NRCS Natural Resources Conservation Service

Alley Cropping

Conservation Practice Job Sheet *311*

Definition

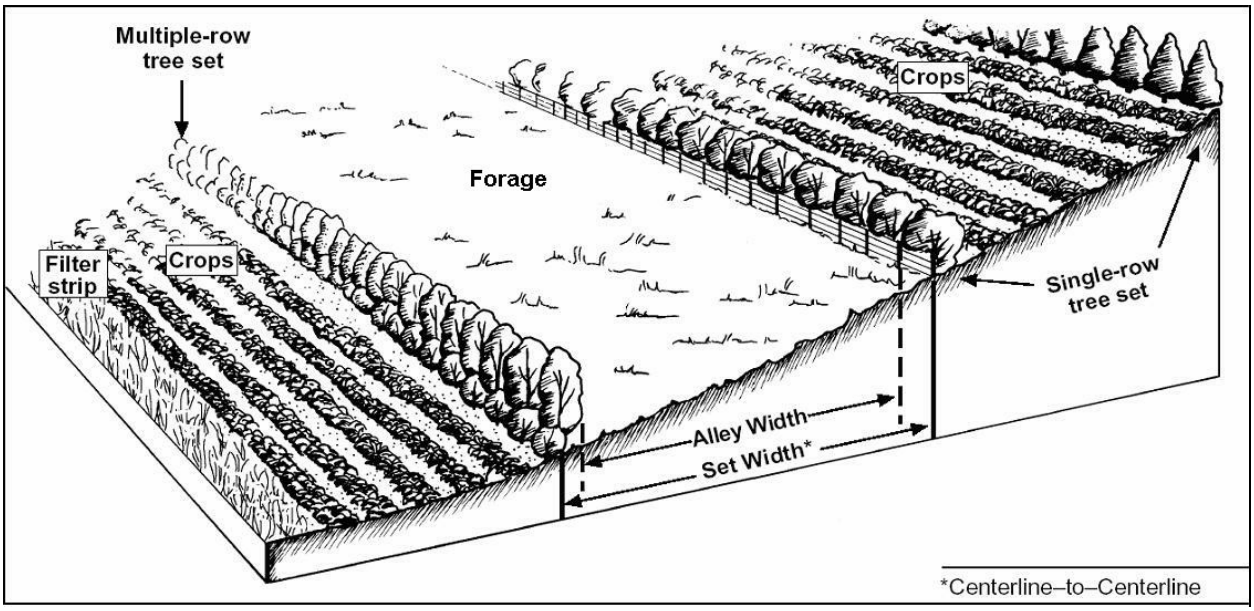
Alley cropping is the planting of trees or shrubs in two or more sets of single or multiple rows with agronomic, horticultural, or forage crops cultivated in the alleys between the rows of woody plants.

Purpose

Alley cropping is used to enhance or diversify a farm enterprise by adding tree/shrub products, reduce surface water runoff and soil erosion, alter water table depths, improve utilization, and reduce offsite movement of nutrients, modify the microclimate for improved crop production, provide habitat for wildlife and beneficial insects, enhance the aesthetics of the area, and increase net carbon storage.

Where used

Alley cropping is used where improved economic or environmental conditions are desired over the existing farming practices. Alley cropping, in addition to the tree or shrub products grown, is used with row-crop, small grain, forages, or specialty crop production. The sites selected must be suited to production of both the woody and herbaceous crop species desired.



Trees or shrubs are generally planted in single or multiple-row sets or series. The spacing between sets is determined by the primary purpose of the alley cropping and the agronomic, horticultural, or forage crop grown. Woody plants are typically selected for their potential value for wood, nut, or fruit crops and/or the benefits they can provide to the crops grown in the alleys. There are many compatible tree or shrub species, depending upon the region of the country, soil type, value, and markets. All traditional agronomic, horticultural, or forage crops can be grown in the alleys between the sets of trees or shrubs. The primary factor for selecting the crops within an alley is their sunlight requirement relative to the canopy density (shade) created by the trees or shrubs in the sets.

Resource management system

Alley cropping is normally established concurrently with conservation crop rotation, nutrient and pest management, residue management, and other practices as part of a resource management system for a conservation management unit. Forage-related practices need to be applied when forage crops are used. When alley cropping is used for soil erosion control, trees or shrubs are planted on the contour in conjunction with herbaceous vegetation. When wildlife habitat enhancement is a concurrent purpose, native or adapted tree or shrub species beneficial to the target wildlife species become part of the site-specific specifications.

When tree/shrub sets are spaced at relatively close intervals (40 feet or less), shade-intolerant crops can be grown for several years until the woody canopy creates significant shading. At that point, several options can be considered: 1) replace shade-intolerant crops with shade-tolerant crops, 2) thin and/or prune the woody vegetation to reduce shading so long as functions or future products are not impaired, or 3) harvest the sets and reestablish woody plants (requires woody species that produce products quickly).

Wildlife

Alley cropping provides excellent opportunities to improve wildlife habitat for some species by creating travel lanes connecting important habitat areas, providing infield cover, improving vertical structure, and increasing edge effect.

Operation and maintenance

Replace dead and dying woody species in newly established sets. Care must be taken to use chemicals or chemical applications that are compatible with both the tree crop and the alley crop. Monitor in-alley crop growth to determine if shading conditions are being met as sets mature. Root pruning may be necessary along the edges of alleys to maintain adequate growth in adjacent agronomic, horticultural, or forage crops. Protect trees and shrubs from damage by livestock or harmful wildlife.

Specifications

Site-specific requirements are listed on the specifications sheet. Additional provisions are entered on the job sketch sheet. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See practice standard Alley Cropping, code 311.

Alley Cropping – Job Sheet

Landowner_____ Field number_____

Purpose (check all that apply)	
☐ Produce tree and/or shrub products (wood, nuts, berries, fodder, mulch, etc.) along with crops or forages	☐ Provide or enhance wildlife habitat
☐ Improve crop or forage quality and quantity by enhancing microclimatic conditions	☐ Create habitat for biological pest management
☐ Reduce surface water runoff and soil erosion	☐ Improve crop diversity, quantity, quality, and economic returns
☐ Improve utilization and recycling of soil nutrients	☐ Reduce movement offsite of nutrients or chemicals
☐ Reduce subsurface water quantity or alter water table depths	☐ Enhance the aesthetics of the area
	☐ Increase net carbon storage in the vegetation and soil

Layout
Alley width[1] (ft):
Spacing between tree/shrub sets[2] (ft):
Supplemental herbaceous cover width – erosive sites (ft):
Tree/shrub set orientations: ___Contour; ___North/South, ___East/West, ___Other (specify _____)

[1]Distance available for herbaceous crops; set equal to multiple agricultural equipment widths. [2]Distance from center of one set to center of the next set.

Woody Plant Materials Information					
Planting date:					
Species/cultivar by set and row number: (indicate set and row numbers on the job sheet sketch)		Kind of stock[3]:	Distance between plants within row (ft):	Total number of plants for row:	Distance (ft) from this row to next row[4]:
Set # 1:	1				
	2				
	3				
	4				--
Set # 2:	1				
	2				
	3				
	4				--

[3]BAreroot, COntainer, CUtting; include size, caliper, height, and age as applicable. [4]Adjusted for width of maintenance equipment.

Temporary Storage Instructions

Planting stock that is dormant may be stored temporarily in a cooler or protected area. For stock that is expected to begin growth before planting, dig a V-shaped trench (heeling-in-bed) sufficiently deep and bury seedlings so that all roots are covered by soil. Pack the soil firmly and water thoroughly. Additional requirements:

Site Preparation

Remove debris and control competing vegetation to allow enough spots or sites for planting and planting equipment. Prepare supplemental moisture materials for installation if required by trees and/or shrubs. Additional requirements:

Planting Methods

For container and bareroot stock, plant stock to a depth even with the root collar in holes deep and wide enough to fully extend the roots. Pack the soil firmly around each plant. Cuttings are inserted in moist soil with at least 2 to 3 buds showing above ground. Additional requirements:

Operation and Maintenance

Inspect alley cropping components periodically and protect from damage so proper function is maintained. Replace dead or dying tree/shrub stock and continue control of competing vegetation to allow proper establishment. Install and begin supplemental irrigation if required. Additional requirements:

Alley Cropping – Job Sheet

If needed, an aerial view or a side view of the practice can be shown below. Other relevant information, complementary practices and measures, and additional specifications may be included.

Scale 1"=_____ ft. (NA indicates sketch not to scale: grid size=1/2" by 1/2")

Additional Specifications and Notes:

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