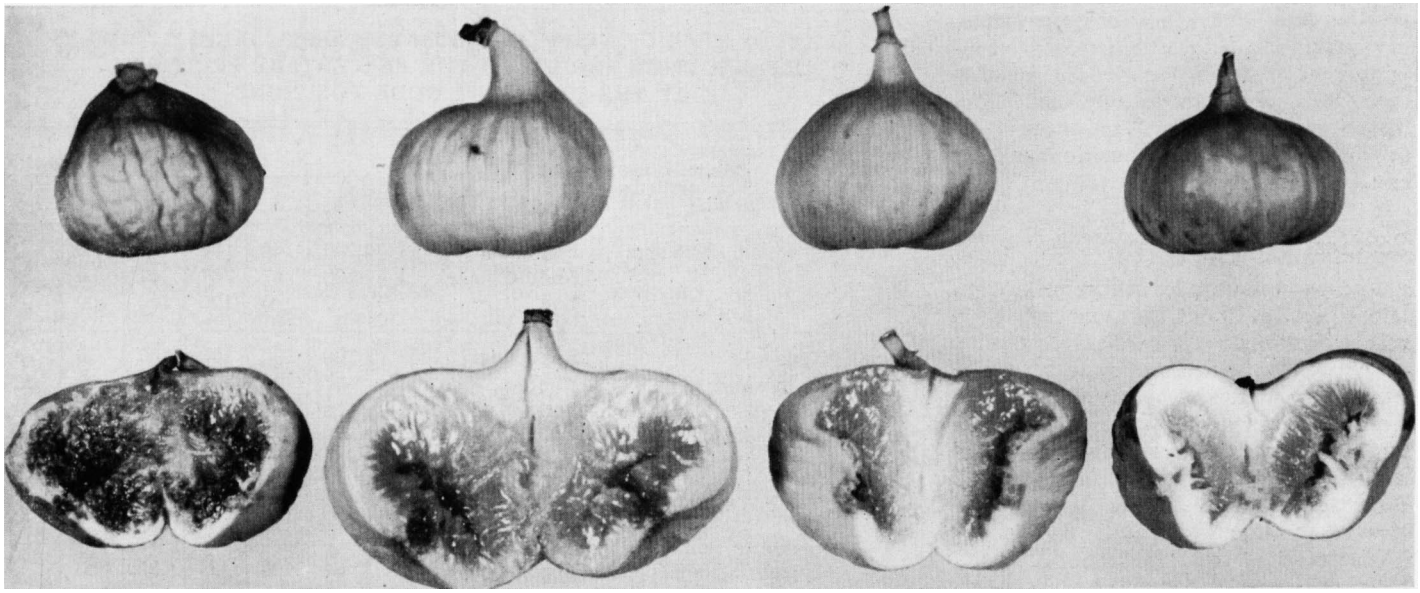

1 2 3 4

Caprified and growth regulator-induced parthenocarpic Calimyrna Fig fruits. 1, caprified fruit; 2, indolebutyric acid; 3, indolebutyric acid and naphthoxyacetic acid; and 4, indolebutyric acid. Note complete lack of seeds in figs produced with growth regulators.

Seedless Calimyrna Figs

produced without caprifigs by spraying with growth regulators

Julian C. Crane and Rene Blondeau

SEEDLESS CALIMYRNA FIGS may be produced without the use of male or caprifigs, by spraying the trees with a solution of indolebutyric acid at caprification—pollination—time.

Data accumulated to date suggest that it is possible to obtain a complete set of fruit by the application of two sprays. It is indicated that one spray application at the critical time is sufficient to set a good commercial crop.

At present prices the cost of this material—the only effective one of the three materials tested—is prohibitive from an economical standpoint. More extensive trials are to be conducted during the season of 1948 and other effective materials may be found which are less expensive than indolebutyric acid.

Fruit Without Pollination

Experimental treatments consisted of injecting various concentrations of different growth regulators through the eyes and into the cavities of the young second-crop fruits or spraying the materials on the leaves and fruits. Wasps were excluded from all treated fruits by covering the branches with muslin bags.

Indolebutyric acid, either alone or in combination with naphthoxyacetic acid, when sprayed on the leaves and fruits, was the only material of the regulators used which induced fruit development without pollination by the fig-wasp. All fruits produced with this material were completely seedless, in contrast to fruits that were caprified. Injections of indolebutyric acid into the cavities of the figs failed to induce fruit set and all fruits so treated dropped about the same time as did the noncaprified fruits.

Fruit Set

The growth regulators were applied at three different times during the caprification period—May 29 to June 20—in order to determine the best time for a single application.

The average percentage fruit set for treatments applied at the beginning, middle, and end of the caprification period was 59%, 78%, and 58%, respectively, as compared with 52% set for the caprified control fruits. A 20% greater fruit set was obtained on fruits sprayed at the middle of the caprification period than fruits similarly treated at the beginning or end of this period.

These data suggest that there is a relatively short period of days during which time there is a maximum number of fruits on the tree that are in a receptive condition for pollination or for being set with growth regulators.

The most significant indication of the data in the accompanying table is that it appears possible to obtain 100% set of fruit by two spray applications and, if applied at the critical time, one application might possibly result in a complete set of fruit.

These data, in general, show that all treatments applied at the beginning of the caprification period set fruits at nodes one through four, starting at the base of current season's shoot growth.

The same treatments applied about the middle of the caprification period showed a tendency to set fruits at all of the node positions, while applications of growth regulators toward the end of this period set the greatest percentage of fruits out toward the terminal ends of the new shoots.

Apparently, fruits at nodes five and six had not yet reached a receptive condition when the first treatments were applied whereas fruits at nodes one and two had passed this critical point when the last treatments were applied.

It is interesting to note that at the first node position on the control branches not a single fig was set. Evidently figs at this

position had passed their receptive state for pollination before the caprifigs containing wasps were suspended in the trees. It is significant to note that in no instance was there 100% set of fruits at any of the various node positions on the control branches.

Seedless Fig

Fruits which were set with growth regulators grew at about the same rate and reached ultimate sizes equal to fruits which were caprified, but matured about two weeks later. The two types of fruits were not markedly different in their external characteristics with the exception that the necks on fruits produced with growth regulators were more pronounced than on the caprified fruits.

The most striking internal difference between fruits produced with growth regulators and those which were naturally pollinated was the complete absence of seeds in the former. Pulp of the seedless figs was light amber in color while that of the caprified figs was considerably darker, being light strawberry in color. Palatability tests revealed that the two types of fruit were remarkably similar in flavor and the unpleasantness of chewing seeds was absent when figs produced with growth regulators were eaten. Sugar analyses revealed the fact that the seedless figs contained approximately the same quantity of total sugars as did figs which were caprified.

RELATION OF TIME OF GROWTH REGULATOR APPLICATION DURING THE CAPRIFICATION PERIOD TO THE PERCENTAGE FRUIT SET AT THE DIFFERENT NODE POSITIONS

Treatment and time of application*		Node position†					
		1	2	3	4	5	6
Indolebutyric acid (2670 ppm) in water	Beginning	100	100	33	0	0	0
	Middle	100	67	67	67	0	..
	End	0	0	100	100	100	..
Indolebutyric acid (1500 ppm) in water	Beginning	100	100	100	100	0	0
	Middle	67	33	100	67	67	100
	End	0	67	100	100	100	100
Naphthoxyacetic acid (100 ppm) and indolebutyric acid (2670 ppm) in water	Beginning	100	100	100	100	0	0
	Middle	100	100	100	100	67	0
	End	0	0	33	100	100	100
Naphthoxyacetic acid (50 ppm) and indolebutyric acid (1500 ppm) in water	Beginning	67	100	33	33	33	0
	Middle	100	100	100	100	67	50
	End	0	33	67	100	100	..
Indolebutyric acid (2670 ppm) in oil emulsion	Beginning	100	100	100	100	0	0
	Middle	100	100	100	50	100	50
	End	0	50	50	50	100	100
Check (caprified)		0	60	50	80	60	50

* Time in relation to caprification period: Beginning—5/23/47, Middle—6/5/47, End—6/12/47.
† Nodes numbered 1 to 6 beginning at base of current season's growth.

No Splitting

The results of this investigation indicate that seedless fruits produced with growth regulators apparently are not subject to the serious problem of fruit splitting.

Although no data have been published to support the conclusion, a considerable amount of evidence has been accumulated which suggests that splitting is the result of an inherent weakness of the variety which is particularly pronounced under high relative humidity conditions. The percentage of split fruits varies from location to location and from season to season but instances are known where splitting occurred in practically every fruit in several different orchards.

The amount of splitting which took place in the orchard where this investigation was conducted was relatively small, being only about 5%. It is significant that of all the seedless fruits produced with growth regulators, splitting did not occur in a single case.

The experimental results presented here are of a preliminary nature, but they suggest the possibility, that someday the Calimyrna fig grower may be able to spray his orchard with an application of some growth regulator at pollination time and, thereby, eliminate the necessity for using the disease-carrying fig-wasp.

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The preliminary tests, reported above, were conducted jointly by the University of California and the Shell Agricultural Laboratory.

Wasp Aids Oriental Fruit Moth Control

Harry S. Smith

THE INFILTRATION of the Oriental fruit moth into California was discovered in the peach orchards of Orange County in 1942.

The State Legislature allocated a sum of money to the California State Department of Agriculture, part of which was turned over by that Department to the Division of Biological Control for the study of insect enemies of the moth. Economic methods for rearing a parasite of the moth were to be devised for large-scale production.

The most aggressive of several enemies of the Oriental fruit moth seemed to be the reddish-brown parasite, *Macrocentrus ancylivorus*, a wasp with an egg-laying stinger half an inch long—as long as the rest of the insect itself. Its native home is in the eastern United States where it preys upon the strawberry leaf-roller and also upon the Oriental fruit moth since the latter invaded that part of the United States from Japan.

By the spring of 1944, techniques for quantity production were in operation and during the next three years shipments were made to representatives of the State Department of Agriculture and the County Agricultural Commissioners in the known infested areas in Orange, Los Angeles, San Bernardino, Kern, Tulare, Stanislaus, Fresno, Sacramento, Merced, Placer, Santa Clara, Kings, and Sutter counties.

Should the Oriental fruit moth reach serious proportions, the University would be able to supply breeding stocks and to supervise insectary operations so that interested organizations could immediately start a production program.

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