unlock the SECRETS IN THE SOIL

Missouri Conservation Planning Course

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Module 4C – Cover Crops 2013

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Objectives

- General definitions and purposes of cover crops
- Why are cover crops becoming more popular?
- Cover crops are one tool in the toolbox for Soil Health
- Timing of cover crops in cropping systems:
  - Timing for establishment
  - Timing for termination
  - Timing for ordering seed

Objectives

- Categories of cover crops
- What are the farmers objectives for cover crops?
- Challenges of cover crops
- How to fit cover crops into a corn-soybean rotation in Missouri
- NRCS Cover Crop Termination Guidelines (non-irrigated cropland) NEW This is for crop insurance purposes.

What are cover crops?

- NRCS 340 Cover Crop Standard definition:

  - Crops including grasses, legumes and forbs for seasonal cover and other conservation purposes.

- Midwest Cover Crops Council definition:
  - Cover crops are plants seeded into agricultural fields, either within or outside of the regular growing season, with the primary purpose of improving or maintaining ecosystem quality.

Purposes and Benefits of Cover Crops

- Reduce erosion from wind and water
- Increase soil organic matter over a long period of use
- Increase biodiversity in the crop rotation and increase soil organism biodiversity
- Suppress weeds
- Capture and recycle or redistribute nutrients in the soil profile

Purposes and Benefits of Cover Crops

- Improve soil quality, through increases in
  - Porosity (reduced compaction)
  - Soil organic matter
  - Water holding capacity
  - Beneficial microbes
  - Micro- and macro-invertebrates
- Suppress disease or pest cycles in cropping systems
- Add diversity to crop rotations
- Provide cover on the soil surface through the winter or anytime that a commodity crop is not being grown
- Reduce soil compaction by breaking through hard pan layers

Why are cover crops becoming more popular?

- Farmers (organic and conventional) are looking at the purposes and benefits just described and becoming interested in how this could benefit their own cropping systems.

Picture courtesy of USDA NRCS

Cover Crops ONE tool in Soil Health Toolbox

A simple definition of soil health is *the capacity of a soil to function*. Soil Quality National Technology Development Team NRCS

Four Important Concepts for Soil Health

1. **Manage More by Disturbing Less Soil** – less tillage is better for the soil structure and the soil organisms that help enhance soil structure.

2. **Diversify with Crop Diversity** – the diversity in a cropping system will help the diversity of the below ground soil food web and the soil organisms that live there.

Cover Crops ONE tool in Soil Health Toolbox

3. Grow Living Roots Throughout the Year – the sugars exuded by living roots is the best food source for the soil organisms. Then they feed on dead plant roots, and above ground crop residues.

4. Keep the Soil Covered as Much as Possible – soil should always be covered by growing plants and/or their residues. Growing cover protects soil aggregates from the force of raindrops hitting the soil. It is like having a protective armor on the soil.

Timing of Cover Crops in Cropping Systems

- 1. Timing for establishment:
  - Consider when existing crop will be harvested
  - Consider residual herbicides
  - Consider what crop will be grown next i.e. if planting cereal rye then corn may not be the best crop after rye because of the allelopathic affect of rye, but soybeans work excellent after rye. Or if you want to plant corn next then have a mix of rye, radishes, and a legume so you can provide your crop some nitrogen from the legume and cut back on the amount of rye in that mix.

Timing of Cover Crops in Cropping Systems

- 2. Timing for termination
  - Base termination on cover crop stage, moisture, etc.
  - Terminate growth of the cover crop early enough to conserve soil moisture for the next crop.
  - Cover crops established for moisture conservation shall be left on the soil surface.
  - In areas of potential excess soil moisture, allow the cover crop to grow as long as possible to maximize soil moisture removal.

Will Cover Crop Survive over Winter?

- Species selection will have a large impact on the outcome for next spring.
- Knowing what species or variety survive over winter in Missouri is important.

Timing of Cover Crops in Cropping Systems

- 2. Timing for termination
  - Don’t skip on herbicide control.
  - Terminate the cover crop as late as possible for increased biomass production and if you have legumes you want them to grow long enough to produce nitrogen for the next crop.
  - Make sure you know the cover crop termination guidelines and give a copy of this to the farmer for crop insurance purposes. The farmer has these guidelines to work with the Risk Management Agency (RMA) and their local agent.

Timing of Cover Crops in Cropping Systems

- 3. Timing for Ordering Seed
  - Availability of seed has become an issue in recent years
  - Make sure producer knows that getting cover crop seed may be a challenge and to think ahead for planting plans
  - Order early for early delivery
    - If you are going to plant in the fall try to have all your seed lined up in May or June

Categories or Classifications of Cover Crops

- Warm Season Grasses
- Warm Season Broadleaves
- Cool Season Grasses
- Cool Season Broadleaves

Warm Season Grasses

- Corn
- Millet (some desirable, some not) Pearl Millet for Missouri
- Sorghum-Sudan grass

Pearl Millet

Warm Season Broadleaves

- Cowpeas
- Buckwheat
- Sun hemp
- Crimson Clover
- Soybeans

Crimson Clover

Cow peas

Buckwheat

Cool Season Grasses

- Annual Ryegrass
- Cereal Rye
- Barley
- Oats
- Winter Wheat
- Triticale

Cereal Rye

Oats & cowpeas

Cool Season Broadleaf

- Field Pea
- Clovers
- Alfalfa
- Hairy Vetch
- Oilseed Radish
- Turnip

Cereal Rye
Hairy Vetch
Crimson Clover

Oilseed Radish
&
Field Peas

What are farmers objectives for cover crops?

- Control erosion?
- Build soil organic matter?
- Control and suppress weeds?
- Start down the road to achieve better soil health?
- Promote biological nitrogen fixation?
- Provide supplemental forage?

Challenges with cover crops

- Pests like voles
- Extremely dry or wet conditions during establishment or termination
- Stepping out and trying cover crops for the first time
- Learning how to fit it into the farmer's rotation

How to fit cover crops in Corn-Soybean rotation in Missouri

- Step 1. No-Till a Cereal Rye cover crop into corn stalks
  - It is easy to establish and easy to kill. Cereal rye is very cold tolerant, and one of the most tolerant species to residual corn herbicides. It can be aerial seeded, broadcast, or drilled with a high rate of success.
  - It can be mixed with other species depending on seeding dates. If early seeding date then oil seed radish and a legume can be mixed in. A legume like hairy vetch or winter peas can be planted later, or if planting earlier then try crimson clover.

How to fit cover crops in Corn-Soybean rotation in Missouri

- Step 2. No-Till a relatively early group soybean into the cereal rye and try to plant these beans early in the planting season.
  - The early group soybeans benefit from early planting and gives you a wider window to seed cover crop mix in the fall.
  - Soybean responds well to the cereal rye environment, even when planted into tall cereal rye.
  - Some of the benefits include weed control and late season water conservation.

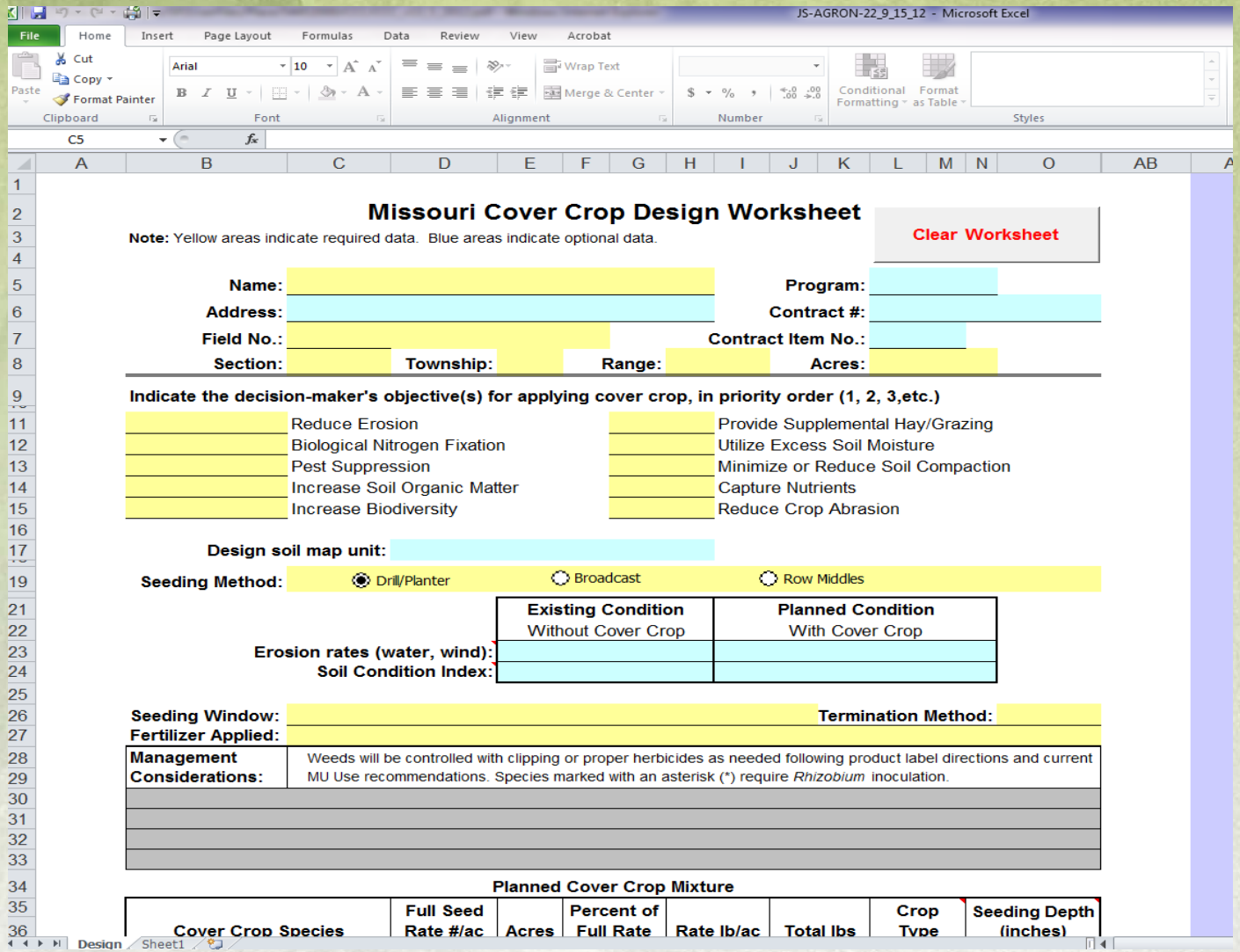
How to fit cover crops in Corn-Soybean rotation in Missouri

- Step 3. Plant a low Carbon:Nitrogen (C:N) mix after Soybeans
  - Cover crops prior to corn should trap or produce Nitrogen in the fall and early spring.
  - Winter Oats and Oilseed Radish (plant early for radish to be effective) could be a good combination.
  - Oats, crimson clover, and Austrian winter pea may be another combination to try.

How to fit cover crops in Corn-Soybean rotation in Missouri

- Step 4. No-Till Corn into the low Carbon:Nitrogen (C:N) mix the following Spring
  - This makes the No-Till corn actually the 4th No-Till operation.
  - By planting a low C:N cover crop mix before corn the Nitrogen is released more timely and the corn crop also benefits from the timed release of the organic Nitrogen (N).
  - Remember the C:N is closely related to cover crop maturity, so plan to terminate the cover crop while it is in the vegetative stage.

Agron 22 Spreadsheet for Cover Crops



This is found In Section IV of eFOTG under Cover Crops 340.

NRCS Cover Crop Termination Guidelines

Non-Irrigated Cropland

- Cover Crops and Soil Health | NRCS this is the place to get this information on the national NRCS website
- This document was put together with NRCS, Farm Service Agency (FSA), and Risk Management Agency (RMA)
- This document provides guidance and flexibility as to when cover crops are terminated in each of the four (4) Cover Crop Management Zones

Contact Information

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Thanks