

COLD STORAGE OF TREE SEEDLINGS

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There are as many variations on how to store seedlings as there are people to store them even though most have the same end objective. There are also stacks of references from which a technical and detailed presentation could be formulated. My talk today, however, will concentrate on IPCo's practical and operational approach to Cold Storage of Seedlings, both pine and hardwood. The time span involved will be from the time seedlings are received at one of our forestry headquarters from the state nurseries, until they are out-planted. Generally this begins in late December or early January.

First, let's take hardwood. Primarily I will be referring to Sweetgum and Sycamore. We have had similar but limited experience with Yellow Poplar, Green Ash, Cottonwood, and Tupelo seedlings.

Well hardened seedlings are lifted and packed in the normal bale fashion. They are then taken to one of our refrigeration units or directly to the field depending on need. If cold stored they are watered well and then put into a commercial locker plant or our own refrigerated railroad cars and kept at 35 -40 F. Our railroad car units are retired, insulated fruit shipping cars in which we have installed refrigeration units. These are single compressor, 3 ton units mounted outside with 2 sets of fans and coils inside the car - one at each end. Thermostats, lights, and inside - outside temperature gauges are the only other additions.

Humidity has presented no problem if seedling bundles are kept moist. This usually means watering once every 2 weeks. Some mold and mildew will form on these seedlings but to date we have noticed no detrimental effect. Our specifications call for a 3/8" root collar diameter seedling. One of these cars will hold approximately 250,000 of this size hardwood seedling. Some of the better railroad cars are left on their original tracks and are mobile from one rail point to another. Most rail locations are on the track at one of our Woodyards. Those that are taken off their wheels and made permanent are blocked up at a central Woodlands depot.

Our primary aim in cold storing hardwood seedlings is to be able to plant areas that are too wet or should I say too deep to winter plant. In the coastal plain or southern river bottoms, these seedlings are kept until July or August and then out-planted. Generally, no more than one and one-half day's planting needs are taken from the cooler at one time. Our success with this summer planting (80-95% survival) has led us to an operational procedure in the Mississippi Delta.

We are presently planting 300 - 1,000 acres a year in this manner, depending on how severe the winter conditions are. I expect some of you are thinking--if these large seedlings were top pruned they could store and handle more at cheaper cost. That would be true but the story doesn't end there. These seedlings are planted at 11' X 11' spacing and clean

cultivated during the 1st and sometimes 2nd growing seasons. If they are top pruned, the tractor operator cannot see the seedling as well. He has to go slow when cultivating and use straddle plow equipment instead of a disk until they grow in height. This is a lot more expensive. Also, top pruned seedlings make an avenue for disease infection and encourage animal depredation.

Cold storage of pine seedlings is in many ways a different matter from hardwood seedlings.

They are alike, however, in that pine seedlings to be kept in cold storage should also be completely dormant. Generally speaking, this means lifting primarily in January and February in the South; before or after this period one can usually find flushes of new growth on seedlings.

Our main objective with cold storing Loblolly or Slash pine is to fill our cold storage railroad cars during the most dormant period and hold them for late planting in April and May. Our experience shows we are on shaky ground planting pine past May 15 during normal years even with good dormant seedlings. This is because of dry weather normally experienced around this time of year. We have extended our old planting season though, since without cold storage, our seedlings were growing in the bundles around March 15 to April 1st and our survival suffered severely at times.

Pine seedlings can be cold stored in bales but sealed K-P Bags generally give the best result over extended periods. Seedlings are best packed with the conventional peat moss or clay coated roots. We keep ours moist at 35 - 40° F until planted.

The railroad cars with seedling racks built in them average holding 400,000 - 500,000 pine seedlings per car--depending upon size of seedlings and the way the racks are built. If large quantities of cold stored seedlings have to be hauled and kept several days before planting, a refrigerated van is recommended.

Our past pine planting season utilizing cold storage in east Texas was summarized by one of our Foresters as follows:

1. The first of February 1974, 315,000 loblolly seedlings and 80,000 slash were placed in the railroad car cold storage unit at Jefferson, Texas. The capacity of the cooler is 420,000 seedlings with the present arrangement of seedling racks.
2. The temperature was kept at 38 degrees F and the watering was done regularly by using a garden hose.
3. No restocking of the cooler was done. We started using the seedlings the first of March and continued using, as ground conditions permitted, until mid-May.
4. We stored 395,000 seedlings (315,000 lob and 80,000 slash). Average storage time was 8 weeks. The total length of storage for the last seedlings to be planted was 14 weeks. All seedlings

stayed in storage for 4 weeks before any were removed for planting.

5. Preliminary survival rates look good. The planting dates were during the period of mid-March to mid-May.
6. No apparent loss to storage was observed. In this low rainfall area, we can't really evaluate survival until after August. However, things look good now. – (June)
7. We would not have been able to plant 400,000 seedlings without cold storage facilities.
8. Cold storage is the only way I can machine plant the east half of Marion and Harrison Counties, Texas. I simply cannot function effectively without cold storage seedlings.

Since this is a nurseryman's conference I would like to end by saying: You as nurserymen play an indispensable part in the successful cold storage of seedlings. One of your biggest challenges lies in getting geared up to give us all the seedlings we need during January and February for storage. As planters our best success comes when you as nurserymen give us (1) fresh, (2) healthy, (3) dormant, and (4) well packed seedlings, and in case you might have forgotten, we needed them yesterday!