

THE USDA ABERDEEN POTATO BREEDING PROGRAM – STATUS AND OUTLOOK

by
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The potato-breeding program began at Aberdeen in 1949 with the principle objective of developing Russet Burbank type varieties with resistance to Verticillium wilt. At its inception the program was planned to serve the needs of the Pacific Northwest, even though The State of Idaho alone petitioned the U. S. Dept. of Agriculture for establishment of the breeding position. In the 1970's, the program was enlarged to serve the entire western U.S. Breeders during the 50-year period were:

John McClean	1949-1957
Darrel Bienz	1958
(Walt Sparks—caretaker	1959)
Lind Sanford	1960-1965
Joe Pavek	1965-1999

Beginning in 1949, John McClean tested a wide array of potential parents for Verticillium wilt resistance at Rexburg and Aberdeen. He identified several clones as resistant and used them in crossing with Russet Burbank (RB), which proved to be mostly sterile. John successfully researched methods for improving the crossing success with RB. He then developed a number of russet-skinned clones that are in the pedigrees of most of the present day, long-russet varieties including Norgold Russet, Ranger Russet, and Russet Norkotah.

In 1968, a USDA-ARS Plant Pathologist position was added to the Aberdeen program. Dexter Douglas filled that position from 1968 to 1975. Dennis Corsini has been the Plant Pathologist since then.

Several additional objectives were added over the 50-year history of the program. These include development of chipping, red, and specialty varieties, taking 20-25% of our current effort. Additional objectives include french frying and chipping out of cold storage (40°F), improved specific gravity and resistance to environmental stresses, black spot, hollow heart, viruses, storage rots, early blight, and late blight.

With increased objectives and area served, it became necessary to increase the number of crosses made and the number of single hills grown.

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The single-hill number increased from 10,000 in 1965 to over 100,000 22 years later. In addition, 50,000 to 75,000 single hills are grown annually in Oregon. This increase in material grown and screened was made possible by the increased funding obtained with the establishment of the Tri-State program in 1983. Cooperators from the University Ag. Experiment Stations of Washington, Oregon and Idaho and from processing companies have joined in selecting and testing this greater volume of material.

Two new positions were established with Tri-State funding. Steve Love was added to do University of Idaho, Aberdeen, advanced testing and cultural trials, and C.R. (Chuck) Brown, USDA-ARS Geneticist, Prosser, doing germplasm enhancement.

Efforts to produce high quality seed early in the selection process were instituted in Idaho and Oregon in the early 1980's. Uniform field trials were established for the Tri-States followed by testing in the Western Regional Potato Variety Trials. As advanced selections are put into the Tri-State and Regional trials they are also started in tissue culture for entry into the States' limited generation seed programs. In addition, experimental seed is produced by cooperating seed growers in large enough quantities for use by processing companies in determining processing quality.

Potato varieties released jointly by the states cooperating with the Aberdeen USDA program:

<u>YEAR</u>	<u>VARIETY</u>	<u>STATES</u>
<u>Russets</u>		
1953	Early Gem	ND, ID, USDA Beltsville
1963	Shoshoni	ID
1973	Nampa, Targhee	ID
1977	Butte	ID, OR, WA
1981	Lemhi Russet	ID, CA, OR, WA, ND
1990	Frontier Russet	ID, OR, WA, CO
1991	Ranger Russet	ID, OR, WA, CO
1998	Umatilla Russet	OR, ID, WA
1999	Bannock Russet	ID, OR, WA

Non-Russet

1982	Sangre	CO, ID
1989	Gemchip	ID, OR, WA, CO
1993	Chipeta	CO, ID
1997	CalWhite	CA, ID

Several promising selections are in various stages of testing and increase. Two selections to be released in 1999 are COO83008-1 as 'Russet Legend', Oregon taking the lead, and A82705-1R as 'IdaRose', Idaho taking the lead. In addition, A8495-1 will be released as 'Gem Russet', but the time for release is still pending.

Over the years, the general overall quality of our parental clones has improved noticeably and this has resulted in better selections now being evaluated as potential varieties. However, with the recent addition of late blight resistance as an objective, we have temporarily lost ground in overall quality because the resistance has only been found in unadapted, non-russets of various shapes, often with poor internal quality. Breeding high quality russets or chippers with broad resistance to late blight in both foliage and tubers is especially challenging.

In 1990, we began cooperating with USDA and university colleagues in evaluating transgenic materials. These, for the most part, are named varieties that have been transformed by the addition of genetic constructs that have been designed to correct deficiencies, such as for blackspot, virus, or bacterial susceptibilities or high glycoalkaloids, inherent to the varieties. One construct is added to a variety at a time, but often the process results in unwanted changes; hence the continued need for field-testing. Promising results have been obtained with blackspot resistance in Ranger Russet and reduction of glycoalkaloids in Lenape.