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WINTER INJECTION OF 2,4-D AND TORDON 101 FOR HARDWOOD CONTROL[1]

Abstract.—During the winter of 1965-66, concentrates of Tordon 101 and 2,4-D amine were injected at 1-, 3-, and 5-inch intervals around the stems of southern red oak (*Quercus falcata* Michx.), sweetgum (*Liquidambar styraciflua* L.), hickory (*Carya* spp.), and flowering dogwood (*Cornus florida* L.). Tordon 101 produced higher mortality than 2,4-D amine in all species, although with hickory the difference may have occurred by chance. Tordon 101 killed over 90 percent of the red oaks and sweetgum at 5-inch spacing and more than 50 percent of the hickory and 40 percent of the dogwood at 3-inch spacing.

Loblolly pine (*Pinus taeda* L.) is the principal timber crop on most uplands in the lower Piedmont. On moist sites, however, low-value hardwoods encroach beneath the pine overstory. If pine is to be regenerated on these sites, hardwood control becomes necessary. Injection of herbicides into trees 3 inches d.b.h. and larger is a frequently used method for this purpose.

Results reported in an earlier Research Note[2] indicated that 2,4-D amine concentrate (alkanolamine salt of 2,4-D at 4 pounds acid equivalent per gallon) will control flowering dogwood (*Cornus florida* L.), hickory (*Carya* spp.), and southern red oak (*Quercus falcata* Michx.) when injected during the summer months. However, only red oak was effectively controlled with winter injections of 2,4-D. Because 2,4-D is a relatively poor herbicide when applied during the dormant season, a study was designed to test the effectiveness of winter injections of Tordon 101.[3] (Each gallon of Tordon 101 contains 0.54 pound acid equivalent of 4-amino-3, 5, 6-trichloropicolinic acid and 2 pounds acid equivalent of 2,4-D as the triisopropalamine salt.) The study included 2,4-D as a basis for comparison.

This report presents the mortality levels resulting from winter injections of these two herbicides into the above hardwood species, plus an additional species, sweetgum (*Liquidambar styraciflua* L.).

METHODS

A factorial experiment with three replications was used to test the two herbicides at three injection spacings. A total of 360 trees (90 of each species) were selected. The trees, which ranged in d.b.h. from 2 to 15 inches, were injected during February 1966 at spacings of 1, 3, or 5 inches. One milliliter of herbicide concentrate per incision was inserted into the base of each tree with a calibrated tree injector. The treated trees were checked for mortality 6, 15, and 18 months after treatment. Only complete top kill with no sprouting is reported.

RESULTS

Average percent kill by Tordon 101 was greater than that by 2,4-D for all species, tree sizes, and spacings (table 1). The largest difference in mortality levels between the two herbicides occurred in hickory and dogwood,

[1]This study was conducted in cooperation with the Georgia Forest Research Council.

[2]Moyer, Elbert L., Jr. Controlling off-site hardwoods with 2,4-D amine concentrate. Southeast. Forest Exp. Sta., U. S. Forest Serv. Res. Note SE-77, 2 pp. 1967.

[3]Mention of a trade name is for purposes of identification only and does not constitute endorsement by the U. S. Department of Agriculture.

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Table 1.--Percent mortality of the four species 6, 15, and 18 months after winter injections of 2,4-D and Tordon 101 at spacings of 1, 3, and 5 inches

Species	Months after injection	Percent mortality after injections of--					
		2,4-D			Tordon 101		
		1-inch spacing	3-inch spacing	5-inch spacing	1-inch spacing	3-inch spacing	5-inch spacing
		Percent					
Dogwood	6	7	0	0	47	13	13
	15	13	0	0	47	40	13
	18	13	0	0	53	40	13
Hickory	6	0	7	0	33	27	7
	15	7	13	7	53	47	20
	18	13	13	7	53	53	20
Sweetgum	6	27	13	0	100	87	87
	15	60	33	13	100	93	93
	18	67	40	13	100	93	93
Red oak	6	80	67	53	93	87	100
	15	87	80	73	100	100	100
	18	93	86	73	100	100	100

which are classified as hard-to-kill species. For all practical purposes, the 2,4-D winter injection failed to kill these two species. Tordon 101, although not highly effective, did kill about half the hickory and dogwood at spacings of 1 and 3 inches. The other two species, red oak and sweetgum, which are classed as easy-to-kill, were readily controlled by either herbicide, although Tordon was more effective than 2,4-D on sweetgum.

One inch, the closest spacing tested, generally gave the highest mortality for all species. However, Tordon 101 was also very effective at up to 5-inch spacings on red oak and sweetgum.

CONCLUSIONS

The results of this study confirm the conclusion reported in the previous Research Note that 2,4-D is a suitable herbicide for red oaks when injected during the dormant season at 5-inch intervals or closer. As recorded in this study, sweetgum was moderately susceptible to kill with 2,4-D at 1-inch spacing. Tordon 101 was found to be a fast-acting, effective herbicide for controlling red oak and sweetgum during the dormant season, even at 5-inch spacing; but mortality for hickory and dogwood was only 50 and 40 percent when injected at 3-inch spacing.

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