

**POTATO VARIETY TRIALS IN NORTH DAKOTA—1948**

By

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Ten advanced potato selections and six varieties were grown in yield trials at Fargo and Grand Forks and with cooperators at the following locations in North Dakota in 1948:

Dickinson	Leroy Moomaw, Superintendent, Dickinson Substation
Edgeley	J. P. Tiernan, Superintendent, Edgeley Substation
Hettinger	Edgar Martin, Superintendent, Hettinger Substation
Hillsboro	R. L. Nelson, County Extension Agent
Langdon	Victor Sturlaugson, Superintendent, Langdon Substation
Mandan	W. P. Baird, Horticulturist, Northern Great Plains Field Station, United States Department of Agriculture
Minot	G. N. Geiszler, Superintendent, North Central Agricultural Experiment Station
Park River	Lyle Currie, County Extension Agent
Williston	Arlon Hazen, Superintendent, Williston Dryland and Irrigation Substations

The red tuber varieties Triumph, Red Pontiac and Satapa and the white tuber varieties Chisago, Cobbler and Russet Sebago were grown with white tuber selections USDA B61-3, Minn 23 and Minn 42, and seven white selections of the potato breeding program of the Horticulture Department of the North Dakota Agricultural Experiment Station.

**Yield**

Yields of these trial potatoes are reported in Table 1 which records average yields of two 16-plant rows of each variety and selection expressed in bushels per acre. Yields varied from a plot average of 48 bushels per acre from 42 x 42-inch spacing of plants at Edgeley to 326 bushels from 16 x 40-inch spacing at Grand Forks with natural rainfall, and 410 bushels from 15 x 42-inch spacing in the irrigated trial at Williston. The 198 bushel per acre average yield of the ten non-irrigated trials may be compared to the 165 bushels per acre harvested from the 123,000 acres of potatoes grown in North Dakota in 1948.

ND 530, USDA B61-3, Red Pontiac and ND K5 produced the highest yields. The yield of these selections ranged from 228 to 242 bushels per acre as an average of ten dryland trials. These yields were significantly higher than those of all other trial varieties except ND 47102-3 which produced an average yield of 213 bushels per acre.

Cobbler, Chisago, Satapa, Minn 42 and North Dakota selections 148-84, 334-3 and 346-5 comprise an average yielding group. Their average yields in the dryland trials did not differ significantly one from another.

Triumph, ND 179-8 and Minn 23 were low in yield, averaging significantly below the overall average of 198 bushels per acre in the dryland trials. Triumph yielded well at Langdon and Grand Forks and in the irrigated trial at Williston where its average yield was 438 bushels per acre.

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Table 1.—Yield of trial potatoes in 11 locations in North Dakota—1948.  
(Bushels per Acre)

Variety	Grand Forks	Minot	Park River	Fargo	Dickinson	Hillsboro	Mandan	Langdon	Hettinger	Edgeley	Ave. 10 locations	Williston
												Irrigation
ND 530	410	358	328	350	217	254	186	151	111	54	242	.....
USDA B61-3	443	352	336	270	271	218	145	200	96	60	239	487
Red Pontiac	386	407	279	292	225	230	173	188	129	60	237	536
ND K5	328	248	345	417	194	230	173	182	111	51	228	438
ND 47102-3	279	314	320	370	213	157	180	127	123	48	213	421
Russet Sebago	312	325	353	258	181	145	145	121	96	45	198	347
ND 346-5	336	237	303	288	196	121	186	145	123	45	198	347
Satapa	369	396	164	219	194	182	166	139	84	42	196	471
Chisago	361	297	230	234	224	133	145	151	114	45	193	355
ND 334-3	271	226	279	331	221	145	110	151	134	48	192	421
Minn 42	287	242	263	304	164	170	138	133	120	42	187	364
ND 148-84	263	248	271	171	215	121	166	176	114	48	179	454
Cobbler	304	303	246	146	183	133	145	157	93	54	176	397
ND 179-8	271	325	205	183	177	121	138	103	78	48	165	314
Triumph	369	270	189	172	151	146	83	151	69	42	164	438
Minn 23	222	231	172	198	181	145	152	133	123	39	160	364
Least significant difference	88	.....*	119	.....*	54	.....*	48	32	.....*	11	26	82
Average	326	299	268	263	201	166	152	151	107	48	198	410
Spacing: inches:	16x40	24x40	16x40	18x36	18x36	12x36	18x42	24x36	42x42	42x42		15x42

\*No significant difference in these trials analyzed individually.

Virus disease was present in Triumph and a number of the lower yielding selections, particularly ND 179-8 and Minn 23. These lots and ND selections 148-84 and 334-3 and Chisago, Cobbler and Satapa showed considerable current season virus infection resulting in necrotic spotting of the leaves and defoliation. These symptoms follow current season infection following aphid transmission of virus Y in Cobbler and Triumph and many other varieties. Russet Sebago and B61-3 showed these symptoms in only a few plants.

Plants of ND 530 in all plantings examined were vigorous and free of necrotic leaf spots and defoliation which hastened the maturity of infected plants of other trial lots. Juice from these symptomless plants of ND 530 was rubbed into leaves of Triumph plants grown in the greenhouse. These Triumph plants developed symptoms of crinkle mosaic. Inoculation of juice from ND 530 plants to leaves of the ground cherry (*Physalis floridana*) was followed by the development of necrotic spots on the leaves of this plant. These tests indicate that the tested plants of ND 530 were carrying potato virus Y. Thus it appears that the trial plants of ND 530 failed to show current season symptoms of virus Y because they already carried this virus. ND 530 appears to harbor potato virus Y in the same way that Cobbler and Triumph and many other varieties harbor potato virus X.

ND 530 plants grown under cool temperatures in the greenhouse showed a faint mottle of the lower leaves. This mottling was not noticeable when the plants were grown at higher temperatures such as those that obtain in the field. Inoculation of juice of these ND 530 plants to globe amaranth (*Gomphrena globosa*) did not induce necrotic symptoms in this test plant. This indicates that these plants of ND 530 did not harbor X virus. However, necrotic symptoms of both globe amaranth and ground cherry resulted from inoculation of juice from a number of stunted and necrotic (*Rugose mosaic*) plants of both ND 530 and Triumph in greenhouse inoculation studies.

### Specific Gravity

The specific gravity of the trial potatoes was determined by floating 20 tuber samples through salt solutions of known specific gravity. The specific gravity of varieties and selections is reported in Table 2. The overall average specific gravity of material from the ten trials was 1.088. This indicates a dry matter content of 21.9 percent and a starch content of 15.4 percent. This is similar to the specific gravity of Cobbler in low test years and to the specific gravity of Triumph in high test years such as 1943 when the average specific gravity of Triumph lots from 100 North Dakota Certified Seed potato fields was found to average 1.087.

### Red Varieties

Satapa is a medium late variety with good yielding ability. In specific gravity Satapa ranked significantly higher than Red Pontiac and Triumph and significantly lower than Cobbler. Satapa has pale red skin color. Many tubers were deeply cracked.

Red Pontiac ranked high in yield and low in specific gravity. The 1.079 average specific gravity of Red Pontiac and Triumph indicates a starch content of 13.6 percent.

The low average specific gravity of Red Pontiac and Triumph and the pale color and cracking of Satapa suggests that there is a place for a better quality red potato in North Dakota. A number of newer red-tuber selections which appear promising are being increased for inclusion in these trials.

### White Varieties

Chisago, an early white potato from the Minnesota station, did not yield significantly above or below Cobbler in any trial but was significantly below Cobbler in specific gravity in seven trials. It was generally more attractive in tuber shape and appearance.

Russet Sebago is a russet sport of the Sebago variety and is similar to Sebago in late maturity and resistance to scab and late blight. Russet Sebago did not yield significantly above Cobbler. The seed tubers secured from the Wisconsin Foundation Seed Farm appeared to be uniformly netted or lightly russeted and were attractive in appearance. The harvested tubers did not have an attractive russetting but were brownish with a smooth finish.

### White Selections

While each of the numbered advanced selections has one or more valuable characters or points of differentiation from varieties, attention will be given here to selections USDA B61-3, ND K5, ND 148-84 and ND 530.

USDA selection B61-3 produced high yields and ranked high in specific gravity. This selection has resistance to scab and blight. It is late maturing and the tuber shape, while generally not as rough as in preceding years, was sufficiently uneven to be a possible handicap for commercial production.

ND K5, an early round white potato, yielded well but ranked below Cobbler in specific gravity. The vine of ND K5 is subject to rolling of the lower leaves and the selection may not be of commercial promise.

ND 148-84 has yielded in a class with Cobbler in these trials in 1947 and 1948. It has averaged significantly below Cobbler and significantly above Triumph and Pontiac in specific gravity each year. It is later than Cobbler in maturity, produces smooth round potatoes, and has had a good degree of resistance to late blight in vines and tubers.

Table 2—Specific gravity of trial potatoes from 11 locations in North Dakota—1948.

White varieties and selections	Man-dan	Hett-inger	Lang-don	Park River	Dick-inson	Willis-ton	Grand Forks	Edge-ley	Minot	Fargo	Hills-boro	Ave. 11 locations
ND 530	1.100	1.098	1.103	1.104	1.093	1.096*	1.089	1.089	1.093	1.098	1.086	1.095
Russet Sebago	98	99	99	95	95	84	102	90	89	99	92	95
USDA B61-3	99	96	105	96	98	94	102	88	87	89	88	95
ND 334-3	96	92	93	95	94	98	91	87	91	91	83	92
ND 346-5	101	98	84	95	93	91	85	89	89	87	86	91
Cobbler	90	95	95	94	91	93	88	84	87	82	88	90
ND 179-8	92	88	90	90	93	86	85	87	87	85	84	88
Minn 42	89	94	88	91	88	88	85	88	84	83	86	88
ND 148-84	93	90	85	84	89	89	82	82	84	60	84	86
ND K5	96	88	84	87	86	81	82	85	82	87	83	86
ND 47102-3	93	91	86	88	89	86	81	81	81	85	75	85
Chisago	94	91	90	81	90	90	83	81	82	74	76	85
Minn 23	85	87	83	85	86	84	79	83	76	74	77	82
Red varieties												
Satapa	89	95	85	88	93	93	86	85	86	83	76	87
Red Pontiac	77	85	85	83	77	81	80	76	76	78	76	79
Triumph	82	83	85	83	74	78	83	80	77	76	71	79
Least significant difference	.008	4	1	5	5	9	3	....	5	6	.008	.002
Average	1.092	1.092	1.090	1.090	1.089	1.088	1.087	1.085	1.084	1.084	1.082	1.088

\*A calculated specific gravity of 1.096 is included for ND 530 which was not grown in the trial at Williston.

**ND 530**

ND 530 ranked with the late maturing Red Pontiac and B61-3 in yield and ranked with the late maturing Russet Sebago and B61-3 in specific gravity, averaging 1.095. This indicates a starch content of 16.8 percent.

ND 530 has a vigorous vine of medium maturity. Tubers are oblong and usually of good shape with shallow eyes and free from knobs, growth cracks and hollow heart. Tubers are slightly netted in areas over the surface. The flesh is clear white and the table and baking quality is very good.

Hollow heart was common in these trials with Cobbler and Minn 23 and Minn 42 suffering the greatest injury. Hollow heart in Cobbler stock from six trials averaged 17 percent (49 lbs. of 287 lbs.). It was infrequent in B61-3, and Satapa and K5 and was found occasionally in other lots except in ND 530 which was entirely free from this defect. ND 530 is susceptible to common scab.

ND 530 is a selection from a cross between ND 148-84 and NND 121. It has been used extensively in the crossing program because of its high yield and good tuber quality. It is pollen fertile. ND 530 is being increased to provide material for more extensive tests.

**Summary**

1. Red Pontiac was the highest yielding named variety and Cobbler and Triumph were the lowest yielding named varieties in trials with the newer varieties Chisago, Russet Sebago and Satapa and 10 advanced potato selections in North Dakota in 1948.
2. Chisago, Russet Sebago and Satapa, three recently introduced varieties, did not yield significantly above Cobbler in any one of ten trials with natural rainfall or in a trial grown under irrigation at Williston.
3. Among named varieties, Russet Sebago (1.095) and Cobbler (1.090) were high and Red Pontiac (1.079) and Triumph (1.079) were low in average specific gravity.
4. ND 530, USDA B61-3, Red Pontiac and ND K5 produced average yields of 242, 239, 237 and 228 bushels per acre. These yields were significantly above the 198 bushel average yield of Russet Sebago and the 176 bushel average yield of Cobbler.
5. ND 530, Russet Sebago and USDA B61-3 ranked significantly above other trial varieties and selections in specific gravity with an average specific gravity of 1.095 which indicates a starch content of 16.8 percent.
6. ND 530, a selection of the North Dakota breeding program, is a high yielding white potato that is high in specific gravity.
7. No hollow heart was found in tubers of selection ND 530.