

MICHIGAN STATE UNIVERSITY Extension



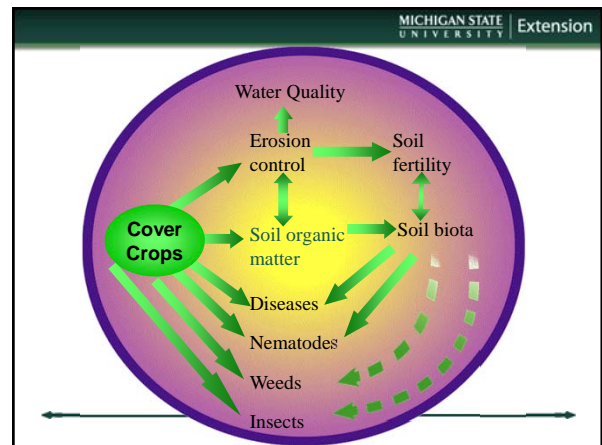
**Considerations to Successfully Establish and Remove Cover Crops in Field Crop Production Systems**

**Kim Cassida**  
MSU Forage Specialist



MICHIGAN STATE UNIVERSITY Extension

**Lake Erie Summer 2014**

MICHIGAN STATE UNIVERSITY Extension

**Building Soil Resistance and Resilience to Stress**


1. Disturb soil as little as possible
2. Keep soil covered as much as possible
3. Keep live plants growing throughout the year to feed soil organisms
4. Increase plant biodiversity via crop rotations, including cover crops

MICHIGAN STATE UNIVERSITY Extension

**Why Don't Farmers Use Cover Crops?**  
2012 CTIC Survey

Why are cover crops not in your rotation?

1. Not enough time to get a cover after harvest
2. Cost of cover crop seed
3. Land is rented with a short-term lease
4. Cover crops don't yield benefits
5. Reduced profits
6. Cost of specialized equipment



\*Conservation Technology Information Center (CTIC), 2012-2013 survey of 809 Corn and Soybean Digest readers, sponsored by Howard G. Buffet Foundation

MICHIGAN STATE UNIVERSITY Extension


### Why Don't Farmers Use Cover Crops?

2012 CTIC Survey


What are the challenges of cover crop management?

1. Cost of cover crop seed
2. Time required for increased management
3. Labor required to plant a cover crop
4. Cover crop becomes a weed
5. Cover crops use too much soil moisture
6. Potential yield reduction
7. I don't know enough about cover crops to answer
8. Increased insect and disease potential
9. Carbon:Nitrogen ratio imbalance

MICHIGAN STATE UNIVERSITY Extension



NORTH CENTRAL  
**SARE**  
Sustainable Agriculture  
Research & Education



**CTIC**

### Cover Crop Survey Report 2013-14

\*Corn yields on fields that had previously been in cover crops were 5 bushels per acre higher than on fields that had not had a cover crop the previous season—an increase of 3.2%.

\*Soybean yields increased by 2 bushels per acre where cover crops were used, a boost of 4.6%.

MICHIGAN STATE UNIVERSITY Extension

### Selecting the Best Cover Crops For Your Farm

#### #1-What are your goals?

- Reduce soil erosion
- Nitrogen fixation
- Control of weeds
- Reduce soil compaction
- Nitrogen scavenging
- Reduction in soil and residue-borne disease
- Control of insects




MICHIGAN STATE UNIVERSITY Extension

### Selecting the Best Cover Crops For Your Farm

#### #2 – How and when will you plant the cover?

- How will it be seeded?
- When will it be seeded?
- What will the weather be like then?
- What will soil temperature and moisture be?
- How vigorous will other crops or pests be?
- Should the cover crop be low growing and spreading or tall and vigorous?
- What weather extremes and wheel traffic must be tolerated?



MICHIGAN STATE UNIVERSITY Extension

### Selecting the Best Cover Crops For Your Farm

#### #3 - How and when will you terminate the cover?

- Will it winterkill in my area?
- Should it winterkill to meet my goals?
- What kind of regrowth can I expect?
- How will I kill it to plant into it?
- Will I have the time to make it work?
- What's my contingency plan and risk if the crop does not establish or does not die on schedule?
- Do I have the equipment and labor needed?

MICHIGAN STATE UNIVERSITY Extension

### Selecting the Best Cover Crops For Your Farm


#### #4 – Which cover species or mix will you use?

- The "Wonder Crop" doesn't exist
- Choose one or more species that come as close as possible



MICHIGAN STATE UNIVERSITY Extension

## Cover Crops That Fit Michigan

| Legume  | Grass  | Non-Legume Broadleaf  |
|---|--|---|
| <ul style="list-style-type: none"><li>★ Red Clover</li><li>★ Crimson Clover</li><li>★ Austrian Winter Pea</li><li>★ Sweet Clover</li><li>★ Berseem Clover</li><li>★ Hairy Vetch</li></ul>  |  <ul style="list-style-type: none"><li>★ Oats</li><li>★ Barley</li><li>★ Sorghum-Sudangrass</li><li>★ Cereal Rye</li><li>★ Wheat</li><li>★ Triticale</li><li>★ Annual Ryegrass</li><li>★ Millet</li></ul> | <ul style="list-style-type: none"><li>★ Buckwheat</li><li>★ Oilseed Radish</li><li>★ Canola/Turnip</li><li>★ Oriental Mustard</li></ul>  |

4-way mix

MI mammoth      Annual ryegrass      Oilseed radish      Hairy vetch



**Seeding Rates**

Monoculture seeding rate information

- MSUE bulletins and fact sheets, <http://forage.msu.edu/extension/>
- MCCC website, <http://www.mccc.msu.edu/>
- Seed companies

Use top end of seeding rate range when broadcasting, and bottom end when drilling

Seeding rates for mixtures

- For even proportions, divide monoculture rate of each species by the number of species in the mix
- Or divide according to your specific goals (60/40, 60/20/20)

**Cover crop options for corn**

Mar Apr May Jun Jul Aug Sept Oct Nov

| Legumes                         |                    | Non-legumes                     |                 |
|---------------------------------|--------------------|---------------------------------|-----------------|
| A                               | Berseem clover     | A <sup>†</sup> , B <sup>†</sup> | Annual ryegrass |
| A, B                            | Crimson clover     | C                               | Barley          |
| A, B                            | Mammoth red clover | A, B                            | Buckwheat       |
| A, B                            | Medium red clover  | B                               | Oats            |
| A, B                            | Sweet clover       | B                               | Oilseed radish  |
| A, B                            | White clover       | B                               | Rape/Turnip     |
| A, B                            | 60/40 mix          | C                               | Rye             |
| A <sup>†</sup> , B <sup>†</sup> | Hairy vetch        | C                               | Triticale       |
| A                               | Medic annual       | C <sup>*</sup>                  | Wheat           |

A = Overseed corn at vegetative stages V4 - V8  
 B = Overseed corn by air or highboy  
 C = Overseed corn by air or highboy  
<sup>†</sup> = After Hessian fly-free date  
<sup>\*</sup> = Not recommended if being planted to wheat

**Cover crop options for wheat**

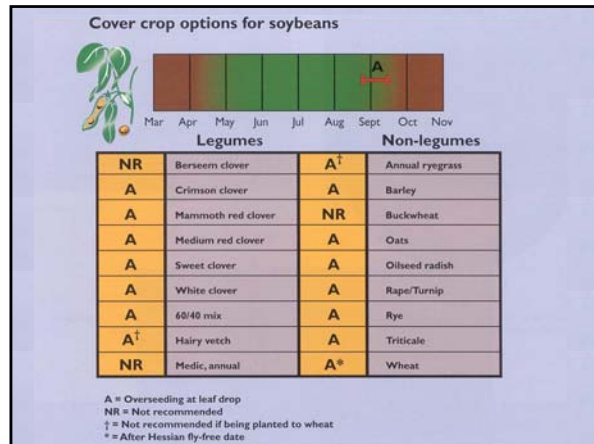
Mar Apr May Jun Jul Aug Sept Oct Nov

**Legumes** **Non-legumes**

|             |                    |           |                 |
|-------------|--------------------|-----------|-----------------|
| <b>B</b>    | Berseem clover     | <b>B</b>  | Annual ryegrass |
| <b>B</b>    | Crimson clover     | <b>B</b>  | Barley          |
| <b>A, B</b> | Mammoth red clover | <b>B</b>  | Buckwheat       |
| <b>A, B</b> | Medium red clover  | <b>B</b>  | Oats            |
| <b>B</b>    | Sweet clover       | <b>B</b>  | Oilseed radish  |
| <b>B</b>    | White clover       | <b>B</b>  | Rape/Turnip     |
| <b>A, B</b> | 60/40 mix          | <b>B</b>  | Rye             |
| <b>B</b>    | Hairy vetch        | <b>NR</b> | Triticale       |
| <b>B</b>    | Medic, annual      | <b>NR</b> | Wheat           |

A = Frost seed  
 B = Seed after harvest  
 NR = Not recommended





MICHIGAN STATE UNIVERSITY Extension

### Keys to Successful Termination

1. Timing, timing, timing!
2. Terminate before cover crop goes reproductive
3. Use the right method for the cover species
4. Consider weeds that may also be present
5. Use greater herbicide rate when cover crop is taller or more mature (especially grasses)
6. In Michigan, terminate cereal grains at least 10 days prior to planting corn and at maximum growth of 12" – 18"

MICHIGAN STATE UNIVERSITY Extension

### Termination methods

1. Allow to winterkill or die naturally
2. Herbicide
3. Incorporation/tillage
4. Crimp
5. Mow or graze

MICHIGAN STATE UNIVERSITY Extension

### Ryegrasses

MICHIGAN STATE UNIVERSITY Extension

### Considerations for Successful Cover Cropping

1. Decide what you want to accomplish in light of available resources (time, machinery, money)
2. Select cover crop(s) that can achieve your goals
3. Start small (10-20 acres) with dependable cover crop(s)
4. Increase acres and species as you gain experience
5. Cover crops take more management, not less!

**“Successful cover croppers consider cover crops part of their rotation”**

Great Lakes Forage & Grazing Conference  
 March 12, 2015  
 East Lansing, Michigan  
 “Improving Forages with Healthy Soils”

Kim Cassida  
 cassida@msu.edu  
 MSU Forage Connection  
<http://www.forage.msu.edu>