

Manipulation of Hass Avocado Trees Fruit Induction and Thinning

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ABSTRACT

Experiments to determine whether vigorously growing trees can be forced into fruiting by curbing growth at the right stage and at the correct time are in demand. The influence of fruit load on fruit size and future production is presently being investigated. Other aspects of tree management (controlling vigorous growth, stimulating fruit set and preventing fruit drop) are being planned for the forthcoming season.

Provisional results are presented and discussed.

INTRODUCTION

Horticultural practices have as primary aim the management of vegetative and reproductive relationships in appropriate crops. In this respect support is provided by physiological data which clearly define the sink-source relationship between the various plant parts and organs. Essentially, tree management involves the timeous canalization of assimilates and nutrient elements, and the control of hormone levels to achieve an effective orchard with regard to light utilization, fruit production, fruit quality, tree size, etc.

In certain crops, some of these aspects have already been adapted to commercially viable practices. Wolstenholme & Whiley (1989; 1990), and Wolstenholme (1990) have, in this connection, debated the theoretical aspects relating to avocados. These principles must, however, be developed into practical implementable practices in order that a tree management programme can be established. Certain information is available while other aspects are still vague. A comprehensive crop approach will be required to bring together all these aspects.

What are we striving for?

- Development of sufficient bearers within and throughout the whole tree but with the prevention of vigorous growth of watershoots that compete with the bearers and encourage overshadowing within the tree.
- Optimum, healthy and effective leaf coverage (through tree size and shape).
- Sufficient flowering and good pollination.
- Good fruit set (in order that small, damaged, misshapen and excess fruit can be selectively removed).
- Retention of fruit set.

- Stimulation of fruit growth.
- Ideal leaf to fruit ratio i.e. correct fruit load (tree potential utilization without exceeding the limits).

MATERIAL AND METHODS

This is given in the article *Manipulation of Hass Avocado Trees — Pruning* on page 73 above.

RESULTS AND DISCUSSION

The avocado-producing areas of South Africa have mainly high potential soils with resultant vigorous growth of young trees. It has been found that even clonal plant material produces trees that do not fruit at the same time. It has been debated that trees could be forced into fruiting by inhibiting growth at the initiation stage. Initiation, according to Scholefield *et al.*, (1985), occurs in the avocado in autumn. In table 1 results are given of what was achieved in provisional cincturing trials carried out at an early stage (end of February) and at a late stage (beginning of May).

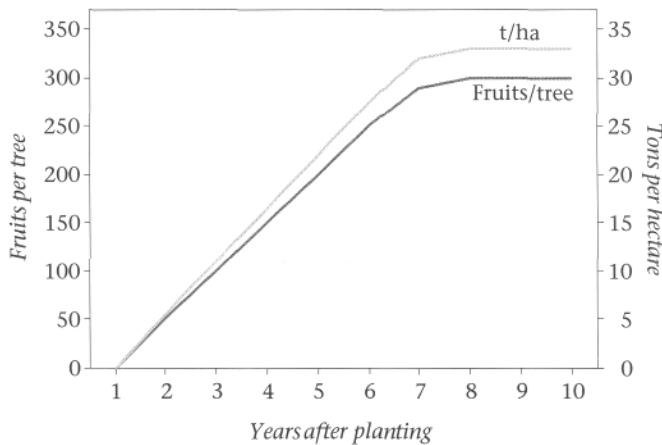


Figure 1

Arbitrary fruit yield graph for avocados at 400 trees/hectare (fruits/tree and tons/ha)

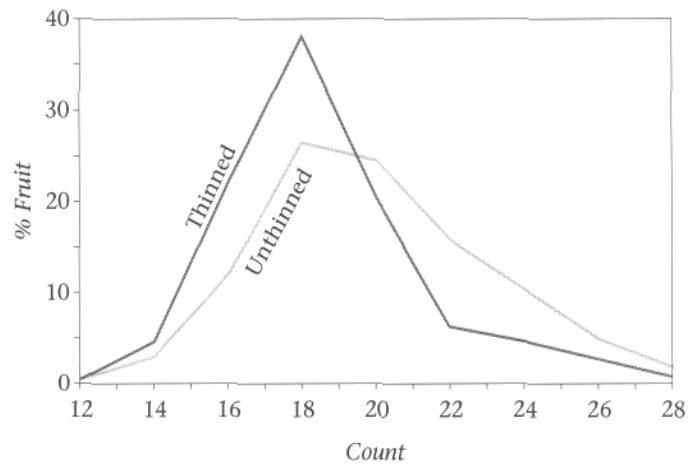


Figure 2

Initial results of fruit thinning on fruit size distribution

From the results shown in table 1 there appears to be a tendency toward increased fruit set with both treatments. The increase in May is, despite the relatively large number of trees, not significant, but the difference in February is significant.

It appears that cincturing achieves the necessary improvement in fruit set and that the February treatment for forcing young trees into set is better than the later treatment. Dramatic set improvement with scoring during February at Riverside (August in the southern hemisphere) was found with older trees

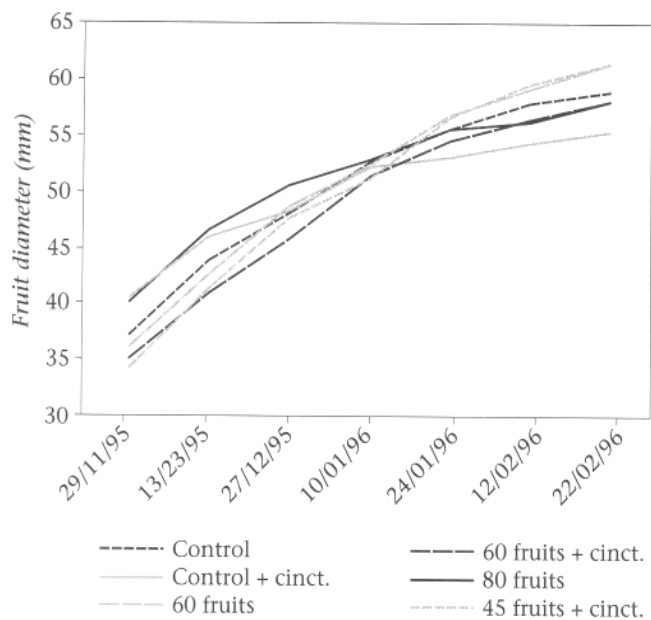


Figure 3

Fruit growth curves of young Hass avocado trees with various fruit thinning treatments in the Kiepersol area (experiment 1)

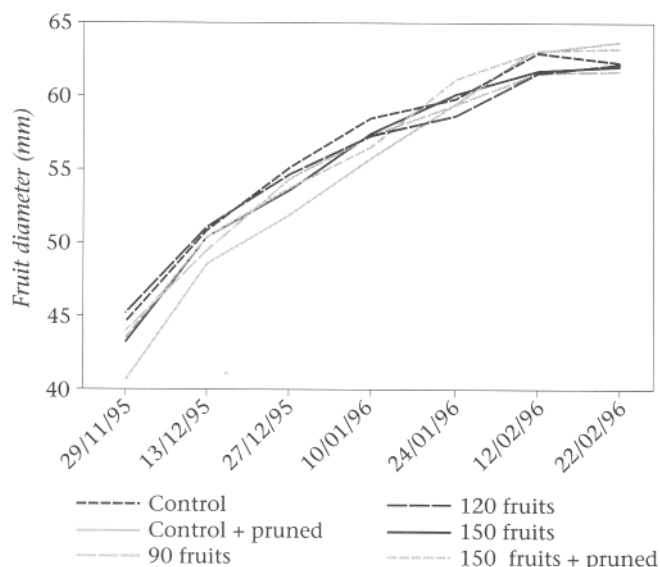


Figure 4

Fruit growth curves of young Hass avocado trees with various fruit thinning treatments in the Kiepersol area (experiment 2)

Table 1

A comparison of the production of cinctured and non-cinctured 24- and 29-month-old Hass avocado trees in the Kiepersol area

Tree age	Treatment	Fruit load	
		Nov.	Feb.
24 months	Cinctured beginning May	76,9 ^a kg (40) ¹	
	Non-cinctured	59,6 ^a kg (40) ¹	
Not significant			
29 months	Cinctured end of February		142 ^a kg (10) ¹
	Non-cinctured		64 ^b kg (10) ¹

(P = 0,05)

¹Number of trees per treatment

Table 2

Fruit counts carried out on avocado trees of various ages to determine potential yield

Trees and treatments	Nov.	Feb.
Pruned 2-year-old Hass at Kiepersol	122 (37)	81 (10)
Pruned 3-year-old Hass at Kiepersol	310 (10)	125 (5)
Unpruned 4-year-old Hass at Kiepersol	—	172 (10)
Pruned 8-year-old Hass at Levubu	1 189 (4)	517 (4)

(H.L. Francis, 1996 — Lecture given at the South African Avocado Growers' Association symposium). A whole series of cincturing trials will be conducted bi-weekly from February to April of this year. In addition, other methods of inhibiting over-vigorous growth during the early spring and summer months will be examined during this year.

In order to study the effect of fruit load on fruit size in the current season, and yield in the following season, we have this year commenced with a number of fruit thinning trials.

Figure 1, an arbitrary production graph, is based on fruit load counts over the past two

years (table 2).

Using the graph in figure 1 as a tentative indicator of the trees' yield potential, various fruit thinning trials have been conducted.

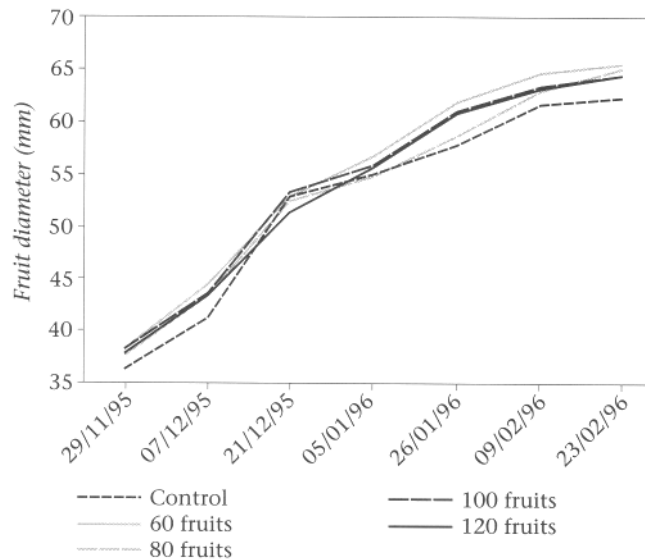


Figure 5
Fruit growth curves of young Hass avocado trees with various fruit thinning treatments in the Levubu area (experiment 3)

An initial pilot study carried out in 1994 suggested a positive shift in fruit size when fruit was thinned in October to 50 % of the fruit load at that time (figure 2).

The effect of fruit thinning on the current fruit growth curves are shown in figures 3-5. From these curves it is clear that over a period of nine weeks, after fruit thinning, no significant shift has as yet occurred. The season to date has, however, been mainly cloudy with relatively cool temperatures and there is still a reasonably long period before maturity. These trials will be continued as fruit counts indicate that after November (January fruit drop) a further 82 % of fruit fall from avocado trees growing on high potential soils and up to 41 % with less vigorous growers, while the percentage drop is reduced, in relation to the intensity of thinning. This situation will be followed up at harvest and the effect monitored in the new season.

SUMMARY

Provisional results suggest that cincturing promotes fruit set. Cincturing during January appears to be better than during May. Cincturing can therefore be used as a method of forcing vigorously growing young trees into fruiting, and scoring during August might be looked at for better fruit set.

To date fruit thinning has not shown any evidence of fruit enlargement, but as it has been a cool season so far we shall have to wait till harvest for final deductions to be

made.

It has yet to be determined what the avocado's actual yield potential is and whether the removal of excess fruit will stabilize the annual yield.

REFERENCES

- WOLSTENHOLME, B.N. 1990. Resource allocation and vegetative — reproductive competition: opportunities for manipulation in evergreen fruit trees. *Acta Horticulturae* 275: 451 - 459.
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