

Cover Crop Demonstration Trial



Delta Farmland
& Wildlife Trust

2024-2025

Objectives

The purpose of the trial was to demonstrate and compare how several types of cover crops grew on a farm field in Delta, BC. Cover crops were selected that would grow quickly, provide ground cover rapidly, compete with weeds, fit into annual vegetable cropping systems and add diversity. An additional goal was to see if the cover crop varieties would experience different levels of waterfowl grazing.

Twenty types of cover crops were grown, including cereals, brassicas, legumes, other floral species, and mixtures.

Methods

The trial took place on a vegetable farm on Westham Island. The area has Westham soils, which are mostly silt loam and poorly drained. The previous cash crop grown on the field was peas. The pea residue was left in the field and the field was disced and subsoiled before seeding the first 13 plots with a seed drill on Aug 29th, 2024. The remaining seven plots were seeded on September 3rd with a 6 row Jang seeder, except the favas which were seeded with an Earthway. The plots that were seeded with the drill were harrowed after seeding to make sure the seed was covered.

Seeding rates were based on recommended rates. Settings on the seed drill were approximate and actual seeding rates were calculated based on the pounds of seed planted. Percent cover was assessed using three 0.25m² quadrats per plot. The site was very wet, with standing water most of the fall and winter.



Cover Crop Varieties, fall 2024

Cover Crop	Seeding date	Seeder used	Seeding rate, lb/ac	Seed cost per acre (High, medium, low)
Spring Barley AB Cattlelac	Aug 29th	Seed drill	200 (target was 120 lb/ac)	M
Oats Common No. 1	Aug 29th	Seed drill	121	M
Spring Triticale Common No. 1	Aug 29th	Seed drill	108	M
Winter Wheat Common No. 1	Aug 29th	Seed drill	121	M
Fall Rye Common No. 1	Aug 29th	Seed drill	108	M
Buckwheat Common No. 1	Aug 29th	Seed drill	108	H
Austrian Winter Peas	Aug 29th	Seed drill	94	H
Black Oil Sunflower	Aug 29th	Seed drill	108	H
Early Pollinator Mix: 50% fava bean, 25% sunflower, 15% sorghum, 5% phacelia, 5% vivant hybrid turnip	Aug 29th	Seed drill	54	-
Late Pollinator Mix: 50% fava beans, 30% spring barley, 4% purple top turnip, 10% spring oats, 6% vivant hybrid turnip	Aug 29th	Seed drill	108 (target was ~50)	-
Crimson Clover & Oats	Aug 29th	Seed drill	54, 40 lb/ac oats and 10lb/ac clover	H
Tillage Radish & Barley	Aug 29th	Seed drill	54, 30 lb/ac barley and 4lb/ac radish	L
Double Cut Red Clover & Oats	Aug 29th	Seed drill	~54, 40 lb/ac oats and 10 lb/ac clover	-
Vivant Hybrid Turnip	Sep 3rd	Jang seeder	4.4	L
Purple Top Turnip	Sep 3rd	Jang seeder	2.8	L
Tillage Radish	Sep 3rd	Jang seeder	11	M
Forage Sorghum	Sep 3rd	Jang seeder	20	L
Sunn Hemp	Sep 3rd	Jang seeder	22	H
Super Bee Phacelia	Sep 3rd	Jang seeder	6.8	M
Fava Beans	Sep 3rd	Earthway seeder	288 (target was 115)	H

Many of these varieties, such as sunflowers, phacelia, the brassicas, fava beans, and peas, would generally be grown in mixes. We grew them individually to demonstrate how they grow but would typically recommend including them in mixes.

Results

Fastest Growing Varieties: Varieties that achieved at least 90% cover by Oct 9th, starting with the fastest

- Late pollinator mix
 - Fall rye
 - Early pollinator mix
 - Winter wheat
 - Tillage radish and barley mix
 - Tillage radish
- Spring triticale
 - Phacelia
 - Spring barley
 - Oats
 - Vivant hybrid turnip
 - Purple top turnip

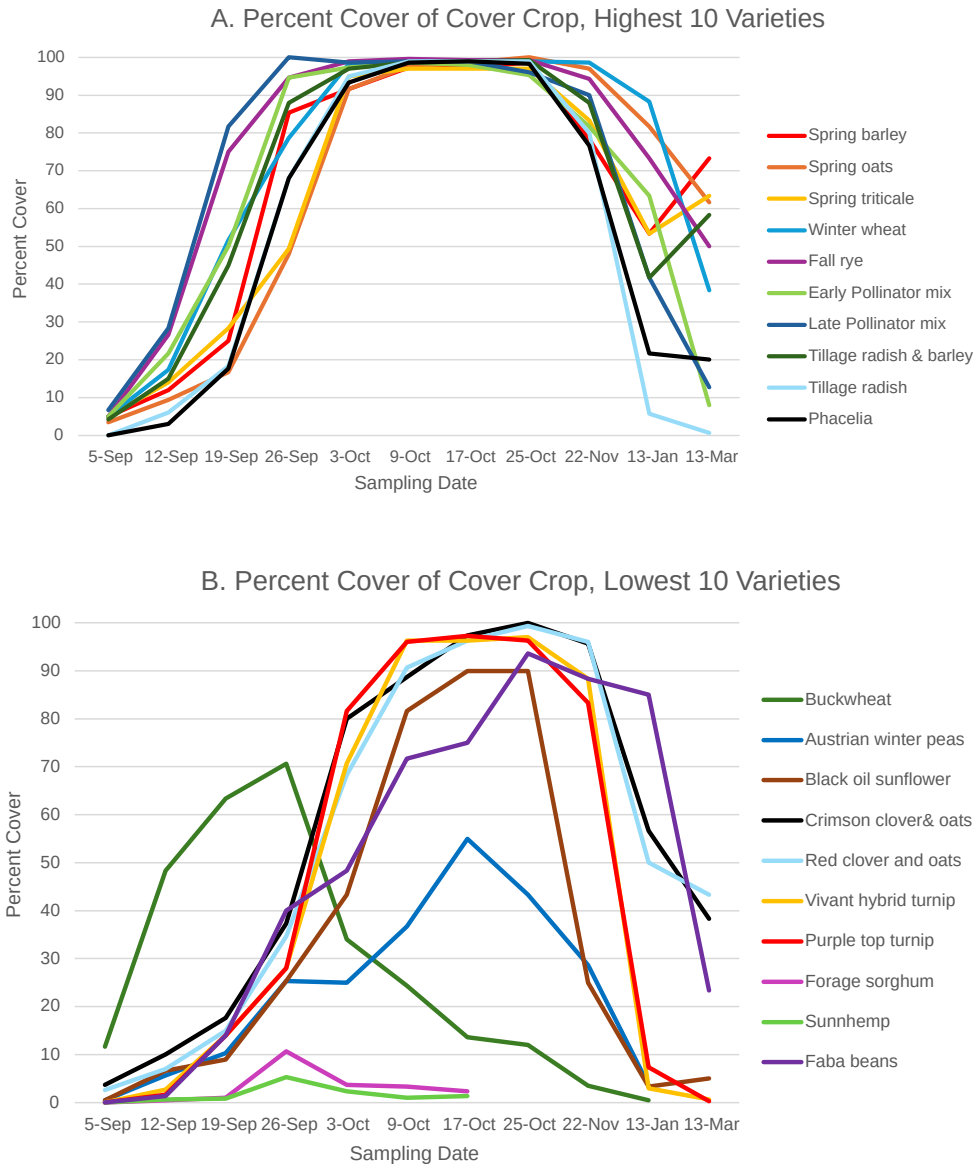


Figure 1. Percent cover of cover crop foliage: A. shows percent cover of the 10 varieties that grew the fastest, B. shows the 10 varieties that grew more slowly. Note the number of days between sampling times is not consistent, with the last three sampling periods being farther apart.

Varieties that did poorly

- Sunn hemp had poor germination and grew less than 10cm tall.
- Forage sorghum had poor germination, and grew less than 10cm tall.
- Buckwheat had a strong start but declined rapidly in late September.
- Austrian winter peas were patchy and never achieved more than 60% cover

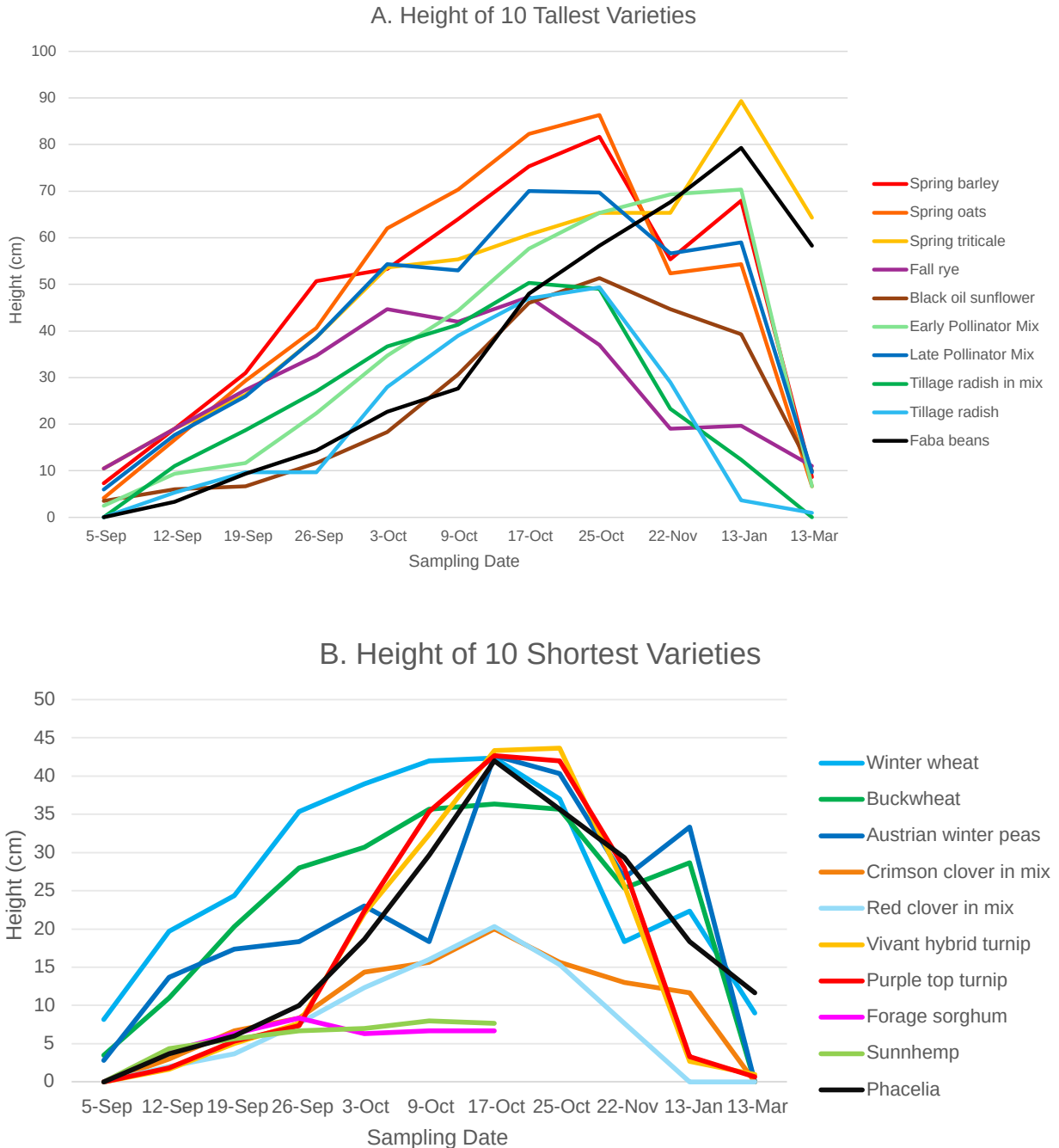


Figure 2. Cover crop height: A. shows height of the 10 tallest varieties, B. shows the height of the 10 shortest varieties. Note the number of days between sampling times is not consistent, with the last three sampling periods being farther apart.

January standouts (before major freeze)

- Fava beans were still green and flowering – looked great!
- Triticale was tall and green compared to other cereals.
- Triticale (89cm) and fava beans (79cm) were the tallest cover crops in January.
- The brassicas, phacelia and fava beans in the pollinator mixes were still green.
- The phacelia-only plot was mostly dead but still had good cover, the sunflowers and peas were dead, and both types of clovers mostly gone.



March standouts

- The only cover crops that survived the winter were the two winter cereals, winter wheat and fall rye. The winter wheat survived the wet winter much better than the fall rye. The winter wheat was still green in mid-March whereas the fall rye was patchy and looked sickly.
- Spring cereals (barley, triticale, then oats) had the most residue left on the field. The next highest cover was the barley and tillage radish mix (due to the barley, as the tillage radish had been grazed), fall rye, the clover-oats mixes (only oats remaining) and winter wheat. The non-cereals that had the most residue cover in the spring were fava beans (~25%) and phacelia (~20%)

Waterfowl grazing

- The tillage radish, purple top turnip (pictured), and vibrant hybrid brassica plots were thoroughly grazed by mid January, with only tubers remaining. No other plots had significant grazing at that time.
- The tillage radish – barley mix, clover – oats mixes and both pollinator mixes had been partially grazed by mid-March, though not as thoroughly as the three brassica plots. The fall rye and winter wheat had been very lightly grazed. The favas and phacelia were not grazed despite being close to the grazed plots.



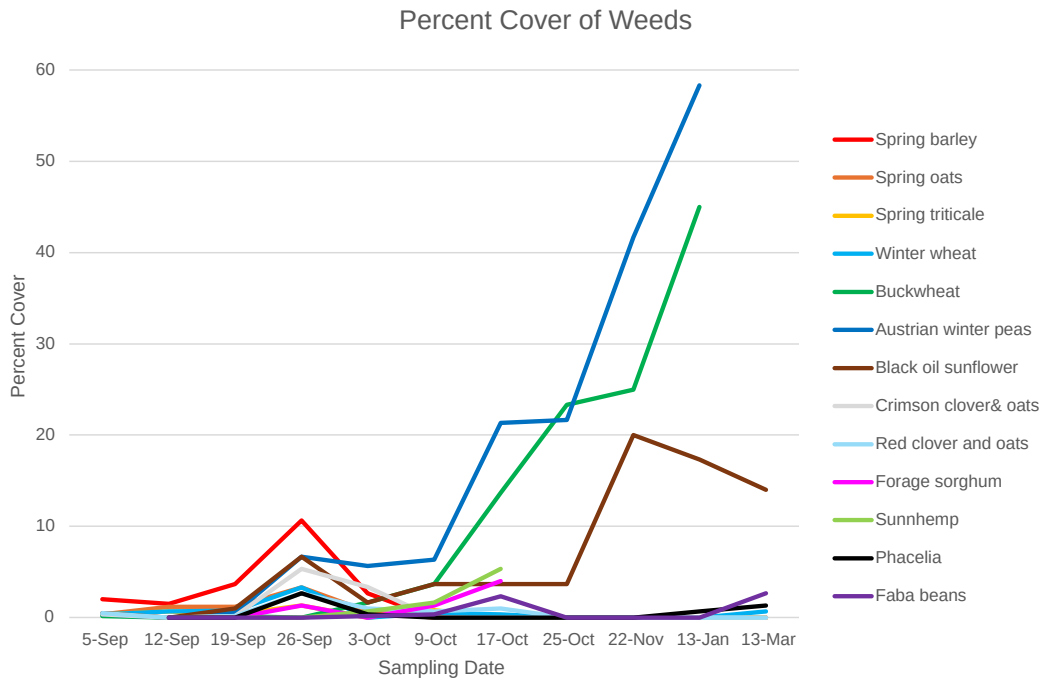


Figure 3. Percent cover of weeds in the cover crop plots. Varieties with <1% weed cover not included in figure. Note the number of days between sampling times is not consistent, with the last three sampling periods being farther apart.

Weed suppression

- Weeds (mostly Kentucky bluegrass) were only problematic with the cover crops that had poor coverage later in the season, particularly peas, buckwheat and sunflowers. Kentucky bluegrass took over the sorghum and sunn hemp plots as well, but we stopped measuring these once it was clear they were not worthwhile.

Spring Cereals



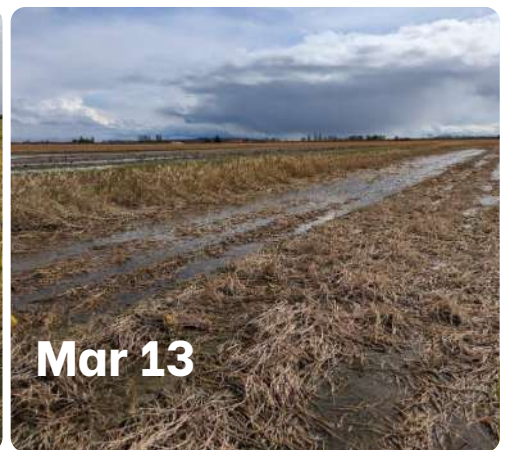
Oct 25

Oats centre (fallen over), barley to the right, triticale to the left.



Jan 13

Oats centre (fallen over), barley to the right, triticale to the left.



Mar 13

Barley right, oats centre left, and triticale to far left (taller).

Spring Triticale



Triticale in centre, with oats to the left and winter wheat to the right



Triticale still green and growing in January.



Triticale dead with plenty of residue (centre), oats to the left, winter wheat to the right.

Winter cereals



Winter wheat centre, fall rye right, and triticale left (taller).



Winter wheat left (still green), fall rye right, before significant freezing temperatures.



Fall rye centre (brown), winter wheat to the right (green), and triticale farther to the right (taller).



Cereal plots, 2/26/2025

Brassicas



Purple top turnip centre, vibrant hybrid brassica to the right, tillage radish to the left



Purple top turnip centre left, vibrant hybrid brassica right, tillage radish far left.



Individual species brassica plots: all foliage grazed, only tubers remaining. By March the tubers were also gone and it was just bare soil.

Early Pollinator Mix



Early pollinator mix: fava beans, sunflowers, sorghum, phacelia, vibrant hybrid turnip.



Early pollinator mix in centre.



Early pollinator mix centre (dead fava stalks). Has been grazed by waterfowl.



Late Pollinator Mix



Late pollinator mix: fava beans, oats, barley, purple top turnip and viviant hybrid turnip.



Late pollinator mix (centre), early pollinator mix to the right, and oat-crimson clover mix is the darker foliage to the left.



Late pollinator mix, covered in water and grazed by waterfowl.

Cereal Mixes, October



Cereal Mixes, later



Tillage radish and barley mix centre (yellowing), crimson clover and oats to the right, and red clover and oats to the left



Red clover and oat mix centre, tillage radish and barley mix to the right (yellowing), grazed brassica plots to the left.



Tillage radish and barley in centre, crimson clover and oats to the right, red clover and oats to the left.

Phacelia



Phacelia



Phacelia mostly dead but still pretty good cover



Phacelia residue

Fava Beans



Fava beans.



Fava beans still green and flowering in January, before any significant cold weather.



Fava bean residue still standing in March.



Winter wheat, 9/19/2024

Sunflowers, Peas and Buckwheat, fall



Sunflowers with good canopy cover in October.



Peas patchy in October.



Buckwheat started out very strong but was already yellowing and thinning out in October.

Sunflowers, Peas and Buckwheat, winter



In January the sunflowers were dead and the plot was being overgrown with grass.



In January the peas were dying and being over take by grass



The buckwheat was gone by January and the plot full of grass. Picture is from November, when the buckwheat was already mostly gone.

Thanks to Zellweger Farms for hosting the trial and helping with seeding. Thanks to Crophorne Farm for the use of the Jang Seeder and to Brent Harris for sharing seed for the pollinator mixes and all the seed sourced from Green Cover.

To learn more about the BC Living Lab, visit www.bclivinglab.ca. This project is funded, in part, by Agriculture and Agri-Food Canada through the Agricultural Climate Solution; delivered by the Investment Agriculture Foundation of BC.