Planting Green Research Summary

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Planting green into cereal rye
~2 weeks before cash crop planting date
Desiccated (typical practice)

Cash crop planting date

Living (Planting Green)
Within 5 days after planting
PSU Research Stations
- At least 3 years no-till
- Within more complex experiments
- Greater biomass

Cooperator sites
- 30+ years no-till + CC
- Range of practices
- Lesser biomass CC

Clinton Co. Cooperator
Rock Springs
Landisville
Centre Co. Cooperator
Lancaster Co. Cooperator
Verified + Potential Benefits

- Soil conservation
- Soil moisture management
- Slug management
- Weed management
- Save time
- More N provision from legumes
Results – biomass

- Biomass 94-134% **higher** in PG across main crop x site-year
Results – soil moisture

- At planting soil water content 2.0-7.7% lower in PG
- Soil water content 2% higher in PG later in season

Representative site: Rock Springs soybean 2016

*indicates treatment difference at p < 0.05
Results – soil temperature

PG soil 0.7-2.4°C cooler at planting than desiccated

Representative site: Landisville corn 2016

*indicates treatment difference at p < 0.05
Challenges

• Establishment
Challenges

• Establishment
• Pests
Challenges

- Establishment
- Pests
- N management in corn
Set your growers up for success

In the fall

• Establishing the CC
  o Species
  o Seeding rate
  o Timing

• Fertility
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
  o Equipment

• Growing season
  o Fertility management
  o Pest management
Set your growers up for success

In the fall

• Establishing the CC
  o Species
    • What’s the main crop
    • Supply or trap N
    • Cost & availability
    • Growth habit
### Set your growers up for success

In the fall:

- Establish the CC
- Species
- Will it establish?
- What’s the main crop
- Supply or trap N
- Cost & availability
- Growth habit

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<table>
<thead>
<tr>
<th>Table 1.10-5. Characteristics of common cover crops.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species</strong></td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>COOL-SEASON GRASSES</td>
</tr>
<tr>
<td>Winter rye <em>(Secale cereale L.)</em></td>
</tr>
<tr>
<td>Winter wheat <em>(Triticum aestivum L.)</em></td>
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<tr>
<td>Hairy vetch <em>(Vicia vilosa Roth)</em></td>
</tr>
<tr>
<td>Clover, crimson <em>(Trifolium incarnatum L.)</em></td>
</tr>
<tr>
<td>Clover, red <em>(Trifolium pratense L.)</em></td>
</tr>
</tbody>
</table>
Set your growers up for success

In the fall

• Establishing the CC
  o Species
    • What’s the main crop
    • Supply or trap N
    • Cost & availability
    • Growth habit

<table>
<thead>
<tr>
<th>Species</th>
<th>Cost/Unit</th>
<th>Cost/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal rye</td>
<td>$17-19/bu</td>
<td>$9-38</td>
</tr>
<tr>
<td>Wheat</td>
<td>$4.50-5/bu</td>
<td>$4.50-10</td>
</tr>
<tr>
<td>Crimson cl.</td>
<td>$2.00/lb</td>
<td>$20-30</td>
</tr>
<tr>
<td>Med. Red cl.</td>
<td>$2.50/lb</td>
<td>$20-25</td>
</tr>
</tbody>
</table>
Set your growers up for success

In the fall

• Establishing the CC
  o Species
  o Seeding rate

Winter small grain

• 30 lb/A if planted “early” or high fertility/manure
• 60 lb/A if planted “late” or low fertility/manure
Set your growers up for success

- **Rye seeding rate had little effect** on biomass or other measurements – farmers can **save $$ on seed**

- **Putting too much N on rye cover crop** can have **negative impacts on soybean yield**
Set your growers up for success

In the fall

• Establishing the CC
  - Species
  - Seeding rate
  - Timing
    • Based on species
    • Can compensate seeding rates/fertility
    • Agronomy Guide rec
Set your growers up for success

In the fall

• Establishing the CC
  o Species
  o Seeding rate
  o Timing

• Fertility
  o Risk lodging with too much N on cereals
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
    • Before, during, after planting?
    • Dry conditions, kill CC
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
    • Glyphosate works well
    • Depends on GM trait
    • Caution with plant growth regulators
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
  o Equipment
    • Can be done with most well-maintained NT equipment
    • Planter > Drill
    • Rollers help with tall CC
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
  o Equipment
    • Can be done with most well-maintained NT equipment, **BUT**...
    • Planter > Drill
    • Rollers help with tall CC
Set your growers up for success

- In the spring
  - Killing the cover crop
    - Timing
    - Herbicide program
    - Equipment
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      - Planter > Drill
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Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
  o Equipment

• Growing season
  o Fertility management
    • Depends on CC C:N
    • Biomass
    • Cash crop needs
Set your growers up for success

In the spring

• Killing the cover crop
  o Timing
  o Herbicide program
  o Equipment

• Growing season
  o Fertility management
  o Pest management
    • Slugs
    • Insects
Corn slug damage was *not* significantly reduced by PG

- **PG increased** damage at Lancaster Co. in 2016, decreased in 2017

75% of corn plants were damaged at the Lancaster Co. cooperator site, 2 July, 2016.
Soybean slug damage was not predictably lower in PG

- **Damage** trended higher in 2017 at northern sites, no treatment effect
In summary, current PG BMPs:

- PG with soybeans before trying corn
- Reduce CC seeding rate
- Kill early in dry spring
- Roll-crimp knee high or taller cover
- Use aggressive row cleaners
- Use planter instead of a drill for soybeans
- Understand importance of C:N ratio of CC
- Scout/use IPM
- Have a PG mentor
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