

Greenbank Farm Organic Seed Project: 2015 Western Washington Trial Report

Conducted in partnership with Organic Seed Alliance



Table of Contents

Introduction.....	3
Resources.....	3
Dry Pole Bean Trial.....	4
Dwarf and Determinate Tomato Trial.....	6
Yellow Snap Bean Trial.....	8
Snap Pea Trial.....	10
Popcorn Trial.....	12
Chicory and Radicchio Trial.....	14

Introduction

On-farm trials are a valuable tool for farmers to learn first-hand how varieties grown under their specific environment and growing practices perform. A great deal of information can also be gained from sharing results with other farmers. In 2015, Greenbank Farm's *Organic Seed Project*, in partnership with Organic Seed Alliance (OSA), offered organic farmers in Western Washington the opportunity to conduct on-farm variety trials with the technical advising support from both Greenbank Farm and OSA. Participating farmers selected the crop and varieties of their choice to conduct a trial. They identified the trial goals, managed the trial, conducted all trial evaluations, and prepared written trial reports. Farmers received a financial stipend to support their time and costs of conducting the trial, and were asked to share their results so performance data could be made available to other farmers in the region. They were encouraged to include some organic and open-pollinated varieties in their trials to foster organic seed use and on-farm seed saving. OSA compiled individual farmer reports and conducted statistical analysis of replicated trials. This report includes the results of six on-farm variety trials conducted on four participating farms in Western Washington in 2015.

Participating farms, trial crops, and locations

Farm Name	Farmer	Crop	Location (WA)
Backyard Beans and Grains	Krista Rome	Dry Pole Beans and Determinate and Dwarf Tomatoes	Everson
Ken Wood Farm	Ken Wood	Popcorn	Orcas Island
Fork to Fork Edible Gardens	Jim Moravec	Bush Yellow Snap Beans and Snap Peas	Bremerton
Harmony Fields	Jessica Gigot	Chicory and Radicchio	Bow

The *Organic Seed Project* is an initiative of Greenbank Farm and sponsored by the Washington State Department of Agriculture's Specialty Crop Block Grant Program and Sustainable Path Foundation. The project encompasses several activities in addition to on-farm variety trials that collectively aim to foster organic seed systems in the region. Other project activities include a seed equipment rental program, an online seed grower discussion forum, online seed information resources, a series of seed-related workshops, and variety trials and educational programs offered at Greenbank Farm's Organic Farm School.

Resources

For more information about Greenbank Farm and the *Organic Seed Project* please visit www.greenbank-farm.biz/seed-project.

For more information about Organic Seed Alliance please visit www.seedalliance.org.

To learn how to conduct your own on-farm variety trials, download Organic Seed Alliance's publication *On-farm Variety Trials: A Guide for Organic Vegetable, Herb, and Flower Producers* at www.seedalliance.org/Publications.

Dry Pole Bean Trial

Farmer	Krista Rome
Farm	Backyard Beans and Grains
Location	Everson, Washington
Year	2014-2015

Trial Goals

Krista Rome has experienced challenges in sourcing pole bean varieties well suited for production in Western Washington. Her seed business, Backyard Beans and Grains, attracts many urban and smaller-space gardeners enthusiastic about growing winter storage food and who demand pole type varieties. Rome was contacted by Betsy Schoolmaster, the wife of a recently deceased member of Seed Savers Exchange in the winter of 2013. Schoolmaster's late husband had focused on preservation of bean varieties and she wanted to distribute her late husband's collection to fellow seed savers. Rome took the opportunity to evaluate Schoolmaster's collection along with additional varieties. Varieties were screened for early maturity, flavor, and yield.

Methods

In 2014, 19 dry pole common bean varieties (*Phaseolus vulgaris*) and three early-maturing pole lima beans (*Phaseolus lunatus*) were evaluated. In 2015, six varieties were selected and trialed a second year.

Seed of some varieties that had been in extended storage were started in plug trays to ensure adequate germination and transplanted into the field on May 16, 2014. Seed of newer seed sources were direct-sown on May 18, 2014 (see Table 1). In 2015, all entries were direct sown on May 6th. The trial was planted in a fertile silt loam soil, plants were trellised on eight-foot tall posts with a top and bottom horizontal wire and jute twine crossed in a "V" formation up and down between wires. Irrigation was provided by drip until maturity. Plots were regularly

weeded. Harvested seed were threshed by hand in 2014 and using a wood chipper which had been converted into a bean thresher in 2015.

Harvest dates and yields were recorded in both 2014 and 2015. Nineteen people rated the 13 earliest maturing *P. vulgaris* varieties for flavor in the autumn of 2014. The lima beans were not included in the taste test because yields were too low.

Results

The date of first harvest ranged from August 18th to September 30th in 2014 (Table 1). The earliest maturing varieties included 'Papa de Rollo', 'Tarheel', 'Tamila', 'Winterfare', and 'Annie Jackson'. Late maturing varieties included 'Joyce Fetterly's', 'Musica', 'Kirsche Bohne', 'Petaluna Gold Rush', and all three lima beans. 'Ohio' did not mature at all before it molded in the October rains. The first harvest date ranged from August 28th to September 4th in 2015 (Table 1).

Flavor rankings are in order as follows, with the highest (best) ranked variety listed first: 'Khabarovsk', 'Annie Jackson', 'Tarheel', 'Goose', 'Tamila', 'Pellegrini', 'Winterfare', 'Herrenbohnli', 'Chester', 'Diecimino', 'Turkey Crow', 'Poletska', and 'Papa de Rollo' (Table 1).

Yields ranged from 1.3 to 6.2 pounds per ten row feet in 2014. Yields ranged from 3.3 to 5.6 pounds per ten row feet in 2015 (Table 1). Over the past several years, check varieties ('Ely', 'Saxon', 'Cherokee Trail of Tears', and 'Painted Lady') averaged between 4 and 6 pounds per ten row feet.

Variety	Species	Source	2015			2014			
			Yield (lbs/10 row feet)	First Harvest	Last Harvest	Yield (lbs/10 row feet)	First Harvest	Last Harvest	Taste Rank (1=best, 13=worst)
Annie Jackson	<i>Phaseolus vulgaris</i>	Salt Spring Seeds	5.6	8/28/2015			9/4/2014	9/20/2014	2
Khabarovsk	<i>Phaseolus vulgaris</i>	Adaptive Seeds	4.4	8/28/2015	9/4/2015		9/10/2014	9/17/2014	1
Diecimino	<i>Phaseolus vulgaris</i>	Adaptive	4.0	8/28/2015	9/4/2015		9/10/2014	9/17/2014	10
Tamila*	<i>Phaseolus vulgaris</i>	Schoolmaster	3.8	8/28/2015			9/4/2014		5
Turkey Crow*	<i>Phaseolus vulgaris</i>	Schoolmaster	3.3	9/4/2015	9/25/2015		9/10/2014	9/20/2014	11
Pellegrini*	<i>Phaseolus vulgaris</i>	HerbFarm	3.3	9/4/2015	9/25/2015		9/12/2014	9/20/2014	6
Falsetti*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/20/2014	9/30/2014	
Winterfare*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/4/2014		7
Herrenbohli*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/10/2014	9/20/2014	8
Kirsche Bohne*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/30/2014		
Poletschka	<i>Phaseolus vulgaris</i>	Adaptive Seeds					9/10/2014	9/17/2014	12
Joyce Fetterly's*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/30/2014		
Goose*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/10/2014	9/20/2014	4
Tarheel*	<i>Phaseolus vulgaris</i>	Seed Swap					8/28/2014		3
Chester*	<i>Phaseolus vulgaris</i>	Schoolmaster					9/10/2014	9/20/2014	9
Musica*	<i>Phaseolus vulgaris</i>	Seed swap					9/30/2014		
Petaluna Gold Rush*	<i>Phaseolus vulgaris</i>	Seed Swap					9/30/2014		
Ohio*	<i>Phaseolus vulgaris</i>	Schoolmaster							
Papa de Rollo (BL)	<i>Phaseolus vulgaris</i>	Uprising Seeds						9/4/2014	13
Bandy*	<i>Phaseolus lunatus</i>	Schoolmaster					9/20/2014	9/30/2014	
Lynch Butterbean*	<i>Phaseolus lunatus</i>	Schoolmaster					9/20/2014	9/30/2014	
PA Dutch Lima*	<i>Phaseolus lunatus</i>	Schoolmaster					9/20/2014	9/30/2014	
Average			4.0	8/30/2015	9/14/2015		9/14/2014	9/21/2014	7
High			5.6	9/4/2015	9/25/2015		9/30/2014	9/30/2014	13
Low			3.3	8/28/2015	9/4/2015		8/28/2014	9/4/2014	1

*Varieties transplanted in 2014

Table 1. Dry pole bean trial results.

Dwarf and Determinate Tomato Trial

Farmer	Krista Rome
Farm	Backyard Beans and Grains
Location	Everson, Washington
Year	2015

Trial Goals

Identify determinate salad, sauce, and slicer type tomatoes suitable for outdoor production west of the Cascades that don't require staking, pruning, or trellising. Varieties were screened for early maturity, length of harvest, disease resistance, and flavor.

Methods

A total of 27 varieties were evaluated including: nine dwarf types from gardener Craig LeHoullier (NCTomatoMan), 16 open-pollinated determinate varieties and two hybrid determinate varieties ('Iron Lady' and 'Defiant'). Three plants were transplanted in mid-May. Dwarf varieties were planted one foot apart as recommended, and determinate varieties were planted two feet apart. The trial field was flat with fertile silt loam soil. The field was prepared with a disc, amended with aged manure, and tilled. Irrigation was regularly provided by drip tape until September. Plots were regularly weeded until tomato plants sprawled too much to easily weed. Plants were not staked, pruned, or trellised.

Observations on maturity date and general plant health were taken throughout the season. Flavor was rated on a one to nine scale with one being the worst and nine being the best.

Results

The date of first harvest ranged from July 21st to August 18th in 2015 (Table 2). The harvest window ranged from 13 to 62 days. The two earliest dwarf varieties, 'Sean's Yellow' and 'Sleeping Lady', had the longest harvest window. One variety, 'Jade Beauty', did not mature during the growing season. Flavor ratings ranged from one to eight. The dwarf varieties were by far the tastiest, with 'Sleeping

Lady', 'Arctic Rose', 'Sweet Sue', 'Tasmanian Chocolate', 'Perth Pride', and 'Iditarod Red' all scoring seven or above.

General observations of plant health indicated that 'Geranium Kiss', 'Legend', 'Moskvich', 'Roma VF', 'Everson Blocky', 'Iron Lady', and 'Defiant' were the healthiest in mid-August, prior to the first rains. 'Geranium Kiss' was the healthiest variety late into the season even after summer rains and had the latest harvest of marketable fruits. In general, the dwarf varieties appeared more disease-resistant than all of the determinates, with 'Sean's Yellow' and 'Sleeping Lady' staying healthy latest into the season in that category.

Rome plans to use a weed barrier in future trials, as the sprawling nature of determinate and dwarf varieties made weeding difficult. Additionally, a single stake is suggested to assist in keeping plants off the ground.

Variety	Type	Source	First Harvest	Last Harvest	Harvest Window (# Days)	Flavor (1=bad, 9=good)
Sean's Yellow	Dwarf	Lehoullier	7/21/15	9/21/15	62	6
Sleeping Lady	Dwarf	Lehoullier	7/21/15	9/21/15	62	8
Sweet Sue	Dwarf	Lehoullier	7/28/15	9/21/15	55	7
Tasmanian Ch	Dwarf	Lehoullier	7/28/15	9/21/15	55	7
Yukon Quest	Dwarf	Lehoullier	7/28/15	9/21/15	55	6
Arctic Rose	Dwarf	Lehoullier	8/18/15	9/21/15	34	8
Iditarod Red	Dwarf	Lehoullier	8/18/15	9/21/15	34	7
Perth Pride	Dwarf	Lehoullier	8/18/15	9/21/15	34	7
Jade Beauty	Dwarf	Lehoullier	N/A			
Northern RP	Roma	Uprising Organic Seeds	8/15/15	9/15/15	31	1
Roma VF	Roma	High Mowing Organic Seeds	8/18/15	9/18/15	31	3
Everson Blocky	Roma, Dry	Local	7/28/15	9/15/15	49	2
Fiaschetto	Roma, Juicy	Adaptive Seeds	7/28/15	9/1/15	35	4
Alpha	Salad	Salt Spring	7/21/15	8/3/15	13	4
Amber	Salad	Adaptive Seeds	7/21/15	8/15/15	25	5
Aurora	Salad	Adaptive Seeds	7/21/15	8/21/15	31	5
Glacier	Salad	Baker Creek	7/21/15	9/1/15	40	8
Latah	Salad	Uprising Organic Seeds	7/21/15	8/15/15	25	7
Sub-Arctic Plenty	Salad	Baker Creek	7/28/15	9/1/15	34	5
Geranium Kiss	Salad	Nichols	8/18/15	10/1/15	43	7
Bison	Slicer	Baker Creek	7/21/15	8/21/15	31	5
Moskvich	Slicer	High Mowing Organic Seeds	7/21/15	9/21	31	7
Siletz	Slicer	Nichols	7/21/15	9/1/15	40	6
Starfire	Slicer	Adaptive Seeds	7/21/15	9/1/15	40	5
Defiant (F1)	Slicer	Johnny's Selected Seeds	7/28/15	9/21/15	55	5
Iron Lady (F1)	Slicer	High Mowing Organic Seeds	7/28/15	9/21/15	55	6
Legend	Slicer	Nichols	8/18/15	9/21/15	34	4
Average			7/30/15	9/9/15	40	5
High			8/18/15	10/1/15	62	8
Low			7/21/15	8/3/15	13	1

Table 2. Dwarf and determinate outdoor tomato trial results.

Yellow Snap Bean Trial

Farmer	Jim Moravec
Farm	Fork to Fork Edible Gardens
Location	Bremerton, Washington
Year	2015

Trial Goals

Identify varieties for the Pacific Northwest that continue to perform well into the autumn with good flavor and storability.

Methods

Five snap bean varieties were evaluated in a trial with two replications. Thirty-six seeds per plot were planted with the goal of establishing 30 to 36 plants per plot. Beans were planted in four-foot wide beds with two rows per bed on two-foot centers. The targeted planting date was from July 2nd to 15th in 2015. Plots were weeded every two weeks. The trial field was in full sun with sandy loam soil. Each plot was rated on a scale of one to nine for flavor, texture, storability, germination, and harvest window.

Analysis of variance tests were conducted to determine if there were significant differences between varieties for a given trait. This allowed us to be 95% confident that the differences among varieties for a given trait were real differences rather than

being due to chance. Pairwise comparison tests were conducted using Tukey's method to determine which varieties were significantly different from each other. In the table of results, means with the same letter superscript are not considered significantly different. At the bottom of the table there are two important numbers, the coefficient of variation (CV) and Tukey's honest significant difference (HSD). The CV is a measure of how variable the data were. Traits with lower CVs were less variable (more consistent) across the plots than those with high CVs (more variable, less consistent). HSD is the smallest amount by which two values can be separated and still be considered significantly different.

Results

There were no significant differences between flavor, texture, storability, or harvest window (Table 3). 'Pencil Pod' and 'Golden Rocky' were rated significantly higher for germination in the field (Table 3).

Variety (OG=organic seed)	Source	Flavor (1=bad, 9=good)		Texture (1=bad, 9=good)		Stora- bility (1=bad, 9=good)		Germi- nation (1=bad, 9=good)		Harvest window (1=bad, 9=good)	
Carson	Territorial	6.0	a	7.5	a	5.5	a	1.0	b	5.0	a
Eureka	West Coast Seeds	6.5	a	7.0	a	7.3	a	1.0	b	6.0	a
Golden Rocky OG	Fedco	7.0	a	6.0	a	6.3	a	6.5	a	5.0	a
Indy Gold OG	Fedco	7.0	a	7.5	a	7.0	a	2.0	b	6.5	a
Pencil Pod	Pinetree	7.0	a	6.5	a	6.8	a	7.0	a	5.5	a
Average		6.7		6.9		6.6		3.5		5.6	
High		7.0		7.5		7.3		7.0		6.5	
Low		6.0		6.0		5.5		1.0		5.0	
CV		9.4		11.7		11.7		18.1		10.6	
HSD		2.8		3.6		3.4		2.8		2.6	

Table 3. Yellow bush bean trial results. Letters after trait value indicate groups of varieties whose means are not significantly different.

Snap Pea Trial

Farmer	Jim Moravec
Farm	Fork to Fork Edible Gardens
Location	Bremerton, Washington
Year	2015

Trial Goals

Identify a good quality snap pea that will grow well into the autumn in the Pacific Northwest. Evaluation included harvest window, texture, flavor, storability, and germination.

Methods

Five snap pea varieties were evaluated in two replications. Thirty-six seeds per plot were planted with the goal of a final stand of 30 to 36 plants per plot. Peas were planted in four-foot wide beds with two rows per bed on three-foot centers. The targeted planting date was from June 25th to July 4th in 2015. Plots were weeded every two weeks. The field was in full sun with sandy loam soil. Each plot was rated on a scale of one to nine for flavor, texture, storability, germination, and harvest window.

Analysis of variance tests were conducted to determine if there were significant differences between varieties for a given trait. This allowed us to be 95% confident that the differences among varieties for a given trait were real differences rather than being due to chance. Pairwise comparison tests were conducted using Tukey's method

to determine which varieties were significantly different from each other. In the table of results, means with the same letter superscript are not considered significantly different. At the bottom of the table there are two important numbers, the coefficient of variation (CV) and Tukey's honest significant difference (HSD). The CV is a measure of how variable the data were. Traits with lower CVs were less variable (more consistent) across the plots than those with high CVs (more variable, less consistent). HSD is the smallest amount by which two values can be separated and still be considered significantly different.

Results

'Cascadia' and 'Sugar Ann' showed a significantly better harvest window than all other varieties in the trial (Table 4). 'Cascadia', 'Sugar Lace', and 'Sugar Ann' had significantly better texture than the other two varieties (Table 4). 'Sugar Daddy' had the worst germination in the field and was rated as a one, significantly worse than 'Sugar Ann' and 'Sugar Lace' (Table 4). There were no significant differences between varieties for flavor or storability (Table 4).

Variety (OG = organic seed)	Source	Harvest Window (1=bad, 9=good)		Texture (1=bad, 9=good)		Flavor (1=bad, 9=good)		Stora- bility (1=bad, 9=good)		Germi- nation in Field (1=bad, 9=good)	
Cascadia OG	Fedco	8	a	8	a	6	a	7.75	a	3	abc
Sugar Ann OG	Fedco	9	a	6	ab	6.5	a	6.5	a	6	ab
Sugar Daddy OG	Renee's	1	b	4	b	6	a	5.75	a	1	c
Sugar Lace	Ed Hume	2	b	9	a	7	a	7	a	6.5	a
Sugar Sprint	Ed Hume	3	b	6	ab	7.5	a	6	a	2	bc
Average		4.6		6.6		6.6		6.6		3.7	
High		9.0		9.0		7.5		7.8		6.5	
Low		1.0		4.0		6.0		5.8		1.0	
CV		16.8		11.7		14		15.6		27	
HSD		3.4		3.4		4.1		4.6		4.4	

Table 4. Snap pea trial results. Letters after trait value indicate groups of varieties whose means are not significantly different.

Popcorn Trial

Farmer	Ken Wood
Farm	Ken Wood Farms
Location	Orcas Island, Washington
Year	2015

Trial Goals

Identify popcorn varieties suitable for production in the Salish Sea region.

Methods

Five varieties of popcorn were grown in a trial with three replications. Each replication was harvested separately on October 6th, October 24th, and November 9th in 2015. Varieties were evaluated for seedling vigor, plant vigor, early ripening, yield, popping quality, and flavor. Popping quality was compared

to a check of commercially available popcorn that was not grown in the trial (Table 5).

Analysis of variance tests were conducted to determine if there were significant differences between varieties for a given trait. This allowed us to be 95% confident that the differences among varieties for a given trait were real differences rather than being due to chance. Pairwise comparison tests were conducted using Tukey's method to determine which varieties were significantly different from each other. In the table of results, means with the same letter superscript are not considered significantly different. At the bottom of the table there are two important numbers, the coefficient of variation (CV) and Tukey's honest significant difference (HSD). The CV is a measure of how variable the data were. Traits with lower CVs were less variable (more consistent) across the plots than those with high CVs (more variable, less consistent). HSD is the smallest amount by which two values can be separated and still be considered significantly different.



Figure 1. Visual comparison of popcorn seed of trial varieties.



Figure 2. Visual comparison of popping quality of trial varieties.

Results

Seedling vigor ranged from 1.3 to 6.0, with 'Dakota Black' rated as the lowest, but differences were not significant (Table 5). 'Cherokee Rainbow' had the best rating for plant vigor and was significantly better than 'Dakota Black' and 'Strawberry' (Table

5). All differences between entries were significant for early ripening, yield, popping quality, and flavor (Table 5). 'Dakota Black' rated the best for early ripening and popping quality. 'Cherokee Rainbow' rated the best for yield and 'Strawberry' rated the best for flavor (Table 5).

Variety	Seedling Vigor (1=bad, 9=good)		Plant Vigor (1=bad, 9=good)		Early Ripening (1=bad, 9=good)		Yield (1=bad, 9=good)		Popping Quality (1=bad, 9=good)		Flavor (1=bad, 9=good)	
Cherokee Long Ear	6.0	a	7.3	ab	2.0	d	7.0	b	2.0	d	2.0	d
Cherokee Rainbow	4.7	a	7.7	a	1.0	e	9.0	a	3.0	c	6.0	c
Dakota Black	1.3	a	4.0	bc	9.0	a	5.0	c	9.0	a	7.0	b
Indian Berries	4.3	a	5.0	abc	5.0	c	5.0	c	1.0	e	1.0	e
Strawberry	5.0	a	2.3	c	6.0	b	1.0	d	7.0	b	9.0	a
Average	4.3		5.3		4.6		5.4		4.4		5.0	
High	6.0		7.7		9.0		9.0		9.0		9.0	
Low	1.3		2.3		1.0		1.0		1.0		1.0	
CV	41.8		24.6		1.6E-14		2.9E-14		2.6E-14		3.4E-14	
HSD	5		3.7		2.1E-15		4.4E-15		3.3E-15		4.8E-15	

Table 5. Popcorn trial results. Letters after trait value indicate groups of varieties whose means are not significantly different.

Chicory and Radicchio Trial

Farmer	Jessica Gigot
Farm	Harmony Fields
Location	Bow, Washington
Year	2015

Trial Goals

Evaluate chicory and radicchio varieties for production in the Skagit Valley.

The size of heads was measured at harvest (height for oblong types and diameter for round types) and notes were taken on color and uniformity.

Methods

Six varieties of chicory and radicchio were evaluated in an un-replicated, observational trial. Plants for the observational trial were transplanted on July 7th and harvested October 13th of 2015. A second trial with three replications was established late in the summer of 2015; however, the plots did not mature in time for evaluations by November.

Results

Average head height/diameter was 7.7 inches and ranged from 4.7 to 11.4 (Table 6). 'Nettuno' had the largest head size. Both 'Baldo' and 'TV405' had a strong dark red color and other varieties were a mix of green and spotted types. 'Baldo', 'Nettuno', and 'Lusia' were very uniform or uniform whereas the other entries had more variability.

Variety	Height (in)	Color	Notes
Nettuno	11.4		Uniform
Baldo	9.2	Strong, dark red color	Very uniform
TVG1	7.8	Deep red/purple green tint to stems	
TV4050*	5.5	Strong, dark red color	Some variation in color (green, faded red), some oblong head shape
Adige*	4.7	Color varies, majority faded, strong red spots	Some oblong head shape
Lusia	n/a	Strong green color, red flecks	Uniform head shape
Average	7.7		
High	11.4		
Low	4.7		

*Round types (diameter measured)

Table 6. Chicory and radicchio trial results.

Authors and Project Participants:

Brook Brouwer, Organic Seed Alliance

Micaela Colley, Organic Seed Alliance

Photos courtesy of Organic Seed Alliance (cover) and Ken Wood (Figures 1 and 2)

Reference as:

Brouwer, B., Colley, M. 2015. Greenbank Farm Organic Seed Project: 2015 Western Washington Trial Report. Organic Seed Alliance, Port Townsend, WA

Educational Materials

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