

1986 Annual Report  
and  
1987 Proposal  
Ringrot Clone Testing

G. D. Franc and M. D. Harrison

The detailed report of the results of testing seventeen cultivars and clones for their reaction to ringrot infection in 1986 is attached following the 1987 proposal. The results are generally the same as those from previous years and are briefly summarized here.

Seventeen potato clones were inoculated with Corynebacterium sepedonicum by dipping freshly cut tuber seedpieces into a slurry prepared from ringrot infected tubers. The seedpieces were planted in the field and symptom expression evaluated in the San Luis Valley, CO. Clones tested were AC77652-1, AC77513-1, TXA17-1, AC79128-1, ND534-4, CO7916-1, BR7093-24, CO7922-1, TC582-1, ND534-4, Centennial Russet, Russet Burbank, Sangré and Sangré lines 10, 11 and 14.

All clones except ND534-4 became infected with C. sepedonicum (ringrot) based on foliar symptom expression. However, ND534-4 was not planted until much later than the rest of the clones. Russet Burbank expressed foliar symptoms as early as 9 July. Clones TC582-1 and ND534-4 were the only clones that did not show tuber symptoms at harvest.

Foliar symptom expression in the new Sangré lines (10, 11 and 14), although considered strong, appeared slightly later than in the Sangré standard. This was probably due to the later maturity in the new lines.

Proposed Work for 1987

M. D. Harrison

This project will be a continuation of the one begun several years ago and will follow essentially the same procedures. Up to seventeen cultivars and advanced numbered clones will be inoculated with Corynebacterium sepedonicum and planted in replicated plots in the San Luis Valley. Data will be collected on the time of appearance of foliar symptoms, type of symptoms which occur and disease severity.

The percentage of tubers from each clone which show symptoms, the type of symptoms which occur (internal only or internal plus external) and the severity of infection will be determined at harvest time.

Budget Request

Plot maintenance	\$ 650.00
Labor	850.00
Travel	700.00
Supplies	150.00
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TOTAL	\$2,350.00

**The Effect of Ringrot Infection on Symptom Development  
in Potato Clones - 1986**

Gary D. Franc and Monty D. Harrison

**Abstract**

Seventeen potato clones were inoculated with Corynebacterium sepedonicum by dipping freshly cut tuber seedpieces in a slurry prepared from ringrot infected tubers. The seedpieces were planted in the field and symptom expression evaluated in the San Luis Valley, CO. Clones tested were AC77652-1, AC77513-1, TXA17-1, AC79128-1, ND534-4, CO7916-1, BR7093-24, CO7922-1, TC582-1, Centennial Russet, Russet Burbank, Sangré and Sangré lines 10, 11 and 14.

All clones except ND534-4 became infected with C. sepedonicum (ringrot) based on foliar symptom expression. However, ND534-4 was not planted until much later than the rest of the clones. Russet Burbank expressed foliar symptoms as early as 9 July. Clones TC582-1 and ND534-4 were the only clones that did not have tuber symptoms evident at harvest.

Foliar symptom expression in the new Sangré lines (10, 11 and 14), although considered strong, appeared slightly later than in the Sangré standard. This was probably due to the later maturity in the new lines.

**Materials and Methods**

All clones except ND534-4 were planted on 17 May 1986 in replicated plots near Center, CO. ND534-4 was planted on 6 June 1986.

Whole tubers were cut and seedpieces were immediately immersed in tap water (treatment A; uninoculated control) or tap water to which a macerate prepared from ringrot infected tubers had been added (treatment B). All treatment A (water control) tuber seedpieces were planted before treatment B tuber seedpieces to preclude cross-contamination.

Plots were visually inspected periodically throughout the growing season for the development of foliar ringrot symptoms. Dates of visual inspections were 9, 18 and 30 July and 13 and 19 August. Symptoms were recorded as wilting (W), interveinal chlorosis (IVC), marginal necrosis (MN), interveinal necrosis (IVN) and "early dwarfing" (ED).

Tubers were harvested on 6-7 September, 1986 and evaluated for symptom expression on 17 September in Fort Collins. Approximately 20 daughter tubers from each replication (3 replications) were evaluated on this date and the percentage of tubers expressing symptoms was determined. Tubers were also rated on an arbitrary scale (0-3) for the intensity of symptom expression. A "0" rating indicated that the "stolen end" of tubers had to be cut before symptoms could be observed; a rating of 1, 2 or 3 indicated that at least 1 tuber in each of 1, 2 or 3 replications, respectively, had typical surface-cracking symptoms evident.

### Results and Discussion

Clone ND534-4 did not develop tuber or foliar symptoms during the course of the study. A Russet Burbank control planted at the same time also did not develop tuber or foliar symptoms; therefore,

the test was not conclusive and ND534-4 will not be discussed further.

The data for foliar ringrot symptom expression in the other clones are shown in Table 1. The data show that only Russet Burbank showed foliar symptoms on 9 July 1986. Clone WNC230-14, known to be a poor expressor of foliar ringrot symptoms, did not develop symptoms until 13 August 1986. Clones AC77513-1 and TXA17 also did not show symptoms until 13 August. Symptom expression in AC77652-1 was considered to be as weak as expression in WNC230-14 because of the very sporadic appearance of symptoms in the plots. All other clones showed identifiable visual symptoms in most plots by 30 July to 13 August. It should be noted that foliar early blight infection and psyllid injury made it difficult to rate foliar ringrot symptoms in plants accurately during the latter part of the 1986 growing season.

The data for tuber symptom development are shown in Table 2. All clones except TC582-1 had visible tuber symptoms visible at harvest. However, tubers from clones WNC230-14, AC77652-1, TC582-1, C07916-1, TXA17-1 and AC79100-1 did not show external symptoms and had to be cut before symptoms could be observed. This is an undesirable characteristic which makes detection during bin inspection more difficult.

Table 1. The effect of Corynebacterium sepedonium inoculation on foliar symptom development in selected potato clones, Center, CO, 1986.

Clone# and ID	Foliar Symptom Expression (# Reps RR+) Max = 3				
	09-Jul-86	18-Jul-86	30-Jul-86	13-Aug-86	19-Aug-86
1 WNC230-14	0	0	0	1	3
2 R. Burb	3	1	2	3	3
3 AC77652-1	0	0	1	0	3
4 TC582-1	0	0	2	1	2
5 Centennial	0	0	1	2	ND <sup>1</sup>
6 AC77513-1	0	0	0	2	1
7 CO7916-1	0	0	1	2	3
8 Sangré	0	2	3	3	3
9 BR7093-24	0	0	3	3	3
10 San 10	0	0	3	3	3
11 San 14	0	0	2	3	3
12 CO7922-1	0	0	2	3	3
13 TXA17-1	0	0	0	2	2
14 AC79128-1	0	1	3	3	3
15 AC79100-1	0	0	0	0	3
16 San 11	0	0	2	3	3
17 RB(Late <sup>2</sup> )	0	0	0	0	0
18 ND5344 <sup>2</sup>	0	0	0	0	0

<sup>1</sup>Extensive early blight infection made it impossible to rate this clone for foliar ringrot symptom expression.

<sup>2</sup>Planted 6 June 1986 while other clones were planted on 17 May 1986.

Table 2. The effect of Corynebacterium sepedoniucum inoculation on the incidence of daughter tuber symptoms in selected clones, Center, CO, 17 Sept 1986.

Clone# and ID	Tuber Symptom Evaluations	
	Ave % with RR symptoms <sup>1</sup>	Severity (0-3) <sup>2</sup>
1 WNC230-14	3.3	0
2 R. Burb	8.3	2
3 AC77652-1	4.9	0
4 TC582-1	0.0	0
5 Centen.	11.7	2
6 AC77513-1	3.4	2
7 C07916-1	3.3	0
8 Sangré	28.6	3
9 BR7093-24	16.7	2
10 San 10	22.1	3
11 San 14	15.0	3
12 C07922-1	11.7	2
13 TXA17-1	5.0	0
14 AC79128-1	7.2	3
15 AC79100-1	1.7	0
16 San 11	16.8	3
17 RB (Late*)	0.0	0
18 ND5344*	0.0	0

<sup>1</sup> Each figure represents the average of 3 replications.

<sup>2</sup>

- 0 = Tuber symptoms visible only after cutting tubers
- 1 = at least one tuber in one replication showed surface cracking symptoms.
- 2 = at least one tuber in each of two replications showed surface cracking symptoms.
- 3 = at least one tuber in each of three replications showed surface cracking symptoms.