

HDC SF 8d

Evaluation of summer and primocane fruiting raspberry selections at East Malling Research in 2004

A new Defra project entitled 'Developing new, high quality varieties of raspberry which will crop over an extended season' started in April 2003, in which 72% of the funding comes from Defra and 28% from the newly- formed East Malling Raspberry Breeding Consortium (EMRBC). The HDC is a member of the EMRBC and have agreed to support the breeding programme until 2008. One of the main objectives is to evaluate summer and primocane fruiting selections under polythene tunnels and select those with commercial potential to go forward to industry-funded grower trials.

In March 2003, 44 summer fruiting (SF) and 50 primocane fruiting (PF) selections from the 1999 SF and the 2000 PF seedling populations, respectively, were propagated and planted as single 5-plant plots. In winter 2003/04 these plots were covered with tunnels and the fruit was picked in 2004. Unfortunately the standard SF cultivars (Glen Moy, Glen Ample and Tulameen) and PF cultivars (Autumn Bliss and Joan Squire), were not planted until December 2003, so no direct comparisons could be made in 2004.

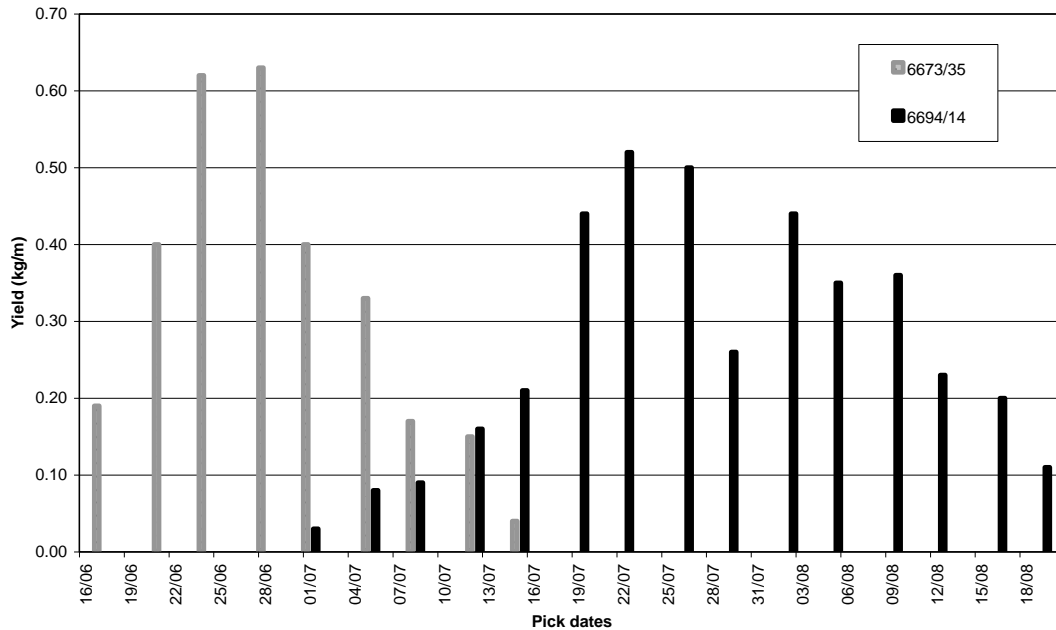
Summer fruiting selections

Following planting in March, only a small number of canes were produced in 2003, but these grew well and 37 out of 44 SF selections were recorded in summer 2004 (albeit a 'baby' crop). The various selections could be compared in terms of ripening season, fruit quality and shelf life but the yield results were unreliable in 2004 because of differences between selections in the numbers of fruiting canes. The SF tunnel was covered with polythene on 10 June and picking commenced on 17 June. The aim was to protect the fruit from rain rather than advance the ripening season of the selections.

1. Season

Seven early selections cropped for 4 weeks from mid June to mid July, similar to Glen Moy. Some of the latest selections cropped for 7 weeks from early July to mid August. The cropping profile of an early selection, EM6673/35, and a late selection, EM6694/14, are compared in Figure 1 and illustrate the progress made in extending the season either side of the main Glen Ample and Tulameen peak.

Fig 1. Extending the summer fruiting season



2. Fruit quality

Fruit size, colour, shape, texture, cohesion, skin strength, flavour and Brix were recorded twice a week during the cropping season. Overall mean berry weight per selection ranged from 5.0 – 2.7g while mean berry weight per selection per pick ranged from 6.6 – 1.9g. Several selections had good-coloured, cohesive fruit with strong skin but 14 selections were considered too soft and 16 were rated as moderate to poor for flavour. A few selections were judged unacceptable for several key quality characters (size, colour, texture and flavour) and were dismissed in 2004 but most selections will be picked for a second time in 2005. No selections were rated good or very good for all attributes and inevitably it will come down to balancing good and moderately good quality attributes with season, yield and plant habit after the 2005 crop.

3. Shelf life

Fruit colour, texture and post-harvest fruit rots were recorded in two punnets of fruit per selection, once a week, after 72 hours at 18°C and 90% relative humidity. Fruit of Glen Moy, Glen Ample and Tulameen was picked from an older plot to make comparisons. Approximately half of the selections were a better colour than Glen Ample and Tulameen after 72h and most were brighter than Glen Moy. Tulameen had amongst the highest incidence of rots but 20 selections had less rot than Glen Moy. Similarly 32 selections were judged better than Tulameen for texture and were less collapsed in the punnet but only 6 were better than Glen Ample. A few selections were rated higher or similar to Glen Ample for all shelf life attributes.

Primocane fruiting selections

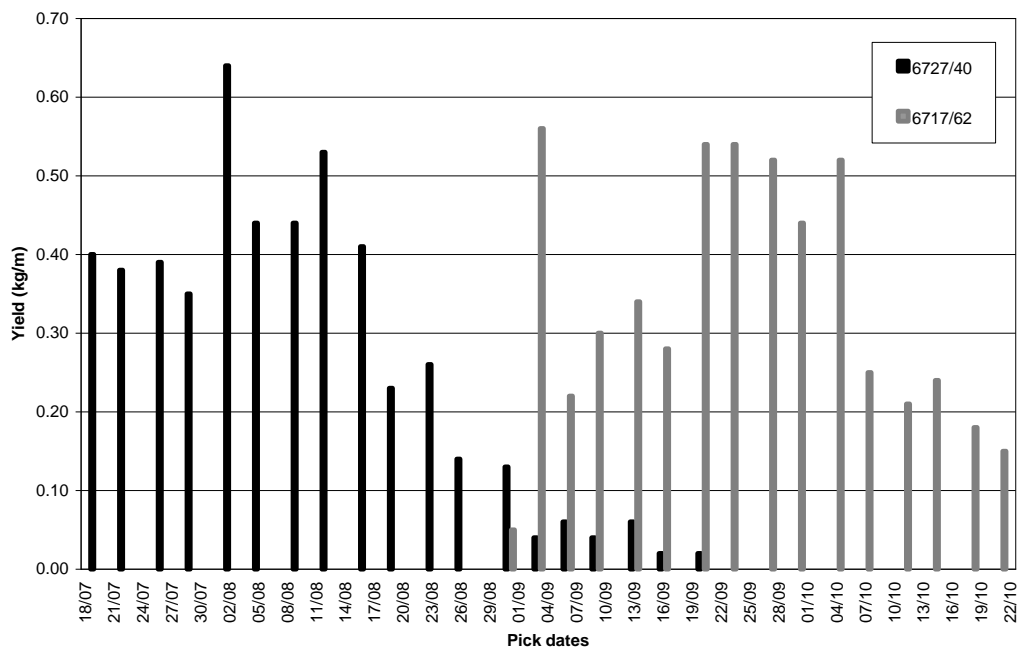
Field notes were taken of the primocane fruit produced on the new cane in 2003 and then this cane was cut to the ground in February 2004. The new cane produced in spring 2004 produced ripe fruit from 19 July to 21 October

and the tunnel was covered as the first fruit ripened. Fruit size, quality and shelf life and were recorded as for the SF selections in 42 out of the 50 PF selections planted in 2003. Yield comparisons could be made between these selections in 2004 but not between the selections and the PF controls, which were effectively a year behind in terms of establishment.

1. Season

There were many early ripening selections and in half of the selections 50% of the crop had been picked by the end of August. Almost half of the selections started picking on 19 July and a further 25% had ripe fruit by the end of July. A few selections, mostly from Family 6727, were exceptionally early and condensed ripening. There were only seven selections which had no ripe fruit by mid August. Figure 2 illustrates the range in ripening season available in the PF material at EMR by comparing a very early selection (EM6727/40) with a late selection (EM6717/62).

Fig 2. Seasons of very early and late PF selections



2. Yield

The fruit was sorted in to marketable and unmarketable at picking and recorded separately but the total pick is considered here. The plots were picked twice a week and the percentage of unmarketable fruit was higher than it would have been on a commercial farm which was picking more frequently. Total yield was converted into kg/m based on the single 3.0m plots but with no replication these figures are only an indication of yield potential. Yield ranged from 6.21 – 1.95 kg/m and the highest yielding selections varied both in season and duration of harvest (which ranged from 6 -14 weeks).

3. Fruit quality

Fruit quality of the PF selections was generally poorer than that of the SF selections. Overall mean berry weight per selection ranged from 4.0 – 2.2g while mean berry weight per selection per pick ranged from 9.3 – 1.3g. Fruit size decreased over time and selections which started with mean fruit weights of 9.3, 8.4, 7.6 and 7.3g ended up with mean fruit weights of 2.2, 1.6, 2.1 and 1.7g, respectively. Approximately 30% of selections were a good colour, size and shape but most of these were too soft. Only 11 selections were consistently rated good or moderate for flavour. Nine selections were dismissed for having small, irregular or dark fruit and/or poor flavour. Another two selections were grubbed because they indexed positive for RBDV.

4. Shelf life

Shelf life was assessed as described previously and fruit of Autumn Bliss was picked from another plot as a control. Four selections (EM6707/47, EM6717/45, EM6720/40 and EM6720/103) were rated highly for all aspects of shelf life but EM6707/47 was subsequently found infected with RBDV. All 42 selections had less rots than Autumn Bliss and 36 selections had better texture in the punnet so widespread improvements have been made to the shelf life performance of the EM primocane fruiting material.

Selections which have been named or which have gone forward for further trials

'Malling Minerva' (EM6166/98)

Performed well in HDC SF Trial 1 in Surrey and has continued to do well as a guard in HDC SF Trial 2 in Oxford. Early ripening summer fruiter, has good quality fruit, although only moderate in size, plus a neat compact habit which would be good for protected cropping. It was named in 2005 and is being propagated by Meiosis Ltd. for large scale grower trials to be planted in 2006.

'Malling Hestia' (EM5928/114)

Performed well in HDC SF Trial 1 in Surrey. Late ripening summer fruiter, has very bright, attractive, moderate-sized fruit and excellent shelf life. It was named by EMR in 2005 and is being propagated by Meiosis Ltd. for the amateur market.

'Malling Juno' (EM6544/80)

Planted in HDC SF Trial 2 in Oxford in 2002 and performed well in 2004. It was picked under tunnels at EMR in 2004 and was early ripening and condensed, had good quality fruit and very good shelf life. It was named in 2005 and is being propagated by Meiosis Ltd. for large scale grower trials to be planted in 2006.

EM6592/11

Very early ripening primocane fruiter which has performed well in trials at EMR. It was planted on a BerryWorld farm in winter 2003/04 and observed in 2004. It was very early ripening compared to the other PF material on the

farm but the fruit was rather soft. It was resistant to *Phytophthora* root rot in glasshouse tests at EM in 2004.

EM6597/46

Moderately early ripening primocane selection which was transferred to Meiosis Ltd. for grower trials in 2002. It did well under the tunnel at EMR in 2004 and in a grower trial and is currently being propagated for further evaluation.