

COLD STORAGE IN MINNESOTA

Miles Wiegand 1/

Minnesota entered into the method of cold storage of conifers and hardwoods in 1976. The cold storage room measures approximately 40' x 70' and is insulated with 4" of styrofoam. It has two sets of manually operated cork insulated doors and one electric biparting metal door. The cooling system is a 72,000 BTU compressor which supplies refrigerant to 4 banks of 5 fans each. The fans are approximately 8" in diameter. There are also 4 electric heaters to keep the temperature from dropping too low when the outside air temperature may drop to -50 F. A portable power plant is held in standby in the event of an electrical outage.

Temperature and humidity are recorded on a 7 day hygrometer. A thermalarm has also been installed to warn of an electrical outage or high temperatures.

The cooler walls and floors are swept, washed, and sprayed with a fungicide prior to each year's use.

The proper lifting time for us occurs sometime in October when the white root tips of the Norway Pine shorten to 1/2" or less and the soil temperature drops to 50 F. for several days at a 6" depth. We normally try to lift the spruces first, then white Pine, and last the Norway Pine.

The trees are then lifted, pulled, sorted, and counted. Once the trees have been lifted, the labor crews shake all the soil off the trees. All the damaged, weak, diseased, and undersized trees are culled out.

The trees are tied loosely with plastic twine in bundles of 50 for the 3-0 stock and 25 for the 2-2 and hardwood stock.

The storage crates are made of 1/2" plywood and measure 4' x 4' by 2' deep. The crates are lined with Kraft packing bags cut open and stapled down. The bundles of trees are placed in the crates loosely and root to root if possible. After the crate is full, a sheet of black plastic is stretched over the top and stapled around the edges. Each crate is marked as to the species and age, number of trees, and date.

The loaded crates are then preconditioned at 35° F. for one week. After this period the temperature is set at 27 F., but will fluctuate between 25 and 28'. The relative humidity generally ranges between 85% and 95% without adding any moisture to the air.

During the first week of March the temperature is turned up to 35° - 38° F. to begin thawing. The trees are then removed from the crates and packaged for shipment.

1/ Nursery Superintendent, Minnesota Department of Natural Resources

Survival tests were conducted by the Minnesota Department of Agriculture for the first year, 1977, and showed a survival of 85% - 90%. Other reports from field personnel have been very encouraging.

In 1978 we placed 538,000 in cold storage using this method. The species included:

Norway Pine	Black Hills Spruce
White Pine	Colorado Spruce
Jack Pine	White Cedar
Ponderosa Pine	Balsam Fir
White Spruce	Black Walnut
Black Spruce	Russian Olive
Norway Pine 2-2	Colorado Spruce 2-2
White Pine 2-2	White Spruce 2-2