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Environmental Horticulture Notes

EHN 68

WHY FRUIT TREES FAIL TO BEAR

(Adapted from Pub. No. EB0838, Washington State Univ. Coop. Extension)

Fruit trees will normally begin to bear fruit between two and five years after planting, depending mainly on the species and method of training and pruning. Most stone fruits begin to bear in year two or three. However, cherries may not begin bearing for up to five years, apples often begin to bear in about two to four years but pears can take one to two years longer than apples. Fruiting in many species requires pollination, as well as adequate irrigation, drainage, and fertilization.

OBSERVE FLOWERING AND FRUITING CHARACTERISTICS

It is important to note whether your trees did not bloom at all, bloomed but did not set fruit, or bloomed and set, but most or all the fruit fell off at some point before harvest.

If your trees have never bloomed and they are older than the bearing ages listed above, you may be pruning too severely. Most fruit trees require the development of spurs or short shoots on which flowers form, although peaches and nectarines bloom on longer shoots. It is important, therefore, not to cut off all the one-year-old spurs and shoots. It is also important to provide adequate light to these fruiting shoots by thinning out crowded growth and/or opening the center, especially by summer pruning (see "Training and Pruning Fruit Trees," Environmental Horticulture Note 82). Lack of sunlight can also prevent flowering and fruit set; trees should have at least six hours of direct sun per day. If you are pruning appropriately and your tree is healthy, but still no flowers form after several years, consider grafting to a different variety or replacing the tree.

Trees that consistently flower but set little or no fruit probably lack a pollinizer variety (see Pollination section, page 2). However, the problem could be cold and/or wet weather during bloom, which reduces the activity of pollinator insects, preventing the transfer of pollen. Such weather conditions also prevent pollen tube growth in the female parts of the flower. Inclement weather is often more of a factor on early flowering species such as almond and plum. Lack of nitrogen can also lead to poor fruit set. If nitrogen deficiency is suspected, fertilize in the summer to increase the nitrogen storage in the tree over the winter; this stored nitrogen is utilized for flowering a fruit set the following spring.

If your trees bloomed and set fruit normally, but the fruit dropped off prematurely, any of several factors could have contributed. Sometimes fruit appears to set, but drops in April; this could still be a lack of pollination. Any factors that cause poor tree health can affect fruit set and retention. For example, excess or insufficient water during the summer can cause fruit to drop, but you would also see drooping or yellowing leaves. Other contributing stresses include root constrictions caused by hardpan or compacted soil, sunburn or borer insects on the trunk or branches, and pests such as soil nematodes, root rot, bacterial canker, brown rot of twigs, powdery mildew, and spider mites.

ENCOURAGING PRECOCITY

Trees with vigorous, upright growth, such as cherry and pear, tend to begin bearing later than those with spreading habit, such as peach and apricot. However, these trees can be encouraged to bear

earlier by bending upright branches outward during the growing season, before they become too stiff to bend. Branches can be held in place by tying them to a stake, a string attached to the ground, or a trellis (espalier). Also, avoid excessive heading cuts, especially during the dormant season, since heading encourages vigorous growth and reduces flower development. Bending unheaded, upright branches outward is a proven method for developing spurs and flowers quickly.

CLIMATE AND WEATHER

Most fruit trees need a substantial amount of cold winter weather to end their dormancy and to promote spring growth. After mild winters, spring growth and flowering are delayed and irregular, the flowering period is extended, and fruit set is reduced. The extended bloom increases the chance that inclement weather will cause blossom diseases, such as brown rot or fire blight.

The chilling requirement is the number of hours below 45°F from November 1 through February 15. Fruit tree species and varieties differ greatly in the number of hours required to fully break dormancy. The label on a purchased fruit tree will often state the chilling requirement. The Sacramento area usually receives adequate chilling, averaging about 900 to 1,000 hours. When possible, select varieties with a chilling requirement below about 700 to 800 hours, because there are some years in which we receive less than 800 hours. Varieties requiring 1,000 hours or more may set poorly in some years. Low-chill varieties are available for most fruit tree species, and the chilling requirement is usually stated on the label.

Sometimes frost during or shortly after blossoming can cause young fruit to abort, even though no frost damage is seen. When a heavy frost is expected, covering the trees with plastic or bed sheets will sometimes prevent injury to the expanding buds or blossoms, providing temperatures do not fall too low and the cold weather is of short duration.

POLLINATION

Most fruit trees need to be pollinated. Without sufficient pollination, they may blossom abundantly, but will not bear fruit. A pollinizer is a tree or branch of a different variety with a similar bloom period. Pollinators (usually bees) carry pollen from the flower of one variety to the flower of another variety.

Most species of fruit trees have “perfect” flowers: both the anthers, which contain pollen, and the pistil, which develops into fruit, are located in the same blossom. Trees that bear fruit through self-pollination, or set fruit without pollination, are called “self-fruitful.” However, there are many fruit species with perfect flowers that cannot produce fruit from their own pollen. These require pollen from another variety and are called “self-unfruitful.”

Some species do not fit into either category. Pistachio and kiwifruit have male trees that produce pollen and female trees that produce fruit. To grow them successfully, it is necessary to plant at least one tree of each gender near each other.

Self-fruitful types. Almost all citrus species are “self-fruitful.” Other self-fruitful species include quince, sour cherry, most apricots, fig (except the Smyrna type), peach (except ‘J.H. Hale’ and some others), and European-type plums and prunes. Some European pears are also self-fruitful. ‘Bartlett’ pear is parthenocarpic, which means that no pollination is required to set fruit (only in California). Some cherries are self-fruitful, such as ‘Lapins,’ ‘Stella,’ and ‘Sunburst.’ Many apple varieties are self-fruitful, including ‘Braeburn,’ ‘Empire,’ ‘Fuji,’ ‘Gala,’ ‘Granny Smith,’ and ‘Pippin.’

Self-unfruitful types. “Self-unfruitful” species include many apple, Asian pear, sweet cherry, and Japanese plum varieties. The label usually indicates varieties that will pollinate your tree.

To pollinate adequately, plant two or more varieties no further than 35 to 50 feet apart – the closer, the better. Alternatively, you can graft a pollinizer variety onto the tree (see “Bud Grafting,” EHN 85).

The use of bees can improve pollination. In the interim before a pollinizer variety is grafted or planted nearby, you can place flowering branches of a pollinizer variety in a jar filled with water, and set the jar and flowers in the tree canopy. Bees will visit these flowers and will pollinate the tree's flowers.

Some cherries have fairly specific pollinizer requirements. 'Bing,' 'Lambert,' and 'Royal Ann' cherry trees do not pollinate one another. Plant a pollinating variety such as 'Black Tartarian' or 'Van,' or a sour cherry such as 'Montmorency' nearby.

For information on pollination and varieties, see Websites listed below.

BIENNIAL BEARING

Occasionally, certain fruit trees such as apples bear heavily one year and sparsely the next. This is called "biennial bearing." The spring-flowering buds of most deciduous fruit trees have actually been formed during the previous summer. Therefore, an especially heavy crop one year may prevent adequate flower bud formation for the following year because the carbohydrates produced through photosynthesis are used preferentially for fruit production during the "on" year.

Biennial bearing of apples is difficult to alter or correct. However, you can induce a return to normal annual fruit production by heavily thinning during the year in which the trees are producing their large yield (see "Fruit Thinning to Increase Fruit Size and Maintain Healthy Trees," EHN 84).

For additional information on pollination and varieties, see these websites:

- http://homeorchard.ucdavis.edu
- http://www.davewilson.com
- Sacramento County UC Master Gardeners at http://ucanr.edu/sacmg and http://www.facebook.com/sacmg

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