

BC Seed Trials

Leek Variety Trial Overview 2018



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Background and Objectives

The goal of the BC Seed Trials is to engage farmers in producing knowledge relevant to seed systems development in British Columbia. The project consists of a network of variety trials aimed at identifying superior crop varieties for fresh market farming and seed production. This report covers variety trials conducted during the 2018-2019 growing season at the University of British Columbia Farm (UBC Farm) and on a group of organic and conventional farms, primarily in the BC Lower Mainland and Vancouver Island. More information can be found at www.bcseedtrials.ca.

Leek Variety Trials

Leeks (*Allium ampeloprasum*) are fall and winter crop for direct-market production in the Pacific Northwest, and can be an important crop for season extension. While the majority of onion and leek seed in North America has historically been produced in the Snake River Valley of Idaho and Oregon, leek seed is also grown in the Columbia Basin of Washington and in the more maritime climates of western Washington and British. Hybrid leek varieties have become popular due to their higher uniformity, but many open-pollinated varieties exist and may offer farmers more reliable access to seed, particularly if they can be combined with local seed production. For this reason, BC Seed Trials growers expressed interest investigating OP leek varieties that have desired market qualities and perform well in BC during the late fall and winter.

Materials and Methods

Trial Design

We used a Mother-Baby trial design, which pairs larger, researcher-managed trials with a group of farmer-managed trials on participating farms. The UBC Farm in Vancouver, which is certified organic, served as the “mother” site, with each variety planted in three replications in the field on these farms. “Baby” sites (called “on-farm” sites henceforward) consisted of a single planting of all varieties, and two plantings of the check varieties discussed below.

In addition to the UBC Farm, leek trials were grown on 7 on-farm sites in 2018, most of which were certified organic. Farms that were not certified organic employed a range of ecological practices from using integrated pest management (IPM) to guide their use of conventional inputs, to complying with most organic standards but opting out of certification.

Planting Specifications

Farmers were given planting guidelines and allowed to vary the precise bed spacing based on their growing system.

Plot size	24 seedlings/plot
Row spacing	6" (~15 cm) apart in row, with 2 rows per bed and 14" between row. Spacing guidelines were adjusted as needed by farmers planting on-farm trials.
Seeding method	Seeded in greenhouse and transplanted

Planting and Harvest Dates

Growers were asked to time leek planting for late fall harvest or overwintering. Farmers aimed to plant 6 week old transplants. Trial entries ranged from 120-150 days to maturity. Farmers were given a choice between harvesting all of the leeks in the late fall or leaving part of each plot to overwinter and evaluate in December or later.

Location	Seeding	Transplant	First Harvest	Overwintering Eval
UBC Farm – 1 st planting	March 16, 2018	May 25, 2018	November 1, 2018	Jan. 29, 2019
UBC Farm – 2 nd planting	April 13, 2018	June 13, 2018	-	-
Other on-farm sites	March 9 to April 11, 2018	Mid-May to mid-June 2018	Sept. 19, 2018 to Jan. 10 2019	n/a

Varieties and Seed Sources

In response to farmers' comments of dissatisfaction with the available of high-performing open-pollinated varieties for late season leeks, we opted to do a large screening trial of as many open-pollinated varieties as possible, beginning in 2017. Varieties were selected based on an online search for all open-pollinated leek varieties long-season or winter leeks. For the second year of the trial in 2018, we dropped varieties that clearly demonstrated qualities of summer rather than fall/winter leeks, including in terms of shape and colour. We replaced these with new varieties of interest, while maintaining most varieties in the trial for two years. See 2017 Leek report for differences in the variety list.

In order to keep the trial size manageable for farmers the complete set of varieties was grown at the UBC Farm only, while participating farmers were given smaller subsets of varieties. ‘Bandit’ and ‘Curling F1’ were included in all on-farm trials as check varieties, and several hybrids were included as additional checks at the UBC Farm including ‘Gladius’, ‘Keeper’, and ‘Surfer’. A total of 19 of the 33 varieties were included in on-farm trials. Those grown only at the UBC Farm are noted below.

Code	Variety	Type	Source	Sites*
LK-01	Curling Organic F1 (check)	F1	West Coast Seeds	2
LK-02	Belton	F1	Osborne	1
LK-04	Bandit (check)	OP	Johnny's Selected Seeds	2
LK-05	King Richard - Johnny's	OP	Johnny's Selected Seeds	2
LK-06	Lancelot	OP	Fedco	1
LK-08	Giant Musselburgh	OP	Hawthorn Organic Seeds	2
LK-09	King Richard - BCESC	OP	BCESC - Glorious Organics	2
LK-10	Verdonnet	OP	Adaptive Seeds	2
LK-11	St-Victor	OP	BCESC - FC Seeds	2
LK-12	Zermatt	OP	Park Seeds	1
LK-13	Prizetaker	OP	Seed Savers Exchange	1
LK-14	German Winter leek	OP	Sunshine Seeds	2
LK-15	Melaton	OP	UBC Farm	1
LK-16	Blaugruner Winter Avano	OP	Uprising Seeds	2
LK-20	Hannibal	OP	William Dam Seeds	2
LK-21	Liege Giant Winter	OP	Adaptive Seeds	2
LK-22	Belgium Breeder's mix	OP	Wild Garden Seeds	1
LK-25	Durabel	OP	Salt Spring Seeds	2
LK-26	Linnea	OP	BCESC	1
LK-30	Mechelen Blue Green Winter	OP	Adaptive Seeds	1
LK-31	Runner F1	F1	High Mowing Seeds	1
LK-32	Ray DeVries 1	OP	Ralph's Greenhouse	2
LK-33	Amercian Flag/Broad London	OP	Harold Steves	1
LK-34	KingSieg	OP	Fedco	2
LK-35	Unique Leek	OP	Full Circle Seeds	2
LK-36	Gladius F1	F1	Osborne	1
LK-37	Keeper F1	F1	Osborne	1
LK-38	Surfer F1	F1	Osborne	1
LK-39	Ester Cook	OP	Siskiyou	2
LK-40	Delft	OP	Wild Garden Seeds	2
LK-42	Blue Solaise	OP	Wild Garden Seeds	2
LK-43	Tadorna	F1	High Mowing Seeds	2
LK-44	Val-Aux-Vents	OP	Richard Favreau, QC	1

* 1= grown at UBC Farm only; 2 = grown at UBC Farm and participating baby farm sites

Evaluation

Evaluation criteria were developed by the research team with consultation from farmer participants and members of the BC Eco Seed Co-op and based on a review of methods from other leek trials. Evaluations at on-farm sites were more minimal and emphasized farmers' notes and scores, while evaluations at the UBC Farm were more extensive. The following characteristics were evaluated:

Evaluation Window	UBC Farm	On-Farm Sites
At seeding and transplant	<ul style="list-style-type: none"> • Percent germination • Seedling vigour score • Post-transplant vigour score 	<ul style="list-style-type: none"> • Seedling vigour score & notes
Mid-season	<ul style="list-style-type: none"> • Thrips damage • Rust damage • Plant stature (score) • Colour (score) • Size (score) • Uniformity 	<ul style="list-style-type: none"> • Photos and notes
At first harvest	<ul style="list-style-type: none"> • Rust damage (score) • Other diseases (notes) • Thrip damage (score) • Splitting or other notes (score) • Bolting (score) • Uprightness (score) • Colour (score) • Leaf angle (score) • Bulbing (score) • Uniformity (score) • Overall appearance (score) • Marketable/unmarketable leeks (number) • Marketable unmarketable weight (kg) • Reasons not marketable • Plant length (5 plants) • Width (5 plants) 	<ul style="list-style-type: none"> • Rust damage (score) • Other diseases (notes) • Thrip damage (score) • Splitting or other notes (score) • Bolting (score) • Uniformity (score) • Overall appearance (score) • Other notes
After overwintering	<ul style="list-style-type: none"> • Marketable/unmarketable leeks (number) • Marketable unmarketable weight (kg) • Reasons not marketable 	<p><i>(Collected either at 1st harvest)</i></p> <ul style="list-style-type: none"> • Marketable/unmarketable leeks (number) • Marketable unmarketable weight (kg) • Frost damage • Other reasons for unmarketable plants • Other notes

Results

Here we have included a written description of results, which are also displayed in Table 1 below. The UBC Farm Hub site experienced a seedling failure for the leek variety trial in 2018 due to greenhouse management issues. As a result, only 10 of the planned 33 varieties were ready as seedlings for the expected planting date in May. A second seeding of leeks was conducted, and these seedlings were ready for transplanting in mid-June. Unfortunately the later planting never reached a harvestable size, demonstrating that mid-June is too late for planting fall leeks in maritime BC climates. Mid-season quality data was collected from both plantings, displayed in Table 1. Yield and harvest quality data is available for the varieties in the early planting (Table 2).

Reasons for Unmarketability

The primary reasons cited for unmarketability for leeks were cracking, and leeks that were too small. There were few significant differences across varieties on metrics of yield and marketability.

Quality Variables (Scored on 1 – 9 Scale)

Early Vigour, rust during mid season and at harvest, mid season stature, colour at both mid season and harvest, colour uniformity at harvest, and thrip presence at harvest were all measured for varieties on a 1-9 scale. Because of this, we decided to take the sum of these traits for each variety as a means of comparison. Top performing varieties across these variables for UBC Farm included ‘Melaton’, ‘Ray DeVries 1’, ‘Surfer 1’, and ‘Mechelen Blue Green Winter (OG)’. Worst performing varieties included ‘Belton’ and ‘Val-Aux-Vents’.

Variety	Vigour Early Season (2 week)	Rust Mid Season	Stature Mid Season	Colour Mid Season	Thrip Presence at Harvest	Colour at Harvest	Colour Uniformity at Harvest	Total Score
	1-9 scale	1-9 scale	1-9 scale	1-9 scale	1-9 scale	1-9 scale	1-9 scale	(sum)
Melaton	5.67	7.67	6.33	6.67	9.00	7.33	6.00	48.67
Ray DeVries 1	5.67	7.00	4.33	6.33	9.00	9.00	6.33	47.67
Surfer F1	5.67	7.67	7.00	6.67	9.00	4.67	5.67	46.33
Mechelen Blue Green Winter (OG)	3.00	7.00	5.00	7.00	9.00	9.00	6.00	46.00
Linnea	5.40	7.80	6.33	5.80	9.00	4.60	6.20	45.13
Delft	4.33	7.67	5.00	6.33	9.00	7.00	5.67	45.00
Belgium Breeder's mix	6.00	6.33	5.00	5.00	9.00	6.33	7.00	44.67
St-Victor	5.00	5.33	5.00	6.00	9.00	8.33	6.00	44.67
Verdonnet	3.00	6.00	7.00	6.00	9.00	8.00	5.00	44.00
King Richard (JSS)	3.00	7.67	6.33	5.00	9.00	5.67	6.33	43.00
Zermatt	6.33	8.33	3.00	5.00	9.00	3.67	7.67	43.00
Prizetaker	4.33	7.67	5.00	5.00	9.00	5.00	7.00	43.00
King Richard (BCESC)	4.60	6.33	6.67	3.67	9.00	4.33	8.00	42.60
Blaugruner Winter Avano	5.00	6.20	5.80	5.80	9.00	5.40	5.40	42.60
German Winter Leek	3.00	7.29	6.00	4.71	9.00	5.00	7.57	42.57
American Flag/Broad London	5.00	7.67	4.33	6.33	9.00	3.00	6.33	41.67
Liege Giant Winter (OG)	5.00	5.67	5.67	5.00	9.00	5.00	5.67	41.00
Tadorna	5.00	4.33	5.00	4.33	9.00	5.00	8.33	41.00
Ester Cook	5.67	5.00	3.00	5.00	9.00	6.00	7.00	40.67
Durabel	4.33	7.67	4.67	4.33	9.00	3.00	7.00	40.00
Lancelot	5.67	7.67	3.67	4.33	9.00	4.33	5.00	39.67
KingSieg	6.00	6.33	3.67	3.00	9.00	3.67	7.67	39.33
Bandit (check)	3.00	7.00	5.00	4.67	9.00	5.00	5.00	38.67
Hannibal (OG)	4.33	6.33	3.67	3.67	9.00	3.67	7.00	37.67
Unique Leek	2.33	7.00	3.67	4.33	9.00	4.33	5.00	35.67
Blue Solaise	4.33	5.00	2.33	3.67	9.00	3.00	8.33	35.67
Giant Musselburgh	4.33	8.20	2.20	3.00	9.00	1.67	7.00	35.40
Runner F1	5.00	5.00	3.67	2.33	9.00	4.33	5.67	35.00
Val-Aux-Vents	4.33	5.67	6.33	1.67	9.00	1.00	6.33	34.33
Belton	3.00	6.00	4.00	3.00	9.00	1.00	5.00	31.00

Table 1. Comparison of variables rated on a 1-9 scale. Varieties are compared here using sum totals of scores for each variable where 1 is the least favorable. Results are colour coded with green being the most favorable for the trait and red the least favorable.

Variety	Marketable Number	Marketable Weight (g)	Unmarketable Number	Shank Length	Shank Width
Belton	6.33	1200.00	4.00	17.00	3.17
King Richard (BCESC)	7.00	1260.00	3.33	16.95	3.12
Delft	8.67	1400.00	3.00	21.47	2.79
St-Victor	5.67	820.00	6.00	16.07	2.32
Unique Leek	9.00	1470.00	2.00	16.33	2.86
Prizetaker	6.33	1110.00	2.33	15.93	2.99
Tadorna	7.67	1270.00	2.33	13.67	2.95
Zermatt	4.33	590.00	6.33	7.73	2.23
Linnea	3.00	410.00	7.33	15.00	2.36

Table 2. *Quantitative variables for selected varieties included in the first planting.*

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