

REVITALIZING AVOCADO JUNGLES

Piet J. C. Stassen

Infruitec (Fruit Vine and Wine Research Institute)
Stellenbosch, Republic of South Africa

Introduction

Overcrowded orchards create a jungle effect with dense canopies and dark interiors. This results in a denuded unproductive area inside and at the base of a tree, because of the die-back of bearing shoots. Huge trees develop and this makes spraying and picking in the orchard extremely difficult.

Light management

The basic problem in an overcrowded orchard is light deficiency. The secret of revitalizing such an orchard lies with optimizing light interception in the entire orchard and insuring light penetration into the tree canopy. A hedgerow system with trees closer together in the rows and more space between rows is the best way to improve light interception. An adapted north-south row orientation (according to latitude, siting, sunburn occurrence, and other practical considerations) will give the ideal spatial arrangement.

Time of pruning. The initial severe pruning should preferably be done after harvesting. Pruning is not a one-time process and follow-up pruning actions must be carried out throughout the year.

Post harvest pruning. Remove individual branches that cause overshadowing. Retain the shape of the tree by especially preventing the treetops from becoming too wide and tall.

Spring pruning (light shaving). Vigorous water-shoots should be removed or headed back in a timely manner (at ± 200 mm length). Tip terminal growth where excessive flowering occurs. Vigorous water-shoots must be removed selectively or in the case of mechanical pruning cut back when they reach a length of about 200 mm. Growth inhibitors applied to the young flush (50 mm) after pruning and correct nitrogen application are important tools to help curb the vigorous growth. *(Editors' note: At the current time the use of plant growth regulators for such use are NOT approved for use in California. CAC/PRC is currently funding research examining the potential of PGRs for California avocados.)*

Summer pruning (light shaving). Skim shoot tips. Pay attention to treetops to avoid wide and bushy growth. It must be emphasized that tree management is a parcel of activities with correct timing of the activity crucial to its success.

Strategies

Little or no overcrowding. In this instance the orchard has not yet reached the overcrowded stage or a tree thinning program has been timely applied. The base of the tree has not been denuded but die-back could have started on the inside of the trees. Ensure that a V-shape opening is achieved in the work-row and remove any branches creating a roof effect.

Open tree tops selectively. Tops of trees are pruned selectively by removing angled branches that may cause over-shadowing and cut others to a more horizontal plane. In this way better light penetration can be achieved. Treetops are made narrower by cutting back long branches so as not to overshadow the base and an open V-shape is obtained in the work-row.

Open tree tops mechanically. To introduce light into trees where the tops are starting to touch, the tops (i.e. the top 1/3 of the tree) are cut open at 25° to prevent the base being denuded.

Cut the sides of the trees at a 10° angle and ensure that the tree height does not surpass 80% of the row width by cutting the top 1/3 of the tree at a 25° angle. The above strategies will not decrease yield but should increase yield and fruit quality.

Medium overcrowding. In this case die-back on the inside and at the base of the trees has commenced. To counteract this phenomenon light must immediately be allowed to reach the base and the inside of the tree.

1. Prune one side (first the east side) at 10° and the tree tops on the same side at 25°. The next year the other side can be pruned. The first side will then have developed new bearer shoots and tree height can be reduced as required. Hereafter a lighter annual manipulation program is followed. No yield loss will occur.

Serious overcrowding. In this instance the base of the tree is already denuded for a number of meters above the ground. To rehabilitate such trees, drastic pruning has to be done. One year's yield will be sacrificed in most instances but with correct timing and a growth management program it is not always the case. Cultivars like 'Pinkerton' and 'Edranol' especially, can be revived and still produce a good crop.

1. Select one to four vertical leaders.
2. Head these leaders at a height of 3 to 4 m in about July (January in the Northern Hemisphere)
3. Cut the angled leaders and other branches back to achieve a pyramidal shape (cut branches at the base, growing into the work row, to about 1.5 to 2 m from the main stem and at the top to about 500 mm)
4. This will ensure that an open V-shape is created in the work row.
5. Paint the trees.
6. The first re-growth will develop within three to six weeks.
7. During October/November (May/June in California based on phenology data) shave the re-growth when about 200 mm or longer.
8. Spray the flush when about 50 mm long with a growth inhibitor if allowed.
9. Do another shave during December/January (August/September in California based on phenology data). Spray again when the new flush is about 50 mm long, if necessary.
10. Make use of a nitrogen management program. Divide the annual nitrogen requirement into six or more applications and decide according to the leaf analyses and visual observations of growth whether all the applications are necessary. Vigorous growth must be avoided at all costs.

Chemical growth inhibitors and nitrogen

Pruning is only one part of a rehabilitating process that also includes growth management. Growth inhibitors can play an important part in the pruning program especially in high potential soils. It must be remembered that no residues are permitted on export fruit after harvesting and the withholding period must therefore be strictly adhered to. *(Editors' note: At the current time the use of plant growth regulators are NOT approved for this use in California. CAC/PRC is currently funding research examining the potential of PGRs for California avocados.)* Judicious nitrogen management is another tool for controlling vigorous growth. It is also easier to control growth with nitrogen if soils have less than 25% clay. Yield is one of the best ways to control shoot growth, therefore alternating and low yields must be avoided.

Pruning equipment and mechanization

Various mechanical saws are currently available. For the initial sawing process chainsaws and/or tractor driven saws are necessary. For the summer pruning processes use can be made of a light inexpensive gasoline driven hand saw with a rotating blade. The additional advantages of orchards that have been pruned open are that picking, spraying and other orchard operations become cheaper and can be semi-mechanized for greater efficiency and cost saving.

Summary

Rehabilitation of encroached orchards can be done on a commercial scale. It is recommended that whatever strategy is chosen, trees be pruned to a pyramidal shape so that the work-row can have an open V-shape for better light utilization. The work-row should preferably be north - south orientated if circumstances permit. Tree height should not be more than 80% of row width and on steep slopes or with east-west orientations, even less.

It is critically important to realize that pruning is not a one-time treatment. In most situations the initial pruning must be followed up with less drastic pruning. A growth management program must be in place to control growth. Nitrogen application, in particular, must be done with great care so as not to stimulate unnecessarily vigorous growth.