Update from the UKRBC Breeding Programme

Nikki Jennings

SSCR Soft Fruit winter meeting
20th February 2014
Breeding objectives

• UK Raspberry Breeding Consortium 2009-2014
  • Scottish Government, industry partners

• Select cultivars suitable for fresh and processing markets
  • Floricane and primocane types

• Create new hybrids with improved P&D resistance, especially to *Phytophthora* root rot

• Deployment of marker assisted selection
2013 Season at James Hutton Institute

- Cold temperatures and dry March-June
- Warm and dry in July and August
- Early genotypes 2 weeks late
- Short condensed season
- Yield and fruit size exceptional
- Flavour and brix average
- Glen Ample very productive but sharp
- *Phytophthora* root rot, raspberry leaf and bud mite, spider mite, raspberry beetle, split fruit, crown gall
Accepted by Sainsbury’s and Asda in 2014

- Consistently productive
- Superb sweet raspberry flavour
- Large fruit with good shelf life
- Easy and cheap to pick and grow
- Suitable for fresh and processing markets
- Susceptible to RBDV and powdery mildew
- Susceptible to *Phytophthora* root rot

<table>
<thead>
<tr>
<th></th>
<th>Mean yield/ stool (g)</th>
<th>Mean fruit size (g)</th>
<th>Mean Brix°</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Glen Fyne</strong></td>
<td>3877</td>
<td>5.4</td>
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<tr>
<td>Glen Ample</td>
<td>4751</td>
<td>5.7</td>
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<td>15th July</td>
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<td>Octavia</td>
<td>2643</td>
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<td>8.7</td>
<td>1st Aug</td>
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2013 data from JHI
• Early season, 2-3 days earlier than Glen Lyon
• Productive over a long season
• Neat, conical fruit, firm with a good shelf-life
• Sweet with low acidity
• Popular at JHI open day
• *Gene H* gives tolerance to cane botrytis and spur blight
• Planted in on-farm trials in 2013
• Tescos ‘*Would like to see more fruit next season. Good sweet flavour*’

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<tr>
<td>0435D-3</td>
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<td>Glen Ample</td>
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2013 data from JHI
0485K-1

- Early-mid season
- Large, conical fruit, very glossy and attractive in punnet
- Popular at JHI fruit event
- Attracted interest in HDC plot in 2012
- *Gene H* gives tolerance to cane botrytis and spur blight
- No P&D problems thus far
- New trials planted in 2013
- Mixed response from retailers. Tesco ‘*Good appearance needs further assessment*’

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<th>Variety</th>
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2013 data from JHI
**0019E2**

- Mid-late season
- Very large attractive fruit, good shelf-life and sweet flavour
- Consistent yield and quality over several years’ trialling
- Vigorous strong cane
- Collapsing laterals maybe a concern
- Good feedback from most triallists
- No P&D problems thus far
- New trials planted in 2013
- Mixed response from retailers. Sainsbury’s ‘taste excellent. Appearance and firmness good’

### Mean yield/stool (g) Mean fruit size (g) Mean Brix° First pick date

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2013 data from JHI
0447C-5 (Glen....)

- Late season, similar to Octavia but picks for longer
- Large, conical fruit with pleasant flavour.
- High yield over three seasons
- Vigorous cane with a easy to manage habit
- Raspberry beetle damage 2013
- Several trials planted in 2013
- Tesco ‘Liked large fruit size, appearance, firmness and consistently good flavour’
- Morrisons ‘Big, firm fruit. Good appearance and flavour’

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2013 data from JHI
New trials in 2013

- New HDC floricane trial SF41d
  - Four selections are main entries
- 0447C-5 large scale trials (>1000 plants)
  - Gaskains
  - Tim Chambers
  - Place UK
  - Kelsey Farms LLP
  - Paul Harrold
New trials in 2013

- European trials
  - Pcfruit, Belgium
  - DLV Plant BV, NL
  - Van Der Avoird Trayplant, NL
  - Eurosemillas, Spain
  - Klaus Rosenberger, Austria
  - LVWO, Germany

0447C-5 in Styria, Austria
New selection O658C5

- Fruit size exceptional
  - First pick >12g
  - Mean size 7.9g
- Most productive at JHI in 2013
- Popular with visitors and media
- Identified for trials in 2012
- Plants available for spring planting 2014

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<td>0658C5</td>
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2014 Yield at James Hutton

![Bar graph showing yield for different genotypes: 0658C5, Glen Ample, Glen Fyne, 0019E2, Glen Erich, Maling Hestia, 0485K-1, Glen Doll, Octavia, Tulameen, 0447C-5, Glen Ample, 0435D-3, Tulameen. The graph illustrates yield in grams per stool for each genotype in different fields: Advanced selection, Control Lab field, Advanced Selection - Bullionfield, Control Bullionfield.](image-url)
Primocane types at James Hutton

- Polytunnel dedicated to primocane types
  - Early
  - Fruit quality
  - Spinefree
  - Easy plugged
- 700 seedlings in 10L pots, segregating for primocane habit
- Fruit from mid-August – late October
- Controls
  - Autumn Treasure, Erika, Polka, Brice, Sugana
Primocane selections from James Hutton

- Primocane 1132F-12, 7.4g
- Primocane 1132F16, 8.2g
- Primocane 0925B8, 6.1g
- Primocane Erika, 7.4g
Deployment of markers for resistance to *Phytophthora* root rot

- Markers identified in 2008 (Hortlink 0169)
- Parents with root rot resistance marker identified for crossing in 2009 (25 families)
- Currently >40 selections identified with the marker
- 10 selections fruiting in 5-plant plots in 2013
  - Exceptional root vigour
  - Two selections with good fruit size, quality and yield
  - Resistance holding in infestation plot
Underpinning support for the breeding programme

- **Markers already deployed**
  - Root rot marker (HL0169)
  - Gene H (cane diseases)

- **Markers under validation**
  - Fruit size (HL0170)
  - Post harvest softening (HL0195)

- **Traits under investigation**
  - Physical resistance traits
  - High throughput tools
  - Seasonality
    - Primocane x floricane mapping population

Generate new high quality cultivars suitable for low input systems that can be grown economically
Thank you very much!!

James Hutton Institute

- **Fruit Group**
  - Lynne Ferguson
  - Avril Britten
  - Rex Brennan
  - Sandra Gordon
  - Julie Graham
  - Kay Smith
  - Alison Dolan
  - Susan McCallum
  - Linzi Jorgensen
  - Carolyn Mitchell

- **Estate and Glasshouse Dept**

UK Raspberry Breeding Consortium

- Scottish Government
- HDC
- SSCR
- Angus Soft Fruits
- CPM
- Berrygarden Growers
- Meiosis
- Total Berry
- Trade Solutions
- GSK

- Sarah Troop, Meiosis
- UK Soft Fruit Growers and triallists