



Grower Summary

The Bedding and Pot Plant Centre – new product opportunities for bedding and pot plant growers.

Objective 4. Adopting new responsibly sourced growing media blends

PO 019d

Final report

Project title: The Bedding and Pot Plant Centre – new product opportunities for bedding and pot plant growers.

Objective 4. Adopting new responsibly sourced growing media blends

Project number: PO 019d

Project leader: Dr Jill England, ADAS Boxworth

Report: Annual report, 31 March 2023

Previous report: None

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(or expected completion date):

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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.

Katie Kenney

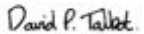
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Grower Summary

Headline

- Commercial quality plug plants were successfully produced in a range of peat-free growing media
- Marketable plants were successfully produced in hanging baskets in peat-free growing media.
- Peat-free growing media tended to exhibit higher conductivities (EC) and these may have to be accounted for in fertigation regimes
- pH tended to be higher in the peat-free mixes than targets for traditional peat-based mixes (5.5 – 6.0); this can affect plant quality as nutrients become unavailable to plants

Background

The Bedding and Pot Plant Centre (BPPC) has been established to address the needs of the industry via a programme of work to trial and demonstrate new product opportunities and practical solutions to problems encountered on nurseries.

In 2011, Defra introduced a voluntary phase-out target for peat use of 2030 for professional growers of fruit, vegetables and ornamental plants. In August 2022, Defra announced plans to ban the use of peat in the amateur sector in England and Wales by 2024. Defra more recently announced a ban of peat use in the professional sector, with certain exemptions by 2026, followed by a [complete ban on the use of peat in horticulture by 2026](#) (other than non time limited conservation exemptions). The reduction of peat use in horticulture is expected to be achieved by using a blended range of materials rather than relying solely on one or two main ingredients, not least due to availability of alternative materials.

Where proprietary peat-free growing media blends have been used with some success on nurseries, the need to optimise irrigation, nutrition and mechanisation have been highlighted as areas where further support is required by the industry to get the best out of those blends and increase grower confidence.

This report covers the two final demonstration trials for this objective, both of which were hosted by Arden Lea Nurseries in 2022. These trials charted the production of a range of bedding plants from: **1. Propagation phase** to **2. Production phase** and marketing in hanging baskets; seed-raised subjects underwent an interim stage where they were

transplanted into coir-filled packs to bulk them up prior to transplant into hanging baskets. These trials were not replicated, therefore statistical analysis has not been completed.

This is the Bedding and Pot Plant Centre report for:

Objective 4. Adopting new responsibly sourced growing media blends. It reports trials carried out at Arden Lea Nurseries for both propagation and production stages.

Summary

The propagation phase trial was set up at Arden Lea Nurseries, Preston on 19 May 2022 (week 21). Seeds of four plant species (*Dianthus*, *Marigold*, *Petunia* and *Verbena*), and cuttings of three plant species (*Bidens*, *Nemesia* and *Petunia*) were sown / stuck into four propagation phase peat-free substrates provided by different manufacturers plus the Nursery Standard propagation media (which contained a small proportion of peat) and grown on under glass from 23 May 2022 (**Figure 1**) until the final assessment on 7 June 2022. Tray sizes were 360 plugs (*Dianthus*, *Marigold*, *Petunia* and *Verbena*), and 50 plugs (*Bidens*, *Nemesia* and *Petunia*). Seeds were machine-sown, and cuttings were stuck by hand. Benches were open mesh and the irrigation and feeding regime followed Arden Lea's standard practice, with irrigation applied via boom and lance and no adjustment to nutrition.



Figure 1. Growing media trial: propagation phase (left) and production phase (right)

For the production phase trial, cutting-raised subjects were transplanted into hanging baskets on 13 July. The seed raised subjects underwent an interim stage where they were transplanted into coir-filled packs to bulk them up prior to transplant into hanging baskets. Plants that had been produced in the propagation phase of this trial were used in this production phase. Five plants per species were transplanted into 25 cm hanging baskets for

all seven species, into nine different growing media combinations (**Figure 1**). Plants were transplanted into production phase growing media from the same manufacturer, and also into the Nursery Standard production media and grown on under glass. The irrigation and feeding regime followed Arden Lea's standard practice. Irrigation was via boom and lance.

Propagation phase outcomes

- For the cutting-raised plugs, the root quality assessment on 7 June indicated that the plugs crumbled when removed from the plug tray. However, the grower reported that the plugs held together well when transplanted in mid-July; suggesting the initial issue was linked to root development rather than plug integrity.
- The cutting-raised *Petunia* in Treatments C and D remained under mist for 4 days longer than other species / treatments before weaning.
- The high EC may have contributed to delayed rooting / low plant quality scores recorded for the cutting-raised *Petunia* in Treatments C and D. *Nemesia* had low root quality scores at the 7 June assessment, but scores improved by the July assessment.
- Results were mixed. Seed-raised plugs performed well in the Nursery Standard and Treatment A, and were all marketable (plant quality scores 3.8 to 4.8). *Dianthus* and *Petunia* performed less well in Treatment C (plant quality <3.0) and were not marketable. *Verbena*, Marigold and *Dianthus* performed less well in Treatment B for root quality <3.0, while plant quality scores ranged between 3.5 and 3.7 (marketable).

Nutrient analysis:

- Nutrient analysis indicated that Treatments C and D both had high EC (641 uS/cm and 667 uS/cm respectively). Cl and SO₄, and particularly K, contributed to the high EC. A substrate EC below 200 µS/cm is usually recommended for seedlings, above this root damage can be caused, depending on species sensitivity.
- Available N (Nitrate-N and Ammonium-N) measurements were low in Treatment B and may be linked to poor performance for some subjects.

Production phase outcomes

- The best plant quality was seen in cutting-raised *Petunia* (scores of 5.0 in Treatments B+NS and C+NS), and seed-raised *Petunia* (scores of 5.0 in six out of nine treatments).
- Root quality was poorer in the production phase than the 6 July propagation phase assessment, particularly for cutting-raised subjects (plants were transplanted 11 and 12 days prior to the final assessment).
- Rooting was generally poorest in Treatments D and D+NS

- Production in manufacturer submitted materials followed by the Nursery Standard (i.e. Treatments A+NS, B+NS, C+NS and D+NS) did not consistently improve plant performance.

Growing media outcomes (propagation and production phases):

- There were no difficulties sowing seeds or sticking cuttings in any of the supplier mixes
- All species remained intact during transplant
- There were no issues reported with the various growing media during production
- There was a lot of weed seed in the Treatment D propagation media

Nutrient analysis:

- EC was again high for some substrates used in the production phase. A high level of K, one of the contributors to this, is often associated with coir. Cl and SO₄ also contributed to the high EC, and a particularly high level of SO₄ was measured in Treatment D. Low root quality was seen generally seen in plants produced in Treatment D and D+NA, with the lowest root quality score recorded for the cutting-raised *Petunia* (score 1.1).
- Nitrogen (ammonium-N and nitrate-N) and Mg levels were low in Treatment A but this does not appear to have overly affected plant quality scores.
- The pH of the treatment growing media mixes were higher than is usually maintained in peat-based media; nutrients, such as Mn, P and Fe can become unavailable as pH increases, and this may have contributed to some of the symptoms seen.
- There are physical benefits of using alternative substrates to peat. Materials such as bark can provide a greater buffering effect which can help to protect plants against high salt levels
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Conclusions (2021 and 2022 trials)

This series of trials demonstrated that propagating and growing on pot plants and pot and bedding plants in peat free mixes is possible with appropriate adaptations in management; these include consideration of the below factors:

- Irrigation system and growing media characteristics are important as observed by growers evaluating one of three of the peat-free mixes trialled in an ebb and flood system in the 2021 pot plant trial, which had poorer draining properties that impacted root development.
- The source of growing media materials (e.g. manufacturer) and the way they are produced (e.g. size, how fibrous the final product is) can cause growing media to

perform differently, particularly in terms of water holding capacity and therefore water management requirements. It is good practice to trial new mixes before widespread use.

- The EC of the peat-free mixes used in the trial tended to be higher than we would expect to see in peat-based growing media. Elevated EC can cause root damage to young plants and more sensitive species. Care should be taken when growing sensitive species such as *Antirrhinum*, *Primula*, *Begonia Rex* and Poinsettia. Materials such as composted bark and green compost (more commonly used in retail growing media) offer a greater buffering capacity than peat which can reduce the impact of higher EC.
- In mixes where pH is higher than normal, this may lead to nutrients (e.g. iron) becoming unavailable, particularly to sensitive species such as *Calibrachoa*.
- Growers should work with their growing media manufacturer to ensure that the specification of the growing media supplied, in terms of structure and nutrition (EC and pH), is suitable for their production system and the crop(s) being produced.

Financial benefits

- A comparison of a sample of growing media products (Fargro, <https://fargro.co.uk/>) indicates that 100% peat growing media (11p/L) is usually offered at a lower price than peat-reduced (9-18% difference) and peat-free (18-73% difference). Peat has historically been the lowest cost substrate, but the price has increased in recent years because of availability and sourcing issues, and this is narrowing the price gap between peat and peat-free media.
- There are other cost implications in transitioning away from peat use. These costs include in-house trials of new substrate and blends (including nutrition / irrigation management), and new machinery (e.g. pot fillers, coir shredders) may be required.