

Cover Crop Basics

Jim Stute

Rock County UW-Extension

jim.stute@ces.uwex.edu

the “take home messages”

No such thing as a “Universal” cover crop

- multiple uses
- selection based on goal
- multiple benefits are possible in some situations, mutually exclusive in others

No such thing as a “Perfect” cover crop

- all species have pros and cons

Experimentation and management = success

- start small with new covers, gain experience
- look for opportunity to exploit properties

**Vast amount of farmer knowledge and experience
available to draw from**

Topics

Cover crop basics

- intended uses and species selection
- management considerations

Catalogue of cover crop options

- grasses
- broadleaves
 - legumes and nonlegumes

Suggested reading

Managing Cover Crops Profitably, 3rd ed.

SARE/ SAN handbook #9

Online: www.sare.org/publications/handbooks.htm

Cover Crops on the Intensive Market Farm

UW Center for Integrated Agricultural Systems

Online: www.cias.wisc.edu/pdf/cvrcrop.pdf

*“cover crop” really a catch all name,
uses include:*

- Conservation/ soil protection
- Soil improvement
- Nutrient cycling/ Management
 - trap crop
 - nutrient removal
- Green manure
- Pest suppression
- Other
 - feed, carbon sequestration

Conservation Uses

Goal:

- protect soil from wind/water erosion
- prevent soil/nutrient movement

Aim:

- develop cover as rapidly as possible

Desirable attributes:

- rapid germination and early growth
- spreading stature
- adapted to difficult environments, easy to establish

Soil Improvement

Goal:

- improve physical structure

Aim:

- add as much organic material as possible
- break up compacted soil

Desirable attributes:

- high yield potential
- recalcitrant (resists decay) biomass
- fibrous root system for plow layer compaction
- tap root for deep compaction

Nutrient Cycling

Goal:

- retain nutrients and make available for other crops

Aim:

- “sponge” available/ excess nutrients
- keep “available” nutrients available

Desirable attributes:

- rapid growth
- medium to high yield potential
- degradable biomass
- deep root system
- high nutrient demand

Green Manure

Goal:

- add nitrogen

Aim:

- fix as much nitrogen as possible
- release it efficiently to the following crop

Desirable attributes:

- legume
- competitive growth
- medium to high yield potential
- degradable biomass

Pest Suppression

Goal:

- control or reduce pest populations

Aim:

- outcompete pests
- disrupt pest lifecycles
- reduce “innoculum” available to susceptible crops

Desirable attributes:

- rapid germination/early growth
- highly specific species/pest interactions

Management Considerations

Things to ask yourself before seed goes in the ground

How am I going to terminate it?

- will it winter-kill?
- is tillage enough?
- will chemicals alone work?

How will I deal with escapes?

- can it volunteer?
- can it get out of control?
- can it get too big for my equipment?

Management Considerations

Things to ask yourself before seed goes in the ground

What about pest interactions?

- is it an alternate host for disease?
- will it attract insects pests of my other crops?

How will it affect the following crop?

- will the residue tie up nitrogen?
- will the residue interfere with seedbed prep./ planting
- will it deplete soil moisture?
- is it allelopathic?

Management Considerations

Things to ask yourself before seed goes in the ground

Is tillage required for establishment?

- may make soil more prone to erosion
- may “burn up” more organic matter that returned

Are conditions suitable to insure success?

- sufficient moisture for germination
- sufficient time for growth

Would a warm or cool season species be more appropriate?

Management Considerations

Things to ask yourself before seed goes in the ground

How am I going to plant it?

- Can I get good soil/seed contact
- Is residue/seed contact enough?

How do I get the right seeding rate?

- Equipment calibration
- Double spreading

Cover Crop Options

Classifications and Distinctions

Life cycles

- annual
- winter annual
- biennial
- perennial

Warm vs. cool season

Grass vs. Broadleaf (dicots)

- fibrous vs tap root
- high vs low fiber
- lower vs higher tissue nitrogen
- legume vs. nonlegume within dicots

Classifications and Distinctions

Life cycles

Why Important?

How and when growth (DM accumulation) occurs

When it should be terminated

Manipulation

Planting “out of season”

Cover Crop Catalogue

Conditions

- ✓ widely tested/ used in the upper Midwest
- ✓ seed widely available/obtainable
- ✓ list covers the range of uses
- ✓ **Caveats**
- ✓ other species commercially available
- ✓ may be acceptable, information not public

My Ratings

- + recommended
- not recommended
- ? some questions
- nei not enough information publicly available

Grasses

Oats and barley

cool season annuals, will winterkill

Best use: conservation

Comments:

- ✓ Could be used for forage and nutrient cycling if planted early enough
- ✓ Plant by September 1, switch to rye after that

Rating: +



Grasses

Annual ryegrass

cool season annual, will winterkill

Best use: conservation

Comments:

- ✓ could be used for forage and nutrient cycling if planted early enough
- ✓ plant by September 1, switch to rye after that
- ✓ more difficult to establish than oat but provides better soil cover

Rating: +



Grasses

Winter rye

cool season, winter annual, will not winterkill

Best use: conservation

Comments:

- ✓ also for forage, soil building and nutrient cycling if planted and allowed to grow into spring
- ✓ plant by October 15, earlier better
- ✓ high N demand if allowed to grow, immobilization could result
- ✓ must be able to manage biomass
- ✓ allelopathy
- ✓ Armyworm attractant?

Rating: +





Grasses

Sorghum Sudan hybrids

Warm season annual, will winterkill

Best use: soil building

Comments:

- ✓ also for forage, weed suppression and nutrient cycling
- ✓ plant June 1-Aug 1, earlier better
- ✓ high N demand if allowed to grow, immobilization could result
- ✓ must be able to manage biomass
- ✓ can be clipped
- ✓ do not allow to go to seed

Rating: +





Broadleaves

Buckwheat

warm season annual, will winterkill

Best use: conservation, smother crop

Comments:

- ✓ role in nutrient cycling debated
- ✓ dies at first hint of frost
- ✓ do not plant after August 15
- ✓ very rapid emergence, ~ 5 days with moisture
- ✓ friable residue
- ✓ seed to seed in 60 to 75 days, volunteer potential high

Rating: +





Broadleaves

Forage brassica

cool season annual, will winterkill (most of the time)

Best use: conservation

Comments:

- ✓ can be used as feed
- ✓ hard seed plus short life cycle increase volunteer potential
- ✓ do not plant after September 1
- ✓ potential disease reservoir for cabbage etc.
- ✓ friable residue

Rating: ?



Legumes

General Comments:

- ✓ Use as green manures, fix atmospheric N
- ✓ Inoculate seed to insure efficient fixation
- ✓ Slow growing as a group relative to others
 - ✓ establish where weeds will be less of an issue
 - ✓ need a fair amount of time to produce sufficient N
- ✓ Hard seed is a concern
- ✓ Lifecycles include annual, winter annual, biennial and perennial
- ✓ Perennials harder to kill once established

Legumes

Berseem clover

annual, will winterkill

Best use: green manure

Comments:

- ✓ good yield potential
- ✓ can be planted from April to August
- ✓ can be clipped.
- ✓ will set seed if planted early enough
- ✓ do not plant after August 15

Rating: +





Legumes

Hairy vetch

cool season winter annual, will winterkill if planted too late

Best use: green manure, conservation

Comments:

- ✓ more rapid development than other legumes
- ✓ competitive, very high yield potential
- ✓ hard seed increases volunteer potential
- ✓ vine-like stature with tendrils, pros and cons
 - will climb other crops
 - will form mat
- ✓ do not plant after August 15

Rating: +



Legumes

Sweetclover

cool season biennial

will winterkill if planted too late

Best use: green manure

Comments:

- ✓ most growth in spring of second year
- ✓ competitive once established
- ✓ high % of hard seed increases volunteer potential
- ✓ do not plant after August 15
- ✓ susceptible to sweetclover weevil
- ✓ honey bee forage

Rating: ? to -



Legumes

Red clover

- ▶ cool season
- ▶ true biennial and short-lived perennial types
- ▶ will winterkill if planted too late

Best use: green manure

Comments:

- ✓ high yield potential
- ✓ well adapted to interseeding
- ✓ competitive once established, also harder to kill
- ✓ hard seed less of an issue
- ✓ do not plant after August 15
- ✓ can be clipped

Rating: +



Broadleaves

The Unknowns

Chickling Vetch
Cool season annual

Field Pea
Cool season annual

Best use: green manure

Comments:
✓ disease issues with field pea?

Rating: nei



