

Annual Project Report

1988-89

Prepared for:  
San Luis Valley Research Center Advisory Committee

Title: Fungus and Bacterial Diseases of Potatoes

Project Justification: Blackleg and ringrot continue to be important diseases in the San Luis Valley. The question of whether blackleg-free seed will continue to perform when irrigated with Erwinia-contaminated water needs to be answered. Until this is done growers in areas where contaminated irrigation water is used may hesitate to purchase such stocks. Ringrot is the most serious uncontrolled disease in Colorado. Little is known about factors which affect its expression, sources of inoculum and means of detection. This project addresses these questions as well as other important disease problems.

Project Leader: Monty Harrison

Department: Plant Pathology and Weed Science

Project Status: This is a continuing project that has been in operation for many years. Emphasis changes as some disease problems are brought under control and new ones emerge.

Progress toward achieving answers to the question of the effects of Erwinia inoculum in irrigation water on productivity of Erwinia-free seed potatoes has been very good. Data from closely controlled plots in the San Luis Valley have shown that application of water containing several times the amount of inoculum normally found in irrigation water does not significantly affect plant growth or tuber yield in the San Luis Valley. Application of contaminated water does, however, tend to increase the contamination of daughter tubers and the extent of invasion of the stems of exposed plants during the current season. Studies in northern Colorado (funded by the Area III Potato Administrative Committee) appear to confirm experimental data for the San Luis Valley Erwinia-free seed planted in northeastern Colorado in a warm area where relatively high populations (300+ cells/ml) occur naturally in irrigation water performed considerably better than regular stocks. Vigor and yield were higher and blackleg infection lower in these stocks than in Erwinia-contaminated seed lots at least during the first year they were planted.

Progress on the ringrot disease has shown that the efficiency of eggplants for use as a bioassay for the presence of the ringrot bacterium can be increased by modifying the environment in which eggplants are grown. Very small amounts of inoculum can produce symptoms, even in old eggplants in 7-14 days if proper environmental conditions are provided. The same is true for tissue cultured plantlets. Under some conditions inoculated plantlets produced weak or no symptoms but changing growth conditions will allow detectable symptoms to develop. These findings may have a direct bearing on latency in seed potato stocks.

Preliminary data have been collected on presence of C. sepedonicum in weeds and water. To date no cells have been found. A new student is now working exclusively on sources of inoculum in the environment.

A second student is working on factors which determine whether ringrot symptoms are expressed or remain latent in potato cultivars.

Potato early dying in the San Luis Valley will be addressed starting next year using funds successfully obtained from the Western Regional IPM Project.

Significant Accomplishments 1987-88: We have shown that

Erwinia-free seed can be grown and irrigated with Erwinia-contaminated water without a significant loss in productivity during the first year. Increasing recontamination resulting from irrigation with contaminated water may reduce performance in subsequent years but how long it takes for performance to be affected is not known.

Significant progress has been made toward defining the conditions which favor ringrot symptom expression in eggplants and tissue culture plantlets. This may help determine conditions which affect latency in the field.

Objectives for 1988-89: 1) Continue work on the effect of Erwinia-contaminated irrigated water by following Erwinia-free seed exposed to contaminated irrigation water in 1987 through 1988 and longer if necessary to determine when performance is decreased due to continued exposure to inoculum via irrigation water. 2) Continue and expand ringrot studies on environmental factors affecting expression in eggplants and tissue cultured plantlets in the laboratory and three potato cultivars in the field. 3) Intensive work on alternate sources of ringrot inoculum. Weeds, water, symptomless seed lots and possibly insects will be tested as potential sources of inoculum.

<u>Funding:</u>	1987-88 Allocation	\$ 6,900
	1988-89 Request	6,900

Budget Summary

Labor	\$ 2,700
Travel	1,800
Plot Costs	300
Supplies	2,100
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	\$ 6,900