

AVOCADO PRODUCTION RESEARCH AT MERENSKY TECHNOLOGICAL SERVICES AND WESTFALIA ESTATE – AN OVERVIEW

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INTRODUCTION

Merensky Technological Services (MTS) and Westfalia Estate are companies within the Hans Merensky Foundation. The mission of MTS is to carry out applied research into subtropical fruit production, to the benefit of the production units within the HM Foundation as well as the subtropical fruit industry in general. MTS presently employs eight agricultural researchers who focus on avocado, mango, litchi and papaya research. MTS is based on Westfalia Estate, a large scale avocado producer, and avocado research is carried out in close co-operation with Westfalia's technical staff. An overview of seven fields of avocado research is given below. All these research fields have essentially the same objective, i.e. increasing yield of high quality export avocados per hectare.

FIELDS OF AVOCADO RESEARCH 1

1. Control of avocado root rot

Root rot, caused by *Phytophthora cinnamomi*, is the most important avocado disease in South Africa.

Recently imported clonal rootstocks, reputedly less susceptible to *Phytophthora cinnamomi* than the present standard Duke 7, are being tested under local conditions for productivity and resistance to root rot (Conradie et al, 1994).

Furthermore, selected fungi and bacteria, which occur naturally in local avocado soils, are being cultured and applied as antagonists to combat *Phytophthora cinnamomi* (Duvenhage & Kotzé, 1993). Investigations into improving the method of application for chemical control of root rot are under way. In addition, possible resistance of *Phytophthora cinnamomi* to phosphite after prolonged use of phosphite compounds is being studied (Duvenhage, 1994 a).

2. New avocado rootstocks

A rootstock breeding programme was initiated at MTS some years ago. This project involves the exposure of seedlings from the breeding programme to *Phytophthora cinnamomi*, selection of the healthiest plants, and subsequent testing for productivity and root rot resistance in the field. Furthermore, the performance of Hass on the rootstocks Thomas, Barr Duke and D9 is being compared to Duke 7 (Smith, 1993), with

the first substantial crop to be harvested from these trees during the 1994 season.

A first batch of copies from high performing trees (Smith et al, 1993) has been produced and will be planted in the field during 1994. Their respective rootstock-scion combination is identical to Westfalia's top producing old Fuerte trees on seedling rootstocks.

The choice of the rootstock has been shown to have considerable influence on yield, tree size and orchard profitability with very vigorous rootstocks giving poor returns (Whiley et al, 1990; Köhne, 1991). The evaluation of dwarfing rootstocks and interstocks is therefore receiving attention at MTS. Encouraging observations concerning precocious bearing of Hass grafted on the local rootstock selection, Wilg, have been made. Hass on

Duke 7 with an interstock of Colin V33 also looks promising.

3. Avocado fruit diseases

Cercospora spot, caused by *Pseudocercospora purpurea*, is an important pre-harvest disease of Fuerte fruit. This disease is commonly controlled by timely applications of copperoxychloride. However, unsightly copper deposits often remain on the fruit, necessitating time-consuming and labour-intensive cleaning prior to packing. To overcome this problem, new fungicides and alternative methods of application are being evaluated for the control of Cercospora spot (Duvenhage, 1994b).

4. Hass small fruit size

The avocado cultivar Hass is very popular on the overseas markets due to its superior shelf life and excellent eating quality. However, Hass trees tend to produce a large proportion of undersized fruit, too small for profitable export. The following research projects are aimed at overcoming the Hass small fruit size problem:

- Optimal timing of irrigation for Hass (Van Eyk, 1994).
- Manipulation of Hass fruit growth by means of growth regulators (Köhne et al, 1993).
- Investigation into cross pollination with cv. Ettinger.
- Propagation of large-fruited Hass selections.

5. New avocado cultivars

To ensure competitiveness on the overseas market, testing of new avocado cultivars is of great importance for the future of the South African avocado industry. New cultivars presently under evaluation were either imported (e.g. Pinkerton, T142 and BL122 from California; Iriet from Israel; Shepard from Australia) or are local selections (e.g. 1.14.2 selected by Mr. C. Smit, Citrusdal Research Station). Some of the promising new avocado cultivars under evaluation are described by Smith (1993) and Conradie et al (1994).

6. Physiological disorders in Fuerte

Fuerte fruit is sensitive to cold storage-related physiological disorders. At MTS regular samples are drawn from each Westfalia consignment destined for Europe, and these samples are exposed to simulated sea shipment storage at the prevailing commercial

temperature recommendations. This allows for continuous monitoring of fruit quality. The influence of two clonal rootstocks on Fuerte yield and fruit quality is being studied (Kremer-Köhne & Köhne, 1994). Additionally, post-harvest treatments, such as treating fruit with chlorinated water and waxing, are currently being evaluated for their effect on the development of physiological disorders in Fuerte fruit.

7. Avocado orchard practices

Avocados are horticulturally a young crop with considerable room for improvements with regard to orchard practices. Field trials evaluating fertilisation, pruning and high density orchard practices are under way.

THE COST OF RESEARCH

The Merensky Foundation makes a significant contribution to the costs of research on subtropical fruit in South Africa. Total MTS research costs budgeted for 1994/95 exceed R2,5 million. Of this, approximately one eighth is recovered by funding received from the grower's associations, one fifth is recovered from Westfalia's overseas agents and the balance is paid for directly by the HM Foundation. No government funding is received.

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