

Optimize Productivity by Pruning for Maximum Light

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Most growers are faced with a very light crop for the 2019 season. Although income may be low this year, the light crop presents an opportunity for pruning. The first thing to understand is that there is no single best way to prune avocados. However, there are at least three objectives to consider when pruning:

1. Maximize fruiting potential
2. Control tree size for ease of harvest
3. Correct tree structural issues

How you achieve these objectives is up to you and will vary from grower to grower and grove to grove.

Before beginning to prune, it's important to remember a couple of things about the avocado tree. First, branches bearing fruit right now have a low likelihood of flowering and producing more fruit next year. Second, flowers develop on summer flush growth — a branch that grows in summer 2019 has the potential to produce flowers and fruit in 2020 for harvest in 2021 — thus, you are trying to maximize summer flush growth with pruning done now.

You are always trying to balance three types of branches in the avocado tree:

- Those currently producing fruit
- Those that will flower and produce next year's crop
- Those that will grow this year and flower next year to produce a crop two years from now

Maximizing Fruiting Potential

The primary reason for growing avocado trees is fruit production, and all cultural activities should be focused on maximizing fruit production. Pruning is no exception. Numerous pruning trials over the years have shown that maximum yields are achieved from very large (30-feet tall or larger) trees



Figure 1. Examples of different tree structural issues, including scaffold limbs too low to the ground (A), limbs crossing through the center of the canopy (B), and crossing limbs (C).



Figure 2. A large tree (left) that lost all lower branches causing productivity to be on the canopy periphery very high off the ground. Trees in this state need to be rejuvenated either through traditional stumping or over a period of a several years by removing one limb at a time (right).

widely spaced. But the economics of producing avocados in the 21st century dictate that we must do things differently.

There is one key objective to any pruning program and that's light penetration. Poor light penetration into an avocado tree canopy causes the interior and lower branches to die off and pushes fruit production to the exterior of the canopy. Why have a 25-foot tall tree, that's 20-foot wide, if fruit is only being produced on a few feet of the canopy periphery?

Flower production and fruiting will occur where there is light. The key to maintaining productive trees of smaller stature and more closely spaced than was the historical norm is to ensure light penetration throughout the canopy.

When you approach a tree to begin pruning ask yourself these questions:

- Where do I have fruit production on this tree?
- Where do I have flowering potential for fruit production next year?
- Which branches are shading other branches within the canopy?
- How is the tree you're about to prune affecting or being affected by neighboring trees?

It's difficult to answer these questions in isolation from one another, so we'll tackle them collectively. Looking for where there is current fruit production or lack thereof will help you know where you can expect fruit production next year. Fruit suppresses the development of flower buds on a branch. A heavily fruiting branch this year likely had a small summer flush last year and has a low probability of flowering and producing fruit for next year. Therefore, you can start to see where your potential fruiting branches are for next year by seeing where the fruit isn't this year.

Now that you've identified those branches that have the potential to flower and produce fruit for next year, look at where they are located in the canopy. Are they heavily shaded by other branches or will they become heavily shaded as other branches grow? You need some shading to prevent sunburn on the fruit, but too much shade will result in lower fruit set and potentially smaller fruit size.

Next, consider where your summer flush will be coming from this year. Summer flush growth is where next year's flower buds will be produced. You can help direct where this growth occurs by making strategic pruning cuts to expose



Figure 3. A 4-year-old Hass tree on Toro Canyon rootstock before pruning (left) and after pruning (right). Note how the width of the tree has been adjusted (lower right of each image) and the center has been opened to allow light penetration. This was achieved with two pruning cuts (see Figure 4).

shaded areas to sunlight and encourage new growth. By making strategic pruning cuts that allow light into the canopy interior, you are maintaining shoot growth and flowering potential, thus making the most of the tree’s “real estate.”

And while you’re considering shading, look to the neighboring trees and determine how the tree you’re pruning is influencing or being influenced by those adjacent trees. A very tall limb casting a shadow is probably a good candidate for removal.

Control Tree Size for Ease of Harvest

The general rule of thumb in any orchard is that tree height should not exceed 80 percent of the row spacing. For example, for rows spaced 20-feet apart the trees should not exceed 16 feet: $20 \times 0.80 = 16$. This spacing-to-height relationship ensures that direct sunlight can reach the lowest limbs on the tree as the sun moves across the sky, assuming your rows are oriented north-south.

This rule of thumb goes out the window for growing trees on slopes where rows may not go north-south or the entire hillside may not face due south. In those cases, it’s more im-

portant to consider your management objectives. For many growers today, a primary objective is to reduce or eliminate the use of ladders. Thus, a tree height of not more than about 15 feet is ideal for harvesting from the ground using picking poles.

Correcting Tree Structural Issues

Avocado trees are typically not trained like peaches, apples or most other tree crops. Often, trees are planted and they are left alone until they begin to crowd — then pruning becomes a necessity. Usually, at this point some corrective action will be needed to fix issues with basic tree structure. This can include, but isn’t limited to:

- Scaffold limbs originating too low to the ground
- Competing central leaders (if a central leader is your objective)
- Crossing limbs or branches crossing through the center of the tree

Pruning cuts to correct these types of structural issues should be made before any other cuts are made.



Figure 4. The interior of the 4-year-old tree shown in Figure 3 (top). Note how the interior shoots are already beginning to die-off due to shading and there is minimal production in the center of the tree. Also note the limb that curves through the center of the tree from left to right. A scaffold limb arising at ground level (bottom) has grown horizontally trying to find light. Removal of the limb crossing through the center of the tree and the low scaffold limb achieved the results shown in Figure 3.

Putting it all Together

So, you've studied your tree and corrected any structural issues, now what? Consider how to achieve everything you want to achieve with the fewest cuts possible. Is there one tall branch shooting straight up? This is a good candidate to remove because it helps you manage tree height and reduces shading within the tree and on adjacent trees. Similarly, look for branches protruding out of the side of the canopy that have a good chance of breaking or dragging on the ground if heavily loaded with fruit. Remember, a couple of larger cuts are quicker and more economical than many small cuts.

It may not be possible to get to where you want to be in one season, but there's always next year. What's important is that you have a clear objective in mind when you begin pruning and work toward that objective over time. 🍌



Figure 5. Large branches (>1-inch diameter) should always be pruned using the 3-cut method. Begin by making an under-cut about one-third of the way through the branch from the underside of the branch (top photo, white arrow). Next, make a cut from the top of the branch about 1 to 2 inches beyond (toward the end of the branch) the under-cut (top photo, yellow arrow). As the top cut is made, gravity will pull the branch down, breaking it between the two cuts (center photo). Finish by removing the remaining stub with a clean cut at the branch collar. Following the 3-cut method ensures that the final cut can be made cleanly with no bark tear out.