NATURAL RESOURCES CONSERVATION SERVICE

NEW JERSEY

CONSERVATION PRACTICE STANDARD

RESIDUE AND TILLAGE MANAGEMENT MULCH TILL

(Ac.)

Code 345

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting.

PURPOSE

- Reduce sheet and rill erosion.
- Reduce wind erosion and Particulate matter less than 10 micrometers in diameter - PM 10.
- Maintain or improve soil quality.
- Increase plant-available moisture.
- Reduce energy use.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland.

This practice includes tillage methods commonly referred to as mulch tillage where a majority of the soil surface is disturbed by tillage operations such as vertical tillage, chiseling and disking and also includes tillage/planting systems with relatively minimal soil disturbance but which do not meet the criteria for Residue and Tillage Management (No Till/Strip Till/Direct Seed (code 329). It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops and to tillage for planting perennial crops. It also includes some planting operations, such as hoe drills that disturb a large percentage of the soil surface during the planting operation and cropping systems in which the majority of surface area is disturbed during harvest operations.

CRITERIA

General Criteria Applicable to All Purposes

Uniformly distribute residues over the entire field.

Residue shall not be burned.

Additional Criteria to Reduce Sheet and Rill Erosion and Reduce Wind Erosion and Particulate matter less than 10 micrometers in diameter - PM 10

Determine the amount of randomly distributed surface residue needed and the amount of surface soil disturbance allowed managing erosion to the planned soil loss objective using the current approved water and wind erosion prediction technology. Ensure that calculations account for the effects of other practices in the management system.

However, in all cases, the crop residue remaining immediately after planting of the current crop shall provide a minimum 30% cover of the soil surface.

Additional Criteria to Maintain or Improve Soil Quality

Ensure that an evaluation of the cropping system using the current approved soil conditioning index (SCI) procedure results in a positive trend. Ensure that calculations account for the effects of other practices in the management system.

Additional Criteria to Increase Plant-Available Moisture

Reducing Evaporation from the Soil Surface. Maintain a minimum 60 percent surface residue cover throughout the year.

Trapping Snow. Fall tillage operation shall leave the crop stubble in an upright position.

Maintain a crop stubble height during the time significant snowfall is expected to occur to:

- at least 10 inches for crops with a row spacing of less than 15 inches;
- at least 15 inches for crops with a row spacing of 15 inches or greater

Maintain these heights over at least 50% of the field.

Conduct fall tillage operations as close as possible to perpendicular to the direction of prevailing winds during the time that significant snowfall is expected to occur.

Additional Criteria to Reduce Energy Use

Ensure the Soil Tillage Intensity Rating (STIR) for the single crop establishment and harvest is less than or equal to 80.

CONSIDERATIONS

General - Removal of crop residue, such as by burning, baling or grazing, can have a negative impact on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plant, and air resources.

Mulch till may be practiced continuously throughout the crop sequence, or may be managed as part of a residue management system that includes other tillage methods such as no till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Intensity Rating (STIR).

Energy savings in fuel used can be estimated using NRCS approved energy software or other software to determine the impact of alternative tillage systems.

Production of adequate amounts of crop residue necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops and adjustment of plant populations and row spacing.

A field border (see code 386) planted to permanent vegetation can:

- allow unobstructed turning for equipment
- eliminate unproductive end rows
- provide food and escape cover for wildlife
- provide travel lanes for farming operations
- provide habitat for beneficial insects and pollinators.

When providing technical assistance to organic producers, residue management, and tillage activities should be consistent with the USDA-Agricultural Marketing Service National Organic Program standard.

Increasing Soil Organic Matter Level and Reducing CO_2 Loss from the Soil – Where improving soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer.

CO_2 loss is directly related to the volume of soil disturbed, the intensity of the disturbance and the soil moisture content and soil temperature at the time the disturbance occurs. The following guidelines can make this practice more effective:

- Shallow soil disturbance (1-3 inches) releases less CO_2 than deeper operations.
- When deep soil disturbance is performed, such as by subsoiling or fertilizer injection, make sure the vertical tillage slot created by these implements is closed at the surface.
- Planting with a single-disk opener no-till drill will release less CO_2 than planting with a wide-point hoe/chisel opener air seeder drill.
- Soil disturbance that occurs when soil temperatures are below 50° F will release less CO_2 than operations done when the soil is warmer.

Increasing Plant-available Moisture – The effectiveness of stubble to trap snow increases with stubble height. Increasing the stubble height beyond the minimum required will increase the amount of snow trapped.

Variable height stubble patterns may be created to further increase snow trapping and storage.

Tillage and planting operations done on the contour will help slow overland flow and increase infiltration, thus increasing the

potential for increased water storage in the root zone.

Providing Food and Escape Cover for Wildlife - Avoid tillage and other soil and residue/stubble disturbing operations during the nesting season and brood-rearing period for ground-nesting species

Forgoing fall shredding or tillage operations will maximize the amount of wildlife food and cover during critical winter months.

Leaving rows of unharvested crop standing at intervals across the field or adjacent to permanent cover will enhance the value of residues for wildlife food and cover. Leaving unharvested crop rows for two growing seasons will further enhance the value of these areas for wildlife.

An approved habitat evaluation procedure will aid in determining the appropriate time and amount of residue and stubble needed to provide adequate food and cover for the target wildlife species.

PLANS AND SPECIFICATIONS

Plans and Specifications shall include:

- field number(s)and acres
- purpose(s) for this practice
- crops(s) where this practice will be used
- the type and timing of soil disturbing operations
- estimated surface residue following each operation

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and O & M described in this standard.

OPERATION AND MAINTENANCE

Evaluate/measure the crop residues cover and orientation for each crop to ensure the planned amounts and orientation are being achieved. Adjust management as needed to either plan a new residue amount or orientation; or adjust the planting, tillage, or harvesting equipment.

REFERENCES

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