Photo by Robert Warren

B and R Farms:
Dryland Full Season Cover Crop as an Alternative to Summer Fallow

Figure 2. Site Detail Map

Ralph Egbert of B and R Farms raises cattle, dryland barley, and hay for forage. In 2018 Ralph applied a full season cover crop mix on 30 acres of dryland as an alternative to summer fallow between barley crops. This 30-acre parcel has been planted in Barley and managed in a conventional till system with annual fall plowing and spring disking since 2016, if not longer. The main goals for this project included weed control on fallow ground, erosion control, and overall improved soil health. A secondary goal was to use the cover crop mix as a forage for beef cattle.

Seeding Method

Ralph seeded a 9-way cover crop mix using a conventional seed drill. The cover crop was seeded on May 3 at a rate of 40 lbs/acre. All seeds were mixed together without the ability to change seeding rate or depth according to seed size or plant species.

Ralph experienced poor germination and stand development across the 30-acre parcel. Ralph attributes this to poor soil preparation—not enough cultivation to kill weeds and incorrect seeding depth. Ralph noticed that peas, oats, radish, turnip, and safflower germinated but he did not notice that any other species did. Dry matter yield (tons/acre) results also reflect poor cover crop stand with a mean of 1.5 tons/acre as compared to results from a different producer-led demonstration project with 2.5 tons per acre planted on a similar date in similar dryland conditions.

9-Way Cover Crop Seed Mix	
Variety	**Percentage**
Spring Pea	34%
Spring Oat	27%
Common Vetch	20%
Meadow Brome	7%
Safflower "Finch"	4.5%
Collards: Impact Forage	2.3%
Graza Radish	2.3%
Purple Top Turnip	1.1%
Plantain "Boston"	1.1%
Seed Cost (per acre)	**$48.53/acre**

Seeding Notes

Field Preparation: Fall 2017: chisel plowed 12" and disked spring 2018: roller harrow

Seeding Method: no-till seed drill

Seeding Date: May 3rd

Seeding Rate: 30 lbs/acre

Seed Mix: 9-way cover crop mix

Soil Compaction

Soil compaction can reduce water infiltration rates, increase runoff, reduce crop yields, and lead to a decline in soil health overtime. Results listed indicate the feet of penetration in different locations with the sam amount of force applies. The higher the result, the better or less compacted the soil is. With the implementation of soil building practices, we expect to see reduced soil compaction over time.

Soil Compaction (feet of penetration)				
	South Parcel	North Parcel	Control	Fence line (untilled)
Minimum	0.83	0.46	0.93	1.16
Median	1.36	0.98	1.00	1.53
Maximum	1.96	1.33	1.06	1.79

Haney Test

The Haney Test results indicate low soil health calculations across all sampling points with all results below the recommended soil health calculation of 7. This is likely due to low amounts of organic matter, low amounts of microbial activity, and low amounts of available carbon and nitrogen food sources for soil microbes. The Haney Test will be repeated annually to see if management changes and the implementation of soil-building practices improves the soil health calculation over time.

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
Minimum	1.8	11.7	97	11.1	8.6	4.39
Median	2.2	14.6	105	11.3	9.5	4.8
Maximum	2.5	14.6	142	14.8	9.6	5.77

Key Lessons

Due to poor germination and poor cover crop stand densities, the desired result of improved weed control was not achieved. In response to this, Ralph identified changes to make for future years:

- When transitioning from a long-term conventional cropping system to a no-till system, slowly reducing the amount of tilling over time, while also implementing soil building practices may lead to a more successful transition to a no-till system.
- Seek a less expensive cover crop seed mix that would reduce the financial risk taken on by a producer.
- Start with a less diverse cover crop mix, a 3 species mix for example, to make seeding easier.