

Field testing of new avocado rootstocks for tolerance to root rot

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ABSTRACT

Vegetatively propagated rootstock selections grafted with Hass are being evaluated for their root rot tolerance and yield potential in an orchard heavily infested with *Phytophthora cinnamomi*; two plantings have been established to date. The rootstock selections are compared to the commercial standard (Duke 7) and susceptible controls (Edranol seedling rootstocks). In 1999, tree condition was evaluated in both orchards. In the first orchard (established 1996), trees were rated from the healthiest to the poorest: VC 256, VC 805, VC 801, VC 218, VC 207, VC 241, Duke 7, Edranol seedlings and VC 225. In the second orchard (established 1998), first differences in tree condition also became apparent between rootstocks; trees were rated from the healthiest to the poorest: Velvick, Merensky II, Merensky III, Duke 7, Merensky IV, Gordon, Edranol seedlings and Jovo. In both orchards, a first crop is to be picked in 2000.

INTRODUCTION

Root rot of avocado, caused by *Phytophthora cinnamomi*, is the most important avocado disease in South Africa. Currently, the South African avocado industry relies on chemical control of root rot with phosphite compounds, and the use of the root rot tolerant Duke 7 rootstock. The long term solution would be a high yielding avocado rootstock with resistance to root rot. In this study, various vegetatively propagated rootstock selections are evaluated in the field for yield and root rot tolerance in comparison with the tolerant Duke 7 rootstock.

MATERIALS AND METHODS

The experimental orchards are situated at Westfalia Estate in the Northern Province of South Africa (latitude 24°S). This is a summer rainfall area (average 1300 mm per year). The soil type is a fine-loamy, red, mixed paleudult with a clay content of approximately 40%. Irrigation is scheduled by means of tensiometers and applied by micro sprinklers.

The rootstocks are tested in an old avocado orchard which is heavily infested with *Phytophthora cinnamomi*.

Two experimental blocks of 0.8 , hectare each have been planted. Each block contains a total of 250 trees on various clonal rootstocks, interplanted with 250 trees on root rot susceptible seedling rootstock (Edranol). For comparison, the current commercial

standard rootstock, the tolerant Duke 7, was also included. Thirty clonal trees were used per rootstock and were planted in a randomised block design. All trees were grafted with Hass.

Block 1 was planted in October 1996, and contains the following root rot tolerant rootstocks from Israel (Ben Ya'acov *et al.* 1992; Ben Ya'acov & Zilberstaine, 1999; Zilberstaine & Ben Ya'acov, 1999): VC 207, VC 218, VC 225, VC241, VC256, VC801 and VC 805. Block 2 was planted in February 1998, and contains South African rootstocks. These rootstocks originate from productive trees, which survived root rot, and were selected at Westfalia Estate (Botha, 1991): Merensky II (Dusa), Merensky III (Evstro), Merensky IV (W 14), Jovo and Gordon. The Velvick rootstock from Australia was also included in Block 2.

To create harsh conditions for selection, no root rot treatments are applied in this orchard. Tree condition was rated in July 1999, according to a disease index of zero (healthy) to 10 (dead) as described by Darvas *et al.* (1984). Results are expressed as the percentage of trees in the healthy category (rating <1). Tree yield will be recorded.

RESULTS

Tree condition ratings of Hass trees on rootstocks originating from Israel are presented in Table 1.

Rootstock	% Trees with rating ≤ 1 *
VC 256	100
VC 805	97
VC 801	93
VC 218	92
VC 207	90
VC 241	80
Duke 7	73
Edranol seedling	52
VC 225	31

* Rating on a scale of 0 (healthy) to 10 (dead)

In 1999, trees were rated from the healthiest to the poorest: VC 256, VC 805, VC 801, VC 218, VC 207, VC 241, Duke 7, Edranol seedlings and VC 225. Although trees on rootstock VC 801 were relatively healthy, crown rot was observed on 10% of the VC 801 trees. No other rootstock was affected by crown rot. Tree condition ratings of the trees on Merensky rootstocks and Velvick are shown in Table 2.

Table 2 Condition of Hass trees on various vegetatively propagated rootstocks as rated in July 1999 (Block 2, planted 02/1998)

Rootstock	% Trees with rating ≤ 1 *
Velvick	100
Merensky II (Dusa)	97
Merensky III (Evstro)	96
Duke 7	87
Merensky IV (W 14)	86
Gordon	63
Edranol seedling	63
Jovo	47

* Rating on a scale of 0 (healthy) to 10 (dead)

In 1999, trees were rated from the healthiest to the poorest: Velvick, Merensky II, Merensky III, Duke 7, Merensky IV, Gordon, Edranol seedlings and Jovo. These preliminary results are in accordance with findings of Menge (1999). No yield results are available as yet.

PRELIMINARY CONCLUSIONS

Clear differences in the health condition of Hass trees on various vegetatively propagated rootstock selections were observed within less than two years after planting. A first crop will be produced in the year 2000.

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