

THE DELTA REGION'S McNAIR SEED ORCHARD

Howard Johnson, International Paper Company
Natchez, Mississippi

The Delta Region Seed Orchard, one of several orchards International Paper manages throughout the South, was started in 1960. It is located 37 miles East of the Natchez Mill, near McNair, Mississippi. We are interested in one race of loblolly pine only, with 31 clones. After the December 1968 transplantings, this 49-acre orchard will be completed. Our spacing is 30-foot x 30-foot and we have a total of 2,401 positions.

At first, we used the cleft graft with aluminum foil inside polyethylene bags, achieving an average survival of 40 percent. Since 1964, we have used the side graft, where we put a kraft bag over the polyethylene bag, always getting at least 95 percent survival. This past spring, 413 out of 423 grafts survived.

Incompatibility has averaged 45 percent in nine of our clones and was our greatest problem. We overcame this by: (1) getting more clones introduced into the orchard, (2) destroying each ramet as it became incompatible, (3) grafting all incompatible clones in nursery beds. Most of this incompatibility shows up by the end of the first growing season, and these are not transplanted. To date, we have lost 1,039 ramets in this way. Many of the questionable clones have turned out to be very good cone and pollen producers.

In the past month, the Soil Conservation Service made an intensive study of the soils in the entire orchard, finding Loring, Memphis, and Falaya. They remapped the entire orchard, so that now we know the exact soil type in which each individual ramet is located.

Soil samples were sent to the North Carolina State University, where graduate students who are seed orchard soil experts, report that we are low in phosphorus. They recommended that we apply 400 pounds of 10-20-10 per acre, twice each year, and also advised that we should keep the soil pH at 5.5.

Dioryctria amatella (Hulst.) cone insects are now our biggest problem. For the past two summers we have used a Budget-Model Hurricane Mist Blower on our orchard, using a mixture of 1.5 percent BHC in water. However, this has not been satisfactory.

Dr. William Neel, Entomologist at Mississippi State University, and one of his graduate students, Mr. Clyde Sartor, are observing our orchard and advising us. We have installed their black light for collecting insects and have sent them freshly attacked cones. Mr. Sartor is also observing orchards in Northeast Mississippi and

Northern Alabama. Both of these orchards are using the granular systemic Thimet, and he reports each of them to be 100 percent clean. We plan to use this systemic next spring.

Since the spring 1964, we have been very successful in freezing stored pollen to be used in controlled-pollination progeny tests.

We outplanted controlled-pollinated seedlings in the winters of 1966-67 and 1967-68. This winter we will outplant the third group. Our Southlands Experiment Forest at Bainbridge, Georgia, is making comprehensive tests for fusiform rust on more of these same seedlings.

Seed production at McNair is as follows: (1) through 1965, one-fourth pound; (2) in 1966, 7 pounds; (3) in 1967, 87 pounds, from 85 bushels that averaged 291 cones per bushel versus 450 cones per bushel. This is a good average in this area for seed production areas or woods-run cones. We estimate for 1968 that we will get 170 pounds, or more, and I believe that our 1968 cones will be larger than those of 1967. We have observed one ramet with 380 cones for this year; and one clone, which has cones on 119 of its 149 ramets, will produce one-fourth of the entire crop. Of our total ramets, 52 percent have cones on them. By 1987, we estimate that we will be producing from 2,000 to 3,000 pounds of seed per year. For at least the next few years, we will keep a separate cone count on each ramet. This will give us the needed background information to more accurately project the future.

The Eastern Tree Seed Laboratory at Macon, Georgia, reported on our 1967 crop as follows: 15,780 seeds per pound and 83 percent germination after 30 days of stratification, or 13,097 viable seeds per pound.

The big question is how many plantable seedlings we will get per pound of seed. Some predictions go as high as 70 percent. Mr. John Little at the Mississippi Forestry Commission's Winona Nursery is custom-growing these seedlings now.

This winter, we hope to have the Macon, Georgia, people check the number of seeds per pound and the germination percentages separately by clones. Their results should be interesting.

In January of 1968, the tallest tree in our orchard was 26.8 feet, d.b.h. was 7.2 inches, and it had grown 1.4 inches d.b.h. during the last year. Already this year (September 9, 1968) it has grown 1.3 inches d.b.h.

This past spring I made a simple pollen production test of this orchard. The differences by clones were amazing. Some clones that produced heavily in 1967 had little or none in 1968. Here are the

results of the test:

None	64.5 percent
Very light	6.3 percent
Light	7.2 percent
Medium	7.2 percent
Heavy	11.0 percent
Very heavy	3.8 percent

We plan to continue this study every spring. Another observation made from the test last spring is that the heaviest production clones began to shed pollen 5 days before the first female flowers were receptive. In that same 5-day period, we had one very heavy rain and two killing frosts. Clone conelet receptivity started over a 9-day period last year. We plan to continue this study also each spring.

Another big problem is how to give an accurate estimate in June of the crop we will harvest in the fall. I am working on a sampling system, a separate one for each clone, which is broken down into the number of ramets by each grafting year. I am going a step farther by breaking these segregations into the previously mentioned soil types. Preliminary work on one clone shows some interesting differences.

Another difficulty is that of keeping the identification stakes for each ramet. Between the termites and the grass cutting, this seems to be a losing battle; and we are experimenting with a new system which we believe will be satisfactory. We are using aluminum tags which have cardboard between two pieces of aluminum. Both sides of this tag are spray-painted with a high gloss white enamel. Using a dull pencil we letter on one side of the tag the clone name, year of grafting (two digits only), grafter's initial, and the acre and position number. These tags are tied with copper wire at head height or higher, on a secondary or lesser branch, always in the southeast quadrant of each ramet. We take special care to twist each tag wire when positioned so that it will not be blown off by the wind. Once each year the tags are checked and possibly re-positioned to account for limb lengthening and limb drooping as it becomes older.

As these branches begin to drop, they must be cut so that we can proceed with the normal orchard operations. Right now, I am beginning to think that we need a small power saw to speed things up.

We pick our cones after they float sideways in SAE 20 motor oil. Our experience is that cones ripen by clones. For the past 2 years, one particular clone has always ripened first. In 1967 we spread our cone picking over a 23-day period as follows: seven clones ripened one at

the time; three times, two clones ripened at one time; and the last 13 clones came in together.

All of you know that in a loblolly pine seed orchard, each cone must be hand-picked, one at the time, being careful not to destroy any of the branches which would continue to bear future crops. Our Southlands Experiment Forest research people think that eventually cone picking will be out. For example, our orchard would be mowed closely--like you would a golf course--in late September and all of the clippings would be sucked into a huge tractor-mounted industrial vacuum sweeper. Then, as the cones open up, a tree shaker would shake out the seeds, followed by the sweeper which would suck up seed, trash, and all. More than likely, an orchard would have to be swept several times each fall to get the majority of the seed.

That, gentlemen, in conclusion, is the day I am looking for. On that day, I will truly say..."We've got it made."