Cover Crops Strategies After Short Season Crops

Wisconsin Cover Crop Webinar Series January 31, 2018

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selecting cover crops that best utilize the remaining growing season

Winter Wheat, Canning Crops

The Value of Legumes





cover crops after short season crops are a unique opportunity

- Reduce soil erosion
- Increase water infiltration
- Improved water quality
- Improve soil structure
- Opportunity to maximize the growing season and land base. Approximately 40% of precipitation and GDDs accumulate after August 1st.

Forage Production

- Small grains after wheat or vegetable crops
- Late season grazing & stockpiling
- Direct seeded alfalfa after wheat

Annual Clovers/Nitrogen Credits/Rotational Benefits

Remember the Inoculant Berseem, Crimson Clovers, Barley & No Cover Crop 3 year study – Sheboygan County 2014 - 2015 2015 – 2016 2016 – 2017

- Soil Kewaunee Silt Loam
- August 15, 2014 covers planted
 - Berseem clover 15 lb/ac
 - Crimson clover 15 lb/ac
 - Barley 60 lbs
- August 12 , 2015
- Berseem and Crimson Clovers (15 lb/ac)
- Barley 60 lbs

Biomass harvesting – early November all years (after a hard freeze - end of growth)

- Nitrogen fertilizer, broadcast urea with Agrotain®
 - 8 N rates (0, 40, 80, 120, 160, 200, 240, 280 lb/ac)

Crimson 2015

Berseem – 2015

Crimson Clover



Crimson Clover—Spring Residue



Berseem Cover Crop

Mike Ballweg UWEX Sheboygan County November 9, 2016

Berseem Cover Residue

Mike Ballweg LWVEX Sheboygan County April 12, 2017



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Barley Residue

Mike Ballweg HWEX Sheboygan County

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Barley Crop Residue

No Cover Crop

April 30, 2015

Cover Crop DM Yields After Wheat





Barley Cover Crop

40 lbs - N/ac in AGB C:N 35

> Mike Ballweg UWEX - Sheboygan County November 9, 2016

Carbon to nitrogen ratios of crop residues and other organic materials

Material	C:N Ratio
rye straw	82:1
wheat straw	80:1
oat straw	70:1
corn stover	57:1
rye cover crop (anthesis)	37:1
barley – Sheboygan County	38:1
oats – Sheboygan County	30:1
pea straw	29:1
rye cover crop (vegetative)	26:1
mature alfalfa hay	25:1
Carbon: Nitrogen - Neutral	25:1
rotted barnyard manure	20:1
oilseed radish	20:1
legume hay	17:1
beef manure	17:1
crimson – Sheboygan County	14:1
berseem – Sheboygan County	14:1
young alfalfa hay	13:1
	44.4

Carbon/Nitrogen Ratio



Carbon/Nitrogen Ratio

Cover Crops Suppress Volunteer

Wheat Biomass harvest early November 2016



Both crimson and berseem clovers provide yield benefits -2015 - Sheboygan County



Crimson N credit, Berseem had the clearer yield benefit 2016 - Sheboygan County



2017 Cover Crops Yields



Clover provides an N credit, both crimson and berseem clover provide yield benefits



Berseem, Crimson, Barley Mix

5 5

14

12

50

113

18

11

120

5 01

A 23

2 23

Berseem: 4 lb /ac Crimson: 4 lb/ac Barley: 40 lb/ac

Planted 8/15/2014 DM on 11/12: 1.6 ton/ac

Berseem and Crimson Mix

Berseem: 6 lb/ac Crimson: 6 lb/ac

Planted 8/15/2014 DM on 11/12: 1.4 ton/ac



Berseem and Oilseed Radish planted on 30 inch centers

4

September 29, 2017 Berseem & Crimson – Radish on 30 " centers



Corn Yields at Various N Rates Following Oil Seed Radish Compared to no Cover Crop., Washington County 2 years of data



Source: research conducted by Matt Ruark (UW-Madison & Extension Soil Scientist), Jim Stute (Michael Fields), Michael Ballweg (UW-Extension Crops & Soils Agent, Sheboygan County), Richard Proost (UW-Madison, Nutrient & Pest Management Program), Megan Chawner (UW-Madison graduate student)

Cover Crop Seeding Rates & Planting Dates – Following Short Season Crops

Cover Crop	Seeding Rate Ibs/acre	Seeding Dates
 Berseem Clover Crimson Clover 	10 – 12 10 - 12	July 15 – August 15 July 15 – August 15
3) Berseem Clover Crimson Clover	5 – 6 5 – 6	July 15 – August 15 July 15 – August 15
4) Berseem Clover Oilseed Radish	8 – 10 2	July 15 – August 15 July 15 – August 15
5) Crimson Clover Oilseed Radish	8 – 10 2	July 15 – August 15 July 15 – August 15
6) Barley	30 – 100 (depending on goal & planting date)	August 1 to September 15
7) Volunteer Winter Wheat	Will need to terminate	
8) Red Clover	10 – 12 (Will need to terminate)	Limited fall growth after wheat Frost seed into Wheat
9) Oilseed Radish	2-3 (When used in mixtures)	July 15 – August 15
10) Barley Berseem Oil Seed Radish	10 – 20 lbs 5 – 6 lbs 2 lbs	July 15 – August 15
 Others – Winter-Fields F Canola, Rapeseed, Hair Vetch? 	Peas, ry	July 15 – August 15

Forage Crops

Oats Oats & Peas 90 -95 lbs./ 3 bushels 60 - 65 lbs./ 2 bushels/ Peas 30 - 40 August 1 – August 15 August 1 – August 15







Corn yield response to winter cover crops based on cover crop species and region. Miguez and Bollero (2005). Results adapted by: Heggenstaller, DuPont Pioneer Corn and soybean yield response to a cereal rye cover crop in a 4-year, on-farm trial in Iowa. Each bar represents the cover crop yield effect at 1 location in a single year.



Carlson, S. 2012. Winter rye cover crop effect on grain crop yields: Year 4. Practical Farmers of Iowa. Ames, Iowa. Adapted by: Heggenstaller, DuPont Pioneer

In Summary - Things to consider

- Corn following annual clovers yielded 10 15 bu/ac more than where no cover crop was planted...rotational benefits.
- Corn yields following barley were lowest yielding 2/3 years.
- Grass covers take up nitrogen utilizing that N to produce biomass carbon.
- Greater amounts of carbon (biomass) may result in immobilization of N thus requiring additional

N for optimal yields.

Before you get started . . .

Be clear about your cover crop goals

- Reduce soil erosion, improve soil structure & water infiltration, grow nitrogen & enhance rotational benefits, or slowly improve OM

Understand where cover crops best fit into the cropping system

- After small grains, vegetable crops, corn silage, inter-seeding

Avoid half-hearted attempts

- Treat as you would other crops

Understand the impact on the next crop

- Winterkill or need to be terminated
- What impact will it have in the spring?
- What is the Carbon:Nitrogen ratio of residue
- Herbicide carryover concerns?

Committed to learning about cover crops

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