

Soil Quality Enhancement Activity – SQL02 – Continuous cover crops



Enhancement Description

Growing continuous *seasonal* cover crops of grasses, legumes or forbs following **all annual crops** during all the non-crop production periods of the rotation. Continuous cover cropping is applicable to conventional, specialty and organic crop production systems.

Landuse Applicability

Cropland

Benefits

Growing seasonal cover crops during all non-crop periods between annual crops reduces wind and water erosion.

Cover crops also restore and maintain soil productivity and soil quality over a wide range of climates and crop species. They do so by increasing organic matter, improving soil fertility, breaking pest cycles and providing habitat for soil macro-fauna, such as earthworms.

Conditions Where Enhancement Applies

This enhancement applies to all acres of annually planted cropland. These acres can be organic, transitioning to organic, or non-organic.

Criteria

Implementation of this enhancement requires continuous cover crops during the non-crop production period of the rotation. For the purposes of this enhancement, the cover crop shall not be grazed. Further, the cover crops must meet 2 or more of the following criteria:

1. High bio-mass cover crops for erosion control and increased soil organic matter improvement.
 - Plant a cover crop with a growth potential to produce a minimum of 3,000 lbs/acre (dry weight) above ground bio-mass when terminated by harvest, frost, mowing, tillage, crimping, and/or herbicides in preparation for the following crop.
 - Growth potential lists for selected cover crops are available in “Managing Cover Crops Profitably, 3rd Edition” (Sarrantonia, 1998).

2. Legume cover crops for biological nitrogen fixation.
 - Plant a leguminous cover crop between two primary crops in the rotation. This enhancement does not apply to legumes that are normally part of the crop rotation. It shall be seeded at a rate recommended by the NRCS Field Office Technical Guide. Estimate nitrogen credits from the leguminous crop and base any additional N applications according to the guidelines of the Land Grant University.



3. Non-leguminous cover crops to capture and recycle residual nitrogen.

- Plant a cover crop with a growth rate and rooting depth sufficient to scavenge excess nitrogen from the root zone of the previous crop. Seed the cover crop at the rate recommended by the NRCS Field Office Technical Guide.
- Consider reducing the nitrogen recommendation for the following crop by an estimated amount based on the site conditions both before and during the cover crop's growing period, the cover crop species, and the termination phase of the cover crop.

Note: This enhancement does not apply to the same acres on which a leguminous cover crop is applied.

4. Cover crops for weed suppression.

- Plant a cover crop with the chemical and physical characteristics necessary to suppress or compete with the identified target weed species. Leave cover crop residues on the soil surface to maximize the allelopathic (chemical) and mulching (physical) effects. Select cover crops and seeding rates as recommended in the NRCS Field Office Technical Guide or from the Land Grant University as appropriate.

5. Biodiversity improvement with cover crops.

- Plant cover crop species with the characteristics to attract beneficial insects such as pollinators and/or predator insects, serve as trap crops for damaging insects, and/or provide natural bio-fumigation for soil dwelling pests. Select cover crops to meet the planned objective as recommended in the NRCS Field Office Technical Guide or from the Land Grant University as appropriate.

Adoption Requirements

This enhancement is considered adopted when two or more of the criteria are met on land use acreage.

Documentation Requirements

1. Crop rotation records, including rotation length in years, crops and cover crops planted, and
2. Sequence and description of operations for each crop and cover crop including harvest, tillage, nutrient placement and planting/seeding.

Soil Quality Enhancement Activity – SQL02 – *Continuous Cover Crops*

Reference:

- **340 – Cover Crop**
- **Managing Cover Crops Profitably, 3rd Edition**

The cover crops must meet 2 or more of the following criteria:

| | Criteria 1: High Bio- mass (lbs/Ac)* | Criteria 2: Biological N Fixation (lbs/ac) | Criteria 3: Capture/Recycle Residual N | Criteria 4: Weed Suppression | Criteria 5: Biodiversity |
|-----------------|---|---|---|---|-------------------------------------|
| Annual Ryegrass | 2000-9000 | | X | X | |
| Barley | 2000-10000 | | X | X | |
| Berseem Clover | 6000-10000 | 75-220 | | X | |
| Buckwheat | 2000-4000 | | | X | X |
| Cereal Rye | 3000-10000 | | X | X | |
| Cowpeas | 2500-4500 | 100-150 | | X | X |
| Crimson Clover | 3500-5500 | 70-130 | | X | X |
| Hairy Vetch | 2300-5000 | 90-200 | | | X |
| Medics | 1500-4000 | 50-120 | | X | |
| Red Clover | 2000-5000 | 70-150 | | X | X |
| Oats | 2000-10000 | | X | X | |
| Radish | 4000-7000 | 50-200 | | X | |
| Sorghum – Sudan | 8000-10000 | | X | X | |
| Sweetclover | 3000-5000 | 90-170 | | X | X |
| Turnips | | | | X | |
| White Clover | 2000-6000 | 80-200 | | X | |
| Winter Wheat | 3000-8000 | | X | X | |

Source: *Managing Cover Crops Profitably, 3rd Edition*. Sustainable Agriculture Network. 2007; Minnesota NRCS Cover Crop (340) Practice Standard.

* Special attention to the seeding rate and management may be required to meet the 3,000 lbs/acre dry weight bio-mass requirement for the SQL02 Enhancement.

SEEDING RATES AND ASSOCIATED INFORMATION

| Species | Seeding Rate | Seeding Depth (inches) | Seeding Date | Comments |
|-----------------|----------------|------------------------|--------------------------------------|---|
| Annual Ryegrass | 15 – 20 lbs/ac | ¼ to ½ | June 1-July 1 OR Aug 15 – Sept 15 | Easily established. Good for use as overseeding row crop. May be seeded after harvest. |
| Barley | 0.75 bu/ac | ½ to 1 ½ | April 1 - May 15 | Broadcast or drilled; kill by using chemicals, row cultivation or both |
| Barley | 1.5 – 2 bu/ac | ½ to 1 ½ | Aug 15 - Sept 15 | May be overseeded into growing crop or seeded after harvest. |
| Oats | 1 bu/ac | ½ to 1 ½ | April 1 - May 15 | Broadcast or drilled; kill by using chemicals, row cultivation or both |
| Oats | 1 – 2 bu/ac | ½ to 1 ½ | Aug 15 - Sept 15. | Can be seeded on rough plowed land (usually before Sept. 1) and will not need plowing the following spring |
| Cereal Rye | 1 – 1 ¼ bu/ac | ½ to 1 ½ | Aug 15 - Sept 15 | Easily established. Rapid growth in fall and spring. Has an allelopathic property. |
| Cereal Rye | ¼ - ½ bu/ac | ½ to 1 ½ | Aug 15 - Sept 15 | Use this rate only for cropland going into sugarbeets the following spring |
| Winter Wheat | 1- 1 ½ bu/ac | ½ to 1 ½ | Aug 15 - Sept 15 | Advantageous if site is seeded after Sept. 1 or under dry soil conditions. |
| Buckwheat | 35 – 60 lbs/ac | ½ to 1 ½ | June 1 - July 10 | Summer smother crop. Residue degrades rapidly. |
| Sorghum – Sudan | 25 – 30 lbs/ac | ½ to 1 | May 15 - July 1 | Advantageous to use on well drained and droughty sites. |
| Turnips | 1- 4 lbs/ac | | July 15 - Aug 15 | Fast growing and tolerate cold temperatures. Broadcast or drilled. |
| Oilseed Radish | 8 – 12 lbs/ac | ¼ to ½ | June 1 - Sept 15 | Drilled or broadcast & incorporated. Best suited: early fall growth after small grain, vegetable, corn silage, early soybean harvest. |
| Spring Wheat | 0.75 bu/ac | ½ to 1 ½ | April 1 - May 15 | Broadcast or drilled; kill by using chemicals, row cultivation or both |

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Conservation Stewardship Program

Minnesota

2012 Ranking Period 1

| Species | Seeding Rate | Seeding Depth (inches) | Seeding Date | Comments |
|-------------------|----------------|------------------------|--|--|
| Berseem Clover | 10 – 15 lbs/ac | ¼ to ½ | Early spring into small grain. | Summer annual. Often mixed with ryegrass or small grains. Heavy N producer, establishes well with an oat nurse crop – excellent cover for sg-c-sb rotations. Winter kills. |
| Cowpeas | 30 – 90 lbs/Ac | 1 to 2 | May 15 - July 1 | Summer annual adapted to southern MN. Often mixed with sorghum-sudangrass or interseeded with corn. |
| Crimson Clover | 10 – 15 lbs/ac | ¼ to ½ | Early spring into small grain OR Aug 1 - Sept 15 | Adapted to southern MN; rapid summer or fall growth; use as a winter killed annual like oats. Provides good groundcover and weed control. |
| Hairy Vetch | 20 – 30 lbs/ac | ½ to 1 ½ | Aug 1 - Sept 15 | Adapted to southern MN; produces plenty of residues to condition soil and supply N. It can provide sufficient N for many vegetable and late planted crops and partially replace N for corn. Smothers spring weeds. Commonly planted with winter cereals. |
| Medics | 10 – 20 lbs/ac | ¼ to ½ | Aug 1 - Sept 15 | Adapted to southeastern MN; ideal for long rotations of forages and cash crops. Often used after wheat harvest. May become invasive if allowed to seed out. Hard seed will remain viable in soil for many years. |
| Medium Red Clover | 8 – 10 lbs/ac | ¼ to ½ | April 15 - June 15 OR Aug 1 - Sept 15 | Good on somewhat poorly drained sites and potato fields with moderate pH. Prefers drilling to broadcast. |
| Sweet Clover | 8 – 10 lbs/ac | ¼ to ½ | Early spring into small grain OR Aug 1 - Sept 15 | Advantageous to use on well drained and droughty sites. Prefers drilling to broadcast. May become invasive if allowed to seed out. Hard seed will remain viable in soil for many years. |
| White Clover | 5 – 7 lbs/ac | ¼ to ½ | Aug 1 - Sept 15 | Often mixed with annual rye or red clover. Good when planted between rows of irrigated vegetables or trees. |

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