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Chemical Control Of Hardwoods On Pine Sites Of Maryland's Eastern Shore

Relatively worthless hardwoods often take over space that should be growing loblolly pine on Maryland's Eastern Shore. In many cut-over areas, hardwoods are suppressing small pines that would become a part of the next crop if released. One way of controlling these hardwoods is with chemicals such as ammate and 2,4,5-T.

But there are several ways of applying these; and the method, species treated, and type of chemical used greatly affect costs and results. To determine what might be best locally, the Maryland Department of Forests and Parks and the Northeastern Forest Experiment Station tested several possible methods in January 1953.

The test, made in the Pocomoke State Forest, was limited to hardwoods more than 4 inches in diameter (breast high), since control of these is usually of most importance in cut-over areas on the Eastern Shore. On the average acre the stand included 130 of these hardwoods--85 white and post oaks; 17 black, southern red, and willow oaks; 18 red maples; 5 blackgums; 4 sweetgums; and 1 holly.

Treatments

Ten treatments were tried--9 with chemicals, either ammate or 2,4,5-T.[1] The tenth was a girdling treatment. The chemical treatments included:

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[1]The only formulation of 2,4,5-T used in this test contained the low-volatile propylene glycol butyl ether esters of 2,4,5-T, and is marketed as Esteron 245 by the Dow Chemical Company.

1-2. Basal spraying with 2 and 4 percent of 2,4,5-T in oil (8 or 16 pounds of acid equivalent per 100 gallons of kerosene).

3. Ammate crystals in notches or cups.

4. Ammate solution (2 pounds of ammate per gallon of water) in frills.

5-7. 1, 2, and 4 percent of 2,4,5-T in water in frills.

8-9. 1 and 2 percent of 2,4,5-T in oil in frills.

The two basal-spraying treatments were tried on 24 and 77 trees; each of the other treatments, on 127 to 178 trees.

Both water and oil carriers for 2,4,5-T were tried because of variable results reported elsewhere. In the Southeast, Chaiken (3) had recommended the use of 2,4,5-T in water; but Arend and Coulter (2) reported this was not always effective in lower Michigan, although 2,4,5-T in oil was.

Results

Treated trees were examined in August 1953, 1954, and 1955--7, 19, and 31 months after treatment. Chief results on the killing of stems above the treated spots, or on sprouting below these spots in 1955, were as follows:

Treatment	Stems killed by: Aug 1953 Percent	Aug 1955 Percent	Sprouting of killed stems Percent
2,4,5-T basal spraying:			
2 percent in oil	12	29	5
4 percent in oil	33	67	0
Ammate:			
Crystals in cups	29	61	2
Water solution in frills	73	94	13
2,4,5-T in frills:			
1 percent in water	28	77	27
2 percent in water	17	81	31
4 percent in water	25	85	28
1 percent in oil	83	95	29
2 percent in oil	86	99	33
Girdling	49	92	37

Different species reacted differently to some of the treatments. For example, basal spraying with a 4-percent mixture killed all red maples by August 1953, and 64 percent of the oaks by August 1955, but only 1 of the 7 blackgums

and sweetgums. In contrast, ammate crystals in cups killed all sweetgums, and about 90 percent of the blackgums, but only 7 percent of the red maples. Both blackgum and red maple proved relatively resistant to 2,4,5-T applied in frills, particularly when water was used as the carrier.

The use of 2,4,5-T in frills did not greatly reduce the number of killed stems that produced basal sprouts; but sprouts there were relatively short and usually started at the base. In contrast, many of the sprouts on girdled stems started along the bole just below the girdle.

Apparently the 2,4,5-T treatments were not made in the best way to minimize sprouting. In the Lake States, less sprouting resulted when 2,4,5-T in oil was applied to frills between July and October than when used in other months, and hardly any sprouting developed after the mixture was applied to frills made just above the root collar in any season (1).

Also according to studies in other regions, treatments in this test might have been more effective in killing stems if they had been made in other seasons. For example, 2,4,5-T in water applied to frills was least effective during the dormant season in the Lake States (2). In Pennsylvania, ammate applied in cups in July or September killed more than 90 percent of the red maples; but when applied in the early part of the dormant season, only 17 percent (5). And girdling in the spring, particularly in May, caused more rapid kill of southern red oak and post oak in southern Arkansas than girdling in other seasons (4).

Relative Costs

Frilling treatments were the least expensive of those tried in this test. Girdling was somewhat more expensive, chiefly because making a good girdle is more time-consuming than frilling. Basal spraying and using ammate crystals in cups were the most expensive. As found elsewhere, basal spraying should not be used on large trees because of the high cost. Ammate in cups was expensive, in part because the axmen were not experienced in making cups, but also because the material cost more than twice as much as that used in the frilling treatments. Frills were also easier to make than cups in the study area.

While a water solution of ammate in frills is effective, it is corrosive and more expensive than using 2,4,5-T. For the latter an oil carrier is recommended, since it costs very little more, does not freeze, and is more effective than water. Also, since the 2-percent concentration is more

effective, it is recommended over the 1-percent strength.

Application

During the last 3 years hardwoods on about 2,000 acres of State and private lands have been treated by applying 2 percent of 2,4,5-T in No. 2 fuel oil to frills. Satisfactory results have been obtained at a cost of $13 to $15 an acre for treating about 385 trees with an average diameter of 6 inches.

This poisoning has been done chiefly by 4-man crews employed by the Maryland Department of Forests and Parks under a revolving-fund program. State foresters inspect and, if advisable, recommend the treatment for specific areas. Then contracts are signed before the crews start. On private land the owner, sometimes with the aid of ACP payments, reimburses the State when the job is completed.

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