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Commercial Avocado Rootstock Evaluation at Merensky Technological Services: Further Progress in 1997

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ABSTRACT

The avocado clonal rootstocks D9, Thomas, Barr Duke, Dusa and Merensky were compared to Duke 7 for the cultivar Hass at Westfalia Estate. At one site, affected by drought until 1995, production of Hass on Thomas (5.8 t/ha cumulative yield) was significantly less than on Duke 7 (16.8 t/ha cumulative). At another site, less severely affected by drought, Hass on Thomas (17.1 t/ha cumulative) did not have significantly different production when compared to Duke 7 as a rootstock for Hass. Hass on both Merensky (renamed from Latas) and Dusa rootstocks have out-yielded Hass on Duke 7 for two seasons by at least 29%. Although it is still early in the commercial evaluation of these rootstocks, promising *Phytophthora* tolerance results have led to an early release of Merensky to local and overseas institutions for testing purposes. Colin V-33 is being tested as an interstock between Duke 7 rootstock and Hass scion, but the commercial block has yet to bear fruit.

COMMERCIAL EVALUATION OF IMPORTED AND LOCALLY SELECTED ROOTSTOCKS FOR HASS

Three avocado rootstocks: Thomas, Barr Duke and D9 with Hass as scion, have been compared to Hass on Duke 7, on a semi-commercial scale at Westfalia Estate, in orchards established from 1989 to 1991, at three sites (total 220 trees per rootstock).

During the 1996 season, the second high-rainfall year since the drought, D9 outyielded Duke 7 at two out of three sites (Roe *et al,* 1997) and this trend was repeated in 1997 (table 1). One of the sites failed to crop in 1997 and was therefore left out of the current year's analysis. However, D9 is still proving itself as a high yielding rootstock at Evenrond Farm (table 1). At Westfalia Farm, D9 is not as convincing cf. Duke 7.

As was the case in previous years (Roe *et al.,* 1995; 1996) Hass on Thomas has produced acceptable yields at only one site (table 1) and this rootstock cannot be recommended for all Westfalia conditions. The site where it did well was not as severely affected by drought as the other sites, and it can be speculated that Thomas may be more sensitive to stress conditions than Duke 7.

Hass on the two locally selected clonal rootstocks Merensky (renamed from Latas) and Dusa were planted in 1993 for commercial evaluation in comparison to Hass on Duke 7. The second crop was obtained in 1997 (table 2). Hass yields on both of the local selections were greater than on Duke 7 rootstock, and this has led to the early release

of Merensky rootstock for testing purposes, both nationally and internationally. Merensky rootstock also displayed excellent *Phytophthora* tolerance when exposed to virulent *Phytophthora cinnamomi* in a mistbed trial (Duvenhage, unpubl. data, 1998) and this resulted in it being chosen for early release for testing.

Duke 7 is still the recommended rootstock for South African Hass orchards, but D9 and Merensky are future possible alternative rootstocks.

Table 2. Production data (t ha^{-1}) from commercial plantings of Hass avocado on locally selected clonal rootstocks, established 1993, compared to Duke 7, at Westfalia Estate.

Rootstock	Yield (t ha^{-1}) 1996	1997	Cumulative
Duke 7	1.52	2.94	4.46b
Dusa	3.77	3.44	7.24a
Merensky	2.55	3.81	6.36a

LOW VIGOUR INTERSTOCKS

In order to become more efficient in our orchards, tree size control is becoming of paramount importance in the deep red, well-drained soils of the South African summer rainfall areas. The ultimate long-term solution is to have genetic low vigour.

Colin V-33, a Mexican low vigour selection which has been used successfully as a dwarfing interstock for Fuerte trees in Mexico (Barrientos Priego *et al.,* 1987) is being evaluated as an interstock between Duke 7 rootstock and Hass scion, and is being compared to Hass on Duke 7. A semi-commercial planting of Hass/Colin V-33/Duke 7 was established in 1995 and the first crop is expected during 1998.

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Table 1. Tree size data and yields (t ha^{-1}) from commercial plantings of Hass avocado on different rootstocks at three localities at Westfalia Estate.

		Rootstock					*LSD*	*Level of Significance*
		Duke 7	*D9*	*Barr Duke*	*Thomas*	*G755*		
Zendelingshoek farm (Planted 1989, affected by soil problems								
Stem circumfer-ence (cm)	1992	32.9 b1	27.9c	28.8c	31.8b	37.2a	1.2	0.01
	1994	43.3a	39.6b	39.9b	42.8a	-	1.49	0.01
	1995	50.4a	45.4c	45.4c	48.7b	-	1.66	0.01
	1996	54.9a	50.1b	49.4b	53.5a	-	1.84	0.01
Yield (t/ha-1)	1992	0.25	0.03	0.01	0.37	0.05	-	-
	1996	2.9bc	10.0a	5.0b	1.1c	-	3.2	0.01
	1997	No	Crop	-	-	-	-	-
	Cumulative	3.2bc	10.03a	5.01b	1.47c	-	3.3	0.01
Evenrond Farm (planted 1991; severely affected by drought 1992-95								
Stem circum-ference (cm)	1993		20.8	21.3	21.4		NS[2]	
	1994		30.4b	31.6a	32.2a		1.12	0.01
	1995		39.9	39.1	39.9		NS	
	1996		45.3	44.7	45.6		NS	
Yield (t ha^{-1})	1994	(1.0)	2.8a	2.4b	2.7ab		0.32	0.05
	1995	(6.8)	5.2a	2.5b	0.04c		1.10	0.01
	1996	(1.7)	4.5a	2.0b	0.6c		1.19	0.01
	1997	(7.4)	8.6a	8.6a	2.7b		2.54	0.01
	Cumulative	(16.8)	21.1a	16.4b	5.8c		3.87	0.01
Westfalia Farm (planted 1991; not severely affected by drought)								
Stem circum-ference (cm)	1995	30.5a	24.3b	28.5a	30.0a		3.29	0.01
	1996	40.9a	32.0c	36.8b	39.3ab		4.04	0.01
Yield (t ha^{-1})	1995	6.9a	2.9c	3.4c	4.9b		1.53	0.05
	1996	4.5a	4.4a	4.4a	5.1a		1.62	0.05
	1997	9.3a	5.4b	6.4ab	7.1ab		2.82	0.05
	Cumulative	20.5a	12.2c	14.2bc	17.1ab		3.62	0.05

[1] Means in each row (year) followed by the same letter are not significantly different according to F test.
[2]NS = Non-significant
Data in parenthesis are from 60 Hass/Duke 7 trees planted at the same time as, in similar soils as, and within 300m of the rootstock trial at Evenrond Farm; no statistical comparison with Duke 7 was done.