COTTONWOOD SEEDLING PRODUCTION

By

Richard D. McNabb, Asst. State Forester
Indiana Division of Forestry

The State of Indiana raises 15 different hardwood species with 10 of this number being used almost exclusively on the strip-mined areas. The various species are shipped in 4 different mixtures depending upon the acidity of the planting site. Cottonwood is one of the species used on some of the more acid locations along with Sycamore, European Black Alder, River Birch and Red Gum. We have been using Cottonwood in Indiana for quite a few years and have shipped from 100,000 to 300,000 trees annually. Generally when we start raising a new species, we encounter problems for the first couple of years, then a method of operation is established that is usually dependable for production. Not so with cottonwood, it has always been one of Indiana's problem childs, so to speak. just when we think all the questions are answered, it drops you flat on your face. We have encountered problems from seed collection right on thru until it has been shipped from the heeling-in yards the next spring. We have tried all the acceptable methods, but nothing seems to please it entirely. It has proved to be quite a challenge. We don't claim to know all the answers on any species, but the operation that we shall attempt to outline today appears to be a method of nurturing that it responds to favorably for the needs we face in Indiana.

Generally, about the middle part of May, the willow start to disperse its seed. It acts as an indicator species, that cottonwood is close behind. At this time we scout the local area for the seed trees . After they are located, they are flagged until the seed ripens . The female trees can be spotted from a distance by the lighter color of the leaves and sparceness of the foliage. The seed will start to cotton out within a few days after maturation, so it must be picked while the seed is still in the catkins.

In the past, prior to spring of 1966, we have collected from 80-100 bus hels of seed from 60-70 trees to obtain the amounts that was needed to sow the area required. After the seed was collected, it was stored in the sheds until ready for sowing. We have tried all the methods used but were not able to obtain the controlled density that would guarantee a known amount of shippable trees within a given area. Because of the removal of the females from the area s urrounding the Nursery, we were also experiencing difficulty locating the quantity of seed needed.

For the past two springs we have reaped on an average of 123 lbs. of clean s eed (90%) from 32 bushels taken from 27 trees. After the tree is dropped, the catkins are collected and returned to the Nursery as soon as the amount warrants the trip. The seed is then run through a shredder to grind up the capsules containing the small seed. Sometimes the grinding mus t be repeated twice to obtain proper release. This depends upon the moistness of the catkins. The ground up seed-cotton mixture is then separated by screening on a #8 hardware cloth. The seed is collected on paper beneath the screen. The cotton then checked to see if all the seed is removed, if not, it is reground. After the seed has been removed on the #8 screen, its run thru a #12 screen to clean it further from trash and obtain pure seed. This process should be done in the early A.M. During the same time that the extraction is taking place, the beds are being prepared and wet down prior to sowing. The freshly extracted seed is then taken out and sown on the beds at a rate of 6 ozs. per 60 square feet. It should be kept in mind that the factor of moisture loss is critical when handling the pure seed of cottonwood. In 1966, we planted 7 beds that were wet down before and after sowing within a 55 minute period and germination failed to result on the first four beds. It is our practice now to keep the time between watering to twenty minutes at the most for guaranteed success .

By collecting, extracting and sowing early on the same day, germination will result late in the P.M. of the second day. If by check sampling, the density is not desirable, the beds can be touched up with fresh seed. This can be repeated until proper density is obtained. All germination appears to take place within a 36 hour period which eliminates a broad range of sizes. By sowing pure seed, we can specify a certain amount of s eed on a given area for a controlled density and more exact results . The rate mentioned before results in 12 to 15 shippable trees per square foot with a caliper of 5/32" immediately above the root collar. The beds are normally planted about the last week of May and the inventory is taken in the last of August. There is some ingrowth after inventory and the final results when graded out was an average of 16.7 trees per square foot last year. Another great advantage is that the felling crew is only a few hours ahead of the sowing crew and collection can be s topped almost to the amount needed which results in no waste. In the past, we had to collect large amount to be certain that enough was collected for our needs before it dispersed.

SPECIFIC DATA POPULUS DELTOIDES (In Southern Indiana)

Average stand tree yields about one bushel of catkins
One bushel of catkins yields about 4.5 lbs. of clean seed
One crew-2 men, 4 women, felling and collecting 8 bushels per day
One crew-2 men, 2 women will extract about 30 lbs. per day

As mentioned before, moisture is critical with cottonwood. The beds should be kept moist after sowing, thru germination and until the seedling has developed a root system for self support.

Because of pathological problems with the cottonwood causing loss in the beds and after heeling-in primarily from rust and black spot, we spray it with captan every 10 days at the rate of four lbs. per 100 gals. of water. Sometimes we have insects to contend with and a mild toxic insecticide is also added to the spray. We feel that some of our stem and root rot problems that occur later are possibly introduced by insect vectors. The captan spraying program continues until the trees are lifted in the fall and we have no infections. After we have experienced a killing fros t and the trees have dropped their leaves, the cottonwood is lifted with all other hardwoods. They are graded by size of top, root and stem. Also all injuried or diseased trees are removed and the trees are bundled up in bunches of 25 and tied with a treated twine. They are top pruned in the field to a 12" top. After grading and tying, they are heeled-in in one of our holding yards to a depth slightly deeper than the root collar. The soil is washed in around the roots and a 2-3" layer of sawdust is applied to the entire yard. When the individual yards are filled and mulched, they are drenched with a captan solution of equal concentration as the bed spray. After the hardwoods reach the yards they all receive the same treatment as we have had many problems holding over large amounts of hardwoods. The beds and yards both receive MC-2 as a soil s terilant. As an oversight, we forgot to mention that all cottonwood receive the following rates of fertilizer:

400# /acre - 12-12-12
250% /acre - 0-46- 0
150% /acre - 0-0-60 (potassium sulfate)

By using the method described, we have no great problems with cottonwood in the past few years. Also we have a labor problem and it takes far les s people and is much cheaper to handle now then in the past.

The production of cottonwood has always been of great concern to us in the past but it appears that we are possibly approaching a level of existence to which we can begin to live with.