

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ALLEY CROPPING

(acre)
Code 311



- Improve air quality

CONDITIONS WHERE PRACTICE APPLIES

On all cropland and hayland where trees, shrubs, crops and/or forages can be grown in combination.

CRITERIA

General Criteria Applicable to All Purposes

Combinations of crops, forages, and woody plants that are compatible, complementary, and provide the products and crops that meet landowner objectives.

Establish plants that are adapted to the climatic region and the soil resource, marketable, and suited to the landowner's equipment and management capabilities.

Determine the crop or forage rotation and woody species by using an acceptable nutrient balance procedure. Select crops, forages, and woody plants that maximize the utilization and recycling of soil nutrients, animal wastes, and plant residues, and maintain soil organic matter content.

Provide moisture conservation or supplemental watering for plant establishment and growth where natural precipitation is too low for the selected species.

For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

Select crops or forages and woody plants for rooting depths and water requirements not to exceed available soil water.

DEFINITION

Trees or shrubs are planted in sets of single or multiple rows with agronomic, horticultural crops or forages produced in the alleys between the sets of woody plants that produce additional products.

PURPOSE

- Enhance microclimatic conditions to improve crop or forage quality and quantity.
- Reduce surface water runoff and erosion.
- Improve soil quality by increasing utilization and cycling of nutrients.
- Alter subsurface water quantity or water table depths.
- Enhance wildlife and beneficial insect habitat.
- Increase crop diversity
- Decrease offsite movement of nutrients or chemicals.
- Increase carbon storage in plant biomass and soils.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Select pest resistant plant varieties.

Avoid selecting tree or shrub species which provide habitat to pests of the accompanying crop or forage or Category I invasive plant according to FL Exotic Pest Plant Council (www.fleppc.org).

Select crop, forage, tree and/or shrub varieties based on their tolerance to agriculture chemicals that will be used at the site.

To determine the distance between the sets of trees or shrubs use the following:

- Tree or shrub management objectives;
- Light requirements and growth period of the crops or forages in the alleys;
- Erosion control needs;
- Machinery widths and turning areas.

Crops (woody and herbaceous) shall be grown in a planned conservation management system. Refer to the Florida Conservation Practice Standard, Tree/Shrub Establishment, Code 612, for further guidance.

Impact to cultural resources, wetlands, and Federal and State protected species shall be evaluated and avoided or minimized to the extent practical during planning, design and implementation of this conservation practice in accordance with established National and Florida NRCS policy, General Manual (GM) Title 420-Part 401, Title 450-Part 401, and Title 190-Parts 410.22 and 410.26; National Planning Procedures Handbook (NPPH) FL Supplements to Parts 600.1 and 600.6; National Cultural Resources Procedures Handbook (NCRPH); and The National Environmental Compliance Handbook (NECH).

Comply with applicable federal, state and local laws and regulations, during the installation, operation (including product harvesting), and maintenance of this practice.

Additional Criteria to Reduce Surface Water Runoff and Erosion

Orient tree or shrub rows on or near the contour to reduce water erosion.

Establish herbaceous ground cover in conjunction with the tree or shrub rows to reduce surface water runoff and erosion.

Orient tree or shrub rows as close as possible to perpendicular to erosive winds to reduce wind erosion.

To encourage infiltration select species of trees and shrubs that are relatively deep rooted.

Additional Criteria to Increase Carbon Storage

Select tree and shrubs species with rapid growth rates.

Plant/manage the appropriate density for the site that will maximize above and below ground biomass production.

Minimize soil disturbance in alley crops through use of no-till planting methods.

Additional Criteria to Improve Air Quality

Use plant species in the alley that provide full ground coverage during establishment and harvest operations.

Leave residue from the alley-crop on the surface.

Select and maintain tree/shrub species with foliar and structural characteristics that optimize interception, adsorption, and absorption of particulates.

Orient tree or shrub rows as close to perpendicular as possible to prevailing wind direction during the critical air period.

CONSIDERATIONS

Select crop, forage, tree, and/or shrub varieties based on their tolerance to agriculture chemicals that will be used at the site.

Species diversity including use of native species should be considered to avoid loss of function due to species-specific pests or to enhance wildlife needs.

High value trees or shrubs should be selected to maximize economic returns.

Anticipate possible off-site effects and modify the practice design accordingly.

Coppicing ability (i.e., ability to develop stems from the plant base) of selected species of trees and shrubs should be considered when they are to be pruned or harvested periodically.

Establish plant species that enhance the biomass collection opportunities, if desired.

Select crops, forages and woody plants in accordance to soil and site capabilities.

Select crops, forages and woody plants with compatible rooting depths to better utilize available soil moisture.

Consider modifying microclimatic conditions and habitat to enhance biological pest management.

PLANS AND SPECIFICATIONS

Plans and Specifications for applying this practice need to be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

As a minimum plans and specifications will include:

- Plant materials or species to be planted
- Plant spacing and arrangement/width of crop/forage alleys and woody plantings
- Spacing between tree/shrub sets
- Planting Date of tree/shrub sets
- Site preparation and planting method

OPERATION AND MAINTENANCE

The trees, shrubs, crops, and/or forages will be inspected periodically and protected from adverse impacts including insects, diseases or competing vegetation. See the Florida NRCS Conservation Practice Standard, Pest Management, Code 595, for guidance. The trees or shrubs also need to be protected from fire and damage from livestock or wildlife.

Fertilize trees and shrubs as needed to maintain plant vigor. Refer to the Florida Conservation Practice Standard, Nutrient Management, Code 590, for guidance.

All other specified maintenance measures and techniques of tree/shrub establishment need to be continued until plant survival and establishment are assured. This includes replacement of dead and dying trees or shrubs, pruning of dead or damaged branches for safety reasons, periodic pruning of selected branches for control of product quality, and control of undesirable competing vegetation.

Any removals of tree or shrub products, use of agricultural chemicals, and maintenance operations need to be consistent with the intended purpose of the practice. Avoid damaging the site and soil and comply with applicable federal, state and local regulations pertaining to on-site and off-site effects.

REFERENCES

- Florida NRCS Conservation Practice Standards
- Nutrient Management, Code 590
 - Pest Management, Code 595
 - Tree/Shrub Establishment, Code 612
- Florida Erosion Control Handbook
- General Manual – Titles 190, 420, and 450
- National Planning Procedures Handbook
- National Cultural Resources Procedures Handbook
- National Environmental Compliance Handbook