# Grower Summary

## SF 041d

Summer Fruiting Raspberry Varieties Trial

Annual *2016*

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| **Project title:** | Summer Fruiting Raspberry Varieties Trial |
| **Project number:** | SF 041d |
| **Project leader:** | Janet Allen, ADAS |
| **Report:** | Annual Report, March 2016 |
| **Previous report:** | Annual report, March 2015 |
| **Key staff:** | Harriet Roberts, ADAS<br>Chris Dyer, ADAS |
| **Location of project:** | Rectory Farm, Stanton St John, Oxford |
| **Industry Representative:** | Salih Hodzov, WB Chambers |
| **Date project commenced:** | 1st April 2013 |
| **Date project completed (or expected completion date):** | 31st March 2017 |

# GROWER SUMMARY

## Headline

- Four new summer fruiting raspberry varieties/selections show considerable promise for commercial production in the UK, including Squamish (very early), 0485K-1 (early-mid), EM6805/142 (late) and EM6804/81 (late).

## Background

There is a continuing requirement to identify summer fruiting raspberry varieties for commercial production which meet the evolving needs of the market, whilst offering opportunities for profitable production to growers. This project has been established within a commercial plantation of raspberries to identify varieties and advanced selections which offer:

- High yields and reliable cropping over the longest possible season
- Reduced labour costs through ease of cane management and improved fruit presentation for picking
- Fruit with an attractive appearance, good flavour, texture and shelf-life
- Potential to reduce reliance on traditional crop protection methods through improved tolerance or resistance to major pests and diseases

In combination, these traits will enable the UK industry to maintain and increase its market share, extend the harvest season and, importantly, reduce unit costs.

This trial has been designed to critically evaluate cultivars and advanced selections, sourced from UK and overseas raspberry breeding programmes. It aims to appraise cultivars that are now, or soon may be, available to growers for which there is little or no experience as to their suitability for growing in the UK or elsewhere in Europe. The trial includes two advanced selections from James Hutton Ltd. (0485K-1 and 0019E-2) and Jeanne d' Orleans from the Agricultural and Agri-Food Research Canada sub-station in L'Acadie, Quebec. These were identified as having considerable commercial potential in the previous AHDB Horticulture funded raspberry variety trial (SF 041c).

## Results of the Variety Trials

This is a summary of the information presented in the Full Trial Report. Please refer to the 'Full Trial Report' for full and comprehensive information on the results.

Tables 1 and 2 provide details of the varieties and numbered selections included in both the main replicated plots and those included in the single guard plots. All selections were planted in 2013 except those marked * which were planted in 2014.

**Table 1**. Details of the main entry selections in order of season, with their source and type of planting material used.

| Variety | Source, country | Planting material | Season | 2015 Harvest start date | 2015 Harvest end date |
|---|---|---|---|---|---|
| 0435D-3 | James Hutton Ltd., Scotland | Module plants | Very Early | 18/06/2015 | 03/08/2015 |
| BC 92-9-15 (Squamish) | PARC, Canada | Module plants | Early | 18/06/2015 | 29/07/2015 |
| 0485K-1 | James Hutton Ltd., Scotland | Module plants | Early-mid | 26/06/2015 | 03/08/2015 |
| Tulameen (Naktuinbouw clone) | RW Walpole, England | Module plants | Mid | 26/06/2015 | 12/08/2015 |
| AAC Eden (KO6-2) | PARC, Canada | Module plants | Mid | 18/06/2015 | 10/08/2015 |
| 0019 E2 | James Hutton Ltd., Scotland | Module plants | Mid-Late | 01/07/2015 | 12/08/2015 |
| Octavia | RW Walpole, England | Module plants | Late | 01/07/2015 | 12/08/2015 |
| EM6803/16 | EMR, England | Module plants | Late | 29/06/2015 | 10/08/2015 |
| EM6805/142 | EMR, England | Module plants | Late | 01/07/2015 | 12/08/2015 |
| EM6804/68 | EMR, England | Module plants | Late | 01/07/2015 | 03/08/2015 |
| 0447C-5 | James Hutton Ltd., Scotland | Module plants | Late | 26/06/2015 | 12/08/2015 |
| EM6804/81 | EMR, England | Module plants | Late - V Late | 29/06/2015 | 12/08/2015 |

**Table 2.** Details of the guard entry selections in order of season, with their source and type of planting material used.

| Variety | Source, country | Planting material | Season | 2015 Harvest start date | 2015 Harvest end date |
|---|---|---|---|---|---|
| 0658 C-5 | James Hutton Ltd., Scotland | Module plants | Early | 26/06/2015 | 10/08/2015 |
| 0550 E4 | James Hutton Ltd., Scotland | Module plants | Early | 29/06/2015 | 10/08/2015 |
| Glen Fyne | James Hutton Ltd., Scotland | Module plants | Early | 03/07/2015 | 05/08/2015 |
| 0460 F-5 | James Hutton Ltd., Scotland | Module plants | Early | 03/07/2015 | 05/08/2015 |
| RU004 03067* | Graminor Norway | Module plants | Early-Mid | - | - |
| RU044 03073* | Graminor Norway | Module plants | Early-Mid | - | - |

| Variety | Source, country | Planting material | Season | 2015 Harvest start date | 2015 Harvest end date |
|---|---|---|---|---|---|
| WSU 1568 | WSU, America | Module plants | Early-Mid | 03/07/2015 | 29/07/2015 |
| BC 1- 88-6 | James Hutton Ltd., Scotland | Module plants | Early-Mid | 01/07/2015 | 03/08/2015 |
| RU004 04106* | Graminor Norway | Module plants | Early-Mid | - | - |
| WSU 1607 | WSU, America | Module plants | Early-Mid | 03/07/2015 | 05/08/2015 |
| WSU 1605 | WSU, America | Module plants | Mid | 03/07/2015 | 12/08/2015 |
| Tulameen Pearl Clone 299-5 | PARC, Canada | Module plants | Mid | 03/07/2015 | 10/08/2015 |
| Tulameen Pearl Clone 300-5 | PARC, Canada | Module plants | Mid | 29/06/2015 | 12/08/2015 |
| Tulameen Pearl Clone 301-5 | PARC, Canada | Module plants | Mid | 03/07/2015 | 10/08/2015 |
| 0658 E-1 | James Hutton Ltd., Scotland | Module plants | Mid | 26/06/2015 | 29/07/2015 |
| 0427 G-7* | James Hutton Ltd., Scotland | Module plants | Mid | - | - |
| EM6804/42 | EMR | Module plants | Mid - Late | 29/06/2015 | 05/08/2015 |
| 0534RB1 | James Hutton Ltd., Scotland | Module plants | Mid - Late | 26/06/2015 | 12/08/2015 |
| 0015F-1 | James Hutton Ltd., Scotland | Module plants | Late | 29/06/2015 | 29/07/2015 |
| Ukee | PARC | Module plants | Late | 01/07/2015 | 03/08/2015 |
| Jean d'Orléans | PARC (L'Acadie, Quebec) | Module plants | Late | 01/07/2015 | 03/08/2015 |

*Planted in 2014

### *Trial design and establishment*

The trial is located at Rectory Farm, Oxford and located within an established commercial plantation of Tulameen (Naktuinbouw clone) which is south facing and protected with Spanish style multi-bay polythene tunnels. The soil is a free draining, light, loamy sand. Vegetatively propagated module raised plants were used at planting. The modules were planted into polythene mulched raised beds which are supplied with water and most nutrients via trickle irrigation. The distance between plants in the row was 0.45 m and a 1 metre gap was maintained between individual plots throughout the trial. Four replicate plots of each of the main entries were planted with 10 plants. Guard entries were single unreplicated 10 plant

plots. The main entry plots were set up with two rows of plants per tunnel bay and the guard entries with three rows per bay.

All of the main and the majority of the guard entries were planted as planting material became available in June, July or August of 2013. The exceptions were four selections in the guard plots (0427G, RU004 03067, RU044 03073 and RU004 04106) and a single plot of the main entry EM6803/16, which were all planted in July 2014. For this East Malling selection in the main entries, this was done to check that the plants supplied and planted were true to type. As in 2013 all the additional planting material was supplied as module raised plants.

The plants supplied in 2013 established a large root system and, in the majority of cases, reasonable amounts of primocane growth during the year of planting. However, so as to ensure that all plants were as even in growth as possible and that their first harvest would be as fully cropping plants, all of the canes produced by them in 2013 were removed whilst they were fully dormant, by cutting out at ground level in mid-February 2014.

In late May, the first flush of primocane produced by these cut back plants was thinned by hand down to three to four per plant. This was repeated in early August 2014. A further thinning of the canes was made between September and early October 2014, so as to leave approximately three canes/plant or six floricane per linear run of crop row, to fruit in 2015. After this final thinning, the retained canes were secured (laced with twine) to the fixed wires of the crop support trellis. Canes were managed as per commercial practice on site throughout 2015 with, as in the previous growing season, unwanted primocane removed from the crop rows in May and June and finally immediately post-harvest.

Harvest in 2015 commenced on 19 June and was completed on 12 August. Assessments were made of yield, berry weight, fruit quality, shelf life, ease of picking, plant habit and plant pest and disease susceptibility.

***2015 results***

Fruit was picked and assessed three times a week throughout the harvest period.
Within the main replicated trial, several of the selections achieved a marketable yield of more than 2 kg per plant, greater than either Tulameen or Octavia, the industry standards. All of the 2015 assessments are summarised in Tables 3-6.

**Table 3.** Summary of the yield and average berry weights of the main entries in 2015 in order of season – earliest selections first

| Variety/Selection | Marketable yield kg/plant | % marketable fruit | Average flori-cane /plant | Average berry weight over the season (g) | Minimum berry weight (g) | Maximum berry weight (g) |
|---|---|---|---|---|---|---|
| 0435D-3 | 2.2 | 86.1 | 2.8 | 3.8 | 2.6 | 5.8 |
| BC 92-9-15 (Squamish) | 2.0 | 89.5 | 2.9 | 4.0 | 2.6 | 5.6 |
| 0485K-1 | 1.4 | 93.5 | 2.7 | 4.7 | 2.6 | 6.5 |
| Tulameen (Naktuinbouw) clone) | 1.7 | 82.5 | 2.9 | 4.4 | 3.3 | 5.9 |
| AAC Eden (KO6-2) | 1.9 | 60.5 | 2.8 | 4.8 | 3.3 | 7.4 |
| 0019 E2 | 2.1 | 86.0 | 2.5 | 4.9 | 3.8 | 7.1 |
| Octavia | 1.6 | 81.4 | 2.2 | 5.0 | 3.1 | 7.8 |
| EM6803/16 | 1.9 | 35.9 | 1.8 | 4.7 | 3.4 | 6.4 |
| EM6805/142 | 2.0 | 89.1 | 2.3 | 5.1 | 3.8 | 7.2 |
| EM6804/68 | 1.3 | 74.8 | 2.5 | 4.4 | 3.2 | 6.5 |
| 0447C-5 | 2.1 | 92.0 | 3.0 | 5.4 | 3.9 | 7.6 |
| EM6804/81 | 2.1 | 90.3 | 2.5 | 4.8 | 3.6 | 6.6 |

**Table 4.** Summary of the yield and average berry weights of the guard entry plots in 2015 in order of season– earliest selections first

| Variety/Selection | Marketable yield kg/plant | % marketable fruit | Average flori-cane /plant | Average Berry Weight over the season (g) | Minimum berry weight (g) | Maximum berry weight (g) |
|---|---|---|---|---|---|---|
| 0658 C-5 | 2.8 | 82.1 | 3.0 | 4.7 | 3.4 | 6.0 |
| 0550 E4 | 1.6 | 82.4 | 2.2 | 3.7 | 2.4 | 5.6 |
| Glen Fyne | 1.0 | 59.8 | 2.8 | 3.5 | 2.6 | 5.0 |
| 0460 F-5 | 1.4 | 95.1 | 2.9 | 4.2 | 3.4 | 5.5 |
| WSU 1568 | 1.8 | 88.3 | 3.0 | 4.3 | 3.2 | 6.0 |
| BC 1-88-6 | 3.7 | 70.8 | 3.5 | 4.9 | 2.6 | 6.1 |
| WSU 1607 | 2.5 | 86.4 | 3.0 | 5.8 | 4.6 | 7.9 |
| WSU 1605 | 2.1 | 88.6 | 3.1 | 5.5 | 4.5 | 7.4 |
| Tulameen Pearl Clone 299-5 | 2.8 | 90.6 | 3.2 | 5.0 | 4.2 | 6.6 |
| Tulameen Pearl Clone 300-5 | 2.9 | 88.3 | 2.7 | 4.9 | 3.7 | 6.1 |
| Tulameen Pearl Clone 301-5 | 3.7 | 89.5 | 2.7 | 5.4 | 4.5 | 6.7 |
| 0658 E-1 | 2.7 | 74.7 | 2.6 | 4.8 | 3.4 | 7.0 |
| EM6804/42 | 2.0 | 80.2 | 3.0 | 4.1 | 3.4 | 5.4 |
| 0534RB1 | 2.4 | 83.7 | 3.3 | 5.2 | 4.2 | 6.5 |
| 0015F-1 | 0.8 | 77.3 | 1.9 | 3.5 | 2.6 | 4.4 |
| Ukee | 2.0 | 83.0 | 3.1 | 3.5 | 2.8 | 5.0 |
| Jean d'Orléans | 1.8 | 83.7 | 3.2 | 3.1 | 1.2 | 4.0 |

**Table 5.** Aggregated berry quality scores and BRIX° for the main selections in 2015 in order of season – earliest selections first

| Variety/Selection | Brix | Flavour | Aggregated quality score (/35)* |
|---|---|---|---|
| 0435D-3 | 6.9 | 3.1 | 23.9 |
| BC 92-9-15 (Squamish) | 10.5 | 4.2 | 26.2 |
| 0485K-1 | 10.0 | 3.9 | 26.3 |
| Tulameen (Naktuinbouw clone) | 9.5 | 4.4 | 26.1 |
| AAC Eden (KO6-2) | 9.0 | 4.0 | 24.6 |
| 0019 E2 | 6.9 | 3.3 | 26.1 |
| Octavia | 8.3 | 2.9 | 25.1 |
| EM6803/16 | 7.3 | 3.0 | 22.3 |
| EM6805/142 | 7.4 | 2.9 | 26.0 |
| EM6804/68 | 7.5 | 2.9 | 23.3 |
| 0447C-5 | 8.0 | 3.8 | 26.0 |
| EM6804/81 | 8.4 | 3.4 | 26.5 |

*The aggregated score includes redness, brightness, outline, texture, cohesiveness, skin strength and flavour – higher score = better berry

**Table 6.** Aggregated berry quality scores and BRIX° for the guard selections in 2015 in order of season – earliest selections first

| Variety/Selection | Brix | Flavour | Aggregated quality score (/35)* |
|---|---|---|---|
| 0658 C-5 | 8.6 | 3.7 | 27.0 |
| 0550 E4 | 9.4 | 4.0 | 26.0 |
| Glen Fyne | 8.6 | 4.0 | 26.8 |
| 0460 F-5 | 10.0 | 4.0 | 26.5 |
| WSU 1568 | 10.0 | 4.0 | 27.0 |
| BC1 88-6 | 9.4 | 3.6 | 25.9 |
| WSU 1607 | 8.2 | 3.5 | 27.5 |
| WSU 1605 | 9.8 | 4.0 | 27.7 |
| Tulameen Pearl Clone 299-5 | 10.7 | 4.5 | 26.0 |
| Tulameen Pearl Clone 300-5 | 10.8 | 4.5 | 26.0 |
| Tulameen Pearl Clone 301-5 | 9.7 | 4.5 | 26.8 |
| 0658 E-1 | 8.0 | 4.0 | 25.7 |
| EM6804/42 | 9.4 | 3.3 | 25.2 |
| 0534RB1 | 10.3 | 3.8 | 26.2 |
| 0015F-1 | 6.0 | 3.7 | 26.0 |
| Ukee | 8.2 | 3.8 | 26.5 |
| Jean d'Orléans | 9.8 | 4.2 | 25.7 |

*The aggregated score includes redness, brightness, outline, texture, cohesiveness, skin strength and flavour – higher score = better berry

Assessments of pest and disease susceptibility, plant habit, bud break and lateral development are detailed in the Full Trial Report (below) and individual descriptions of all selections can be found in the appendices. Further information along with images of the fruit on the plant and in punnets is available in a presentation on the AHDB Horticulture website at: http://horticulture.ahdb.org.uk/publication/presentation-raspberry-selections-ahdb-horticulture-raspberry-variety-trial.

## Main Conclusions

In 2015 the selections of particular interest from the main trial were:

- Squamish (BC 92-9-15)
- 0485K-1

### *Squamish*

Squamish was harvested exceptionally early and produced 2 kg/plant of fruit. The fruit was not very large but had an excellent flavour, was evenly set, bright and attractive in the punnet (Figure 1) and had a good shelf life. Other benefits of this selection are that it is reported to have tolerance to *phytophthora* root rot and in this trial its plant growth habit and lateral characteristics made it very easy and cheap to pick and grow. It attracted a lot of interest at the variety trial open day held on 20 July 2015.


**Figure 1.** Squamish (BC 92-9-15)

### *0485K-1*

The fruit was attractive and very uniform in size and shape (Figure 2). The selection had large, attractive, evenly set and cohesive berries so that a very high proportion of the fruit picked was marketable. Berry flavour was excellent and shelf life was also good. The fruit was well displayed to pickers on long laterals and was easy to pick. However, support for the fruiting laterals is recommended to avoid unacceptable lateral breakage during harvest. Recent research at the James Hutton Institute has shown that this selection has a high chilling requirement (in excess of that of Glen Ample). This finding was supported by the very poor bud break displayed by the floricane of 0485K-1 in spring 2015. Fruit production was in the main confined to the top third section of floricane, with the majority of buds below this point failing to develop. As a consequence, the potential yield of this entry was not achieved in 2015.


**Figure 2.** 0485K-1

*Other varieties/selections of interest in 2015*

Other high yielding selections in 2015 included **0019E2** (James Hutton Ltd.) which produced high yields and large fruit but like 0485K-1, showed problems with poor bud break and lateral breakage in 2015. **EM6805/142** and **EM6804/81** (East Malling Research) produced a good yield and berries of both looked good in a punnet. However the flavour of all three of these entries was not as good as Squamish or 0485K-1.

Of the guard entries, three selections were outstanding. These included **BC 1-88-6** (PARC-Figure 3) which had a very high yield and very good quality berries and was the highest scored selection at the variety trial open day. **WSU 1607** (Figure 4), a mid to late selection from Washington State, had a very large average berry size of 5.8 g, a long harvest period, distinct fruit flavour and was very popular with growers who visited the open day, along with the two other WSU selections. **0534RBI** (James Hutton Ltd – Figure 5) was also rated highly by visitors to the trial. It had a wonderful flavour, is late harvested, has large sized fruit (average 5.1 g), produced a marketable yield of 2.4 kg/plant with 84% of the fruit harvested being marketable. The three Tulameen Pearl clones in the guard selections also performed very well.


**Figure 3.** PARC BC1-88-6


**Figure 4.** WSU 1607


**Figure 5.** JH Ltd 0534RBI

## Action points for growers

Growers should consider planting any of the following varieties in the future:

- Squamish (BC 92-9-15)
- 0485K-1
- 0019E2
- EM6805/142
- EM6804/81
- BC 1-88-6
- WSU 1607
- Tulameen Pearl Clones (299-5, 300-5 and 301-5)
- 0534 RB1