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Fairbanks Vegetable Variety Trials 2021

VT 2021-02

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Vegetable cultivar trials were conducted in the summer of 2021 at the UAF Alaska Agricultural and Forestry Experiment Station (AFES) Fairbanks Farm (64° 51'N, 147° 52'W). Cultivar, or "variety" trials evaluate commercially available and newly released cultivars to evaluate yield and multiple subjective ratings in order to determine suitability of cultivars for the local growing conditions. Trials are conducted to assist small market farms and local gardeners in making climate-smart decisions about which cultivars will perform well in the Tanana Valley and nearby areas of Interior Alaska. The soil at the Fairbanks farm is Minto silt-loam with a pH of 6.9 -7.1. Readers should be cautioned that plot sizes are small; results will likely differ in different microclimates, soil types and heterogeneous soils.

Research techs Anja and Nicole harvest Scarlet Nantes carrots.

Weather

Weather data was compiled from a U.S. Weather Service station, elevation 475 feet (145 meters), located approximately 380 feet (115 meters) north of the research plots. The growing season started late in 2021 due to early April snow accumulation.

However, with warm May temperatures, followed by greater than average air temperatures in June, July and August the growing season was one of the best in recent years. The table below only captures weather data from the 2021 growing season; however, you can locate an Alaska weather station near you by visiting: https://www.weather.gov/aawu/stnlist and obtain historical weather data for your specific area.

Table 1: 2021 Growing Season

Temperature (degrees F)	May	June	July	August	Sept.
Average daily maximum	60	73	75	63	53
Monthly high	73	85	88	89	74
Average daily minimum	37	49	52	47	45
Monthly low	27	42	42	32	13
Precipitation (inches)	0.21	1.5	2.10	3.86	0.5

Plots of direct-seeded crops, carrots in front.

Table 2: 2021 Frost

Last Frost	Frost-free days	First frost
5/08/21	127	9/12/21

Experimental Design

In 2021, beans, beets and carrots were grown in three replicated plots in a randomized complete block design (RCBD).

Artichokes, Brussels sprouts, corn, fennel, hot peppers, spinach and winter squash were grown in randomized unreplicated or preliminary trials.

Fertilizer and Soil Amendment

Prior to planting, plots were tilled with a tractor, and 20-10-10 slow-release fertilizer was applied at a rate of 40 pounds per 1,000 square feet based on soil analysis results from the previous fall. Additionally, composted steer manure was applied to research plots at 1.5 cubic yards per 1,000 square feet, and fish meal was applied at a rate of 10 pounds per 1,000 square feet to improve soil fertility. Corn plots were fertigated midway through the growing season with a 23-13-8 water-soluble fertilizer at an approximate rate of .25 pounds per 1,000 square feet.

Planting and Growing

Artichokes, Brussels sprouts, celery, fennel, peppers and winter squash plants were started in the Arctic Health Research Greenhouse at the University of Alaska Fairbanks (UAF). See Tables 4 and 5 for seed starting dates. Germination rates were uniform for all crop types except for fennel cultivars, which after several seasons of trials, seem to consistently experience only about an 80% germination rate.

Corn seeds were soaked 8 hours prior to planting. All seedlings were transferred to a high tunnel and hardened off a week or more prior to planting outside. Artichokes require a period of vernalization in order to produce the flower buds we refer to as artichokes. Vernalization is accomplished by exposing the artichoke starts to a 7-to-10-day period of nighttime temperatures above freezing, but below 50°F prior to transplanting.

Beets, beans, spinach and carrot cultivars were direct seeded (see Tables 3 and 5 for planting dates) in twin rows. Bean seeds were soaked in water for eight hours and inoculated with mycorrhizae prior to planting. Carrots were planted thickly and thinned to ensure even germination and spacing in plots. All crops were planted in 30-inch-wide beds with 18-inch aisles, with the exception of winter squash, which were planted in 30-inch-wide beds with 12-foot aisles to allow for vining.

Plot sizes were large enough to fit a minimum of 12 plants of each cultivar for larger crop types (e.g., artichokes), and up to 50 plants in other, smaller crop type plots (e.g., carrots). Crops were irrigated using

Direct-seeded beds were covered with frost cloth to aid germination (left), and the rows to the right are planted with winter squash with woven ground cover between rows.

drip irrigation on a 3-day per week irrigation schedule throughout the summer, with irrigation being withheld from crops like carrots and winter squash as they matured to avoid splitting. In 2021 artichoke, Brussels sprouts, corn and winter squash were planted into infrared-transmitting (IRT) plastic mulch, which acts both as a weed barrier and soil warmer.

Trial Evaluation

Harvest began later than normal due to wet spring fields delaying planting. Harvest of beets and beans began Aug. 2 and continued twice a week until Sept. 7. Mature vegetables were harvested each week, or in the case of beans, biweekly. Diseased or very deformed vegetables that would be considered unmarketable at a farmers market were not included in the marketable yield upon which results are based (see summary tables). Data was collected in the field using a harvest log form and an iPad for data entry.

Each cultivar was evaluated at least once in terms of plant vigor, bolting sensitivity (or susceptibility to bolt), uniformity, pest resistance and disease resistance. These traits were evaluated on a scale from 1 to 9, with 1 being very poor and 9 being excellent. Taste tests were conducted at home by UAF Agriculture and Forestry Experiment Station staff in 2021 due to Covid-19 making in-person taste testing with participants from the community infeasible. As many varieties of each crop as possible were rated for flavor and texture on a scale of 1 to 5 (1 being very poor and 5 being excellent).

Total marketable yield was evaluated in terms of both weight and units harvested. For replicated varieties, yield per plot was statistically evaluated in an Analysis of Variance (ANOVA) using a significance value (p-value) of ≤ 0.05. Mean yield per plot, yield per row foot, average unit weight, as well as subjective ratings were collected (see table 3a) for all crops regardless of replication.

Results of Replicated Trials

Beans

Beans performed fairly in 2021, and all varieties had acceptable to good germination. After planting, bean plots were covered with remay (frost cloth) to retain soil moisture and improve germination rates. All plots were thinned to 24 plants per plot to ensure equal comparison between varieties. Bean plants suffered

Bean varieties, from left: Goldmine, Provider, Dragon Langerie, Gold Rush, Strike.

from harvest damage due to heaver precipitation in August and became highly susceptible to white mold which shortened the harvest period. Contender significantly outperformed all other cultivars; Strike and Provider significantly outperformed Gold Rush, Gold Mine and Dragon Langerie. Contender and Strike scored the highest for both taste and texture (n=3).

Although 2021 was only the first year Gold Mine and Dragon Langerie were trialed, based on results from trials in both Palmer and Fairbanks, these varieties do not appear to be suitable cultivars for Alaska's growing conditions, and Rocdor remains our recommended wax bean (yellow bean) cultivar.

Beets

Beet varieties had acceptable to excellent germination in 2021. Like Beans, after planting, beet plots were covered with frost cloth to retain soil moisture and improve germination rates. Detroit Dark Red, Subeto, Zeppo and Boro all yielded significantly higher than the other cultivars trialed. Red Ace, Merlin, Cylindra

Table 3: 2021 Randomized Complete Block Design Trials

Vegetable	Cultivar	Source	Spacing			Date Seeded	Days to Maturity	Harvest Period	Avg. Yield (lbs.)/Plot	Yield (lbs.)/ row foot	Avg. Unit weight (oz.)	1= Very Poor 9=Excellent		
			Within Row	Between Rows	Plot Length							Plant vigor	Pest Resistance	Disease Resistance
Beans														
	Contender	Burpee	2"	18"	4'	6/5	55	8/5-8/20	4.4	1.1	N/A	9	8	8
	Provider	Johnny's	2"	18"	4'	6/5	50	8/5-8/20	2.9	0.72	N/A	8	9	8
	Gold Rush	High Mowing	2"	18"	4'	6/5	52	8/11-8/20	2.1	0.52	N/A	7	9	8
	Gold Mine	High Mowing	2"	18"	4'	6/5	55	8/13-9/17	2.0	0.5	N/A	7	6	8
	Dragon Langerie	High Mowing	2"	18"	4'	6/5	55	Crop fail	0.3	0.1	N/A			
	Strike	Territorial	2"	18"	4'	6/5	55	8/11-8/20	3.0	0.7	N/A	9	9	7
Beet											oz.			
	Early Wonder	Burpee	3"	18"	4'	6/5	45	8/02-8/17	5.7	1.4	1.2	8	8	8
	Detroit Dark Red	High Mowing	3"	18"	4'	6/5	55	8/02 - 8/23	11.2	2.8	2.4	8	8	9
	Red Ace (F1)	Johnny's	3"	18"	4'	6/5	50	8/02 - 8/25	8.0	2.0	1.5	8	8	6
	Zeppo (F1)	Johnny's	3"	18"	4'	6/5	50	8/02 - 8/25	10.7	2.7	1.6	8	8	7
	Boro (F1)	Johnny's	3"	18"	4'	6/5	50	8/02 - 8/23	10.4	2.6	1.7	9	8	9
	Merlin (F1)	Burpee	3"	18"	4'	6/5	55	8/02 - 8/25	8.5	2.1	2.0	9	8	9
	Cylindra	Burpee	3"	18"	4'	6/5	54	8/02 - 8/17	8.9	2.2	1.5	8	8	9
	Robin (F1)	Territorial	3"	18"	4'	6/5	60	8/02 - 8/25	9.6	2.4	1.8	8	8	9
	Subeto (F1)	High Mowing	3"	18"	4'	6/5	55-60	8/02 - 8/23	11.1	2.8	1.7	9	8	8
Carrot											oz.			
	Romance (F1)	Johnny's	1"	18"	2'	6/6	70	8/27	6.4	3.2	3.4	9	9	9
	Touchon	Burpee	1"	18"	2'	6/6	65	8/27	5.8	2.9	3.0	9	9	9
	Nantes half long	Burpee	1"	18"	2'	6/6	70	8/23	6.2	3.1	2.9	9	9	9
	Hercules (F1)	Johnny's	1"	18"	2'	6/6	65	8/23	6.1	3.1	3.0	9	9	9
	Napoli (F1)	Johnny's	1"	18"	2'	6/6	58	8/23	6.8	3.4	3.3	9	9	9
	Bolero (F1)	Johnny's	1"	18"	2'	6/6	75	8/12	4.3	2.1	2.2	9	9	9
	Yaya (F1)	Burpee	1"	18"	2'	6/6	56	8/27	5.5	2.8	3.1	9	9	9
	Scarlet Nantes	Fedco	1"	18"	2'	6/6	65	8/23	5.7	2.9	2.7	9	9	9
	Nectar (F1)	Johnny's	1"	18"	2'	6/6	72	8/27	6.7	3.4	3.2	9	9	9
	Napa (F1)	Territorial	1"	18"	2'	6/6	63	8/27	6.9	3.5	3.4	9	9	9
	Eskimo (F1)	Territorial	1"	18"	2'	6/6	85	8/27	5.3	2.6	2.8	8	9	9

		Quality: 1= Poor 5=Excellent		
Bolting Sensitivity	Uniformity	Taste	Texture	Comments
9	9	4	4	Became moldy shortly after first harvest, but held better than other varieties.
9	9	3	4	Held in field equal to or better than other varieties despite wet conditions.
9	9	3	4	Yellowing leaves. Poor germination, lots of collapsed and moldy plants.
9	9	3	4	Some molding; poor germination; pest predation on leaves.
				Considered a crop failure. Few beans matured before frost.
9	9	4	4	Some spotty, wrinkly leaves; nice dark green beans.
4	7	2	2	Lots of plants bolted.
9	8	3	3	Dimples on beets present in all plots; a few with heart rot.
9	8	4	4	Some tops cracking; scabs on some.
9	8	5	4	Some heart rot, scabbing; moose selectively ate tops.
9	8	4	4	Very uniform, spherical beet with smooth ruby skin.
9	9	4	4	Nice-sized long, cylindrical beetroot.
6	7	3	3	Moose selectively ate cylindra tops from all plots.
8	8	4	4	Scabs on some beets; nice, large, round beets.
9	8	5	5	Very uniform and round beetroot.
9	8	3	3	Good productivity; some hairy taproots.
9	7	4	4	Sweet and crisp.
8	9	4	4	Some were hairy; nice tapered shape.
8	8	3	4	Shorter than last year; some leggy carrots.
9	8	3	4	Fairly uniform, blunt-ended carrot; some leggy
9	8	3	3	Moose ate greens of this variety; held in cold storage until March.
9	8	3	4	Tall greens and short, mostly uniform carrots.
9	8	3	3	Shorter and wider than other years; all very uniform within plot.
9	8	4	4	Held well in storage until February.
9	9	3	4	Big, highly uniform carrots.
9	8	3	3	Hairy, otherwise very uniform size.

and Robin all significantly outperformed Early Wonder. Early Wonder was once a recommended variety for interior Alaska, and has been trialed repeatedly in Fairbanks in the past. However, in contemporary trials (2017-2021) Early Wonder continues to have a strong tendency to bolt, therefore, we do not recommend it as a suitable cultivar for interior Alaska growing conditions. The highest rated varieties for both taste and texture were Red Ace, Boro, Merlin and Robin (n=3). As with yield results, Early Wonder scored the lowest for taste and texture.

Merlin beets

Carrots

Overall, carrots had acceptable to excellent germination rates and like other direct seeded crops, were covered with frost cloth to improve germination rates in fast-drying silty soils.

Carrots plots were thinned to 24 plants per plot for equal evaluation across cultivars. All carrot varieties performed relatively equally in 2021. In descending order, Napa, Napoli and Nectar yielded the most. Bolero yielded significantly less than all other cultivars, however the carrot tops from Bolero were selectively eaten by a moose, and as such, we suspect this lower-than-normal yield for Bolero is a result of that. Nectar, Touchon, Napoli and Nantes Half Long, scored the highest for taste (n=4) and scored similarly high in taste test results from replicate trials in Palmer.

Table 4: 2021 Unreplicated

Vegetable	Cultivar	Source	Spacing			Date Seeded	Transplanted	Days to Maturity	Harvest Period	Yield/plot (lbs.)	Yield (lbs.)/ row foot	Avg. Unit weight (oz.)
			Within Row	Between Rows	Plot Length							
Artichoke												
	Green Globe	Baker Creek	36"	N/A	30'	3/22	6/1	181	8/18-9/17	11.6	0.4	6.6
	Tavor	High Mowing	36"	N/A	30'	3/22	6/1	160	8/18-9/17	23.8	0.8	4.8
	Imperial Star	Burpee	36"	N/A	30'	3/22	6/1	180	8/18-9/17	16.0	0.5	3.6
	Colorado Star	Johnny's	36"	N/A	30'	3/22	6/1	180	8/18-9/17	14.8	0.5	3.3
Brussels Sprouts												**oz.**
	Franklin (F1)	Territorial	18"	18"	20'	3/24	6/3	80	9/07	7.2	0.4	0.3
	Hestia (F1)	Johnny's	18"	18"	20'	3/24	6/3	100	9/07	9.9	0.5	0.2
	Nautic (F1)	Territorial	18"	18"	20'	3/24	6/3	120	9/07	4.9	0.3	0.2
	Diablo (F1)	Johnny's	18"	18"	20'	3/24	6/3		9/07	4.7	1.2	0.2
	Dagan (F1)	Johnny's	18"	18"	20'	3/24	6/3		9/07	7.3	0.4	0.2
Celery												**oz.**
	Tall Utah 52-70 Improved	Burpee	10"	18"	96'	3/14	6/4	105	8/26	41.2	5.2	44.0
	Merengo (F1)	White Seed	10"	18"	96'	3/24	6/4	80	8/26	43.8	5.5	46.7
	Conquistador	Johnny's	10"	18"	96'	3/24	6/4	80	8/26	35.8	4.5	38.2
	Tango OG	Johnny's	10"	18"	96'	3/24	6/4	80	8/26	53.6	6.7	57.1
	Nero (F1)	Stokes	10"	18"	96'	3/24	6/4	98	8/26	41.7	5.2	44.5
Corn												**oz.**
	Early Sunglow	Burpee	12"	2'	24'	5/4	6/5	63	8/10-8/17	15.2	0.6	8.7
	Sugar Pearl (F1)	Jung Seed	12"	2'	24'	5/4	6/5	72	8/17-8/24	22.1	0.9	12.2
	Cafe Corn (F1)	Territorial	12"	2'	24'	5/4	6/5	68	8/10-8/24	32.2	1.3	12.3
	Sugar Buns (F1)	Territorial	12"	2'	24'	5/4	6/5	75	8/10-8/24	24.2	1.0	10.5
	Sweetness Corn (F1)	Territorial	12"	2'	24'	5/4	6/5	68	8/24	15.2	0.6	11.1
	Honey Select Triplesweet		12"	2'	24'	5/4	6/5	79	8/27	32.4	1.4	13.6
	Temptress (F1)	Territorial	12"	2'	24'	5/4	6/5	70	8/18-8/24	36.6	1.5	13.0
	Trinity	Stokes	12"	2'	24'	5/4	6/5	59	8/20-8/24	18.0	0.8	9.0
Fennel												**oz.**
	Fino	Johnny's	9"	18"	72"	4/19	6/4	70	7/19	6.9	0.6	11.1
	Perfection	Fedco	9"	18"	72"	4/19	6/4	72	7/19	6.1	0.5	9.8
	Solaris (F1)	High Mowing	9"	18"	72"	4/19	6/4	75	7/19	5.8	0.5	9.2
	Preludo (F1)	High Mowing	9"	18"	72"	4/19	6/4	75	7/19	6.5	0.6	10.5
	Finale	High Mowing	9"	18"	72"	4/19	6/4	80	7/21	7.4	0.6	14.8
	Orion (F1)	High Mowing	9"	18"	72"	4/19	6/4	82	7/21	8.5	0.7	13.7
	Orazio	Johnny's	9"	18"	72"	4/19	6/4	80	7/21	9.5	0.8	0.8

1=Very Poor 9=Excellent					Quality: 1= Poor 5=Excellent		
Plant Vigor	Pest Resistance	Disease Resistance	Bolting Sensitivity	Uniformity	Taste	Texture	Comments
9	9	9	9	8	3	3	Resistant to light frost.
9	9	9	9	9	4	3	Lots of artichokes produced; very big globes.
9	9	7	9	9	3	3	Small-sized chokes; black spotting on tips of some.
9	9	9	8	9	5	4	Early variety; higher tendency for looser bracts or "petals."
7	7	9	9	7	3	3	Moose predation.
7	7	9	9	7	4	4	Moose predation.
5	7	9	9	5	4	4	Moose predation; small sprouts.
7	7	9	9	6	5	5	Moose predation; small sprouts; best flavor.
7	7	9	9	5	4	3	Moose predation.
8	8	9	9	6	2	3	Lots of side shoots; difficult to harvest.
9	9	8	9	9	5	5	Excellent productivity; nice juicy, sweet, crunchy stalks.
8	9	7	9	8	4	4	Nice flavor and texture.
8	9	8	9	9	3	4	Easier to harvest; thick, uniform ribs.
9	9	9	9	8	4	4	Large rootmass; great flavor.
5	9	9	9	7	2	2	Very compact plant; does not hold in field well; becomes starchy if not harvested promptly.
9	9	9	9	7	4	4	Excellent eating quality; plants less uniform.
8	9	8	9	9	5	5	Very productive, often 2-3 ears per plant; excellent eating quality.
8	9	8	9	8	5	5	Very productive, very sweet and excellent eating quality.
8	9	9	9	8	5	5	Very leafy, excellent eating quality — sweet.
6	9	9	9	9	3	4	Late to mature; many ears still under-mature at time of last harvest prior to killing frost.
8	9	9	9	9	4	4	Lots of tillers; large, uniform ears.
5	9	9	9	4	3	3	Did not grow tall; lots of tillers with non-uniform hermaphroditic ears.
9	9	9	7	7	5	4	Some unmarketable plants due to bolting.
7	9	9	7	7	2	2	Baby fennel bulbs formed by mid-August off the root left after main bulb was harvested.
8	9	9	8	7	4	4	Early variety; very juicy and good-flavored bulbs without woodiness.
9	9	9	9	9	3	4	Heavy bulbs; traditional anise flavor.
8	8	9	7	7	3	4	Aphids present; some unmarketable plants due to bolting.
8	9	9	8	7	5	4	Large heavy bulbs; highly stress-tolerant; excellent sweet, mild anise flavor.
9	9	9	9	9	4	4	Large uniform rounded white bulbs; crisp texture; nice anise flavor.

Table 5: 2021 Unreplicated (continued)

Vegetable	Cultivar	Source	Spacing			Date Seeded	Transplanted	Days to Maturity	Harvest Period	Yield/plot (lbs.)	Yield (lbs.)/ row foot	Avg. Unit weight (oz.)
			Within Row	Between Rows	Plot Length							
Hot Peppers												
	Czech Black	Burpee	18"	18"	12'	3/28	6/2	65	7/27-9/13	8.9	0.6	0.4
	Dragon Roll	Burpee	18"	18"	12'	3/28	6/2	67	8/05-9/13	8.0	0.5	0.3
	Big Boss Man	Burpee	18"	18"	12'	3/28	6/2	70	8/12-9/13	10.0	0.6	1.6
	Poblano	Johnny's	18"	18"	12'	3/28	6/2	65-80	8/05-9/14	9.3	0.6	1.9
	Red Ember	Johnny's	18"	18"	12'	3/28	6/2	55-75	7/27-9/13	20.0	1.3	0.5
	Black Magic	Johnny's	18"	18"	12'	3/28	6/2	654	7/27-9/13	9.2	0.6	0.6
Spinach - Bolting and taste study only, no yield data collected					**Planting :**	**1st**	**2nd**					
	Renegade (F1)	High Mowing	2"	18"	4'	7/2	8/2	30	N/A	N/A	N/A	N/A
	Oceanside	Fedco	2"	18"	4'	7/2	8/2	37	N/A	N/A	N/A	N/A
	Space	Johnny's	2"	18"	4'	7/2	8/2	25	N/A	N/A	N/A	N/A
	Lakeside	Territorial	2"	18"	4'	7/2	8/2	27	N/A	N/A	N/A	N/A
	Regiment	Territorial	2"	18"	4'	7/2	8/2	27	N/A	N/A	N/A	N/A
	Palco	Territorial	2"	18"	4'	7/2	8/2	27	N/A	N/A	N/A	N/A
	Lizard (F1)	Johnny's	2"	18"	4'	7/2	8/2	28	N/A	N/A	N/A	N/A
	Seaside	Johnny's	2"	18"	4'	7/2	8/2	43	N/A	N/A	N/A	N/A
	Bloomsdale Long Stand	Burpee	2"	18"	4'	7/2	8/2	43	N/A	N/A	N/A	N/A
	Escalade (F1)	Territorial	2"	18"	4'	7/2	8/2	43	N/A			
Winter Squash - Data from 10 plants/ variety												**lbs.**
	Lakota	Burpee	3'	12'	30'	5/5	6/3	95	8/18-9/13	258.2	25.8	9.9
	Bonbon	Johnny's	3'	12'	30'	5/5	6/3	95	8/26-9/13	261.5	26.2	5.2
	Sunshine (F1)	Johnny's	3'	12'	30'	5/5	6/3	95	8/18-9/13	298.8	29.9	6.0
	Uncle David's Dakota	Fedco	3'	12'	30'	5/5	6/3	90	8/18-9/8	227.4	22.7	3.9
	Yuxi Jiang Bing Gua	Burpee	3'	12'	30'	5/5	6/3	92	Crop failure			
	Gete-Okosomin	Baker Creek	3'	12'	30'	5/5	6/3	85	8/18-8/26	269.0	26.9	11.2
	Honey Boat	High Mowing	3'	12'	30'	5/5	6/3	95	8/26-9/13	247.1	24.7	1.8
	Winter Sweet	High Mowing	3'	12'	30'	5/5	6/3	95	8/26-9/13	296.9	29.7	5.1
	Red Kuri	High Mowing	3'	12'	30'	5/5	6/3	95	8/18-9/13	353.2	35.3	4.4
	Butterscotch PMR	Johnny's	3'	12'	30'	5/5	6/3	100	Crop failure			
	Hasta la Pasta	Burpee	3'	12'	30'	5/5	6/3	73	8/26-8/18	208.3	20.8	3.0
	Waltham Butternut	Burpee	3'	12'	30'	5/5	6/3	85	9/13	100.5	10.1	4.0
	Harvest Moon	Burpee	3'	12'	30'	5/5	6/3	90	8/26-9/13	433.2	43.3	8.8

1=Very Poor 9=Excellent					Quality: 1= Poor 5=Excellent		
Plant Vigor	Pest Resistance	Disease Resistance	Bolting Sensitivity	Uniformity	Taste	Texture	Comments
9	9	9	9	8	N/A	N/A	Some color and size variation (green to red); very prolific producer.
9	9	9	9	9	N/A	N/A	Plants not as resistant to cool weather; browning and wilting leaves starting mid-August.
9	9	6	9	9	N/A	N/A	Some of the larger peppers developed blossom end rot.
9	9	9	9	9	N/A	N/A	Very productive; produced very uniform peppers.
9	9	9	9	9	N/A	N/A	First variety to set fruit; very prolific pepper growth; plants held nicely as weather cooled.
9	9	9	9	7	N/A	N/A	Plants healthy; lots of set peppers; size widely uniform; many peppers were short and ball-like at the end of the season.
9	9	9	9	8	4	3	Massive leaves; good field holding in plantings.
8	9	9	6	9	4	4	Excellent taste; not particularly bolt-hardy in either plantings.
8	9	9	7	7	4	3	Nice thick leaves; productive with good field holding.
8	9	9	8	8	3	4	Strong spinach flavor; bolted in early (July) planting.
8	9	9	8	7	3	2	Good field holding capacity for later planting; not so for the summer.
9	9	9	9	8	4	2	Big lush leaves; excellent holding capacity in both plantings.
7	9	9	8	8	4	4	Poor germination; fall planting better bolt-resistant; sweet flavor.
9	9	9	8	8	4	4	Big lush leaves; excellent flavor.
8	9	9	8	7	3	2	Held well in field both plantings, better in fall planting (August).
9	9	9	9	9	4	4	Nice large leaves, excellent field holding capacity.
9	9	9	9	8	5	5	Prolific blossoms and fruit set; variable fruit size; excellent eating quality; held in storage until December.
9	9	9	9	9	4	5	Uniform attractive shiny dark green fruit; good eating quality
9	9	8	9	8	3	5	Prolific fruit set; continues to produce squash after first harvest for successive harvest; many squash still unripe at time of killing frost.
8	9	7	9	6	3	3	More susceptible to rot than other varieties; small, variable fruit size.
							Third year evaluating this variety; vegetative growth is vigorous, however very little fruit set. At this time not recommended for Alaska.
9	9	7	9	9	5	5	Prolific early plant growth and fruit; excellent eating quality with melon-like notes. Stores well to November -January.
8	9	8	9	6	5	5	Vigorous plant growth and blossoms; fruit set is mediocre - may be in part due to northern long photoperiod.
9	9	9	9	9	3	2	Prolific growth, however, many hybrid squash developed; question as to whether seed was pure.
9	9	9	9	8	4	5	Prolific growth and good eating quality; many unripe fruit still on vine at time of killing frost.
							Plants struggled to thrive; did not produce any marginally ripe fruit at time of killing frost.
9	9	8	9	6	2	2	Spaghetti squash generally do well; nice compact plants and smaller fruit with less splitting observed than standard spaghetti variety.
4	9	5	9	3	4	4	Produced lots of underripe fruit that were brought indoors to continue maturing at time of last harvest.
9	9	9	9	9	4	5	Only nine plants in plot; very large, dense fruit; excellent storage variety, kept until February.

Nectar carrots at harvest.

Results of Unreplicated Trials

Unreplicated or screening trials are conducted to vet crops and varieties prior to including then in fully-replicated trials, or to evaluate crops that are resource-/space-intensive to test.

Therefore, results should be interpreted cautiously as unreplicated trials do not have the same degree of experimental rigor as those that have been replicated. In lieu of same-season replication, we do typically evaluate cultivars for a minimum of three growing seasons for inter-annual replication. Refer to AFES variety trial reports from other years for comparison.

Green Globe artichoke, left. Right, Tavor artichoke in August.

Artichoke

Artichokes were added to the AFES Variety Trials program in 2021. Plants were started in the greenhouse in mid-March, and moved to a cold frame to vernalize for 10 days in mid-May prior to being transplanted into IRT plastic mulch in late May. Tavor was very prolific, producing nearly double the marketable yield to other cultivars tested. In descending order of yield the other varieties tested were: Imperial Star, Colorado Star and Green Globe.

Green Globe was historically the recommended variety for Interior Alaska, and future years of testing will help

determine if Green Globe is still a good choice for the growing conditions, however we also suggest trying Tavor.

Tavor received the highest ratings in taste tests (by a small margin) and the remaining varieties all received equally high ratings for taste and texture (n=5).

Brussels sprouts

Brussels sprouts were started in the greenhouse in late March, and transplanted outdoors in late May. Of note, all varieties were promising a good to excellent harvest before being predated by moose less than a week prior to harvest. While moose damage was similar across plots, results are considered skewed and should be considered with caution. Hestia produced the highest marketable yield (in number and weight of sprouts), and has performed similarly in years past, making it a good option for Interior Alaska. Dagan and Franklin yielded equally well in 2021. Hestia and Franklin received the highest ratings for taste, although all varieties received equally similar ratings in taste tests (n=4).

Celery

Celery plants were planted in a trench 8-10 inches deep and allowed to grow for approximately a month before

Anja harvests Franklin Brussels sprouts.

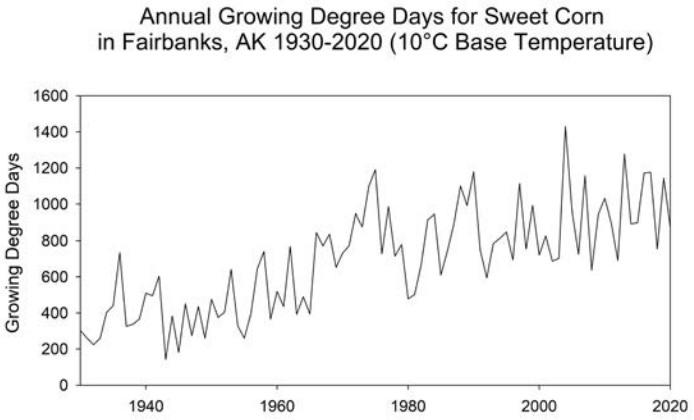
Celery hearts post harvest, from left: Tall Utah, Conquistador, Tango, Nero

the trench was backfilled in order to blanch the bases of celery plants and encourage upright versus sprawling growth habit. The base of plants was buried in 3-5 inches of soil, and a large harvest knife is required for cutting the plant from the sub-soil root mass. Based on four years of testing, the effort planting celery this way appears to be worth the larger, better formed hearts that are produced using this technique. Celery appears to be an attractive crop to slugs. The base of the celery ribs where soil contact is present is where slug-caused damage appears the worst. Tango significantly out-yielded other cultivars, and Merengo was also highly productive. Merengo received the highest ratings for taste, while Tall Utah 52-70 Improved received the lowest ratings for taste (n=4).

Corn

Overall, corn did very well in 2021 due to warm temperatures providing sufficient Growing Degree Days (GDD) over a longer-than-average growing season (127 frost-free days). Increasingly, this trend for a warmer, longer growing season is making formerly marginal crops for Alaska, such as sweet corn, feasible.

Sugar Buns corn at harvest.



Growing Degree Days is a measurement used to estimate how much heat is available to crops. Heat units are added up daily, throughout the growing season, to create a cumulative total. Crops tend to reach particular growth stages (e.g. corn will tassel) when cumulative GDDs reach specific values.

Corn plots are grown in rows with IRT plastic mulch to warm the soil.

Temptress, Honey Select Triple Sweet and Café corn all yielded significantly more than the other cultivars evaluated.

All of the very early-maturing cultivars (63-70 days) — Early Sunglow, Trinity and Sweetness — failed to thrive in 2021, likely due to cool early-season soil temperatures and a later than anticipated transplanting date. Sweetness (68 days) has been a reliable producer in past year's trials, and rated high in taste tests, making it and Early Sunglow (63 days) — which is more tolerant to cool growing conditions than other varieties of sweet corn — ideal for individuals who want to try growing corn for the first time in Alaska's short growing season. Both cultivars exhibit compact growth habit reaching 4-5 feet in height, making them a good choice for container/raised bed gardens.

That being said, Early Sunglow does not hold well in the field and the flavor and texture quickly become bland and starchy if left unharvested past its prime. Café, Sugar Buns, and Sweetness scored highest (5/5) in both taste and texture (n = 8). Temptress and Sugar Pear were also rated highly (4/4) in both categories, while Early Sunglow continued to be rated the lowest in taste tests for four consecutive years.

Fennel

Seven varieties of fennel were selected to test in Alaska (Fairbanks and Palmer) based on bolting resistance and short days-to-maturity. In 2020 several varieties,

Fennel plots a few days prior to harvest. Front to back row: Orazio, Orion, Fino.

especially Orion and Fino, demonstrated leaf chlorosis (bronzing) indicating nitrogen deficiency, in response to this during the 2021 growing season, fennel beds were top-dressed with additional fish meal (source of nitrogen) at time of planting and similar signs of nutrient stress were not observed. All varieties performed good to excellent in 2021.

Varieties produced the greatest marketable yield in descending order: Orazio, Orion, Finale, Fino, Preludo, Perfection, and Solaris. In 2021, all fennel was harvested in mid-July using a harvest knife to cut bulbs from the root mass.

We observed that by leaving the root mass intact, and by continuing to receive water through the drip irrigation system, that multiple baby fennel bulbs had formed by mid-late August, which would be considered marketable if harvested, however we did not collect data on these lateral shoots in 2021. Orion and Fino received the highest ratings in taste tests, and Perfection received the lowest ratings in taste tests (n=5).

Hot Peppers

Seven varieties of hot peppers of different types (Cayenne, Jalapeño, Poblano, Szechwan, and Ancho-hybrid) were tested in 2021. Cultivars were selected based on shorter days to maturity and tolerance to cool weather and/or stress. All peppers were planted outdoors in IRT plastic mulch with no other season extension techniques applied. Marketable yield was collected on all pepper cultivars, however comparison across varieties should be made with caution since pepper types will yield drastically different amounts based on mature pepper size, and other physiological traits.

In 2021 Red Ember (Cayenne) was a standout producer, yielding 1.3 pounds of peppers per row foot (more than twice that of all other cultivars in the trials) and continued to set fruit late into the season with lots

Glenna Gannon harvests Red Ember peppers.

of green peppers being harvested into early September. Big Boss Man (Ancho-poblano hybrid) and Poblano were also highly productive, although Big Boss Man appeared to be more susceptible to blossom end rot (BER) than other cultivars as none of the others tested in 2021 developed BER.

Peppers were not included in a formal taste test; however, the following notes were provided by AFES staff who sampled/used peppers in cooking. Big Boss Man and Poblano made excellent roasting peppers; Red Ember was mildly spicy when used immature (green) becoming mid- to highly spicy as it matured to red.

Red Ember dried excellently when left in a shallow open bowl on the counter and kept as dried chili or could be crushed into flakes and stored. Similarly, Czech Black (heirloom Jalapeño type) became hotter as it matured from purple to red. Dragon Roll (Szechwan) was very thin skinned, and not particularly desirable

Harvesting spinach - example of bolted spinach in background (Space)

for fresh eating. Black Magic (Jalapeño) was very mild when harvested prior to fruit "checking."

Spinach

Ten varieties of spinach were tested in 2021 as part of a bolting study to determine which "bolt-hardy" cultivars perform best during the long photoperiod (length of daylight) in Alaska. As such, yield data was not collected for spinach, rather evaluation focused on bolting susceptibility as well as rating plant vigor, pest and disease susceptibility and taste.

Spinach was planted two times throughout the summer in 2021 (July 2 and Aug. 2). The data in table 5 represents a summary of each variety across successive planting dates, however details on differences in bolting from successive plantings can be found in the comments section. Overall, all cultivars performed slightly to markedly better in the second (fall) planting. It is likely that most spinach cultivars would perform equally well in an early spring planting (e.g., early May) if seeded soon after the soil was workable, and under season extenders like low tunnels, however we have not been able to work the soil in the trials field early enough to test a spring planting.

Escalade, Palco, Renegade and Space received the highest ratings for bolt-hardiness across multiple plantings. Other varieties of note that performed well with regard to bolting in Fairbanks were: Lizard, Regiment and Bloomsdale Longstanding. Oceanside, Seaside and Lizard all performed very well in the taste tests (n=4), with noticeably sweet and nutty flavors, however, few of these were the best cultivars for bolt-resistance. More information about how varieties

differed based on planting date can be obtained by contacting the authors.

Winter Squash

Thirteen varieties of winter squash were grown in 2021 to screen different squash species (i.e. *Cucurbita maxima, C. peop* and *C. moschata*) and types (i.e. Hubbard, Kabocha, Spaghetti, Delicata etc.) for success at reaching maturity. Like sweet corn, winter squash is a crop that is benefiting from a longer growing season.

Germination rates were generally uniform for winter squash planted in the greenhouse, except for the Yuxi Jiang Bing Gua winter squash variety, which had very poor germination for the second year in a row. Squash plants were transfer to a high tunnel to harden off, and transplanted in the field after the chance of freezing temperatures had passed. Winter squash are transplanted into IRT plastic much, with three feet between plants, and with 12-foot spacing between rows. Aisles between rows are covered with a black geotextile fabric to keep squash plants off the ground (to reduce loss to rot) and to further help warm the soil.

Winter squash generally did very well in 2021. In descending order the top yielding varieties were: Harvest Moon (a hubbard hybrid); Red Kuri (red mini-hubbard), Sunshine (orange kabocha), Wintersweet (green kabocha); Gete-Okosomin (Native American heirloom), Bonbon (buttercup), Lakota (Native American heirloom), Honey Boat (delicata), Uncle David's Dakota Desert (buttercup heirloom), and Hasta la Pasta (spaghetti). The cultivars that did the poorest were the two butternut varieties that were tested (Butterscotch PMR and Waltham) and the Chinese heirloom variety, Yuxi Jiang Bing Gua.

The Waltham Butternut produced healthy plants, however there were few mature squash by the end of the growing season and those that were harvested to continue to mature indoors experienced about a 40% loss rate once indoors. Honey Boat and Gete-Okosamin received the highest ratings for taste and texture, with the varieties Harvest Moon, Red Kuri and Waltham Butternut also doing very well in taste tests (n=6).

Sunshine winter squash curing

Bon Bon winter squash

Weighing and Recording data from Gete-Okosomin squash

Glenna Gannon harvests Lakota winter squash

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Retail Sources of Plants/Seeds
Baker Creek Heirloom Seeds, www.rareseeds.com
Bejo Seed Co., www.bejoseeds.com
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Note: Companies, product or equipment trade names and seed sources are listed to clearly communicate what was used in the trials. It does not serve as an endorsement.

To learn more about variety trials in Alaska:

To see results from past trials, and take a survey which will help us decide what crops we should try in the future, please visit: https://www.uaf.edu/afes/research/variety-trials/

www.uaf.edu/ces or 1-877-520-5211

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