

Chemical Inhibition of Sprouting of Avocado Stumps¹

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Abstract. Ammonium sulfamate (Animate X) gave the best results for controlling resprouting of tree stumps of avocado (*Persea americana* Mill.).

Many close-planted avocado orchards have reached the stage where crowding has made it necessary to thin the orchard by removing part of the trees. Alternate rows are removed in some orchards; alternate rows and also alternate trees in the remaining rows are removed in others to give the trees which are left room to attain their full size and bearing capacity. Orchard thinning can be accomplished by bull dozing which removes the complete tree, or by cutting down some of the trees with a chain saw which leaves a stump from which numerous shoots soon sprout. These sprouts produce considerable regrowth if left uncontrolled. Pruning stump sprouts is costly and they also use nutrients and water intended for the producing trees.

A growth regulator or herbicide which would kill the stump or at least inhibit sprout regrowth for a considerable period of time without damage to the environment or phytotoxic danger to adjacent trees would be of value to the avocado industry. Chemicals have been used in California to control sprouts on stumps of citrus, blackjack, sweet gum, poplar, maple, ash, post oak and blue and black oak (1, 2, 3). The purpose of this study was to compare several chemicals as sprout inhibitors on avocado stumps.

Avocado stumps were treated at the Univ. of California South Coast Field Station (SCFS) in Orange County and on a grower's property in Ventura County. All trees in alternate rows at SCFS had been removed by cutting with a chain saw several months prior to treatment. Stumps were re-cut into live wood, then five 1-cm-diam holes were drilled in each stump to a depth of 6 cm to act as reservoirs to hold the chemicals until absorbed by the stumps. Treatments were made on September 17, 1974. Materials and formulation are described in Table 1. A randomized block design was used with 5 replications of single-tree plots. Stumps were retreated 4 months later at which time they were frilled completely around each stump with axe strokes cutting well into sapwood. Diameter of the stumps averaged 31.6 cm. Stumps were saturated to run off on both treatment dates.

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The second location was in Ventura County where all trees in alternate rows were removed with a chain saw, to leave stumps. Plots consisted of single trees replicated 6 times. The first application of sprout inhibitors (Table 1) was made on Jan. 22, 1974 to freshly cut stumps. The second treatment was made 4 months later without additional preparation.

Table 1. Formulation and method of application of materials.^z

Treatment	Formulation	Method of application	Location
A	Ammate X(2270 g in 3.8 liters H ₂ O)	hand sprayer	SCFS
B	2,4-D Esteron Ten-Ten (undiluted)	brush applied	SCFS
C	2,4-D Lithate (paste)	brush applied	SCFS
D	NAA (2.5%) (ethyl ester) (in 50% white latex paint)	brush applied	SCFS
E	Ammate X(454 g in 3.8 liters H ₂ O)	hand sprayer	Ventura
F	2, 4-D Esteron Ten-Ten (20%)	brush applied	Ventura
G	2, 4-D Lithate (paste)	brush applied	Ventura
H	Weed oil (undiluted)	brush applied	Ventura
I	EHPP (20%) Ethyl Hydrogen 1-propylphosphorate	hand sprayer	Ventura
J	NAA (2.5%) (sodium salt in 50% white latex paint)	brush applied	Ventura

^zAll stumps were saturated with the chemicals.

It has been reported (3) that 2, 4-D and 2, 4, 5-T may not be as effective in controlling sprouts on stumps in areas of very low humidity and rainfall as moisture is needed to carry these chemicals downward. Annual rainfall is less than 40 mm in Southern California where these 2 trials were conducted.

Table 2. Effect of chemicals on the no. of avocado sprouts arising from the stumps by Month, SCFS.^z

Treatment ^y	No. of Sprouts				
	8 mo.	9 mo.	11 mo.	15 mo.	19 mo.
Control	23.0 a	35.2 a	35.2 a	35.2 a	35.2 a
A = Ammate X	0.0 b	0.0 b	0.0 c	0.0 c	0.0 c
C = 2,4-D Lithate	0.0 b	0.0 b	2.0 bc	7.4 bc	8.2 bc
B = 2,4-D Esteron	0.0 b	2.6 b	3.0 b	14.4 abc	18.0 ab
D = NAA	0.6 b	1.0 b	4.2 b	15.2 ab	22.8 ab

^zMeans separated in columns by Duncan's multiple range test, 1% level.

^yApplied Sept. 17, 1974 and retreated Jan. 13, 1975.

Results of the trial at SCFS are shown in Table 2, where the average numbers of sprouts per treatment for all replications on 5 different dates are given. Non-treated stumps averaged 35 sprouts 19 months after treatment (Fig 1) while A (Ammate X) had no sprouts (Fig. 2). There were no significant differences between treatments A and C; however treatment A was significantly different from treatment B, D and the check.

Table 3. Effect of chemicals on percent of avocado stumps without sprouts by Month, Ventura.^z

Treatment	Stumps without sprouts (%)		
	4 mo.	5 mo.	9 mo.
Control	34	0	0
E = Ammate X	100	100	100
F = 2,4-D Esteron Ten-Ten	100	34	17
G = 2,4-D Lithate	67	50	17
H = Weed oil	50	67	0
I = EHPP (20%)	84	34	17
J = NAA (2.5%)	100	100	84

^zApplied Jan. 24, 1974 and retreated May 19, 1974.



Fig. 1. Typical avocado stump regrowth 19 months after tree top removed at South Coast Field Station.



Fig. 2. Avocado stump sprayed with Ammate X. Photo 19 months after treatment at South Coast Field Station.

Data collected in Ventura County (Table 3), were not suitable for statistical analysis. Results were rated on the basis of whether or not shoots were growing and not on the no. of shoots per stump. Treatments E (Ammate X) and J (NAA) gave 100 and 84% control respectively over a period of 9 months in this trial. Other materials trial were ineffective in controlling regrowth on the avocado stumps. Unpublished data by Lee has shown that walnut stumps treated with 2, 4-D has caused damage to adjoining mature walnut trees. Ad joining trees were not damaged because of volatilization or other unknown factors such as root grafts when these materials were applied to fresh-cut avocado stumps in either of the 2 trials.

Indications are that Ammate X would be the most useful to avocado growers for permanent control of unwanted sprout growth.

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