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An Introduction to Integrating Cover Crops Into a Corn-Soybean Rotation

Part 2, see our May/June 2021 issue for Part 1

A Two-year Plan for Corn-Soybean Rotation

There are many different cover crop options that can be tailored to work in very specific soils, climates, or management styles. The plan described below is considered a basic, relatively low-risk option.

Step 1: Plant Cereal Rye into Corn Stalks

No-till plant winter cereal rye into corn stalks as your first cover crop. Cereal rye is a versatile cover crop, because it is winter-hardy and can still provide benefits if you plant it late in the fall. Seeding cereal rye with a no-till drill is timely and effective, but cereal rye can also be broadcast seeded and incorporated with a vertical tillage tool, or aerially seeded into the mature corn crop.

Step 2: Terminate in Spring

Terminate the cereal rye in spring when the plants are 6 to 12 inches tall and actively growing or about two weeks before planting soybeans, whichever comes first.

Note that in some years or locations, the cereal rye will grow this tall long before planting. Even when that's the case, we still recommend that you terminate the cover at this small stage for easier management.

You may have heard of some growers who are successfully terminating the cereal rye later, but this is not recommended for those just starting with cover crops, due to increased management risk and crop establishment challenges.

You need to watch the weather and be ready to modify your termination plans. In a dry spring, the cereal rye has the potential to use moisture that the cash crop will need, so terminate covers as early as possible.

In a very wet spring, when it has been very difficult to get into the fields to spray and the cereal rye has gotten very tall, then it often works better to spray within a day or two of planting. The key to success is to not plant into

large cereal rye plants that have fallen on the soil surface and formed a wet mat. This matted material can attract pest insects, such as seedcorn maggot, which will feed on any rotting organic material and readily move to corn and soybean seeds and young plants.

There is debate about whether it is better to terminate a cover crop with herbicides before or after planting at this late stage. Table 1 (on page 2) summarizes the risks and advantages to both approaches. For Indiana and the eastern Corn Belt, crop insurance now allows growers to plant into the green cover crop and terminate the cover crop within five days and before the cash crop emerges.

Step 3: No-till Plant Soybean into Cereal Rye

No-till plant soybeans into the dying or dead cereal rye cover crop. Consider using an early maturity group soybean and try to plant those soybeans early in the planting season. These soybeans could then accumulate more heat units to grow vegetatively (that is, undergo additional leaf node development and branching) before reaching the critical photoperiods or reproductive triggers for the soybean varieties.

Potential benefits include more pod/seed production via nodal positions, branches, and reproduction duration for the early maturity soybean. The combination of planting an early maturity group soybean early will provide earlier maturity in the season, which would give you more calendar days to seed your cover crop next fall.

There may be a tradeoff between soybean yield and cover crop benefits if you choose a maturity group that is too early for your area. However, most growers already purchase several different maturity groups for their farms. Take the earliest maturity soybean group for your farm, and plant it first on the fields that will go to cover crops in the fall. Also, remember that planting soybeans early comes with a higher risk for soilborne diseases, so careful variety selection is essential and seed treatment may be warranted.



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Step 4: Plant Cover Crops that Winter-kill

Plant a low carbon:nitrogen (C:N) cover crop mix after soybeans and before corn. The cover crops you plant before corn should scavenge N in the fall but not tie up N the following season when the corn needs it.

One viable choice is to use a mixture of oats and daikon radish. Both are excellent N scavengers, and both die over the winter (winter-kill). Thus, you do not need to terminate the cover crop in the spring. The radish scavenges soil N and leaves the soil surface friable in spring, but do not plant radish alone because it has very little residue in spring and leaves the soil susceptible to erosion.

The disadvantage of the oats/radish mixture is that you need to plant it by mid-September in much of Indiana in order to have enough fall growth to be of benefit. Oats or another spring cereal, like spring wheat or spring

barley may be planted a bit later, but the earlier the better.

Aerial seeding has been effective as an alternative to seeding after soybean harvest, but aerial seeding is more risky because of the uncertainty of rainfall timing in the fall. You may hear of growers who seed more elaborate species mixtures in their fields; however, we do not recommend these mixes when you are first learning how to grow cover crops because they are more challenging to manage — particularly terminating plants with different growth characteristics.

Step 5: No-till Plant Corn into Dead Cover

No-till plant corn into the dead oats/radish mix in the spring. If a few cover crop plants are present in spring, a normal burndown herbicide program will easily kill them. If you do not want to no-till plant the corn, then a fall strip-till or a shallow tillage pass with a vertical tillage tool in the spring, is possible.

Table 1. A comparison of the advantages and risks of three methods of terminating a cereal rye cover crop.

Preferred Option			Alternative Termination Options Under Very West Conditions Only	
Spray 2 weeks before planting or when cereal rye is 6-12 inches tall	Option 1	Option 2		
	Spray 1-2 days BEFORE planting	Spray AFTER planting (same day or within 1-2 days)		
Advantages				
Herbicide works effectively on undamaged cereal rye plants. Cereal rye is dead before cash crop is planted. Relatively small amount of residue to plant through.	Herbicide works effectively on undamaged cereal rye plants. Cereal rye plants start dying before cash crop is planted.	Planter/drill performance I better in the standing cereal rye.		
Risks				
	If it rains after praying but before planting, planting may be further delayed and the cereal rye may form a wet mat that interferes with planter/drill performance.	Herbicide may not work as well on plants damaged by planter/drill operation. If it rains after planting but before herbicide application, there is a risk the cash crop will emerge before the application. If that happens, there are fewer options for killing the cover crop and there is a potential for yield loss due to earl-season competition.		

Factors affecting establishment of cover crops:

Success is dependent on several factors: seeding date, weather (temperature and moisture) after seeding, seedbed conditions, fertility, depth and volume of previous crop residues, planting depth, seed soil contact, seeding rate, seed quality (germination and % purity), time of freeze after seeding, insects and diseases.

The benefits of a cover crop will be greatest when a good stand is established with as little soil disturbance as possible. The seeding tool or method should have a calculated Soil Tillage Intensity Rating (STIR) rating of 20 or less according to Revised Universal Soil Loss Equation (RUSLE2).

The following are recommended seeding methods and tools which optimize the above factors.

No-Till Drilling: Use a no-till drill that is designed to handle heavy crop residues and the type of seed being planted (especially important for small seeded species). Set the no-till drill to provide good seed-to-soil contact and a planting depth preferred for the desired species to be planted. Depth control for most drills is not precise, so it is important to set it for the optimum depth, and check often to assure placement doesn't exceed the maxim depth for selected species. Soils that are too wet or too dry can also cause improper seed placement.

Harrow Seeding: Rotary harrows, coulter harrow type vertical tillage tools or similar tools can be used to aid in fluffing or cutting residue to allow improved contact with the seed and soil. Air delivery seeders can be mounted to these tools to deliver the seed to the soil as the residue is lifted

or cut. The implement shall be set to run no deeper than 1" and not be designed to invert the soil or to bury the crop residue. Coulters will be set to run straight and not be cupped or concave. Tools with multiple operation gangs should only utilize the coulters with the rear harrow gangs raised or detached. This prevents excessive soil disturbance that will reduce the benefit of the cover crop. This shall be a single pass operation.

Narrow Row Planting: Many split-row or narrow row planters (15" row width or less) can be equipped with seed plates, such as are used for sugar beets or sorghum, which works well for many cover crop species. Additional adaptation and or calibration may be necessary due to variation of seed size among cover crop species and varieties. Since a planter is capable of much more precise spacing and depth control, it is possible to



Two species of Cover Crops in alternating 15" rows

reduce overall seeding rates to 50% of drilled rates. 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. This method will not be used if weed control is the primary purpose.

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Broadcast Seeding: Seed may be broadcast into light residue crops, without a seedbed preparation, if completed in a uniform manner. Heavier seed such as cereal grains are more adapted to this method when seeding into freshly harvested crop residues. Seeding rates should be adjusted up by at least 15%. Pre-mixing the seed with 200 lbs. per acre of pelletized lime or blended with the fertilizer intended for the subsequent crop is acceptable if using an airflow applicator. Seed blended with Fertilizer should be immediately spread to prevent damage to the seed. Wind speed should be 15 m.p.h. or less when broadcasting light seed such as annual ryegrass. A harrow, meeting the same specifications as Harrow Seeding above, may be used immediately following the spreader to improve seed to soil contact.

Aerial Inter-Crop Seeding: Broadcast via a plane, helicopter or high clearance spreader into existing vegetation or residues. This method relies on rain, freeze/thaw cycles, or snow to incorporate the seed. Timing in the fall should be just prior to leaf drop or crop maturity for most cover crops. Some shade tolerant species may be adapted to earlier seeding. It does not include a seedbed preparation. Earlier seeding is desirable when cover crop is to be used for fall forage. An attempt should be made to seed just ahead of predicted rain. Seeding rates should be adjusted up by at least 15%. Only seed mixes of species with similar density should be considered. Aerial applicators should be knowledgeable of the spreading width and the weight of the planned species. Wind speed should be 15 m.p.h. or less when broadcasting.



For more information or to get started using cover crops on your land, contact our office at 574-936-2024 Ext. 4. You can also visit our cover crops page on our website at www.stjosephswcd.org/cover-crops.

Indiana Monarch and Pollinator Conservation

Most of us have probably heard or seen a lot about pollinators in the media recently. The reason why is that pollinators are really, really important. We simply can't live without them. Researchers estimate that one out of every three bites of food we eat is made possible by pollinators. More than 100 food crops in the U.S. depend on pollinators, including almost all fruit and grain crops.

There are many different types of pollinators including native bees, butterflies and moths, beetles, flies, wasps, and of course hummingbirds. But perhaps one of the more interesting pollinators is the Monarch. Millions of Monarchs congregate in a relative small area in Mexico each winter. In March they start their journey north which has occurred over several generations. Unfortunately, the number of Monarchs counted in overwintering colonies has declined over the past 25 years.

In response, many states including Indiana have developed a state Monarch Conservation Plan. With input from many stakeholders over several years, the Indiana Monarch Conservation Plan was released in December 2020. One goal of the plan was to create an online resource that would act as a clearinghouse for Indiana monarch and pollinator conservation data, research, best management practices (BMPs), and events. I invite you to visit the Indiana Monarch and Pollinator Conservation Hub at <https://indianawildlife.org/monarchs/>.

Did you know that quality habitat for wildlife is often quality habitat for pollinators. The diversity of wildflowers and structure



that native grasslands, trees and shrubs benefit them all. Trees such as eastern redbud and Ohio buckeye provide early nectar sources. Native grasslands that have a diverse mixture of wildflowers provide food, bare ground, and structure desirable for a wide variety of pollinators.

If you are interested in turning part of you space into pollinator habitat, contact our office. Through a Clean Water Indiana Grant, the SWCD can help with a cost share program for spaces that are as little as 1/2 acre up to 10 acres. USDA NRCS also has programs that can help with the cost of installing pollinator plantings. Contact Sarah or Debbie to discuss all the available options at (574) 936-2024 ext. 4.

Source: <https://www.purdue.edu/fnr/extension/indiana-monarch-and-pollinator-conservation/>



35% of the world's food crops depend on pollinators to grow.



Together we can care for the land, improve the environment and provide safe affordable food!





Visit us on Facebook 2903 GARY DRIVE PLYMOUTH IN 46563

St. Joseph County Soil And Water Conservation Partnership

July

- 2nd - 10th St Joseph Co. 4-H Fair
- 2nd County Holiday
- 5th Independence Day (Observed) office closed
- 20th Board meeting, location and time TBA

August

- 6th - 22nd Indiana State Fair (Closed Mondays & Tuesdays)
- 17th Board meeting, location and time TBA

September

- 3rd County Holiday
- 6th Labor Day office closed
- 21st Board meeting, location and time TBA



Certification deadline is July 15th

Contact your local FSA office to get your maps and certify your crops today!

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