

Effect of a Single Application of Naphthaleneacetic Acid on Yield and Shoot Growth of Young Lemon Trees¹

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Abstract. Application of 1% ethyl ester of naphthaleneacetic acid (NAA) in an aqueous or latex formulation to trunk and scaffold branches of pruned lemon trees [*C. limon* (L.) Burm.] did not affect yield during the season of application or during the year following application. Regrowth of trunk and limb sprouts was controlled for approximately 1 year.

NAA has been used to control unwanted sprouts on numerous trees and shrubs (2, 3). Definite benefits can be derived from its use on lemon trees to retarding sucker growth in the center and tops of the tree after pruning. Sprout growth on the trunk and scaffold limbs may also be controlled when training trees for mechanical harvesting (4, 5).

Previous tests on woody plants have shown that the ethyl ester of NAA is superior to the Na salt formulation as well as to 2,4,5-T, picloram, ethyl hydrogen 1-propylphosphonate, and 1-propylphosphonic acid (1, 6).

A test plot was established in March 1974 to determine the effectiveness and longevity of ethyl ester of NAA treatment on lemons in the warmer desert area of southern California where condition of low humidity and summer temp of 49°C are not uncommon. 'Lisbon' lemon scion on *C. macrophylla* rootstock, planted in 1968, were trained for mechanical shaker harvesting which entailed sprout removal from the trunks and lower scaffold branches by hand-pruning. The result was open-centered trees with higher inside light intensities favoring sprouting of latent buds.

NAA was applied with a hand sprayer as a 1% ethyl ester formulation in water sprayed to run-off on trunks

and scaffold branches, and as a 1% ethyl ester in a 50% water-based white latex paint painted on the trunks and branches by brush. Each treatment was applied to single tree replicates in a randomized block layout. Observations were made at intervals for tree condition as to bark burn, leaf drop, and exterior fruit quality. Counts were made on shoot regrowth 11 and 14 months after treatment. Effectiveness of each treatment was determined by the no. and length of shoots and by the effect of NAA on yield. Yields were taken in Oct. 1974 and 1975.

Trees treated with NAA in aqueous solution yielded 188 kg per tree during the 2 years following treatment, while those trees treated with NAA in latex paint yielded 171 kg (Table 1). Nontreated controls yielded 190 kg over the same period. These differences were not significant.

The no. of shoots which had sprouted on each tree were counted in Feb. 1975, 11 months after treatment and the length of the longest shoot on each tree measured. No sprouts occurred during the first 11 months after treatment on trees which had been sprayed with the ethyl ester of NAA in water, but there were 2.2 shoots per tree on trees treated with NAA in latex

paint, and 8.0 on the nontreated controls. Longest shoot length was 26 cm on the NAA in latex-treated trees, and 84 cm on the controls.

The inhibitory effect of NAA began to dissipate during the next 3 months. After 14 months there were 7.0 shoots per tree from aqueous NAA, 7.5 from NAA in latex, and 10.4 from controls. Longest shoot length was 14 cm in the aqueous NAA treatment, 42 cm in the NAA in latex treatment, and 98 in the controls. Phillips and Tucker reported that 1% NAA (free acid) + 5% EHPP caused a certain amount of leaf drop and distortion which persisted in 2 following flushes of growth (5). The 1% NAA ethyl ester in either 50% latex paint or aqueous solution did not show any adverse effect to foliage, tree bark or exterior fruit quality (color or size) in this study, which agrees with previous work on figs (2).

Our results suggest that a 1% ethyl ester formulation of NAA in a single application controls unwanted shoot growth on trunk and lower scaffold branches of lemon trees with little or no effect on yield, tree condition, and exterior fruit quality. Further experiments need to be carried out to determine the effect of repeated yearly applications on lemon tree yield and fruit quality.

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Table 1. Effect of NAA on yield and sprouting on trunk and lower scaffold branches of lemon.

1974 treatment	Yield ² (kg/tree)		No shoots per tree		Length of longest shoot (cm)	
	1974	1975	11 mo.	14 mo. ²	11 mo.	14 mo.
NAA 1% (water)	89.5	98.5	0.0a ²	7.0	0a	14a
NAA 1% (50% latex paint in water)	83.1	87.9	2.2b	7.5	26b	42b
Control	89.5	100.1	8.0c	10.4	84c	98c

²Mean separation in columns by Duncan's multiple range test, 1% level.

³No significant differences.

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