Summary Research Progress
Report for 1988

Submitted to:

San Luis Valley Research Center Committee
and the
Area II Potato Administrative Committee

Title: Fungus and Bacterial Diseases of Potatoes

Project Leader: Monty Harrison

Project Justification: In spite of considerable advances in methods for disease control during the past few years, diseases continue to be major limiting factors in potato production in the San Luis Valley. Bacterial ringrot and potato early dying along with continuing unanswered questions about some aspects of the blackleg problem are of major concern. The progress in blackleg control through tissue culture has allowed us to concentrate more effort on ringrot and early dying in the past two years. This focus will continue even more intensively in 1989 because these two diseases cause large losses to all segments of potato production in the San Luis Valley. We need more information on what factors determine the severity and extent of occurrence of these diseases in the San Luis Valley in order to devise more effective means to reduce the losses.

Project Status: This is a continuing project that has been functioning for many years. Emphasis has changed as some problems are solved and others have emerged. In order to respond to the most pressing needs for disease control in the San Luis Valley, emphasis has changed from early blight and blackleg to ringrot and early dying. Some work continues on the early blight and blackleg problems, however. During the past two years we have learned a considerable amount about factors which affect ringrot and early dying expression in the San Luis Valley and work in 1989 will add to this knowledge. Additional funds have been attracted to the Colorado program to supplement State and Industry funding to "speed up" the research. Five graduate students, all supported by external grants, are now working on ringrot, early dying and blackleg problems in the State.

Significant Accomplishments in 1988: Research in 1988 showed that exposure of Erwinia-free seed potatoes to high levels of Erwinia in irrigation water for two consecutive years begins to affect productivity in some cultivars but apparently not in others.

Ringrot expression was shown to be affected by cultivar, inoculum dose, planting date and location. Some cultivars, which express symptoms poorly or not at all in the San Luis Valley, express symptoms better than some standard cultivars when grown in warmer areas. Irrigation water (tail water) was identified as a potential source of ringrot inoculum but its significance in

producing symptoms in potatoes and infecting developing tubers remains to be determined.

Plantlets of the cultivar Sangre were shown to carry ringrot bacteria through at least two nodal transfers in tissue culture without showing visible symptoms.

Soil moisture, inoculum level and the presence of absence of Erwinia in seed tubers were found to be factors which apparently affect the severity of early dying in the San Luis Valley.

Objectives for 1989: Research in 1989 will concentrate on the ringrot and early dying diseases. Field and greenhouse studies will be carried out to study factors affecting expression and severity of both diseases. Effects of inoculum density, soil and air temperatures and potato cultivar will be the main focus of the ringrot research. Inoculum density, soil moisture, fertility and presence or absence of Erwinia will be the main factors studied with the early dying disease. Also, the role of water, insects and weeds as sources of ringrot bacteria and means of spreading the organism will be studied. The presence and location of ringrot bacteria in tissue culture plantlets will be studied in the laboratory and greenhouse.

Funding:

1988 Allocation	$6,900
1989 Budget Request	$6,900

Budget Detail:

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