

Landowner _____ Farm No. _____



WHAT IS ALLEY CROPPING?

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

PURPOSE

Alley cropping is used to:

- Produce tree and/or shrub products (wood, nuts, berries, etc.) along with crops or forages
- 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 selected to meet the landowner's objectives and be compatible with the alley crops. The trees used in alley cropping typically produce nuts, fruits, quality wood or provide wildlife habitat.

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 single row should be selected. If straight log or saw timber is desired, then multiple tree rows spaced between the agricultural crops may provide for natural tree pruning.

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, markets for the products and suitability of current equipment.

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). Also, the trees can be pruned of their lower branches improving equipment access and allowing more sunlight to reach the ground.

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.

Plant trees, crops and forages that are grown in your area. Do not plant non-native species.

Alley Cropping– Job Sheet

Landowner _____ Field number _____ Designed by _____ Date _____

Purpose: (check all that apply)	
<input type="checkbox"/> Enhance microclimatic conditions to improve crop or forage quality and quantity	<input type="checkbox"/> Increase crop diversity, multiple crops including wood, crops, or forages
<input type="checkbox"/> Reduce surface water runoff and erosion	<input type="checkbox"/> Decrease offsite movement of nutrients or chemicals
<input type="checkbox"/> Improve soil health	<input type="checkbox"/> Increase carbon storage in plant biomass and soils
<input type="checkbox"/> Alter subsurface water quantity or water table depths	<input type="checkbox"/> Develop renewable energy systems
<input type="checkbox"/> Enhance wildlife and beneficial insect habitat	<input type="checkbox"/> 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)	

¹Distance available for herbaceous crops; set equal to multiple agricultural equipment widths.
²Distance 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				

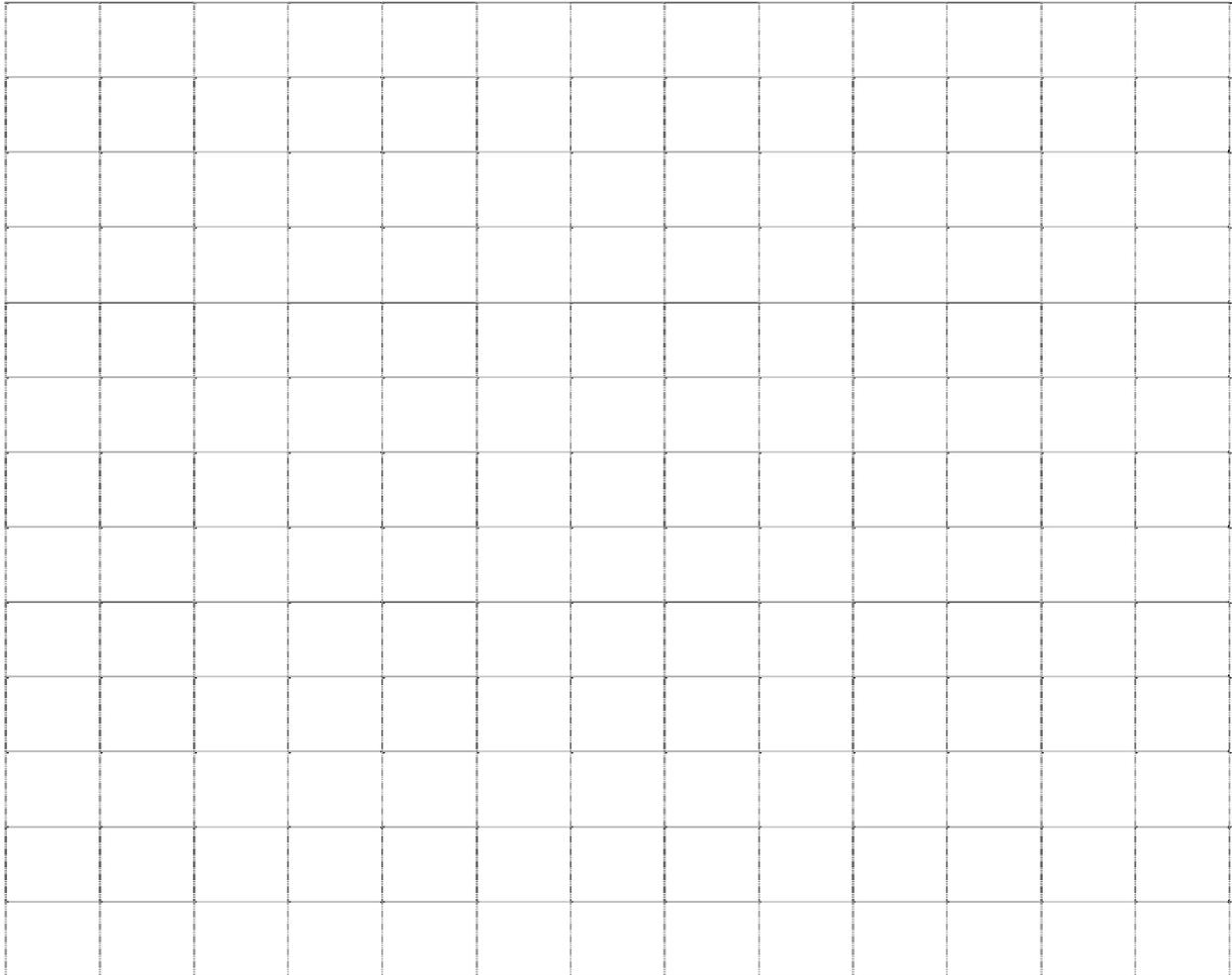
³BAreroot, Container, Cutting; include size, caliper, height, and age as applicable.
⁴Adjusted for width of maintenance equipment.

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.
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. Site may require ripping or chemical treatment prior to the trees being planted.
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. See guidelines for tree and shrub establishment.
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. Do not damage or run over the seedlings or shrubs.

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, _____

Planner Signature _____

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