

check plot the lygus adult count suddenly rose from 1½ bugs per 50 sweeps on June 13 to 12 adults on June 21, and the non-interplant cotton was then treated. The 20-ft strips of alfalfa seed were also treated to set a seed crop.

The heavy lygus invasion continued and the seed strips and the non-interplant cotton required another treatment on June 27. During the invasion there was less than one adult per 50 sweeps in the interplant cotton.

### Lygus flight

The heavy lygus flight continued through the first week in July. Unfortunately at this time the seed strips were under moisture stress. Under the constant pressure of invading lygus, the population in the interplant cotton rose from less than one, to fifteen lygus per 50 sweeps, and the field was treated.

In mid-July another lygus flight invaded the area and the non-interplant cotton was treated. During this period the lygus population in the interplant cotton remained at less than one adult per 50 sweeps. In early August both worms and lygus appeared in the non-interplant cotton and the field was treated again.

### Seed strips

If the alfalfa seed strips had been green and more succulent when the early July flight occurred, the interplant cotton could probably have gone through the season without a lygus treatment. There were about five acres of alfalfa in this 80-acre interplant field. When the alfalfa seed strips were harvested in September, they produced 365 lbs of cleaned seed per acre.

The alfalfa strips not only served as a trap crop for lygus bugs, but also as an insectary for natural enemies of other pests. The natural enemy adults appear to leave the alfalfa strips and to fly into the adjacent cotton to attack eggs and small larvae of the bollworm, cabbage looper, and beet armyworm.

*Vernon M. Stern is Associate Professor, Department of Entomology, University of California, Riverside. Arthur Mueller, Vahram Sevacherian, and Michael Way are graduate students, Department of Entomology, U.C., Riverside. This investigation was supported by Cotton Producers Institute funds administered by the National Cotton Council of America. Lew Isaak, Entomologist, W. B. Camp, Jr. Ranch, Shafter, assisted in solving management problems with the 1967 study.*

# CLING PEACHES EFFECTIVELY THINNED WITH 3-CPA

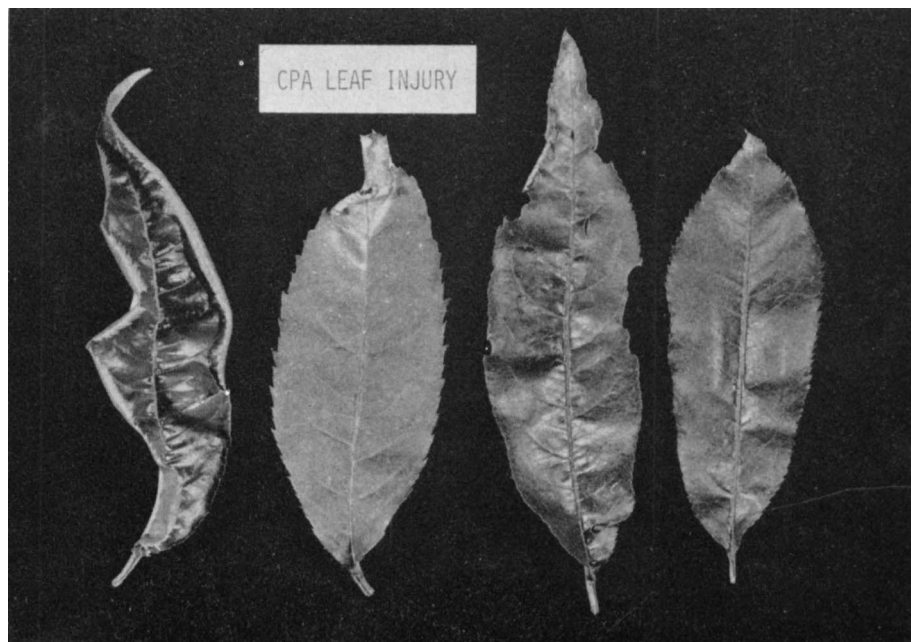
J. BEUTEL • J. YEAGER • G. POST • D. ROUGH • W. ANDERSON  
N. ROSS • F. PERRY • M. GERDTS • J. LA RUE • L. BROWN

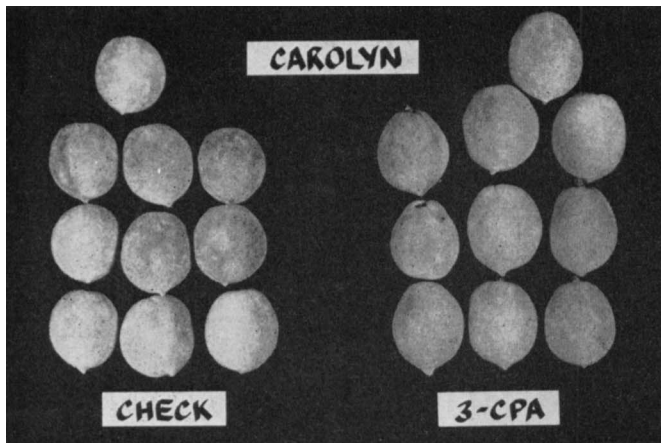
Four major cling peach varieties (Halford, Peak, Paloro, Carolyn) were effectively thinned with 3-CPA. Proper timing based on ovule length (8.5 to 9.5 mm is best) was essential for best thinning. The best sprays were of 300 ppm applied at 400 gallons per acre, or 1.6 gallons of formulated material per acre. Slight phytotoxicity usually occurred whenever thinning was obtained but was limited to a few yellow leaves which dropped two weeks later and some leaf tipburning and twisting. Fruit harvested after 3-CPA sprays appeared equal in size, maturity and quality to hand-thinned fruit. A small amount of pole or touch-up hand thinning was usually needed in addition to the thinning sprays to attain good commercial thinning.

**I**N 1967 AND 1968, 21 test plots and 78 commercial applications of 3-CPA for fruit thinning were evaluated in California peach counties. Test plots contained six to 10 randomized, single tree replications and commercial applications were made to two- to eight-row sections in commercial orchards. Results were evaluated in terms of the number of fruit removed by the spray and size of fruit at time of hand thinning. In some tests, additional measurements were made of the time needed to hand thin, the percentage of split pits, the maturity of the fruit and the size of the yield. General observations were also made on the degree of leaf injury.

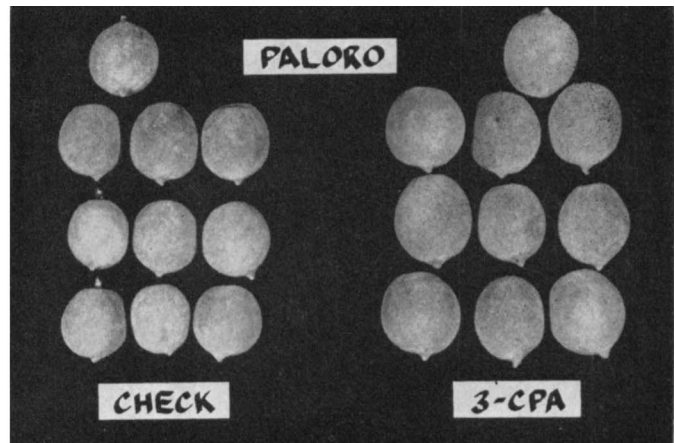
Halford, Peak, Paloro, and Carolyn varieties thinned well while other varieties were thinned less effectively. Table 1 summarizes 1968 results and classifies

Injury on some leaves after spraying with 300 ppm 3-CPA.





Size comparisons of Carolyn peaches at thinning time from unsprayed trees and from trees sprayed with 300 ppm 3-CPA.



Size comparisons of Paloro peaches at thinning time from unsprayed trees and from trees sprayed with 300 ppm 3-CPA.

cling peach varieties according to ease of thinning with 300 ppm 3-CPA.

Proper timing of 3-CPA sprays was essential for effective thinning. The more difficult a variety was to thin, the more critically important was the timing. Proper timing was determined by measuring the maximum length of the ovule (seed) in millimeters (mm) of at least 20 fruit per orchard and calculating the average. Thinning was successful when sprays were applied at average ovule lengths of 7.0 to 10.0 mm, but 8.5 to 9.5 mm was best for most cling peach varieties. Depending on the season, these ovule lengths usually occur in April, 25 to 48 days after full bloom. Table 2 shows the thinning effectiveness of 3-CPA when applied at different ovule lengths to a hard-to-thin variety like Vivian and when applied to easy-to-thin varieties like Peak and Halford.

Thorough and uniform coverage with thinning sprays was essential for good thinning. Portions of trees not sprayed were not thinned. The sprays thinned equally well at any time of day they were applied.

TABLE 1. CLING PEACH VARIETY RESPONSE  
300 PPM SPRAYS OF 3-CPA

Variety	Tests* Good/Total	Thin† Rating	Fruit‡ Weight Increase	Average Diameter Increase
<b>1. EASY THINNING</b>				
Halford	14/16	1.4	19	2.4
Peak	10/11	1.2	17	1.9
Paloro	4/5	1.2	15	2.1
Carolyn	7/9	1.5	15	2.5
<b>2. DIFFICULT THINNING</b>				
Cortez	2/5	2.4	13	1.0
Dixon	2/8	2.1	11	1.5
Fortuna	0/4	2.3	14	7.3
Guame	1/4	2.0	4	0.9
Loadel	2/5	2.3	8	1.6
Vivian	1/6	2.4	0	0

\* Good/Total number of good to excellent thinning responses out of all tests made in 1968.

† Average thin rating—1.0 is excellent thinning and 3.0 is no useful thinning.

‡ Increase in fruit weight at hand thinning time due to 3-CPA.

The best overall concentration was 300 ppm in dilute sprays (400 gallons per acre), which used 1.6 gallons of 7.9 per cent formulated material per acre. Although a few good responses were obtained with 150 ppm, that concentration was unsatisfactory. Data in table 3 provide comparisons between sprays of 150 and 300 ppm, illustrating the necessity of using 300 ppm to thin cling peaches in California. Limited tests with concentrate sprays in one orchard consisting of four varieties, indicated that if 1.6 gallons of formulated material were used per acre, the results would be equally good when thoroughly applied in 100, 200 or 400 gallons of spray per acre.

#### Slight injury

Slight leaf injury occurred whenever effective thinning was obtained (see photo). The injury consisted of slight tip-burn, some yellow leaves which dropped in two weeks and a slight twisting of leaves on water sprouts. When overdoses were applied, leaf shot-holing and drop became pronounced and some killing of shoot tips occurred. In all these cases trees looked normal six weeks later. Injury tended to be more pronounced when 3-CPA was applied at the 10 to 12 mm ovule length than when applied at 7 to 9 mm. Overthinning occurred in a few cases when trees received overdoses, were double sprayed, were weak, had light fruit sets or when growers thinned too soon after spraying.

Harvest samples taken in seven test orchards showed no reduction in marketable yield in 3-CPA treated portions of the orchards. Fruit size, maturity, color, split pits, and soluble solids appeared to be no more affected by 3-CPA sprays than by normal hand thinning practices.

*J. Beutel is Extension Pomologist, and J. Yeager is Extension Technician, University of California, Davis. G. Post was formerly Farm Advisor, Sutter County. D. Rough, W. Anderson, and N. Ross are farm advisors in San Joaquin, Yuba, and Stanislaus counties respectively; F. Perry, M. Gerdts, J. LaRue, and L. Brown are farm advisors in Butte, Fresno, Tulare, and Kings counties.*

TABLE 2. EFFECTIVENESS OF 3-CPA AT DIFFERENT  
OVULE LENGTHS

Variety	Ovule length mm	Increase in fruit weight over unsprayed*	
		%	%
Peak	7.2	11	
	8.3	24	
	9.5	22	
	10.1	19	
	12.5	9	
Halford	5.3	0	
	6.9	15	
	7.9	25	
	8.5	30	
	10.2	21	
Vivian	10.5	10	
	4.2	0	
	7.2	1	
	8.2	2	
	9.0	15	
	9.4	20	
	9.5	17	
	10.6	10	

\* 0-12% poor thinning, 15-19% good thinning (reduces hand thinning), 20-25% excellent thinning (limited touch up needed).

TABLE 3. EFFECT OF 3-CPA CONCENTRATION ON  
PEACH THINNING

	Ovule length	Increase in fruit* weight over check	
		150 ppm	300 ppm
Halford	mm	%	%
	7.9	15	25
	8.5	18	30
Peak	10.2	14	21
	8.0	15	18
	7.2	10	11
	8.6	16	16
	7.2	19	20
Fortuna	10.1	12	19
	10.2	5	20
	9.0	7	15
Loadel	10.4	4	12
	10.6	2	10

\* 0-12% poor thinning, 15-19% good thinning, 20-25% excellent thinning.