



United States Department of Agriculture

Cover Crop Management Job Sheet

Natural Resources Conservation Service - Indiana - October 2015

340 Cover Crop

In most cases, each of the following cover crop benefits are maximized when they are planted as early as possible and terminated as late as feasible.

COVER CROP BENEFITS

Erosion Control: Cover crops reduce soil erosion in several ways. They protect the soil surface from raindrop impact, increase water infiltration, trap and secure crop residues, improve soil aggregate stability and provide a network of roots which protect soil from flowing water.

Reduce Nitrate Loss: Nitrate losses from Indiana cropland can find its way to surface waters through surface runoff and tile. Studies show that as much as 80% of these losses can occur during the winter fallow period and into the spring. Many cover crops are good scavengers of nitrogen and will take up excess nitrogen and store it in plant tissues through the winter and early spring. Studies at the USDA-ARS and Purdue University have shown that a winter cover crop of Cereal Rye can reduce the total nitrate loading in drainage systems by 60%. Most of this nitrogen will be available to the following crop or stored in the soil biomass and organic matter.

Reduce Phosphorus Loss: Phosphorus loss from Indiana fields occurs in both soluble and particulate (i.e. attached to soil particles or organic manure or crop residues) forms. Cover crops reduce runoff of soluble phosphorus to surface water through increased infiltration and plant uptake. Particulate phosphorus loss is reduced by trapping organic residues and reducing soil erosion.



Field with cover crop showing no sign of runoff after a 2" rain event

Fix Atmospheric Nitrogen into the Soil: Legume cover crops can produce most or all of subsequent crop nitrogen needs. Many legumes require Rhizobium Bacteria

to fix nitrogen. In many cases these are specific strains to individual species of legumes. Assure the proper inoculant is applied to the seed just before planting. Use only fresh inoculant (check the date). See (SARE) "Managing Cover Crops Profitably, 3rd edition", page 122, *Nodulation* and Chart 3B. *planting*.

Weed Suppression: Cereal Grains, especially Cereal Rye, are very effective in providing competition when growing and once terminated the mulch cover will create a weed barrier by blocking sunlight and producing natural chemicals which suppress weed growth.

Improve Soil Health: Cover crops have the potential to increase soil organic matter and increase the biodiversity of organisms in the soil. This increase is greater where less tillage is used to establish the cover crop and more growth is allowed prior to spring termination. Studies show that tillage prior to seeding or as a part of seeding may cause a greater net loss of carbon than the cover crop can regain. Increased bio diversity from cover crops can increase populations of beneficial organisms such as earthworms and arbuscular mycorrhizal fungi, which greatly



increase nutrient use efficiency, aeration and improve soil structure. Select cover crop species capable of producing high volumes of organic material and/or root mass.

Cereal rye no-till drilled immediately after corn harvest

Plant the cover crop as early as possible and terminate as late as practical for the planned cropping system to

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maximize plant biomass production. To maximize soil biology, select cover crop species to achieve one or more of the following: a species mix with different maturity dates and/or physiology; species that attract beneficial organisms and/or pollinators; and increase biological diversity to a crop rotation.

SITE PREPARATION AND WEED CONTROL

Preceding crop residues should be spread evenly before seeding or following aerial seeding. Existing weeds should be eliminated by applying herbicide if it is determined that sufficient pressure exists to hinder the establishment and growth of the cover crop or perennial weeds are present. If spraying, work with a local consultant or Purdue Extension Specialist to determine the best herbicide combination and timing. Follow the manufacturer's label rates and guidelines when applying herbicides. Herbicide residue or carryover from the previous crop can cause problems with cover crop establishment.

SEEDING

Selection of Plant Materials: Use seed that has been cleaned, tested and labeled according to Indiana Seed Law. Select a species or a mix that is adaptable to the desired planting date with ample time to germinate and reach an acceptable growth stage prior to a killing freeze or adequate root growth to survive the winter. **See: (Midwest Cover Crop Council) - Cover Crop Decision Tool - Cover Crop Selector for Indiana Counties and Indiana Field Office Technical Guide (FOTG) Section IV, Cover Crop Seeding Tool** to select proper seeding rates for a selected species or mix which will meet the intended seeding conditions, methods and desired benefits. **See references.**

Seeding Methods: for complete details, refer to the **Indiana NRCS Agronomy Technical Note - Recommended Cover Crop Seeding Methods and Tools. See references.**

No-till Seeding: Ensure the drill or planter (15" rows or less) is designed to handle the crop residues and seed being planted (especially important for small seeds or mixtures with varying size and/or density). Set and operate the drill/planter to provide an ideal planting depth. Since a planter is capable of much more precise spacing and depth control, it is possible to reduce overall seeding rates by up to 50%. To meet criteria for soil erosion and soil quality at least two species of cover crops should be planted either in alternating rows or combined together.

Broadcast Seeding: Seed may be broadcast using a broadcast seeder if capable of spreading seed in a uniform manner. Pre-mixing the seed with needed

fertilizer or pelletized lime and utilizing an airflow applicator can also be effective.



High clearance applicator converted for seeding cover crops- photo courtesy Mike Shuter

Aerial Seeding: Over seeding into the existing crop in August through September can be an effective seeding method to acquire more fall growth. Seed spread on the surface is more rain dependent and generally requires a higher seeding rate. Seeding cover crops just ahead of soybean leaf drop will aid in mulching the seed and conserving moisture. Results are dependent on adequate rainfall.

Lime and Fertilizer: Fertilizer is not recommended (this includes nitrogen) for the establishment of the cover crop, but may be used to increase biomass production on poor or damaged sites. The cover crop may be used to sequester or trap nutrients from manure or fertilizer applied for the subsequent crop. Lime application in conjunction with a cover crop is advantageous to improve soil quality benefits where pH is less than 6.4. Apply all soil amendments prior to seedbed preparation where possible, or before planting if a no-till drill is used.

TERMINATION

For most cropping systems, it is **not** desirable to allow the cover crop to produce seed. Harvest for grain is not a purpose of this practice standard. When applicable, ensure cover crops are managed and are compatible with crop insurance and /or USDA Program criteria

Use of Herbicides: If the cover crop is to be terminated with herbicides, assure that timing and selection of herbicides achieve a complete kill. Translocated herbicides will normally perform better under conditions that are ideal for active growth. A minimum daytime

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temperature above 55° and night time temperature above 45° is needed for good translocation. During cool weather periods, application should be made during the warming time of day (i.e. 9:00 a.m. - 3:00 p.m.). Avoid tank mixing herbicides that are antagonistic to translocation. See also: A publication from the Oregon Ryegrass Seed Commission- *Annual Ryegrass as a Cover Crop in Midwest Corn and Soybean Production*, for excellent recommendations on Cover Crop Control and burn-down applications that are applicable to most cover crop for spring herbicide termination.

Follow all federal, state, and local guidelines as well as the manufacturer's label rates and guidelines when applying herbicides. For additional information on herbicide controls, contact a local consultant or Purdue Extension Specialist.

Always apply herbicides according to labeled directions. See references.

Mechanical: Most cereal grains are easily terminated by mowing, crimping, or tillage once the cover crop has reached a reproductive growth stage.



Using a roller-crimper to terminate headed out cereal rye

Midwest Cover Crop Council - Cover Crop Decision Tool - Cover Crop Selector for Indiana Counties
<http://mccc.msu.edu/selectorINTRO.html>

Sustainable Agriculture Research and Education (SARE) "Managing Cover Crops Profitably", 3rd Edition explores how and why cover crops work and provides all the information needed to build cover crops into any farming operation. <http://www.sare.org/publications/>

USDA-Natural Resources Conservation Service, Field Office Technical Guide (FOTG) Section IV, Cover Crop Seeding Tool allows the user to develop cover crop mixes based on the desired cover crop biomass composition: http://efotg.sc.egov.usda.gov/references/public/IN/IN_N_RCS_Cover_Crops_Seeding_Calculator.xlsm

Purdue University - "Weed Control Guide for Indiana and Ohio" <http://bteny.purdue.edu/Pubs/WS/WS-16/>

Indiana Conservation Cropping Systems Initiative hosts numerous events and resources on cover crops and conservation cropping systems
<http://ccsin.iaswcd.org/>

USDA-Natural Resources Conservation Service, Field Office Technical Guide (FOTG) Section I, Agronomy Technical notes:
http://efotg.sc.egov.usda.gov/references/public/IN/Technical_Note_Agronomy_Cover_Crop_Seeding.pdf

Annual Ryegrass as a Cover Crop in Midwest Corn and Soybean Production
<http://ryegrasscovercrop.com/resources/publications/>

