



Getting to grips with peat-free

A range of peat-free media has been available for years, yet gardeners are still confused which to choose and how best to manage them. RHS experts **Paul Alexander** and **Nick Morgan** offer practical examples to help guide us. Photography by Tim Sandall



For many gardeners, changing to peat-free media can prove testing. RHS scientist **Paul Alexander** (left) outlines the issues of finding an acceptable peat replacement, and makes suggestions for a smooth transition, based on his research



Making the right choice of growing medium and then knowing how best to treat it is important if you want to get the most from the plants you grow in it

AS THE NEED TO REDUCE the use of peat becomes more pressing, home gardeners can face a daunting choice of alternatives (see *The Garden*, March 2010, pp178–181). These numerous products make a variety of claims regarding their use, and the selection of growing media on offer is further complicated by the presence of peat-based, peat-reduced and peat-free products.

The RHS promotes sustainable use of peat alternatives and will support progress towards the Government's target of a total withdrawal of peat use by home gardeners by 2020. Whatever your own thoughts on peat use in horticulture, there is a need for gardeners and growers to understand how to manage peat-free growing media.

Consider these key points when choosing a compost:

- **What is it to be used for?** Multipurpose compost (peat-based or peat-free) is suited for potting and growing on (see below) as well as raising seed; more specialist seed and cutting composts (see pp54–56) may provide better results.

- **How easy is it to wet the growing**

medium properly and how well does it then hold onto water?

- **Are nutrient levels available in the medium suitable** for the plants you wish it to support?

Media components

Most growing media (including peat-based) are blends of one, or possibly two, main ingredients with a small volume of a variety of other materials for specific beneficial properties. The principal materials tend to dominate how growing media perform although this can be unpredictable due to a number of factors:

- Different materials behave differently to each other, but the packaging of many growing-media products does not state what the main components (feedstocks) are.
- Variation can occur between batches of any one component supply.
- Quality control for peat-free media is often more difficult due to this potential variability in components.

In addition, peat-free media may cost more than peat-based products due to production and quality-control issues. Competitive

pricing in-store often means that manufacturers (both peat and peat-free) use cheaper materials, which can lead to variable quality.

Plant responses

Recent research by the RHS has focused on the principal material from which composts are manufactured, as we seek to understand the basis for differences in performance rather than simply compare what is available. However, poor labelling of some peat-free compost adds to confusion. The RHS believes that this information would be extremely helpful to gardeners and is actively working with the Growing

Media Initiative to support this.

Research is further complicated by variable responses shown by different plants to different materials. Using plants that are familiar and frequently grown is helpful, but results cannot be seen as typical for all plants. This can be confusing for gardeners who want a compost that performs well across their needs, for all plants.

When using growing media, water management is critical (as the research detailed below begins to reveal); this is especially the case with peat-free materials.

There are other points to consider, such as how best to feed plants grown in these

composts, as the primary components may supply more nutrition than ordinarily found in peat-based composts. In all, we still need to learn how to get the best from these media, be they used for general potting or plant propagation. As we build experience and peat-free products become more mainstream, these issues will be less of a problem. ■

Paul Alexander is RHS Principle Scientist – Horticulture, and has a particular interest in soils and growing media

- See Nick Morgan's tests with seeds and cuttings in different media (pp54–56) ►

WHICH MEDIA TO CHOOSE?

The range of peat-free media on the market can be daunting. Here are some points to consider:

- Various materials are used as substitutes for peat in growing media. Most commonly offered are coir (a by-product of coir-fibre production, made from coconut husks), composted green waste, and wood fibre (made from pressure-treated wood chips). Others include composted wool fibre and bark. Loam-based media are also offered.
- Packaging of many peat-free and peat-reduced media is poorly labelled. If possible, choose one that clearly states its principal ingredients (below) or ask suppliers before you buy.
- Be prepared to pay more for peat-free growing media to secure the best-quality product.
- Try different brands to familiarise yourself with the range of available products, and experiment before committing to expensive or difficult plants.
- Look for specially formulated media suited for specific purposes, such as seed and cutting compost for propagation (see p56).



RHS RESEARCH: WATERING PEAT-FREE MEDIA

Paul Alexander's experiment (left) assessed different growing media for growing plants when given differing amounts of water. Petunia and fuchsia plants were grown through last summer in multi-purpose media based on peat, wood fibre, coir and composted green waste. Water was applied at five different rates for each medium, the control treatment being optimum watering for that medium, while the other four treatments were this value +25 percent, +50 percent, -25 percent and -50 percent.

For research reasons, optimum watering was taken to be when the container is wet through but not waterlogged.

The experiment is currently being analysed, but some effects have already been observed:

Plant quality

All the media tested were capable of producing good-quality plants. When comparing plants watered at the control rate, plants appeared slightly bigger in coir and peat, but leaf colour, size and flower number were good in all four.

Effects on plant quality

With plants that were under- or overwatered, quality reduced most quickly in composted green-waste and wood-fibre composts. Peat- and coir-based media proved more forgiving. If using composted green waste or wood fibre composts it is important to water more carefully.

Water requirements

Peat and coir were able to retain far higher volumes of water than wood fibre and composted green waste. Good water retention offers greater flexibility, as frequency of watering can be reduced. However, as water resources become more valuable, media needing less water to produce good plants could be

preferable to those that need more. Under optimum watering, green compost and wood fibre plants were still good quality but only received around one third of the water that the peat and the coir plants received.

- The findings of this research will be published on RHS Online at a future date: www.rhs.org.uk



Nick Morgan (left) from the Glass Department at RHS Garden Wisley tested various different media, including traditional peat, peat-free and loam-based composts for use in raising seeds and cuttings; here he observes their varied properties

THE PLANT REQUIREMENTS of any type of media may seem basic; it must provide moisture, oxygen, plant nutrients and something into which the roots can anchor. However, these essentials have to be married together carefully in order to create useful compost for plant raising.

Blending different grades and types of bulky organic materials, and possibly adding mineral aggregates such as grit, sands or perlite, should create media that hold moisture without becoming waterlogged, and provide sufficient pore spaces to trap air for the roots to absorb.

Assessing the textural qualities of a medium by running it through your fingers is a good indicator of its ability to meet those requirements. It should flow freely, with variable particle sizes, and be neither coarse and lumpy nor too fine; it should feel moist without being wet and sticky. With the right textural qualities it should be easy to fill any size of container and produce a level, smooth seedbed. The filled containers should wet up quickly either by watering overhead or from below by standing pots in a water bath.

Stable nutrient levels

At the propagation stage plants are susceptible to fluctuations in nutrient levels: they can be deprived of, or over-supplied with, essential plant foods if the organic content in compost is not stable and is still breaking down. The organic content in peat-free media is not as decomposed as peat and therefore more likely to create plant-nutrient deficiencies or toxicity. Gardeners depend on the manufacturers to make media that are stable with nutrient levels suited to seedlings and rooting cuttings.

Media compared

At RHS Garden Wisley we ran a test to make a simple comparison between some proprietary peat-based and peat-free propagation and multipurpose composts; it also included traditional loam-based (John Innes) propagation media. The main organic ingredients in the peat-free media were bark, coir and green waste. Some also included sterilised soil in their mixes

To see how well media performed we sowed containers with different easy-to-grow flower and vegetables seeds.

Small seeds (lobelia) were mixed with fine sand to aid sowing; this mix was broadcast over the surface and left uncovered. Medium-sized seeds (lettuce) were surface-sown and covered with 5–10mm (3/16–3/8in) of medium. The large bean seeds were simply pushed straight into the compost.

All were put in a warm propagator.

Seedlings and cuttings

The speed and overall germination rate was observed along with the general quality of the seedlings produced to a stage ready for pricking out. We also prepared pelargonium cuttings (see p56) to compare how well they rooted. The cuttings were inserted around the edge of a small pot, and watered in to settle the compost around the cuttings; these were then placed in a warm propagator to allow them to develop root systems. Our evaluations were based on the time taken to root and the quality of the root system. ■

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SEEDS SOWN IN WIDELY AVAILABLE GROWING MEDIA

	PEAT-BASED	LOAM-BASED	GREEN WASTE	WOOD FIBRE	COIR
LOBELIA					
LETTUCE					
BEANS	<p>The peat-based propagation medium had a fine texture, producing a smooth seedbed, and wetted up easily.</p> <p>A high proportion of all seed types germinated. Seedling development was rapid and the growth a little soft, making it urgent to prick them out before they deteriorated.</p> <p>A peat-based multipurpose compost was also tested and provided similar results, although some particularly coarse fibres and hard lumps had to be picked out in order to make a smooth seedbed for the finest seed.</p>	<p>Loam-based propagation media are made from a mixture of finely screened loam and sand. The media tested produced a fine, smooth seedbed and wetted-up easily by standing in a water bath, which preserved the fine, smooth surface from capping (formation of a surface crust).</p> <p>Germination was slowest in this medium; the fine surface-sown seed struggled to anchor into the dense surface. Larger seeds, however, performed much better, producing good-quality seedlings at the pricking-out stage.</p>	<p>This medium, formulated for propagation, was mostly green waste with some composted bark and mineral aggregates. It had a moist, crumbly texture; producing a level seedbed was not easy. On wetting, the medium soon retained water; the pots needed a long period to drain well before the surface was suitable for sowing. Germination levels were high, producing good-quality seedlings soon ready for pricking-out.</p> <p>A multipurpose equivalent of this medium proved coarse and lumpy, making it difficult to prepare a suitable seedbed.</p>	<p>Predominantly derived from shredded wood, with a coarse texture arising from fibrous wood fragments, it was difficult to create a level seedbed with this medium – the surface was open and uneven, so smaller seeds might not have good contact with the medium.</p> <p>Water drained through quickly; seedlings required frequent light watering to keep the immediate rooting zone moist. Larger seeds, however, fared well. The manufacturers do state that this medium is unsuitable for small seeds; the test served to confirm this.</p>	<p>Coconut fibre-based media with added vermiculite look and handle similarly to peat-based composts. The coir propagation medium tried here was easily handled, producing a smooth, level seedbed. It wetted-up and drained quickly.</p> <p>Germination was erratic with low counts of small and medium seeds; larger ones germinated slowly and produced compact plants. These findings were surprising, as good results have been previously observed with coir at Wisley. A multipurpose compost gave similarly poor results. ►</p>

PELARGONIUM CUTTINGS: HOW THE MEDIA FARED



PEAT-BASED PROPAGATION MEDIA

Rooting took about 14 days and cuttings were ready for potting into individual pots a week later. During the propagation phase, the foliage remained green. The top growth was quite 'soft', with expanding new leaves and some stem stretching. The root system was extensive and had moved through the medium, penetrating almost to the bottom of the container.



LOAM-BASED PROPAGATION MEDIA

This medium was dense and heavy; after 14 days, rooting had started but had not penetrated far into the compost, and the top growth had become hard and pale. At 21 days the cutting growth remained poor; the amount of root had not increased significantly and had not penetrated more than 3cm (1 $\frac{3}{8}$ in) into the medium.



GREEN-WASTE PROPAGATION MEDIA

Cuttings produced roots in 14 days, and these continued to develop in number and length over a 21-day period prior to potting up. The foliage remained green; there were not any obvious signs of new vegetative growth, the stem hardening a little. The root system was quite extensive and had penetrated well into the medium.



WOOD-FIBRE MULTIPURPOSE MEDIA

This fibrous medium posed some problems in keeping the cutting upright, and therefore they had to be inserted quite deeply. Rooting after 10 days was quite extensive and at 21 days had increased in volume and penetrated to the bottom of the container. The leaves remained green, new leaves expanded and stem length increased.



COIR PROPAGATION MEDIA

After 10 days, the cuttings had produced a large callus and some rooting had started to penetrate the medium. However, the rooting was slower and more limited than experienced at Wisley in the past with coir. The leaves held a good green colour; new leaves were expanding and the stems remained quite soft.



www.rhs.org.uk For more information, search 'Peat-free media' on the homepage of RHS Online



GROWING AND PROPAGATING USING PEAT-FREE MEDIA

Paul Alexander's research and even the simple tests done by Nick Morgan indicate that changing to peat alternatives will require gardeners to make changes in cultivation, especially in propagation, when plants are at their most sensitive.

Key points to consider:

- Different requirements may not be served by the same bag of compost. Media specifically manufactured for propagation performed better for this purpose than multipurpose composts, particularly for smaller seeds. Multipurpose composts, despite their descriptive name, are not formulated specifically for seed sowing or raising cuttings.
- Coir-based composts are the most peat-like of the products tested here.
- Watering regimes of peat-free media differ from those of peat. For example, propagation media made from composted green waste were found to be easily overwatered. A light touch is needed when preparing containers of these products to avoid smearing and compacting the surface.
- Multipurpose composts based on wood fibres need to be finely milled and well composted to be suitable for seed sowing.
- As supplied, the composts were compressed in their bags. Ensure that the medium is 'fluffed up' and aerated before transferring to the containers. Media that feel warm are still decomposing and should not be used.