

# Olive Girdling Investigations

seek to determine the best time and method for obtaining optimum fruit set

H. T. Hartmann

One of the principal problems confronting California olive growers in certain years is the lack of sufficient set of fruit to assure a profitable yield at harvest time.

One of two distinct situations in this problem is typified by the orchard which bears fruit only every other year—alternate bearing. Such an orchard exhibits the same behavior found in certain apple and plum varieties. It sets and matures a very large number of relatively small fruits in one year and the following year there is little or no bloom and very few fruits. This cycle is repeated over and over.

The remedy for such a situation in olives will probably be the same as found for apples—early thinning of the fruit in the *on* year, either by hand, mechanical means, or by spray thinning with certain caustic or hormone sprays.

Tests over the past three years by the Division of Pomology on spray thinning of olives have failed to reveal any reliable materials for accomplishing this.

If it is economically practical to hand-thin olives, this practice may overcome

the alternate bearing habit as well as result in larger-sized fruits. It is possible that the thinning may only have to be done once in order to bring the trees out of the alternate-bearing cycle—at least for a time.

The second—and most common—situation composing the nonbearing problem in olives is typified by the orchard which has a heavy bloom every year, but with the blossoms dropping off and leaving little or no fruit.

This may continue for several years then, due to favorable weather or other unknown factors, a good crop will be set.

Observation has shown that olive trees which bloom heavily but produce no fruits are merely forming the *staminate*, or male, flowers which only produce pollen, then drop. The other flower type formed by the olive is the so-called, perfect flower, having—in addition to the pollen-producing anthers—the female part, the pistil, which develops into the olive fruit. Unless substantial numbers of this flower type are formed the crop will be light.

In the olive the flower parts are dif-

ferentiated, or initiated, during the spring, about eight weeks preceding bloom. It is believed that the excessive production of staminate flowers, with the simultaneous lack of perfect flowers, is due to the failure of the female part of the flowers to develop normally from the time it is formed in March, until the blooming period. This could be due, among other things, to a deficiency of carbohydrates available to the developing flowers at certain critical times in the spring. Carbohydrates—such as sugars, starch and cellulose—are utilized by living plants as a source of energy and as components for certain parts of the cell structure. Carbohydrates are manufactured in the leaves by the process of photosynthesis which occurs in the presence of sunlight, together with carbon dioxide in the air.

In the olive, which is an evergreen, photosynthesis continues throughout the year. Normally, after carbohydrates are manufactured in the leaves, all those in excess of the amount needed for the current metabolic activity in the upper portion of the tree are translocated to the large branches, trunk, and roots where they are stored in certain tissues. This translocation of carbohydrates takes place in the phloem tissue—the bark.

By the process of ringing, or girdling, in which a narrow strip of bark is removed from the trunk or branch, the normal downward movement of carbohydrates is stopped for a period of time until the girdling wound has healed. During this time, if leaves are on the tree, photosynthesis will, of course, continue and the carbohydrate level in the top of the tree will build up to a higher point than it would be in nongirdled branches.

If a deficiency of carbohydrates is responsible for the failure of the pistil in the olive flower to develop normally then girdling done at the proper time should cause the formation of a higher percentage of perfect flowers. This should result in a higher yield of fruits per tree.

Continued on page 15



Girdling cut on young Mission olive tree before being covered with grafting compound. Cut is  $\frac{1}{4}$  inch wide with the bark completely removed down to the wood.

## OLIVES

Continued from page 4

Girdling plots were established with Sevillano olives in Tulare County during the 1948 season with girdling done at three different times.

Five trees were girdled on November 13, 1947, five on December 17, 1947 and five on February 3, 1948.

The trees used were relatively large and had a history of nonbearing, but with flower production, for the previous four or five years.

**Effect of Girdling on Olive Yields. Pounds of Fruit Per Tree  
Sevillano Variety—Lindsay, California, 1948**

Date girdled	Tree number					Total	Average yield per tree	Per cent increase over check
	1	2	3	4	5			
Nov. 13, 1947	329	310	438	256	183	1516	303	98
Dec. 17, 1947	328	402	292	329	365	1716	343	124
Feb. 3, 1948	548	329	438	365	256	1936	387	153
Check	127	37	256	164	182	766	153	.....

The girdling operation consisted of the removal of a strip of bark about  $\frac{1}{4}$  inch wide completely around the primary branches. The cuts were immediately covered with an asphalt emulsion grafting wax.

The best method yet used for making the girdling cuts is with an ordinary grape girdling knife. It is very important in making the girdling cut to completely remove the bark down to the wood or the desired results are not likely to be obtained.

Two small branches on each tree were not girdled; they were left for the purpose of supplying the roots with some carbohydrates until the girdling cuts healed, which took about eight weeks.

ary 3rd had the highest yields, an increase of 153% over the nongirdled trees.

A composite fruit sample from the three girdled plots was compared with a fruit sample from the nongirdled trees. Little difference was seen except in the cull grade which is in favor of the girdled trees.

No detrimental effects have been noted in the appearance of the girdled trees at any time during the year since the girdling was done.

The results from the Tulare County test plot are encouraging but the work so

far is of a preliminary nature. More experimental plots are necessary to see if such results can be obtained consistently and to determine the long-time effect on the trees.

If girdling proves to be a reliable method of obtaining fruit set in olives it probably will be of the most value in securing crops from orchards which have a history of failing to set fruit although they bloom heavily.

Girdling should not be attempted in orchards which are infected with olive knot until reliable methods of disinfecting the cuts can be demonstrated so as to prevent the entrance of the olive knot bacteria.

Trials are under way to test various

**Effect of Girdling on Size of Fruit. Sevillano Variety. Lindsay, California, 1948**

	Size Grades							
	Super colossal	Colossal	Jumbo	Giant	Mammoth	Extra large	Large	Culls
Girdled	6.8%	24.3%	21.6%	20.3%	12.2%	9.5%	2.7%	2.7%
Check	7.7	23.6	21.0	15.0	11.5	5.8	2.3	13.0

The dates on which the girdling was done were selected with the idea that the desired accumulation of carbohydrates in the tops of the trees should occur just preceding or coincident with the development of the flowers which are initiated about March 15th.

Previous girdling tests with olives in 1946 and 1947 in which the girdling was done at the blooming period, in May, failed to show any beneficial results.

Increased yields, which were statistically significant, were obtained in all the girdled plots. The trees girdled on Febru-

methods of disinfecting the girdling cuts. Further girdling plots have been established for the 1949 season at Lindsay, Madera, Winters, Oroville, Palermo, Orland, and Corning.

These trials are designed to give more information as to the optimum time for the girdling to be done; and more rapid methods of making the cuts.

H. T. Hartmann is Assistant Professor of Pomology and Assistant Pomologist in the Experiment Station, Davis.

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## NEW BLACKBERRY

Continued from preceding page

The Thornless Oregon Evergreen—Thornless Himalaya—developed as a bud mutation of the Oregon Evergreen. It was introduced in 1946.

In the interior valley the berries are small, production is light, and the picking season begins in the latter part of June and continues until August. In the central coast region the berries are small to medium in size, production is fair, and the picking usually does not begin until the first or second week of July and extends throughout the fall months.

The flavor is pleasing but distinctly different from that of other blackberries. Typically it has a slightly sweet taste and a musty-like aroma. The flavor is not good enough to justify the inclusion of this variety in home garden plantings.

### Alfred

The Alfred variety is a vigorous blackberry and is the best of the erect types which have been tested by the University. The berries are medium to large and attractive in appearance. The flavor is fair to good.

In the central coast area the picking season continues from June to October. Production has been too light for commercial purposes. However, this variety may be suitable for home garden plantings.

Richard E. Baker is Assistant Professor of Pomology and Assistant Pomologist in the Experiment Station, Davis.

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Carl Muller and George Murphy first reported the discovery of the Boysen variety shiny type, in their planting near Denair in 1947.

## ORNAMENTALS

Continued from page 13

showed distortion and serious leaf and flower burns. Several gynura and grape ivy plants showed peculiar distortion.

Several ivy plants, azaleas, and one potted phoenix palm showed no injury when sprayed with 25% DMC emulsion at a rate of two quarts per 100 gallons of water. A small plant each of *Ficus repens* and asparagus fern showed serious leaf and tip burn. Of 27 potted fuchsias treated, one variety was killed while the others showed serious leaf burn, defoliation, and stem brittleness.

A. Earl Pritchard is Assistant Professor of Entomology and Assistant Entomologist in the Experiment Station, Berkeley.

Robert E. Beer is Research Assistant, Division of Entomology and Parasitology, in the Experiment Station, Berkeley.

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