

CULTURAL PRACTICES
IN
GROWING BAREROOT
WESTERN HEMLOCK AND SITKA SPRUCE
SEEDLINGS

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The Industrial Forestry Association launched its debut into the forest tree seedling nursery business in 1941. It was shortly before then that Col. W.B. Greeley, a former U.S. Forest Service Chief, had come to the Western Douglas Fir Region to head an association of Western Washington and Oregon lumbermen and pulp, paper and plywood manufacturers called the West Coast Lumbermen's Association which is now called the Industrial Forestry Association. He had always lived and worked toward his conception that man with his strong faith in the land and the ability of informed people would manage it wisely during the transition from old forest to new forest. With this in mind and with the limited source of supply of seedlings for reforestation from public agency nurseries, because of political reasons, and non-existence of private nurseries, his leadership encouraged the Association to build its own nursery to supply seedlings to its membership at cost for planting on their lands.

The early stages and development of the first IFA nursery was quite hectic and discouraging at times and, I might add, still is. However, with the increasing demands on native forests to continue to supply the material for wood products and paper, the importance of growing seedlings for reforestation became more apparent. At first, the main specie grown was Douglas fir, and Western hemlock and Sitka spruce were considered never to become depleted as it reforested itself almost on its own. However, foresters became more aware that depending on Mother Nature to reforest the hemlock and spruce areas was not to man's liking in relation to economics and supply. The pressure came to the nursery in the early to mid-fifties to produce the hemlock and spruce for use in better management of the natural hemlock and spruce areas on the coasts of Western Washington and Western Oregon.

As nursery superintendent, with John Grimm as my assistant, we launched a program to grow these two species much the same as we did the Douglas fir. Using the experience we had in growing Douglas fir and with many attempts and much discouragement, we found that we weren't as smart as we thought we were. This along with the interest in developing a tree improvement program, prompted the association to hire a silviculturist to develop the tree improvement program and assist the nursery program in utilizing the growing technical knowledge and any available

experience at that time to grow the hemlock and spruce. The experience in growing hemlock and spruce was very limited; we knew of only two sources and that was a nursery just north of Victoria, B.C. on Vancouver Island and mother nature herself. Both sources were reviewed and questioned by our silviculturist and the consensus was that we should try to duplicate mother nature in many ways within the nursery, such as we have done in growing other species. High organic levels, shallow sowing or light seed covering, root aeration, shade, root pruning and different watering and fertilizer regimes were tried and developed.

There is not enough time here today to relate to you all the details of our system of growing hemlock and spruce. However, I would like to highlight some of them for you.

Industrial Forestry Association operates its nurseries on a block management basis. Each block will contain seedlings for two years then the block is fallowed for one year. During the following year the blocks are deep-subsoiled to 4 feet deep in early spring, after seedling or transplant removal, then Douglas fir and/or alder sawdust is added for organic additions. (Slide 1) The sawdust is then plowed in about 5 inches (Slide 2) and commercial fertilizers are added to break down the sawdust. The blocks are then rototilled and deep-plowed to prepare for sowing manure crops. Additional fertilizer is added before the cover crops are sown. Sometimes these cover crops are moved two or three times a summer to allow the cover crop to stool out and to keep the soil covered during the hot weather; the cover crop is then plowed under just before heading out. (Slide 3) Sowing blocks are then prepared for sowing by 2 feet deep subsoiling, disking, tilling and fall sterilizing. (Slide 4) We use 67 percent methyl bromide, 33 percent chloropicrin at 350 lbs. per acre applied in September. Slide 5 shows a comparison of sterilized and nonsterilized areas in relation to weed control during the first few weeks after sowing.

During the time of preparing the blocks for sowing, the seed for sowing is counted for number of seeds per pound, tested for germination percent and checked for purity. Seed samples are prepared for testing the same as for sowing and are tested both in the germinator and soil tables, using the same soil in the tables from the respective nursery that the seed will be sown in. According to the sowing formula, the amount of seed used will be from 1.5 to 2.5 pounds of seed per 30,000 or 50,000 2-0 seedlings to be grown. All lots are stratified either 30 days or 60 days depending on what the seed testing data indicates will yield the most from the seed. Seeds are soaked for 24 to 30 hours then drained and placed in plastic bags in cold storage for the 30 or 60 days. (Slide 6) Seedbeds are being prepared for sowing about the 1st to the middle of May, then the seed is surface dried on screens then coated with the fungicide captan and sown in open rows. (Slide 7) The beds are then covered with 10 oz. weight and 54" wide burlap rolled out and pinned down by wire pins. (Slide 8) Chip car netting is then placed over the beds to protect from

birds, because the birds will eat the seed right through the burlap. (Slide 9) The posts in this slide show the preparation of posts and wire to carry the 56 percent seran shade material on the hemlock only. (Slide 10) When the seed has germinated under the burlap, usually 10 to 15 days for Sitka spruce and 15-25 days for Western hemlock, the bird protection and burlap are removed and the seran shade is installed on the hemlock only. A light cover of sphagnum peat is also sprinkled over the germinating seed.

During the 1-0 growing season, the area between the rows of seedlings is aerated by scratching it with a hand weeding tool several times. Periodic fertilization, irrigation and fungicide spraying is carried out during the 1-0, 2-0 and transplant growing seasons. The shade material is removed in the fall of the first year. 2-0 and transplants are not shaded. Frost damage protection by watering is done on all age classes for both fall and spring periods. At the beginning of the second growing season for seedlings both the vertical roots (Slide 11) and the horizontal roots are pruned (Slide 12), then the seedlings are thinned by hand at a density desirable for the age class to be grown. Aeration between the rows is continued until the beds close in during the second summer's growth. Root wrenching is done several times to encourage fine hair-root development and stimulate stem caliper growth. Transplanting of 2-0 is done in the early spring of the year with the modified 6-row Holland transplanter pulled by a slow gear tractor. A combination of hand and machine lifting is done on both species of 2-0 and transplants. When both seedlings and transplants are lifted they are transported to the packing shed for grading, counting and packaging in the 3-ply poly-lined, wet strength Kraft paper bags and placed in cooler rooms at 33o to 35o until nursery contractors come to pick them up for transport to the fields. We do not freezer store at this time any hemlock held in storage.

Our minimum standards for 2-0-5 for both species for transplanting are 5 inch tops and 2mm caliper stems. Minimum standards for 2-0-3 for outplanting are 6 to 8 inch tops and 3mm caliper stems. Minimum standards for 2-1 Western hemlock are 10 inch tops and 4mm caliper stems and Sitka spruce are 11 inch tops and 5mm caliper stems. (Slides 13 through 22)