ALLEY CROPPING

Oklahoma Conservation Practice Job Sheet 311 01

Landowner_____

WHAT IS ALLEY CROPPING?

Alley cropping is the planting of trees or shrubs in sets of single or multiple rows with agronomic, horticultural crops or forages produced in alleys between the sets of woody plants that produce additional products.

PURPOSE

Alley cropping is used to:

- Enhance microclimate conditions to improve crop and 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
- Develop renewable energy systems
- Improve air quality

HOW IT HELPS THE LAND

Alley cropping adds diversity to the land and helps improve or optimize economic viability in an operation. Alley cropping also provides excellent opportunities to improve wildlife habitat for some species by creating travel lanes connecting important habitat areas or infield cover.

WHERE THE PRACTICE APPLIES

Alley cropping can be used on crop and hay land where trees, shrubs, crops and/or forages can be grown in combination during the life of the system. Livestock are not used in the system to graze crops or forages. Alley cropping is used where increased farming diversity is desired to improve economics over existing farming practices.

WHERE TO GET HELP

For assistance in planning alley cropping systems, contact your local Natural Resources Conservation Service or your local Conservation District office.

APPLYING THE PRACTICE

Alley cropping is normally established as part of a total conservation management system to address the soil, water, air, plant, and animal resources. The system may include other practices such as tree/shrub planting, conservation crop rotation, nutrient management, pest management, and crop residue and tillage management. Forage harvest management for hay land needs to be planned when forage crops are used in the system.

TREE SELECTION

Trees/shrubs are generally planted in a single or multiple row set or series. Tree species should remain the same in row but may vary in adjoining rows as long as species are compatible. The spacing between tree/shrub sets is determined by the primary purpose of the system and the agronomic, horticultural, or forage crop grown in the alley way.

Tree species selection should be based on the following characteristics:

- Produce a high value product – wood, nuts, and/or fruit
- Be relatively fast growing
- Have a growing season that complements the alley crop
- Provide wildlife benefits when desired

Trees such as pecan, black walnut, ash, oaks, and pine are favored species and can provide high-value lumber or veneer logs as well as nut crops. Alley crop systems can also be used for specialty and biomass tree plantings using species such as dogwood, redbud, poplar, maple, and birch.

Tree Spacing

Trees may be planted in single rows or in multiple row designs. Using single tree rows or multiple rows will be determined by the tree product desired. If nut production is the desired product, then a wide single row spacing is needed. If straight log or saw timber is desired, then multiple tree rows spaced closely together for natural tree pruning will be needed.

CROP SELECTION

Most traditional annual crops such as small grains, soybeans, sorghum, and corn can be grown in the alley ways between the trees. Other annual crops may be used in the alley ways provided they produce the desired result. Perennial grasses and legumes may also be used in the alley ways of the system.

The primary factors determining which crops can be grown are the canopy density and sunlight needs of the agronomic, horticultural, or forage crop.

Alley Row Width

Alley row width will vary depending on management decisions.

- ***Crop light requirements -*** For nut trees, wider row or alley spacing will be needed to allow sufficient tree crown development for nut production.
- ***Length of time crops/forages are expected to be in the alley ways -*** To grow shade intolerant crops in alley ways for more than the first few years, wider alleys will be required to allow for expanding tree crowns. A 40’ alley way generally allows enough sunlight for the traditional annual crops (corn, soybeans, sorghums, and small grains) for 5 to 10 years depending on the growth rate of the trees. An 80’ alley way may allow as much as 20 years of crop production. Alley ways should not be any wider than 100’.
- ***Machinery widths and turning areas -***Consider the width of farming equipment in alley width designs and allow for maximum utilization of planting, tillage or harvesting equipment.

Maintaining the Practice

Trees need to be periodically inspected and protected from damage so proper functioning is maintained.

Care must be taken to utilize chemicals or chemical applications that are compatible both with the tree crop and the alley crop.

When trees mature and sunlight becomes restricted, the alley crop can be changed to more shade tolerant species or perennial forages (bluegrass, fescue, ryegrass, and brome).

Trees will compete for moisture with the crop in the alley way. Tree root pruning/ripping may be needed to improve crop production in the alley ways. Root pruning is normally done to a depth of 24” and approximately 2’ outside the drip line of the tree. Root pruning should only be done on one side of the tree or tree row at a time. Allow at least 3 years before root pruning the other side of the tree or tree row. Once root pruning is started, it will need to continue on a 5 to 8 year cycle.

CONSIDERATIONS

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

Select crops, forages and woody plants for water requirements not to exceed available soil water.

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.

Alley Cropping– Job Sheet

Landowner_____Field number_____Designed by_____Date_____

Purpose: *(check all that apply)*	
☐*Enhance microclimatic conditions to improve crop or forage quality and quantity*	☐*Increase crop diversity*
☐*Reduce surface water runoff and erosion*	☐*Decrease offsite movement of nutrients or chemicals*
☐*Improve soil health*	☐*Increase carbon storage in plant biomass and soils*
☐*Alter subsurface water quantity or water table depths*	☐*Develop renewable energy systems*
☐*Enhance wildlife and beneficial insect habitat*	☐*Improve air quality*

Layout
Type of crop or herbaceous cover:
Alley width[1] (ft):
Spacing between trees/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 dates:				
Species/cultivar by set and row number: (indicate set and row numbers on the job sheet sketch)	Kind of stock:	Distance between plants within row (ft):	Total number of plants per row:	Distance (ft) from this row to next row:
Set Number 1				
1				
2				
3				
4				
Set Number 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 will not be planted within two weeks 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 bare root 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 Specification and Notes:

Client Signature, as needed _____