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INVESTIGATION INTO FRUITSET OF AVOCADO

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SUMMARY

The influence of the type op inflorescence ("det./indet."), tipping and growth retardant on avocado fruitset is under investigation. Preliminary results show considerably higher fruitset in "determinate" clusters.

OPSOMMING

Die invloed van die soort bloeiwyse ("det./indet."), groei-inhibeerder en snoei van groeipunte op avokado vrugset word nog ondersoek. Voorlopig resultate toon heelwat beter vrugset in die geval van "bepaalde"bloeiwyses.

INTRODUCTION

In order to achieve a higher yield of avocados, an increase in fruitset is required. In other horticultural crops, e.g. apples, pears and grapes, shoot tipping is used to achieve better fruitset. In principle this has also been proved to be true for avocados (Blumenfeld, Gazit and Argaman, 1983) but more detailed information is required.

It seems that tipping results in a change of hormone patterns of fruitlets, especially auxins and abscisic acid (ABA).

The avocado has two different types of flower clusters. The "determinate" one consisting of flowers only and the "indeterminate" one which continues with vegetative growth during and after flowering (Fig. 1). The "determinate" type of flower cluster can be regarded as a naturally tipped "indeterminate" inflorescence. This study is aimed at pointing out possible differences in fruitset between the two types of flower clusters.

Fig. 1. Determinate and indeterminate flower cluster.

MATERIALS AND METHODS

1. Vegetative growth of "indeterminate" flower clusters in the cultivars Mass and Fuerte was reduced by shoot tipping and application of a growth retardant (Paclobutrazol), [(2RS,3RS)-1-(4-chlorophenyl)-4, 4-dimethyl-2-(1,2,4-triazol-1-yl)pentan-3-o1].

Fruitlets in different stages of development were picked and placed on agar to allow hormones to diffuse into it. After 24 hours the agar blocks were shock-frozen in liquid nitrogen for later hormone analysis.

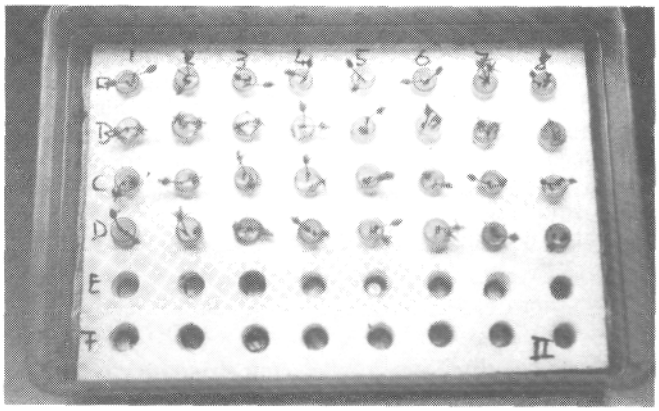
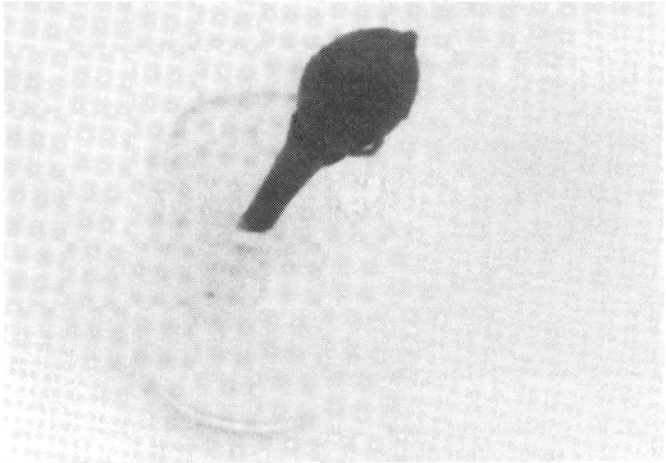


Fig. 2. Sampling different stages of fruitlets for hormone analysis.



The aim should be to get better yields from smaller trees instead of excessive growth from vigorous trees. This aim is not easily achieved because the major prerequisite, a dwarfing rootstock that is also *Phytophthora* resistant, has not yet been found. However, there are other possibilities for manipulating the tree in order to control growth, which have not yet been utilised at all.

Internationally this way of thinking is receiving more and more support. Wolstenholme (1985), reporting on the ISHS Symposium stated: ”The recurring theme at the symposium was the need to control vegetative vigour of the branched evergreens. In the words of Dr G. Edwards, in his closing summary: 'We are in the business of growing fruit not timber. It is true that big trees produce more fruit than little trees, but lots of little trees can produce as much or more fruit as a few big ones.’ It is fruit production per ha, and not per tree, which is important. Tropical and subtropical horticulture must therefore follow the established trend of the deciduous fruit growers, where possible".

CONTROLLING GROWTH

A. YOUNG TREES

Controlling the growth and shape of trees that should bear fruit early and regularly later on, should already start in the nursery. Young trees with many potential bearing points become productive at an earlier stage than trees with only a few lateral branches.

Trees with more lateral branches can be obtained by careful pruning and/or by spraying with branching agents (Quinlan, 1978). Early cropping is essential in order to get rapid repayment of the capital invested in a new intensive orchard (Walpole, 1984).

New plantations are to be laid out and managed with the idea of shortening the juvenile phase and making young trees produce fruit at an early stage. This can be achieved by a higher planting density and by careful tree training. The latter follows the principle that horizontal branches tend to fruit much better than vertical ones. Upright branches should therefore be tied or pulled down. By this means, vegetative development can be limited while early fruiting is enhanced. The best weight one can put on a branch in order to pull it into a more horizontal position is of course fruit! Early and regular yields as such, restrict excessive vegetative growth

Fig. 3. Branches have been tied down to a more horizontal position.

Even if all these measures are taken, the vegetative growth of avocado trees might still be difficult to control because of high summer rainfall, warm temperatures and good soil with rather high nitrogen levels such as occur in our orchards at the Westfalia Estate.

B. PRUNING

Attempts at pruning strong growing trees back to the desired shape often result in even more regrowth. Continuous pruning leads to more branching and stimulates constant regrowth. Pruning at the wrong time therefore encourages the vegetative phase and this should be avoided.

C. HORMONAL MANIPULATIONS

Boswell, Bergh and Whitsell (1971 & 1976) demonstrated that undesirable regrowth occurring after pruning can be inhibited through the use of certain chemicals. Quinlan (1981) also showed that some growth regulators can successfully control tree size at all stages of tree development. Promising results with a new potent growth retardant were obtained in deciduous fruit trees (Quinlan, 1981; Williams, 1984). This compound is presently being tested on avocado trees at Westfalia.

CONCLUSIONS

The successful avocado grower should put the emphasis on fruit production not on wood production. Poor fruit set and physiological disorders of fruit can be increased through excessive vegetative growth. Too much growth can be controlled by higher planting densities as well as by careful orchard management. Well known horticultural practices and judicious application of suitable growth regulators will help in achieving higher yields and thus improving the prospects of meeting the growing demands of the markets.

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