



# News & Notes of the UCSC Farm & Garden

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## The How's and Why's of Summer Fruit Tree Pruning

— by Orin Martin

### Introduction

Summer pruning has an overall de-invigorating affect on vegetative fruit tree growth. It reduces, limits, eliminates, and induces—

**Reduces:** By thinning out entire branches or “cutting to weakness”<sup>\*\*</sup> at the top of a tree you can:

- Reduce overall tree height
- Reduce the number of shoots/branches and thus allow more sunlight into the interior of the canopy. As sunlight does not move more than 3–4 feet into a canopy, and as >50% sunlight on the fruit buds is required to produce fruit, by thinning out crowded branches on high, you create “chimneys” or “alleys” of light in the tree’s lower regions. This keeps the most easily accessed portion of the tree lively and fruitful.

While thinning pruning can be done summer or winter, the dividend of summer thinning is being able to immediately see the increase of light into the tree’s interior. This can be quite dramatic in the presence of willing learners; it often elicits “oohs” and “aahs” as the branches fall to the ground and sunlight tumbles down.

**Limits:** The regrowth of branches after summer pruning cuts is minimal (more on this below), often inches compared to feet following winter pruning. Therefore you can use summer pruning to “shape” the tree without creating unintended new growth.

**Eliminates:** Summer pruning thins out excessive branches (both in number and length).

**Induces:** Under optimal conditions, summer pruning of a pome fruit’s (apple or pear’s) lateral branches—the shoots growing off the primary scaffold branches that emerge from the central trunk—induces rapid formation of the fruit buds that will become next year’s fruit crop. These fruit buds are in fact perennial organs, bearing fruit for a number of years.

### Summer vs. Winter Pruning

Summer pruning takes place in the Monterey Bay region from early August to mid September, while dormant winter pruning happens from leaf drop in December until trees leaf out in April.

Winter pruning is analogous to pouring the foundation and framing the house: it creates the tree’s structure, form, and extent. Summer pruning is all about “finish work”: trim, tile, cabinetry, etc. It refines form and keeps the interior of the tree open to sunlight, which is vital to fruit production. Remember that it takes >50% direct sunlight striking a branch to produce and maintain fruit buds.

Summer pruning can also induce fruit bud development on lateral branches and can actually hasten the time to fruit production on these laterals. Normally, a lateral branch will form and grow in Year 1. In Years 2 and 3 it forms fruit buds, eventually fruiting in Years 3–4. With well-timed summer pruning, sometimes Year 1 (current season’s) lateral shoots can form fruit buds and even flower and fruit, and although the fruit won’t mature that late in the season, you have formed a perennial fruit-bearing organ that will be productive for a number of years. At the very least, 1 Year laterals can be induced to form fruit buds that will bear by the following summer, or the one after that.

### Understanding the Physiological “Why’s” behind Summer Pruning’s Effects

When you prune back a branch (using a cut called a heading cut, or simply “heading back”) the branch responds by trying to regrow what was cut off. When a branch is headed back, the top remaining vegetative bud regrows the branch. The next 2–5 buds down the branch break from dormancy and form lateral branches that

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(if all goes well) will eventually bear fruit. Whether a branch is headed back in winter or summer, the pattern of the response is identical. However, the magnitude of the growth response is radically different.

Dormant (winter) pruning is invigorating, that is it induces rapid extension growth in the following growing season. The reason for this is that trees store carbohydrates, garnered in late summer through photosynthesis, in their wood (principally in the trunk's bark). These resources are mobilized for growth and fruiting the following summer. Although winter pruning reduces a tree's volume by removing wood, it doesn't significantly diminish the stored carbohydrate reserves.

By heading back, or shortening branches, the tree exhibits stronger growth through a lesser number of outlets (buds=outlets) and thus grows longer branches. It is absolutely proportional: the harder you cut back a 1-year-old shoot in winter (on pome fruits) the longer it grows in summer.

Consequently, you make heavy/hard heading cuts on a young tree to grow its extent and form. As a tree matures and fills its allotted space, you reduce both the number and magnitude of heading cuts.

In contrast, summer pruning is dwarfing or deinvigorating for several reasons:

In summer, leaves engage in photosynthesis and produce carbohydrates. The tree translocates those carbohydrates throughout to grow roots, shoots, leaves, and fruit. By removing leaves during summer pruning you remove a resource point and thus reduce energy for overall tree growth or regrowth. In the internal battle for resources, fruit usually acts as a strong resource "sink": it can sequester >70–80% of a tree's resources annually (which is one reason to fertilize your trees every year).

Thus by late summer, when summer pruning occurs, the tree has already allocated most of its reserves to existing branches, roots, and fruit; it is essentially "tapped out," with inadequate resources (or enough summer season) left to add more than a few inches of regrowth on a pruned branch.

In addition, summer pruning of laterals on pome fruits releases ethylene gas at the site of the pruning cut. Ethylene is a gaseous hormone/growth stimulant. This released ethylene gas saturates the tree canopy, particularly the summer-pruned laterals. And although the causative mechanism is still unknown, it is thought that flooding the tree canopy with ethylene stimulates fruit bud formation, rather than vegetative branch extension.

So, the dividends of summer pruning include:

- Tree height reduction and more sunlight (via thinning cuts) in interior of the canopy, which promotes fruit growth and ripening
- Minimal regrowth of pruned branches (and thus the size of the tree is controlled)
- Rapid induction of fruit buds
- A thickening and strengthening of the pruned



Matthew Sutton, owner of Orchard Keepers, teaching a summer pruning class at the UCSC Farm.

laterals, making them better able to bear fruit without breaking

### Summer Pruning Tips

#### Timing

Summer pruning is best done in August–September, when the majority of branches have set a terminal bud. Note that when branches are actively growing, their tips feature a vegetative bud that continues to produce leaves and lengthen. This is visible—you see new leaves forming at the tip of a branch. When a branch has stopped growing for the season, it sets a fat terminal bud (often the beginning of a fruit bud) and will grow no more that year. It has physiologically shut down for the season and pruning does not stimulate regrowth (or at least not much).

When actively growing, 1-year-old laterals feature at least 1 foot of new growth and have an audible snap when broken at the base.

#### How to treat lateral branches

**Vigor:** When deciding which laterals to keep and which to thin (remove), keep the laterals of moderate or weak vigor (yes, a seeming oxymoron). Overly vigorous laterals tend to grow too long and shade adjacent branches. Their hormonal "impulse" is to be non-fruitful.

The best policy is to completely remove upright and vigorous laterals. Keep weaker ones that are growing at an angle approaching horizontal and train them perpendicular (90°) to the primary branch. This can be done with string or V-notched lathe spreaders. Based on this approach, the options for treatment of laterals are the following:

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- If they are short (<8–9") and flat (45° above horizontal or flatter) leave them alone. They will probably stop growing and start fruiting of their own accord. I refer to them as "self-managing laterals." And life would be a lot sweeter (literally as well as figuratively) if all laterals were of this nature and if one occurred every 7–9" on main limbs.

- If they are of moderate vigor, train them down toward horizontal. They will suffice.

- If they are longer and more vigorous, summer prune them (see below).

#### Orientation and positioning

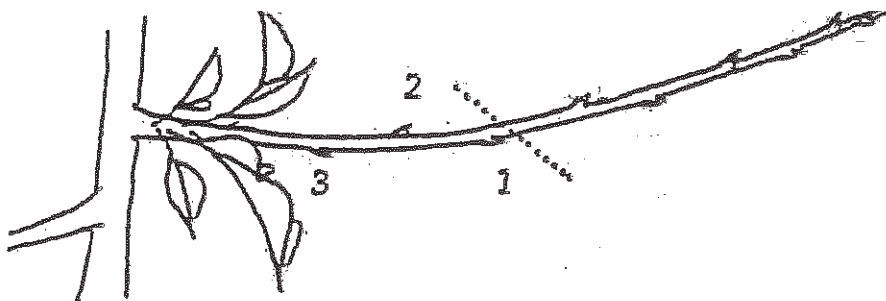
- Laterals should be thinned so that they are spaced approximately 7–9" apart on a primary branch
- They should be positioned at an angle of 45° to horizontal, and perpendicular (90°) to the primary branch (use strings, stakes and spacers to adjust them as needed)

#### Pruning

Do not prune laterals in winter. This will cause them to grow vigorously and branch, leading to crowding and shading, and thus reducing both quality and quantity of fruit.

If longer than 8–9" laterals may be summer pruned:

Identify current season's growth and prune it back to 3 buds of new growth. Ideally, the top bud will resume growth and extend, but minimally so. The next 2 buds may initiate fruit buds and bear within a year. This is referred to as the 3 bud system, based on the methodology of Louise Lorette, a French orchardist and nurseryman of the early 20th century.



When summer pruning laterals, cut back to three buds of new growth above the cluster of leaves growing at the base of the lateral.

A more general approach to summer pruning of laterals is non-specific: simply cut back laterals as per what fits between primary branches (<10–12" long). An added benefit of cutting back laterals is that they will be shorter and thus thicker and better able to support the weight of the fruit without sagging or breaking.

To learn more about summer pruning, join Matthew Sutton of Orchard Keepers and Sky DeMuro of UCSC's Alan Chadwick Garden on Saturday, July 26th, from 9:30 am–12:30 pm at the UCSC Farm. They'll discuss and demonstrate how to control and reduce tree height, talk about the "summer care package" for fruit trees, and show you how to prune laterals on pome fruits to shape the tree and induce fruit production. Bring your questions!

*Pre-register for the summer pruning class at [summerprune.bpt.me](http://summerprune.bpt.me), or contact us, (831) 459-3240 or [casfs@ucsc.edu](mailto:casfs@ucsc.edu), for more information or to pre-register by check.*