Updates from the RBC Raspberry Breeding Programme

SSCR Soft Fruit winter meeting, 16th February 2017
2016 Season at James Hutton Institute

- Mild and wet winter, sustained temperatures >12°C Nov-Jan
- Wettest winter on record (Scotland)
- Repeated flooding in breeding plots
- Chilling units achieved late in winter
- Patchy bud break issues (although less than 2015)
- Cool and dry spring, blizzards in late April
- Condensed flowering period
- First fruit 8th July
- Warm and dry from late summer into October
- *Phytophthora* and raspberry beetle prevalent, short aphid season, split fruit, powdery mildew and wind rub appeared late season

Raspberry beetle damage

Split fruit
Glen Dee at JHI (released 2014)

- Stood out with large fruit in a new young plot
- Large, pale, conical fruit, sweet with an acid bite and creamy texture
- Consistent and superb shelf-life, maintains uniform colour and firmness
- Vigorous cane with an easy to manage habit – good cane for 2017

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<tr>
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<tbody>
<tr>
<td>Glen Dee</td>
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<tr>
<td>Glen Ample</td>
<td>1704</td>
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Castleton Farm, Aberdeenshire, Sept 2016
Glen Dee in substrate, Kent
Glen Dee in soil production, Scotland 2016

- Large fruit size
- Long laterals
- Lower picking costs

Even bud break, April 2016

Strong lateral extension, July 2016
Glen Dee in soil, Scotland 2016

Perthshire, 28th July 2016

Big fruit
0485K-1 at JHI

- Selected for trials 2010
- Early season selection with glossy appearance, consistently popular with visitors
- Tasting feedback - best selection for flavour at FFF 2012-16
- Sweet, sherbet flavour with low acidity
- Fruit smaller than usual in 2016
- Poor and patchy bud break in 2015/2016
- Symptoms look like lack of winter chill
- Subsequent low yield in 2016

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Positive and consistent feedback on flavour and appearance by triallists, retailers and industry members:

- Early – mid selection with glossy appearance
- Aromatic ‘Love hearts’ flavour with low acid
- Poor bud break lead to subsequent low yield in 2016
  - ‘Looks like a lack of winter chill’
  - May be more suited as cold-stored long cane in warmer regions
0658E-1

- Identified for trials in 2014
- Beautiful appearance, flavour was juicy and tart in 2016
- Preferred over 0485K-1 for flavour by Soft Fruit Technical Manager (leading retailer)
- First year on-farm trials:
  - Thin floricanes – not fully established
  - Juicy but tart in 2016
  - Short season
  - Stronger canes for 2017

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Early floricane RBC16F6

- Primocane x Floricane cross showing tip fruit in autumn
- Earliest in breeding plots in 2015 and 2016
- Productive over a long season, highest yield last season
- Maintains fruit size, good shelf-life score
- Has Rub118b marker for root rot resistance
- No symptoms of Phytophthora despite repeated flooding in a 4-year infested plot
- Plants available for trials in 2017

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Events in 2016

Fruit tasting at the following events

• Royal Highland Show
• Fruit for the Future
• Fruit Focus
• RBC summer meeting

Visitors were asked to score samples for appearance, texture and flavour
Fruit events 2016

Consistent results:

• Glen Dee scored best overall
• 0485K-1 scored best for flavour
New floricanes selected in 2016

- Good field tolerance to *Phytophthora* after 5 yrs

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- Sweet, aromatic flavour and good shelf-life

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*Propagation for on-farm trials, plants available spring 2018*
2016 yield at JHI
Plots M17 and M21 (4\textsuperscript{th} season)
2016 yield at JHI
Plot M31 (1st season)
Molecular marker deployment: Selections with *Rub118b* marker

- 39 selections in 4-plant plots assessed for fruit quality
- Glen Ample and Glen Fyne controls showing root rot symptoms
- Many genotypes very productive and had good eating quality
- High root vigour and spawn number
- All had small fruit size
- Good parental material for future crossing
Molecular marker deployment: Softening markers

Two Post-harvest softening markers to select for improved shelf-life (HL0195)

- >250 seedlings identified with Rub118b marker screened with softening markers
- Fruit assessments completed on long cane in 2016
- Markers will be validated against phenotype data

Shelf-life, 11 days storage at 4°C
Molecular marker deployment: resistance to *Phytophthora* x fruit size

- >900 seedlings in progress of screening
  - New generation of 2015 crosses, with largest-ruited genotypes
  - *Rub118b* (*Phytophthora* resistance)
  - Four markers for fruit size
- Selected genotypes from these new populations will be assessed in a *Phytophthora* pot test to check there is no loss of linkage
JHI Primocane types in 2016

- Warm, bright conditions gave good primocane growth and fruit quality
- Autumn fruit assessed from late July until early November
- 400 seedlings
  - 120 with *Rub118b* marker
- 20 selections
- 15 JHI early-stage selections in Norfolk trials
- Controls
  - Autumn Treasure, Erika, Polka, Kweli, Imara, Kwanza, Versailles

Visible step-change in fruit quality seen in 2015 selections
New early primocane RBC16P5

• First ripe fruit 28\textsuperscript{th} July, \sim 3\ weeks before Polka
• Large fruit size, easy to plug
• Sweet, low acidity with a ‘vanilla’ flavour
• Positive feedback from Norfolk trials

Norfolk, August 2016
New primocane RBC16P4

- First pick 5\textsuperscript{th} September at JHI
- Large fruit with sweet flavour and low acidity
- Quick and easy to plug
- Performed very well with promising feedback in 2016 in Norfolk trials

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Primocane yield at JHI

Plans to fast track RBC16P4 and RBC16P5 into trials in 2017
Plans for 2017

• Crossing programme 2017
• Dormancy experiment
• Trial visits
• Review of selection methods
  • *Phytophthora* infection and poor establishment of breeding plots in 2016
  • New selection plots will be evaluated in substrate
  • Seedlings and processing types will continue in soil
• Demonstration plot

Glen Rocio in Huelva, Spain Feb 2017
JHL Demonstration plot

- Dedicated plot to showcase advanced selections
- Distinct from breeding plots at JHI
  - 10L pots in substrate
  - 2 reps, 10 plants/rep
  - 10 x floricane selections/cvs
  - 10 x primocane selections/cvs
- Elite Tunnels, Enviro range
  - 2 x 50m bays, 8.5m span
- Plants propagated at JHI for spring planting 2017
Raspberry Breeding Consortium
2014-2019