

Seeding Notes

Field #7 Barley Seeding Notes

Previous Crop: Potatoes

Field Preparation: Lemken disk fall 2018

Inputs: Pre-planting fertilizer, herbicide, fungicide

Seeding Method: Conventional grain drill

Seeding Date: May 5 & 6

Seeding Rate: 100 lb/acre

Harvest Date: August 30

Post-Harvest Methods: No fall till, air seed radish and turnip

Field #3 Quinoa Seeding Notes

Previous Crop: Barley

Field Preparation: Lemken disk fall 2018

Inputs: Pre-planting fertilizer with 85-10-5-25 analysis

Seeding Method: Conventional grain drill

Seeding Date: April 30

Seeding Rate: 11 lb/acre

Harvest Date: September 9

Post-Harvest Methods: No fall

Cover Crop Seeding Notes

Field Preparation: Bale barley straw (as soon as possible)

Seeding Method: Air seeder

Seeding Date: Mid-September

Seeding Rate: 4 lb/acre

Cover Crop Species Mix: 50% turnip, 50% radish

Post-Seeding Method: Pivot Irrigated

Penfold Farms: Transition to Irrigated No-Till Barley with Cover Crop Seeding Post Cash Crop Harvest

Penfold Farms is a fifth generation farm specializing in growing seed potatoes and barley and, more recently, quinoa and buckwheat. In 2018, Penfold Farms implemented a crop management plan on 300 acres focused on gaining familiarity with cover crop application and no-till farming practices with a goal of improving soil health over 4 years. Two of four fields will be managed with conventional farming methods (fields 4 and 8) and Penfold Farm's typical crop rotations. The other two fields (fields 3 and 7) will have a variety of soil building practices applied including adding cover crops to the rotation and utilizing no-till farming techniques. The comparison of the fields 4 and 8 (the control) to fields 3 and 7 with soil building practices applied, will establish baseline soil health data and allow for documenting the impact of management changes on soil health.



Seeding Method

All fields were disked with a Lemken disk in the fall of 2017 following cash crop harvest. In the spring of 2018, pre-planting fertilizer was applied to both parcels (see inputs below). Field 7 was planted on May 6 and Field 3 was planted on April 30. Both parcels were seeded using a conventional grain drill.

Harvest Methods

Both field 3 and 7 were harvested with a draper header and straw was windrowed. Barley on field 7 was harvested on August 30 with a yield of 92 bushels per acre. Quinoa on field 3 was harvested on September 9 with a yield of 1500 pounds per acre. Straw was baled off on both parcels in mid-September.

Water Infiltration Rates

The average water infiltration rate was 3.7 inches per hour. This demonstrates that up to 3.7 inches of water can be absorbed into the soil per hour to be used by plants. Water infiltration rates ranged from a minimum of 0.2 inches per hour (less than a quarter of an inch) to a maximum of 19 inches per hour.

Water Infiltration Rates (inches/hour)		
	Parcel #3	Parcel #4
Minimum	2.1	0.2
Mean	4.7	3.7
Maximum	7	19



Key Lessons

- In 2018 the cover crop seeding rate averaged 4 lb/acre, but it took time and adjusting to get the seeding rate correct. Increased familiarity with cover crop application and seeding techniques will help producers achieve desired seeding rates sooner and achieve desired results.

Cover Crop Seeding

Following barley or quinoa straw removal, a cover crop mix of turnips and radishes was broadcast on fields 3 and 7 in mid-September using an air seeder. The cover crop was air seeded at a rate of 4 lbs/acre and then irrigated. While some cover-crop plants germinated throughout parcel 7, the plants were so few in the barley chaff row that in ten random samples, zero radish or turnip plants were counted.

Haney Test

Field	Organic Matter % LOI	Soil Respiration (CO ₂ - C) ppm C	Organic C ppm C	Organic N ppm N	Organic C:N	Soil Health Calculation
Field 7 Minimum	2.9	10.8	103	10.3	8.1	4.76
Field 7 Median	3.2	43.05	119.5	11.9	9.6	8.12
Field 7 Maximum	3.3	60.2	136	16	11.5	9.25
Field 4 Minimum	3.3	31.3	71	7.3	6.1	6.14
Field 4 Median	3.65	37.1	94	12.3	7.15	6.9
Field 4 Maximum	3.9	46.3	114	13.4	15.6	7.22
Field 3 Minimum	2.5	10.2	71	11.9	5.0	5.29
Field 3 Median	2.9	19	138	13.4	9.95	6.02
Field 3 Maximum	3.0	39.8	149	33.9	12.5	6.79
Field 8 Minimum	2.7	10.7	82	8.5	8.2	4.65
Field 8 Median	3	21.5	122	9.75	11.95	5.615
Field 8 Maximum	3.4	34.5	136	15.7	16	6.09

Next Steps

In 2019, barley was planted in field 3 and quinoa was planted in field 7, both using no-till techniques. Comparisons after the 2019 growing season will be made on soil compaction, Haney Test results, water infiltration rates, crop stand and weed counts, and financial returns.

- Seed the cover crop as soon as possible once the barley is harvested. This was not possible in 2018 due to the custom contractor not being able available to pick up the straw sooner. Penfold Farms is interested in exploring ways to seed a post-harvest cover crop immediately after grain is harvested to maximize the little remaining growing season.