Proper Storage of Trees Before Planting

Congratulations, and thank you for your tree/shrub purchase! If you are not ready to plant your trees yet, keep them in a cool, dark area, and keep the roots moist! One way to keep roots damp is to repack them in moist material. Perhaps the same packing material they arrived in. Otherwise, moist autumn leaves, wood chips, or even shredded newspaper will suffice.

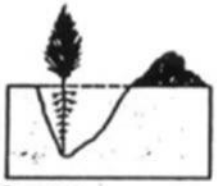
To prevent trees from breaking dormancy, you must keep it cool, ideally between 30 and 40 degrees Fahrenheit. After repacking the roots to hold in moisture, put the tree(s) in an unheated garage, or against the north side of your house. If this is not feasible, another option is to "heel it in". This can be done by digging a shallow hole on the north side of your house, just deep enough for the roots, and temporarily plant there. If opting for this route, it is imperative that you transplant the tree(s) in the proper timeframe to prevent possible girdling of the roots. One other option is to "hold" trees for planting by layering their roots on top of the ground and then covering them with a few inches of moist woodchips or leaves, again, this should be done on the north side of your house.

Just before planting time, inspect each tree's roots, cutting off any that are dead, diseased, or broken. Cleanly cutting frayed ends reduces the surface area of wounds so that the healing process is quicker, while the risk of disease is reduced. Also, shorten any roots that are too long to splay out into the planting hole, or dig a larger hole to accommodate them. If the tree(s) have been in storage, immerse the roots in water for a couple of hours before planting. If the roots are drying out while transporting to the planting site, you can carry the tree in a bucket of water, or with its roots wrapped in moist burlap.

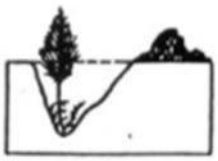
If you have any questions, concerns, or need any other forestry related assistance, please don't hesitate to reach out to **Joshua Isaac, Dickinson and Menominee County Conservation District Forester, at 906-774-1550, ext. 100**.

Or at **dmFAPforester @gmail.com**

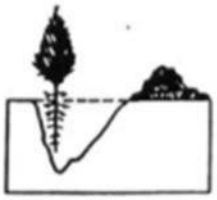
Correct and Incorrect Depths



Correct
At same depth or 1/2" deeper than seedling grew in nursery.



Incorrect
Too deep and roots bent.

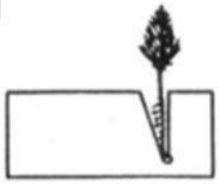


Incorrect
Too shallow and roots exposed.

Dibble Planting

"Planting Bar"

1. Insert dibble as shown and pull toward planter.



2. remove dibble and place seedling at correct depth.

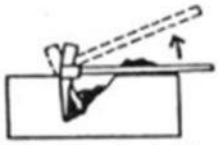
3. Insert dibble 2 inches toward planter from seedling.

4. Pull handles of dibble toward planter firming soil at bottom of roots.

5. Push handle of dibble forward from planter firming soil at top of roots.

6. Firm soil around seedling with feet.

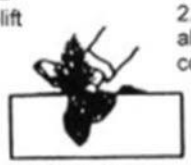
Mattock Planting



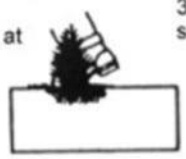
1. Insert mattock-lift handle and pull.

2. Place seedling along straight side at correct depth.

3. Fill in and pack soil to bottom of



4. Finish filling in soil and firm with heel.



5. Firm around seedling with feet.

MICHIGAN FORESTRY
Assistance Program

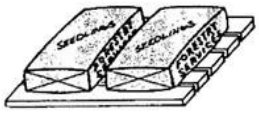
HOW TO PLANT BAREROOT TREE SEEDLINGS

The few minutes you spend reading this brochure will help your tree planting project be a success. In the nursery, these seedlings were pampered and nurtured and will grow well on a wide variety of soils and growing conditions. However, seedlings out of the ground are like fish out of water. You must take special steps to keep them healthy.

Storage Precautions

IF PLANTED WITHIN TWO WEEKS ...

- Spread the bags in a cool, ventilated building where they will not freeze.
- DO NOT PILE THEM!
- DO NOT OPEN THE BAGS UNTIL YOU ARE READY TO PLANT. Tightly closed bags will keep seedlings from drying out.



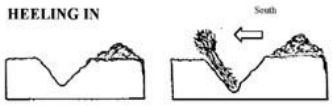
- Check bags for holes or tears. Tape holes to prevent drying.

STORE SEEDLINGS IN A COOL, SHADY LOCATION

IF NOT PLANTED WITHIN TWO WEEKS...

If the seedlings will not be planted within two weeks after your receive them, they should be "heeled in".

HEELING IN



1. Dig V-shaped trench in moist shady place.
2. Open bags and spread out evenly.

3. Fill in loose soil and water well.
4. Complete filling in soil and firm with feet.

When To Plant

- Plant bareroot seedlings from December through late March or early April. Ask your forester for advice.
- Plant when there is good soil moisture, but not when the ground is saturated with water.
- Avoid planting under dry, windy or very warm conditions, or during prolonged periods of freezing weather.
- Do not plant when the ground is frozen.

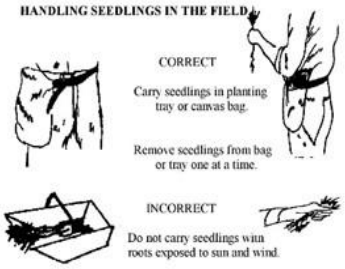
How To Plant

- In the field, transport and store seedling bags in cool, shady locations, and protect them from temperature extremes. Reflective tarps may be used. Do not use heat to thaw frozen seedlings, but let them thaw naturally.

KEEP ROOT EXPOSURE TO A MINIMUM

- Open only one bag at a time, and reclose it immediately after removing seedlings.
- Remove only one handful of seedlings at a time from the bag, rather than emptying the whole thing.
- Keep presorting to a minimum, but do not plant undersized trees.
- Use care when separating roots. Do not hit tree roots to remove excess soil. Transfer trees from shipping bags to planting bags quickly.
- KEEP SEEDLING ROOT EXPOSURE TO THE SUN AND AIR TO AN ABSOLUTE MINIMUM.
- Keep seedling roots covered with moist burlap, moss or in buckets or water while planting.
- Do not carry excess seedlings, in planting bags or on planting machines. Store them in the shade.
- The planting hole must be deep enough to accommodate the entire root system.
- Remove only one seedling at a time from the planting bag, and only when the planting hole is ready.

HANDLING SEEDLINGS IN THE FIELD



CORRECT

Carry seedlings in planting tray or canvas bag.

Remove seedlings from bag or tray one at a time.

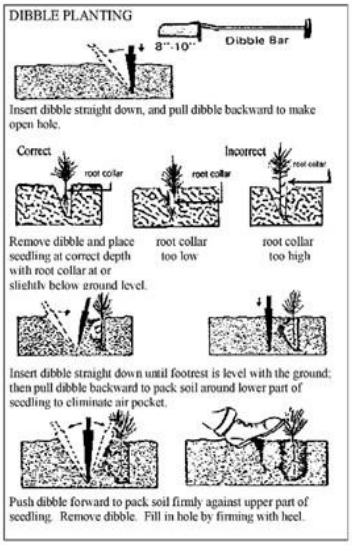
INCORRECT

Do not carry seedlings with roots exposed to sun and wind.

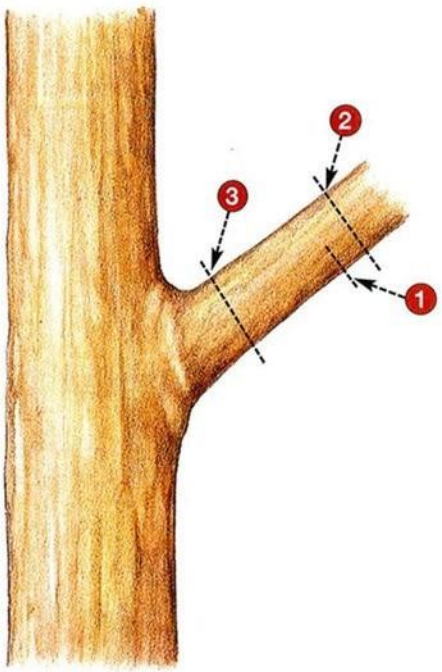
DON'T LET THE ROOTS DRY OUT

- Plant the trees one inch deeper than they grew in the nursery. Roots must extend down and out naturally, and not be cramped in the hole.
- Do not force the roots into too shallow a hole. Avoid "J" or "L" rooting.
- Pack the soil firmly around the roots. Do not leave air pockets.
- Check to see if the roots are packed tightly by gently pulling the top. The seedling should not be loose.

DIBBLE PLANTING



PLANT ONE INCH DEEPER THAN GROWN IN NURSERY



three-cut branch removal

To prune a tree limb cleanly and safely, use a prunning saw and make these three sequential cuts:

1. *On the bottom of the limb between 6 and 12 inches from the trunk; cut about one-quarter of the way through.*
2. *Through the limb from the top, starting about 1 inch beyond the first cut. (The weight of the branch may cause it to snap off before the cut is complete.)*
3. *Completely through the short remaining stub from top to bottom just beyond the swollen branch collar. (Support the stub while sawing, to make a clean cut.)*

MICHIGAN FORESTRY Assistance Program

Spacing Guidelines for Trees and Shrubs

After selecting the appropriate species for the planting site, and to meet the landowner's objectives, it is important to determine the number of seedlings that can be planted. The following spacing guidelines, and rates, are recommended for allowing appropriate growing room to grow merchantable products without significant stagnation of growth or vigor and will allow for efficient use of the growing site. For reference, and calculation, 1 acre = 43,560 square feet.

Species	In Rows (Feet)	Between Rows (Feet)	Needed Per Acre	Rate Per Acre
Spruce/Fir	6	9	800	700-900
Red/White Pine	7	8	800	700-800
Hardwood/Larch	10	10	435	400-500
Black Walnut	10	12	350	300-400
Hardwood Shrubs	4	6*	1800	1500-2000
Fruit Trees	10-20*	12-24*	90-360	80-400

*Shrubs can be planted in bands, clumps, or patches.

*Fruit tree spacing will depend on root stock (dwarf, semi-dwarf, or standard).

You will be picking up live trees and can expect a very successful planting experience if you do proper site prep and give your trees the attention they need. Advice and assistance will be provided by your District Forester upon request.

For Windbreaks, Wildlife, & Visual Screens

Species	In Rows (Feet)	Between Rows (Feet)
Spruce/Fir	7	9
Red/White Pine	8	9
Hardwood/Larch	10	12
Black Walnut	10	10
Shrubs	5	7*

Based on two to three rows planted in a staggered form.

*Hawthorn and crabapple should be spaced 6 x 10 feet.

Need Help with the number of trees for your windbreak? Determine how many feet your planting will cover. Take the number of feet and divide it by the spacing recommended for that particular tree type. This will give you the number of trees to plant for that row.

Example: I have a 63 foot row and want to plant spruce along this row for a visual screen. I take 63, divide it by 7 feet, and come up with 9 trees. Since I am planting two rows, I multiply 9 by 2, and get 18 trees total.

For acreage planting: 43,560 / (feet within rows x feet between rows) = Example

(for spruce windbreak): 43,56 / (7 x 9) = 691.4 = 692 trees per acre.

For more information, contact your District Forester, Joshua Isaac, at:

906-774-1550 ext. 100 or at **dmFAPforester@gmail.com**

TREE/SHRUB SITE PREPARATION

JOB SHEET - Forestry Series **490**

Natural Resources Conservation Service

Michigan

Client/operating unit:		Farm no.:		Tract no.:	
Farm/ranch location:		Field no.:		Program:	
Specifications date:				nstallation	
Proposed treatment acres:			Planned i	date:	

Site preparation eliminates weed competition from the area to be planted to trees and/or shrubs, helping to get the plants off to a good start.

Purpose of this Document

This Conservation Design Sheet describes the techniques used to prepare a site for tree and/or shrub planting.

In additional to the primary practice, e.g., Tree/Shrub Establishment (612), Windbreak/Shelterbelt Establishment (380), also refer to following Michigan NRCS Conservation Practice Standards and associated job sheets for additional considerations for tree and shrub establishment:

- Herbaceous Weed Control (315)
- Mulching (484)
- Cover Crop (340)

Additional practices may also be required to address

additional resource concerns, e.g., Brush Management (314), Access Control (472).

Site Preparation

Site preparation prior to tree/shrub planting or direct seeding is usually necessary on any site with existing vegetation to reduce competition and assure tree survival. Site Preparation may not be needed on bare or very sparsely vegetated sites – recently tilled, following an annual crop (e.g. annual grains, soybeans), moss, sparse Junegrass, etc.

Site preparation can be accomplished through either mechanical or herbicide treatment or both. Long-term techniques such as fabric weed barriers and mulch can be good alternatives for weed control as well.

Site preparation can be done to the entire field (where risk of soil erosion is minimal), in 36” wide strips centered on the planting rows, or in 36” x 36” square, or 36” diameter spots centered on individual trees planting sites.

<u>Mechanical Treatment</u>
This will provide initial control of weed competition. Follow-up weed control will be needed during or 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.

Mechanical site preparation can yield good results when done in the fall prior to a spring planting. On

highly erodible sites, mechanical site preparation should be done in the spring prior to planting, and the need for a cover crop should be assessed.

Select the mechanical site preparation techniques from the following:

- Bare ground, light cover of vegetation (moss, open sand, light Junegrass, etc.): No site preparation is necessary.

- Medium cover of vegetation (medium density Junegrass, light quackgrass, etc.): Kill or destroy the sod layer with one of the following methods:
  - Use tillage (plowing, disking, etc.).
  - Use shallow (2 to 4" deep) furrowing.
  - Use mechanical or hand scalping on sands, sandy loams, and loamy sands with light to moderate grassy and/or herbaceous competition.

- Heavy cover of vegetation (dense Junegrass, dense quackgrass, hayland/pasture, sweet fern, etc.): Kill or destroy the sod by plowing or other tillage 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.

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. Select chemical site preparation techniques from the following:

- Spot or band treat an area a minimum of 36" wide around the tree/shrub planting site. Use only herbicides labeled for the species being planted, the intended use of the trees and shrubs, and the weeds to be controlled. Read and follow herbicide label instructions. See References for further information on herbicide use.

- For spring plantings, when dense vegetative cover is present, herbicide should be applied in late summer or early fall prior to the planting year, if possible. This practice normally will provide optimum weed control and better tree/shrub survival. An assessment of the weed re-growth should be made in the spring prior to planting, with herbicide applied if needed.

- For fall plantings (only recommended on well and moderately well drained sands, loamy sands, and sandy loams due to frost-heave potential), apply herbicides in the previous spring if possible to assure a weed-free planting bed. An assessment of the weed re-growth should be made in the fall prior to planting, with herbicide applied if needed.

Additional Considerations:

Site Preparation for Direct Seeding Prepare the seeding bed by exposing mineral soil using mechanical or chemical methods described above on the entire field, prescribed burning, or a combination of these methods. If possible, mix humus in with the mineral soil to prepare a seedbed.

Fabric Weed Barriers and Mulch Fabric weed barriers are porous, yet opaque material that is installed over a tree or shrub seedling. They permit water to seep through to the seedling, but prevent weed growth. They are installed as 3' x 3' squares over individual plants, or as long rolls that can be rolled out over rows of trees.

Mulch is organic or inorganic material that is spread around the individual seedling to help retain soil moisture, moderate soil temperature, and prevent weed growth. Apply mulch in a 3' diameter circle around each seedling, 2 to 3" deep, and pulled back from the plant stem slightly. Straw or other similar mulch generally should be avoided as it can encourage mice and other small herbivores that may damage the seedlings.

If weed barriers or mulch will be used for follow-up weed control, site preparation may not be required. However, in sites with aggressive difficult-to-kill weeds (e.g., reed canary grass), mechanical or chemical site preparation should be used prior to planting and installation of the weed barriers or mulch.

If fabric weed barriers or mulch are to be used, refer to the NRCS-MI Mulching (484) Conservation Practice Standard.

Cover Crops

Cover crops 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. Cover crops are also used to minimize the risk of more aggressive or invasive vegetation (e.g., Canada thistle) establishing. If cover crops are to be used, refer to the Michigan NRCS Cover Crop (340) Conservation Practice Standard.

NRCS, Michigan
October 2012

TREE/SHRUB PRUNING

JOB SHEET - Forestry Series **660**

Natural Resources Conservation Service

Michigan

Client/Operating Unit:		Farm No.:		Tract No.:	
Proposed Treatment Acres:		Field No.:		Program:	
Farm/Ranch Location:					
Specifications Date:		Planned Installation Date:			

Figure 1. Clear-stem pruning of red oak improves sawlog quality for future wood products.

Definition

Tree/Shrub Pruning is the removal of all or part of selected branches, leaders, or roots from trees or shrubs.

Purposes

Some common reasons for pruning are:

- Improve the appearance of trees or shrubs, e.g., ornamental plants and Christmas trees.
- Improve the quality of wood products.
- Improve the production of plant products, e.g., nuts, fruits, boughs and tips.
- Reduce fire and/or safety hazards.
- Improve the growth and vigor of understory plants.
- Adjust the foliage and branching density or rooting length for other specific intents, such as wind and snow control, noise abatement, access control, and visual screens and managing competition.
- Improve health and vigor of woody plants e.g. disease, insect and injury management.

General Pruning Criteria

Safety Considerations

Always wear a hardhat with eye protection.

Never prune trees that are touching or near utility lines. Consult the utility company for assistance with such trees.

Use an insured, professional tree surgeon for work on large trees, around buildings, utility or power lines, and other obstructions.

Pruning Technique

Except for Christmas tree shearing, prune trees according to the following steps:

1. Locate the branch bark ridge (See Figures 2 and 3).

2. Find A (outside edge of branch bark ridge).

3. Find B (swelling where branch meets branch collar). If B is difficult to determine, drop a line from A: the angle XAC is equal to the angle XAB.

4. Make first cut as an undercut several inches beyond branch collar.

5. Remove limb with second cut made slightly above first cut.

6. Make the final cut on line AB.

7. Do not cut behind the branch bark ridge.

8. Do not leave stubs.

9. Do not cut into the branch collar.

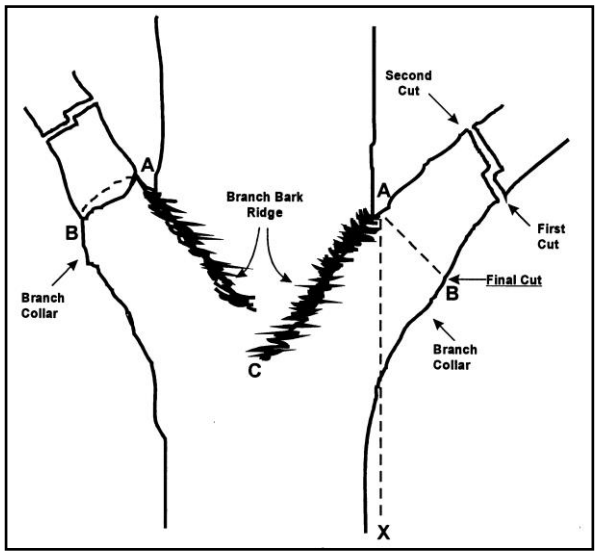


Figure 2. Hardwood Pruning Guidelines

Use tools intended for the purpose of pruning and appropriate for the size of the limbs being removed.

Other General Pruning Criteria Comply with applicable federal, state, and local laws and regulations during the installation, operation, and maintenance of this practice.

Do not cut into the branch collar, prune flush to the stem, or leave branch stubs, as this can result in delayed wound closure, and increased tissue damage and decay.

Do not leave debris and vegetative material on the site after treatment that will present an unacceptable fire or pest hazard or interfere with the intended purpose and other management activities.

Burning of removed vegetation shall be done according to the MI-NRCS Prescribed Burning (338) practice standard.

Ground vegetation and/or conditions must be left in a manner to address erosion and other natural resource concerns to acceptable levels.

To reduce the risk of spreading oak wilt disease and Dutch elm disease, do not prune oak and elm species between March 1 and October 1, except as required to repair limbs

and branches broken unintentionally during that time frame, e.g., storm damage, or where delaying pruning would be a safety hazard. If pruning is required on these species between March 1 and October 1, disinfect pruning tools between trees (see information in "Considerations" section).

Do not paint or dress pruning cuts, except following growing season pruning on oaks or elms as described above. Use latex paint or commercial tree wound dressing.

Do not remove more than one third of the live crown at one time. Do not prune higher than half the total tree height.

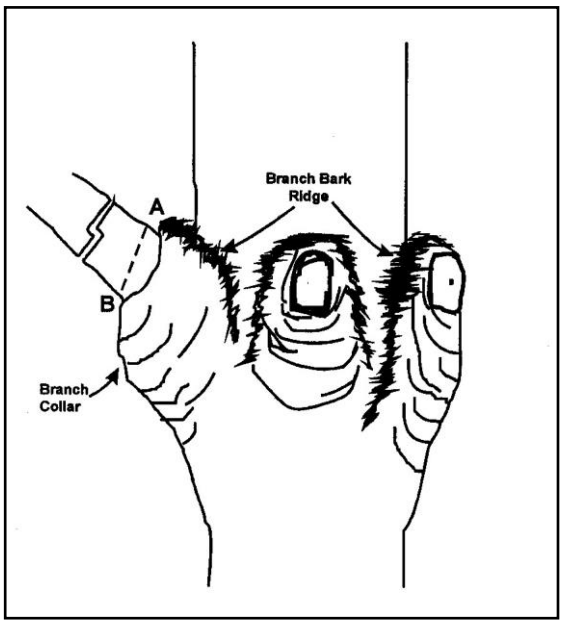


Figure 3. Conifer Pruning Guidelines

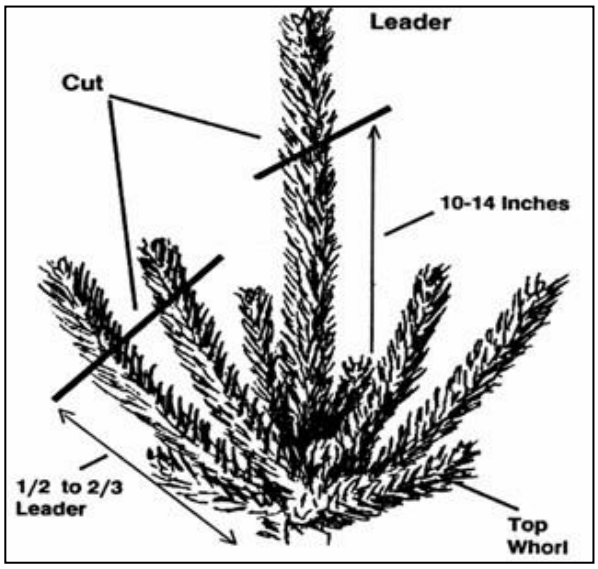


Figure 4. Christmas Tree Shearing Detail

Additional Criteria Applicable to Shearing or Shaping Christmas Trees

Shear spruce and fir after the season's growth is complete and throughout dormant season (usually between November 1 and April 1). Shear spruce and fir just above a bud. Shear when temperatures are above freezing.

Shear pines during the active growing season just before terminal growth is completed (usually between June 20 and July 20).

Cut terminal leader back to 10 to 14 inches with a 45-degree angle cut. Cut the lateral branches of the top whorl from ½ to 2/3 the length of the leader (see Figure 4).

Trim lightly during year of harvest.

Refer to North Central Regional Extension Publication 310, Shearing Recommendations for Christmas Tree Producers for additional information.

Additional Criteria Applicable to Corrective Pruning of Hardwood Seedlings

Prune seedlings in the late winter or early spring before the new terminal has grown more than 3 inches.

Prune seedlings only as needed to select one leader and to remove dead branches.

If a quality seedling is not apparent after 3 growing seasons, cut the tree off 1 inch above the ground during the dormant season. After stump sprouts appear, select the best sprout to leave and remove all others.

Additional Criteria Applicable to Clear Stem Pruning for Sawlog Production

Selective pruning with subsequent thinning of crop trees under favorable growth and market conditions has been shown to be an economical venture yielding returns of up to 12 percent.

Prioritize pruning of stands based on site quality and species.

Preferred pruning time is late winter before bud break.

Pines should be at least 16 feet tall before pruning; hardwoods should be at least 16 feet

tall and 5 inches DBH (Diameter at Breast Height, 4.5').

Prune vigorous, well-formed, single-stem dominant and co-dominant crop trees up to the number of crop trees per acre required to provide full stocking at maturity. (Note: This may vary depending on market purpose, but for sawlogs will normally be between 40-151 trees per acre; see Table 1.)

Table 1. Number of Crop Trees and Growing Space Recommended for Timber Production based on DBH (Diameter at Breast Height, 4.5')

	Hardwoods		**Pines**	
DBH *(in.)*	No. Crop Trees *(per acre)*	Distance Between Trees *(ft.)*	No. Crop Trees *(per acre)*	Distance Between Trees *(ft.)*
10	151	17	170	16
11	134	18	151	17
12	109	20	134	18
13	90	22	121	19
14	82	23	109	20
15	70	25	99	21
16	60	27	90	22
17	56	28	82	23
18	48	30	76	24
19	43	32	70	25
20	40	33	64	26
21	36	35	60	27
22	32	37	56	28
23	30	38	52	29
24	27	40	40	30

Prune to develop a single straight stem. Prune to a minimum of 10 feet; prune up to 18 feet if possible. It may be necessary to implement multiple pruning treatments over several years to reach a 10-foot or 18-foot height.

Prioritize pruning based on species and local markets. In Michigan, the following species are favorable for pruning: sugar maple, northern red oak, white oak, black cherry, black walnut, yellow birch, tulip poplar, red pine, and white pine.

If possible, prune limbs when they are 1 to 2 inches in diameter to expedite wound closure; wounds of greater size may take up to 10 years to heal and introduce decay into the butt log.

Additional Criteria Applicable to Pruning to Reduce Fire Hazard in Conifer Stands

Remove all the pruned branches from a 15-foot border strip.

CONSIDERATIONS

Improper or excessive pruning may reduce the value of the timber, and cause trees/shrubs to be less healthy by increasing the incidence of disease or insect infestation.

Begin shearing Christmas trees when trees are 35 years old (approximately 3 feet in height) and continue until trees are marketed.

For consumer preference, shape Christmas trees so that the base is two-thirds as wide as the overall height (i.e., a 6-foot high tree should have a base that does not exceed 4 feet wide).

Limbs one inch in diameter or less will normally close within one or two years. Limbs in excess of 2 inches in diameter may take 10 years or to close.

Time pruning and shearing to minimize disturbance to breeding and nesting wildlife species.

To prevent the spread of pathogens, shearing and pruning equipment should be disinfected between pruning individual trees by dipping tools in 1 part bleach to 9 parts water or 70 percent denatured alcohol. (Note: bleach can corrode metal, and should be washed off equipment with soap and water after use.)

Review the estimated cost and projected economic benefits of the project before starting a pruning or shearing project.

Organic matter from decomposition of tree limbs will improve soil condition.

To maintain plant growth and sustain vigor, pruning may be done in two or more timed intervals.

Branches removed may be used for other purposes.

Pruning between October 1 and March 1 reduces the likelihood of introducing disease into the tree wound. Note: Pruning of pine in forest stands during growing season increase the chance for attack by bark beetles and root collar weevil.

OPERATION AND MAINTENANCE

Periodically inspect plant condition and take additional actions as necessary; e.g., additional pruning, pest management, nutrient management, and forest stand improvement.

For More Information

Additional information on this subject may be obtained in the following references:

Bedker, Peter J., J.G. O'Brien and M.E. Mielke. 1995. How to Prune Trees, USDA-FS Publication NA-FR-01. Northeastern Area State and Private Forestry. Radnor, PA. http://www.na.fs.fed.us/spfo/pubs/howtos/ht_prune/htprune.pdf

Kesner, Charles D and K.L. Lamkin. 1986. Renovating Old, Abandoned Apple Trees. Michigan State University Extension Bulletin E1941. East Lansing, MI. http://archive.lib.msu.edu/DMC/Ag.%20Ext.%202007-Chelsie/PDF/e1941-1986.pdf

Kielbaso, J. James and M. Koelling. 1975, Pruning Shade and Ornamental Trees. Michigan State University Extension Bulletin E-804. East Lansing, MI.

Koelling, Melvin R..1991. Shearing Recommendations for Christmas Tree Producers. North Central Regional Extension Publication No. 310. East Lansing, MI. http://www.for.msu.edu/extension/extdocs/shear.htm

Koelling, Melvin R. and L.J. Dornbush. 1992. Growing Christmas Trees in Michigan, Michigan State University Extension Bulletin E1172. East Lansing, MI. http://forestry.msu.edu/extension/ExtDocs/xmast ree.htm

SILVICULTURE FIELD TIP

Field tested ideas.
Contact the author for further information.

MNDNR
Forestry

Field Tip No. 6 (Revised) 1997

Protect Pine Tree Seedlings from Deer Browsing with Paper Bud Caps

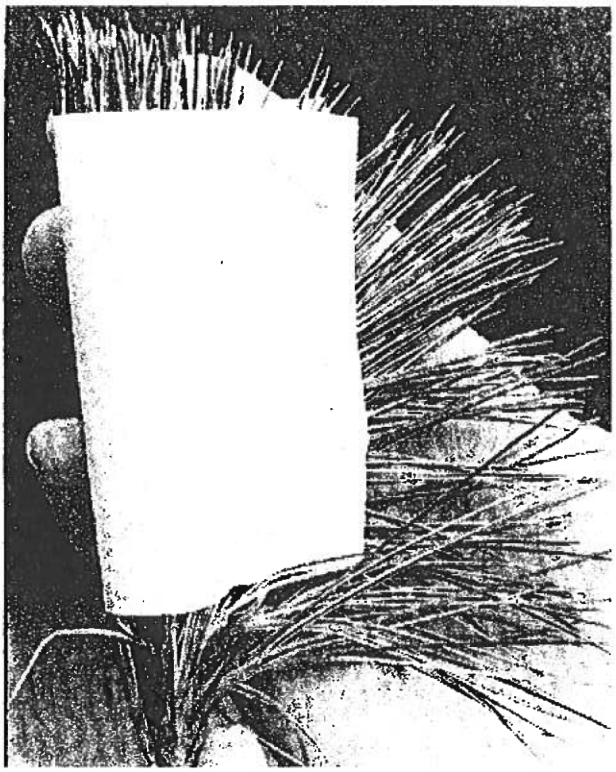
By: Bill Barnacle
Brainerd Region Silviculturist

Depredation by deer on planted and natural pine tree seedlings can be a problem. A cheap and effective way of saving terminal buds (terminal bud is the bud, or cluster of buds, at the very top of, the tree) from browsing is using paper bud caps. A tree seedling will continue to grow in a vertical manner if the terminal bud is not damaged, even if most of the tree is browsed.

Paper bud caps have been used in state forests for many years. Paper bud caps are inexpensive, environmentally friendly, and easily applied. They offer one potential solution to a widespread seedling survival problem.

The idea behind the bud cap is to protect the terminal bud cluster by stapling a small piece of paper around it. Suitable paper products include common lightweight papers such as typing or photocopy paper. The paper should be cut to 4" x 6", folded around the terminal bud of the tree, and stapled to some needles near the top. However, for trees that tend to have very weak terminal shoots such as young white pine, pieces of paper as small as 3" x 4" are recommended. Wet snow can stick to the paper and cause the weak terminal to bend over. A smaller piece of paper will not catch as much snow as a larger one.

Bud caps should be applied with three staples catching needles. The staples have to be put on tight enough so they squeeze the needles and don't pull off in the wind. Use a common office-type desktop stapler or equivalent. The paper should be placed so that the bud cluster is at least 1/2 inch below the top of the paper but not lower than the midpoint. The proper stapling pattern is shown in the photo. The staples should be applied near the outside edge of the paper. The middle staple should



Three staples through some needles hold the paper bud cap in place. Be careful not to staple the terminal bud or leader. Top bud should be at least 1/2 inch below top of paper.

Plantra
Plant Like You Mean It

INSTALLATION INSTRUCTIONS:

SunFlex™ Greenhouse Grow Tube System for Trees

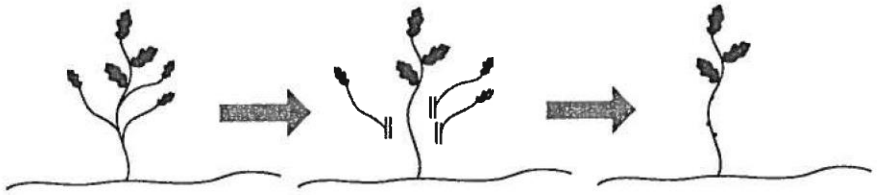
STEP 1 Plant seedling

STEP 2 Prepare the seedling for "tubing"

If your seedlings have side (lateral) branches please remove them carefully using sharp pruning shears before installing the grow tube ***(see figure 1).***

NOTE: Do NOT bend side branches to squeeze or otherwise force them into the grow tube. Doing so will encourage weak branching and other problems as the tree matures.

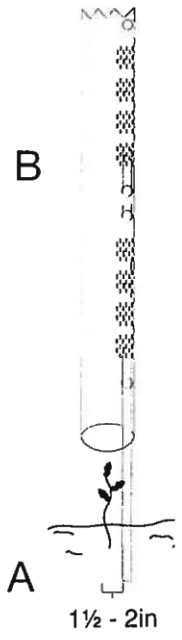
FIGURE 1



STEP 3 Install SunFlex™ Grow Tube & Trunk Builder Stake

(Stake Entirely Inside Grow Tube) ***(see figure 2)***

FIGURE 2



A. Position stake 1.5 – 2 inches from the seedling with ground-line marker towards the ground. Use Plantra Stake Driver **(do not use a hammer or mallet)** and drive stake until ground-line marker reaches the the soil surface.

B. Pop grow tube open by flattening tube its entire length in opposite direction as packed. Next, slide the grow tube over the top of the stake and down to the ground while carefully guiding both the seedling and the stake entirely inside the grow tube.

NOTE: This method of installing support stake inside the grow tube is recommended for Trunk-Builder stakes only. The Trunk-Builder Stake has a rounded top to avoid stem abrasion and a small diameter to avoid crowding the seedling inside the grow tube. Other stake materials should never be installed inside grow tubes as their sharp edges could damage stems that come in contact with the stake top and have large diameters which will occupy important growing volume inside the tube the tree should have.

TREE MAINTENANCE GUIDELINES (MINIMUM)

This information is provide by Authority of the Michigan Department of Natural Resources

To ensure success from your tree planting, the tree must be properly cared for after the initial planting. A properly maintained tree grows well, has less problems and provides many benefits to people and our environment. By following the three (3) year maintenance guidelines, trees receive the care they need to become established. After the first three (3) years, trees should be routinely inspected for problems and watered during dry spells.

Your tree should be planted according to the specifications in these planting guides...

- American National Standards Institute (ANSI)
- Tree City USA Bulletin No. 19 – How to Select and Plant a Tree
- Department of Natural Resources (DNR) Tree Planting Guide (IC4108)

The year after the tree is planted, these specifications should be followed...

- **Water** – Check soil moisture a few inches below the surface in the root ball.
- **Mulch** – Layer three (3) to four (4) inches above the ground around the tree but not touching the tree trunk. The area should be four (4) times the area of the root ball. Do not use treated or dyed mulch.
- **Prune** – only if necessary. Follow specifications in the How to Prune Trees Bulletin (NA-FR-01-95) and/or Tree City USA Bulletin No. 1 – How to Prune Young Shade Trees.
- **Stake** – only if necessary. Follow the specifications on the Tree Planting Guide (IC4108).
- **Check** – for mower/weed whip damage, vandal damage and animal damage.
- **Check** – for any insect or disease problems on the tree and surrounding trees. Contact a forester or arborist if a problem exists.
- **Do not** – fertilize. Fertilizer applied to newly transplanted trees can excessively dry roots (burning). **Remove** – all tags and twine from the tree to prevent girdling

The second year after the tree is planted...

- **Water** – Trees should be checked and watered. Monitor and water trees from spring to fall.
- **Mulch** – The area surrounding the tree must be re-mulched every spring to achieve the 3-4 inches depth.
- **Remove** any stakes and ties.
- **Prune** – only if necessary. Follow specifications in the How to Prune Trees Bulletin (NA-FR-01-95).
- **Check** – for any insect or disease problems on the new trees and surrounding trees. Contact a forester or arborist if a problem exists.

The third year after the tree is planted...

- **Water** – Root systems are still being established and soil moisture needs to be checked on a regular basis from early spring to fall.
- **Re-mulch** – trees in the spring.
- **Prune** – if necessary. Remember to prune before the growing season starts.
- **Check** – for any type of damage and make corrections.
- Trees may be **fertilize**d in the spring if a need exists. Consult a forester or arborist before fertilizing.

Research has shown it takes approximately three (3) years for a transplanted tree to become well established on a new site. Maintaining a vigorous, healthy tree requires commitment well after the initial planting. The tree should have a healthy living environment and a structurally good form. Good form is obtained from quality planting stock, and importantly, from proper pruning. Your tree should be mulched, watered, free of insect and disease problems, and should be protected from animal damage and lawn care equipment injury.