

## **New Hass-like avocado cultivars at Merensky Technological Services — progress report**

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### **ABSTRACT**

Lamb Hass and Hass have been evaluated at Westfalia Estate (Duivelskloof) and at Goedgelegen Estate (Mooketsi) for several years. Lamb Hass fruit mature from August to October, i.e. later in the year than Hass which reaches maturity at the end of May. At Westfalia, cumulative yield (1995-1999) was 50.4 t/ha for Lamb Hass and 28.4 t/ha for Hass. At Goedgelegen, cumulative yield (1998-1999) was 22.6 t/ha for Lamb Hass and 19.5 t/ha for Hass. Both cultivars, Lamb Hass and Hass, have an alternate bearing pattern. With regard to fruit size distribution, Lamb Hass is typically larger than Hass and the average Lamb Hass fruit size is count 12 to 14. Lamb Hass and Hass fruit quality was good after both simulated and commercial export.

The first crop of the new Hass-like cultivars Harvest, Gem, Jewel, Sir Prize, BL 667, 8-22-5 and Bonus was evaluated in 1999. Preliminary results indicate that these new cultivars mature at the same time as Hass. Harvest gave the best results with regard to yield, fruit size and quality after simulated export. Sir Prize and Jewel fruit were found to be too large. Gem, BL 667 and Jewel fruit did not colour up and had physiological disorders. There has been no crop yet from 8-22-5 or Bonus.

### **INTRODUCTION**

Hass trees produce a large percentage of undersized fruit, causing high financial losses in the South African avocado industry. In the long term, the Hass small fruit problem could be solved by replacing Hass with a new Hass-like cultivar with bigger fruit size. Therefore, the following new Hass-like cultivars are currently tested at Westfalia Estate: Lamb Hass, Harvest, Gem, Jewel, Sir Prize, BL 667, 8-22-5 and Bonus. This paper reports on the progress made with the evaluation of these Hass-like selections and cultivars.

### **MATERIALS AND METHODS**

Lamb Hass was top-worked at Westfalia Estate near Duivelskloof (a warm, moist area) in 1993 and at Goedgelegen Estate near Mooketsi (a hot, dry area) in 1995. Top-working the more recently introduced new Hass-like cultivars Harvest, Gem, Jewel, Sir Prize, BL 667, 8-22-5 and Bonus started at Westfalia Estate in 1996, and the first crop

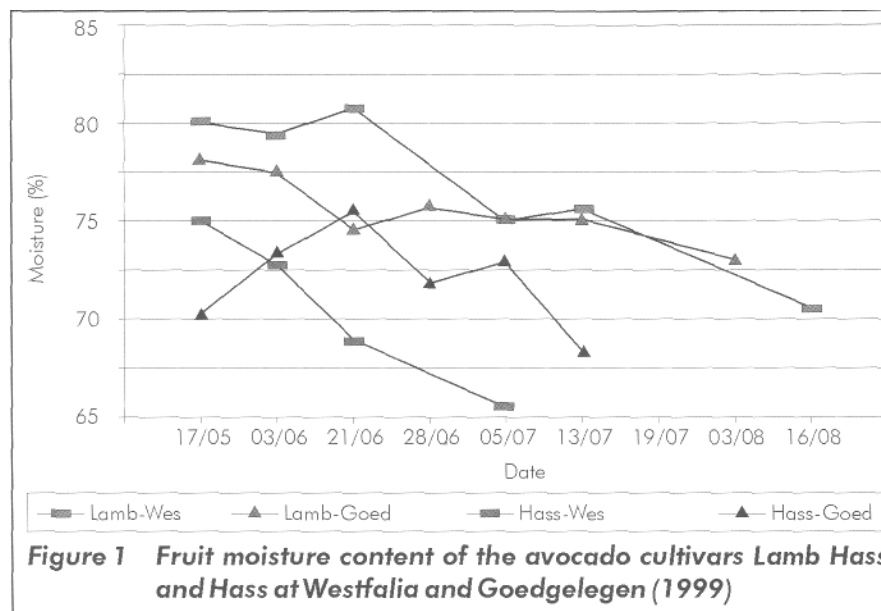
was evaluated in 1999. For comparison, trees were also top-worked with Hass.

Data on fruit maturity, yield, fruit size distribution and fruit quality after simulated export were collected as described previously (Kremer-Köhne, 1999). Fruit firmness readings were taken with a densimeter (Köhne *et al.* 1998) before cold storage and upon removal from cold storage. As there was no crop on the Lamb Hass and Hass trees in the experimental orchard at Westfalia in 1999, Lamb Hass and Hass fruit from a nearby commercial orchard were used for fruit moisture determination. One test consignment of Lamb Hass fruit from Goedgelegen was exported on vessel 683, and evaluated by the SAAGA overseas technical officer in Paris. For Harvest, Gem, Jewel, Sir Prize, BL 667, fruit samples were taken and fruit weighed individually to determine the fruit size distribution.

## RESULTS

### Lamb Hass.

Fruit maturity did not differ between Westfalia and Goedgelegen (Figure 1).



**Figure 1** Fruit moisture content of the avocado cultivars Lamb Hass and Hass at Westfalia and Goedgelegen (1999)

At both sites, Hass reached picking maturity (75% moisture) at the end of May, and Lamb Hass fruit matured as from August. The maximum moisture content for picking Lamb Hass is approximately 73%.

Yield data for Lamb Hass and Hass are presented in Tables 1 and 2.

**Table 1** Yields of avocado cultivars Lamb Hass and Hass at Westfalia Estate (top-worked 1993) for the years 1995 through 1999.

Cultivar	Yield (t/ha) <sup>1)</sup>					Cumulative
	1995	1996	1997	1998	1999	
Lamb Hass	16.6	6.2	2.0	25.6	0	50.4
Hass	-	-	1.5	23.3	0	24.8

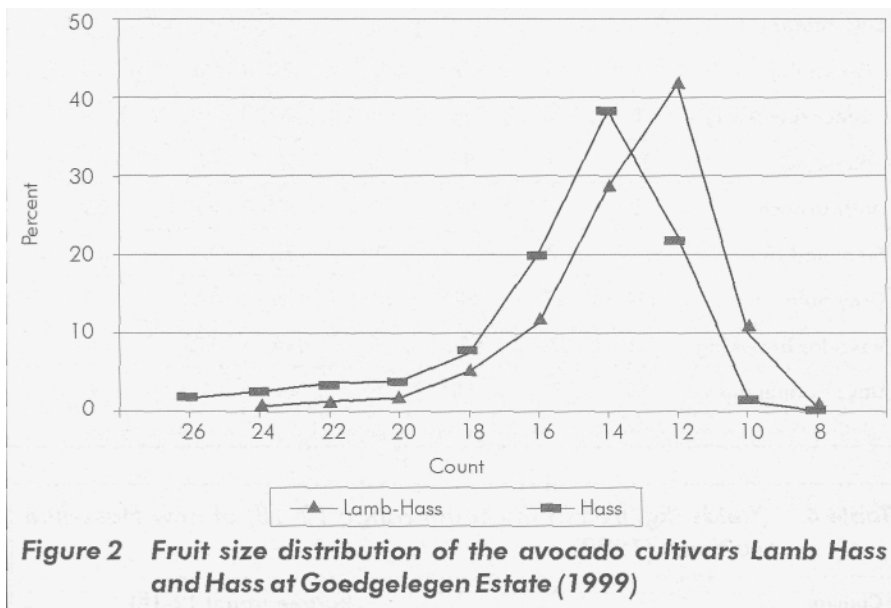
<sup>1)</sup> based on 200 trees/ha

**Table 2** Yields of avocado cultivars Lamb Hass and Hass at Goedgelegen Estate (top-worked 1995) for 1998 and 1999.

Cultivar	Yield (t/ha) <sup>1)</sup>		
	1998	1999	Cumulative
Lamb Hass	15.8	6.8	22.6
Hass	2.9	16.6	19.5

<sup>1)</sup> based on 200 trees/ha

After the heavy crop and the late picking in 1988 (Hass: 13/08/98, Lamb Hass: 12/10/98, due to labour constraints), 1999 was an off year. Both cultivars, Lamb Hass and Hass, have an alternate bearing pattern. Lamb Hass trees produced a considerably higher cumulative yield than Hass at both Westfalia and Goedgelegen. With regard to the fruit size distribution, fruit size varies with crop size, but Lamb Hass is typically larger than Hass. The 1999 fruit size distributions of Lamb Hass and Hass at Goedgelegen are shown in Figure 2.



**Figure 2** Fruit size distribution of the avocado cultivars Lamb Hass and Hass at Goedgelegen Estate (1999)

Lamb Hass fruit that underwent simulated shipment had good quality in 1999 (Table 3), and the Lamb Hass test consignment exported on vessel 683 arrived in good condition.

**Table 3** Postharvest quality of new Hass-like cultivars from Westfalia Estate after 28 days storage at 5.5°C. All fruit were waxed. Symptoms were rated on a scale of 0 (no symptom) to 3 (severe symptom). Black cold and lenticel damage were evaluated upon removal from cold storage, while skin colour, diseases and physiological disorders were rated when the fruit were eat ripe.

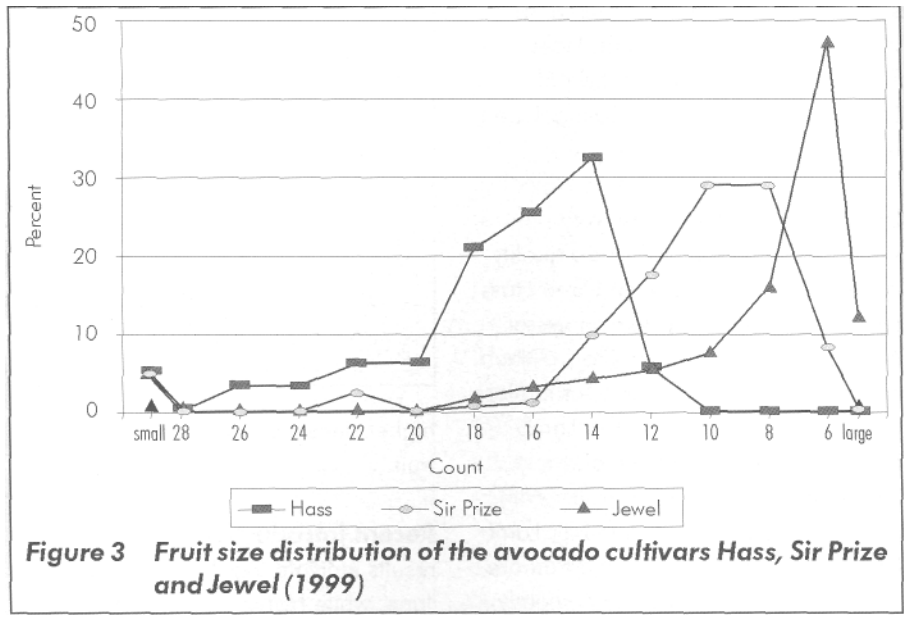
	Sir Prize	Harvest	Gem	BL 667	Jewel	Hass	Lamb Hass <sup>1)</sup>
Date picked	07/06/99	22/07/99	05/08/99	05/08/99	05/08/99	05/08/99	17/08/99
Fruit moisture (%)	77.5	77	74	69	71	68	73
Number of fruit	45	120	120	120	36	42	140
Densimeter before <sup>2)</sup>	91.7	92.1	-	-	-	-	92.0
Densimeter after <sup>3)</sup>	84.8	85.7	87.5	84.4	82.4	81.9	86.7
Black cold damage	0.156	0.042	0.283	0.467	0.361	0.500	0.071
Lenticel damage	0.133	0.275	0.700	0.675	0.500	0.857	0.407
<b>Skin colour</b>							
Green (%)	0	0	0	13	0	0	0
Green/black (%)	0	12	53	55	69	24	5
Black (%)	100	88	47	32	31	76	95
Anthracnose	0	0.050	0.033	0	0	0.071	0.064
Stem end rot	0.089	0.300	0.075	0	0.333	0.071	0.143
Grey pulp	0.044	0.025	0.008	2.417	1.722	0.071	0
Vascular browning	0.089	0.400	0.825	0	0.694	0.167	0.050
Days to ripening	3.6	5.0	5.0	4.6	4.0	6.0	9.7

<sup>1)</sup> Lamb Hass from Goedgelegen <sup>2)</sup> Densimeter reading before storage <sup>3)</sup> Densimeter reading upon removal from storage

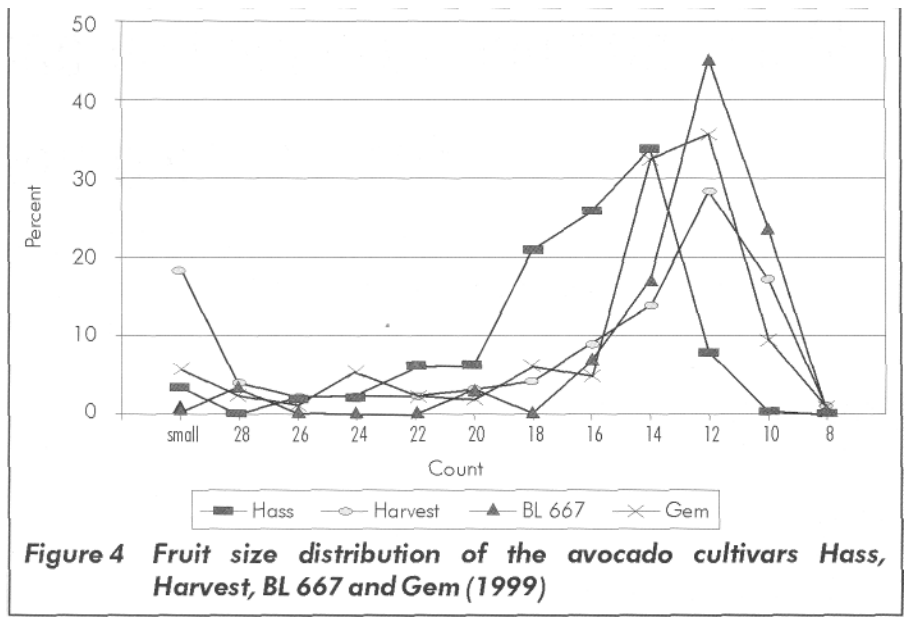
When comparing an early season Lamb Hass with a late season Hass fruit, Lamb Hass fruit are more watery and take longer to ripen than Hass fruit. With regard to post-harvest handling, Lamb Hass fruit colour up while the fruit are still firm and are eat-ripe at a slightly higher densimeter reading than Hass fruit.

### Recent introductions.

Preliminary results indicate that Sir Prize matures in June, while Harvest, Gem, Jewel, and BL 667 mature in July. Fruit size distributions are presented in Figures 3 and 4.



**Figure 3** Fruit size distribution of the avocado cultivars Hass, Sir Prize and Jewel (1999)



**Figure 4** Fruit size distribution of the avocado cultivars Hass, Harvest, BL 667 and Gem (1999)

Sir Prize and Jewel fruit were found to be too large, while the fruit size distribution curve peaks at count 12 for Harvest, BL 667 and Gem, and at count 14 for Hass. With regard to yield in the favourable count range 12 to 18, Harvest gave best results (Table 4).

**Table 4** Yields (kg/tree in the count range 12-18) of new Hass-like cultivars (1999)

Cultivar	Kg/tree (count 12-18)
Hass	12
Sir Prize	28
Jewel	4
Harvest	79
BL 667	24
Gem	43
8-22-5	0
Bonus	0

Fruit quality after simulated export is shown in Table 3. Gem, BL 667 and Jewel fruit did not colour up and had physiological disorders; BL 667 and Jewel were probably picked too late and therefore had a high incidence of grey pulp. There was no crop as yet from 8-22-5 or Bonus.

### **CONCLUSIONS**

Lamb Hass matures two months later than Hass and remains the most promising new Hass-like cultivar tested in this study. Preliminary results were obtained with the more recent introductions of which the first crop was evaluated in 1999. Cultivar Harvest matures in July and gave the best results with regard to yield, fruit size and quality after simulated export. Further testing is warranted.

### **LITERATURE CITED**

- KÖHNE, J.S., KREMER-KÖHNE, S. & GAY, S.H. 1998. Non-destructive avocado fruit firmness measurement. *South African Avocado Growers' Association Yearbook* 21: 19-21.
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