

POLLINATION OF FEIJOAS

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One hundred and twenty seedling shrubs of the new fruit, the Feijoa, were planted by the Homestead in 1917. During that year and the two following years several shrubs each of all the obtainable grafted varieties were also planted. The seedling Feijoa crop here now amounts to an average of about 30 lbs. per plant, a total of about 4000 lbs., or at the rate of over 10,000 lbs. per acre. The plants have apparently not yet reached their maximum production. Results and tests have proven that the size and quality of the fruits, and—if pollination is not lacking—the quantity of the crop depends on good irrigation and good soil fertility. However, excessive irrigation and soil fertilization when given have produced fruits lacking in sweetness. The greater part of the crop is eaten fresh out-of-hand, and the best of jams and jellies are made from the remainder.

It is evident that the good crops produced are due in part to the location of a small apiary not far away. During six years of observation honey bees are the only insects that have been seen visiting the handsome flowers of the Feijoa. Even bees visit Feijoa flowers less than they do the flowers of most of the many fruits observed. The infrequency of the visits of bees is due to the fact that they gather no nectar, but only pollen from these flowers. It is evident that the greater the number of bees located near Feijoas, the better, as the scarcity of pollen-carrying insects has been proven here by observation and by pollination experiments to be an important and probably in most cases the chief factor limiting productiveness. The observation of bees on Feijoas, as also on other plants, indicates that small isolated Feijoa Plants having only a few flowers may fail to attract the attention of bees, whereas a greater number of flowers similarly located may attract their attention. This evidently is a cause of the sterility of some isolated plants.

When their abundant pollen is shaken from Feijoa flowers it can be seen to float slowly downward, reaching the ground not more than a few feet from the plant. Our experiments have proven that air-borne pollen produces some, but not many fruits. A much greater number of fruits results from the visits of bees. Parts of two large seedling plants were covered with mosquito netting, excluding all pollen-carrying insects. These two plants are close together, with much of their foliage interlacing. The interlaced parts of these two plants were enclosed together in one netting, thus the covered flowers had the best opportunity for air-borne cross-pollination. If air-borne pollination alone were considered, the enclosed flowers would have received as much cross-pollination as the unenclosed parts of these same plants. The great number of flowers (4870) on these two plants made conditions unusually favorable for the effectiveness of air-borne pollen. But only 9% of the covered flowers produced fruits, showing the limited effectiveness of air-borne pollen. On the parts of these same plants not covered by netting and open to the visits of bees 40% of the flowers produced fruits.

During three successive years, hand-pollinations were made on several grafted

varieties. Both cross-pollinations and self-pollinations were made. The pollinated flowers were emasculated, bagged, tagged, and records kept. In all cases hand cross-pollination proved practically 100% productive. On leading grafted varieties pollination with pollen from flowers of the same grafted variety gave the following results: Superba proved 33% self-fertile, Choiceana 42% self-fertile, and Coolidge 100% self-fertile. Coolidge was the only variety that was found not to need cross-pollination.

We have been informed by Professor Ryerson that he and Dr. Popenoe, working separately, found that sterile seedling Feijoa plants responded favorably to hand cross-pollinations. La Rue informs us that two sterile seedling plants responded favorably to self or close-pollination by hand, from which it is evident that their sterility was due to the lack of bees. The effectiveness of hand-pollinations proves that insufficient pollination is a chief factor limiting productiveness. A Coolidge plant had 1669 flowers which were pollinated only by bees or other natural means or which failed to get pollinated. Of these, 48% produced fruits. Of hand self-pollinated flowers on the same plant 100% the efficacy of a greater number of pollinations.

From our observations of the insufficient work of bees on Feijoas and also produced fruits. Similar results were obtained on several other plants, showing of the tendency of bees to limit their work to one tree at a time unless the tree is interlaced with others, it is unmistakably evident that varieties requiring cross-pollination should be planted very close together to promote the greatest possible number of cross-pollinations. For this purpose they should be planted so that when of bearing age the foliage of plants of different varieties will interlace. If plants interlace, pollen, whether carried by the air or by bees reaches the flowers of other plants much more often than if plants are not so close together. Such close planting is not necessary for the Coolidge, or any other variety which may be proven self-fertile.

At Point Loma, the Coolidge has been found to be the most productive, and to have the largest and best quality fruits. Coolidge fruits 4 inches in length and weighing 4 oz. each have not been uncommon here. We do not know whether this variety will prove superior elsewhere. The Coolidge has also proven to remain in the best edible condition a longer time than other grafted varieties or seedlings. The quality of the grafted varieties is so superior to the seedlings that, in comparison, the seedlings are not worth growing. A number of grafted, and layered, and aerial-layered Feijoa plants have been propagated in this orchard, and it is planned to replace seedlings with an improved variety.

The fact that seedling Feijoa plants are so variable, differing from each other greatly in size, and quality of fruits produced, gives reason to believe that in time other superior varieties will be found or will be produced by some of the advanced horticulturists interested in this fragrant and piquant fruit.

The United States Acclimatization Gardens at Torrey Pines, San Diego, obtained here tip cuttings of the Coolidge for rooting under glass with solar heat. (See footnote.) Should this prove practicable it would make easy the propagation of choice Feijoa varieties. At Point Loma Feijoas are the freest of all fruits from pests and diseases, and this large ornamental evergreen shrub is one of the easiest of fruit producing plants to care for.

This method is described in U. S. D. A. Circular 310: "The Solar Propagating Frame for Rooting Citrus and other Subtropical Plants."