

Trees and Shrubs

Planting trees and shrubs is an excellent way to reduce maintenance demands, provide forage and cover for wildlife, control erosion and stabilize streambanks; and to develop a future timber resource. The following information will help you determine what to plant, prepare a site for planting, order and care for seedlings, learn proper planting methods, and maintain new plantings.

Deciding What to Plant

Bareroot seedlings are trees and shrubs that have been grown from seed in a nursery bed and lifted out after one or two growing seasons. They are shipped and planted without any soil around the roots. Older and larger trees and shrubs must be potted or balled in burlap. Unless you are considering planting just a few trees or shrubs, the cost and labor demands associated with potted or balled trees and shrubs far exceeds that of bareroot seedlings. In some instances directly planting seeds is an option, but seed sources are hard to find and the germination requirements for tree and shrub seeds is highly variable. So when deciding what species of trees and shrubs to plant you should most likely be considering bareroot seedlings.

There are so many species of native tree and shrub seedlings that can be planted for wildlife that deciding what to plant can be overwhelming. However, you can narrow down the search by eliminating species that are not commercially available or that may be so rare and hard to get that they are not economical for most purposes. Before any final decisions on planting are made, you should contact your seedling sources (see Ordering and Caring for Seedlings below) to see what is in stock. Due to variable weather conditions and consumer demands, many nurseries will not have everything that is advertised in stock.

When selecting species that are desirable for your tree planting objectives it is also important to choose tree and shrub species that are suited to the soil type and growing conditions for your planting site. For example, if you are interested in planting pines, white pine may be the most desirable tree for your objectives because of its hardiness, fast growth, and form. However, loblolly pine is better suited



Figure 1. A tractor and tree planting machine planting hardwood tree seedlings for The Nature Conservancy along Clover Lick in Green County.



Figure 2. Tree shelters can be used to enhance survival and growth of tree and shrub seedlings.



The tulip poplar, also known as yellow-poplar or tuliptree, is Kentucky's state tree and the tallest growing tree in the Eastern United States.

to poorly drained soils and Virginia pine is better suited to shallow and excessively dry soils. Table 1 provides some useful information for selecting tree and shrub species based on your planting objectives and soil characteristics. Keep in mind that topography will greatly influence local growing conditions, north and east facing slopes generally hold more moisture and have deeper soils than south and west facing slopes which tend to be droughty and have shallower soils. Before making final species selections, you may also want to consult with your local resource professionals.

Preparing A Site For Planting

Site preparation is an important factor to consider in tree planting and should be planned well before you intend to plant your tree or shrub seedlings. Controlling the existing vegetation on your planting site will generally improve seedling establishment and vigor, and in some situations may be necessary for survival. Generally, on good growing sites such as rich bottomlands or gently sloping upland sites with deep, well drained, silty loam soils, site preparation is a necessity. The lush weedy growth or dense sod on these sites will choke out all but the hardiest seedlings. On poorer growing sites, particularly if pine is planted, plant competition is usually not as severe, and the faster growing pines can often overcome it with little or no help. As a rule of thumb, hardwoods are generally more sensitive to plant competition than pines, so regardless of site conditions some type of site preparation should be considered when planting hardwoods.

Preparing a site for tree and shrub planting can be accomplished in a variety of ways. The two primary methods are conventional tillage and the use of herbicides. A herbicide treatment or spraying is suitable for any area, but strongly recommended on any slopes with high erosion potential. The advantages of spraying include less time from the landowner and minimal problems with soil erosion. You can also contract with a local farm store or a local farmer to have spraying done. On areas where topography is mild and the threat of soil erosion is not a concern, conventional tillage can be an effective means of site preparation. This involves either fall or spring plowing and disking*, or rototilling, to prepare the site. For a detailed description of site preparation using herbicides and conventional tillage please see the Habitat How-To titled "Fescue Eradication"*.

Ordering and Caring for Seedlings

Tree and shrub seedlings can be ordered from a number of state run and private nurseries. The Kentucky Division of Forestry operates two nurseries where a variety of low-cost seedlings are grown for tree and shrub planting projects in the state. Order blanks may be obtained from district offices, County Extension offices, and County Farm Service Agency offices. Listed on page 4 is contact information on some reputable nurseries that sell bareroot tree and shrub seedlings.

The lack of proper care given to planting stock is a major cause of seedling mortality. You should inspect your seedlings when they arrive. Check to see if your order was correct and examine the roots to see if they are moist. If the roots are dry to the touch and powdery you should contact the nursery you purchased them from and inquire about replacements. If only moderate drying has occurred and you intend to store your seedlings for several days, adding a little water to the package is recommended. Seedlings should be stored at a temperature of about 40-45 degrees prior to planting. Temperatures above about 60 degrees can affect survival and growth. However, do not leave the seedlings where freezing is likely.

If you need to store seedling for more than 10-14 days, either place them in a cooler or refrigerator at 40-45 degrees or "heel" them

Table 1. Trees and shrubs to plant based on objectives and soil characteristics.

Species of Trees and Shrubs (Not a complete list, but these are commercially available.)	Types of Objectives						Soil Considerations				
	Evergreen Cover, Wind Breaks & Privacy	Hardwood Cover Thickets, Fence Rows, & Travel Corridors	Streambank Stabilization & Riparian Buffers	Reforestation	Desirable Fruits & Berries	Desirable Nuts & Seeds	Upland Erosion Control	Quality Timber	Will Tolerate Poorly Drained Soils	Needs Deep Well Drained Soils	Will Grow On Shallow Excessively Dry Soils
TREES											
Baldcypress			X	X				X			
White Pine	X			X				X			X
Loblolly Pine	X			X				X			X
Scotch Pine	X									X	
Shortleaf Pine	X			X				X			X
Virginia Pine	X										X
Red Maple		X	X						X		
Sugar Maple				X				X			
Black Oak				X	X		X	X		X	
White Oak				X	X		X	X		X	
Northern Red Oak				X	X		X	X		X	
Southern Red Oak				X	X		X	X		X	
Bur Oak		X		X	X		X	X		X	
Pin Oak			X	X	X		X	X			
Cherrybark Oak			X	X	X		X	X			
Shumard Oak			X	X	X		X	X			
Water Oak			X	X	X		X	X			
Willow Oak			X	X	X		X	X			
Swamp Chestnut Oak			X	X	X		X	X			
Swamp White Oak			X	X	X		X	X			
Overcup Oak			X	X	X		X	X			
Black Walnut			X	X	X		X	X		X	
Pecan			X	X	X		X	X		X	
Black Locust		X								X	
Yellow Poplar				X				X		X	
White Ash				X				X		X	
Green Ash			X	X				X			
Sycamore			X					X			
Persimmon		X			X					X	
Sweetgum			X					X			
Wild Black Cherry		X		X	X			X		X	
Hackberry		X								X	
SHRUBS											
Chinese Chestnut		X								X	
Serviceberry		X			X			X		X	
Flowering Dogwood		X			X			X		X	
Silky Dogwood		X	X		X			X			X
Wild Plum		X			X						
American Hazelnut		X			X					X	
American Cranberry Viburnum		X	X		X			X			
Arrowwood Viburnum		X	X		X					X	
White Mulberry		X			X					X	
Red Mulberry		X			X					X	
Redbud		X			X						X
Bicolor Lespedeza		X			X						X
Crabapple					X						X
Willows			X						X		

Table 2. Tree and Shrub Vendors

Kentucky Division of Forestry
627 Comanche Trail
Frankfort, KY 40601
502-654-4496 or
1-800-866-0555

Carino Nurseries
P.O. Box 538
Indiana, PA 15701
1-800-223-7075
www.carinonurseries.com

Melot's Inc.
8900 W. Memorial Rd.
Oklahoma City, OK 73142
405-721-4394

Frank Clark and Associates, Inc.
420 Lagoon Dr.
McMinnville, TN 37110
931-473-6449

Nolin River Nut Tree Nursery
797 Port Wooden Rd.
Upton, KY, 42784
270-369-8551

Ripley County Farms
P.O. Box 614
Doniphan, MO 63935
573-996-3449
rcf@semo.net

Pine Grove Nursery
R.D #3, Box 146
Clearfield, PA 16830
1-800-647-1727

Westvaco Nursery
P.O. Box 1950
Summerhill, SC 29484
843-556-7584

Hills Creek Nursery
826 Hills Creek Rd.
McMinnville, TN 37110
931-668-8071

Forrest Keeling Nursery, Inc.
P.O. Box 135, Keeling Lane
Elsberry, MO 63343
1-800-356-2401
www.fknursery.com

National Wild Turkey Federation
P.O. Box 530
Edgefield, SC 29824
1-800-THE-NWTF

Musser Forests, Inc.
P.O. Box 340, Dept. 34
Indiana, PA 15701
724-465-5684

Triangle Nursery, Inc.
8526 Beersheba Hwy.
McMinnville, TN 37110
931-668-8022

Tennessee Div. of Forestry Nursery
P.O. Box 59
Delano, TN 37325
423-263-1625

Delta View Nursery
Rt. 1 Box 28
Old Highway 61 South
Leland, MS 38756
1-800-748-9018
hardwoods@techinfo.com

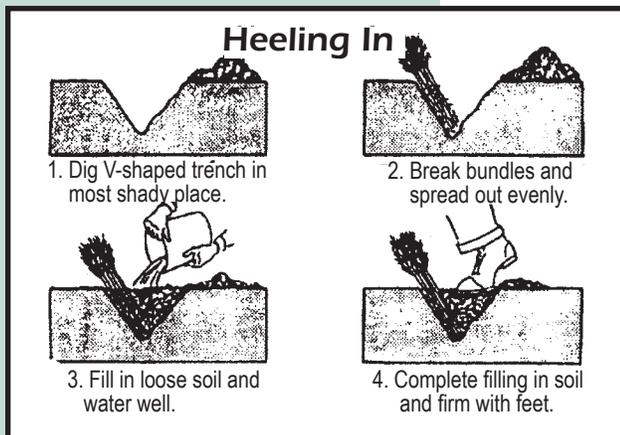


Figure 3. Storing trees and shrubs by "heeling in."

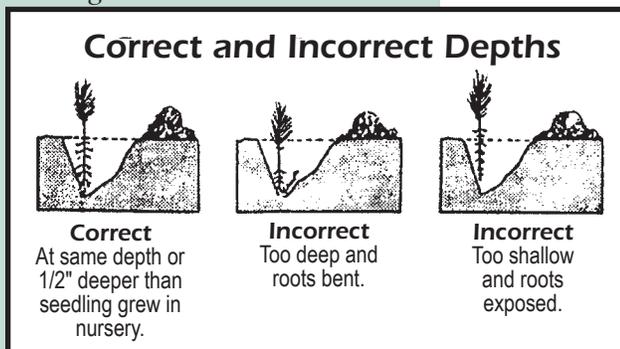


Figure 4. Proper planting.

in the ground (Figure 3). To heel in seedlings, dig a trench deep enough for the roots to fit without bending. Gently separate the bundles, place the seedlings in the trench, cover with soil to just slightly above the depth they were planted in the nursery, and firm up the loose soil with your feet. If watered regularly, seedlings can be kept in this manner for up to a year. However, be careful about waiting until seedlings leaf out to plant them. Seedlings should be planted while they are still dormant. Do not keep the seedlings in a bucket of water. This will wash off valuable particles of soil attached to root hairs and may eventually "drown" the seedlings and kill your planting stock.

Planting Dates

Trees and shrubs should be planted during the dormant season, which occurs after hardwoods have lost their leaves in the fall and before they begin to grow in the spring. The dormant planting season will vary from year to year depending on weather conditions. Spring planting is generally the recommended time to plant tree and shrub seedlings. Fall planting is acceptable, but there are some disadvantages. Freezing during the winter months may cause a winter kill on some seedlings and frost-heaving (freezing and thawing of the soil that can work seedlings loose) can be a serious problem for seedlings planted on bare ground or fine-textured soils.

Spacing

No spacing recommendation can be considered optimum for all species in every situation. However, there are some generalizations that can be made. Table 3 gives the number of trees per acre for variety of common spacings.

There are several factors that can influence your decision on spacing. Do not plant on a spacing that is too narrow for your equipment. Shrub rows and cover thickets* are generally planted on a much closer spacing than whole field plantings. Most shrub and cover thicket plantings should be less than 6 feet apart. Whole field plantings of pines or hardwood trees are generally not planted closer than 9 feet apart. Three hundred to 500 trees per acre in a reforestation project is usually considered adequate.

Planting Methods

Bareroot tree and shrub seedlings can be planted by hand or with a planting machine. In either case it is extremely important to make sure that 1) seedlings are planted at the same depth they were planted in the nursery; 2) the soil is firmly packed around the seedlings and there are no air pockets; and 3) seedling roots are pointed straight down, not bent or doubled up (J-rooted). Careless planting methods can result in significant seedling mortality (Figure 4).

Hand plantings are recommended for small projects (less than 1,000 seedlings), planting on sites too rough for planting machines, and planting seedlings with roots too large for planting machines. Seedlings can be hand planted using a planting bar (also called dibble bar or planting spade), mattock, shovel, or post-hole digger. When using a mattock, shovel, or post-hole digger a simple hole is dug, deeper than the seedling roots, and the seedling is held upright while refilling the hole and packing the loose dirt firmly around the seedling. Planting bars provide a more streamlined planting approach and are often the preferred tool for hand planting seedlings (Figure 5). Using a planting bar (Figure 6), a slit is made in the ground, the seedling's roots are placed in the slit, and the planting bar is used again to push the opening closed. Planting bars are available on a loan basis from the Kentucky Division of Forestry and the Kentucky Department of Fish and Wildlife Resources.

Tree planting machines offer a fast, effective, and economical method for planting seedlings on large projects (more than 1,000 seedlings) where the soils and topography are suitable. Most planting machines consist of a rolling coulter that cuts the ground surface, followed by an adjustable trencher that creates a slit for inserting seedlings, which is followed by a set of packing wheels that firm up the soil around the seedling. A 50 hp. or larger tractor is needed to pull a planting machine, although slightly smaller tractors may work in some situations depending on the size of the planting machine. A 3 to 4 man crew is generally needed to man the tractor and planting machine and have someone walk behind the planter to make sure seedlings are being planted properly. Tree planting machines are available on a loan basis from the Kentucky Division of Forestry.

Maintenance

Even the best initial site preparation may give way to aggressive, competitive vegetation that can stunt seedling growth or completely smother new seedlings. Efforts should be made to control this



Figure 5. Planting spade or dibble bar.

Table 3. Trees per acre by spacing.

Spacing (feet)	Trees (number)
2 x 2	10,890
4 x 4	4,840
5 x 5	1,742
6 x 6	1,210
7 x 7	889
7 x 10	622
7 x 12	519
8 x 8	681
8 x 10	544
8 x 12	454
9 x 9	538
9 x 10	484
9 x 12	403
10 x 10	436
10 x 12	363

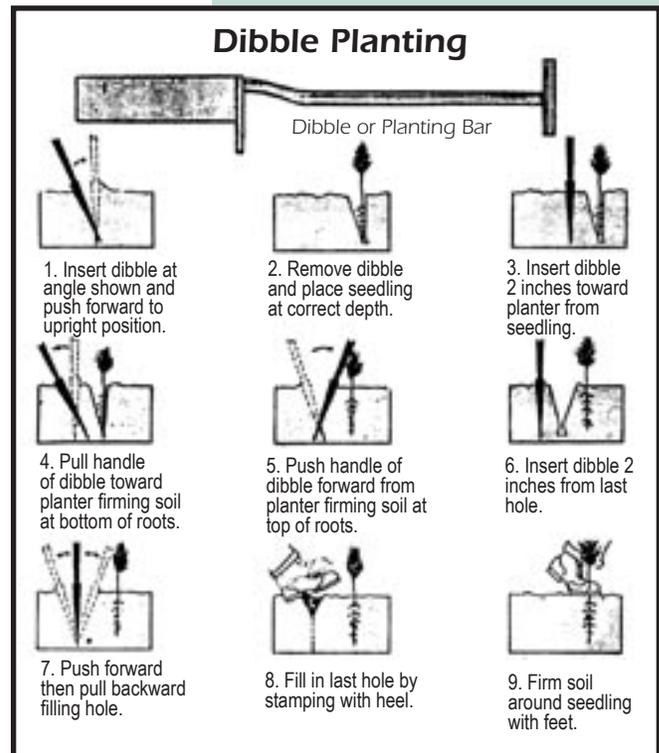


Figure 6. Planting by hand.

SUMMARY OF OPTIONS:

Species Selection
Spacing
Ordering Seedlings
Site Preparation
Storage and Care of Seedlings
Hand or Machine Planting
Maintenance

*Related *Habitat How-To* references:

Cover Thickets
Fescue Eradication
Streamside Management
Shallow-water Wetlands
Wildlife Corridors
Strip Disking
Fencing



Figure 7. A mixed evergreen and hardwood tree planting along a field border.

competition for the first few growing seasons to ensure your tree and shrub planting efforts will be successful. After the second or third growing season the seedlings usually outgrow the surrounding vegetation, and weed control is no longer necessary. Most tree and shrub plantings are maintained by periodic mowing to keep surrounding vegetation lower than newly planted seedlings. There are effective herbicides that can be used to maintain new plantings. If you are interested in using herbicides to maintain your tree and shrub planting, you should consult with your local forester or biologist for up to date maintenance information. Also, keep in mind that for some wildlife plantings, such as shrub rows or cover thickets where the spacing is too close for mowing, unmanaged native plant growth may be a desirable component of your project.

Fencing and Tree Shelters

Your planting project should be fenced to protect seedlings from grazing damage if livestock are present. Rabbits, small rodents, and deer may browse or girdle seedlings in some situations. Some wildlife damage problems can be solved using tree shelters or wildlife deterrents. If you notice seedling mortality you should consult with your forester or wildlife biologist to determine the cause and potential remedies.



The Kentucky Department of Fish and Wildlife Resources does not discriminate on the basis of race, color, national origin, sex, religion, age or disability in employment or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities.

If you feel you have been discriminated against by this department, contact the Kentucky Department of Fish and Wildlife Resources Commissioner's Office, #1 Game Farm Road, Frankfort, KY 40601.

A portion of this publication was underwritten by the Forest Stewardship Program in cooperation with the Kentucky Division of Forestry.

Planning for My Property