Nectarine and Peach Varietal Response to NAA Sprout Inhibition[1,2]

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Abstract

Naphthaleneacetic acid (NAA) was applied to first and second leaf [*Prunus persica* (L.) Batsch] trees at rates of 0.5 and 1.0% to inhibit undesired sprouting and thus reduce pruning, and to enhance the open-vase tree form. First leaf Flordaking peach and Armking nectarine and second leaf Aurelia and Fla. M. 6-6 nectarines had vegetative sprout lengths of 3.2, 0.6, 1.3, and 3.8 cm, respectively, during the March 9 application. Sprout inhibition was achieved with no substained reduction of trunk diameter growth. Though light to moderate NAA-induced gummosis occurred 3 months after treatment, it was not significant compared to the checks by the 7th month. Tree mortality was confined to the first leaf trees at the 1.0% rate.

Manual training of first and second leaf nectarine and peach trees to an open-vase shape is critical and costly. Development of a strong scaffold structure at least 46 cm high is accomplished the first year. The next year secondary scaffolding is developed. All extraneous sprouts on the trunk and in the crotch area should be removed during this period. This not only directs available nutrients into strengthening the selected limbs but also reduces the possibility of foliar herbicidal uptake.

Chemical sprout inhibition is not a new concept. The product studied for such use is 1-naphthaleneacetic acid (NAA). Experimentation has shown NAA successful in sprout control on several crops including apples (4, 5), pears (4), citrus (2), peaches (1), and pecans (6).

Currently, 24(c) registrations permit use of TRE-HOLD sprout inhibitor A-112 (NAA) in several states on apple and pear trees. The premix formulation of 1.15% NAA in diluted white latex paint is approved for use on nonbearing citrus in Florida.

The inconsistent response of various crops to NAA has been reported. In one study, Bukovac, Flore, and Goren (3) found that foliar-applied ^{14}C-1-NAA (16.0μCi/μmole, 6.25x10^{-5}M) was conjugated differently by several fruits and cultivars within the crop. They also found that peaches moderately conjugate NAA as do pears and apples which have NAA label clearance.

This study was conducted to determine the response of 3 nectarines and a peach to 2 rates of NAA with 20% white latex paint when applied after vegetative and/or fruit bud break.

Materials and Methods

A randomized complete block design of 3 trees per replication and 3 replications per treatment was used. Tree spacing was 6.1 m x 6.1 m.

Treatments included an untreated check and an aqueous mixture of either 0.5% or 1.0% NAA (ethyl ester, 72-A112) with 20% white latex paint. Treatments were applied using a hand compression tank sprayer on March 9, 1979. Aurelia was at fruit bud break with sprouts 1.3 cm and Fla. M. 6-6

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[1]Florida Agr. Exp. Sta. Journal Series No. 2239.

[2]Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the Univ. of Fla. and does not imply its approval to the exclusion of other products that may also be suitable. NAA product supplied by Union Carbide Corporation Agricultural Products, New York, NY.

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was at full bloom with 3.8 cm sprouts. First leaf Flordaking peach and Armking nectarine were treated with sprouts 3.2 and 0.6 cm, respectively. On the Flordaking and Armking trees, only the trunk area from ground level up 46 cm was treated. In addition to this same area, 30 cm up the primary scaffolds was sprayed on the Aurelia and Fla. M. 6-6. All untreated check trees had sprouts removed on March 12th. Sprouts present at the time of application were desiccated by the treatments. All other cultural practices were the same for each cultivar. Accumulative sprout counts, trunk diameters, and gummosis ratings of 0 (no gummosis) to 10 (extreme gummosis) were recorded. Data were analyzed using Least Significant Difference (LSD) at the 1 and 5% levels.

Results and Discussion

Aurelia, Fla. M. 6-6 and Flordaking had the same general response to the NAA treatments (Table 1, 2 and 3). Trunk diameter growth was unaffected by either 0.5 or 1.0% NAA. One percent NAA applied to Aurelia and the 0.5 and 1.0% rates on Fla. M. 6-6 and Flordaking significantly increased gummosis over the checks but only for the first rating date. The June and October ratings showed nearly complete control of sprouts by 0.5 and 1.0% NAA. There was no tree mortality on the second leaf trees. One Flordaking tree died after treatment with 1.0% NAA.

The Armking trees did not respond as favorably as the others (Table 4). The 1.0% NAA treated trees had significantly smaller trunk diameters and more gummosis than the untreated checks at the second rating date. However, the 0.5% rate did not significantly effect these parameters compared to the checks. The most important parameter for this variety was tree mortality. One-third (3 of 9) of the trees in the 1.0% plots died due to treatment effect.

Generally, neither 0.5 nor 1.0% NAA reduced trunk diameter growth. The nectarines showed a strong position relationship between NAA-induced gummosis and sprout length (at time of application) on the June 7 rating date for both 0.5 and 1.0%. However, gummosis had been considerably reduced or eliminated by the

Table 1. Response of trunk diameter, gummosis, and sprouting from NAA applied to second leaf Aurelia nectarine trees in 1979.

Treatment	Trunk diameter (cm) 3/12	6/7	10/11	Gummosis 6/7	10/11	Sprout count 6/7	10/11	Tree mortality
Untreated check	5.3[1]	7.2	10.4	0.0[2]	0.1	7.6[3]	13.2	0
0.5% NAA + 20% white latex	5.1	6.7	10.2	0.4	0.3	0.2	0.4	0
1.0% NAA + 20% white latex	5.2	6.5	10.2	2.1	0.4	0.3	0.6	0
LSD 5%	ns	ns	ns	1.7	ns	3.6	5.7	
1%				2.4		4.9	7.6	

[1]Average of 3 trees/rep with 3 reps/treatment.
[2]Gummosis rating 0 = none to 10 = extreme.
[3]Accumulative number of sprouts on trunk and 30 cm up the primary scaffolds.

Table 2. Response of trunk diameter, gummosis, and sprouting from NAA applied to second leaf Fla. M. 6-6 nectarine trees in 1979.

Treatment	Trunk diameter (cm) 3/12	6/7	10/11	Gummosis 6/7	10/11	Sprout count 6/7	10/11	Tree mortality
Untreated check	5.9[1]	7.4	11.2	0.2[2]	0.0	5.1[3]	6.0	0
0.5% NAA + 20% white latex	5.9	7.5	10.7	2.1	0.1	0.0	0.0	0
1.0% NAA + 20% white latex	6.0	7.5	11.1	1.8	0.4	0.0	0.2	0
LSD 5%	ns	ns	ns	1.7	ns	4.3	4.2	
1%				2.2		5.8	5.7	

[1]Average of 3 trees/rep with 3 reps/treatment.
[2]Gummosis rating 0 = none to 10 = extreme.
[3]Accumulative number of sprouts on trunk and 30 cm up the primary scaffolds.

Table 3. Response of trunk diameter, gummosis, and sprouting from NAA applied to first leaf Flordaking peach trees in 1979.

Treatment	Trunk diameter (cm) 3/12	6/7	10/11	Gummosis 6/7	10/11	Sprout count 6/7	10/11	Tree mortality
Untreated check	1.0[1]	1.3	4.1	0.0[2]	0.0	2.6[3]	0.6	0
0.5% NAA + 20% white latex	1.0	1.4	4.5	6.0	0.0	0.0	0.0	0
1.0% NAA + 20% white latex	1.0	1.3	4.5	5.9	0.0	0.0	0.0	1
LSD 5%	ns	ns	ns	3.4	ns	2.2	ns	
1%				4.6		3.0		

[1]Average of 3 trees/rep with 3 reps/treatment.
[2]Gummosis rating 0 = none to 10 = extreme.
[3]Accumulative number of sprouts 46 cm up the trunk.

Table 4. Response of trunk diameter, gummosis, and sprouting from NAA applied to first leaf Armking nectarine trees in 1979.

Treatment	Trunk diameter (cm) 3/12	6/7	10/11	Gummosis 6/7	10/11	Sprout count 6/7	10/11	Tree mortality
Untreated check	1.1[1]	1.5	4.5	0.0[2]	0.1	0.9[3]	0.0	0
0.5% NAA + 20% white latex	1.1	1.4	4.8	1.0	0.0	0.0	0.0	0
1.0% NAA + 20% white latex	1.2	1.3	4.1	1.5	0.0	0.0	0.0	3
LSD 5%	ns	0.2	ns	1.3	ns	ns	ns	
1%		0.3		1.7				

[1]Average of 3 trees/rep with 3 reps/treatment.
[2]Gummosis rating 0 = none to 10 = extreme.
[3]Accumulative number of sprouts 46 cm up the trunk.

final rating. Both rates of NAA either eliminated or averaged less than 1 sprout per tree up to 7 months after treatment. Tree mortality is of some concern when used on first leaf trees at the 1.0% rate. Yet, the 0.5% rate on first leaf and both 0.5 and 1.0% NAA on second leaf trees did not cause tree death.

Overall, it appears that sprout control on nonbearing *Prunus persica* can be achieved with NAA, yet have no apparent permanent interference with tree growth (as measured by trunk diameter) while maintaining an acceptable level of gummosis.

Literature Cited

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Book Review

Sorte Jabuka U Suvremenoj Proizvodnji (Apple Varieties in Modern Production) 1978 by Raphael Gliha, Faculty of Agriculture, University of Zagreb, Croatia, Jugoslavia. Editor: Mosa Pijade, Zagreb. Photographer: Vlado Lesnik.

Written in the Croatian language, this 245 page hard cover text is a classic as a reference in modern fruit production. The first section briefly reviews apple production in 29 countries of the world, with reference to regions, cultivars, rootstocks, exports and imports. In the second section types of plantings, methods of training and pruning and other cultural techniques are described and profusely illustrated, mostly in color.

The major part of the book is devoted to the origin and description of 226 cultivars grown in one part or another of the world, illustrating many of them in color.

Each of the major apple cultivars are described at length, followed by brief descriptions of their progeny. The color photography is beautiful as well as being true to color and technically extremely well done.

The extensive list of references is compiled from reports by workers in pomology in many countries. An English translation of this book with its superb color prints would be much sought after by professionals, commercial growers and hobbyists. Production figures should be converted from carloads to metric tons.

—Josip Barkovic and Aleck Hutchinson