

Deadening Culls in Bottomland Hardwood Stands

Nearly every acre of Southern bottomland hardwood forest is carrying an appreciable number of rotten or grossly misshapen trees. These worthless culls prevent the establishment of seedlings and reduce the growth of good trees. Worse yet, the culls are a source of undesirable seed. Many are of inferior species and others are of poor form. Leaving them to reproduce their kind is certain to harm the future composition of the forest.

The Delta Research Center of the Southern Forest Experiment Station has shown that girdling or poisoning the cull trees in a hardwood forest is almost certain to be a lucrative investment. Large culls taking up about one-seventh of the growing space on a 120-acre tract were killed at a cost of \$1.20 an acre. Thus, for every seven acres treated, an extra acre of growing space was "bought" for \$8.40 with no increase in taxes or protection costs.

Methods of Deadening

Work at the Delta Research Center is continuing in order to find the cheapest and most effective means of deadening cull trees in stands of bottomland hardwoods. Three methods that tests have already shown to be satisfactory are described here.

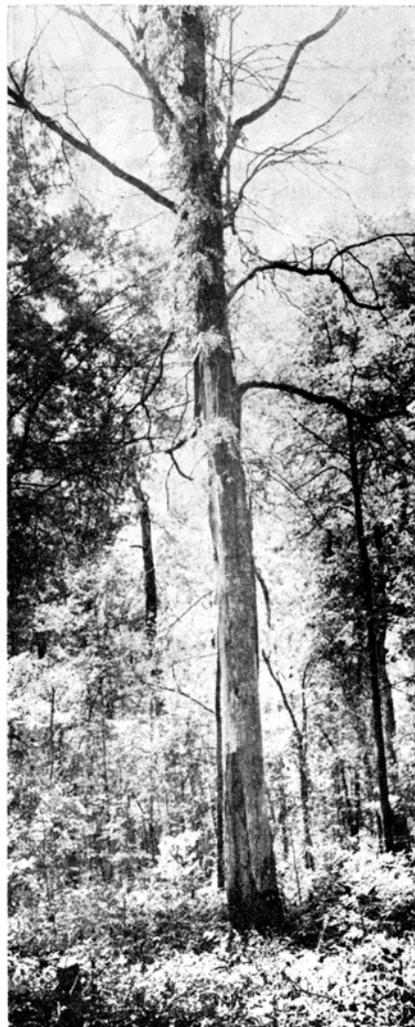
Notch girdle.—A notch girdle is the simplest and one of the most effective means of deadening cull trees. The only equipment needed is a good axe and a file to keep it sharp. The procedure is to chop a shallow notch around the tree, taking care to get into all seams and catfaces. The girdle need only be one chip in depth; deeper girdles seem to encourage sprouting.

Frill with 2, 4, 5-T in water.—A ring of overlapping downward axe cuts is chopped around the tree and the wood thus exposed is wet with a mixture of 2, 4, 5-T and water. A convenient applicator is a one-gallon kerosene can with a short piece of tubing soldered to the spout.

Commercial 2, 4, 5-T preparations usually contain four pounds of 2, 4, 5-T

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acid equivalent per gallon of concentrate. For deadening trees, one part of the concentrate should be mixed with 50 parts of water. An open-topped five-gallon can with a mark scratched on the



This cedar elm cull was deadened to provide more growing space for desirable pole-size green ash and willow oaks. (U. S. Forest Service photo)

inside at the four-gallon level forms a suitable mixing vessel. The desired concentration can be obtained by first emptying a ten-ounce soft drink bottle full of 2, 4, 5-T concentrate into the can and then adding enough water to bring the level of the liquid up to the four-gallon mark.

If one man is to poison after several axemen, a dye should be added to the mixture so that trees will not be missed or treated more than once. In brushy stands of hardwood, it is probably best for each axeman to carry his own can of poison. With this system, no dye is needed and there is no beating back and forth through the brush and vines between several axemen.

Frill with Ammate.—Ammate (ammonium sulfamate) is sold as a yellow crystalline powder. For use in frills, four pounds of the powder are mixed with one gallon of water. Since the resulting solution corrodes metal, glass jugs are often used as applicators and the mixing is preferably done in a wooden vat. Metal containers may be used but cannot be expected to last more than one season. The method of making the frill and applying the poison is the same as with 2, 4, 5-T.

Whatever method of treatment is used, many of the techniques are the same. Frills or girdles should be chopped around the tree at a convenient height, taking care to get into all bark folds and crevices. Usually a better job will be obtained by putting the frill or girdle high enough to clear low catfaces. Even if poison is used, the frill or girdle must be complete. The tree may live if only a narrow strip of bark is left uncut.

Work done elsewhere indicates that the best time to deaden is in the spring, after the growing season has begun. However, satisfactory kills have been obtained at the Delta Research Center with treatments applied during

¹Delta Research Center, Southern Forest Experiment Station, in cooperation with Mississippi Agricultural Experiment Station and Southern Hardwood Forest Research Group.

In the following equations, C is the cost, in dollars per acre, of labor and materials. W is the wage rate. D is the sum of the diameters (at breast height) of the trees to be treated per acre. It can be obtained by multiplying the number of trees to be treated by their average d. b. h.

Notch girdle $C = 0.38W + 0.0065WD$

2, 4, 5-T in frill $C = -0.038 + 0.422W + 0.0036WD + 0.0012D$

Ammate solution in frill $C = -0.095 + 0.422W + 0.0036WD + 0.0030D$

Example: What is the cost of using 2,4,5-T in frills to kill 20 cull trees per acre when wages are \$0.75 per hour and the average d. b. h. of the culls is 10 inches?

$$C = -0.038 + 0.422W + 0.0036WD + 0.0012D$$

Substituting the values of W and D and solving gives:

$$C = -0.038 + (0.422 \times 0.75) + (0.0036 \times 0.75 \times 200) + (0.0012 \times 200)$$

$$C = -0.038 + 0.3165 + 0.5400 + 0.2400$$

$$C = 1.0585, \text{ or } \$1.06 \text{ per acre.}$$

FIGURE 1.—Equations for computing costs of labor and materials for treating bottom-land hardwood cull trees.

the late winter, and there are practical advantages in deadening at this time of the year, before the woods "green up". Fewer culls are missed, supervision is simplified, and labor is usually readily obtainable.

Results and Costs

Two years after treatment, 83 per cent of the trees treated with 2, 4, 5-T, 82 per cent of those treated with Ammate, and 89 per cent of those given a notch girdle were dead. In general, the thin-barked species—hackberry, box elder, and honey locust—were the easiest to kill. Thick-barked species like red oak, overcup oak, and bitter pecan

took longer to die. However, unsatisfactory results were obtained for only one species, swamp privet. The multiple stems of this species made it difficult to do a good job of deadening; incomplete frills and girdles were the rule rather than the exception.

In one test on the Delta Experimental Forest, the average cost per acre for labor and materials combined was \$1.10 for the notch girdle, \$0.95 for the 2, 4, 5-T frill, and \$1.17 for the Ammate frill. The average diameter of the test trees was 12 inches, and approximately 14 trees per acre were treated. Costs will, of course, vary with wage



When he frilled and poisoned this willow oak, the axeman failed to chop through the folds of bark at the catface. Three years later, the tree is still flourishing. (U. S. Forest Service photo)

rates and with the number and size of culls on the area. Equations for estimating the cost per acre of treating any particular tract are given in Figure 1.

Marking, travel, and supervisory costs are not included in the equations. The total of these items was about \$0.39 per acre for the work done at the Delta Research Center.

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