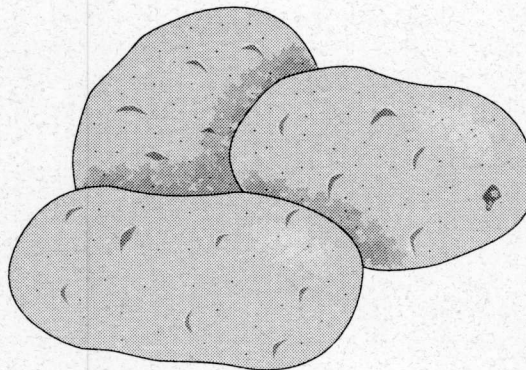


Potato Variety Performance, Alaska 1999

by

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INTRODUCTION

A yield trial comparing 30 cultivars of potatoes (*Solanum tuberosum* L.) was conducted during the 1999 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. Similar to 1998, this trial included irrigated but not irrigated treatments. Data from previous studies has documented the consistent need for irrigation as well as the magnitude of increases in yield that can be realized through irrigation.

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

Nonirrigated trials were conducted annually from 1982-1998 whereas irrigated trials were initiated in 1985 and are continuing. Results of these trials were published in AFES Circulars and are available at AFES and Alaska Cooperative Extension (ACE) offices.

MATERIALS AND METHODS

Seedbed preparation included moldboard plowing to a depth of 10 to 12 inches followed by disking and packing. Potatoes were planted on May 11-12, as soon as possible after tilling to minimize loss of early spring moisture. Soil moisture was very low at planting time because of the small amount of snowmelt and typical minimal rainfall in April. Four replicates

of each variety, with 15 individual plants per replicate, were planted in rows 36 inches apart in a randomized complete block design. Seed used in these trials was produced on the Matanuska Farm from stocks acquired from the Alaska Division of Agriculture or from various certification agencies in the contiguous 48 states and Canada. Some of the varieties may have contained certain latent viruses but no symptoms of virus disease were observed in the crop during the growing season. Seed pieces were planted approximately 11 inches apart in the row and covered with 2-3 inches of packed soil with a single row Iron Age assist feed planter. Shallow planting is advantageous as it helps to minimize the length of time between planting and emergence. Granular fertilizer (10-20-20) was applied at the rate of 120 pounds N, 240 pounds P₂O₅ and 240 pounds of K₂O per acre by the planter in bands two inches to the side and two inches below the seed. The fertilizer was composed of monoammonium phosphate (11-51-0), muriate of potash (0-0-60), urea (45-0-0), and a limestone filler. Water was applied as needed to the plots through overhead sprinklers. Weeds were controlled by a pre-emergent application of Linuron (Lorox) supplemented by cultivation and hand weeding and spot spraying with Roundup (Glyphosate) where necessary. Plants were hilled during the last week of June and all plots were harvested on September 9. Harvest was completed prior to any freezing temperatures in the area and the harvested crop went into cold storage in very good condition.

RESULTS AND DISCUSSION

The early part of the potato growing season is typically quite dry and 1999 was no exception. Rainfall in April (Table 1) was near average but not adequate to affect the extremely low soil moisture level. In May, rainfall was above average, but soil moisture content remained below desirable levels. Application of irrigation water began as soon as plants had emerged and continued as needed throughout the season.

Table 1. Climatic data for Matanuska Farm during the 1999 growing season.¹

| | April | May | June | July | August | September |
|---------------|------------|------------|------------|------------|------------|------------|
| Temp. (°F) | | | | | | |
| Air | | | | | | |
| Daily max. | 45.3(46.4) | 57.3(57.0) | 66.7(65.4) | 66.8(67.5) | 64.8(65.0) | 56.9(56.4) |
| Daily min. | 25.9(27.4) | 35.1(35.8) | 46.2(44.4) | 49.3(48.1) | 48.4(45.9) | 41.0(38.6) |
| Daily mean | 35.5(36.9) | 46.0(46.4) | 56.6(54.9) | 58.3(57.8) | 56.6(55.5) | 49.0(47.5) |
| Precip. (in.) | 0.31(0.45) | 1.48(0.74) | 1.31(1.48) | 1.94(2.26) | 3.94(2.50) | 1.98(2.38) |

¹Values for temperature and precipitation are averages for 1999. Values in parenthesis represent 63-year averages.

Table 2. Irrigated yield trial summary, Matanuska Farm-1999¹.

| Variety | Skin ² | US#1 ³ | Small ⁴ | Other ⁵ | Total | Percent US#1 | Tuber Weight ⁶ | Specific Gravity |
|---------------------|-------------------|-------------------|--------------------|--------------------|-------|--------------|---------------------------|------------------|
| Superior | W | 20.3 | 0.9 | 2.0 | 23.2 | 88 | 6.9 | 1.078 |
| Chieftain | R | 19.7 | 0.7 | 3.7 | 24.0 | 82 | 6.2 | 1.073 |
| Hilite Russet | Ru | 19.3 | 1.0 | 0.2 | 20.5 | 94 | 6.6 | 1.077 |
| Kemerovskii | W | 18.9 | 1.5 | 2.1 | 22.5 | 84 | 6.1 | 1.077 |
| Frontier Russet | Ru | 18.6 | 0.8 | 1.0 | 20.4 | 91 | 7.5 | 1.084 |
| Alaska 114 | W | 18.5 | 1.6 | 0.9 | 20.9 | 88 | 5.7 | 1.081 |
| IditaRed | R | 18.4 | 1.1 | 3.0 | 22.6 | 81 | 6.1 | 1.070 |
| Ranger Russet | Ru | 18.4 | 1.0 | 0.3 | 19.7 | 93 | 7.0 | 1.088 |
| Bake-King | W | 18.0 | 0.9 | 1.3 | 20.2 | 89 | 7.0 | 1.087 |
| Sangre | R | 18.0 | 0.9 | 1.0 | 19.9 | 91 | 8.0 | 1.074 |
| Green Mountain | W | 17.1 | 1.1 | 1.9 | 20.2 | 85 | 6.1 | 1.082 |
| Lemhi Russet | Ru | 16.9 | 1.6 | 1.3 | 19.7 | 85 | 6.3 | 1.094 |
| Norvalley | W | 16.5 | 1.7 | 1.2 | 19.4 | 85 | 5.1 | 1.086 |
| Goldrush Russet | Ru | 16.4 | 1.1 | 1.0 | 18.6 | 89 | 5.7 | 1.077 |
| Yukon Gold | W | 16.2 | 0.8 | 3.1 | 20.1 | 81 | 7.8 | 1.086 |
| Allagash Russet | Ru | 15.9 | 1.5 | 0.4 | 17.8 | 89 | 6.7 | 1.074 |
| Kennebec | W | 15.9 | 1.1 | 4.5 | 21.4 | 74 | 8.2 | 1.084 |
| Shepody | W | 15.9 | 1.0 | 1.8 | 18.7 | 85 | 8.2 | 1.080 |
| Atlantic | W | 15.8 | 0.9 | 5.3 | 22.0 | 72 | 5.8 | 1.093 |
| Russet Norkotah | Ru | 15.4 | 1.9 | 1.0 | 18.3 | 84 | 5.9 | 1.076 |
| Russet Nugget | Ru | 16.3 | 1.1 | 0.3 | 16.7 | 92 | 6.5 | 1.097 |
| Snowden | W | 14.9 | 1.9 | 0.5 | 17.3 | 86 | 4.5 | 1.098 |
| Norgold Russet | Ru | 14.7 | 1.5 | 1.6 | 17.8 | 83 | 6.3 | 1.076 |
| Legend Russet | Ru | 13.8 | 0.9 | 3.1 | 17.8 | 77 | 7.3 | 1.092 |
| Belrus | Ru | 13.3 | 1.4 | 0.1 | 14.8 | 90 | 5.4 | 1.093 |
| Chipeta | W | 13.2 | 0.6 | 6.2 | 20.0 | 66 | 7.1 | 1.095 |
| Prejekulski ranii | W | 13.1 | 2.8 | 2.7 | 18.6 | 70 | 4.6 | 1.070 |
| Norchip | W | 12.4 | 1.0 | 5.1 | 18.5 | 67 | 5.9 | 1.080 |
| Denali | W | 11.0 | 0.7 | 6.7 | 18.3 | 60 | 6.0 | 1.094 |
| Russet Burbank | Ru | 10.6 | 2.2 | 1.3 | 14.2 | 75 | 4.9 | 1.082 |
| Average | | 16.1 | 1.2 | 2.2 | 19.5 | 82 | 6.4 | 1.083 |
| LSD 5% ⁷ | | 3.0 | | | 2.7 | | | |

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

Regular application of water was required in July but the nearly four inches of rain that fell in August fulfilled the crops' needs after July 30. Monthly average air temperatures for the summer were near the long term average from the start and plants were beginning to emerge before June 1.

Conditions for potato plant growth were good for most of the summer although there were extended periods with cloud cover. Cloudy conditions favor the development of late blight disease and it was anticipated that late blight may appear again in 1999, following its widespread occurrence in the Matanuska Valley in 1998. In spite of favorable weather, no late

blight was observed anywhere in Alaska in 1999. The trials were harvested on September 9 under excellent harvesting conditions. Harvested tubers were graded in November after six weeks of cold storage and in general the quality was very good. Yields were considerably higher across varieties compared to 1998 yields, as was the percent of US#1 tubers.

The average yield of US#1 tubers across the 30 varieties was 16.1 tons per acre and average total yield was 19.5 tons per acre (Table 2). Highest total yields were produced by varieties Chieftain, Superior, IditaRed and Kemerovskii, each of which produced a total yield of more than 22 tons per acre.

Superior, Chieftain, Hilite Russet and Kemerovskii were the top yielders of US#1 tubers, Superior with a US#1 yield of more than 20 tons per acre. Percent US#1 level was generally higher than in 1998 (Table 2) although 30–40 percent of some varieties, including Denali and Chipeta did not meet grade.

When the 1999 yields of eleven selected varieties are compared with yields from the previous four years (Table 3), it can be seen that variety performance generally was better than the relatively poor performance in 1998. Superior, the top yielding variety in 1999 and a variety with a reputation for variable yields in Alaska, performed much better than in each of the previous four years. Green Mountain and IditaRed again gave expected good yields, whereas Alaska 114 and Bake-King performed somewhat above expectations. Denali and Russet Burbank performed poorly, in large part due to high gradeout percentages.

Several chipping varieties were included in this

yield trial as part of a larger study of potential potato chip production in Alaska. Chipeta, Norvalley and Snowden were included in these trials for the first time, whereas Atlantic and Norchip have been grown here before. All yielded well, although gradeout in Chipeta and Norchip was exceptionally high. Samples of these and several other varieties (Andover, Pike, Snowchip) grown at the Matanuska Farm are being chipped weekly to assess chipping quality and storability.

As in 1998, Kemerovskii and Prejekulski Ranii (white skinned varieties of Russian origin) were included in these trials. Prior to inclusion in this study, they were put through the USDA quarantine procedures to insure freedom from viruses and other seedborne diseases. Kemerovskii has outyielded its Russian counterpart in 1998 and 1999, indeed Kemerovskii has ranked near the top of the list containing all 30 varieties. However, it remains to be seen if Kemerovskii will find a niche in the Alaska market.

Table 3. Comparative summary of US #1 tuber yields of selected varieties in irrigated trials conducted from 1995 through 1999.¹

| Variety | 1995 | 1996 | 1997 | 1998 | 1999 | Average ² |
|---------------------|------|------|------|------|------|----------------------|
| Alaska 114 | 18.8 | 15.9 | 15.0 | 15.2 | 18.5 | 16.7 |
| Allagash Russet | 15.7 | 15.9 | 18.1 | 11.7 | 15.9 | 15.5 |
| Bake-King | 11.7 | 18.0 | 15.6 | 12.4 | 18.0 | 15.1 |
| Denali | 14.9 | 12.2 | 15.1 | 8.5 | 11.0 | 12.3 |
| Green Mountain | 13.5 | 20.0 | 23.0 | 13.9 | 17.1 | 17.5 |
| IditaRed | 20.2 | 13.8 | 16.9 | 12.8 | 18.4 | 16.4 |
| Kennebec | 17.1 | 14.9 | 16.9 | 17.2 | 15.9 | 16.4 |
| Lemhi Russet | 12.1 | 12.3 | 12.2 | 9.4 | 16.9 | 12.6 |
| Russet Burbank | 12.1 | 16.1 | 16.0 | 8.2 | 10.6 | 12.6 |
| Shepody | 11.4 | 8.3 | 13.1 | 12.8 | 15.9 | 12.3 |
| Superior | 16.4 | 6.6 | 17.2 | 12.8 | 20.3 | 14.7 |
| Average | 14.9 | 14.0 | 16.3 | 12.3 | 16.2 | 14.7 |
| LSD 5% ³ | 3.3 | 3.4 | 2.7 | 3.1 | 3.0 | |

¹ Yields expressed in tons per acre. #1 market grade as defined by the US Department of Agriculture.

² Average calculated on yields from 1994-1998.

³ Least significant difference.

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