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Potato Variety Performance, Alaska 1998

by

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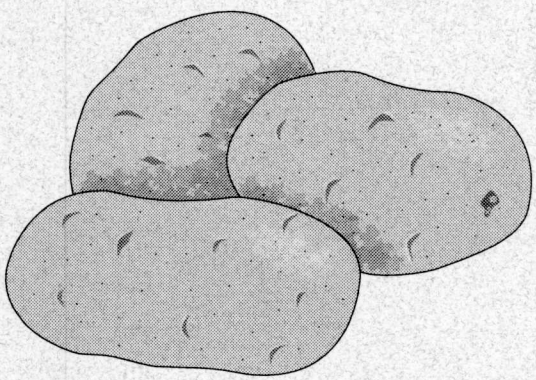

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POTATO VARIETY PERFORMANCE—1998

INTRODUCTION

A yield trial comparing 30 cultivars of potatoes (*Solanum tuberosum* L.) was conducted during the 1998 growing season at the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station's (AFES) Palmer Research Center, Matanuska Farm, located six miles west of Palmer, Alaska. A noteworthy change in design of this trial from previous years is the elimination of a nonirrigated treatment. This change was made in response to grower requests that more emphasis be placed in other research areas. Also, the differences in yield between irrigated and nonirrigated studies, and thus the clear need for systems to supplement rainfall, has been well established by trial results from previous years.

Although the nonirrigated portion of this trial has been discontinued, other aspects of the trial remain the same. Varieties with a history of commercial production in the Matanuska Valley (Alaska 114, Bake-King, Green Mountain, and Superior) were included to serve as a comparative base for newly developed varieties or older named varieties that have not been tested at this location. Russet Burbank, the variety most widely grown in the United States, also was included to broaden the base of comparison although past trials have demonstrated its unsuitability for this area. Varieties that compare favorably with the above listed local standards may warrant consideration by commercial growers.

Nonirrigated trials were conducted annually from 1982–1997 whereas irrigated trials were initiated in 1985 and are continuing. Results of these trials were published in AFES Circulars and are available at AFES offices.

MATERIALS AND METHODS

Irrigated field trials were planted at the Matanuska Farm on May 12, four days later than in 1997. Seedbed preparation included moldboard plowing to a depth of 10 to 12 inches followed by disking and packing. Potatoes were planted as soon as possible after tilling to minimize loss of early spring moisture. Soil moisture was low at planting time because of the small amount of snowmelt and virtually no rainfall in April. Four replicates of each variety, with 15 individual plants per replicate, were planted in rows 36 inches apart in a randomized complete block design. Seed used in these trials was produced on the Matanuska Farm from stocks acquired from the Alaska Division of Agriculture or from various certification agencies in the contiguous 48 states and Canada. Some of the varieties may have contained certain latent viruses. Seed pieces were planted approximately 11 inches apart in the row and covered with 2–3 inches of packed soil with a single row Iron Age assist feed planter. Shallow planting is advantageous as it helps to minimize the length of time between planting and emergence. Granular fertilizer (10–20–20) was applied at the rate of 120 pounds N, 240 pounds $P_2 0_5$ and 240 pounds of $K_2 0$ per acre by the planter in bands two inches to the side and two inches below the seed. The fertilizer was composed of monoammonium phosphate (11–51–0), muriate of potash (0–0–60), urea (45–0–0), and a limestone filler. Water was applied as needed to the plots through overhead sprinklers. Weeds were controlled by a pre-emergent application of Linuron (Lorox) supplemented by cultivation and hand weeding where necessary. Plants were hilled during the last week of June and all plots were harvested on September 14. Harvest was completed prior to any freezing temperatures in the area and the harvested crop went into cold storage in very good condition.

RESULTS AND DISCUSSION

The 1998 growing season began in the dry way that is normal for the Matanuska Valley and at planting time soil moisture was far below adequate levels. Virtually no rain fell in April (Table 1) and in May, rainfall was a trace below the 0.74 inch long term average. Application of irrigation water began

Table 1. Climatic data for Matanuska Farm during the 1998 growing season.[1]

	April	May	June	July	August	September
Temp. (°F)						
Air						
Daily max.	47.3 (46.4)	54.3 (57.0)	63.3 (65.4)	67.1 (67.5)	61.8 (65.0)	56.7 (56.4)
Daily min.	31.2 (27.4)	36.8 (35.8)	46.1 (44.4)	51.7 (48.1)	45.7 (45.9)	39.3 (38.6)
Daily mean	39.3 (36.9)	45.6 (46.4)	54.7 (54.9)	59.4 (57.8)	53.8 (55.5)	48.0 (47.5)
Soil (4" depth)						
Fallow	38.0	46.9	58.3	62.7	57.2	49.7
Sod	32.4	40.6	56.7	60.8	57.4	50.6
Precip. (in.)	0.02 (0.45)	0.71 (0.74)	2.35 (1.48)	1.18 (2.26)	2.86 (2.50)	1.42 (2.38)

[1]Values for temperature and participation are averages for 1998. Values in parentheses represent 63–year averages.

Table 2. Irrigated yield trial summary, Matanuska Farm–1998[1].

Variety	Skin[2]	US#1[3]	Small[4]	Other[5]	Total	Percent US#1	Tuber Weight[6]	Specific Gravity
Kennebec	W	17.2	1.0	3.5	21.8	79	6.8	1.086
Sangre	R	15.3	1.0	2.2	18.5	83	6.5	1.078
Alaska 114	W	15.2	2.7	1.5	19.4	78	5.3	1.085
Kemerovskii	W	15.2	1.5	4.2	20.8	73	7.3	1.086
Chieftain	R	14.7	2.2	2.6	19.5	75	5.4	1.076
Green Mountain	W	13.9	1.1	3.1	18.1	77	6.6	1.089
Ranger Russet	Ru	13.4	0.5	3.5	17.4	77	7.9	1.087
IditaRed	R	12.8	1.6	6.2	20.6	62	7.0	1.077
Superior	W	12.8	0.9	3.4	17.1	75	6.7	1.083
Shepody	W	12.8	0.8	3.0	16.5	77	7.3	1.086
Bake-King	W	12.4	1.7	0.8	14.9	83	5.9	1.090
Frontier Russet	Ru	12.4	1.7	2.9	17.0	73	6.9	1.085
Allagash Russet	Ru	11.7	1.3	2.0	15.1	78	6.8	1.083
Legend Russet	Ru	11.4	1.2	3.1	15.7	72	7.2	1.094
Yellow Finn	W	10.9	2.5	2.1	15.4	71	4.3	1.089
Hilite Russet	Ru	10.8	2.2	0.4	13.4	81	5.9	1.081
Russet Norkotah	Ru	10.5	1.6	3.2	15.3	68	6.8	1.077
Yukon Gold	W	10.3	0.8	3.3	14.4	71	6.8	1.087
Belrus	Ru	9.7	2.0	0.6	12.3	79	5.6	1.096
Lemhi Russet	Ru	9.4	1.6	2.5	13.4	70	5.9	1.089
Butte	Ru	9.3	1.9	3.2	14.3	65	5.9	1.083
Prejekulski Ranii	W	9.0	2.3	5.6	17.0	53	4.3	1.077
Goldrush Russet	Ru	8.6	1.6	3.4	13.6	63	6.8	1.082
Denali	W	8.5	0.8	2.0	11.3	75	6.0	1.078
Tolass	Ru	8.2	1.3	2.2	11.8	70	6.6	1.072
Russet Burbank	Ru	8.2	3.3	3.9	15.4	53	4.5	1.099
Norgold Russet	Ru	7.7	1.9	3.0	12.6	61	6.4	1.077
Eide Russet	Ru	6.9	2.5	0.2	9.6	72	5.4	1.084
Russet Nugget	Ru	6.3	2.0	0.4	8.6	73	5.0	1.098
Nooksack	Ru	4.8	1.2	0.8	6.8	70	5.8	1.085
Average		11.0	1.6	2.6	15.3	72	6.2	1.085
LSD 5%[7]		3.1			2.8			

[1] Yields expressed in tons per acre.
[2] (R) = red skin, (Ru) = russet skin, (W) = white skin.
[3] #1 market grade as defined by the USDA.
[4] Tubers less than 1.88 inches in diameter.
[5] Includes oversize, shatter or growth crack, second growth, green, etc.
[6] Average weight of #1 tubers in ounces.
[7] LSD: Least significant difference.

as soon as plants had emerged and continued as needed throughout the season. June's rainfall of 2.35 inches was nearly twice the long-term average followed by a July rainfall that was well below normal. Weekly application of water was required in July but the nearly three inches of rain that fell in August fulfilled most of the crops needs after July 30. No irrigation water was applied after August 10. April air temperatures averaged nearly 3F above normal signaled an early planting season, but unusually cool temperatures in late April and early May delayed planting by several days compared to 1997. Nevertheless, the first plants were emerging by the end of May, as has been the case for the past few years.

July was somewhat warmer than average but August somewhat cooler. September was cloudy and windy at times but generally dry. The drier than normal weather in September along with above freezing temperatures made for very good harvesting conditions. This was especially important in view of the presence of late blight disease in the Matanuska Valley in 1998.

Late blight disease was first observed in mid-August in several commercial fields and had spread to most potato fields in the valley by early September. Late blight was not reported in other potato growing regions of the state. In the Matanuska Valley, most

commercial fields were only lightly affected although several suffered extensive damage to the foliage. Repeated inspection of the AFES yield trial plots revealed no late blight until the day of harvest and then only on two leaves of a single plant. Therefore, crop growth and yield in this trial were not affected by late blight.

This yield trial was harvested on September 14, somewhat later than harvests of previous years. Weather was ideal for harvest and the crop went into storage in excellent condition. Harvested tubers were graded in November and, in spite of the near absence of foliar symptoms of late blight, symptoms of the tuber blight phase of the disease were observed in four varieties. At the time of grading, the blighted tubers were not exhibiting signs of soft rot so damage had not spread from the small number of blighted tubers. All blighted tubers were removed and destroyed upon discovery.

The average yield of US #1 tubers across the 30 varieties was 11.0 tons per acre and average total yield was 15.3 tons per acre (Table 2). Highest total yields were produced by varieties Kennebec, Kemerovskii and IditaRed, each of which produced a total yield of more than 20 tons per acre. Kennebec, Sangre, Alaska 114 and Kemerovskii were the top yielders of US#1 tubers. Green Mountain yields are usually among the best but were somewhat lower this year due, we believe, to viral infection observed in some Green Mountain plants.

Gradeout was relatively high in several varieties (Table 2) including Prejekulski ranii which lost nearly 50 percent of its total yield to gradeout. IditaRed and Russet Burbank also had very high levels of gradeout. A moderate to large amount of small tubers also were graded out of nearly all varieties (Table 2), led by Russet Burbank and Alaska 114 with 3.3 and 2.5 tons per acre respectively.

When the 1998 yields of selected varieties is compared with yields from the previous four years (Table 3), it can be seen that yields generally tended to be lower than any of the listed years. Kennebec and Alaska 114 yielded near their five year averages but most others were below that level. The preponderance of cloudy weather during the 1998 growing season may have made a significant contribution to the observed yield reductions.

Kemerovskii, along with Prejekulski Ranii are white skinned varieties of Russian origin included in these trials for the first time this year. They were put through the USDA quarantine procedures prior to release for use in Alaska, and now will be included in these trials for at least the next four years. Both Russian varieties yielded well, but Prejekulski Ranii lost nearly half of its total yield to gradeout (Table 2). Undersized tubers and green tubers were the primary types of gradeout in both Russian varieties. Seven additional Russian varieties are now available to us and will be included in these trials in the coming year.

Table 3. Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1994 through 1998.[1]

Variety	1994	1995	1996	1997	1998	Average[2]
Allagash Russet	15.9	15.7	15.9	18.1	11.7	15.5
Alaska 114	13.6	18.8	15.9	15.0	15.2	15.7
Bake–King	15.4	11.7	18.0	15.6	12.4	14.6
Denali	12.3	14.9	12.2	15.1	8.5	12.6
Green Mountain	18.5	13.5	20.0	23.0	13.9	17.8
IditaRed	14.8	20.2	13.8	16.9	12.8	15.7
Kennebec	22.8	17.1	14.9	16.9	17.2	17.8
Lemhi Russet	12.9	12.1	12.3	12.2	9.4	11.8
Russet Burbank	12.1	12.1	16.1	16.0	8.2	12.9
Shepody	15.7	11.4	8.3	13.1	12.8	12.3
Superior	17.6	16.4	6.6	17.2	12.8	14.1
Average	15.6	14.9	14.0	16.3	12.3	14.6
LSD 5%[3]	4.5	3.3	3.4	2.7	3.1	

[1] Yields expressed in tons per acre. #1 market grade as defined by the US Department of Agriculture.
[2] Average calculated on yields from 1994-1998.
[3] Least significant difference.

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