

Hedging, topping and skirting trees in the citrus canker era

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Good grove design and management should provide a canopy structure which receives optimum light intensity. One aspect of higher-density plantings is that they require hedging and topping to maintain good light interception. In mature citrus groves that are not hedged regularly, insufficient light and increased shading promote a thin canopy and reduction in fruiting on the lower parts of the tree.

Factors that affect light interception in a mature grove include width of the drive middle, foliage wall angle (hedging angle), tree height, and row orientation. Grove care and harvesting equipment require a drive middle of 7 to 8 feet wide. To achieve optimum light and equipment movement, Florida growers have adopted tree spacings that result in hedgerows in a north-south direction. Trees receive maximum amount of light when the sun is aligned with the drive middle, and other times of the day, trees will intercept varying amounts of solar radiation on both east and west sides of the tree.

Most fruit is contained in the outer 3 feet of the tree canopy. It is estimated that 90 percent of the solar radiation is absorbed by this outer 3 feet of canopy. When trees are small or in a narrow hedgerow, the total canopy may be considered to be productive. However, when trees are large, the inner non-productive part (scaffold limbs and branches inside the outer 3-foot shell) can be a major component of the total canopy volume.

TREE PRUNING

Pruning of commercial citrus is done by machine as hedging, topping and skirting. In all cases, sanitation of pruning equipment between groves and large blocks is necessary to reduce the potential spread of citrus canker. Now that canker is endemic in Florida, our pruning practices must change to avoid operating machines when foliage is wet and the bacteria can be easily spread. Citrus greening disease has become a consideration in the past year. The greening bacteria is transmitted by the citrus psyllid, but is not spread mechanically. Pruning stimulates new flush, and the psyllid



is attracted to young flush. Pruning should be scheduled at times when the psyllid population level is low. Growers should avoid late fall pruning when flush would promote carryover populations into spring. Perhaps December and January before the spring flush is the best time for hedging and topping. Skirting does not stimulate much flush because it is in low light areas in the lower canopy and can be done any time of year.

Most Florida groves need to be pruned to avoid problems associated with overcrowded, excessively tall trees. Pruning mature trees usually reduces yield in proportion to the amount of foliage removed. Hence, pruning should be limited to that required for future bearing surface development and still allow efficient cultural and harvesting operations.

Pruning should begin as trees grow outside their allocated space. Continued canopy growth and crowding causes poor light penetration, loss of lower leaves and bearing wood, relocation of fruiting to the upper canopy area, and reduction in yield, fruit size and external quality.

HEDGING

Hedging involves cutting back the sides of the tree to reduce crowding between rows and improve equipment access to the grove. Hedging should be started before crowding becomes a problem so that only small branches are cut and minimal crop reduction results. If pruning is delayed until severe

crowding occurs, removal of a large part of the tree canopy may be needed. This can cause excessive vegetative growth and a major reduction in subsequent yield. Heavy cutting is more expensive. Greater crop reduction can be expected, and brush removal is more difficult and costly.

HEDGING ANGLES

Hedging is usually done at an angle. The cutting blades are tilted toward the tree tops so that the drive middles are wider at the top than at the bottom. This allows more light to reach the lower sides of the tree. Hedging angles of 10 to 15 degrees from vertical are common.

Hedging helps maintain yield. It does not increase yield. Depending on the severity of the hedging, yield reduction may occur the year after hedging, but should recover in subsequent years. If hedging is not done, yield reduction due to shading may occur. Hedging should begin before heavy cutting is needed and repeated at appropriate intervals, so that the desired hedgerow shape can be maintained at low cost with minimum canopy loss. Maintenance hedging should begin when trees encroach on the 7- to 8-foot drive middle so that no more than a foot of foliage is removed from each side.

Hedging programs vary with variety, rootstock, tree vigor, spacing and grower preference. Some growers prefer hedging every middle every year for early varieties. This allows rapid

hedger movement through the grove with minimal leaf and twig removal. Groves on a 2-year program are hedged in alternate middles each year. Hedging Valencia oranges or late-season grapefruit pose a problem due to overlapping crops. When harvest can be scheduled early in the Valencia season, hedging has usually been done in late spring after the mature crop is harvested and the new crop is set. Good results have also been obtained when annual hedging has been done in late winter with the old crop still on the tree and before bloom.

TOPPING

Topping involves cutting off vegetation in the top of the tree, and should be done before trees become excessively tall. No studies have shown an increase in yield due to topping. How about fruit size and/or quality? Hence, topping could be considered to be a necessary evil. Excessively tall trees are more difficult and expensive to harvest and spray. Topping trees will increase light penetration into the lower canopy. Yield reduction due to minor topping is usually not too great. However, if trees have lost their lower canopy bearing wood, a large yield reduction can occur.

Topping should not be started in cold areas until after the threat of

freezes is past. In freeze-prone areas, it is best not to top in the fall to avoid possible cold injury to new growth and exposed internal scaffold wood.

Trees can be flat-topped or roof-topped (topped at angles). Most growers choose to top at angles from 15 to 30 degrees from horizontal, which results in a peak that is about 2 feet higher than the shoulder. It can be conservatively estimated that tree height should not generally exceed twice the middle width. For example, with 8-foot middles, trees would receive adequate light at the base if they were 16 feet tall. Mechanical harvest machines are designed for 16- to 18-foot trees, but operators recommend a maximum tree height of 16 feet due to fruit damage when fruit fall.

SKIRTING

Data (Whitney et al. 2003. Proc. Fla State Hort. Soc. Vol. 116:236) has shown that average yields were not affected by skirting. Although fruit from unskirted trees have juice quality equivalent to other fruit on the tree, the fruit have increased blemishes and are smaller in size. Skirted trees may have reduced yield the following year, but rebound with yields above unskirted trees. Skirting has many horticultural advantages in addition to being necessary for mechanical harvesting.

Advantages of skirting are:

1. Irrigation pattern is not affected by low hanging branches, and water distribution is more uniform.
2. Irrigation emitters are easier to check for clogging and make repairs.
3. Distribution of fertilizer, both dry applications and fertigation, is better.
4. Herbicide application is more uniform and there is less injury to low canopy tree foliage.
5. Herbicide booms don't contact low hanging foliage and fruit, and this reduces the chance for spread of cancer.

6. Skirting trees raises the canopy and may reduce disease problems by increasing the air flow, which decreases leaf wetness and helps to manage brown rot and greasy spot by reducing contact with the soil-borne inoculum.

All mechanical pruning equipment must be decontaminated before and after operations in a grove or large block. In the new era of staying profitable with citrus and living with canker and greening, pruning (hedging, topping, skirting) is required for mechanical harvesting to manage tree canopy for consistent yield.

Additional information is available from University of Florida extension at <http://edis.ifas.ufl.edu/pdf/HS/HS29000.pdf> by L. R. Parsons and T.A. Wheaton.