REFRIGERATED STORAGE OF NURSERY STOCK

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For the past 6 years the Mason State Forest Tree Nursery at Topeka, Ill., has used refrigerated storage for some of its conifer stock as a means of overcoming the handicaps of labor shortages and inclement weather during the spring shipping season. Trees are dug in early winter and stored under refrigeration for 3 to 4 months, usually from December through February. The amount stored in this manner depends somewhat on lifting conditions during the winter, but as many as a million trees have been successfully carried over. They are also dug as early as possible in spring and stored under refrigeration, or if necessary, for short periods in automatic fan-controlled, air-cooled storage rooms. Spring storage of this type presents no problems and lasts from a few days to a few weeks. In this way, Mason State nursery can ship over six million trees in less than 5 weeks in the spring.

The trees are stored in square metal containers lined with wet moss, or are packed ready for final shipment. The shipping packages used were originated in Illinois. A woven wood veneer mat, 26 by 30 inches, is wrapped around 1,000 trees that are packed in wet moss, roots overlapping in the center. The wrapper is rolled around the trees by an ingenious machine, forming a cylindrical bale from 9 to 11 inches in diameter, and weighing from 30 to 50 pounds.

Moisture loss has been the major problem encountered with prolonged storage of trees in such bundles. It is quite rapid at first but soon decreases and the packing material remains moist almost indefinitely. To compensate for this loss, we irrigate the bundles once a month by thrusting a pointed, perforated tube on the end of a hose into their centers.

Humidity must be maintained at a high level in such storage, a difficult thing to do because water condenses out on the cooling coils. We have no way to control humidity, other than by natural evaporation from the stored bundles and from water occasionally sprinkled on the walls and floor. The problem is less difficult when the storage room is filled nearly to capacity.

Mold has not been a serious problem at a storage temperature of 32 to 34^0 F. No mold develops on the conifer seedlings if they are alive, but some white mold develops on dead material and on the wood veneer mats over a period of several months. Sometimes the mats are dipped in copper naphthenate. Vancide and captan seem to give some control of mold on hardwoods. A slightly lower temperature would probably help control the mold still further.

The storage room has 865 square feet of floor space and a 10-foot ceiling. It has been filled to capacity

only twice in 6 years. Data is lacking as to the minimum needs of open space for air circulation. The racks available permit the bundles to be placed two layers deep on slatted 2 by 4 shelves. When the racks are filled, the aisles are bridged and loaded in the same manner. Care is taken to leave air space on all sides of each bundle.

The storage building is in abasement of the packing shed. It is insulated with 4 inches of cork and cooled by two Copeland Model LH combination air and water cooled, hermatic type, 3 hp., 3-phase compressors. There are two unit coolers with a unit capacity of 1,000 B.t.u. per hour 1^0 T.D. These are operated by separate 2-pole thermal switches and magnetic solenoid valves on the liquid lines. The unit coolers have constant fan operation and water defrost. As a precaution against mechanical trouble in an area that has limited repair service, two units were installed instead of one. Since one unit is ordinarily enough to hold the desired temperature, defrosting is done by alternating the use of the two coolers.

Storage is a very important and sensitive part of the operation at this nursery. It is probably very important that the stock be completely dormant when placed in winter storage. Nothing is put into winter storage until after December 1st.

Customers have been naturally hesitant to accept winter-stored stock and the nursery has been hesitant to institute it as standard practice, but results have been very satisfactory during the 6 years it has been tried. The only failure reported to date was with some jack pine lifted in October and stored over winter. They looked good in the spring, but failed to grow.

The accumulated experience of the nursery and customers shows that refrigerated storage permits earlier distribution and planting than would otherwise be possible. It is especially helpful in filling southern and sand-area orders before stock can be lifted in the spring.

The following references have been found helpful in studying the p r o b l e m of refrigerated storage:

Chemical Treatment of Nursery Stock for Better Storage, W.P. Trampe, Ohio Nursery Notes, Vol. 29, No. 1.
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The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks, U.S.D.A. Ag. Handbook No. 66.