Palora cling peach tree, above, was sprayed with 200 ppm gibberellic acid concentration in July 1966. The overthinning is evident in the lack of crop shown in photo taken in August 1967.

Palora cling peaches sprayed with 50 ppm concentration of gibberellic acid in July 1966. The crop in 1967 was normal and no supplementary hand thinning was required.

Gibberellic Acid Reduces Cling Peach Flower Buds

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Flower bud formation in various Prunus species can be curtailed or completely prevented with use of gibberellic acid—depending upon the concentration used. Many of the important tree fruit crops grown in California, including peach, plum, cherry, and apricot belong to this genus. These trials indicated that gibberellic acid sprays may be useful in reducing or eliminating hand thinning and in controlling crop levels in cling peaches.

THESE EXPERIMENTS were conducted to determine the capacity of gibberellic acid applications to regulate the number of flower buds produced on trees of the *Prunus* species in commercial orchards—with the goal of reducing or even eliminating the necessity of hand fruit thinning. The cling peach was selected for these experimental trials because it generally flowers profusely and sets excessive numbers of fruits that must be reduced by hand thinning to obtain marketable fruit size at harvest. Hand thinnng is one of the big cash costs in fruit production, amounting to from $110 to $320 an acre for cling peaches.

TABLE 1. EFFECT OF GIBBERELLIC ACID CONCENTRATION ON PEACH SHOOT GROWTH MADE BETWEEN JULY 22 AND SEPTEMBER 23,1966

Variety	Treatment	Shoot growth
	ppm	inches
Fortuna	Check	0.0
	50	0.8
	100	2.0
	200	5.9
Palora	Check	0.7
	50	2.6
	100	5.0
	200	–
Loadel	Check	0.3
	100	1.9
	200	3.5

The five cling peach varieties used in the 1966 trails in Kings County included Fortuna, Loadel, Palora, Peak, and Halford. Concentrations of 50, 100, and 200 ppm gibberellic acid in water were tested on each variety. The solutions were sprayed on the foliage to the point of slight drip. Approximately five to six gallons of solution were applied to each tree.

Peach flower-bud formation for the next year begins the latter part of July. Sprays were applied in these tests to the Loadel and Fortuna varieties on July 21–22, and to the Palora, Peak, and Halford varieties on July 26—to coincide with the critical period of flower-bud differentiation. Harvest dates were: Fortuna, July 10; Loadel, July 14; Palora, August 10; Peak, August 16; and Halford, September 8. Thus, gibberellic acid was applied to the Palora, Peak, and Halford varieties when the current crop was present on the trees. The fruit on the trees at the time of spraying did not appear to be affected since harvest dates, color, and size of the fruit were the same as fruit from unsprayed trees.

There was some stimulation of vegetative growth in August and September as a result of application of this material. Additional growth was noticeable only on certain branches; it was delicate and spindly. Shoot-growth measurements were made (of three of the five varieties) on certain limbs on July 22 and again on September 23. Results are shown in table 1.

In the spring of 1967, bloom was retarded progressively with each increase in concentration of gibberellic acid. The 50, 100, and 200 ppm concentrations generally delayed bloom 2 or 3, 6 or 7, and 10 or 11 days respectively. Fruit maturity was also progressively delayed as concentration of gibberellic acid was increased. For example, the fruit from the 100-ppm-treated trees matured approximately 5 or 6 days later than that from unsprayed trees. Ultimate fruit size, how-

TABLE 2. EFFECT OF GIBBERELLIC ACID APPLICATION IN JULY, 1966 ON THE NUMBERS OF LEAF AND FLOWER BUDS ON THREE CLING PEACH VARIETIES IN MARCH, 1967

Variety	Treatment	Number of Buds per linear inch of shoot growth	
	ppm	blossom	Leaf
Halford	Check	.460	.842
	50	.260	.824
	100	.521	.744
	200	.270	.824
Loadel	Check	.920	.860
	50	.740	.846
	100	.720	.800
	200	.240	.800
Palora	Check	.824	1.04
	50	.460	1.03
	100	.110	1.10
	200	.116	.96

ever, did not seem to be affected by the spray treatment.

Phytotoxicity resulting from the 200 ppm concentration was too severe on all varieties. It caused some twig die-back and subsequently delayed flowering and foliation. Slight-to-moderate phytotoxic effects were displayed by trees sprayed with 100 ppm.

Leaf and flower buds on representative branches of three varieties were counted separately in March 1967. The data in table 2 show that the numbers of leaf buds per inch of growth were not affected by gibberellic acid treatment.

The numbers of flower buds, however, were markedly decreased; the Palora variety showing about 45% reduction even at 50 ppm. The Halford variety, having fewer flower buds per linear inch, also showed a considerable reduction at 50 ppm.

There was no carry-over effect on the new vegetative growth made by the trees in 1967. In May, 1967, the trees were rated as to the effectiveness of the gibberellic acid treatment in reducing crop levels on the trees. The 200 ppm treatment drastically overthinned all five cling varieties. The 100 ppm treatment overthinned and reduced crop levels in the Palora, Peak, and Halford varieties. The Fortuna and Loadel varieties, being heavy bloomers, showed moderate thinning.

The 50 ppm treatment on Palora reduced the crop enough that no supplemental hand thinning was necessary. Peak and Halford varieties rated from moderate to good in thinning. Fortuna and Loadel showed less thinning effect from the 50 ppm treatment and were rated at little or no thinning.

These trials demonstrated that gibberellic acid foliage sprays in July may also be able to control crop levels in cling peaches.

More extensive trials were established in July, 1967 following the preliminary trials in 1966. Concentrations of gibberellic acid in the 1967 trials were considerably reduced in line with the results obtained in 1966.

Gibberellic acid is not registered for the purpose used in this experiment. Registration of this material for this use will be necessary before it can be used commercially or recommended by University of California.

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WEED C I CUCU

ANNUAL LOSSES from weeds in California melon and cucumber crops were recently estimated at $11,000,000. The cost of controlling weeds in these crops by cultivation and hand hoeing was estimated at $20 per acre in 1964. Early weed competition in the field is difficult to control, particularly in the seed row and under hot caps. Once growing young vines spread out over the bed surface, mechanical cultivation becomes difficult to impossible.

In addition to weed germination with the crop seeds at emergence, there is a weed problem in the irrigation furrow and on the shoulder of the beds, which becomes more important during the summer and at harvest. While selective chemical weed control in the seed row is more difficult to obtain, weed control down in the furrow can be accomplished safely with a number of herbicides.

In a recent survey, the five important weeds most often listed as pests in melons were lambsquarter, pigweed, barnyard grass, other annual grasses, and mustard. Purslane was one of the main weeds frequently observed in University of California weed-control trials.

A series of uniform trials were conducted in several of the major melon and cucumber areas in the state including Fresno, Tulare, Kern, and San Joaquin counties. These trials included a preplant, incorporated application of the registered herbicides, CDEC (Vegadex) and NPA (Alanap), and of the three unregistered herbicides, bensulide (Prefar), benefin (Balan), and R 1856. These herbicides were incorporated shortly after application on tops of preformed beds. Nearly all the trials were furrow irrigated as is common practice in most melon-growing acreage in California.

The second set of uniform trials for preemergence weed control on the shoulder and in the furrow was conducted in some of the same counties. In these trials melon plants were seeded and grown to a height of 4 to 5 inches before herbicide application. Postplant herbicides were trifluralin (Treflan), registered for application 4 to 6 weeks after seeding; and nitralin (Planavin), an unregistered herbicide related to trifluralin.

Among the registered herbicides, CDEC (Vegadex) showed a narrow margin of safety for weed control in the seed row. Although the number of trials was somewhat limited, there were more failures than successes at 4 lbs per acre (table 1). NPA (Alanap), long registered for weed control in melons, likewise showed erratic results and less crop safety than some of the more promising new herbicides. DCPA (Dacthal), although registered only for postplant applications, offered marginal safety, for preplant incorporation, and excellent weed control in all trials at rates from 8 to 16 lbs per acre. However, DCPA has shown no selectivity in light, low-organic-matter soils, in previous trials.

Benefin (Balan), another unregistered herbicide, although giving excellent weed control, showed insufficient safety even at rates of 1 lb per acre. R 1856, although safe on cucurbits, showed generally poor weed control.

Among the unregistered herbicides, bensulide (Prefar) was one of the safest and gave fairly consistent weed control, particularly when watergrass and purslane were the main weeds present. Four- to 5-lb-per-acre rates were effective in seven out of 11 trials. In heavier soils more herbicide would probably be necessary depending upon the weed species

TABLE 1. CUCURBITS WEED-CONTROL SUMMARY 1964–66

Herbicide	lb/A	Number of trials			
		Weed control (+)	Weed control (–)	Crop safety (+)	Crop safety (–)
CDEC	4	1	2	2	2
NPA	4–5	2	1	4	2
	8–10	2	1	3	3
BENSULIDE	4–5	7	4	12	0
	8–10	10	1	11	1
DCPA	8–10	6	0	4	2
	16	5	0	0	5
BENEFIN	1	8	1	4	5
	2	8	0	2	7
R 1855	4	1	7	7	0
	8	3	5	7	0

+ = Satisfactory.
– = Unsatisfactory.