

PERFORMANCE OF HASS ON THREE CLONAL ROOTSTOCKS

J S Köhne

Merensky Technological Services, P O Box 14, Duivelskloof 0835

ABSTRACT

Hass avocado trees on Duke 7, G6 and G755C rootstocks were planted in 1987. In 1989, trees on all three rootstocks bore a first small crop. In 1990, yields averaged 33, 15 and 6 kg per tree for Haas on Duke 7, G6 and G755C respectively. This ranking was reversed for trunk circumference measurements. There was no difference in quality of the fruit grown on the different rootstocks.

INTRODUCTION

The commercial use of clonal rootstocks is relatively new in avocado growing (Whiley *et al.*, 1990). In South Africa, the devastation caused by *Phytophthora cinnamomi* in avocado orchards led to the importation of several new rootstocks from California, for example Duke 7, G6 and Martin Grande (collectively G755A, G755B, G755C). While considerable advances have been made with the selection of *Phytophthora* root rot tolerant rootstocks, only little information regarding the productivity and fruit quality of important cultivars grafted on these clonal rootstocks is available (Whiley *et al.*, 1990).

In this paper, data on the horticultural performance of cv Hass grafted on three clonal rootstocks are reported.

MATERIALS AND METHODS

A Hass orchard (approx 3 ha) was established at Westfalia Estate at a spacing of 5,0 by 5,0 m using equal numbers of Duke 7, G6 and G755C rootstocks. Trees, all equal in size, age and scion, were planted in March 1987. The trees are irrigated by microjet, using tensiometers for irrigation scheduling.

In July 1989 and 1990, tree health, trunk circumference and yield were recorded for 37 trees on each rootstock. Tree health was rated according to a disease index of 0 (healthy) to 10 (dead) as described by Darvas *et al.*, (1984). For tree size determination, trunk circumference was measured 20 cm above ground level.

Fruit quality was evaluated after four weeks of cold storage at 5°C, using 70 fruit (weight range 266 — 305 g) grown on each of the three rootstocks. In 1990, pericarp and seed weight as well as fruit length and diameter were recorded for 50 fruit (weight range 266 — 305 g) grown on each of the three rootstocks.

TABLE 1 Trunk circumference and yield of Hass trees as influenced by three clonal rootstocks

Rootstock	Trunk circumference (cm)		Yield (kg)	
	1989	1990	1989	1990
Duke 7	33,7b*	45,6b	2,08a	33,46a
G6	34,4b	46,4b	0,48b	14,52b
G755C	37,5a	54,6a	1,03b	5,55c

*Mean separation in columns by Duncan's multiple range test, 5% level.

TABLE 2 Influence of Duke 7, G6 and G755C rootstocks on Hass fruit shape (length/diameter ratio, L/D) and seed weight

Rootstock	L/D	Seed weight (% of total fruit weight)
Duke 7	1,3a*	21,4b
G6	1,5b	18,9a
G755C	1,5b	18,6a

*Mean separation in columns by Duncan's multiple range test, 5% level.

RESULTS AND DISCUSSION

In 1989 and 1990, tree health of all trees in this trial was rated zero, i. e. they looked perfectly healthy. In 1989 and 1990, trunk circumference did not differ between Haas on Duke 7 and G6. Haas on G755C, however, had a significantly larger trunk circumference and was thus the fastest growing rootstock-scion combination in this trial (Table 1).

In 1989, trees on all three rootstocks bore a first small crop. In 1990, the yield ranking was Hass on Duke 7 > G 6> G755C — a ranking reversed for trunk circumference (Table 1). This is in agreement with data obtained from a rootstock trial at South Coast Field Station (California), where Hass on Duke 7 was also the most productive rootstock-scion combination; Hass on G755C had the lowest yield of all the rootstocks compared (Whiley *et al.*, 1990). In the postharvest evaluation, Hass fruit grown on all three rootstocks reached the eat-ripe stage four days after removal from cold storage; all fruit were of excellent quality. Fruit shape was, however, influenced by the rootstock. Hass fruit grown on Duke 7 had a significantly smaller length/diameter ratio than fruit grown on G6 and G755C (Table 2). In other words, the shape of Hass fruit grown on Duke 7 was rounder than Hass on G6 and G755C, which were more pear-shaped. Seed weight, expressed as a percentage of total fruit weight, was higher in fruit grown on Duke 7 when compared to fruit grown on G6 and G755C (Table 2).

This study showed that rootstocks have a major influence on the precocious bearing of Hass trees. Of the three clonal root-stocks evaluated in this experiment, the well-known Duke 7, out-performed the two new rootstocks tested, G6 and G755C. Future rootstock research should focus not only on disease resistance, as in the past, but also on

horticultural aspects such as tree productivity.

REFERENCES

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