SUMMARY RESEARCH PROGRESS REPORT FOR 1993
AND RESEARCH PROPOSAL FOR 1994

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 disease 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 storage diseases such as early blight. Cultivars with these characteristics will help assure that the potato industry in Colorado remains productive and in a competitive position.

PROJECT STATUS: This is an ongoing project. Beginning this year the reporting for the Potato Breeding and Selection project is combined with the Physiological and Cultural Studies on Potatoes project.

SIGNIFICANT ACCOMPLISHMENTS FOR 1993:

Thirty-nine parental clones were intercrossed in 1993. Seeds from 89 combinations were obtained. Seventy seedling families were grown in the greenhouse producing 17,471 tubers for initial field selection in 1994. Surplus tubers will be distributed to Idaho, Minnesota, Oregon, and Texas.

A total of 80,933 first-year seedlings were planted, with 467 being selected for further observation. One hundred seventy seven preliminary and intermediate clones were saved for further evaluation. Thirty-eight advanced selections were saved and will be increased. Another 218 selections were maintained for germplasm development, breeding, or other experimental purposes.

Grower evaluations were conducted on eight russets (CO80011-5, AC78069-17, CO81082-1, CO82142-4, AC83064-1, AC83064-6, AC83068-1, and AC83172-1) and one chipper (AC83306-1). Selection AC83172-1 was discarded from further testing. CO80011-5 will be named in 1994 as a high yielding, medium-early maturing, fresh market potato. Release was delayed due to limited seed stocks being available for planting in 1993. Chipeta (AC80545-1), a chipping cultivar, was named and released jointly by the Colorado and Idaho Agricultural Experiment Stations and the USDA-ARS.

Eleven clonal selections of Russet Norkotah with improved vine vigor were evaluated in comparative trials. Three selections (2, 3, and 8) had total and US #1 yields that were significantly greater than standard Russet Norkotah.

A total of 145 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.

A study was conducted to evaluate factors that may influence emergence uniformity of CO80011-5. Treatments included were bud-end, stem-end, mixed, or single drop seedpieces. Seedpieces from the stem-end of the mother tuber had a 7% decrease in stand compared to those from the bud-end. Single drop seed resulted in more tubers per plant and reduced average tuber weight. No differences in treatments were observed for total and US #1 yields.

Other results relating to the sugar profiles of processing cultivars during growth and storage and simulated hail studies are summarized in the comprehensive report.

OBJECTIVES FOR 1993:

1. The potato breeding and selection program will be continued. Advanced clones will be tested in yield trials, out-of-state trials, and by growers.

2. The Colorado Western Regional Trials will be conducted.

3. Clonal selections of Russet Norkotah will be compared in yield trials.

4. Twelve-hill plots and clones acquired from other programs will be screened for potato spindle tuber viroid (PSTV).

5. Test intermediate and advanced selections from the breeding project and Western Regional Trials for: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, chip color, french fry color, and french fry texture.

6. Clonal evaluations for storage disease reaction will be continued. Primary focus is concentrated on bacterial soft rot and dry rot (Fusarium and early blight). No funding for this study is being requested.

7. A study to determine sugar profiles for standard processing cultivars under San Luis Valley growing conditions will be continued.

8. Simulated hail studies will be continued in cooperation with National Crop Insurance Services. No funding is requested from the SLV Research Committee for this project.

9. Studies will be initiated in the greenhouse to study the utility of various chemicals in enhancing production of nuclear seedstocks.

10. Cooperate with Joe Maga, Department of Food Science and Human Nutrition in postharvest evaluations for advanced selections for protein, alkaloids, taste (flavor), and vitamin C.

FUNDING REQUEST: 1993 Allocation - $22,000.00

1994 Budget Request

Labor	$10,100.00
Travel	1,500.00
Supplies	10,900.00
Total	$22,500.00