



Malling[™]
Ace GROWER
GUIDELINES



A very high yielding everbearer



Alin Borleanu
 Technical Development Officer
alin.borleanu@niab.com

Welcome to the first in a new series of grower guidelines being developed by Malling™ Fruits for growers and propagators, helping you get the very best from our varieties.

Launched at Fruit Focus in July 2021, everbearing Malling™ Ace has exceptional fruit quality, matching that of the best June-bearer varieties, and is proving to be the variety of choice for those wishing to adopt that growing system. There is clearly a remarkable level of interest in Malling™ Ace. As more growers experience this great new variety, we will doubtless see that interest continue to rise.

Malling™ Fruits may be new in the marketplace, but the Malling name is well-recognised in the global soft-fruit industry - both for research and commercial plant breeding. Now part of the crop research organisation NIAB, strawberry breeding first began at East Malling in Kent in 1983 for commercial and amateur markets and we have since launched more than 45 varieties of soft fruit with sales exceeding 400 million plants. Using a combination of traditional techniques and genomics-assisted breeding NIAB supports the efficient development of disease resistant, high quality varieties ensuring improved yield, fruit size and quality, lower fruit wastage, easier picking and season extension.



Malling™ Fruits is our marketing brand, working with industry consortia across the world to breed, develop and commercialise soft fruit varieties, including the phenomenally successful strawberry Malling™ Centenary and raspberries Malling™ Bella and Malling™ Charm.

In the meantime I hope that our guidelines will provide essential reading and top tips to maximise production and I look forward to meeting you at trade events and open days across the season.

CONTENTS

Summary	3
Propagation phase	4
Mini-tray plants	4
Cultivation phase.....	5
Table-top substrate cultivation	5
Fertilisation for substrate cultivation	7
Soil cultivation	8
Disease control	9
Fruit quality and shelf-life	11
Retailer acceptance and feedback	12
Acknowledgements	12

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SUMMARY

Malling™ Ace is a very high yielding everbearer, launched at Fruit Focus in July 2021. It was bred and selected at NIAB as part of the East Malling Strawberry Breeding Club programme.

Fruit quality

Malling™ Ace has a sweet, juicy flavour and high average Brix of 9.2°. It is very uniform in shape with conic berries and excellent fruit size. Fruit weight is maintained throughout the whole season.

Growth habit

This variety has compact plants, with long flower trusses that give excellent fruit display and make picking very easy. Fast picking speeds of up to 40 kg/hour can be achieved in table-top systems. Early trials data suggests that the variety works well in lower density plantings of 5-6 plants/m.

Production period

Malling™ Ace starts producing fruit in May from the first spring-initiated flowers, followed by peak production in August. It is a very high yielding variety with yields of up to 1.9 kg/plant of Class 1 fruit when planted at the recommended density of 5-6 plants/m.

Disease resistance

Preliminary tests indicate Malling™ Ace has resistance to crown rot (*Phytophthora cactorum*) but with some susceptibility to powdery mildew (*Phodosphaera aphanis*). It is important that a robust powdery mildew control strategy is followed shortly after planting.



Very high-yielding everbearer

Exceptional fruit quality

Great fruit size, firm, sweet and juicy

Well-presented fruits for fast picking



PROPAGATION PHASE

With every new variety, knowledge is needed to realise the most stable pattern of production in order to deliver high quality fruit for the entire production period.

Mini-tray plants

For optimising plant production, a good understanding of the influence of different plant types on production patterns and potential is essential. Beginning in 2019, Malling™ Fruits Ltd. commissioned work with Delphy BV (Netherlands) to examine aspects of plant propagation for Malling™ Ace. This has started on mini-tray plants (the predominant everbearer plant type used currently in UK production) and looking at nitrogen (N) on the tray field, as follows:

- Light (low) N input fertilisation scheme (124 kg N/ha)
- Heavy (high) N input fertilisation scheme (184 kg N/ha)

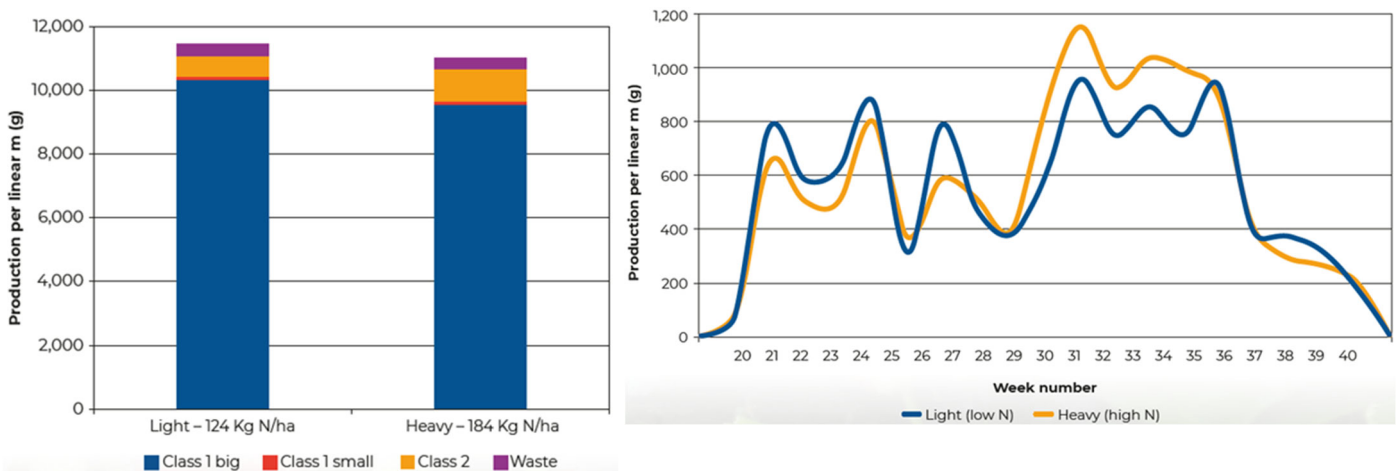
Figure 1: (source: Delphy BV)



In the tray field, it was observed that Malling™ Ace:

- had almost no pre-flowering and very good roots;
- the flower mapping showed a higher number of positions in the heavy N plants, which can give opportunity for runners, side crowns, buds, and trusses;
- there were no plant losses.

Figure 2: Fruit production from Malling™ Ace mini-tray plants propagated at different nitrogen regimes in 2020 (table-top production, 6 plants/m) (source: Delphy BV)



CULTIVATION PHASE

Table-top substrate cultivation

Malling™ Ace is an excellent variety for substrate table-top production, it has very high yields, with well displayed fruit which maintains its size throughout the season. The variety has a compact plant habit, with long trusses and erect leaves which provides for fast picking; speeds of up to 45 kg/hour can easily be achieved.

Figure 3: Protected cultivation on table-top - yield and grading kg/m² (Source PCH, planting date: 31 March 2021, 6 plants/m, mini-tray plants)

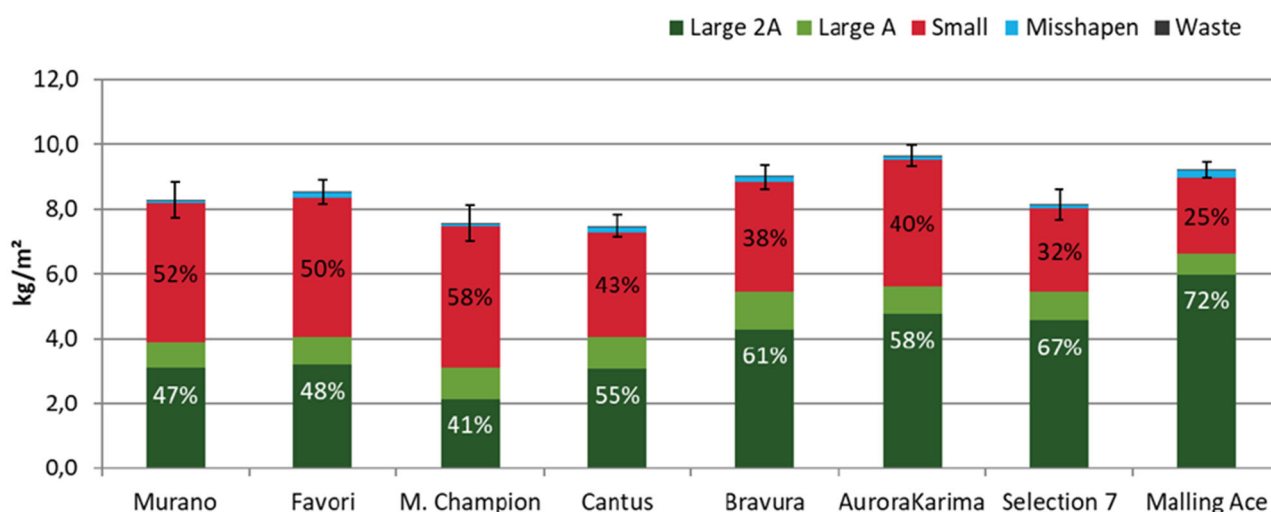
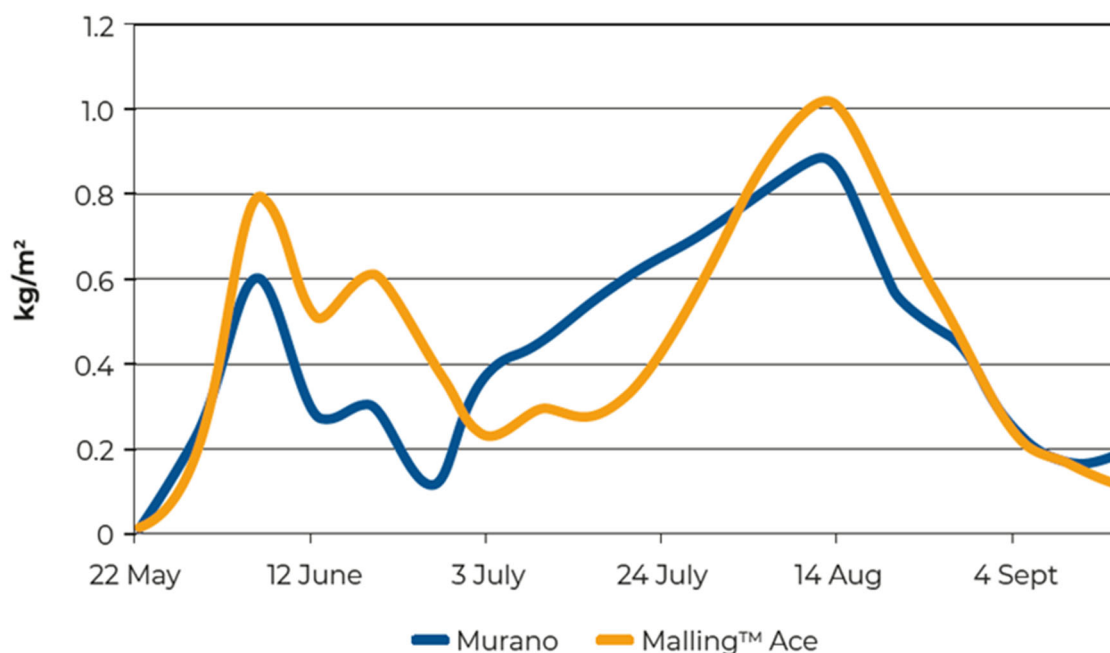


Figure 4: Protected cultivation on table-top - production pattern (Source PCH, planting date: 31 March 2021, 6 plants/m, mini-tray plants)



CULTIVATION PHASE

Malling™ Ace seems to benefit from a low planting density; good results have been obtained with densities of 5-6 plants/m.

Figure 5 - Protected cultivation on table-top (2020, various UK growers)

Trial location	Plant type	Planting density (plants/m)	Total yield (kg/plant)	Class 1 yield (kg/plant)	Class 1 %	Class 1 yield (kg/m)	Mean berry weight (g)
1	130cc	5	1.7	1.6	93	7.8	27.2
1	250cc	5	1.7	1.6	92	7.9	24.6
2	250cc	8	1.2	1.2	98	9.7	27.5
2	90cc	8	1.2	1.2	97	9.2	30.7

In 2020 at Delphy’s Berry Plaza in The Netherlands, Malling™ Ace had a yield in the region of 1.9 kg/plant. This is a “super high production” 0.5 kg/plant higher than the standard Berry Plaza everbearer, which had an average production of 1.4 kg/plant. The fruit was of very good quality even during the warmest weeks, keeping a consistent fruit size throughout the season.

Figure 6: Protected cultivation on table-top - average sorting grams/m (Source Delphy, NL, planting date: 16 March 2020, 6 plants/m, mini-tray plants)

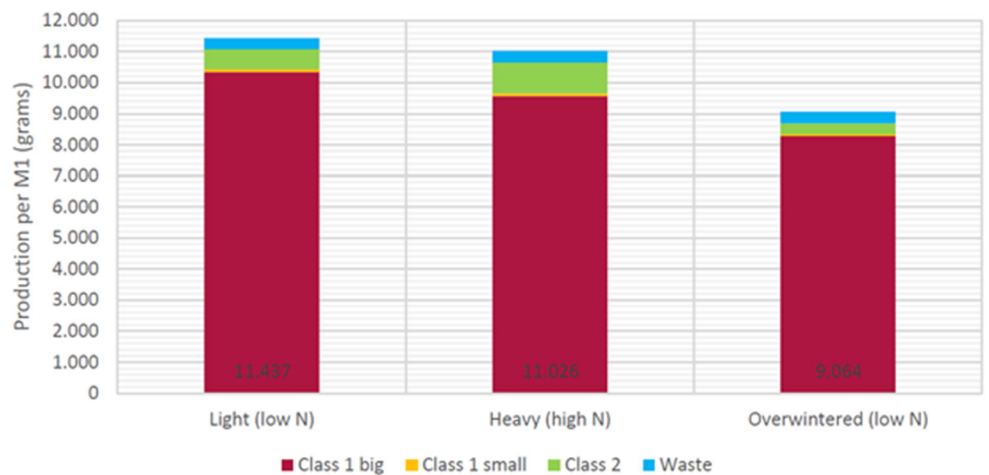
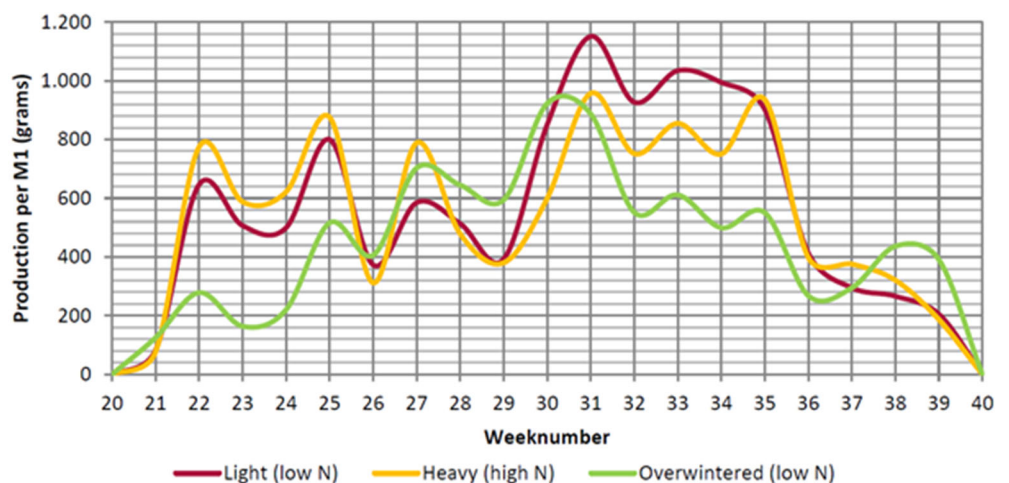


Figure 7: Protected cultivation on table-top - production pattern (Source Delphy, NL, planting date: 16 March 2020, 6 plants/m, mini-tray plants)



CULTIVATION PHASE

Fertilisation for substrate cultivation

Every variety is different in terms of nutritional requirements; by understanding these requirements and adjusting fertiliser accordingly this improves growth, quality, and yields. Correct management of nutrition, and the availability of it, will ensure the production of a top-quality berry.

During its early trials no special nutritional requirements have been identified for Malling™ Ace.

Over irrigation, especially during hot spells, should be avoided as this has been seen to affect the fruit quality by causing soft skin and a watery texture. Further work will be completed at NIAB in 2022 to investigate irrigation set points for this variety.

Whilst conducting trials for Malling™ Ace, Delphy BV have been following this protocol: Starting with an EC sum (drip+drain) of 2.0-2.2 mS/cm, adjusting that to 2.2-2.4 mS/cm when flowering, increasing it further when fruiting to 2.4-2.6, and 2.6-2.8 mS/cm at peak plant load with the second flush.

In trials so far, the nutrient balance during cultivation was very good. Plant sap analysis has shown that Sulphur can be a bit on the high end and nitrogen at the lower end. But knowing that Malling™ Ace is more susceptible to mildew this is not something to act on. The potassium is really important with Malling™ Ace as the fruit are big and they need potassium to fill, increase K^+ according to fruit load and in relation to Ca^{++} .

Regular and scheduled analysis of base water, feed inputs, run off and substrate will ensure correct and accurate nutrition is applied to crops. Figure 8 and 9 can be used as a basic guide to ensure provision of adequate and efficient application of the correct nutrition for crops.

More trials and observations are needed to fully understand this variety.

Figure 8: Basic scheme for vegetative feed (Source Berry Gardens Ltd)

NH4 ⁺	NO3 ⁻	P	SO4	K ⁺	Ca ⁺⁺	Mg ⁺⁺	Fe	Mn	Zn	B	Cu	Mo
	12	1,3	1,5	4.5	4.5	2	0.055	33	11	15	0,75	0,5
	Mmol	Mmol	Mmol	Mmol	Mmol	Mmol	Mmol	Umol	Umol	Umol	Umol	Umol
	168	40	48	175	180	48	3.07	2.5	0.72	0.165	0.1	0.05
	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l

Figure 9: Basic scheme for fruiting feed (Source Berry Gardens Ltd)

NH4 ⁺	NO3 ⁻	P	SO4	K ⁺	Ca ⁺⁺	Mg ⁺⁺	Fe	Mn	Zn	B	Cu	Mo
	11	1,0	1,5	6.5	4	1,65	0.05	26	11	15	0,75	0,5
	Mmol	Mmol	Mmol	Mmol	Mmol	Mmol	Mmol	Umol	Umol	Umol	Umol	Umol
	154	38.5	48	254	160	40	2.8	1.43	0.72	0.165	0.05	0.05
	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l	Mg/l



CULTIVATION PHASE

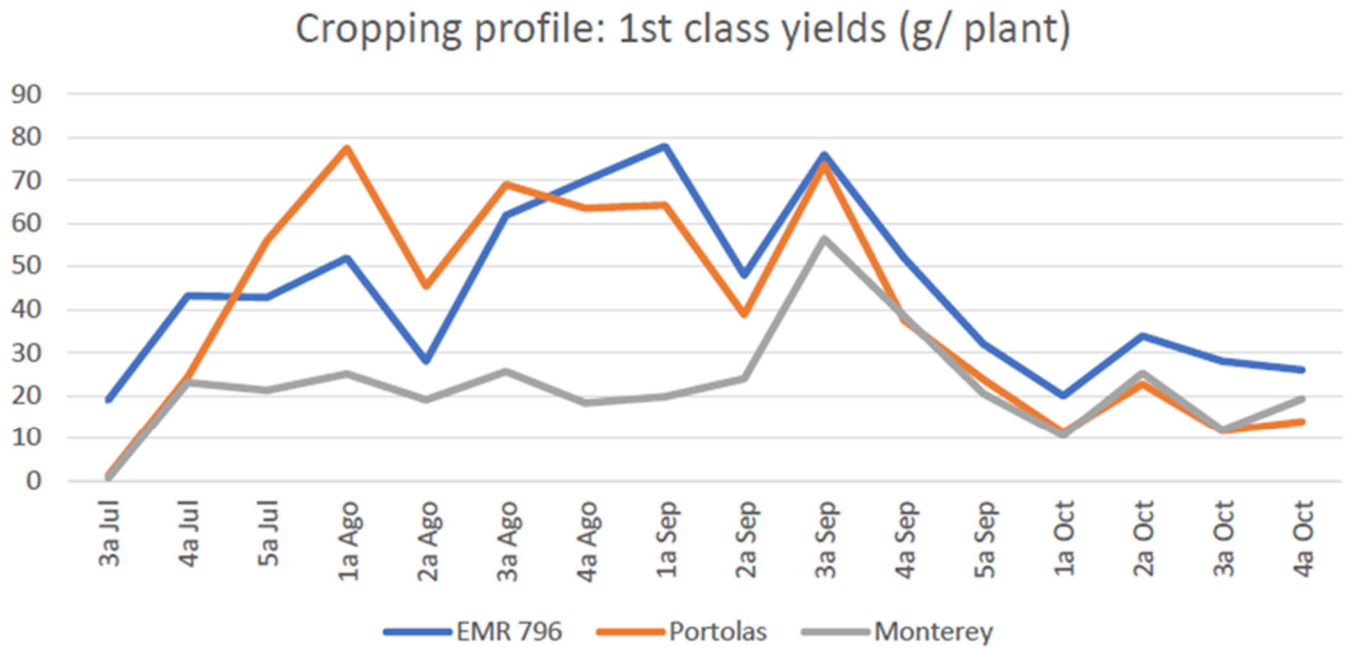
Soil cultivation

Malling™ Ace performs very well in soil production as well as substrate. The variety is high yielding, with a good percentage of Class 1 fruit and good fruit weight. Fruit is attractive, very glossy, with a consistent Brix and a long shelf life of up to seven days.

Figure 10: Yield and quality data (Source El Pinar ESP, planting date 6 May 2020, 10 plants/m, mini-tray plants)

Variety	Total yield (g/plant)	Class 1 yield (g/plant)	Class 1 (%)	Mean berry weight (g)	Skin colour	Skin Firmness	Flavor	Mean Brix
Malling™ Ace	852.5	710.9	83.4	17.3	4	6.5	3.2	8.3
Portola	892.8	649.3	72.7	17.05	4	7	2.3	6.2

Figure 11: Production pattern (Source El Pinar ESP, planting date 6 May 2020, 10 plants/m, mini-tray plants)



CULTIVATION PHASE

Disease control

Preliminary tests indicate that Malling™ Ace has resistance to crown rot (*Phytophthora cactorum*).

However, early trials data have suggested that Malling™ Ace has some susceptibility to powdery mildew (*Phodosphaera aphanis*) and it can be difficult to spot early on as this is manifesting firstly on the newly formed fruit, and later on leaves and runners. Once infection is established the problem can escalate quickly therefore the advice is to start powdery mildew

control early in the season as soon as plants establish and follow a robust control programme.

Large scale trials with growers (2020-2021) have shown that a standard spraying programme applied weekly can significantly reduce the risk of powdery mildew. In the two years of trialing with growers, the number of sites with serious powdery mildew has decreased substantially. In 2021, despite the powdery mildew pressure which was very high, two-thirds of the farms had none or light powdery mildew.

Figure 12: Powdery mildew representation in growers trials 2020 (18 sites)

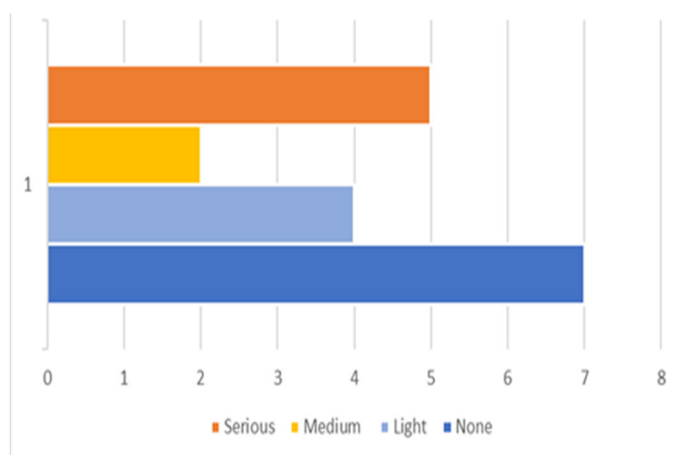
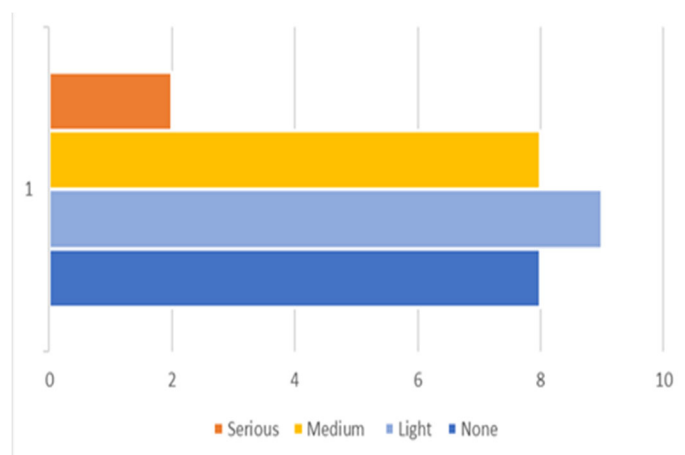
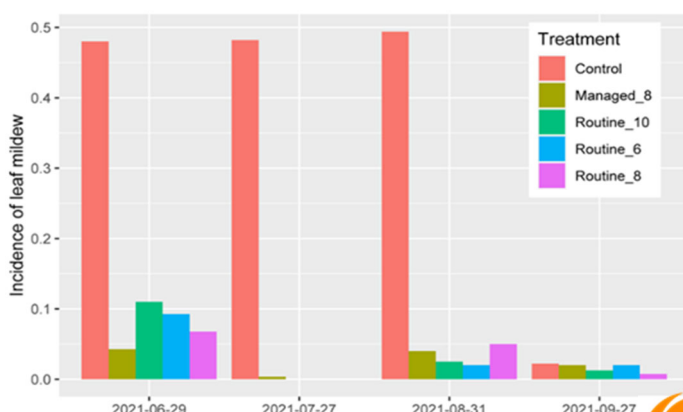


Figure 13: Powdery mildew representation in growers trials 2021 (27 sites)



Trials at NIAB in 2021 have shown that a managed programme with more biocontrol input (10 rounds of fungicides + 8 rounds of bio-fungicides) also managed mildew as effectively as the seven-day routine programme (17 rounds of fungicides + 3 rounds of bio-fungicides). In the managed programme, decision for spraying and the product to be used is primarily based on assessing the current level of mildew on leaves and fruit, with additional information on diseased risks and forecast weather conditions.

Figure 14: managing powdery mildew on everbearer Malling™ Ace - incidence of leaves with mildew (table-top, tunnelled production NIAB, 2021)



CULTIVATION PHASE

Delphy BV have also reported good results at managing powdery mildew by following a weekly spraying programme, alternating every week between a conventional fungicide and a bio-fungicide.

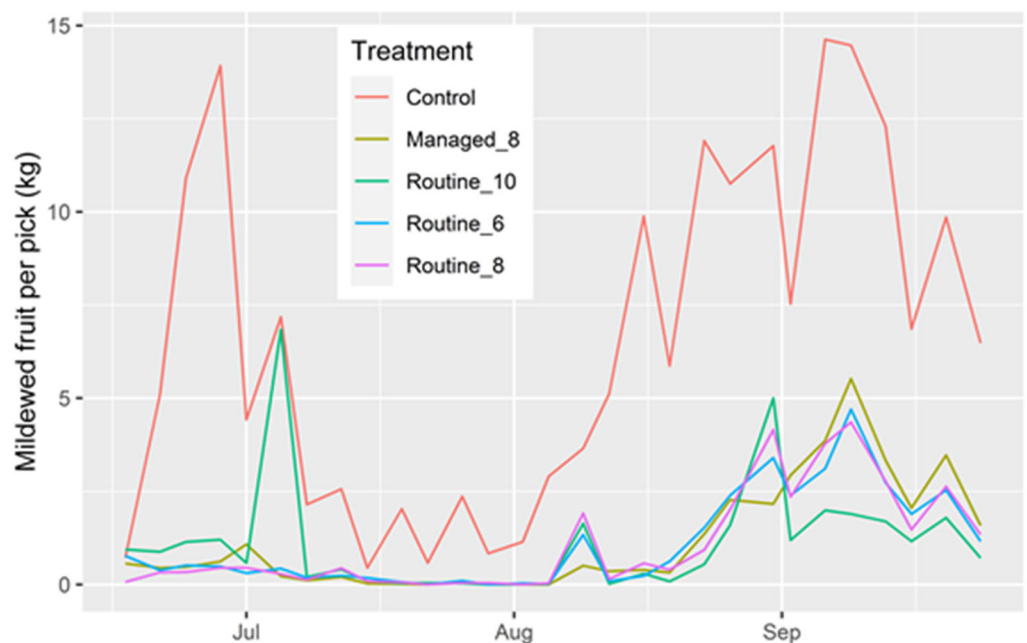
Some early data is suggesting that the newly introduced UVC treatments may have a useful role to play in controlling powdery mildew on Malling™ Ace. UVC treatments are applied with the help of an autonomous robot, routinely overnight at 3-4 day interval.

To ensure best results with Malling™ Ace, a “good farming practice” should always be followed, including:

- managing canopy - remove the big old leaves first, normally three times during the season x2leaves per plant each time. Start early;
- consider lower density planting (5-6 plants/ m)
- strict hygiene - start clean, stay clean;
- avoid over application of nitrogen. Once harvesting use liquid calcium (e.g. Omex, Calmax), this has lower levels of nitrogen compared to calcium nitrate;

- add silicon to fertigation programme (1.5 l/ 1,000 l in the stock tank B); www.engageagroeuropa.com/new-advances-silicon-silicon-technology/
- keep grass below table tops mown tight;
- mow every 10 days depending on growth;
- manage climate and vent away from the direction of wind (encourage positive airflow upwards). Mildew can be carried by airflow; it is important to make sure ventilation does not travel across the crop;
- pick clean and remove diseased fruit as soon as they are seen;
- spraying weekly and start early in the season
- rotating chemical modes of action (follow FRAC’s guidelines - see FRAC CODE www.frac.info/docs/default-source/publications/frac-code-list/frac-code-list-2021--final.pdf?sfvrsn=f7ec499a_2);
- frequent spray application checks and operator training ;
- pH test the spray water and correct accordingly;
- spray quality - long trusses position the fruit away from the canopy, spray configurations providing enough coverage and penetration to the fruits and trusses are needed.

Figure 15: Managing powdery mildew on everbearer Malling™ Ace - total weight of mildewed fruit (kg) per plot (table-top, tunnelled production NIAB, 2021)



FRUIT QUALITY AND SHELF LIFE

Malling™ Ace has all the high-quality fruit attributes of Malling™ Centenary in everbearer form, providing a prolonged season. Fruit quality is consistent throughout the season, with high Class 1 yields and large fruit size. It has a sweet, juicy flavour and a high average Brix of 9.2°.

Within quality screening trials held at PCH (Belgium) in 2020, Malling™ Ace has scored highest of the varieties assessed (Figure 16). Malling™ Ace performed very well in shelf-life assessments, maintaining its freshness for an extended period after picking (Figure 17).

Figure 16: Quality assessments of Malling™ Ace (source PCH, Belgium)

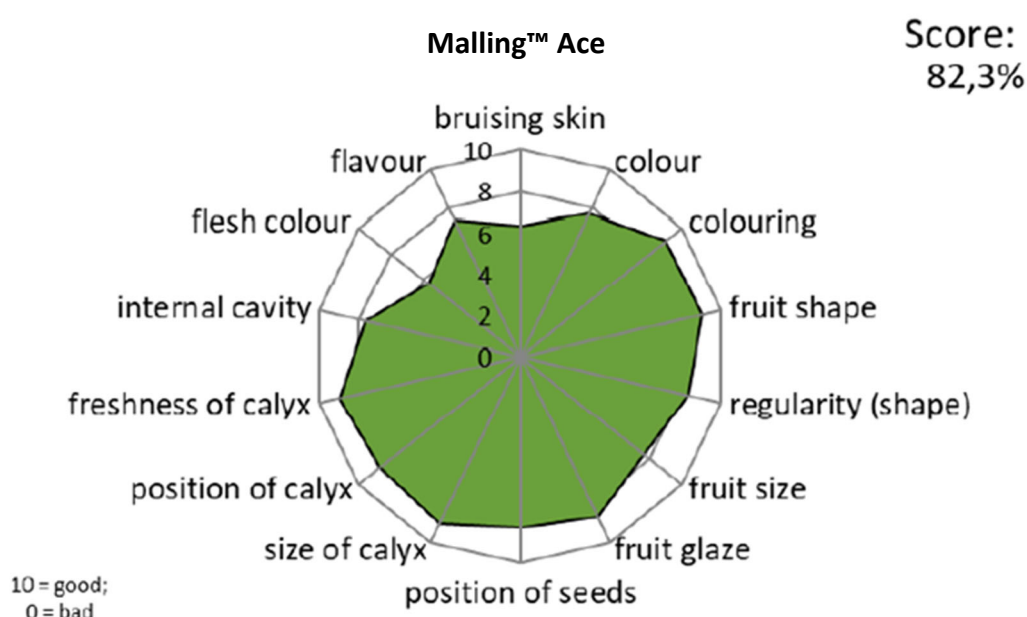
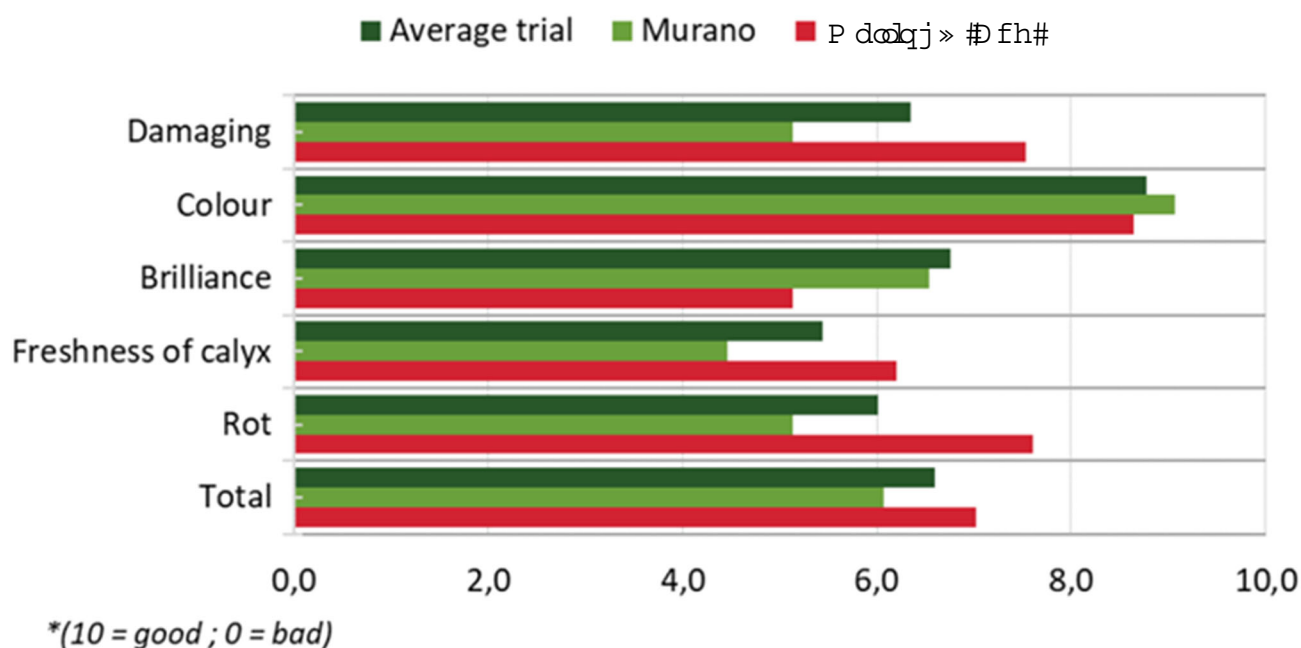


Figure 17: Shelf life assessment of Malling™ Ace (source PCH, Belgium)



RETAILER ACCEPTANCE AND FEEDBACK

In the UK, Malling™ Ace has been received with excitement, with most of the big retailers being keen on the new variety. Fruit has been sampled to them throughout 2020/2021 and the feedback has been positive (Figure 18).

In continental Europe Malling™ Ace has also seen some keen interest from different retailers in various countries and sampling and retail engagement will continue in 2022.

Figure 18: Retailers acceptance of Malling™ Ace (source Berry Gardens Ltd, January 2022)

Variety	M&S	Tesco	Waitrose	Sainsbury's	ASDA	Morrisons	Aldi	Lidl	Iceland
Malling™ Ace	Preferred core	TBC - Core	Development	Standard	Development	No	Development	Standard	No

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- Hugh Lowe Farms (UK) – Tom Pearson
- Jeremy Darby (UK)

Malling™ Fruits, New Road, East Malling, ME19 6BJ | Phone +44 (0) 1732 843833
 Email licensing@mallingsfruits.com | Web mallingsfruits.com | Twitter [@mallingsfruits](https://twitter.com/mallingsfruits)

