Grower Summary

East Malling Strawberry Breeding Club

SF 096a

Final report

Project title:	East Malling Strawberry Breeding Club
Project number:	SF 96a
Project leader:	Adam Whitehouse, NIAB
Report:	Final report, May 2023
Previous report:	SF 96a Annual Report 2022
Key staff:	Adam Whitehouse David Simpson Katie Hopson Abi Johnson Andy Passey Kirsty McLeary
Location of project:	NIAB, East Malling
Industry Representative:	Debbie Wilson
Date project commenced:	1 June 2013
Date project completed **(or expected completion date):**	31 May 2023

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

Programme Leader (Plant Breeder)

NIAB

Signature  Date 31st May 2023

Katie Hopson

Specialist (Plant Breeder)

NIAB EMR

Signature  Date 31st May 2023

Report authorised by:

Signature ..... Date .....

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GROWER SUMMARY

Headline

Five selections from the East Malling Strawberry Breeding Club (EMSBC) programme were commercialised as part of this project, and were named and protected and released to the industry: ‘Malling™ Allure (EM2157), ‘Malling™ Vitality’ (EM2464), ‘Malling™ Champion’ (EMR564), ‘Malling™ Supreme’ (EMR639), ‘Malling™ Ace’ (EMR796) and are available to the UK industry.

Background

The main objective of the East Malling Strawberry Breeding Club (EMSBC) was to develop and improve strawberry varieties, both June and everbearing with increased yield, larger fruit size, 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 started in 2008 and that delivered the June-bearer variety Malling™ Centenary. AHDB continued to contribute to the EMSBC via project SF 96a. In 2017 it was agreed that AHDB would continue to remain a member of the EMSBC and continue funding the programme until Tranche 2 of the EMSBC terminated at the end of May 2023. In 2016, East Malling Research was acquired by NIAB Ltd., and identified as NIAB EMR before finally being referred to as NIAB from 2022 onwards. Therefore for the avoidance of confusion and for consistency all activities performed or managed at the East Malling site during the period of the project will be will be referred to as ‘NIAB East Malling’.

This final report summarises the outputs from this project with particular emphasis on the EMSBC trials (June-bearer maincrop and everbearer trials) that were carried out at NIAB East Malling. Details of each of the selections that have progressed to and remain in advanced trials as well as those that have been commercialised are described in detail in the Science Section.

Summary of the project and main conclusions

Between 2013 and 2023 the EMSBC programme performed 1674 crosses, assessed over 135,300 strawberry seedlings, selected and evaluated over 1,203 lines, and identified 78 advanced selections for proceeding to growers' trials. From these selections, 13 are currently being assessed or progressed to preliminary growers' trials, and three are currently being assessed in growers' large-scale trials. A further five selections: two June-bearers (EM2157 and EM2464) and three everbearers (EMR564, EMR639 and EMR796) have been commercialised, named and protected, and released to the industry: 'Malling™ Allure' (EM2157), 'Malling™ Vitality' (EM2464), 'Malling™ Champion' (EMR564), 'Malling™ Supreme' (EMR639) and 'Malling™ Ace' (EMR796). A summary table outlining the scale of the programme (2013-23) is shown below:

Process	June-bearers	Everbearers	Totals
Crosses performed	970	704	1674
Seedlings assessed	85,391	49,914	135,305
Number of selections:			
Selected from seedlings[1]	849	480	1329
Assessed in preliminary trials at NIAB[2]	860	343	1203
Progressed to growers' trials	50	28	78
Progressed to large-scale trials	3	9	12
Progressed to commercialisation	2	3	5

Descriptions of the five selections that have been commercialised between 2013 and 2023, are shown below:

- **'Malling™ Allure** (EM2157) is a late-season June-bearer, typically fruiting seven to 10 days later than 'Malling™ Centenary' and 10 to 12 days later than 'Elsanta'. Fruit quality is very similar to 'Malling™ Centenary', with Brix levels greater than Malling™ Centenary. The berries are attractive with a uniform shape and excellent firmness scores, which is reflected in good performance of berries in shelf-life tests. '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 East Malling. Observations from

growers' trials also indicate it has a longer cropping profile than 'Malling™ Centenary'. Fruit size is large, averaging 68% of berries >35 mm diameter and with a high percentage Class 1 fruit, averaging 91% in EMSBC grower trials. Plants have moderate vigour in comparison with other late-season varieties, and have an upright habit allowing berries to be displayed well and picked easily. Plants have moderate susceptibility crown rot and Verticillium wilt and show moderate resistance to powdery mildew.

- **'Malling™ Vitality'** (EM2464), is an early-mid season, short-day cultivar with a similar season to 'Malling™ Centenary'. It has a moderate to high Class 1 yield (comparable to 'Malling™ Centenary'), with a high percentage of Class 1 berries (96% in NIAB EMR 2016 preliminary trial, unpublished) and >60% of fruit grading out at >35mm diameter. Plants have moderate habit and vigour (similar to 'Elsanta') and excellent fruit display with berries held on long peduncles, allowing for rapid harvesting. Disease resistance Preliminary tests at NIAB East Malling indicate intermediate resistance to Verticillium wilt, and moderate resistance to both crown rot and powdery mildew.

- **'Malling™ Champion'** (EMR564), is an early season everbearer, which produces its peak harvest in July in the UK. Berries are attractive with a regular conic shape and pleasant flavour, with firm skin and flesh and excellent storage in shelf life tests. 'Malling™ Champion' has very good yield potential, averaging over 900 grams per plant in EMSBC growers' trials. Berries can be large, averaging 24 g in EMSBC growers trials, with 62% measuring >35 mm, although berry size has been noted to go smaller under very warm conditions. The percentage of Class 1 berries produced averaged 88% in EMSBC grower trials. Plants are compact with low vigour, and berries are presented on long trusses offering easy harvesting. Tests at NIAB EMR indicate plants are resistant to crown rot and Verticillium wilt and show moderate resistance to powdery mildew

- **'Malling™ Supreme'** (EMR639), is an everbearer that has shown a similar fruiting season to 'Finesse' and 'Murano' in NIAB East Malling trials. Berries are glossy and attractive, with a regular globose-conic shape, and sweet, pleasant flavour, with a mean Brix score of 9.2º in EMSBC grower trials. Yield and berry size are moderate to high with a mean high Class 1 yield of 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 East Malling preliminary trials. Plants have moderate vigour with characteristic large leaves. Based on preliminary tests at NIAB East Malling,

‘Malling™ Supreme’ shows resistance to crown rot and powdery mildew, and moderate resistance to Verticillium wilt.

- **‘Malling™ Ace’** (EMR796), is a high-yielding everbearer (>10kg Class 1 fruit (>25mm) per linear metre, Delphy Agronomic Trials 2020, unpublished).. Fruit quality is very similar to the June-bearer cultivar ‘Malling™ Centenary’ with large fruit size (>70% >35mm) and excellent eating quality. Preliminary tests carried out at NIAB EMR indicate it has resistance crown rot but susceptibility to powdery mildew.

All of the above varieties are being commercialised and managed by Malling™ Fruits Ltd. Technical sheets, grower guidelines and lists of licensed propagators can be found by visiting the Malling™ Fruits website (mallingfruits.com).

Three advanced selections showed potential in both the NIAB East Malling and preliminary growers’ trials between 2013 and 2022 and progressed to large-scale growers’ trials where their commercial potential was assessed, three of these remain in trial and will be assessed between 2023 and 2024, to ascertain their commercialisation potential. Descriptions of these three selections is shown below:

- **EM2723** is a mid-late season June-bearer selection. It has a good yield, high percentage Class 1 fruit, attractive and sweet-tasting fruit. It is being reassessed in large-scale growers’ trials in 2023/24**.**
- **EMR794** is a high-yielding, large-fruit sized everbearer that has June-bearer-like fruit quality. It has a good yield, high percentage of Class 1 fruit of excellent appearance. It will be reassessed in large-scale growers’ trials in 2023.
- **EMR863** is an early high-yielding everbearer, with good fruit size and excellent flavour, with a season about 4 days later than ‘Elsanta’. It has very attractive, glossy berries with a regular shape, good colour and pleasant flavour. It will be reassessed in large-scale growers’ trials in 2023.

In addition, 14 new selections that were identified between 2013 and 2022 are currently being tested or progressing to preliminary growers’ trials for assessment between 2023 and 2025.

Financial benefits

- Improved fruit size and fruit display combined with low percentage waste, as produced by ‘Malling™ Allure’ and ‘Malling™ Ace’, will lead to reduced picking costs.
- Improved fruit quality traits (flavour, appearance, shelf life) will increase the marketability of fruit due to widespread acceptance and approval by retailers and customers.

- Extension of the growing season using early and late season, and everbearer varieties such as 'Malling™ Vitality' (early-mid June bearer), Malling™ Allure' (late June bearer) , 'Malling™ Champion' (early everbearer) and 'Malling™ Ace' (main season everbearer), will allow growers to produce fruit economically during periods when demand is high.
- Excellent disease resistance, as demonstrated by 'Malling™ Vitality' and 'Malling™ Champion' and Malling™ Supreme', allows production with reduced pesticide applications.
- UK propagators will benefit through the opportunity to produce plants of these cultivars to satisfy demand from the UK and overseas.

Action points for growers

- 'Malling™ Allure' offers a late season June-bearing cultivar that has a high percentage of Class 1 fruit, combined with excellent fruit quality, with consistently sweet flavour.
- 'Malling™ Vitality' offers an early-mid season variety where disease resistance is paramount. It offers a well-displayed yield of glossy, uniform fruit.
- 'Malling™ Champion' is an early, generative everbearer that produces firm, unform-shaped berries that have excellent shelf-life. It also has excellent disease resistance, and provides fast picking from a compact plant, with fruit on well-displayed trusses.
- 'Malling™ Supreme' produces consistently sweet berries, with a moderate-high yield and excellent disease resistance.
- 'Malling™ Ace' is the latest everbearer variety to be released from the EMSBC programme. It has excellent yield potential, with large-fruit size and June-bearer like fruit quality. It is known to be susceptible to powdery mildew, but advice on prevention and control with this variety can be found on the mallingfruits.com website.
- All of the released varieties above are being commercialised by Malling™ Fruits Ltd on behalf of the EMSBC. Technical information, grower guidelines and list of licenced propagators can be found on the Malling™ Fruits website: mallingfruits.com
- ADHB-levy payers had the opportunity to sample and discuss advanced selections and released varieties from the EMSBC programme at annual AHDB-organised growers' walk at NIAB East Malling, Kent in June of each year of the project.