



1963

U.S. FOREST SERVICE RESEARCH NOTE

SO-4

Forest Service, U. S. Dept. of Agriculture

T-10210 FEDERAL BLDG.

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NEW ORLEANS, LA. 70113

CONTROLLING SHRUBS ON WET SLASH PINE SITES

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SOUTHERN FOREST EXPERIMENT STATION

Cutting stems near groundline and spraying the fresh stumps with 2,4,5-T in diesel oil killed 99 percent of the plants within 2 years, but cost twice as much as a foliage spray with 2,4,5-T in water, which killed 66 percent.

This paper reports the effects of five 2,4,5-T spray treatments on understory shrubs bordering a stream in south Mississippi. The bottoms and terraces of small streams in the longleaf-slash pine type are among the most productive sites for slash pine, but in many places a heavy shrub understory prevents the establishment of pine seedlings. Prescribed burning is often impractical, because the soil usually is too wet for winter burning, and summer fires hot enough to kill the shrubs are likely to damage seed trees.

STUDY AREA AND METHODS

The study was installed on a stream bottom on the McNeill Experimental Forest. The soil is a deep, fine, sandy loam, well adapted for rapid growth of slash pine. Usually flowing water is present only for short periods after heavy rains, when the stream overflows onto the study site. A stand of slash pine, sweetbay, and swamp tupelo had been logged off 11 years before the study began, but scattered slash pines were left for seed production. The most abundant weed species were swamp cyrilla (*Cyrilla racemiflora* L.), large gallberry (*Ilex coriacea* (Pursh) Chapm.), common gallberry (*Ilex glabra* (L.) Gray), southern bayberry (*Myrica cerifera* L.), red maple (*Acer rubrum* L.), and common sweetleaf (*Symplocos tinctoria* (L.) L'Her). Several other shrubs and vines were present in smaller numbers.

Plots of 0.1 acre were located in a randomized block design with five replications. Five plants of each of the most abundant weed species, or 30 in all, were tagged on each plot for assessment of spray effects. Average heights of sample shrubs were: cyrilla 9.3 feet, large gallberry 9.3 feet, common gallberry 3.8 feet, bayberry 3.0 feet, red maple 6.7 feet, and sweetleaf 7.3 feet.

The spray formulations were:

1. Foliage spray of 1 gallon of 2,4,5-T (4 pounds acid) in 49 gallons of water.
2. Foliage spray of 1 gallon of 2,4,5-T in 49 gallons of a 75-25 mixture of water and No. 2 diesel oil.
3. Rootcollar spray of 1 gallon of 2,4,5-T in 19 gallons of No. 2 diesel oil.
4. Stem and rootcollar spray of 1 gallon of 2,4,5-T in 19 gallons of No. 2 diesel oil.
5. Stump spray of 1 gallon of 2,4,5-T in 19 gallons of No. 2 diesel oil. This treatment was applied to freshly cut stumps.

A single application of each spray formulation was made in August 1959, with a gear-type pressure pump operated from the power takeoff of a tractor. In all treatments the plant surface was wet to the point of runoff. Quantity of spray used ranged from 54 gallons per acre in treatment 5 to 110 gallons in treatment 2. All understory plants were sprayed on all plots in the various treatments.

EFFECTS OF TREATMENTS

Treatment 5—2,4,5-T in oil, sprayed on fresh stumps—gave the highest average kill, as measured 2 years after application (table 1). The foliage

Table 1.—Percent of sample plants dead 2 years after treatment

2,4,5-T treatment	Cyrilla	Large gallberry	Common gallberry	Southern bayberry	Red maple	Common sweetleaf	All species
----- Percent -----							
1. Foliage spray in water	60	84	76	84	20	73	66
2. Foliage spray in water and oil	44	44	68	96	32	93	61
3. Rootcollar spray in oil	56	84	72	96	56	70	72
4. Stem and rootcollar spray in oil	84	88	96	96	84	100	91
5. Stump spray in oil	100	100	96	100	100	96	99
Average	69	80	82	94	58	86	78

spray of treatment 2—a 2-percent solution of 2,4,5-T in a mixture of water and oil—yielded the lowest average kill. With oil solutions, spraying both the stem and rootcollar (treatment 4) was more effective on all species except bayberry than spraying the rootcollar only (treatment 3). Plants were judged dead if stems were defoliated and no living root sprouts were present 2 years after treatment. Except for red maple, which sprouted the most vigorously, early defoliation was an index of treatment results at 2 years.

The six species varied in resistance. For all treatments, they were rated in the following order ranging from the highest to lowest kill in 2 years: bayberry, sweetleaf, common gallberry, large gallberry, cyrilla, and red maple. On cyrilla and the two gallberry species the foliage spray with 2,4,5-T in water only, in treatment 1, was more effective than the mixture of water and oil in treatment 2. The water-oil mixture was more effective on bayberry, red maple, and sweetleaf. In other studies (2,3,4)¹ with broad-leaved trees 2,4,5-T has usually been more effective in an oil-water mixture than in water alone. In preliminary trials on the control of gallberry, Halls (1) reported that 2,4,5-T in oil was superior for fall and winter sprays, but that a water carrier was more effective for spring and summer sprays. In the present study, treatment differences were significant at the 5-percent level in large gallberry and sweetleaf and at the 1-percent level in red maple. Difference in mortality due to treatments was not significant in the other species.

¹ Italic numbers in parentheses refer to Literature Cited.

COSTS

Average costs per acre ranged from \$24.14 in treatment 1 to \$48.24 in treatment 5. The other treatments were intermediate. The major expenditure in all treatments was for materials, but in treatment 5 the labor of brush-cutting added to costs. If the treatments were applied to large areas, costs probably would be substantially reduced.

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