

## Cover Crops to Improve Soil in Prevented Planting Fields

Prolonged rain and flooding may result 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 also their agronomic options to ensure long-term productivity from this difficult situation.

Producers should explore the benefits of planting a cover crop that has the potential to fix and/or hold-on to nitrogen, build organic matter, control weeds, control erosion and/or improve soil health during the remainder of the season. These together can build considerable yield potential for following crops. With the potential “prevented planting” payment and the improved yield potential following a full season “green manure” crop, the economic potential for the whole rotation could be considerable.



Producers must check with Farm Service Agency (FSA) and their crop insurance agent on planting, grazing and harvest restrictions for cover crops related to prevented planting acres.

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

**Building vs. Loss of 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.

The above-ground biomass of cover crops will help protect the soil from further sun, wind and water damage.

Selecting high bio-mass cover crop mixes will rebuild topsoil. Cover crops, especially if part of a quality no-till system, 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 harvesting the cover crop biomass for forage (*Insured cropland may have harvest and grazing restrictions*), which will reduce the organic matter benefits. Instead, consider killing or mowing cover crops prior to seed-head formation if reseeding could be incompatible with subsequent crops. This will also ensure rapid decomposition and

leave more nutrients in the below-ground plant material that are available to soil organisms and subsequent crops.

Insured prevented planting acres, which could be utilized for grazing after it is released by the crop insurance company (*be sure to check RMA guidelines*), could gain some additional soil health benefits from the added bioflora supplied by the livestock if managed correctly, and soil moisture conditions are monitored. Non-insured acreage could possibly be utilized for grazing earlier with similar results. The addition of animal waste products prior to planting the cover crop could also have similar benefits. Both would help tie up nutrients until the subsequent crop.

**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 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 deep tillage or other remediation activities are planned. 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 recently deep-tilled layers more open to result in a quicker fix of the compacted layers.

**Building vs. Loss of 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% of the needed Nitrogen of a following corn crop.

A brassica or grass, or brassica+grass mix can scavenge over 40 pounds of residual N from the soil, and even more in situations where manure or preplant 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.

**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, legumes &/or brassicas, and leaving the growth through flower and/or the grain can be a very valuable late fall and winter food source for a wide variety of wildlife and pollinators. Just remember that allowing cover crops to produce seed may not be desirable in many cropping situations.

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 N prior to a killing frost when it will be terminated. For later plantings, an over wintering legume such as Austrian winter pea should be considered. Make sure all legume seed is freshly inoculated.

Brassicas like Daikon Radish, provide excellent weed control and nitrogen scavenging potential. The tap roots are excellent at penetrating tillage pans and dense soil layers. Remember that planting them too early (prior to August) may cause them to *bolt* and produce seed, or produce larger than desirable (vs. desired) tubers. To reduce nitrogen loss after the start of the brassica decomposition, a grass should be planted with it to maintain the nitrogen storage until the subsequent crop.

**Seeding and Establishment:** One of the challenges of an early to mid-summer seeding is the timeliness of rainfall after seeding for germination. It is best if the seeding is with a drill or planter to get the best placement and seed-to-soil contact. This will also address concern about crusted soil.

### **Choose plant species (Cover Crops) from the following lists:**

1. Select the species or mix for the desired attributes described in the selected criteria from the **Midwest Cover Crop Council Decision Tool** at: <http://mccc.msu.edu/selectorINTRO.html>
2. The rates for the desired % of each species in a mix can be calculated with the **IN Cover Crops Seeding Calculator** ([http://efotg.sc.egov.usda.gov/references/public/IN/IN\\_NRCS\\_Cover\\_Crops\\_Seeding\\_Calculator.xlsm](http://efotg.sc.egov.usda.gov/references/public/IN/IN_NRCS_Cover_Crops_Seeding_Calculator.xlsm))

### **Additional References:**

- Midwest Cover Crop Council: <http://www.mccc.msu.edu/>
- Indiana NRCS Agronomy page: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/in/technical/ecoscience/agronomy/>
- USDA-RMA-2012 *Prevented Planting Handbook* [http://www.rma.usda.gov/handbooks/25000/2012/12\\_25370-1h.pdf](http://www.rma.usda.gov/handbooks/25000/2012/12_25370-1h.pdf).
- Indiana Conservation Cropping Systems Initiative - <http://ccsin.iaswcd.org/>
- Sustainable Agriculture Research and Education (SARE): *Managing Cover Crops Profitably* - <http://www.sare.org/publications/>
- Natural Resources Conservation Service - Field Office Technical Guide: <http://efotg.nrcs.usda.gov/treemenuFS.aspx>