ALASKA POTATO PROFILE

Thomas R. Jahns, Land Resources Agent

FGV-00046

PRODUCTION FACTS

Producing potatoes in Alaska profitably requires a delicate balance of skill, knowledge and experience as sub-arctic environmental conditions can be limiting. Although there are numerous difficulties involved in high latitude potato production, the 100-day growing season is augmented by long daylength, which allows producers to average 15-16 T/a under irrigation and 8-10 T/a dryland. With more intensively managed fields, yields are consistently over 20 T/a. Commercial potato production has continued to be a solid contributor to the economy. The potato crop, averaging over 8,000 T the last ten years, adds over $3 million to Alaska's economy annually (Benz and Lucero, 2003; Benz and Roos, 2001; Brown and Burgess, 1995, 1996, 1997; Mueller, 1998, 1999).

U.S. Ranking[1]:	Last in potato growing regions- (840 acres)
Product Cost/Acre:	$1200-$2000
% Alaska Fresh Market[2]:	35.2 %
% U.S. Crop CWT. Production[3]:	0.03 %

Growing conditions are favorable for potato production in the Matanuska Valley (61 N 149 W) from mid-May through September. Located on the Knik arm of Cook Inlet, the elevation is near sea level with a maritime climate. The winter snow is typically removed by strong winds in the early spring or melts in March and April. The average precipitation pattern usually includes light rain in May and June with increased amounts in July, August and September. Sunlight is a major factor in crop production in sub-arctic Alaska with continuous light prevailing from mid-May through August. Although actual sunlight increases to nearly 20 hours per day in the Matanuska Valley, the sun barely dips below the horizon creating ample twilight. Soil temperature peaks in early July at approximately 68^0F.

PRODUCTION REGIONS

The commercial production of potatoes in Alaska provides a high quality product for the fresh table market. The Matanuska Valley (2) remains the breadbasket of Alaska and is the principal production area partly due to its proximity to Anchorage, Alaska's largest city with a population of over 270,000. A paved highway system of

[1] U.S. Ranking: Benz, 2004
[2] % Alaska Fresh Market: Benz, 2004
[3] % U.S. Crop CWT. Production: Benz, 2004

over 2,500 miles links Anchorage to other populated areas: the Kenai Peninsula (3) to the south, the Matanuska Valley (2) and Fairbanks (1) to the north, Delta Junction (1) to the northeast and the Copper River Basin and Valdez (2) to the east. Alaskan growers rely upon this transportation corridor to access 450,000 of the state's 620,000 military and resident civilian population.

South Central (Mat-Su Valley):	66% acreage; 78% production
Interior (Delta, Fairbanks):	31% acreage; 20% production

CROPPING PRACTICES

Soils & Fertility: Cultivated soils in South Central Alaska are developed from loess deposited over alluvial sands and gravel. Other than the volcanic ash soils that fix large amounts of phosphorus (P), soils are fairly fertile. Phosphorus fertilizer recommendations are based on soil test results and tied to soil series that account for the P fixing of some soils. Typical application rates can vary between 0-320 lb of P_20_5/a (Walworth, 1992).

Commercial producers utilize a complete fertilizer on potatoes. Nitrogen (N) application rates are based on soil analytical results and fertilizer guides. For red and white-skinned varieties, approximately 90 lb N/a is recommended (Walworth, 1992). Russets however, tend to have a higher requirement and will respond to N rates up to 175 lb residual soil plus applied N/a (R.G. Gavlak, unpublished data). The potassium (K) supplying capacity of these predominately silt loam soils is fairly high and typical application rates based on soil test are approximately 90 lb K_20/a (or more), often applied as potassium sulfate.

Seed: Single drop seed is preferred. But, planting a mix of single drop and cut seed is the common practice. Seed is provided by certified seed growers, however some table stock producers hold back material to plant the following year. Growers may obtain small quantities of disease free seed from the Alaska Plant Material Center's tissue culture based seed program. Growers intending to sell seed must enter their production in the Limited Generation Seed Certification Program. Approximately 10 percent of the growers use some form of seed treatment.

Tops 2.5D	5% growers	10% acres	rate: 1 lb per 100 lb. seed	0.25 lb a.i./100 lb seed	12 hr REI
Maxim	5% growers	10% acres	rate: 0.5 lb per 100 lb. seed	0.25 lb a.i./100 lb seed	12 hr REI

Varieties: Alaskan potato producers are still looking for a russet that will meet restaurant needs and economic returns. The russeted skin is required by restaurants for a potato to be used as a baker. Sales of white-skinned potatoes are thus limited, with imported russets filling most of this market. Alaska also lacks potato-processing facilities, so the demand for frozen or other processed products is also filled by imports.

Common varieties produced in Alaska include: Bake King, Green Mountain, Highlite, Kennebec, Russet Norkotah, Shepody and Yukon Gold. Some red and novelty varieties are also produced for fresh market.

Planting: Planting begins in mid-May with the day-length reaching nearly 17 hours and fallow soil temperature at 4 inches approaching 45^0F. The probability of frost is very low at this time (Alaska's Agricultural Potential, 1974). Planting is usually completed by the end of May. The crop emerges three to four weeks after planting, coinciding closely with the summer solstice.

Irrigation: Irrigation, if part of the farm management program, is performed as needed. The amount of seasonally distributed rainfall is not sufficient to maximize production potential. Irrigated potato yields are consistently higher than yields without supplemented water. Sprinkler systems including linear, center pivot, wheel and hand-lines are used. Irrigation is scheduled using tensiometers and gypsum blocks in the Matanuska Valley.

IPM PRACTICES

Most growers practice some form of integrated pest management. Crop rotations are practiced by 70% of the growers. Insect pest population monitoring is also conducted, although no insecticides have been regularly used to date. Alaska is fortunate to be free from many of the insect pests and diseases common to the rest of North America.

Insects & Diseases: The Colorado Potato Beetle *(Leptinotarsa decemlineata*) as well as the Northern Root-Knot Nematode (*Meloidogyne hapla*) and the Columbia Root-Knot Nematode (*M. chitwoodi*) have not been found in Alaska. Potato Leafroll Virus and Potato Virus Y have not been detected in commercial fields during routine inspections since 1984 (Campbell, 1987). This is fortunate since both the Green Peach Aphid (*Myzus persicae*) and the Potato Aphid (*Macrosiphum euphorbiae*) have been collected in the Matanuska Valley (Robinson, 1979). Wireworm *(*unidentified *spp.*) damage has been reported and controlled to a limited extent in the Delta Junction region of Interior Alaska. Late Blight caused by *Phytophthora infestans* was first reported in S.E. Alaska near Wrangell (Cash, 1953, reported by Farr et. al., 1989). The first Late Blight outbreak in the Matanuska Valley was reported in 1995. The second Late Blight outbreak occurred in the Matanuska Valley in 1998. This resulted in approximately 30 percent of the growers applying multiple fungicides to their crops.

BravoUltrex:	26% growers	34% acres	rate: 0.7-1.4 lb/a	0.58-1.16 lb a.i./a	12 hr REI	14 day PHI
Curzate 60DF[4]	30% growers	40% acres	rate: 3.2 oz/a	1.92 oz a.i./a	12 hr REI	14 day PHI
Super Tin 80WP	4% growers	6% acres	rate: 2.5-3.75 oz/a	2-3 oz ai/a	48 hr REI	7 day PHI

No Late Blight disease has been detected in the Matanuska Valley since 1998.

[4] Curzate 60DF: Curzate must be used in a mixture with other late blight fungicides, per label requirements

Many of the common potato diseases either are endemic or were introduced and have become established. Blackleg, Common Scab, *Fusarium*, Leak, PVS, PVX, *Rhizoctonia*, *Sclerotinia*, Silver Scurf and Witches Broom can be found. The use of locally available disease free seed stocks has significantly reduced the levels of Potato Virus X (PVX) and Potato Virus S (PVS) (Campbell, 1987). This has simultaneously reduced the potential of importing seed borne disease with imported seed stock. A disorder labeled Pinkeye has been causing substantial economic losses over the past several years.

Weeds: Herbicide is applied after planting and usually prior to crop emergence. A hilling operation is performed in early July when the canopy approaches 8-12 inches in height. A typical application would include glyphosate (Roundup), particularly where the rotation is solely potatoes and cabbage or lettuce. Metribuzin (Sencor) is also an effective material though rarely applied in vegetable rotations. Organic producers use weeding crews and propane burners to deter weed infestation with expensive, but excellent results. Linuron (Lorox) has been found to be extremely effective at suppressing weeds when used in a rotation of potatoes, cabbage or lettuce. Alaska pursued and received a 24C registration of Lorox for use in potatoes in 2002, and has maintained supplemental labeling for use of this product to date.

Herbicides[5]

Roundup	25% growers	20% acres	Rate: 32 oz/a	1 lb a.i./a	12 hr REI	14 day PHI
Sencor6	10% growers	10% acres	Rate: .33-.67 lb/a Pre-emerge	0.25-.5 a.i./a	12 hr REI	60 day PHI
Eptam 7E	10% growers	10% acres	Rate: 3.5-7 pt/a	3.1-6.1 lb a.i./a	12 hr REI	45 day PHI
Gramoxone Extra	20% growers	15% acres	Rate: 1.5 pt/a	0.47 lb a.i./a	12 hr REI	No PHI
Lorox DF	20% growers	15% acres	Rate: 1.5-3 lb/a Crop pre-emerge	0.75-1.5 lb a.i./a	24 hr REI	No PHI
Matrix7	10% growers	5% acres	Rate: 1-1.5 oz/a	0.25-0.375 oz a.i./a	4 hr REI	60 day PHI

Harvest: Harvest begins in mid-August primarily to prevent early-sizing cultivars from producing oversized tubers and to expedite entry into the market. The main crop harvest begins in early September. A light frost can occur in mid-August, however the killing frost usually occurs in mid-September. Frequent precipitation events in September necessitate digging under poor conditions to complete harvest prior to freeze-up. Vine desiccation materials are used in some cases, particularly on russets.

Reglone (Diquat)	50% growers	25% acres	Rate: 1-2 pt/a	0.25-0.5 lb a.i./a	24 hr REI	7 day PHI

The cool, wet environment prevents tubers from maturing. Machine digging of immature tubers causes problems for Alaskan growers. Harvesting equipment tends to bruise and remove the skin from the potatoes. Red and russet-skinned potatoes are more likely to show this problem than the white-skinned cultivars that mask the skinning. Many harvesters have been modified to reduce skinning. Retrofitting with belted chain and adjusting ground speed/chain speed ratios have helped reduce the skinning problem. Wet soils and cold air temperatures lead to air checking of

[5] Herbicides: Stand-alone rates. Rates may differ when mixing multiple herbicides. Always consult label before use of any pesticide. Soil texture will determine application rates in many instances

[6] Sencor: Post-emergence applications have been found to injure early maturing smooth skinned white and all red skinned varieties.

[7] Matrix: Do not exceed 2.5 oz / acre / growing season (total).

some cultivars. The application of Mertect to the tubers going into storage has helped reduce the losses caused by *Fusarium* and soft rot entering harvest wounds.

Mertect 340-F	10% growers	12% acres	Rate: 0.42 fl oz/T	0.0135 lb a.i./a	12 hr REI	No PHI

Storage: Potatoes are stored either in bulk storage, complete with air handling systems, or in individual 4 x 4 x 2.5 ft plywood-sided, slat-bottomed pallet boxes made forklift movable. Cellar temperatures are maintained between 50 and 60^0F for up to three weeks after harvest to facilitate wound healing. The storage temperature is then slowly reduced to the holding temperature of 38^0F. The crop is then washed, graded, bagged or boxed for market. Nearly all potatoes are marketed by June of the following year. Most growers who store their potatoes past January of the following year use sprout inhibitors.

Royal MH-30 Extra	20% growers	33% acres	Rate: 1.33 gal/a	3 lb a.i./a	12 hr REI	No PHI
Sprout Nip EC	70% growers	60% acres	Rate: 1 qt 1% emulsion/T	0.0006lb a.i./qt	4 hr REI	No PHI

Grading & Marketing: With few exceptions, each potato producer in Alaska maintains individual storage, washing and packaging facilities to prepare the crop for market. The potatoes are moved from storage, graded along a conveyor system, and then packaged in 5 or 10 lb poly-film bags or 50 lb count boxes. Potatoes marketed in this fashion account for 60% to 70% of the fresh market sales of potatoes in Alaska. Competition is vigorous for the markets in Alaska as individual producers vie to market their crop. Utilizing the "Alaskan Grown" label and marketing novelty varieties has helped smaller growers to develop niche markets.

Crop Activity Chart

Month	**Activity**
May	Seed treatments, planting, pre-emergent weed control
June	Plant growth, weed control, irrigation
July	Hilling, irrigation
August	Harvest begins, vine desiccation, irrigation
September	Main harvesting
October	Storage and marketing
November - March	Grading – Marketing, sprout inhibitors

SUMMARY

It is clear that sub-arctic potato production has certain limitations. Production practices have evolved to address some of these constraints. Potato production will continue to be an important segment of agriculture in Alaska. The evaluation of new technologies and implementation of existing technology to improve production efficiency while protecting the environment is the priority of those involved in the potato industry in Alaska.

ACKNOWLEDGEMENTS

The author would like to thank William L. Campbell and Dr. Raymond G. Gavlak for allowing the use of their *An Overview of Potato Production in Alaska* (Campbell, W.L. and R.G. Gavlak, 1994) as the background manuscript for developing this crop profile. Thanks to Phil Kaspari, Christy Roden, and Pam Compton for the production pictures used in this publication. I would also like to thank Ben VanderWeele (potato grower), William L. Campbell (Division of Ag, Plant Material Center-Potato Seed Certification Program) and Dr. Don Carling (Retired, UAF/AFES Plant Pathologist) for technical review. A special thanks is expressed to Janice Chumley for her pesticide label reviews, state registration updates and manuscript review.

LITERATURE CITED

Alaska's Agricultural Potential. 1974. Alaska Rural Development Council Publication No. 1, 152p.

Benz, S. 2004. Personal Communication. 2003-data. Alaska Agricultural Statistics. USDA National Ag Statistics Service. Palmer, Alaska.

Benz, S. and G. Lucero. 2004. Alaska Agricultural Statistics. USDA National Ag Statistics Service. Palmer, Alaska.

Brown, D.A., and M. Burgess. 1995, 1996, 1997. Alaska Agricultural Statistics. USDA National Ag Statistics Service and Alaska Department of Natural Resources.

Campbell, W.L. 1987. Potatoes Alaska. Spudman Magazine, January 4.

Campbell, W.L. and R. G. Gavlak. 1994. An overview of Potato production in Alaska. Proceedings 1st Circumpolar Agricultural Conference, September 1992, Whitehorse, YT, p. 153-156.

Cash, E.K. 1953. A Checklist of Alaskan Fungi. Plant Disease Reporter Supplement 219:1-70.

Farr, D., G.F. Bills, G.P. Chamuris and A.Y. Rossman. 1989. Fungi on Plants and Plant Products in the United States. American Phytopathological Society Press.

Mueller, D.M. 1998, 1999. Alaska Agricultural Statistics. USDA National Ag Statistics Service. Palmer, Alaska.

Robinson, A.G. 1979. Annotated List of Aphids (*Homoptera: Aphididae*) of Northwest Canada, Yukon and Alaska. The Manitoba Entomologist 13:23-29.

Walworth, J.L. 1992. Field crop fertilizer recommendations for Alaska: Potatoes. University of Alaska Fairbanks Extension Crop Production and Soil Management Series No. 100G-246A.

UNIVERSITY OF ALASKA
FAIRBANKS
College of Rural Alaska
Cooperative Extension Service

Visit the Cooperative Extension Service Web site at www.uaf.edu/ces

9/02/TJ/500 Revised April 2005