HARDWOOD SEED ORCHARD MANAGEMENT

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The number of papers written on Hardwood Seed Orchard Management is a "few". It would be difficult to write on the subject without sounding somewhat like a literary review. Therefore, this paper will be more or less a summary of our own orchard management program which will no doubt reflect much of the information given in previous papers.

The aim of our seed orchard program is to produce genetically improved seed of every hardwood species grown in our nursery and distributed for planting throughout the state. The initial step then is an intensive selection of the desired species.

The State of Tennessee is some 400 miles long from West to East. There are three or perhaps four distinctive geographic divisions with elevations ranging from 250 feet in the extreme western portion to 1,800 feet and more in the Cumberlands and Eastern section, with large valleys in between. This makes parent tree selections by geographic area a necessity.

Seed orchards are established for each source as dictated by provenance tests. These orchards can all be located in the same general area so long as the site is in the milder section of the state. For instance, a yellow poplar orchard of a West Tennessee source would foul-out if established on the Cumberland plateau. However, an orchard of a Cumberland source does real well in West Tennessee. Yellow poplar is particularly sensitive to geographic change.

Orchard spacing and layout are very important decisions. The importance of mapping the clones cannot be stressed enough. A lost or shifted tag can spell trouble if not corrected in time. The time of layout is the time to map. Always have a spare.

A spacing of 30 foot x 30 foot is in general use, and seems to work out nicely. It is well to plant two seedlings at each stake. This doubles the chance of one success, and perhaps makes a spare available to replace a failure at another place. Understock should not be grafted until the second season. The grafting should begin at the first sign of bud burst.

The method of propagation should be the one whereby the best success is realized. Grafting in the spring and budding in the summer will speed up completion of the orchard. Yellow poplar is an easy grafter, some of the others are a hit and miss proposition

at present. Sycamore is easily propagated by stem cuttings, and black locust by root cuttings. Whatever the method, early completion is important.

Orchards should be small during the parent tree selection stage. Until the desired number of clones have been selected, it should be little more than a "clone bank" with probably only four or five ramets of each clone present. Once the trees begin to flower, the proper crosses can be made to determine what clone combinations to keep. A close check on the flowering pattern will also help to determine the position of clones in future orchards. In the case of yellow poplar, there is as many as 10 days difference in the beginning of flowering between different clones within the West Tennessee source.

The new orchard should start with good virgorous understock of a local seed source. It should be planted in the early spring one year before anticipated grafting. Each seedling should be planted as if it had cost $40.00.

A hardwood seedling with a good root system crammed into a small hole made with a worn out dibble bar will find it rough getting a good grip on the world. Some type post hold digger should be used. The seedlings should be fertilized in the early spring prior to grafting. An early start of a successful graft will be reflected all during the early life of the tree. Further fertilizing of the orchard should be delayed until that particular orchard is 100% complete, except for poorly growing individuals or to control noticible yellowing. Once the grafting is complete the tailored to an even aged look.

Weed control is very important, especially in newly established orchards. Hoeing is necessary around individual trees. This will lessen the risk of insects and rodents that sometimes invade the orchards, and will make inspections for pests much easier. The number of mowings needed will depend on the type of cover and other things, such as availability of equipment and the wishes of the orchard manager.

The only real purpose of any seed orchard is the production of seed. Therefore, we can more or less influence the results by our planning. Yellow poplar is primarily an insect pollinated species. Some of the others are at least partially so. The quantity of filled seed can be increased by the introduction of honey bees into the orchards. The use of flowering cover crops such as clover serves to encourage all types of pollinating insects. Prunning to a low, spreading fruit type will influence ease of harvesting, and increase the percentage of seed harvested from the light seeded species.

Prunning should begin early, but with reservations. When the graft shows a good flush, the limbs above it should be prunned off. A stub of the trunk should be left to tie and support the graft for the first year. In case of a cleft graft, it might be necessary to set a small support stake. Grafts should not be made on lateral branches except they be tied close to the trunk at the time of grafting. A graft starting off at a bad angle is hard to correct. Bands should be checked often to prevent girdling of fast growing stems. A couple of days can spell ruin.

Subsoiling is needed during the early years of the orchard if established in cropped land or pasture. If subsoiling is done before the cover crop is established, the surface can be smoothed at the time of planting.

Insect control is a must. Hardwoods generally have fewer insect enemies than pines, nevertheless, they have them. A root collar bores can play havoc with a yellow poplar orchard before they are noticed. Oak worms can strip cherrybark oak practically overnight. Acorns of both white and cherrybark oak have weevils almost from the bloom. Scale insects can be a problem on cherrybark oak and yellow poplar. Cherrybark oak is particularly susceptible to gall insects.

Last but not least is orchard size. Several acres are needed for yellow poplar, and especially black walnut, while only a few trees of the oaks and sycamore can furnish an abundance of seed. After proper testing, these two species can be narrowed down to the best few selections. Widely located plantings must be made to avoid possible loss of any or all of these clones.