



Cover Crop Preventive Planting

SD-FS-92

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In excessively wet years, farmers may be unable to plant fields or portions of fields in a timely manner. Farmers in this difficult situation need to weigh not only their program and insurance options (“prevented planting”), but should also consider agronomic options which ensure long-term soil productivity and health.

Rather than leaving soils bare and susceptible to erosion, producers should explore the benefits of planting a cover crop. Cover crops have the potential to use excess water, fix nitrogen, control weeds, reduce compaction, control erosion, and/or improve soil health and biology during the remainder of the growing season. These together can build considerable yield potential for the following crop resulting in improved economic potential for the whole rotation.

Producers are advised to check with USDA’s Farm Service Agency (FSA) and Risk Management Agency (RMA) on prevented planting requirements and harvest restrictions for cover crops.

A key soil health concept is to ensure that there is vegetation green and growing during all times of the year.

Building vs. Losing Topsoil

As excessive rainfall runoff or flood waters cut across unprotected fields, the top soil may have been lost from erosion and scouring. With the productive topsoil lost, so too are the nutrients, organic matter, and soil biology. If tillage is applied to these water-damaged fields to control weeds or smooth them out, even relatively flat soils will lose carbon, nitrogen and biomass

Above-ground biomass of cover crops helps protect the soil from further sun, wind and water damage. Selecting high bio-mass cover crop mixes will rebuild topsoil. Cover crops, especially if no-tilled, will add organic biomass both above and below ground to rebuild topsoil quicker than if left to grow weeds or especially if left with no cover.



Avoid removing biomass from the field by harvesting for forage or tillage, as this will reduce the organic matter benefits. Instead consider seeding a frost-kill mix, using herbicide or mowing prior to seed-head formation, particularly if reseeding could be incompatible with subsequent crops. This will also ensure rapid decomposition and leave more nutrients in the roots that are available to soil organisms and subsequent crops. Moderate grazing is not a concern because biomass and nutrients are returned to the soil. However, grazing should be avoided when saturated or wet conditions exist to prevent potential compaction issues.

Soil Biology, Structure and Compaction

Many fields saturated for long periods lose soil organisms that create soil macro-pores and cycle nutrients and lose beneficial soil biology, such as arbuscular mycorrhizal fungi and rhizobia bacteria that build structure and tilth. Without these organisms, the soils are very subject to compaction, crusting, and high bulk density problems.

Some fields may be so compacted that remediation activities are needed. However, cover crops, whether used alone or in conjunction with other compaction remediation activities, are essential to rebuild healthy soil structure. The roots of cover crops help to penetrate compacted zones, hold soil aggregates together, and sustain healthy organisms to restore soil structure.

Growing roots are essential to re-establish the mycorrhizae in the soil and to create pathways for air and water to move through the soil profile, which are key components to restoring the soil's functional properties and will keep the pathways more open to result in a quicker fix of the compacted layers.

Building vs. Losing Nitrogen

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

A legume or legume mix planted in early summer can easily provide 60-100 percent of the needed Nitrogen of a following corn crop.

A brassica or grass, or brassica+grass mix can scavenge over 40 pounds of residual Nitrogen from the soil, and even more in situations where manure or pre-plant nutrients have been recently applied. Additionally, this results in a more rapid gain in total soil biomass and a higher total nutrient availability for subsequent crops.

Herbicide Concerns

A bioassay test is recommended to determine if a herbicide carry over is present. For amine herbicides, sorghum-Sudan grass is the most tolerant of cover crop species.

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 brassica 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 be a very valuable winter food source for a wide variety of wildlife and pollinators.



Legumes alone or in combination with grasses can provide quicker soil biology/biota restoration and Nitrogen fixation. Nitrogen fixation is directly related to growth and development of the legume. An early summer planted legume such as cow peas, will grow rapidly and fix a good amount of Nitrogen prior to a killing frost when it will be terminated. Make sure all legume seed is inoculated.

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

One of the challenges of a mid-summer seeding is the timeliness of rainfall after seeding for germination. It is best if the seed is drilled. This will also address concern about crusted soil and seed-to- soil contact.

Additional References

Sustainable Agriculture Research and Education (SARE): Managing Cover Crops

Profitably 3rd Edition:

www.sare.org/publications

Natural Resources Conservation Service
Soil Health web page:

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>

The table below lists some suggested cover crop mixes for a variety of purposes and their benefits. Additional resources including full seeding rates can be found on the [Cover Crops](#) page under the “[Technical Resources](#)” section of the [South Dakota NRCS](#) web site: <http://www.nrcs.usda.gov/>. Seeding ranges provide flexibility to customize seed mixes based on site conditions and grower needs to achieve 100 percent of the mix.

Example Cover Crop Mixes for South Dakota

Crop Type	Crop Species	Percent
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Compaction

CSG	oats, barley, wheat, rye, triticale, annual ryegrass	10-50%
CSB - legume	field pea, lentil, common vetch, crimson clover, chickling vetch	0-20%
WSG	sorghum-sudan, teff	0-40%
WSB	Sunflower, safflower	0-15%
Brassica	dwarf essex rape, radish, Barkant turnip, hybrids	20-40%

Spring Moisture Utilization and N Fixation

CSB - legume	field pea, lentil, common vetch, crimson clover, chickling vetch	10-25%
WSB - legume	cowpea, soybean, sunn hemp	0-25%
CSG	winter wheat, rye, triticale	50-80%

Spring Moisture Utilization, Nutrient Cycling, N Fixation

CSB - legume	field pea, lentil, common vetch, crimson clover, chickling vetch	0-15%
Brassica	dwarf essex rape, radish, hybrids	15-40%
WSB - legume	cowpea, soybean, sunn hemp	0-15%
CSG	winter wheat, rye, triticale, annual ryegrass	50-85%

Soil Health - Increase crop diversity and organic matter

CSB - legume	field pea, lentil, common vetch, crimson clover, chickling vetch	10-30%
CSB	flax, camelina	5-15%
Brassica	dwarf essex rape, radish, mustard, ethiopian cabbage, hybrids	5-40%
WSB	Sunflower, safflower, buckwheat	0-15%
WSG	millet, teff, sorghum-sudan, sudangrass	0-30%
WSB - legume	cowpea, soybean, sunn hemp	0-15%
CSG	Oat, annual ryegrass, barley	10-30%

Wildlife

CSB - legume	field pea, lentil, common vetch, crimson clover, chickling vetch, red clover	10-30%
CSB	flax, camelina	5-15%
Brassica	dwarf essex rape, radish, mustard, ethiopian cabbage, hybrids	10-50%
WSB	Sunflower, safflower, buckwheat	0-15%
WSG	millet, teff, sorghum-sudan, grain sorghum sudangrass	0-30%
WSB - legume	cowpea, soybean, sunn hemp	0-15%
CSG	Oat, annual ryegrass, barley	10-30%

***Brassicas include:** Canola, ethiopian cabbage, kale, mustard, radish, rapeseed (dwarf essex), turnip, and hybrids of these species.