

Why some apple trees don't flower

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I have had a number of questions this year regarding apple trees (primarily) that don't flower. Failure to flower can be caused by a number of reasons and their interactions. Identifying a single cause in any situation is unlikely. This article will describe several factors that contribute to lack of flowering in apple trees.

Juvenility. Apple trees must reach a certain stage of maturity before they will begin to flower and set fruit. Seedling trees will be juvenile for some time and will take many years to come into bearing.

Rootstock. This is related to juvenility. In general, trees on dwarfing rootstocks will flower and set fruit at an earlier age than trees on semi-dwarfing or standard rootstocks. Trees on dwarfing rootstocks may flower the year after planting while trees on standard rootstocks may take 7-10 years to begin to flower. If trees on dwarfing rootstocks were planted with the graft union below ground scion rooting will have occurred and the dwarfing influence of the rootstock will be lost.

Tree vigor. Trees that are vegetatively vigorous will have delayed flowering compared to trees that are not so vigorous. Excessive vigor can be caused by heavy pruning, vigorous rootstocks, and too much fertilizer (particularly N). Pruning is invigorating. Trees that have been heavily pruned will produce much vegetative growth at the expense of reproductive growth. Nitrogen fertilizer also encourages vegetative growth.

Limb position. Branches that are growing vertically tend to be more vegetatively vigorous than branches that are growing towards horizontal. Bending vertical branches towards horizontal in the spring will encourage flower bud formation for the following year.

Winter injury. Flowers that will produce the current year's crop were initiated the previous year just after bloom. These buds must survive the winter to produce fruit. Bitter cold temperatures during mid-winter can kill flower buds resulting in no crop the following year. There are cultivar differences in susceptibility to winter temperatures.

Biennial bearing. Apple trees that produce a large crop one year will have few if any flowers and fruit the following year. Developing seeds in apples emit plant growth hormones that inhibit flower bud formation. Thinning fruit during the "on" year within three weeks following petal fall will reduce the inhibition and result in a crop the following year.

How to induce flowering

Since no single factor usually accounts for lack of fruiting by apple trees remedies are also varied. Planting trees correctly with the graft union 2-3 inches above the soil line is critical. Tree training is an important component. While some annual pruning is usually required, limb positioning (from vertical to horizontal) will reduce vegetative vigor and encourage flowering and fruiting. Trees that have heavily pruned will be difficult to manage and will continue to produce much vegetative growth.

Limb or trunk scoring will induce flowering in trees that are old enough to produce flowers. Using a sharp knife make a single cut to a depth of about one-quarter inch all the way around the trunk or branch. Scoring accomplishes two things. It induces ethylene production and ethylene (a plant growth hormone) will encourage trees to induce buds. It also interferes with movement of carbohydrates out of the upper portion of the tree to the roots making more sugars available in the upper portion of the tree. Timing for scoring is critical. The proper timing is from full bloom to about three weeks after full bloom. Later scoring will not be effective. Scoring will encourage flowering the following year.



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Home "Brewed" Insecticides for Apple

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Unfortunately in biology, most simple questions have answers more complicated than people wish.

There are indeed home remedy traps and over the years I've had several folks say they work pretty well. Unfortunately, I don't believe there has been any University research that has backed this up. And equally unfortunately, these traps are aimed at only one of the "Big Three" apple pests - namely, codling moth (CM). They are not effective against plum curculio or, as others have noted, our number 1 home apple pest, apple maggot (railroad worm). Also, such traps are never fully effective and the grower has to be willing to accept some level of damage, which can vary from modest to moderate depending on the size of the local pest population.

So, the first step in the process is to identify what is causing the damage. A good place to start is an article Patty McManus and I wrote a couple years ago on diagnosing apple fruit problems - it is on the Master Gardener website at:

<http://wimastergardener.org/?q=DiagnosisAppleProblems>

It has lots of color pictures so takes a little while to load.

If the problem is indeed codling moth, then the home remedy requested goes something like this.

Gather one-gallon plastic milk jugs with their caps - two for each dwarf or semi-dwarf tree, three for each full sized tree. Cut a 2" hole on the side near the top. Add 1-2 quarts of the bait (see below). Replace the lid. Using light-weight rope and the jug's handle, tie each jug to a secure branch. The higher in the tree the better, but the traps will need to be serviced periodically (cleaned; new bait added every couple weeks). Protect the limb from rope damage with a partial covering of duct tape. There are two generations annually, with first flight about the middle of apple bloom and the last flight ending in August, so the traps will need to be tended throughout this period.

There are numerous recipes for the bait. All include a sugar source (molasses, honey, brown sugar, granulated sugar) and water (10% sugar solution by volume). Some recipes include a banana peel. Some recipes include most any type of ripe fruit (though I've never seen citrus used). Some include vinegar (1 tsp per gallon). Some include a bit of active brewers yeast.

Most people these days find it much easier to use one of the effective organically-approved sprays. One of the better ones includes the active ingredient spinosad. These can be found at better garden centers or over the internet.

I'd also suggest referring them to our home apple pest control publication available through the Learning Store:

<http://learningstore.uwex.edu/Assets/pdfs/A2179.pdf>