# Tree Shelter Installation and Maintenance Fact Sheet

Applicable to all deciduous tree planting practices

**USDA Natural Resources Conservation Service - Illinois** **October 2011**

Tree shelters, also known as tree protectors or tree tubes, protect young trees from wind, deer, rodents, and direct herbicide spray. Shelters also provide a mini-greenhouse effect that stimulates rapid early tree growth which, after emergence above the shelter, slows to the same growth as without shelters.

Most tree shelters are made of polyethylene or polypropylene with varying amounts of ultraviolet light (UV) protection and come in lengths from one to six feet. They are available as preformed cylinders, cylinders that ship flat, flat sheets that are folded into cylinders, or square tubes that ship flat.

Tree shelters should be installed after seeds or seedlings have been planted. They are installed with a support stake and with, or without, protective bird netting. Shelters may be installed with or without tillage, chemical, fabric, or mulch weed control. Regular inspection and maintenance is needed for effective protection.

*4-year old black cherry protected in tree tube*

For information on wire cages, Vexar® or other animal protective control measures, refer to: "Protecting Trees & Shrubs from Deer" – April 2008.
http://efotg.nrcs.usda.gov/references/public/ND/deer_fact_sheet.pdf
and/or "Proper Installation, Maintenance, and Removal of Rigid Seedling Protector Tubes." NRCS, MT February 2004.
http://www.mt.nrcs.usda.gov/technical/ecs/plants/technotes/pmtechnoteMT45/index.html

## Materials

Tree shelters should be warranted by the manufacturer for at least five years. Five feet or greater height is needed for deer protection and protection against rabbits on top deep snow. Lengths four feet and greater should be vented (perforations or holes in the middle ¼ to ½ of the tube provided by the manufacturer) to reduce the chances of winter dieback. Tie holes, (1 to 3 per tube) are located to provide needed tube support when tied to the support stake. The manufacturer should warrant that the top of the tube, when properly installed, will not abrade the tree once it grows out of the tube.

Ties are usually UV resistant plastic that easily thread through the tube holes and tighten around the stake. Ties shall be warranted to last as long as the tree shelter. Some brands of ties allow loosening for inspection of the tree, lifting the tube, or replacing broken stakes.

Stakes may include: 1"x1" oak or other rot resistant wood, 1" diameter bamboo, #3 or #4 rebar, fence posts, ½" or ¾" schedule 40 electrical PVC. Stakes must be long enough to penetrate the ground 1' and extend 3 to 6" above the topmost tie position on the tube. Stakes should provide support the entire time shelters are needed.

| Tree shelter types | Pros | Cons |
|---|---|---|
| Rigid tubes. - Nested 3-5 per bundle for shipping. Usually double wall. | Maintains shape, often with flared, bark-protecting top. Quite rigid. | Bulky to ship and store. Different diameters. Inner tube quite narrow. |
| Round tubes, shipped flat, usually double wall. Must be squeezed back into a cylindrical shape. | Uniform size. Many tubes per bundle. | Must be squeezed into cylindrical shape. Less rigid. Taller tubes require an extra tie. |
| Flat sheets that must be curled into a cylindrical shape and secured to the stake. Usually single wall. | Can transport many in a small space. Once formed, tubes quite rigid. Tube can be opened to inspect tree. May be removed and reused. | Takes time to form cylinder from flat sheet. Single wall design definitely requires manufacturer–supplied, bark protector at top. |
| Square tubes, shipped flat, usually double wall. Must be squeezed into square shape. | Can transport many in a small space. Easily folds to shape. | Squares are less structurally rigid than cylinders. Corners may abrade bark and damage tree. |
| Vertically slit drain tile | Available at local garden centers and lumber yards. Can be cut to length. Rigid. | Difficult to stake. Hard to hold straight. Difficult to remove. Black color can heat trunk to point |

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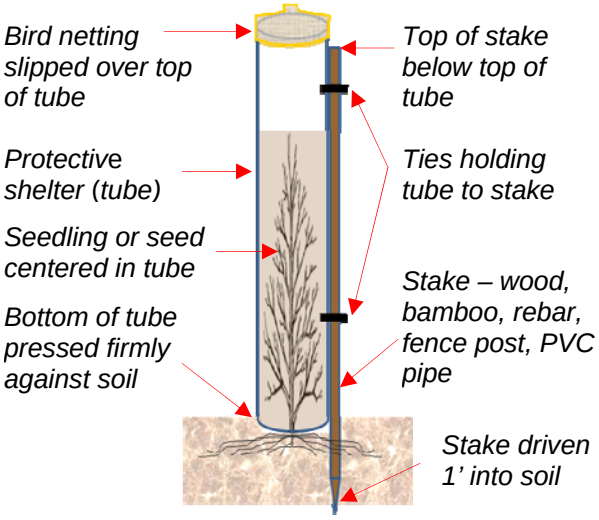
| | | of tissue damage or death. |
| **Tree shelter stakes** | **Pros** | **Cons** |
| 1”x1” oak or other rot resistant wood. | Readily available, ready to use. Sturdy. Easy to drive with steel post driver. | Expensive. Some will break at installation. Some break from wind and deer. May rot too soon. |
| 1” diameter bamboo | Cheaper than wood stakes. Easy to drive with steel post driver. | Can shatter when driven in hard or rocky ground. May rot or break too soon. |
| #3 or #4 rebar | Available locally at a reasonable price. Easy to install by hand, maul or steel post driver. Reusable. | Heavy. Can tip with wind or animal rubbing. If forgotten, tree can grow around the rod. |
| Steel post | Readily available. Sturdy. Easily installed with steel post driver. Reusable. | Expensive. Heavy. Tree can grow around post. Post flange can damage roots when removed. |
| ½” or ¾” schedule 40 electrical PVC | Readily available. Cheap. Easily processed by common shop tools. Flexes in the wind. Springs back after animal bumping. Uniform strength. Reusable. | May shatter if driven into hard ground. May shatter if bumped in extremely cold weather. May flex too much in high winds. May flex, making installation difficult. |

## Installation

Drive stake in ground 2” to 3” from seedling or seed, to a depth of 1’, ensuring that top of stake will be below top of tube, but 3” to 6” above the topmost tie position. Note: To prevent PVC from flexing while driving into hard ground, slip a capped sleeve (1½’ shorter than the PVC stake) of steel conduit or pipe, over the PVC and pound on the steel cap.

Insert ties in appropriate holes on tube and tie loosely, or leave open, as instructed by manufacturer. Slip ties over stake. Center the seed or seedling in the middle of the tube. Press the tube firmly against the soil surface (preferably ½” to 1” into the soil.) Ensure tree limbs are not caught under the ties. Tighten ties on stake. If installing bird netting, follow manufacturer’s instructions.

**Properly Installed Tree Shelter**




## Maintenance

Inspect at least annually. Straighten tipped shelters. Replace broken stakes. Remove bird netting if trees are at or above the top of the tube. Use fabric, mulches, mowing, or herbicides to control weeds around trees. Remove shelters and stakes when the tube begins restricting tree stem diameter growth. Some types of tree shelters will be destroyed when removed. Removing tubes too early may result in a tree unable to support itself. Trees need to grow above the shelter for several years to develop wind hardiness. Freshly exposed tree bark may take several weeks to “harden” and become resistant to damage.

Tree shelters may encourage weak, V-shaped branch angles within the tube, especially on opposite branching species. Prune off these weak branches when the tubes are removed.

Tree shelters restrict limb formation for the height of the tree shelter. When tall tree shelters are installed on windbreak trees, additional rows of shrubs or conifers may be needed to provide wind protection close to the ground.

## References

Berta, Scott, Registered Forester, Tree Protection Supply, Newnan, GA, Personal Communication.
Ehni, Anne, Wells Co. Soil Conservation District Manager, Fessenden, ND, Personal Communication.
Lais, Joseph, CEO, Plantra®, Mendota Heights, MN, Personal Communication.
Tree Shelters: “A Multipurpose Forest Management Tool,” College of Agricultural Sciences, Penn State Univ.
“Tree Shelter Installation Tips”, Timber Management and Seed Company, LLC., Robins, IA.



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