Using concentrate postbloom NAA sprays to thin olives

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Thinning with a concentrate spray was just as effective as with a dilute spray in reducing the crop, improving fruit size and value, and increasing return bloom.

Olive varieties in California are naturally alternate bearing, tending to have large crops of smaller, less valuable fruit one year and very light crops the following year. This cropping pattern disrupts orderly marketing, reduces tree vigor, and can result in economic hardship for growers.

These problems can be partially offset by chemical fruit thinning with naphthalene acetic acid (NAA). This chemical gives some control over the fruit population and thus the alternate bearing characteristics of varieties such as 'Manzanillo', 'Ascolano', and 'Mission'. Research and grower experience over the last 25 years have shown that 150 parts per million (ppm) NAA applied as a dilute spray (300 to 500 gallons per acre) approximately two weeks after full bloom during heavy crop years will reduce the crop, improve fruit size and value, and increase return bloom and the subsequent crop.

Olive thinning recommendations were initially developed for dilute sprays. As chemical olive thinning has become more widespread, the need to reduce the time required for spray tank filling has led to grower interest in applying NAA in less water, specifically in a concentrate spray of 100 gallons of water per acre. Pesticides are usually applied at the same amount of active ingredient per acre regardless of the total gallonage. No information has been available, however, on concentrate application of NAA for thinning olives.

Opinions varied among those working with spray thinning of olives. Some felt that NAA should be used at 150 ppm in 100 gallons of water per acre, or at 25 percent of the active ingredient used in the normal dilute spray. Others felt the amount of active ingredient per acre should be the same regardless of the gallonage: 600 ppm NAA in 100 gallons would give the same amount of active ingredient as 150 ppm NAA in 400 gallons.

Thinning study

During 1984, we began an experiment to determine whether the total amount of active ingredient should be reduced proportionately when gallons per acre are reduced or whether the NAA concentration should be increased as gallonage is reduced. Using 12-year-old 'Manzanillo' olive trees, we compared the recommended dilute spray (150 ppm NAA in 400 gallons per acre) with concentrate sprays of NAA at 150, 300, and 450 ppm in 100 gallons of water. The thinning agent was applied with an air-carrier sprayer at the end of May, 15 days after full bloom, in treatments replicated four times. The plots were harvested during the first week of October and data collected on fruit size, yield, and value. We also estimated return bloom and crop load in 1985.

Although NAA was applied on a very warm day (a high of 105°F), a condition that enhances thinning activity, none of the treatments over-thinned. Untreated controls yielded 6.66 tons per acre, while treated plots ranged from 4.35 to 6.04 tons per acre. Because of tree yield variability, there were no statistically significant differences in yield (table 1). The early reduction in fruit population by the dilute treatment at 150 ppm and concentrate at 450 ppm NAA were most desirable in their enhancement of fruit size during 1984 and return bloom and crop for 1985.

While untreated fruit peaked in the standard and smaller size category, the 150 ppm dilute and 450 ppm concentrate treatments peaked in medium and large fruit. NAA application produced larger fruit, increasing dollar return per ton by as much as 23 percent.

Conclusions

As is true of other tree fruits, early fruit removal results in larger, more valuable olives. The return bloom and crop are also larger in the year following successful early removal. After unsuccessful crop reduction, the amount of return bloom is usually poor. In this experiment, the return crop was below commercially acceptable standards from nonthinned controls, but was above these standards from treatments with dilute or 450 ppm concentrate NAA.

Our results indicated that 450 ppm NAA in 100 gallons of water per acre could be expected to give approximately the same degree of thinning as 150 ppm in 400 gallons of water. Less NAA than this gave significantly poorer results.

These findings represent only one year's data, and results may vary from year to year. However, observations of thinning done by the same grower during 1985 and 1986 support the results reported here.

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TABLE 1. Effect of NAA in dilute or concentrate spray for postbloom thinning of 'Manzanillo' olive, 1984

Treatment	Amount water/ acre	NAA/ acre	Fruit weight	Fruit size distribution			Yield/ acre	Value/ ton	1985 return bloom*	1985 return crop load*
				Std & smaller	Med & Large	Ex Large & Mammoth				
	gal	*oz*	*gm/100*	%	%	%	*tons*	*$*		
Dilute 150 ppm	400	144	443 a	9.9 a	78.4 a	11.9 a	5.13 a	522 a	3.5 a	3.9 a
Concentrate 450 ppm	100	108	431 a	14.3 a	77.3 a	8.5 ab	5.93 a	509 a	3.5 a	3.8 ab
Concentrate 300 ppm	100	72	374 b	33.7 b	63.6 b	2.7 bc	6.04 a	472 b	2.25 ab	2.6 bc
Concentrate 150 ppm	100	36	352 bc	47.8 c	50.7 c	1.5 c	4.35 a	442 c	1.75 b	1.9 c
Control	—	0	334 c	53.7 c	45.5 c	0.8 c	6.66 a	423 c	1.50 b	1.9 c

NOTE: Numbers represent the mean of four replicates. Means in the same column followed by the same letter are not significantly different at the 0.5 level, using Duncan's multiple range test.

* Based on a visual rating, where 5 is heaviest and 1 is lightest.