

GUIDE SHEET: Using a Cover Crop **Before Soybeans** (in an Iowa corn-soybean rotation)

Introduction

Planting winter hardy cover crops to enhance a corn-soybean rotation has many short and long-term benefits. To maximize benefits, cover crops need to be planted for several years. Implemented correctly, cover crops can improve soil health and crop production.

Cover crops need to be managed as part of the rotation. Timing of planting and terminating is crucial for successful implementation. A primary benefit of cover crops is Soil Organic Matter (SOM) accumulation. The SOM increase is directly related to the biomass produced by the cover crop and the amount of mechanical disturbance applied after the cover crop.

Species Selection

Cereal Rye is the best cover crop to use when going into soybeans the following spring. It's the most winter hardy cereal grain available, and provides excellent root growth to build the soil and scavenge excess nutrients.



Winter Hardy Grains

- » Cereal rye
- » Wheat
- » Triticale

Benefits of Winter Hardy Grains

- » Easy to establish
- » Grass to a broadleaf (*rotational benefit*)
- » Weed control
- » Carbon loading
- » Reduce/prevent compaction

- » Build soil structure - *improves infiltration, soil load bearing capacity, and aggregate stability*
- » Greater residue cover and overall biomass than other options
- » Food for microbes - *increase time with living root*
- » Not as sensitive to residual herbicide carryover
- » Uptake residual nitrate

Fields to Target

The best acres to target when beginning to use cover crops are harvested early or sensitive areas.

- » Corn silage
- » Seed corn
- » Low organic matter soils, eroded farms
- » Resistant weed problem fields – marehail, giant ragweed, waterhemp
- » Compacted areas
- » Soil erosion concerns
- » Transitioning to long term no-till system
- » Manured fields

Application

In Iowa, there is limited growing degree day accumulation, November–February. Getting the seed in the ground as soon as possible increases biomass production in the spring. A good target date is application by Oct. 15.

Drill after harvest (*Best Option*)

- » Uniform stands - *key for weed control*
- » High success rate
- » Slower start
- » Recommended on eroded side hills where surface broadcasting is difficult to get stands established.

Seed on standing crop after 1/2 milk line is reached (*2 weeks before black layer*)

- » **Aerial**
 - Earlier start - *more growing degree days*
 - Seed may drift to neighbor's farm
 - Typical coverage (75-85%)
 - Rainfall dependent - *need rains in first 10 days or stands may be diminished*
- » **High-boy broadcast** - *better for coverage, but will run down some crops*

Rate

- » 45 lbs. meets NRCS Standard requirement (regardless of seeding method).
- » Agronomically, earlier planted stands require fewer lbs. than later planted stands.
- » Consider higher rates for weed control and grazing.
 - Organic producers who rely solely on cover crops for weed control use 2.5 – 3.0 bushels.

Termination

- » Winter hardy grains are easy to kill with herbicide - *When using non-RoundUp® Ready beans, glyphosate must be applied before beans are up.*
- » Plant into green, then terminate:
 - Maximizes cover crop growth
 - Cover crop removes moisture - *excess moisture is often a concern at planting*
 - Easier to plant into green than partially dead
 - There will be some escapes by planter cutting up plants when spraying within a few days of planting.
- » Don't terminate until ready to plant – *unless dry spring and dry forecast*
 - Crop Insurance - requires termination before crop emergence when no-tilling.
- » Tillage termination is difficult and reduces cover crop benefits.

Maximize Biomass Production

- » Improves weed control
- » Add carbon to increase organic matter

Goal – 4,000 lbs. biomass (20"- 24" ht.)

- » How can we get there?
 - Drill by October 15
 - Don't terminate before May 15
- » Consider rolling waist-high rye terminated by herbicide to ensure light won't be limiting to soybean seedling.
- » Roller crimping (terminating) rye after anthesis (flowering) is great for soil health, but delayed planting and available water can reduce yields.

Other Considerations

- » Use with a long-term no-till system to maximize the cover crop benefits.
- » Drill cereal grains 3/4" – 1.5" deep.
- » Air seeders over drills with wavy coulters for minimal soil disturbance.

- » Broadcasting over corn before 1/2 milk line can diminish stands due to shading.
- » Consider earlier maturity corn to increase cover crop growing time.
- » Keep cereal grain row spacing no wider than 20".
- » Cereal rye is known to reduce white mold and sudden death on soybeans when no-tilled.
- » Cereal rye has shown to reduce weed competition.
- » Planting into mature cereal rye can be difficult due to the crown development of the plant.
 - **Planter:** down pressure, planter weight, good condition double disk openers, and row coulters should be considered.
- » If rye is terminated before planting and it rains, soil drying will slow due to extra residue.

Research Findings

The findings below from a **southwest Minnesota study** (Feyereisen et al: *Potential for Cover Crop to Reduce Nitrate Loss, 2006*) show the correlation between earlier fall cereal rye application and increasing the amount of biomass in the spring:

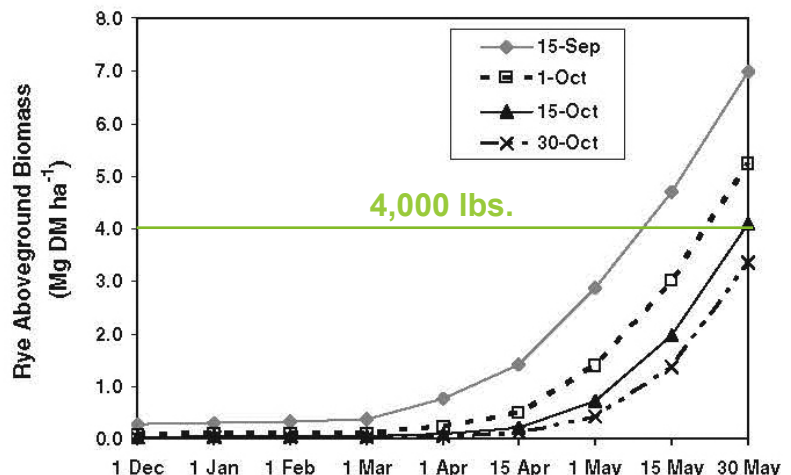


Fig. 2. Cumulative rye aboveground biomass (DM, dry matter) for four fall sowing dates; the data represent mean values after 2500 simulation years.

For More Information

Contact your local NRCS office.

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