

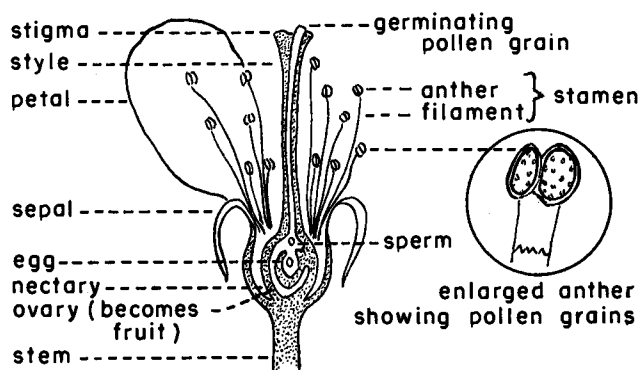
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Sweet Cherry Pollination in Oregon

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Longitudinal section of a sweet cherry flower showing male (anthers, pollen) and female (stigma, style, ovary) flower parts and portions that will form the fruit.

A knowledge of the flower parts and their functions and of the terms used to describe the process of pollination and fruit set is essential to an understanding of pollination problems of sweet cherries. Here are some of the terms and definitions:

Pollination: The transfer of pollen to the stigma.

Cross pollination: The transfer of pollen from the anthers of a flower of one variety to the stigma of a flower of a different variety.

Fertilization: The union of the male germ cell, contained in the pollen tube, with the female germ cell, or egg, in the ovule.

Self-unfruitful: A variety which is unstable to set and mature a commercial crop of fruit with its own pollen.

Intercompatible: The pollen produced by either variety of a combination is capable of functioning in the styles and fertilizing the ovules of the other variety.

Interincompatible: Varieties A and B are unfruitful when pollinated by each other because the pollen, although it is viable, is unable to develop sufficiently to effect fertilization. Either variety may be an effective pollinizer for some other varieties.

All sweet cherry varieties are self-unfruitful and must be cross-pollinated for satisfactory yields. Some variety combinations are interincompatible and will not produce crops when planted together unless other effective pollinizing varieties are provided. Royal Ann (Napoleon), Bing, and Lambert are interincompatible as are some other combinations of varieties. However, all varieties produce viable pollen.

Pollinizers for Royal Ann. Although several newer varieties are being tested, Corum, Black Republican, Hoskins, Van, and Mazzard seedlings are the pollinizers most commonly used for Royal Ann in Oregon

at present. These varieties are intercompatible with Royal Ann. Most seedlings bloom too early to effect pollination. Black Republican blooms before Royal Ann, and in some years is in full bloom before the first 10% of the Royal Ann bloom has opened. Usually, however, there is enough overlap in the blooming periods of the two varieties for a satisfactory fruit set. The fruits of Black Republican are purplish-black and medium in size, ranging from $\frac{5}{8}$ to $\frac{3}{4}$ inch in diameter. The crop on a given tree often ripens unevenly. It is rated as an inferior variety for canning and brining. In dry unirrigated orchards, the fruit is often small with a bitter flavor. Thus, although it is a good pollinizer in most years, the fruit quality is frequently not satisfactory. As production of Royal Ann increases, the black-fruited pollinizer varieties will become less marketable for brining.

At least one strain of the Hoskins variety seems to be a fairly good pollinizer and is acceptable for brining. However, it often blooms too late, and the trees have shown a tendency to mature their fruit unevenly which has made it difficult to pick at the proper stage of maturity.

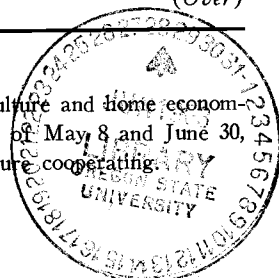
Mazzard seedlings can be used as pollinizers, but the fruit is unsalable. However, not all Mazzard seedlings will pollinize Royal Ann, since blooming periods do not overlap sufficiently.

The value of Corum as an effective and reliable pollinizer under orchard conditions over a period of many years has not been thoroughly proven. However, observations made so far indicate that Corum is an excellent pollinizer variety for Royal Ann. Many Corum trees have been planted in recent years. The full-bloom periods of Corum and Black Republican are nearly the same, but with Corum there appear to be more blossoms which open late during the peak-bloom period of Royal Ann. There are two commercial orchards of bearing age near Eugene in which Corum has been planted, and its performance as a pollinizer has been satisfactory to date. The fruit is moderately large, light colored, and closely resembles Royal Ann. It has been rated very high in canning and brining tests. Corum ripens six to seven days before Royal Ann. Therefore, it would be helpful to mark the Corum pollinizer trees so that pickers will harvest them before Royal Ann. The Corum tree appears to be less susceptible to bacterial canker (gummosis) than most other cherry varieties. It is the only variety which we can recommend as a pollinizer for Royal Ann at present.

(Over)



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The full-bloom period of Van coincides well with that of Royal Ann, and it is an excellent pollinizer for that variety. It is a black cherry that ranks high for canning. However, the fruit set on mature Van trees is usually so heavy that the fruits are smaller than Bing and Royal Ann. Furthermore, the tree is very susceptible to bacterial canker in Oregon.

Pollinizers for Bing. The most commonly grown pollinizers for Bing are Black Republican, Van, and Corum. In some years Black Republican blooms too early to be a completely effective pollinizer for Bing. The full-bloom period of Van coincides well with that of Bing, and it is an excellent pollinizer for that variety. Its fruit can be sold fresh or for canning. Corum is an excellent pollinizer for Bing, but, since it is a light-colored variety, its principal use is for brining.

Pollinizers for Lambert. The most commonly grown pollinizers for Lambert are Waterhouse, Hoskins, and Sam. Sometimes Black Republican and Van are grown as pollinizers for Lambert, but they usually bloom too early to be effective. The full-bloom period of Waterhouse coincides closely with that of Lambert. Its fruit is light in color and resembles Royal Ann, except that it is soft and has a large seed. It is not a desirable variety for canning or brining, and is planted only because it is a late-blooming pollinizer for Lambert.

The full-bloom period of Hoskins is earlier than that of Lambert, but it usually overlaps sufficiently to make pollination possible.

Sam is currently recommended as the best pollinizer for Lambert. The fruit is black and nearly as large as Bing and Lambert. It is rated low in brining quality due to a coarse texture; however, it is satisfactory for canning. Its peak bloom comes slightly before that of Lambert.

Number and Placement of Pollinizers

The number and placement of pollinizers required for optimum pollination is largely determined by the foraging habits of the honey bees which carry the pollen. Wind plays little or no part in sweet-cherry pollination. A single bee usually only works one side of one tree and sometimes part of an adjacent tree in a single trip from the hive.

The heavier set on the part of a tree nearest a pollinizer, or to a "bouquet," suggests that a bee arriving on a main variety tree from pollinizer flowers pollinates only the first few flowers it visits. Presumably the pollinizer pollen on its head and body is soon greatly diluted with main-variety pollen or transferred to its corbiculae (pollen sacs). Thus, knowing the habits of the honey bees, one can appreciate the need for pollinizer trees in close proximity to the main variety.

The optimum arrangement for maximum pollination is *every other tree in every row* a pollinizer. All other arrangements are compromises for convenience

of harvesting, or are made because the pollinizer varieties are less valuable. *Every other tree in every other row* a pollinizer provides nearly maximum cross pollination, but the scheme includes too many pollinizer trees to be practical unless the fruit from them is salable. Even fewer pollinizers are often used where the weather for pollination is usually good. A system where every third tree in every third row is a pollinizer places a pollinizer next to every tree of the main variety at least on the diagonal and allows for a minimum number of pollinizers.

In orchards where there are not enough pollinizers, a pollinizer variety is sometimes grafted into a limb of a tree of the main variety. To avoid the risk of spreading viruses, only virus-free scion wood should be used. Black Republican OC4 (R533), Van OC5 (V543), Sam OC14 (S542), and Corum (OC12) are free of known viruses. When pollinizers are grafted into the main variety, pickers frequently mix the two together. The grafts must grow for three or four years before they will furnish enough blossoms for cross-pollination.

A temporary source of pollen can be obtained by placement of large bouquets of flowers taken from suitable pollinizing varieties. A deep water bucket of blossoming branches for each tree hung on the leeward side has been found to be adequate.

Placement and Care of Bees

The honey bee is admirably designed for the job of pollen carrier, for its body is covered with hairs which make it a veritable pollen duster. Its existence depends wholly upon the plants' pollen and nectar.

The need for pollinizers and for more bees increases when cool, cloudy, windy, and rainy weather occurs during the blossoming period. Usually honey bees do not fly in rainy weather. When bees fly long distances, they use the position of the sun to guide them to and from the hive. In cloudy weather they do not fly as far from the hive.

During the bloom period, the grower should provide at least one strong hive for each acre of fruit to be cross-pollinated. Without handling the bees, growers must observe bee activity to determine the strength of the colonies. When cloudy weather prevails, the hives should be distributed evenly through the orchard in order to take advantage of the shorter bee flights. The bees will be more active if the hives are in sunlight.

Artificial Pollination

Cross-pollination with the use of pollen from bee hive inserts has not given consistently good results in Oregon tests. Application by speed sprayer also has been unsuccessful. Hand application of pollen using a brush is satisfactory but also slow, tedious, and expensive.

Oregon State University Station Bulletin 570 gives further information concerning cherry varieties and other pollinizers.