	68.5 a	423.5 a
Potassium Salt Dust (1.6% a.i.) (1 lbs./cwt.)					
Sodium Carbonate Dust (2.3% a.i.) (1 lbs./cwt.)	38.7 a	54.3 a	222.9 bc	67.5 a	436.8 a
Maxim (½ lbs./cwt.) + PCNB (1.65 lbs./1000 ft. row in furrow)	61.6 a	60.0 a	324.6 e	77.9 a	248.8 a
Untreated Control	44.8 a	43.7 a	214.4 abc	60.5 a	418.1 a
SIGNIFICANT TREATMENT X LOCATION INTERACTION	NO	NO	YES	NO	NO

1. Yields taken from 18.75 feet of row after approximately 50 tubers of various sizes were dug randomly by hand from each plot for silver scurf evaluation. Row spacing 36 inches. Seed spacing 9 inches.
2. Values followed by the same letter within an analysis are not significantly different from each other. Fisher's LSD (P=0.05).
3. Total yield excludes weight of 50 tubers taken before harvest.
4. Total yield includes weight of 50 tubers taken before harvest.

Table 4. Tuber yields from potato plants after seed treatments to control silver scurf at the Hermiston Agricultural Research and Extension Center.¹

Treatment	Culls and No.2's (cwt./A)	Under 4 oz. (cwt./A)	4 to 8 oz. (cwt./A)	8 to 12 of (cwt./A)	Over 12 oz. (cwt./A)	Total Yield (cwt./A)
Tops 5 (½ lbs./cwt)	3.4 a ²	41.3 ab	175.4 cde	86.8 ab	56.9 a	363.7 bcd
Maxim (½ lbs. /cwt)	6.7 a	22.5 a	87.2 a	74.4 a	81.0 a	271.8a
Tops MZ (1 lbs./cwt)	5.1 a	38.3 ab	219.7 of	111.1 bc	51.1 a	425.3 d
Quadris (½ lbs /c++1.)	5.6 a	55.1 b	231.1 f	89.3 ab	47.4 a	428.5 d
New Tops MZ (12 oz./cwt.)	6.1 a	56.7 b	210.1 ef	112.5 bc	38.8 a	424.0 d
Dithane 8% (1 lbs /cwt)	5.5 a	57.2 b	208.6 ef	129.2 c	39.0 a	439.4 d
Sorbic Acid Potassium Salt Dust (1.6% a.i.) (1 lbs /cwt)	7.6 a	39.8 ab	131.6 abc	125.1 c	76.4 a	380.5 cd
Sodium Carbonate Dust (2.3% a.i.) (1 lbs /cwt)	6.8 a	53.2 b	150.2 bcd	112.5 bc	60.6 a	383.3 d
Maxus (½ lbs./cwt.) + PCNB (1.65 lbs./1000 ft. row in furrow)	4.5 a	40.5 ab	109.3 ab	82.5 a	67.5 a	304.2 abc
Untreated Control	5.5 a	27.6 a	132.3 abc	81.2 a	48.8 a	295.4 ab

¹ Yields taken from 30 feet of row after approximately 25 tubers of various sizes were dug randomly by hand from each plot for silver scurf evaluation. Row spacing 34 inches. Seed spacing 9.25 inches.

² Values followed by the same letter within an analysis are not significantly different from each other. Fisher's LSD (P=0.05).

Table 5. Surface appearance of potatoes harvested from the regional silver scurf trial.

Treatment	Surface Appearance Rating ¹	
	At Harvest ²	After 6 Months of Storage ³
Tops 5 (½ lbs./cwt)	2.0 a ⁴	
Maxim (½ lbs./cwt)	2.0 a	
Tops MZ (1 lbs./cwt)	1.6 a	
Quadris (½ lbs./cwt.)	2.3 a	
New Tops MZ (12 oz/cwt.)	1.5 a	
Dithane 8% (1 lbs. /cwt.)	2.5 a	
Sorbic Acid Potassium Salt Dust (1.6% a.i.) (1 lbs./cwt.)	2.5 a	
Sodium Carbonate Dust (2.3% a.i) (1 lbs./cwt.)	2.8 a	
Maxim (½ lbs./cwt.) + PCNB (1.65 lbs. /1000 ft. row in furrow))	2.3 a	
Untreated Control	2.5 a	

1. Ratings were taken after 3 weeks of incubation at 20°C in the dark at high humidity.

Surface rating scale:

1= Smooth - Surface smooth and russet easy to see with little skinning.

2= Intermediate

3= Rough - Surface rough and russet difficult to see. Lots of skinning.

2. Tubers observed at harvest.

3. Tubers will be observed after 6 months of storage at 4°C.

4. Values followed by the same letter are not significantly different. Fisher's LSD (P=0.05).

Table 6. Plant Vigor and Emergence of potato plants after seed treatments to control silver scurf at the Hermiston Agricultural research and Extension Center.

Treatment	Vigor Rating ¹ 35 Days After Planting	Percent Emergence ²	
		28 Days After Planting	35 Days After Planting
Tops 5 (½ lbs./cwt)	2.0 bcd ³	41.7 a	69.2 bcd
Maxim (½ lbs. /cwt)	1.3 ab	21.8 a	50.6 a
Tops MZ (1 lbs./cwt)	2.5 d	47.4 a	80.8 d
Quadris (½ lbs /c++1.)	2.5 d	37.2 a	78.2 cd
New Tops MZ (12 oz./cwt.)	2.3 cd	39.7 a	81.4 d
Dithane 8% (1 lbs /cwt)	2.3 cd	55.1 a	78.2 cd
Sorbic Acid Potassium Salt Dust (1.6% a.i.) (1 lbs./cwt.)	1.5 abc	28.2 a	62.2 ab
Sodium Carbonate Dust (2.3% a.i.) (1 lbs./cwt.)	1.5 abc	30.1 a	66.0 bc
Maxus (½ lbs./cwt.) + PCNB (1.65 lbs./1000 ft. row in furrow)	1.0 a	19.9 a	51.3 a
Untreated Control	1 5 abc	37.2 a	63.5 ab

¹ Rating System:

1= Plants small sized and emergence 0-33%

2= Plants medium sized and emergence 34-66%

3= Plants larger sized and emergence 67-100%

² Percentage of plants which emerged from 39 seed pieces that were planted.

³ Values followed by the same letter within an analysis are not significantly different from each other, Fisher's LSD (P= 0.05).

Table 7. Comparison of efficacy to control silver scurf by seed treatments following treatment of seed with three levels of infection, 1998

Treatment	Percent of Tubers Showing Symptoms ¹ at Harvest			Average Percentage of Tuber Area Covered with Symptoms ² at Harvest			Surface Appearance Rating ³ at Harvest		
	Silver Scurf Symptom Level ⁴			Silver Scurf Symptom Level ⁴			Silver Scurf Symptom Level ⁴		
	Low	Med.	High	Low	Med.	High	Low	Med	High
Maxim ½ lbs./cwt.	1.1 a ⁵	1.1 a	43. a	001 a	0.01 a	0.35 a	1.5 a	1.8 a	2.5 a
TopsMZ 1 lbs./cwt	23a	20a	13.5 a	0.02 a	0.02 a	0.27 a	2.0 a	1.8 a	2.0 'a
Fluazinam ⁶ 6.4 fl. oz./gal water			2.1 a			0.02 a			3.0 a
Untreated Control	51.5 b	14.1 b	32.1 b	3.62 b	0.39 a	2.01 b	2.3 a	2.8 b	3.0 a

¹. Average percent of Russet Norkotah tubers showing symptoms after 3 weeks of post harvest incubation at 20°C in the dark at high humidity.

². Average percentage of tuber area covered by symptoms of the disease calculated using the total number of tubers harvested from 10' of a single row

³. Ratings were taken after 3 weeks of incubation at 20°C in the dark at high humidity.
Surface rating scale:

1= Smooth - Surface smooth and russet easy to see with little skinning.

2= Intermediate

3= Rough - Surface rough and russet difficult to see. Lots of skinning

⁴. Level determined before treatment by incubating samples from seed lots at 20°C at high humidity for 3 weeks.

⁵. Values followed by the same letter are not significantly different from each other. Fisher's LSD (P = 0.05)

⁶. Fluazinam was only applied to tubers expressing a high level of Silver Scurf symptoms.

⁷. Storage in the dark at 4°C. Tubers will be assayed in March of 1998.

Table 8. Comparison of efficacy to control silver scurf b seed treatment with three levels of silver scurf infection 1998.

Silver Scurf Levels ⁴	Percent of Tubers Showing Symptoms ¹ at Harvest				Average Percentage of Tuber Area Symptoms ² at Harvest Covered with				Surface Appearance Rating ³ at Harvest			
	Treatments				Treatments				Treatments			
	Maxim ½ lbs /A	Tops MZ 1 lbs./A	Untreated	Fluazinam ⁷ 6.4 fl. oz./gal. water	Maxim ½ lbs/A	Tops MZ 1 lbs./A	Untreated	Fluazinam ⁷ 6.4 fl oz./gal. water	Maxim 1,2 lbs./A	Tops MZ 1 lbs./A	Untreated	Fluazinam ⁷ 6.4 fl.oz./gal. water
High	4.3 a ⁶	13.5 b	32.1 ab	2.1	0.35 a	0.27 a	2.01 ab	0.02	2.5 a	2.0 a	3.0 a	3.0
Medium	1.1 a	2.0 a	14.1 a		0.01 a	0.02 a	0.39 a		1.8 a	1.8 a	2.8 a	
Low	1.1 a	2.2 a	51.5 b		0.01 a	0.02 a	362b		1.5 a	2.0 a	2.3 a	

¹ Average percentage of Russet Norkotah tubers showing symptoms after 3 weeks of post-harvest incubation at 20°C in the dark at high humidity. Potatoes were harvested from 10' single row plots.

² Average percentage of tuber area covered by symptoms of the disease calculated using the total number of tubers.

³ Ratings were taken after 3 weeks of incubation at 20°C in the dark at high humidity
Surface rating scale:

1= Smooth - Surface smooth and russet easy to see with little skinning.

2= Intermediate

3= Rough - Surface rough and russet difficult to see. Lots of skinning.

⁴ Level determined before treatment by incubating samples from seed lots at 20°C at high humidity for 3 weeks.

⁵ Storage in the dark at 4°C. Tubers will be assayed March 1999.

⁶ Values followed by the same letter are not significantly different from each other Fisher's LSD (P = 0.05).

⁷ Fluazinam was only applied to tubers expressing a high level of Silver Scurf symptoms.