

## ISSUES AND STRATEGIES FOR CANOPY MANAGEMENT OF AVOCADO ORCHARDS IN THE JORDAN VALLEY OF ISRAEL

**Cliff Lahav**

Ministry of Agriculture and Rural Development  
Interior Valley Region, Extension Service, Israel

The purpose of this short paper is to share with California avocado growers the light and canopy maintenance practices in certain commercial orchards in Israel. After visiting groves and meeting grove owners, farm labor contractors, farm managers and workers, researchers and extension personnel and discussing their earnest concerns with regard to this vital issue, I am certain, that one of the main energy inputs in the California groves will be directed in this area in the future.

In the comments below I am not necessarily recommending to growers that these exact methods be implemented for maintaining orchards since conditions are so varied. What I am hoping is that the California grower will consider the principles surrounding the approach and will adapt this strategy to their local conditions.

The Israeli Avocado industry is facing stiff competition from the Spanish and Mexican Avocado producers. European Market prices are sagging due to the influx of large quantities of fruit and in light of this only those producers, at the farm level, that can maintain consistently high levels of yield with good fruit size (The European markets prefer quality fruit that range in size between 235 to 315 grams) will be able to be profitable and thrive in the coming years. Our orchards were becoming overgrown and the fruiting canopy of the trees was starting to become extremely high; too high, in fact, for economically harvesting the fruits (We have high labor costs along with the costly operation of our picking aids, "Afronim" or "Cherry Pickers": \$35 to \$60 per day at the rate of 1 to 0.75 tons per work day).

Do these problems sound familiar? What the Israeli industry did was to undertake a holistic approach to solving their problems. There were discussions and reevaluations of recommendations in all matters of orchard care: irrigation methods, quantities and intervals; fertigation, types of fertilizer, quantity and method of application; tree structure, pruning methods and light maintenance; as well as harvest and postharvest practices in the groves and packinghouse. These issues are still being examined, and believe me, there are still many questions unanswered and some of the solutions are debatable – *but the main point is that all the industry woke up to the cold fact that "you better get on the train of high yield and quality fruit before you find yourself left back losing money because of poor production and inferior quality fruit.*

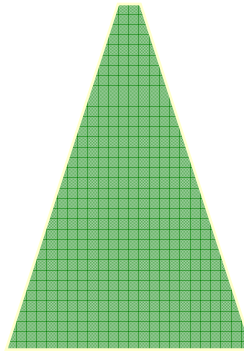
I cannot include in this short discourse our solutions to all these issues. The approach to the issue of canopy and light management practiced in the interior Valley Region (Sea of Galilee) will be presented.

Our main producing variety, 'Pinkerton' was introduced to my area in the late seventies. This Californian native is well adapted to our area. It's characteristics; consistently high

production, small compact trees, high quality fruit are what the Interior Valley grower needs to stay in the market (climatic conditions do not allow commercial 'Hass' production).

The light management system we are implementing is based upon the coordinated use of mechanical hedging and topping and selective branch pruning together with minimal use of plant growth regulators. We are initially shaping our mature trees in a pyramidal form (wider tree bottom than top; Fig. 1) taking into account row spacing, row direction and the maximum tree height desired.

**Figure 1. Pyramidal Tree Form**



In the issue of canopy management we must take into consideration the following:

- The inherent tree structure and growth vigor characteristic of the variety
- Topography
- Planting density
- Labor costs; considerations for harvesting
- Available technology and labor costs for pruning whether it is mechanical or manually accomplished.

Our Specific Strategy for 'Pinkerton' includes the following:

- 420 trees per ha. (4 x 6 meters)
- Planting direction – we prefer to have the rows in a north to south orientation
- Maintaining the tree height at 4 to 4.5 meters.
- We recommend that the lower width of the tree be kept at 3.5 meters, or about 1 to 1.5 meters from the trunk
- Maintain a “open” distance between the rows of 2.5 to 3 meters
- We maintain this structure by:
  - Post Harvest Hedging and Topping
  - Summer Hedging and Topping (Light Trimming)

Changing your orchard into a manageable orchard is not an overnight process; it takes time and patience. Listed below is a 4 year scheme to that we use to maintain our orchard structure.

#### Year 1

- Harvest early in the commercial season
- Mechanical hedging and topping; initiated before orchard growth “runs away”
- Use of plant growth regulators during bloom

- Late summer “trimming” on post-bloom flush
- Application of plant growth regulators post-trimming in late summer (5 cm sprouts)

#### Year 2

- No postharvest topping + hedging
- Late summer “trimming” on post-bloom flush.

#### Year 3

- If needed, following harvest do “heavy” cutbacks on one side of the row to 1-1.5 meters from trunk. Do this all along the row to create open light space. The opposite side is not pruned so yield potential is not affected.

#### Year 4

- After harvest, we cutback the side that was not touched the previous year and in the summer, after the second growth flush is fully extended we slightly trim the opposite side.

At the conclusion of the fourth year we have returned to our initial tree structure and the process begins again.

There are several advantages to this system including:

- Constant and uniform light penetration into the interior of the tree
- Continuous rejuvenation of trees
- Compact trees
- Larger fruit
- High yield

In summary, this system is recommended on a commercial level and is economically advantageous to our growers and most importantly is practical and operable in our conditions.

For the California avocado grower who is facing the dilemma of how, what and when to prune their orchard: You may consider the benefits of certain aspects of this program such as cutting back in alternate years plus maintaining tree structure.

I hope that this short discourse stimulates you into asking yourselves: How is it possible to adapt this strategy and implement it in California orchards? And if any of you are ever in the neighborhood of the Sea of Galilee, Israel, give me a ring and stop by for a visit and see for yourselves!!!