RESEARCH PROPOSAL FOR 2003

Submitted to:
Dr. Lee Sommers, Director
CSU Agriculture Experiment Station

Funding Source: Royalties collected from CCPGA and participating growers raising CSU developed, protected potato cultivars

Title: Evaluation of Cultivars and Advanced Clones for Susceptibility to Powdery Scab (*Spongospora subterranea*)

Project Leaders: Robert D. Davidson and Richard T. Zink

Project Justification: The potato industry in the San Luis Valley continues to be faced with serious disease management challenges. The certified seed potato business is in an even more tenuous position. The presence of many of the more "traditional" disease problems are still significant in overall potato production. In the past few years, however, diseases, more insidious in nature, are moving to the forefront. Often, these problems are invisible to the grower until after the damage has been done. These diseases fall into two categories; seed-borne and soil-borne. Powdery scab (*Spongospora subterranea*) fits into both categories. It is becoming very widespread and its management has become increasingly sophisticated and difficult, if not almost impossible.

There are no known effective controls for powdery scab short of good luck, some potential chemistries used to reduce symptoms and good production management. Use of resistant germplasm has shown the most promise to date. While many russet cultivars are resistant to the tuber phase of the disease (scab lesions), they can be a major source of soil inoculum buildup by allowing the pathogen to increase on their roots through the production of root galls (powdery scab spore factories). These galls can subsequently be moved into the soil during harvest. In addition, many whites, and most red or yellow skinned cultivars are susceptible. The inoculum rapidly builds up in infested soils and is available for causing disease when susceptible cultivars are grown. Also, inoculum can move from field to field by wind, water, adhering soil on seed tubers, and equipment.

The unique production area in the San Luis Valley has been a major source of russet-type cultivars for decades. Growers, however, are being forced to raise non-traditional cultivars (non-russets) to compete effectively in the market place. The certified seed potato program is even more competitive on a national and international scale, with growers raising most types of potatoes and over 150 different cultivars. Over the past four years, powdery scab has become more of a factor in moving the certified seed product out of the Valley. The disease is especially problematic in the international arena. Thus, there is a need to maintain a viable research program aimed at understanding the pathogen from a biological standpoint, and reducing its effects on the crop. It is apparent after many years of research in different parts of the world and the U.S. that the best chance for success is growing cultivars which are resistant to b oth the inoculum increase and tuber symptoms.

Accomplishments since 2001:

- Established permanent relationships with specific SLV growers to maintain annual plots on ground heavily infested with the pathogen.
- One of four sites in the country to screen new germplasm being developed by U.S. breeding programs for reaction to powdery scab.
- Evaluated over thirty clones with subsequent ranking of susceptibility to powdery scab.
- Built and maintained a collaborative effort with Drs. Barb Christ, Penn State University and Kathy Haynes, USDA, Beltsville, Maryland.

Proposal for 2003: To continue working with the comprehensive evaluation program for all cultivars currently being produced and the advanced germplasm coming from the Colorado Cultivar Development program. These funds will be used in combination with other monies to continue the germplasm evaluation effort with emphasis placed on identifying resistant germplasm for future breeding purposes. Cultivars which fit into the San Luis Valley production cycle and show minimal impact due to powdery scab will be noted for the growers through the use of newsletters, meetings and one on one consultations. Additionally, a greenhouse evaluation system (utilizing the new greenhouse addition at the SLV Research Center) for screening advanced clones at an earlier stage in development will be pursued.

Funding Request: 2003 $10,000

Brief Literature Review:

Burgess, P.J. and S.J. Wale. 1994. Development of an integrated control strategy for powdery scab of potatoes. Brighton Crop Protection Conference - Pests and Diseases. pp. 301-306.

Christ, B.J. 2002. Report to the National Potato Council regarding evaluation of potato germplasm for resistance to powdery scab.

Christ, B.J. 2002. Is powdery scab a new concern? Multi-prong approach needed to control disease. Valley Potato Grower. pp. 26-27.

Wale, S.J. January, 2001. The A to Z of powdery scab and its control. Growers workshop put on by Richard Zink and Robert Davidson, Holiday Inn, Alamosa, CO.

Zink, R.T., R.D. Davidson, and A. Houser. 2003. Strategies for Control of Powdery Scab. Abstract submitted and project to be given as a poster session during the 2003 Potato Association of America annual meeting.

Zink, R.T., R.D. Davidson, and A. Houser. 2001, 2002. Report to the San Luis Valley Research Center titled: "Annual Report on Potato Diseases in the San Luis Valley". 52 & 58 pp. respectively.