

Improved Hotbed Design for Winter Storage of Tree Seedlings

L. R. Johnson and D. B. Houston

Research Scientists, Ohio Agricultural Research and Development Center, Wooster

New construction materials and environmental control features reduce labor and maintenance requirements in tree seedling-storage hotbeds.

Hotbeds for winter tree seedling storage, recently constructed for the Department of Forestry, Ohio Agricultural Research and Development Center (OARDC), Wooster, incorporate some new materials and environmental control features that provide a more closely controlled environment, conserve energy, and reduce maintenance (figs. 1, 2, and 3).

Three parallel beds, 36 by 6 feet, were constructed of Wolmanized lumber. This preservative has shown no propensity for plant damage as have some other wood preservatives. Material costs were \$10.25 per square foot, including extension of water and electricity to the site. OARDC Physical Plant personnel provided the labor.

Each bed has three 12-foot hinged sash panels, which are raised to a vertical position by means of ropes and pulleys. These self-storing sashes were constructed of acrylic sandwich panels (Cyro) set in aluminum extrusions. The net light transmission of this material equals that of glass, but heat losses are reduced by 50 percent. The ac-



Figure 1.—Hotbed with sashes lowered in normal closed position.



Figure 2.—Hotbed with 12-foot sash partially raised by pulley system.

rylic sandwich is mechanically sealed, eliminating caulking requirements, and is relatively unbreakable compared to glass. The self-storing feature reduces wear and tear on hotbed sashes and provides easy access to plant materials for watering and other manipulations.

Six-inch PVC air inlet and exhaust pipes were installed at



Figure 3.—Hotbed with sashes raised to storage position. Air intake and outlet pipes are located on the east and west ends of the bed, respectively.

opposite ends of each bed with a small, thermostatically controlled exhaust fan to provide winter ventilation. On sunny days, interior temperatures in hotbeds can exceed 38° C, in spite of cold outside temperatures. The exhaust system was designed to exchange air at a rate of 1.5 cubic feet per minute per square foot of hotbed, eliminating the need to open hotbed sashes during sunny, warmer winter days, and providing savings in labor and energy along with more even temperature control. The hotbeds are also equipped with thermostatically controlled soil heating cables to prevent root systems of potted or containerized plants from freezing. Thermostats are set to maintain soil and air temperatures in the hotbeds between 33° F and 40° F. Self-draining hydrants located inside each bed provide water for irrigation, even during the winter months.

The cross-section (fig. 4) illustrates many of the construction details. For further information contact L. R. Johnson,

Superintendent of Physical Plant, Ohio Agricultural Research and Development Center, Wooster, OH 44691.

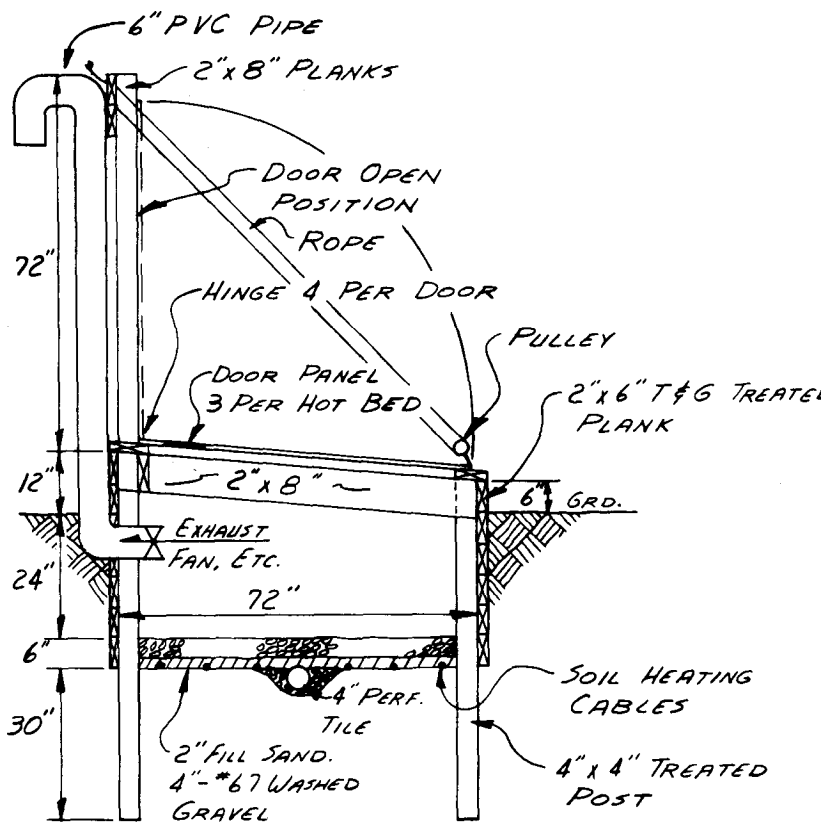


Figure 4.—Cross-section of hotbed, with construction details.