

# **The Scottish raspberry breeding programme**

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## **Project title: The Scottish raspberry breeding programme**

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Project Leaders: Nikki Jennings  
Mylnefield Research Services Ltd,  
Scottish Crop Research Institute  
Invergowrie DD2 5DA

Dr Rex Brennan  
Scottish Crop Research Institute  
Invergowrie DD2 5DA

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Location: Scottish Crop Research Institute  
Invergowrie DD2 5DA

Project co-ordinator: Martin Beckenham  
Horticultural Development Council

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# The Scottish Raspberry Breeding Programme

## Headline

- The raspberry selection 9053B6 out-performed all other breeding selections on growers' trials in 2004 and is recommended for release.
- Raspberry selections 9046RA2, 9050RD3 and 9059D-2 require further trialling.
- A further seven selections will be available for planting on growers trials in spring 2005.

## Background and expected deliverables

In 2002, the UK raspberry industry formed a Consortium to fund the raspberry breeding programme for seven years. The objective of the programme is to produce improved raspberry cultivars selected for particular markets and cultural practices.

The expected deliverables from this work will include:

- New potential cultivars suitable for both fresh market production, including season extension through protected cropping and machine harvesting for processing.
- New hybrids with improved pest and disease resistance, especially to *Phytophthora* root rot.
- Expanded and characterised germplasm collections for exploitation within the breeding programme.
- Evaluation of promising selections under commercial conditions on growers' trials.
- Generation of high health selections for commercial propagation and release to industry.

## Summary of the project and main conclusions

### 2004 Crossing Programme

This year, 124 crosses were made at SCRI, targeting fruit quality, season extension and pest and disease resistance. Approximately 9,000 seedlings were generated, screened in the glasshouse and will be planted out in spring 2005. Fruit from these seedlings will be evaluated initially in 2006.

### On-Farm Trials

This year, the following four selections were evaluated on growers' trials in the UK:

9053B6  
9050RD3  
9059D-2  
9046RA2

These selections have performed exceptionally well on small trial plots at SCRI over the last six years and were identified for trialling on commercial farms in 1999. Plants were micropropagated at SAC in Edinburgh and planted out, in 2002 and 2003, on diverse sites throughout the UK, including outside and protected cropping trials and, where appropriate, machine harvested trials (Table 1). 2004 saw these trials fruiting for the first time. Below is a summary of the performance of each selection. Growers comments can be found in the Appendix.

#### **9053B6**

This late season selection was originally selected for its superior machine harvest characteristics but its sensory traits, in particular good flavour, have proved it an excellent selection for the fresh market. At SCRI 9053B6 has outperformed Glen Ample in terms of yield, fruit quality and flavour for the last six years (see Annual report 2003). This selection had the highest yield in the HDC trial in Oxford this year (Table 3). Canes are easy to manage due to their upright habit and absence of spines.

#### **9050RD3**

This selection is mid to late season and has large, firm conical fruit, bright and glossy in a punnet but flavour was poor this year. Laterals are long and primocane are very vigorous and tend to fall over and growers found this selection difficult to manage on farm trials both outside and under polytunnels. Some growers also mentioned that the primocane tended to have a 'twisting' habit. This habit makes 9050RD3 an unsuitable candidate for machine harvesting.

#### **9046RA2**

9046RA2 is a slightly darker fruited selection which harvests well by machine, picking little green or husk. Fruit is large firm and conical with good shelf life and freezing quality. Primocane are very upright, growing through the middle of the plot, making fruit more accessible to pickers and also reduces damage by a machine harvester. Growers found this to be a good machine harvest selection but due to its' dark colour and variable flavour, was unsuitable for fresh. One grower found this selection to be infected with crown gall, *Agrobacterium sp.*

#### **9059D-2**

This is an early season selection, fruiting 5-7 days before Glen Ample. Fruit are large, pale and conical and look stunning in a punnet. 9059D-2 has a very strong, sweet raspberry flavour. On growers' trials, this selection had a good flavour but poor shelf life. In the HDC trial, 9059D-2 had uneven, crumbly fruit (which may have contributed to its poor shelf life). Spinefree primocane have a compact, upright habit and fruit is displayed well on strong laterals. 9059D-2 is unsuitable for machine harvesting.

#### **Charis results**

This year, fruit samples were sent to for sensory profiling at Charis Innovative Food Services in Ayrshire, where flavour and quality are evaluated by a professional taste panel. These results give an objective evaluation of flavour and other sensory characteristics.

Fruit from the on-farm trials was compared with Glen Ample and Tulameen both from outside field plots and protected cropping systems. Comparisons between geographical sites and between fresh and frozen fruit were also made. Two new SCRI selections 9764F-3 and 9628E-3 were also included in the trial. Fruit was harvested over three weeks and picked at supermarket ripeness and quality. Fruit was sampled from five trial sites, including SCRI. See Appendix for the full set results.

Key points from the results:

- 9053B6 was outstanding in the trial, superior to Glen Ample and similar to Tulameen for flavour. 9053B6 was more 'fruity', 'sweet' and 'raspberry' and less 'bitter' and 'acid' than the cultivars.
- 9053B6 was firmer but less juicy than the cultivars.
- 9059D-2 had excellent flavour, scoring well for 'fruity', 'sweet' and 'floral' attributes.
- 9046RA2 had a variable flavour over the season.
- 9050RD3 had poorer flavour than Glen Ample and Tulameen but scored well for firmness and colour.
- New selections 9764F-3 and 9628E-3 performed well for flavour against both Glen Ample and Tulameen. Both selections had a larger fruit size than Tulameen.

#### **On-Farm trial fingerprinting**

The following trial plots were included in this season's assessments:

- Peter Marshall, Muirton, Alyth
- Ewan Pate, South Powrie Farm, by Dundee
- Janet Allen, Rectory Farm, Stanton St. John, Oxford (HDC trial)

Visual examination of the trials by Nikki Jennings strongly suggested that the initial planting material of 9050RD3 and 9053B6 had become transposed outwith SCRI, and this was confirmed by molecular fingerprinting at SCRI, ie, plants delivered to sites labelled 9050RD3 are actually 9053B6 and those labelled 9053B6 are actually 9050RD3. The best performing seedling in these trials this year is therefore confirmed as 9053B6, in both agronomic and sensory assessments.

The following trial plots await confirmation:

- Hargreaves, Cowpers Gate, Long Sutton, Spalding
- Trevor Reynolds, Long Drove Waterbeach, Cambridge CB5 9LR

The same molecular analysis also confirmed that the identity of material currently undergoing propagation at Highland Fruit Stocks is true, ie. 9053B6. Propagation can therefore continue as planned.

#### **Raspberry Selection 9062E-1**

This selection was identified for on-farm trials in 1996 under funding from Scottish Soft Fruit Growers. It was planted on three trial sites in 1999/2000. This selection was very

promising but was dropped from the advanced selections at SCRI due to its fluctuating yield in the SCRI trials.

Two growers have continued their trials of 9062E-1 and have been highly impressed with its performance when harvested by machine (see Appendix ). This selection was planted on the HDC trial site in Oxford in spring 2004, and will produce a small crop in 2005.

#### **New selections identified for on-farm trials in 2004**

This season, two new selections were identified at SCRI as having promising characteristics for the fresh market. 9764F-3 and 9628E-3 are both late season and have a very large fruit size. Both selections were sent to Charis for sensory evaluation and performed well against Glen Ample and Tulameen. These selections will be micro-propagated at Gentech for on-farm trials.

#### **Propagation of new on-farm trials**

Ten promising raspberry selections, suitable for both fresh and processing markets, were identified in 2001 and 2002 for new on-farm trials (Table 3). These selections have been micropropagated at Gentech and some will be available for planting out in spring 2005. Triallists and plant numbers have yet to be decided. A small number of plants of four of these selections were planted into the HDC trial site in spring 2004, and will produce a small crop in 2005.

#### **Conclusion**

- 9053B6 was outstanding on growers' trials this year.
- High health root material of 9053B6 is bulked up at commercial propagators.
- 9050RD3, 9046RA2 and 9059D-2 require further trialling.
- New trials will be evaluated in 2005, both on-farm and SCRI.
- Seven new selections will be available to plant in spring 2005.
- Two new selections were identified at SCRI in 2004.

#### **Action Points**

- Assessment of 9053B6 as a possible new raspberry cultivar.
- Identify triallists for new selections, including a site infested with *Phytophthora* root rot.
- Micropropagate selections 9628E-3 and 9764F-3, identified at SCRI this season, for 2006 on-farm trials.

#### **Technology & Knowledge Transfer**

- A presentation of the project was given at the following events:
  - SSCR Fruit Event, 'Fruit for the Future', July 15<sup>th</sup> 2004, SCRI.
  - HDC Fruit Panel AGM, September 28<sup>th</sup> 2004, SCRI.
  - Raspberry growers' meeting, October 28<sup>th</sup> 2004, Altamount Hotel, Blairgowrie.
  - SSCR Fruit Forum, November 4<sup>th</sup> 2004, SCRI.

- A poster display and handouts were given at Fruit Focus, July 28<sup>th</sup> 2004, East Malling, Kent.
- SCRI is currently developing a soft fruit portal, funded outwith the Consortium, for researchers, growers, advisors and end users. It is envisaged that separate pages with restricted access within the portal will subsequently be available to specific interest groups, including the breeding Consortium.
- Nikki Jennings visited other *Rubus* breeding programmes in the Pacific Northwest, June 2004 to exchange knowledge, visit breeders and field trials, and initiate exchange of germplasm. The following organisations were visited.

Organisation	Address	Key Individuals
Driscolls,	Watsonville, CA	Carlos Fear Fred Cooke Rick Harrison
Oregon State University	Corvallis, OR	Chad Finn Bob Martin
National Clonal Germplasm Repository	Corvallis, OR	Kim Hummer
Washington State University (HortResearch)	Puyallup, WA New Zealand	Pat Moore Harvey Hall)
PARC	Agassiz, BC	Chaim Kempler

### **Acknowledgments**

Thanks to Gentech, Charis Innovative Food Services Ltd, the SCRI fruit group and the growers with on-farm trials.

Table 1 On-farm trials fruiting in 2004

Grower	Address	Testing & Trailing Ref.	Date Planted	Harvest	No. of Plants				Notes	
					9062E-1	9053B6	9050RD3	9046RA2		
John Hamilton	Milton Of Ruthven, Craighton, Blairgowrie, PH12 8RG	SSFG	Spring 98	Machine Harvest	130		130	9046RA2	9059D-2	9046RA2 has been grubbed. Good establishment of 9062E-1
Peter Marshall	Muirton, Alyth, PH11 8JF	SSFG	Spring 99	Machine Harvest	250					Good establishment
Peter Marshall	Muirton, Alyth, PH11 8JF	141	Autumn 2002	Machine Harvest		100	100			Good establishment
Peter Marshall	Muirton, Alyth, PH11 8JF	184	Autumn 2002	Machine Harvest				225		Good establishment
Peter Thomson	Bramblebank Works, Blairgowrie, PH10 7HY	139	Spring 2002	Protected cropping		200	200			low vigour, some gaps but good fruit set
Trevor Reynolds	Long Drove Waterbeach, Cambridge CB5 9LR	139	Autumn 2002			200	200			
EW Mitchell	Kinpurmie Farm, Newtyle, PH12 8SQ	184	Autumn 2002	Hand pick outside				225		very low vigour, good primocane for next year
Richard Stanley	Rectory Farm, Stanton ST, John, Oxford OX33 1HF	*	Autumn 2002	Hand pick outside		60	60	60	60	<i>P. idaei</i> existing in one rep, but 2 reps good establishment. Janet Allen*
Ewan Pate	South Powrie, by Dundee	142	Spring 2002	Machine harvest		300	300			Good establishment
Andrew Logan	Tarvit Home Farm, Cupar KY15 5SU	155	Autumn 2002	Protected cropping		120	120			Good establishment
Rupert Hargreaves	Hargreaves Plants, Long Suttou, Spalding PE12 9GG	138	Autumn 2002	Protected cropping		100	100			Good establishment



**Table 2 Fruit samples sent to Charis**

Delivery to Charis	Date Picked	Selection	Cropping System	Location		
20 <sup>th</sup> July 2004	19 <sup>th</sup> July 2004	9053B6	Polytunnel	Scotfruit, Cupar		
		9050RD3	Polytunnel	Scotfruit, Cupar		
		9046RA2	Polytunnel	Peter Thomson, Blairgowrie		
		9059D-2	Outside	SCRI		
		97134B1	Outside	SCRI		
		Glen Ample Tulameen	Polytunnel Polytunnel	Scotfruit, Cupar Scotfruit, Cupar		
27 <sup>th</sup> July 2004	25 <sup>th</sup> July 2004	9053B6	Outside	HDC trial, Oxford		
		9050RD3	Outside	HDC trial, Oxford		
		9046RA2	Outside	HDC trial, Oxford		
		9059D-2	Outside	HDC trial, Oxford		
		Glen Ample	Outside	HDC trial, Oxford		
		Tulameen	Outside	HDC trial, Oxford		
	7 <sup>th</sup> July*	9053B6*	Outside	HDC trial, Oxford		
		9050RD3*	Outside	HDC trial, Oxford		
		9046RA2*	Outside	HDC trial, Oxford		
		9059D-2*	Outside	HDC trial, Oxford		
		Glen Ample*	Outside	HDC trial, Oxford		
	26 <sup>th</sup> July	9764F-3	Outside	SCRI		
		97134B1	Outside	SCRI		
		3 <sup>rd</sup> August 2004	2 <sup>nd</sup> August 2004	9053B6	Polytunnel	Scotfruit, Cupar
				9050RD3	Polytunnel	Scotfruit, Cupar
Glen Ample	Polytunnel			Scotfruit, Cupar		
Tulameen	Polytunnel			Scotfruit, Cupar		
9053B6	Outside			Pete Marshall, Alyth		
9050RD3	Outside			Pete Marshall, Alyth		
Glen Ample	Outside			Pete Marshall, Alyth		
Tulameen	Outside			Pete Marshall, Alyth		
9764F-3	Outside			SCRI		
9628E-3	Outside	SCRI				

**Table 3 HDC trial, Oxford - Yield data 2004**

Genotype	Yield (kg/plant)
9053B6	2.984
EM6506/37	2.980
EM6428/1	2.824
Tulameen	2.769
9059D-2	2.733
Glen Ample	2.430
Octavia	2.269
Glen Moy	2.205
EM6544/80	2.184
EM6545/12	2.179
EM6390/47	1.931
9046RA2	1.888
9050RD3	1.631

**Table 4 Selections identified in 2001 and 2002 for on-farm trials**

Selection	Season	Attributes	Notes
9451D4	Mid-Late	Large conical fruit, clean dry pick, long season	
9455E3	Mid	Conical fruit, good clean pick from machine, firm.	
9455F-2	Mid	Very large, meaty fruit, conical, bright, better flavour than 9455E3, hand pick only.	
9751E-2	Early-Mid	Round and firm, picks well by machine.	
9612F2	Late	Very large round fruit, bright red, good machine pick, high yield in a short season.	
9451E2	Late	Good flavour, large fruit. Hand pick only.	RBDV positive summer 2004
9455D-7	Mid	Picks well by machine. Good yield.	BRNV positive summer 2004
9440E-3	Mid	Round fruit, slightly small. Clean pick by machine. Good yield, mild flavour.	RBDV positive summer 2004
99111A1		Putative <i>Phytophthora</i> tolerance, good flavour, firm, good crop.	
99111B2		Putative <i>Phytophthora</i> tolerance, good display, large fruit.	

**Table 5 2005 Trialling programme**

Grower	Address	Trialling & Testing Ref	Date Planted	Harvest	No. of Plants										
					9062E-1	9053B6	9050RD3	9046RA2	9059D-2	9455E3	9451D4	9751E-2	9612F12	2000123A7	
John Hamilton	Milton Of Ruthven, Craighton, Blairgowrie, PH12 8RG	SSFG	Spring 99	Machine Harvest	1,000										
Peter Marshall	Muirton, Alyth, PH11 8JF	SSFG	Spring 99	Machine Harvest	6,300										
Peter Marshall	Muirton, Alyth, PH11 8JF	SSFG	Spring 99	Machine Harvest		6,300									
Peter Marshall	Muirton, Alyth, PH11 8JF	141	Autumn 2002	Machine Harvest		100	100								
Peter Marshall	Muirton, Alyth, PH11 8JF	184	Autumn 2002	Machine Harvest				225							
Peter Thomson	Bramblebank Works, Blairgowrie, PH10 7HY	139	Spring 2002	Protected cropping		200	200								
Trevor Reynolds	Long Drove Waterbeach, Cambridge CB5 9LR	139	Autumn 2002			200	200								
EW Mitchell	Kinpurmie Farm, Newtyle, PH12 8SQ	184	Autumn 2002	Hand pick outside				225							
Richard Stanley	Rectory Farm, Stanton ST. John, Oxford OX33 1HF		Autumn 2002	Hand pick outside		60	60	60							
Richard Stanley	Rectory Farm, Stanton ST. John, Oxford OX33 1HF		Spring 2003	Hand pick outside							30				
Ewan Pate	South Powrie, by Dundee	142	Spring 2002	Machine harvest		300	300								
Andrew Logan	Tarvit Home Farm, Cupar KY15 5SU	155	Autumn 2002	Protected cropping		120	120								
Rupert Hargreaves	Hargreaves Plants, Long Sutton, Spalding PE12 9GG	138	Autumn 2002	Protected cropping		100	100								
Patricia Sutherland	Roadside Croft, Harpsdale, Halkirk, Caithness KW12 6UL	150	Spring 2003	Protected cropping											90

## RASPBERRY SELECTION 9053B6

### YIELD

- 9053B6 has consistently outperformed Glen Ample at SCRI for the last six years.
- 9053B6 outyielded all other selections and controls at the HDC trial, Oxford in 2004.

### FRUIT QUALITY

- Shelf life is superior to Glen Ample and Tulameen.
- Freezing quality is excellent, due to the firm, cohesive fruit.
- The flavour of 9053B6 is superior to Glen Ample and at least as good as Tulameen, as supported by independent results from Charis.

### MACHINE HARVEST

- High quality machine pick, harvesting very few green fruit or husk.
- 9053B6 machine picks a high yield of good quality whole fruit, not pulp.

### PLANT HABIT

- Laterals present fruit well for hand picking or machine harvesting.
- Primocane is easy to manage due to the upright growth habit and absence of spines.

### PEST AND DISEASE RESISTANCE

- 9053B6 has the gene  $A_{10}$ , conferring resistance to four biotypes of the large raspberry aphid, *Amphorophora idaei*. Glen Ample and Tulameen are both susceptible to aphids.
- Based on the pedigree, 9053B6 is unlikely to have strong resistance to *Phytophthora fragariae* var. *rubi*, but is currently undergoing screening in an infestation plot at SCRI.
- Greater tolerance to leaf and bud mite than Glen Ample.

### MARKET

- 9053B6 was originally selected for its superior machine harvest characteristics but, in addition, its sensory traits, in particular good flavour, have proved it an excellent candidate for both the processing and the fresh market.

## Sensory Evaluation of Raspberries

On behalf of

Scottish Crop Research Institute

Project Leader: Carol Shankland email: carol.shankland@charisfoods.co.uk tel: 01292670181

Date of Sensory Profiling: 20/7/04

Sensory Science, Charis Innovative Food Services Ltd, Hannah Research Park, Ayr, KA6 5HL, Scotland.

This information was gathered using a conventional PROFILING technique

Table 1. Attribute ratings for APPEARANCE of raspberries

Sample	Attribute rating (0 - 100)				
	Red	Brown	Purple	Uniform	Size
9059D-2	69.1	2.0	30.0	69.4	63.7
97134B1	2.6	3.4	0.3	65.0	70.1
9046RA2	67.3	1.6	26.4	65.1	45.3
Tulameen (polytunnel)	65.9	2.0	26.8	69.8	64.5
Glen Ample (polytunnel)	67.7	2.1	30.9	73.6	67.6
9050RD3 (polytunnel)	66.3	1.9	16.4	67.6	53.8
9053B6	59.6	6.9	10.3	63.6	55.7
SED <sup>1</sup>	2.17	1.80	4.17	4.27	3.60
Significance <sup>2</sup>	***	ns	***	ns	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

This information was gathered using a conventional PROFILING technique

Table 2. Attribute ratings for FLAVOUR of raspberries

Sample	Attribute rating (1-100)							
	Fruity	Sweet	Woody	Acid/Sour	Raspberry	Grassy	Bitter	Floral
9059D-2	57.5	40.6	7.7	36.3	54.9	1.6	11.4	13.7
97134B1	51.2	36.8	7.4	36.4	29.8	7.6	11.8	5.3
9046RA2	58.4	41.9	1.4	34.9	55.1	0.9	7.0	12.6
Tulameen (polytunnel)	52.0	27.7	1.9	49.4	44.6	4.9	18.2	5.8
Glen Ample (polytunnel)	55.5	31.2	9.5	44.7	49.0	7.4	17.3	4.8
9050RD3 (polytunnel)	54.9	35.1	4.8	40.8	51.4	4.8	13.4	6.2
9053B6	54.8	35.5	2.3	36.8	50.1	4.3	6.7	9.7
SED <sup>1</sup>	3.36	2.32	2.05	2.40	3.48	3.34	1.89	3.16
Significance <sup>2</sup>	ns	***	**	***	***	ns	***	ns

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

This information was gathered using a conventional PROFILING technique

Table 3. Attribute ratings for AFTERTASTE of raspberries

Sample	Attribute rating (1-100)	
	Intensity	Persistence
9059D-2	39.5	31.7
97134B1	35.8	34.7
9046RA2	32.0	29.6
Tulameen (polytunnel)	44.3	41.9
Glen Ample (polytunnel)	40.6	41.6
9050RD3 (polytunnel)	39.6	36.6
9053B6	36.5	36.0
SED <sup>1</sup>	1.87	4.01
Significance <sup>2</sup>	***	ns

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 4. Attribute ratings for MOUTHFEEL of raspberries

Sample	Attribute rating (1-100)		
	Firmness	Seedy	Juicy
9059D-2	43.1	41.5	47.4
97134B1	31.3	45.9	49.8
9046RA2	37.3	43.0	52.2
Tulameen (polytunnel)	37.9	46.8	47.5
Glen Ample (polytunnel)	39	42.4	50.1
9050RD3 (polytunnel)	46.9	42.6	45.7
9053B6	64.6	42.5	33.6
SED <sup>1</sup>	4.21	3.59	3.97
Significance <sup>2</sup>	***	ns	**

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 5. Attribute ratings for ACCEPTABILITY of raspberries

Sample		Attribute rating (0 - 100) Acceptability
9059D-2		57.4
97134B1		38.3
9046RA2		59.8
Tulameen	(polytunnel)	46.9
Glen Ample	(polytunnel)	49.2
9050RD3	(polytunnel)	51.5
9053B6		50.4
SED <sup>1</sup>		3.99
Significance <sup>2</sup>		**

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

## Sensory Evaluation of Raspberries

On behalf of

Scottish Crop Research Institute

Note! Selections 9050RD3 and 9053B6 are transposed in this sample, ie. 9050RD3 is actually 9053B6 and vice-versa

Project Leader: Carol Shankland email: carol.shankland@charisfoods.co.uk tel: 01292670181

Date of Sensory Profiling: 27/7/04

Sensory Science, Charis Innovative Food Services Ltd, Hannah Research Park, Ayr, KA6 5HL, Scotland.

Table 1. Attribute ratings for APPEARANCE of raspberries

Sample		Attribute rating (0 - 100)				Size
		Red	Brown	Purple	Uniform	
Glen Ample	(England)	65.1	1.5	8.9	63.6	52.9
9050RD3	(England)	66.4	1.7	17.1	64.5	55.2
9046RA2	(England)	66.8	1.1	11.2	59.8	48.1
9059D-2	(England)	60.8	0.8	8.0	54.8	42.5
9053B6	(England)	60.6	3.7	8.8	58.8	39.0
Tulameen	(England)	65.9	0.9	8.4	61.3	62.1
9053B6	(frozen)	65.2	1.0	11.7	45.2	29.7
Glen Ample	(frozen)	67.4	1.8	12.0	55.0	50.1
9059D-2	(frozen)	66.6	1.1	10.6	60.3	56.0
9050RD3	(frozen)	65.1	1.1	13.0	56.2	52.3
9046RA2	(frozen)	60.5	1.4	9.3	51.6	35.0
9764F-3		61.5	1.4	41.8	72.3	75.8
97134B1	(yellow)	3.8	2.2	1.2	66.8	73.0
SED <sup>1</sup>		2.56	1.15	2.33	3.52	3.13
Significance <sup>2</sup>		***	ns	***	***	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

This information was gathered using a conventional PROFILING technique

Table 2. Attribute ratings for FLAVOUR of raspberries

Sample		Attribute rating (1-100)							
		Fruity	Sweet	Woody	Acid/Sour	Raspberry	Grassy	Bitter	Floral
Glen Ample	(England)	57.7	36.4	0.8	39.5	55.8	1.6	12.4	13.8
9050RD3	(England)	59.1	41.1	0.3	28.3	56.4	0.7	8.3	19.9
9046RA2	(England)	55.8	30.7	1.4	40.4	53.2	2.2	16.7	9.3
9059D-2	(England)	55.6	33.5	2.7	39.5	54.4	2.9	12.9	11.3
9053B6	(England)	53.8	30.9	3.5	37.1	47.7	1.9	13.2	12.4
Tulameen	(England)	60.4	39.3	3.0	34.9	56.8	2.2	10.9	15.2
9053B6	(frozen)	40.5	16.0	11.0	49.4	32.5	7.4	27.1	2.2
Glen Ample	(frozen)	46.4	21.3	0.6	51.3	42.0	4.5	20.7	2.8
9059D-2	(frozen)	45.7	16.7	4.0	57.9	43.2	5.1	24.6	3.9
9050RD3	(frozen)	55.6	18.6	0.6	54.4	46.1	7.1	22.3	6.9
9046RA2	(frozen)	39.8	12.0	3.9	65.0	31.9	6.6	28.4	3.2
9764F-3		55.6	37.7	3.0	32.8	49.7	3.0	12.1	11.2
97134B1	(yellow)	53.2	43.5	1.9	28.6	33.7	5.9	10.2	14.9
SED <sup>1</sup>		2.3	3.1	2.0	4.1	2.6	3.1	2.1	3.1
Significance <sup>2</sup>		***	***	**	***	***	ns	***	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001



This information was gathered using a conventional PROFILING technique

Table 3. Attribute ratings for AFTERTASTE of raspberries

Sample		Attribute rating (1-100)	
		Intensity	Persistence
Glen Ample	(England)	36.9	30.6
9050RD3	(England)	35.2	27.2
9046RA2	(England)	38.9	32.4
9059D-2	(England)	39.6	33.3
9053B6	(England)	36.6	31.0
Tulameen	(England)	38.6	32.7
9053B6	(frozen)	41.6	37.1
Glen Ample	(frozen)	41.1	34.9
9059D-2	(frozen)	43.9	38.7
9050RD3	(frozen)	43.5	38.0
9046RA2	(frozen)	46.4	38.0
9764F-3		37.1	29.1
97134B1	(yellow)	34.1	27.9
SED <sup>1</sup>		2.17	1.99
Significance <sup>2</sup>		***	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

This information was gathered using a conventional PROFILING technique

Table 4. Attribute ratings for MOUTHFEEL of raspberries

Sample		Attribute rating (1-100)		
		Firmness	Seedy	Juicy
Glen Ample	(England)	41.9	38.1	53.8
9050RD3	(England)	53.8	35.3	43.2
9046RA2	(England)	50.1	39.8	44.4
9059D-2	(England)	44.9	38.6	47.9
9053B6	(England)	45.2	39.1	43.8
Tulameen	(England)	43.3	38.9	47.3
9053B6	(frozen)	13.2	41.8	58.8
Glen Ample	(frozen)	17.2	34.3	61.0
9059D-2	(frozen)	22.3	37.8	64.0
9050RD3	(frozen)	18.5	36.6	61.9
9046RA2	(frozen)	21.5	39.2	56.7
9764F-3		57.8	39.5	37.4
97134B1	(yellow)	37.6	38.1	51.8
SED <sup>1</sup>		3.48	2.39	2.70
Significance <sup>2</sup>		***	ns	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

This information was gathered using a conventional PROFILING technique

Table 5. Attribute ratings for ACCEPTABILITY of raspberries

Sample		Attribute rating (0 - 100)
		Acceptability
Glen Ample	(England)	54.3
9050RD3	(England)	58.2
9046RA2	(England)	47.5
9059D-2	(England)	53.0
9053B6	(England)	43.7
Tulameen	(England)	59.5
9053B6	(frozen)	18.3
Glen Ample	(frozen)	31.7
9059D-2	(frozen)	33.6
9050RD3	(frozen)	31.7
9046RA2	(frozen)	19.5
9764F-3		52.3
97134B1	(yellow)	43.3
SED <sup>1</sup>		3.24
Significance <sup>2</sup>		***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

## Sensory Evaluation of Raspberries

On behalf of

Scottish Crop Research Institute

Project Leader: Carol Shankland email: carol.shankland@charisfoods.co.uk tel: 01292670181

Date of Sensory Profiling: 3/8/04

Sensory Science, Charis Innovative Food Services Ltd, Hannah Research Park, Ayr, KA6 5HL, Scotland.

This information was gathered using a conventional PROFILING technique

Table 1. Attribute ratings for APPEARANCE of raspberries

Sample		Attribute rating (0 - 100)					Size
		Red	Brown	Purple	Uniform		
9628E - 3	(SCRI)	72.0	2.1	31.4	73.5	70.8	
9764F - 3	(SCRI)	65.4	3.3	41.7	70.4	79.2	
Glen Ample	(outside)	64.5	1.3	15.9	74.1	66.6	
9053B6	(outside)	68.0	2.0	12.9	71.7	63.0	
9050RD3	(outside)	64.1	1.3	11.9	64.2	58.7	
Tulameen	(polytunnel)	66.4	1.3	17.2	68.4	70.3	
Glen Ample	(polytunnel)	65.3	1.7	27.4	63.5	58.5	
9053B6	(polytunnel)	66.3	1.3	20.8	57.8	54.8	
9050RD3	(polytunnel)	64.0	1.9	19.6	66.4	53.5	
SED <sup>1</sup>		2.10	0.74	3.64	2.60	3.13	
Significance <sup>2</sup>		*	ns	***	***	***	

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 2. Attribute ratings for FLAVOUR of raspberries

Sample		Attribute rating (1-100)							
		Fruity	Sweet	Woody	Acid/Sour	Raspberry	Grassy	Bitter	Floral
9628E - 3	(SCRI)	55.3	43.0	6.9	25.2	50.0	7.4	8.9	23.8
9764F - 3	(SCRI)	53.3	36.1	6.5	28.2	45.0	6.4	8.7	16.4
Glen Ample	(outside)	56.2	25.6	1.6	45.5	46.4	3.2	12.1	5.3
9053B6	(outside)	55.7	33.9	0.8	34.3	52.3	3.0	8.0	14.6
9050RD3	(outside)	50.5	20.3	3.8	51.3	37.2	5.0	12.2	2.4
Tulameen	(polytunnel)	61.8	39.7	3.7	38.8	53.1	5.1	10.3	18.2
Glen Ample	(polytunnel)	60.6	41.0	4.1	36.3	53.6	2.9	11.3	18.4
9053B6	(polytunnel)	62.3	40.6	0.4	32.4	52.8	5.8	13.2	11.1
9050RD3	(polytunnel)	55.1	40.0	1.1	31.1	48.8	4.7	11.6	19.6
SED <sup>1</sup>		3.34	2.86	2.28	2.62	3.07	2.07	2.68	3.88
Significance <sup>2</sup>		*	***	ns	***	***	ns	ns	***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 3. Attribute ratings for AFTERTASTE of raspberries

Sample		Attribute rating (1-100)	
		Intensity	Persistence
9628E - 3	(SCRI)	37.9	32.7
9764F - 3	(SCRI)	34.3	30.0
Glen Ample	(outside)	43.5	38.4
9053B6	(outside)	40.5	35.8
9050RD3	(outside)	42.1	39.7
Tulameen	(polytunnel)	39.1	37.0
Glen Ample	(polytunnel)	42.7	34.2
9053B6	(polytunnel)	41.0	37.2
9050RD3	(polytunnel)	40.9	33.9
SED <sup>1</sup>		3.36	3.10
Significance <sup>2</sup>		ns	ns

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 4. Attribute ratings for MOUTHFEEL of raspberries

Sample		Attribute rating (1-100)		
		Firmness	Seedy	Juicy
9628E - 3	(SCRI)	44.1	34.0	47.8
9764F - 3	(SCRI)	52.1	33.5	40.7
Glen Ample	(outside)	47.8	34.7	45.6
9053B6	(outside)	58.5	35.2	37.6
9050RD3	(outside)	57.8	36.1	36.2
Tulameen	(polytunnel)	37.2	34.2	55.6
Glen Ample	(polytunnel)	40.4	33.1	54.3
9053B6	(polytunnel)	43.8	33.4	47.7
9050RD3	(polytunnel)	56.4	35.1	36.0
SED <sup>1</sup>		3.59	2.50	3.77
Significance <sup>2</sup>		ns	***	ns

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

This information was gathered using a conventional PROFILING technique

Table 5. Attribute ratings for ACCEPTABILITY of raspberries

Sample		Attribute rating (0 - 100)
		Acceptability
9628E - 3	(SCRI)	57.3
9764F - 3	(SCRI)	50.7
Glen Ample	(outside)	50.1
9053B6	(outside)	52.9
9050RD3	(outside)	35.8
Tulameen	(polytunnel)	61.9
Glen Ample	(polytunnel)	62.7
9053B6	(polytunnel)	59.6
9050RD3	(polytunnel)	54.5
SED <sup>1</sup>		3.74
Significance <sup>2</sup>		***

<sup>1</sup>SED = standard error of difference of means

<sup>2</sup>Significance of sample effect: ns = not significant; \*p≤0.05; \*\*p≤0.01; \*\*\*p≤0.001

## Report to the Executive of the Raspberry Breeding Project relating to allegation of illegal propagation

### Mr P Marshall of Muirton Farm

#### Background

There have been allegations that certain growers including Mr Peter Marshall of Muirton, Alyth had illegally propagated raspberry selections that were being trialled.

Lesley Beaton and Nigel Kerby visited Mr Marshall on 04 August 2004 to investigate the allegations.

#### Findings

MRS has two current Trialling and Testing Agreements covering three selections which involve Mr Marshall, these were signed prior to the execution of the Raspberry Consortium Agreement:

T & T Number	Date Signed	Variety	Period	Quantity
141	November 2001	9050RD3, 9053B6	3 Years	100 of each
184*	May 2003	9046RA2	3 Years	225
*Agreement is with KG and is for 450 plants, 225 of which went to Mr Marshall				

#### 9046RA2

It is believed that a Trialling and Testing Agreement was entered into with SSFG (copies not available) for 300 plants which were planted in spring 1999.

Mr Marshall has propagated from these plants and there are now 3.5 acres of this selection. We believe that the density is 1,800 plants per acre which equates to a total of 6,300 plants.

The propagation started in 2002 and the first full fruiting year for these plants will be in 2005. Photographs of the plantation were taken and are appended to this report.

**9062E-1**

It is believed that a Trialling and Testing Agreement was entered into with SSFG for 300 plants which were planted in spring 1999.

Mr Marshall has self-propagated from these plants. The area currently planted has 3.5 acres of this selection. We believe that the density is 1,800 plants per acre which equates to a total of 6,300 plants.

The propagation started in 2002 and the first full fruiting year for these plants will be in 2005. Photographs of the plantation were taken and are appended to this report.

**Conclusion**

Although it is clear that self-propagation did take place it should be pointed out that Mr Marshall was not aware that he had contravened the terms of any agreements. He had obtained the material from SSFG who had consequently gone into receivership. Any propagation took place prior to subsequent trialling and testing agreements.

Mr Marshall has never denied access to any member of staff from SCRI or MRS. The MRS raspberry breeder Nikki Jennings visits Mr Marshall's farm regularly and obtains good quality data and fruit samples from him which help us evaluate the performance of selections.

On investigation of MRS Trialling and Testing Agreements it was noted that they were ambiguous as to whether or not propagation is permitted as they read 'commercial propagation is not permitted'. One could argue that propagation for larger machine-harvest trials is not 'commercial' propagation since it is still part of a trial. Furthermore, since any agreement with SSFG for these selections was invalidated in July 2000 when SSFG went out of business, it is questionable as to whether Mr Marshall has acted illegally.

Schedule 2, Part II of the 1964 Plant Variety Rights Act (paragraph 4(8)) allows for the disposal of material other than propagating material produced in the course of breeding, bulking up or carrying out tests or trials of the variety, provided no mention is made of the variety name. The equivalent provision in the EC Council Regulation of 1994 is Article 10.3. Therefore PVR has not been jeopardized as the harvested material from the plants has:

- a) not been sold to date and;

- b) will not be sold in the future with a number or any means of identifying it as a specific selection.

### **Recommendations**

1. MRS's normal strategy in dealing with illegal propagation would be to calculate how much royalty would have been due and then to double this amount and charge as a fine. In this case the total would be (12,600 canes @ £22.50 per 1000) x 2 = £567. However, as the information we receive from Mr Marshall regarding our selections has proven invaluable over the years, MRS believe that a) the in-kind contribution already given by Mr Marshall to MRS far outweighs this amount and b) the data gained from this large scale trial will go a long way to evaluate commercial potential. Therefore, MRS recommends that a fine is not imposed.
2. Trialling and Testing Agreements are put into place to cover the material of 9046RA2 and 9062E-1 now being trialled on Mr Marshall's site.
3. The wording in future Trialling and Testing Agreements for soft fruit should be amended to read 'no propagation is permitted without the written approval of MRS'. The Agreements should also contain wording to make it clear that any fruit offered for sale should not include a number or name of the selection as this could jeopardize future applications for plant variety rights.
4. Mr Marshall's Trialling and Testing Agreement should prohibit the sale of fruit of 9046RA2 and 9062E-1 to the fresh market to ensure that he has no competitive advantage in this market.
5. All holders of current or past Trialling and Testing Agreements for soft fruit should be sent a letter advising them that 'no propagation is permitted without the written permission of Mylnefield Research Services Ltd' and they should also be asked to indicate their agreement to this by signing and returning of copy of the letter.
6. An article detailing what constitutes illegal propagation is and how this can adversely affect the industry should be written and published in an appropriate publication such as the *Grower*.

7. MRS recommends that 9062E-1 is released as soon as possible. Trials indicate that 9062E-1 is particularly suited to machine harvest and has excellent processing qualities.

### **Mr John Hamilton, Milton of Ruthven Farm**

Investigation has established that Mr Hamilton has approximately 1000 plants of 9062E-1.

Mr Hamilton did self-propagate these plants and claims that the plants were supplied to him without any 'Trialling and Testing' Agreement. Therefore, it is unlikely that he has acted illegally.

Again Mr Hamilton has supplied us with data on this selection and is happy to continue doing so in the future.

A Trialling and Testing agreement covering the 1000 plants has been sent to Mr Hamilton for signature. This Agreement stipulates that:

1. The fruit is for agronomic evaluation.
2. No further propagation permitted without the prior written consent of Mylnefield Research Services Ltd.
3. Fruit cannot be sold as a named or numbered variety and can only be sold for processing.

9046RA2 at Mr Marshall's farm





9062E-1 at Mr Marshall's farm



## RASPBERRY TRIAL RESULTS FORM

RECEIVED  
 - 5 OCT 2004

Name of Grower: A M HAMILTON & SON  
 Address of Grower: MILTON OF RUTVEN  
BLAIRGOWRIE PH 12 899.  
 Tel No: 01575 530284 Mobile: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Location of Trial: MILTON OF RUTVEN  
 Variety/Selection No's: 9062E-1  
 Control Variety: ALLEN AMBLE  
 Date Planted: MARCH 2002  
 Location: (Field) (Plastic Structure) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	25-75% survived	Less than 25% <del>_____</del>
Irrigation	<del>Tackle</del>	None	
Density	Canes per acre: <u>2250</u>	Spacing: <u>24" - 30"</u>	
Picking Date	First fruit picked: <u>10/7/04</u>	Approx 50% picked: <u>21/7/04</u>	Picking completed: <u>08/08/04</u>
Harvesting	Machine <u>PATTON DEN OSPREY</u>	<del>Hand</del>	
Total Yield (t/ha)	<u>7.6 t/ha.</u>		
Yield/Pick	<u>0.5</u>	<u>1.2</u>	<u>1.8</u>
	<u>1.8</u>	<u>1.6</u>	<u>0.4</u>
	<u>0.3</u>		
Yield, Quality & Acceptance Compared with Control variety		Better	Similar
	Yield	<input checked="" type="checkbox"/>	
	Berry Size		<input checked="" type="checkbox"/>
	Appearance		<input checked="" type="checkbox"/>
	Flavour		<input checked="" type="checkbox"/>
Pest/Disease Tolerance		Better	Similar
	Fruit Rot		<input checked="" type="checkbox"/>
	Root Rot		<input checked="" type="checkbox"/>
	Cane Disease		<input checked="" type="checkbox"/>
	Virus Infection		<input checked="" type="checkbox"/>
Others (specify)	<u>CHEMICAL TOLERANCE</u>		<input checked="" type="checkbox"/>
How do you rate against control variety		Better <input checked="" type="checkbox"/>	Similar
Will you plant more:		Yes <input checked="" type="checkbox"/>	No
Further Comments:	<u>GOOD MACHINE PICKING VARIETY ALTHOUGH IT HAS A VERY TANGLY UNTIDY GROWTH HABIT. IN WET WEATHER SUSCEPTIBLE TO BOTRYTIS.</u>		

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

## RASPBERRY TRIAL RESULTS FORM

Name of Grower: PETER MARSHALL & Co.  
 Address of Grower: MURTON A197L.  
 Tel No: 01828632227 Mobile: 07808052581  
 Email: \_\_\_\_\_  
 Location of Trial: West Cairns.  
 Variety/Selection No's: 9053B6  
 Control Variety: Ample.  
 Date Planted: Dec. 2002  
 Location: (Field) (Plastic Structure) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	<del>25-75% survived</del>	<input checked="" type="checkbox"/> Less than 25%	
Irrigation	<del>Trickle</del>	None		
Density	Canes per acre:	Spacing: <u>3'</u>		
Picking Date	First fruit picked: <u>7 July</u>	Approx 50% picked:	Picking completed:	
Harvesting	<del>Machine</del>	Hand		
Total Yield (t/ha)		Fruit Size(g):		
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield			
	Berry Size			/
	Appearance			/
	Flavour		/	
Pest/Disease Tolerance		Better	Similar	Worse
	Fruit Rot			
	Root Rot	<u>No Problem.</u>		
	Cane Disease			
	Virus Infection			
Others (specify)				
How do you rate against control variety		<del>Better</del>	<del>Similar</del>	Worse
Will you plant more:		<del>Yes</del>		No
Further Comments: <u>Would not be good for machine.</u> <u>Laterals too long &amp; easily broken.</u> <u>Fruits over a long period hence too many passes with mach</u> <u>Young cane growth very poor and very floppy.</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

copy with

## RASPBERRY TRIAL RESULTS FORM

Name of Grower: PETER MARSHALL & Co.  
 Address of Grower: MUNICTON AVENUE PHILIPPS  
 Tel No: 01828632227 Mobile: 07808052581  
 Email: \_\_\_\_\_  
 Location of Trial: West Jordanstone.  
 Variety/Selection No's: 9046 RA2.  
 Control Variety: AMPLE  
 Date Planted: March 2000  
 Location: (Field) (Plastic Structure) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	<del>25-75% survived</del>	<del>Less than 25%</del>	
Irrigation	<del>Trickle</del>	None		
Density	Canes per acre:	Spacing: <u>3'</u>		
Picking Date	First fruit picked:	Approx 50% picked:	Picking completed:	
Harvesting	Machine <u>Once.</u>	Hand <u>15.</u>		
Total Yield (t/ha)	Fruit Size(g):			
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield		-	
	Berry Size			-
	Appearance		-	
	Flavour		-	
Pest/Disease Tolerance	Firmness	-		
		Better	Similar	Worse
	Fruit Rot			
	Root Rot			
	Cane Disease			
Others (specify)	<u>CROWN GALL</u>			
How do you rate against control variety		Better	<del>Similar</del>	<del>Worse</del>
Will you plant more:		Yes	<del>No</del>	
Further Comments: <u>Picked once mid season with machine. 6.25 Tonne/ha.</u> <u>Excellent machine variety.</u> <u>Husks have a tendency to split.</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

RASPBERRY TRIAL RESULTS FORM

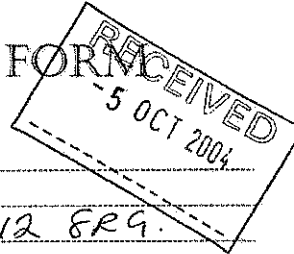
RECEIVED  
20 SEP 2004

Name of Grower: PETER THOMSON  
 Address of Grower: THOMAS THOMSON (3) LTD BRAMBLEBANK  
BLAIRGOWRIE PERTHSHIRE PH10 7HY  
 Tel No: 01250 875500 Mobile: 07715 810 538  
 Email: p.thomson@t.thomson.co.uk  
 Location of Trial: WEST HAUGH FARM  
 Variety/Selection No's: 9053 B6  
 Control Variety: GLEN AMPLE  
 Date Planted: AUTUMN 2001  
 Location: ( Field) ( Plastic Structure) ( Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived <input checked="" type="checkbox"/>	25-75% survived	Less than 25%	
Irrigation	Trickle <input checked="" type="checkbox"/>	None		
Density	Canes per acre: <u>~ 2200</u>	Spacing: <u>75 cm x 2.15m</u>		
Picking Date	First fruit picked:	Approx 50% picked:	Picking completed:	
Harvesting	Machine	Hand <input checked="" type="checkbox"/>		
Total Yield (t/ha)	Fruit Size(g):			
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield			<input checked="" type="checkbox"/>
	Berry Size			<input checked="" type="checkbox"/>
	Appearance			<input checked="" type="checkbox"/>
	Flavour		<input checked="" type="checkbox"/>	
Pest/Disease Tolerance		Better	Similar	Worse
	Firmness		<input checked="" type="checkbox"/>	
	Fruit Rot		<input checked="" type="checkbox"/>	
	Root Rot		<input checked="" type="checkbox"/>	
	Cane Disease		<input checked="" type="checkbox"/>	
	Virus Infection	<input checked="" type="checkbox"/>		
	Others (specify)			
How do you rate against control variety	Better	Similar	Worse <input checked="" type="checkbox"/>	
Will you plant more:	Yes	No <input checked="" type="checkbox"/>		
Further Comments: <u>GOOD FRUIT SIMILAR TO AMPLE TO START, BUT QUICKLY GOING SMALLER. AMPLE HAS LEAF EDDO HIDE AND THIS IS PERHAPS RESISTANT. SEASON SIMILAR TO AMPLE</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

## RASPBERRY TRIAL RESULTS FORM



Name of Grower: A M HAMILTON & SON  
 Address of Grower: MILTON OF RUTVEN  
BLAIRGOWRIE PH 12 8RG.  
 Tel No: 01575 530284 Mobile: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Location of Trial: MILTON OF RUTVEN  
 Variety/Selection No's: 9062E-1  
 Control Variety: GLYN AMBLE  
 Date Planted: MARCH 2002  
 Location: (Field) (Plastic Structure) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	25-75% survived	Less than 25%	
Irrigation	<del>Trickle</del>	None		
Density	Canes per acre: <u>2250</u>	Spacing: <u>24" - 30"</u>		
Picking Date	First fruit picked: <u>10/7/04</u>	Approx 50% picked: <u>21/7/04</u>	Picking completed: <u>08/08/04</u>	
Harvesting	Machine <u>PATTON DEN OSPREY</u>	<del>Hand</del>		
Total Yield (t/ha)	<u>7.6 t/ha.</u>			
Yield/Pick	<u>0.5</u>	<u>1.2</u>	<u>1.8</u>	
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield	<input checked="" type="checkbox"/>		
	Berry Size		<input checked="" type="checkbox"/>	
	Appearance			<input checked="" type="checkbox"/>
	Flavour			<input checked="" type="checkbox"/>
Pest/Disease Tolerance		Better	Similar	Worse
	Firmness	<input checked="" type="checkbox"/>		
	Fruit Rot		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Root Rot		<input checked="" type="checkbox"/>	
	Cane Disease		<input checked="" type="checkbox"/>	
Virus Infection		<input checked="" type="checkbox"/>		
Others (specify)	<u>CHEMICAL TOLERANCE</u>			
How do you rate against control variety		Better <input checked="" type="checkbox"/>	Similar	Worse
Will you plant more:		Yes <input checked="" type="checkbox"/>	No	
Further Comments:	<u>GOOD MACHINE PICKING VARIETY ALTHOUGH IT HAS A VERY TANGLY UNTIDY GROWTH HABIT. IN WET WEATHER SUSCEPTIBLE TO BOTRYTIS.</u>			

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

## RASPBERRY TRIAL RESULTS FORM

Name of Grower: PETER MARSHALL & Co.  
 Address of Grower: WURTON Aylt.  
 Tel No: 01828632227 Mobile: 07808052581  
 Email: \_\_\_\_\_  
 Location of Trial: West Cairns.  
 Variety/Selection No's: 9053B6  
 Control Variety: Ample.  
 Date Planted: Dec. 2002  
 Location: (Field) (Plastic Structure) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	<del>25-75% survived</del>	<del>Less than 25%</del>	
Irrigation	<del>Trickle</del>	None		
Density	Canes per acre:	Spacing: <u>3'</u>		
Picking Date	First fruit picked: <u>7 July</u>	Approx 50% picked:	Picking completed:	
Harvesting	<del>Machine</del>	Hand		
Total Yield (t/ha)	Fruit Size(g):			
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield			
	Berry Size			/
	Appearance			/
	Flavour		/	
Pest/Disease Tolerance		Better	Similar	Worse
	Fruit Rot			
	Root Rot	<u>No Problem.</u>		
	Cane Disease			
	Virus Infection			
Others (specify)				
How do you rate against control variety		<del>Better</del>	<del>Similar</del>	Worse
Will you plant more:		<del>Yes</del>		No
Further Comments: <u>would not be good for machine.</u> <u>Laterals too long &amp; easily broken.</u> <u>Fruits over a long period hence too many passes with mach</u> <u>Young cane growth very poor and very floppy.</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.

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## RASPBERRY TRIAL RESULTS FORM

Name of Grower: PETER MARSHALL & Co.  
 Address of Grower: MILTON AITON PH11 8JF  
 Tel No: 01828632227 Mobile: 07808052581  
 Email: \_\_\_\_\_  
 Location of Trial: West Jordanstone.  
 Variety/Selection No's: 9046 RA2.  
 Control Variety: AMPLE  
 Date Planted: March 2000  
 Location: (Field) (~~Plastic Structure~~) (Glasshouse) (Please delete as appropriate)

Establishment	More than 75% survived	<del>25-75% survived</del>	Less than 25%	
Irrigation	<del>Fields</del>	None		
Density	Canes per acre:	Spacing: <u>3'</u>		
Picking Date	First fruit picked:	Approx 50% picked:	Picking completed:	
Harvesting	Machine <u>Once.</u>	Hand <u>15.</u>		
Total Yield (t/ha)	Fruit Size(g):			
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield		-	
	Berry Size			-
	Appearance		-	
	Flavour		-	
Pest/Disease Tolerance	Firmness	-		
		Better	Similar	Worse
	Fruit Rot			
	Root Rot			
	Cane Disease			
	Virus Infection			
	Others (specify)	<u>CROWN GALL</u>		
How do you rate against control variety	Better	<del>Similar</del>	<u>Worse</u>	
Will you plant more:	Yes		<u>No</u>	
Further Comments: <u>Picked once mid season with machine. 6.25 Tons/ha.</u> <u>Excellent machine variety.</u> <u>Husks have a tendency to split.</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.



## RASPBERRY TRIAL RESULTS FORM

Name of Grower: PETER THOMSON  
 Address of Grower: T. THOMSON (S) LTD, BLANDBLEBANK, BLAIRGOWRIE  
PERTHSHIRE  
 Tel No: 01259 875500 Mobile: 07715 810535  
 Email: p.thomson@tthomson.co.uk  
 Location of Trial: WEST HAUGH  
 Variety/Selection No's: 9046 RA 2 9050 RD 3  
 Control Variety: GLEN AMPLE  
 Date Planted: AUTUMN 2001  
 Location: (Field) (Plastic Structure) (~~Glasshouse~~) (Please delete as appropriate)

Establishment	More than 75% survived	25-75% survived <input checked="" type="checkbox"/>	Less than 25%	
Irrigation	Trickle <input checked="" type="checkbox"/>		None	
Density	Canes per acre: <u>~ 2200</u>		Spacing: <u>75cm x 2.15m.</u>	
Picking Date	First fruit picked:	Approx 50% picked:	Picking completed:	
Harvesting	Machine		Hand <input checked="" type="checkbox"/>	
Total Yield (t/ha)	Fruit Size(g):			
Yield/Pick				
Yield, Quality & Acceptance Compared with Control variety		Better	Similar	Worse
	Yield			<input checked="" type="checkbox"/>
	Berry Size			<input checked="" type="checkbox"/>
	Appearance			<input checked="" type="checkbox"/>
	Flavour			<input checked="" type="checkbox"/>
Pest/Disease Tolerance		Better	Similar	Worse
	Fruit Rot		<input checked="" type="checkbox"/>	
	Root Rot			<input checked="" type="checkbox"/>
	Cane Disease		<input checked="" type="checkbox"/>	
	Virus Infection	<input checked="" type="checkbox"/>		
Others (specify)				
How do you rate against control variety	Better	Similar	Worse <input checked="" type="checkbox"/>	
Will you plant more:	Yes		No <input checked="" type="checkbox"/>	
Further Comments: <u>BOTH VERY POOR FRUITS - NOT PICKED.</u>				

PLEASE COMPLETE RELEVANT SECTIONS AND TICK BOXES WHERE APPROPRIATE AND RETURN TO MRS.