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

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Lake Erie Summer 2014

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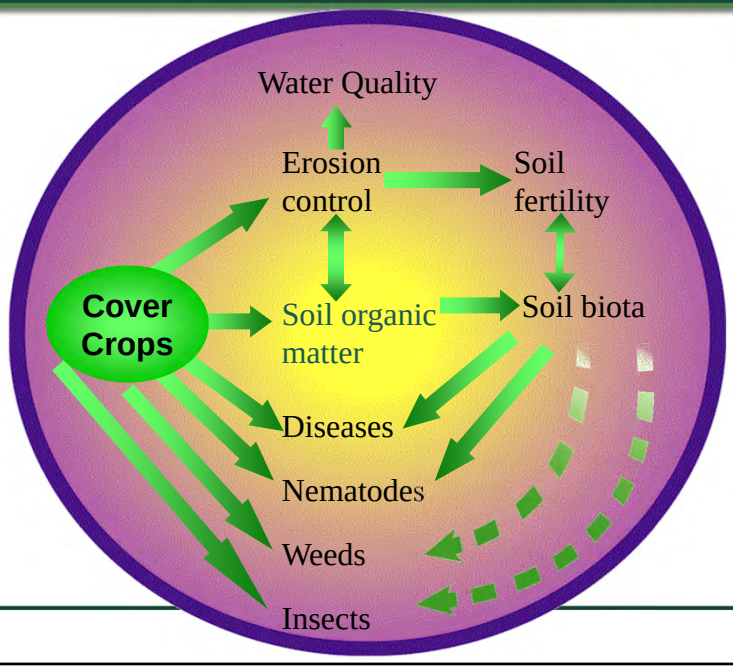

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Building Soil Resistance and Resilience to Stress using the Four Rules of Cover Crops

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 in space and time

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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

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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. Increased insect and disease potential
8. Carbon:Nitrogen imbalance

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NORTH CENTRAL SARE Sustainable Agriculture Research & Education

CTIC Conservation Technology Information Center

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%.

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Selecting the Best Cover Crops For Your Farm

#1-What are your goals?

Most common goals from CTIC survey

1. Reduce soil erosion
2. Nitrogen fixation
3. Control of weeds
4. Reduce soil compaction
5. Nitrogen scavenging
6. Reduction in soil and residue-borne disease
7. Control of insects

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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?

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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?

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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

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Cover Crops That Fit Michigan

Legume

- ★ Red Clover
- ★ Crimson Clover
- ★ Austrian Winter Pea
- ★ Sweet Clover
- ★ Berseem clover
- ★ Hairy Vetch

Grass

- ★ Oats
- ★ Barley
- ★ Sorghum-Sudangrass
- ★ Cereal Rye
- ★ Wheat
- ★ Triticale
- ★ Annual Ryegrass
- ★ Millet

Non-Legume Broadleaf

- ★ Buckwheat
- ★ Oilseed Radish
- ★ Canola/Turnip
- ★ Oriental Mustard

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4-way mix

Red clover

Annual ryegrass

Oilseed radish

Hairy vetch

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Seeding Rates

Monoculture seeding rate information

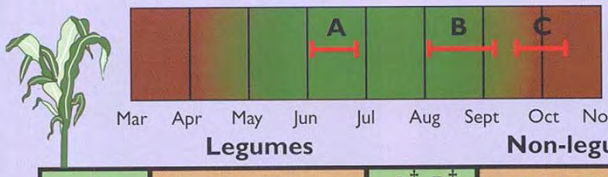
- MSUE bulletins and fact sheets, http://forage.msu.edu/extension/
- MCCC website, http://www.mccc.msu.edu/
- Seed companies

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



Legumes		Non-legumes	
A	Berseem clover	A†, B†	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†, B†	Hairy vetch	C	Triticale
A	Medic annual	C*	Wheat

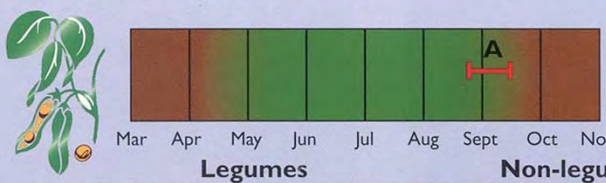
A = Overseed corn at vegetative stages V4 - V8
B = Overseed corn by air or highboy
C = Overseed corn by air or highboy
* = After Hessian fly-free date
† = Not recommended if being planted to wheat

Cover crop options for wheat

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

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

Cover crop options for soybeans



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

A = Overseeding at leaf drop
NR = Not recommended
† = Not recommended if being planted to wheat
* = After Hessian fly-free date

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Keys to Successful Termination

1. **Timing, timing, timing!**
2. **Terminate <u>before</u> 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 grain covers at least 10 days prior to planting corn and at maximum growth of 12” – 18”**

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Termination methods

1. Allow to winterkill or die naturally
2. Herbicide
3. Incorporation/tillage
4. Crimp
5. Mow
6. Graze (not approved)

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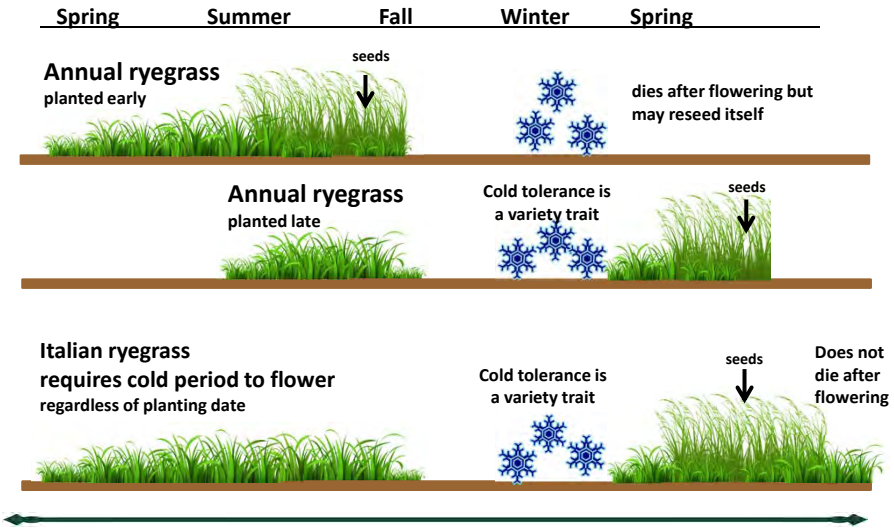
Ryegrasses



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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"

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What's New in Alfalfa?

MSU Forage Connection, www.forage.msu.edu

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Low Lignin Alfalfa

Two companies entering the market

Marketer	Alforex	Forage Genetics International
Variety name	Hi-Gest 360 Hi-Gest 660	HarvXtra
Availability date	2015	2016
Trait development	Conventional breeding	GMO
Stacked traits	None	Roundup Ready
Lignin reduction, % of lignin	7-10%	10-15%
Lignin reduction, %age units	0.5-0.8	0.8-1.2
Digestibility improvement	?	Up to 10%

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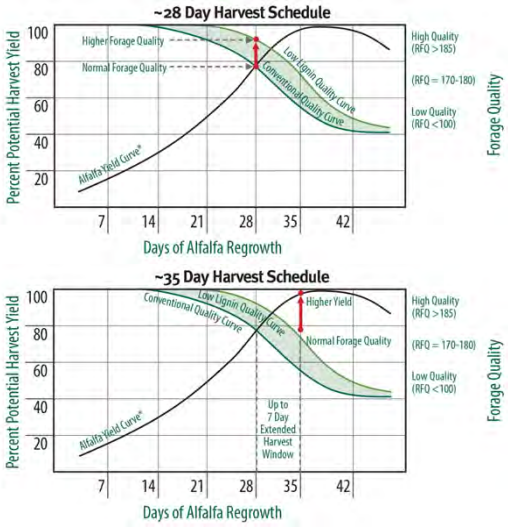

The Sales Pitch

Equal yield and quality in fewer harvests?

Improved persistence?

MSU Forage Connection, www.forage.msu.edu

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The Catch

Extremely limited performance testing leads to many unanswered questions

- ? **Is yield and lignin reduction stable over a wide variety of environments and management choices?**
- ? **Will it lodge?**
- ? **Is it truly persistent under real life management?**
- ? **ONE animal performance trial!**

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