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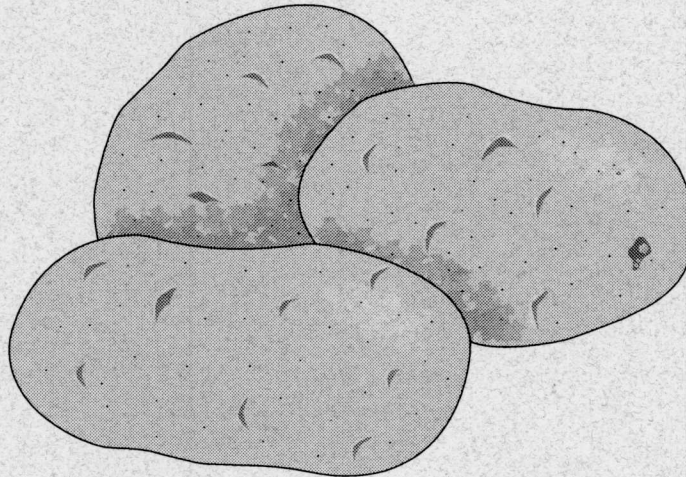
Potato Variety Performance Alaska 1993

by

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May 1994

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ACKNOWLEDGEMENTS

We acknowledge the contribution of the following people, without whose voluntary help the off-station trials would not have been possible.

Delta Junction:	Don Quarberg, Alaska Cooperative Extension (ACE)
Fairbanks:	J. S. Conn, USDA, Agricultural Research Service
Homer:	Sigmund Restad, ACE, and Ted Reynolds
Kenai-Soldotna:	Sigmund Restad, ACE
Nome:	Hunter Michelbrink, ACE, and Tim Humes

POTATO VARIETY PERFORMANCE—1993

INTRODUCTION

A yield trial in which 43 named varieties and one numbered selection of potatoes were compared was conducted during the 1993 growing season at the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station's Palmer Research Center, Matanuska Farm, located six miles west of Palmer, Alaska.

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, numbered selections or older named varieties that have not been tested at this location. Russet Burbank, the variety most commonly grown in the United States, also was included to broaden the base of comparison. Varieties that compare favorably with the above listed local standards may warrant consideration by commercial growers.

Nonirrigated trials have been conducted annually since 1982, whereas irrigated trials were initiated in 1985. Results of these trials were reported in AFES Circulars 49, 54, 58, 65, 71, 77, 84, 89, and 95 which are available at the AFES offices in Fairbanks and Palmer.

Included in this report are results of abbreviated versions of the AFES potato yield trial conducted by cooperating individuals and agencies at other locations in Alaska including Delta Junction, Fairbanks, Homer, Kenai-Soldotna, and Nome.

MATANUSKA FARM YIELD TRIALS

Cultural Practices

Irrigated and nonirrigated field trials were planted at the Matanuska Farm on May 6 and 7. This planting date was the same as in 1992, but approximately one week earlier than the long-term average. Seedbed preparation included moldboard plowing to a depth between 8 to 10 inches followed by discing and packing. Potatoes were planted as soon as possible after tilling to minimize loss of early spring moisture. 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 pieces were planted approximately 11 inches apart in the row and covered with 2 to 3 inches of packed soil with a single row Iron Age® assist feed planter. Granular fertilizer was applied at the rate of 120 pounds N, 240 pounds P₂O₅ and 240 pounds K₂O per acre by the planter in bands two inches to the side and two inches below the seed. The composition of fertilizer applied to one acre was 471 pounds of monoammonium phosphate (11-21-0), 400 pounds of muriate of potash (0-0-60), 138 pounds of urea (45-0-0), and 191 pounds of limestone filler. Tensiometers were installed at depths of 12 and 18 inches in the irrigated plots. Water was applied through overhead sprinklers to maintain tensiometer readings between 20-40 centibars. Weeds were controlled by a post-emergent application of Paraquat followed by cultivation and hand weeding when necessary. Ordinarily, chemical weed control in these plots involves a pre-emergent treatment with Linuron (Lorox®), but the surprisingly rapid rate of emergence in 1993 made it impossible to apply Linuron. Approximately 10 to 20% of the plants had emerged by the time Paraquat was applied, and these plants were partially burned back. However, final stands were at or near 100% in all varieties. Plots were hilled the last week of June.

Seed used in these trials was produced on the Matanuska Farm from stocks inherited from the discontinued USDA potato breeding program, from the Alaska Division of Agriculture, or from stocks acquired from various certification agencies in the contiguous 48 states and Canada. This seed may have contained certain latent viruses. Seed of all varieties was dipped in a 1.85% aqueous solution of formaldehyde for two minutes at room temperature to kill any pathogenic fungi or bacteria present on the tuber surfaces. Dipping in formaldehyde was completed while tubers were dormant to avoid damage to developing sprouts as any actively growing plant tissues are killed by formaldehyde. The principal target of the formaldehyde dip was the disease-causing fungus *Rhizoctonia solani*. Seed of most varieties consisted of tuber pieces weighing 1.5 to 2.0 ounces that were cut from 6 to 10 ounce tubers. Seeds of remaining varieties were whole tubers weighing from 2 to 4 ounces.

Results and Discussion

Environmental conditions in the early part of the 1993 growing season were similar to the dry conditions one year earlier. Residual soil moisture was very low (0.03 inch of rain fell in April), which permitted planting on May 7. The maximum daily air temperature was nearly 7°F above average in April and nearly 5°F above average in May (Table 1). These sustained and unusually high temperatures contributed to a rapid rate of emergence, but also increased the rate of water loss (via evaporation) from the already dry soil.

Rainfall was 37% above the monthly average in May, but 42% below the monthly average in June. However, long-term average rainfall was only 0.76 inches in May and 1.48 inches in June. Water deficiencies occurring at this time generally do not severely limit plant development and yields unless preplant soil moisture and July rainfall also are low. In 1993 preplant soil moisture was very low and July rainfall was far below (33%) the long term average.

The requirement by potatoes for water during July is greater and more critical than at any other time during the growing season. This point is illustrated clearly in the results of yield trials from two previous years. In 1990 (AFES Circular #84) total rainfall in May and June was 120% of average but dropped to 9% of average in July. The US #1 yield in the 1990 nonirrigated plots was 33% of the yield in irrigated plots. Conversely, in 1991 (AFES Circular #89), rainfall in May and June was 18% of average, whereas rainfall in July was 148% of average. In response to the more favorable moisture conditions during July, US #1 yield in the nonirrigated plots was 84% of that harvested from the irrigated plots. The low yield averages of US #1 tubers in nonirrigated plots in 1993 (33% of irrigated plot yields), were consistent with the low rainfall (33% of average) in July.

Total rainfall in the 1993 growing season (May - September) was 9.14 inches, just 3.4% below the long-term average. However, nearly half of this total fell after mid-August. Ample late season rainfall had little effect on final yield but it did contribute to ideal harvest conditions. Soil contained enough moisture to eliminate dust, but not too much to interfere with separation of tubers from the soil by the harvester. Also, soil temperatures remained well above freezing until potatoes were harvested on September 9.

Summaries of yields from the irrigated and nonirrigated trials are presented in Tables 2 and 3, respectively. Average total yield for all 44 varieties was 19.9 tons/acre in the irrigated trials and 8.5 tons/acre in the nonirrigated trials. Yields of US #1 tubers was 16.5 and 5.4 tons/acre in the

irrigated and nonirrigated trials respectively. The top yielding variety in irrigated trials was Gold Coin (21.7 tons/acre US #1), followed by Red Pontiac, Chieftain, Green Mountain, Alaska 114, and Acadia Russet, all of which yielded more than 19 tons/acre of US #1 tubers. The most popular commercially grown varieties, Bake-King and Shepody, yielded 15.9 and 15.4 tons/acre of US #1 tubers respectively. In the nonirrigated trial the top yielding varieties were Green Mountain (9.5 tons/acre US #1), Gold Coin, Kennebec, and Russet Burbank. Shepody and Bake-King yielded 7.5 and 6.3 tons/acre US #1 tubers respectively under nonirrigated conditions.

The percent of harvest from the irrigated plots that met criteria for the US #1 category was relatively high this year at 83.2% (Table 2). More than 90% of the Bake-King, Allagash, and Denali tubers harvested from irrigated plots were in the US #1 category, whereas the respective total yields of Russet Burbank and Red Warba were reduced by nearly 40% for various reasons including shatter cracking and second growth. Percent of tubers in the US #1 category from nonirrigated plots averaged 63%. One may expect that, due to drought, a large portion of the gradeout would be in the small category. This was true sometimes, most notably in certain foreign and russet varieties. Often, however, the primary reason for failure to meet US #1 grade was shatter cracking (Table 6). Specific gravity averaged 1.089 in the irrigated trials and 1.092 in the nonirrigated trials.

Performance of selected varieties over the past five years under irrigated conditions is summarized in Table 4. The average yield in 1993 of 17.2 tons per acre was comparable to those of 1992 and 1991, less than 1990 and 1989, and about one ton per acre less than the five year average. Based on general growing conditions, we expected yields in the irrigated plots would have been somewhat higher than average, and it is not clear why they were not. One possible explanation is that extensive irrigation may have leached some of the nitrogen out of the soil profile. Under nonirrigated conditions (Table 5), 1993 yields production was clearly lower than that of 1992 and also well below the five year average. In fact, average yields in this year's nonirrigated trials are the lowest observed in the 12 years these trials have been conducted. Data in Tables 4 and 5 demonstrate that irrigation results in consistently higher yields, as well as reduces the year-to-year variability in yield.

Specific types of gradeout found in 11 selected varieties under irrigated and nonirrigated conditions are summarized in Table 6. With one exception, the percentage of US #1 tubers was lower in the nonirrigated trial. The percentage of undersize

tubers was not increased by water stress in all varieties. In certain varieties, however (Alaska 114, Lemhi Russet, Sangre, and Superior) large increases in percentage of undersized tubers resulted from lack of water. Percentage of gradeout due to oversize was very low this year, even with Shepody, a variety known for producing oversized tubers. Shatter cracking was common in 1993 especially in certain varieties grown without irrigation. More than 30% of IdataRed and Lemhi, and more than 20% of Acadia Russet and Sangre grown under nonirrigated conditions were graded out of the US #1 category because of shatter cracks. Even Bake-King, which generally does not shatter crack, lost more than 10% of its total yield to shatter cracking when it was not irrigated.

Again this year, as in 1991 and 1992, foreign varieties, including Caulin Alto, Chilac Ancyd, Kamarez, and Kutri Jeevan, were included in the variety trial. Isla Cauchua, included in 1991 and 1992, was dropped this year because of poor performance in prior trials. Kamaraz was developed in Minsk, Belarus, while the origin of the others, although probably Asian, is not known. Chilac Ancyd yielded in the top 25% in both irrigated and nonirrigated trials, and Kamaraz also did well, especially in the nonirrigated trial. Again, as in previous years, more than 30% of Caulin Alto tubers were too small to be included in the US #1 category. As observed last year, characteristics such as tuber shape, eye depth and others preclude any commercial production of these varieties.

One variety included in these trials for the first time was Russet Bake-King, a selection of the variety Bake-King. In addition to a russet skin, it may possess other characteristics that have made Bake-King the most popular commercially grown variety of potatoes in Alaska. This year, however, yields of Russet Bake-King were very poor. Also, its skin, though heavily russeted, may not be able to withstand the rigors of mechanical harvesting under Alaska conditions. We will be including Russet Bake-King in trials for several more years.

TRIALS AT OTHER ALASKA LOCATIONS

General Procedures

Ten potato varieties were planted by cooperators at six other locations throughout Alaska. Some of the cooperators are private citizens, others are employed by the Alaska Cooperative Extension (ACE) or U.S. Department of Agriculture, Agricultural Research Service, (USDA-ARS). At the various locations, when environmental conditions permitted, seed pieces were planted in rows 36

inches apart and spaced 11 to 12 inches apart in the row. At most locations, commercial fertilizers were applied at a rate that was comparable to that applied at the Matanuska farm. Crop management, including irrigation, fertilization, weed control, and hilling, was carried out by each cooperator at the respective site and varied from site to site according to what equipment and materials were available. Total and US #1 yields for varieties at each site are summarized in Table 7. Length of season at the five sites and at the Matanuska farm (Palmer) are given in Table 8.

Site Specific Information

Delta Junction—This test was fertilized at the rate of 134 pounds N, 400 pounds P_2O_5 , 200 pounds K_2O , and 40 pounds S per acre. Fertilizer was broadcast and incorporated prior to planting on May 19. The spring was dry and rainfall was well below average for the entire season. Also the spring was very warm, but temperatures were just slightly above normal for the remainder of the growing season. A frost killed most of the vegetative growth on August 25 and potatoes were harvested the next day. *Cooperator: Don Quarberg, ACE*

Fairbanks—Plots were fertilized at the rate of 290 pounds N, 290 pounds P_2O_5 , and 145 pounds K per acre and planted on May 18, a very early planting date for Fairbanks. Rainfall was below average for the entire season and water was applied through over head sprinklers as needed throughout the season. More than 8 inches of water was applied. Weeds were controlled with Linuron that was applied pre-emergent on June 7. Growing season temperatures were average with the exception of June and July which were above average. Harvest was completed on September 7, prior to any damage to the plants by freezing temperatures. *Cooperator: J. S. Conn, USDA-ARS.*

Homer—Plots were planted on May 17, after fertilization with blood meal, bone meal and seaweed, sawdust, halibut compost. First frost occurred on September 17, and potatoes were harvested on September 24 and October 5. *Cooperators: Sigmund Restad, ACE and Ted Reynolds, master gardener.*

Kenai-Soldotna—Plots were fertilized at the rate of 180 pounds N, 360 pounds P_2O_5 , 360 pounds K per acre and planted on May 20. Potatoes were harvested September 21 and was completed prior to any frost damage. *Cooperator: Sigmund Restad, ACE.*

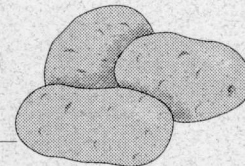
Nome—This trial was planted June 13 at a farm site near Pilgrim Hot Springs. In most years planting could be done earlier, but fields were very wet

this spring. Fertilizer was a mix of blood meal, bone meal, green sand and wood ash applied at an approximate rate of 100 lbs/acre. After the fields were planted, only 0.25 inches of rain fell for the remainder of the growing season. Some irrigation water was applied, but some drought stress occurred. Although the middle of the grow-

ing season was warmer than average, the first killing frost came August 17 ending a very short (65 day) growing season. After that frost, it was too wet to harvest, but temperatures remained above freezing and plots were harvested on September 15. *Cooperators: Hunter Michelbrink, ACE and Tim Humes, private grower.*

Table 1. Climatic data for Matanuska Farm during the 1993 growing season.

	April	May	June	July	August	September
Temp. (°F)						
Air						
Daily max.	53.1 (46.2) ¹	62.5 (57.8)	67.5 (65.3)	71.2 (67.5)	66.1 (65.0)	55.5 (56.3)
Daily min.	31.5 (27.2)	40.1 (36.3)	45.9 (44.2)	50.5 (47.9)	49.9 (45.8)	39.7 (38.5)
Daily mean	42.3 (36.7)	51.3 (47.1)	56.7 (54.8)	60.9 (57.7)	58.0 (55.4)	47.6 (47.4)
Soil (4" depth)						
Fallow	38.3	54.5	64.1	67.3	61.0	50.3
Sod	41.1	57.3	66.1	68.4	61.9	49.2
Precip. (in.)	0.03 (0.47)	1.04 (0.76)	0.86 (1.48)	0.77 (2.31)	2.58 (2.48)	3.89 (2.46)
¹ Values in parentheses represent 58-year averages.						



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Editor: Donna Gindle, AFES Publications Supervisor

Table 2. Irrigated yield trial summary, Matanuska Farm—1993¹.

Variety	Skin ²	US#1 ³	Small ⁴	Other ⁵	Total	Percent US#1	Tuber Weight ⁶	Specific Gravity
Gold Coin	W	21.7	0.9	2.3	25.0	87.0	6.2	1.096
Red Pontiac	R	21.4	0.6	2.9	24.9	85.9	6.5	1.081
Chieftain	R	20.2	1.7	1.4	23.4	86.7	5.0	1.078
Green Mountain	W	19.5	1.0	1.5	22.0	88.6	6.3	1.095
Alaska 114	W	19.3	1.9	0.4	21.6	89.2	4.9	1.088
Acadia Russet	Ru	19.1	1.4	1.8	22.3	85.7	6.7	1.089
Kennebec	W	18.8	1.3	3.2	23.4	80.4	8.5	1.089
Chilac Ancyd	P	18.5	1.8	0.4	20.7	89.1	4.5	1.105
Mirton Pearl	W	18.3	0.7	2.7	21.7	84.2	6.3	1.086
Blue Mac	P	18.2	0.8	1.3	20.3	89.7	6.3	1.100
IditaRed	R	18.1	0.8	2.2	21.1	85.9	6.8	1.075
Atlantic	W	17.7	0.5	2.8	21.0	84.3	6.5	1.097
6-78-139-80 ⁷	W	17.6	1.6	1.7	20.9	84.0	5.6	1.088
Denali	W	17.5	0.6	1.2	19.3	90.7	6.9	1.102
Kamaraz	W	17.4	2.2	1.1	20.6	84.4	4.5	1.098
Lemhi Russet	Ru	17.3	1.5	1.3	20.1	86.2	5.9	1.095
Nipigon	W	17.0	0.5	5.6	23.1	73.7	8.8	1.084
Norland	R	16.9	1.1	1.9	19.9	85.0	5.7	1.077
Yukon Gold	W	16.8	0.3	2.6	19.7	85.5	9.0	1.088
Red Warba	R	16.8	0.9	8.7	26.4	63.6	7.0	1.079
Superior	W	16.6	0.7	1.1	18.5	90.1	6.2	1.087
Norgold Russet	Ru	16.6	1.5	2.0	20.1	82.8	6.2	1.082
Allagash Russet	Ru	16.6	0.6	0.7	17.9	92.5	6.8	1.082
Hilite Russet	Ru	16.0	2.0	0.1	18.1	88.5	4.6	1.085
Bake-King	W	15.9	0.6	0.7	17.1	92.8	6.4	1.096
Kutri Jeevan	W	15.7	1.1	1.1	18.0	87.7	5.4	1.084
Cherokee	W	15.7	0.8	3.8	20.3	77.4	6.4	1.086
Shepody	W	15.4	0.7	2.7	18.8	82.1	8.7	1.087
Alasclear	W	15.4	0.9	1.8	18.1	84.8	6.6	1.093
Butte	Ru	15.3	2.5	0.8	18.6	82.5	5.7	1.094
Russet Norkotah	Ru	14.9	1.3	0.8	17.0	87.6	6.0	1.082
Rote Erstling	R	14.9	2.3	0.6	17.8	83.7	4.9	1.085
Katahdin	W	14.6	0.4	1.5	16.4	88.8	7.2	1.087
Caulin Alto	W	14.6	6.5	0.3	21.4	68.2	3.8	1.099
Russet Nugget	Ru	14.4	2.3	0.6	17.3	83.2	4.5	1.103
Campbell 13	W	14.3	0.3	2.5	17.1	83.7	8.2	1.080
Batoche	R	14.2	1.1	3.7	19.0	74.7	6.1	1.083
Fundy	W	14.1	0.4	4.5	19.1	73.9	7.5	1.085
Sangre	R	14.1	1.4	0.9	16.4	86.1	5.8	1.077
Avon	W	14.0	0.4	5.1	19.5	71.7	7.3	1.083
Alpha	W	14.0	1.2	2.9	18.1	77.3	5.3	1.097
Russet Bake-King	Ru	13.7	1.2	0.7	15.6	88.2	6.0	1.103
Russet Burbank	Ru	13.4	2.4	5.3	21.1	63.4	5.5	1.095
Sable	W	12.2	0.6	2.4	15.2	80.3	7.5	1.075
Average		16.5	1.3	2.1	19.9	83.2	6.3	1.089
LSD 5% ⁸		2.4				2.1		

¹Yields expressed in tons per acre. ²R = red skin; Ru = russet skin; W = white skin; P = purple skin.

³#1 market grade as defined by the USDA. ⁴Tubers less than 1.88 inches in diameter.

⁵Includes oversize, shatter or growth crack, second growth, green, etc. ⁶Average weight of #1 tubers in ounces.

⁷6-78-139-80 originated in the breeding program of C.H. Dearborn.

⁸LSD: Least significant difference.

Table 3. Nonirrigated yield trial summary, Matanuska Farm—1993.¹

Variety	Skin ²	US#1 ³	Small ⁴	Other ⁵	Total	Percent US#1	Tuber Weight ⁶	Specific Gravity
Green Mountain	W	9.5	0.5	0.9	10.9	87.3	5.9	1.093
Gold Coin	W	8.7	0.5	2.0	11.2	77.4	5.8	1.093
Kennebec	W	8.4	0.5	2.2	11.0	76.0	7.7	1.090
Russet Burbank	Ru	8.4	1.5	0.7	10.6	78.7	5.4	1.093
Shepody	W	7.5	0.3	0.4	8.2	91.5	6.6	1.091
Kamaraz	W	7.4	1.3	1.1	9.8	75.4	4.5	1.091
Allagash Russet	Ru	7.3	0.6	0.0	7.9	92.6	5.4	1.092
Alpha	W	7.2	1.9	0.1	9.2	78.4	4.3	1.096
Chilac Ancyd	P	7.1	1.4	1.0	9.5	75.1	4.1	1.102
Blue Mac	P	6.9	1.3	1.3	9.6	72.5	4.4	1.085
6-78-139-80 ⁷	W	6.8	1.3	1.2	9.3	72.7	4.5	1.079
Katahdin	W	6.7	0.4	0.8	8.0	84.1	6.1	1.088
Alasclear	W	6.6	0.9	1.3	8.8	75.0	4.8	1.093
Caulin Alto	W	6.6	4.1	0.1	10.7	61.4	3.5	1.093
Bake-King	W	6.3	0.4	0.9	7.6	82.9	5.9	1.097
Alaska 114	W	6.1	1.6	0.2	7.9	77.8	4.0	1.096
Superior	W	5.8	1.0	0.6	7.5	78.4	4.5	1.101
Sable	W	5.7	0.4	1.1	7.2	79.0	5.6	1.093
Kutri Jeevan	W	5.6	0.9	1.3	7.8	72.5	4.6	1.080
Acadia Russet	Ru	5.6	0.7	2.3	8.6	64.8	5.7	1.089
Chieftain	R	5.3	1.4	3.2	9.9	53.8	4.1	1.082
Mirton Pearl	W	5.1	0.4	1.8	7.2	70.1	4.9	1.097
Yukon Gold	W	5.1	0.4	1.1	6.5	77.7	5.3	1.094
Hilite Russet	Ru	5.0	2.3	1.0	8.2	60.6	4.0	1.090
IditaRed	R	5.0	0.6	3.8	9.3	53.3	5.2	1.082
Nipigon	W	4.9	0.3	4.3	9.5	51.0	6.2	1.092
Rote Erstling	R	4.8	2.2	0.1	7.2	66.9	3.7	1.089
Sangre	R	4.8	1.3	1.7	7.8	61.6	4.2	1.086
Lemhi Russet	Ru	4.7	1.1	3.5	9.3	50.5	4.8	1.100
Atlantic	W	4.6	0.3	4.2	9.1	51.2	6.1	1.096
Norland	R	4.6	1.0	0.9	6.5	71.3	4.0	1.088
Russet Nugget	Ru	4.5	1.8	1.9	8.2	55.1	3.9	1.100
Norgold Russet	Ru	4.4	1.2	3.0	8.5	51.2	4.3	1.094
Butte	Ru	4.3	1.6	3.9	9.7	43.9	4.8	1.089
Campbell 13	W	4.2	0.2	2.8	7.3	57.9	5.8	1.092
Red Pontiac	R	3.8	0.3	6.9	11.0	34.5	4.9	1.086
Red Warba	R	3.2	0.3	7.7	11.2	28.4	4.8	1.086
Denali	W	3.1	0.4	3.9	7.4	42.0	5.2	1.103
Fundy	W	3.1	0.4	2.7	6.2	49.5	4.7	1.096
Russet Norkotah	Ru	2.7	1.5	0.3	4.5	59.5	4.2	1.095
Russet Bake-King	Ru	2.6	0.5	3.8	6.8	37.6	4.7	1.106
Cherokee	W	2.5	0.7	2.8	6.0	41.4	4.4	1.096
Batoche	R	1.8	0.9	4.5	7.2	25.5	3.9	1.094
Avon	W	1.7	0.6	4.3	6.5	26.0	4.5	1.091
Average		5.4	1.0	2.1	8.5	63.0	4.9	1.092
LSD 5% ⁸		1.8			1.6			

¹Yields expressed in tons per acre.

²R= red skin; Ru = russet skin; W = white skin; P = purple skin.

³#1 market grade as defined by the USDA.

⁴Tubers less than 1.88 inches in diameter.

⁵Includes oversize, shatter or growth crack, second growth, green, etc.

⁶Average weight of #1 tubers in ounces.

⁷6-78-139-80 originated in the breeding program of C.H. Dearborn.

⁸LSD: Least significant difference.

Table 4. Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1989 through 1993.¹

Variety	1989	1990	1991	1992	1993	Average ²
Alaska 114	20.6	22.1	19.3	18.1	19.3	19.9
Bake-King	20.3	18.5	15.8	16.2	15.9	17.3
Denali	18.2	17.5	20.4	15.4	17.5	17.8
Green Mountain	23.3	22.8	20.6	19.4	19.5	21.1
IditaRed	22.4	22.4	19.3	22.4	18.1	20.9
Kennebec	20.9	16.8	18.9	20.1	18.8	19.1
Lemhi Russet	20.9	19.6	14.3	13.8	17.3	17.2
Russet Burbank	14.3	15.5	—	16.3	13.4	14.9
Shepody	17.9	16.2	14.9	15.6	15.4	16.0
Superior	20.5	18.4	18.2	16.6	16.6	18.1
6-78-139-80	22.2	20.4	12.5	15.4	17.6	17.6
LSD 5% ³	2.1	3.5	2.7	3.3	2.4	
Average	20.2	19.1	17.4	17.2	17.2	18.2

¹Yields expressed in tons per acre (— indicates variety not tested). #1 market grade as defined by the USDA.
²Average calculated on yields from 1989-1993.
³Least significant difference.

Table 5. Comparative summary of US #1 tuber yields of selected varieties in nonirrigated trials conducted from 1989 through 1993.¹

Variety	1989	1990	1991	1992	1993	Average ²
Alaska 114	16.9	6.0	13.9	10.2	6.1	10.6
Bake-King	16.3	6.9	13.6	9.3	6.3	10.5
Denali	13.2	6.5	12.8	7.5	3.1	8.6
Green Mountain	18.5	8.6	16.7	13.2	9.5	13.3
IditaRed	18.0	5.4	17.5	11.6	5.0	11.5
Kennebec	17.5	9.9	15.8	13.5	8.4	13.0
Lemhi Russet	16.2	5.4	12.2	8.1	4.7	9.3
Russet Burbank	12.6	7.1	—	11.4	8.4	9.9
Shepody	15.7	7.5	11.4	11.7	7.5	10.8
Superior	14.8	3.7	15.4	9.6	5.8	9.9
6-78-139-80	18.2	8.0	11.7	12.1	6.8	11.4
LSD 5% ³	1.9	2.0	2.2	2.3	1.8	
Average	16.2	6.6	14.1	10.7	6.5	10.8

¹Yields expressed in tons per acre (— indicates variety not tested). #1 market grade as defined by the USDA.
²Average calculated on yields from 1989-1993.
³Least significant difference.

Table 6. Type and quantity of gradeout observed among selected varieties in irrigated and nonirrigated trials in 1993.

	Total		#1	Under size	Over size	Shatter crack	Growth crack	Green	Other ²
Acadia Russet	(NI) ³	8.6	5.6(65.1)	0.7(8.1)	0.0(0.0)	2.2(25.6)	0.0(0.0)	0.0(0.0)	0.1(1.2)
	(I)	22.3	19.2(86.1)	1.5(6.7)	0.0(0.0)	1.1(4.9)	0.1(0.5)	0.1(0.5)	0.3(1.3)
Alaska 114	(NI)	7.9	6.1(77.2)	1.6(20.3)	0.0(0.0)	0.2(2.5)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	21.6	19.3(89.4)	1.9(8.8)	0.0(0.0)	0.0(0.0)	0.1(0.4)	0.3(1.4)	0.0(0.0)
Allagash Russet	(NI)	7.9	7.3(92.4)	0.6(7.6)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	17.9	16.6(92.7)	0.6(3.3)	0.2(1.1)	0.1(0.6)	0.0(0.0)	0.3(1.7)	0.1(0.6)
Bake-King	(NI)	7.6	6.3(82.9)	0.4(5.3)	0.0(0.0)	0.8(10.5)	0.0(0.0)	0.0(0.0)	0.1(1.3)
	(I)	17.1	15.9(93.0)	0.6(3.5)	0.0(0.0)	0.3(1.7)	0.1(0.6)	0.1(0.6)	0.1(0.6)
Gold Coin	(NI)	11.2	8.7(77.7)	0.5(4.5)	0.0(0.0)	1.6(14.3)	0.1(0.9)	0.0(0.0)	0.3(2.6)
	(I)	25.0	21.7(86.8)	0.9(3.6)	0.7(2.8)	0.5(2.0)	0.5(2.0)	0.6(2.4)	0.1(0.4)
Green Mountain	(NI)	10.9	9.5(87.2)	0.5(4.6)	0.0(0.0)	0.9(8.2)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	22.0	19.5(88.6)	1.0(4.5)	0.2(0.9)	0.2(0.9)	0.4(1.8)	0.6(2.7)	0.1(0.6)
IditaRed	(NI)	9.3	5.0(53.8)	0.6(6.4)	0.1(1.1)	3.6(38.7)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	21.1	18.1(85.8)	0.8(3.8)	0.0(0.0)	1.4(6.6)	0.7(3.3)	0.0(0.0)	0.1(0.5)
Lemhi Russet	(NI)	9.3	4.7(50.5)	1.1(11.8)	0.0(0.0)	3.1(33.4)	0.3(3.2)	0.0(0.0)	0.1(1.1)
	(I)	20.1	17.3(86.1)	1.5(7.5)	0.2(1.0)	0.4(1.9)	0.2(1.0)	0.3(1.5)	0.2(1.0)
Sangre	(NI)	7.8	4.8(61.5)	1.3(16.7)	0.0(0.0)	1.6(20.5)	0.1(1.3)	0.0(0.0)	0.0(0.0)
	(I)	16.4	14.1(86.0)	1.4(8.5)	0.1(0.6)	0.5(3.1)	0.1(0.6)	0.1(0.6)	0.1(0.6)
Shepody	(NI)	8.2	7.5(91.5)	0.3(3.7)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.3(3.7)	0.1(1.1)
	(I)	18.8	15.5(82.4)	0.8(4.3)	0.8(4.3)	0.0(0.0)	0.4(2.1)	0.6(3.2)	0.7(3.7)
Superior	(NI)	7.5	5.8(77.3)	1.0(13.3)	0.0(0.0)	0.7(9.4)	0.0(0.0)	0.0(0.0)	0.0(0.0)
	(I)	18.5	16.6(90.0)	0.7(3.8)	0.2(1.0)	0.3(1.5)	0.2(1.0)	0.5(2.7)	0.0(0.0)

¹Weights expressed in tons per acre. Values in parenthesis indicate percent of total yield.

²Includes primarily second growth; also rotten, misshapen, etc.

³(NI) = not irrigated, (I) = irrigated.

Table 7. Yield trial summary from selected Alaskan locations in 1993.¹

Variety	Delta		Fairbanks		Homer		Kenai-Soldotna		Nome		Palmer	
	#1 ²	Total ³	#1	Total	#1	Total	#1	Total	#1	Total	#1	Total
Alasclear	5.6	10.2	13.1	16.7	9.4	17.2	4.5	7.3	4.3	9.3	15.4	18.1
Alaska 114	6.2	12.6	13.3	18.6	11.8	22.2	5.3	13.2	-	-	19.3	21.6
Allagash	10.3	14.3	16.0	18.4	14.5	20.5	3.9	8.4	-	-	16.6	17.9
Bake-King	4.6	8.5	10.9	14.0	9.1	14.3	4.0	6.6	5.9	8.4	15.9	17.1
Caribe	14.2	19.3	17.6	20.1	14.3	21.8	7.1	9.5	7.4	9.4	-	-
Green Mountain	9.4	14.4	17.4	21.7	12.9	23.8	9.4	14.5	5.0	10.0	19.5	22.0
IditaRed	5.7	11.0	19.2	21.9	16.8	23.5	6.9	11.9	5.3	10.3	18.1	21.1
Kennebec	9.3	12.5	20.1	25.0	17.5	25.2	11.9	14.5	5.1	7.1	18.8	23.4
Shepody	7.0	10.2	13.1	15.8	16.8	22.7	7.9	11.1	-	-	15.4	18.8
Superior	7.2	12.1	14.3	17.9	14.1	19.9	6.5	10.8	4.3	10.3	16.6	18.5

¹All #1 and total yields are expressed in tons per acre. Yield figures represent the average of three replications at all locations except Palmer.

²#1 market grade as defined by the USDA.

³Total yield = #1 plus gradeout. Gradeout includes undersize, oversize, growth and shatter crack, green, etc.

Table 8. Length of the 1993 potato growing season at seven locations in Alaska.

Location	No. of days from plant to harvest	Killing frost ¹	No. of days from plant to killing frost
Delta Junction	100	1	99
Fairbanks	112	0	112 ²
Homer	130	8	122
Kenai-Soldotna	116	0	116 ²
Nome	94	29	65
Palmer	126	0	126 ²

¹Number of days prior to harvest that killing frost occurred.

²Harvest was completed before a killing frost.

Potato trial locations

