Grower Summary

SF 134

The performance of new June-bearing strawberry varieties and advanced selections in raised soil beds

Final 2014

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Further information

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GROWER SUMMARY

Headline

Flair, Vibrant EM1905, Malling Centenary, FF1005, EM1990 and FF1004 performed very well in this soil grown June-bearing strawberry variety trial.

Background

One of the most widely used strawberry production systems in the UK is two-row raised bed soil culture. There are many June-bearing varieties currently suited to this type of production system. However, each year there are new varieties being released into the industry from breeding programmes worldwide, some of which may provide the UK grower with better performance than the varieties currently grown.

To compare new varieties with those currently grown, it's important to trial them on the same site in commercial production under the same UK growing conditions. This enables true comparisons to be made between varieties, rather than relying on individual trial results from diverse locations using varying plant types, where comparison between the performances of varieties can be unreliable.

New and near-market selections could provide improvements through season extension, increased productivity, harvest efficiency and/or improvements in fruit quality characteristics such as berry size, flavour and shelf life. The data gathered during this project should provide a good foundation for growers to identify varieties that best suit their growing system and ultimate market outlet, so reducing the risk a grower takes when choosing to use new varieties.

Results Summary

The following is a summary of the information provided in the 'SF 134 Full Trial Report', available from the HDC.

Table 1 lists the varieties, breeding programmes, plant suppliers and plant types used.

Table 1: Varieties and numbered selections included in the trial

Variety/ Selection	Breeder	Country	Season	Plant Type
Flair	Goossens Flevoplants BV	Netherlands	Early	Tray 9cm x 7cm
Vibrant	East Malling Research	UK	Early	Tray 9cm x 7cm
EM1905	East Malling Research	UK	Early	Tray 9cm x 7cm
Capriss	CIREF	France	Early-mid	Tray 9cm x 7cm
FC15	CRA-FRF	France	Early-mid	Tray 9cm x 7cm
Malling Centenary	East Malling Research	UK	Early-mid	Medium waiting bed
CIR903	CIREF	France	Early-mid	Tray 9cm x 7cm
Elsanta	Plant Research International (PRI)	Netherlands	Mid	Tray 9cm x 7cm
EM1746	East Malling Research	UK	Mid-late	Tray 9cm x 7cm
EM1990	East Malling Research	UK	Mid-late	Tray 9cm x 7cm
EM1942	East Malling Research	UK	Mid-late	Tray 9cm x 7cm
FF1005 (Vivaldi)	Fresh Forward	Netherlands	Mid-late	Heavy waiting bed
FF1004	Fresh Forward	Netherlands	Late	Heavy waiting bed

The varieties/selections were planted in raised bed production and protected during fruiting with Spanish tunnels on New Farm Produce's site at Hanch near Elmhurst in Staffordshire. The trial was located in the centre three beds of a five-bed tunnel. It was managed for fertigation and agrochemical inputs in the same way as the surrounding commercial Malling Centenary crop. Planting took place on 17th March 2013 (week 12) at a spacing of 40 cm between plants in the row (24,500 plants per hectare); three replicates were planted. The aim was to use tray plants of all varieties but Malling Centenary was only available as a medium waiting bed plant and FF1004 and FF1005 as heavy waiting bed plants.

A summary of the project results is given below.

Table 2: Year 1 Fruit Yield data - 2013

Variety	50% harvest date	Total yield g/plant	Class 1 Yield g/plant	Class 1 yield as a % of Elsanta	% Class 1	Class 1 Berry Size %		
						Extra large >45 mm	Large 35-45 mm	Medium 25-35 mm
Flair	02/07/13	394	351	109%	89.3	5.08	55.40	39.52
Vibrant	05/07/13	354	331	102%	93.7	4.05	68.35	27.60
EM1905	05/07/13	224	219	68%	97.5	12.57	62.76	24.67
Capriss	07/07/13	268	237	73%	88.0	3.26	46.14	50.60
FC15	08/07/13	311	283	88%	91.0	27.39	48.43	24.18
Malling Centenary*	09/07/13	306	300	93%	97.9	16.24	61.22	22.55
CIR903	12/07/13	593	491	152%	82.8	4.82	39.04	56.40
Elsanta	09/07/13	405	323	100%	79.7	3.95	55.56	40.49
EM1746	11/07/13	304	236	73%	78.0	0.80	49.22	49.97
EM1990	10/07/13	254	248	77%	97.5	16.13	60.54	23.30
EM1942	14/07/13	290	275	85%	94.8	9.18	52.42	38.40
FF1005 *	12/07/13	657	531	164%	80.5	4.91	34.77	60.32
FF1004 *	17/07/13	605	496	153%	82.0	18.17	49.18	32.65

** FF1004 and FF1005 were planted as heavy waiting bed plants. Malling Centenary was a medium waiting bed plant. All other varieties in trial were tray plants.*

Table 3: Year 2 Fruit Yield data - 2014

Variety	First pick date	50% harvest (days) cv Elsanta	Total Yield g/plant	Class 1 Yield g/plant	% Class 1	Berry Size %				
						Extra large >45mm	Large 35-45mm	Medium 25-35mm	Small <25mm	Mishapen All sizes
Flair	20/05	-12	981	784	80	1	37	43	4	16
						1	46	53	Class 1 only	
Vibrant	25/05	-7	1065	978	92	1	45	45	4	4
						1	49	49	Class 1 only	
EM1905	25/05	-5	1380	1184	86	4	55	27	5	9
						4	65	31	Class 1 only	
Capriss	28/05	-5	343	232	68	1	19	48	10	22
						1	28	71	Class 1 only	
FC15	28/05	-5	1238	985	80	15	48	17	2	19
						18	61	21	Class 1 only	
Malling Centenary	31/05	-1	1119	843	75	4	46	26	3	22
						5	61	34	Class 1 only	
CIR903	05/06	+2	1509	942	62	0	13	50	20	18
						0	20	79	Class 1 only	
Elsanta	05/06	14/06/14	1262	918	73	1	33	37	10	20
						1	47	52	Class 1 only	
EM1746	08/06	+6	1010	598	59	1	20	38	13	27
						2	34	64	Class 1 only	
EM1990	09/06	+5	1172	1010	86	6	45	35	6	8
						6	53	41	Class 1 only	
EM1942	05/06	+2	1172	891	76	2	35	39	11	13
						2	47	51	Class 1 only	
FF1005	05/06	+3	1387	1121	80	0	25	55	10	10
						0	31	69	Class 1 only	
FF1004	09/06	+6	1334	969	72	7	30	36	10	17
						9	41	50	Class 1 only	

Most interesting varieties and selections

The following varieties/selections are of most interest to the industry. Full information on all varieties can be found in the 'SF 128 Full Trial Report'.

Early season varieties

Flair was the earliest variety to pick with a 50% pick date 11 days before Elsanta. Fruit yields were lower than Elsanta and the fruit quality average. It is a variety that would probably be better suited to substrate culture. Fruit yield was similar or lower than Elsanta in both harvest years.

Not as early as Flair but still providing an advantage in earliness over Elsanta, **Vibrant** and **EM1905** both gave significant improvements over Elsanta for berry size and percentage class 1. EM1905 also gave the highest class 1 yield in trial in year two. Class 1 percentage for Vibrant was 92% and for EM1905 86%, compared to Elsanta's 73%.

Midseason varieties

Malling Centenary had a picking season very similar to Elsanta's, although in other trials and commercial production it has been shown to be a few days earlier. Class 1 yields in both seasons were similar to Elsanta but with much improved berry size and shape. Finding the optimum production system to increase fruit yields would be worthwhile as the fruit quality of this variety is well suited to most markets.

FF1005 was three days later than Elsanta. It showed good class 1 yields in both year 1 and 2 but the proportion of medium size berries (25-35mm) was one of the highest in the trial. The plants were very vigorous. Developing an optimum feeding regime and production system may help to improve the fruit quality and berry size.

EM1942 started picking eight days later than Elsanta, but 50% pick date was only two days later. Class 1 yields were similar to Elsanta. The fruit size was not as large (>35mm) as Malling Centenary.

Later season varieties

FF1004 produced higher class 1 yields than Elsanta in both harvest seasons. In the main crop year, the percentage class 1 (72%) was quite low due to misshapen and small fruit. The class 1 consisted of a higher proportion of medium (25-35mm) rather than large (>35mm) berries.

EM1990 produced significantly larger fruit than Elsanta. Class 1 yields were lower in year one than Elsanta but in year two, the yield was higher than Elsanta with a higher proportion of large berries (>35mm) and good percentage class 1 of 86.

EM1746 had lower total and class 1 fruit yields than Elsanta. The percentage class 1 was particularly low at 59%. There were more medium (25-35mm) than large (>35mm) berries in the class 1 category.

Table 4: Fruit Quality

Variety	External berry colour 1 = light orange 8 = dark wine-red	Uniformity of berry shape 1 = irregular 9 = uniform	Skin firmness 1 = soft 9 = firm	Berry appearance 1 = poor 9 = excellent	Fruit flavour 1 = poor 9= excellent	Shelf life 1 = poor 9 = excellent	Mean Brix (sugar content)
Flair	7.5	6.5	6.6	7.0	8.0	6.0	10.7
Vibrant	8.0	8.0	7.5	8.0	8.5	6.5	9.0
EM1905	7.5	8.5	6.8	7.8	7.0	6.8	9.2
Capriss	7.0	6.2	6.2	5.5	8.0	5.3	11.2
FC15	4.5	7.0	7.4	7.0	4.5	4.0	7.8
Malling Centenary	6.0	8.5	8.0	9.0	8.0	7.5	9.0
CIR903	6.5	7.0	6.0	4.5	4.0	2.5	7.6
Elsanta	6.5	5.5	7.0	6.0	6.5	6.0	8.8
EM1746	5.8	7.0	7.5	8.5	6.5	6.5	10.1
EM1990	7.0	8.5	8.0	8.5	7.0	7.5	9.9
EM1942	6.0	6.5	7.5	7.8	8.0	5.0	9.6
FF1005	8.6	6.0	7.5	7.5	5.0	7.0	7.8
FF1004	7.3	7.0	6.5	5.5	4.5	6.0	8.2

Malling Centenary produced the best fruit quality scores of all varieties in trial and markedly higher than for Elsanta. The flavour was sweet and the texture juicy. Brix levels were consistently higher than Elsanta. The berries were very attractive with a bright glossy orange/red colour, pointed conic very regular uniform shape with slightly indented seeds giving the skin a very smooth look. Both skin and flesh had good firmness. The calyx was of average size and in proportion to the berries. The berries retained their gloss when stored, showing only slight darkening in store.

Flair was pleasantly sweet tasting with a smooth, soft texture though not always very juicy. Brix levels were consistently higher than those of Elsanta. The berries were glossy and attractive, darker than Elsanta with an irregular conic shape and some variability of size. The seeds were indented. Skin and flesh had moderate firmness. In store the berries showed some darkening and bruising.

Vibrant had a good sweet/acid balanced flavour which scored highly in tastings, described as sometimes sharp but always tasty. The berries were very juicy. Brix levels were similar to Elsanta. Berries are a uniform, regular conic shape with glossy darker skin colour than Elsanta. The flesh was firm and the skin strong. In shelf life tests, the berries darkened in colour and any bruising became more noticeable.

EM1905 had a clean uncomplicated sweet to bland flavour. The texture was juicy and good. Brix levels were similar to Elsanta. The berries were very attractive, glossy red/orange, slightly darker than Elsanta but lighter than Vibrant. The seeds were slightly indented with a uniformly regular conic shape. Petal retention under the calyx occurred mostly during the first half of harvest, which detracted from the appearance. The skin was moderately firm and the flesh firm. Shelf life was similar to Elsanta.

EM1942 had a sweet classic strawberry flavour with good juicy texture. Brix levels were slightly higher than Elsanta. At the Open Day it was noted for its very good appearance. Berries were glossy, orange to orange/red in colour with a rounded globose shape that had some irregularity like Elsanta. The flesh and skin were quite firm. In shelf life tests the orange skin colour showed bruising quite readily. The skin darkened in storage.

FF1005 had a watery, sometimes quite bland taste with low sweetness. Brix levels were lower than that of Elsanta. The berries had a very glossy bright attractive appearance with a darker red skin colour than Elsanta and a white neck under the small reflexed calyx. The

berry shape was round with a similar irregularity of shape to Elsanta. The skin and flesh had good firmness. In storage the fruit retained its gloss but did darken in colour and bruises became more noticeable.

EM1990 had variable flavour. Usually the darker the colour the sweeter the berry tasted, though brix levels were consistently higher than Elsanta. The berries were very attractive with a glossy bright orange/red skin and uniformly conic shape with wide shoulders. The seeds slightly protruded from the berry surface, which sometimes gave it a seedy appearance. EM1990 scored highly for appearance at the Open Day. The berries were firm with a dense texture, white flesh colour and the skin had good strength. The calyx was quite large. All quality scores including shelf life, were better than for Elsanta.

EM1746 had variable flavour, very good tasting at some picks and bland at others. The texture was juicy. Brix levels were higher than Elsanta. The berries were very attractive, glossy with an orange/red colour. Berry shape was an irregular round wedge, of medium size with some splitting noted later in pick. In shelf life tests the berries stored slightly better than Elsanta.

Capriss had a good flavour and brix level but other quality scores were poor. **FF1004**, **CIR903** and **FC15** were also found to have poor fruit quality.

Main conclusions

The following conclusions are drawn from the 2013 and 2014 cropping season of the twelve varieties grown in raised bed soil culture:

- **Flair** is a promising variety for very early production. In soil production the fruit yields were similar to Elsanta in year 1 but lower in year 2. The berries were a slightly better size and the percentage class 1, 80% or above. The fruit had a good taste but showed some deterioration in store. To get the best from this variety it may be better suited to growing in substrate with a tailored feed regime and agronomic husbandry (crown thinning, etc.) specific to the variety.

- **Early** season **Vibrant** and **EM1905** both gave significant improvements over Elsanta for berry size, shape and percentage class 1 in soil culture. EM1905 produced the highest class 1 yield in trial. Vibrant yields were also higher than Elsanta. These

attributes should provide growers with the opportunity to start picking earlier in the season and greatly improve picking speeds. Vibrant has already demonstrated that it is suited to substrate culture. EM1905 may benefit from being grown in substrate as it has a susceptibility to *Verticillium* wilt similar to Elsanta. EM1905 fruit suffered from petal retention, which detracted from the appearance post storage.

- **Malling Centenary** had excellent fruit quality characteristics providing a marked improvement over Elsanta in soil culture for berry size, shape and percentage class 1. Class 1 fruit yields were similar to Elsanta. The use of good plant material and tailoring agronomic practice to help increase yields would be worthwhile as the fruit quality is well suited to most markets. In this trial the fruiting season was similar to Elsanta though it has often been shown to crop a few days earlier.

- **FF1005** was 3 days later than Elsanta and had good fruit yields, though a much higher proportion of the fruit was medium (25-35 mm) rather than large (>35mm) in size. Flavour was quite weak with low brix levels. The plants were very vigorous so a feed regime and alternative agronomic practice suited to the variety would be needed to help improve fruit quality and berry size.

- **EM1942** had a similar season to Elsanta. Fruit quality including flavour was generally good, though it did have a lower shelf life score than Elsanta. Class 1 yields were similar to Elsanta but fruit size was smaller than Malling Centenary. With a susceptibility to *Verticillium* wilt there were some plant losses noted in trial, which will limit its use in soil production. With no particularly outstanding qualities it may not provide sufficient improvements to compete with other midseason varieties.

- For a later fruiting variety, **EM1990** had good fruit quality with a significantly higher proportion of large berries (>35mm) and higher percentage class 1 than Elsanta. Fruit yields were lower than Elsanta in year one but higher in year two. With a moderate susceptibility to *Verticillium* wilt but moderate resistance to crown rot *(Phytophthora cactorum*), it may provide sufficient improvement over the currently grown mid/late season varieties to warrant a place in UK soil production systems.

- **FF1004** had good class 1 yields and a similar percentage class 1 to Elsanta. Fruit size was similar to Elsanta. Fruit quality scores were generally lower than Elsanta including flavour and brix levels. The late season and good yields may be of interest

to growers but with poor fruit quality scores it may not be readily accepted by the market.

- **EM1746** was 6 days later than Elsanta. Class 1 fruit yields in both cropping seasons were significantly lower than Elsanta with a particularly low percentage class 1 of 59 in year two, well below expectations for this selection. Fruit flavour and shelf life were similar or better than Elsanta. The plants were very vigorous and in EMR tests showed good resistance to crown rot (*Phytophthora cactorum*), advantageous for a later season variety, and intermediate tolerance to *Verticillium* wilt.

- In this trial, early season **Capriss** and **FC15**, and midseason **CIR903** had generally poor fruit quality and/or low yields, which are unlikely to be overcome by alternative growing systems. Other varieties may be better suited to UK soil production systems.