

Preliminary Assessment of G-755c Root Rot Resistant Avocado Rootstock on the Far North Coast of New South Wales, Australia

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Root rot caused by *Phytophthora cinnamomi* is the main limiting factor to avocado production in most parts of the world. Control measures recommended in New South Wales (Allen 1984) have included close attention to site selection in regard to drainage, exclusion of the pathogen, judicious use of fertilizers and fungicides, and encouragement of biological antagonists through soil amelioration. Choice of rootstock has not been of great significance, even though sources of mild resistance have been identified in Californian research (Zentmyer and Schroeder 1951) and some of these sources have been available in New South Wales for many years. In 1984 however, a potentially highly resistant rootstock cultivar (G-755c) became available from California for evaluation under commercial conditions in New South Wales.

Materials and Methods

G-755c (*Persea americana* x *P. schiedeana*) was imported under license from the University of California, indexed in quarantine for avocado sunblotch viroid and ds-RNA (Allen 1958), and propagated using the nurse seedling method of Brokaw (Anon. 1983). Sixty grafted Hass plants on G-755c rootstock were produced for field evaluation and compared with grafted Hass on Mexican seedling rootstocks. Trial plantings were made on three farms on red krasnozem soil near Alstonville (29 °S) between February and May 1988.

Tree growth (girth, height, canopy diameter), health (1-healthy, 10-dead), and fruiting were assessed annually from May 1989 to August 1992.

Results

Growth and health data for each year are summarized in Table 1. The clonal G-755c trees were slow to establish compared with the standard Mexican seedling rootstock trees. Girth in the second year, for example, averaged 25.7 cm for clones compared with 26.7 cm for standard stocks. By the third year, however, superior growth rate of the clones reversed this trend with a 30% greater girth than non-clonals by year 5 (Table 1).

Table 1. Mean health ratings, tree height, canopy diameter, tree girth, and fruit number measurements on Hass avocado trees established on clonal G-755c and standard (Mexican seedling) rootstocks from 1989-1992.

Year	Rootstock	Health rating*	Height m	Canopy m	Girth cm	Fruit per tree
1989	G-755c	1.0	2.5	2.5	25.7	0
	standard	1.8	2.6	2.5	26.7	8
1990	G-755c	1.0	4.3	4.0	47.6	7
	standard	2.0	3.9	3.7	41.4	40
1991	G-755c	1.3	4.9	4.6	64.3	81
	standard	2.3	4.6	4.2	54.9	103
1992	G-755c	1.6	5.8	6.5	87.0	152
	standard	2.2	5.4	5.9	67.8	176

*health rating scale: 1-healthy, 10-dead.

Overgrowths of the Hass scion at the graft union occurred on only 5 % of the clonals compared with 23 % on standard stocks. Tree health was on average better on clonal than standard stocks.

The superior vigour on the clonal G-755c stocks resulted in some reduced fruit production in the three years of bearing observed. The standard stocks began bearing in year 2, compared with year 3 in the clonals, and numbers of fruit per tree were greater on standard stocks at all three sites in each year. There was evidence, however, that differences in fruit production between stocks decline with increasing age of the trees.

Discussion

G-755c propagated satisfactorily under New South Wales conditions, and trees on this rootstock grew and produced fruit satisfactorily. Our results confirm observations in California that Hass on G-755c does not bear as well as Hass on seedling rootstocks (Arpaia, Bender, and Witney (1990)). Under subtropical New South Wales conditions, however, this yield difference is not as great as in California and could be offset easily in the long term by better tree health and greater longevity.

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