

## Niche Market Dry Bean Variety Trial

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Dry beans are generally considered a large-scale bulk commodity crop yet they are also well suited to small-scale production for niche markets. Dry beans are harvested in the fall, are easily stored over the winter, and can be a good addition for direct market farmers who need additional crops at the beginning and end of the growing season. A primary criterion for variety suitability in the maritime Pacific Northwest is early maturity. Cool summer temperatures in the region result in a low number of growing degree days (1900 GDD in Vancouver) and most varieties are harvested 15 or more days later than in the mid-west. A primary objective for evaluating dry beans in Vancouver was to determine which varieties are suitable for production in western Washington.

### Materials and Methods

The field was prepared in May and dry beans were planted on June 6. The experiment had a randomized complete block design with four replications and included 53 varieties from four commercial seed companies and USDA-ARS (Table 1). Only 33 of the varieties were planted in 4 replications, while 20 varieties were planted in only 1 plot due to limited seed. Plots were 2 rows wide and 10 feet long, spacing between rows was 2 feet, and spacing in the row was 2 inches.

The field was certified organic and was maintained accordingly. Plots were mechanically cultivated once a week to control weeds between rows and hand weeded to control in-row weeds as needed from July through August. Feather meal fertilizer (12-0-0) was applied in a side-dress application on July 5 at a rate of 375 lb/A (45 lb N/A). Overhead irrigation was applied weekly as needed and total water applied plus rainfall was 10 inches throughout the growing season.

Plant stand was measured in 10 feet of row, and plant height (cm) was measured for 10 randomly selected plants in each plot, from the base of the plant (soil surface) to the top node. A few runner varieties were included in this trial, however they were not staked or trellised. Plants were harvested from the center 5 feet of both rows in each plot for a total harvest area of 10 feet per plot. For varieties in single-row plots, plants were harvested from the center 5 feet of row. Whole plants were harvested, placed in burlap bags, and dried in field ovens for 16 hours at 68° C, until seed moisture was approximately 12%. Beans were threshed and cleaned by hand and total marketable bean weight (g) was measured. 100 beans were randomly selected and weighed from each plot, and length and width (cm) of 25 beans were measured.

### Results and Discussion

Data is presented for varieties that were included in single row plots but will not be discussed as plots were unreplicated (Table 3). These varieties were included for observation, and seed was saved from these plots and will be planted in replicated plots in 2002.

Beans emerged June 17-21, 11-15 days after planting (DAP) (Table 2). Plant stand was measured on July 12 and varied significantly among varieties. Mean plant stand was 45 plants per 10 feet of row and ranged from 19 (Norstar) to 67 (UI-911). Mean plant height on August 24 was 27 cm (10.6 in), and plant height at harvest was 25 cm (9.8 in) as the weight of mature pods caused plants to bend slightly.

Flowering began on July 15 (39 DAP), and all varieties had reached the 50% flowering stage by August 9 (64 DAP). Harvest began on September 24 (110 DAP), and continued until October 11 (127 DAP) when rains prevented further harvesting. Varieties that did not mature in this trial were Candy, Celina's Romano, and California Blackeye 46 (*Vigna unguiculata*). Mean yield for 10 feet of row was 446 g (0.98 lb), and yield differed significantly among varieties. In this trial, *pinks* (588 g, 1.3 lb) and *cranberry* (490 g, 1.1 lb) were the highest

yielding types of beans. Varieties that yielded greater than 600 g per 10 feet of row were G18689 (681g, 1.5 lb), NW-63 (655 g, 1.4 g), and Etna (640 g, 1.4 lb). The three climbing-types of beans, Scarlet Emperor (156 g, 0.34 lb), Painted Lady (167 g, 0.37 lb), and Kentucky Wonder (197 g, 0.43 lb) were very low yielding as can be expected as they were not trellised.

Mean weight of 100 beans was 47 g and differed significantly among varieties. Painted Lady (105 g) and Scarlet Emperor (89 g) were twice as large as most other varieties. Varieties with 100-bean weight greater than 60 g were Etna (69.7 g), Trout/Jacob's Cattle (66.5 g), Old Fashioned Soldier (66.2 g), Cardinal (63.8 g), and CELRK (63.0 g). Length and width of 25 beans and the length of 10 pods were measured in order to further characterize bean size. We have developed a web page, <http://sustainableseedsystems.wsu.edu/nicheMarket/beanVarieties.pdf>, which includes this information for niche market bean varieties to facilitate variety selection by farmers. The page includes a brief description of each variety based on our data and a color photograph as the color and pattern of the beans play a large role in variety selection for niche markets.

**Table 1.** Fifty-three bean varieties, and their sources, planted at WSU Vancouver REU in 2001.

<b>No.</b>	<b>Variety</b>	<b>Seed Company</b>	<b>No.</b>	<b>Variety</b>	<b>Seed Company</b>
1	Vermont Cranberry	Johnny's Selected Seeds	28	USWA-27	Phil Miklas
2	Tongue of Fire	Johnny's Selected Seeds	29	G18689	Phil Miklas
3	Adrew Kent	Johnny's Selected Seeds	30	Norstar	Phil Miklas
4	Old Fashioned Soldier	Johnny's Selected Seeds	31	Arthur	Phil Miklas
5	Trout/Jacobs Cattle	Johnny's Selected Seeds	32	Montezuma Red	Nichol's
6	Maine Yellow Eye	Johnny's Selected Seeds	33	French Flageolet	Nichol's
7	Midnight Black Turtle	Johnny's Selected Seeds	34	Norwegian	Salt Spring Seeds
8	Black Coco	Johnny's Selected Seeds	35	Hutterite	Salt Spring Seeds
9	Etna	Territorial Seed Company	36	Molasses Face	Salt Spring Seeds
10	Cannellini	Territorial Seed Company	37	Childer's Golden	Salt Spring Seeds
11	Black Coco	Territorial Seed Company	38	Beka	Salt Spring Seeds
12	Speckled Bays	Territorial Seed Company	39	Magpie	Salt Spring Seeds
13	Montcalm	Territorial Seed Company	40	Stevenson Blue Eye	Salt Spring Seeds
14	Kentucky Wonder	Territorial Seed Company	41	Pinks	Salt Spring Seeds
15	California Blackeye 46	Territorial Seed Company	42	Lake Kivu	Salt Spring Seeds
16	Scarlet Emperor	Territorial Seed Company	43	Maefax	Salt Spring Seeds
17	Painted Lady	Territorial Seed Company	44	Dwane Baptiste's	Salt Spring Seeds
18	ICB-10-5-14	Phil Miklas <sup>1</sup>	45	ZERT	Salt Spring Seeds
19	UI-911	Phil Miklas	46	Tongue of Fire (Salt Lake)	Salt Spring Seeds
20	PR95-055-2-1-16	Phil Miklas	47	Candy	Salt Spring Seeds
21	UI-537	Phil Miklas	48	Celina's Romano	Salt Spring Seeds
22	NW-63	Phil Miklas	49	Ireland creek	Salt Spring Seeds
23	LeBaron	Phil Miklas	50	Kintoki	Salt Spring Seeds
24	Cardinal	Phil Miklas	51	Mrocumiere	Salt Spring Seeds
25	Thort	Phil Miklas	52	Serene	Salt Spring Seeds
26	CELRK	Phil Miklas	53	Mansell Magic	Salt Spring Seeds
27	Kardinal	Phil Miklas			

<sup>1</sup> Phil Miklas is the United States Department of Agriculture-Agriculture Research Service (USDA-ARS) legume breeder in Prosser, Washington.

**Table 2.** Days after planting (DAP) to emergence, flowering, and harvest; plant height (cm); plant stand and yield (g) for 10-feet of row; length and width (cm) of 25 beans; and pod length (cm) of 33 varieties at WSU Vancouver REU in 2001.

Type	Emerge	Plant	Plt Ht	Plt Ht	1st Flw	50% Flw	Harv	No Plts	T Bean	Wt 100	Lth 25	Wth 25	Pod
Variety	DAP	Stand	Aug.	Harv	DAP	DAP	DAP	Harv	Wt	Beans	Beans	Beans	Lth
<b>Dark Red Kidney</b>													
Montcalm	11	64	27.9	25.1	43.7	46.5	112.2	46.7	431.2	51.89	39.3	19.2	11.65
<b>Light Red Kidney</b>													
CELRK	13	36	26.4	23.4	40.7	42.5	110	38.7	437.9	63.03	42.3	20.8	12.8
<b>Cardinal</b>													
<b>White Kidney</b>													
Cannellini	11	45	34.3	29	45.7	47	116.5	42	479.9	57	42.2	21.8	13.15
<b>Small White/Navy</b>													
Norstar	13	36	26.8	23.4	40.3	42.5	115	28.5	320.4	59.26	38.5	20.1	13.45
<b>Arthur</b>													
<b>Small Red/ Red Mexican</b>													
LeBaron	12	19	24.5	22.2	49.3	52.7	111.7	40.5	465.6	17.79	21.1	14.4	8.45
Arthur	11	44	36.1	42.7	46.3	50.7	112.2	48.7	481.5	14.71	20.9	14	9.25
<b>LeBaron</b>													
LeBaron	11	56	22.8	18.8	42.7	48.5	110	35.2	344.4	34.68	28.2	18.7	9.5
<b>Montezuma Red</b>													
Montezuma Red	15	44	25.8	21.3	45	47	111	20	401	36.28	26.5	16.7	9.5
<b>NW-63</b>													
NW-63	13	50	23.6	21.5	40.7	45	116.2	42.2	655	34.64	28.4	19.2	9.9
<b>Pink</b>													
UI-537	13	41	21.5	23.1	47.7	49.7	115.2	35.7	592.9	36.42	28.1	18.3	9.35
<b>PR95-055-2-1-16</b>													
PR95-055-2-1-16	13	54	24.4	17.3	49.3	52.5	112	38.7	581.9	36.83	31.3	19.2	9.95
<b>Black</b>													
UI-911	12	67	31.1	24.4	43.7	45.5	118	52.5	487.1	20.1	22	14.9	9.9
<b>Midnight Black Turtle</b>													
Midnight Black Turtle	11	46	36.7	30.8	54	56.7	118.2	36	517.4	17.91	22.3	14.7	10.13
<b>Black Coco (Johnny's)</b>													
Black Coco (Johnny's)	11	40	26.2	22.6	42	43	118	33.5	317.1	53.58	30.3	21.7	11.6
<b>Black Coco (Territorial)</b>													
Black Coco (Territorial)	11	54	27.6	23.1	43	45.2	115.5	55	516.4	55.15	30.9	21.9	10.8
<b>ICB-10-5-14</b>													
ICB-10-5-14	11	52	25.2	25.7	52	55	118	50.5	406.7	21.47	23.7	16.1	8.9
<b>Cranberry</b>													
Vermont Cranberry	11	41	21.5	19.5	42.3	48	111.7	42.2	457.1	48.82	30.6	19	13.35
<b>Etna</b>													
Etna	10	63	27.5	24.6	42	44.7	113.5	43.2	639.5	69.67	35	22.3	14.1
<b>Thort</b>													
Thort	11	50	28.5	24.4	43.3	46.7	114	40	452.2	55.33	33	22.6	13.4
<b>Speckled Bays</b>													
Speckled Bays	12	35	23.8	19.5	45	46.7	116.2	29.5	357.1	49.48	28.3	20.1	10.4
<b>Andrew Kent</b>													
Andrew Kent	10	54	30.7	26.3	43	45.5	119.7	37	572.6	58.26	31.3	27.4	13
<b>Tongue of Fire</b>													
Tongue of Fire	10	44	24.9	22.1	42.3	43.5	116.3	45	502.9	58.83	32.6	22.9	11.08
<b>Cardinal</b>													
Cardinal	11	48	26.1	22.9	43	45.5	118.7	39.5	452.8	63.76	34	22.7	12.9
<b>Yellow Eye/ Partially Colored</b>													
Maine Yellow Eye	11	46	26.2	24.2	42.3	44	113.5	38.7	285.5	43.49	28	19.6	10.2
<b>Old Fashioned Soldier</b>													
Old Fashioned Soldier	11	56	28.9	24.4	42.7	46	113.5	45	575.9	66.16	40.2	20	13.95
<b>Trout/Jacobs Cattle</b>													
Trout/Jacobs Cattle	10	43	28.5	22.3	40.7	43.2	113.7	43.5	394.3	66.54	40.1	19.9	15.45
<b>USWA-27</b>													
USWA-27	12	41	26.6	29.4	51	56.7	117	37.2	435.2	32.46	28.2	18.1	9.45
<b>Other</b>													
G18689	12	33	26.7	19.6	55	58	115.2	38	681.3	23.58	24.6	15.8	10.5
<b>Scarlet Emperor</b>													
Scarlet Emperor	12	32	25.9	28.4	40	44.5	127	31.7	155.9	88.49	47.4	26.4	16.45
<b>Painted Lady</b>													
Painted Lady	11	48	32.8	26.5	39	42.7	127	33	167.4	104.48	49.5	29.3	15.3
<b>French Flageolet</b>													
French Flageolet		40	25.4	24.5	50.5	54	114.5	28	518.1	25.39	31	15	12.7
<b>Pole</b>													
California Blackeye 46	13	23	17.9	35.6	67	-	-	-	-	-	-	-	14.75
<b>Kentucky Wonder</b>													
Kentucky Wonder	12	43	30.8	22.7	61	64	127	30	197	38.85	34.9	18	15
<b>Mean</b>													
Mean	12	45	27	25	46	48	116	39	446	47	32	20	12
<b>P Value</b>													
P Value	0.0008	0.0001	0.026	0.0001	0.0001	0.0001	0.0001	0.1507	0.0001	0.0001	0.0001	0.0091	N/A

**Table 3.** Days after planting (DAP) to emergence, flowering, and harvest; plant height (cm); plant stand and yield (g) for 10-feet of row; length and width (cm) of 25 beans; and length (cm) of 10 pods of 20 varieties grown in single plots at WSU Vancouver REU in 2001.

<b>Type</b>	<b>Emerg</b>	<b>Plt</b>	<b>Plt Ht</b>	<b>Plt Ht</b>	<b>1st Flw</b>	<b>50% Flw</b>	<b>Harv</b>	<b>No Plts</b>	<b>T Bean</b>	<b>Wt 100</b>	<b>Lth 25</b>	<b>Wth 25</b>	<b>Pod</b>
<b>Variety</b>	<b>DAP</b>	<b>Stand</b>	<b>Aug</b>	<b>Harv</b>	<b>DAP</b>	<b>DAP</b>	<b>DAP</b>	<b>Hrv</b>	<b>Wt</b>	<b>Beans</b>	<b>Beans</b>	<b>Beans</b>	<b>Lth</b>
<i>Light Red Kidney</i>													
<i>Kintoki</i>	11	25	27	29.8	39	41	111	19	273.92	63.93	27.5	17.5	10.75
<i>White Kidney</i>													
<i>Dwane Baptiste's</i>	13	30	33	26.7	42	43	118	32	435.98	59.73	37	19	12.55
<i>Pink</i>													
<i>Pinks</i>	13	31	26	15.4	46	48	117	37	610.97	31.81	26.5	18.5	11.85
<i>Cranberry</i>													
<i>Candy</i>	11	18	27.4	24.4	43	48	-	-	-	-	-	-	14.6
<i>Celina's Romano</i>	12	33	31.6	23.5	50	54	-	-	-	-	-	-	12.25
<i>Tongue of Fire (Salt Spring)</i>	11	33	25.6	24.5	42	43	111	32	133	60.47	32.2	19.8	12.5
<i>Brown or Yellow</i>													
<i>Beka</i>	11	47	17.8	18.1	43	43	118	37	362.31	42.15	27	19.4	15.55
<i>Childer's Golden</i>	11	58	22	20.9	43	46	111	60	495.14	25.4	21.4	17	10.05
<i>Hutterite</i>	13	54	22.8	20	45	46	111	48	607.89	47.19	28.2	19	10.8
<i>Ireland Creek</i>	11	56	29	29.6	42	43	118	59	310.55	55.64	35.3	19.3	12.8
<i>Lake Kivu</i>	13	47	22.4	13.2	39	43	111	43	293.16	48.06	26.5	20	10.65
<i>Maefax</i>	12	50	22	18.4	39	42	111	46	390.81	43.14	24	20	10.05
<i>Norwegian</i>	11	47	22.8	21.6	40	43	111	45	355.34	35.96	33.5	16	11.75
<i>ZERT</i>	12	32	21.8	N/A	42	43	111	18	164.97	51.92	25	21	11.65
<i>Yellow Eye/ Partially Colored</i>													
<i>Magpie</i>	13	47	26.8	29.2	42	49	118	20	248.06	39.26	36.1	14.4	10.1
<i>Molasses Face</i>	13	40	25.6	22.5	46	50	111	38	456.42	50.22	29	20	9.4
<i>Stevenson Blue Eye</i>	13	55	62.4	22.7	50	54	118	54	469.6	49.73	27.6	20.7	9.5
<i>Other</i>													
<i>Mansell Magic</i>	10	41	29.4	20.3	37	40	111	37	262.46	60.14	33.8	24	12.1
<i>Mrocumiere</i>	12	12	24.8	23	42	43	118	15	388.24	54.68	39.3	18.2	5
<i>Serene</i>	13	25	24.2	12.2	44	46	111	31	181.49	27.27	36	23	11.4