



## Cover Crop Variety Trial 2014-2015

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### Cooperators:

- **Jeremy Gustafson** - Boone
- **Paul Kassel** - Clay
- **Clarke McGrath** - Crawford, Pottawattamie, Ringgold, Union
- **Mark Peterson** - Montgomery
- **Dave and Meg Schmidt** - Audubon

### Funding By:

**Walton Family Foundation**

### In a Nutshell

- Cereal rye, oats and other cool-season, small grains grass species have been proven as effective cover crops in Iowa crop production systems.
- Cooperators screened pure seedings and mixtures of grass, legume and brassica cover crops for ground cover and aboveground biomass production in small, hand-seeded plots across the state.

### Key findings

- Cereal rye and mustard tended to produce the most amount of fall ground cover.
- Cereal rye and field pennycress were the only entries to consistently overwinter and produce spring growth.
- Field pennycress may be a good option for those in corn-soybean systems looking to add diversity to their practice of cover cropping.

Project Timeline:  
Fall 2014 - Spring 2015

### Background

This was the fourth year of trials screening cover crop varieties conducted by the Practical Farmers of Iowa Cooperators' Program. Reports of previous iterations of this trial are available on the Practical Farmers Web site (Carlson and Anderson, 2012; Carlson and Gailans, 2013; Gailans and Carlson, 2014). Predominant cover crops used by farmers in Iowa have tended to be cool-season grasses like cereal rye, winter wheat and oats (Singer, 2008). But more recently, farmers have wondered if legume and brassica species could also be used as cover crops, generally in mixtures with cool-season, small grains.

The current iteration of this trial involved



*Cover crop test plots on Jeremy Gustafson's farm in Boone County near Boone, Iowa. Upper left: field pennycress; lower left: rye, rapeseed and hairy vetch mix; right: oats and mustard mix. Photos taken on November 9, 2014.*

10 cooperators representing 20 locations that screened 21 cover crop entries – grasses, legumes, brassicas, and some in mixtures – to determine which entries would have the greatest success if established by aerial seeding into standing corn and soybean crops.

### Methods

Cover crop entries evaluated and seeding rates used at each location are presented in **Table 1**. Seeding rates for mixes were chosen to achieve a population of approximately one million seeds per acre.

Cover crops were hand-seeded by cooperators into a standing cash crop with two replications of randomized plots. Each plot was 7.5-ft wide and 25-ft long. Cover crops were seeded when the first soybean leaves yellowed or when corn reached

black layer (physiological maturity). Seeds were not incorporated into the soil. Cash crops were harvested using standard practices, and the cover crops were left undisturbed.

Cooperators determined ground cover of each cover crop using a pre-marked 16-ft rope placed diagonally across each cover crop entry's plot, and counting how many marks lay on top of cover crop biomass at 6-in. increments. These counts were used to calculate the percent coverage of the soil by the cover crop. A fall measurement was taken within a few days of the first predicted hard freeze, and a spring measurement was taken just prior to any field work preceding cash crop planting in 2015. Where sufficient spring growth had occurred, samples of the aboveground cover crop biomass were collected, dried and weighed.

Table 1

## Cover Crop Entries, Seeding Rates and Source of Seed

Cover Crop	Variety	Category	Seeding Rate (lb/ac)	Source
Cereal rye	VNS	Grass	112	Albert Lea Seed House, Albert Lea, MN
Spring wheat	Soren	Grass	112	Albert Lea Seed House, Albert Lea, MN
Oats	Saber	Grass	125	Albert Lea Seed House, Albert Lea, MN
Annual ryegrass	Kodiak	Grass	25	DLF Pickseed USA, Tangent, OR
Common vetch	Pepite	Legume	35	DLF Pickseed USA, Tangent, OR
Crimson clover	VNS	Legume	21	Albert Lea Seed House, Albert Lea, MN
Hairy vetch	VNS	Legume	28	Albert Lea Seed House, Albert Lea, MN
Partridge pea	VNS	Legume	35	Allendan Seed Company, Winterset, IA
Brown mustard	Kodiak	Brassica	10	Albert Lea Seed House, Albert Lea, MN
Rapeseed	Dwarf Essex	Brassica	8	Albert Lea Seed House, Albert Lea, MN
Oilseed radish	NitroRadish™	Brassica	11	Albert Lea Seed House, Albert Lea, MN
Field pennycress	Ruby Wild	Brassica	10	Arvegenix LLC, St. Louis, MO
Cereal rye-hairy vetch-rapeseed	--	Mix	40-10-3	--
Oats-brown mustard	--	Mix	50-5	--
Cereal rye-rapeseed	--	Mix	45-4	--
Cereal rye-hairy vetch	--	Mix	70-20	--
Spring wheat-brown mustard	--	Mix	45-4	--
Cereal rye-common vetch	--	Mix	70-20	--
Cereal rye-crimson clover	--	Mix	40-7	--
Cereal rye-brown mustard	--	Mix	45-4	--
Oats-oilseed radish	--	Mix	55-6	--
Annual ryegrass*	MO-1	Grass	25	DLF Pickseed USA, Tangent, OR
Annual ryegrass*	Gulf	Grass	25	Albert Lea Seed House, Albert Lea, MN
Common vetch*	Cristal	Legume	35	DLF Pickseed USA, Tangent, OR
Virginia wildrye*	VNS	Grass	23	Allendan Seed Company, Winterset, IA
Canada wildrye*	VNS	Grass	18	Allendan Seed Company, Winterset, IA
Common evening primrose*	VNS	Forb	1	Allendan Seed Company, Winterset, IA
Blackeyed Susan*	VNS	Forb	1	Allendan Seed Company, Winterset, IA

\* These entries were tested at the Gustafson (Boone) site only.

## Results

### 2014-2015 Growing Conditions

Mean monthly temperature and total monthly rainfall for the period Aug. 1, 2014–Apr. 30, 2015, as well as the long-term averages, is provided from the nearest weather station to each location (Iowa Environmental Mesonet, 2015). Rainfall tended to be above normal in Fall 2014 and in April 2015 at each location. Fall 2014 and Spring 2015 temperatures tended to be near the average across locations with a few exceptions: November 2014 and February 2015 were cooler than normal with December 2014 and January 2015 tending to be warmer than normal. Each site accumulated over 500 heat units (base 50 °F) in September–October, 2014.

### Cover crop performance

Of the 20 locations involved in the trial, 9 locations either failed to establish or were not evaluated and were thus not included in this report. For the remaining 11 sites, fall groundcover, spring groundcover and spring aboveground biomass are presented in the following tables. Entries from the current iteration of the trial that were also evaluated in past years at locations are also included.

In the present study, pure cereal rye provided more ground cover in the fall than the other entries featuring cereal rye in a mixture—cereal rye was seeded at a higher rate in the pure entry than in the mixtures. But this did not tend to translate to the pure entry of cereal rye resulting in any increase in ground cover or biomass in the spring compared to the mixtures.

Oats, spring wheat and brown mustard continue to be decent options for those seeking only a fall cover crop. Rapeseed and oilseed radish tended to perform less consistently in this role.

The legume entries tended to provide the least amount of cover with only hairy vetch showing any ability to overwinter. Though, hairy vetch did not produce much ground cover or biomass in the spring. Using legume species as cover crops in corn-soybean systems remains a challenge due to the limited amount of heat units remaining in the season for establishment when seeded in late August or early September.

Like cereal rye, field pennycress consistently overwintered at locations and in some instances, rivaled cereal rye in terms of ground cover in the spring. Field pennycress and other winter-hardy brassica species like camelina bear more investigation as potential alternatives to cereal rye or in mixes with cereal rye for those interested in expanding cover crop diversity.

**Jeremy Gustafson, Boone County**

Standing crop, 2014: Soybeans  
 Seeding date: 9/8/2014  
 Fall measurement: 11/9/2014  
 Spring measurement: 4/4/2015

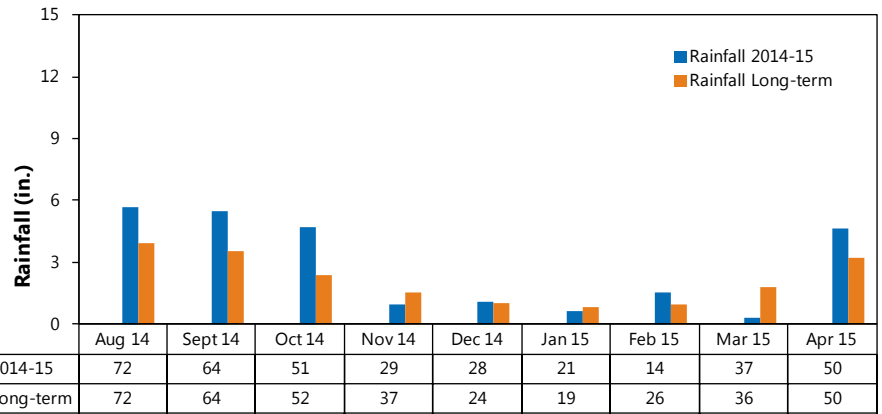


Figure 1. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Ames weather station (Iowa Environmental Mesonet, 2015).

**Table 2**

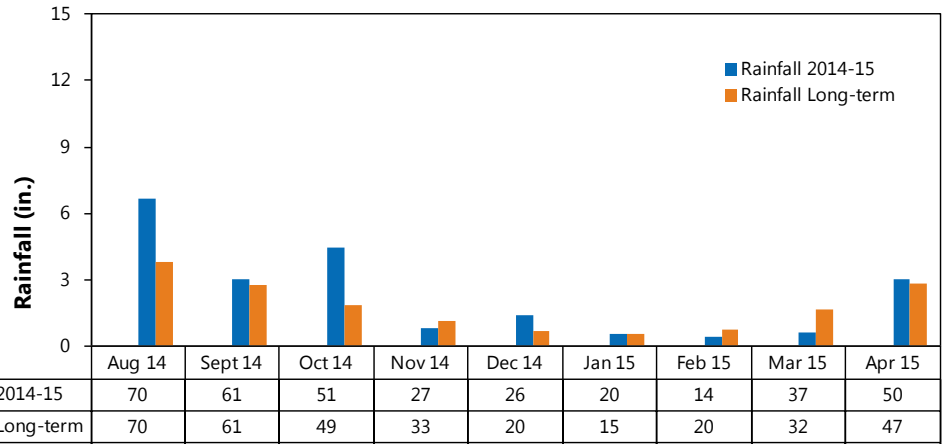
**Results for the Cover Crop Variety Trial 2014-2015 at Jeremy Gustafson's soybean field in Boone County.**

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	78.1	43.8	57.8	73.4	60.9	56.3	910	456	1,080
Spring wheat	--	39.0	34.4	--	0.0	0.0	--	0	0
Oats	--	39.0	51.6	--	0.0	0.0	--	0	0
Annual ryegrass	--	17.2	28.1	--	0.0	1.6	--	0	0
Common vetch	43.8	21.8	23.4	25.0	0.0	0.0	96	0	0
Crimson clover	20.3	15.6	29.7	0.0	0.0	0.0	0	0	0
Hairy vetch	45.3	15.6	17.2	34.4	0.0	15.6	216	0	288
Partridge pea	--	--	0.0	--	--	0.0	--	--	0
Brown mustard	--	67.2	78.2	--	0.0	0.0	--	0	0
Rapeseed	--	35.9	42.2	--	0.0	0.0	--	0	0
Oilseed radish	--	40.7	23.4	--	0.0	0.0	--	0	0
Field pennycress	--	--	34.4	--	--	39.1	--	--	936
Cereal rye-hairy vetch-rapeseed	--	--	39.1	--	--	42.2	--	--	1,080
Oats-brown mustard	--	--	54.7	--	--	0.0	--	--	0
Cereal rye-rapeseed	--	--	45.3	--	--	26.6	--	--	240
Cereal rye-hairy vetch	--	--	51.6	--	--	56.3	--	--	1,152
Spring wheat-brown mustard	--	--	53.1	--	--	0.0	--	--	0
Cereal rye-common vetch	--	--	46.7	--	--	48.4	--	--	1,296
Cereal rye-crimson clover	--	--	39.1	--	--	26.6	--	--	936
Cereal rye-brown mustard	--	--	56.3	--	--	56.3	--	--	936
Oats-oilseed radish	--	--	25.0	--	--	0.0	--	--	0
Annual ryegrass—MO-1	--	--	21.9	--	--	3.1	--	--	0
Annual ryegrass—Gulf	--	--	56.3	--	--	0.0	--	--	0
Common vetch—Cristal	--	26.5	10.9	--	0.0	1.6	--	0	0
Virginia wildrye	--	--	18.8	--	--	31.3	--	--	144
Canada wildrye	--	--	6.3	--	--	7.8	--	--	0
Common evening primrose	--	--	0.0	--	--	0.0	--	--	0
Blackeyed Susan	--	--	0.0	--	--	0.0	--	--	0

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

**Paul Kassel, Clay County**

Standing crop, 2014: Soybeans  
 Seeding date: 9/11/2014  
 Fall measurement: 11/7/2014  
 Spring measurement: 4/21/2015



	Aug 14	Sept 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15
Temperature (°F) 2014-15	70	61	51	27	26	20	14	37	50
Temperature (°F) Long-term	70	61	49	33	20	15	20	32	47

Figure 2. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Spencer weather station (Iowa Environmental Mesonet, 2015).

**Table 3**

**Results for the Cover Crop Variety Trial 2014-2015 at Paul Kassel's soybean field in Clay County.**

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	17.2	21.9	21.9	31.3	25.0	7.8	216	96	72
Spring wheat	--	21.9	15.6	--	0.0	0.0	--	0	0
Oats	--	23.4	18.8	--	0.0	0.0	--	0	0
Annual ryegrass	--	3.1	28.1	--	0.0	0.0	--	0	0
Common vetch	6.3	4.7	10.9	0.0	0.0	0.0	0	0	0
Crimson clover	0.0	1.6	15.6	0.0	0.0	0.0	0	0	0
Hairy vetch	17.2	6.3	10.9	0.0	0.0	7.8	0	0	0
Partridge pea	--	--	7.8	--	--	0.0	--	--	0
Brown mustard	--	15.6	21.9	--	0.0	0.0	--	0	0
Rapeseed	--	7.8	21.9	--	0.0	0.0	--	0	0
Oilseed radish	--	15.6	20.3	--	0.0	0.0	--	0	0
Field pennycress	--	--	14.1	--	--	20.3	--	--	384
Cereal rye-hairy vetch-rapeseed	--	--	21.9	--	--	14.1	--	--	240
Oats-brown mustard	--	--	12.5	--	--	0.0	--	--	0
Cereal rye-rapeseed	--	--	20.3	--	--	6.3	--	--	168
Cereal rye-hairy vetch	--	--	23.4	--	--	14.1	--	--	240
Spring wheat-brown mustard	--	--	25.0	--	--	0.0	--	--	0
Cereal rye-common vetch	--	--	28.1	--	--	14.1	--	--	360
Cereal rye-crimson clover	--	--	20.3	--	--	10.9	--	--	216
Cereal rye-brown mustard	--	--	21.9	--	--	6.3	--	--	168
Oats-oilseed radish	--	--	20.3	--	--	0.0	--	--	0

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

### Clarke McGrath, Crawford County

Standing crop, 2014: Corn  
 Seeding date: 9/19/2014  
 Fall measurement: 11/10/2014  
 Spring measurement: 4/24/2015

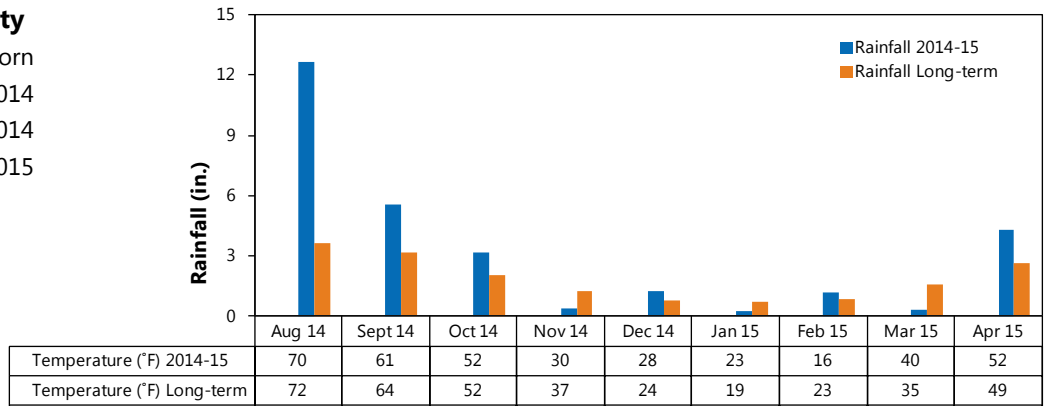


Figure 3. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Harlan weather station (Iowa Environmental Mesonet, 2015).

Table 4

### Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's corn field in Crawford County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	4.7	37.5	--	4.7	31.3	--	0	--
Spring wheat	--	0.0	20.3	--	0.0	0.0	--	0	--
Oats	--	0.0	10.9	--	0.0	0.0	--	0	--
Annual ryegrass	--	0.0	20.3	--	0.0	1.6	--	0	--
Common vetch	--	0.0	12.5	--	0.0	3.1	--	0	--
Crimson clover	--	0.0	6.3	--	0.0	0.0	--	0	--
Hairy vetch	--	0.0	6.3	--	0.0	4.7	--	0	--
Partridge pea	--	--	1.6	--	--	0.0	--	--	--
Brown mustard	--	9.4	34.4	--	0.0	0.0	--	0	--
Rapeseed	--	10.9	7.8	--	0.0	0.0	--	0	--
Oilseed radish	--	0.0	14.1	--	0.0	0.0	--	0	--
Field pennycress	--	--	20.3	--	--	35.9	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	15.6	--	--	32.8	--	--	--
Oats-brown mustard	--	--	25.0	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	34.4	--	--	23.4	--	--	--
Cereal rye-hairy vetch	--	--	7.8	--	--	18.8	--	--	--
Spring wheat-brown mustard	--	--	20.3	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	23.4	--	--	23.4	--	--	--
Cereal rye-crimson clover	--	--	14.1	--	--	21.9	--	--	--
Cereal rye-brown mustard	--	--	32.8	--	--	25.0	--	--	--
Oats-oilseed radish	--	--	12.5	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

**Clarke McGrath, Crawford County**

Standing crop, 2014: Soybeans  
 Seeding date: 9/19/2014  
 Fall measurement: 11/10/2014  
 Spring measurement: 4/24/2015

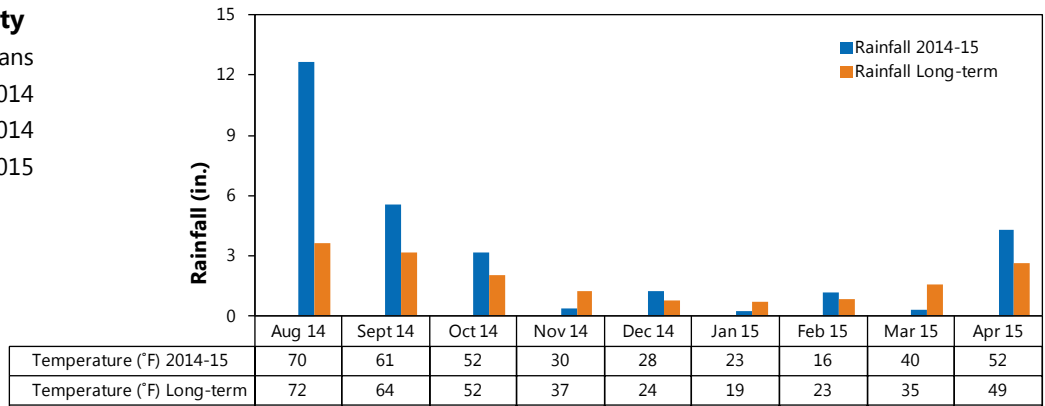


Figure 3. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Harlan weather station (Iowa Environmental Mesonet, 2015).

**Table 5**

**Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath’s soybean field in Crawford County.**

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	14.1	18.8	--	3.1	35.9	--	0	--
Spring wheat	--	10.9	15.6	--	0.0	0.0	--	0	--
Oats	--	7.8	4.7	--	0.0	0.0	--	0	--
Annual ryegrass	--	0.0	0.0	--	0.0	1.6	--	0	--
Common vetch	--	1.6	0.0	--	0.0	1.6	--	0	--
Crimson clover	--	1.6	0.0	--	0.0	0.0	--	0	--
Hairy vetch	--	0.0	0.0	--	0.0	6.3	--	0	--
Partridge pea	--	--	0.0	--	--	0.0	--	--	--
Brown mustard	--	15.6	29.7	--	0.0	0.0	--	0	--
Rapeseed	--	17.2	0.0	--	0.0	0.0	--	0	--
Oilseed radish	--	6.3	7.8	--	0.0	0.0	--	0	--
Field pennycress	--	--	0.0	--	--	46.9	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	9.4	--	--	29.7	--	--	--
Oats-brown mustard	--	--	35.9	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	21.9	--	--	20.3	--	--	--
Cereal rye-hairy vetch	--	--	9.4	--	--	35.9	--	--	--
Spring wheat-brown mustard	--	--	21.9	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	7.8	--	--	20.3	--	--	--
Cereal rye-crimson clover	--	--	6.3	--	--	12.5	--	--	--
Cereal rye-brown mustard	--	--	20.3	--	--	21.9	--	--	--
Oats-oilseed radish	--	--	14.1	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

### Clarke McGrath, Pottawattamie County

Standing crop, 2014: Corn  
 Seeding date: 9/22/2014  
 Fall measurement: 10/31/2014  
 Spring measurement: 4/24/2015

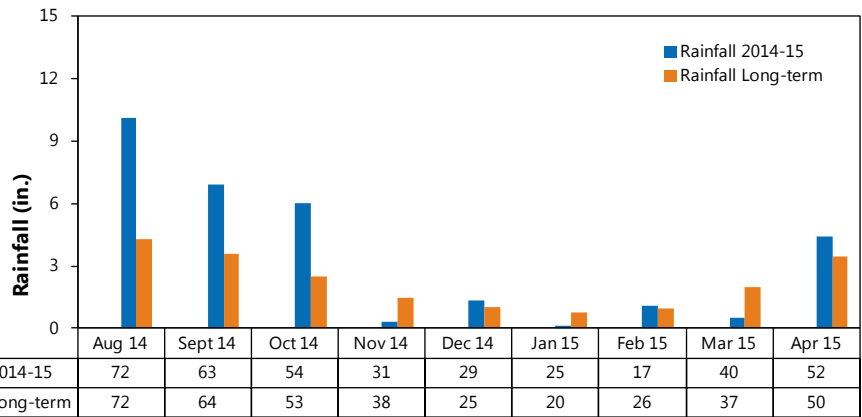


Figure 4. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Oakland weather station (Iowa Environmental Mesonet, 2015).

**Table 6**

### Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's corn field in Pottawattamie County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	9.4	10.9	--	0.0	10.9	--	0	--
Spring wheat	--	3.1	15.6	--	0.0	0.0	--	0	--
Oats	--	3.1	15.6	--	0.0	0.0	--	0	--
Annual ryegrass	--	0.0	0.0	--	0.0	0.0	--	0	--
Common vetch	--	0.0	0.0	--	0.0	0.0	--	0	--
Crimson clover	--	0.0	0.0	--	0.0	0.0	--	0	--
Hairy vetch	--	0.0	0.0	--	0.0	0.0	--	0	--
Partridge pea	--	--	0.0	--	--	0.0	--	--	--
Brown mustard	--	6.3	6.3	--	0.0	0.0	--	0	--
Rapeseed	--	1.6	0.0	--	0.0	0.0	--	0	--
Oilseed radish	--	4.7	1.6	--	0.0	0.0	--	0	--
Field pennycress	--	--	0.0	--	--	12.5	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	1.6	--	--	6.3	--	--	--
Oats-brown mustard	--	--	9.4	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	6.3	--	--	14.1	--	--	--
Cereal rye-hairy vetch	--	--	4.7	--	--	9.4	--	--	--
Spring wheat-brown mustard	--	--	14.1	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	6.3	--	--	10.9	--	--	--
Cereal rye-crimson clover	--	--	1.6	--	--	7.8	--	--	--
Cereal rye-brown mustard	--	--	7.8	--	--	6.3	--	--	--
Oats-oilseed radish	--	--	6.3	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

**Clarke McGrath, Pottawattamie County**

Standing crop, 2014: Soybeans  
 Seeding date: 9/22/2014  
 Fall measurement: 10/31/2014  
 Spring measurement: 4/24/2015

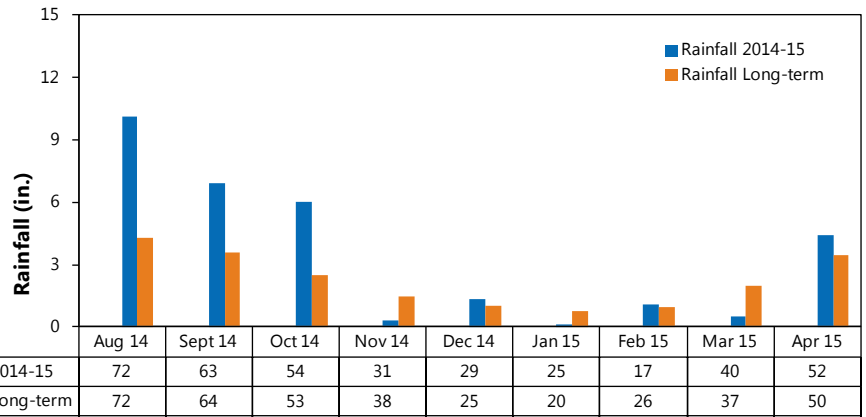


Figure 4. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Oakland weather station (Iowa Environmental Mesonet, 2015).

**Table 7**

**Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's soybean field in Pottawattamie County.**

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	7.8	15.6	--	0.0	21.9	--	0	--
Spring wheat	--	1.6	20.3	--	0.0	0.0	--	0	--
Oats	--	1.6	25.0	--	0.0	0.0	--	0	--
Annual ryegrass	--	0.0	0.0	--	0.0	1.6	--	0	--
Common vetch	--	0.0	3.1	--	0.0	0.0	--	0	--
Crimson clover	--	0.0	0.0	--	0.0	0.0	--	0	--
Hairy vetch	--	0.0	3.1	--	0.0	3.1	--	0	--
Partridge pea	--	--	4.7	--	--	0.0	--	--	--
Brown mustard	--	--	28.1	--	0.0	0.0	--	0	--
Rapeseed	--	--	0.0	--	0.0	0.0	--	0	--
Oilseed radish	--	--	12.5	--	0.0	0.0	--	0	--
Field pennycress	--	--	3.1	--	--	26.6	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	4.7	--	--	18.8	--	--	--
Oats-brown mustard	--	--	14.1	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	14.1	--	--	10.9	--	--	--
Cereal rye-hairy vetch	--	--	7.8	--	--	15.6	--	--	--
Spring wheat-brown mustard	--	--	17.2	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	9.4	--	--	15.6	--	--	--
Cereal rye-crimson clover	--	--	4.7	--	--	14.1	--	--	--
Cereal rye-brown mustard	--	--	6.3	--	--	15.6	--	--	--
Oats-oilseed radish	--	--	14.1	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).



### Clarke McGrath, Ringgold County

Standing crop, 2014: Soybeans  
 Seeding date: 9/29/2014  
 Fall measurement: 11/6/2014  
 Spring measurement: 4/22/2015

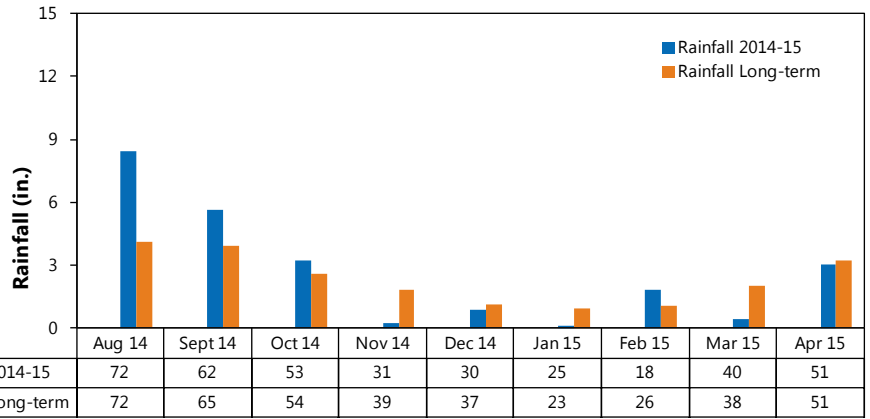


Figure 5. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Mt. Ayr weather station (Iowa Environmental Mesonet, 2015).

**Table 8**

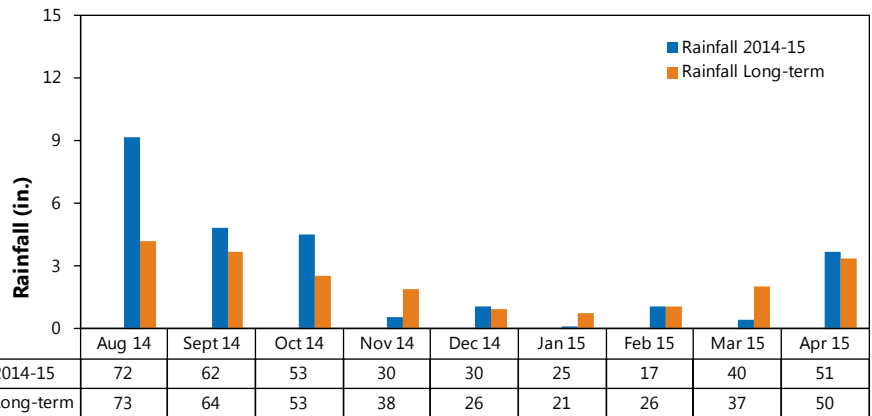
### Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's soybean field in Ringgold County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	43.8	40.6	--	98.4	21.9	--	--	--
Spring wheat	--	21.9	42.2	--	0.0	0.0	--	--	--
Oats	--	21.9	9.4	--	0.0	0.0	--	--	--
Annual ryegrass	--	31.3	4.7	--	0.0	3.1	--	--	--
Common vetch	--	7.8	6.3	--	0.0	3.1	--	--	--
Crimson clover	--	9.4	7.8	--	0.0	0.0	--	--	--
Hairy vetch	--	10.9	1.6	--	0.0	1.6	--	--	--
Partridge pea	--	--	0.0	--	--	0.0	--	--	--
Brown mustard	--	40.6	20.3	--	0.0	0.0	--	--	--
Rapeseed	--	20.3	4.7	--	0.0	0.0	--	--	--
Oilseed radish	--	35.9	10.9	--	0.0	0.0	--	--	--
Field pennycress	--	--	3.1	--	--	37.5	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	15.6	--	--	35.9	--	--	--
Oats-brown mustard	--	--	28.1	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	17.2	--	--	25.0	--	--	--
Cereal rye-hairy vetch	--	--	17.2	--	--	23.4	--	--	--
Spring wheat-brown mustard	--	--	18.8	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	35.9	--	--	17.2	--	--	--
Cereal rye-crimson clover	--	--	17.2	--	--	15.6	--	--	--
Cereal rye-brown mustard	--	--	18.8	--	--	12.5	--	--	--
Oats-oilseed radish	--	--	15.6	--	--	0.0	--	--	--

By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).  
 \*Cover crops were established in a standing corn crop.

## Clarke McGrath, Union County

Standing crop, 2014: Corn  
 Seeding date: 10/2/2014  
 Fall measurement: 11/7/2014  
 Spring measurement: 4/24/2015



	Aug 14	Sept 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15
Temperature (°F) 2014-15	72	62	53	30	30	25	17	40	51
Temperature (°F) Long-term	73	64	53	38	26	21	26	37	50

Figure 6. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Creston weather station (Iowa Environmental Mesonet, 2015).

Table 9

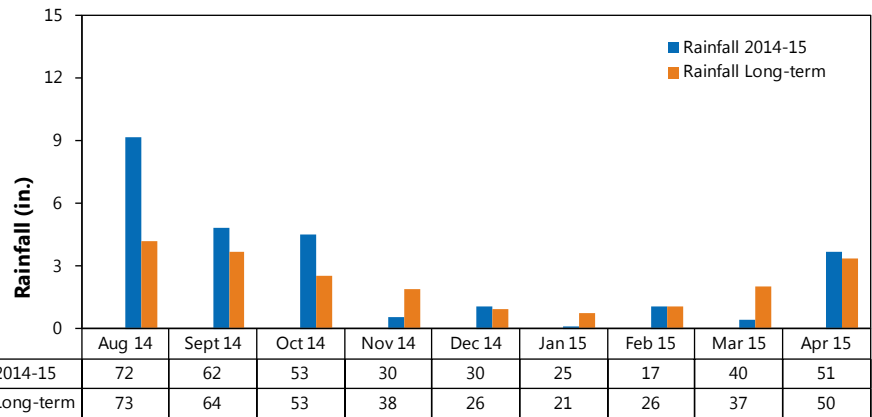
### Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's corn field in Union County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	32.8	4.7	--	12.5	15.6	--	96	--
Spring wheat	--	12.5	7.8	--	0.0	0.0	--	0	--
Oats	--	9.4	9.4	--	0.0	0.0	--	0	--
Annual ryegrass	--	6.3	0.0	--	0.0	0.0	--	0	--
Common vetch	--	6.3	0.0	--	0.0	0.0	--	0	--
Crimson clover	--	3.1	0.0	--	0.0	0.0	--	0	--
Hairy vetch	--	7.8	0.0	--	0.0	0.0	--	0	--
Partridge pea	--	--	0.0	--	--	0.0	--	--	--
Brown mustard	--	64.1	3.1	--	0.0	0.0	--	0	--
Rapeseed	--	23.4	0.0	--	0.0	0.0	--	0	--
Oilseed radish	--	29.7	0.0	--	0.0	0.0	--	0	--
Field pennycress	--	--	0.0	--	--	15.6	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	1.6	--	--	12.5	--	--	--
Oats-brown mustard	--	--	7.8	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	4.7	--	--	12.5	--	--	--
Cereal rye-hairy vetch	--	--	1.6	--	--	12.5	--	--	--
Spring wheat-brown mustard	--	--	6.3	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	1.6	--	--	17.2	--	--	--
Cereal rye-crimson clover	--	--	3.1	--	--	9.4	--	--	--
Cereal rye-brown mustard	--	--	4.7	--	--	7.8	--	--	--
Oats-oilseed radish	--	--	7.8	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

## Clarke McGrath, Union County

Standing crop, 2014: Soybeans  
 Seeding date: 10/2/2014  
 Fall measurement: 11/7/2014  
 Spring measurement: 4/22/2015



	Aug 14	Sept 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15
Temperature (°F) 2014-15	72	62	53	30	30	25	17	40	51
Temperature (°F) Long-term	73	64	53	38	26	21	26	37	50

Figure 6. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Creston weather station (Iowa Environmental Mesonet, 2015).

Table 10

### Results for the Cover Crop Variety Trial 2014-2015 at Clarke McGrath's soybean field in Union County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	29.7	40.6	--	65.6	25.0	--	456	--
Spring wheat	--	12.5	34.4	--	0.0	0.0	--	0	--
Oats	--	14.1	26.6	--	0.0	0.0	--	0	--
Annual ryegrass	--	1.6	14.1	--	0.0	0.0	--	0	--
Common vetch	--	4.7	9.4	--	0.0	0.0	--	0	--
Crimson clover	--	3.1	7.8	--	0.0	0.0	--	0	--
Hairy vetch	--	6.3	9.4	--	0.0	1.6	--	0	--
Partridge pea	--	--	0.0	--	--	0.0	--	--	--
Brown mustard	--	70.3	23.4	--	0.0	0.0	--	0	--
Rapeseed	--	26.6	10.9	--	0.0	0.0	--	0	--
Oilseed radish	--	26.6	7.8	--	0.0	0.0	--	0	--
Field pennycress	--	--	4.7	--	--	31.3	--	--	--
Cereal rye-hairy vetch-rapeseed	--	--	17.2	--	--	26.6	--	--	--
Oats-brown mustard	--	--	14.1	--	--	0.0	--	--	--
Cereal rye-rapeseed	--	--	17.2	--	--	12.5	--	--	--
Cereal rye-hairy vetch	--	--	21.9	--	--	18.8	--	--	--
Spring wheat-brown mustard	--	--	20.3	--	--	0.0	--	--	--
Cereal rye-common vetch	--	--	20.3	--	--	17.2	--	--	--
Cereal rye-crimson clover	--	--	18.8	--	--	18.8	--	--	--
Cereal rye-brown mustard	--	--	15.6	--	--	17.2	--	--	--
Oats-oilseed radish	--	--	9.4	--	--	0.0	--	--	--

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

**Mark Peterson, Montgomery County**

Standing crop, 2014: Corn  
 Seeding date: 9/7/2014  
 Fall measurement: 11/16/2014  
 Spring measurement: 4/30/2015

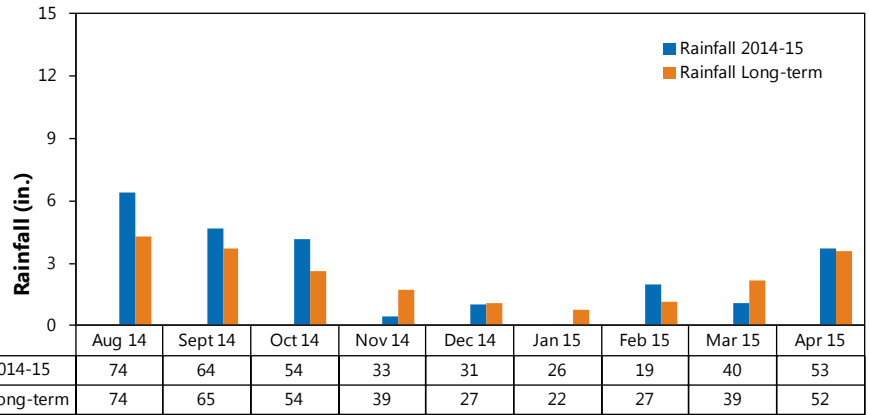


Figure 7. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Red Oak weather station (Iowa Environmental Mesonet, 2015).

**Table 11**

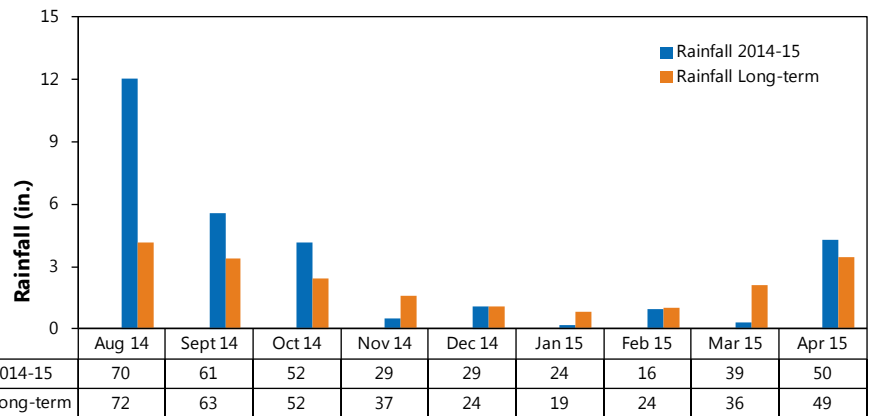
**Results for the Cover Crop Variety Trial 2014-2015 at Mark Peterson’s corn field in Montgomery County.**

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	35.9	37.5	--	100	--	--	1,921	1,488
Spring wheat	--	14.1	4.7	--	0.0	--	--	0	0
Oats	--	12.5	10.9	--	0.0	--	--	0	0
Annual ryegrass	--	1.6	9.4	--	0.0	--	--	0	0
Common vetch	--	7.8	7.8	--	0.0	--	--	0	0
Crimson clover	--	3.1	9.4	--	0.0	--	--	0	0
Hairy vetch	--	9.4	6.3	--	0.0	--	--	0	366
Partridge pea	--	--	0.0	--	--	--	--	--	0
Brown mustard	--	4.7	17.2	--	0.0	--	--	0	0
Rapeseed	--	1.6	10.9	--	0.0	--	--	0	0
Oilseed radish	--	1.6	6.3	--	0.0	--	--	0	0
Field pennycress	--	--	6.3	--	--	--	--	--	720
Cereal rye-hairy vetch-rapeseed	--	--	25.0	--	--	--	--	--	1,248
Oats-brown mustard	--	--	6.3	--	--	--	--	--	0
Cereal rye-rapeseed	--	--	14.1	--	--	--	--	--	1,488
Cereal rye-hairy vetch	--	--	17.2	--	--	--	--	--	1,104
Spring wheat-brown mustard	--	--	12.5	--	--	--	--	--	0
Cereal rye-common vetch	--	--	18.8	--	--	--	--	--	1,513
Cereal rye-crimson clover	--	--	15.6	--	--	--	--	--	1,513
Cereal rye-brown mustard	--	--	7.8	--	--	--	--	--	1,585
Oats-oilseed radish	--	--	4.7	--	--	--	--	--	0

\* By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).

## Dave & Meg Schmidt, Audubon County

Standing crop, 2014: Corn  
 Seeding date: 9/18/2014  
 Fall measurement: 10/31/2014  
 Spring measurement: 4/17/2015



	Aug 14	Sept 14	Oct 14	Nov 14	Dec 14	Jan 15	Feb 15	Mar 15	Apr 15
Temperature (°F) 2014-15	70	61	52	29	29	24	16	39	50
Temperature (°F) Long-term	72	63	52	37	24	19	24	36	49

Figure 8. Mean monthly rainfall and temperature for the period August 2014–May 2015 and the 60-year averages at the Audubon weather station (Iowa Environmental Mesonet, 2015).

Table 12

### Results for the Cover Crop Variety Trial 2014-2015 at Dave & Meg Schmidt's corn field in Audubon County.

Cover Crop	Fall groundcover (%)			Spring groundcover (%)			Spring aboveground biomass (lb/ac)		
	2012	2013	2014	2013	2014	2015	2013	2014	2015
Cereal rye	--	54.7	54.7	--	53.1	64.1	--	264	168
Spring wheat	--	14.4	64.1	--	0.0	0.0	--	0	0
Oats	--	46.9	60.9	--	0.0	0.0	--	0	0
Annual ryegrass	--	6.3	32.8	--	0.0	3.1	--	0	0
Common vetch	--	1.6	12.5	--	0.0	0.0	--	0	0
Crimson clover	--	0.0	29.7	--	0.0	0.0	--	0	0
Hairy vetch	--	23.4	32.8	--	0.0	17.2	--	0	0
Partridge pea	--	--	0.0	--	--	0.0	--	--	0
Brown mustard	--	37.5	42.2	--	0.0	0.0	--	0	0
Rapeseed	--	6.3	21.9	--	0.0	0.0	--	0	0
Oilseed radish	--	15.6	31.3	--	0.0	0.0	--	0	0
Field pennycress	--	--	14.1	--	--	20.3	--	--	120
Cereal rye-hairy vetch-rapeseed	--	--	35.9	--	--	35.9	--	--	144
Oats-brown mustard	--	--	68.8	--	--	0.0	--	--	0
Cereal rye-rapeseed	--	--	29.7	--	--	28.1	--	--	144
Cereal rye-hairy vetch	--	--	43.8	--	--	51.6	--	--	384
Spring wheat-brown mustard	--	--	31.3	--	--	0.0	--	--	0
Cereal rye-common vetch	--	--	51.6	--	--	48.4	--	--	241
Cereal rye-crimson clover	--	--	20.3	--	--	37.5	--	--	264
Cereal rye-brown mustard	--	--	46.9	--	--	56.3	--	--	241
Oats-oilseed radish	--	--	29.7	--	--	0.0	--	--	0

By column, values followed by the same letter are not significantly different ( $P \leq 0.05$ ).  
 \*Cover crops were established in a standing soybean crop.

## References

- Carlson, S. and S. Gailans. 2013. Cover Crop Variety Trial 2012-2013. Practical Farmers of Iowa Cooperators' Program. Ames, IA. <http://practicalfarmers.org/farmer-knowledge/research-reports/2013/twenty-cover-crop-variety-trial-final-report/> (accessed Apr. 24, 2015).
- Carlson, S. and A. Anderson. 2012. Cover Crops Do Double-Duty. Practical Farmers of Iowa Cooperators' Program. Ames, IA. <http://practicalfarmers.org/farmer-knowledge/research-reports/2012/cover-crops-double-duty-cover-and-small-grains/> (accessed Apr. 24, 2015).
- Gailans, S. and S. Carlson. 2014. Cover Crop Variety Trial 2013-2014. Practical Farmers of Iowa Cooperators' Program. Ames, IA. <http://practicalfarmers.org/farmer-knowledge/research-reports/2014/cover-crop-variety-trial-2013-2014/> (accessed Apr. 24, 2015).
- Iowa Environmental Mesonet. 2015. Climodat Reports. Iowa State University, Ames, IA. <http://mesonet.agron.iastate.edu/climodat/> (accessed June 2, 2015).
- Singer, J. 2008. Corn belt assessment of cover crop management and preferences. *Agron. J.* 100:1670-1672

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### **PFI Cooperators' Program**

PFI's Cooperators' Program gives farmers practical answers to questions they have about on-farm challenges through research, record-keeping, and demonstration projects. The Cooperators' Program began in 1987 with farmers looking to save money through more judicious use of inputs. If you are interested in conducting an on-farm trial contact Stefan Gailans @ 515-232-5661 or [stefan@practicalfarmers.org](mailto:stefan@practicalfarmers.org).