Pistil Abortion of the Olive

experiments with Mission olives indicate loss of leaves may be one cause of poor flower development

K. Uriu

Loss of leaves in olive trees decreases the number of perfect flowers and therefore may lower production since imperfect flowers cannot set fruit.

A perfect flower has well-developed stamens and a normal pistil at the time of bloom. An imperfect flower, although it may have normal stamens, has an aborted pistil—that is, one that has stopped growing sometime before full bloom.

One factor influencing pistil abortion in the olive is leaf-bud ratio—the number of leaves present for each inflorescence bud. If there is a reduction in the number of leaves, poor development of the olive flowers can be expected, and with further loss of leaves, the number of aborted pistils increase.

In experiments conducted over a number of years with Mission olives at Davis and Winters, certain leaf-to-bud ratios were created on the fruiting twigs of the olive. This was done by removing either leaves or buds.

In 1950, four trees were selected for uniformity in size and vigor, and individual fruiting twigs were tagged. The tagged twigs were treated as follows: *1,* check—no treatment; *2,* alternate leaves removed; *3,* all leaves removed; *4,* alternate buds removed; *5,* three fourths of the buds removed—every fourth bud left intact.

The Effect of Defoliation and Disbudding on Production of Perfect Flowers—1950

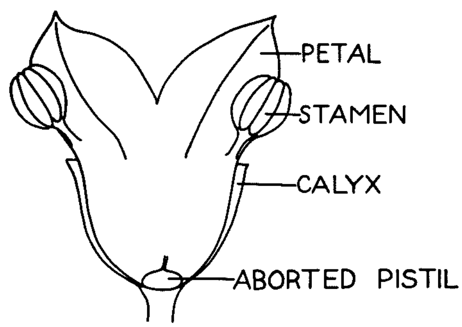
Plant part removed	Amount removed from twig	Total number flowers	Number perfect flowers	Per cent perfect flowers
Leaves	all	1496	159	11
Leaves	½	1459	243	17
None (check)		1998	637	32
Inflorescence buds	½	783	368	47
Inflorescence buds	¾	601	386	64

The Effect of Leaf Area Reduction on Production of Perfect Flowers—1951

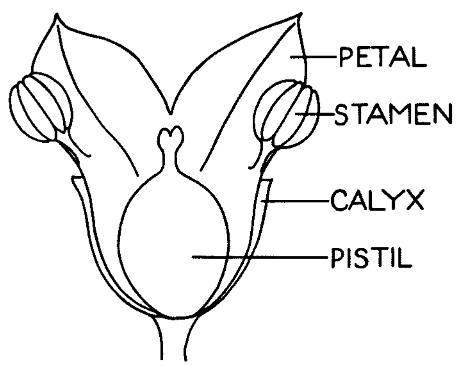
Approximate % of leaf area removed from each leaf	Total number flowers	Number perfect flowers	Per cent perfect flowers
None	2801	766	27
50	2590	663	25
90	2402	306	12
100	1607	136	8

All five treatments were grouped on a small branch. Twenty such branches, all on the south side of the trees, were used; thus, each treatment was replicated twenty times.

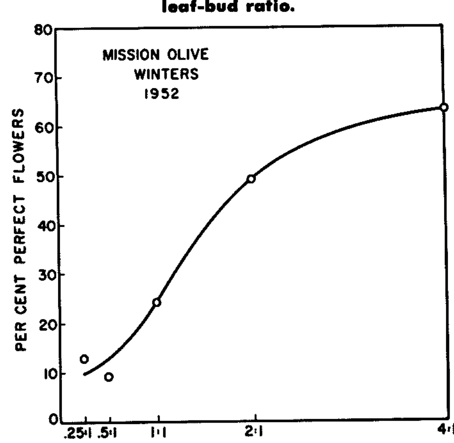
The treatments were made in February, and the flower counts were made in May at full bloom. As shown in the upper table in column 1, both the total number of flowers and the flowers with normal pistils were counted and recorded.



Diagrammatic outlines of olive flowers showing normal and aborted pistils. *Above:* flower with aborted pistil. *Below:* flower with normal pistil.



The production of perfect flowers as affected by leaf-bud ratio.



In the second experiment in 1951, instead of removing a given number of whole leaves, the leaf area was reduced to the desired size by cutting a portion of the blade from each leaf on the fruiting twigs.

The shoots used were all on one large branch on the southeast side of a tree. The selected twigs were tagged in numerical order and the different leaf area treatments given consecutively. Each treatment was given and replicated ten times on March 12 and the flowers were counted at full bloom on May 19. The treatments and results are shown in the lower table in column 1.

In 1952, the study was altered somewhat to permit a comparison of the results in terms of leaf-bud ratios.

All the selected twigs were on one large, southwest branch of a tree. From each of these twigs all the leaves and buds below the eighth node were removed, leaving only sixteen leaves and sixteen buds on the terminal portion of the stem. Leaves and buds were then removed in varying proportions to produce the desired leaf-bud ratios. Fifteen twigs were used for each ratio and treated on March 4. The flower count was made on May 22, 1952. The results are listed in the table in column 3 and are shown in the graph.

In each of the three years, as the leaf area available for the development of each inflorescence decreased, there was a progressive decrease in the per cent of perfect flowers. In every case the removal of leaves resulted in a reduction—below the check—in the number of perfect flowers, and usually the reduction was greater as more leaves were removed. In 1950, for example, the per cent of per-

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The Effect of Leaf-bud Ratio on Production of Perfect Flowers—1952

Number left on twig: Leaves	Number left on twig: Buds	Resulting leaf-bud ratio	Total No. flowers	No. perfect flowers	% perfect flowers
16	4	4:1	466	294	63
16	8	2:1	940	461	49
16	16	1:1	1629	394	24
8	16	½:1	1539	140	9
4	16	¼:1	1338	176	13

OLIVE

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fect flowers was reduced from 32% in the check to 17% by removing half of the leaves and to 11% by complete defoliation. On the other hand, the removal of potential inflorescences months before bloom resulted in a substantial increase in perfect flowers in the remaining buds. In 1952, where there were four leaves to each bud, the per cent of perfect flowers was as high as 63%, as compared with 24% where there was only one leaf for each inflorescence.

Although complete defoliation considerably reduced the per cent of perfect flowers, some normal ones still developed. Apparently this was because the reserve materials stored in stems and branches were translocated and utilized in the development of the flowers. However, if there are leaves nearby, they contribute toward even better development of the pistil, and this beneficial effect is increased as the number of leaves increase.

The experiments at Davis indicate that cultural practices—such as shading from overcrowding, nutrient deficiencies, or disease conditions such as peacock spot — *Cycloconium oleaginum* — that tend to cause loss of leaves and therefore a decrease in the number of perfect flowers should be avoided. Whereas, if cultural practices are directed toward the retention of as many healthy leaves as possible, a higher proportion of perfect flowers—and thus a greater fruit set—can be expected.

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DEER

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cated starvation or to starvation brought on by the deterioration of their teeth.

The sex ratio of fawns at birth was determined from a sample of fetuses to be 11 males to eight females, giving a ratio of 137.5 males to 100 females. Even though the sample was small, it was considered fairly indicative.

However, during the die-off in the exceptionally severe winter of 1951–52, early and midwinter fawn losses ran to nearly 400 males to 100 females, but later in the winter more females died to bring the over-winter average to 210 males to 100 females.

The winter of 1951–52 had a high rate of rainfall, low temperatures and heavy parasite infections. During the three subsequent winters, conditions were generally milder, with the exception of the 1954–55 winter which was cold but with little rainfall. The average sex ratio of the fawn losses from natural causes for these three winters was 100 males to 100 females, which indicates that fundamental differences appear to mitigate variously against the sexes, depending on environmental circumstances.

In general, it is evident that under the conditions encountered at Hopland, parasites can contribute significantly to losses of fawns during their first winter and, to a lesser extent, to the losses of yearlings during their second summer. Few older deer carry sufficient number of worms to be affected. Likewise, the magnitude of losses involving parasitism can be increased by severe weather and overstocked conditions.

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AIR POLLUTANTS

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of unfumigated trees was 9⅛″ with an average increase in diameter of 0.16″. Although the stem diameter in the fumigated trees was significantly smaller than in the unfumigated ones, there was no real difference in the height of the two sets of trees.

Reduced growth in the Mexican seedlings has been caused in six months by exposure to ozonated gasoline. Because the effects produced by controlled air pollution are usually indistinguishable from those caused by natural pollution, growth reduction in field-grown trees may be expected. Field tests are scheduled to determine the effects of pollution on growth and production of commercial avocado varieties.

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The above progress report is based on Research Project No. 1633.

WALNUT

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pean red mite became noticeable on July 29. Controlling the pest at this time did not appear to greatly influence the quality of the crop at harvest. Regardless of mite control, better quality was obtained from OMPA treatments than from the plot treated with Systox. The same situation held in orchard *B* where plots treated with OMPA produced better quality nuts than the Systox plot.

Serious spider mite populations have failed to develop where Systox has been used in the spring to control the walnut aphid. However, its direct use to control spider mite infestations in late season is in need of further investigation. This is particularly true in regard to the dosage required.

OMPA applied in the spring to control the walnut aphid has in all cases resulted in excellent control of the Pacific spider mite. This has not proved to be the case in regard to the European red mite, and threatening populations of this species have developed where OMPA has been used.

Serious spider mite populations are not likely to develop before August. Where it is apparent that natural enemies will not take care of the situation, control measures should be applied. Adequate control of the Pacific spider mite with conventional sprayers has been obtained where 15% wettable aramite powder was used at the rate of 1.5 pounds per 100 gallons of water and applied as a thorough coverage spray.

Control of the Pacific spider mite should result from treatment by air carrier sprayers with 12 to 14 pounds of aramite 15% wettable powder applied in from 400 to 500 gallons of water per acre. For the control of the European red mite, the aramite wettable powder should be increased to two pounds per 100 gallons where applications are made with conventional sprayers. With air carrier sprayers the amount should be increased to 15 to 18 pounds per acre. In all cases, satisfactory control of spider mites is dependent upon thorough coverage.

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The above progress report is based on Research Project No. 1314.

MAPPING

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attention to watering. Preplanting fumigation or change of rootstock may also be indicated.

The relatively high incidence of B condition trees points toward root trouble and suggests further investigation of cultural and irrigation practices as they affect root health.

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