

## **A Progress Report of Avocado Rootstock Research at Merensky Technological Services**

**D.J. Roe J.S. Köhne**

*Merensky Technological Services, PO Box 14, Duivelskloof 0835*

### **ABSTRACT**

The rootstocks Thomas, Barr-Duke, D9, G755 and Duke 7 are being evaluated for Hass avocado on a semi-commercial basis (220 trees per rootstock) in the Tzaneen-Duivelskloof area. The potential low-vigour rootstocks Wilg, Ryan and Colin V-33 are also being compared to Duke 7. Wilg has had a significant dwarfing effect on Hass, but production potential of this rootstock is not yet known. To date, Colin V-33 interstock has decreased the vigour of Hass only slightly. Drought has influenced the results of the evaluation and, at this stage; the only recommendation is to continue with Duke 7 as a rootstock for Hass.

### **SEMI-COMMERCIAL EVALUATION OF PROMISING IMPORTED ROOTSTOCKS FOR HASS**

The avocado rootstocks Thomas, Barr-Duke, D9, and G755, with Hass as the scion, are being compared to Hass on Duke 7, on a semi-commercial scale at Westfalia Estate. The evaluations have been carried out since 1989 at the farm Fowey (100 trees per rootstock), and since 1991 at Evenrond (100 trees per rootstock) and Westfalia Farm (20 trees per rootstock). Drought in the Letaba District over the last few years has hampered growth and yields of trees in these plantings. However, good rains in the 1995/96 season have heightened optimism for good conditions for future rootstock research.

Due to excessive vigour imparted to Hass by the rootstock G755c, it was eliminated from the trial (Köhne & Kremer-Köhne, 1992). Hass on D9 and Barr-Duke had significantly ( $P \leq 0.05$ ) lower vigour than Hass on Duke 7 or Thomas at Fowey, while at Evenrond, D9, Barr-Duke and Thomas had similar vigour (table 1). The cumulative yield up to 1995 of Hass on Thomas was significantly ( $P \leq 0.01$ ) poorer than on D9 and Barr-Duke at Evenrond, and although no statistical analysis was possible due to spacial separation, was also poorer than Duke 7. The yields of Hass on Thomas, D9 and Barr-Duke were significantly lower than Duke 7 at the Westfalia Farm site (table 1).

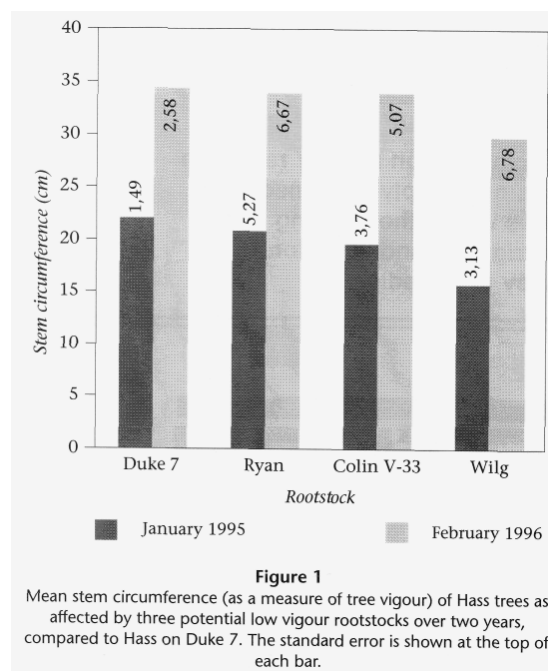
In general, Hass on Thomas has yielded poorly and therefore this rootstock cannot be recommended. The lower vigour imparted to Hass by D9 and Barr-Duke is desirable, but the yield results are variable. From these results, only Duke 7 can be recommended at this stage.

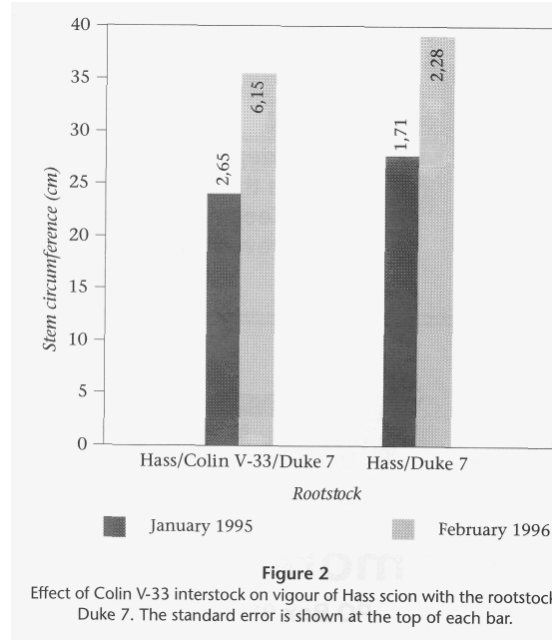
## HASS TREE-SIZE CONTROL BY LOW-VIGOUR ROOTSTOCKS AND INTERSTOCKS

Avocado trees generally grow vigorously and become unmanageably large in the deep red, well-drained soils of the South African summer rainfall areas. Ryan, Colin V-33 and Wilg are being tested as rootstocks, compared with Duke 7, for their ability to impart lower vigour to Hass scions. Ryan is a well-known low-vigour fruiting cultivar. Colin V-33, a Mexican selection of low vigour and sprawling growth habit, has been used successfully as a dwarfing interstock of Fuerte trees in Mexico (Barrientos Priego, 1987). Wilg is a Westfalia selection which survived high *Phytophthora* pressure and imparts low vigour to Hass (Roe *et al.*, 1995). Although it has been tested for Fuerte, Colin V-33 has never been tried as a dwarfing interstock for Hass, and is therefore also being evaluated as an interstock between Duke 7 and Hass, compared to Hass on Duke 7.

Wilg has exhibited the greatest dwarfing ability thus far (figure 1). It has also proved to be precocious, bearing some fruit in its first year. However, production during its second year of growth was poor, probably due to alternate cropping, resulting from the overload caused by its initial precocity. Ryan and Colin V-33 rootstocks have had little dwarfing effect on Hass and results have been variable so far. We will continue to monitor these rootstocks for lower vigour.

Colin V-33 as an interstock also produced fruit during its first year in the field, but this may have been due to more mature trees resulting from a longer than usual nursery period (Roe *et al.*, 1995). The second year of growth was a drought year and therefore no crop was set. There is a slight trend towards lower vigour due to the interstock (figure 2), but it is too early to draw any conclusions. A semi-commercial planting of Hass/Colin V-33/ Duke 7 has been planted for more extensive evaluation.





**Table 1**  
Tree-size data from semi-commercial plantings of Hass avocado on different rootstocks at three localities<sup>1</sup>

		Rootstock					LSD	Probability
		Duke 7	D9	Barr-Duke	Thomas	G755		
		<i>Fowey (planted 1989)</i>						
Stem circumference (cm)	1992	32.9 b	27.9 c	28.8 c	31.8 b	37.2 a	1.21	0.01
	1994	43.3 a	39.6 b	39.9 b	42.8 a	—	1.49	0.01
	1995	50.4 a	45.4 c	45.4 c	48.7 b	—	1.66	0.01
	1996	54.9 a	50.1 b	49.4 b	53.5 a	—	1.84	0.01
Yield (t/ha)	1992	0.25	0.03	0.01	0.37	0.05	—	—
		<i>Evenrond (planted 1991)</i>						
Stem circumference (cm)	1993		20.8	21.3	21.4		NS	
	1994		30.4 b	31.6 a	32.2 a		1.12	0.01
	1995		39.9	39.1	39.9		NS	
	1996		45.3	44.7	45.6		NS	
Yield (t/ha)	1994	(0.95)	2.81 a	2.43 b	2.69 ab		0.32	0.05
	1995	(6.76)	5.24 a	2.53 b	0.04 c		1.10	0.01
	Cumulative	(7.71)	8.05 a	4.96 b	2.73 c		1.22	0.01
		<i>Westfalia Farm (planted 1991)</i>						
Stem circumference (cm)	1995	30.5 a	24.3 b	28.5 a	30.0 a		3.292	0.01
	1996	40.9 a	32.0 c	36.8 b	39.3 ab		4.04	0.01
Yield (t/ha)	1995	6.9 a	2.9 c	3.4 c	4.9 b		1.53	0.05

<sup>1</sup>Means in each row followed by the same letter are not significantly different according to two-way ANOVA. Data in parentheses are from 60 Hass/Duke 7 trees planted at the same time as, in similar soils as, and within 300 m of the rootstock trial at Evenrond Farm. No statistical comparison with Duke 7 was done in this case.

## **ACKNOWLEDGEMENTS**

These projects are jointly funded by the HM Foundation and the South African Avocado Growers' Association. The management inputs of Koos Coetzee, Charl Marais and Wouter Conradie, and the technical assistance of Terrence Mookamedi, Malan Selowa, Oscar Shiburi and Alfred Tema are gratefully acknowledged.

## **REFERENCES**

- BARRIENTOS PRIEGO, A., LOPEZ JIMINEZ, A. & SANCHEZ COLIN, S. 1987. Effect of cv Colin V-33 as interstock on avocado (*Persea Americana* Mill) growth, cv Fuerte. *South African Avocado Growers' Association Yearbook*. 10: 62 - 64.
- KREMER-KÖHNE, S. & KÖHNE, J.S. 1992. Yield and fruit quality of Fuerte and Hass on clonal rootstocks. *South African Avocado Growers' Association Yearbook*. 15: 69.
- ROE, D.J., CONRADIE, W. & KÖHNE, J.S. 1995. Progress with rootstock research at Merensky Technological Services. *South African Avocado Growers' Association Yearbook*. 18: 10 - 11.