Weed Control by Herbicides Promotes Growth of Cottonwood Cuttings

Ronald A. Woessner 1

Production of cottonwood at close spacing (40" x 12") fails on Brazos Bottom agricultural soils because of severe competition from broadleafed weeds and Johnson grass. Weed competition reduces both growth and survival (fig. 1).

Weed control with herbicides would be an ideal solution if cottonwood would tolerate levels of herbicide dosage heavy enough for sustained weed control throughout the first growing season. One pound per acre of active ingredient of Trifluralin generally gives good control only for the first part of the growing season. Martin and Carter (1966)[2] found that cottonwood would tolerate rates of up to 3 pounds per acre of active ingredient of the preemergent herbicide Trifluralin.

Figure 1.—One-year old planting of closely spaced cottonwood infested with Johnson grass.

A test with two pre-emergent herbicides, Trifluralin and Nitralin, was undertaken on a Norwood clay loam soil in Brazos County, Tex., to determine what effect they would have on cottonwood at dosage levels sufficiently heavy to provide weed control the entire first growing season.

In February of 1970, Trifluralin (a,a,a-trifluoro-2,6d initro-N,N-dipropyl-p-toluidine) and Nitralin (4-(methylsufonyl) 2, 6 -d i nitro-N,N-dipropylaniline) were applied at rates of 0, 2, 4, and 8 pounds per acre of active ingredient on freshly prepared ground. Each treatment level for each herbicide was replicated four times in a randomized, complete block design. Following mechanical incorporation of the herbicides, the ground was subsoiled and 40 10-inch cuttings of eastern cottonwood were planted in each treatment plot. After leaf fall, a qualitative assessment as well as survival counts and height measurements were made on each plot.

The qualitative assessment of the treated plots indicated that weed competition had been successfully reduced with herbicides. Some idea of the appearance of the control and treated plots can be obtained from figures 2 and 3. Figure 2 is a control and figure 3 is a plot treated with 2 pounds per acre of Nitralin. There are essentially no weeds on the Nitralin plot, whereas the control plot has a heavy infestation.

The percentages in table 1

1 Associate geneticist, Texas Forest Service and assistant professor, Plant Sciences Department, Texas A&M University.

1 Martin, James W. and Mason C. Carter. 1966. Tolerance of Cottonwood to Certain. Herbicides. Auburn Univ. Agr. Exp. Sta. Bull. 372.

indicate that plots treated with Trifluralin averaged 82 percent survival and those treated with Nitralin averaged 86 percent. No level of herbicide treatment differed from its control by more than 4 percent. Although plots treated with Nitralin and the control plots consistently averaged slightly higher survival than those for Trifluralin, the difference was negligible. The results obtained here indicated that first-year survival was neither enhanced nor hindered by herbicide application at rates up to 8 pounds per acre of active ingredient.

Total height results for both herbicides are shown in table 1. Total height for plots treated with Trifluralin ranged from 4.1 feet for the control to 5 feet for the plots treated with 4 pounds per acre. Plots treated with Nitralin ranged from 3.7 feet for the control to 4.7 feet for those treated with 2 pounds per acre. The 4-pound-per-acre level of Trifluralin increased average height at the end of one year by 18 percent over the control. The 2-pound-per-acre treatment of Nitralin increased height growth by 21 percent over control. The trend indicated that high rates of both herbicides could reduce growth of 10-inch cottonwood cuttings.

The results obtained with this trial indicate that Trifluralin and Nitralin at 2 to 4 pounds her acre could be successfully used the first growing season to control herbaceous weeds and to increase the total height. growth of closely spaced cotton-wood on Brazos Bottom Norwood clay loam soils.

Figure 2.–Heavy infestation of weeds on a control plot.

TABLE 1.–*Average survival and average total height of 10-inch cottonwood cuttings at the end of one growing season*

	Percent survival [1]		1 year height (feet)	
	Trifluralin	Nitralin	Trifluralin[2]	Nitralin [3]
Control	84	87	4.1	3.7
2 lb/acre	81	86	4.3	4.7
4 lb/acre	80	85	5.0	4.1
8 lb/acre	84	88	4.2	3.6
Mean	82	86	4.4	4.0

[1]No statistically significant differences among means of the .05 level.

[2]By Duncan's multiple range test, the height of the 4 lb/acre dosage of trifluralin differs at the .05 level from the control and the 8 lb/acre dosage.

[3]By Duncan's multiple range test, the height of the 2 lb/acre dosage of nitralin differs at the .05 level from the control and the 8 lb/acre dosage.

Figure 3.–Plot treated with 2 lbs per acre of Nitralin.