Cover Crops and Weed Management in Pumpkin Production

Nathan Johanning
Extension Educator, Local Food Systems and Small Farms
University of Illinois Extension
The Importance of Weed Management

• Weed/Pumpkin plant competition can severely reduce yields
• Weeds can limit air movement
  • Increase the incidence of some plant diseases
• Weeds can harbor insects
• Reduce/interfere with spray coverage of pesticide applications
How Can Cover Crops Help?

• Residue covering the soil can be a physical barrier to weed emergence.
  • For some cover crops residue can last the entire growing season (ie. wheat, cereal rye)
• Cover crops can chemically suppress weeds (allelopathy – Cereal rye)
• Prior to pumpkin planting cover crops can suppress weeds
• Cover crops provide the most weed control when used in no-till production
Cover Crop Considerations

- Relies heavily on limited herbicide options
- Some cover crop residues can be difficult to plant/transplant in to.
- Heavy residue can keep the soil wet during excessively wet weather at planting
- Requires some additional management.
- Vole and mice predation of seeds (direct-seeding)
Other Benefits of Cover Crops

• Cleaner fruit/fruit not lying directly on the soil
• Nitrogen production (legumes)
• Easier field access/harvesting under adverse weather conditions
  • Especially less muddy after rains
• Habitat for beneficial insects
• Overall improved soil health!
Small Grains - Wheat

- Residue is good at suppressing weeds
- Residue can last season long
- Look for wheat varieties that are taller and produce more biomass to obtain more effective weed control
- In southern IL pumpkins can be double cropped especially if pumpkins are transplanted
Small Grains – Cereal Rye

• Residue is very good at suppressing weeds
• Allelopathy
• Residue lasts season long
• Produces more biomass than wheat or many other small grains
• Good nitrogen scavenger (less need for supplemental N for cover crop growth)
Small Grains - Others

- Triticale (wheat x cereal rye)
- Barley
  - Both fall planted and similar cover crop traits
- Oats (spring)
  - Residue does not last as long as fall planted cover crops
  - Can be a good option if unable to get cover crops planted in the fall
**Legumes – Hairy Vetch**

- Good weed suppression while growing
- Residue breaks down more quickly than small grains
  - Less weed suppression later in the season
- Very good as a nitrogen producer
- Can produce a lot of biomass and can be difficult to manage at planting
- Establish in late summer/early fall
Legumes – Crimson Clover

- Good weed suppression while growing
- Residue breaks down more quickly than small grains
  - Less weed suppression later in the season
- Excellent nitrogen producer
- Establish late summer/early fall
- Residue is easier to manage than hairy vetch
Small Grain/Legume Mix

• Ex. Cereal Rye/Hairy Vetch
• Heavy long lasting residue of the small grains combined with the nitrogen production of the legumes
• Best of both worlds!?!?
• Make sure to plan for establishment and termination of both combined.
Termination

• Do not let the cover crops go to seed unless you plant to harvest the seed or deal with potential volunteer cover crops!
• For many cover crops the best time to terminate close to maturity but before any viable seed is set
  • For small grains at flowering (anthesis) is ideal
  • At this point the plants are converting to reproductive growth and you have less vegetative regrowth of the cover crops
Termination Methods

• Roller or Roller/Crimper
• Sickle Mower
• Disc Mower
• Herbicides
• Combination
  • Mow or Crimp followed by a herbicide
Cover Crop Selection

• Based on weed control cereal rye is one of the best crop species.
  • Allelopathy and heavy residue provides the best suppression of most weeds
• The other small grains also very effective
• Legumes provide early weed control but residue breaks down too quickly to provide season long control
• Midwest Cover Crop Council – Cover Crop Selector Tool (mccc.msu.edu)
# Midwest Cover Crops Council - Cover Crop Decision Tool

## Illinois: Jackson County Seeding Dates

### Location Information
- **Location Information:** Illinois
- **Location:** Jackson

### Cash Crop Information
- **Cash Crop:** None or Prevented Planting
- **Plant Date:**
- **Harvest Date:**

### Soil Information

### Attribute Information

#### Drainage Information
- **Select a Drainage Class:**
- **Flooding:** No

#### Goal #1
- **Select an attribute:**

#### Goal #2
- **Select an attribute:**

#### Goal #3
- **Select an attribute:**

---

### Select cover crop to create information sheet
- **50% HV/50% Oats**
- **Submit**

### Reliable Establishment

<table>
<thead>
<tr>
<th>Nonlegumes</th>
<th>March 15</th>
<th>April 1</th>
<th>May 1</th>
<th>May 15</th>
<th>June 1</th>
<th>June 15</th>
<th>July 1</th>
<th>July 15</th>
<th>Aug 15</th>
<th>Aug 15</th>
<th>Sep 15</th>
<th>Sep 15</th>
<th>Oct 15</th>
<th>Oct 15</th>
<th>Nov 15</th>
<th>Nov 15</th>
<th>Dec 15</th>
<th>Dec 15</th>
<th>Jan 15</th>
<th>Jan 15</th>
<th>Feb 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buckwheat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millet, Japanese</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millet, Pearl</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oats, Spring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rye, Winter Cereal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ryegrass, Annual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorghum-sudangrass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sudangrass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triticale, Winter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat, Winter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Brassicas

<table>
<thead>
<tr>
<th>Brassicas</th>
<th>March 15</th>
<th>April 1</th>
<th>May 1</th>
<th>May 15</th>
<th>June 1</th>
<th>June 15</th>
<th>July 1</th>
<th>July 15</th>
<th>Aug 15</th>
<th>Aug 15</th>
<th>Sep 15</th>
<th>Sep 15</th>
<th>Oct 15</th>
<th>Oct 15</th>
<th>Nov 15</th>
<th>Nov 15</th>
<th>Dec 15</th>
<th>Dec 15</th>
<th>Jan 15</th>
<th>Jan 15</th>
<th>Feb 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mustard, Oriental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radish, Oilseed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapeseed/Canola</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tumip, Forage type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Legumes

<table>
<thead>
<tr>
<th>Legumes</th>
<th>March 15</th>
<th>April 1</th>
<th>May 1</th>
<th>May 15</th>
<th>June 1</th>
<th>June 15</th>
<th>July 1</th>
<th>July 15</th>
<th>Aug 15</th>
<th>Aug 15</th>
<th>Sep 15</th>
<th>Sep 15</th>
<th>Oct 15</th>
<th>Oct 15</th>
<th>Nov 15</th>
<th>Nov 15</th>
<th>Dec 15</th>
<th>Dec 15</th>
<th>Jan 15</th>
<th>Jan 15</th>
<th>Feb 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa - Dormant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clover, Crimson</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clover, Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cowpea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pea, Field/Winter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweetclover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

[mccc.msu.edu](http://mccc.msu.edu)
Example Production Plan #1

• October – Drill Cereal Rye
• May – sickle mow cover crop at flowering
• June – direct seed pumpkins and apply a burndown/residual herbicide
  • Roundup, Dual Magnum, Strategy
• July – follow up weed control with Select for grasses and hand-weeding/spot spraying for broadleaves
Example Production Plan #2

- October – drill winter wheat
- June
  - Harvest wheat and mow stubble
  - Apply a burndown/residual herbicide
    - Gramoxone, Dual Magnum, Sandea
  - Transplant pumpkins
- July – follow up weed control with Select for grasses and hand-weeding/spot spraying for broadleaves
Tips to Success with Cover Crops

• Start small to see how things can work for you
  • Different soils and field conditions can change the performance of these cover crops
• Manage the cover crop as another crop
• Don’t give up if at first you don’t succeed
  • Learn from your experiences and explore ways to overcome any challenges
• Have a “Plan B”
  • Know that weather and crop growth might require a modification to your management plan
Maximizing Weed Control

- **Start clean** and free of weeds!
  - Apply an effective burndown herbicide right after planting or right before transplanting
    - If weeds resistant to glyphosate (Roundup) are problematic and present, consider using Gramoxone.

- Grow a healthy cover crop
  - Best planting and growing conditions

- Terminate the cover crop near maturity to get the most residue
  - Most small grains “lignify” and stems stronger near maturity; these stems will also last longer as residue on the soil
Maximizing Weed Control

• Transplant vs. Direct-seed
  • One advantage of transplanting is that crop has a 2-3 week head start on the weeds compared to direct seeding
  • Crop canopy forms in a shorter time
  • Less time to rely on herbicides, cover crops, hoe, etc. to maintain weed control
Managing Waterhemp

- Amaranthus spp. Weeds (waterhemp, palmer amaranth, pigweeds, etc.) are becoming a challenge in pumpkins
  - Dual Magnum (pre) is the best available
    - Needs rainfall for activation!
  - Sandea preemergence can also help
    - ALS-resistant waterhemp is common so Sandea postemergence often does not give complete control
  - Cereal rye or other small grain can suppress waterhemp
2014 Pumpkin Field Day

• September 4, 2014 - 10:00 AM
• U of I Ewing Demonstration Center, Ewing, IL
  • Located about 15 minutes south of Mt. Vernon; 4 miles east of I-57
• Variety Trials, demonstration plots, no-till production, and more
• More details to come!!
  • Watch the IL Fruit/Veg Newsletter
Thank You!

Nathan Johanning
Extension Educator, Local Food Systems and Small Farms
University of Illinois Extension
402 Ava Rd.
Murphysboro, IL 62966
njohann@illinois.edu
(618) 687-1727