

Research Report 2018
to
Vegetable Research Committee
on
Long-Term Cover Crop Research.

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This is an annual report of two long-term cover crop trial that was initiated in 2007 (site L2E) and repeated 2008 (L2W). For more detailed results over the years, please see previous reports (crop yields, weeds, insect and disease pressure, N cycling). The focus of this report was to summarize 2018 crop yield.

Methods:

Location: Ridgetown Campus research plots on a sandy loam soil

Long-term trials: 2 side-by-side sites a year a part initiated in 2007 and 2008 (called L2E and L2W).

Design: Split-plot design with cover crops arranged in randomized complete block with four replications

Crop Rotation: Processing vegetable with grain crops.

Cover Crops:

- 1) no cover crop
- 2) oat (seeding rate 72 lb/ac)
- 3) oilseed radish (12)
- 4) winter cereal rye (60)
- 5) oilseed radish & fall rye (8 + 30)

Field Operations:

- After main crop harvest, the trial site was disked and cultivated (once or twice depending on crop)
- Cover crops were planted as soon as possible after main crop harvest between mid-July (after peas) and early Sept (after tomatoes)
- Cover crops were planted with a drill
- Cover crops were left over winter
- In early May the following year, rye was terminated (glyphosate sprayed on whole trial)
- Cover crop residue was incorporated (disked and cultivated) and the main crop planted (mid-May to early June)
- Main crop was grown according to typical grower production practices

Research Results:

Cover crop growth in fall and following spring (Table 1)

Fall

- Except for cereal rye, cover crops had greater than 1300 kg/ha, an amount generally accepted to reduce erosion and nutrient loss.
- Radish had the greatest growth and N accumulation, which was not different than oats and the mix of radish and rye.
- The lowest amount of growth and N content was with cereal rye, which was indicative of its slow growth

Spring

- Except for radish, cover crop residues the following spring were greater than 1300 kg/ha, an amount generally accepted to reduce erosion and nutrient loss.
- The following spring, winter-killed cover crop residues contained less than 14 kg/ha nitrogen.
- The least amount of crop residues remaining in the spring was with radish. Thus, there was a lot of breakdown/decomposition of radishes over the winter.
- Cereal rye was growing in the spring and contained approximately twice as much N (28 to 32 kg/ha of nitrogen) as oats.

Table 1. Cover crop growth in the fall and following spring (Site L2W).

Cover crop	30 Oct-2017			07-May-2018		
	Aboveground growth kg/ha	N content	C/N ratio	Aboveground growth kg/ha	N content	C/N ratio
No cover†	597 c	48.7 b	11.9	980 a	13.5 b	19.2 b
Oats	1390 b	112 a	12.2	1300 a	13.8 b	21.2 b
Radish	1420 b	131 a	11.0	223 b	2.32 c	40.8 a
Radish + RYE	2710 a	89.4 a	12.5	1500 a	28.3 a	21.9 b
Rye	790 c	61.9 b	12.8	1570 a	31.7 a	20.5 b
se	234.68	10.18	0.596	171.29	3.067	1.958
p value	0.0001	<0.0001	0.356	0.0003	<0.0001	<0.0001

† Weeds were present in the no cover crop plots.

Crop Yields (Table 2)

SWEET CORN

Although not statistically significant, in both years sweet corn yield was lowest in the no cover crop treatment. The highest yield was with radish, which was 18% to 22% higher than the no cover crop plots. Nitrogen fertilizer increased yield by 2.1 to 2.6 ton/ac.

WINTER WHEAT

In 2018, winter wheat yield, moisture and test weight were not impacted by long-term cover cropping (10 year). This trial will be repeated in 2018 on an adjacent site.

Table 2. Effect of long-term cover cropping (9 years) and fertilizer nitrogen on processing sweet corn yield in 2017 (trial name L2E) and 2018 (L2W).

Effect	Treatment	2017	2018	2018 Winter wheat		
		Sweet corn yield (ton/ac)	Sweet corn yield (ton/ac)	Yield† (bu/ac)	Moisture (%)	Test weight (kg/HL)
Cover crops	No cover	6.05	7.03	82.4	13.7	75.9
	Oats	6.06	8.49	80.7	13.9	76.0
	Radish	7.78	8.62	84.5	14.1	75.9
	Radish + RYE	6.70	8.41	80.9	13.6	75.7
	Rye	7.20	8.17	71.2	13.0	74.7
	se	0.565	1.445	5.369	0.363	0.448
Fertilizer N‡	125 lb/ac	8.05 a	8.61			
	Zero	5.46 b	7.67			
	se	0.308	1.012			
P value	Cover	0.2012	0.3692	0.3706	0.1628	0.2671
	Nrate	<.0001	0.0986			
	Cover*Nrate	0.7694	0.7509			
	CV	28.5	21.6	14.8	6.45	1.70

†Soft red winter wheat yield based on 14% moisture.

‡Preplant broadcast incorporated 27-0-0 to sweet corn. No fertilizer treatment in winter wheat.