

## ANNUAL REPORT

### Testing Clones For Ringrot Reactions

1982 Results and 1983 Proposal

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Results of the 1982 evaluation of advanced clones for their reaction to ringrot infection are summarized below. The detailed report of the testing is attached for those who wish to study the details of the work:

Seedpieces from 10 potato clones were inoculated with Corynebacterium sepedonicum and evaluated for ringrot symptom development in the San Luis Valley. All clones (except WC285-18) developed typical foliar ringrot symptoms at approximately the same time including WC230-14 and Belrus in which ringrot infection is commonly latent. However, foliar symptoms in WC230-14 and Belrus were evident only during the first 2 weeks of August in a limited number of plants. Symptoms (early dwarfing) developed in Russet Burbank more quickly than in any other clone tested (July 20). A selection of stems collected from symptomatic plants from all clones, except Belrus, had a positive stem squeeze (a diagnostic test was conducted in the field) on August 26, 1982. Stems collected from cv. Belrus all had a negative stem squeeze at this time. Daughter tubers harvested from clones WC285-18, WC230-14, WC567-1, WC672-2 and Russet Burbank commonly had typical ringrot symptoms. Tubers from clones WC630-2 and WC708-6 had a very limited number of tubers with typical symptoms. Tubers with typical symptoms were not found in clones BC9289-1, Belrus and WC521-12. However, only a limited number of tubers were observed for clone WC521-12 because of poor plant emergence.

Proposed 1983 Testing

Tubers from 10-12 advanced clones from the variety development program in the San Luis Valley will be uniformly inoculated with Corynebacterium sepedonicum and planted in replicated plots. Evaluations will be made to determine the types of symptoms which develop in the foliage and the tubers and the time of symptom expression in relation to a Russet Burbank standard.

Clones which show no field symptoms will be tested in the laboratory to determine if they carry ringrot bacteria in a symptomless state.

Budget Request

Labor	500.00
Travel	700.00
Supplies	<u>300.00</u>
	<u>\$1500.00</u>

The Evaluation of Foliar and Tuber Ringrot Symptom  
Expression in Selected Potato Clones

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Abstract

Seedpieces from 10 potato clones were inoculated with Corynebacterium sepedonicum and evaluated for ringrot symptom development in the San Luis Valley. All clones (except WC285-18) developed typical foliar ringrot symptoms at approximately the same time including WC230-14 and Belrus in which ringrot infection is commonly latent. However, foliar symptoms in WC230-14 and Belrus were evident only during the first two weeks of August in a limited number of plants. Symptoms (early dwarfing) developed in Russet Burbank more quickly than in any other clone tested (July 20). A selection of stems collected from symptomatic plants from all clones, except Belrus, had a positive stem squeeze (a diagnostic test conducted in the field) on August 26, 1982. All stems collected from cv Belrus had a negative stem squeeze at this time. Daughter tubers harvested from clones WC285-18, WC230-14, WC567-1, WC672-2 and Russet Burbank commonly had typical ringrot symptoms. Tubers from clones WC630-2 and WC708-6 had a very limited number of tubers with typical symptoms. Tubers with typical symptoms were not found for clones BC9289-1, Belrus and WC521-12. However, only a limited number of tubers were observed for clone WC521-12 because of poor plant emergence.

Materials and Methods

Ten potato clones were tested for foliar and tuber ringrot (Corynebacterium sepedonicum) symptom expression in the San Luis Valley. Clones tested were WC285-18, WC521-12, WC230-14, WC630-2, WC567-1, WC708-6, WC672-2, BC9289-1, Russet Burbank and Belrus (limited seed available).

Clones were inoculated by placing freshly cut seedpieces into a bucket containing tap water and macerated tuber tissue prepared from ringrot infected plants. Inoculated tuber seedpieces were immediately planted into pre-irrigated soil and covered by hand. Seedpieces were either inoculated by (A) water alone or (B) water containing macerated ringrot-infected tubers. All treatment A tubers were planted before treatment B tubers to prevent cross contamination. A blank row was left between planted rows. The plot plan used is illustrated in Figure 1.

Plots were visually inspected periodically throughout the growing season for the development of foliar ringrot symptoms. Typical symptoms were wilting, interveinal chlorosis, interveinal necrosis and entire leaf necrosis at advanced disease stages.

On August 26 stems from each clone were selected and pulled, cut as close to the seedpiece as possible and squeezed with pliers to detect milky exudate (positive stem squeeze). This is a preliminary diagnostic test for ringrot infection that is commonly conducted in the field.

On September 22, daughter tubers were harvested by hand. The presence or absence of typical ringrot tuber symptoms was noted. Typical symptoms consisted of surface cracking and decay. After cutting, infected tubers commonly had a yellow cheese-like exudate present when squeezed.

### Results

Data in Table 1 show that inoculation of seedpieces with C. sepedonicum did not reduce stand counts.

On August 26, all clones gave a positive stem squeeze except for Belrus (Table 2). Plants previously exhibiting foliar symptoms on August 6 were selected for testing.

West

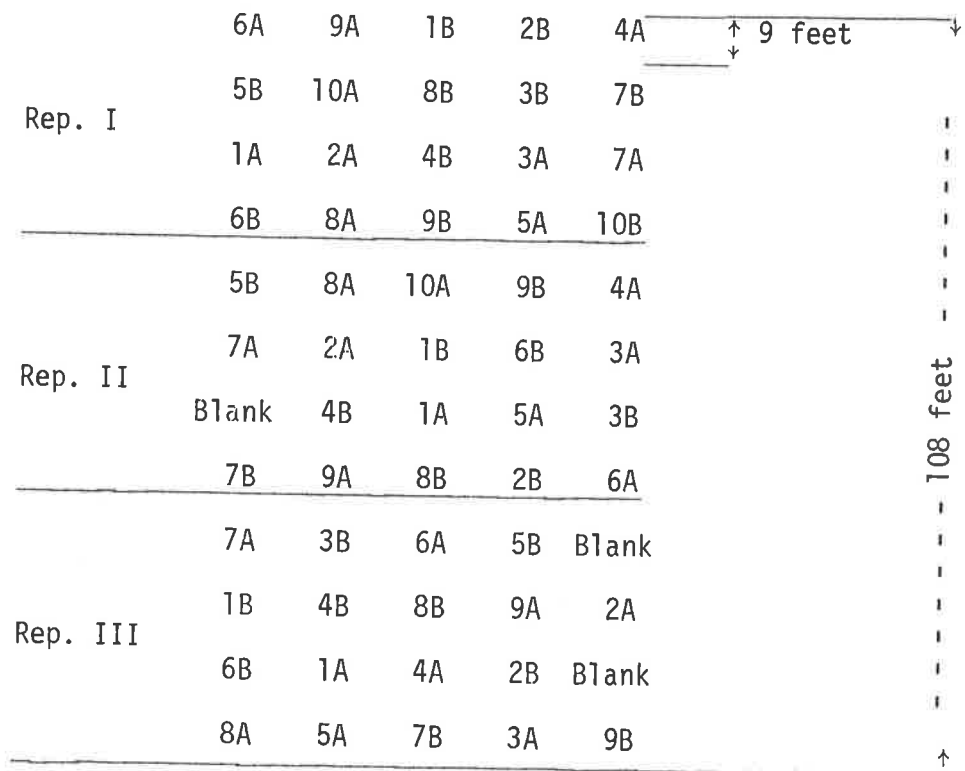


Figure 1. Field plot plan used for ringrot clone testing study in the San Luis Valley. Six tuber seedpieces per plot (7 feet) per replication were planted followed by three Monona spacers (2 feet) into pre-irrigated soil and covered by hand. Seedpieces were inoculated by either (A) water alone or (B) water containing macerated ringrot-infected tubers. All treatment "A" tubers were planted before treatment "B" tubers. A blank row was left between planted rows. Clone designations used were: (1) WC285-18, (2) WC521-12, (3) WC230-14, (4) WC630-2, (5) WC567-1, (6) WC708-6, (7) WC672-2, (8) BC9289-1, (9) Russet Burbank and (10) Belrus (limited seed available).

Table 1. The effect of ringrot infection on stand counts - Center, Colorado, 1982.

Clone tested	Average stand count <sup>1/</sup>	
	Water inoculated	Ringrot inoculated
1) WC285-18	2.3	3.0
2) WC521-12	2.7	2.0
3) WC230-14	1.3	1.7
4) WC630-2	2.0	1.0
5) WC567-1	2.7	4.0
6) WC708-6	3.0	2.0
7) WC672-2	2.0	2.3
8) BC9289-1	2.3	4.0
9) Russet Burbank	3.0	2.3
10) Belrus (limited seed available)	2.0	2.0
	$\bar{X} = 2.3$	$\bar{X} = 2.4$

<sup>1/</sup>Stand counts were determined on July 20 (planting date: May 17, 1983). Six tuber seedpieces per plot were planted. Each entry represents the average of three replications.

Table 2. The effect of ringrot inoculation on foliar symptom development and daughter tuber and stem infection - Center, Colorado, 1982.

Clone tested	Present (+) or absence (-) of typical ringrot symptoms on:		
	Foliage	Stem squeeze <sup>4/</sup>	Daughter tubers
1) WC285-18	- <u>1/</u>	+	+
2) WC521-12	+	+	- <u>5/</u>
3) WC230-14	+ <u>3/</u>	+	+
4) WC630-2	+	+	+ <u>6/</u>
5) WC567-1	+	+	+
6) WC708-6	+	+	+ <u>6/</u>
7) WC672-2	+	+	+
8) BC9289-1	+	+	-
9) Russet Burbank	+ <u>2/</u>	+	+
10) Belrus (limited seed available)	+ <u>3/</u>	-	- <u>7/</u>

<sup>1/</sup> Plant emergence very irregular and foliar symptoms not evident in emerged plants.

<sup>2/</sup> Early dwarfing symptoms in Russet Burbank (July 20) was evident ca two weeks before appearance of foliar symptoms in Russet Burbank and other clones tested.

<sup>3/</sup> Foliar symptoms in Belrus and WC230-14 were only evident during the first part of August (August 6).

<sup>4/</sup> On August 26, 1982 (planting date May 17, 1982).

<sup>5/</sup> Very few daughter tubers were present.

<sup>6/</sup> Symptoms, although present, were subtle.

<sup>7/</sup> No symptoms were evident in ca 13 tubers inspected.

Data in Table 2 show that foliar symptoms developed on all clones tested except for WC285-18. This includes clones WC230-14 and Belrus for which foliar symptoms are commonly lacking (infection is latent) after inoculation with ringrot.

All clones produced daughter tubers with typical symptoms except for WC521-12, BC9289-1 and Belrus (Table 2). Very few daughter tubers were available for inspection from WC521-12, however. Daughter tuber symptoms for WC708-6 and WC630-2 were subtle and not as readily evident as for other clones.

### Discussion

Results were unusual in 1982 since WC230-14 and Belrus developed visible foliar symptoms. Previous research indicated foliar symptoms are rare or lacking for infected plants of these two clones. Environment can influence symptom development and this may be the reason for disease expression in 1982.

Clone WC285-18 did not develop foliar symptoms even though daughter tuber and stem infections were evident. However, plant emergence for this clone was very irregular and many plants emerged late in July.

Stand count data (Table 1) indicate that very poor stands resulted in the test plots. Plants were frequently water-stressed during the growing season and there was a serious weed problem. This made it very difficult to evaluate the clones consistently and on a comparative basis during the growing season. Since emergence was very irregular plants of different physiological age were being compared.