Notes on Avocado-Tree Pruning

These are brief notes on pruning, intended to jog memories, rather than serve as a detailed record of pruning do's and don'ts. A multitude of pruning information is available, and readers are encouraged to begin their research with articles posted on the website: www.avocadosource.com.

- Successful pruning outcomes require an understanding of the how the tree grows, and responds, to branch removal
- Only prune trees enough, rather than under or over prune; however, always prune with a purpose
- There is no "one-size-fits-all" treatment when pruning, as each tree requires individual treatment
- An important skill is to visualize ideal tree image, resulting from pruning, in 2, 5, 10 and 15 years
- Many research studies indicate pruned trees generate lower yields than un-pruned trees
- Avocados bear fruit on new growth and are peripheral bearers; therefore, when pruning, removing new growth reduces yield
- Pruning reduces production, or yield, of trees; in proportion to severity of pruning
- Pruning affects tree development and, if severe, can throw trees into alternate bearing
- The basic shaping of avocado trees should start in the nursery, while training should begin immediately following planting
    - This is particularly the case when training for the central-leader shape
- Hass avocado trees have natural tendencies as broad-spreading trees, as they only have moderate apical dominance
- Avocado trees grow in a rhythmic pattern, where the main branch forms identical branches and flowers are borne laterally; with little effect on the vegetative-shoot system
- Shoot growth is periodic – or seasonal – alternating, with short periods of rest; in other words, the shoots grow, then stop, and grow, then stop
    - This is important to recognize, as when shoots stop growing, flowers are established
- Shoot growth can be unbranched (proleptic) or branched (sylleptic), depending on different growth patterns
- Unbranched shoots (proleptic) occur after a period of bud dormancy, once the shoot stops growing
- Multi-branched shoots (sylleptic) have no dormant period, and branches simultaneously grow with the shoot tip (the shoot does not stop growing)
- Shoot growth appears to be predetermined, with only a certain number of nodes (leaves and buds) produced before the shoot stops growing
    - Long shoots result from greater distances between nodes
- The most productive leaves grow on the outside of trees, as avocado leaves respond very slowly to changes in light levels
    - Leaves on the outside of the tree are exposed to light for most of the day and, therefore, contribute the most photosynthate to the tree
- Hygiene is very important, when pruning avocado trees
    - Pruning tools should be cleaned regularly, and sick – or unhealthy – trees pruned separately from the healthy trees, to prevent the spread of sunblotch and fungal – or bacterial – diseases like blackstreak

Why prune?

Reasons:

- Reduce costs
- Improve profitability
- Improve pest control
- Assist trees in Phytophthora recovery
- Recovery from fire or freeze
- Save water
- Develop trees with strong framework
- Reduce fertilizer needs
- Increase ease of harvesting
- Maximize tree-bearing surface
- Reduce tree size
- Improve tree health
- Keep fruit off the ground
- Restore tree vigor
- Improve fruit quality, with more minerals available to the fruit
- Most fruit hangs low, making picking easier and more productive
- Rebalance the tree among shoots, roots and fruit

As avocado trees grow – if uncrowded – they will spread and create dead, unproductive space within the tree; however – if crowded – trees will grow competitively with other trees, achieving greater size. As a result, unpruned trees can become a "jungle." Pruning also can influence tree response to fertilizer applications, with pruned trees inclined to grow more than unpruned trees. In South Africa, pruning increased the fruit-mineral content of P, K, Ca and Mg, leading to better quality fruit.

There are different systems for managing tree size and improving light interception:

- Selective limb removal
- Mechanical pruning to a hedgerow
- Stumping (stag-horning); remember to whitewash the trunks
- Tree thinning; remove every second tree
- Replacement of the entire tree block
- Central leader

What to prune?

What –and how much – is removed, depends on the reason(s) for pruning. Pruning involves large branches, small branches and flowering branches.

General principles are:

- Avoid horizontal branches developing low to the ground, as these interfere with tree access
- Push light into the tree interior, by cutting "windows" in the canopy
- Trees grown on slopes should be pruned to a lower height than trees on flat land
- Space the main limbs 3-to-4 feet apart, to allow access inside the tree

- Rejuvenation can require cutting the tree back to the main trunk; however, don't expect production in the second year
- Eliminate 'v-type' crotches, as these are mechanically weak and prone to developing rots
- Remove dead wood, as far as possible
- Make major cuts clean, and in line, with trunk contour
- When renovating a grove, aim to remove large, interfering – and low-lying – laterals, badly crossed limbs and spilt crotches
- Pruning needs to balance the side-shoot growth and remove strong, upright water shoots, in order to achieve a good central-leader shape (if this is desired)
- A conical, or pyramidal, tree shape enables good light interception and minimizes unproductive bare areas
- Constant attention to pruning detail, with small cuts at the correct time, minimizes need for additional major pruning cuts

When to prune?

When to prune depends on what result is desired; pruning in spring is used to invigorate the trees and encourage new growth, while pruning in winter is used to devigorate the trees, controlling tree size and shape.

General principles are:

- Best time to cut back is spring, to achieve good regrowth
- In California, most pruning takes place in winter, i.e. – January and February
- Pruning between January and May promotes shoot-flush presence during fruit set, early fruit development through August and delays leaf hardening
- Leaf hardening causes avocado Thrips to move to the fruit; therefore, certain pruning times may increase availability of new leaves that avocado Thrips feed on, possibly increasing Thrips population
- The timing of summer pruning affects the length of regrowth and, ultimately, increases tree size

How does the tree respond to pruning?

This concept is related to the phenology cycle and is generally poorly understood, as simple "rule-of-thumb" measures are lacking. For example, when asking, "how long does it take for the dormant buds to break, after cutting;" does this depend on the time of year or location of the cut?

When opening the inside of the tree, new growth can develop, and there may be fruit; however, the hole closes quickly and is often not worthwhile. Most of the production remains on the outside of the tree.

Sources

- Anon. (1999) Pruning/Grove Rejuvenation. The California Avocado Grower Number 5.
- Anon. (1999) Canopy Management: A South African Point of View. The California Avocado Grower Number 6.
- France, J.G. (1934) Looking ahead in avocado pruning. California Avocado Society Yearbook 19, 75-77.

- Blanchard, V.F. (1936) Symposium on pruning avocados. California Avocado Society Yearbook 21, 160-166.
- Barrett, C. (1938) Pruning practice on the avocado. California Avocado Society Yearbook 23, 113-118.
- Bender, G. and Faber, B. (2000) Avocado pruning trials. California Avocado Commission Progress Report.
- Cutting, J.G.M. and Bower, J.P. (1992) The effect of vegetative pruning on fruit mineral composition and postharvest quality in 'Hass' avocado. Proceedings of the Second World Avocado Congress, 403-407.
- Martin, G. and Witney, G. (1995) Avocado tree structuring. Proceedings of the World Avocado Congress III, 245-250.
- Micklebart, M. (2004) Sun access the secret when pruning avocados.
- Oevering, P., Faber, B. and Phillips, P. (2004) Time of avocado pruning affects fruit set and avocado Thrips occurrence in southern California groves. California Avocado Society Yearbook 87, 83-96.
- Stassen, P.J.C. and Davie, S.J. (1996) Information Bulletin Number 285. Institute for Tropical and Subtropical Crops, Agricultural Research Council South Africa.
- Thorp, T.G. and Sedgley, M. (1992) Shoot growth and tree architecture in a range of avocado cultivars. Proceedings of the Second World Avocado Congress, 237-240.