

Tree/Shrub Planting for Reforestation, Windbreaks and Wildlife

CONSERVATION DESIGN SHEET - Forestry Series

612A



Natural Resources Conservation Service

Michigan



Matching the woody plant species with the planting site, together with good weed control and planting techniques make for successful reforestation. Containerized seedlings (as shown above) offer several advantages over bare-root stock.

Species and Soil-site Selection

Trees and shrubs grow best on sites with soils and climate similar to those in which they have become naturally adapted. Refer to the published county soil survey report (<http://websoilsurvey.nrcs.usda.gov/app/>) to determine the soil series name(s) for the site to

be planted. Use Michigan Conservation Tree/Shrub Suitability Groups (CTSG) to develop a list of suitable tree and/or shrub species to plant (see eFOTG, Section II. K., Forestry Information, CTSG).

Site Preparation

Site preparation prior to tree/shrub planting or direct seeding is necessary to reduce competition and assure tree survival. This can be accomplished through either mechanical or herbicide treatment or both. See practice standard Forest Site Preparation (490) and Michigan conservation sheet Weed Control for Tree/Shrub Establishment (612).

Mechanical Treatment: This will provide initial control of weed competition. Follow-up treatment with an herbicide or mulch is often needed after the first growing season to provide adequate control of competition. *Generally disking will remove broadleaf weeds but plowing may be necessary to remove grass weeds.*

- Light cover of vegetation: moss, open sand, light Junegrass, etc. No site preparation is necessary.
- Medium cover of vegetation: medium density Junegrass, light quackgrass and old fields. Kill or destroy through tillage the sod layer within a two-foot area around the tree/shrub planting site, or by shallow two inch deep furrowing with a plow or other tillage means prior to planting.
- Heavy cover of vegetation: dense Junegrass, dense quackgrass, hayland/pasture and sweet fern. Kill and/or destroy the sod in a two-foot area around the tree site by plowing or other tillage means early in the fall before spring planting. *It may be necessary to spray with an herbicide either in late fall or early spring to finish the kill on sod-forming grasses.* Cultivate or mulch around trees/shrubs during the growing season to control vegetation. Note: Care must be taken to prevent damage to tree/shrub stems during cultivation.

Herbicide Treatment - This will provide initial control of weed competition but repeated applications will be needed to provide adequate control of competing vegetation for three or more years after planting.

- Light cover of vegetation: moss, open sand, light Junegrass, etc. No herbicide treatment is necessary.
- Spot or band treat an area a minimum of two feet around the tree/shrub planting site. Use only herbicides labeled for the species being planted and the intended use

of the trees. Read and follow herbicide label instructions. See References for further information on herbicide use.

- The preferred timing for herbicide treatment is one season prior to the planting of the trees/shrubs. With spring planting there is a greater risk of damaging trees/shrubs (also, fewer herbicides are species selective) if an herbicide is applied after planting.
- When dense vegetative cover is present, herbicide should be applied in late summer or early fall prior to spring planting. This practice normally will provide optimum weed control and better tree/shrub survival.

Note: *Cover crops [see practice standard Cover Crop (340)] or permanent sod strips may be needed between tree/shrub rows on sandy or highly erosive sites in order to prevent erosion and damage to seedlings by sandblasting. See conservation practice Conservation Cover (327).*

Care of Seedlings

Proper care of seedlings prior to and during the planting process is critical to ensuring a successful planting. Seedlings that have had roots dried, frozen, or subjected to mold or high temperature should be assumed dead and not suitable for planting.

- Seedlings should be packed and shipped in wet moss or other medium, kept cool (ideal temperature between 33 and 37 degrees F) and moist through the planting process. *Make plans for cold storage in case planting is delayed.* Exposure to drying sun and wind can kill a seedling in less than 30 seconds.
- Plant seedlings as soon as possible after they are received, keeping roots moist throughout the planting process.
- Store seedlings in a cool, moist, shaded location up to 7 days. Do not stack bundles of trees in layers of more than two deep to allow adequate air circulation and prevent heating.
- If planting is delayed for longer than seven days after receipt and they can not be kept in cold storage, heel in the seedlings in a shaded area and keep them moist. To heel-in seedlings: Dig a trench in the soil, place the seedling in the trench and cover the roots with soil, wetting the soil and roots during

the process. Refer to *Figure 3. Transplant heeled in seedlings and resume normal tree planting as soon as suitable conditions exist.*

- Do not immerse roots in water or wash soil off of seedling roots. Mist seedlings to keep them moist.
- Water absorbent/retention dip may help conserve moisture on seedling roots when planting in dry weather.

Planting and Spacing Requirements

- Tree/shrub spacing and densities vary depending on the purpose of planting:
 1. Timber production:
 - Conifers - 600-1000/ac.
 - Hardwoods - 545-900/ac.
 2. Wildlife Plantings: 545-1200/ac
 3. Windbreak/Shelterbelt Plantings:
 - Refer to practice standard
 - Windbreak/Shelterbelt (380)
 - Establishment for spacing requirements for trees and/or shrubs. Refer to *Table 1. Common Tree/Shrub Spacings*
 4. Christmas Trees: 1200/ac.

For minimum planting stock sizes see conservation practice Tree/Shrub Establishment (612).

- Trees may be planted with a tree planting machine or by hand using a planting bar, shovel, or other tool. Refer to *Figures 1 and 2.* Plant trees in the middle of the prepared site or area to ensure maximum distance from competing vegetation. *Use of a professional tree planting contractor has been shown to significantly increase the chances for successful tree establishment.*
- Plant trees/shrubs vertically with the root collars *equal to or up to* one inch below the soil surface to ensure adequate coverage of the roots with soil. Roots may be pruned *if necessary to fit the planting hole, but to a length of no less than* eight inches to facilitate proper planting. Refer to *Figure 1.*
- The trench or hole should be deep and wide enough to permit the roots to be spread out in a natural, uncurled position. Avoid “J” rooting. Refer to *Figure 2 and drawings 1, 2, and 3 of Figure 4.*
- Soil around the seedling should be packed firmly to eliminate all air pockets.
- Planting should be done in the spring as

soon as possible after the frost is out of the ground. Fall planting is acceptable on light soils (sands, loamy sands, or sandy loams) after seedling buds are dormant and until frost or snow interferes.

Table 1 - Common Tree/Shrub Spacings

Spacing (feet)	Plants/Acre
6 x 6	1210
6 x 8	907
5 x 10	871
6 x 10	726
7 x 7	889
7 x 10	622
8 x 8	681
8 x 10	544
8 x 12	453
9 x 9	538
10 x 10	436
10 x 12	363
12 x 12	302

Maintenance

- See practice standard *Tree/Shrub Establishment (612)* for minimum survival requirements. Supplemental watering, if possible, may increase survival during droughty periods.
- Control competing vegetation during the first three years by mulching, use of fabric weed barriers, and/or herbicide treatment. *Good weed control has been shown to significantly increase the chances for successful tree establishment.* Note: Mowing is not generally recommended weed control practices in field plantings.
- Exclude livestock from all plantings and monitor to protect from insect, disease and animal pests by use of shelters, wire, guards, repellents, pesticides or fencing as needed.
- *Where deer or other herbivore populations are high consider the use of deer herd reduction, tree shelters, repellants or fencing. Tube tree shelters on sandy and/or droughty sites may result in seedling desiccation and death.*
- Protect large plantings from fire by establishing firebreaks. Refer to practice standard *Firebreak (394).*

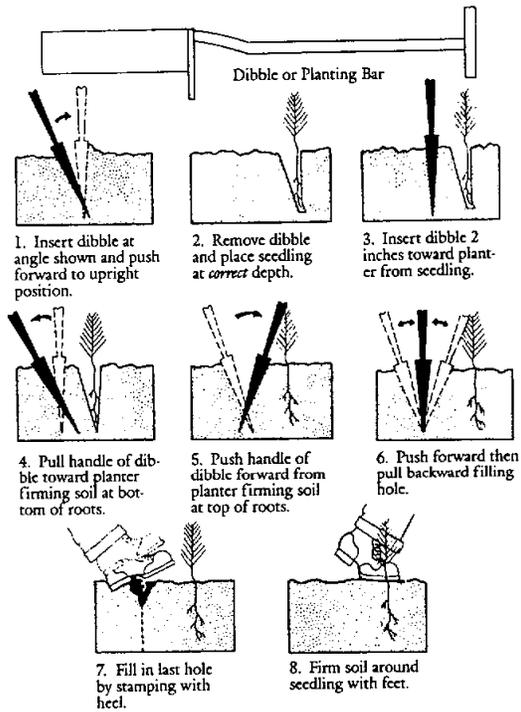


Figure 1: Using a dibble (planting bar) to plant seedlings.

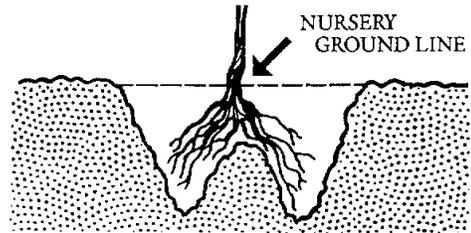


Figure 2: An example of the hole and shovel method of planting seedlings.

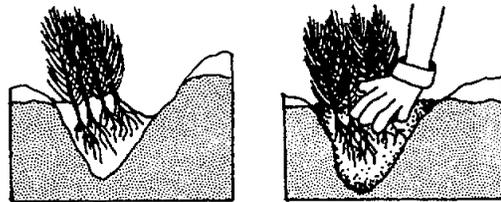


Fig. 3. One method of long-term tree storage is the "heeling-in" technique. Roots must be packed tightly in soil and kept moist, and the heel-in trench must be shaded and protected from the wind.

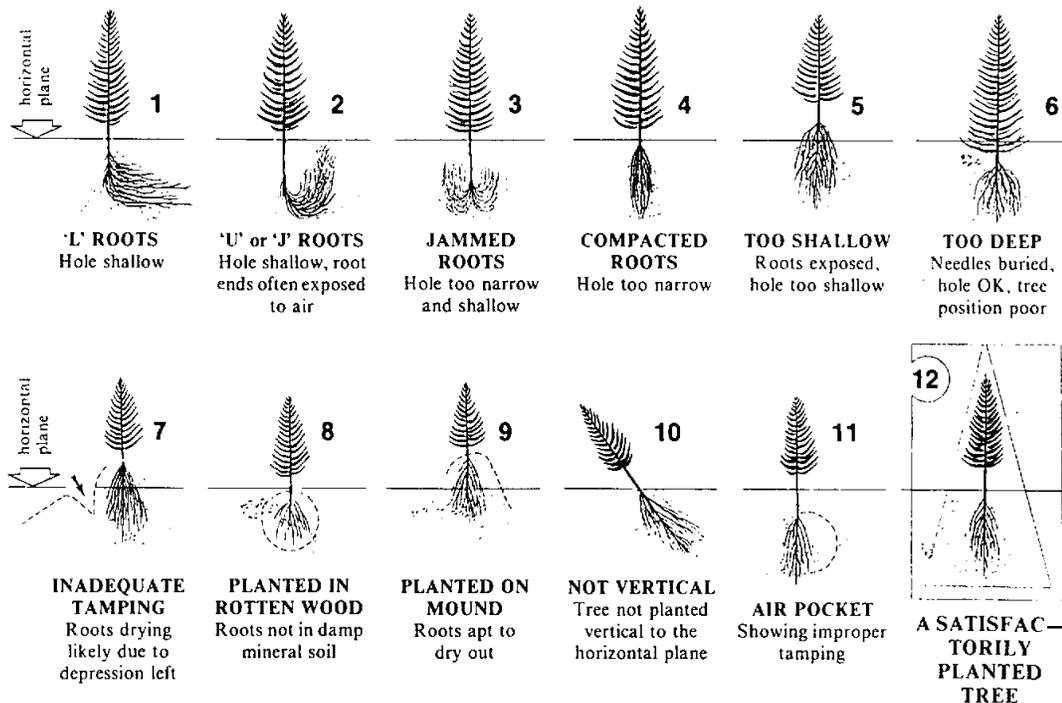


Figure 4. Drawings 1 through 11 illustrate various ways that trees should not be planted. The ideal planting is shown in drawing 12.

Tree Planting – Specifications Sheet

Landowner: _____ Purpose of Planting*: _____ Field number: _____

Location: _____

Soil Map Unit: _____ Cons.Tree/Shrub Suitability Group: _____ Planting Date: _____

Site Prep.: _____ Planting Method*: _____

Storage requirements, if necessary: _____

Acres to be Planted: _____ Average Stems/Ac: _____ Total stems required: _____

Ave. Row Spacing*: _____ Ave. In-Row Spacing*: _____ Ave. size of seedlings: _____

Number of Trees/Acre at Various Spacings

<u>Spacing</u>	<u>Stems per acre</u>	<u>Spacing</u>	<u>Stems per acre</u>
5 X 5	1742	10 X 10	436
6 X 6	1210	10 X 12	363
6 X 8	907	12 X 12	302
6 X 10	726	14 X 14	222
7 X 10	622	15 X 15	194
7 X 7	889	16 X 16	170
8 X 8	681	18 X 18	134
8 x 10	544	20 X 20	109
9 X 9	538	30 X 30	48
9 X 10	484	40 x 40	27

To calculate stems/acre for other spacings: 43,560 divided by (row spacing in feet x stem spacing in feet).

Species/cultivars*:	Kind of Stock	Stems/ac	Total stems
1			
2			
3			
4			
5			
6			
7			
8			
9			
9			

¹ Bareroot, container, cutting, balled and burlapped. Include size, caliper, height, and age as applicable.

Post-planting Weed Control*

Year 1: _____

Year 2: _____

Year 3: _____

Post-planting Seedling Survival (stems/ac. and % of stems planted)

Year 1*: _____ Year 2*: _____ Year 3*: _____

Method of estimating seedling survival: _____

*required for certification of the practice.

Sketch of Planting Site

(photo may also be attached)

References:

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