

## PLANT MATERIALS TECHNICAL NOTE

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### Proper Installation, Maintenance, and Removal of Rigid Seedling Protector Tubes

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**Introduction:** There are numerous types of seedling shelters or protectors used to prevent or minimize animal damage to recently planted tree and shrub seedlings. One type of seedling shelter is the rigid seedling protector tube, sometimes referred to by the specific brand name Vexar®. Improper installation of rigid seedling protector tubes may result in damage to the form and function of seedlings on which they are installed. Similarly, improper maintenance and untimely removal of the tube may result in branch deformation, structural weakness, or mortality. This Technical Note provides information on the proper installation, maintenance, and removal of rigid seedling protector tubes.

**I. BACKGROUND:** One method of reducing seedling damage from animal browsing and rubbing is the installation of seedling shelters. These products come in various designs, shapes, sizes, and construction materials. One type of seedling shelter that has proven effective in reducing animal damage to seedlings in the northern Great Plains and Rocky Mountains is the rigid seedling protector tube. These are cylindrical, open-mesh products that fit over a seedling and are supported by 1 or 2 tall stakes (FIGURE 1). They consist of flexible polyethylene and polypropylene (plastic) mesh with diamond-shaped openings, and often have an ultra-violet light inhibiting formulation (FIGURE 2). They are available in various sizes including 3.25- and 4.0-inch diameters, and 18-, 24-, 30-, and 36-inch lengths. They are effective in reducing browse damage to small seedlings from animals such as deer, elk, moose, rabbits, and large gophers. They do not exclude mice, voles, small gophers, or other rodents that are small enough to slip through mesh openings. Browsing of plant parts is possible once they protrude from the tube. Large animals have been observed biting and pulling tubes completely off seedlings, although they seldom continue this behavior if other sources of food are available nearby. Rigid seedling protector tubes offer varying degrees of seedling protection for approximately 2 to 6 years, depending on the tube, plant species, and growing conditions.



FIGURE 1

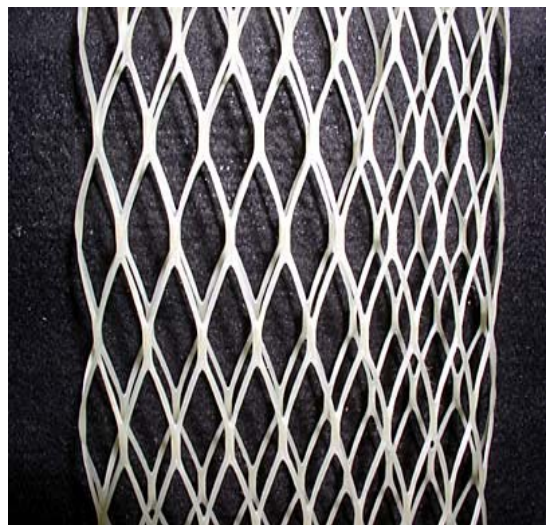


FIGURE 2

**II. PROPER INSTALLATION:** Rigid seedling protector tubes can be installed on most small deciduous species by manually slipping the tube over the seedling. They are not normally used on conifers because of potential needle and branch deformation. For larger stock, especially deciduous species with long, upright stems, the branches may become entangled in the openings as the tube is slipped over the plant. In some cases, branches are deformed or broken. To prevent this from occurring and to speed the installation process, carefully slip a rigid piece of PVC (polyvinyl chloride) pipe the same or greater length as the rigid seedling protector tube over the seedling.



**FIGURE 3**



**FIGURE 4**

As an example, a 4-inch inside diameter, 4.5-inch outside diameter, Schedule 40 (0.25-inch thick side walls) PVC pipe that is about 38 inches long works well for 4-inch diameter, 36-inch long tubes. The extra length of the PVC pipe provides a surface to grab when removing it from the tube. A piece of rope attached to each side of the top lip of the PVC pipe acts as a handle for pulling the pipe. When slipping the PVC over the seedling, it may be necessary to compress branches together in one hand while placing the PVC pipe over the seedling. See FIGURES 3 and 4.

After the pipe is in place, slip a protector tube over the pipe and slide the tube downward until it contacts the ground. The tube may also be slipped over the PVC prior to placing the PVC over the plant. See FIGURE 5.



FIGURE 5

Pull the PVC pipe upward while holding the protector tube in place. See FIGURE 6. Secure the tubes to 1 or 2 stakes (bamboo or other material) with wire ties or other fasteners. Verify that terminal branch ends are not tangled in the tube mesh.



FIGURE 6

A graphic example of a properly installed tube appears in *Hand-Planting Guidelines for Bareroot Trees and Shrubs* posted at <http://www.mt.nrcs.usda.gov/technical/ecs/forestry/bareroot.html>.

**III. PROPER MAINTENANCE:** Initially, rigid seedling protector tubes require minimal maintenance other than periodic inspection to assure that they have not been damaged or removed by animals or shaken loose from their bamboo supports. Each seedling and tube should be inspected each spring and fall for litter and debris buildup inside the tube, a condition that harbors rodents. This is especially important for deciduous species. As seedlings grow over time, it may be necessary to enlarge some mesh openings to prevent girdling of expanding lateral branches (FIGURE 7). In some cases, elongating branches may become entangled within the tube, causing a shepherd's crook growth pattern to the individual branch (FIGURE 8). Carefully feeding these branches through a mesh opening as they elongate in the spring prevents this problem.



FIGURE 7



FIGURE 8

**IV. TIMELY REMOVAL:** Initial manufacturer information indicated that rigid seedling protector tubes would photo- and thermal-degrade within approximately 5 years, eliminating the need for manual removal. On 400 bur oak seedlings at the Plant Materials Center at Bridger, Montana, more than 75 percent of the tubes did not show significant signs of physical deterioration after 6 years in use. In approximately 10 to 15 percent of cases, girdling damage was caused by the tube to lateral branches. Bridger is an area characterized by a high number of solar days, low relative humidity, and extreme temperature fluctuations--conditions that favor tube deterioration. Since several companies manufacture rigid seedling protector tubes, presumably with different formulations of materials, it is possible that product performance may vary. As a result, the performance of the tubes at Bridger may not necessarily be the same as other brands. Although the life span of rigid seedling protector tubes varies by tube, plant species, and site conditions, an average useful life appears to be approximately 2 to 6 years. **Tubes should be inspected annually for condition and possible negative impacts to protected seedlings.** Protector tubes and other types of shelters should be removed when they begin to interfere with normal plant growth or deteriorate and function improperly. Protector tubes are removed by pulling aged shelters apart with pliers or cutting the tube lengthwise with a pair of heavy-duty scissors. In some cases, embedded plastic must be removed with pliers or Vise Grips™, or a razor or knife may be needed to cut away bark tissue to facilitate plastic removal. Branches severely weakened or killed by girdling should be properly pruned to prevent portals of entry for insects and disease.



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