5. Cold Storage of Planting Stock, Vern McDaniel; Chairman

Storage Methods and Procedures of Forest Nurser Stock

By Vern McDaniel

Introduction

The storing of forest nursery tree stock has been carried on in some degree for many years. Some old timers have reported good results of the storage methods used in the good old days of small nurseries and limited field plantings. We all know that the best survival of plantings is usually from the tree beds directly to the field -planters as soon as possible. We also know that with.. the terrific increased production of our present nurseries this method is highly improbable today.

Methods of Storage

The storing of nursery stock can be classified by one of the following practices:

1. Heeling-in trees in the open ground.

2. Heeling-in trees under cover. This means under the protection of a thick stand of timber and also in a protected cellar with a sand medium to place the trees in. The trees are tied in bundles and placed in regular rows or the bundles are broken and the trees placed in thinner layers.

3. The holding of bundles of trees in buildings or cellars with some sort of temperature controls. As mentioned in "Forest Planting in Douglas-fir Region", a U.S.F.S. 1944 publication by Kummel, Rindt and Munger, bundled trees will remain in good condition for 10 to 14 days. It also mentioned that it is poor practice to hold the trees that long. Our forest pathologists state that bundled trees should not be held in this condition for over 3 to 4 days. This depends on weather conditions. The bundles should be kept moist inside at all times.

4. Storage of trees in specialized snow cellars or snowbanks.

5. The storage of trees in a well-built cold storage building using the best insulation and modern refrigeration machinery is highly recommended today.

Procedures Of Storing Forest Nursery Stock In Artificial Cold Storage Building

The refrigeration plant at our Oregon Forest Nursery near Corvallis, Oregon was initiated to tree bundles and tree box storage during the shipping season of 1950-51. These rooms have given us very satisfactory results as far as our uses are concerned. We keep our rooms at an even 35° F. temperature. The relative humidity ranges from 90 to 95 percent. The length of storage periods we usually plan on is from 15 to 90 days. The trees are packed in very wet shingle tow. The wrap we use is called Fibreen #220. This material is 2 layers of paper with a tar layer between and 2 string layers going lengthwise and crosswise of glass threads before it is pressed together. These rolls of material we purchase are 18 inches wide and 300 feet long. Our tie is a good grade of baler twine plus a 1-inch by 2-inch stick which is 26 inches long. We use dry sticks for packing. This stick is used for a tightener. When our packers get through with a bundle it is very compact and can be thrown around except endwise. As you know, this is tough on terminal buds. Each bundle is marked by ink pencil as to species, site and number of bundle and recorded. They are then placed on the storage racks 12 inches between bundles and 4 inches between tops of the bundles and the bottom of the other rack. The bundles are checked each week for their moisture content. Checked bundles are weighed, marked and later checked for weight. Careful watch is kept for any signs of mold or mildew and also for shriveling of the tops of the conifers. We check our recording instruments with thermometers in water for constant temperatures and a sling psychrometer. There is a very good forced air circulation in these storage rooms.

.The more up-to-date cold storage-buildings such as established at the Wind River U.S . Forest Service Nursery and The State of Washington Mike Webster Nursery at Tummter point toward the importance of cold storage of nursery stock. All of us "kinda" envy "Frosty" and "Red" but are very glad that they have them.

Summary

It is becoming very apparent that there is an absolute need for cold storage of conifer planting stock where the freshly dug trees cannot be field-planted within a very few days. The reprint from the Journa of Forestry, Vol. 52, No; 12, December 1954, "Refrigerated Storage of Conifer Seedlings in The Pacific Northwest" by Forrest W. Deffenbacher, Superintendent of the Wind River, U. S. Forest Service Nursery and Ernest Wright, U. S. Forest Service Pathologist then, shows that survival tests in the nursery and field indicate that if proper storage conditions are maintained, survival of trees is not impaired by storage up to six months. The cold storage temperatures must be maintained at from 33° to 35° F. and the humidity between 90 and 95 percent. A good circulation of air must also be maintained. The trees should also be wrapped in waterproof bundles with the tops exposed and their roots packed in very wet shingle tow or clean, sterile moss. A very high moisture content must be maintained in the packed bundles throughout this long period of storage. There was no detrimental effect on mycorrhizal associations. The survival of the storage seedlings was as good as the freshly dug trees in the nursery plots and field planting.