

Pollination—Why Orchards Don't Bear

(By Wm. B. Hoag, Sutherlin.)



WHILE many orchard planters have been very successful in planting and growing beautiful orchards of large, vigorous healthy trees, and have spent money and labor on them from eight to ten years, they have with only disappointment at last in the discovery that they have produced nothing but a lovely landscape instead of a profitable orchard. Every spring these trees adorn themselves in the most gorgeous dresses of pink and white, truly a scene for the artist to copy, but after the last sweet-scented petal has fallen the only thing that remains to cheer the heart of the would-be fruit grower is a luxuriant growth of leaves—and another long year to wait for the picture to be repeated.

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Throughout all the higher orders of plant life, there exists the two sexes, male and female, the same as is found in animal life; but differing more or less in detail. In all plants the distinction of sex is found in the blossom. In some plants, both male and female organs (stamens and pistils) are found in the same blossoms, as we find them in apples, pears, peaches, prunes, some varieties of strawberries, etc. In other plants they are separated, being different blossoms on the same plant, as in all kinds of melons, squashes, cucumbers, tomatoes, corn, etc. and in still other plants, they are found separated on different individual plants, as in the mulberries, date palm, and certain other varieties of strawberries.

To produce fruit it is absolutely necessary for the pollen which is the fertilizing element produced on the stamens of the blossom to be transferred to the pistil of the blossom. This transfer, known as pollination, is accomplished in various ways.

Nearly all the edible nuts of North America, such as the walnut, butternut, hickory, pecan, chestnut, filbert and others, are pollinated almost entirely by the agency of the wind, also the grasses (Gramineae), including the common cereals, corn, wheat, barley, rye, rice, oats, and sorghum, and millet are all wind-pollinated. Several widely cultivated garden and forage plants are pollinated mostly by wild insects. Red clover is pollinated almost entirely by bumble bees. In New Zealand clover seed could not be produced until bumble bees were imported there, of which three species were taken from England. Since that importation, hundreds of tons of clover seed have been produced there without any trouble. Thus we see the usefulness of that "abominable bumble bee."

But in the production of our common orchard fruits, including apples, pears, peaches, cherries, prunes, and plums, the faithful busy little honey

bee is the most important visitor to our trees, of all other insects and wind combined. Wild bees, beetles, flies, butterflies, moths, sawflies, and wasps are all more or less useful agents in pollination; and in wild or thinly settled regions, and in small orchards, their work of pollination may be quite satisfactory. But many of these wild insects injure the fruit and trees in various ways, and so do more harm than good, and therefore in the largest plantings they are kept to closely limited numbers by spraying. Also the nests of the wild bees are more or less destroyed by intensive cultivation, therefore they cannot be relied upon in extensive fruit plantations.

Various experiments have been made to test the value of the honey bee as compared with that of the wind for pollinating purposes. In one experiment by the Oregon Experiment Station, a seven year old apple tree was selected. From 1500 blossoms on this tree all the petals were removed in order that they might not attract insects. Only eight bees were ever seen to visit these flowers, while another tree 20 feet away, which bloomed profusely, received forty visits from bees in only half an hour. This tree bore a crop of fruit, while on the tree with the clipped petals, only 5 blossoms set fruit. Evidently the wind did not pollinate a single blossom.

In the Santa Clara valley, Calif., an experiment was made on French and Imperial prunes. Two trees of each variety as nearly alike as possible were selected in pairs, and covered during the blooming period, by mosquito bar tent, 40 by 25 feet and 16 feet high. A hive of bees was placed under one tent, and kept there five days. All insects were excluded from the second tent. The bees worked contentedly in the tent but seemed to prefer the flowers of the French prune to those of the Imperial. The result was that the French prune under the tent with the bees, set a much heavier crop than any of the best trees exposed to normal conditions; while the French prune under

the other tent with no bees, set a very light crop.

One or two such experiments would really prove nothing beyond a mere hypothesis, but similar experiments have been repeated many times, and almost invariably result in favor of the honey bee.

At different times when practically all the entire blooming period has been affected by cold, rainy weather in which the bees could not work, the writer has observed a scarcity of fruit. Many times only one or two small branches are heavily loaded, while there is no other fruit on the entire tree, this being the result of the work of possibly only one or two bees who ventured out during a few minutes of sunshine.

However, the lack of bees does not account for failure to set fruit where climatic conditions are favorable and bees are plentiful.

Going back to the principle of sex and breeding in animal life, it is a well known fact to all successful animal breeders that the best results are seldom attained by "inbreeding," or breeding back to parentage. In a certain way not fully understood, this same law of nature seems to govern plant life to such an extent that certain varieties are said to be self-sterile. They will not become fertilized by the pollen of their own variety, nor in many cases by the pollen of a closely related variety.

Examples of this kind are found in the sweet cherries. Bing, Lambert and Royal Ann are practically both self-sterile and inter-sterile—they will not successfully fertilize each other; but any of these varieties are readily fertilized by Black Republican, Black Tartarian, Waterhouse, Centennial, Governor Wood or Norma. The Norma is thought by some to be a better commercial variety than any of the other named pollinizers.

In Waite's experiment on pears, he tested 35 varieties, of which over half were found to be self-sterile, including Anjou, Bartlett, Clapp's Favorite, Howell, Lawrence and Winter Nelis. Bosc, Huffum, and Flemish Beauty were found to be self-fertile; but all self-fertilized pears were found to be smaller and less perfect than those produced by crossing. He visited a certain orchard of 22,000 standard Bartlett pear trees, 18 years old. This orchard had never borne a full crop. The maximum crop was three-fifths of a peck per tree although the trees always bloomed heavily. In three places where the trees had died, the places had been refilled by mistake with one Buffum and two Clapp's Favorites. In the vicinity of all three of these trees the Bartletts fruited heavily.

In Douglas Co., Oregon, we find the Comice is a very unprofitable pear. Orchards 12 to 14 years old have never borne a crop, even with other varieties like Bartlett, Anjou, and Howell planted with them. The real trouble in this particular case, apparently has not been fully worked out yet, and many of the growers are cutting back their Comice trees and top grafting them with Bartlett or Bosc, thus avoiding the total loss of their orchard.

Most all of our plums, especially the native American varieties are self-sterile; therefore to insure best results different varieties should be planted together. And in general it has been found that different varieties of the same group, as American, European, or Japan, will fertilize each other better than varieties belonging to different groups.

One cold, rainy spring in Mass., a hive of bees was placed in a small block of peach trees, where the bees could easily reach all the trees. This orchard set all the peaches the trees could carry, while other peach orchards farther away, that bloomed heavily, but had no bees, produced nothing.

Of 87 varieties of apples tested by Lewis and Vincent in Oregon, 59 were found to be self-sterile, including King, Wealthy, and Winesap. Fifteen were self-fertile, including Yellow Newtown, and 13 were partially self-sterile including Spitzenburg, and Stark's Delicious.

In planting apples in Oregon it has been the practice to plant two rows of one variety and the next two rows of another variety for pollinating. In planting for pollinizers, care should be used to select varieties that bloom at the same time. There the varieties selected for pollinizers are not as good for commercial purposes, as in the case of cherries, it is not wise to plant more of them than is necessary. About one pollinizer to every nine trees is generally considered sufficient.

Where orchards have been grown to bearing age with the pollinizers left out, it is then best to graft in a sufficient number of pollinizers in the branches scattered through the orchard.

In conclusion we can say that the pollination of cultivated fruits can be controlled with certainty only by the aid of honey bees. Albert Repp, of Repp Bros., owners of an 800-acre fruit farm of Gloucester, N. Y., says: "I could not do without bees. I never take a pound of their honey. All I want them to do is to pollinate the blossoms. I'd as soon think of managing this orchard without a single spray-pump as to be without bees. I've got fifty colonies now and I am building up the Apiary each year."

Written by Wm. B. Hoag, B. Agr., from Missouri University, Sutherlin, Oregon.

The Practical Side.

He had duly proposed and been accepted and the engagement sealed with a kiss, a number of them, in fact. Then, as they sat on the sofa, he ventured to discuss more prosaic matters.

"The little question, dearest."

"Yes," she replied expectantly.

"Can you cook?" he asked earnestly.

"Why, no."

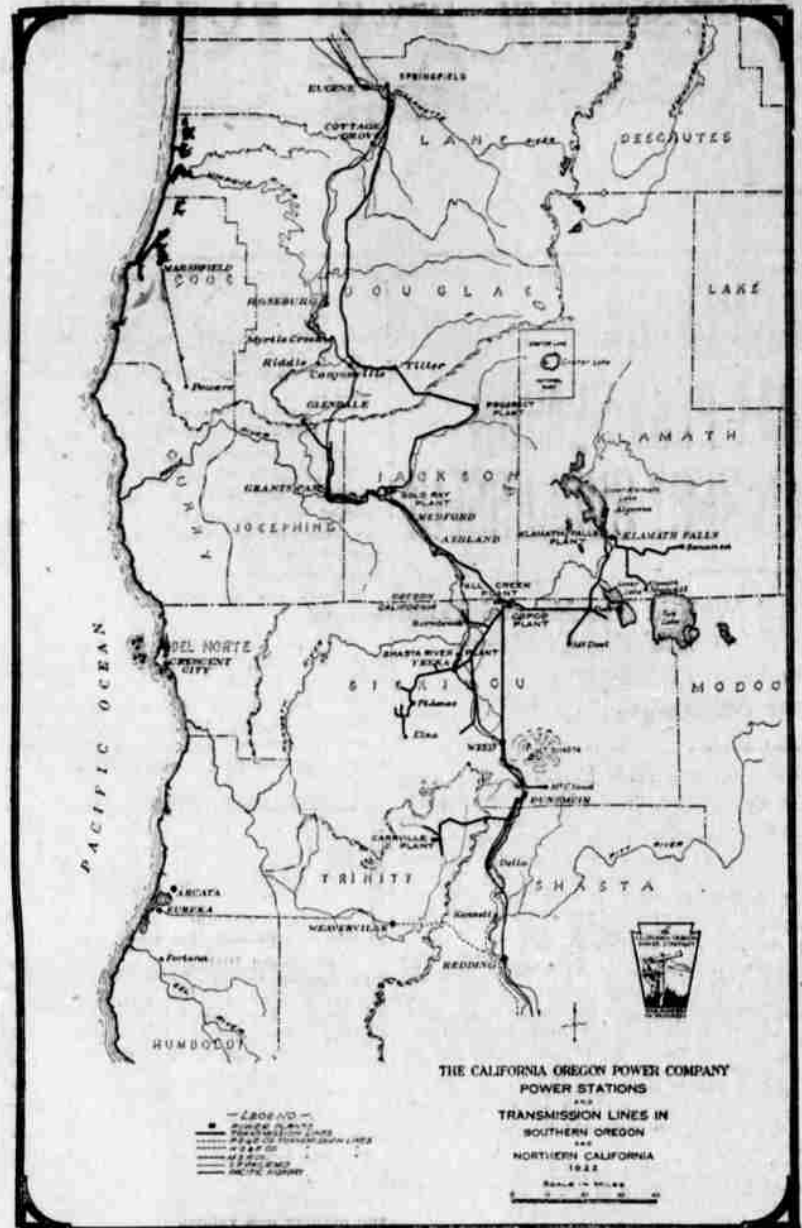
"Then how will we eat?"

"Oh, George, aren't you going to continue to bring me bonbons?"

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