

Final Report

94000232

**EVALUATION OF NEWLY DEVELOPED POTATO CLONES
FOR PRODUCTION IN SASKATCHEWAN**

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The Agriculture Development Fund
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Prepared by: University of Saskatchewan

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Production in Saskatchewan**

ADF Project No: 94000233

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Evaluation of Newly Developed Potato Clones for Production in Saskatchewan

Abstract

The potato industry in Saskatchewan is, at present, too limited to justify a full scale breeding program, yet the continuing health and expansion of the industry depends on the growers planting the best available cultivars. The Prairie Regional Potato Trials (PRPT) develop and test potato lines with characteristics required by the potato industry on the prairies. Agriculture Canada provides the personnel responsible for breeding, early generation selection and pathology while the provinces conduct the regional test sites. Promising clones from the northern U.S. are evaluated as well as the clones developed by Canadian breeders. This project covered Saskatchewan's participation in the PRPT from 1995-1997. The PRPT were conducted at two sites in Saskatchewan (Saskatoon and Outlook). A total of > 500 breeding lines were during this three year period for vigor, earliness, yields, tuber appearance, disease and insect resistance, flavor and processing characteristics. Results of trials conducted in Manitoba, Alberta and Saskatchewan were considered in determining which releases should be licensed, named and made available to prairie potato growers. From 1995-1997, the Prairie Regional Potato Program released 23 lines with sufficient merit to warrant industry evaluation. The Saskatchewan Seed Potato Growers Association was granted a licence to field test 8 of these lines. The lines were evaluated in large scale trials on grower sites in 1996 and 1997. If these new varieties meet grower expectations, Saskatchewan's potato industry will be given an opportunity to bid on an exclusive licence for the varieties.

Project Background

Cultivar testing represents a highly efficient and cost effective means of maintaining and/or improving yields, quality and profitability or crop production. Industry needs may be matched with breeders achievements without the expense of maintaining a full breeding program. Growers are provided with the cultivars required to meet changing production practices, pest pressure and market demand.

Potato production in Saskatchewan is, at present, too limited to justify a full scale breeding program, yet the continuing health and expansion of the industry depends on the growers planting the best available cultivars. The Prairie Regional Potato Trials (PRPT) were initiated in 1979 at the request of the Prairie Potato Council to develop and test potato lines with characteristics required by the potato industry on the prairies. Agriculture Canada has provided the personnel responsible for breeding, early generation selection and pathology while the provinces conduct the regional test sites. Promising clones from the northern U.S. are evaluated as well as the clones developed by Canadian breeders. Saskatchewan has participated in the Prairie Regional Potato Trials since their inception with funding provided through the Agriculture Development Fund and Saskatchewan Agriculture and Food.

This report outlines the Prairie Regional Trials conducted in Saskatchewan from 1995-1997.

The Prairie Regional Potato Trials are conducted in accordance with a standardized protocol which is followed at all testing sites. Clones or cultivars are included for evaluation trials based on recommendations by the Cultivar Evaluation Committee of the Prairie Potato Council. Each year, performance of the various lines are evaluated by the Breeding and Selection Committee of the PRPT, with sub-standard types dropped from the trials, outstanding performers graduated to more extensive testing and the remainder examined again in the next year. There are 5 levels of testing, from the adaptation trial in which new entries are evaluated in small non-replicated plots, to the large replicated trials, in which the most promising lines are evaluated against standard cultivars. Entries are evaluated for vigor, earliness, yields, tuber appearance, disease and insect resistance, flavor and processing characteristics. Results of trials conducted in Manitoba, Alberta and Saskatchewan are considered in determining which releases should be licensed, named and made available to prairie potato growers.

The trials from 1995-1997 were conducted at the Horticulture Science Potato Plots in Saskatoon, with a satellite trial site at the S.I.D.C. in Outlook. The inclusion of the Outlook site allows for more thorough testing of the cultivars under differing conditions while also raising the profile of the trial with local grower groups. The Saskatoon site is a loam (pH 6.9) while the Outlook site is a moderately saline, sandy loam (pH 8.2). The Saskatoon site has severe problems with the disease common scab (*Streptomyces scabies*) which allows for effective screening of the new lines for resistance to this disease. Standard irrigated production practices were employed at both sites. A portion of the crop is harvested in late August to allow for evaluation of early yield potential. The remainder of the crop is harvested at the normal time in late September.

The breakdown of trials conducted at the two sites is as follows;

	<u>Saskatoon Site</u>	<u>Outlook Site</u>
1) Adaptation Trial		
- 30-40 most recent releases	yes	no
- 8 plants/plot		
- non-replicated		
2) Advanced Adaptation Trial		
- Level I - 40 lines	yes	no
- 8 plants/plot		
- 2 replicates		
- Level II - 50 lines	yes	no
- 12 plants/plot		
- 4 replicates		
3) Prairie Main Crop Trial		
- 20 advanced lines	yes	yes
- 20 plants/plot		
- 4 replicates		
4) Prairie Early Replicated Trial		
- 10-15 advanced lines for areas with shorter growing seasons	yes	yes
- 20 plants/plot		
- 8 replicates		
5) Prairie Region Registration Trials		
- evaluate newly registered lines	no	yes
- European and N. America breeding programs		

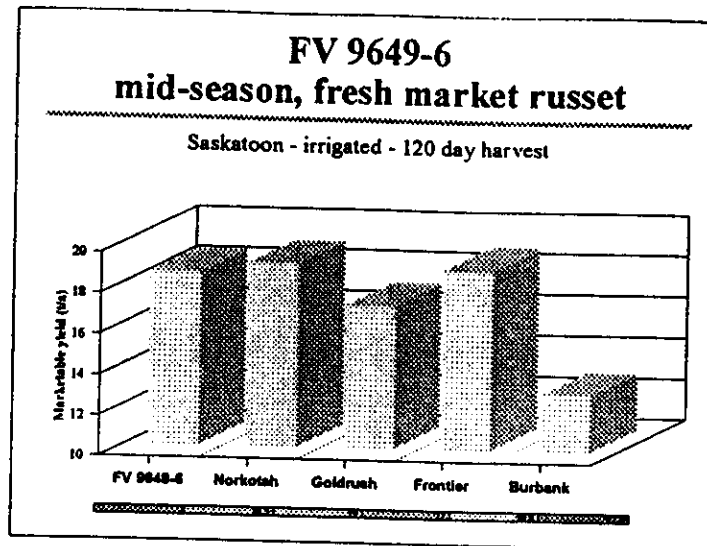
Data Collected: Emergence time, % stand, yield components at 85 and 110 days after planting, tuber appearance, plant and tuber disease incidence and reactions, boiling, baking, chipping, frying and storage quality.

Progress to Project Completion - December 1997

The field evaluation, data compilation and interpretation components on this program have been completed for the 1995-1997 cropping seasons. Registration recommendations based on the 1997 cropping season results will be finalized at the Prairie Potato Council meeting scheduled for February 1998.

AV82101-12 An early maincrop potato with russeted skin and shallow eyes. Processing quality is equal to Russet Burbank. Yields are superior to Russet Burbank and comparable to Shepody. Disease resistance is comparable to Russet Burbank.

FV9649-6 fresh market russet type. Very uniform with shallow eyes. Yields superior to Russet Burbank. Superior disease resistance to Norkotah



Prairie Potato Breeding Consortium

The inclusion of potatoes under Plant Breeders' Rights legislation provides seed producers with the opportunity to control seed production and marketing of varieties developed by the Prairie Potato Breeding and Development Program. In the spring of 1994 a Prairie Potato Breeding Consortium was established. Consortium members will have the right to bid on the exclusive licence for any varieties developed by the Prairie Potato Breeding and Development Program (PPBDP). In return, the Consortium will pay the PPBDP an annual membership fee and royalties for each variety. The Vegetable Producers of Saskatchewan (Ltd.) is a member of the Consortium, with licencing rights held by members of the Saskatchewan Seed Potato Growers Association.

The development of the Consortium should allow the Prairie Potato industry to reap maximum benefits from the Breeding and Development Program, while the royalties will help underwrite future program costs.

In 1997, 15 lines developed by the Prairie Regional Potato Breeding Program were on trial at grower sites across the Prairies as the final step in the review and bidding process that has been developed for the Potato Consortium. Interested growers and associations had until February of 1998 to tender bids for exclusive or non-exclusive access to these lines. Beginning in 1997, all transgenic lines developed as by the Prairie Regional Breeding Program will also be licenced through the Consortium.

Technical Reports

- 1) 1996 Prairie Regional Potato Cultivar Testing Report (in press)
- 2) 1996 Vegetable Cultivar Evaluation Trial Results (University of Saskatchewan)
- 3) 1996 Annual Report by the Saskatchewan Irrigation Development Centre
- 4) 1997 Prairie Regional Potato Cultivar Testing Report (in press)
- 5) 1997 Vegetable Cultivar Evaluation Trials (in press)

Notable Program Achievements

The release and introduction of new cultivars by the Prairie Regional Potato Program has resulted in increased acreage and enhanced competitiveness while also opening potential export markets. Some notable releases from this program over the last five years are;

Niska - is a chip cultivar with excellent processing characteristics and long term storage capability. Niska has consistently rated as one of the top varieties in the cross Canada chipping trials. Exclusive European rights to Niska have been sold to a German company.

AC Ptarmigan - is an early maturing cultivar licenced in 1993 and suited for both chipping and table use. Edmonton Potato Growers have been granted the exclusive licence for Ptarmigan, with the royalties being ploughed back into the Prairie Regional Potato Program.

Amisk - a clonal variant of Ranger Russet, licenced in 1993, has begun to replace Russet Burbank as the dominant processing and table stock variety in North America. Significant acreages of Ranger and Amisk seed are being grown in Saskatchewan for export into the United States. Growers are beginning to prefer Amisk over Ranger, as it tends to be more uniform with less problems with blackspot bruising.

Latest Releases

AV 7788-9: A french fry type with superior yields and disease resistance.

FV 9650-1: A yellow fleshed processing variety suited for export markets.

V 0056-1: A chipping variety producing good chip colors out of the field or cold storage.

MN 8777: A red skinned table variety with better color retention during storage than Norland (aka Red Ruby).

In 1997, the Saskatchewan Seed Potato Growers Association tested the following lines derived from the Prairie Potato Cultivar Program

ND3001-2, ND2937-3 and V0299-4

Main crop table potatoes with superior skin color to Norland. Yields slightly lower than Norland.

