

35 Years of SAAGA Yearbooks: A review

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INTRODUCTION

A review of the first 35 SAAGA Yearbooks, from 1977 to 2012, was undertaken to consolidate the hundreds of articles and make the results from articles written in Afrikaans accessible in English. The review is too large for publication in a SAAGA Yearbook so it is located on the websites of Westfalia Technological Services (www.westfaliainfo.com) and SAAGA (www.avocado.co.za). An electronic document will make searching for relevant information easier, and allows for enriched formatting.

The review is divided into the following sections: orchard management, pathology, entomology and market access, genetic resources, anatomy, phenology and physiology, postharvest, nursery, fruit products and economics. Every article in the yearbooks has been included in the review, with editorial comments where appropriate. It must be pointed out that this is not a complete or comprehensive review of South African avocado research and protocols. Information from additional sources – such as Avo Info bulletins, journal publications and monographs – has not been included. The reader is referred to the scientific textbook by Schaffer *et al.* (2013) for additional information, with an international bias, as a guide to the scientific underpinning of contemporary best practice.

RESEARCH TRENDS

Although the South African avocado industry has grown and changed immensely since the 1970s, the same challenges of increasing input costs, increased competition on the European market, *Phytophthora cinnamomi* root rot control, fruit disease control and the need to increase production per hectare, remain. As such, SAAGA's research aims are broadly categorised into four main areas: (i) enhancement of on-farm profitability, (ii) decreased packing and logistics costs, (iii) enhanced fruit quality and consistency of quality in the market, and (iv) threats to industry profitability (Smith, 2012).

Orchard management

Pruning and the use of growth retardants received a lot of attention in the late 1980s and 1990s. Before then, tree removal was standard practice once

orchards became crowded. From those research projects, pruning and growth retardants (uniconazole and paclobutrazol) are today widely used to control tree size and vigour. Orchards are now commonly managed as a hedge-row system with mechanical pruning to maintain the inter-row space. Tree planting densities have increased from about 200 to about 350 per ha under tree invigorating conditions.

The Small Hass Problem received much attention in the 1990s and recommendations from that research, such as mulching and better soil water management, improved fruit size, but a shift in European buying habits from large to small fruit helped to overcome this problem.

Pathology

Phytophthora cinnamomi root rot control received the most attention during the late 1970s and the 1980s as it was devastating the South African industry at the time. Since phosphonate injections were developed and refined, SAAGA funded research on PRR has declined, but research into improved disease control has continued.

Research into the reduction of copper-based fungicides for fruit diseases is on-going, with good progress being made in formulations (i.e. Ortiva™ and cuprous oxide) and spray machinery (i.e. mist-blowers and more recently the TracFog ultra-low volume applicator).

Entomology and market access

When avocados were first cultivated in South Africa, there were no insect pests of economic concern, but over time and as the industry has grown, insect pests have become increasingly problematic and required research to develop control and management strategies.

The need to diversify into new markets, some with phytosanitary restrictions, necessitated research on phytosanitary treatments (particularly cold disinfestation for insect pests). This research has shown that it is possible to achieve phytosanitary disinfestation using cold sterilisation for Hass.



Genetic resources

A number of rootstock and scion cultivars have been evaluated in South Africa and in the 1990s the Agricultural Research Council managed the local breeding programme for both rootstocks and scions. Unfortunately the breeding programme was terminated at the end of the last century. However, private breeding and evaluation programmes have resulted in new cultivars being released to the industry, notably the Dusa® and Bounty™ rootstocks, and Carmen™-Hass, Gem™ and Maluma™ scions.

Postharvest and the Pinkerton problem

Along with PRR control with phosphonate injections, the other major research achievement from South Africa was cold chain maintenance and step down temperature regimes developed in the late 1980s and 1990s. These findings enabled the delivery of fruit with consistent good quality onto the European market and enabled the industry to expand. More recently, the development of SmartFresh™ for avocados has been very beneficial to the industry by reducing shipping costs and maintaining fruit quality during shipment to Europe.

The adoption of Pinkerton as a high-yielding green skin cultivar, but prone to fruit quality problems, notably external cold damage and grey pulp, necessitated dedicated research into overcoming these disorders. They were largely overcome with the improvement in orchard management and adoption of norms for fruit nitrogen content, moisture content and shipping temperature regimes, and the adoption of controlled atmosphere storage and 1-MCP (Smart-Fresh™) treatment.

Nursery

Good quality nursery trees are essential for the success of an orchard. The establishment of the South African Avocado Nurseryman's Association and the Avocado Plant Improvement Scheme in the 1980s resulted in better quality nursery trees being supplied to growers.

Fruit products

The establishment of avocado fruit processing plants for oil and guacamole, removed poor quality fruit from the local market, restricting the supply of poor quality fresh fruit and ensuring better fruit quality and sustainable fruit prices on the local market.

CONCLUSION

Although the South African avocado industry has grown and developed greatly since the founding of SAAGA, there is still work to be done to enable it to prosper in the twenty-first century. It is hoped that the main review will assist future researchers by making this invaluable information more easily available.

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