

Natural Resources Conservation Service

Cover Crops to Improve Soil in Prevented Planting Fields

Prolonged rain and flooding have resulted in many fields that will go unplanted this year. Farmers in this situation need to weigh not only their program and insurance options (“prevented planting”), but they should also assess agronomic options to ensure long-term productivity in this difficult situation.

Producers should explore the benefits of planting a cover crop that has the potential to capture applied nutrients, fix nitrogen, build organic matter, control weeds, control erosion and/or improve soil health and biology during the remainder of the growing season and over the coming fall and winter. These together can maintain yield potential for crops that follow.

Producers are advised to check with their crop insurance agents on prevented planting requirements and harvest or grazing restrictions for cover crops.

A key soil health concept is to ensure that there are live roots during all times of the year. [See NRCS Cover Crop Termination Guidelines.](#)

Building vs. Losing Topsoil

As excessive rainfall runoff or flood waters flow across unprotected fields, the topsoil, rich with nutrients, organic matter, and soil biology is lost.

Tillage applied to water-damaged fields to control weeds or smooth them out are susceptible further losses. Even relatively flat soils will be subject to damage from excessive erosion.

Cover crops that produce abundant above and below-ground biomass help protect these soils from further wind and water damage.



Selecting high biomass cover crop mixes will rebuild topsoil. Cover crops will help restore water damaged soils quicker than if left to grow weeds. The damage to these soils will accelerate especially if left with no cover.

Unless emergency forage is needed, avoid removing biomass from the field by harvesting for forage or grain before late fall to maximize the cover crop benefits. Instead, consider spraying or mowing prior to seed-head formation. This will also ensure quicker decomposition and leave more nutrients in the roots that are available to soil organisms and subsequent crops. Managed grazing is a viable method to manage the growth of cover crops unless programmatic restrictions apply.

Soil Biology, Structure and Compaction

Many fields saturated for long periods lose beneficial soil organisms, such as mycorrhizal fungi that build structure and tilth and rhizobia bacteria necessary for nitrogen fixing legume species. Without these organisms, the soils are further subject to compaction and crusting.

Some fields may be so damaged from channel erosion and sand deposits that extensive remediation activities are required. Heavy machinery necessary for these remediation activities can also damage and compact soils.

Cover crops are essential to rebuild healthy soil structure after these necessary activities. The roots of cover crops penetrate compacted zones, re-form water stable soil aggregates, re-establish macropores, and restore beneficial soil organism populations to restore soil function.

Building vs. Losing Nitrogen

Cover crops can build organic nitrogen pools, and/or sequester residual nitrogen in the soil.

A legume or legume mix planted in early summer can easily provide a significant amount of nitrogen for a following corn or small grain crop.

A brassica, grass, or brassica/grass cover crop mix can scavenge significant residual N from the soil, especially in situations where manure or preplant nutrients have been recently applied.

Herbicide Concerns

Where herbicides were applied, a soil bioassay test is recommended to determine if herbicide residues are present that will hinder cover crop establishment. There are many references available to identify if herbicide residues will limit cover crop species selection. Visit: <https://fyi.extension.wisc.edu/covercrop/herbicide-interactions/>.

Cover Crop Species Guidance

Cover crop selection and management should focus on maximizing both above and below-ground biomass and encouraging nutrient cycling as deep in the soil profile as possible. Choosing a mix of a grass with a fibrous root system and a legume or a deep-rooted broadleaf with a tap root will usually provide the widest range of benefits.

Planting wildlife-friendly cover crops, such as buckwheat or brassicas and leaving the growth and/or the grain can provide a valuable winter food source for a wide variety of wildlife and pollinator species.



An early summer planted legume such as cowpeas, will grow rapidly and fix a good amount of nitrogen prior to a killing frost when it will be terminated.

Brassicas provide excellent weed control and nitrogen scavenging potential. The tap roots are excellent at penetrating tillage pans and dense soil layers.

Seeding and Establishment

Drilling has traditionally been the most successful method of establishment for cover crops but broadcasting and lightly harrowing afterward works well also.

Seed Quality

Source and quality of cover crop seed is extremely important. Bin run seed should be cleaned and tested prior to seeding to avoid weed seed introduction, plugging seeder mechanisms by chaff, and determining seed viability.

Additional References

Midwest Cover Crop Council: www.mccc.msu.edu

Sustainable Agriculture Research and Education (SARE): Managing Cover Crops Profitably www.sare.org/publications

Natural Resources Conservation Service - Field Office Technical Guide (eFOTG): <https://efotg.sc.egov.usda.gov/>

Use the following table and/or the Illinois Cover Crop Selector Tool at:

<http://mccc.msu.edu/selector-tool/>

Cover Crop Recommendations by Resource Concern for SINGLE SPECIES Cover Crop Plantings

Resource Concern	Species	Pure Stand Rate lbs./ac. of PLS1	Seeding Dates
SUMMER COVER - Full Rate for Single Species			
Erosion Control ²	Spring Oats	30-60	8/1 - 9/15
	Annual Ryegrass	10-15	8/1 - 9/15
	3Sudangrass or Sorghum/Sudangrass	15-20	5/15 - 7/15
	Buckwheat	20-35	5/15 - 8/15
	Pearl or Japanese Millet	10-12	5/15 - 8/1
Compaction	Oil Seed Radish	4-8	7/15 - 9/15
	Turnips	2-4	7/15 - 9/15
Nitrogen Fixing	Alfalfa	12-16	7/15 - 9/15
	Red Clover	8-10	8/1-9/15
	Cowpea	50-90	5/15 - 7/15
FALL/WINTER COVER			
Soil Building/N Scavenge/ Weed Suppression ²	Annual Ryegrass	10-15	8/1 - 9/15
	Cereal Rye	50-90	8/20 - 10/15
	Winter Wheat ⁴	50-90	FFD - 10/15
	Spring Oats	60	7/15 - 9/15
	Winter Triticale	50-90	8/20 - 10/15
Nitrogen Fixing	Hairy Vetch	15-20	7/15 - 9/15
	Winter Pea	25-50	8/1 - 9/15
	Crimson Clover	10-20	8/1 - 9/15
	Alfalfa	12-16	7/15-9/15
	Red Clover	8-10	7/15-9/15

1. Pure Live Seed (PLS).
2. For weed suppression use the higher seeding rates within the range.
3. Concern with grazing after frost.
4. Wheat should not be planted prior to Hessian Fly Fee Date (FFD).
<http://extension.cropsciences.illinois.edu/handbook/pdfs/chapter04.pdf>

This is not an all-inclusive list of species or planting dates. See Midwest Cover Crop Council - Illinois Cover Crop Selector Tool <http://mccc.msu.edu/selector-tool/> for more information.

It is recommended that you plant diverse cover crop mixes. The rates listed are for pure stand seedings. When developing a cover crop mix, take the percent desired by the pure stand rate to determine seeding rate by species. (Example 60% Cereal Rye 40% crimson clover would have a seeding rate of .6 X 50-90 = 30-54 lbs./acre cereal rye and .4 X 10-20 = 4-8 lbs./acre crimson clover).

Examples of Diverse Cover Crop Mixes

See Midwest Cover Crop Council-Cover Crop Decision Tool – Cover Crop Selector for Illinois Counties for an all-inclusive species list.

Resource Concern	Species Mix	% of Pure Stand Rate	lbs./ac. of PLS	Seeding Dates
SUMMER COVER – Seed Mixtures by Resource Concern				
Erosion Control	Sorghum/Sudangrass	50	8	5/15 - 7/15
	Buckwheat	15	3	
	Forage Radish ¹	20	2	
	Cowpea	15	15	
Compaction	Sorghum/Sudangrass	50	10	5/15 - 7/15
	Cowpea	50	25	
Nitrogen Fixing Option 1	Alfalfa	50	8	7/15 - 9/15
	Red Clover	50	5	
Nitrogen Fixing Option 2	Crimson Clover	50	5-10	7/15 - 9/15
	Hairy Vetch	50	8-10	
Grazing/Compaction	Cowpea	20	10	5/15 - 7/15
	Millet (Pearl or Japanese)	20	2	
	Sorghum/Sudangrass	20	3	
	Turnip ¹	20	2	
	Forage Radish ¹	20	2	
FALL/WINTER COVER – Seed Mixtures by Resource Concern				
Soil Building/N Scavenging	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	50	25-45	7/15-9/15
	Forage Radish ¹	50	2-4	
Erosion Control	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	60	30-54	7/15-9/15
	Hairy Vetch	40	6-8	
Nitrogen Fixing	Cereal Rye	40	20-36	8/1 - 9/15
	Winter Pea	30	8-15	
	Hairy Vetch	30	8-15	
Grazing/Compaction	Cereal Grain (Cereal Rye, Winter Wheat, Winter Triticale)	50	25-45	8/1 - 9/15
	Forage Radish ¹	25	1-2	
	Turnip	25	½-1	

1. Brassicas are subject to bolt when spring seeded and may produce seed unless mowed or grazed. The seeding dates above were adjusted based on the most limiting species in the mix with respect to growing season. For example, brassicas require at least 45-60 days prior to the first expected frost for optimal growth. Recent on-farm experience suggests that forage radish included in seed mixtures should be limited to 2 lbs. PLS/acre due to competition with other species in the mixture.

