FROZEN STOCK STORAGE

by
Stephen E. McDonald
Western Nursery Specialist
State and Private Forestry
Lakewood, Colorado

In the early fall of 1971 I received, as many of you did, a number of printed reports by Hocking and Nyland and some others concerning successes with sub - 32° F. stock storage in New York State and Ontario, Canada.

The crux of the idea was to lift the stock when it was really "hardened-off" in very late fall or early winter. The trees were then sealed in polyethylene bags .and placed in cold storage at 26° F. to 28° F. for the duration of the winter. It was then shipped in the spring for outplanting. Some of the species they worked with were red pine, black spruce, and tamarack..

The reports of this work was particularly interesting for several reasons:

1. The short period between the spring thaw and dormancy break at Coeur d' Alene confined lifting to a short period when stock was somewhat dormant. This meant we had a huge job to do in very little time. Usually the stock would break root dormancy, at least, before lifting was finished. This is often the case in many western nurseries. Freezing stock over winter would mean part of the job would be done before spring came and that it would be fully dormant.

2. Spring lifted stock was usually not dormant when lifted. Consequently, it did not store well in refrigerated storage, particularly over long periods of time. Long storage of high elevation planting stock often occurs when the nursery is placed at a low enough elevation to take advantage of a long growing season. Overwinter frozen storage circumvents the problem since it is fully dormant when stored and a few added weeks of storage makes little difference at 28° F.

3. Nyland and Hocking reported good results storing tamarack using the "frozen stock" method. The early dormancy break of western larch is particularly troublesome to western nurseries. Perhaps the method would work on 9,0= cidentalis.

As a result of reviewing this work in the east we determined to find out if the technique was transferrable to western conifers. Lodgepole pine, Engelmann spruce and western larch were the selected species. Trees of all three species were frozen overwinter at 26° - 28° F. In the spring,

duplicate numbers of the same species and seed sources were stored in refrigerated storage and in snowcaches. Fresh stock from the same seedlots and trees from each of the storage treatments were planted in moisture stress plots in a replicated procedure on five spring planting dates from April 4 to June 27. After the last planting date the plots were allowed to dry to extreme, moderate and low water stress conditions. In October, the survival was checked and we found that, for all three species frozen stored stock performed as well as, and usually better than "regular" storage regimes. Frozen stored trees performed much better late in the season, after prolonged storage, than thus from other methods.

The second__ ster in this work was to find out if the results were "field tran-ferable". The following year a series of replicated plots with frozen, refrigerated and fresh stock of the 3 species were established in Wolf Lodge Creek on the Panhandle National Forest. Parallel results were obtained.

The next step is larger scale field testing; now under way. I assume Dr. Peter Laird, Region One reforestation specialist, can report on these results next year.

However, the message is clear from the first two year's work by the nursery: sub - 32 F. overwinter storage of Western conifer planting stock is practical and has potential for solving some nursery operational and storage problems. Its another trick of our trade that can be used. It should be particularly valuable in Rocky Mountain Nurseries.

About the end of the year the Intermountain Forest and Range Experiment Station will publish this work in even greater detail. Ryker's and Morby's work along similar lines at Lucky Peak Nursery will also be published by the Intermountain Station very shortly. I hope some of you will try testing the technique and incorporating it into your operation.