



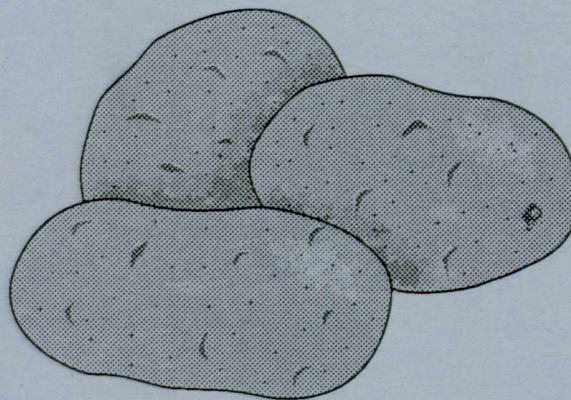
POTATO VARIETY PERFORMANCE ALASKA 1989

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TABLE OF CONTENTS

| | PAGE |
|--|------|
| Introduction..... | 1 |
| Matanuska Farm Yield Trials..... | 1 |
| Cultural Practices and Environmental Conditions..... | 1 |
| Results and Discussion..... | 3 |
| Trials at Other Locations in Alaska..... | 11 |
| General Procedures..... | 11 |
| Specific Site Information..... | 11 |
| Delta Junction..... | 11 |
| Fairbanks..... | 11 |
| Homer..... | 11 |
| Kenai - Soldotna..... | 11 |
| Kodiak..... | 11 |
| Kotzebue..... | 11 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Climatic data for Matanuska Farm during the 1989 growing season..... | 2 |
| Table 2: Irrigated yield trial summary, Matanuska Farm | 4 |
| Table 3: Nonirrigated yield trial summary, Matanuska Farm..... | 5 |
| Table 4: Comparative summary of US #1 tuber yields by selected varieties in irrigated trials conducted from 1985 through 1989..... | 6 |
| Table 5: Comparative summary of US #1 tuber yields by selected varieties in nonirrigated trials conducted from 1982 through 1989..... | 7 |
| Table 6: Type and quality of gradeout observed among selected varieties in irrigated and nonirrigated trials in 1989..... | 8 |
| Table 7: Yield trial summary from selected Alaskan locations in 1989..... | 9 |
| Table 8: Length of the 1989 potato growing season at seven locations in Alaska..... | 10 |

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INTRODUCTION

A comparative yield trial with 45 named varieties and numbered selections of potatoes was conducted during the 1989 growing season at the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station's (AFES) Palmer Research Center, Matanuska Research Farm, located six miles west of Palmer on Trunk Road.

Nonirrigated trials have been conducted annually since 1982 and irrigated trials were begun in 1985. Results of previous trials are recorded in AFES Circulars 49, 54, 58, 65 and 71. These circulars are available at the Agricultural and Forestry Experiment Station offices in Fairbanks and Palmer.

Also included in this report are the results of abbreviated versions of the AFES potato yield trial that were conducted by cooperating individuals and agencies at six locations in Alaska.

Varieties with a history of commercial production in the Matanuska Valley (including 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.

MATANUSKA FARM YIELD TRIALS

Cultural Practices and Environmental Conditions

Duplicated trials, irrigated and nonirrigated, were planted at the Matanuska Farm on May 10, 1989. Seedbed preparation included moldboard plowing to a depth of 8-10 inches followed by disking and packing. Seedbed preparation was scheduled in order to permit planting as quickly as possible after tilling. In so doing, loss of early spring moisture from the soil was held to a minimum. Soil moisture usually is in short supply early in the spring. Four randomly placed (randomized complete block design) replicates of each variety, with 22 individual plants per replicate, were planted in rows 36 inches apart. Seed pieces were planted with a single row Iron Age assist-feed planter, spaced approximately 11 inches apart in the row and covered with 2-3 inches of packed soil. Granular fertilizer was applied by the planter at the rate of 96 pounds N, 304 pounds P_2O_5 and 192 pounds K_2O per acre in bands beside and below the seed. The composition of one ton of the fertilizer used was 1255 pounds of monoammonium phosphate, 530 pounds of muriate of potash, 21 pounds of urea and 190 pounds of limestone filler. Tensiometers were installed at depths of 6 and 12 inches in the irrigated plots, and water was applied when tensiometer readings rose to 40 centibars. Weeds were controlled by a preemergent application of glyphosate (Roundup) followed by cultivation and hand weeding.

Seed of most varieties used in these trials was produced on the Matanuska Farm. These seed potatoes were 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. The principal target of the formaldehyde dip was *Rhizoctonia solani*. Attempts were made to cut all seed from tubers weighing 6-10 ounces.

Ample soil moisture was available early in the 1989 growing season. This was due to a greater than average amount of snow melt and above average spring rainfall. More than two inches of rain fell in May, compared with the 54-year average of 0.74 inches (Table 1). Some spots in the field were wetter than ideal at the time of planting, but emergence was 95-100% in all varieties, indicating that the high soil moisture did not promote rotting of seed pieces.

Table 1. Climatic data for Matanuska Farm during the 1989 growing season.

| | May | June | July | August | September |
|-------------------|--------------------------|-------------|-------------|-------------|-------------|
| Temp. (°F) | | | | | |
| Air | | | | | |
| Daily max. | 55.9 (57.7) ¹ | 64.8 (65.2) | 69.2 (67.4) | 65.9 (64.9) | 57.7 (56.4) |
| Daily min. | 36.7 (36.1) | 44.4 (44.1) | 48.0 (47.7) | 49.3 (45.7) | 41.6 (38.5) |
| Daily mean | 46.3 (46.9) | 54.6 (54.6) | 58.6 (57.6) | 57.6 (55.3) | 49.7 (47.5) |
| Soil ² | | | | | |
| Fallow | 42.8 | 50.0 | 59.6 | 56.0 | 47.8 |
| Sod | 37.2 | 48.5 | 61.4 | 59.3 | 51.5 |
| Precip. (in.) | 2.13 (0.74) | 1.51 (1.52) | 1.73 (2.36) | 3.61 (2.55) | 2.44 (2.40) |

¹ Values in parenthesis represent a 54-year average of temperature or precipitation at the Matanuska Farm.

² Soil temperatures were recorded at a 4 inch depth at the Palmer Research Center.

In spite of high soil moisture early in the season, unusually high temperatures (occasionally higher than 80°F) led to moisture stress by late June to early July. Moisture stress largely was offset by irrigation, but development of plants in the nonirrigated plots clearly was retarded by the lack of water.

Mean air temperatures were near average for May and June but clearly above average for July, August and September (Table 1). Although below normal for July, rainfall was above average for August and September. A total of 11.42 inches of rain fell during the 1989 growing season compared to the long term average 9.57 inches.

Harvesting occurred on September 12 and was completed in a single day. Tubers were lifted with a mechanical digger, then picked up by hand and placed in plastic tubs. Harvest was made somewhat difficult by wet soils, but tubers went into storage in good condition and rot in storage was minimal. Freezing temperatures did not occur until after harvest.

Results and Discussion

Results of the irrigated and nonirrigated trials are summarized in Tables 2 and 3, respectively. The average total yield for all cultivars was 20.7 tons/acre in the irrigated and 16.1 tons/acre in the nonirrigated trials. Yields of US #1 tubers averaged 12-15% less than total yields. Green Mountain, IditaRed and 6-78-139-80 (a numbered selection from the inventory of C. H. Dearborn) were the top US #1 yielding cultivars in both irrigated and nonirrigated trials. Reddale also was among the leaders in total yield, but because of a high gradeout percentage, its US #1 yield was judged as average. Yields across cultivars were higher than they have been at any time during the 1980s, and the 23.3 tons/acre US #1 yield by cultivar (cv) Green Mountain in the irrigated trial exceeds the individual production performance of any cultivar since these trials began in 1982. A comparison of selected varieties in Tables 4 and 5 illustrates the superiority of the 1989 growing season. In irrigated trials, the average production of the selected varieties in 1989 was nearly three tons/acre higher than the next best year (1988). In nonirrigated trials (Table 5), again average yields were nearly three tons/acre higher than the next best year (1986). The four highest yielding cultivars over the last five years in both irrigated and nonirrigated trials are Green Mountain, 6-78-139-80 (a round white skinned tuber), IditaRed and Kennebec.

Once again, white skinned cultivars were dominant among the top yielders. The red skinned cultivars IditaRed and Reddale had high total yields but of the two, only IditaRed was among the top yielders of US #1 tubers. The yield of russet cultivars was generally poor compared to reds and whites, but Lemhi Russet, Allagash Russet, and Maverick yielded well in both irrigated and nonirrigated plots. Russet Norkotah, a new variety that has generated much interest in the Midwest, yielded very poorly for the second year in a row.

High yields in 1989 are attributable to above average temperatures and favorable soil moisture (Table 1). Moisture stress in late June and early July inhibited plant development in the nonirrigated plots, and unquestionably contributed to the difference in yields between irrigated and nonirrigated trials. August and September were wet and warm (Table 1), and bulking continued until harvest.

Quality of the harvested crop was very good. In spite of generally wet soils at harvest, a very small amount of soft rot was observed. Gradeout averaged less than 14%, which is lower than it has been since 1983. Specific gravity values were generally lower than they have been for the last several years.

Specific types of gradeout are identified in 11 selected varieties in Table 6. Since gradeout was generally low, percentages in the various categories are small. As usual, a large amount of shatter cracking occurred in Superior and Russet Burbank, and oversized tubers were common in Shepody and IditaRed. It is interesting to note that a higher percentage of oversized tubers occurred in the nonirrigated than in the irrigated plots of IditaRed. It appears that the early season dry period decreased the tuber set, but ample rainfall later in the season caused some of these tubers to grow too large.

Table 2. Irrigated yield trial summary, Matanuska Farm - 1989.¹

| Variety ² | US#1 ³ | Small ⁴ | Other ⁵ | Total | Percent US #1 | Tuber Weight ⁶ | Specific Gravity |
|----------------------|-------------------|--------------------|--------------------|-------|---------------|---------------------------|------------------|
| Green Mountain | 23.3 | 0.6 | 1.9 | 25.8 | 90.4 | 7.3 | 1.088 |
| IditaRed | 22.4 | 0.9 | 1.5 | 24.8 | 90.0 | 7.4 | 1.072 |
| 6-78-139-80 | 22.2 | 1.5 | 0.2 | 23.9 | 92.6 | 5.5 | 1.079 |
| Sable | 21.9 | 0.2 | 1.3 | 23.4 | 93.6 | 8.2 | 1.073 |
| Rosa | 21.2 | 1.6 | 1.3 | 24.0 | 88.0 | 5.9 | 1.076 |
| Kennebec | 20.9 | 0.6 | 3.4 | 24.9 | 83.9 | 8.2 | 1.084 |
| Lemhi Russet | 20.9 | 0.9 | 2.1 | 23.9 | 87.4 | 6.9 | 1.091 |
| Alaska 114 | 20.6 | 1.1 | 1.0 | 22.8 | 90.7 | 5.5 | 1.080 |
| Superior | 20.5 | 0.3 | 2.5 | 23.3 | 88.1 | 7.1 | 1.081 |
| Bake-King | 20.3 | 0.8 | 0.7 | 21.8 | 93.3 | 6.9 | 1.089 |
| Atlantic | 20.0 | 0.7 | 1.2 | 21.9 | 91.2 | 6.6 | 1.093 |
| Allagash Russet | 19.9 | 0.7 | 0.3 | 20.8 | 95.4 | 6.8 | 1.079 |
| Maverick | 19.7 | 0.9 | 1.0 | 21.6 | 91.2 | 6.1 | 1.070 |
| 3-79-270-81 | 19.5 | 1.1 | 0.9 | 21.4 | 90.9 | 6.8 | 1.081 |
| NDA 8694-3 | 18.6 | 1.0 | 0.2 | 19.9 | 93.8 | 5.6 | 1.079 |
| 3-79-280-81 | 18.5 | 1.1 | 0.6 | 20.3 | 91.4 | 5.9 | 1.085 |
| Denali | 18.2 | 0.5 | 1.2 | 19.9 | 91.7 | 7.0 | 1.095 |
| Snowchip | 18.2 | 1.1 | 1.3 | 20.6 | 88.1 | 6.3 | 1.085 |
| Acadia Russet | 18.2 | 1.7 | 1.0 | 20.9 | 86.9 | 6.6 | 1.080 |
| AF 4114-4 | 18.0 | 1.4 | 0.4 | 19.8 | 90.7 | 7.0 | 1.081 |
| Yukon Gold | 17.9 | 0.6 | 2.8 | 21.3 | 84.2 | 8.0 | 1.082 |
| Sangre | 17.9 | 1.0 | 0.9 | 19.8 | 90.3 | 7.2 | 1.074 |
| Shepody | 17.9 | 0.7 | 3.1 | 21.6 | 82.6 | 8.1 | 1.086 |
| Alpha | 17.7 | 0.9 | 1.5 | 20.2 | 87.9 | 6.0 | 1.089 |
| Katahdin | 17.5 | 0.6 | 3.9 | 22.0 | 79.4 | 7.7 | 1.077 |
| 6-5 | 17.3 | 0.7 | 2.1 | 20.1 | 86.1 | 7.3 | 1.078 |
| Reddale | 17.3 | 0.7 | 7.0 | 25.0 | 69.1 | 8.4 | 1.070 |
| Caribe | 17.1 | 0.4 | 7.2 | 24.7 | 69.1 | 8.2 | 1.070 |
| Jemseg | 16.9 | 0.4 | 2.5 | 19.8 | 85.3 | 7.2 | 1.075 |
| Penn-71 | 16.8 | 0.3 | 4.7 | 21.7 | 77.1 | 8.9 | 1.076 |
| Monona | 16.5 | 0.3 | 1.3 | 18.2 | 91.0 | 8.9 | 1.073 |
| Bintje | 16.2 | 2.2 | 0.9 | 19.3 | 84.0 | 5.1 | 1.081 |
| NorKing Russet | 16.0 | 0.8 | 0.9 | 17.7 | 90.6 | 6.6 | 1.086 |
| Alaska Russet | 16.0 | 1.3 | 2.2 | 19.4 | 82.4 | 6.0 | 1.082 |
| Columbia Russet | 15.8 | 1.2 | 3.9 | 20.8 | 75.8 | 5.5 | 1.095 |
| Penn-71-007 | 15.4 | 0.5 | 3.1 | 18.9 | 81.1 | 8.0 | 1.077 |
| Krantz | 15.3 | 0.3 | 2.1 | 17.7 | 86.8 | 8.3 | 1.079 |
| ND 860-2 | 15.1 | 1.0 | 1.2 | 17.4 | 87.2 | 4.8 | 1.081 |
| Irish Cobbler | 14.5 | 1.1 | 7.3 | 22.9 | 63.3 | 6.6 | 1.075 |
| Nooksack | 14.4 | 0.3 | 0.3 | 15.0 | 95.6 | 7.0 | 1.087 |
| Russet Burbank | 14.3 | 0.8 | 1.8 | 17.0 | 84.5 | 6.6 | 1.091 |
| Russet Norkotah | 14.1 | 1.3 | 1.2 | 16.7 | 84.5 | 5.7 | 1.076 |
| Agassiz | 13.1 | 2.9 | 0.1 | 16.1 | 81.5 | 4.5 | 1.086 |
| Russette | 12.4 | 0.8 | 0.7 | 13.9 | 89.3 | 5.8 | 1.090 |
| Nemarus | 11.3 | 1.0 | 5.0 | 17.3 | 65.5 | 6.9 | 1.080 |
| Average | 17.7 | - | - | 20.7 | 85.9 | - | 1.081 |
| LSD 5% ⁷ | 2.1 | | | 2.0 | | | |

¹ Yields expressed in tons per acre.

² Numbered selections originated in the breeding program of C.H. Dearborn.

³ #1 market grade as defined by the US Department of Agriculture.

⁴ Tubers less than 1.75 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 - 1989.¹

| Variety ² | US#1 ³ | Small ⁴ | Other ⁵ | Total | Percent US #1 | Tuber Weight ⁶ | Specific Gravity |
|----------------------|-------------------|--------------------|--------------------|-------|---------------|---------------------------|------------------|
| Green Mountain | 18.5 | 0.2 | 2.0 | 20.7 | 89.3 | 8.4 | 1.088 |
| 6-78-139-80 | 18.2 | 1.0 | 0.4 | 19.6 | 92.7 | 6.0 | 1.077 |
| IditaRed | 18.0 | 0.5 | 2.9 | 21.5 | 83.8 | 6.9 | 1.073 |
| Kennebec | 17.5 | 0.3 | 1.1 | 18.9 | 92.3 | 7.8 | 1.085 |
| Alaska 114 | 16.9 | 0.9 | 0.1 | 17.9 | 94.2 | 5.8 | 1.084 |
| Rosa | 16.8 | 1.0 | 0.7 | 18.5 | 90.6 | 5.8 | 1.081 |
| Maverick | 16.6 | 0.4 | 1.0 | 18.0 | 92.2 | 6.1 | 1.076 |
| Allagash Russet | 16.5 | 0.4 | 0.4 | 17.3 | 95.4 | 7.0 | 1.084 |
| Sable | 16.4 | 0.2 | 2.2 | 18.8 | 86.9 | 8.3 | 1.075 |
| Bake-King | 16.3 | 0.3 | 0.3 | 16.9 | 96.5 | 8.1 | 1.091 |
| Caribe | 16.3 | 0.1 | 1.9 | 18.3 | 88.7 | 8.6 | 1.076 |
| Lemhi Russet | 16.2 | 0.7 | 0.9 | 17.8 | 90.9 | 6.7 | 1.094 |
| Atlantic | 16.1 | 0.5 | 0.4 | 17.0 | 94.5 | 6.5 | 1.096 |
| 3-79-270-81 | 15.9 | 0.5 | 0.8 | 17.2 | 92.7 | 7.8 | 1.080 |
| Shepody | 15.7 | 0.3 | 2.1 | 18.2 | 86.7 | 8.8 | 1.085 |
| Columbia Russet | 15.6 | 0.4 | 1.9 | 17.9 | 86.9 | 6.7 | 1.089 |
| 3-79-280-81 | 15.4 | 0.8 | 0.2 | 16.4 | 93.8 | 6.0 | 1.086 |
| Superior | 14.8 | 0.3 | 2.6 | 17.7 | 84.0 | 7.0 | 1.080 |
| Penn-71 | 14.8 | 0.1 | 2.3 | 17.1 | 86.2 | 8.5 | 1.082 |
| Snowchip | 14.5 | 0.7 | 0.4 | 15.6 | 92.9 | 5.7 | 1.087 |
| AF 4114-4 | 14.2 | 0.8 | 0.1 | 15.2 | 93.7 | 6.8 | 1.082 |
| Jemseg | 14.1 | 0.3 | 0.4 | 14.8 | 95.5 | 6.5 | 1.080 |
| NorKing Russet | 14.0 | 0.4 | 0.6 | 15.0 | 93.8 | 6.6 | 1.091 |
| Alpha | 13.9 | 0.7 | 0.6 | 15.3 | 91.1 | 5.2 | 1.090 |
| Sangre | 13.8 | 0.6 | 0.6 | 15.1 | 91.8 | 7.6 | 1.075 |
| Reddale | 13.8 | 0.3 | 5.3 | 19.4 | 71.2 | 8.4 | 1.076 |
| Acadia Russet | 13.7 | 0.7 | 1.0 | 15.4 | 89.2 | 7.2 | 1.082 |
| Penn-71-007 | 13.7 | 0.2 | 2.7 | 16.6 | 82.4 | 8.7 | 1.078 |
| Nemarus | 13.3 | 0.8 | 0.9 | 15.0 | 88.6 | 6.8 | 1.086 |
| 6-5 | 13.2 | 0.3 | 2.1 | 15.6 | 84.7 | 7.3 | 1.082 |
| Katahdin | 13.2 | 0.2 | 2.1 | 15.6 | 85.0 | 8.1 | 1.082 |
| Denali | 13.2 | 0.5 | 0.5 | 14.3 | 92.4 | 6.8 | 1.100 |
| Bintje | 13.2 | 2.0 | 1.2 | 16.4 | 80.5 | 4.6 | 1.085 |
| NDA 8694-3 | 12.7 | 0.5 | 1.7 | 14.9 | 85.2 | 5.8 | 1.079 |
| Russet Burbank | 12.6 | 0.6 | 1.4 | 14.6 | 86.4 | 6.2 | 1.092 |
| Yukon Gold | 12.4 | 0.4 | 1.1 | 13.9 | 89.3 | 7.4 | 1.085 |
| ND 860-2 | 12.4 | 1.0 | 0.3 | 13.6 | 90.6 | 4.7 | 1.084 |
| Russette | 11.6 | 0.8 | 0.7 | 13.1 | 88.3 | 6.0 | 1.090 |
| Nooksack | 11.6 | 0.2 | 0.5 | 12.3 | 94.7 | 7.0 | 1.089 |
| Alaska Russet | 11.5 | 0.9 | 1.2 | 13.7 | 84.5 | 5.3 | 1.085 |
| Agassiz | 11.1 | 2.0 | 0.1 | 13.2 | 84.4 | 4.2 | 1.086 |
| Monona | 10.9 | 0.2 | 3.7 | 14.8 | 73.6 | 8.3 | 1.079 |
| Krantz | 10.0 | 0.2 | 0.7 | 10.9 | 91.8 | 7.0 | 1.085 |
| Russet Norkotah | 8.7 | 1.5 | 0.1 | 10.3 | 84.4 | 5.0 | 1.084 |
| Irish Cobbler | 4.4 | 0.6 | 10.4 | 15.5 | 28.8 | 5.4 | 1.077 |
| Average | 14.1 | - | - | 16.1 | 87.4 | - | 1.084 |
| LSD 5% ⁷ | 1.9 | | | 1.9 | | | |

¹ Yields expressed in tons per acre.

² Numbered selections originated in the breeding program of C.H. Dearborn.

³ #1 market grade as defined by US Department of Agriculture.

⁴ Tubers less than 1.75 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 1985 through 1989.¹

| Variety | 1985 | 1986 | 1987 | 1988 | 1989 | Average ² |
|---------------------|------|------|------|------|------|----------------------|
| Alaska 114 | 13.3 | 12.2 | 13.6 | - | 20.6 | 14.9 |
| Bake-King | 14.6 | 12.3 | 13.8 | - | 20.3 | 15.3 |
| Denali | 13.1 | 12.3 | 12.1 | - | 18.2 | 13.9 |
| Green Mountain | 15.2 | 13.0 | 15.5 | 19.4 | 23.3 | 17.3 |
| IditaRed | 14.6 | 13.7 | 13.5 | 17.8 | 22.4 | 16.4 |
| Kennebec | 13.8 | 16.9 | 12.7 | - | 20.9 | 16.1 |
| Lemhi Russet | 12.3 | 10.8 | 13.6 | 16.3 | 20.9 | 14.8 |
| Rosa | 14.4 | 12.7 | 13.8 | 15.9 | 21.2 | 15.6 |
| Russet Burbank | 10.3 | 8.5 | 9.9 | 13.6 | 14.3 | 11.3 |
| Shepody | 14.3 | 12.8 | 12.4 | 16.9 | 17.9 | 14.9 |
| Superior | 14.7 | 14.2 | 14.5 | 18.2 | 20.5 | 16.4 |
| 6-78-139-80 | 13.8 | 15.7 | 14.1 | 21.3 | 22.2 | 17.4 |
| 3-79-270-81 | 14.8 | 15.4 | 11.1 | - | 19.5 | 15.2 |
| LSD 5% ³ | 2.0 | 3.2 | 2.1 | 2.7 | 2.1 | |
| Average | 13.8 | 13.1 | 13.1 | 17.4 | 20.2 | 15.3 |

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

² Average calculated on yields from 1985-1989.

³ Least significant difference.

Table 5. Comparative summary of US #1 tuber yields of selected varieties in nonirrigated trials conducted from 1985 through 1989.¹

| Variety | 1985 | 1986 | 1987 | 1988 | 1989 | Average ² |
|---------------------|------|------|------|------|------|----------------------|
| Alaska 114 | 7.2 | 14.3 | 10.0 | - | 16.9 | 13.0 |
| Bake-King | 9.3 | 12.1 | 10.5 | - | 16.3 | 12.8 |
| Denali | 8.5 | 11.4 | 6.6 | - | 13.2 | 11.1 |
| Green Mountain | 9.1 | 15.5 | 12.4 | - | 18.5 | 15.3 |
| IditaRed | 9.2 | 14.0 | 9.7 | 9.9 | 18.0 | 14.4 |
| Kennebec | 9.8 | 13.6 | 12.0 | 11.9 | 17.5 | 14.9 |
| Lemhi Russet | 8.4 | 14.8 | 10.8 | - | 16.2 | 12.8 |
| Rosa | 10.5 | 14.1 | 11.6 | 13.9 | 16.8 | 14.0 |
| Russet Burbank | 8.2 | 11.0 | 10.2 | 11.9 | 12.6 | 11.0 |
| Shepody | 9.4 | 14.2 | 11.7 | 14.4 | 15.7 | 13.3 |
| Superior | 8.6 | 11.1 | 8.2 | 10.9 | 14.8 | 11.2 |
| 6-78-139-80 | 10.0 | 14.0 | 12.3 | 17.2 | 18.2 | 14.5 |
| 3-79-270-81 | 9.4 | 14.8 | 10.2 | 10.9 | 15.9 | 13.0 |
| LSD 5% ³ | 2.1 | 2.5 | 2.0 | 2.1 | 1.9 | |
| Average | 9.0 | 13.5 | 10.5 | 12.6 | 16.2 | 13.2 |

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

² Average calculated on yields from 1982-1989, although data from 1982-1984 are not shown.

³ Least significant difference.

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

| Variety | | Total | US#1 ² | Under size | Over size | Shatter crack | Growth crack | Second growth | Other ³ |
|-----------------|-------------------|-------|-------------------|------------|------------|---------------|--------------|---------------|--------------------|
| Alaska 114 | (NI) ⁴ | 17.9 | 16.9 (94.4) | 0.9 (5.0) | 0.1 (0.6) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.6) |
| | (I) | 22.8 | 20.6 (90.4) | 1.1 (4.8) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 1.0 (4.4) |
| Allagash Russet | (NI) | 17.3 | 16.5 (95.4) | 0.4 (2.2) | 0.2 (1.2) | 0.1 (0.6) | 0.0 (0.0) | 0.1 (0.6) | 0.1 (0.6) |
| | (I) | 20.8 | 19.9 (95.7) | 0.7 (3.4) | 0.1 (0.5) | 0.0 (0.0) | 0.1 (0.5) | 0.0 (0.0) | 0.1 (0.5) |
| Bake-King | (NI) | 16.9 | 16.3 (96.4) | 0.3 (1.8) | 0.2 (1.2) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.6) | 0.0 (0.0) |
| | (I) | 21.8 | 20.3 (93.1) | 0.8 (3.7) | 0.7 (3.2) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.5) |
| Green Mountain | (NI) | 20.7 | 18.5 (89.4) | 0.2 (1.0) | 1.5 (7.2) | 0.1 (0.5) | 0.0 (0.0) | 0.5 (2.4) | 0.0 (0.0) |
| | (I) | 25.8 | 23.3 (90.3) | 0.6 (2.3) | 1.5 (5.8) | 0.0 (0.0) | 0.0 (0.0) | 0.2 (0.8) | 0.1 (0.4) |
| IditaRed | (NI) | 21.5 | 18.0 (83.7) | 0.5 (2.3) | 2.6 (12.1) | 0.2 (0.9) | 0.0 (0.0) | 0.2 (0.9) | 0.0 (0.0) |
| | (I) | 24.8 | 22.4 (90.3) | 0.9 (3.6) | 1.1 (4.4) | 0.1 (0.4) | 0.1 (0.4) | 0.2 (0.8) | 0.0 (0.0) |
| Lemhi Russet | (NI) | 17.8 | 16.2 (91.0) | 0.7 (3.9) | 0.2 (1.1) | 0.3 (1.7) | 0.1 (0.6) | 0.1 (0.6) | 0.3 (1.7) |
| | (I) | 23.9 | 20.9 (87.4) | 0.9 (3.8) | 0.4 (1.7) | 0.3 (1.3) | 0.1 (0.4) | 0.3 (1.3) | 1.0 (4.2) |
| Russet Burbank | (NI) | 14.6 | 12.6 (86.3) | 0.6 (4.1) | 0.0 (0.0) | 1.1 (7.5) | 0.1 (0.7) | 0.1 (0.7) | 0.0 (0.0) |
| | (I) | 17.0 | 14.3 (84.1) | 0.8 (4.7) | 0.0 (0.0) | 1.5 (8.8) | 0.2 (1.2) | 0.0 (0.0) | 0.2 (1.2) |
| Sangre | (NI) | 15.1 | 13.8 (91.4) | 0.6 (4.0) | 0.5 (3.3) | 0.1 (0.7) | 0.0 (0.0) | 0.0 (0.0) | 0.0 (0.0) |
| | (I) | 19.8 | 17.9 (90.4) | 1.0 (5.1) | 0.5 (2.5) | 0.1 (0.5) | 0.0 (0.0) | 0.2 (1.0) | 0.0 (0.0) |
| Shepody | (NI) | 18.2 | 15.7 (86.3) | 0.3 (1.6) | 1.9 (10.4) | 0.0 (0.0) | 0.0 (0.0) | 0.2 (1.1) | 0.0 (0.0) |
| | (I) | 21.6 | 17.9 (82.9) | 0.7 (3.2) | 2.8 (13.0) | 0.0 (0.0) | 0.0 (0.0) | 0.3 (1.4) | 0.0 (0.0) |
| Superior | (NI) | 17.7 | 14.8 (83.6) | 0.3 (1.7) | 1.0 (5.6) | 1.4 (7.9) | 0.0 (0.0) | 0.0 (0.0) | 0.1 (0.6) |
| | (I) | 23.3 | 20.5 (88.0) | 0.3 (1.3) | 0.3 (1.3) | 1.3 (5.6) | 0.1 (0.4) | 0.8 (3.4) | 0.0 (0.0) |
| Yukon Gold | (NI) | 13.9 | 12.4 (89.2) | 0.4 (2.9) | 0.2 (1.4) | 0.6 (4.3) | 0.1 (0.7) | 0.0 (0.0) | 0.2 (1.4) |
| | (I) | 21.3 | 17.9 (84.0) | 0.6 (2.8) | 1.0 (4.7) | 0.2 (0.9) | 0.4 (1.9) | 0.1 (0.5) | 1.1 (5.2) |

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

² #1 market grade as defined by the US Department of Agriculture.

³ Includes green, rotten, and misshapen tubers.

⁴ (NI) = nonirrigated, (I) = irrigated.

Table 7. Yield trial summary from selected Alaskan locations for 1989.¹

| Variety | Delta | | Fairbanks | | Homer | | Kenai-Soldotna | | Kodiak | | Kotzebue | | Palmer | |
|----------------|-----------------|-------|-----------|-------|-------|-------|----------------|-------|--------|-------|----------|-------|--------|-------|
| | #1 ² | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total | #1 | Total |
| Alaska 114 | 6.7 | 12.4 | 4.6 | 7.3 | 9.0 | 13.9 | 6.9 | 16.2 | 9.0 | 17.9 | 4.1 | 7.5 | 20.6 | 22.8 |
| Bake-King | 7.8 | 10.6 | 5.9 | 7.1 | 16.3 | 19.3 | 9.3 | 15.2 | 9.9 | 15.7 | 4.1 | 6.2 | 20.3 | 21.8 |
| Denali | 6.3 | 9.7 | 3.9 | 6.2 | 13.3 | 18.0 | 7.3 | 15.4 | 10.9 | 17.2 | 5.4 | 7.6 | 18.2 | 19.9 |
| Green Mountain | 8.5 | 13.2 | 5.6 | 8.1 | 20.9 | 21.4 | 8.0 | 15.3 | 15.0 | 21.3 | 5.9 | 7.7 | 23.3 | 25.8 |
| IditaRed | 9.6 | 13.1 | 7.2 | 9.9 | 17.2 | 19.5 | 7.2 | 14.0 | 13.3 | 19.4 | 3.9 | 5.3 | 22.4 | 24.8 |
| Kennebec | 7.8 | 11.7 | 5.9 | 7.6 | 17.9 | 20.7 | 14.9 | 20.7 | 13.8 | 19.6 | 4.8 | 6.3 | 20.9 | 24.9 |
| Lemhi | 4.0 | 11.5 | 6.2 | 8.8 | 13.7 | 18.2 | 5.3 | 14.4 | 10.6 | 19.1 | 3.9 | 7.4 | 20.9 | 23.9 |
| Shepody | 5.2 | 11.9 | 5.5 | 8.7 | 13.9 | 20.5 | 8.5 | 13.5 | 13.6 | 19.8 | 4.4 | 6.8 | 17.9 | 21.6 |
| Superior | 11.4 | 13.2 | 6.8 | 8.3 | 22.0 | 24.1 | 12.0 | 16.1 | 20.1 | 25.9 | 7.4 | 9.0 | 20.5 | 23.3 |
| 3-79-270-81 | 6.3 | 11.8 | 5.3 | 8.3 | 8.6 | 13.5 | 6.2 | 11.9 | 10.6 | 13.6 | 1.7 | 4.6 | 19.5 | 21.4 |

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 replicates were averaged.

² #1 market grade as defined by the US Department of Agriculture.

Table 8. Length of the 1989 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 | 106 | 7 (25°F) | 99 |
| Fairbanks | 113 | 0 - | 113 |
| Homer | 116 | 0 - | 116 |
| Kenai-Soldotna | 102 | 0 - | 102 |
| Kodiak | 123 | 3 (30°F) | 120 |
| Kotzebue | 91 | 3 (32°F) | 88 |
| Palmer | 125 | 0 - | 125 |

¹ Number of days prior to harvest that killing frost occurred, followed in parenthesis by the actual temperature.

TRIALS AT OTHER LOCATIONS IN ALASKA

General Procedures

Seed of 10 potato varieties were planted by cooperators at six locations throughout Alaska. Some of the cooperators were private citizens, while others were employed by the Agricultural and Forestry Experiment Station, Cooperative Extension Service or Maniilaq Association. At the various locations, when environmental conditions permitted, seeds were planted in rows 36 inches apart with plants 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 maintenance, including irrigation, fertilization, weed control, and hilling, was carried out by each cooperator at his/her 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 six sites and at the Matanuska Farm are recorded in Table 8.

Specific Site Information

Delta Junction (Cooperator, Don Quarberg—CES). The spring of 1989 was cold in Delta Junction and the potatoes were planted on May 15 while snow was still present on the field. Potatoes continued to emerge through the month of June. Rainfall was very light during August (0.38 inches) and the plants were stressed for water. A 25°F freeze on August 22 killed about half of the foliage. Plots were harvested on August 29.

Fairbanks (Cooperator, Frank Wooding—AFES). Plots were planted on May 25 in soil that was quite dry. Temperatures were somewhat cooler than normal in May and June but warmer than normal in July and August. Rainfall was less than normal for the growing season, and yields would have been improved with irrigation. A 30°F freeze occurred on September 15, the same day the plots were harvested.

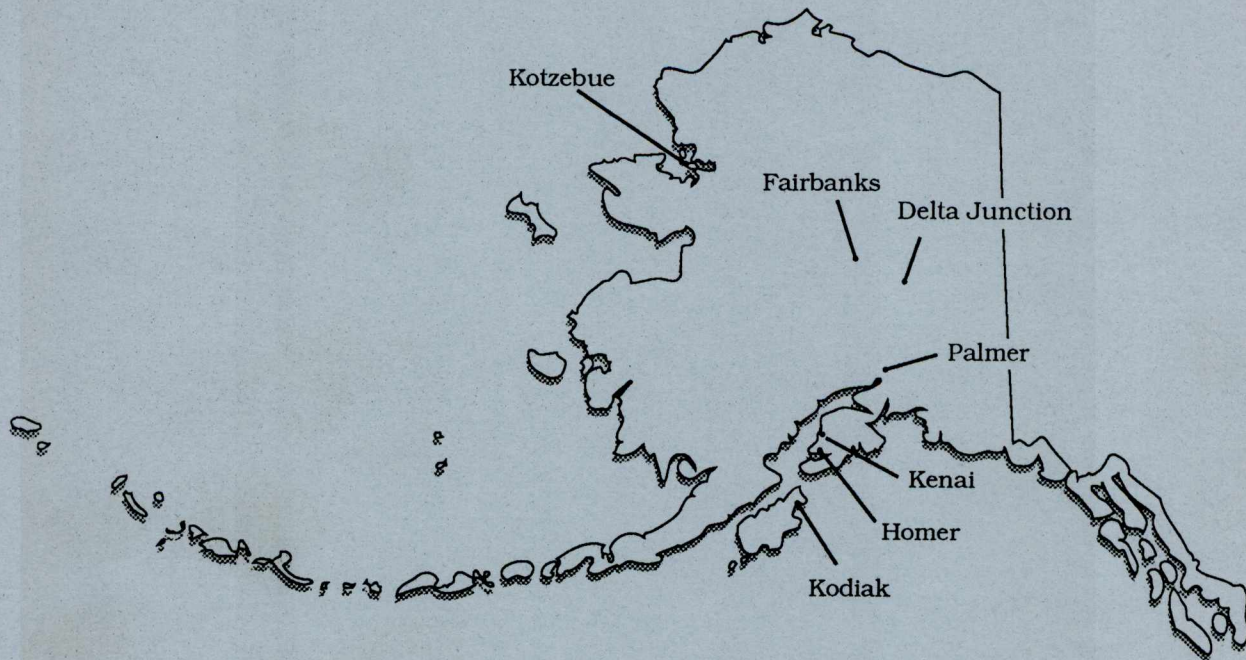
Homer (Cooperators, Warren Larson—CES, and several Homer citizens). Planting occurred on June 15. The growing season was considerably warmer than usual and precipitation was slightly above average. Potatoes were harvested on October 6, three days before the first killing frost.

Kenai-Soldotna (Cooperator, Warren Larson—CES). The plots in Kenai were planted on June 3 and hilled July 14. A half inch of irrigation water was applied in late July. The season was warmer than average and rainfall was considerably heavier than usual. Plots were harvested September 11, before the first killing frost.

Kodiak (Cooperator Hank Pennington—CES). Plots were planted on June 10 at the Kodiak Borough Fairgrounds located 10 miles south of Kodiak city. Plots were neither weeded nor irrigated. Temperatures were above normal throughout the summer. Precipitation was heavy in June and August but below normal in July and September. A 30°F freeze occurred on October 8, and plots were harvested on October 11.

Kotzebue (Cooperator Brian Krosschell—Maniilaq Assn.). Heavy winter snows and a slow spring thaw delayed planting until June 19. Even then the soil was wet and cold. Temperatures were about average for the remainder of the summer. The temperature dropped to 32°F on September 15, and the crop was harvested on September 18.

Potato trial locations



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