INNOVATIVE FARMERS
PART OF THE DUCHY FUTURE FARMING PROGRAMME

Earthcare TECHNICAL

The Pebble Trust

SRUC

Field lab: Eliminating peat and plastic from propagation using growing media blocks

Final report

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Authors: Dr Robin Walker & Dr Audrey Litterick

Sow & Grow Blocks

Summary

Take home messages: The project has shown that growers can successfully produce their own peat-free seed compost and growing media from locally sourced materials that are suitable for the propagation of a range of seedlings using GrowBlocks.

Context: The Sow & GrowBlocks Field lab builds on previous work to help growers develop their own peat-free growing media suitable for producing propagation blocks for vegetable and salad transplants and as a result reduce the use of plastic.

Trial design: Hotbin composters at 3 different Scottish nurseries were used to compost locally sourced materials into seed compost from which growing media were made and tested as GrowBlocks. Each trial tested germination and growth of lettuce, pea and kale in a range of home produced growing media treatments a well as a commercially available control product. The treatments were replicated.

Findings:

- There are some very good commercial UK peat-free propagation media available now, but there are also many inconsistent and poor products.
- The compost and growing media recipes in this project worked well, but other mixtures may also work well. If trying different mixtures, you should always test them carefully on several species on a small scale before committing to using them commercially on a larger scale.
- When making growing media, dilute the compost with a less salty, less nutrient-rich material such as leaf mould and smaller amounts of heavier materials such as the river sand and loam used in this project.
- If you want to use the medium in GrowBlocks, you must test it in your own blocking kit, because not all propagation media are suitable for use in blocks.
- If you are thinking that (or have already found that) it would be too expensive and time-consuming to use GrowBlocks, then it is still worth considering how you might make it easier by using larger block-making tools, or even machine blocking.

Recommendations & next steps:

- Get to know the difference between true composts and growing media. If deciding to make your own compost and growing media for reasons of resource use and sustainability, make the very best compost that you can.
- Ask other growers what works for them, test out your chosen product on several species on a small scale before committing to using it on a larger scale.
- If using your media in GrowBlocks, assess the pros and cons at each stage, as you will learn more that way and be better prepared to share information gained with others interested in this system.

Useful resources:

All resources relating directly to this project, which include background information and the results of additional work in the form of videos, recordings and guidance notes are available on the Innovative Farmers GrowBlocks web page (https://innovativefarmers.org/field-labs/peat-free-blocking/).

Farmer comment: "The Innovative Farmer project gave us the opportunity to take our previous fledgling project to a wider audience, including two other busy market gardens. It was great to be able to talk about peat free growing media, blocking and reduced plastic use with other interested growers. The addition of in-depth lab testing of the materials allowed for a much more robust comparison of germination and growth results and helps pave the way for the next stage, including ways of upscaling the use of blocks and how this can better fit in with the rhythm of the growing season. It will be nice to be able to share the project and underlying philosophies at the ORC conference." Pam Rodway, Organic Market Gardner, Forres.

Main report

1 Field lab aims

The Sow & Grow Blocks Field lab builds on previous work funded by Interface and The Pebble Trust to help growers develop their own peat-free growing media suitable for producing propagation blocks for vegetable and salad transplants and as a result reduce the use of plastic.

2 Background

There is a general feeling amongst growers experimenting with the manufacture of their own peat-free growing media that it is very difficult to obtain the required textures and physical properties needed to consistently produce high quality grow blocks on any scale without the use of peat.

The group involved in the Sow & Grow Blocks Field lab were aiming to produce peat-free growing media based partly on composts made in insulated "Aerobins" (https://www.aerobin400.com/) using locally-sourced materials. They utilised these composts in set recipes to create growing media which could be tested to compare their performance in terms of appropriate chemical properties for seed propagation, but also their ability to produce grow blocks with the correct physical attributes at this crucial propagation period. Successfully achieving these goals could have a significant impact on the sector, as it would allow commercial growers to produce their own growing media, whilst also eliminating peat and drastically reducing the use of plastic from the propagation stage.

The current trials built on previous work, which compared five peat-free growing media recipes for seed sowing based on locally sourced feedstocks in order to determine which were most suitable for making propagation blocks for raising seedlings (as outlined in the criteria above). There was a desire to broaden the original project from an area localised around Forres in NE Scotland to a national level and consequently growers in Perthshire and Fife were recruited to encompass this.

Definitions

There is frequent confusion surrounding the word "compost", which has two broad meanings in the UK. The word "compost" can mean:

- A stable, sanitised ***soil conditioner*** or ***constituent for growing media***, made from biodegradable organic materials through a ***composting*** process. [***Composting*** can be defined as a controlled, aerobic (with oxygen), microbial decomposition process which involves self-generated heating]. ***Compost***, as defined here, can be made at any scale, from garden compost heaps and bins to large commercial composting systems designed to take municipal food and garden wastes**. In this project, we will only use the word *compost* for the material we produce in hot bins for use as a constituent of growing medium** (see below).
- A ***growing medium*** in which seeds are sown or young plants are grown in containers. It's usually bought and sold in plastic bags, though larger quantities can sometimes be sold in bulk bags. **In this project, we will use the term "*growing media*"** to describe the material

we manufacture to make blocks from a mixture of ***compost*** (produced in hot bins) and other locally-sourced ingredients.

3 Methodology and data collection

The main focus of the project was based around four germination and growth trials using home-made media, based on nursery-made "Aerobin" composts made to two standard recipes. Trials were conducted at three nurseries, including: Wester Lawrenceton Farm, Forres, Moray (courtesy of Pam Rodway); East Neuk Market Garden, St Monans, Fife (courtesy of Connie Hunter and Tom Booth); Tombreck Farm, Lawers, Aberfeldy (courtesy of Rachel Wake and Ian Machacek) and were supported by staff and volunteers. Feedstock constituents for the "Aerobin" composts were chosen based on local availability and the need to include a mix of high nitrogen/green/fleshy material with high carbon/brown material.

The feedstock mixes used at the 3 trial sites are provided in Table 1 for the "Vegan" compost mixes which contained no livestock wastes or residues, and in Table 2 for the "Non-Vegan" compost mixes, which were then utilised within the same growing media recipe that was common to all sites and trials, with the growing media being used to produce the grow blocks from which three different species were propagated (peas, kale and lettuce). Typically the "Aerobin" hotbin composting process took about 3 months in total from late autumn / early winter 2023. The very cold weather encountered at this time at some premises necessitated re-mixing to kick-start microbial activity and associated heat production, with these batches taking slightly longer to produce acceptable compost.

Table 1. "Vegan" compost feedstock mixes produced in "Aerobins" and used in the growing media recipe at the three trial sites

Vegan compost mixes		
Wester Lawrenceton **(tractor bucket volume = 50 litres)**	**Tombreck (5 loads per aerobin using 15 litre hand buckets)**	**East Neuk Growers** **(Standard wheelbarrow)**
• 1.5 buckets brown bracken • 1.5 buckets spent strawberry straw with small amount of chopped cardboard • 1.3 buckets finely chopped ramial willow woodchip • 0.6 buckets very wet grass mowings, • 0.6 very wet fresh nettles, • 0.3 shredded comfrey leaves • No water added	• 4 buckets of finely chopped ramial woodchip • 2 buckets of brown bracken • 2 buckets of fresh grass clippings with some rushes • 2 big handfuls of wood ash • 2 big handfuls of smashed up charcoal • 2 big handfuls of mature garden compost	4 barrowloads containing 2 forks of: • straw • seaweed • comfrey • bracken plus 3 barrows of wood chip

Table 2. "Non-Vegan" compost feedstock mixes produced in "Aerobins" and used in the growing media recipe at the three trial sites

Non-vegan compost mixes		
Wester Lawrenceton **(tractor bucket volume = 50 litres)**	**Tombreck (5.5 loads per aerobin using 15 litre hand buckets)**	**East Neuk Growers** **(Standard wheelbarrow)**
• 1.25 buckets brown bracken • 2.25 buckets spent straw, mostly chicken bedding • 0.25 buckets chopped wool • 0.25 buckets shredded cardboard • 1.3 buckets finely chopped ramial willow woodchip • 0.25 buckets dried leaves • 2 buckets equal quantities fresh nettles, grass mowings, shredded comfrey leaves • 10 L diluted comfrey liquid • 15 L water	• 1 bucket of finely chopped ramial woodchip • 2 buckets of coarse softwood chip • 2 buckets of brown bracken • 1 bucket of fresh grass clippings with some rushes • 1/10 of a bucket of rabbit poo plus bedding • ¼ bucket of well-separated daggy sheeps wool • 1 shovelful of well-rotted strawy FYM • 2 big handfuls of wood ash • 2 big handfuls of smashed up charcoal • 2 big handfuls of mature garden compost	6 barrowloads containing 1 fork of: • straw • seaweed • comfrey • bracken • wool • manure • food waste plus 1 barrow of wood chip

Once the composts had been produced at each nursery, two types of growing media were mixed (one based on vegan compost and one on non-vegan). Each medium was then used to make grow blocks.

The ingredients used to make the growing media were chosen based on a number of criteria: (1) they were sourced locally/from around the host nurseries; (2) they must not include peat; and the finished media had to be (3) sufficiently fine and sticky to form good, cohesive blocks; (4) suitable for raising veg/salad seedlings in (e.g. low salt content but adequate nutrient content); (5) largely free of viable weed propagules.

Growing media recipe (same on all nurseries)

- 4 parts by volume "Aerobin" compost (sieved through 10 mm then 6 mm sieve)
- 4 parts by volume leaf mould (sieved through 10 mm then 6 mm sieve)
- 1 part by volume coarse river sand (sieved through 6 mm sieve)
- 1 part by volume loamy soil (sieved through 6 mm sieve)

Each nursery used Ladbroke hand blocking tools (4-module for peas and 5-module for kale and lettuce). For those less familiar with these items, some practise was required in order to achieve production of consistent, cohesive blocks, which were not overly compacted. These blocks were then used for the trial.

Three rows of four blocks were made for peas (using a four-block tool, giving 12 blocks) and three rows of five blocks were made for both kale and lettuce (using a five-block tool, giving 15 blocks) and the blocks were set out in a randomised design in trays on capillary matting. Each tray also included a control treatment (a proprietary growing medium "Moorland Gold" based on 100% waste peat filtered from drinking water supplies). One nursery also included an additional control growing medium, which was the product currently used by them in their day-to-day activities (Klassman reduced-peat), and another used a medium based on a different home-produced compost (Dalnashian) as an additional control. All treatments were replicated three times on each nursery (with one tray per replicate, Fig. 1). All trays were covered with protective mesh until the young seedlings were through. Watering took place regularly to maintain adequate moisture for plant growth and to prevent the grow blocks drying out.

Figure 1: Experimental design showing the three replicated blocks (trays) with the groups of seedlings within each growing medium under test randomly located within the tray.

During each trial, seed germination and seedling performance was monitored at least twice over a period of several weeks. A destructive biomass sampling was undertaken at the time the plants would typically be transplanted. Growth data was analysed using ANOVA for each individual crop species at each site across the different growing media under test. This data was interrogated for treatment differences across the different germination sampling dates to assess rapidity and uniformity of germination and establishment, as well as for the final germination sampling date alone. Data was also statistically analysed for treatment differences in terms of biomass for each individual species at transplanting across the different growing media under test at each site.

Growing media were also tested for a range of physical, chemical and biological parameters, including:

Chemical parameters (NRM)

- Electrical conductivity
- pH
- Total carbon, nitrogen and C:N ratio
- Compost stability
- Total nutrients and ammonium and nitrate nitrogen
- Carbon dioxide evolution/compost stability

Physical parameters (NRM)

- Air-filled porosity

Biological parameters (NRM and Mycolife)

- Microbial respiration
- Total fungi, active fungi, total bacteria, active bacteria, protozoa

A literature review and information gathering exercise, primarily funded by the Pebble Trust, was used to investigate what other growers and research organisations have done in this area to compliment the experiences of the group and to amalgamate information that can be passed on to others interested in trying this approach themselves.

Five guidance notes describing compost, composting, growing media and how to make and use grow blocks have also been produced as part of the project, which are designed to provide useful practical information that can be readily utilised by growers. These are available through links on the Innovative Farmers Field Lab "Eliminating peat and plastic from propagation using growing media blocks" webpage https://innovativefarmers.org/field-labs/peat-free-blocking/.

4 Results and discussions

Analysis of the germination data and plant biomass data at transplant stage from the trials using grow blocks made from the nursery-made growing media created at each trial site compared to the commercially-available control growing medium often showed no significant differences between treatments. This was viewed by project participants as a positive result, as it provided evidence that nursery-made growing media based on "Aerobin" composts produced onsite were often as good as a commercially available product. The growers knew the provenance of their own compost feedstocks and using these also enabled them to reduce their environmental footprint through a reduction in haulage requirements and plastic use. The following results indicate the specific situations where significant treatment differences were found within the trials at each site as well as those that were close to being significant, and therefore highlighting a trend. All other comparisons were found not to be significant and are not presented here.

Wester Lawrenceton

At the Wester Lawrenceton trial, for lettuce, there was found to be a significant treatment difference effect on germination %, although not between assessment dates or as an interaction between treatment and assessment date. This implies that any germination had taken place over a short period of time early in the testing period. There were also no differences between the control and vegan composts, with both showing higher lettuce germination % across the period than the non-vegan compost (see Fig 2).

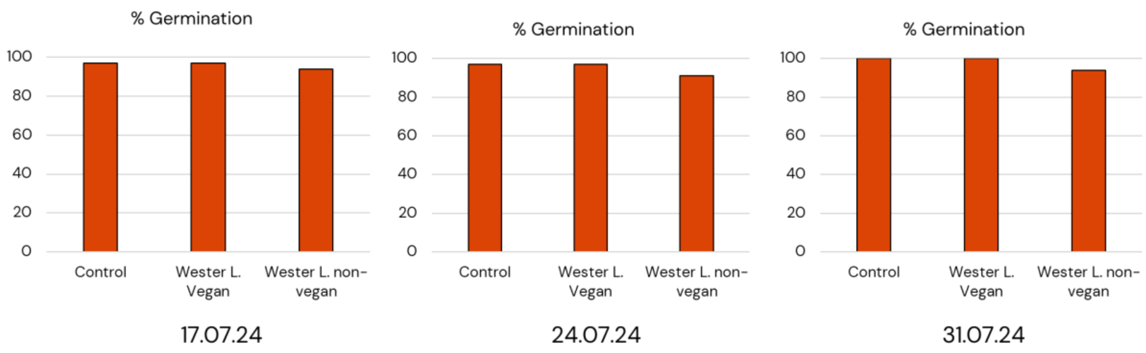


Figure 2: Lettuce % germination across 3 different sampling dates (left to right) for the 3 different growing media used at Wester Lawrenceton (control, vegan and non-vegan).

At the Wester Lawrenceton trial, for peas, there was found to be a significant treatment difference effect on germination %, although not between assessment dates or as an interaction between treatment and assessment date. This implies that any germination had taken place over a short period of time early on in the testing period. In this case, the control treatment showed a higher pea germination % across the period than both of the home-produced media, i.e. the non-vegan and vegan treatments (see Fig 3).

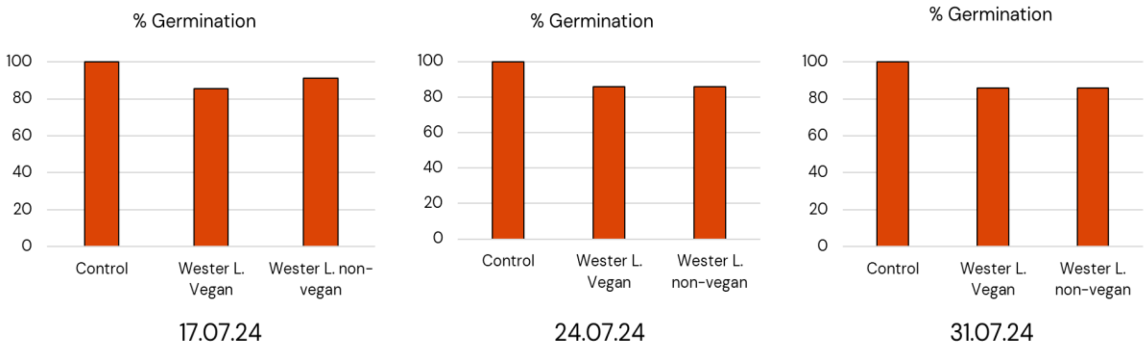


Figure 3: Pea % germination across 3 different sampling dates (left to right) for the 3 different growing media used at Wester Lawrenceton (control, vegan and non-vegan).

At the Wester Lawrenceton trial, for lettuce, there was found to be a significant treatment effect on fresh biomass, with lettuce grown in the vegan compost having significantly greater biomass than the non-vegan compost biomass which was in turn significantly greater than the control treatment at the time of sampling on 07.08.24 (see Fig 4).

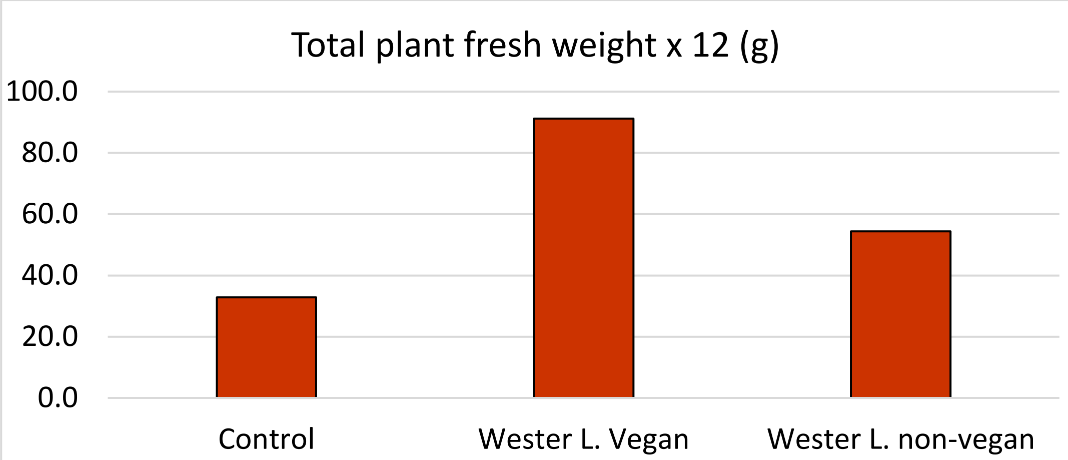


Figure 4: Lettuce biomass (g) at transplanting for the 3 different growing media used at Wester Lawrenceton (control, vegan and non-vegan). Each value represents the total biomass of 12 plants.

Tombreck: Trial 1

At the first Tombreck trial, for lettuce, there was found to be a significant assessment date effect, and a non-significant trend on germination %, although no interaction effect between treatment and assessment date. Initially the trend was for the control to have higher lettuce germination % and Dalnashian the lowest germination %, with the Tombreck vegan and non-vegan composts in the middle, but this soon evened up over time (see Fig 5.) This implies that maximum germination % was a little slower to take place in this trial than in the Wester Lawrenceton lettuce grow blocks, for example.

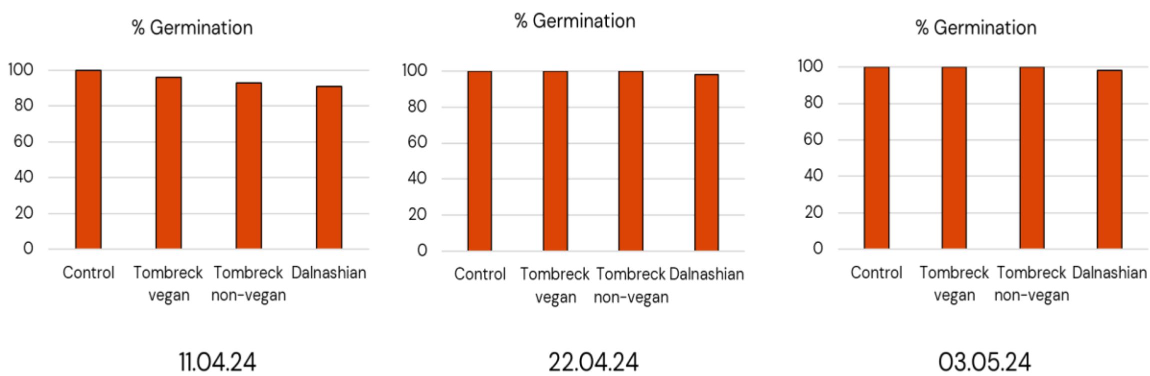


Figure 5: Lettuce % germination across 3 different sampling dates (left to right) for the 4 different growing media used in the Tombreck 1 trial (control, vegan, non-vegan and Dalnashian).

At the first Tombreck trial, for peas, there was found to be a non-significant trend in treatment effect on germination %, although not between assessment dates or as an interaction between treatment and assessment date. This implies that any germination had taken place over a short period of time early in the testing period. In this case, the control treatment and Dalnashian based growing media tended to have a higher pea germination % across the assessment period than both home-produced media, i.e. the non-vegan and vegan treatments (see Fig 6).

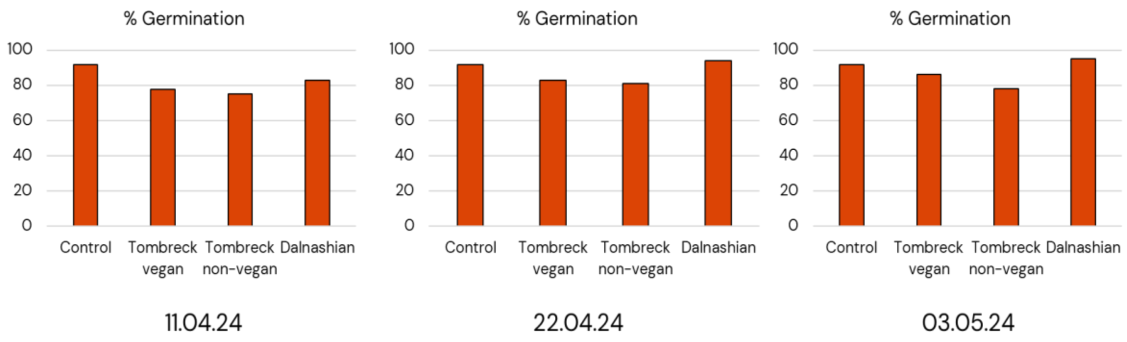


Figure 6: Pea % germination across 3 different sampling dates (left to right) for the 4 different growing media used in the Tombreck 1 trial (control, vegan, non-vegan and Dalnashian).

At the first Tombreck trial, for lettuce, there was found to be a significant treatment effect on fresh biomass, with lettuce grown in the control and non-vegan based growing media having significantly greater biomass than lettuce grown in the vegan and Dalnashian based growing media biomass at the time of sampling on 08.06.24 (see Fig 7).

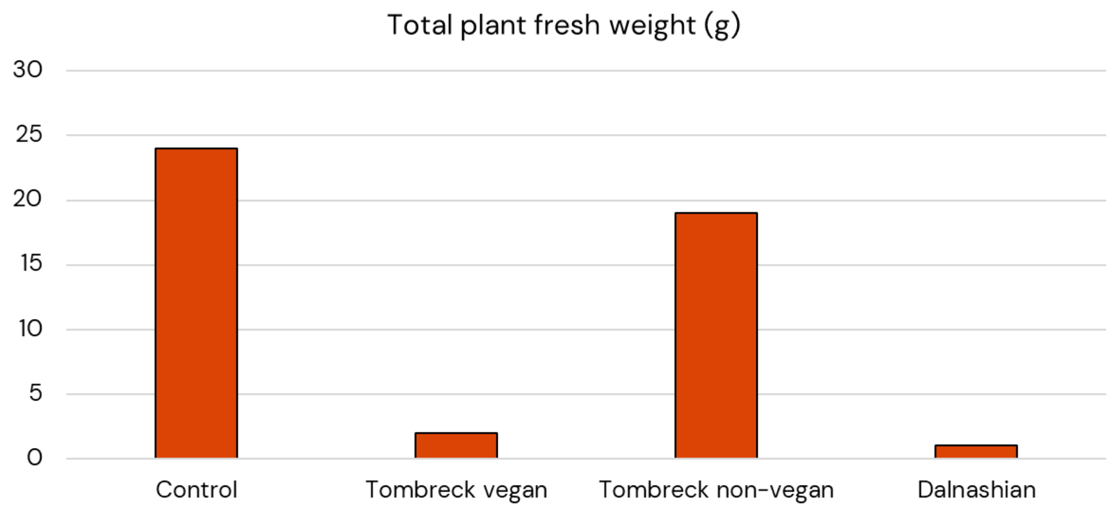


Figure 7: Lettuce biomass (g) at transplanting for the 4 different growing media used in the Tombreck 1 trial (control, vegan, non-vegan and Dalnashian). Each value represents the total biomass of 12 plants.

Tombreck: Trial 2

At the second Tombreck trial, for lettuce, there was found to be a significant treatment effect on germination %, with this holding true for both assessment dates. There was no assessment date effect or interaction effect between treatment and assessment date. The control, Klassmann and non-vegan treatments had higher lettuce germination % than the vegan and Dalnashian treatments (see Fig 8.), with this consistent between assessment dates.

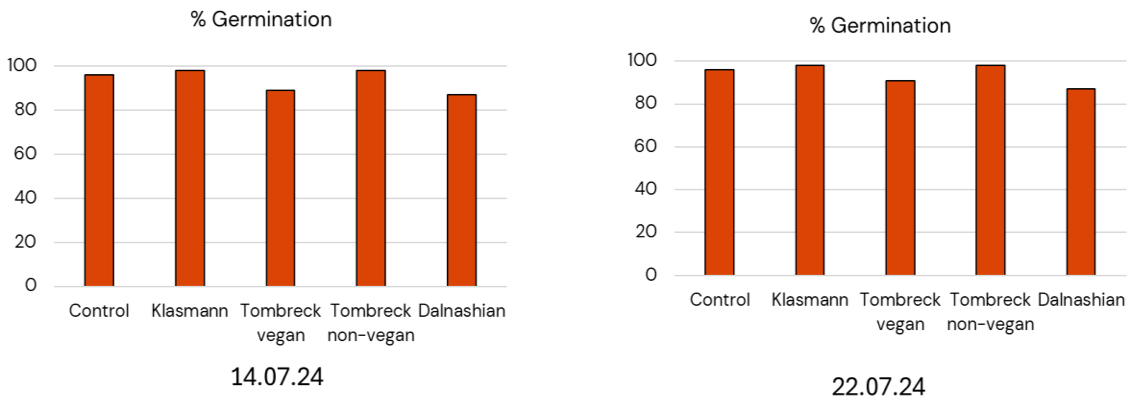


Figure 8: Lettuce % germination across 2 different sampling dates (left to right) for the 5 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian).

At the second Tombreck trial, for pea, there was found to be a significant treatment effect on germination %, although not between assessment dates or as an interaction between treatment and assessment date. This implies that any germination had taken place over a short period of time early in the testing period. In this case, the germination % of pea in the Klasmann treatment based growing media was significantly higher than both of the home-produced media as well as the other two control treatments which all performed to a similar level (see Fig 9).

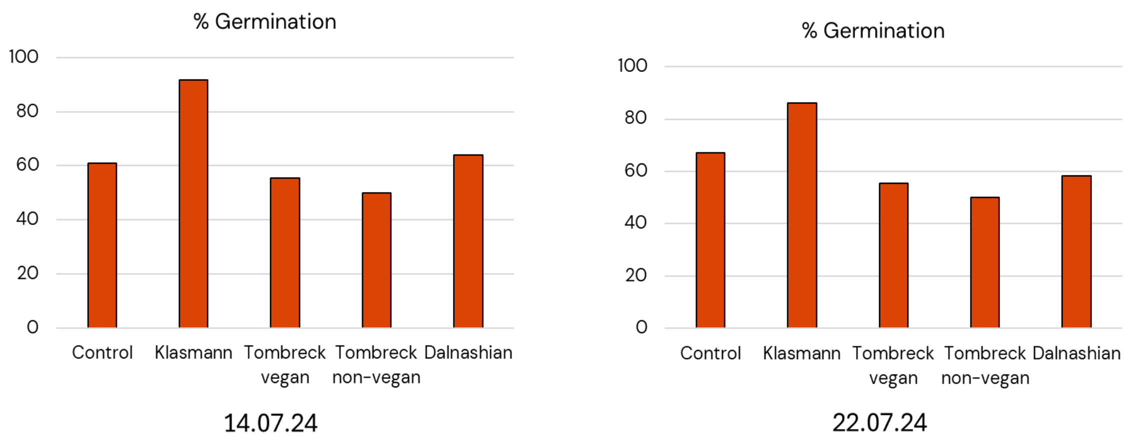


Figure 9: Pea % germination across 2 different sampling dates (left to right) for the 5 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian).

At the second Tombreck trial, for kale, there was found to be an assessment date effect on germination %, but not between treatments or as an interaction between treatment and assessment date. The maximum germination was relatively slow for all treatments over the testing period with germination averaged across all treatments increasing significantly between the first and second assessment dates. However, germination % in all the treatments behaved in a similar manner with no treatment effect apparent at either assessment date. (see Fig 10). The overall % germination of the kale was relatively poor in this trial as well as the others (data not shown), with % germination rarely exceeding 60%, suggesting that there may have been some issue with the kale seed.

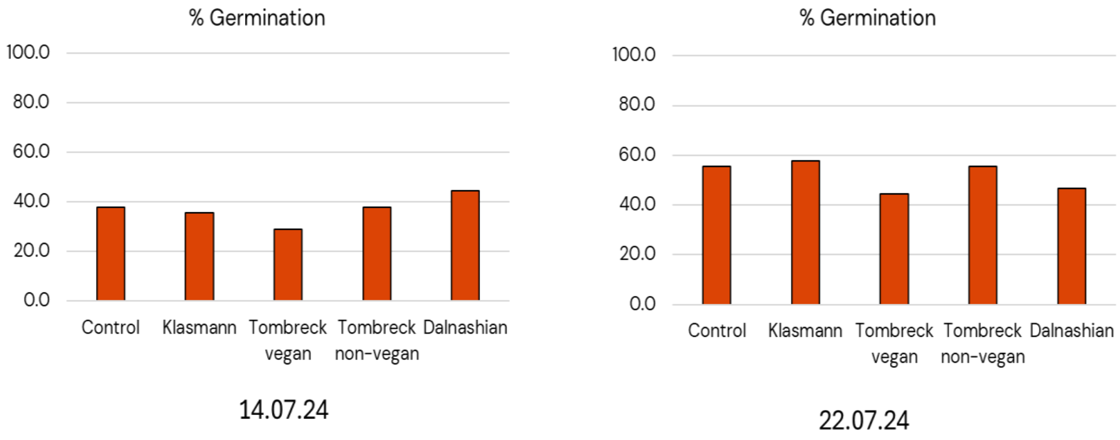


Figure 10: Kale % germination across 2 different sampling dates (left to right) for the 5 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian).

At the second Tombreck trial, for lettuce, there was found to be a significant treatment effect on fresh biomass, with lettuce grown in the Klasmann Compost having significantly greater biomass than the others, although the non-vegan was not far behind. The control, vegan and Dalnashian growing media all had significantly lower biomass (see Fig 11) at the time of sampling on 09.08.24.

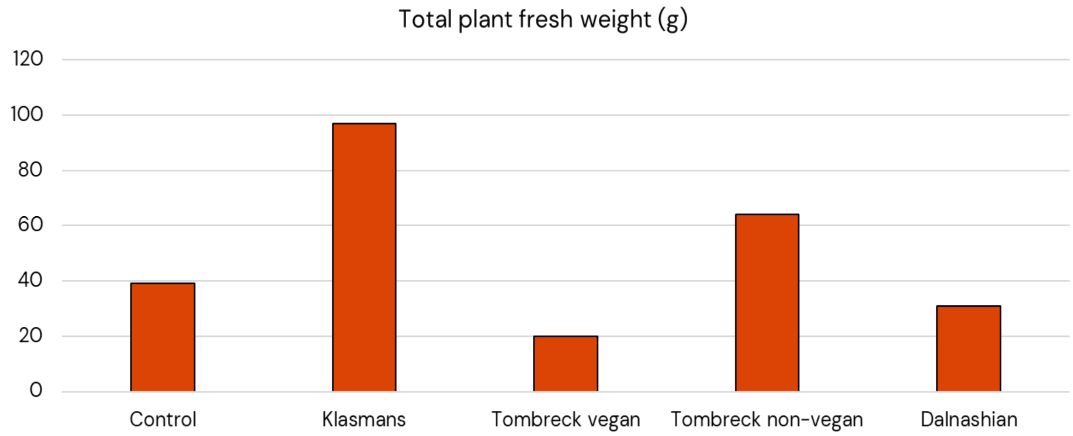


Figure 11: Lettuce biomass (g) at transplanting for the 4 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian). Each value represents the total biomass of 12 plants.

At the second Tombreck trial, for peas, there was found to be a significant treatment effect on fresh biomass, with peas grown in the Klasmann Compost having significantly greater biomass than the others. The control, vegan, non-vegan and Dalnashian growing media all had similar and significantly lower pea biomass at the time of sampling on 09.08.24 (see Fig 12).

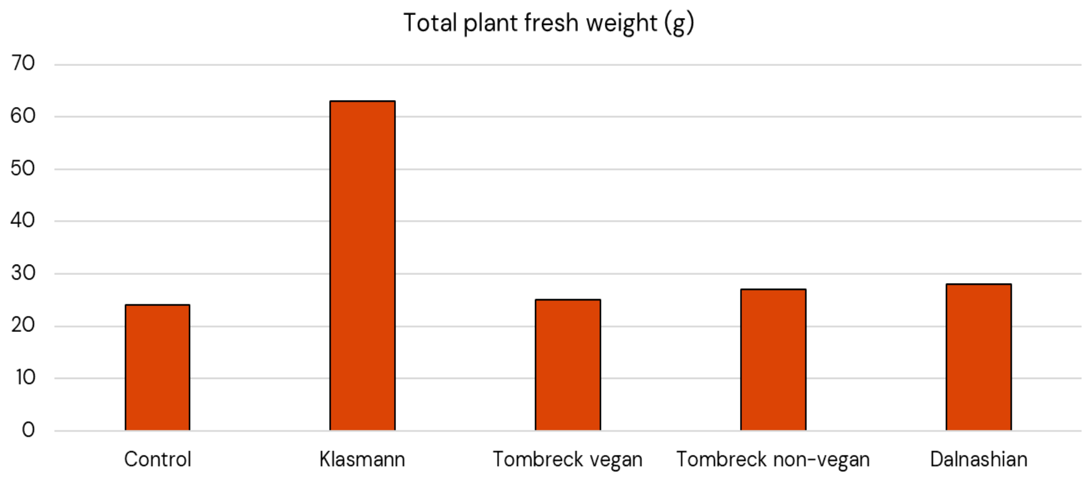


Figure 12: Pea biomass (g) at transplanting for the 4 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian). Each value represents the total biomass of 12 plants.

At the second Tombreck trial, for kale, there was found to be a significant treatment effect on fresh biomass, with kale grown in the Klasmann Compost having significantly greater biomass than the others, although the non-vegan was not far behind. The control, vegan and Dalnashian growing media all had significantly lower biomass (see Fig 13) at the time of sampling on 09.08.24. The relative trend shown for kale biomass across the 5 growing media treatments mirrored those shown by the lettuce biomass very closely.

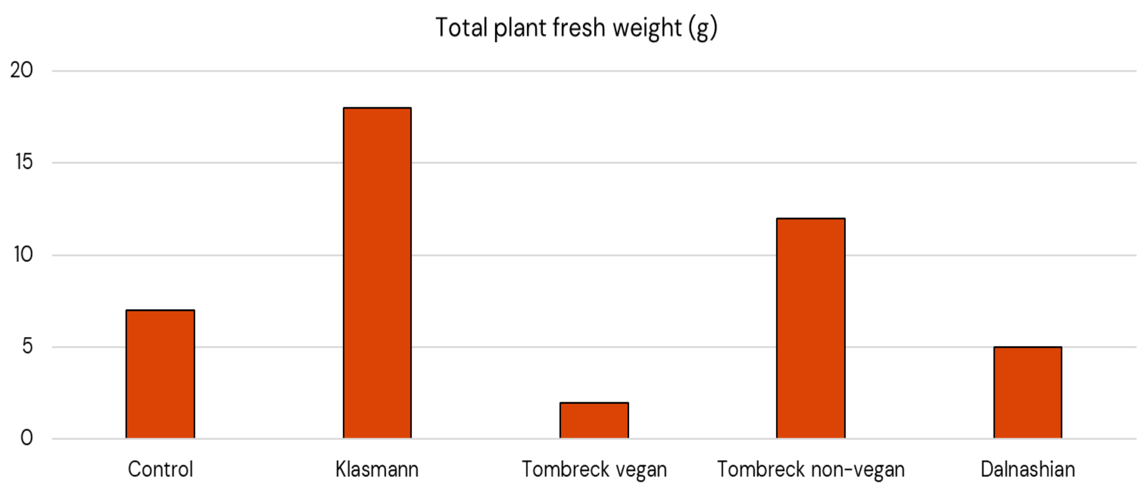
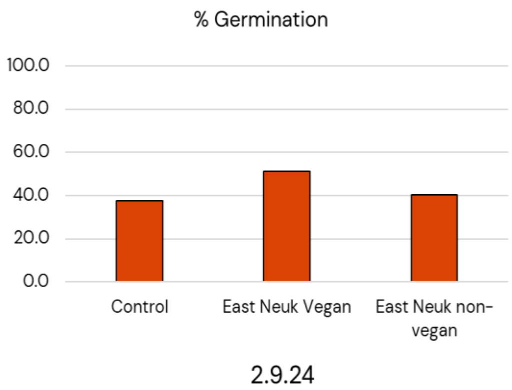


Figure 13: Kale biomass (g) at transplanting for the 4 different growing media used in the Tombreck 2 trial (control, Klasmann, vegan, non-vegan and Dalnashian). Each value represents the total biomass of 15 plants.

East Neuk

At the East Neuk trial, for kale, there was a non-significant trend between treatments, but no difference between assessment date or as an interaction between treatment and assessment date (see Fig 14). The germination % of kale grown using the vegan compost based growing media was close to being, although not actually, significantly greater than the control and no-vegan based media used to make the grow blocks. As indicated previously, kale germination in all trials was quite poor, with this possibly attributed to issues with the seed.



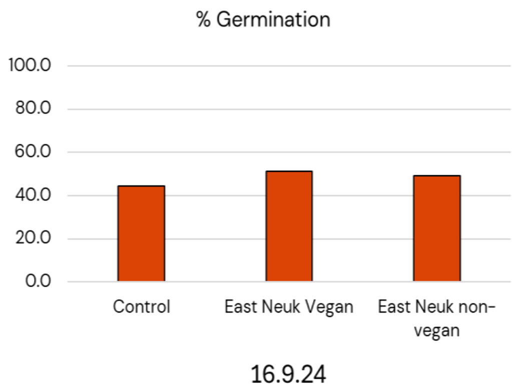


Figure 14: Kale % germination across 2 different sampling dates (left to right) for the 3 different growing media used in the East Neuk trial (control, vegan and non-vegan).

At the East Neuk trial, for lettuce, there was found to be a significant treatment effect on fresh biomass, with lettuce grown in the non-vegan based growing media having significantly greater biomass than the others. The control and vegan based growing media both had similar and significantly lower biomass (see Fig 15) at the time of sampling on 9.10.24.

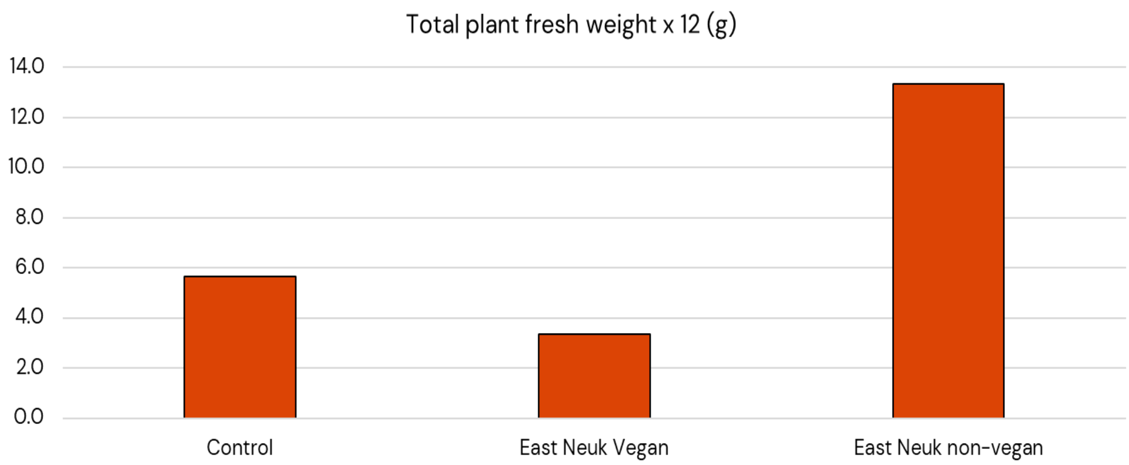


Figure 15: Lettuce biomass (g) at transplanting for the 4 different growing media used in the East Neuk trial (control, vegan and non-vegan). Each value represents the total biomass of 12 plants.

Results of growing media testing

Physical, chemical and biological properties of all twelve growing media used in this work were comprehensively tested at UK labs. The reasoning behind this work, results of testing and a discussion of the results obtained are available in Guidance Notes 4 and 5 on the Innovative Farmers GrowBlocks web page (see 7. Further reading).

Discussion

Differences that were encountered between treatments within any individual trial, particularly differences indicated between the growing media, can be attributed to the relative influence of that media on the germination and growth of the species showing improved or reduced performance. Of the media based on “Aerobin” composts, no one product stood out across all species tested at any nursery for germination or biomass production at transplanting, as sometimes the medium based on vegan compost and at other times the one based on non-vegan compost proved to be better. On more than one occasion, the nursery-made media were as good as, or sometimes better than the control treatment. One product that was shown to be consistently effective in the trial it was used in was the Klasmann reduced-peat product. It was often better, or at least on par with the other media under test.

The fact that many of the comparisons across the trials, crop species and growing media treatments in terms of germination % and plant biomass at transplanting show no significance can also be viewed as a positive result. We have provided evidence that composts produced on the three nurseries in many cases made good constituents of growing media. The recipes used resulted in production of grow blocks with desirable physical and chemical properties for successfully germinating and raising seedlings and germination percentage and growth were often the same as with a commercially available product. As the growers were able to source all feedstocks for their compost locally, they were able to reduce their environmental footprint through a reduction in haulage requirements and plastic use linked to the propagation process.

Where significant differences did occur between trial sites, especially in relation to the performance of the control medium which was common to all trials, a number of environmental or human factors could be at play. These might have included slight differences in the way personnel at each site approached the blocking procedure, e.g. in terms of physical action as well as moisture levels, etc. Growing conditions would also differ between sites, as well as watering regime. As indicated earlier, the kale seed germination seemed to be relatively poor across all trials suggesting there may be an issue with the seed used.

5 Conclusions

Whilst the quality of some peat-free and peat-reduced media is now superb and certainly at least as good as some of the peat-based media, there are still some very poor products out there. Evidence from the GrowBlocks project has shown that it is possible to produce nursery-made media which are as good as one of the industry standards. In order to get the best from home-made media, it is a good idea to test key constituents prior to blending, then test the final medium for a range of key the parameters. It is also essential that you conduct basic germination and growth trials with at least three species before committing to use the media for important purposes.

All of the growers in this project were keen to reduce the use of peat and plastic where they could, and the GrowBlocks were viewed positively in being able to reduce the area required for propagation if germination was patchy (blocks could be split up and viable plants moved together easily allowing poor plants to be removed, unlike those grown in plastic trays), the time needed to plant out was reduced as was risk of damage to seedlings at this critical time. In most cases they were also thought to improve plant growth after transplanting (due to “air pruning” of roots).

The biggest issues with production of nursery-made GrowBlocks was the time required: (1) to locate and stockpile the various compost feedstocks and the ingredients for the growing media “recipe”, (2) the preparation, chopping / shredding and mixing of materials to put in the composter, (3) monitoring compost temperature and moisture and re-mixing if necessary, (4) sieving composted product, (5) production of the grow blocks themselves.

In terms of making the grow blocks, the current blocking tools used were limited to hand made apparatus that made either four or five blocks at any one time. The issue of scale came into play, as this was fine for small scale enterprises, but if the nursery was propagating several thousand plants a year, a larger scale device was deemed necessary. These are available on the market, but the group had not had a chance to try one, and purchase cost was a concern.

6 Tips and recommendations:

There are some very good commercial UK peat-free propagation media available now, but there are also many inconsistent and poor products. If you have decided that you cannot spare the time and energy to make your own growing media, you are strongly advised to work only with products intended for the professional horticultural market. These do not necessarily have to bought in great bulk. Ask other growers what works for them, test out your chosen product on several species on a small scale before committing to using it on a large scale. Develop a good working relationship with your growing media supplier and they will rarely, if ever let you down. If you want to use the medium in blocks, you must test it in your own blocking kit, because not all good propagation media are suitable for use in blocks. If you are committed to producing your own growing media for reasons of resource use and sustainability, then read on.

It's worth getting to grips with the difference between true composts (made through a composting process, which must involve selection of the right balance of materials, may involve shredding and must involve mixing, aeration, self-heating and gradual cooling) and growing media, which may or may not include true composts. The two are very different and true composts are rarely suitable for use alone as a propagation medium.

It is worth taking the time to make the very best compost that you can for propagation, then, when making growing media, dilute the compost with a less salty, less nutrient-rich material such as leaf mould and smaller amounts of heavier materials such as the river sand and loam used in this project. Many UK growers use coir to dilute nursery-made compost, but although it works very well, it is not, unlike all the materials used in this project, a locally-available waste. Making the best compost may mean using more fine wood chip and less of what you have in terms of animal manures and grass or vegetable wastes. The recipe in this project worked well, but other mixtures may also work well. If trying different mixtures, you should always test them carefully on several species on a small scale before committing to using them commercially on a significant scale.

If using or trying GrowBlocks, it is a good idea to write down your thoughts on the advantages and disadvantages, successes and failures, because you might learn more that way and might be better prepared to share the information gained with the many others who are considering trying the system.

If you are thinking that (or have already found that) it would be too expensive and time-consuming to use GrowBlocks, then it is still worth considering how you might make it easier by using bigger block-making tools, or even machine blocking. Bear in mind that as soon as you change your system, you will have to re-evaluate the type of medium that works best in it.

7 Further reading

All of the following information, which has been written specifically for this project can be found on the GrowBlocks web page on the Innovative Farmers website:

(https://innovativefarmers.org/field-labs/peat-free-blocking/)

Guidance Note 1: Eliminating peat from propagation using growing media blocks

Guidance Note 2: The composting process

Guidance Note 3: Making and using growing media

Guidance Note 4: Testing growing media

Guidance Note 5: Results of testing nursery-made growing media

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