

Canopy Management for Avocados

It's important to understand that there is no physiological requirement for pruning trees, including avocados. Trees survive quite well in the natural environment without any pruning or other forms of canopy management. Thus, when we discuss canopy management in an orchard setting we must start by understanding why we are pruning since it is not because the trees require pruning.

In an orchard setting, our goal is to achieve as much fruit production as possible in a given area. To reach this goal frequently requires canopy management through pruning in order to maximize light interception, maintain row clearance for various tasks (e.g., harvesting, spraying, irrigation maintenance), control tree height to reduce harvest costs, and remove dead, diseased or damaged limbs.

Canopy Height

In California, avocados were traditionally very large trees, up to 30 feet or more. Today, the trend is to keep trees shorter — generally no more than 15 feet — to reduce harvest costs and improve the overall quality of the grove. This is more in line with how other orchard fruit trees are managed; however, the chal-

lenge in avocados is that the trees are vigorous and want to grow tall.

For maximum canopy light interception, the rule of thumb is that tree height should not exceed 80 percent of the between-row spacing. For a grove with 20-foot row spacing, tree height should be kept to no more than 16 feet. This ratio ensures that light is able to reach the grove floor and the tree canopy can be maintained to the ground by preventing the lower limbs from being lost to shading.

When to Prune

In California, the challenge to pruning avocados is determining when to prune. Since the crop stays on the tree for more than 12 months there is never an opportunity to prune without crop loss. Thus, the decision becomes partly psychological: is it easier to see the fruit lost when they are small or large? Of course, the decision also partly depends on your pruning method.

Usually in an environment such as California, pruning after harvest removes both flowers and developing fruit (depending on harvest timing) and may expose fruit to sunburn. Thus, many growers prune following the on-crop harvest when the trees are in an off year to minimize fruit

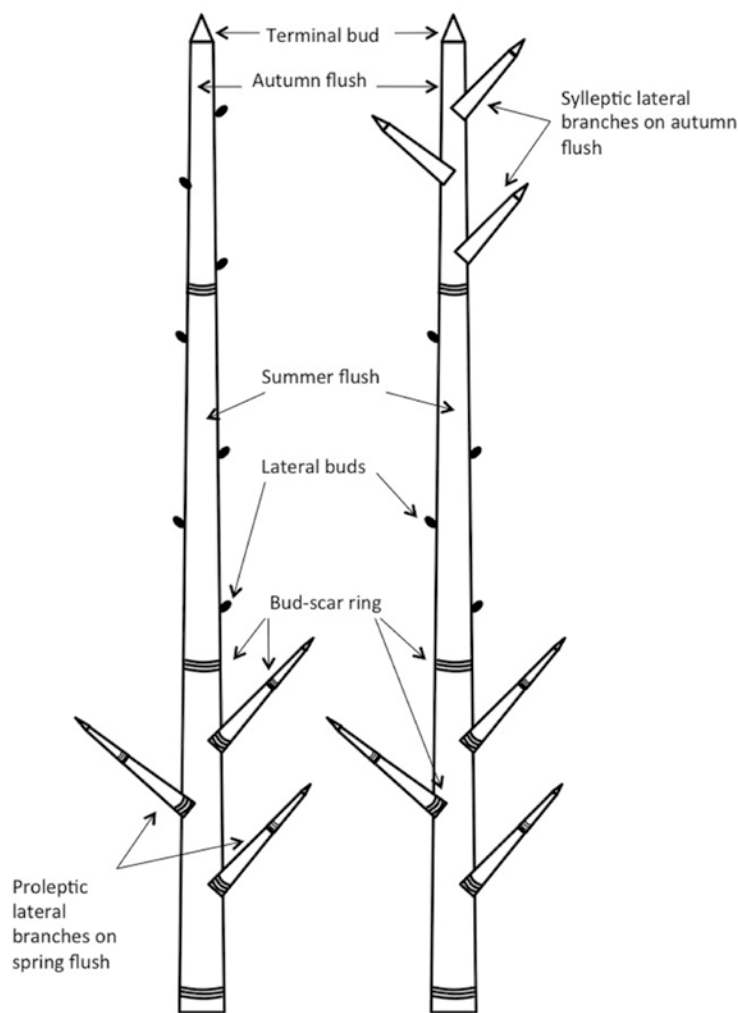
loss. In citrus, where late varieties such as 'Valencia' also carry two crops at the same time, research has shown that if pruning is carried out at the same time each year, the trees naturally adjust and yields stabilize after a few seasons. Whether this holds for avocado is unknown.

Aside from late fall and winter when pruning could stimulate new growth that is easily damaged by frost, there really is no wrong time of year to prune avocados in California. Again, timing will in part depend on your pruning strategy.

Where to Prune

There is no prescriptive pruning program that can be applied to every tree. Rather, each tree needs to be looked at as an individual with a pruning strategy devised for that individual tree. This is easier than it sounds if you have a goal in mind, follow a few basic principles and know how the tree will respond to different types of pruning cuts.

In the last issue of *From the Grove*, several terms and concepts were presented concerning the architecture of the avocado tree and its proleptic and sylleptic shoot growth. Because pruning affects shoot growth of the avocado tree, it is important



A diagram of two different shoot structures that may be found in an avocado tree canopy. Both shoots are composed of three flushes of growth – spring, summer and autumn. The shoot on the left has strong apical dominance and the lateral buds on the summer and autumn flushes have not grown out. The shoot on the right has weak apical dominance and the buds on the autumn flush have grown out into sylleptic lateral shoots.

for us to review the terminology. The first concept to remember is apical dominance — the inhibition of the growth of lateral buds by the terminal bud or meristem. The figure shows two types of shoots that may be found on an avocado tree. The shoot on the left has no lateral branching (the terminal bud has exhibited strong apical dominance); the shoot on the right has sylleptic lateral branches (the terminal bud has

exhibited weak apical dominance). If the terminal bud on each of the shoots is removed by pruning, the responses will be very different. The shoot on the left would develop several lateral branches because the apical dominance has been broken. In contrast, removing the terminal bud from the shoot on the right would have little effect since each of the sylleptic lateral branches is controlled by their own terminal bud.

Tip or Terminal Bud Pruning

In practice, tip or terminal bud pruning can be used in an on-crop year — that is a year in which a large crop is developing for harvest the following year — to try to mitigate alternate bearing. Usually, in a heavy on-crop year, the developing fruit will suppress the summer flush that will produce next season’s flower buds, leading to alternate bearing. By observing your trees and doing some selective tip pruning (of non-bearing shoots) in an on-crop year, you may be able to stimulate more summer flush, increasing next year’s flowering potential and reducing the magnitude of alternate bearing.

In contrast, in an off-crop year, you may want to try to control the amount of summer flush and do some tree-size-control pruning. In this case, removing terminal buds on shoots with sylleptic lateral branches or pruning back to lower lateral branches will reduce the growth response from the pruning cut and help control growth and vigor.

Selective Limb Removal

In a lot of cases, it is more economical and a more efficient use of time to make a few larger cuts per tree rather than many small cuts. In these situations, selective limb removal is the best choice, but as with terminal bud removal how and where the cuts are made will determine the growth response. Generally, this type of pruning starts by removing crossing branches, especially those that are rubbing together.

If tree height control is one of your goals, look for water shoot/sprouts, which are vigorous shoots growing straight up with few if any branches. These shoots will emerge from the top of the canopy and can add several feet to overall tree height in a single season. They should be removed flush with the limb they arise from.

Following crossing limb and

water sprout removal, ask yourself if the interior of the canopy is becoming too shaded — are the inner canopy branches dying back, is there little or no interior fruit production? If so, consider removing one or two relatively large limbs (three- to five-inch diameter) to open some light channels into the canopy. Again, if tree height control is a goal consider your limb choice carefully so that you can reduce the overall height of the tree and open light channels at the same time. When making thinning cuts it is usually best to remove the limb flush with the adjoining branch by making your cut at the branch collar — the area of wrinkled bark where one branch joins another. This will promote healing and minimize regrowth. If you leave a short stump, multiple new shoots are likely to regrow and require follow up pruning.

Following selective limb removal you will need to monitor the tree. If the interior was just starting to become too shaded there may not be any follow up pruning needed. However, if the interior of the canopy was completely barren of leaves, selective limb removal will stimulate a lot of new growth, which will require follow up pruning. Follow up pruning should thin the number of new shoots and prevent the development of water sprouts by removing the terminal bud on very vigorous shoots to induce lateral branching.

For trees being trained to central leader — usually high-density plantings — the same principles and types of pruning cuts apply. However, your pruning strategy should work to bring the canopy into the center rather than allow it to spread.

When practicing selective limb removal keep in mind where your crop was and will be. If you have just harvested an on-crop, select limbs for removal that had a heavy crop on them since they will likely set less fruit next year than limbs that produced few or no fruit. In this way, you

can help to balance the trees and reduce the risk of exacerbating alternate bearing.

Pruning Sanitation

Although growers prune their groves with good intention, the results can be disastrous if some basic principles of sanitation are not followed. First and foremost is to avoid pruning when trees are wet. When the canopy is wet, any fungal pathogens that may be in the canopy will release spores — fungal reproductive bodies — that can enter fresh pruning wounds. Pruning only during dry conditions will reduce this risk.

To further reduce the risk of disease spread, pruning tools need to be sanitized often. It's best to sanitize after pruning each tree. This is easily done using a spray bottle with a 25 percent household bleach solution or 70 percent ethanol solution. If you are pruning a tree with known disease issues (e.g., branch canker), remove the diseased material from the grove rather than leave it on the grove floor.

Of critical importance in California is Avocado Sunblotch Viroid (ASBVd). Pruning easily spreads this disease and it is virtually impossible to disinfect pruning tools. For this reason, growers should familiarize themselves with ASBVd symptoms and remove infected trees to prevent the unintentional spread. However, growers must also be aware that there is an asymptomatic form of this disease, the symptom of which is no fruit production. Thus, growers should monitor their tree yields carefully — some growers spray paint different colors on the trunk to represent high, moderate, low and no yield — and remove any trees that have not produced fruit for three consecutive seasons.

A more complete discussion of pruning and grove sanitation can be found in the Winter 2013 issue of *From the Grove* ([www.californiaavoca-](http://www.californiaavoca)

dogrowers.com/publications/from-the-grove).

Growth Regulators

California avocado growers can use the product Tre-Hold® Sprout Inhibitor (AMVAC Chemical Corp.) to aid in canopy management. Tre-Hold® contains naphthalene acetic acid (NAA), which is a synthetic form of the plant hormone auxin. Auxin is the chemical produced by terminal buds that allow them to exert apical dominance over lateral buds. Thus, applying Tre-Hold® to a pruning wound effectively restores the apical dominance and suppresses regrowth.

Tre-Hold® is applied in a latex-based paint, which can be brushed or sprayed on the cut surface. It is difficult to give usage recommendations for a product like Tre-Hold® because its efficacy is dependent on both rate and dosage of the chemical. That is to say, the same rate (i.e., quantity of active ingredient per volume of paint) will give different results if applied lightly or more heavily. Thus, growers interested in using Tre-Hold® should do some small-scale trials and get a feel for the product. Because application is critical to efficacy, the same person should apply the product to all pruning cuts to ensure consistent results. Many growers who have taken the time to learn how to use Tre-Hold® in their grove management program find it to be a useful tool.

Canopy management in avocados can seem like a daunting task. However, having a plan and following a few basic principles can simplify the task. If you've never ventured into the realm of pruning before, make some cuts on a few test trees before pruning your whole grove. Keep notes or take before and after pictures so you can remember what type of cut you made and what the response was. But remember, each tree is unique and must be treated as such. 🥑