WASHINGTON STATE UNIVERSITY
GRANT/ADAMS COUNTY EXTENSION

Cover crops overseeded into corn 2013 field trial report

Andy McGuire, Irrigated Cropping Systems Agronomist
Center for Sustaining Agriculture and Natural Resources
In cooperation with Jeremy Hawes.

Objective

1. Evaluate cover crop species for their ability to germinate and grow when overseeded into a corn crop in late summer

Site details

- Location: Grant County, between Ephrata and Quincy
- Soil: Timmerman coarse sandy loam
- Cropping system
    - Corn, Pioneer PO474, 106 day RR, grown for high moisture grain harvest
    - Herbicides used: 32 oz. Roundup, 2.5 oz. Status applied last week in May

Methods

Experimental design: Randomized Complete Block Design, five replications, plots 2.5' wide (1 row) x 30'.

Planting

August 15, overseeded the plots by hand and then irrigated the same afternoon

Cooperator overseeded an additional four plots of oilseed radish on September 6th.

Cover crop species and seeding rates

Species	Broadcast seeding rate, lb. per ac
Crimson clover	25
Medium red clover	11
Sweet clover	12
White clover	10
Hairy vetch	30
Berseem clover	15
Mustard	10
Arugula	12
Rapeseed	10
Annual ryegrass	25
Oats	120
Triticale	110
Teff	5
Foxtail millet	10
Sudangrass	45
Buckwheat	56
Safflower	16
Radish	unknown

Evaluation

The plots were evaluated on the following dates:

August 21
August 30
September 9
September 17
September 23

A visual rating scale of 0-5 was used with 0=no plants visible, 5=ground covered by plants, based on ground cover only, not biomass.

High moisture corn was harvested on October 2. The combine ran over some plots, but all were left undisturbed over winter.

Plots were viewed but not rated on October 28 and the next spring on March 18, 2014.

Results and Discussion

Cover crop ratings over the season

	Evaluation Date					
Species	8/21/2013	8/30/2013	9/9/2013	9/17/2013	9/23/2013	Average
Annual ryegrass	3.6	2.8	3.2	3	3.2	3.2
Triticale	2	3.2	3	2.8	2.8	2.8
Oats	1.6	2.8	2.9	3	3	2.7
Rapeseed	2.2	2.4	2.6	2.4	2.4	2.4
White clover	3.1	2.4	2	2	2.2	2.3
Medium red clover	3	2.4	2.2	1.6	1.6	2.2
Mustard	3.3	2.8	2.4	1.2	0.8	2.1
Hairy vetch	1	1.6	2.5	2.2	2.2	1.9
Crimson clover	3	2.2	2	1.2	1	1.9
Arugula	4	2.8	1	0.4	0.4	1.7
Berseem clover	2.2	1.8	1.6	1.2	0.8	1.5
Sudangrass	0.8	1.6	1.4	1.8	1.2	1.4
Buckwheat	2	2.8	1.4	0	0	1.2
Sweet clover	1.8	1.6	0.8	0.2	0.2	0.9
Teff	2.4	1.4	0.2	0.2	0.2	0.9
Foxtail millet	1	1	0.4	0.2	0.2	0.6
Safflower	0	0	0	0	0	0.0

Notes on cover crop species performance:

Annual ryegrass: germinated and tolerated shade well, can become a weed in wheat

Triticale: seed moved with first irrigation, this was the only species to survive the winter

Oats: performed well, did not overwinter

Rapeseed: moderate performance

White clover: germinated very well but then declined some, perhaps due to shading.

Medium red clover: germinated very well but then declined some, perhaps due to shading.

Mustard: germinated very well but then declined rapidly, perhaps due to shading.

Hairy vetch: Took longer to get established than other legumes, but grew once established.

Crimson clover: germinated very well but then declined rapidly, perhaps due to shading.

Arugula: germinated very well but then declined rapidly, perhaps due to shading.

Berseem clover: germinated very well but then declined rapidly, perhaps due to shading.

Sudangrass: did not germinate well on soil surface

Buckwheat: moderate germination but then declined.

Sweet clover: weak germination and then declined.

Teff: germinated well but then declined

Foxtail millet: poor germination and establishment

Safflower: did not germinate in these conditions

Radish: although these plots were not rated, the later planting seemed allowed them to survive to harvest better than earlier planted Brassicas. However, the short growing season after corn harvest did not allow much additional growth and they winterkilled.

General observations

- Larger seeds took longer to germinate on soil surface than smaller seeds
- Water from the first irrigation water moved smaller, ungerminated seeds more than larger seeds.
- Cool season grasses tolerated shade better than warm season grasses
- Many species (white clover, red clover, mustard, crimson clover, arugula, berseem clover, buckwheat and teff) germinated well but then stands declined, probably due to shading. These might do better if planted closer to harvest to limit the duration of shading.
- Only grasses and hairy vetch grew much after germination.

Conclusions:

1. There are many cover crop species that will germinate well when overseeded into standing corn in the Columbia Basin. However, most do not do well when shaded more than 2-3 weeks.
2. Planting 2-3 weeks before harvest may improve plant survival, although crushing by harvest equipment can then become a problem. This is in agreement with Midwest recommendations to plant 2-3 weeks before silage harvest, or for grain harvest, when corn plant is dried to the ear. However, in contrast to the Midwest, we generally field dry grain corn, and so following the latter timing would allow very little growing time for cover crops after grain harvest. This makes overseeding cover crops into corn being harvested for dry grain impractical.
3. The short growing season after corn harvest, even after earlier harvested high moisture corn, probably rules out using warm season and slower growing species, like legumes, as overseeded cover crops, unless they can overwinter AND are allowed to grow to at least early May the following year.

Address questions to Andy McGuire, WSU Extension, andrew.mcguire@wsu.edu, 509.754.2011 ext. 413.