

Potato Varieties and Breeding

Robert H. Johansen

Since 1957, 14 varieties of potatoes have been named and released by the horticulture department at NDSU. Of these 14 varieties, eight have had some impact on potato production in North Dakota and nationally. For example, in 1989, 53 percent of the total North Dakota certified seed potato acreage is of NDSU introduced varieties. Nationally, NDSU varieties make up at least 30 percent of the total potato production. In 1988 Norchip ranked second and Russet Norkotah fourth in certified seed production in the United States. Also in 1988, of the 11 major fall producing states, nine states had an NDSU variety ranking either first, second, third or fourth in their total potato production.

The eight varieties that have had some significance or impact in potato production are Norland, released in 1957, Viking (1963), Norgold Russet (1964), Norchip (1969), Bison (1974), Redsen (1982), NorKing Russet (1985) and Russet Norkotah (1987). Norchip still ranks as the top chipping variety and has had this honor almost all of the 20 years since it was first named in 1969. In the past two years, Russet Norkotah has been one of the top early russet varieties produced in the early and late summer producing states. States such as California (Bakersfield), Oregon, Idaho, Washington (Columbia Basin), Colorado and others have greatly increased production of Russet Norkotah. During August and early fall, Russet Norkotah is the top russet variety seen sold in most supermarkets. Norland, released 32 years ago, is still the top early red variety grown in the United States and Canada.

Where do all these varieties come from? Each year the horticulture department grows approximately 50,000 to 60,000 seedlings in the greenhouse from potato crosses made the previous winter. Also about 50,000 to 60,000 seedling tubers are grown in the field at the Langdon Experiment Station. From these seedling tubers, approximately 1,500 seedling hills are selected each fall and all have the potential of being a new and improved variety. All of the 14 potato varieties released by NDSU have first been grown

and selected in the field at the Langdon Experiment Station. The significance of this can be seen in the economic impact the Langdon Experiment Station has had on the approximately \$100 to \$150 million potato crop produced in North Dakota.

Characteristics sought for in new varieties are yield, total solids, disease and insect resistance, smooth type and shallow eyes, skin color (red, russet or white), low sugars for good processing qualities and others. All of these characteristics are important for a new variety and each new variety must possess at least one or more of these characteristics to become a new variety.

The use of *Solanum* species to enhance better insect and disease resistance and to develop chipping varieties that will chip or fry white out of 38 degrees Fahrenheit (3 to 4 degrees C) storage has also been undertaken in the past few years. A selection number, ND860-2, which has *Solanum phureja* in its pedigree or breeding, has been grown and used with excellent chipping results by growers in the United States and Japan. Japan will be growing approximately 50 to 73 hectares of ND860-2 this next season for chipping. ND860-2 will be named in the near future.

Crosses between *S. fendleri* and *S. vernei* hybrids (from Alaska) with *S. tuberosum* have resulted in some selections with apparent resistance to Colorado potato beetle. Several new North Dakota selections have a fair degree of resistance to scab and other potato diseases. A russet selection, ND671-4Russ, will probably be named in the near future. This selection, along with NorKing Russet, has Verticillium wilt resistance and both are being grown and used by growers in Idaho, North Dakota, and Minnesota for processing into frozen french fries. Both ND671-Russ and NorKing Russet are having a great impact on early processing in those states.