

Pruning and managing existing avocado orchards

B Snijder, JM Mathumbu and PJC Stassen

ARC-Institute for Tropical and Subtropical Crops, Private Bag XI7208, Nelspruit 1200

E-mail: Bram@itsg2.agric.za

ABSTRACT

Pruning of avocado trees is becoming an important part of orchard management. Producers are more aware of the difficulties with the management of large trees in overcrowded orchards. Spraying is difficult and often ineffective and fruit picking becomes more formidable, the larger the trees become, with yield and fruit quality declining rapidly in such orchards. Alternate bearing also becomes more ensconced along with all the fruit quality and economic implications thereof. The underlying **problem** is a lack of light interception and penetration into the dense overcrowded orchards. Die-back of inner branches creates vast empty canopies moving the crop ever higher.

In the past, practices such as tree thinning or staghorning of trees were used to alleviate the overcrowding problem. These were only temporary measures as the avocado trees grew back vigorously diminishing the effect of thinning or staghorning within two to three years.

The ARC-ITSC has shown over the past five years that a well structured and managed pruning programme can alleviate the problem of overcrowding. Pruning trees to a pyramidal shape can increase sunlight interception and penetration with the renewal of bearing wood and an improvement on yield and fruit quality. Initial heavy pruning of an overcrowded orchard may result in the loss of one year's crop. Timeous pruning of orchards not yet overcrowded can, however, keep the orchards in production for their entire lifespan.

In this paper the principles and practice of mechanical and selective pruning will be discussed. The use of bio-regulators and cincturing to curb vigorous regrowth and induce fruiting will also be briefly discussed.

INTRODUCTION

Overcrowded orchards create a jungle effect with dense interlaced canopies and dark interiors. This results in denuded unproductive areas inside the trees and at their base because of die-back of bearer shoots. Huge trees develop and this can make spraying ineffective and fruit picking in the orchard extremely difficult.

LIGHT MANAGEMENT

The basic problem in a overcrowded orchard is light deficiency. The secret of revitalizing such an orchard lies in optimizing light interception by the trees in the orchard as a whole and ensuring light penetration into the tree canopy.

TIME OF PRUNING

An initial severe pruning will preferably be done in the period directly after harvesting. Prunings are not a one-off 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 (watershoot control)

Remove or head vigorous watershoots timeously. Selectively remove or mechanically head watershoots when they reach a length of 200 mm. Tip terminal growth where excessive flowering occurs. Growth inhibitors can be applied to the young flush when reaching 50 mm after pruning. Correct applications of nitrogen (small amounts more regularly, avoiding the Nov-Jan period) is also an important tool to help curb the vigorous growth.

Summer pruning (light shaving)

Skim the shoot tops to induce complexity. 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

A) Little or no overcrowding

In this instance the orchard has not yet reached the overcrowded stage or a tree thinning program has been timeously 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.

1. Open the tops selectively. Tops of the trees are pruned selectively by removing angled branches that may cause overshadowing 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.

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

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

B) 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 (eastern side first to prevent sunburn on the main branches) at an angle of 10° and the tree tops at 25° at the same time. The other side will be pruned in the second year.

2. In the second year, the eastern side will have developed new bearer shoots and tree height can be reduced as required.

3. From the third year onward a lighter annual maintenance programme is followed. No or little yield loss will occur.

C) 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 years 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 and head these leaders at a height of 3 to 4 m in about July.

2. Cut the angled leaders of other branches back to achieve a pyramidal shape. Cut the branches at the base that grow into the work-row to about 1,5 to 2 m from the main stem and at the top to about 500 mm. This will ensure that an open V-shape is created in the work-row.

3. Paint the trees with a reflecting paint to minimize sunburn on the branches.

4. The first regrowth will develop within six weeks after pruning in July/August.

5. In October/November shave the regrowth when about 200 mm long to ensure enough branching. The regrowth after this shave can be sprayed with a growth inhibitor when the shoots are 50 mm long.

6. Another shave can be done in December/January to ensure enough complexity, and again the regrowth can be sprayed when 50 mm long.

7. Make use of a judicious nitrogen management programme by dividing the annual application into six or more applications. Decide according to the leaf analysis and visual observations of growth whether all the applications are necessary. Avoid vigorous growth at all cost.

CHEMICAL INHIBITORS AND OTHER MANIPULATION 'TOOLS'

Pruning is only one part of a rehabilitating process that also includes growth management. Vigorous growth that is not curbed in time will undo the advantages obtained by pruning within one season. In high potential soils this process is reversed even sooner without growth control. The best controller is yield, as this will drain much of the energy away towards its fruit.

Bio-regulators (plant growth inhibitors) can play a very important role in curbing the growth. Spraying the new flushes at the correct stages will reduce the vigour in favour of fruit. It must be remembered to follow the instructions for the bio-regulators, as no residue is permitted in export fruit. Girdling or cincturing are also tools that can be used to induce fruiting in avocado. Results have shown that timing is not critical, but it should be done between February and April for the best results. Another tool, which has been mentioned already, is judicious nitrogen control. Soils with less than 30% clay growth can be more easily manipulated with correct nitrogen applications. In soils with higher clay contents it is more difficult and great care should be taken in compiling a nitrogen programme.

PRUNING EQUIPMENT AND MECHANIZATION

Various mechanical saws are currently available. For the initial sawing process, chainsaws and tractor driven saws are necessary. For the summer pruning process use can be made of a light inexpensive petroleum driven hand saw with rotating blade. It is however very important to remember that mechanical pruning needs to be followed with a selective pruning, to avoid the formation of a wall of branches, without much leaf canopy. In winter selectively remove some of these 'brooms' to regrow new shoots from within the tree. The additional advantage 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.

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, however, important to realize that pruning is not a one-off treatment. In most situations the initial pruning must be followed up with less drastic pruning. A growth management programme 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.