

Potato Variety Trials in North Dakota - 1950

By Harold Mattson¹ and Robert Johansen²

Kennebec, Pontiac, and Red Pontiac were the highest yielding varieties in North Dakota Agricultural Experiment Station potato variety trials in 1950. The red tuber varieties, Pontiac, Red Pontiac, Progress and Triumph, and the white tuber varieties, Cobbler, Canus, Essex, Kennebec, White Cloud and Station selection ND 457, were grown in seven standard yield trials in five locations with the following cooperators:

Fargo	Department of Horticulture, NDAC
Grand Forks two trials	William C. Case, Executive Secretary Red River Valley Potato Growers Association
Langdon	Victor Sturlaugson, Superintendent of Sub- station
Minot	G. N. Geiszler, Superintendent, North Central Agricultural Experiment Station
Williston two trials	Arlon Hazen, Superintendent, Williston Dryland and Williston Irrigation Experiment Station

Planting was delayed two to three weeks because of wet grounds and ranged from May 27 at Fargo to June 7 and 15 for the two trials at Grand Forks. Growing conditions were generally favorable and the trials were quite free from virus and other vine diseases.

Cobbler, White Cloud, Triumph, and Progress were medium early; Pontiac, Red Pontiac, Essex, Canus, and ND 457 were medium late, and Kennebec was late in maturity of foliage. The vines of all but the medium early varieties were quite green in the trials at Grand Forks, Fargo, and Langdon until killed by frost October 2.

Harvested stocks were assembled at Fargo and graded for determination of tuber size and yield. Specific gravity of trial stocks was determined by floating samples of 20 tubers through a series of salt solutions. Cooking quality and vitamin C content of the trial varieties are being studied by the department of human nutrition. Resistance of the trial varieties to puncture and skinning by mechanical devices is being studied in cooperation with the department of agricultural engineering.

YIELD AND SIZE OF TUBERS

Trial yields were very good, ranging with natural rainfall from 251 bushels per acre at Langdon to 348 bushels per acre at

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Fargo and in the irrigated trial at Williston, 388 bushels per acre. Yields from the trials are reported in Table I as bushels per acre from 25-plant rows of each variety replicated four times in each trial. The spacing was 14x42 inches in the trials at Williston, 24x42 inches at Minot, and 16x38 inches in the remaining trials.

Table I. TOTAL YIELD OF POTATO VARIETIES IN SEVEN TRIALS¹

Variety	Williston		Fargo	Minot	Grand	Forks	Langdon	Average
	Irrigation ²	Dryland			6/7	6/15		
	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A	Bu/A
Kennebec	441	487	411	403	323	298	276	377
Pontiac	405	386	359	402	274	302	333	352
Red Pontiac	436	360	383	366	310	280	296	347
Canus	410	371	347	339	252	217	279	316
Essex	369	404	350	311	279	226	226	309
Triumph	329	334	389	300	283	231	212	297
Progress	430	251	304	307	291	240	191	288
ND 457	371	316	307	253	250	251	261	287
Cobbler	321	288	323	327	265	256	225	286
White Cloud	363	275	304	306	235	219	213	274
Average	388	347	348	331	276	252	251	313
Least significant difference at 5% level	84	60	55	58	52	36	56	34

¹Based on four 25-hill rows of each variety in a randomized block trial at each location.

²Approximately 4 inches of water applied July 29.

RED VARIETIES

Triumph, Red Pontiac, and Pontiac are red tuber varieties widely grown in North Dakota. Red Pontiac is a mutation or bud sport of the Pontiac variety and has brighter red skin color than Pontiac. Progress is a red tuber variety introduced by the Nebraska Agricultural Experiment Station in 1948.

Pontiac with 352 bushels per acre and Red Pontiac with 347 bushels per acre were similar in yielding ability. They ranked significantly above Triumph, which yielded at the rate of 297 bushels per acre and Progress, which yielded at the rate of 288 bushels per acre.

Triumph and Progress yielded about the same in four of the seven trials. In the trial at Fargo and in the trial with natural rainfall at Williston, Progress yielded one-fourth less than Triumph, but in the irrigated trial at Williston, Progress yielded 100 bushels more than Triumph. This is similar to the performance of Progress in western Nebraska where it has been found to yield more than Triumph under irrigation. Progress is reported to suffer less cracking of tubers than Triumph under Nebraska conditions, where cracking of tubers at harvest is a serious problem. There was very little cracking of tubers in any of the varieties in these trials. Progress had slightly less scab than the Pontiac, Red Pontiac and Triumph varieties which had moderate scab injury on occasional tubers.

POTATO VARIETY YIELDS IN STATION TRIALS

VARIETIES

Early

COBBLER



YIELD
in bushels
per acre

286

AVERAGE
wt of tubers
ounces

5.3

TRIUMPH



297

5.5

Medium Late

PONTIAC



347

7.1

**RED
PONTIAC**



352

7.2

Late

KENNEBEC



377

7.5

These five varieties, important in commercial production, were tested together with 5 other varieties in North Dakota in 1950. Four 25-plant rows of each variety were planted in randomized block trials at Fargo, Grand Forks (two), Langdon, Minot, and both with and without irrigation at Williston.

WHITE VARIETIES

Among the white tuber varieties Essex and Kennebec are grown in a few localities in North Dakota and Cobbler is widely grown. Essex is midseason and Kennebec is late in maturity of vine. Both are resistant to late blight. Kennebec and Canus are productions of the United States Department of Agriculture and Essex was developed by the New York Agricultural Experiment Station. White Cloud is an early, round, white variety introduced by the Nebraska Station in 1949. ND 457 is an advanced selection of the potato breeding program of the North Dakota Agricultural Experiment Station. ND 457 has shown field resistance to potato virus Y and the tubers have shallow eyes and better shape than Cobbler.

Kennebec yielded significantly more than Cobbler in each trial and one-third more than Cobbler in the seven trials combined. Kennebec yielded significantly more than all other trial varieties except Pontiac and Red Pontiac which yielded nearly as much. Kennebec had less scab than the other white tuber varieties, ranking with the red tuber varieties in freedom from scab.

Among the white tuber varieties other than Kennebec, none yielded significantly more than ND 457 and Cobbler. White Cloud alone yielded significantly less than Canus and Essex but about the same as ND 457 and Cobbler when all seven trials are considered. Scab injury was common in White Cloud and moderate in Canus, Cobbler, Essex, and ND 457 in these trials.

The yield of tubers by percentage, in four size classes is reported in Table II, together with the average tuber weight and the average total yield of the varieties in seven trials.

Pontiac, Red Pontiac, and Kennebec were similar in percentage of yield of tubers in the several size classes with approximately

Table II. PERCENTAGE OF YIELD IN FOUR SIZE CLASSES AND AVERAGE TUBER WEIGHT OF POTATOES FROM SEVEN TRIALS¹

Variety	Average	Percentage of yield				Average
	total yield	below 2¼"	2¼"-3"	3"-4"	over 4"	tuber weight
	Bu/A	%	%	%	%	ounces
Kennebec	377	7	36	49	8	7.5
Pontiac	352	8	33	53	6	7.1
Red Pontiac	347	7	34	53	6	7.2
Canus	316	13	42	42	3	5.3
Essex	309	17	47	33	3	4.4
Triumph	297	12	49	37	2	5.5
Progress	288	35	55	10	0	3.5
ND 457	287	13	44	41	2	5.4
Cobbler	286	13	47	38	2	5.3
White Cloud	274	26	52	21	1	4.2
Average	313	15	44	38	3	5.5
Least significant difference at 5% level	34					0.9

¹Based on four 25-plant rows of each variety in randomized block trials at Fargo, Grand Forks (two), Langdon, Minot, and with and without irrigation at Williston.

seven per cent of their yield in tubers having a minimum diameter below $2\frac{1}{4}$ inches, 35 per cent $2\frac{1}{4}$ to 3 inches, 51 per cent 3 to 4 inches, and seven per cent over 4 inches.

Progress produced small to medium tubers and was below other varieties tested in average weight of tubers. On the average Progress tubers were three-fifths as large as those of Triumph and Cobbler and one-half as large as those of Pontiac and Red Pontiac. One-third of the yield of the Progress variety was in tubers under $2\frac{1}{4}$ inches and one-tenth in tubers over 3 inches in diameter.

Canus, Cobbler, and ND 457 were similar in average tuber weight and in the percentage of tubers in the various size classes. Essex and White Cloud were low in average tuber weight and produced respectively one-sixth and one-fourth of their yield in tubers below $2\frac{1}{4}$ inches in diameter.

SPECIFIC GRAVITY

The specific gravity of potato tubers is related to the starch content and mealiness of the cooked product. Potatoes which are low to medium in specific gravity and mealiness are best suited for frying and for use in salads as the individual pieces do not break apart readily in preparation and use. Potatoes that are medium in specific gravity and mealiness usually do not slough or fall apart in cooking and are suitable for boiling. A potato that is fairly high in specific gravity is usually satisfactory in mealiness and makes a good mashed potato. Potatoes that are high in specific gravity may break up more readily when boiled but are well suited for baking.

The average specific gravity of the trial varieties is reported in Table III, together with the range in the seven trials and the average specific gravity of six of the varieties which were included in 13 similar trials in 1949.

Table III. SPECIFIC GRAVITY OF TRIAL POTATOES

Variety	Average of 13 trials in 1949	Seven trials in 1950	
		Range	Average
ND 457		1.092-104	1.097
White Cloud		1.092-104	1.097
Cobbler	1.089	1.090-102	1.095
Progress	1.081	1.088-101	1.093
Kennebec	1.083	1.084-97	1.090
Triumph	1.076	1.083-93	1.088
Canus		1.080-90	1.084
Red Pontiac	1.072	1.080-89	1.083
Pontiac		1.078-88	1.082
Essex	1.077	1.076-90	1.080
Average	1.080		1.089
Least significant difference at 5% level004		.002

ND 457 and White Cloud were highest in specific gravity, each averaging 1.097, which is significantly above that of the other trial varieties. Cobbler was high, Kennebec medium, Canus fairly low, and Essex the lowest in specific gravity among the remaining white tuber varieties.

In the red tuber varieties, Progress was high, Triumph intermediate, and Pontiac and Red Pontiac relatively low in average specific gravity. Specific gravity readings were very much higher than in the 1949 trials but the varieties which were grown in the two trials maintained the same rank each year. There is considerable variation in specific gravity within varieties. Thus, the high testing tubers from a low specific gravity variety may be as high as the low testing tubers from a high specific gravity variety. This indicates that while the variety is an important determiner of specific gravity and table quality, these factors are influenced by other variables such as growing conditions and soil.

These varieties were tested also in single row trials of 25 plants each in plantings at the North Dakota Experiment Station branch stations at Dickinson and Edgeley in cooperation with T. J. Conlon, assistant agronomist, and J. P. Tiernan, superintendent, of the respective stations. The yield and specific gravity of the varieties in these trials were generally similar to those in the larger trials except that Cobbler and White Cloud yielded relatively more and Kennebec relatively less in these locations.

SUMMARY

1. Kennebec, a late maturing, blight resistant, white tuber variety, yielded slightly more, and produced tubers of slightly larger size than Pontiac and Red Pontiac in a test of 10 varieties in Experiment Station potato trials in seven locations in 1950.
2. Kennebec was higher in specific gravity of tubers than Pontiac, Red Pontiac, Triumph, Canus, and Essex but below Station Selection ND 457, White Cloud, Cobbler, and Progress in this measure of table quality.
3. Canus, Essex, ND 457, and White Cloud, white tuber varieties, and Progress, a red tuber variety, were similar to Cobbler and Triumph in yield in these trials.
4. ND 457, a station selection which has shown field resistance to virus Y, produced tubers of good shape with shallow eyes, and was high in specific gravity.
5. White Cloud was high in specific gravity and injury from scab and low in yield and size of tubers.
6. Canus and Essex were similar to Cobbler in tuber characters but were below Cobbler in specific gravity.
7. Kennebec, Pontiac, and Red Pontiac produced tubers of large average size and Progress, White Cloud, and Essex were small in average size of tubers.
8. Red Pontiac was found to be generally similar to Pontiac except in the red color of skin, which was more intense on tubers of Red Pontiac.