USDA
NATURAL RESOURCES
CONSERVATION SERVICE
DELAWARE
CONSERVATION PRACTICE
STANDARD

# CONSERVATION CROP ROTATION

CODE 328
(Reported in Acres)

## DEFINITION

Growing crops in a recurring sequence on the same field.

## PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following resource concerns:

- Reduce sheet and rill erosion.
- Reduce irrigation-induced erosion.
- Reduce soil erosion from wind.
- Maintain or improve soil organic matter content.
- Manage the balance of plant nutrients.
- Improve water use efficiency.
- Manage plant pests (weeds, insects, and diseases).
- Provide food for domestic livestock.
- Sustain the economic viability of the farm operations.
- Provide food and cover for wildlife.

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land where crops are grown.

This standard does not apply to pastureland, permanent hayland, or other land uses where annual row crops or close growing crops are grown occasionally, only to facilitate renovation or re-establishment of perennial vegetation. It does not apply to land devoted to orchards, vineyards, or nurseries.

## CRITERIA

### General Criteria Applicable To All Purposes Named Above

Crops shall be grown in a planned, recurring sequence.

Crops shall be adapted to the climatic region, the soil resource, and the goals of the producer. Adapted crops and varieties, listed in appropriate university publications or other approved sources, shall be selected.

A conservation crop rotation may include crops planted for cover or nutrient management.

### Additional Criteria To Reduce Sheet And Rill Erosion.

Crops shall be selected that produce enough above and below ground plant biomass to control erosion within the soil loss tolerance (T) or any other planned soil loss objective.

The Revised Universal Soil Loss Equation (RUSLE) erosion prediction technology will be used to evaluate the effectiveness of the cropping sequence to reduce erosion to acceptable levels. Calculations shall account for the effects of residue management and other supporting practices, including irrigation, in the conservation management system.

**Additional Criteria To Reduce Irrigation Induced Erosion**

To reduce erosion induced by sprinkler irrigation, crops or cover crops shall be selected that develop

**Additional Criteria To Maintain Or Improve Soil Organic Matter Content**

Crops shall be selected that produce the amount of plant biomass needed to maintain or improve soil organic matter content, as determined using the current approved Soil Conditioning Index Procedure.

Erosion shall not exceed the soil loss tolerance (T).

If partial removal of residue by means such as baling or grazing occurs, adequate residue shall be maintained to achieve the desired level of soil organic matter content.

Cover and green manure crops planted specifically for soil improvement may be harvested or grazed, providing adequate biomass is retained.

**Additional Criteria To Manage The Balance Of Plant Nutrients**

Crop selection, sequence, and management shall achieve the desired nutrient balance. This determination shall be determined using an approved nutrient balance procedure.

To reduce excess nutrients, crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients shall be included in the crop sequence.

When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with nitrogen depleting crops.

**Additional Criteria To Manage Plant Pests (Weeds, Insects, Diseases)**

Crops shall be alternated to break the pest cycle and/or allow for the use of a variety of other control methods that support a reduction of chemical inputs consistent with Integrated Pest Management principles.

Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest.

Resistant varieties, listed in appropriate university publications or other approved sources, shall be selected where there is a history of a pest problem.

Noxious weeds shall be controlled as required by Delaware State law.

**Additional Criteria To Provide Food and Cover For Wildlife**

Crop selection shall be determined using an appropriate wildlife habitat evaluation procedure.

## PLANNING CONSIDERATIONS

Where stripcropping is a component of the conservation management system, the stripcropping design for Stripcropping – Contour, Code 585, or Stripcropping – Field, Code 586, shall be

consistent with the desired crop rotation and/or cover management condition.

Where Residue Management, Codes 329A, 329B, 329C, and 344, practices are a component of the conservation management system, the selection of high residue producing crops and varieties, use of cover crops, and decreased row spacing can enhance residue production (type, amount, and distribution) and erosion protection.

Erosion from sprinkler irrigation may be reduced by crops or cover crops that develop surface canopy rapidly and/or produce an adequate amount of residue.

Selection of crops and varieties, and the sequence of crops, can be considered to improve water use efficiency.

Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by increasing/retaining crop residues and reducing tillage. In addition, animal wastes and/or mulch may be applied to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, utilizing deep rooted crops and/or cover crops in the rotation can help remove nutrients or contaminants from the soil profile.

Where precipitation is limited, seasonal, or erratic, moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation.

Including deep-rooted crops that are able to extend to and penetrate the compacted soil layers can reduce soil compaction. Crops should be avoided that require field operations when the soils are wet.

Leaving rows of unharvested crop around the edges of the field can enhance wildlife habitat value by providing protective cover and/or feed over winter.

## PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications should include the cropping sequence, the numbers of years of each crop, and the total length of the crop rotation.

Specifications shall be recorded using narrative statements in the conservation plan, job sheets, or other acceptable documentation.

## OPERATION AND MAINTENANCE

Producers may need to modify crop rotations due to crop failure, specific weather events, or economic conditions. Crop rotations should provide for acceptable substitute crops. Acceptable substitute crops are crops having similar properties that meet the criteria for all of the resource concerns identified for the field or treatment unit.

Proper adjustment, operation, and maintenance of equipment are essential for successful implementation of this practice.

## SUPPORTING DATA AND DOCUMENTATION

1. Identify resource concerns to be treated.

2. Ensure that field location, acreage, and crop rotation needed to address the identified resource concerns are recorded in the conservation plan.

1. Provide appropriate documentation for identified concerns (e.g. - soil loss calculations, soil conditioning index calculations, nutrient management plan, livestock feed balance calculations, and/ or wildlife habitat evaluation) if needed.

## REFERENCES

1. Agricultural Handbook 703, USDA Agricultural Research Service, Washington, D.C., 1996.

2. Delaware RUSLE Manual (FOTG), USDA NRCS.

3. Conservation Research Report No. 41, Crop Residue Management To Reduce Erosion and Improve Soil Quality - Appalachia and Northeast, USDA Agricultural Research Service, Washington, D.C., August, 1995.

4. Stubble Over the Soil. The Vital Role of Plant Residue in Soil Management to Improve Soil Quality, Carlos Crovetto Lamarca, 1996.