

SUMMARY RESEARCH PROGRESS REPORT FOR 2001 AND RESEARCH PROPOSAL FOR 2002

Submitted to:
SLV Research Center Committee
and the Colorado Potato Administrative Committee (Area II)

Title: Potato Disease Management

Project Leaders: Richard Zink and Robert Davidson, CSU

Project Justification: The potato industry in the San Luis Valley continues to be faced with serious disease management challenges. The ongoing threat of late blight has significantly increased the need for expensive fungicide applications, thus increasing production costs. Early blight continues to be damaging and difficult to control. Potato leafroll and potato virus Y are becoming epidemic in some cultivars. Seed-borne and soil-borne diseases such as powdery scab, pink rot, silver scurf, and *Rhizoctonia* require increasingly sophisticated management schemes. Although cultural practices and varietal resistance are of great value, these diseases will be controlled to a large extent by utilizing clean seed, good management techniques, and judicious use of chemicals.

Efficacy trials are now a permanent component of the overall research effort at the San Luis Valley Research Center. These trials generate the basic information required by product manufacturers, the EPA and State Department of Agriculture for labeling and registration. Ongoing evaluation of products is essential to maintaining current labels as well as justifying Section 18, LSN24C and Section 3 registrations for new products. Availability of new crop care products to potato growers in Colorado is contingent upon scientifically valid data developed within the University on a regional basis. Resistance management among fungicides, both foliar and soil applied, is becoming even more critical as many new products have similar modes of action. Therefore, development of season-long fungicide programs for potato require more attention than ever in the past.

Evaluation of advanced clones from the Cultivar Development Program for reaction to several critical diseases is also a permanent component of the overall research effort. The increasing threat of several major disease problems and the advent of Plant Variety Protection for new cultivars makes this a major thrust for protecting the growers' and the University's interests. Additionally, these evaluations can provide valuable information to the producer of new cultivars so that the threat from many diseases can be mitigated.

The funds being requested in this research progress report and proposal will be used to secure the ongoing labor needed to insure continuity in efficacy trials from year to year and in the advanced clone disease assessment program. The funding request for Objective 1 covers 90% of the cost for a full-time Research Associate. Additional funds are requested for plot rent, seasonal labor, supplies, analyses and expendable equipment. Funds for some expenses will also be obtained from outside sources.

Project Status: Ongoing

Significant Accomplishments for 2001:

- Evaluated twenty-four season-long fungicide programs for control of early blight.
- Evaluated twelve potato seed piece treatments for control of *Rhizoctonia*, *Fusarium* dry rot, and bacterial soft rot.
- Evaluated eleven treatments as in-furrow applications for control of *Rhizoctonia* on potato stems, stolons and tubers.
- Evaluated twelve chemical treatments as in-furrow applications for control of powdery scab.
- Evaluated planting dates and temperature on the incidence of *Spongospora subterranea* on roots and tubers.
- Evaluated thirteen cultivars for expression to powdery scab.
- Evaluated eleven Ridomil Gold 4EC application programs for control of pink rot.
- Data was collected from four weather stations in the San Luis Valley to predict late blight onset.
- Collaborated with Dr. Barbara Christ at Pennsylvania State University on powdery scab research, chemical control studies and cultivar resistance.
- Advanced powdery scab research effort through co-authoring two USDA funded projects with Dr. Barbara Christ, Penn State University, and Dr. Kathy Haynes, USDA/ARS, Beltsville.
- Evaluated sixteen advanced clones for reaction to potato leafroll virus and PVY.
- Evaluated thirty advanced clones and cultivars for reaction to bacterial ring rot.
- Evaluated forty advanced clones and cultivars for reaction to storage rots.
- Finished evaluation of several selections from commonly grown red cultivars for skin color retention.

Objectives for 2002:

- 1) Continue a full range of efficacy trials for control of pink rot, early blight, seed piece decay and *Rhizoctonia* to facilitate product registration, labeling and use recommendations for the San Luis Valley.
- 2) Continue evaluation of advanced selections from the potato cultivar program for reactions to several major pathogens such as early blight, leafroll, blackleg, ring rot and dry rot.
- 3) Continue and expand comprehensive research effort on powdery scab. The following objectives will be priorities for 2002:
 - Establish a permanent powdery scab research site.
 - Expand chemical control trials.
 - Evaluate soil assays for detection of pathogen.
 - Elucidate the roles of soil temperature and water level and planting date on symptom development and disease onset so as to develop control strategies.
 - Continue collaboration with Dr. Barbara Christ on chemical and biological controls.
 - Continue collaboration with Dr. Kathy Haynes on cultivar resistance.
 - Initiate large scale on-farm trials with Omega.

- 4) Continue collaboration with Dr. Russ Ingham, Oregon State University. The following priorities will be addressed in 2002:
- Understanding the biology of root knot nematode in the San Luis Valley.
 - Expand studies in chemical controls to include Telone and Mocap.
 - Initiate studies in biological control.
 - Using information from the above three priorities, move toward development of a multi-component control strategy for commercial and seed potato growers.
- 5) Continue and expand comprehensive research effort on PVY to better understand how this virus perpetuates in the San Luis Valley, potential for new strains, and better strategies for control in the certified seed program. Studies will include the use of a new anti-transpirate, Stress Guard, for control of PVY and potato leafroll virus.

Funding Request:	2002 Request:	Labor	\$27,000
		Equipment/Supplies	\$ 2,000
		Land Cost	\$ 2,500
		Travel	\$ 1,000
		Total	\$32,500

2001 Expenditures:	2001 Allocation:		\$25,000
		Labor	\$10,925
		Travel	\$ 650
		Ag Supplies	\$ 2,750
		Equipment	\$ 1,150
		Misc.	\$ 2,000
		Total	\$17,475
		Residual	\$ 7,525

Residual will be used to sustain project until 2002 CPAC appropriation.