



Grower Summary

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

PO 19d

Annual report 2022

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 019

Project leader: Dr Jill England, ADAS Boxworth

Report: Annual report, 31 March 2022

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.

Thomas James

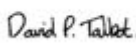
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Grower Summary

Headline

- Marketable pot plants were successfully produced in peat-free growing media within an ebb and flood system
- Commercial quality plug plants were successfully produced in peat free growing media albeit there were differing responses to the various media in the species trialled
- Peat-free growing media blends tested exhibit different water holding properties; water management should be adjusted to produce conditions suitable for the plant species being grown, grouping plants with similar requirements.
- Peat free growing media also tend to exhibit higher conductivities (EC) and these may have to be accounted for in fertigation regimes

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 of 2030 for professional growers of fruit, vegetables and ornamental plants. In December 2021, Defra announced plans to ban the use of peat in the amateur sector in England and Wales by the end of this Parliament and has been consulting on the phasing out of peat in the professional sector by 2028. 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. The trial reported below is one out of a series of demonstration trials carried out at various grower sites over two years.

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 1. Hills Plants (Pot Plants) and 2. Earley Ornamentals (Propagation).

Summary

1. Hills Plants (Pot Plants)

Plugs of two pot plant species (*Calathea roseopicta* 'Silvia' and *Ficus benjamina* 'Exotica') were potted on 29 September 2021 (week 39) into three proprietary peat-free substrates provided by different manufacturers, and a peat-based growing media (13 cm pots) and grown on under glass at Hills Plants, Runcton until the final assessment on 19 January 2022 (**Figure 1**). *Calathea* and *Ficus* were selected for this trial because *Calathea* don't like to be too dry on capillary matting, and *Ficus* tends to show nutritional problems easily. Plants were potted by hand and set out on benches irrigated via ebb and flood irrigation. The irrigation and feeding regime followed standard commercial practice, with any effects on plant quality recorded. Nursery standard practices were also used for pest and disease control.



Figure 1. Growing media trial set up, Hills Plants, Chichester, 29 September 2021

The peat-based growing media was generally a fine grade, with some woodfibre pieces 1-2 cm long, and perlite. Treatments A, B and C were a fine grade, with treatment B damper than the others and initially became stuck in the pot filling machine, which was resolved by adjusting the flow rate.

Irrigation was applied to most closely suit the peat-based growing media, which tended to hold most water. However, *Calathea* perform better in drier conditions than provided by the peat-based growing media on this system and so plant quality was adversely affected, and several

plants developed scorch (**Figure 2**). An adjustment to the amount of irrigation applied would have improved plant quality in the peat-based growing media. Similarly, when growing in treatments A and C the substrate provided better drainage, therefore growers would need to irrigate more often. *Ficus* however grew well in the peat-based growing media.



Figure 2. *Calathea* 'Silvia' produced in the peat-based growing media.

Main outcomes for *Calathea* (figure 3):

- Suffered from lack of drying out resulting in 'scorch' symptoms, shorter plant height and poor root development in the peat-based growing media
- Greatest fresh weight and dry weight and root development in treatment C

Main outcome for *Ficus* (figure 3):

- Best performance in treatment B
- Shortest plants in treatment A
- No root development differences



Figure 3. Comparative images of *Calathea* 'Silvia' (left) and *Ficus benjamina* 'Exotica' (right). 19 January 2022. Peat-based growing media (blue labels), treatment A (yellow labels), treatment B (purple labels) and treatment C (green labels)

Growing media analysis outcomes:

- Treatment B had high initial EC at 647 $\mu\text{S}/\text{cm}$ (compared with 221-442 $\mu\text{S}/\text{cm}$ for the other treatments)

- High final EC for Ficus in all treatments (576-1102 $\mu\text{S}/\text{cm}$) with treatment C at the highest level, linked to high Cl and K in particular without visible impact on plant quality

The increase in EC across all the growing media may be due to the amount of water and liquid feed applied, with water application managed to allow the peat-based growing media to dry back. Where water application is restricted in this way, salts can build up in the growing media if not taken up or utilised by the plants, as they are not flushed through when irrigation is applied. Materials such as bark can provide a greater buffering effect which can help to protect plants against high salt levels.

Some of the growing media included in this trial appear to have been better suited than others for use within this system, with better growth and development of plants grown in the more open and well drained growing media.

It is also worth noting that the source of materials (e.g. manufacturer) and the way they are produced (e.g. size, how fibrous the final product is) can cause the growing media to behave differently, particularly in terms of water holding capacity and this will affect water management requirements.

2. Earley Ornamentals (Propagation)

A propagation trial was set up at Earley Ornamentals, Thirsk on 05 January 2022 (week 1). Seeds of seven plant species (*Antirrhinum* 'Sonnet', Geranium 'Horizon', African Marigold 'Antigua', *Mimulus* 'Mystic', Pansy 'Premier', *Petunia grandiflora* 'Espresso Grande', and *Cosmos* 'Sonata White'), and cuttings of *Senetti* 'Deep Blue' were sown / stuck into two peat free substrates and a peat-based growing media provided by different manufacturers and grown on under glass until the final assessment on 15 February 2022. Tray sizes were 480 plugs (*Antirrhinum*, African Marigold, *Mimulus*, Pansy, *Petunia* and *Cosmos*), 360 plugs (Geranium) and 84 plugs (*Senetti*). Seeds were machine-sown, and cuttings were stuck by hand. Benches were open mesh and the irrigation and feeding regime followed Earley Ornamentals' standard practice, with irrigation applied via boom and lance and no adjustment to nutrition. Notable outcomes were:

Outcomes for plant quality:

- All plants assessed were marketable, achieving scores of 3 to 5.
- A score of 5 (excellent quality, no damage visible) was recorded for all species in the peat-based media, for the *Senetti*, *Mimulus*, *Cosmos* and Geranium in Treatment B, and for the *Senetti*, *Petunia*, Geranium, and the African Marigold in Treatment C.
- All species scored 4 and above when grown in Treatment B.

- The lowest scores were achieved by the *Mimulus*, Pansy and *Antirrhinum* grown in Treatment C, scoring 3.

The grower had ‘gapped’ the plug trays where seedlings were undersize or had not survived, and this showed differences between species in the number of plants that germinated and established. The *Mimulus*, *Petunia* and *Antirrhinum* established well with minimal losses. The *Cosmos* and The African marigold appeared most sensitive to the treatments, with most losses in Treatment C and fewest in the peat-based growing media (**Figure 4**). *Cosmos* similarly had most losses in Treatments B and C.

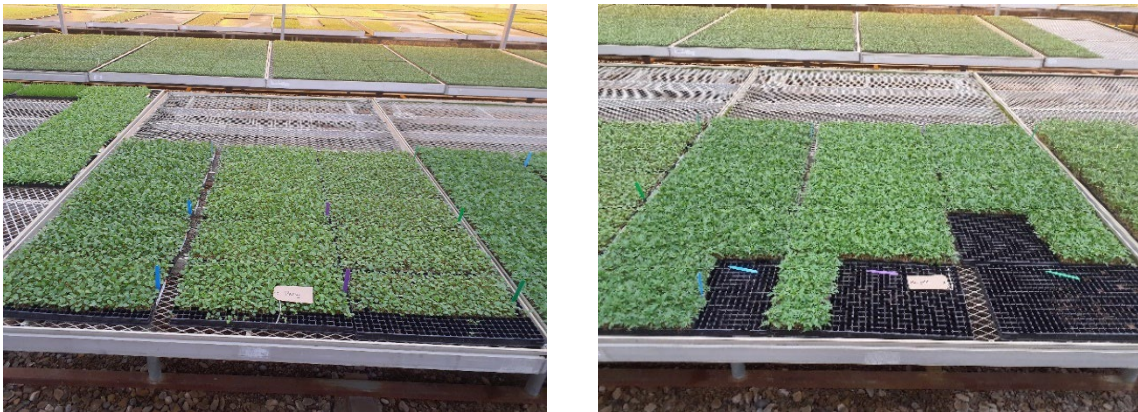


Figure 4. Earley Ornamentals. Growing media trial: Pansy (left) and African marigold (right) after gapping up, 05 January 2022. Peat-based growing media (blue labels), treatment B (purple labels) and treatment C (green labels),

Main outcomes for root quality and plug integrity (**Figure 5**):

- Root quality was consistently good across all growing media treatments for all species, except for *Antirrhinum* in treatment B (score 3) and the *Antirrhinum* and *Petunia* in Treatment C (score 3), where the roots were less well developed.
- Plugs held together well when grown in the peat-based growing media.
- Plugs generally held together well in Treatment B, although there was a tendency for the plug to crumble for *Petunia* and *Antirrhinum*.
- There was a more pronounced tendency for the plugs to crumble in Treatment C (*Mimulus*, *Petunia*, and *Geranium*), but this was linked to plug integrity rather than root quality as these species all scored 3 or 4 for root quality.
- The high EC in Treatment C may have contributed to the poorer root quality scores for *Petunia* and *Antirrhinum*. A substrate EC below 200 $\mu\text{S}/\text{cm}$ is usually recommended for seedlings, above this root damage can be caused, depending on species sensitivity.

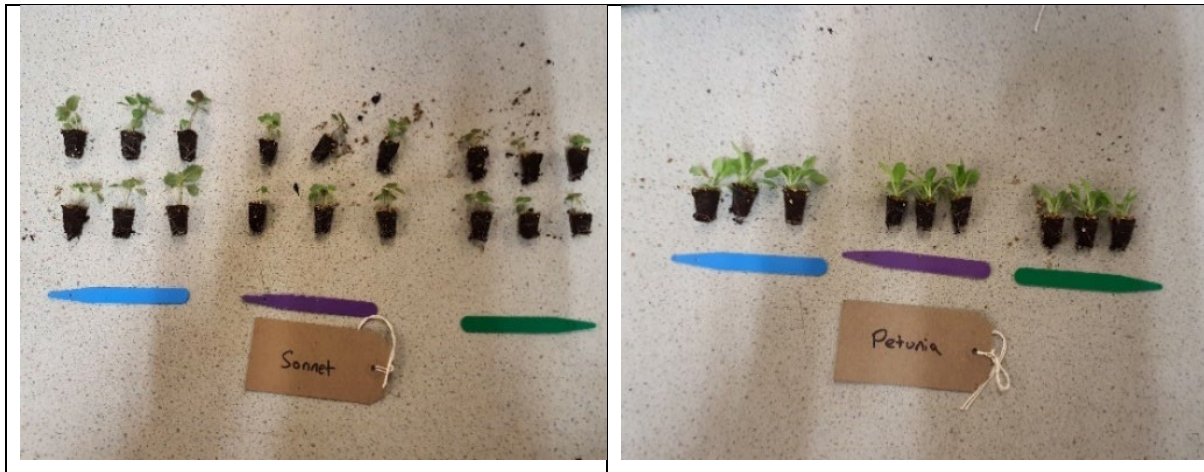


Figure 5. Early Ornamentals. Root quality: *Antirrhinum* 'Sonnet' (left) and *Petunia grandiflora* 'Espresso Grande' (right). Peat-based growing media (blue labels), treatment B (purple labels) and treatment C (green labels), 15 February 2022

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.

Action points

- Trial new peat-free or peat-reduced growing media before widescale use to fully understand the best water management techniques for each substrate and performance at transplant (plug integrity).
- Select peat-free or peat-reduced growing media to suit the nursery production system, for example ebb and flood, overhead, or hand irrigation, and adjust the irrigation regime to suit the crop being produced.
- Undertake nutrient analysis of substrates before use and adjust the nutrient regime to take account of nutrient levels; irrigation water analysis should also be undertaken with nutrients accounted for within the nutrition programme.
- Encourage strong root development through careful attention to watering (not too wet) and consider allowing slightly longer for roots to develop before transplant.

- The tray/pot/pack filling machine may require adjustment depending on growing media moisture level. The moisture level of the substrate can affect the speed of container filling, with a slower flow rate for moister materials, which can result in under-filled containers.