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Repeated applications of herbicides to

Live Oak Sprouts

essential for complete kills

Live oak—*Quercus wislizenii*—sprouts that develop after burning or bulldozing make conversion of a site to grass a difficult task.

Repeated individual plant treatments by foliage applications of herbicides are essential if complete kills of live oak sprouts are to be obtained. In some cases, the initial sprays may be wasted unless follow-up spraying is conducted.

Experiments were undertaken to evaluate the effect of 2,3,6-trichlorobenzoic acid, polychlorobenzoic acid—mixtures—and amitrol on the kill of live oak sprouts. The benzoics were formulated as the emulsifiable acids and as the salts. Three phenoxy preparations known to be effective against live oak sprouts—with repeated applications—were included for comparative purposes. The test preparations were 2-(2,4,5-TP)—silvex, 2,4-D amine, and mixtures of the esters of 2,4-D and 2,4,5-T. The concentration of 2,4-D amine was varied considerably to correspond to similar variations in the benzoics.

Live oak sprouts were not killed by any of the chlorinated benzoic acids, regardless of concentration to 32 pounds of acid equivalent per 100 gallons of water. Amitrol was relatively poor in comparison with the phenoxy herbicides, except in the August treatments. The best kill with amitrol was obtained in August 1956 when an application containing eight pounds of amitrol per 100 gallons of water resulted in a kill of 80% of the live oak clumps treated. Treatments applied in August 1958 severely affected the plants, but none of the plants was completely killed.

Effect of Brush Killer, Silvex, and 2,4-D Amine on the Kill of Live Oak Sprouts. El Dorado County.

Date	Brush killer	Silvex	2,4-D amine			
	Pounds acid equivalent per 100 gal.					
	4	4	4	8	16	32
	%	%	%	%	%	%
Aug. 1956	10	10	10	0	10	60
Nov. 1957	60	60	40	60	80	100
Apr. 1958	20	20	20	70	80	100
June 1958	30	70	0	10	20	60
Aug. 1958	10	10	0	0	20	20
Oct. 1958	50	30	0	30	30	60
Feb. 1959	20	0	10	0	40	70
Average	29	31	11	24	40	67

Brush killer—a mixture of the esters of 2,4-D and 2,4,5-T—was the best killer where a variety of brush species were treated. Under such conditions, treatments were made in the spring and early summer before growth had ceased. Poorest kills occurred under hot, dry conditions. Live oak appears to become even more sensitive to brush killer after midfall, if rains occur. Winter and spring applications have been satisfactory when the plants had not lost too many leaves before treatment.

Silvex was generally more effective against live oak sprouts than was brush killer, which was especially evident in the reduction of the size of the shoots. Apparently silvex has its greatest advantage over brush killer in the late spring when shoot growth is active. Silvex may not be more effective than brush killer at other times of the year, except in reducing the amount of shoot growth. In these experiments silvex was less effective than brush killer against some woody plants, such as toyon and coffeeberry.

The amine salt of 2,4-D was more erratic in killing live oak than either brush killer or silvex. Amine appears to be relatively poor during the hot, dry periods of the year. However, rain falling soon after application may wash it off the shoots, which would markedly reduce its effectiveness. Amine was most effective during the late fall, winter, and spring and it has, at times, given better kills than any other treatment. Actual sprout kill is related to treatment dosage and under some conditions, complete kills were obtained. The addition of ½% oil to the 32-pound amine treatment increased the sprout kill an average of about 10%.

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STRIP-FARMING

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time, the ratio of natural enemies to the aphid was very favorable in the strip-farmed field and no economic loss occurred.

Similarly, twice as many natural enemies of the worms were produced and retained in the strip-farming program as in the regular-farming program.

The 32 species of the major natural enemies of worms studied included one species of egg parasite, two species of egg-larval parasites, seven species of larval and pupal parasites, two species of predaceous earwigs, seven species of beetles, three species of spiders, four species of big-eyed bugs, two species of damsel bugs, two species of pirate bugs, and two species of green lacewing larvae.

The total numbers of worms in the regular-farmed and in the strip-farmed fields were often similar. However, the worms in the strip-farmed field never developed to maturity and did not cause economic damage to the alfalfa, simply because of the better ratio of natural enemies to the pest. On the other hand, worms in economic proportions did develop to maturity in the regular-farmed field and caused considerable loss of alfalfa.

Of the six most important natural enemies of aphids, the green lacewing larva population appeared to be the least altered by the farming method used in the tests.

In each square foot of the strip-farmed alfalfa there were 56 aphid-eaters as compared to 14 aphid-eaters in the regular-farmed alfalfa. If a flight of aphids had occurred during that period the aphid-eaters in the strip alfalfa could have controlled the aphids, whereas it is doubtful if such would have been the case in the regular-farmed alfalfa.

Yield records showed that the strip-farmed field produced 3,942 bales of hay, while the regular-farmed field produced only 3,360 bales, nearly 15% less than the strip-farmed field.

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