Vegetable Variety Trials Matanuska Valley, Alaska 1989

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INTRODUCTION

To remain competitive, commercial vegetable producers require updated information on the performance of new vegetable varieties under the soil and climatic conditions of southcentral Alaska. Variety trials provide the opportunity to evaluate potentially adapted plant material. Although many varieties are developed in environments considerably different from that of southcentral Alaska, some may prove to be useful to commercial growers in Alaska. The information on new varieties must be collected over several growing seasons to provide sufficient confidence in the observed performance. Additionally, each year of the performance trials, new varieties are grown with traditional or standard varieties which are used to compare the quality of the new varieties. Commercial production of new varieties should be considered after several years of variety trial work with initial plantings on a small production scale.

OVERVIEW

This variety trial was conducted at the Agricultural and Forestry Experiment Station's Matanuska Farm, located approximately six miles southwest of Palmer on a Knik silt loam (Typic Cryorthent). The Knik series is representative of Matanuska Valley soils developed from loess. Selected pre-fertilizer soil properties are presented in Table 1 from samples collected from variety trial soils prior to spring soil preparation.

Table 1. Selected soil properties[1] of Knik series at the Matanuska Farm, Alaska, 1989.

		Mineral	Mehlich 3			DTPA		Hot Water
pH	EC	N	P	K	Cu	Zn	Mn	B
	mmho/cm			ppm				
6.0	0.31	7	60	56	2.4	0.5	2.1	0.36

[1]0-6 in. soil sample depth

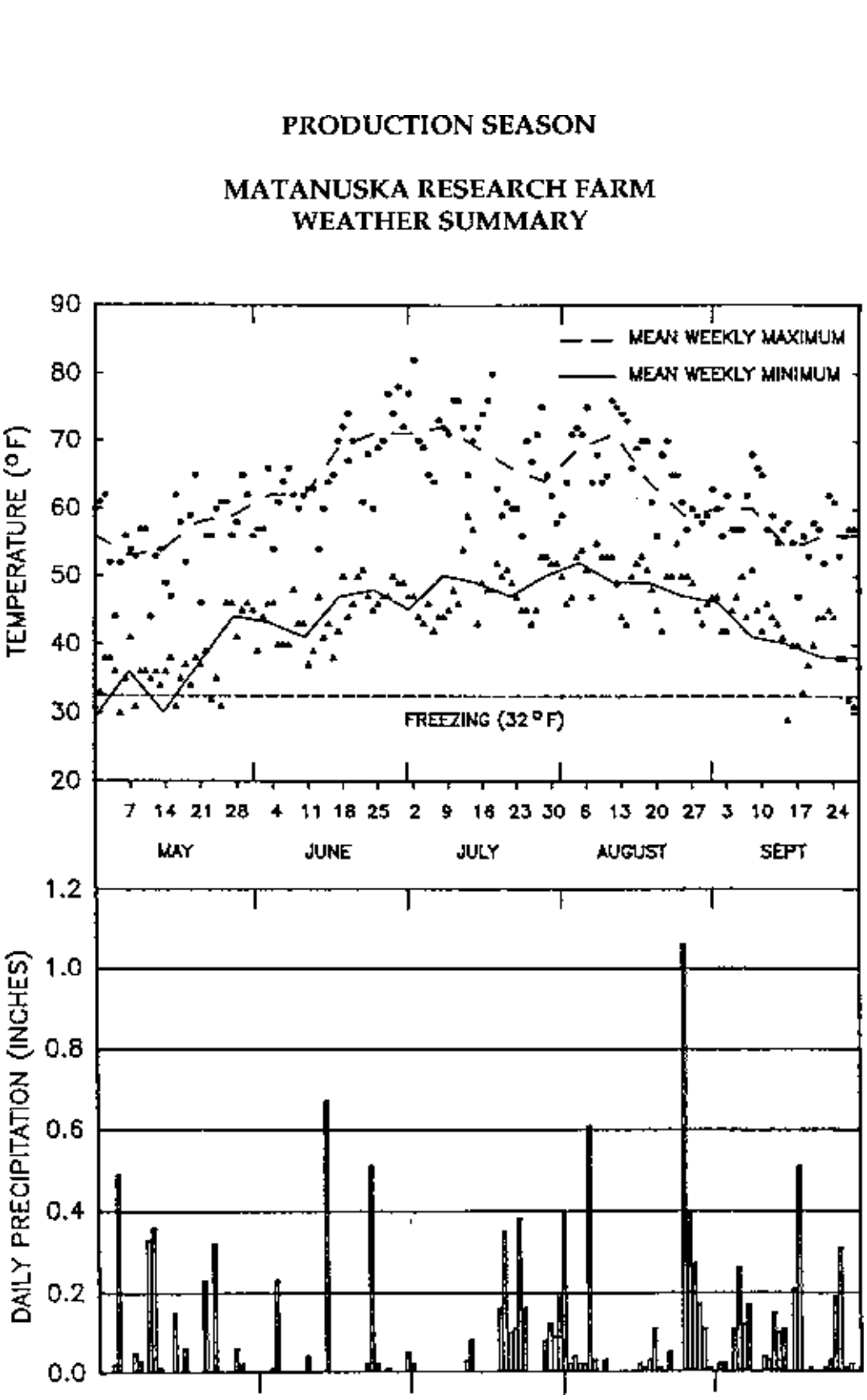

Figure 1. Growing season daily precipitation and weekly maximum and minimum air temperatures.

Broccoli

Methods

Eight broccoli varieties were evaluated using a randomized complete block design with three replications in three row plots, 32 ft. long, with 18 in. between rows, and 16 in. between plants in the row (21,780 plants per acre). The area was chisel plowed, fertilized with 130 lb. N, 260 lb. P_2O_5, 260 lb. K_2O per acre and tilled with a rotary cultivator prior to planting. Fertilizer was blended using urea, monoammonium phosphate, and potassium chloride. Transplants were grown by Gold Nugget Farm in Styrofoam® flats with 338 cavities per flat, each square cavity measuring 13/16 in. A commercial Peat-lite® potting media was used for the transplants. Greenhouse temperatures were maintained at a minimum of 70°F for the first six days and at a minimum of 50°–55°F for approximately 20 days. All flats were covered with a germination fabric until seedling emergence. Flats were watered as required with an automatic, overhead, traveling boom sprinkler system. The seedlings were fertilized with Peters® 15–30–15 applied at the rate of 100 ppm N. No supplemental light was provided. Seedlings were transplanted at the second true leaf stage on May 12. All plants were treated with the insecticide chlorpyrofos (Lorsban 4E) on May 19 at a rate of 2.24 pt. per acre of material applied as a spray directed at the base of each plant for the control of root maggots. Irrigation was scheduled using tensiometers placed at 6 in. soil depth with water applied by means of a sprinkler irrigation system when soil water tension reached 0.4 bars. The center row of each three row plot was harvested for the collection of data. Plots were checked three times per week for mature terminal and lateral heads. Harvestable size was determined on the basis of commercial marketability. Terminal heads measuring over 6 in. diameter are not adaptable to commercial bunching and for this reason none of the terminal heads were allowed to attain a size greater than this. Most varieties in this trial were fully mature as they approached this size limit. Data on lateral heads was compiled from cuttings taken for a one week period after removal of the terminal head.

Results

Yield and quality data by harvest period are presented in Table 2. There was an 11 day difference in maturation between the earliest and latest maturing varieties in this trial. The peak cut for Early Dawn occurred 55 days after planting and was the first variety to be harvested. Cruiser was the last variety to mature with peak harvest 66 days after planting.

There was a significant difference in yield of terminal heads between the top producer, Iandy, and the two lowest yielding varieties, Early Dawn and Saga. Iandy produced 3,056 lb. per acre more in terminal heads than did Saga. Varietal differences in terminal head yields may have been greater if head size had not been limited to a diameter of approximately 6 in. by marketability standards. This restriction may have limited final head weight in varieties which would have attained greater head size before flowering. Early Dawn produced the greatest yield of lateral heads, while Embassy produced the least. A significant difference (2,445 lb. per acre) in total yield of terminals plus laterals was found between Iandy and the lowest yielding variety Saga.

Broccoli is typically marketed with several stalks banded together. For this reason a minimum stalk length is established by USDA to be not less than 5 in. for Grade No. 1. Stalk is defined as a portion of the broccoli plant including the stem, bud clusters, and leaves. All varieties screened in this trial met the minimum requirement for stalk length.

Head diameter, as discussed earlier, was determined by commercial marketability. Some varieties may have obtained a greater diameter and weight without bolting, however these data were not collected. On the other hand, Embassy and Cruiser matured before reaching a 5.5 in. head diameter.

All varieties screened show some evidence of internal stem cracking. It appears that in 1989 the early season varieties were more susceptible to this problem than those maturing later in the season.

Table 2. Production data for eight broccoli varieties screened at the Matanuska Farm, 1989.

Seed Source	Variety	Harvest Period	Peak Cut	Yield Terminal carton/ac[1]	Yield Terminal lb/ac	Yield Lateral[2] lb/ac	Yield Total[3] lb/ac	Stalk Length in	Head Diameter in	Stem Cracking %
As	Early Dawn	7/6-12	7/6	336	10,127	4,220	14,347	7.6	5.7	55
Js	Packman	7/7-12	7/10	363	10,913	3,045	13,958	7.4	5.8	88
Jo	Dandy Early	7/10-14	7/10	422	12,659	2,590	15,249	7.2	6.0	97
JS	Saga	7/10-14	7/10	318	9,603	2,444	12,047	7.5	5.7	37
As	Embassy	7/12-14	7/12	341	10,215	1,775	11,990	6.9	5.1	50
Js	Emperor	7/14-19	7/14	359	10,709	3,405	14,114	8.4	5.6	5
JS	Green Valiant	7/14-19	7/14	372	11,145	2,997	14,142	7.0	6.0	8
Js	Cruiser	7/14-19	7/17	350	10,476	2,590	13,066	7.9	5.3	10
	LSD 5%			79	2,357	1,048	3,405	0.7	0.4	15

[1] A carton equals 30 lb. net weight.
[2] Laterals were harvested for a period of one week after removal of the terminal head.
[3] Lateral plus terminal weights.

Cabbage

Methods

Ten varieties of storage cabbage and 12 varieties of fresh market cabbage were planted in separate trials. Transplants were grown by Gold Nugget Farm in Styrofoam® flats with 338 cavities per flat, each square cavity measuring 13/16 in. A commercial Peat–lite® potting media was used for the transplants. Greenhouse temperatures were maintained at a minimum of 70°F for the first six days and at a minimum of 50°–55°F for approximately 20 days for the storage cabbage. All flats were covered with a germination fabric until seedling emergence. Flats were watered as required with an automatic, overhead, traveling boom sprinkler system. The seedlings were fertilized with Peter's® 15–30–15 applied at the rate of 100 ppm N. No supplemental light was provided.

The trial area was prepared using a chisel plow prior to the application of 130 lb. per acre N, 260 lb. per acre P_2O_5, and 260 lb. per acre K_2O. The fertilizer was blended from urea, monoammonium phosphate, and potassium chloride and preplant incorporated with a rotary cultivator.

A randomized complete block design with three replications in three row plots was used to evaluate both trials. In both trials, 30 ft. long rows were spaced 18 in. apart with plants 12 in. apart within the row resulting in 29,040 plants per acre. Both trials were transplanted by hand. The storage cabbage was planted May 11. Fresh market cabbage planting began on May 18, and was completed May 19, except one variety, Hybrid 15, which was planted on June 1, 1989.

The trials were cultivated by hand and tensiometers were placed at 6 in. soil depth and used to schedule sprinkler irrigation when soil water tension reached 0.4 bars. Lorsban 4E was applied at 2.24 pt per acre of material as a spray directed to the base of each plant for the control of root maggots on May 26.

The center row of each three row plot, except two guard plants on each end, was harvested for the collection of data. A commercial carton was packed if enough heads of each variety were harvested at one time. Data on the average head weight, core length, diameter, and market quality were recorded at harvest.

Results

Good plant stand and establishment were noted and very few of the plants were lost to disease or insect infestations. Diseases which developed later in the season include fusarium yellows and a head rot caused by Rhizoctonia. Symptoms of fusarium yellows were first seen in late July. The symptoms of head rot were not seen until midAugust.

Both trials developed N deficiency symptoms in late July. The deficiency was most likely caused by deep irrigation periods in late June and early July. The field had been planted to cereal grains in 1988 and,

according to the soil tests, had little residual N available in 1989. Commercial vegetable fields often have a higher residual N fertility.

Although fertilizer rates used by commercial producers range from 90 to 120 lb. per acre of N, the applied N rate of 130 lb. per acre was not adequate for most of the varieties in this 1989 trial. Yield of the early season varieties did not appear to be as affected by the nutrient deficiency and were the only varieties of which enough heads were harvested at one time to pack a carton. A 24 head carton of Emerald Acre weighed 44.8 lb., a 24 head carton of Tucana weighed 47.8 lb. and a 26 head carton of Darkri Hybrid weighed 46.6 lb. Perfect Ball, a fresh market cabbage, produced no marketable size heads. Seven of the storage cabbage varieties (Bartollo, Bingo, Brutus, Manrico, President, Safekeeper II and Slawdena) did not produce any marketable sized heads.

A comparison of the days to the first harvest in Alaska to the relative days to maturity listed by the seed companies may also be an indication of each variety's response to the low fertility conditions (Table 3).

Table 3. Days to First harvest for fresh market and storage cabbage varieties screened at the Matanuska Farm, 1989.

Seed Source	Variety	Days to 1st harvest in Alaska[1]	Expected days to maturity[2]
		Fresh market	
SW	Carlton	140	90
SS	Castello	103	-
GP	Darkri Hybrid	62	42
SS	Emerald Acre	59	61
SW	Fieldgoal	90	90
SW	Fieldking	141	90
SW	Fieldlion	133	90
MO	Hybrid 15	77	70
SW	Krautman	95	78
JS	Perfect Ball	—	87
RS	Tucana	62	63
		Storage	
AK	AK 6467	147	80-85
SS	Multikeeper	133	86
SS	Survivor	133	85

[1] number of days to 1st harvest in this trial.

[2] number of days to maturity listed by seed companies.

Table 4. Production data for three storage cabbage varieties screened at the Ma tanuska.

				Marketable harvest					
Seed Source	Variety	Harvest dates	Means No. of harvests	Mean head weight lbs	1st Harvest lb/ac	Season total lb/ac	Cartons/ acre[1]	Mean core length inches	Mean diameter inches
SS	Survivor	9/22-10/6	2.00	2.02	23097	29387	588	3.25	4.95
SS	Multikeeper	9/22-10/6	1.67	2.22	131W	27952	559	3.47	4.93
AK	Ak 6467	10/6	1.00	1.94	14618	14648	293	2.43	5.20
	LSD 5%			0.16	NS	NS	NS	0.36	NS
	CV %			3.6	49.6	42.9	42.9	5.2	33

[1]A carton equals 50 lb. net weight.

Table 5. Production data for eleven fresh market cabbage varieties screened at the Matanuska Farm, 1989.

					Marketable harvest				
Seed Source	Variety	Harvest dates	Means No. of harvests	Mean head weight lbs	1st Harvest lb/ac	Season total lb/ac	Cartons/ acre[1]	Mean core length inches	Mean diameter inches
SS	Emerald Acre	7/17-7/26	3.00	1.66	34067	42054	841	2.27	5.31
RS	Tucana	7/20-8/30	3.33	1.83	30167	42891	858	2.80	5.42
GP	Darkri Hybrid	7/20-7/26	2.33	1.75	34203	41195	824	2.48	5.37
SW	Fieldgoal	7/26-9/21	5.33	1.66	10484	39427	789	2.69	554
MO	Hybrid 151	8/17-10/6	5.33	2.17	6629	42434	849	2.66	5.02
SW	Fieldsport	8/17-9/28	4.00	2.09	6098	32010	640	2.66	4.80
SW	Krautman	8/21-10/6	4.00	2.19	4527	46961	939	3.93	4.89
SS	Castello	8/30-10/6	3.33	2.39	24967	59994	1200	2.83	5.05
SW	Carlton	10/6	1.00	1.20	6579	6579	132	1.65	3.17
SW	Fieldlion	9/28-10/6	1.33	1.88	3925	6268	125	2.76	5.20
SW	Fieldking	10/6	1.00	1.63	3054	3054	61	2.45	4.53
JS	Perfect Ball	0	0	0	0	0	0	0	0
	LSD 5%			0.59	13612	13533	270	0.84	NS
	CV %			18.7	53.4	24.1	24.1	185	17.2

[1] A carton equals 50 lb. net weight.

Yield data for first harvest, season total, and cartons per acre are summarized in Table 4 and indicate marketable heads for the storage cabbage varieties. There was a significant difference in mean head weight between Multikeeper, the variety producing the largest mean head weight and AK 6467, the variety producing the lowest mean head weight. Multikeeper produced heads with a mean head weight of 2.22 lb. while AK 6467 produced heads with a mean head weight of 1.67 lb. There was also a significant difference between the mean core length of these two varieties. All three harvested storage cabbage varieties produced round–oval heads with Survivor producing the most consistently round heads. Survivor also had the most severe infestation of fusarium yellows, yet it still produced 9,972 lb. per acre more than Multikeeper and 8,449 lb. per acre more than AK 6467.

Summaries of yield data for first harvest and season total in cartons per acre are found in Table 5. There was an 81 day difference between the initial harvest date of the first variety harvested, Emerald Acre, and last varieties harvested, Carlton and Fieldking.

The first harvest of Emerald Acre, Tucana, Darkri Hybrid, and Fieldgoal was accomplished within a nine day period. Mean head weights of these varieties were not significantly different from each other. Castello, which produced heads with the largest mean head weight, was significantly heavier than Emerald Acre, Darkri Hybrid, Fieldgoal, Carlton, and Fieldlion. Varietal differences in mean head weight may have been greater with adequate fertility for the later maturing varieties.

There was a significant difference in the total yield (56,939 lb. per acre) between Castello, the highest yielding variety, and Fieldking, the lowest yielding variety. The total season yield of Castello was significantly greater than all varieties except Krautman. Commercial cabbage growers have a production target of a 24 head, 50 lb. carton. Two varieties, Fieldsport and Hybrid 15, produced near optimum weight heads averaging 2.09 and 2.17 lb., respectively. Emerald Acre, Tucana, Darkri Hybrid, and Fieldgoal were small frame plants which produced relatively small heads.

Carrots

Methods

Fifteen carrot varieties were planted in a randomized complete block design with three replications. Soil preparation included chisel plowing with fertilizer applied May 8 at the rate of 130 lb. N, 260 lb. P_2O_5 and 260 lb. K_2O per acre and then tilled with a rotary cultivator. Fertilizer was blended using urea,

monoammonium phosphate, and potassium chloride. All varieties were seeded May 19 using a Planet Junior. Each row was 4 in. wide and 36 ft. long. Three varieties were planted in each row and each variety occupied 12 of the 36 ft. Rows were planted 20 in. apart with a 4 ft. space between each of the three replications. Border rows were planted on both sides of the plot.

Hand thinning was conducted with a final plant density of 20 carrots per ft. Herbicides were not used. Weeds were controlled by hand. Carrots were sprinkler irrigated when soil water tension reached 0.4 bars as determined by tensiometers placed at 6 in. soil depth. Ten ft. of each variety was harvested by hand on September 19 leaving a one ft. buffer on each end. Total growing time was 123 days.

Results

Each variety was weighed and graded according to USDA standards for topped carrots. The yield data is summarized in Table 6.

The variety Kazan produced the greatest yield of No. 1 carrots, jumbos, and total production. Nandrin had high production but should be hilled early because it pushed out of the soil and was subject to greening. The larger carrots also tended to have a rough surface. Ingot was a heavy producer with consistent quality. Oranza was fourth in production of number one carrots but had a noticeable amount of distorted growth. Klondike Nantes and Narbonne were both consistent in quality. Napoli had a relatively large number of small diameter carrots. Romosa was quite consistent in quality. Sixpak had noticeable growth cracks and rhizoctonia canker. Cellobunch was quite consistent with some knobbiness. Minicor had a considerable amount of distorted growth and was very subject to shatter cracking. Kamaran had a significant number of jumbos with some surface roughness. Carropak was consistent in quality. Fincor was subject to shatter cracking and had many with a diameter less than 0.75 in. Prospector had consistent quality but germination was poor and emergence was slower than other varieties.

Table 6. Yield and quality for carrot varieties screened at the Matanuska Farm, 1989.

Seed Source	Variety	No. 1	Jumbo	No. 2	Culls	Total
		----------	tons/acre	----------	----------	----------
SW	Kazan	21.00	9.09	1.38	3.11	34.58
SW	Nandrin	20.89	5.79	1.47	4.37	32.52
TS	Ingot	20.36	4.24	1.95	3.47	30.02
SW	Oranza	20.11	3.36	1.70	4.16	29.33
SS	Klondike Nantes	19.19	1.13	1.66	1.85	23.83
SW	Narbone	18.60	4.86	1.70	2.76	27.92
JS	Napoli	18.52	1,90	1.49	8.30	30.21
SW	Romosa	18.49	5.61	2.87	3.32	30.29
VS	Sixpak	17.28	1.45	2.23	4.19	25.15
AS	Cellobunch	16.52	4.68	2.81	3.41	27.42
JS	Minicor	16.26	O.OO	1.35	9.43	27.04
SW	Kamaran	16.24	7.86	1.40	3.72	29.22
AS	Carropak	15.96	1.56	2.77	2.77	23.06
SS	Fincor	15.50	0.56	1.31	5.56	22.93
PS	Prospector	13.88	1.19	1.74	2.78 1	9.59
	LSD 5%	4.85	0.693	0.317	0.312	3.98

Lettuce

Methods

Eight head lettuce varieties were evaluated at three planting dates in the 1989 trial. Two varieties, Salinas and Grande, were planted from both coated and uncoated seed, each of which originated from different seed lots. All varieties were seeded into Styrofoam® planter flats (338 cavities) containing a peat/vermiculite medium, grown in the greenhouse by Gold Nugget Farm to two true leaf stage, then transplanted to the

field as indicated in Table 7, The variety trial area was prepared in the spring using a chisel plow followed by the application of 130 lbs. N, 260 lbs. P_2O_5, and 260 lbs. K_2O per acre incorporated with a rotary cultivator. Fertilizer was blended using urea, monoammonium phosphate, and potassium chloride. Transplants were hand planted and spaced 12 in. within row and 18 in. between rows resulting in 29,066 plants per acre. Varieties were planted in single 30 ft. rows with three replicates. Single border rows were used at each planting date. Lettuce was sprinkler irrigated when soil water tension reached 0.4 bars on tensiometers placed at 6 in. soil depth. Weeds were controlled by hand cultivation without application of preplant herbicide. Aphid populations were monitored and did not reach levels requiring control. Harvest was initiated when approximately 50 percent of the heads reached marketable size. Twenty-four heads per variety were harvested, weighed, and packed into cartons for the first planting. Twenty heads per variety were harvested, weighed, measured, and rated for tip burn for the second and third plantings. Four wrapper leaves were retained on all harvested heads. Yield data are limited to head and carton weights with no estimate of number of cartons per acre. Since lettuce grown from transplants tends to mature more uniformly than lettuce seeded directly into the field and management strongly impacts harvestability, the yield per acre data are not estimated.

Results

The earliest head lettuce planting was harvested on July 17. Yieid data in Table 8 indicates the significant difference in head weight among the varieties tested. At this early point in the growing season Ithaca, Acacia, and the uncoated Salinas variety weighed significantly less than Bix and Grande. Production of a 48 lb. carton is the target for commercial producers with 45 lb. cartons considered the minimum acceptable weight. Bix, Grande, coated Salinas, and Malika produced packed 24 head cartons in excess of 45 lbs. at this harvest date.

Acacia did not size well and produced elliptical heads that did not pack well in the carton. Ithaca also did not size as early as the other varieties. Bix and Grande produced heads similar to Salinas with good color, size, and uniformity.

The mid-season head lettuce planting was harvested a week later than optimum. Head weights were approximately one-half pound over the 2 lb. target weight when harvested. Carton weight is not presented due to head size limitation. Harvestable varieties did not differ significantly in head weight (Table 9). The mid-season planting was severely affected by tip burn, Acacia heads showed significantly greater tip burn and soft rot symptoms than the other varieties. Grande and Bix were also considered unharvestable due to tip burn damage. Ithaca and Malika were slightly affected by tip burn. Tip burn symptoms were probably exaggerated due to the maturity of this planting when rated, however, the amount of tip burn present was indicative of levels experienced by commercial producers at similar planting dates.

The late planted lettuce was harvested September 1, 1989. Most varieties approached the minimum 45 lb. carton except Ithaca which produced the smallest heads with the least tip burn symptoms (Table 10). Grande and Bix continued to produce heads that were similar in size to Salinas, though they probably reached marketable size before Salinas. Acacia was again the variety most susceptible to tip burn.

Table 7. Head lettuce planting and harvesting dates for varieties screened at the Matanuska Farm, 1989.

Time of Season	Seeding Date	Transplant Date	Harvest Date	Days to[1] Harvest
Early	Apr 10	May 8	Jul 17	64
Mid	May 8	Jun 2	Aug 2	62
Late	Jun 5	Jun 30	Sept 1	64

[1] From transplanting.

Table 8. Yield data from early season head lettuce harvested July 17, 1989 at the Matanuska Farm.

Seed Source	Variety	coated/[1] uncoated	Head[2] lbs	Carton[3] lbs
RS	Acacia	uc	1,66	39.8
AS	Bix	c	1.96	47.0
RS	Grande	uc	1.96	47.0
	Ithaca	c	1.67	40.1
	Salinas	c	1.92	46.1
RS	Kelvin	uc	1.79	43.0
	Malika	c	1.94	46.6
	Salinas 126	c	1.85	44.4
RS	Salinas	uc	1.76	42.2
	LSD 5%		0.19	4.56
	CV %		10.5	10.5

[1] Lettuce seed coating.
[2] Minimal tip burn apparent on wrapper leaves of most varieties. Did not affect internal quality.
[3]Twenty four head carton.

Table 9. Yield and quality data from mid-season head lettuce harvested August 2, 1989 at the Matanuska Farm.

Seed Source	Variety	coated/[1] uncoated	Head weight Ibs	TipBurn[2] rating Ibs
RS	Acacia	uc	2.44	3.9
RS	Grande	uc	2.77	2.0
AS	Bix	c	2.83	2.1
	Ithaca	c	2.36	1.3
	Salinas	c	2.43	1.6
RS	Kelvin	uc	2.53	1,7
	Malika	c	2.42	1.3
	Salinas 126	c	2.43	1,7
RS	Salinas	uc	2.55	1.8
	Grande	c	2.44	2.0
	LSD 5%		0.36	0.7
	CV %		14.0	53.2

[1] Lettuce seed coating.
[2] 0 = Good, 5 = Poor (includes secondary soft rot). Rating over 2 not marketable.

Table 10. Yield and qualify data from late planted head Iettuce harvested September 1, 1989 at the Matanuska Farm.

Seed Source	Variety	coated/[1] uncoated	Head weight Ibs	Carton[2] weight Ibs	Tip Burn[3] rating Ibs
RS	Acacia	uc	1.87	44.9	2.7
RS	Grande	uc	2.28	54.7	1.5
AS	Bix	c	2.31	55.4	1.2
	Ithaca	c	1.71	41.0	0.7
	Salinas	c	2.03	48.7	1.1
RS	Kelvin	uc	1,85	44.4	1.1
	Malika	c	1,86	44.6	1.5
	Salinasl26	c	1.87	44.9	1.0
RS	Salinas	uc	2.03	48.7	1.0
	Grande	c	1.95	46.8	1.4
	LSD 5%		0.30	7.2	0.5
	CV %		10.9	10.9	62.0

[1] Lettuce seed coating.
[2] Twenty four head carton.
[3] 0 = Good, 5 = Poor (includes secondary soft rot). Rating over 2 not marketable.

Potatoes

Methods

A collection of 45 named varieties and numbered potato selections were evaluated under irrigated and non-irrigated conditions. Water was applied as needed to irrigated plots through overhead sprinklers. Soil moisture levels were monitored with tensiometers installed at 6 in. and 12 in. depths.

Seedbed preparation was accomplished immediately before planting to conserve soil moisture. The seedbed was moldboard plowed 8–10 in. followed by disking and packing. Twenty–two individual plants were planted in 36 in. rows in a randomized complete block design with four replications on May 10. Seed pieces, planted with a single row, assist-feed planter, placed approximately 11 in. apart in the row and were covered with 2–3 in. of packed soil. Granular fertilizer was applied at 96 lbs. N, and below the seed. 304 lbs. P_2O_5, and 192 lbs. K_2O per acre at planting in bands beside and below the seed. Fertilizer was blended using monoammonium phosphate, urea, and potassium chloride. Weeds were controlled with a preemergent application of glyphosate (Roundup), followed by cultivation and hand weeding.

Seed of most varieties used in this yield trial was increased on the Matanuska Experiment Farm from stocks obtained from several sources including the Alaska Division of Agriculture–Plant Materials Center and certification agencies in the continental U.S. All seed was dipped in a 1.85% aqueous solution of formaldehyde for two minutes at room temperature to kill any pathogenic fungi or bacteria present on the tuber surface. Formaldehyde seed treatment was done in January to minimize damage to sprouts, as formaldehyde kills growing sprout tissue.

Plots were lifted with a mechanical digger then picked by hand and placed in plastic tubs on September 12. The harvest was placed in cold storage, and graded approximately two months later.

Results

The 1989 crop year was one of the best production years for potatoes at this location in the decade. Yields were well above average in irrigated (Table 11) and nonirrigated (Table 12) trials. Ample sunshine, above average temperatures, and adequate rainfall contributed to these yields. Soil moisture was adequate

very early in the season, but plants in the non–irrigated plots were stressed by a shortage of moisture through the month of June. However, the moderate to high yields in the non–irrigated plots illustrates that early season drought stress can be partially overcome by an adequate supply of water later in the season.

The primary commercial varieties in this region appear at the top of the list in both irrigated and non-irrigated trials. Green Mountain, Kennebec, Alaska 114, Superior, and Bake-King were among the top 10 varieties. Others that may be of commercial interest include the newly named variety IditaRed, Sable, and Lemhi Russet. In addition, for the third consecutive year, the numbered selection 6–78–139–80 (bred and selected by C.H. Dearborn) ranked near the top of the yield list in both irrigated and nonirrigated plots.

1989 SEED SOURCE LIST

Symbol	Firm and Address
	BROCCOLI
AS	Asgrow Seed Company, San Juan Bautista, CA 95045
TS	Johnny's Selected Seeds, 305 Foss Hill Road, Albion, MA 04910
JO	Jordan Seeds, Woodbury, MN 55125
	CABBAGE
AK	Alaska Seed Growers, Inc., Box 895, Palmer, AK 99645
GP	Park Seed Co., Cokesbury Road, Greenwood, SC 29647
JS	Johnny's Selected Seeds, 305 Foss Hill Road, Albion, MA 04910
MO	Harris Moran, 1155 Harkins Road, Salinas, CA 93901
RS	Royal Sluis, Inc., 1293 Harkins Road, Salinas, CA 93901
SS	Stokes Seeds, Inc., Box 548, Buffalo, New York 14240
SW	Seedway, Hall, NY 14463
	CARROTS
AS	Asgrow Seed Company, Kalamazoo, MI 49001
JS	Johnny's Selected Seeds, 305 Foss Hill Road, Albion, MA 04910
PS	Petoseed Co., Inc., Saticoy, CA 93003
SS	Stokes Seed Inc., Box 548, Buffalo, NY 14240
SW	Seedway Inc., Hall, NY 14463
VS	Vesey's Seeds Ltd., York, Prince Edward Island
	LETTUCE
AS	Asgrow Seed Company, Kalamazoo, MI 49001
RS	Royal Sluis Inc., 1293 Harkins Road, Salinas, CA 939011989

Table 11. Irrigated potato yield trial summary, Matanuska Farm, 1989.

Variety[1]	US#l[2]	Small[3]	Other[4]	Total	US #1	Avg US #1 Tuber weight	Specific Gravity
	tons/acre				%	ounces/tuber	
Green Mt.	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
Bakeking	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	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	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	I8.9	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%	2.1				2.0		
CV %	8.5				6.8		

[1] Numbered selections originated in the breeding program of C.H. Dearborn.
[2] #1 market grade as defined by USDA.
[3] Tubers less than 1.75 in. diameter.
[4] Includes oversize, shatter or growth crack, second growth, green, etc.

Table 12. Nonirrigated potato yield trial summary, Matanuska Farm, 1989.

Variety[1]	US#l[2]	Small[3]	Other[4]	Total	US #1	Avg US#1 Tuber weight	Specific Gravity
	tons/acre				%	ounces/tuber	
Green Mt.	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	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
Bakeking	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	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.O82
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 86943	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.O85
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%	1.9				1.9		
CV %	9.6				8.2		

[1] Numbered selections originated in the breeding program of C.H. Dearborn.
[2] #1 market grade as defined by USDA.
[3] Tubers less than 1.75 in. diameter.
[4] Includes oversize, shatter or growth crack, second growth, green, etc.