Why Fruit Trees Fail to Bear Fruit

If your fruit tree is growing but not blooming or bearing fruit, the problem could be anything from tree age and health to weather or environmental conditions. Here is what you should know about growth requirements, cultural practices, and weather conditions that may interfere with your tree's ability to flower and produce fruit.

Age

Fruit trees are 1 to 2 years old when you buy them from the nursery or garden center. They are in a juvenile growth stage and should begin producing fruit as the tree matures. The time from planting to fruit bearing varies depending on growing conditions and type of fruit:

- apple and apricot, 2 to 5
- fig, 2 to 3
- peach, 2 to 4
- pear, 4 to 6
- plum, 3 to 6
- quince, 5 to 6
- sour cherry and citrus, 3 to 5, and
- sweet cherry, 4 to 7.

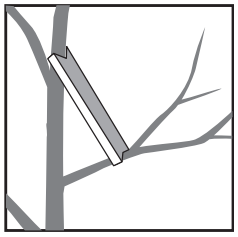
Fruit trees grafted on dwarf rootstock may bear fruit 1 to 2 years earlier than a standard size tree.

Structure

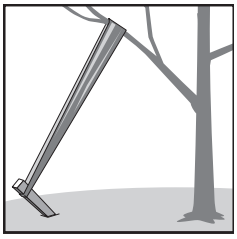
Good cultural practices encourage bearing. For example, you should train permanent or scaffold limbs to grow at wide angles. This increases sun exposure in potential fruiting areas and triggers hormonal changes that promote fruit bud development. For the first two to three years, most of the tree's energy goes into vegetative growth for future fruit bearing, rather than supporting a fruit crop. By the third growing season, the tree may blossom and develop fruit.

Spreading limbs is a common practice to increase sun exposure and promote fruit bud development on apple and pear trees. It should be done during the first and second growing seasons when limbs are flexible and can be bent away from the center of the tree. The goal is to train main limbs (scaffolds) to form an angle of about 60 degrees with the trunk. Limbs growing upright produce more vegetation than fruit buds.

Limb spreaders and stakes help open up limbs and branches. You can make spreaders from 1 x 2-inch wood of various lengths. To keep the spreader in position, cut a notch or drive a nail into each end and cut the head off at an angle, leaving a sharp point to stick into the wood. Place the spreader so it forces the limb away from the tree center. Do this carefully so you do not split the limb from the tree trunk. When staking, use soft tie-down material to keep from cutting into the bark. Tighten it around the stake until the limb forms an angle of about 60 degrees with the trunk. Be careful not to spread limbs 90 degrees or more, or vertical shoot growth may develop on the upper side of the limbs. Spreading can be done throughout the growing season.



Limb spreader



Stake

Growing Conditions

Extremely vigorous growth inhibits flower bud formation and may be a sign your tree is receiving too much nitrogen from fertilizers applied to the lawn and landscape. On bearing trees, stop nitrogen fertilization if more than 12 to 24 inches of new shoot growth occurs during the growing season. Normal growth for nonbearing trees

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is 18 to 30 inches. If growth falls below 18 inches, you can increase nitrogen the following spring. More than 30 inches of new growth indicates overfertilization or over pruning.

If fertilization is not the issue, evaluate pruning practices. Excessive pruning stimulates upright growth, which reduces flower bud formation and delays fruit bearing. Thinning out, which is the removal of the entire branch back to its origin point, will help develop a strong framework with a central leader and exposes horizontal branches where flower buds develop.

Pruning

Insufficient pruning results in an increasing number of limbs, branches, and shoots in the tree canopy. This growth causes heavy shading, and fruit buds fail to develop. Over a few years, fruit buds develop only at the top and sides of the tree where there is sunlight. Pruning a large portion of the limbs and branches inside the canopy to increase sunlight penetration will promote fruit bud development in the inner area of the tree. Never remove more than 30 percent of the tree in one year. Two to three years of selective pruning will be necessary to induce fruit production in the inner part of the tree.

Winter Cold Injury

Extremely cold winter temperatures can kill flower buds. Fruit type and variety are factors in bud survival. Hardy apple, pear, plum, and sour cherry varieties are seldom injured by winter weather. Sweet cherry varieties are relatively sensitive to cold until they harden. Mid-winter temperatures of around –10 degrees Fahrenheit can kill peach tree flower buds. A mid-winter warm period followed by a cold one can damage the flower buds of most fruits. The temperature at which fruit bud injury occurs depends primarily on the stage of development. Table 1 shows critical temperatures for blossom buds at the first stage of bud development.

Spring Frost Damage

As flower buds begin to swell and open, they become susceptible to damage and may be killed at temperatures below 24 degrees. At full bloom, flower buds will start to suffer damage as the temperature reaches 28 degrees. Injured flowers may appear normal, but the pistil (the center part of the flower) is damaged, and trees will not bear fruit.

When a heavy frost is expected, covering home garden trees may prevent bud or blossom injury if temperatures do not fall too low and the cold period is short. Hanging incandescent or old-style Christmas tree lights underneath the cover during frost periods can further protect fruit buds. Commercial growers can heat their orchards to protect against frost. Overhead sprinklers are effective when temperatures dip below 32 degrees. As ice forms on the flower buds, heat is released, which protects flower buds until temperatures rise above freezing. Buds will not be harmed as long as unfrozen water remains on the ice. All ice should have melted before turning off the sprinklers. Tree limbs can break if ice build-up is excessive.

Pollination

All fruit buds require pollination for fruit development. Without sufficient pollination they may blossom abundantly, but will not bear fruit. Most species of fruit trees have "perfect" flowers. Perfect flowers have anthers, which contain pollen, and pistils, which develop into fruit, in the same flower on the same tree. If trees bear fruit as the result of pollination from their own anthers, they are self-fruitful. Fruits such as quinces, sour cherries, most apricots, most peaches and European plums such as Stanley, Green Gage, and Italian prune are self-fruitful.

Table 1 – Critical temperatures (˚F) at which fruit buds are injured.

Type of Fruit	10% Bud Kill	90% Bud Kill	Bud Stage
Apples[a]	15°	2°	Silvertip
Cherries[b]	17°	5°	First swelling
Peaches[c]	18°	1°	Swollen bud (first swelling)
Pears[d]	15°	0°	Swollen bud (scales separating)
Prunes[e]	14°	0°	Swollen bud (first swelling)

[a]For Red Delicious, Golden Delicious, and Winesap, 1 degree lower; Rome Beauty, 2 degrees lower at this stage.

[b]For Bing, Lambert, and Rainier, 1 to 2 degrees lower.

[c]For Elberta.

[d]For Bartlett. Anjou is similiar and may bloom earlier and be more tender than Barlett at the same date.

[e]For Italian and Early Italian prunes.

Self-unfruitful trees with perfect flowers that cannot produce fruit from their own pollen require pollen from another cultivar. This type includes apple, pear, sweet cherry, and Japanese and American plum trees. At least two varieties must be planted nearby. Some nut trees have pollen-producing male trees and fruit-producing female trees. Pecan trees have separate male and female flowers on the same tree. The following planting practices are recommended to ensure successful pollination of self-unfruitful trees.

Apple. Most cultivars produce high yield and quality fruit when they are cross-pollinated. Golden Delicious, Jonathan, and Red Delicious are some of the cultivars that produce viable pollen. Poor pollen producers are Stayman, Winesap, Jonagold, Crispin, Gravenstein, Summer Rambo, and Spigold. Plant them with at least two other varieties to ensure adequate pollination.

Pear. Many pear cultivars are partially or completely self-unfruitful. For adequate pollination, plant at least two cultivars together. Moonglow, Maxine, and Duchess are effective pollinating varieties. Bartlett and Seckel pears will not pollinate each other, and Magness and Waite cannot be used as pollinators because of their sterile pollens.

Plum. Most American and Japanese plum cultivars are self-unfruitful; plant two or more cultivars side by side. Japanese plums will not pollinate European plums.

Sweet Cherry. Pollinating cultivars are needed for most sweet cherries. Bing, Lambert, and Napoleon cultivars do not pollinate each other, so plant a pollinator nearby. Black Tartarian, Republican, Van, or Windsor cherry cultivars, or a sour cherry cultivar, such as Montmorency, is appropriate. Stella and Compact Stella do not need a pollinating variety. As a rule of thumb, dark-colored varieties will pollinate dark varieties, and light varieties will pollinate light varieties. Most sour cherries do not need a pollinator. They are hardier and bloom later than the sweet cherries.

Apricot. Most varieties are self-fruitful. However, a pollinator will increase yield and improve fruit size. Goldrich, Perfection, and Riland must be pollinated to set fruit.

Peach. Most peach varieties are self-fruitful. However, J.H. Hale, Stark Honeydew Male, Stark Male, and Berta Giant cultivars need another variety to ensure pollination.

Biennial Bearing

Occasionally, certain fruit trees, especially apples, bear fruit heavily one year and sparsely the next. Pruning and fruit thinning will correct biennial bearing. A heavy pruning during the dormant season following a light fruit crop reduces the fruit crop that otherwise would be heavy the coming season. Also, small fruits can be removed by hand 30 days after bloom during the heavy fruiting year. Remove enough fruits so there is an apple every 4 inches. Peaches should be thinned to a peach every 6 to 8 inches. These are averages, and fruit may be closer together as long as the load falls within the averages recommended above. Peaches, especially, tend to bear in clumps. Other tree fruits rarely require thinning.

Train and prune your fruit trees every year to promote annual bearing, and limbs will be well-distributed around the tree.

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