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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

## AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

Adam Whitehouse

Project Leader

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Date 10th May 2016

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## **GROWER SUMMARY**

### **Headline**

- Nine new selections, four June-bearers and five everbearers, were selected from the 2015 East Malling Strawberry Breeding (EMSBC) preliminary trials to go forward to UK growers' trials.

### **Background**

The main objective of the East Malling Strawberry Breeding Club (EMSBC) is to develop improved strawberry varieties, both June-and everbearing, with increased yield, larger fruit size, an extended season of production and greater resistance to fungal diseases. Funding for the programme was renewed in 2013 to follow on from the first tranche of the EMSBC breeding programme which had started in 2008 and has delivered the June-bearer variety Malling™ Centenary. AHDB continues to contribute to the EMSBC via project SF 96a.

This report covers three trials (June-bearer main crop, 60-day and everbearer trials) of EMSBC material assessed in 2015 as part of the preliminary trials held at East Malling Research.

### **Results of variety trials**

This section provides a precis of the results. The full set of results can be found in the Full Trial Report (Science Section).

The following information provides descriptions and results from the most promising selections in each of the 2015 trials, accompanied by tables of results for each trial:

#### **June-bearer (main crop) trial**

Four selections performed well enough to be chosen for assessment in growers' trials in 2017:

**EM2199**; an early-mid season type, noted for its excellent appearance, high % of Class 1 fruit and excellent fruit size (Tables 1 & 2).

**EM2379**; has potential as an early season variety (50% pick date close to that of Vibrant), producing a high % Class 1 yield for early production (Tables 1 & 2).

**EM2380**; an early-mid season type with excellent fruit size, very high percentage of Class 1 fruit (95%) and sensory flavour scores similar to Malling™ Centenary (Tables 1 & 2).

**EM2421**; a mid-season type, producing very attractive fruit with good mean Brix scores (8.6°). Yield was moderately high but with excellent fruit size and a high percentage Class 1 (96%).

**Table 1.** June-bearer selections - Main crop yield, fruit size and season

<b>Selection</b>	<b>Class 1 yield (g/plant)</b>	<b>% Class 1</b>	<b>% large fruit (&gt;35mm)</b>	<b>50% pick date</b>
EM2379	862	90	85	15 Jun
EM2199	739	98	85	18 Jun
EM2380	838	95	65	18 Jun
EM2421	843	96	60	22 Jun
<i>Elsanta</i> <sup>1</sup>	1324	87	49	23 Jun

<sup>1</sup>Mean of three plots

**Table 2.** June-bearer selections - Main crop fruit quality scores

<b>Selection</b>	<b>Appearance (1-9)</b>	<b>Skin firmness (1-9)</b>	<b>Flesh firmness (1-9)</b>	<b>Flavour (1-9)</b>	<b>Shelf life (1-5)</b>	<b>Mean Brix</b>
EM2379	5.4	5.6	5.6	5.1	3.2	6.5
EM2199	6.4	6.8	6.9	5.4	4.0	7.2
EM2380	5.6	5.8	6.4	5.9	3.7	7.4
EM2421	5.6	6.3	5.8	5.5	4.3	8.6
<i>Elsanta</i> <sup>1</sup>	4.5	5.4	5.3	5.3	3.0	7.4

<sup>1</sup>Mean of two plots

Full descriptions of the fruit quality scoring system can be found in Appendix I of the main report, but as a guide 1=poor, 9=excellent, shelf life comparison 1=worse, 3=same, 5=better than standard

### **June-bearer (60-day) trial**

This trial included selections that have progressed for assessment in growers' trials in 2016. Two selections stood out as having potential for commercial use:

**EM2157**; a late-season selection with excellent fruit quality, including very high average Brix, with comparable yield to *Elsanta* (when comparing yield per mm of crown diameter - Table 3).

**EM2192**; an early-season selection with very attractive fruit, very low mark out, and the highest yield in the trial (Table 3).

**Table 3.** June-bearer selections - 60-day yield, crown size and season

Selection	Marketable yield <sup>1</sup> (g/plant)	% marketable yield	Mean crown diameter (mm)	Marketable (g/plant) yield per mm crown diameter	50% pick date
EM2192	218.2	97.4	10.1	21.6	9 July
EM2206	204.5	90.2	12.2	16.8	9 July
EM2358	136.4	90.0	12.1	11.3	16 July
EM2157	164.2	89.3	10.6	15.5	20 July
<b>EM2315</b>	173.0	90.4	12.5	13.8	9 July
<b>EM2298</b>	152.2	90.8	9.5	16.0	9 July
<b>EM2299</b>	38.8	100.0	10.2	3.8	9 July
<b>EM2290</b>	198.2	93.7	12.0	16.5	13 July
<b>EM2301</b>	166.3	86.3	9.2	15.8	13 July
<b>EM2320</b>	177.2	88.3	11.7	15.1	13 July
Elsanta <sup>2</sup>	201.3	87.7	12.5	15.9	11 July
M Centenary	178.3	87.8	8.2	21.7	7 July
Sonata <sup>2</sup>	200.6	93.7	9.4	21.4	13 July

<sup>1</sup> >25 mm, <sup>2</sup> mean of two plots

**BOLD** are advanced selections that are currently in growers' trials (2015-16)

Full descriptions of the fruit quality scoring system can be found in Appendix I of the main report, but as a guide 1=poor, 9=excellent

### Everbearer trial

Five new selections were considered for assessment in growers' trials in 2017:

**EMR688**; gave a very high percentage of Class 1 fruit. Berries were glossy, sometimes a little dark, but with a pleasant flavour and Brix scores higher than the standards (Tables 4 & 5).

**EMR693**; had a moderately-high yield of good fruit size and very low mark out (Table 4) but stood out for its excellent fruit quality (Tables 4 & 5).



**EMR701**; an early everbearer with high yield and excellent fruit size. Fruit was sweet with a relatively high mean Brix score (Tables 4 & 5).

**EMR704**; another high-yielding selection with excellent % Class 1 fruit and fruit size (Table 4) but slightly later than Finesse. Berries were very glossy with sweet flavour and good shelf life (Table 5).

**EMR710**; an early-season everbearer which showed good tolerance to mildew. Yield, fruit size and % Class 1 were all good (Table 4). Fruit was attractive and noted as being sweet throughout the season.

**Table 4.** Everbearer selections - Yield, fruit size and season

<b>Selection</b>	<b>Class 1 yield (g/plant)</b>	<b>% Class 1</b>	<b>% large fruit (&gt;35mm)</b>	<b>50% pick date</b>
EMR710	1193	88	62	6 Aug
EMR701	1216	90	72	10 Aug
EMR693	1184	93	65	13 Aug
EMR704	1207	92	72	17 Aug
EMR688	1126	95	55	17 Aug
<b>EMR564</b>	1240	93	62	7 Aug
<b>EMR590</b>	1327	90	68	15 Aug
<i>Evie 2<sup>1</sup></i>	<i>1249</i>	<i>88</i>	<i>72</i>	<i>10 Aug</i>
<i>Finesse<sup>1</sup></i>	<i>1063</i>	<i>89</i>	<i>52</i>	<i>14 Aug</i>

<sup>1</sup>Mean of two plots

**BOLD** are advanced selections that are currently in growers' trials (2016)

**Table 5.** Everbearer selections - Fruit quality scores

<b>Selection</b>	<b>Appearance</b>	<b>Skin firmness (1-9)</b>	<b>Flesh firmness (1-9)</b>	<b>Flavour (1-9)</b>	<b>Shelf life (1-5)</b>	<b>Mean Brix</b>
EMR710	5.6	5.9	5.6	5.8	3.1	7.2
EMR701	5.6	6.4	6.2	6.0	3.7	8.2
EMR693	5.9	6.0	6.2	5.6	4.0	7.5
EMR704	5.6	6.0	6.3	5.6	3.8	8.0
EMR688	5.5	6.2	6.5	5.5	3.7	7.8
<b>EMR564</b>	5.9	6.6	6.8	5.2	3.3	7.3
<b>EMR590</b>	5.6	6.3	6.6	5.7	3.5	7.8
<i>Evie 2<sup>1</sup></i>	5.4	5.4	5.5	5.0	2.1	5.9
<i>Finesse<sup>1</sup></i>	5.3	5.7	5.9	5.2	-	6.6

<sup>1</sup>Mean of two plots

**BOLD** are advanced selections that are currently in growers' trials (2016)

Full descriptions of the fruit quality scoring system can be found in Appendix I of the main report, but as a guide 1=poor, 9=excellent, shelf life comparison 1=worse, 3=same,5 better than standard

## SCIENCE SECTION

### Introduction

This report covers three trials (June-bearer main crop, 60-day and everbearer) as part of the preliminary trials assessed at East Malling Research in 2015 on behalf of the East Malling Strawberry Breeding Club (EMSBC). The EMSBC was set up in 2008 to continue the national strawberry programme that had operated at EMR since 1983 with the HDC contributing via project SF 96. A second tranche of the EMSBC was agreed in 2013 for a 10-year term (with a break clause after five years) and commenced on 1 June 2013. The funding members of the EMSBC are currently Berry Gardens Growers, CPM Retail, East Malling Services, AHDB, Mack Multiples and Meiosis. The AHDB continues to contribute to the EMSBC via project SF 96a.

It is the intention of the breeding programme to release new varieties which show advantage over those currently available for a particular purpose or slot in the season. This advantage may be in terms of fruit quality, yield, resistance to diseases (to minimise use of crop protection products and the reliance on soil fumigation), fruit size and display (to reduce picking costs) or any combination of these characters.

In addition, the programme is benefiting from associated research projects funded at EMR that feed into the breeding work, primarily those associated with the development of molecular markers linked with disease resistance. The integration of basic science to benefit the programme has recently been demonstrated by the adoption of a marker-assisted approach to the design of a number of crosses that have been carried out (January 2015) with the specific aim of pyramiding markers associated with resistance to *Verticillium* wilt (*Verticillium dahliae*). Progeny from these crosses will be assessed in the field and selected lines genotyped in 2016 with the intention of selecting breeding lines or selections with cultivar potential that have multiple genes for resistance to this pathogen.

### Trial methods

All trials were performed on the Ditton Rough plot (sandy loam soil) at East Malling Research, New Road, East Malling, Kent ME19 6BJ. Each trial was planted into fumigated soil formed into raised beds with polythene mulch and trickle irrigation as double rows at 0.6, 0.55 and 0.5m spacing for 60-day, main crop and everbearer

trials respectively. These beds were covered with polythene clad tunnels for rain protection prior to flowering and also with netting to protect from bird damage.

In each trial, fruit was harvested twice-weekly into individual trays that were assigned a unique alpha-numeric plot code (to avoid selection bias). Fruit was graded into five categories, primarily based on fruit size (diameter in mm): giant (>45mm), large (>35mm), medium (>25mm), small (<25mm) and waste (fruit rendered unmarketable due to damage (physical and/or pathological), misshape or rots. Class 1, or marketable fruit, was classified as fruit >25mm diameter, with unmarketable (for the June-bearer 60-day trial) being defined as <25mm diameter and waste fruit. Yield is presented as the mean of all plants in each individual plot.

Fruit quality (appearance, skin/flesh firmness and flavour) assessments were performed immediately after each pick, using the scoring system shown in the Appendices. Assessments were carried out by a panel of experienced breeders.

Post-harvest records of Brix<sup>0</sup> (soluble sugars) and shelf-life, were recorded as often as possible throughout the season with a minimum of three records for each selection per season.

Brix was measured using a sample of two berries per selection per pick that were halved longitudinally with the juice from each half-fruit being assessed using a hand-held refractometer. The mean scores for each selection across the season are presented.

Shelf-life tests were performed on ten unblemished fruits that were sampled once a week from each selection. Samples were collected at the fruit evaluation stage immediately after picking and were transferred in open, 454g punnets to a +2°C cold-store for 24h. After 24h these samples were transferred to a controlled environment cabinet and maintained at 17°C at 70% RH for a further 72h. An assessment of each sample was then performed via a comparative assessment against a standard cultivar using the scoring system shown in the Appendices. The mean scores for each selection across the season are presented.

#### *Main crop (June-bearer) trial*

The main crop trial contained 86 new selections, 33 advanced, re-cycled or re-trialled selections and five industry/season standard cultivars (Elsanta, Fenella, Sonata, Malling™ Centenary and Vibrant). It was established from misted tips planted on 30 July 2014. Plots consisted of a maximum of six plants per selection, with the exception of re-trialled/recycled selections or standards which were replicated as either two (2 x six plants) or three (3 x six plants) plots.

#### *60-day trial*

The 60-day trial included ten advanced selections and three standards (Elsanta, Sonata and Malling™ Centenary). The trial was established using bare root cold stored runners planted on 13 May 2015. Plots consisted of a maximum of ten plants per selection, with the exception of re-trialled/recycled selections or standards which were replicated as either two (2 x ten plants) or three (3x ten plants) plots.

#### *Everbearer trial*

The everbearer trial contained 45 new selections and two advanced selections plus standard cultivars (Evie 2 and Finesse). It was established from potted plants derived from pinned down tips, taken in August 2014 and planted on 31 March 2015. Plants were de-blossomed during the second week of May and harvesting began on 26 June 2015 and continued twice weekly until 28 September 2015. Plots were a maximum of ten plants per selection, with the exception of re-trialled/recycled selections or standards which were replicated as either two (2 x ten plants) or three (3 x ten plants) plots.

## **Results and Discussion**

### *Main crop (June-bearer) trial*

The planting was completed on schedule and the plants had established well by early autumn 2014. By spring 2015 a few of the 6-plant plots were showing uneven vigour but were generally uniform. Yields and vigour of Elsanta were above average and Florence also produced a higher than average yield. For the other standard varieties the yields were generally as expected. The season was later than 2014 with the first harvests from early lines on June 1st and the first significant harvests from Elsanta on June 11th. Harvesting on most of the late-season selections was completed by July 20th.

Most aspects of fruit quality were good, with a high average percentage of class 1 fruit. However, Brix was below average and on many harvests the flavour was weak and rather bland, making it difficult to distinguish between selections for sensory eating quality.

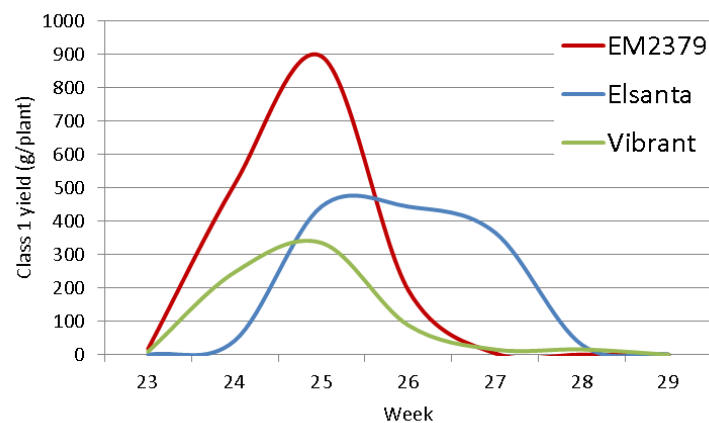
The results from the most promising selections for UK growers is summarised in Table 6 (towards the end of the report). Data on quality, yield and plant characteristics were considered together to identify the most promising selections and the EMSBC Board decided to progress with four new selections for UK growers' trials in 2017/18. These selections were:

**EM2379** (Early season)

EM2379 had an early season, similar to Vibrant (Figure 2.b). This selection produced a very high yield for an early type, with very good fruit size and high percentage of Class 1 (Table 6). Plants were vigorous but with a good fruit display. Attractive, glossy berries with a regular shape were produced at harvest, with a regular colour (Figure 2.a) but sometimes with uneven ripening. Good firmness and good shelf life from early picks but later picks tended to show some bruising. Sensory flavour scores and Brix scores, although variable, were on average comparable to Vibrant.



**Figure 2.a.** Fruit of EM2379



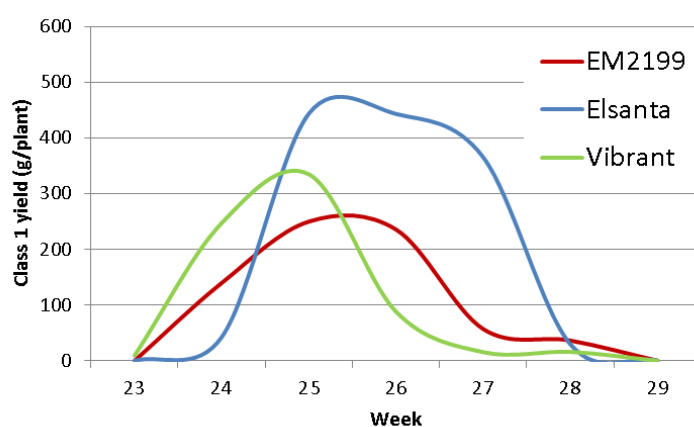
**Figure 2.b.** Cropping profile of EM2379

**EM2199** (early-mid season)

This selection had a moderate class 1 yield (718g per plant), but with very good fruit size (85% >35 mm) and a very high percentage of class 1 fruit (98%). Skin and flesh firmness were shown to be much firmer than Elsanta. Berries were attractive and glossy, with a regular shape and good skin colour (Figure 1.a). White necks were seen occasionally on some fruit, but berries were noted as having uniform colour following shelf-life tests. Average Brix scores were slightly lower than Elsanta but sensory flavour scores were slightly better (Table 6). Plants had moderate vigour with a good fruit display. EM2199 had a fruiting season that was few days earlier than Elsanta but with a longer harvesting period (Figure 1.b).



**Figure 1.a.** Fruit of EM2199



**Figure 1.b.** Cropping profile of EM2199

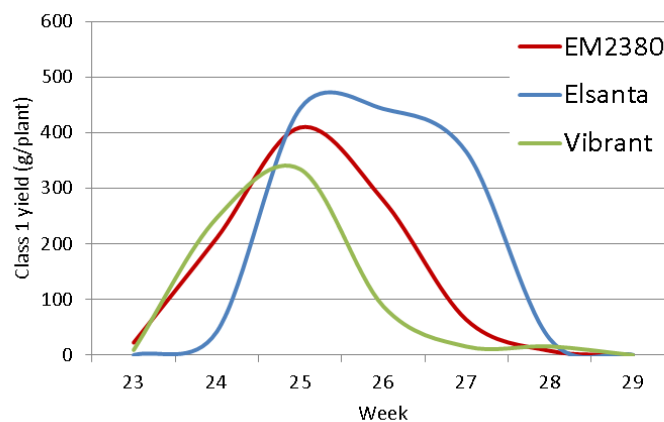


**EM2380** (Early-mid season)

This selection had a moderately high yield (993 g per plant) with good fruit size (65% >35mm) and high percentage of class 1 (95%). The 50% harvest date was a few days before Elsanta. Plants were tall with big leaves but not dense and fruit was well displayed. Fruit was a bit irregular with seedy appearance on early harvests but thereafter was glossy with regular shape and good colour (Figure 3.a). Berries were firm and performed well in shelf life tests (Table 6). Sensory flavour scores and Brix were both quite variable, but on average similar to Malling™ Centenary and better than Elsanta.



**Figure 3.a.** Fruit of EM2380



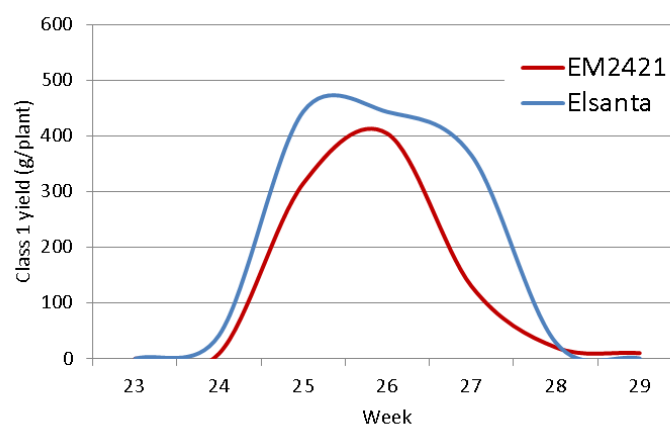
**Figure 3.b.** Cropping profile of EM2380

### EM2421 (mid-season)

EM2421 gave a moderately high class 1 yield (889 grams per plant) but with good fruit size (60% >35mm) and very high percentage of class 1 (96%). Cropping followed a similar pattern to Elsanta (Figure 4.b). Plants were more vigorous than Malling™Centenary but showed acceptable vigour for tunnel production. Berries were glossy with uniform shape and good colour but on occasion had slightly uneven ripening (Figure 4.a). Fruit was firm, with excellent shelf life. Berries had a high mean Brix in the context of this trial and were considered to have good balance between sweetness and acidity in sensory tests.



**Figure 4.a.** Fruit of EM2421



**Figure 4.b.** Cropping profile of EM2421

### *60-day trial*

The trial established well with marketable yields produced from standards being close to the average from EMR 60-day trials. Harvesting commenced early, on 6 July, and fruit was picked and recorded twice weekly until 8 August. The results of the trial are shown in Table 7 (later in the report).

Of the selections that had been selected in 2014 to go forward for UK growers' trials, EM2157, EM2192 and EM2206 showed the greatest potential in the 60-day system.

**EM2157** showed potential, having a similar marketable yield per mm of crown diameter to Elsanta but with a later season (50% pick date, 9 days later) and high mean Brix (9.4°).

**EM2192** is an early-season selection, which produced the highest yield in the trial and from relatively small plants. The fruit had an attractive appearance with a very low mark out (97% marketable). However the mean Brix score was low, with flavour often described as watery, which corresponded well with flavour assessments as main crop in 2014.

**EM2206** was comparable to Elsanta in terms of yield and plant size but had a slightly earlier 50% pick date, similar to EM2192. Flavour was judged to be good, but fruit was sometimes dark and often had raised necks/reflexed calyx.

Of the more advanced selections (EM2290, EM2298, EM2299, EM2301, EM2315, EM2320) that had been selected to go forward for trial in 2013, **EM2290** and **EM2315** showed most promise, the former being comparable to the standards, albeit with a lower mean Brix score and the latter having a slightly earlier season but comparable in terms of Brix scores and flavour. Plant deaths were observed in plots of EM2299 and EM2301, with the former giving a very low yield that corresponds to similar yield data from 2014. Both EM2299 and EM2315 were subsequently rejected due to their susceptibility to crown rot (*Phytophthora cactorum*).

When assessing yield by plant size (marketable yield against average crown size), Malling™ Centenary gave the highest yield (21.7 grams per mm of crown diameter), similar to 'Sonata' and 'EM2192'.

The EMSBC Board agreed that those selections already selected for assessment in growers' trials in 2016/17 should continue based on these trial results.

### *Everbearer trial*

Trial plants established well after planting and developed well. Wet, cool weather from mid-August led to a decrease in % class 1 fruit due to an outbreak of powdery mildew, but this was brought under control in early-September and warm day temperatures in the latter part of that month allowed picking to continue until September 28th.

The results from the most promising and advanced selections are summarised in Table 8 (later in the report).

The advanced selections, EMR564 and EMR590 both performed very well in trial and are due to be trialled in large-scale, growers' trials in 2016.

**EMR564** represents an early-season type, with an excellent appearance and % of class 1 fruit, good yield and fruit size.

**EMR590** has a production season similar to Finesse and has a high yield, excellent fruit size and a good flavour. Both selections have exhibited good disease tolerance in tests and trial at EMR. The full characteristics of these advanced selections and results from earlier trials is summarised in reports of AHDB Project SF 96.

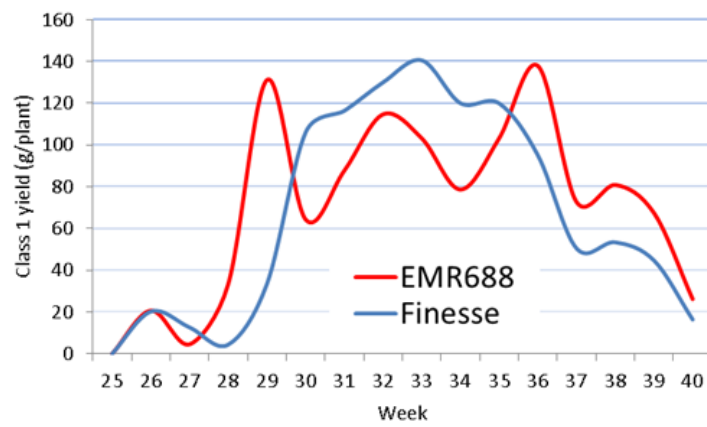
Of the new selections trialled, the EMSBC Board decided to progress five to UK growers' trials in 2017 and the descriptions of these selections appears below:

### **EMR688**

This selection had a moderately high class 1 yield (1,126g/plant) with a very high % of class 1 fruit (95 %), but with fruit size similar to Finesse (55%, >35mm). Shape was consistent throughout the season and berries having a glossy appearance but with slightly sunken seeds. Skin colour was judged to be slightly darker than standards on some occasions (Figure 5.a.), but this was not reflected in shelf-life scores which were judged to be superior to the standards. Flavour was pleasant with Brix scores better than the standards. EMR688's 50% harvest date was later than Finesse but did initially have an early peak in production. Plant vigour was similar to Finesse but with a slightly denser canopy, although fruit display was good and the plants showed moderate runnering ability. Plants remained disease free until September when mildew was noted on some runners and fruit.



**Figure 5.a.** Fruit of EMR688



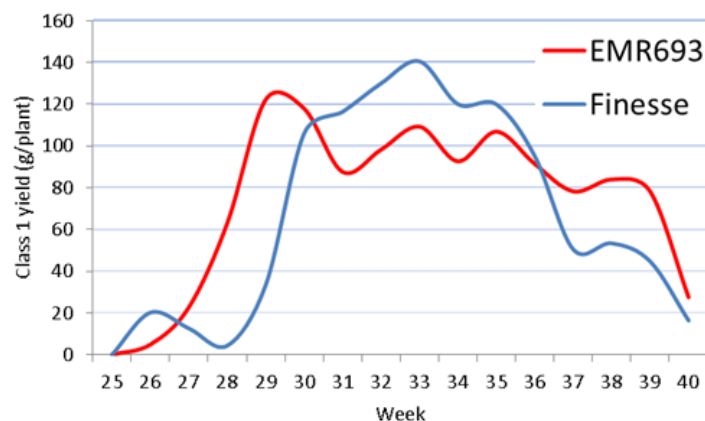
**Figure 5.b.** Cropping profile of EMR688

## EMR693

This selection had a moderately high yield of class 1 fruit (1,184 grams per plant) with good fruit size (65% >35mm) and an excellent percentage of class 1 fruit (93%). Berries were glossy and attractive, with good shape and excellent shelf-life scores (Figure 6.a.). Flavour was pleasant, with a mean Brix score (7.5°) greater than for Finesse and Evie 2. Cropping started slightly earlier than Finesse, although the 50% harvest date was similar, with a steady cropping pattern across the season (Figure 6.b.). Plant vigour, density and runner production were also similar to Finesse. Mildew was seen on the plants at the end of August and on some fruit from mid-September.



**Figure 6.a.** Fruit of EMR693



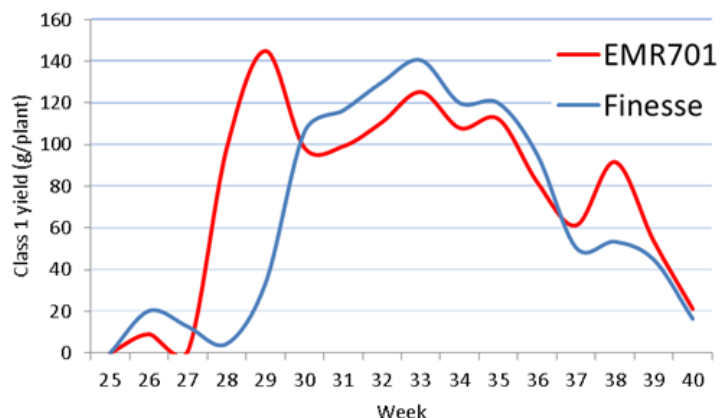
**Figure 6.b.** Cropping profile of EMR693

## **EMR701**

EMR701 produced a high yield (1,216 grams per plant) and a high percentage of class 1 fruit (90%) which was of an excellent size (72%, >35mm). Berries were slightly darker than the standards on some picks and had prominent yellow seeds (Figure 7.a.), but flavour was very good throughout the season, often sweet and this was reflected in relatively high mean Brix score (8.2°). Fruit had good skin and flesh firmness and performed better in shelf-life tests than the standards. Production was slightly earlier than Finesse with an early peak in production being noted in early July (Figure 7.b.). Plants were similar in vigour to Evie 2, being slightly more vigorous than Finesse. Mildew was recorded from mid-August and persisted on fruit throughout September, but otherwise plants appeared healthy, with moderate runner production.



**Figure 7.a.** Fruit of EMR701



**Figure 7.b.** Cropping profile of EMR701

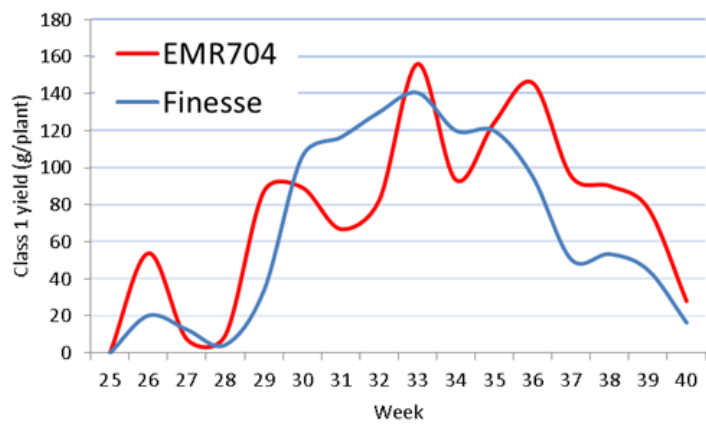
#### **EMR704**

EMR704 had a high yield, with a class 1 yield of 1,207 grams per plant. This was coupled with a high percentage of class 1 fruit (92%) and excellent fruit size (72%). Berries were glossy, with a bright, mid-red colour but with slightly raised seeds (Figure 8.a), with some uneven shape at the start and end of the season. Berries were firm, with shelf-life scores superior to the standards, with a pleasant, often sweet flavour and relatively high mean Brix score (8.0°). Production was more erratic than Finesse, with a slightly later 50% pick date (Figure 8.b.). Plants were slightly uneven in the plot but generally had similar vigour to Finesse but with a more erect habit and with moderate runner production. Plants appeared healthy with no mildew noted.





**Figure 8.a.** Fruit of EMR704



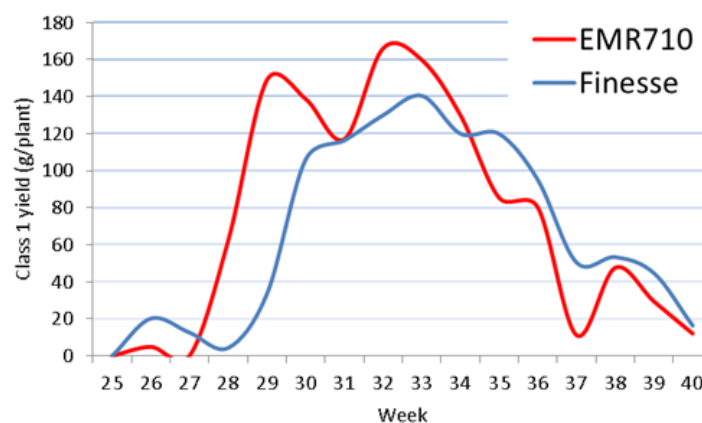
**Figure 8.b.** Cropping profile of EMR704

## EMR710

EMR710 gave a moderately high yield (1,193 grams per plant), good % class 1 (88%) and good fruit size (62%). Berries were glossy but with prominent seeds (Figure 9.a). Flesh firmness scores were slightly variable but shelf life was comparable to the standards. Flavour was judged to be good, being described as sweet throughout the main season but noted as watery on the early and late picks, which contributed to only average Brix scores (Table 8). EMR710 had an early season with a 50% pick date that was comparable to the early standard, Malling™ Star (Figure 9.b.). Plants appeared healthy, with no plant deaths or mildew noted. They were considered to have moderate vigour, with a denser leaf canopy than Finesse, although fruit display was good.



**Figure 8.a.** Fruit of EMR710



**Figure 8.b.** Cropping profile of EMR710

**Table 6.** Main crop (June-bearer) results

Selection	Class 1 yield (g/plant)	% Class 1	% large fruit (>35mm)	Appearance (1-9)	Skin firm (1-9)	Flesh firm (1-9)	Flavour (1-9)	Shelf life score (1-5)	Mean Brix (min-max)	50% pick date	Vigour (1-9)	Density (1-5)	Display (1-3)
EM2379	1618	90	85	5.4	5.6	5.6	5.1	3.2	6.5 (3.0-11.9)	15 Jun	7	3	3
EM2199	718	98	85	6.4	6.8	6.9	5.4	4.0	7.2 (5.2-9.9)	18 Jun	6	3	3
EM2380	993	95	65	5.6	5.8	6.4	5.9	3.7	7.4 (4.7-10.6)	18 Jun	7	3	3
EM2421	889	96	60	5.6	6.3	5.8	5.5	4.3	8.6 (4.8-12.1)	22 Jun	6	4	2
<i>Elsanta</i> <sup>1</sup>	1324	87	49	4.5	5.4	5.3	5.3	3.0	7.4 (4.5-11.4)	23 Jun	6	4	3
<i>M. Cent</i> <sup>2</sup>	904	94	74	6.0	6.2	6.1	5.8	3.7	7.1 (4.1-10.3)	17 Jun	5	3	3

<sup>1</sup>Mean of three plots

<sup>2</sup>'Malling™ Centenary', mean of three plots

The key to fruit and plant characteristics scores are shown in Appendix I

**Table 7.** 60-day trial results (those shown in **BOLD** are advanced selections)

Selection	Marketable yield <sup>1</sup> (g/plant)	Unmarketable <sup>2</sup> yield (g/plant)	% marketable yield	Mean crown diameter (mm)	Marketable (g/plant) yield per mm crown diameter	50% pick date	Brix	
							Mean	Range
EM2192	218.2	5.9	97.4	10.1	21.6	9 July	7.1	(4.1-10.6)
EM2206	204.5	22.3	90.2	12.2	16.8	9 July	8.1	(5.5-11.4)
EM2358	136.4	15.2	90.0	12.1	11.3	16 July	9.5	(7.4-11.0)
EM2157	164.2	19.7	89.3	10.6	15.5	20 July	9.4	(6.7-11.5)
<b>EM2315</b>	173.0	18.3	90.4	12.5	13.8	9 July	9.0	(7.2-11.6)
<b>EM2298</b>	152.2	15.4	90.8	9.5	16.0	9 July	8.5	(5.9-12.6)
<b>EM2299</b>	38.8	0.0	100.0	10.2	3.8	9 July	8.6	(7.6-10.1)
<b>EM2290</b>	198.2	13.3	93.7	12.0	16.5	13 July	7.7	(3.2-9.6)
<b>EM2301</b>	166.3	26.5	86.3	9.2	15.8	13 July	8.7	(6.3-10.5)
<b>EM2320</b>	177.2	23.5	88.3	11.7	15.1	13 July	7.6	(4.6-11.3)
Elsanta <sup>3</sup>	201.3	26.5	87.7	12.5	15.9	11 July	8.6	(5.8-11.5)
M Centenary	178.3	24.7	87.8	8.2	21.7	7 July	9.3	(7.8-10.9)
Sonata <sup>3</sup>	200.6	13.4	93.7	9.4	21.4	13 July	9.3	(6.6-13.4)

<sup>1</sup> >25 mm <sup>2</sup> < 25mm & waste <sup>3</sup> mean of two plots

The key to fruit and plant characteristics scores are shown in Appendix I

**Table 8.** Everbearer trial results (those shown in **BOLD** are advanced selections)

Selection	Class 1 yield (g/plant)	% Class 1	% large fruit (>35mm)	Appearance (1-9)	Skin firm (1-9)	Flesh firm (1-9)	Flavour (1-9)	Shelf life score (1-5)	Mean Brix (min-max)	50% pick date	Vigour (1-9)	Density (1-5)	Display (1-3)
EMR710	1193	88	62	5.6	5.9	5.6	5.8	3.1	7.2 (4.9-11.9)	6 Aug	5	4	2
EMR701	1216	90	72	5.6	6.4	6.2	6.0	3.7	8.2 (6.6-10.2)	10 Aug	6	3	3
EMR693	1184	93	65	5.9	6.0	6.2	5.6	4.0	7.5 (5.6-10.5)	13 Aug	5	3	3
EMR704	1207	92	72	5.6	6.0	6.3	5.6	3.8	8.0 (6.0-10.6)	17 Aug	5	3	3
EMR688	1126	95	55	5.5	6.2	6.5	5.5	3.7	7.8 (5.6-10.4)	17 Aug	6	3	3
<b>EMR564</b>	1240	93	62	5.9	6.6	6.8	5.2	3.3	7.3 (4.8-9.8)	7 Aug	5	3	3
<b>EMR590</b>	1327	90	68	5.6	6.3	6.6	5.7	3.5	7.8 (5.3-10.5)	15 Aug	5	4	3
<i>Evie 2</i> <sup>1</sup>	1249	88	72	5.4	5.4	5.5	5.0	2.1	5.9 (3.8-8.3)	10 Aug	6	3	3
<i>Finesse</i> <sup>2</sup>	1063	89	52	5.0	5.7	5.9	5.2	-	6.6 (3.9-9.0)	14 Aug	5	3	3
<i>M. Star</i> <sup>3</sup>	1077	91	58	5.5	6.1	6.1	6.1	2.5	8.6 (5.4-10.9)	6 Aug	5	3	3

<sup>1</sup>Mean of two plots <sup>2</sup>Mean of three plots <sup>3</sup>Malling™ Star', mean of two plots

The key to fruit and plant characteristics scores are shown in Appendix I

## Conclusions

### *Main crop (June-bearer) trial*

- Four new selections, EM2199, EM2379, EM2380 and EM2421 were identified as being of sufficient interest to progress to growers' trials in 2017 (60-day) and 2018 (main crop).

### *60-day trial*

- Two new selections, EM2192 and EM2206 showed potential in the 60-day system, having a comparable or greater marketable yield (grams per plant) to Elsanta, but with a higher percentage of class 1 fruit.
- Of the advanced selections trialled, EM2290 and EM2315 showed most promise, the former having a comparable yield to the standards and the latter having a slightly earlier season than the standards and comparable in terms of Brix scores and flavour.
- Two advanced selections, EM2299 and EM2301 were rejected due to susceptibility to crown rot (*Phytophthora cactorum*).

### *Everbearer trial*

- Five new selections, EMR701, EMR701, EM693, EMR704 and EMR688 were identified as being of sufficient interest to progress to growers' trials in 2017.
- Two advanced selections, EMR564 and EMR590, performed well in the trial and will be assessed on large-scale growers' trials in 2016.

## Knowledge and Technology Transfer

A joint AHDB/EMRA fruit walk was taken place on 18 June 2014 to allow AHDB levy payers to sample and discuss the latest selections from the EMSBC programme. This was hosted by Adam Whitehouse and was well attended. In addition AHDB representatives (Andrew Tinsley, Rachel Lockley and Marion Regan) were able to attend an EMSBC Board meeting 'strawberry walk' on 16 June 2015 and ad hoc tastings throughout the summer. Updates on the programme, trials and selections were also made to AHDB representatives at the EMSBC Board meetings in August and October 2015 and February 2016.

A presentation, 'New strawberry varieties from the EMR Strawberry Breeding Club' was given by Adam Whitehouse at the AHDB/EMRA Soft Fruit Day, EMR on 25 November 2015 and another presentation, 'Strawberry Breeding at NIAB-EMR' was given at the SSCR Soft Fruit Day, at the Inchtute Hotel, Perthshire on 18 February 2016.

## Appendices

### Scoring system employed for fruit and plant characteristics

#### Fruit characteristics:

Appearance	3=poor 5=acceptable 7=attractive
Skin Firmness	3=weak 5=acceptable 7=tough
Flesh Firmness	3=soft 5=acceptable 7=firm
Flavour	1=unpleasant 3=poor 5=acceptable 7=pleasant 9=very pleasant

#### Shelf life:

Comparison to standard	1=Much worse 2=Worse 3=Same 4=Better 5=Much better
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**Plant characteristics:**

Plant Vigour                    1=weak  
    5=intermediate  
    9=excessive

Plant Density                    1=open  
    3=intermediate  
    5=dense

Fruit Display                    1=poor  
    2=intermediate  
    3=good