

PROGRESS WITH THE SINGLE TREE MANAGEMENT CONCEPT

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ABSTRACT

A second years' data of the performance of 'A' trees (top producers) and 'E' trees (poor producers) was reported on. The trend in yield of 'A' and 'E' trees over two years was generally consistent. Internal quality of fruit from 'A' trees was significantly better than that from 'E' trees over a two year period. Attempts are constantly being made to make exact copies of 'A' trees with some success during the 1992 season. The practical implications and applications of single tree management were reported on.

INTRODUCTION

The concept of a single tree rating system was introduced in the 1992 South African Avocado Growers' Association Symposium (Smith & Köhne, 1992) and the difference in yield and quality of so-called 'A' trees (high producing trees) and 'E' trees (low producing trees) in the cultivar 'Fuerte' shown.

No one cultural or physiological factor was identified as a causal factor of 'A' trees, yet 72% of the 'E' trees were shown to be infected with the Avocado sunblotch viroid (ASBV) which is known to cause a yield decline (Wallace, 1958; Bergh, 1974; Da Graca, 1985). However, without physically infecting a good bearing tree with the sunblotch viroid and showing a decline in yield one cannot conclusively say that ASBV is the cause of 'E' trees.

The yield and quality work of 1991 (Smith & Köhne, 1992) was repeated in 1992. Furthermore the practical implication to the grower of this type of work was reported on.

MATERIALS AND METHODS

The same fifty 'A' trees and fifty 'E' trees were used and harvested individually in two rounds (April and May) and fruit quality for each round evaluated after four weeks of cold storage at 5,5°C using 28 fruits per tree per round (fruit weight range 266 305 g). After removal from cold storage, fruit were placed at 18°C to induce ripening. Soft-fruit were inspected externally for cold damage and internally for the physiological disorders pulp spot, grey pulp and vascular browning. Phenological stages of trees were also monitored.

As reported in 1992 (Smith & Köhne, 1992) further physiological work would continue, as well as following the genetic option to ascertain whether or not exact copies of 'A'

trees would produce similarly to the mother tree based on work reported on by Ben Ya'acov(1972; 1973; 1976; 1987). From a physiological aspect Steyn & Robbertse (1993) reported on work done on the possible hypothesis of botanical differences between 'A' and 'E' tree flowers. In terms of making copy trees a number of options were followed by the authors and with the assistance of Dries Alberts of Levubu. This work is reported on later.

RESULTS AND DISCUSSION

In terms of yield over a two year period the majority of trees were consistent in their 'A' or 'E' trends. Two of the 50 'A' trees did not perform well during the 1992 season and would therefore fall out of the selection process. Of the 'E' trees there were five that had a very good yield during the 1992 season all of these particular 'E' trees were negative for SABV. Average yields from 'A' trees were higher during the 1992 season than 1991 with two 'A' trees yielding 1100 kg each. Internal fruit quality of all 'Fuerte' was excellent during the 1992 season. Fruit quality from this trial was no exception. There was no significant difference in fruit quality (internally and externally) between 'A' and 'E' trees over both rounds. Over the two year trial period however, 'A' trees had significantly better internal fruit quality than 'E' trees (Fig. 1).

Tree phenology followed the same pattern as in 1991 with 'E' trees beginning to flower about one month earlier than 'A' trees and continuing to flower longer than 'A' trees.

Attempts were made during the 1991/1992 season to make exact copies of 'A' trees. A method using root cuttings from 'A' trees to establish the rootstock showed some success initially, yet rooted cuttings have since died back. Time of sampling of cuttings could play a role here and further work will be done in this respect. Approximately five 'A' trees have however now been "copied" by exposing roots to sunlight and girdling, followed by putting the resulting rootstock shoots through normal avocado nursery procedures (Durand, 1990). These young copy trees, although not from the best 'A' trees, must now be planted out to monitor their performance.

The implication of the whole single tree management concept is twofold.

1. Identification alone assisting orchard management:

- (a) By mapping orchards, areas of 'E' trees and/or 'A' trees can be looked into and possible cultural differences managed.
- (b) Identifying 'E' trees quantifies one's cost of failure enabling one to possibly remove trees that have had a consistently poor yield for an extended period.
- (c) Knowing a tree's performance will also assist one in one's decisions when thinning an older orchard.

2. Identification of 'A' trees could assist in future selections, be it from a rootstock, scion or rootstock/scion combination aspect.

Therefore by firstly, single tree identification, and subsequent management of this, the cost of failure can be influenced as well as yield potential and, hopefully, there can be an influence of future yields.

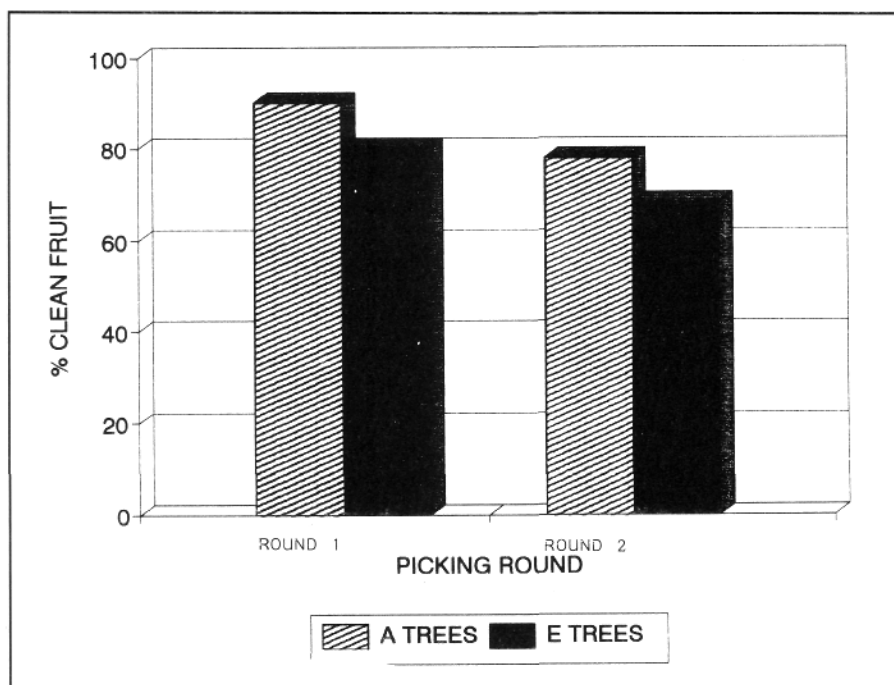


FIG. 1 Average internal quality of 'Fuerte' from 'A' and 'E' trees over a two year period expressed as the percentage fruit clean of grey pulp, pulp spot and vascular discolouration.

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