

SUMMARY RESEARCH PROGRESS REPORT FOR 1999  
AND RESEARCH PROPOSAL FOR 2000

Submitted to:

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

**TITLE:** Potato Breeding and Selection

**PROJECT LEADER:** David G. Holm

**PROJECT JUSTIFICATION:** Many challenges and opportunities are confronting the Colorado potato industry. These challenges/opportunities include food safety, water quality, current market constraints, new market development (processing, exporting, etc.), changing consumer expectations, and increasing costs with highly variable potato prices.

To help meet each of these challenges, continued emphasis needs to be placed on developing potato cultivars with increased yield, improved quality, resistance to diseases and pests, and tolerance to environmental stresses. Increased emphasis needs to be placed on breeding for improved postharvest and processing qualities such as lengthened dormancy, ability to process after cold storage, and resistance to diseases such as tuber early blight and late blight. Cultivars with these characteristics will help assure that the potato industry in Colorado will remain productive and in a competitive position.

The basic objective of the Colorado Potato Breeding and Selection Program is to develop new potato cultivars with increased yield, improved quality, resistance to diseases and pests, and tolerance to environmental stresses for Colorado.

**PROJECT STATUS:** This is an ongoing project.

**SIGNIFICANT ACCOMPLISHMENTS FOR 1999:**

Sixty-eight parental clones were intercrossed in 1999. Seeds from 406 combinations were obtained. Seedlings from selected families will be produced in 2000 for initial field selection in 2001. Approximately 35,500 seedlings tubers representing 134 families were produced from 1998 crosses for initial field selection in 2000. Second thru fourth size tubers will be distributed to Idaho, Minnesota, Oregon, Texas, and Alberta, Canada.

Additional seedling tubers were obtained from Dr. J. J. Pavek, USDA-ARS, Aberdeen, Idaho; ; Dr. Dermot Lynch, Agriculture Canada, Lethbridge, Alberta; and Dr. J. Creighton Miller, Texas A&M University, College Station, Texas.

Approximately 79,700 first-year seedlings were grown in 1999 with 847 being selected for subsequent planting, evaluation, and increase in future years. Some of these seedlings were obtained from breeding programs in Idaho, Texas, and Canada. Another 1,074 clones were in 12-hill, preliminary, and intermediate stages of selection. Of these, 299 were saved for further observation. Twenty-five advanced selections were saved and will be increased pending final evaluations. Another 178 selections were maintained for germplasm development, breeding, other experimental purposes, or seed increases for the other programs.

Grower evaluations were conducted on eight russets (AC83064-1, AC83064-6, AC87079-3, AC87084-3, AC87138-4, CO80011-5, CO86026-4, and CO89036-10), three reds (CO86218-2, CO89097-2, and DT6063-1R), and two chipping selections (AC87340-2 and BC0894-2).

Release notices for the cultivars AC83064-1 (Keystone Russet), AC83064-6 (Silverton Russet), and DT6063-1R (Cherry Red) are in preparation. Selections to be recommended for release and naming in 2000 are CO85026-5 (fresh market russet) and CO86218-2 (red). Selections that will continue to undergo grower evaluation are AC87079-3, AC87084-3, AC87138-4, AC87340-2, BC0894-2, and CO89097-2.

Two new selections will be evaluated by growers in 2000. They are AC89536-5 and AC89536-3. AC89536-5 is a high yielding, medium maturing russet selection with fresh market potential. AC89536-3 is a chipping selection with high yield potential.

A total of 159 samples were evaluated for two or more of the following postharvest characteristics: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture. Studies are currently underway to develop protocols to evaluate advanced selections for tuber greening potential and red skin color retention in storage. A study evaluating the reconditioning ability of advanced selections is also in progress.

#### **OBJECTIVES FOR 2000:**

1. The potato breeding and selection program will be continued. Advanced clones will be tested, as appropriate in yield trials, Western Regional Trials, out-of-state trials, and by growers.
2. Twelve-hill plots will be screened for potato spindle tuber viroid (PSTV).
3. Evaluate preliminary, intermediate, and advanced selections from the breeding project, Southwestern Regional Trials, and Western Regional Trials for: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture. Advanced selections will be also be screened, as appropriate, for tuber greening potential and red skin color retention in storage. The reconditioning ability of advanced selections and named cultivars will also be investigated.
4. Continued emphasis will be placed on identifying parental material for developing germplasm with dry rot (*Fusarium* and early blight), late blight, and bacterial soft rot resistance. The emphasis will be continued on identifying, acquiring, and incorporating additional parental material into the breeding program with late blight resistance. Protocols will be refined for screening progenies for late blight resistance.
5. Clones in the 8<sup>th</sup> cycle of field selection will be entered in cultural management trials and postharvest disease evaluations. Evaluations will be conducted primarily on bacterial soft rot and dry rot (*Fusarium* and early blight). These studies will be conducted by Dr. Susie Thompson and Dr. Robert Davidson.

FUNDING REQUEST: 1999 Allocation - \$28,000  
2000 Request - \$28,000 [Temporary Labor - \$20,000; Travel - \$1,500.00;  
Supplies - \$6,500.00]