TREES AND SHRUBS

ESTABLISHING AND MAINTAINING BARE-ROOT SEEDLINGS

Conservation Practice Job Sheet

Natural Resources Conservation Service (NRCS) August 2013

INTRODUCTION

Trees and shrubs may be planted to reduce soil erosion and sedimentation, improve water quality, produce commercial timber, provide wildlife habitat, beautify an area, and provide shade.

This job sheet provides instructions for planting and maintaining trees and shrubs in good condition so that they can serve their intended purpose. Using proper planting and management techniques, especially during the establishment years, will significantly improve plant health and survival.

SITE PREPARATION

Before planting, it is essential to reduce competition from other vegetation that may be present on the planting site, such as grasses or weeds. The type and density of existing vegetation will determine how much pre-planting control is needed.

It's important to allow adequate time to complete this process. If significant amounts of noxious or aggressive weeds or invasive plants are present, be aware that you may need a year or two to control them before you can plant, especially if you will be planting a large area. By state law, noxious weeds in Delaware are johnsongrass, Canada thistle, burcucumber, giant ragweed, Texas panicum, and Palmer amaranth.

For more information about controlling specific weeds in tree and shrub plantings, contact your local office of the Delaware Cooperative Extension or the Delaware Department of Agriculture.

Sites without Existing Vegetation

If the seedling trees and shrubs will be planted into a clean, relatively weed-free area (such as cropland that was planted during the previous growing season), then competition from existing vegetation should not be a concern. However, a companion planting (see page 2) may be needed or desirable for erosion control and/or to reduce future weed competition.

Take into account any noxious or aggressive weeds on the site that might have been suppressed (but not killed) with previous herbicide applications. If live rootstocks are present, these weeds may be very difficult to kill in a new planting without destroying the desirable plants. If you think you may have a weed problem, or if you don't know the site's weed history, it may be prudent to wait one full growing season to see what comes up. Use an appropriate herbicide to treat weeds if they occur, then plant the trees and shrubs.

Sites with Existing Vegetation

If trees and shrubs are going to be planted into existing vegetation (for example, grasses, weeds), you will need to reduce competition before planting. For sites that need extensive preparation, much of the work can be done during the fall prior to spring planting.

Mow or brush hog the field or planting strips. Then either treat the area with an appropriate herbicide or cultivate the planting area to reduce competition.

Using herbicides. Choose a non-selective herbicide such as glyphosate (for example, Roundup, KleenUp). A selective herbicide such as 2,4-D may be used instead, depending on the species of weeds you are trying to control. Follow all label directions when

Land owners and managers please note: *If you received cost-sharing for your tree or shrub planting, be sure to check with your funding agency/organization for specific management requirements.*

using herbicides, and consider herbicide persistence (carryover) as it may affect new plantings.

For extremely vigorous turf or weeds, you should plan to make one application of herbicide in early fall, followed by another the next spring before planting. Or, if you make the first herbicide application in the spring, you should plan to make a second application a few weeks before planting, if needed.

Do not plant seedling trees and shrubs until the competing vegetation is sufficiently controlled. It is much easier to control the competition before planting than afterward. Cultivation of the planting area may be needed following herbicide treatment if the dead plant matter is very thick and will be difficult to plant through. You may also need to re-spray after cultivation if weed seeds brought to the surface germinate.

Using cultivation only. If you do not want to use herbicides, then you will need to cultivate the field or planting strips. Cultivation is usually less effective than herbicides for killing heavy sod or persistent weeds. Also, the bare ground produced by cultivation may be subject to erosion and can provide a good seedbed for more weed growth. If necessary, use a companion planting mix (as described below) to control erosion and suppress weeds. For small planting areas, aged hardwood or pine bark mulch may also be used for controlling erosion and suppressing weeds (see page 4).

Companion Planting

A companion planting mix of herbaceous species may be needed or desirable for erosion control and/or to reduce future weed competition, especially on large cultivated areas or where mulching is not feasible. Be aware that if you don't provide ground cover, then nature will. Nature's choice is likely to be weeds that you will need to control.

The following mix of three fine fescue grasses, plus clover, is recommended:

Table 1. Recommended companion seeding mix for tree and shrub plantings.

Fine Fescue & Clover Mixture	Seeding Rate (lbs/ac)
Creeping Red Fescue or Chewings Fescue	3 - 6
Hard Fescue	3 - 6
Sheep Fescue	3 - 6
White Clover	1 - 2

Alternatively, planting only the fine fescues (no clover), or only one fine fescue species plus clover, is also acceptable. The total seeding rate for the grasses should be at least 9 pounds per acre, up to 18 pounds per acre. Use the higher rate for erosion control, and the lower rate if only weed suppression is needed. The companion mix can be planted in the fall prior to a spring planting of trees and shrubs, or in the spring along with the tree/shrub planting.

Herbicide Carryover

Carryover from herbicide treatments (recently applied or from prior years) can pose a threat to new plantings. Seedlings are particularly sensitive to herbicide carryover. Herbicides such as Basagran, Blazer, Poast, Plateau, and Roundup have low persistence and generally do not pose a risk for carryover. Herbicides such as Atrazine, Preview, Canopy, Classic, Lorox Plus, Command, Scepter, and Treflan have medium to high persistence and can pose a risk of carryover. The persistence of herbicides is directly affected by factors such as soil pH and moisture. To assess risks before planting, read the herbicide label or contact the manufacturer for specific information on persistence.

PLANTING TREES AND SHRUBS

Trees and shrubs that are planted correctly will grow faster and will be more likely to survive, than ones that are planted incorrectly.

Always check for utility lines (water, gas, electric, cable) before planting. Avoid planting on top of buried utility lines or below overhead lines.

Plant Availability and Planting Dates

Bare-root plants are typically available only during late winter to early spring, and generally must be planted during that time. To obtain recommended planting dates for your area, contact your local NRCS Field Service Center.

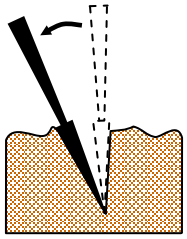
Storing and Planting Techniques

Bare-root seedlings must be properly handled and stored to ensure a successful planting. When the seedlings arrive, open the nursery bales and check the plants for overheating, molding, or dryness. If they are satisfactory, store them in a cool, shady place with the roots protected, and plant within a few days.

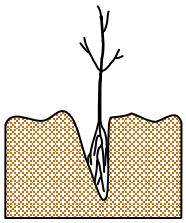
If the seedlings cannot be planted immediately, dig a trench about a foot deep and bury the seedlings' roots in soil. This is called "heeling-in." Pack the soil firmly, water thoroughly, and make certain all roots are covered. The seedlings may also be stored well wrapped in a refrigerator as long as the plants are still dormant.

Evergreens require very careful handling. When heeling-in evergreens, split the small bundles and spread out the seedlings in a trench to make sure the root system of each seedling is protected by soil.

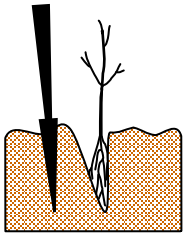
Bare-root seedlings can be machine planted, or hand planted with a planting or dibble bar or a spade. See Figures 1 and 2 for hand planting information.



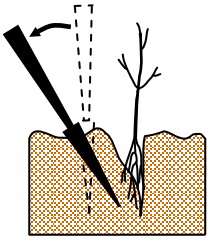
1. Push the planting bar or dibble vertically into the soil to the depth of the blade. Pull back on the handle to open a planting slot.



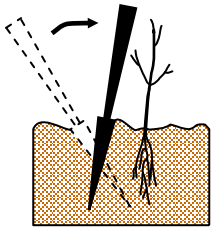
2. Remove the planting bar. Set the seedling in the hole at the same depth or slightly lower than when it was grown. Gently shake the seedling to spread out the roots.



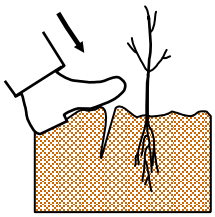
3. Insert the planting bar into the soil 2 inches back from the seedling.



4. Pull back on the handle of the planting bar to close the bottom of the hole.



5. Push the handle of the planting bar forward to close the top of the hole.



6. Remove the planting bar. Use your foot to close the opening and firm the soil around the seedling. BE VERY CAREFUL! Don't damage the seedling.

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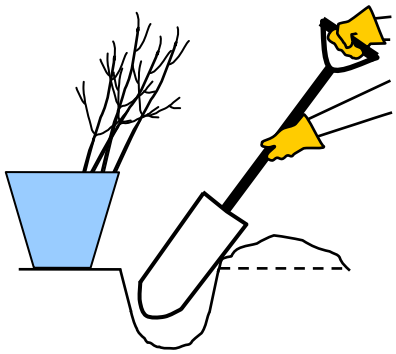
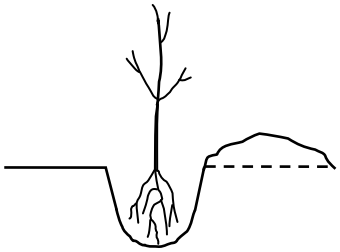
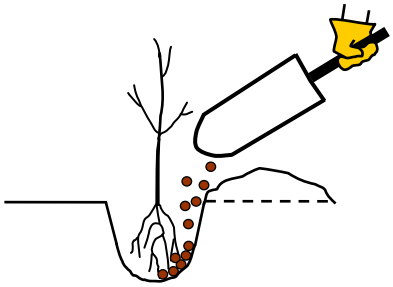
Figure 1. Hand planting bare-root tree and shrub seedlings using a planting or dibble bar.



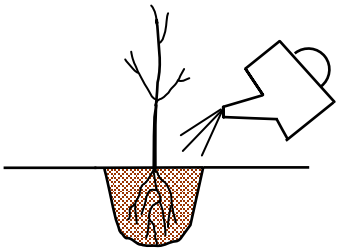
1. Dig a hole that is the same depth and at least 2 times wider than the seedling's roots. Do not let seedlings dry out while planting. Keep roots moist in a bucket or other container, but don't keep roots standing in water for more than 1 hour.



2. Set the seedling in the center of the hole, and spread out the roots. Make sure the seedling sits at the same level or slightly lower than when it was grown.



3. Start backfilling the hole with soil. Do not add sand, peat, compost, or other materials to the backfill. Adjust the seedling as needed to keep it upright and at the correct level in the hole. Gently work soil into the roots, and firm by hand.



4. Fill the hole up to the original ground surface. Tamp the soil gently with your feet, but don't pack the soil or break the roots. Thoroughly water, then add more soil if settling occurs.

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Figure 2. Hand planting bare-root tree and shrub seedlings using a spade.

Lime and Fertilizer

Newly planted trees and shrubs should not be limed and fertilized, unless soil tests show that pH and nutrients are extremely low. For most sites, it's best to allow the root systems of new plantings to become established before applying lime and fertilizer.

PROTECTING PLANTS

Plants should be protected from damage by wildlife, human activities, or livestock by using rodent guards, repellents, tree shelters, fences, and/or other exclusion measures.

Rabbit and Rodent Damage

Rabbits and rodents can use tall grasses and weeds for protection while gnawing on tree and shrub plantings. Mow, mulch, or use herbicides as needed to control vegetation around plantings. Follow recommendations from the Delaware Cooperative Extension when using repellents or poisons to protect plantings from mice and voles.

Tree Shelters

Tree shelters may be used to protect seedlings from competition from weeds, damage by deer and small mammals, and damage by people while mowing or trimming around plants. Tree shelters should be a minimum of 3 feet tall if protection is needed from deer damage. Use shelters that are at least 4 feet tall if the potential for deer damage is severe. Otherwise, shelters that are a minimum of 2 feet tall can be used to reduce damage caused by rodents, rabbits, or maintenance equipment. Push each shelter into the soil to a depth of at least 1 inch to exclude rodents.

Stake each shelter with a wooden stake (minimum 1-inch thickness), or a plastic or fiberglass post, that is at least the same height as the tree shelter being used. Do not use metal or bamboo stakes. Install and maintain bird exclusion netting on the tops of tree shelters until the plantings extend out of the tubes.

Fences and Use Exclusion

Many types of fences and exclusion devices are available. Contact your local NRCS Field Service Center for recommendations for your site.

ESTABLISHING AND MAINTAINING THE PLANTING

Establishing the Planting

Planting year. Control weeds by mowing, hand pulling, or treating with an appropriate herbicide. Mowing should be done with extreme caution to avoid damaging the stems or bark of plantings, especially on seedlings. Vegetation not immediately adjacent to the plantings, such as between rows, can be left for wildlife food and cover (except for noxious weeds, which must be controlled as required by state law).

Herbicides may be spot-sprayed around plantings or applied to the planting strip. Follow specific label instructions to reduce or eliminate damage to trees and shrubs. Do not apply herbicides on windy days when spray drift can damage nearby plantings.

Second year after planting. Continue to control weeds by mowing, hand pulling, or treating with an herbicide. Always avoid damaging the plantings during mowing and herbicide application. If using mulch around plants, do not exceed a total thickness of 3 inches (new mulch, plus any remaining old mulch).

Maintaining the Planting

By the third year, the trees and shrubs should be well established. For optimum wildlife habitat, all management practices should be conducted outside of the primary nesting season for birds and ground-nesting wildlife (April 15 - August 15).

If it becomes necessary to control weeds during the nesting season (for example, noxious weeds), contact your local weed control specialist concerning recommendations for spot-treating the weed problem.

If tree shelters were used, it's best for the health of the trees and the aesthetics of the site to remove and properly dispose of the tree tubes. Remove the them two years after the trees grow out of the shelters or when the trees are 2-inch caliper (as measured at 6 inches above the ground). It may be more convenient to stagger the removal of the shelters over a period of 2 to 3 years. All shelters should be removed by year 7.

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PLANTING PLAN for TREES & SHRUBS		
Name:	**Farm No.:**	**Tax Map:**
	Tract No.:	**Parcel:**
Address:	**Primary Purpose(s):** ☐ **Erosion Control** ☐ **Water Quality** ☐ **Wildlife Habitat for:**	**Recommended Planting Date(s):**
Assisted By: **Date:**		

Planting Area (identify by field no., stand, etc.)	Acres	Tree or Shrub Species (list cultivar, if needed)	Spacing (LF) Between Plants	Number of Plants Needed per Acre	Total Quantities Needed

COMPANION PLANTING

Planting Area	Acres	Mix	Cultivar (if any)	Seeding Rate (lbs/ac)	Total Quantities Needed (lbs)
		Creeping Red Fescue or Chewings Fescue		3 - 6	
		Hard Fescue		3 - 6	
		Sheep Fescue		3 - 6	
		White Clover		1 - 2	

Additional Recommendations/Notes: