

Yield and fruit quality of Fuerte and Hass on clonal rootstocks

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ABSTRACT

A comparative study was undertaken to evaluate yield and internal fruit quality of cv Fuerte grown on Duke 7 and G6 rootstocks and of cv Hass on Duke 7, G6 and G755C rootstocks during the first four years after planting. Hass trees were found to be more precocious than Fuerte trees. The Duke 7 rootstock performed best with regard to yield for both Fuerte and Hass. Internal fruit quality was always much better in Hass than in Fuerte.

INTRODUCTION

Avocado tree productivity is influenced by the rootstock, the scion, or the rootstock scion combination (Ben-Ya'acov, 1987). Arpaia *et al* (1990) and Köhne (1991) showed that rootstocks have a major influence on the precocious bearing of Hass trees. However, despite the importance of Fuerte as an early season cultivar, little is known of the horticultural performance of this cultivar grown on clonal rootstocks.

The aim of this study was to evaluate yield and fruit quality of the cultivars Fuerte and Hass grafted on three clonal rootstocks.

MATERIALS AND METHODS

Fuerte trees on Duke 7 and G6 rootstocks were planted at the Danroc farm in 1987 at a spacing of 7,0 by 7,0 m. In April 1990 and 1991, average yields were recorded for 287 trees on each rootstock.

Hass trees on Duke 7, G6 and G755C rootstocks were planted at Westfalia Estate in 1987 at a spacing of 5,0 by 5,0 m. In July 1989, 1990 and 1991, yields were recorded for 37 trees on each rootstock.

In 1991, 140 Fuerte fruit and 70 Hass fruit grown on each of the rootstocks were stored at 5°C for four weeks, using fruit in the mass range 266-305 g. After cold storage the temperature was increased to 18°C to induce ripening. Soft-ripe fruit were cut open and inspected for the physiological disorders pulp spot, grey pulp and vascular browning. Fruit free of these physiological disorders were graded as clean fruit.

Fuerte and Hass fruit grown on the different clonal rootstocks were sampled at harvest in 1991 and analysed for their K, Mg and Ca content by Outspan Laboratories (Verwoerdburg). Each sample consisted of 14 fruit and there were five replicates per

scion-rootstock combination.

TABLE 1 Yield (kg/tree) and cumulative yield (t/ha) of Fuerte and Hass trees as influenced by different rootstocks and planting densities during the first four years after planting

Cultivar	Rootstock	Yield (kg/tree) Years after planting				Cumulative yield (t/ha)
		1	2	3	4	
Fuerte ¹⁾	Duke 7	–	–	2	15	3,4
	G6	–	–	2	9	2,2
Hass ²⁾	Duke 7	–	2	34	10	18,4
	G6	–	1	15	2	7,2
	G755C	–	1	6	4	4,4

¹⁾ 200 trees/ha ²⁾ 400 trees/ha

TABLE 2 Internal quality and mineral content of Fuerte and Hass fruit as influenced by different rootstocks (1991)

Cultivar	Rootstock	Clean fruit (%)	ppm in dry mass		
			K	Mg	Ca
Fuerte	Duke 7	48	14 980	1 180	440
	G6	59	14 140	1 260	460
Hass	Duke 7	96	18 250	1 025	200
	G6	91	17 100	975	225
	G755C	97	17 250	950	275

RESULTS AND DISCUSSION

Individual tree yields during years one to four after planting are shown in Table 1. Hass was the more precocious cultivar, coming into production one season before Fuerte. Both cultivars performed the best on Duke 7 rootstock. In terms of cumulative production (t/ha) during the first four years from planting, cv Hass was more productive than cv Fuerte (Table 1). This is a result of the higher individual tree yields and the closer spacing of the Hass trees. Due to the more upright growth habit and precocity, Hass can be planted at a higher density than Fuerte.

Data on fruit quality after a simulated sea voyage are presented in Table 2. The percentage of clean fruit was much higher in Hass than in Fuerte and varied little within one cultivar grown on different clonal rootstocks. The preliminary investigation into fruit mineral content indicates that Fuerte fruit have a lower K and a higher Ca content than Hass fruit. This does not agree with the findings of Witney *et al*, (1990), reporting lower K and higher Ca concentrations in Hass than in Fuerte.

In conclusion, Hass on Duke 7 excels when compared with other combinations tested in this study, in terms of precocious bearing and of yield. Although inferior to Hass regarding precocity, yield and fruit quality, Fuerte maintains its market position because as yet, there is no replacement for this early-season cultivar.

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