

# Crystal, A New Processing Potato Variety

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The potato still ranks as the top vegetable crop grown in the U.S. In North Dakota the potato is the only vegetable crop grown extensively and the only vegetable crop that generates any appreciable farm income. Farm income in North Dakota from potatoes varies from 50 to 100 million dollars per year depending on production and current price. This income is from on-the-farm sales and does not take into consideration income that is generated indirectly from potatoes such as sale of machinery, railroad, trucking, construction, chemicals and other products and materials used in potato production.

On March 1, 1980, Crystal, a white-skinned variety, was named and released by the Horticulture and Plant Pathology Departments at NDSU and the Red River Valley Potato Research Laboratory at East Grand Forks, Minnesota. This is the eleventh variety released by NDSU since the introduction of Norland in 1957. Crystal was named after the town of Crystal in Pembina County, North Dakota. The name also describes its bright, clear, crystal-like skin, which is very thin.

Crystal was tested and grown under the pedigree ND8891-3. The selection or clone originated from a cross between Cascade and ND7196-18. Cascade was derived from crossing several South American *Solanum* species and a common USDA potato selection. ND7196-18 resulted from a cross between red-skinned USDA and red-skinned North Dakota selections. The cross was made in 1970 and the seedling was grown in the field and selected at the Langdon Experiment Station in 1971.

The vine type of Crystal is quite large and upright, simplifying spraying and tillage. The blossoms are very fragrant and purple-reddish in color which is unusual for a white-skinned cultivar.

Tuber type of Crystal is oblong to round and has smooth, shallow eyes. It is medium late in maturity.

Crystal has resistance to infection by potato Virus X, some resistance to common scab and is moderately tolerant to Verticillium wilt. It is susceptible to bacterial pink eye during wet harvest seasons.

Crystal will produce both high total and U.S. No. 1 yields. Yield trials at Park River and Grand Forks (Table 1) showed Crystal to out-yield both Kennebec and Norchip when yields are averaged at both locations for five years.

Percent total solids or specific gravity, which is a measure of the amount of dry matter in a potato, is also quite high. In processing, this is important, as high dry matter potatoes have less oil absorption when made into chips or french fries. The finished product has a higher yield, and also requires less energy to remove water from the raw product in processing. Dry matter tests for 5 years (Table 2) at Park River and Grand Forks showed the total solids of Crystal to average 21.0 per cent. In similar trials, Kennebec had 19.9 per cent and Norchip 22.4 per cent.

Tests for chip quality (Table 3) indicates that Crystal does not produce chips as light in color as Norchip but comparable to Kennebec. This agrees with results observed in commercial production, where Crystal seems to be very much like Kennebec in chip quality. Norchip, another NDSU release, is probably probably the top chip variety grown today in both the United States and Canada, and if Norchip wasn't available, Crystal probably would be a very acceptable chip variety.

Since Crystal is long-oblong in shape, it should make an excellent potato for the frozen french fry trade, for dehydration and for table use. Tests for color, flavor

TABLE 1. U.S. No. 1 Yield (Cwt/A) of Crystal and Two Standard Varieties Grown at Park River and Grand Forks, ND 1975-1979.

Variety	1975		1976		1977		1978		1979		Average		Average both locations
	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks <sup>1</sup>	Park River	Grand Forks	Park River	Grand Forks	
Crystal	324	252	278	235	397	329	257		237	243	298.0	264.8	281.4
Kennebec	390	271	178	225	397	287	308		219	201	299.0	196.0	247.5
Norchip	382	297	182	216	282	283	238		180	176	252.8	243.0	247.9

<sup>1</sup>No data - plot flooded out.

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and texture by the Foods and Nutrition Department of the College of Home Economics at NDSU (Table 4) showed Crystal made better french fries and potato flakes than either Kennebec or Russet Burbank. Crystal, with its thin white skin and high dry matter, makes an excellent baking potato. It is also a good variety for

TABLE 2. Per Cent Total Solids of Crystal and Two Standard Varieties Grown at Park River and Grand Forks, ND 1975-1979.

Variety	1975		1976		1977		1978		1979		Average		Average both locations
	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks <sup>1</sup>	Park River	Grand Forks	Park River	Grand Forks	
	%	%	%	%	%	%	%	%	%	%	%	%	%
Crystal	22.9	22.4	22.4	21.8	20.5	19.0	20.3		22.4	20.3	21.7	20.9	21.3
Kennebec	20.9	20.7	19.0	21.4	17.1	17.7	19.2		22.0	20.9	19.6	20.2	19.9
Norchip	23.5	23.1	22.2	23.3	21.4	21.4	21.2		22.7	22.4	22.2	22.6	22.4

<sup>1</sup>No data - plot flooded out.

TABLE 3. Color Chart Readings and Per Cent Recoverable Chip Yield of Crystal and Two Standard Varieties Grown at Park River and Grand Forks, North Dakota.

Variety	Color Chart <sup>1</sup>				Percent Chip Yield <sup>2</sup>				Average <sup>1</sup> Color Chart		Average <sup>2</sup> % Chip Yield	
	1977		1978		1977		1978		Park River	Grand Forks	Park River	Grand Forks
	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks
Crystal	5.0	5.5	5.0	5.8	35.0	33.5	35.3	36.5	5.0	5.7	35.2	35.0
Kennebec	4.0	6.0	5.0	6.2	34.5	30.5	31.5	31.0	4.5	6.1	33.0	30.8
Norchip	6.0	4.0	5.5	5.0	38.5	32.7	34.5	36.0	5.8	4.5	36.5	34.4

<sup>1</sup> PCI Color Chart (1 = very white; 10 = very dark)

<sup>2</sup> Per cent chips from 100 lbs. potatoes.

boiling and other prepared potato dishes.

Crystal has been increased by foundation seed growers in North Dakota and Minnesota. A list of growers having certified seed of Crystal may be obtained by writing to the North Dakota State Seed Department, North Dakota State University, Fargo, ND 58105 or the Minnesota State Seed Department, 620 State Office Building, St. Paul, MN 55101.

TABLE 4. Frozen French Fry and Flake Quality<sup>1</sup> Test Conducted by the NDSU Foods and Nutrition Department, 1979-80.

Variety	French Fry			Flakes		
	Color	Texture	Flavor	Color	Texture	Flavor
Crystal	5.9	5.3	5.9	7.3	7.3	6.5
Kennebec	4.0	4.4	4.5			
Russet Burbank	5.0	4.6	4.8			
Norchip				7.3	7.5	7.8

<sup>1</sup>Ranked on a scale of 1-9

1-4 Poor, not acceptable

5-6 Fair, but acceptable

7-9 Good, very acceptable

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TABLE 2. Days to maturity, seed weight and percentage dockage comparisons of Pindak to check varieties.

	Days to maturity <sup>1</sup>	250 seed wt. <sup>2</sup> grams	Percentage dockage through various slotted screen sizes	
			1980 <sup>1</sup> 10/64 x 3/4	1979 <sup>2</sup> 11/64 x 3/4
UI-114	101.0	92.9	1.4	4.1
Pindak	96.9	81.8	.5	1.4
NW590	----	82.7	2.0	---
NW410	----	81.0		

<sup>1</sup>14 location years  
28 locations 1980

<sup>1</sup>Average of Fargo, Oakes, Barney, and Hatton.

<sup>2</sup>Average of Hatton and Oakes.