Packaging Southern Pine Seedlings With Bags

By Jeff Wischer* and Patrick Kraft*

Bare-root southern pine seedlings are routinely transported for long distances and stored from several days to a few weeks before planting. Consequently, they must be packaged in such a way as to provide maximum protection during transport and storage to insure their survival after planting. Seedlings that fail to survive due to avoidable mishandling between the nursery and planting site represent a major loss of productivity and a significant cost to the forest regeneration effort.

Bags constructed of kraft paper with a polyethylene liner have been widely used for packaging bare-root pine seedlings in the South. Bags have given particularly good protection to seedlings stored for several weeks; when stored under refrigeration bags may allow storage for up to eight weeks, or about twice as long as forest service bales. Also, when bags are sealed properly,they require no additional root system care.

The main disadvantages of bags stem from the seedlings ability to generate heat by respiration, which can build up rapidly when not in refrigerated storage. Respiration can also be a problem with refrigerated storage if trees are not dormant and the bags are not stacked to allow air passage. Planting site storage conditions become a critical factor if bags are used. Finally, bags can be more cumbersome to handle, and can tear if they become wet.

The following is a summary of information concerning bagging procedures used by the Mississippi Forestry Commission for the packaging of loblolly pine (Pinus tadea) and slash pine (Pinus elliotti var. elliotti) seedlings.

Bag Construction & Specifications

Kraft Polyethylene, 3-Ply
Inside wall: 50# unbleached kraft w/ 1 mil polyethylene
Middle wall: "
Outside wall: 50# high-wet-strength kraft

Packing Medium

Clay (Kaolinite) was utilized almost exclusively in our organization during the initial use of bags. Peat moss (sphagnum moss) was tried, but proved to be too heavy, and would dry out even under refrigeration. We are now using various hydrogel (superabsorbent) products, which seem to perform the best in our bagging operation.

Bagging Seedlings

Our counting method consisits of establishing a weight for 125 seedlings. Eight groups of this weight are combined for a 1,000 seeling package. When bagging, the "125" seelings are placed on a grate and the root systems are throughly sprayed with the packing medium slurry. These bundles are oriented so that all roots are to one side of the bag, and all tops are together. We then strap or sew the bag, depending on several factors in our packing facility. The two methods work equally well, although strapping allows a bag to be more easily re-closed after opening. Stapling was once used, but presented various problems. The sharp staples tore adjacent bags, and prevented effective reclosing of bags. Employee safety was also a problem since the sharp point on staples often caused minor scratches and lacerations.

Bagged Seedling Storage

Bags are stacked on pallets in such a way that air can circulate around all packages: They are then stored for at least 24 hours at 1-2 degrees C (35-38 degrees F) to chill down the entire contents of the bag. This is particularly critical for seedlings lifted early or late in the season, when they may be growing and not dormant. Bags remain in cold storage for the duration of their stay at the nursery.

Transportation and the Planting Site

The Mississippi Forestry Commission uses refrigerated trucks for seedling delivery. We encourage everyone picking up at the nursery to use shaded and well ventilated transport. Tree planters are encouraged to use refrigerated storage for any period over a week, and to use ventilated and shaded storage at the planting site. Since cold storage space is usually unavailable to the tree planter locally, we encourage them to only pick up a minimum of packages. A tremendous effort has been made by our organization to have cold storage facilities that are accessible to tree planters and landowners. This is a key factor in successful use of bagged seedlings in the reforestation of non-industrial private lands.

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