New varieties from the East Malling Strawberry Breeding Club (Project SF 96a)

Figure 1. Industry members assessing the quality of new selections bred by the East Malling Strawberry Breeding Club

Figure 2. Malling™ Allure – A recent release from the Club

Action points

Three selections from the EMSBC are in the process of being commercialised:

- **Malling™ Allure (EM2157) – A late-season June-bearer**
- **Malling™ Champion (EMR564) – An early, disease resistant Everbearer**
- **EMR639 – A disease resistant Everbearer with sweet flavour**

Six selections are about to progress to advanced large-scale grower trials. These selections are:

- **EM2547 – A very-early season, large-fruited June-bearer selection**
- **EM2464 – An early season, June-bearer selection with high percentage Class 1**
- **EMR693 – An attractive Everbearer selection with excellent fruit quality**
- **EMR704 – An early Everbearer selection with excellent fruit size**
- **EMR721 – A productive, easy-to-pick Everbearer**
- **EMR796 – An early, high-yielding, large-fruited Everbearer with excellent fruit quality**

This factsheet summarises the attributes of the main varieties released in the second tranche of the East Malling Strawberry Breeding Club (Figures 1 and 2), which started in 2013, as well as details of some promising selections developed during this period.

Introduction

The East Malling Strawberry Breeding Club (EMSBC) was formed in 2008 to continue the national strawberry programme that has operated at EMR since 1983, with AHDB contributing via project SF 96 until 2013, and then via SF 96a for a second tranche of funding until 2023. The programme now has ten additional partners: Asplins PO Ltd, Berry Gardens Ltd, BerryWorld Ltd, DPS Ltd, Farm Fresh PO Ltd, Mack Ltd, Meiosis Ltd, NIAB EMR, Solo Berry Ltd and The Greenery.

It is the intention of the breeding programme to release new varieties that offer advantages over those currently available, and focuses on markets where there are opportunities for improvement. The benefit may be in terms of fruit quality, yield, resistance to diseases (to minimise spray applications and reduce plant losses in commercial production), fruit size and display (to increase picking efficiency) or any combination of these characteristics.

In addition, the programme is benefiting from associated research projects funded at NIAB EMR that feed into the breeding process, 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, with the specific aim of pyramiding markers associated with resistance to Verticillium wilt (*Verticillium dahliae*), powdery mildew (*Podosphaera aphanis*) and *Phytophthora* species (as part of a linked BBSRC IDRIS project).

Three new varieties have been, or are currently being commercialised from the second tranche (2013 onwards) of this project: one June-bearer and two Everbearers, which will be available to the industry in the near future. The characteristics of each of these are summarised below:

June-bearers

Malling™ Allure

Season

A late season variety, typically 10–12 days later than Elsanta.

Fruit

Malling™ Allure has excellent fruit quality characteristics, similar to Malling™ Centenary. Brix levels over a 3-year period averaged 8.7° compared to Elsanta at 7.5° in NIAB EMR preliminary trials. The berries are attractive (Figure 3) with a uniform shape and excellent firmness, superior to Elsanta. This is reflected in very good performance of fruit in shelf-life tests.

Figure 3. Malling™ Allure

Yield and fruit size

Malling™ Allure has very good yield potential, with an average maincrop yield of 990 g per plant in misted tip, protected soil trials at NIAB EMR. Observations from grower trials also indicate it has a longer cropping profile than Malling™ Centenary. Fruit size is large (Figure 4), averaging 68% of berries >35 mm and with a high percentage Class 1, averaging 91% in grower trials.

Figure 4. Malling™ Allure produces large fruits

Plant characteristics

Malling™ Allure is a robust plant, with moderate vigour in comparison with other late-season varieties, and has an upright habit. The fruit is well presented on long trusses for ease of picking (Figure 5).

Figure 5. Malling™ Allure is well presented on long trusses

Disease resistance

Malling™ Allure has moderate susceptibility to crown rot (*Phytophthora cactorum*) and wilt (*Verticillium dahliae*) but shows a useful level of resistance to powdery mildew (*Podosphaera aphanis*).

Plant availability

Malling™ Allure is being commercialised by Meiosis Ltd on behalf of the EMSBC and will be officially released in 2019. It is in propagation with a number of UK and continental propagators and will be available to all growers in commercial quantities in 2019/20. A list of licensed propagators can be found on the following web page: **www.meiosis.co.uk/fruit_types/malling-allure**

Everbearers

Malling™ Champion

Season

Malling™ Champion is considered to be an early season Everbearer, which produces its peak harvest in July and picks steadily through August.

Fruit

Malling™ Champion displays excellent fruit quality, producing attractive, regular conic-shaped berries (Figure 6), with very good skin and flesh firmness, and pleasant flavour. It has performed well in shelf-life tests with good retention of skin colour and firmness.

Figure 6. Malling™ Champion

Yield and fruit size

With an average fruit yield of 935 g per plant in grower trials, Malling™ Champion has good yield potential. Berries can be large, averaging 24 g in EMSBC trials, with 62% measuring >35 mm, although fruit size was noted to drop off in the hot summer of 2018. The percentage of Class 1 berries produced averaged 88% in EMSBC grower trials.

Plant characteristics

Malling™ Champion is a compact plant with low vigour, and fruit is well presented on long trusses offering easy harvesting (Figure 7).

Figure 7. Malling™ Champion is well presented to the picker

Disease resistance

Malling™ Champion is resistant to crown rot (*Phytophthora cactorum*) and wilt (*Verticillium dahliae*), and shows moderate resistance to powdery mildew (*Podosphaera aphanis*). Results are based on preliminary tests conducted at NIAB EMR.

Plant availability

Malling™ Champion is being commercialised by Meiosis Ltd. on behalf of the EMSBC and will be officially released in 2019. It is in propagation with a number of UK and continental propagators and will be available to all growers in commercial quantities in 2019/20. A list of licensed propagators can be found on the following web page: **www.meiosis.co.uk/fruit_types/malling-champion**

EMR639

Season

EMR639 has a 50% pick date, similar to Finesse and Murano in NIAB EMR trials.

Fruit

Berries are glossy and attractive, regular globose-conic in shape (Figure 8). They have a sweet, pleasant flavour with high average Brix score (9.2º) from EMSBC grower trials.

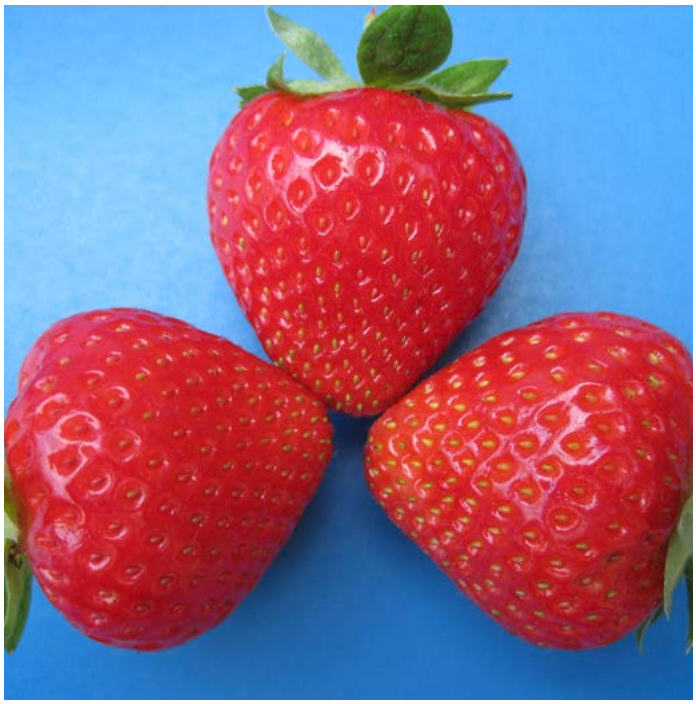

Figure 8. EMR639

Yield and fruit size

EMR639 produced a moderate to high Class 1 yield (mean 838 g per plant from EMSBC grower trials), with good average size (mean berry weight, 21 g on EMSBC grower trials and 60% >35 mm from NIAB EMR preliminary trials).

Plant characteristics

Plants have a good habit, but are not overly vigorous. They are characterised by big leaves, but not to the detriment of fruit display, where berries are well presented for easy picking.

Disease resistance

Based on preliminary tests at NIAB EMR, EMR639 is resistant to crown rot (*Phytophthora cactorum*) and powdery mildew (*Podosphaera aphanis*) and shows moderate resistance to Verticillium wilt (*Verticillium dahliae*).

Plant availability

EMR639 is being considered for commercialisation and release in 2021/22.

Promising selections

Six selections, two June-bearers and four Everbearers, trialled at NIAB EMR and in small-scale trial EMSBC grower trial sites, have been put forward for large-scale EMSBC grower trials in 2019–21 to assess their suitability as varieties for the future. A brief profile of these selections follows.

EM2547 – A very early season, June-bearing selection

Season

A very-early season, June-bearing selection, with a 50% pick date similar to Flair.

Fruit

Berries of EM2547 are glossy (Figure 9), with good colour (lighter skin than Flair) and with better firmness scores and shelf life than Flair. Fruit has been highly scored for sensory flavour and has had a high average Brix score (10º) in 2017 and 2018 in NIAB EMR trials.

Figure 9. EM2547

Yield and fruit size

Yields have been slightly lower than Flair in comparative trials, although the percentage of Class 1 was high. It has excellent fruit size that is superior to Flair (88% and 77% >35 mm in NIAB EMR trials in 2017 and 2018, respectively).

Plant characteristics

Plants are quite vigorous, have an erect habit and are not too dense. Fruit trusses are held clear of the leaf canopy, allowing fruit to be easily picked.

Disease resistance

A full range of preliminary disease test screenings has yet to be completed at NIAB EMR, but no particular susceptibilities were noted in NIAB EMR tunnelled soil trials. Initial EM2547 crown rot (*Phytophthora cactorum*) tests indicate EM2547 has intermediate/moderate resistance.

EM2464 – An early season, June-bearer selection with high percentage Class 1

Season

An early season June-bearer, with a 50% pick date similar to Clery and Vibrant (approximately seven days ahead of Elsanta).

Fruit

Berries are uniform, with an attractive, glossy appearance and good colour (Figure 10). Seeds are slightly sunken, which is characteristic of the selection. Skin and flesh firmness are good, with sensory flavour scores similar to Vibrant but with higher average Brix scores (8.7° average from EMSBC grower trials).

Figure 10. EM2464

Yield and fruit size

EM2464 gives a moderate to high Class 1 yield (comparable to Malling Centenary™ in EMSBC grower trials), with a high percentage of Class 1 fruit (96% in NIAB EMR 2016 preliminary trial). Fruit size in EMSBC trials was good, with 60% of fruit being >35 mm.

Plant characteristics

Plants have a good habit, moderate vigour and good fruit display.

Disease resistance

Preliminary tests at NIAB EMR indicate that EM2464 has intermediate resistance to Verticillium wilt (*Verticillium dahliae*) and moderate resistance to both crown rot (*Phytophthora cactorum*) and powdery mildew (*Podosphaera aphanis*).

EMR693 – An attractive Everbearer selection with excellent fruit quality

Season

EMR693 has a relatively early picking season and follows an even picking profile, similar to Murano.

Fruit

Berries of EMR693 have been highly scored for appearance, showing uniform shape and colour (Figure 11), with good skin and flesh firmness, and pleasant, often sweet flavour. Trials at St Truiden, Belgium, rated EMR693 the best for fruit quality from their everbearer trial in 2017. Retailer and visitor feedback has also been excellent, with triallists suggesting it had clear cultivar potential.

Figure 11. EMR693

Yield and fruit size

EMR693 has a good Class 1 yield, with a mean of 1 kg per plant, producing good fruit size (mean berry weight of 19 g).

Plant characteristics

Plant vigour, density and runner production are similar to Finesse.

Disease resistance

Preliminary tests at NIAB EMR indicate that EMR693 has moderate susceptibility to Verticillium wilt (*Verticillium dahliae*), but moderate resistance to both crown rot (*Phytophthora cactorum*) and powdery mildew (*Podosphaera aphanis*).

EMR704 – An early Everbearer selection with excellent fruit size

Season

EMR704 is an early everbearer, noted for an early flush of large fruit on a number of EMSBC grower sites.

Fruit

Glossy, bright fruit is produced with a good mid-red colour but it tends to have slightly raised seeds (Figure 12) and an uneven shape at the start and end of the season. Berries have been firm with shelf-life scores superior to the standard Everbearers. Flavour is pleasant and often sweet, producing a high mean Brix score of 9°. Skin and flesh firmness were judged to be good.

Figure 12. EMR704

Yield and fruit size

EMR704 was the highest yielding of the Everbearer selections in EMSBC small-scale off-site trials in 2017, with a mean Class 1 yield of 1.1 kg per plant. It had the largest fruit size (23 g mean berry weight) and a high percentage of Class 1 fruit.

Plant characteristics

Plants can be vigorous, but have an erect habit that holds the leaf canopy away from fruit trusses.

Disease resistance

Initial disease screening assessments indicate that EMR704 has intermediate resistance to Verticillium wilt (*Verticillium dahliae*), but moderate resistance to crown rot (*Phytophthora cactorum*) and powdery mildew (*Podosphaera aphanis*).

EMR721 – A productive, easy-to-pick Everbearer

Season

An early season Everbearer, with a 50% pick date seven days ahead of Finesse in NIAB EMR trials.

Fruit

EMR721 has an excellent flavour, producing moderately high average Brix scores (8.9°) from EMSBC off-site growers' trials. Fruit is judged to have a good uniform colour, with glossy appearance (Figure 13) that is retained during shelf-life tests. Many EMSBC triallists considered it to have variety potential.

Figure 13. EMR721

Yield and fruit size

EMR721 is a moderately high-yielding selection (averaging 800–900 g per plant) with a similar yield to Murano in EMSBC off-site grower trials. Fruit size is good, averaging 18.7 g per plant in EMSBC off-site grower trials and 63% >35 mm in the NIAB EMR preliminary trial. It has a good percentage of Class 1 fruit (80% in NIAB EMR preliminary trial).

Plant characteristics

Plants of EMR721 are taller and more vigorous than Finesse, but have an excellent fruit display, with berries that are easy to pick (Figure 14).

Figure 14. EMR721 berries are well displayed and easy to pick

Disease resistance

Preliminary tests at NIAB EMR indicate that EMR721 has resistance to crown rot (*Phytophthora cactorum*) and powdery mildew (*Podosphaera aphanis*) and intermediate resistance to Verticillium wilt (*Verticillium dahliae*).

EMR796 – An early, high-yielding, large-fruited Everbearer with excellent fruit quality

Season

EMR796 has a relatively early season of production but remains productive over an extended period.

Fruit

Berries are a uniform, conic shape, with a bright appearance (Figure 15) that is retained in shelf-life tests. Flavour is judged to be good, with a firm, juicy texture and an average Brix score of 9.2° (NIAB EMR preliminary trial 2018). Fruit size is excellent, with >70% of fruit being larger than 35 mm.

Figure 15. EMR796

Yield and fruit size

EMR796 is productive, with a relatively high Class 1 yield of 1.3 kg per plant in the NIAB EMR 2018 trial plot.

Plant characteristics

Plants have a good habit of moderate vigour, with well-displayed fruit on simple, long trusses that make it easy to pick (Figure 16).

Figure 16. EMR796 fruit is well displayed on long trusses

Disease resistance

Early indications suggest that EMR796 is not particularly sensitive to any of the common diseases of strawberry, and may show some useful resistance to crown rot (*Phytophthora cactorum*), although further resistance tests are awaiting completion.

Further work

The current tranche of funding for the EMSBC continues until the end of May 2023. During this period, the trialling of new selections will move from soil to protected, table-top systems. Further development of genomic tools useful to the programme will continue through allied projects.

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Other useful publications

AHDB Annual reports 2014, 2015, 2016, 2017

AHDB Grower summaries 2014, 2015, 2016, 2017

Further information

Malling™ Allure and Malling™ Champion are being commercialised by Meiosis Ltd:

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