TVA's EXPERIENCE IN RAISING HARDWOOD SEEDLINGS

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I have been asked to talk about the production of hardwoods in our nursery at Clinton, Tennessee. The Clinton Forest Nursery is in the Forest Tree Improvement Section of the Tennessee Valley Authority, Division of Forestry Development. This phase of our forestry work is headed up by Dr. A. A. Foster.

Since the end of the Soil Bank Program, the Clinton Nursery has been operating as a pilot nursery. The tests previously carried on and those now in progress have been or are conducted on a nursery production scale so that they could easily be applied in other nurseries.

Most of our present production of approximately 11,500,000 seedlings is confined to contract seedlings for other federal agencies. Of this production, approximately 500,000 seedlings, mostly hardwoods, are for strip mine reclamation work. The main hardwoods being grown at the Clinton Nursery at this time include northern red oak, white oak, chestnut oak, black walnut, black cherry, black locust, sycamore, red gum, and yellow poplar. Other miscellaneous species include autumn olive, birch, alder, and lespedeza bicolor.

Most of our hardwood seedbeds are planted in the late fall. This eliminates stratification of the seed and the delays caused by inclement weather. Our nursery seedbeds are prepared in the usual manner with the exception of marking off the rows. This is accomplished through the use of a modified cultipacker which is run over each of the seedbeds prior to seeding.

Sawdust is our main mulch for hardwood seedbeds. On large scale seeding operations, the sawdust is applied on the seedbeds with a manure spreader. On small jobs, by shovel from a flat bed trailer. Ordinary building sand is used on some seedbeds where very small seeds are planted. Burlap is used to hold the mulch in place over winter. Practically all of the hardwood seeding is done by hand.

To give you some idea of our hardwood seeding rates you might start with the northern red oak which is our principal hardwood. To produce approximately 5,000 plantable seedlings in a 400-foot bed, we plant about 2-1/2 bushels of acorns. This seeding rate would also apply to white and chestnut oak.

Black cherry is seeded at the rate of 2 to 4 pounds of depulped seed per 400-foot bed to produce the same number of plantable seedlings. Black walnut is primarily grown as grafting and budding understock. Here we only plant 3 rows per bed to allow for working room. The walnuts are

placed 6 inches apart within the rows. We figure on about 1,700 seedlings per 3-row bed at this spacing. The hulls are removed prior to seeding while still green in appearance. We feel that removal of the hulls eliminates some of the disease problems.

Yellow poplar is seeded from 8 to 20 pounds of seed for a 400-foot bed. Eight pounds of good yellow poplar seed is equivalent to about one bushel of threshed dry seed. This will produce about 10,000 plantable seedlings.

Red gum seed is broadcast by hand and covered with sand. Two pounds will produce about 40,000 plantable seedlings. The same rate of seeding will produce about 25,000 plantable autumn olive seedlings. The olive seeds are planted with a hazard seeder in drill rows.

Sycamore seed is broadcast by hand at the rate of one bushel of separated seed per 400 feet of seedbed. The sycamore is seeded heavy, generally, because of poor seed quality and also to control seedling size. We can pretty well regulate the size of the seedlings by the density of the stand. We usually have to do some thinning in the sycamore beds in order to produce good planting stock and still end up with about 40,000 seedlings per bed.

Probably the most difficult to seed are the birches, with some of the seed we plant running up to about 700,000 seeds per pound. We solved this by mixing the seed needed to plant a bed with enough white sand to show up the distribution of the seed on the seedbed.

Most of our hardwoods are root pruned in mid-August in order to develop a fibrous root system by lifting season. The root pruning also slows down the top growth for the balance of the growing season.

I think that I have covered most of our hardwoods. I might mention that this season we have spacing studies in some of our hardwood beds. We hope by these to be able to tell what spacing will be the most desirable for growing some of the hardwood species in the nursery seedbeds.

Other tests include the use of fly ash and dolomitic lime at different rates of application. We hope to get some beneficial results from the fly ash which contains several minor elements. Incidentally, the fly ash is a waste product from the steam plant chimneys. It is collected by the use of mechanical precipitator hoppers.

One of the most promising fertilizers tried to date is Mag Amp. Some of the hardwoods have more than doubled their growth over the seedlings in untreated beds. No top dressing is necessary if the fertilizer is tilled into the seedbeds prior to seeding. Our application of Mag Amp at 50 pounds per 400-foot seedbed appears to be a little heavy on some of the oaks, but just about right on birch. We will not know definitely what the final results will be on the various studies now in progress until the seedlings have been lifted and the data is analyzed.

Well, that about covers the high points on our production of hardwood seedlings.