# POTATO VARIETY PERFORMANCE

AND

# COMMERCIAL POTATO CROP DATA SUMMARY

# ALASKA 1991


by

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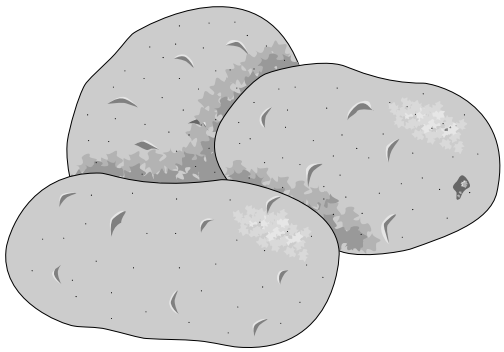


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# Potato Variety Performance – 1991

## Introduction

A yield trial in which 43 named varieties and numbered selections of potatoes were compared was conducted during the 1991 growing season at the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station's Palmer Research Center, Matanuska Research 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) are included and serve as a comparative base for newly developed varieties, numbered selections or older varieties that have not been tested at this location. Varieties that compare favorably with the above listed standards may warrant consideration by commercial growers.

Nonirrigated trials have been conducted annually since 1982, whereas irrigated trials were initiated in 1985 (AFES Circulars 49, 54, 58, 65, 71, 77, and 84). These circulars are available at the AFES Offices in Fairbanks and Palmer.

Included in this report are the 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 Kodiak.

## Matanuska Farm Yield Trials

### Cultural Practices and Environmental Conditions

Duplicated trials, irrigated and nonirrigated, were planted at the Matanuska Farm on May 13. Seedbed preparation included moldboard plowing to a depth of 8-10 inches followed by discing and packing. Seedbed preparation was scheduled to permit planting as quickly as possible after tilling thereby minimizing loss of early spring moisture from the soil. Four replicates of each variety, with 22 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® assist feed planter. Granular fertilizer 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 beside and below the seed. The composition of the fertilizer applied to one acre was 471 pounds of monoammonium phosphate, 400 pounds of muriate of potash, 138 pounds of urea, and 191 pounds of limestone filler. Tensiometers were installed at depths of 12 and 18 inches in the irrigated plots. Water was applied when tensiometer readings reached 40 centibars. Weeds were controlled by a pre-emergent application of Linuron (Lorox®) followed by cultivation and hand weeding. Plots were hilled on June 24.

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 in order to kill any pathogenic fungi or bacteria present on the tuber surfaces. Dipping in formaldehyde must be completed prior to any break in dormancy, as developing sprouts are quickly killed by formaldehyde. The principal target of the formaldehyde dip was the disease-causing fungus *Rhizoctonia solani*. Seed pieces weighing 1.5 to 2.0 ounce were cut from 6 to 10 ounce tubers.

Soil moisture was low at planting time and continued to decline until the end of June. Ordinarily a total of two or more inches of rain falls in May and June (Table 1), but in 1991, the total for these two months was 0.32 inches. Daily mean air temperatures were 1.0 °F above the long-term average for May (Table 1), and these higher than average temperatures continued through the month of June. High temperatures magnified the problem of low early season moisture by increasing the rate of moisture loss through evaporation and transpiration.

Early season conditions were ideal for rapid sprouting, and plants began to emerge within three weeks of planting. Plant stands were at or near 100% in each plot. However, signs of water stress began to show very quickly in the nonirrigated plot. By the end of June the moisture starved plants in the nonirrigated plots were 30-50% the size of plants in the irrigated plots.

Rain began to fall in early July and by months end 3.47 inches had fallen. This amount was nearly 50% above average rainfall for July, and eliminated the drought symptoms observed in the nonirrigated plots in May and June. By the end of July, vine size in the nonirrigated plots was 70-80% of vine size in the irrigated plots. The excessive rain and associated cloud cover resulted in July being somewhat cooler than average.

Rainfall in August and September was below average (Table 1) and probably less than the plants would require to maximize yields. Total rainfall for the 1991 season was 6.52 inches, less than 70% of the long term average for Matanuska Farm growing season. Temperatures were slightly below average in August but nearly 4°F above average in September.

Strong winds blew during August, battering leaves and breaking the vines down. Vines in the nonirrigated trial appeared to suffer more severe injury than those in the irrigated trial, but wind damage probably caused some yield reduction in both trials.

Plots were harvested with a one-row Juko® mechanical harvester on September 5 and 6. Harvested tubers were placed in plastic tubs or burlap bags and stored in a refrigerated storage until grading. Field conditions at the time of harvest were dry and dusty, and at times it was difficult to maintain adequate quantities of soil on the harvester's main chain. As a result more than the normal amount of skinning of tubers occurred during harvest in 1991. Once again, no frost damage was observed in the harvested tubers, as freezing temperatures did not occur until after harvest.

A small amount of bacterial soft rot was found in many varieties during grading. Though not found in large quantities, its presence indicates the possibility of a higher than normal occurrence of soft rot in commercially grown potatoes. A higher incidence of soft rot may be due to warmer than average temperatures at harvest time.

## Results and Discussion

Harvest data from the irrigated and nonirrigated trials are summarized in Tables 2 and 3 respectively. The average total yield for all varieties was 19.2 tons/acre in the irrigated trial and 15.7 tons/acre in the nonirrigated trial. Yields of US #1 tubers averaged 15-20% less than total yields. The top yielding variety in the irrigated trials was Gold Coin, with a US #1 yield of 21.1 tons/acre. US #1 yields greater than 20 tons/acre were also achieved by Green Mountain and Denali. Thirteen of the top yielding 15 varieties were white skinned, the exceptions being IditaRed and Red Warba. Acadia Russet was the top yielding russet variety, as it was in 1990.

In the nonirrigated yield trial the three top yielding varieties were IditaRed, Allagash, and Green Mountain; a red, a russet and a white skinned potato. Gold Coin also yielded well in the nonirrigated trial, and in spite of the extreme dryness in May and June, average yields across all varieties in the nonirrigated trials were 228% higher than in 1990.

1990 also was a year with a period of drought, but it is worthwhile to note the differences in drought between 1990 and 1991. The 1990 growing season began with adequate soil moisture and enough rain fell in the months of May and June to prevent drought related stress on the developing plants. In July, 1990, however, only 0.21 inches of rain fell. This was far less water than the potato plants required during the period of rapid vine growth and early tuber enlargement. The damage done during this dry period was permanent and was not overcome for by adequate rainfall in August, 1990.

When 1990 is compared with 1991 it can be seen that the period of drought stress, though just as severe and twice as long as in 1990, occurred at a less critical time in the plant growth cycle. The damage done by drought stress in May and June of 1991 was not permanent, and the arrival of adequate moisture in July permitted continuation of plant growth and tuber development. This suggests that July is the time when potato growers should keep a most critical eye on soil moisture.

The average specific gravity across varieties in the irrigated trial was 1.092, whereas in the nonirrigated trial it was 1.098 (Table 2 and 3). This relatively minor difference (0.006) is similar to differences between irrigated and nonirrigated trials in most previous years. The one exception was in 1990, when the difference in specific gravity between the two trials was 0.022. The large difference observed in 1990 is relatable to the extreme drought stress in July, 1990 that resulted in unusually high specific gravity values in potatoes from the nonirrigated plot. Although there was a dry period in the 1991 growing season, it was earlier in the growth cycle (May and June), and it had no noticeable effect on specific gravity.

A comparison of yields of selected varieties with previous growing seasons is summarized in Tables 4 and 5. The 1991 average in the irrigated trial (Table 4) was less than 1989 or 1990, due in part to wind damage and to cooler temperatures and low rainfall in August. It was not possible to irrigate in August with our hand-laid line system of irrigation, without causing significant damage to vines. Average yields for the nonirrigated trial (Table 5) were more than twice the average in 1990, once again indicating that early season drought need not limit yields to unacceptably low levels.

Total gradeout across varieties was relatively low, averaging 18% in the irrigated and 14% in the nonirrigated trial. Specific types of gradeout summarized in Table 6 illustrate the expected problems with shatter cracking in IditaRed and undersized tubers in Lemhi Russet. Somewhat unexpected was the relatively high amount of second growth observed in Shepody, in both irrigated and nonirrigated trials.

Five foreign varieties were included with 38 North American varieties in 1991, including Kamaraz, Kutri Jeevan, Chilac Ancyd, Isla Caucahua and Caulin Alto. Kamaraz was developed in Minsk, Belarus, while the specific origin of the others, though probably Asian, is uncertain. Kutri Jeevan, Kamaraz, and Chilac Ancyd yielded comparatively well although characteristics such as size, shape, eye depth and color may eliminate them from serious consideration by commercial growers. Isla Caucahua and Caulin Alto had very high percentages of small tubers, and the average weight of US #1 tubers in all five foreign varieties was below 5.6 ounces.

## TRIALS AT OTHER LOCATIONS IN ALASKA

### General Procedures

Ten potato varieties were planted by cooperators at five other locations throughout Alaska. Some of the cooperators are private citizens; others are employed by the Cooperative Extension Service or U.S. Department of Agriculture. At the various locations, when environmental conditions permitted, 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 may have varied from site to site. 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 recorded in Table 8.

### Site Specific Information

**Delta Junction** - (Cooperator, Don Quarberg - CES): The plot was fertilized at the rate of 122-320-160-48 lbs/acre (N-$P_2O_5$-$K_2O$-S) and planted on May 10. The growing season was dry, receiving only 50% of the average rainfall. Irrigation water was not applied. Temperatures were warm in May and June, but below average for the remainder of the season. Weeds were controlled with chemical herbicides, supplemented by mechanical weed control later in the season. Vines were killed by frost on August 21, and the crop was harvested on August 29.

**Fairbanks** - (Cooperator, J.S. Conn - ARS): The plot was fertilized with 10-20-20 at the rate of 1300 lbs/acre and planted on May 31. Planting was delayed by snow that remained from the previous winter. A preemergent application of metribuzin was made to control weeds. Rainfall was below average in June and July but normal for August and September. Irrigation water was applied as needed through July and early August. Summer temperatures were normal but were above average into September. Harvesting was completed on September 20. Although no killing frosts occurred prior to harvest, a very light frost occurred on August 28.

**Homer** - (Cooperators, Warren Larson [CES] and Ted Reynolds [Master Gardener]): The plot was fertilized with 40 lbs of blood meal, 60 lbs of burnt bone, and composted seaweed. Planting was done May 12-14. The growing season temperature and rainfall was normal for Homer, and no irrigation water was applied. Frost damaged vines to some extent on October 5 and the crop was harvested October 11-16.

**Kenai-Soldotna** - (Cooperator, Warren Larson - CES): The plot was fertilized with 10-20-20-7 (N-$P_2O_5$-$K_2O$-S) at the rate of 1800 lbs/acre then planted on May 23. Rainfall was below average for the year but ample during the latter part of the season. No irrigation water was applied. The month of June was cooler than usual, and the entire summer was cloudier than normal. Harvesting was done September 11-18, and there was no frost prior to harvest.

**Kodiak** - (Cooperator, Fred Sorenson - CES): The Kodiak plot was located at the Borough Fairgrounds. The plot was fertilized with N-$P_2O_5$-$K_2O$ at the rate of 112-448-224 lbs/acre, and was planted on June 7. No chemicals or irrigation was used. Rainfall was above average and most days during the growing season were overcast. The plots were harvested on September 30, prior to frost.

***Table 1.*** *Climatic data for Matanuska Farm during the 1991 growing season.*

| | May | June | July | August | September |
|---|---|---|---|---|---|
| Temp. (°F) | | | | | |
| Air | | | | | |
| Daily max. | 58.8 (57.7) [1] | 67.5 (65.3) | 65.0 (67.4) | 64.1 (65.0) | 58.2 (55.4) |
| Daily min. | 37.1 (36.2) | 46.2 (44.2) | 49.1 (47.8) | 46.0 (45.7) | 42.5 (37.9) |
| Daily mean | 48.0 (47.0) | 56.9 (54.7) | 57.1 (57.6) | 55.1 (55.4) | 50.4 (46.7) |
| Soil (4" depth) [2] | | | | | |
| Fallow | 41.0 | 55.0 | 55.0 | 47.0 | 44.0 |
| Sod | 36.0 | 53.0 | 55.0 | 50.0 | 46.0 |
| Precip. (in.) | 0.18 (0.75) | 0.14 (1.49) | 3.47 (2.34) | 0.82 (2.51) | 1.91 (2.40) |

[1] Values in parenthesis represent a 56-year average.

[2] Soil temperatures were recorded at the Palmer Research Center, 533 E. Fireweed, Palmer, AK.

# Commercial Potato Crop Data Summary – 1991

## Introduction

A statewide Alaska Potato Crop Survey was conducted in the fall of 1991. A total of 41 growers were contacted; 40 responded. Twelve of the 40 interviewed were certified seed growers, some producing table stock as well. The remaining 28 produced only commercial table stock or seed for their own use. The following is a summary of the results of that survey.

| CES Districts Surveyed | Growers Responding | Acres Surveyed* |
|---|---|---|
| Anchorage/Mat-Su | 21 | 580 |
| Kenai/Soldotna | 4 | 6 |
| Fairbanks/Delta Junction | 15 | 123 |
| Total | 40 | 709 |

* Any differences between these figures and those in published reports from the Alaska Agricultural Statistics Service □□□□result from differences in survey methods.

## Potato Varieties and Yields

| | | Yield tons/acre | |
|---|---|---|---|
| | Acres planted | Nonirrigated | Irrigated |
| Bake-King | 227 | 8-16 | 12-18 |
| Shepody | 62 | 8-18 | 12-15 |
| Green Mountain | 59 | 10-17 | 16 |
| Kennebec | 44 | 6-12 | *□□ |
| Lemhi Russet | 39 | 10-12 | 11 |
| Superior | 31 | 10 | 6 |
| Yukon Gold | 29 | 8-12 | 11 |
| BelRus | 25 | * | 12 |
| Russet Norkotah | 23 | *□□ | 16-17 |
| Alaska 114 | 23 | 6-10 | *□□ |
| Reds [1] | 16 | 6-12 | *□□ |
| Other [2] | 7 | 6- 9 | 12 |
| Organic [3] | 7 | 9-16 | *□□ |
| Seed | 117 | *□□ | *□□ |
| Total | 709 | | |

* Data was not available

[1] IditaRed, Alaska Red, Red Pontiac

[2] Peanut, Alaska Frostless, Denali, Jemseg

[3] Green Mountain, Jemseg, Red Pontiac

## Acreage per grower

| # of growers | # acres planted |
|---|---|
| 9 | less than 1 |
| 16 | 1-10 |
| 8 | 11-30 |
| 4 | 31-40 |
| 4 | over 40 |

## Irrigation

272 acres or 38% of the potatoes planted were grown using irrigation.

## Seed and Planting

### A. Seed Source

- 12 certified seed growers purchased certified seed or plantlets to plant for a seed crop
- 12 growers purchased certified seed to plant for their table stock crop (most of these growers produced less than 10 acres each)
- 13 growers purchased certified seed or plantlets to generate seed for a table stock crop the following season (these growers generally plant more than 10 acres each)
- 3 growers did not use certified seed on a regular basis

### B. Seed Size

| Seed piece size (oz) | % of growers | % of acreage |
|---|---|---|
| 1.5-2.0 | 7.1 | 19 |
| 2.0-3.0 | 71.4 | 67 |
| 3.0-4.0 | 21.4 | 14 |

### C. Planter Type

| Planter Type | % of growers | % of acreage |
|---|---|---|
| Pick type | 27.5 | 38 |
| Hand plant | 30.0 | 7 |
| Cup type | 42.5 | 55 |

### D. Plant Spacing (the following data does not include spacing used by seed growers)

| Between plants in the row | % of growers | % of acreage |
|---|---|---|
| 8" | 17.9 | 47 |
| 9-10" | 17.9 | 16 |
| 11-12" | 50.0 | 29 |
| 13-15" | 14.2 | 8 |

| Between rows | % of growers | % of acreage |
|---|---|---|
| 32" | 10.7 | 26 |
| 33" | 3.6 | 2 |
| 34" | 10.7 | 13 |
| 36" | 71.4 | 55 |
| 42-48" | 3.6 | 4 |

## FERTILIZER

### A. Form and Rate

| Form/rate (lb per acre) | % of growers | % of acreage |
|---|---|---|
| 10-20-10/1000 | 5.0 | 3 |
| 8-32-16/700-900 | 7.5 | 4 |
| Organic* | 10.0 | 1 |
| Custom blends | 10.0 | 12 |
| 10-20-20/1000-1200 | 12.5 | 9 |
| 8-32-16/1200 | 20.0 | 43 |
| 8-32-16/1000-1100 | 35.0 | 28 |

* primarily blood meal, fish meal, bone meal, wood ash, manure, compost

### B. Application

| Placement | % of growers | % of acreage |
|---|---|---|
| Banded | | |
| 4 inches to either side of seed piece | 5.0 | 19 |
| 2 inches to either side of seed piece | 17.5 | 31 |
| below the seed piece | 25.0 | 12 |
| Broadcast | 52.5 | 38 |

### C. Soil Fertility Testing

| Do you have your soil tested? | % of growers | % of acreage |
|---|---|---|
| Occasionally (every 3-5 yrs) | 67.5 | 35 |
| Frequently (every 1-2 yrs) | 5.0 | 28 |
| Never | 27.5 | 37 |

## OTHER CULTURAL PRACTICES

### A. Hilling

| Method | % of growers | % of acreage |
|---|---|---|
| Misc. practices* | 12.5 | 21 |
| Hill once | 40.0 | 21 |
| Hill twice | 47.5 | 58 |

* examples: cultivate once and hill, no hill, plant into hills

### B. Rotation *

| Interval | % of growers | % of acreage |
|---|---|---|
| 1 yr in potatoes, 2 or more yrs out | 3.6 | 4 |
| 1-2 yrs in potatoes, 1 yr out | 53.6 | 47 |
| 3 or more yrs in potatoes, 1 yr out | 35.7 | 41 |
| no rotation | 7.1 | 8 |

* rotations for seed producers are set by certification regulations and are not included in the previous table

### C. Preharvest Vine Removal

| Method | % of growers | % of acreage |
|---|---|---|
| Desiccant | 5.0 | 13 |
| Wait for frost | 10.0 | 11 |
| Beating or chopping | 30.0* | 2 |
| No treatment | 55.0 | 74 |

* beating or chopping may apply to only a portion of a growers crop, such as red potatoes

## CHEMICAL CONTROL

### A. Pesticides used on Alaska potato crops in 1991

| Trade Name | Common Name | Total Number Acres Treated |
|---|---|---|
| Fungicides | | |
| Tops-2.5D | thiophanate-methyl | 80 |
| Herbicides* | | |
| Eptam | EPTC | 45 |
| Gramoxone Super | paraquat | 80 |
| Lorox | linuron | 221 |
| Roundup | glyphosate | 207 |
| Sencor | metribuzin | 172 |
| Growth Regulators | | |
| Royal MH-30 | maleic hydrazide | 202 |
| Sprout Nip | chlorpropham | 125 |
| Vine Desiccants | | |
| Diquat Herbicide-H/A | diquat | 20 |

* some acres were treated with more than one herbicide

### B. Type of treatment and percent of total crop area covered

| Treatment type | % of total acreage treated |
|---|---|
| Herbicide-vine desiccant | 3 |
| Fungicide-seed piece treatment | 11 |
| Growth regulator-sprout inhibitor | 46 |
| Herbicide-weed killer | 82* |

* some acres were treated with more than one herbicide, some were not treated with any

***Table 2.*** *Irrigated yield trial summary, Matanuska Farm - 1991.* [1]

| Variety [2] | US #1 [3] | Small [4] | Other [5] | Total | Percent US #1 | Tuber Weight [6] | Specific Gravity |
|---|---|---|---|---|---|---|---|
| Gold Coin | 21.1 | 0.9 | 0.8 | 22.8 | 92.4 | 6.5 | 1.099 |
| Green Mountain | 20.6 | 1.2 | 0.4 | 22.2 | 92.7 | 5.4 | 1.100 |
| Denali | 20.4 | 1.0 | 1.1 | 22.5 | 90.7 | 6.5 | 1.109 |
| Chieftain | 19.5 | 0.9 | 1.3 | 21.8 | 89.6 | 5.1 | 1.082 |
| IditaRed | 19.3 | 0.8 | 3.5 | 23.5 | 81.9 | 6.6 | 1.082 |
| Red Warba | 19.3 | 0.6 | 3.2 | 23.2 | 83.5 | 6.9 | 1.088 |
| Alaska 114 | 19.3 | 1.5 | 0.1 | 20.9 | 92.4 | 4.9 | 1.094 |
| Nipigon | 19.2 | 0.6 | 2.7 | 22.5 | 85.2 | 8.1 | 1.083 |
| Kennebec | 18.9 | 0.6 | 2.7 | 22.2 | 85.5 | 7.7 | 1.090 |
| Superior | 18.2 | 0.5 | 1.6 | 20.2 | 89.8 | 7.0 | 1.082 |
| Sable | 17.9 | 0.1 | 2.1 | 20.1 | 89.1 | 7.9 | 1.080 |
| Sangre | 17.8 | 0.8 | 0.1 | 18.7 | 95.1 | 5.4 | 1.083 |
| Katahdin | 17.7 | 0.8 | 1.4 | 19.8 | 89.2 | 5.9 | 1.088 |
| Campbell 13 | 17.4 | 0.4 | 3.2 | 21.0 | 82.9 | 7.6 | 1.090 |
| Kutri Jeevan | 17.3 | 0.9 | 2.3 | 20.5 | 84.5 | 5.6 | 1.084 |
| Acadia Russet | 17.2 | 1.6 | 1.9 | 20.6 | 83.4 | 6.4 | 1.092 |
| Monona | 16.8 | 0.9 | 2.8 | 20.4 | 82.1 | 6.3 | 1.084 |
| Atlantic | 16.7 | 0.6 | 2.6 | 19.8 | 84.1 | 6.7 | 1.104 |
| Red Pontiac | 16.5 | 0.5 | 4.6 | 21.5 | 76.5 | 7.3 | 1.083 |
| Kamaraz | 16.3 | 1.9 | 0.8 | 19.0 | 85.9 | 4.5 | 1.102 |
| Norgold Russet | 16.2 | 1.1 | 1.5 | 18.7 | 86.6 | 6.6 | 1.087 |
| Alaska Russet | 16.1 | 2.6 | 1.1 | 19.8 | 81.4 | 5.2 | 1.095 |
| Hilite Russet | 15.9 | 1.0 | 0.1 | 17.0 | 93.5 | 5.5 | 1.089 |
| Bake-King | 15.8 | 0.8 | 0.2 | 16.8 | 93.9 | 6.2 | 1.101 |
| Yukon Gold | 15.8 | 0.3 | 1.5 | 17.6 | 89.5 | 7.9 | 1.090 |
| Russet Norkotah | 15.6 | 1.4 | 1.3 | 18.2 | 85.6 | 6.1 | 1.080 |
| Chilac Ancyd | 15.5 | 1.2 | 2.7 | 19.5 | 79.8 | 5.1 | 1.105 |
| Alasclear | 15.0 | 0.5 | 2.2 | 17.7 | 84.6 | 6.8 | 1.098 |
| Shepody | 14.9 | 0.7 | 3.4 | 19.1 | 78.2 | 8.1 | 1.091 |
| Allagash Russet | 14.6 | 1.5 | 0.8 | 16.9 | 86.6 | 5.4 | 1.088 |
| Lemhi Russet | 14.3 | 3.2 | 0.8 | 18.3 | 78.1 | 5.0 | 1.103 |
| Cherokee | 14.1 | 0.5 | 5.7 | 20.2 | 69.6 | 6.3 | 1.088 |
| Irish Cobbler | 13.9 | 2.0 | 4.3 | 20.2 | 68.7 | 5.3 | 1.083 |
| Avon | 13.8 | 0.6 | 3.6 | 18.0 | 77.0 | 6.6 | 1.084 |
| Nugget Russet | 13.7 | 3.2 | 0.1 | 16.9 | 80.8 | 4.2 | 1.103 |
| Batoche | 13.6 | 1.6 | 3.0 | 18.2 | 74.6 | 5.6 | 1.092 |
| BelRus | 13.6 | 1.1 | 0.0 | 14.6 | 92.7 | 5.3 | 1.105 |
| Isla Caucahua | 13.5 | 4.9 | 0.2 | 18.6 | 72.6 | 3.5 | 1.099 |
| Nooksack | 13.1 | 1.0 | 0.7 | 14.8 | 88.8 | 4.9 | 1.097 |
| 6-78-139-80 | 12.5 | 6.1 | 0.6 | 19.2 | 65.1 | 4.0 | 1.096 |
| Alpha | 12.0 | 2.2 | 4.4 | 18.6 | 64.6 | 4.0 | 1.097 |
| Caulin Alto | 8.0 | 8.1 | 0.2 | 16.3 | 49.2 | 3.7 | 1.098 |
| Agassiz | 7.4 | 6.8 | 0.3 | 14.4 | 50.9 | 3.9 | 1.100 |
| Average | 16.1 | 1.6 | 1.8 | 19.2 | 81.9 | 5.9 | 1.092 |
| LSD 5% [7] | 2.7 | | | 2.6 | | | |

[1] Yields expressed in tons per acre.
[2] 6-78-139-80 originated in the breeding program of C.H. Dearborn.
[3] #1 market grade as defined by the U.S. Department of Agriculture.
[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 based upon type 1 comparisonwise error rate.

***Table 3.*** *Nonirrigated yield trial summary, Matanuska Farm - 1991.* [1]

| Variety [2] | US #1 [3] | Small [4] | Other [5] | Total | Percent US #1 | Tuber Weight [6] | Specific Gravity |
|---|---|---|---|---|---|---|---|
| IditaRed | 17.5 | 0.4 | 1.7 | 19.6 | 89.2 | 7.1 | 1.087 |
| Allagash Russet | 17.4 | 0.5 | 0.5 | 18.3 | 94.9 | 7.1 | 1.100 |
| Green Mountain | 16.7 | 0.7 | 0.2 | 17.6 | 94.4 | 5.8 | 1.105 |
| Gold Coin | 16.5 | 0.6 | 0.7 | 17.8 | 93.0 | 6.3 | 1.104 |
| Red Warba | 16.4 | 0.4 | 2.9 | 19.7 | 83.3 | 8.1 | 1.090 |
| Nipigon | 15.9 | 0.4 | 1.4 | 17.8 | 89.5 | 8.0 | 1.095 |
| Chieftain | 15.8 | 0.5 | 0.4 | 16.7 | 94.5 | 6.4 | 1.094 |
| Kennebec | 15.8 | 0.2 | 1.9 | 17.9 | 88.4 | 9.6 | 1.100 |
| Superior | 15.4 | 0.3 | 0.4 | 16.1 | 95.6 | 6.7 | 1.092 |
| Red Pontiac | 15.3 | 0.3 | 3.9 | 19.5 | 78.1 | 8.4 | 1.086 |
| Monona | 15.3 | 0.4 | 0.9 | 16.6 | 92.3 | 7.0 | 1.089 |
| Sangre | 15.1 | 0.7 | 0.2 | 15.9 | 94.6 | 5.7 | 1.092 |
| Yukon Gold | 15.1 | 0.2 | 1.0 | 16.2 | 92.8 | 8.8 | 1.100 |
| Atlantic | 15.0 | 0.3 | 1.7 | 17.0 | 88.4 | 7.3 | 1.108 |
| Campbell 3 | 14.9 | 0.1 | 1.0 | 16.0 | 92.9 | 8.4 | 1.095 |
| Norgold Russet | 14.3 | 0.5 | 0.7 | 15.4 | 92.4 | 6.9 | 1.088 |
| Sable | 14.1 | 0.2 | 2.8 | 17.2 | 82.2 | 9.4 | 1.087 |
| Alaska 114 | 13.9 | 1.0 | 0.5 | 15.4 | 90.6 | 4.9 | 1.104 |
| Russet Norkotah | 13.9 | 0.8 | 0.7 | 15.4 | 90.3 | 6.4 | 1.088 |
| Chilac Ancyd | 13.7 | 1.4 | 0.4 | 15.5 | 88.6 | 5.4 | 1.108 |
| Bake-King | 13.6 | 0.3 | 0.5 | 14.4 | 94.3 | 7.0 | 1.107 |
| Hilite Russet | 13.3 | 0.6 | 0.1 | 14.0 | 95.2 | 5.7 | 1.096 |
| Alasclear | 13.0 | 0.5 | 1.5 | 15.0 | 87.0 | 7.5 | 1.103 |
| BelRus | 13.0 | 0.9 | 0.2 | 14.1 | 92.4 | 5.8 | 1.107 |
| Katahdin | 12.9 | 0.7 | 0.9 | 14.4 | 89.1 | 6.1 | 1.096 |
| Denali | 12.8 | 0.6 | 1.0 | 14.4 | 88.7 | 5.6 | 1.109 |
| Acadia Russet | 12.7 | 1.3 | 1.2 | 15.2 | 83.6 | 7.4 | 1.101 |
| Alaska Russet | 12.6 | 1.4 | 1.1 | 15.1 | 83.1 | 5.7 | 1.101 |
| Kutri Jeevan | 12.6 | 0.8 | 2.3 | 15.6 | 80.4 | 6.4 | 1.090 |
| Cherokee | 12.5 | 0.2 | 2.7 | 15.4 | 81.2 | 7.6 | 1.094 |
| Lemhi Russet | 12.2 | 2.1 | 0.6 | 14.8 | 82.0 | 5.2 | 1.108 |
| Irish Cobbler | 12.0 | 1.4 | 3.4 | 16.8 | 71.3 | 5.5 | 1.082 |
| Nooksack | 11.9 | 0.6 | 0.2 | 12.7 | 93.5 | 5.4 | 1.103 |
| Alpha | 11.8 | 2.5 | 0.8 | 15.0 | 78.2 | 3.9 | 1.107 |
| 6-78-139-80 | 11.7 | 3.4 | 0.3 | 15.4 | 75.8 | 4.5 | 1.103 |
| Batoche | 11.6 | 0.9 | 2.6 | 15.1 | 76.9 | 6.1 | 1.087 |
| Isla Caucahua | 11.5 | 3.8 | 0.1 | 15.4 | 74.4 | 4.0 | 1.105 |
| Shepody | 11.4 | 0.6 | 2.6 | 14.5 | 78.4 | 7.6 | 1.098 |
| Nugget Russet | 11.1 | 3.2 | 0.1 | 14.3 | 77.5 | 4.7 | 1.109 |
| Avon | 11.0 | 0.4 | 3.2 | 14.6 | 75.1 | 7.5 | 1.088 |
| Kamaraz | 10.9 | 1.9 | 0.1 | 12.9 | 84.6 | 4.1 | 1.109 |
| Agassiz | 9.7 | 3.5 | 0.1 | 13.3 | 72.6 | 4.1 | 1.099 |
| Caulin Alto | 6.8 | 5.9 | 0.1 | 12.7 | 53.0 | 3.5 | 1.105 |
| Average | 13.5 | 1.1 | 1.1 | 15.7 | 85.5 | 6.4 | 1.098 |
| LSD 5% [7] | 2.2 | | | 1.9 | | | |

[1] Yields expressed in tons per acre.
[2] 6-78-139-80 originated in the breeding program of C.H. Dearborn.
[3] #1 market grade as defined by the U.S. Department of Agriculture.
[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 based upon type 1 comparisonwise error rate.

***Table 4.*** *Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1987 through 1991.*[1]

| Variety | 1987 | 1988 | 1989 | 1990 | 1991 | Average [2] |
|---|---|---|---|---|---|---|
| Alaska 114 | 13.6 | - | 20.6 | 22.1 | 19.3 | 18.9 |
| Bake-King | 13.8 | - | 20.3 | 18.5 | 15.8 | 17.1 |
| Denali | 12.1 | - | 18.2 | 17.5 | 20.4 | 17.1 |
| Green Mountain | 15.5 | 19.4 | 23.3 | 22.8 | 20.6 | 20.3 |
| IditaRed | 13.5 | 17.8 | 22.4 | 22.4 | 19.3 | 19.1 |
| Kennebec | 12.7 | - | 20.9 | 16.8 | 18.9 | 17.3 |
| Lemhi Russet | 13.6 | 16.3 | 20.9 | 19.6 | 14.3 | 16.9 |
| Russet Burbank | 9.9 | 13.6 | 14.3 | 15.5 | - | 13.3 |
| Shepody | 12.4 | 16.9 | 17.9 | 16.2 | 14.9 | 15.7 |
| Superior | 14.5 | 18.2 | 20.5 | 18.4 | 18.2 | 18.0 |
| 6-78-139-80 | 14.1 | 21.3 | 22.2 | 20.4 | 12.5 | 18.1 |
| LSD 5% [3] | 2.1 | 2.7 | 2.1 | 3.5 | 2.7 | |
| Average | 13.1 | 17.4 | 20.2 | 19.1 | 17.4 | 17.4 |

[1] Yields expressed in tons per acre (- indicates variety not tested). #1 market grade as defined by the U.S. Department of Agriculture.

[2] Average calculated on yields from 1987-1991.

[3] Least significant difference.

***Table 5.*** *Comparative summary of US #1 tuber yields of selected varieties in nonirrigated trials conducted from 1987 through 1991.* [1]

| Variety | 1987 | 1988 | 1989 | 1990 | 1991 | Average [2] |
|---|---|---|---|---|---|---|
| Alaska 114 | 10.0 | - | 16.9 | 6.0 | 13.9 | 11.7 |
| Bake-King | 10.5 | - | 16.3 | 6.9 | 13.6 | 11.8 |
| Denali | 6.6 | - | 13.2 | 6.5 | 12.8 | 9.8 |
| Green Mountain | 12.4 | - | 18.5 | 8.6 | 16.7 | 14.1 |
| IditaRed | 9.7 | 9.9 | 18.0 | 5.4 | 17.5 | 12.1 |
| Kennebec | 12.0 | 11.9 | 17.5 | 9.9 | 15.8 | 13.4 |
| Lemhi Russet | 14.8 | 10.8 | - | 5.4 | 12.2 | 10.8 |
| Russet Burbank | 10.2 | 11.9 | 12.6 | 7.1 | - | 10.5 |
| Shepody | 11.7 | 14.4 | 15.7 | 7.5 | 11.4 | 12.1 |
| Superior | 8.2 | 10.9 | 14.8 | 3.7 | 15.4 | 10.6 |
| 6-78-139-80 | 12.3 | 17.2 | 18.2 | 8.0 | 11.7 | 13.5 |
| LSD 5% [3] | 2.0 | 2.1 | 1.9 | 2.0 | 2.2 | |
| Average | 10.5 | 12.6 | 16.2 | 6.6 | 14.1 | 11.9 |

[1] Yields expressed in tons per acre (- indicates variety not tested). #1 market grade as defined by the U.S. Department of Agriculture.

[2] Average calculated on yields from 1987-1991.

[3] Least significant difference.

***Table 6.*** *Type and quantity of gradeout observed among selected varieties in irrigated and nonirrigated trials in 1991.* [1]

| | | Total | #1 | Under size | Over size | Shatter crack | Growth crack | green | Other [2] |
|---|---|---|---|---|---|---|---|---|---|
| Acadia Russet | (NI) [3] | 15.2 | 12.7 (83.6) | 1.3 (8.6) | 0.1 (0.7) | 0.1 (0.7) | 0.0 (0.0) | 0.2 (1.3) | 0.7 (4.6) |
| | (I) | 20.6 | 17.2 (83.5) | 1.6 (7.8) | 0.4 (1.9) | 0.2 (1.0) | 0.2 (1.0) | 0.1 (0.5) | 1.0 (4.9) |
| Alaska 114 | (NI) | 15.4 | 13.9 (90.3) | 1.0 (6.5) | 0.0 (0.0) | 0.1 (0.6) | 0.2 (1.3) | 0.0 (0.0) | 0.2 (1.3) |
| | (I) | 20.9 | 19.3 (92.3) | 1.5 (7.2) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.5) | 0.1 (0.5) |
| Allagash Russet | (NI) | 18.3 | 17.4 (95.1) | 0.5 (2.7) | 0.1 (0.5) | 0.0 (0.0) | 0.2 (1.1) | 0.1 (0.5) | 0.0 (0.0) |
| | (I) | 16.9 | 14.6 (86.4) | 1.5 (8.9) | 0.0 (0.0) | 0.2 (1.2) | 0.6 (3.6) | 0.0 (0.0) | 0.1 (0.6) |
| Bake-King | (NI) | 14.4 | 13.6 (94.0) | 0.3 (2.1) | 0.3 (2.1) | 0.0 (0.0) | 0.4 (2.8) | 0.1 (0.7) | 0.1 (0.7) |
| | (I) | 16.8 | 15.8 (94.0) | 0.8 (4.8) | 0.0 (0.0) | 0.1 (0.6) | 0.1 (0.6) | 0.0 (0.0) | 0.1 (0.6) |
| Gold Coin | (NI) | 17.8 | 16.5 (92.7) | 0.6 (3.4) | 0.5 (2.8) | 0.0 (0.0) | 0.1 (0.6) | 0.1 (0.6) | 0.2 (1.1) |
| | (I) | 22.8 | 21.1 (92.5) | 0.9 (3.9) | 0.2 (0.9) | 0.2 (0.9) | 0.1 (0.4) | 0.1 (0.4) | 0.2 (0.9) |
| Green Mountain | (NI) | 17.6 | 16.7 (94.9) | 0.7 (4.0) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.6) | 0.1 (0.6) |
| | (I) | 22.2 | 20.6 (92.8) | 1.2 (5.4) | 0.0 (0.0) | 0.1 (0.5) | 0.1 (0.5) | 0.3 (1.4) | 0.1 (0.5) |
| IditaRed | (NI) | 19.6 | 17.5 (89.3) | 0.4 (2.0) | 0.0 (0.0) | 1.3 (7.7) | 0.3 (1.5) | 0.0 (0.0) | 0.1 (0.5) |
| | (I) | 23.5 | 19.3 (82.1) | 0.8 (3.4) | 0.9 (3.8) | 1.5 (6.4) | 0.8 (3.4) | 0.0 (0.0) | 0.3 (0.1) |
| Lemhi Russet | (NI) | 14.8 | 12.2 (82.4) | 2.1 (14.2) | 0.0 (0.0) | 0.1 (0.7) | 0.1 (0.7) | 0.3 (2.0) | 0.0 (0.0) |
| | (I) | 18.3 | 14.3 (78.1) | 3.2 (17.5) | 0.0 (0.0) | 0.4 (2.2) | 0.2 (1.1) | 0.1 (0.5) | 0.1 (0.5) |
| Sangre | (NI) | 15.9 | 15.1 (95.0) | 0.7 (4.4) | 0.1 (0.6) | 0.1 (0.6) | 0.1 (0.6) | 0.0 (0.0) | 0.0 (0.0) |
| | (I) | 18.7 | 17.8 (95.2) | 0.8 (4.3) | 0.0 (0.0) | 0.1 (0.5) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.5) |
| Shepody | (NI) | 14.5 | 11.4 (78.6) | 0.6 (4.1) | 0.2 (1.4) | 0.1 (0.7) | 0.1 (0.7) | 0.6 (4.1) | 1.6(11.0) |
| | (I) | 19.1 | 14.9 (78.0) | 0.7 (3.7) | 0.1 (0.5) | 0.0 (0.0) | 0.3 (1.6) | 0.2 (1.0) | 2.8(14.7) |
| Superior | (NI) | 16.1 | 15.4 (95.7) | 0.3 (1.9) | 0.0 (0.0) | 0.2 (1.2) | 0.0 (0.0) | 0.1 (0.6) | 0.1 (0.6) |
| | (I) | 20.2 | 18.2 (90.1) | 0.5 (2.5) | 0.2 (1.0) | 0.3 (1.5) | 0.1 (0.5) | 0.9 (4.5) | 0.2 (1.0) |

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

[2] Includes primarily second growth; plus rotten, misshapen, etc.

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

***Table 7.*** *Yield trial summary from selected Alaskan locations in 1991.* [1]

| Variety | Delta | | Fairbanks | | Homer | | Kenai-Soldotna | | Kodiak | | Palmer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | #1 [2] | Total [3] | #1 | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total |
| Alaska 114 | 5.6 | 12.7 | 11.9 | 13.5 | 15.4 | 21.8 | 11.1 | 16.8 | 0.0 | 5.4 | 19.3 | 20.9 |
| Allagash | 3.9 | 10.0 | 8.8 | 9.6 | 15.7 | 21.1 | 5.3 | 12.6 | 0.0 | 7.4 | 14.6 | 16.9 |
| Atlantic | 3.6 | 14.4 | 10.0 | 14.9 | 20.0 | 30.7 | 11.7 | 19.6 | 0.0 | 5.1 | 16.7 | 19.8 |
| Bake-King | 7.0 | 12.8 | 12.2 | 13.5 | 22.7 | 27.1 | 14.2 | 18.1 | 0.0 | 9.8 | 15.8 | 16.8 |
| Green Mountain | 7.6 | 16.2 | 15.5 | 17.1 | 27.7 | 35.0 | 19.7 | 26.6 | 0.0 | 5.8 | 20.6 | 22.2 |
| IditaRed | 4.1 | 15.2 | 12.9 | 15.9 | 16.6 | 22.6 | 10.0 | 20.2 | 0.0 | 10.5 | 19.3 | 23.5 |
| Kennebec | 8.3 | 16.5 | 19.2 | 21.0 | 25.6 | 31.2 | 16.8 | 26.9 | 0.0 | 5.3 | 18.9 | 22.2 |
| Shepody | 5.6 | 13.0 | 10.6 | 12.4 | 17.4 | 23.7 | 14.5 | 20.0 | 0.0 | 8.1 | 14.9 | 19.1 |
| Superior | 10.3 | 15.9 | 13.7 | 15.9 | 20.4 | 26.1 | 16.6 | 20.8 | 0.2 | 11.5 | 18.2 | 20.2 |
| 6-78-139-80 | 2.5 | 13.6 | 11.6 | 13.2 | 13.9 | 22.0 | 17.3 | 23.7 | 0.0 | 7.1 | 12.5 | 19.2 |

[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.

[2] #1 market grade as defined by the U.S. Department of Agriculture.

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

***Table 8.*** *Length of the 1991 potato growing season at six locations in Alaska.*

| Location | No. of days from plant to harvest | Killing frost [1] | No. of days from plant to killing frost |
|---|---|---|---|
| Delta Junction | 111 | 8 | 103 |
| Fairbanks | 113 | 0 | 113 [2] |
| Homer | 154 | 9 | 145 |
| Kenai-Soldotna | 114 | 0 | 114 [2] |
| Kodiak | 115 | 0 | 115 [2] |
| Palmer | 115 | 0 | 115 [2] |

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