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# Potato Variety Performance Alaska 1994

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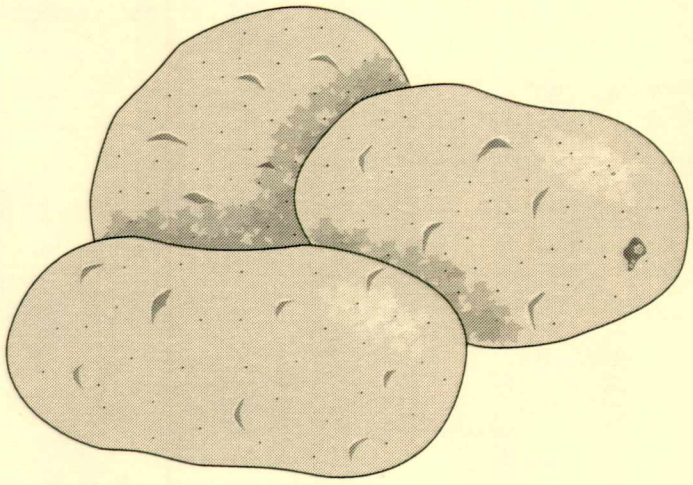



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# Potato Variety Performance—1994

## Introduction

A yield trial in which 44 named varieties and one numbered selection of potatoes were compared, was conducted during the 1994 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.

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 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 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, 95, and 97.

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

## Matanuska Farm Yeild Tials

### Cultural Practices and Environmental Conditions

Irrigated and nonirrigated field trials were established at the Matanuska Farm on May 11 and 12. These planting dates were five days later than in 1993, but very near to the long-term average planting date. Seedbed preparation included chisel plowing to a depth of 10 to 12 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 2-3 inches of packed soil with a single row Iron Age$^{R}$ assist feed planter. Granular fertilizer (10-20-20) was applied at the rate of 120 pounds N, 240 pounds $P_2O_5$ and 240 pounds $K_2O$ 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 (11-21-0), muriate of potash (0-0-60), and urea (45-0-0), and limestone filler. Tensiometers were installed at depths of 12 and 18 inches to monitor soil moisture. Water was applied to the irrigated plots through overhead sprinklers to maintain tensiometer readings between 20-40 centibars. Weeds were controlled by a pre-emergent application of Linuron (Lorox) supplemented by cultivation and hand weeding when necessary. Plots were hilled during the last week of June and harvested on September 6.

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. In December, 1993, 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* but the formaldehyde treatment also is effective in eliminating other fungi and bacteria on the tuber surfaces. 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

The 1994 growing season began with very low moisture levels in the topsoil and subsoil, similar to the beginnings of the previous two growing seasons. The high level of moisture present in the soil in late 1993 as a result of above average to heavy rainfall in August and September 1993 was

gone by planting time. Heavy snowfall during the 1993-1994 winter did not contribute significantly to the spring time soil moisture level as most either blew away or was lost to sublimation or surface runoff. Essentially no rain fell (a total of 0.13 inches) in April and May.

Soil moisture was at a level suitable for planting for up to one week earlier, but cold temperatures in early May delayed planting by about one week. Thus, planting was delayed by cool temperatures even though monthly average temperatures were well above average for both April and May (Table 1). Above average temperature was the rule throughout the 1994 growing season reaching an extreme of nearly 3°F above average in the month of August (Table 1). This pattern was very similar to growing season temperatures in the 1993 growing season, although 1993 was even warmer than 1994. Total rainfall for the 1994 growing season amounted to only 58% of the long term average rainfall (Table 1) for the Matanuska Farm and, with the exception of the month of June when 129% of the long term average monthly amount of rain fell, each month received much less than the long term average. Rains that fell in June provided little relief due to the extremely dry conditions of April and May. July, the month when demand for water by the potato crop is highest, also was very dry, followed by below average rainfall in August and September. The low level of rainfall in July essentially guaranteed very poor yields in the nonirrigated trials in 1994.

Potatoes were harvested with a mechanical harvester on September 6. There had been no freezing temperatures prior to harvest and harvesting problems due to low and freezing temperatures were not encountered. Soil moisture was adequate to minimize tuber damage during harvesting.

Yields from the irrigated and nonirrigated trials are summarized in Tables 2 and 3 respectively. In the irrigated trials the average yield of US #1 tubers of all the 45 varieties was 14.7 tons per acre whereas total tuber yields averaged 19.4 tons per acre (Table 2). As indicated by the least significant difference (LSD) values, variation amongst the four replicates of each variety was unusually high this year. Part of this large variation may have been due to the slight slope of the field, and corresponding difference in soil depth within the plots. This variation made it difficult to maintain a uniform level of soil moisture in all parts of the irrigated experiment.

In the nonirrigated trials average US #1 yields across varieties was 4.5 tons per acre and total yield was 6.6 tons per acre (Table 3). As is usual, the majority of gradeout in the nonirrigated trials was in the undersized category. Variation amongst replicates in the nonirrigated trial (LSD values of 2.0) was more typical of what we have observed in past years suggesting that the high level of variation observed in the irrigated trials indeed was due to nonuniformity of soil moisture.

The performance of selected varieties grown under irrigated conditions over the past five years is presented in Table 4. This comparison clearly shows that production in 1994 was below average. With the exceptions of Kennebec and Shepody, all varieties yielded less than in 1993 and, with the sole exception of Kennebec, yields of all varieties were equivalent to or below the five year average. The time from planting to harvesting was one week shorter in 1994 than in 1993, but except for this, it is uncertain why yields were generally lower in 1994. Tuber formation, checked weekly, was approximately one week later in 1994 than in 1993.

*Table 1. Climatic data for Matanuska Farm during the 1994 growing season.*

| | April | May | June | July | August | September |
|---|---|---|---|---|---|---|
| Temp. (°F) | | | | | | |
| Air | | | | | | |
| Daily max. | 49.1 (46.3)[1] | 57.3 (57.8) | 67.1 (65.3) | 67.8 (67.5) | 68.1 (65.0) | 57.2 (56.3) |
| Daily min. | 29.7 (27.2) | 39.2 (36.3) | 46.7 (44.3) | 50.4 (47.9) | 48.3 (45.9) | 39.1 (38.5) |
| Daily mean | 39.4 (36.8) | 48.3 (47.1) | 56.9 (54.8) | 59.2 (57.7) | 58.2 (55.5) | 48.2 (47.4) |
| Soil (4" depth) | | | | | | |
| Fallow | 36.1 | 51.0 | 63.4 | 66.0 | 63.3 | 50.1 |
| Sod | 35.6 | 44.9 | 59.5 | 63.3 | 62.2 | 50.4 |
| Precip. (in.) | 0.03 (0.46) | 0.10 (0.74) | 1.93 (1.49) | 0.79 (2.29) | 1.46 (2.47) | 1.44 (2.44) |

[1]Values in parentheses represent 59-year averages.

*Table 2. Irrigated yield trial summary, Matanuska Farm. - 1994*[1]

| Variety | Skin[2] | US#1[3] | Small[4] | Other[5] | Total | Percent US#1 | Tuber Weight[6] | Specific Gravity |
|---|---|---|---|---|---|---|---|---|
| Kennebec | W | 22.8 | 0.8 | 2.9 | 26.5 | 86.1 | 7.8 | 1.086 |
| Green Mountain | W | 18.5 | 2.0 | 2.6 | 23.0 | 80.2 | 6.7 | 1.088 |
| Gold Coin | W | 18.3 | 1.3 | 3.0 | 22.7 | 80.9 | 6.8 | 1.087 |
| Chieftain | R | 18.3 | 1.6 | 3.4 | 23.3 | 78.7 | 6.0 | 1.075 |
| Superior | W | 17.6 | 0.8 | 3.4 | 21.8 | 80.6 | 6.9 | 1.078 |
| Atlantic | W | 17.5 | 1.6 | 4.9 | 24.1 | 72.8 | 5.4 | 1.091 |
| Hilite Russet | Ru | 17.3 | 1.9 | 0.4 | 19.6 | 88.0 | 6.0 | 1.082 |
| Mirton Pearl | W | 17.0 | 1.2 | 2.3 | 20.5 | 83.2 | 6.3 | 1.082 |
| Red Warba | R | 17.0 | 1.1 | 6.8 | 24.9 | 68.4 | 6.7 | 1.075 |
| Norland | R | 17.0 | 1.6 | 2.5 | 21.1 | 80.8 | 5.7 | 1.073 |
| Yellow Finn | W | 16.9 | 1.7 | 2.5 | 21.2 | 80.1 | 5.7 | 1.081 |
| Sable | W | 16.4 | 1.0 | 2.6 | 19.9 | 82.2 | 7.6 | 1.072 |
| Blue Mac | P | 16.3 | 0.8 | 1.8 | 19.0 | 86.0 | 6.4 | 1.091 |
| Kufri Jeevan | W | 16.3 | 1.3 | 5.7 | 23.3 | 70.0 | 6.5 | 1.077 |
| Nipigon | W | 15.9 | 1.0 | 6.2 | 23.1 | 68.8 | 8.0 | 1.077 |
| Allagash Russet | Ru | 15.9 | 1.5 | 1.5 | 18.9 | 84.0 | 6.2 | 1.079 |
| Shepody | W | 15.7 | 1.3 | 2.6 | 19.6 | 80.2 | 8.1 | 1.079 |
| Purple Viking | P | 15.6 | 2.3 | 3.7 | 21.6 | 72.2 | 6.2 | 1.087 |
| Butte | Ru | 15.5 | 1.4 | 3.3 | 20.3 | 76.7 | 7.8 | 1.086 |
| Bake-King | W | 15.4 | 1.6 | 1.4 | 18.5 | 83.5 | 6.2 | 1.089 |
| Russet Nugget | Ru | 14.9 | 1.7 | 1.0 | 17.6 | 84.9 | 5.8 | 1.099 |
| Tolaas | Ru | 14.9 | 0.8 | 2.2 | 17.8 | 83.4 | 7.3 | 1.079 |
| IditaRed | R | 14.8 | 1.5 | 3.2 | 19.5 | 75.9 | 6.6 | 1.073 |
| Sangre | R | 14.8 | 1.0 | 1.5 | 17.2 | 85.8 | 6.7 | 1.076 |
| Cherokee | W | 14.6 | 1.7 | 3.8 | 20.1 | 72.8 | 5.7 | 1.082 |
| Avon | W | 14.3 | 0.8 | 5.6 | 20.7 | 69.3 | 6.8 | 1.078 |
| Acadia Russet | Ru | 14.1 | 1.6 | 4.4 | 20.2 | 70.0 | 6.7 | 1.080 |
| Chilac Ancyd | P | 14.1 | 2.5 | 1.3 | 17.9 | 78.7 | 5.0 | 1.095 |
| Campbell 13 | W | 13.8 | 0.7 | 4.1 | 18.7 | 73.9 | 6.7 | 1.082 |
| Alaska 114 | W | 13.6 | 2.4 | 3.0 | 19.0 | 71.8 | 5.7 | 1.075 |
| Caulin Alto | W | 13.3 | 4.7 | 1.4 | 19.3 | 68.6 | 4.6 | 1.092 |
| Conestoga | W | 13.2 | 0.7 | 3.0 | 16.9 | 78.3 | 6.1 | 1.081 |
| Yukon Gold | W | 12.9 | 0.7 | 3.3 | 16.8 | 76.3 | 7.5 | 1.083 |
| Lemhi Russet | Ru | 12.9 | 1.9 | 3.2 | 17.9 | 71.7 | 6.5 | 1.088 |
| Norgold Russet | Ru | 12.8 | 1.5 | 3.7 | 18.0 | 71.3 | 6.3 | 1.077 |
| Russet Bake-King | Ru | 12.7 | 1.6 | 0.9 | 15.1 | 83.8 | 6.1 | 1.094 |
| Norwis | W | 12.5 | 0.5 | 2.5 | 15.5 | 80.7 | 6.2 | 1.079 |
| Denali | W | 12.3 | 0.8 | 5.2 | 18.2 | 67.5 | 7.0 | 1.095 |
| Russet Burbank | Ru | 12.1 | 3.1 | 4.1 | 19.2 | 62.8 | 5.3 | 1.093 |
| 6-78-139-80[7] | W | 11.1 | 2.1 | 3.2 | 16.4 | 68.1 | 5.7 | 1.079 |
| Batoche | R | 11.1 | 1.2 | 5.7 | 18.1 | 61.4 | 5.7 | 1.081 |
| Fundy | W | 10.9 | 1.3 | 6.2 | 18.3 | 59.1 | 6.3 | 1.080 |
| Russet Norkotah | Ru | 9.6 | 2.4 | 1.3 | 13.3 | 72.1 | 6.0 | 1.078 |
| Rote Erstling | R | 9.5 | 2.6 | 1.1 | 13.2 | 71.8 | 4.7 | 1.079 |
| Kamaraz | W | 9.4 | 2.0 | 4.2 | 15.6 | 60.1 | 5.0 | 1.090 |
| Average | | 14.7 | 1.5 | 3.2 | 19.4 | 75.6 | 6.3 | 1.083 |
| LSD 5%[8] | | 4.5 | | | 3.7 | | | |

[1] Yields expressed in tons per acre.
[2] (R) = red skin, (Ru) = russet skin, (W) = white skin, (P) = purple 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] 6-78-139-80 originated in the breeding program of C.H. Dearborn.
[8] LSD: Least significant difference.

*Table 3. Nonirrigated yield trial summary, Matanuska Farm - 1994.*[1]

| Variety | Skin[2] | US#1[3] | Small[4] | Other[5] | Total | Percent US#1 | Tuber Weight[6] | Specific Gravity |
|---|---|---|---|---|---|---|---|---|
| Shepody | W | 8.6 | 1.4 | 0.3 | 10.3 | 83.4 | 4.8 | 1.100 |
| Kennebec | W | 6.6 | 0.8 | 0.3 | 7.7 | 85.0 | 4.4 | 1.103 |
| IditaRed | R | 6.2 | 1.8 | 0.4 | 8.5 | 73.5 | 3.9 | 1.093 |
| Bake-King | W | 6.1 | 1.1 | 0.3 | 7.4 | 81.4 | 4.3 | 1.105 |
| Atlantic | W | 5.9 | 1.5 | 1.2 | 8.5 | 69.4 | 4.3 | 1.107 |
| Gold Coin | W | 5.9 | 1.3 | 0.6 | 7.8 | 75.4 | 4.0 | 1.100 |
| Denali | W | 5.8 | 0.8 | 0.5 | 7.1 | 81.7 | 4.9 | 1.110 |
| Sable | W | 5.7 | 0.8 | 0.0 | 6.6 | 86.6 | 4.3 | 1.094 |
| Yellow Finn | W | 5.5 | 1.4 | 0.3 | 7.3 | 75.8 | 4.0 | 1.104 |
| Butte | Ru | 5.5 | 2.5 | 1.1 | 9.1 | 60.6 | 4.5 | 1.103 |
| Nipigon | W | 5.4 | 1.0 | 0.6 | 7.0 | 77.5 | 5.8 | 1.103 |
| Alaska 114 | W | 5.1 | 2.4 | 0.0 | 7.5 | 67.9 | 3.8 | 1.102 |
| Red Warba | R | 5.1 | 1.5 | 0.5 | 7.0 | 71.7 | 4.0 | 1.096 |
| Mirton Pearl | W | 5.0 | 1.1 | 0.6 | 6.7 | 74.8 | 4.2 | 1.104 |
| Green Mountain | W | 5.0 | 1.5 | 1.3 | 7.9 | 63.9 | 3.9 | 1.101 |
| Chilac Ancyd | P | 5.0 | 2.6 | 0.2 | 7.8 | 64.0 | 3.3 | 1.110 |
| Allagash Russet | Ru | 5.0 | 2.1 | 0.0 | 7.1 | 70.5 | 4.0 | 1.100 |
| Chieftain | R | 5.0 | 1.6 | 0.6 | 7.2 | 68.9 | 4.0 | 1.094 |
| Campbell 13 | W | 4.9 | 0.9 | 0.1 | 5.9 | 82.8 | 4.6 | 1.106 |
| Superior | W | 4.8 | 0.9 | 0.2 | 5.9 | 81.9 | 4.5 | 1.110 |
| Blue Mac | P | 4.8 | 1.3 | 1.5 | 7.6 | 63.2 | 3.8 | 1.093 |
| Acadia Russet | Ru | 4.3 | 2.1 | 0.7 | 7.0 | 60.9 | 4.7 | 1.103 |
| Cherokee | W | 4.3 | 1.0 | 0.3 | 5.5 | 77.4 | 3.7 | 1.107 |
| Kufri Jeevan | W | 4.2 | 0.9 | 1.2 | 6.4 | 66.3 | 4.1 | 1.089 |
| 6-78-139-80[7] | W | 4.2 | 2.7 | 0.1 | 6.9 | 60.5 | 3.3 | 1.095 |
| Conestoga | W | 4.1 | 1.5 | 0.0 | 5.6 | 73.5 | 3.9 | 1.104 |
| Yukon Gold | W | 4.1 | 0.6 | 0.2 | 5.0 | 82.3 | 4.2 | 1.105 |
| Norwis | W | 4.0 | 1.0 | 0.3 | 5.3 | 75.6 | 4.0 | 1.093 |
| Lemhi Russet | Ru | 4.0 | 1.7 | 0.3 | 6.0 | 66.5 | 4.3 | 1.106 |
| Purple Viking | P | 3.9 | 2.4 | 0.2 | 6.5 | 60.0 | 3.8 | 1.098 |
| Tolaas | Ru | 3.9 | 1.7 | 0.1 | 5.6 | 68.9 | 3.8 | 1.099 |
| Sangre | R | 3.8 | 1.3 | 0.3 | 5.4 | 70.6 | 3.8 | 1.096 |
| Batoche | R | 3.7 | 1.5 | 0.8 | 6.0 | 62.0 | 3.8 | 1.101 |
| Avon | W | 3.7 | 1.5 | 0.6 | 5.8 | 63.4 | 4.1 | 1.103 |
| Norgold Russet | Ru | 3.7 | 1.8 | 0.4 | 5.9 | 62.8 | 3.8 | 1.105 |
| Norland | R | 3.6 | 2.0 | 0.1 | 5.7 | 62.4 | 3.8 | 1.097 |
| Russet Nugget | Ru | 3.4 | 1.7 | 1.0 | 6.1 | 55.9 | 4.0 | 1.108 |
| Russet Burbank | Ru | 3.2 | 3.1 | 0.7 | 7.1 | 45.5 | 3.7 | 1.099 |
| Hilite Russet | Ru | 3.2 | 2.5 | 0.0 | 5.7 | 56.7 | 3.6 | 1.107 |
| Kamaraz | W | 3.2 | 2.0 | 1.2 | 6.4 | 49.6 | 3.4 | 1.107 |
| Russet Bake-King | Ru | 2.9 | 0.9 | 1.5 | 5.4 | 54.0 | 3.9 | 1.108 |
| Caulin Alto | W | 2.6 | 2.1 | 0.7 | 5.4 | 47.6 | 3.3 | 1.100 |
| Fundy | W | 2.4 | 1.7 | 0.1 | 4.2 | 57.0 | 3.2 | 1.107 |
| Rote Erstling | R | 2.2 | 2.4 | 0.0 | 4.7 | 47.6 | 3.6 | 1.098 |
| Russet Norkotah | Ru | 2.2 | 1.9 | 0.2 | 4.3 | 50.2 | 3.7 | 1.100 |
| Average | | 4.5 | 1.6 | 0.5 | 6.6 | 67.5 | 4.0 | 1.101 |
| LSD 5%[8] | | 2.0 | | | 2.0 | | | |

[1] Yields expressed in tons per acre.
[2] (R) = red skin, (Ru) = russet skin, (W) = white skin, (P) = purple 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] 6-78-139-80 originated in the breeding program of C.H. Dearborn.
[8] LSD: Least significant difference.

Yields by selected varieties over the past five years under nonirrigated conditions are summarized in Table 5. The average yield of these varieties in 1994 was 5.4 tons per acre. This was nearly one ton per acre less than in 1993 and 1993 yields had been the lowest since these comparative studies were initiated in 1982. Although several varieties, including Denali, IditaRed, and Shepody had higher yields in 1994 than in 1993, yields of all the selected varieties were less in 1994 than average yields for respective varieties over the last five years. Stress from lack of water was extremely pronounced during the 1994 season and was more severe than in any season since these trials began in 1982.

The average percentage of US #1 tubers was somewhat lower in 1994 than previous years in

*Table 4. Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1990 through 1994.*[1]

| Variety | 1990 | 1991 | 1992 | 1993 | 1994 | Average[2] |
|---|---|---|---|---|---|---|
| Alaska 114 | 22.1 | 19.3 | 18.1 | 19.3 | 13.6 | 18.5 |
| Bake-King | 18.5 | 15.8 | 16.2 | 15.9 | 15.4 | 16.4 |
| Denali | 17.5 | 20.4 | 15.4 | 17.5 | 12.3 | 16.6 |
| Green Mountain | 22.8 | 20.6 | 19.4 | 19.5 | 18.5 | 20.2 |
| IditaRed | 22.4 | 19.3 | 22.4 | 18.1 | 14.8 | 19.4 |
| Kennebec | 16.8 | 18.9 | 20.1 | 18.8 | 22.8 | 19.5 |
| Lemhi Russet | 19.6 | 14.3 | 13.8 | 17.3 | 12.9 | 15.6 |
| Russet Burbank | 15.5 | - | 16.3 | 13.4 | 12.1 | 14.3 |
| Shepody | 16.2 | 14.9 | 15.6 | 15.4 | 15.7 | 15.6 |
| Superior | 18.4 | 18.2 | 16.6 | 16.6 | 17.6 | 17.5 |
| 6-78-139-80 | 20.4 | 12.5 | 15.4 | 17.6 | 11.1 | 15.4 |
| LSD 5%[3] | 3.5 | 2.7 | 3.3 | 2.4 | 4.5 | - |
| Average | 19.1 | 17.4 | 17.2 | 17.2 | 15.2 | 17.2 |

[1] Yields expressed in tons per acre (- indicates variety not tested). #1 market grade as defined by the US Department of Agriculture.
[2] Average calculated on yields from 1990-1994.
[3] Least significant difference.

*Table 5. Comparative summary of US #1 tuber yields of selected varieties in nonirrigated trials conducted from 1990 through 1994.*[1]

| Variety | 1990 | 1991 | 1992 | 1993 | 1994 | Average[2] |
|---|---|---|---|---|---|---|
| Alaska 114 | 6.0 | 13.9 | 10.2 | 6.1 | 5.1 | 8.3 |
| Bake-King | 6.9 | 13.6 | 9.3 | 6.3 | 6.1 | 8.4 |
| Denali | 6.5 | 12.8 | 7.5 | 3.1 | 5.8 | 7.1 |
| Green Mountain | 8.6 | 16.7 | 13.2 | 9.5 | 5.0 | 10.6 |
| IditaRed | 5.4 | 17.5 | 11.6 | 5.0 | 6.2 | 9.1 |
| Kennebec | 9.9 | 15.8 | 13.5 | 8.4 | 6.6 | 10.8 |
| Lemhi Russet | 5.4 | 12.2 | 8.1 | 4.7 | 4.0 | 6.9 |
| Russet Burbank | 7.1 | - | 11.4 | 8.4 | 3.2 | 7.5 |
| Shepody | 7.5 | 11.4 | 11.7 | 7.5 | 8.6 | 9.3 |
| Superior | 3.7 | 15.4 | 9.6 | 5.8 | 4.8 | 7.9 |
| 6-78-139-80 | 8.0 | 11.7 | 12.1 | 6.8 | 4.2 | 8.6 |
| LSD 5%[3] | 2.0 | 2.2 | 2.3 | 1.8 | 2.0 | - |
| Average | 6.6 | 14.1 | 10.7 | 6.5 | 5.4 | 8.6 |

[1] Yields expressed in tons per acre (- indicates variety not tested). #1 market grade as defined by the US Department of Agriculture.
[2] Average calculated on yields from 1990-1994.
[3] Least significant difference.

*Table 6. Type and quantity of gradeout observed among selected varieties in irrigated and nonirrigated trials in 1994.*[1]

| | | Total | #1 | Under size | Over size | Shatter crack | Growth crack | Green | Other[2] |
|---|---|---|---|---|---|---|---|---|---|
| Acadia Russet | (NI)[3] | 7.0 | 4.3(61.4) | 2.1(29.4) | 0.0(0.0) | 0.2(2.8) | 0.1(0.7) | 0.1(0.4) | 0.4(5.3) |
| | (I) | 20.2 | 14.1(69.8) | 1.6(7.9) | 1.3(6.4) | 0.6(3.0) | 0.7(3.5) | 0.6(3.0) | 1.3(6.4) |
| Alaska 114 | (NI) | 7.5 | 5.1(68.0) | 2.3(31.6) | 0.0(0.0) | 0.0(0.0) | 0.1(0.4) | 0.0(0.0) | 0.0(0.0) |
| | (I) | 19.0 | 13.6(71.6) | 2.4(12.6) | 0.0(0.0) | 0.0(0.0) | 0.4(2.1) | 0.5(7.9) | 1.1(5.8) |
| Allagash Russet | (NI) | 7.1 | 5.0(70.4) | 2.1(29.6) | 0.0(0.0) | 0.0(0.0) | 0.0(0.0) | 0.0(0.0) | 0.0(0.0) |
| | (I) | 18.9 | 15.9(84.1) | 1.5(7.9) | 0.4(2.1) | 0.0(0.0) | 0.8(4.2) | 0.1(0.6) | 0.2(1.1) |
| Bake-King | (NI) | 7.4 | 6.1(82.4) | 1.1(14.9) | 0.0(0.0) | 0.2(0.3) | 0.1(1.2) | 0.0(0.0) | 0.1(1.2) |
| | (I) | 18.5 | 15.4(83.2) | 1.6(8.6) | 0.2(1.1) | 0.3(1.6) | 0.2(1.1) | 0.4(2.2) | 0.4(2.2) |
| Gold Coin | (NI) | 7.8 | 5.9(75.5) | 1.3(16.2) | 0.0(0.0) | 0.5(6.6) | 0.1(1.7) | 0.0(0.0) | 0.0(0.0) |
| | (I) | 22.7 | 18.3(80.6) | 1.3(5.7) | 1.3(5.7) | 0.5(2.2) | 0.3(1.3) | 0.3(1.3) | 0.7(3.2) |
| Green Mountain | (NI) | 7.9 | 5.0(63.7) | 1.5(18.9) | 0.0(0.0) | 0.7(8.5) | 0.5(6.4) | 0.0(0.0) | 0.2(2.5) |
| | (I) | 23.0 | 18.5(80.4) | 2.0(8.6) | 0.7(3.2) | 0.2(0.9) | 0.1(0.4) | 0.4(1.7) | 1.2(4.8) |
| IditaRed | (NI) | 8.5 | 6.2(72.9) | 1.8(21.3) | 0.0(0.0) | 0.3(3.4) | 0.1(1.2) | 0.0(0.0) | 0.1(1.2) |
| | (I) | 19.5 | 14.8(75.9) | 1.5(7.7) | 0.9(4.6) | 0.7(3.6) | 0.8(4.1) | 0.2(1.0) | 0.6(3.1) |
| Lemhi Russet | (NI) | 6.0 | 4.0(66.7) | 1.7(29.0) | 0.0(0.0) | 0.2(2.9) | 0.1(0.6) | 0.1(0.4) | 0.1(0.4) |
| | (I) | 17.9 | 12.9(72.1) | 1.8(10.0) | 0.3(1.7) | 1.1(6.1) | 0.5(2.8) | 0.5(2.8) | 0.8(4.5) |
| Sangre | (NI) | 5.4 | 3.8(70.4) | 1.3(24.2) | 0.0(0.0) | 0.3(4.7) | 0.0(0.0) | 0.0(0.0) | 0.1(0.7) |
| | (I) | 17.2 | 14.8(86.0) | 1.0(5.8) | 0.0(0.0) | 0.3(1.7) | 0.4(2.5) | 0.2(1.1) | 0.5(2.9) |
| Shepody | (NI) | 10.3 | 8.6(83.5) | 1.4(14.0) | 0.0(0.0) | 0.1(1.0) | 0.1(1.0) | 0.0(0.0) | 0.1(0.5) |
| | (I) | 19.6 | 15.7(80.1) | 1.3(6.5) | 0.4(2.0) | 0.0(0.0) | 0.1(0.6) | 0.7(3.8) | 1.4(7.0) |
| Superior | (NI) | 5.9 | 4.8(81.4) | 0.9(15.3) | 0.0(0.0) | 0.0(0.0) | 0.1(0.9) | 0.1(0.4) | 0.1(2.0) |
| | (I) | 21.8 | 17.6(80.7) | 0.8(3.7) | 1.0(4.6) | 0.3(1.5) | 0.4(1.6) | 1.3(6.2) | 0.4(1.7) |

[1] Weights expressed in tons per acre. Values in parenthesis indicate percent of total yield.
[2] Includes primarily second growth; also rotten, misshapen, etc.
[3] (NI) = not irrigated, (I) = irrigated.

both the irrigated (75.6%) and the nonirrigated (67.5%) trials. (Table 2 and 3). These low percentages are explainable in the nonirrigated trial by the larger quantities of undersized tubers. In the irrigated trial, explanations for the relatively low percentages of US #1 tubers are less obvious. One possible explanation is a higher incidence of damage due to *Rhizoctonia solani* and other soilborne pathogens than has been observed in previous years. The detailed presentation of types of gradeout of selected varieties summarized in Table 6 illustrates that the majority of gradeout for all varieties in both irrigated and nonirrigated trials is in the form of undersized tubers. All other categories of gradeout represent only small percentages (or none) of the total gradeout.

Two varieties deserve specific mention. The first is Russet Bake-King, a new variety of interest because of its kinship with Bake-King, a widely grown variety. Russet Bake-King performed better in 1994 than in 1993. However, it was far down in the rankings in both the irrigated and nonirrigated trials, indicating again that this variety may not possess the production characteristics necessary to be grown commercially in Alaska. The other variety is Allagash Russet. This variety continues to yield well and maintain the relatively high percentage of US #1 tubers that is uncharacteristic of russet skinned varieties grown at this location. We believe Allagash Russet is worthy of consideration for commercial production.

# Trials at Other Locations in Alaska

## General Procedures

Ten potato varieties were planted by cooperators at six other locations throughout Alaska. Some of the cooperators are private citizens whereas others are employed by the Alaska Cooperative Extension (ACE) or U.S. Department of Agriculture, Agricultural Research Service, (USDA-ARS). At the various locations seed pieces were planted in rows 36 inches apart and spaced 11-12 inches apart in the row. At most locations, commercial fertilizers were applied at a rate that was comparable to that applied at 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 the equipment and materials available. Total and US #1 yields for varieties at each site are summarized in Table 7. Length of season at the six sites and at the Matanuska Farm (Palmer) are given in Table 8.

*Table 7. Yield trial summary from selected Alaskan locations in 1994.*[1]

| | Delta | | Fairbanks | | Juneau | | Kenai–Soldotna | | Nome | | Palmer | | Pt. Mack. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety | #1[2] | Total[3] | #1 | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total |
| Alaska 114 | 0.8 | 7.4 | 7.1 | 8.3 | 9.7 | 19.1 | 5.5 | 12.0 | 0.0 | 2.2 | 13.6 | 19.0 | 12.3 | 15.0 |
| Allagash | 1.4 | 7.7 | 8.6 | 9.6 | 7.9 | 12.6 | 2.8 | 7.2 | 0.1 | 2.4 | 15.9 | 18.9 | 10.4 | 12.3 |
| Bake-King | 1.0 | 5.3 | 6.6 | 7.2 | 9.2 | 14.3 | 5.5 | 9.2 | 0.5 | 4.6 | 15.4 | 18.5 | 10.1 | 11.4 |
| Conestoga | 2.3 | 8.9 | 6.1 | 8.3 | 11.8 | 17.8 | 7.3 | 12.9 | 0.5 | 5.3 | 13.2 | 16.9 | 11.2 | 14.3 |
| Green Mountain | 0.8 | 7.5 | 7.4 | 9.0 | 14.4 | 22.4 | 6.1 | 10.1 | 0.2 | 6.1 | 18.5 | 23.0 | 7.5 | 9.8 |
| Russet Burbank | 0.2 | 8.2 | 6.1 | 9.5 | 9.9 | 21.3 | 3.8 | 12.9 | 0.2 | 8.6 | 12.1 | 19.2 | 9.9 | 12.1 |
| Shepody | 1.8 | 6.8 | 7.0 | 10.4 | 9.6 | 21.8 | 7.4 | 9.5 | 0.8 | 4.8 | 15.7 | 19.6 | 11.3 | 13.0 |
| Superior | 4.2 | 9.3 | 7.6 | 9.2 | 10.5 | 12.7 | 7.6 | 10.9 | 1.1 | 9.7 | 17.6 | 21.8 | 11.6 | 12.5 |
| Yukon Gold | 2.4 | 9.3 | 7.2 | 8.7 | 10.9 | 15.8 | 4.9 | 9.8 | 0.3 | 4.1 | 12.9 | 16.8 | 10.1 | 13.0 |
| 6-78-139-80 | 0.7 | 7.9 | 4.8 | 5.7 | 16.6 | 24.2 | 4.7 | 9.6 | 0.0 | 5.4 | 11.1 | 16.4 | 7.2 | 9.6 |

[1] All #1 and total yields are expressed in tons per acre. Yield figures represent the average of three replications at all locations except Palmer, where four replications were averaged.
[2] #1 market grade as defined by the US Department of Agriculture.
[3] Total 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 | 98 | 7 | 91 |
| Fairbanks | 103 | 8 | 95 |
| Juneau | 104 | 0 | 104[2] |
| Kenai-Soldotna | 104 | 7 | 97 |
| Nome | 90 | 6 | 84 |
| Palmer | 119 | 0 | 119[2] |
| Pt. Mackenzie | 105 | 2 | 103 |

[1] Number of days prior to harvest that killing frost occurred.
[2] Harvest was completed before a killing frost.

## Site Specific Information

**Delta Junction** - Plots were fertilized on May 12 at the rate of 92 pounds N, 368 pounds $P_2O_5$, 184 pounds $K_2O$ and 34 pounds S per acre. Fertilizer was broadcast and incorporated prior to planting on May 14. Rainfall during the 1994 growing season totaled 3.6 inches, which was 49% of normal rainfall for that area. Plants were hilled on June 6. Temperatures for the season were above normal which accentuated the shortage of rainfall. No irrigation water was applied. Vines were killed by a 28°F freeze on August 14 and the crop was harvested on August 20.
Cooperator: Don Quarberg, ACE.

**Fairbanks** - Plots were tilled and prepared on May 19. Fertilizer at the rate of 200 pounds N, 100 pounds $P_2O_5$, and 100 pounds $K_2O$ per acre was broadcast and tilled in before planting on May 20. Weeds were controlled by a preemergence application of Metribuzin. Approximately 6.3 inches of rain fell during the growing season (equivalent to the 10 year average for this site). Additional water was applied through overhead sprinklers, twice in July and once in August, at the rate of approximately one inch per application. Plants were hilled in late July. The month of May was warmer than average, but the remainder of the growing season was near to the 10 year average. A light freeze injured the top leaves on August 24 and the crop was harvested on August 31, before any killing frost.
Cooperator: J.S. Conn, USDA.

**Juneau** - Plots were prepared then fertilized with N, $P_2O_5$ and $K_2O$ at the rates of 100, 384, and 192 pounds per acre respectively. Potatoes were planted on June 4. The growing season was dryer than normal, and rainfall was supplemented on two occasions with water from overhead sprinklers. Air temperatures were approximately average for this location. Plots were harvested on September 15, before any damage to plants or tubers by frost.
Cooperators: Jim Douglas, ACE and Jerry Lewis.

**Kenai-Soldotna** - Plots at the Warren Larson Community Garden site were prepared and fertilized with 155 pounds of N, 352 pounds of $P_2O_5$, and 166 pounds of $K_2O$ per acre prior to planting on June 1. Rainfall was below normal for the growing season and plants were stressed as irrigation water was not available. Temperatures were slightly above normal for the growing season. Plots were harvested on September 12, long before the first killing frost.
Cooperator: Tom Jahns, ACE.

**Nome** - Plots at Pilgrim Hot Springs that had been fallowed for several years were prepared and planted on June 4. Fertilizer consisted of a mixture of fish emulsion, sea kelp and a commercial organic fish-based fertilizer (containing 5-7% N, $P_2O_5$ and $K_2O$) side dressed at the rate of 1.5 pounds per 100 feet of row. The early part of the season was drier than average, but in August, when nearly eight inches of rain fell, it was necessary to drain excess water from the plots. Overall, the season was cooler than average (a small amount of snow fell on June 5). Temperatures dropped to 26°F on August 27 and the plots were harvested on September 1.
Cooperators: Hunter Michelbrink ACE, and Tim Humes.

**Pt. MacKenzie** - Plots were prepared and planted on May 25 at the Point Hope Correctional Site at Pt. MacKenzie. The growing season was warm and dry, and although irrigation water was applied, plants were stressed throughout the growing season by a shortage of water. Vines were killed by frost on September 5 and potatoes were harvested on September 7.
Cooperator: Jerry Purser, ACE.

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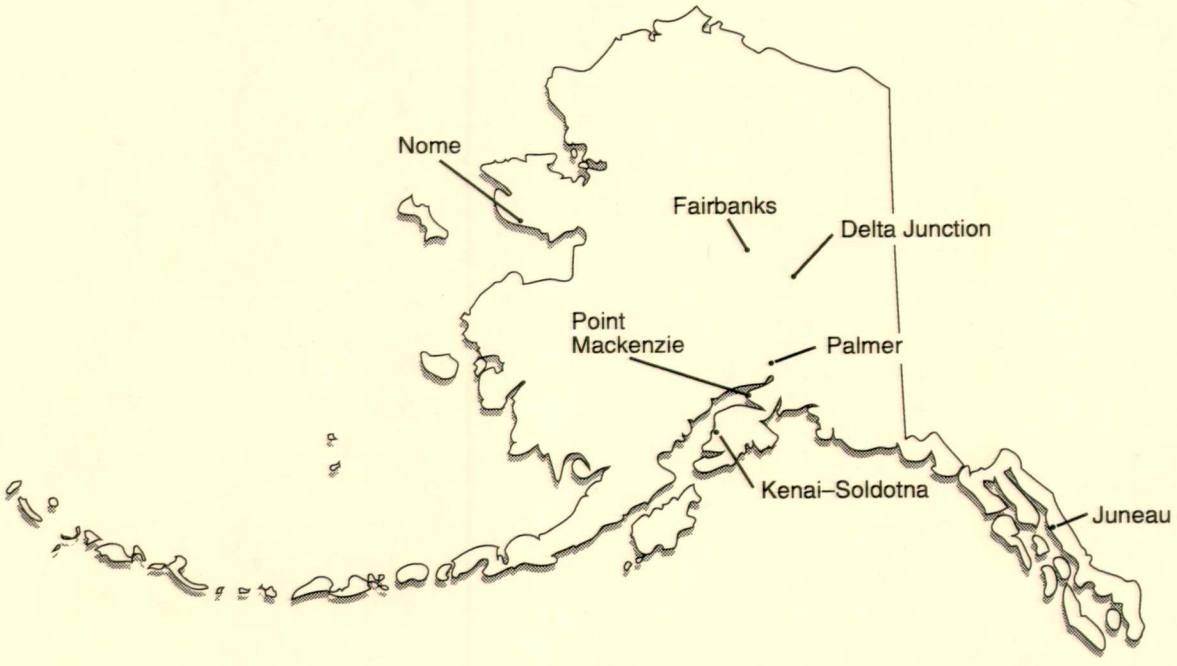
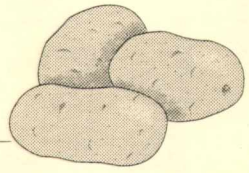
**Juneau** ..... Jim Douglas, ACE

**Kenai-Soldotna** ..... Tom Jahns, ACE

**Nome** ..... Hunter Michelbrink, ACE, and Tim Humes

**Pt. MacKenzie** ..... Jerry Purser, ACE

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