

Applications of ethephon at rates from 300 to 500 ppm, applied when most of the basal figs had turned yellow, resulted in an earlier and more compact maturity period, without adverse effects to the crop. Earlier maturity in turn insured improvement of external and internal fig quality, without decreasing individual fruit weights. Ethephon is not registered for use on figs and is not recommended for use at this time by the University of California.

**C**ALIMYRNA FIGS mature in late August and September in Fresno. Serious fruit quality problems greatly reduce the percentage of crop available for high return, package stock. Factors which reduce quality include delayed harvest, insect infestation, fruit diseases, rain damage and fruit splitting. Earlier and more compact harvest periods could reduce these problems.

In 1969 and 1970 ethephon (2-chloroethylphosphonic acid) was tested on figs to determine if fruit maturity could be hastened. Results indicated ethephon treatments ripened figs earlier and over a shorter period than the untreated control plot. These promising results were followed in 1971 by tests to determine the relationship of timing and rates to fruit quality.

TABLE 1. PERCENT PACKAGE STOCK AFTER ETHEPHON TREATMENTS, CALIMYRNA FIGS, FRESNO COUNTY, 1971\*

Treatment	Application date	Harvest dates			Weighted average
		8/24	8/31	9/8	
per cent					
Check	—	35	39	6	21
Ethephon	7/29	12	36	20	23
Ethephon	8/5	27	47	21	35
Ethephon	8/10	40	43	21	35

\* Samples of 100 figs per treatment tested by Dried Fruit Association using standard industry quality standards.  
† Each application date contains an average of all three rates of ethephon.

TABLE 2. INDIVIDUAL FIG WEIGHTS AFTER ETHEPHON TREATMENTS, CALIMYRNA FIGS, FRESNO COUNTY, 1971

Treatment	Application date	Harvest dates			Weighted average
		8/24	8/31	9/8	
grams					
Check	—	19.6	19.9	15.1	17.7
Ethephon	7/29	17.2	17.1	16.1	16.9
Ethephon	8/5	18.6	17.8	17.7	18.0
Ethephon	8/10	19.6	18.5	17.3	18.3

\* Based on samples of 300 fruits (100 fruit per ethephon rate).

TABLE 3. PER CENT INTERNAL DEFECTS AFTER ETHEPHON TREATMENTS, CALIMYRNA FIGS, FRESNO COUNTY, 1971

Treatment	Application Date	Harvest dates†			Weighted average
		8/24	8/31	9/8	
per cent					
Check	—	17	21	51	29
Ethephon	7/29	17	24	16	19
Ethephon	8/5	19	21	40	23
Ethephon	8/10	11	18	29	19

\* Samples consist of 300 fruits (100 fruit per ethephon rate). Measurements were taken by the Dried Fruit Association using standards established by the Dried Fig Marketing Order.

# Effects of preharvest applications of ETHEPHON ON MATURATION AND QUALITY OF CALMYRNA FIGS

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A completely randomized design was used with four replications (single trees) of each treatment. The test plot was established in a mature Calmyrna fig orchard in the Fig Garden area of Fresno, California. Ethephon was applied at three different rates (250, 375, and 500 ppm) on July 29, August 5 and August 10. Alar was applied at 2000 ppm on July 23.

Treatments were timed according to physiological development of the fruit, but all treatments were later than usual because weather conditions delayed crop development. Fruit development descriptions on the three different treatment dates were: 1st treatment, 7/29/72—a few basal figs showing color break (reduced chlorophyll) but no yellow figs; 2nd treatment, 8/5/72—most of the basal figs showing color break and scattered basal figs full yellow; and 3rd treatment, 8/10/72—all basal figs full yellow.

## Maturity

Yield data are shown in the graph. Composite ethephon treatments averaged 75.8% of the total crop harvested by September 1, while in the check treatment, 48.6% of the fruit was harvested on the same date. Fruit maturity on the third treatment date tended to lag behind the first and second treatment at the first pick, but the cumulative totals through the second harvest showed little difference among the ethephon treatments. Alar, another growth regulator, closely followed the check treatment.

## Quality

Differences in fruit quality result in different uses as well as price differentials. Package quality figs are desired because they provide the highest grower returns. Data in table 1 indicate that general fruit quality increased until September 1, then began to decrease. Ethephon

applied on the third application date gave a higher percentage of package figs at the first harvest date. Conversely, the first application date had a lower percentage of package stock. The general trend indicates the later the application the greater the percentage of package figs. The check lot in the third harvest was lower in quality than the average for that harvest. The overall percentage of package stock, as illustrated by the average of all three harvests, shows ethephon treatments producing better quality fruit than the control.

## Negative factors

Two negative quality factors that influence the percentage of package stock and are apparently related to ethephon application are puff-balls and stem shrivel. Puff-balls were more numerous after the first ethephon treatments than in the check but were of minor importance in later treatments. Stem shrivel was also greatest after the first application and decreased with later applications. The third application produced less stem shrivel than the check. External quality factors such as undersized fruit and sunburn were not related to ethephon treatments. The influence of ethephon on end splits could not be evaluated in 1971 since few splits were found in any of the treatments.

## Weights

Fig weights increased with the later application treatments for the first harvest date, but this did not follow for later harvests (see table 2). After averaging all rates and harvests by treatment date, no fruit weight differences were shown between untreated trees, and the second and the third treatment dates. Fruit from the first treatment date weighed less than from the other treatments, however.

Fig deliveries are subject to marketing

order inspection for the presence of insects and diseases. Tolerances have been established so that loads graded as showing more than 10% defects are progressively discounted.—and are rejected if insect infestation is greater than 13%, and/or if total defects exceed 33%.

Average total internal defects for treatments increased at later harvest dates (see table 3). The third harvest check treatment showed a high incidence of defects, which was attributed to a combination of high infestations of insects, fungus organisms and bacteria.

For the first harvest, insect infestation was higher in the early ethephon treatments. This has occurred in past tests, and probably results from having a few isolated trees with ripe figs. Figs develop early on these trees and attract insects from a wide area. However, in general, insect infestation counts increased with later harvests.

### Summary

All dates of ethephon treatment on Calimyrna figs showed hastened maturity. In 1971, rates of 250, 375 and 500 ppm gave similar responses. However, in 1969 and 1970, 250 ppm was somewhat slower in achieving effects, than higher rates.

Phytotoxic responses were observed as marginal leaf burn and leaf abscission in another experiment for determining residue levels. Ethephon at 1000 ppm produced this adverse response, though at 500 ppm or less, phytotoxicity levels were acceptable.

The early treatment (beginning of basal fig color break) had more external quality defects than later treatments, and individual fruits weighed less.

External and internal quality factors progressively deteriorated with later harvests. Internal defects were greatest in check fruit of the third harvest. This difference resulted from the cumulative effects of bacterial, fungus, and insect damage.

The second and third treatment dates gave earlier and more compact maturity than the check treatment—resulting in more figs harvested during the period of higher external and internal fruit quality. Individual fruit weights for the second and third treatments were similar to untreated fruits.

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Calimyrna figs treated with 500 ppm ethephon, to left, show earlier maturity, as compared with untreated fruit to right.

FIG HARVEST COMPARISONS FOR THREE ETHREL APPLICATION DATES AND FOUR HARVEST DATES, FRESNO COUNTY, 1971

