

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

COVER CROP

(Ac.)

CODE 340

DEFINITION

Crops including grasses, legumes and forbs for seasonal cover and other conservation purposes.

PURPOSE

- Reduce erosion from wind and water
- Increase soil organic matter content
- Capture and recycle or redistribute nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Weed suppression
- Provide supplemental forage
- Soil moisture management
- Reduce particulate emissions into the atmosphere
- Minimize and reduce soil compaction

CONDITIONS WHERE PRACTICE APPLIES

On all lands requiring vegetative cover for natural resource protection and or improvement.

CRITERIA

General Criteria Applicable to All Purposes

Plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods shall be consistent with approved local criteria and site conditions. See Tables 1-5 for common plant species as well as planting dates, depths and

rates. Use the lower seeding rate when drilling and the higher rates when broadcasting seed except where noted (personal communication Dr. Dewey, University of Georgia, Tifton, Ga.). Plant one-half to two-thirds of one species with the normal rate of the other species when mixing species. Use the broadcast rate(s) when seeding a single or multiple species by air.

Selected species will be compatible with other components of the cropping system.

Terminate cover crops by harvest, frost, mowing, tillage, crimping, and/or herbicides in preparation for the following crop. Do not burn cover crop residue.

Apply fertilizer and herbicides according to the Georgia's Nutrient Management (590) and Pesticide Management (595) standard, respectively. Follow the instructions in the herbicide label regarding the effects of herbicides applied to cover crops on subsequent crops.

Do not use plants that are on the state's noxious weed or invasive species lists (<http://www.gaeppc.org/list.cfm>).

Additional Criteria to Reduce Erosion from Wind and Water

Cover crops shall be established and managed, in conjunction with other practices, will be timed so that the soil will be adequately protected during the critical erosion period(s) under normal weather conditions.

Plants selected for cover crops will have the biological and physical characteristics necessary to provide adequate protection.

The amount of surface and/or canopy cover needed from the cover crop shall be determined using current erosion prediction technology.

Additional Criteria to Increase Soil Organic Matter Content

Cover crop species will be selected on the basis of producing large quantities of organic material and or root mass to maintain or increase soil organic matter.

The NRCS Soil Conditioning Index (SCI) procedure will be used to determine the amount of biomass required to have a positive trend in the soil organic matter subfactor.

The cover crop will be terminated as late as feasible to maximize plant biomass production, considering the time needed to prepare the field for planting the next crop and limit soil moisture depletion.

Additional Criteria to Capture and Recycle Excess Nutrients in the Soil Profile

Cover crops will be established and actively growing before the expected period(s) of nutrient leaching.

Cover crop species will be selected for their ability to take up large amounts of nutrients from the rooting profile of the soil.

When used to redistribute nutrients from deeper in the profile up to the surface layer, the cover crop will be terminated in relation to the planting date of the following crop. If the objective is to best synchronize the use of cover crop as a green manure to cycle nutrients, the carbon/nitrogen ratios may be considered to schedule termination. Early termination will result in fast mineralization of nutrients and uptake by the cash crop. Late termination may be used if the objectives are to use as a biocontrol and maximize the addition of organic matter. Scheduling the termination of the cover crop depends on the rotation, weather and objectives.

Additional Criteria to Promote Biological Nitrogen Fixation

Only legumes or legume-grass mixtures will be established as cover crops. Account for

nitrogen credits from legume covers in nutrient management plans.

The specific Rhizobium bacteria for the selected legume will either be present in the soil or the seed will be inoculated at the time of planting. Frequently, it is assumed that the specific bacteria are present in the soil if the crop has been grown in the field.

Additional Criteria to Increase Biodiversity

Cover crop species shall be selected that have different maturity dates, attract beneficial insects, increase soil biological diversity, serve as a trap crop for damaging insects, and/or provide food and cover for wildlife.

Additional Criteria for Weed Suppression

Species of cover crop will be selected for their biological characteristics to suppress or compete with weeds.

Cover crops residues will be left on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects.

For long-term weed suppression, reseeding annuals and/or biennial species can be used.

Additional Criteria to Provide Supplemental Forage

Selected species will have desired forage traits, be palatable to livestock, and not interfere with the production of the subsequent crop.

Forage provided by the cover crop may be hayed or grazed as long as sufficient biomass is left for resource protection.

Additional Criteria for Soil Moisture Management

Terminate growth of the cover crop sufficiently early to conserve soil moisture for the subsequent crop. Cover crops established for moisture conservation shall be left on the soil surface.

In areas of potential excess soil moisture, allow the cover crop to grow as long as possible to maximize soil moisture removal.

Additional Criteria to Reduce Particulate Emissions into the Atmosphere

Manage cover crops and their residues so that at least 80% ground cover is maintained during planting operations for the following crop.

Additional Criteria to Minimize and Reduce Soil Compaction

Select and manage cover crop species that will produce deep roots and large amounts of surface or root biomass to increase soil organic matter, improve soil structure and increase soil moisture through better infiltration.

CONSIDERATIONS

Plant cover crops in a timely matter to establish a good stand and obtain high yields. For example, the early establishment of a rye cover should result in the production of a tall crop and a large amount of biomass to cover the soil in the spring. Also, supply a rye cover crop with additional nitrogen fertilizer to obtain additional cover. A response to the application of up to 60 lbs/ac nitrogen can be expected when it is applied from mid November through February. (Balkcom et al., 2007 and Reiter et al., 2008).

Maintain an actively growing cover crop as late as feasible to maximize plant growth, allowing time to prepare the field for the next crop and limit moisture depletion. However, the alleopathic effects (chemicals from a crop that affect the growth of another crop) of a decomposing cover crop may continue for 3-4 weeks after terminating a cereal rye or black oat cover crop (Reeves, 1994). A similar time period applies to other cover crops. The time period between terminating the cover crop and planting the cash crop is extremely important when planting small-seeded vegetables into cover (Morse, 1999). Large-seeded crops or vegetable transplants are affected to a lesser degree than small-seeded crops.

Terminate cereal cover crops at flowering by applying a nonselective herbicide. Also, use a crimper/roller to create a residue mat that bends the plants in one direction. Two other benefits of a laying the residue of a mat in a single direction are increased emergence, due

to improved seed-soil contact, and easier planting (Ashford and Reeves, 2003).

Greater amounts of residue and improved weed control can be obtained later in the spring by terminating the cover at the early milk stage, rather than at the flowering stage. Another benefit of allowing the cereal cover to begin to set seed is that the termination can be successful by using the crimper-roller without the application of herbicides.

Use deep-rooted species to maximize nutrient recovery.

Use grasses to utilize more soil nitrogen and legumes to utilize both nitrogen and phosphorus.

Avoid cover crop species that harbor or carryover potentially damaging diseases or insects.

For most purposes which cover crops are established, the combined canopy and surface cover is greater than 85 percent and the above ground dry weight of the biomass should be at least 4,000 lbs/acre.

Cover crops may be used to improve site conditions for establishment of perennial species.

Use plant species that enhance bio-fuel opportunities.

Use plant species that enhance forage opportunities for pollinators.

PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for the practice site. Plans for the establishment of cover crops shall include:

- Species or species of plants to be established
- Seeding rates
- Recommended seeding dates
- Establishment procedure
- Planned rates and timing of nutrient application
- Planned dates for terminating the cover crop

- Other information pertinent to establishing and managing the cover crop
- Harvest or other use of the crop may be restricted

Plans and specifications for the establishment and management of cover crops may be recorded in narrative form, on job sheets, or on other forms.

OPERATION AND MAINTENANCE

Maintain the cover crop residue on the soil surface through periods when erosion has the potential to occur, or until 30 days before planting the next crop, whichever occurs first.

Control growth of the cover crop to reduce competition from volunteer plants and shading.

Control weeds in cover crops by mowing or by using other pest management techniques.

Control soil moisture depletion by selecting water efficient plant species and terminating the cover crop before excessive transpiration.

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