

Yellow-Poplar and Black Cherry Grow Well After Underplanting and Release

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Yellow-poplar and black cherry were planted on the Mid-Cumberland Plateau under a poor quality oak stand that was injected with herbicide 6 weeks later. Survival and growth have been excellent. After 7 years, the yellow-poplar has overtopped and nearly eliminated competing trees. Black cherry will need cleanings to reach harvest age.

Thousands of acres of upland hardwoods are so degraded that they presently have little commercial value. On some tracts, it may be desirable to replant with fast-growing species. Russell (3) presented yellow-poplar (*Liriodendron tulipifera* L.) as an excellent plantation species if handled properly. Carvell (1) and McGee (2) described how degraded stands can be successfully converted to yellow-poplar by poisoning the overstory a week or two before planting yellow-poplar. We planted as usual and then varied the method slightly by injecting herbicide after the commencement of the growing season. We had outstanding success in establishing yellow-poplar and successfully established black cherry (*Prunus serotina* Ehrh.), another high-value species, by the same method.

Materials and Methods

The site chosen for planting is a head-of-hollow depression in the Mid-Cumberland Plateau near Sewanee, TN, classified as Land-type #1 (5). The sides of the depression sloped about 5 percent, and the bottom was rounded. Soils on the site ranged from 35 to 45 inches deep with a texture that ranged from sandy loam to heavy silt loam over sandstone.

The stand was dominated by scarlet, white, and chestnut oaks (*Quercus coccinea* Muenchh., *Q. alba* L., *Q. prinus* L.) that remained from a century of highgrade logging. A site with a similar history under the same ownership, logged a few months earlier, yielded an average of one merchantable sawtimber tree per acre. The study site was not logged before planting.

The area was planted in 8- by 8-foot spacing; it was divided into 100 plots; 9 trees per plot, with a buffer row between each plot. The seedlings were nursery-run 1+0 stock of unknown seed source. The yellow-poplar averaged about 18 inches high, the black cherry, about 12 inches. Both species were root-pruned to about 8 inches for easy insertion in the planting holes made with KBC planting bars. The seedlings were planted during the first week of April 1977, and the overstory was injected 6 weeks later, after the trees had leafed out. All

stems over 1 inch in diameter were treated. Incisions spaced 3 inches edge-to-edge received 1 milliliter of undiluted 2,4-D. A 40-foot-wide buffer strip around the planted area was also treated. The few red maple (*Acer rubrum* L.) present were treated with picloram (Tordon 101). In late June of the second year, the few surviving overstory trees were retreated, and the entire area was lightly weeded by lopping sprouts, mostly sassafras [*Sassafras albidum* (Nutt.) Nees] that were overtopping the yellow-poplar and black cherry saplings.

At the end of the seventh growing season, the heights and diameters of the three stems in the middle row of each plot were measured, and the planted trees in each plot were counted for survival. The number of competing stems greater than 1 inch diameter at breast height (dbh) within the nine-tree plot were noted by species.

Results and Discussion

Although we did not actually measure the seedlings, we noted that first-year growth was more than double the 6 to 12 inches of height growth normally observed for yellow-poplar and black cherry. The herbicides were volatile enough to curl the leaves on a few of the yellow-poplars planted near injected trees. It is not known whether any mortality is attributable to the herbicide,

but overall survival was so high that it could not have been important.

Now, after seven seasons, most of the killed overstory has fallen, and remarkably little damage to the new stand has occurred. Those study trees that were broken have resprouted and have nearly regained their former crown position in the stand.

At age 7, survival rates were 95 percent for yellow-poplar and 92 percent for black cherry (table 1). No plot lost more than one-third of its trees. The height of yellow-poplars averaged 24 feet, that of black cherry trees, 18 feet. The height growth of yellow-poplar compares favorably (4) with that of yellow-poplar planted on cove sites (site index = 90 to 110 feet). The black cherry grew well, although a great many trees had crooked or forked stems. Diameters averaged 2.6 inches for yellow-poplar and 1.5 for black cherry.

The black cherry plots supported an average of 8.3 competi-

tors larger than 1 inch dbh or 628 competing stems per acre. Only 3.9 persisted on the yellow-poplar plots (294 stems per acre). The yellow-poplar have overtopped and suppressed nearly all competition, whereas the black cherry are codominant with their competitors. We can expect the sassafras, black locust (*Robinia pseudoacacia* L.) and several other competitors to fall behind black cherry. However, oaks and natural yellow-poplar present a serious threat and, if not soon removed, will overtop and eventually suppress the black cherry near them. At another black cherry plantation (6), less than a mile away on a similar site, that was cleaned periodically until it was 10 years old, the 18-year-old cherry trees are being overtopped by oak and yellow-poplar. Unless cherry plantations are periodically cleaned, very few trees will grow to saw-log size. Yellow-poplar, on the other hand, probably will do well without weeding.

Conclusions

Underplanting and release in the same year by injection of the overstory appears to be an excellent method for establishing yellow-poplar and black cherry, but planting areas need to be cleaned for black cherry trees to reach merchantable size.

Literature Cited

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Table 1—Average survival, height, diameter, and competing stems over 1 inch dbh per acre of 7-year-old underplanted and released yellow-poplar and black cherry

	Survival (%)	Height (ft)	dbh (in)	Competition (No. trees/acre)	
				Total	Threatening species ¹
Yellow-poplar	95	24	2.6	294	13
Black cherry	92	18	1.5	628	137

¹The oaks and, in the case of black cherry, natural yellow-poplar.