DEVELOPMENT CF WEYERHAEUSER NURSERIES

by

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Weyerhaeuser Company decided to develop its own nurseries for several reasons. First, in a two-year period our annual seedling requirements almost trebled - increasing from 5MM to 14MM trees. It didn't appear that local outside nurseries could handle this demand, and the volume was large enough to make development of our facilities economically feasible. Second, we wanted a higher quality tree.We realized this would require some rather major changes in nursery practices, such as lower density sowing, higher and more rigidly maintained soil organic levels, and results from research into root pruning, fertilization, watering, tree handling and storage.

Weyerhaeuser got started in the nursery business rather abruptly. The land was purchased in February of 1967 and by early April, after the irrigation system was installed, we were transplanting and by June 1 we had sowed for 10MM seedlings. In fact, our venture soon became known as the "instant nursery." We were realizing perhaps the dream of all nurserymen - to develop a complete new nursery from scratch. The only problem was how to come to grips in a short time with a wealth of information on machinery and technology, and to incorporate it into a system. A great amount of help came from Rex Eide, Frosty Dieffenbacher, Lyle Baker, John Grimm, Art Hurd, Boyd Elliott, and especially Homer Ward - and our thanks to each of them is gratefully acknowledged.

I will confine my remarks today to those things which are somewhat unique to our nursery operations and which may be of interest to some of you.

Our objectives are to (1) develop primarily two stock sizes; (2) shorten their rotation; (3) produce more uniformity in grade; (4) avoid transplant deformation; and (5) achieve good seed zone control.

Our Washington Nursery is located some 20 miles southwest of Olympia, not far from the State's nursery. About 74 acres of the total 85 acres are allocated to seedling production. We also have a second, smaller nursery 16 miles southeast of Salem, Oregon, where about 35 acres will be in nursery production; in addition, the property will feature a seed orchard. Together these two nurseries will produce about 131/2MM seedlings annually, of which approximately 6MM will be 2+1 and the balance 2+0.

In Washington we were fortunate to find a site which meets the requirements of a nursery extremely well. Prior to purchase, the land was producing corn and beans. The soil is perhaps its most notable item, in that its texture (83% sand, 14% silt, 3% clay) is extremely uniform and well drained. However, we do have to bring up the organic content from 50 to a desired 12%. Our present program is to add bog peat (described in the soil series map as mukilteo and semiahmoo muck) at a rateof 2" or 300 yards per acre. It is found locally, where it is abundant in glacial depressions and along rivers. This material, although costly, is considered the best form of organic addition available.

Because of its age and state of decomposition, one yard of peat is equal to 20 yards of sawdust. Also, unlike sawdust, it provides nitrogen rather than tying it up. With this material and the ability to apply it in wet months, we will attempt to eliminate fallow cropping and, if we're successful, the cost of peat will be more than offset by lower bed rental costs. In the Oregon nursery, because of lack of a better material, we are forced to use sawdust; and to eliminate some of the problems associated with using raw sawdust, we are initiating a composting study. After an initial 6" layer we will add about 2" annually.

Our irrigation system is unique in several ways. It consists entirely of rainbird sprinklers using a 14V head with 3/32" and 7/64" nozzles. These nozzles produce respectively 1.9 and 2.6 galls/min. at 60 pressure. The main line, buried underground, is wrapped and dipped steel pipe which varies in size from 6" to 10". After considerable thought, we decided not to install any protection against electrolysis. Lateral lines are 48' apart with risers every 30 feet. The pump is an electric 150 H.P. turbine capable of producing 1900 gals/min. All of the water is filtered to eliminate sand and gravel. Pressure is automatically maintained at a uniform setting by means of a compensating valve. This eliminates the need for manual operation. One advantage of this system is its ability to provide automatic frost or heat control over approximately 18 acres at any one time. Frost control works on two principles: it warms the air with water and prevents desiccation of the foliage with a shield of ice. The system proved itself this spring, when - unlike other local nurseries - we incurred no frost damage even when temperatures dropped to a damaging 26°. Besides being initially cheaper to install, we feel the system has several distinct advantages over the more conventional "Skinner" system. It is easier to move and set up, requires far less maintenance, and provides a more uniform water distribution during windy periods.

We have initiated a soil moisture study to learn the optimum amount and timing of watering in relation to seedling performance and the soil organic level. With this information we hope to be able to automate the irrigation system still further.

Also, we increased the sizes of our paths and roads. Within the 48' lateral lines we have 7 beds - either 48" seedbeds and 30" paths or 56" transplant beds and 22" paths. By increasing path width we are able to use rubber-tired tractors with 14" tires (for greater flotation and traction). With more automation anticipated we felt better access into the beds is most desirable. Our roads are 40' in width to accommodate our larger transplanters and tractors.

Our transplant equipment is unusual since we are using a 6-row transplanter comprised of 6 Holland Model 1550 units. These new units are the result of a cooperative effort between Homer Ward and myself to get Holland Company to improve the old seedling transplanter and it appears J-rooting has been eliminated. It has a deeper 10" shoe and a new holder which releases the tree faster without dragging it along. The packing wheel has been changed and does a better job of closing the slot. The increased spacing from 4-3" is more than offset with a better planting job. We have also added a pressure water system which wets the trees prior to planting.

One of our problems was to find a tractor to pull these machines at 10 feet per minute without running at an idle. After considerable effort we located a transmission made in England by Howard Rotavator Company which fits a Ford 5000.

This 24:1 reduction gear allows the tractor to travel at a rate of 3-15 ft./min. at 2000 RPM.

Fumigation has produced some rather dramatic results. Not knowing what problems we would incur with soil pests and fungi, we decided to fumigate the seed beds. We used Vorlex at a rate of 35 gals/acre. Prior inquiry loft some question in our minds as to what gain or benefit was achieved with fumigation in other nurseries, so in order to answer this question we left an untreated 17' x 800' control strip. A couple of weeks after sowing, the control strip became filled with weeds. It is safe to say that savings on the first weeding alone paid for the cost of fumigation. But even after hand weeding, the trees remained smaller and chlorotic. They never did recover height or color and within a month losses to disease began. Tap roots were short and stubby - only about 1" in length. Pithium and Fusarium were identified and by September it was estimated there was an 80% falldown in the strip vs. less than 5%, in the treated area. The surviving trees were short, chlorotic and with limited root systems. By May the following year there was an estimated 95% mortality in the control area.

In the rest of the seedbeds we experienced a rather interesting phenomenon. Sometime in August we noticed that the seedlings – in spite of their good color – weren't putting on normal growth. We added fertilizer and water to no avail. Then we became concerned and felt we had either a disease or a phyto toxicity problem as a leftover from past agricultural practices. However, in late September when the hot weather was past a few trees started growing again, and by the time the cold weather sot in bud groups of taller trees had become widespread. Still not knowing what our problem was – if we had one at all – I took some trees to the Forest Science Lab and to Oregon State University. There immediate concern arose when white nodule-like attachments were found on the roots. Those at first were thought to be nematodes and for a time I thought our nursery was to be distinguished by having the first major nematode problem in the nation. However, Dr. Harold Jensen, Professor of Nematology at Oregon State, would not claim these things as nematodes -- and in fact, nobody could, or would, identify them as anything. All we can say is that our seedbeds were loaded with these things which it turned out weren't detrimental at all. But they still remain mysteriously unidentified.

I should add that we apparently achieved good inoculation of mycorrhiza from the peat addition and this was not adversely affected by fumigant. We shall continue testing the effectiveness of fumigants, and also the frequency of treatment needed.

The following slides show some of our equipment which, although not really new in idea, may be of some interest in the way it is modified. Our equipment sheds, 125' x 25', have 12x10 overhead doors and a 25'x25' heated shop and are entirely wood.

This bed shaper made from rails and channel iron leaves a well shaped 3"-4" raised bed. This shaper and roller are designed for the 48" bed used with the Wind River drill. We anticipate a possible change in bed width with a now drill.

The idea for this lifter originated at Webster Nursery. The hydraulic-operated blade located under the belly of the tractor allows better driver Observation and control.

Having been in the nursery business only a year and a half, we are still acquiring new equipment and systems. In a short time we anticipate sowing with a precision vacuum drill which Walter Moden from the University of Idaho is designing and constructing. We feel presently available seeders are not acceptable, and in fact are responsible for many of the problems found in the nursery today. Our own Research Tech Center is working on a mechanized lifting system, part of which we hope to try this winter. The potential for saving labor and thereby achieving lower stock costs are perhaps greatest in this phase of nursery operation.

Our new building complex now under construction will incorporate several new ideas which have yet to be tried and tested. We are going to short (12') double tiered conveyor belts. One belt of each unit will extend into the holding room, which will eliminate the need for boxes and fork lifts for bringing in trees to the sorters. All outgoing bundles will be palletized and stacked as a unit to be stored or loaded directly into trucks. These "units" will be stored on steel racks in the refrigeration room. Once palletized, all moving and lifting will be done by electric "walky" forklifts. In time we hope to standardize handling, loading and trucking in all of our areas. In our refrigeration room we are using a drive-through plastic hinged door called the Kelley Camatic traffic door, which is not only less expensive than the hydraulic door but more efficient in reducing air transfer.

Unfortunately time did not allow us an opportunity to completely investigate all nursery or related operations where no doubt newer and more efficient systems are in use. I suspect that in the not too distant future we too will be regretting not having done it differently or wishing for a better system.

I would like at this time to extend to you an invitation to visit either of our nurseries when you are in the vicinity. The nursery is eight miles off the highway. There is someone there seven days a week.

Question: Why do you use a wheel tractor instead of a crawler?

Answer: It is cheaper, more versatile, and faster. We have not had need for a crawler.