IUCN | National Committee United Kingdom

Peatland Programme

Peat-free Horticulture

demonstrating success

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The International Union for the Conservation of Nature (IUCN) is a global organisation, providing an influential and authoritative voice for nature conservation. The IUCN UK Peatland Programme promotes peatland restoration in the UK and advocates the multiple benefits of peatlands through partnerships, strong science, sound policy and effective practice.

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FOREWORD

We have come a long way from the polarised debates of thirty years ago between peat extraction for horticulture and peatland conservation. Now we face the climate and biodiversity crises that demand a focus on securing a sustainable horticulture industry alongside protecting our wonderful peatlands and all the benefits they bring to society.

I recall an early experience in my career visiting a wonderful lowland peatland in the central belt of Scotland. The contrast between the industrial scene of dust shrouded heavy machinery working across a barren, drained, peat extraction site and the natural peatlands with their carpets of mosses and glistening pools over which dragonflies hovered, filled me with horror. Years of campaigning followed with wave after wave of public action yet still the supply and demand for peat in horticulture continued.

The turning point came as the horticulture industry itself recognised that a reliance on peat was unsustainable and that society expected greater environmental consideration of the climate change and biodiversity impact of businesses throughout the supply chain. Gardeners themselves including high profile media personalities have been championing the peat free approach. Greater thought is being given to the impact that materials we buy have on the environment. Retailers are increasingly expected to avoid supplying unsustainable materials and to provide the information to allow us to make judgements on the products on the shelves.

The horticulture industry now has an exciting array of peat-free products not only helping diversify the industry and avoiding risky reliance on a single product but also opening the door for many exciting new businesses. The innovation and entrepreneurial spirit shown by so many people has also resulted in a variety of products and new manufacturing methods. In the process of moving to peat-free horticulture we are seeing wider environmental benefits beyond peatlands utilising by-products and waste materials, many of which are better suited to specific horticulture tasks than peat. We have also seen great examples and leadership from organisations, some of them showcased in this publication, who have demonstrated the high-quality results that can be achieved without the use of peat.

I am delighted that we now have a situation where government, businesses environmental and gardening bodies and the gardening public are working together on a shared goal to safeguard our peatlands and bring about a transition in the way we garden and supply materials for our gardens. The urgency for change is greater than ever and this report comes at a time when the spotlight is on our world leaders gathering at the United Nations Climate Change Conference (COP26) in Glasgow 2021. The world not only needs to recognise the interconnected, twin crises of climate change and biodiversity but also to see that we have solutions and can make a real change to the way we live our lives. Demonstrating Success: Peat-free Horticulture is one example of how helping nature can help our economy while tackling global problems.

Stuart Brooks
IUCN UK Peatland Programme Chair and Head of Conservation National Trust for Scotland

Great sundew (*Drosera anglica*) (© Tina Claffey)

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1. INTRODUCTION

At a time of global realisation of the climate change and associated biodiversity crises, there is a need to examine all aspects of the way we live and to make changes that will address the problems we all face.

A major aspect of many people's lives is horticulture: the cultivation of plants in gardens and allotments to produce food and medicinal ingredients, or for comfort and ornamental purposes. Gardening enhances our health and well-being as well as helping our environment and being a valuable connection with nature. The challenge now is to ensure that this hugely important cultural, social and economic activity is managed sustainably throughout the chain of supply of materials, the way they are used by commercial growers and in our own gardens. Sustainable horticulture is a goal that is necessary and achievable, with huge progress having been made in recent years.

Bean in pot (© B Otway)

Pumpkin (© B Otway)

A long-standing matter of environmental concern is around the use of peat in horticulture, primarily as a material for growing plants and improving the condition of soil.

The IUCN UK Peatland Programme in its UK Peatland Strategy (IUCN UK peatland Programme 2018) has shown that over 80% of the UK's peatlands are in a damaged state and in urgent need of recovery measures. The strategy has a goal for 2 million hectares of peatland to be in good condition, under restoration management or being sustainably managed by 2040. Peat extraction for horticulture involving the drainage of the peatland and removal of peat has a damaging impact on the important benefits of peatlands including biodiversity, climate change, water and archive properties (IUCN UK Peatland Programme 2014). The high environmental impact of commercial peat extraction has led to calls for a ban on its use and a move towards peat-free horticulture.

This report showcases the wide-ranging successes that have been experienced in peat-free horticulture and explores the opportunities for a thriving and lasting horticulture industry as well as a rewarding gardening experience.

References:

IUCN UK Peatland Programme (2018) 'UK Peatland Strategy 2018-2040', Available at: https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/2018_UK%20Peatland%20Strategy_DIGITAL.pdf (Accessed: September 2021)

IUCN UK Peatland Programme (2014) 'Briefing Note No 6 'Commercial Peat Extraction", Available at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/6%20Commercial%20peat%20extraction%20-%205th%20November%202014_0.pdf (Accessed: September 2021)

2. PEATLAND EXPLOITATION

It has been recognised for many years that there are environmental problems with the commercial extraction of peat for use in horticulture. Calls for an end to the practice have been made in at least the last three decades. (Lindsay 1992, Barkham 1993, Wildlife Trusts 2020).

Peatlands are rare wetland ecosystems with a unique range of plants and animals adapted to thrive in peatland habitats. Peatland drainage for agriculture, forestry and built development as well as peat extraction for use in the power and horticulture industries have all contributed to declines in peatland biodiversity.

Peat is the preserved remains of dead plant material laid down over millennia to form deposits up to 12 metres deep in some UK peatlands.

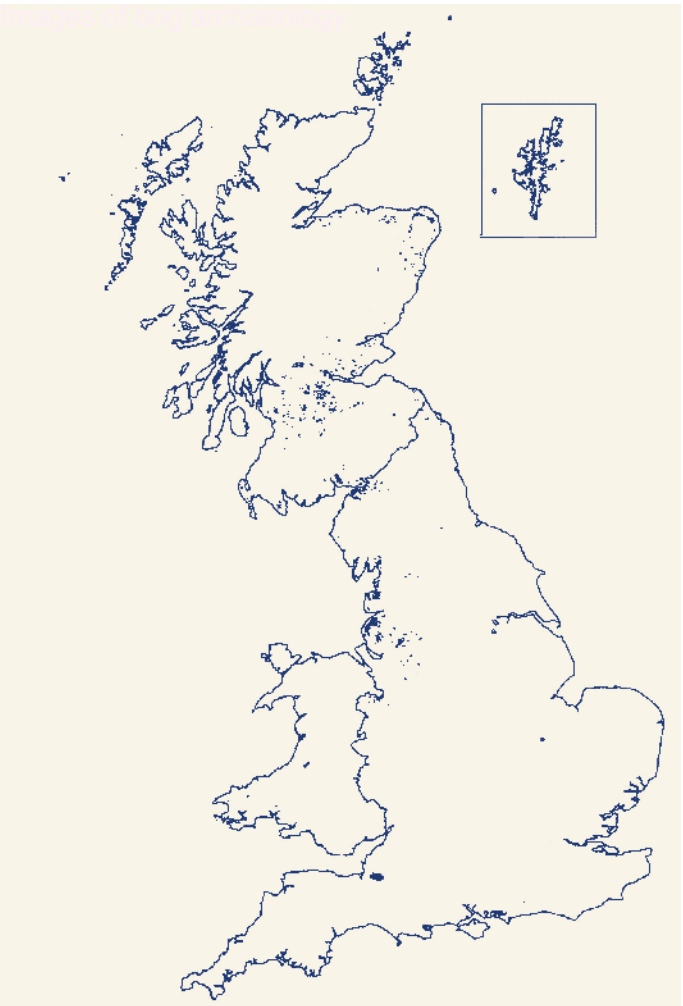
Cut and cleaned blanket peat face, Co. Kerry, Ireland (© Benjamin Gearey)

Peatlands in the UK cover 2.7 million hectares. The most widespread peatland type, blanket bog, occupies much of the uplands. Lowland raised bogs have a more restricted distribution with remaining undisturbed areas covering only 3,800 hectares; less than 5% of the original area. The few raised bog remnants are located across: north England; central, south and east Scotland; and Wales, with fens primarily in the south and east of the UK.

Historic data indicated that commercial peat extraction occupied 4,500ha of peatlands (UK Centre for Ecology and Hydrology 2020). More recent extraction data for horticultural use of peat in the UK identifies approximately 1600ha of currently active sites, although a larger area, particularly in Scotland, has planning permission for extraction covering 7500ha (DCLG 2016). While the extracted area represents a small proportion of the overall peatland area, peat removal is mostly focussed on the rare and declining lowland raised bogs habitat type. This specific type of peatland has been targeted to supply the horticulture industry mainly because they are deeper, are closer to the market and are found in drier conditions than the upland and north-western blanket bogs where extracted peat is more difficult to dry.

Lowland raised bogs are a priority for nature conservation across Europe, with some of the best remaining examples occurring in UK. Because of the limited and fragmented condition of the remnant lowland raised bogs, there is an urgent need for habitat restoration to help protect rare and declining peatland biodiversity as well as providing some resilience to a changing climate.

Extent of peatland in Britain and Ireland (from Evans, C., Artz, R. *et al* 2017. Implementation of an emission inventory for UK peatlands. Report to the Department for Business, Energy and Industrial Strategy. https://naei.beis.gov.uk/reports/reports?report_id=980; and Connolly, J. and Holden, N.M. 2009. Mapping peat soils in Ireland: updating the derived Irish peat map. Irish Geography42. 343-352)



Distribution of soils from former or existing lowland raised bog habitats in Great Britain (from Lindsay, R.A. & Immirzi, C.P. 1996. An inventory of lowland raised bogs in Great Britain. Scottish Natural Heritage Research, Survey and Monitoring Report. No. 78)

In recent years the contribution of peat bogs as a carbon store have also been widely recognised. Peatlands only occupy about 3% of the Earth's land surface but are the largest terrestrial carbon store. UK peatlands cover around 12% of the land area and store 3.2 billion tonnes of carbon, more than twice that of the UK's forests. When peatlands are drained and the peat extracted, the water loss results in the carbon store releasing carbon dioxide, a 'greenhouse gas' responsible for climate change. The carbon impact of peat extraction includes the removed peat which, once taken from the wet anaerobic conditions of a healthy bog, quickly oxidises within a few years. In order to extract peat, the peatlands are drained and surface vegetation removed resulting in additional carbon emissions from the bare peat surface and from adjacent hydrologically compromised areas of unworked peatland.

Peatlands are also valuable as a water resource, providing clean drinking water and helping in flood management. Drinking water companies have experienced problems due to water arising from damaged peatlands containing drained and/or disturbed peat. Dissolved carbon and particulates that need to be removed from the water supply impose a cost on companies and water customers. While most drinking water arises from upland blanket bogs, there are a number of cases of drinking water supplies being affected by peat extraction works within lowland catchments.

The wet anaerobic conditions in peatlands also preserves ecological information and cultural materials including iron age human bodies and artefacts of huge significance for archaeology. These peat deposits also hold important information about past climates and the environment, which could be vital to understanding the current climate change implications provided this natural archive remains undisturbed.

The natural formation of peat is very slow, typically with less than 1mm per year in the UK. Commercial peat extraction is capable of removing thousands of years of peat growth over a few years. Even if a commercially worked peatland is restored, there is no prospect of replacing the peat that has been removed in human lifetimes. Peat extraction is therefore unsustainable.

Prehistoric trackway under excavation. Lisheen Bog, Co. Tipperary, Ireland (© Muireann Ni Cheallachain)

Ireland Peat cutting (© Clifton Bain)

Peatlands can be restored with the raising of water tables, reducing greenhouse gas emissions and supporting recovery of peatland vegetation and associated wildlife. The UK has many good examples of peatland restoration (Cris *et al* 2011) including rewetting of former peat extraction sites. The potential for successful recovery of damaged peatlands does not justify further peat extraction as the full range of species and habitats is slow to recover, if it does at all, and the archaeological resource is lost for ever. The sooner restoration can be initiated, the greater the chance of success.

Near natural bog (© Emma Goodyer)

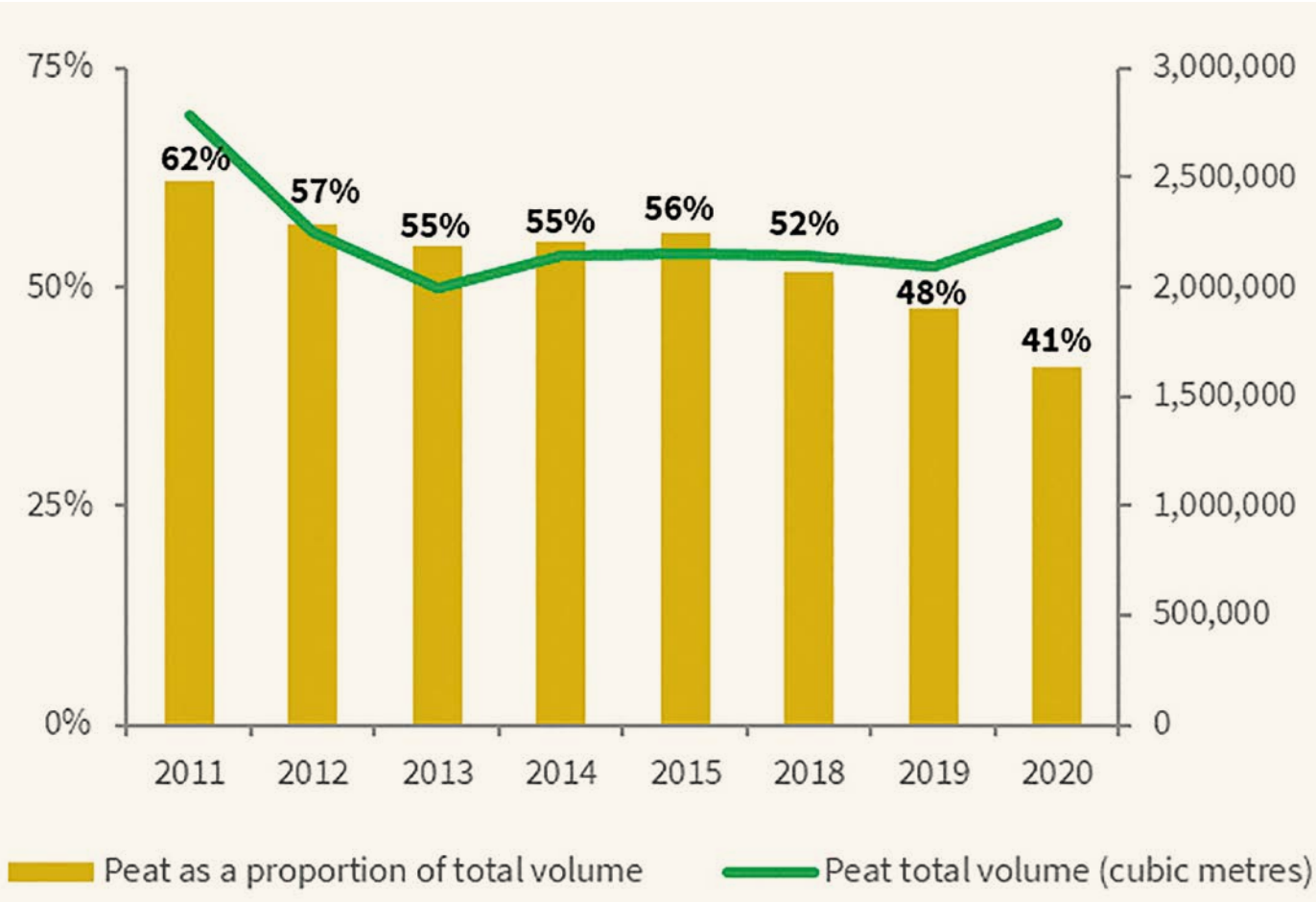
Blawhorn Moss (© Clifton Bain)

3. HORTICULTURAL USE OF PEAT

Peat has been a major ingredient in UK growing media since the 1970s. The horticultural industry uses around 4 million cubic metres of growing media per year, with around 79% of this being used by the amateur gardening market. The volume of peat used by professional growers has remained fairly static despite the value of UK produced ornamental plants increasing by 23% in value between 2011 and 2019 (Defra Horticulture Statistics). The amount of peat used by amateur gardeners has continued to increase, however; there was a peak during the pandemic in 2020 with around 3 million new gardeners.

In 1999, peat made up 94% of the total growing media volume. This has reduced to around 41% currently, but there is still a large volume of peat which needs to be removed from the market.

The uptick in peat use in 2020 is thought to be due to the large increase in gardening activity during the Covid pandemic with an associated increase in sales of growing media as well as problems in the supply chain of other materials due to the pandemic.

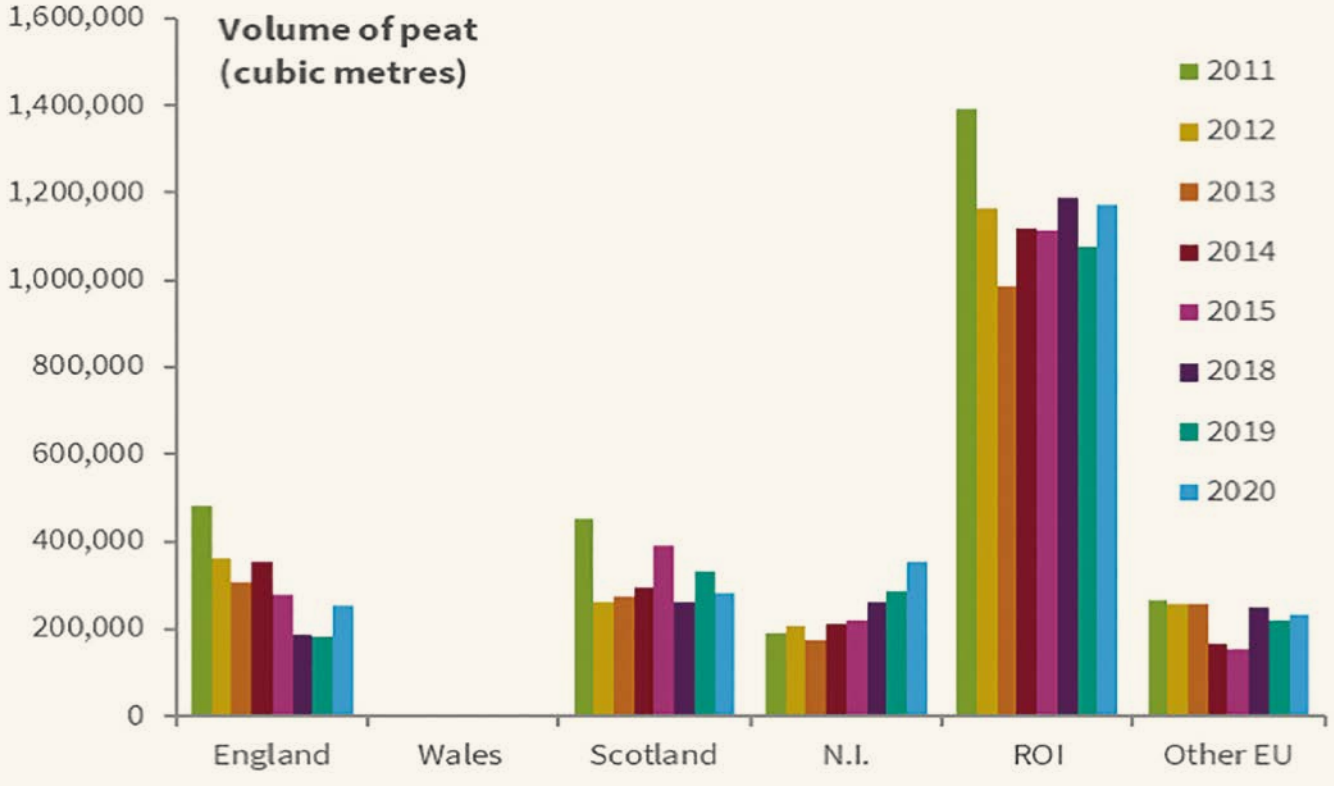


Peat as a proportion of total growing media use, 2011-2020 (HTA/GMA/AHDB/Defra 2021)

Sources of peat

Historically the majority of the peat used in UK growing media has been from the Republic of Ireland. However, Ireland's largest producer, Bord na Mona, ceased peat extraction for horticultural use from its 50,500ha of peat bogs in 2019. Professional growers have also used peat imported from the Baltic states because of its favoured characteristics. Increased peatland protection is now restricting supplies from these areas.

There are two main markets for growing media: the amateur gardening (retail) market and the professional grower market.



Sources of peat used in UK horticulture, 2011-2020 (HTA/GMA/AHDB/Defra, 2021)

Retail growing media

Of the 5.44 million cubic metres of growing media used in 2020, 79% was used by amateur gardeners. Removing peat use from retail products will therefore have the biggest impact. The main products used by gardeners are ‘multi-purpose compost’ and ‘grow bags’. These have often been sold cheaply as a ‘loss leader’ to get people into garden retail outlets and it is known that some gardeners are adding them to soil as a conditioner. Recent RHS data collection indicates that as much as 33% of ‘multi-purpose compost’ may end up being dug into gardens because gardeners are not aware that other materials would be better for this purpose. Peat is a very poor soil conditioner as it is quickly broken down when dug into the soil, and more public education is needed to stop this wasteful use of growing media when there are many other better soil conditioners available, such as green compost (the product from commercial composting of organic waste, including kerbside garden waste collection) or digestate fibre.

The term ‘multi-purpose compost’ is unfortunate and has probably contributed to confusion in the retail market. Until recently most ‘multi-purpose compost’ was mainly composed of peat and was not a composted material at all. The true definition of a compost is the product of a composting process, so green compost made by composting plant materials is a true compost but is not suitable for use undiluted as a growing medium because of its high nutrient levels.

Professional growing media

Commercial growers use growing media to raise plants in containers. The biggest sector is the ornamental plant growers, supplying the garden and landscape markets. Growing media are also used to raise young vegetable and salad plants and there is a large volume used for growing soft fruit in bags, particularly strawberries. The soft fruit sector has already transitioned away from peat to coir, despite it being more expensive, because it gives better results – a good example of how industries can adapt, although some growers are concerned about the longer-term supply of coir if the demand for it increases globally. The protected salad industry (greenhouse-grown tomatoes, peppers etc.) in the UK has mostly moved into hydroponic growing systems which allow full control of the growing environment and support the plant roots in an inert material such as rockwool or perlite. Some hydroponic growers have changed from using rockwool to coir to support plant roots because of the poor environmental credentials of rockwool.

Curlew (*Numenius arquata*) (© Norman Russell)

4. PEAT-FREE HORTICULTURE

Amateur and professional horticulture was largely undertaken without peat before the 1950s. Peat became popular in the UK for a number of reasons in addition to being a relatively low-price product; it is light and easy to transport and is inert, therefore carries added synthetic controlled release fertilisers easily. Its use blossomed alongside the growth of garden retailers who could use peat-based growing media to provide container grown plants throughout the year.

Many countries have low peat availability and have huge horticultural industries, e.g. in the USA the sector is valued at £14 billion (almost 11 times that reported by Defra for the UK ornamental horticulture sector, although the wider economic value of the UK horticulture industry, including associated service industries, has been estimated by the RHS at nearer £12 billion). These countries often use organic raw materials such as bark, wood fibre, coir and composted products. Many of these materials have been trialled and developed over the last few decades for use in the UK's horticulture industry.

Sphagnum moss has potential as a high-end material for professional horticulture use and it has been shown that this can be sustainably grown and harvested as part of peatland restoration. There are also opportunities for *Sphagnum* farming as part of protection and recovery of adjacent nature management areas.

See case studies on *Sphagnum* production and manufacture **F,G,H**

No one material is going to replace peat in all its uses and a wide range of peat-free materials will be needed to supply the horticulture industry. The types of materials used in the retail market may be different to those in the professional grower market, where greater consistency of growing media is required. Over-reliance on a single product is problematic for the industry, as has been shown when weather conditions have disrupted the supply of peat in the past or the Covid pandemic caused issues for global shipping.

The peat debate has focussed attention on the responsible sourcing of raw materials used in the horticultural industry. In the UK, the major manufacturers of growing media are members of the Growing Media Association (GMA). In conjunction with Defra, the GMA have developed the Responsible Sourcing Scheme for Growing Media (RSSGM) to assess the sustainability of the major raw materials they use. This covers energy use, water use, social compliance, habitat and biodiversity, pollution and resource use efficiency. A decision tree is used to score a bulk ingredient against each of these issues and the proportion by volume of that ingredient in a particular product (such as a growbag) to give an overall score. The scores will be clearly shown on bags so that consumers can chose products based on the 'Responsibility Index'.

a. Opportunities

A sustainable horticulture industry not only falls in line with global commitments on sustainability, climate change and biodiversity but provides a more competitive, secure, viable and long-term economic opportunity with associated employment benefits as recognised by the principles of a green recovery.

The wide range of peat-free products diversifies the supply chain as well as incorporating different materials best suited to a particular purpose, some of which out-perform peat. Several mainstream producers are supplying products targeted at different uses for amateur gardeners and professional growers.

See case studies on coir, Evergreen and Melcourt **A,B,C,E**

The gardening retail sector is rapidly approaching an end to sales of peat in growing media and soil conditioners with significant advances in the supply of peat-free plants. Nursery plant growers across many different plant groups are successfully utilising peat-free growing media. See case studies on retailers and nursery growers.

See case studies on retailers and nursery growers **K,P,Q,R**

A number of the products can bring wider environmental benefits such as composted green waste helping reduce the need for landfill.

See case studies on Forth Resource Management and the Greener Gardening Company **D,J**

Some products arise as by-products from other sustainable industries.

See case studies on digestate fibre derived from plant based energy production **I**

Several major environmental and gardening organisations have shifted to peat-free horticulture in their own public gardens and gardening retail outlets as well as providing a range of training and advice for peat-free gardening.

See case studies on RHS, NT/NTS and Garden Organics **L,M,O**

This has been accompanied by a ground swell in individual action and community groups encouraging peat free horticulture.

See case studies on Beth Otway **N**

There needs to be better appreciation and understanding of how our gardens work, different plants' needs and their connections with nature, with gardeners appreciating, for example, the role of home composting and how to manage soils without excessive inputs of outside materials. Gardening in harmony with nature, without artificial fertilisers, pesticides or bought-in growing media can have much wider benefit for nature, our health and the climate, as well as being peat free (Plantlife 2018).

Many plants do not need peat or other bought-in growing media:

- Sowing annuals from seed directly into the soil avoids the need for trays or pots of compost. This works well with cornfield annuals like cornflowers and poppies, garden plants such as marigolds, zinnias and annual clary sage, as well as a wide range of vegetables.
- Seed sowing compost, can be made at home with a mix of finely-sieved garden loam, sand and leafmould. This is especially helpful for gardeners who want to sow flowers and vegetables under cover early in the year.
- Many meadow plants prefer infertile soils and their seeds will grow perfectly well in pots and trays of infertile, loamy soil (which can be harvested from molehills).
- Seaside plants such as sea kale, sea campion, thrift, kidney vetch and viper's-bugloss will grow in very sandy soils or homemade compost with lots of sharp sand added (1 part garden compost or loam to 3 parts sharp sand).
- Most perennials which form clumps over time can simply be lifted, divided and replanted back into the soil straight away without the need for compost. Examples include herbs such as chives, natives such as bluebells and ornamentals such as hardy geraniums and lady's mantle.
- Many trees and shrubs can be grown from seed planted directly in garden soil, including hawthorn, oak, ash, elder and roses.

Bog gardens do not need peat. They are fantastic places to grow water-loving plants but, since most other composts are too fertile, people often fill them with *Sphagnum* peat. Instead, recycled homemade compost can be used if it has been used to grow pots of bedding plants or shrubs for several years, decreasing its fertility.

Potting mixes using loam and sand or home-made green compost for container growing are easily made up at home. They can be adjusted to the type of plant, its maturity and container size. Advice on peat-free mixes, how to make them as well as home composting. Are available from several organisations including Plantlife and Garden Organic.

b. Challenges

Delivering peat-free horticulture is challenging but in the face of a climate and nature emergency, there can be no place for the use of peat in future years. However, switching from peat to another growing media which has another set of environmental problems must be avoided. Rather, the full supply chain, including sourcing processing, packaging and usage, should be examined for its environmental footprint. Unsustainable levels of demand and wastage of scarce and valuable materials also need to be addressed.

Price

The price of peat has until recently been lower than the peat-free products, but recent rises in the price of peat have reduced that gap. However, the price of peat still does not reflect its environmental cost to society and gives the impression of a cheap, disposable material. Acceptance of higher prices for soil conditioners and growing media would convey that these are high-value products and would allow better competition for raw materials from other industries. It would also enable the research and development costs of peat-free materials to be better covered.

Quality

Industry demands consistent quality. Supply can be difficult with new peat-free products but this is often a matter of improving supply chains as demand increases. In the early days, some of the peat-free products being sold were of very poor quality; this has improved hugely now due to the time and money invested by the UK horticultural industry and growing media producers in particular.

The largest volume of peat is used for low technical demand amateur gardening products where it can more easily be replaced by peat-free materials than in the professional grower sector.

Gardener Awareness and Education

Gardeners sometimes have a limited understanding of which product to use for different situations, for example the term ‘planting compost’ can be confusing. A gardener may not know if this is a product for use in a container to grow a plant or if it is a soil improvement product.

Most gardeners have a limited appreciation of the origins of peat and the importance of the peatlands it comes from. Until recently, bags of growing media did not state the peat content so consumers could not make informed choices.

Cowberry (*Vaccinium vitis-idaea*) (© Clifton Bain)

Availability of peat free products

Manufacturers are investing in the development of peat-free products and the pace of this is increasing; progress is mainly being slowed by a limited availability of good quality raw materials. There are also concerns within the horticulture industry over competing demands for the raw materials, such as wood fibre, from other industries.

Better promotion of the wise use of materials is important to avoid ‘wasting’ products such as using growing media and ‘Grow Bags’ as soil conditioners when more readily available and better suited products exist.

Packaging

A large amount of plastic waste is generated through sales of horticulture products with millions of bags of growing media and soil conditioners produced and disposed of every year. Manufacturers are working towards alternative packaging and Melcourt Industries have a ‘Bag for Life’ scheme operating for their SylvaGrow product at participating garden centres.

Technical demands of professional growers

Commercial nurseries operate on tight economic margins and need products that enable well grown plants, with low failure rates. Nurseries are also dependent on consistency of growing media quality and a reliable supply. They are often growing plants to a tight schedule for despatch by a certain week number and any disruption to this can have a major impact on profitability. Retailers will also reject products or plants that fail to meet the required specification (for example plant height).

High quality peat-free industries exist globally so in principle it is possible to make the shift, as has happened in the soft fruit industry.

Encouraging gardeners to accept less than perfect looking plants can also help the industry deal with variation in growing media in the same way that supermarkets promote ‘wonky veg’ through their ‘perfectly imperfect’ initiative to reduce waste.

There are a significant number of container-grown tree producers now using non-peat growing media, such as Melcourt’s SylvaGrow, right from raising tree seedlings, producing trees for garden centres in 15 litre pots, through to containerising large trees in 50-60 litre pots upwards. Forest and Land Scotland only uses bare root stock and no growing medium is used in its main tree nursery. When tendering for stock to plant, they reference the UK Government buying standards which specifies that neither soil improvers nor growing media should contain peat. It also specifies that ‘from 2015 plants must not be supplied in or with growing media containing peat’ but acknowledges that ‘a residual amount of peat may remain from its use in the original propagation of a plant’ (Campbell 2021).

Extant Peat Extraction Permissions

There are still a number of existing peat extraction permissions across the UK and particularly in Scotland with around 86 permissions of which only 14 are known to be currently extracting peat (IUCN UK PP 2017).

Tackling the use and sales of peat in the UK without dealing with the existing extraction permissions simply risks continued exploitation of these peatlands with the peat being exported. Bringing an end to permissions and securing early remedial works to rewet the peatlands, has been proposed through the use of a ‘sunset clause’ under planning regulations (SCCS 2018).

There are opportunities for owners of peat extraction sites to rewet damaged areas and incorporate the growing of new peat-free materials such as *Sphagnum* moss.

Bog Rosemary (*Andromeda polifolia*) (© Tina Claffey)

5. DELIVERING A RAPID TRANSITION TO PEAT-FREE HORTICULTURE

Global society is responding to the need for a rapid transition to sustainable living. Meeting climate challenge requires net zero and beyond to remove carbon. There is a global agreement to limit global warming to 2 degrees, with calls for even lower warming targets. Meeting net zero in the UK requires that all peatlands are protected and that all damaged areas are restored.

Because of the degraded and deteriorating state of the UK peatlands, in particular the rare and fragmented remnants of lowland raised bogs, the species and habitats which depend on these ecosystems are vulnerable. There is an urgent need to extend the area of peatland habitat through restoration to ensure viable and healthy wildlife populations and ensure resilient and robust populations in the face of a changing climate.

As with other all other sectors, the horticulture industry has a responsibility to ensure carbon emissions are cut throughout the supply chain and that the impact on the natural environment is turned into a positive one. The case studies in this report demonstrate that such a goal is achievable but also show the wide ranging opportunities for businesses, individuals and communities to benefit from this transition.

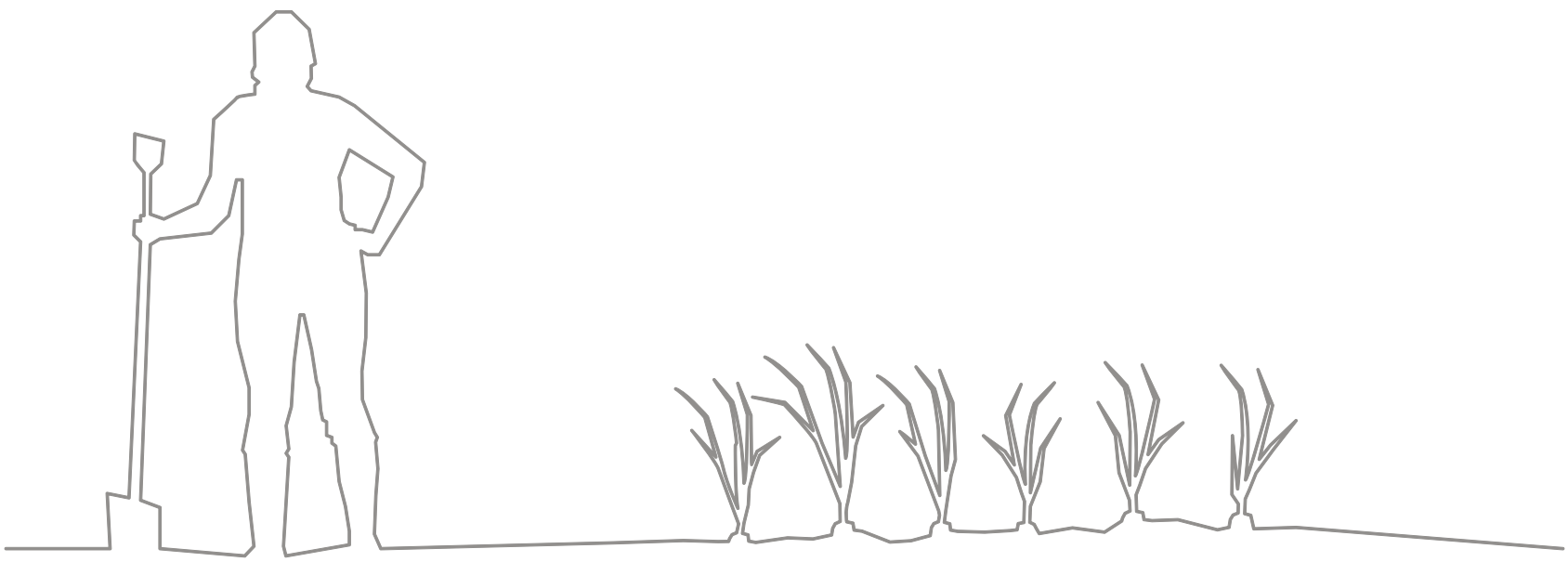
There have been discussions between government, environmental NGOs and gardening bodies, retailers and the horticulture industry over several years. A number of key issues have been identified to help progress a transition to peat free (IUCN UK PP 2017b).

The move to peat-free horticulture requires an appreciation among customers that products are valuable natural resources and the price should reflect that. Growing media need to be valued more as one of the most important factors when growing healthy plants and not thought of as cheap, low-value products to be wasted.

In the amateur market it will be necessary to move away from the idea of a ‘multi-purpose’ product which does everything; with peat-free products, formulating one product that can be used for everything from seed sowing to potting up large trees is not feasible and was not a great idea even with peat-based products. Growing media should be used for container growing and not soil improvement and more consumer education will help get this message across.

Labelling of amateur products to clearly state what is in the bag and its sustainability will help guide consumers. The Growing Media Association Responsible Sourcing scheme will play a key role in this. Clear messaging around the use of the right products for the right job will also help gardeners to make informed purchases.

The retail sector has a key role to play in urgently committing to being peat free in all gardening retail products including growing media, soil improvers and container-grown plants.



Some retailers are already offering support through in-store and online expert advice and information to help steer and guide the gardening customer and this should be adopted by all retailers. Wider education and information for gardeners on sustainable gardening and wise use of peat-free products should continue to be made available through gardening organisations, gardening media, and through formal training.

Community gardening groups such as Britain in Bloom, local gardening and environmental interest groups and individual social media influencers have a key role in promoting peat-free gardening, advice, training and awareness.

Government leadership

Targets are needed for ending peat use in horticulture that are consistent with urgent climate change and biodiversity objectives while addressing the key issues to allow the targets to be met. The planning regulation aspects of existing peat extraction permissions on UK peatlands need to be considered.

Help may be needed in tackling supply chain issues so that products are available in sufficient quantity, for example policies aimed at supporting farmers to provide raw materials such as *Sphagnum* or wood fibre. Policies affecting the supply of materials, including in the forestry and agriculture sectors, need to be assessed to see if there are opportunities for scaling up supply or tackle issues of materials going to lower priority end use.

A 'level playing field' will be needed to help the horticultural industry continue to have access to timber industry by-products which are an essential raw material, but which are also used as biomass for the power generation industry. Power stations cannot utilise the 0-10mm fraction of wood chips so these should remain available to the horticultural industry.

At the local government level, local authorities need to encourage home composting, supplying home compost bins and advice on how to set up home composting systems. Better segregation of household wastes will allow the production of higher quality composts for the horticultural market, both for soil improvers and growing media inclusion.

Hatfield Moor, Humberhead Peatlands (© Clifton Bain)

Four-spotted Chaser (*Libellula quadrimaculata*) (© Tina Claffey)

6. PRODUCERS, MANUFACTURERS AND RETAILERS

Case studies

A. Melcourt Industries Ltd – Specialists in peat-free growing media

B. Horticultural Coir – An excellent and renewable proven peat alternative

C. Southern Trident Ltd: The Coconut – the perfect crop for peat-free gardening

D. The Greener Gardening Company: Green Compost – a sustainable retail growing media diluent

E. Evergreen Garden Care – A journey to a peat free future

F. University of Greifswald - *Sphagnum* biomass produced in paludiculture as a sustainable and climate-friendly raw material for horticultural growing media in Germany

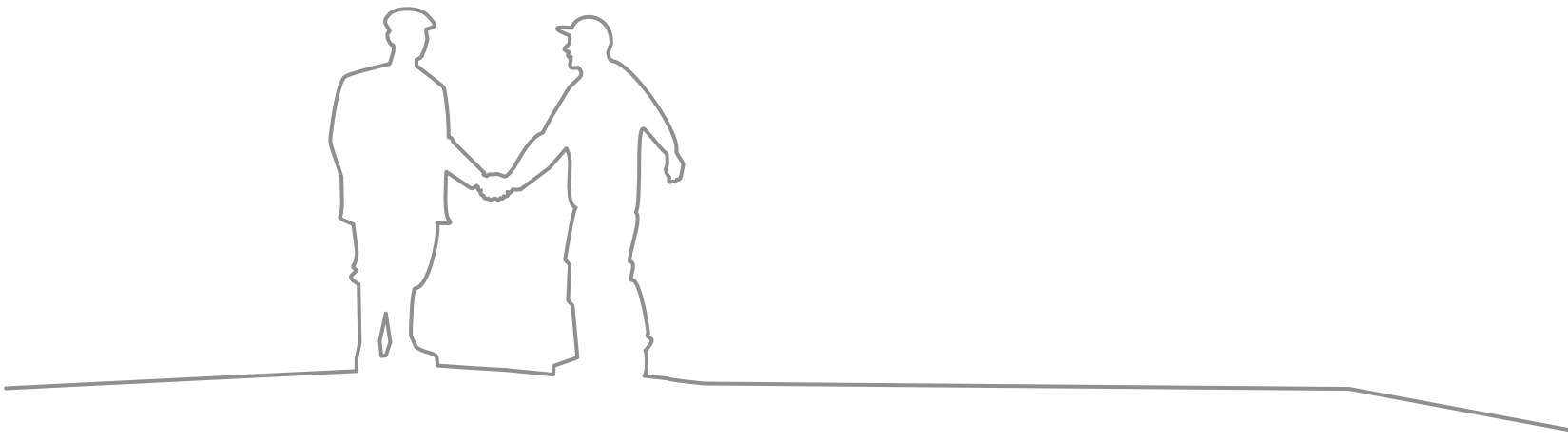
G. University of East London – Growing *Sphagnum* moss at scale

H. BeadaGro™ – Sustainably produced *Sphagnum* as a proven peat alternative

I. West Country Soil Improvement Ltd – A peat-free soil conditioner from an agricultural by-product

J. Forth Resource Management – Top quality peat-free products for home gardeners and commercial use

K. UK Gardening Retailers – Moving towards peat-free



CASE STUDY A
MELCOURT INDUSTRIES LTD – SPECIALISTS IN PEAT-FREE GROWING MEDIA

Introduction

Melcourt Industries started up in 1983, specialising in bark products for a wide range of uses. The company has produced growing media ingredients based on forestry by-products since the early 1990s. Their first peat-free product, Sylvamix® for professional growers, was launched in 2001 and is a blend based on natural wood fibre and fine-grade bark. Although it has always been more expensive than equivalent peat-based growing media, Sylvamix® is used by many professional growers and is particularly suited to long-term crops such as containerised trees because of its stable structure. Melcourt now has a wide range of grower customers using their products to raise anything from seedlings to large specimen trees.

Product development

All the products made by Melcourt have been through extensive trialling, both at their own research facility and on growers' nurseries. The main ingredients in their growing media are wood fibre and fine bark, both by-products from UK sawmills. The advantage these materials have over some other peat alternatives is that they are inherently low in nutrients and have a low pH, so these can be adjusted to suit the crop being grown. A small amount of carefully sourced coconut fibre (coir) is used to increase the moisture holding in some mixes. There has been considerable investment in getting the correct nutrient balance to avoid problems with nitrogen lock-up, which can occur with timber by-products. Their trials have shown that there are very few species of plant which cannot be grown successfully in peat-free growing media.

Expansion into the retail market

Some of the nurseries using Sylvamix® have been selling it in bags to customers buying plants for a while. In 2014, Melcourt responded to the demand for a high-quality retail peat-free growing medium with a new product branded as 'SylvaGrow®'. More recently, their range of retail products has been increased with the addition of peat-free John Innes products.

Future developments

Melcourt has been involved with the soon-to-be-launched Responsible Sourcing of Growing Media (RSGM) scheme since its inception and has already had their first audit. The company is taking part in a government-funded project looking at the development of farmed Sphagnum moss, with partners including Micropropagation Services and Manchester Metropolitan University. They are also interested in researching the potential disease-suppressive properties of some growing media ingredients as an alternative to using fungicides.

"Melcourt is proud of being at the forefront of peat alternative research for over 30 years. There is no doubt that peat use in UK horticulture will reduce to very low levels in the future. Exciting, innovative times lie ahead."

Catherine Dawson (Technical Director)

CASE STUDY A
MELCOURT INDUSTRIES LTD – SPECIALISTS IN PEAT-FREE GROWING MEDIA (CONTINUED)

Melcourt

Plants in Sylvami

CASE STUDY B
HORTICULTURAL COIR – AN EXCELLENT AND RENEWABLE PROVEN PEAT ALTERNATIVE

Introduction

Horticultural Coir Ltd has 25 years of experience in processing and importing coir pith, a waste product of the coir fibre industry sometimes called ‘Cocopeat’ which is produced, entirely naturally, in huge quantities each year. The resultant growing media has a similar air/water holding capacity to peat and a low nutrient content, making it an ideal peat replacement.

The superior drainage and air porosity of coir together with its long-lasting physical stability have contributed to making coir a preferred growing media, particularly in the soft fruit industry. The majority of commercial strawberry growers who previously used peat have now moved to coir, usually in growbags or troughs. The light, dry, compressed form in which the coir arrives significantly reduces the grower’s setting-up costs and this, combined with the longer useful life of the media and its excellent performance, more than compensates for its higher cost per cubic metre.

Background to the company

In partnership with its sister company in Spain, Espafibrac, and Indian partners, Horticultural Coir Ltd has invested significantly over the past 15 years in its large factories in Tamil Nadu, India, and is now one of the biggest processors and exporters from India.

Manufacturing the product

Once removed from the hard coconut shells, the thick husks are processed to remove the long fibres which make up approximately 50% of the husk and which have been for centuries used to make ropes, twines, carpets, matting, upholstery and mattress stuffing etc. The remaining 50% of the husk consists of pithy particles – a problematic waste product until their outstanding properties as a growing medium were commercially appreciated.

Glasshouse with strawberries in coir bags

CASE STUDY B
HORTICULTURAL COIR – AN EXCELLENT AND RENEWABLE PROVEN PEAT ALTERNATIVE (CONTINUED)

Environmental impact

After washing and processing to the required physical particle size, the coir is sun-dried and compressed into blocks before shipping. Thus, although shipping distances are greater than for some other growing media, the actual energy use per cubic metre is not as high as might be assumed, due to the low moisture levels. Once water is reintroduced, the coir expands again to five times its compressed volume.

Horticultural Coir Ltd has been an active founding member of the UK Responsible Sourcing of Growing Media (RSGM) scheme and has already had its Indian factories audited.

Challenges

Delivery times are typically longer than with some other peat alternatives and seasonal monsoon rains can curtail Indian production at certain times of year. With forward planning and an increasing willingness of customers to increase stock levels in the UK, these particular challenges are becoming more manageable. The relatively high stocks in the UK have been an important factor in reducing the impact of Covid on present global containerised shipping challenges.

Drying coir

"Since our small beginnings over 25 years ago Horticultural Coir Ltd has significantly increased its output every year. It has been clear for many years that the horticultural industry must move to using more renewable resources and coir is a superb, proven material, providing wonderful air porosity and water-holding qualities. Coir now has a hugely important role to play in horticulture and our long commitment to R&D is paying off in terms of continual innovations and product improvements every year."

Tom de Vesci (Director)

CASE STUDY C
SOUTHERN TRIDENT LTD: THE COCONUT – THE PERFECT CROP FOR PEAT-FREE GARDENING

Introduction

Southern Trident Ltd is a UK-based company and was initially created by three friends who became the founding directors. Current concerns over the use of peat in horticulture – and its effect on the environment and climate change – fuelled the trio to produce a quality, peat free range of gardening and plant growing products.

The company's Coco & Coir™ range of products is peat free and made from 100% natural, sustainable fibre from coconut husks (coir), which is a natural by-product of the coconut farming industry.

Background to the project

Southern Trident aims to provide professional horticulturists and hobby gardeners 100% sustainable, high quality alternative products to bagged peat-based growing media. The company actively sources product from suppliers in the Tamil Nadu area of Southern India, who use sustainable farming and crafting methods. As a result, their end-product is free from outdated, wasteful and previously unsafe practices, resulting in a gentler and greener approach.

Through its brand Coco & Coir™, Southern Trident offers high quality coir based 100% peat-free growing medium. After harvesting, the coir is stored, ground, washed using rain or recycled water where possible, dried and compressed.

"We were delighted with the results from the Stockbridge trials which reflected the feedback consumers have been telling us. Coco & Coir™ COCO BOOST is specially formulated to provide gardeners with the best 100% peat-free growing medium to grow healthy, strong plants"

Steve Harper (CEO)

Key successes

The team at Southern Trident were reasonably confident that due to the way they source and treat the raw coir in all their products, they had some of the best coir-based growing media on the market. To be certain, they put them to the test. In 2021 they commissioned Stockbridge Technology Centre to conduct extensive growing trials on two of their compost products: Coco & Coir™ COCO BOOST and Coco & Coir Coco Grow+. The results of the trials conclusively proved that Coco Boost outperformed every peat-free compost it was tested against and performed as well as peat-based ones.

With petunias, it performed on par with the peat-based compost, but the plants grew 30% larger with 144% more flowers than a branded peat-free, and 270% larger with eight times as many flowers as an own-label peat-free compost. Coco Grow+ also produced better seed germination rates than all the competition, 15% better than the peat-based compost and three times better than the branded peat-free compost.

Ambition

The Coco & Coir™ range is now stocked in more than 250 UK garden centres and numerous reputable online stores. For 2022, the company is increasing its range to market significantly, including a new range of coir-based bagged composts and other growing media under their new Harmony Gardens brand as well as the established Coco & Coir brand.

All products in the Harmony Gardens portfolio are mixes of coir together with other natural substrates and, for the first time ever, as well as being peat free, are all carbon neutral.

Southern Trident also recently celebrated Soil Association accreditation for all its responsibly sourced coir growing media products, continuing to meet the aims of the company's strongly held values: Green Today. Greener Tomorrow.

CASE STUDY C
SOUTHERN TRIDENT LTD: THE COCONUT – THE PERFECT CROP FOR PEAT-FREE GARDENING (CONTINUED)

Southern Trident cocogrow

Coir and plants

CASE STUDY D
THE GREENER GARDENING COMPANY: GREEN COMPOST – A SUSTAINABLE RETAIL GROWING MEDIA DILUENT

The Greener Gardening Company is a major manufacturer of growing media and soil improvers for the retail market, including B&Q. Their three sites across the UK are capable of supplying bagged growing media throughout the year, and currently supply over 16 million bags a year for the retail industry.

Investment in alternatives to peat

The Greener Gardening Company are working hard to develop, manufacture and supply products using materials that are produced as responsibly as possible, and which will deliver great plants when used by gardeners. They understand the challenges around reducing the amount of peat used in growing media and therefore The Greener Gardening Company have committed to never opening another peat bog and to actively help restore their peat bogs.

They are the only major growing media manufacturer which has its own dedicated green compost sites, taking in green waste from gardens, composting it, screening it and then using it as a core high-quality ingredient within their products.

They are continually trying to reduce their impact on the planet so have been developing products made from green compost, coir, wood fibre and bark, all of which are either completely renewable, recycled or by-products of other industries which would otherwise have gone to waste.

Turning green waste into a valuable resource

The Greener Gardening Company processes over 60,000 thousand tonnes of green waste every year which would have previously been lost to landfill. The green waste is shredded, formed into windrows and composted to the PAS100 and Compost Quality Protocol specification during a 10–12 week process.

The Greener Gardening Company

CASE STUDY D
THE GREENER GARDENING COMPANY: GREEN COMPOST – A SUSTAINABLE RETAIL GROWING MEDIA DILUENT (CONTINUED)

Once the active composting phase is complete, they mature, screen and blend the material into quality growing media and soil improver products as well as manufactured topsoil which is either bagged through their own facilities or sold in bulk to local and national landscapers and groundwork companies.

The head office and main composting site is situated in Kirkby, Liverpool, where some 80 employees work together to produce the final products.

Green compost can be variable, both physically and chemically, contain non-target materials and become heavy when stored during the colder winter months. That said, the company has a range of techniques to ensure the green compost produced from green waste is clean, safe, and as consistent as technically possible.

They have over 20 years' experience within the industry and have long-standing contracts in place with local councils and landscapers. The aim is to further develop the composting process, increase the intake of feedstocks and reduce the amount of material going to landfill.

Screened green compost

''Diverting green waste from landfill has always been one of our key achievements. While good quality, consistent green compost requires a lot of processes, we are proud that we have converted over 1.2 million tonnes of recyclable waste into a naturally sustainable growing media diluent."

Simon Blackhurst (Head of Quality & Innovation TGGC)

CASE STUDY E
EVERGREEN GARDEN CARE – A JOURNEY TO A PEAT-FREE FUTURE

Introduction

Evergreen Garden Care is committed to a peat free future and for the past 30 years have been tirelessly working to create good quality peat-free composts. Hand in hand is the need to restore our peatlands, and the business has worked with partners to pioneer techniques to restore peatland, supporting the best bio-diverse habitats.

Their driving ambition has always been to create peat-free growing media that deliver the same results as peat-based ones. However, there have been challenges. The introduction of different raw materials, which all have different properties, has required a careful balance to create the right formulations. The experienced team of horticulturists at their Levington Research Station have spent decades developing and testing blends. Over the years they have gradually reduced the proportion of peat in the biggest volume products, reaching 40% in 2004.

Investment in Production

Evergreen Garden Care have worked to develop the use of green compost in horticulture in the UK and have exclusive rights to make a highly effective wood fibre ingredient at their own factory.

Their production sites in Hatfield and Gretna have had investment over the years, with a significant injection of £7m in 2021/22 to ensure these sites are equipped for the changing nature of raw materials. At times development has been challenging, especially since the biggest production site, Hatfield, is located next to a protected Site of Special Scientific Interest (SSSI). Evergreen have developed excellent working relationships with Natural England and other partners to ensure a way forward.

Evergreen's journey to peat free can be seen at: www.lovethegarden.com/uk-en/article/your-compost-changing

Fibresmart (© Evergreen Garden Care Ltd)

Quality Results. No compromise.

n 2020, Evergreen launched peat-free products under the UK leading garden care brand Miracle-Gro, as well as a comprehensive range under their heritage brand Levington. The plan is to move away from peat in products for Miracle-Gro by 2024.

Success will always be measured by consumer acceptance. Moving to new substrates means that the products look and feel very different to those based on peat, which is a big step for some consumers. Results in the early days of peat-free products were not always comparable and so consumers' acceptance has taken a long time. However, 2021 has seen a significant shift in demand, with more consumer desire to 'do the right thing', and formulations now being comparable in performance to peat. To increase awareness, Evergreen has a training academy for retail staff to learn the different raw materials and they have increased communication on the topic via social media, www.lovethegarden.com and in-store.

CASE STUDY E
EVERGREEN GARDEN CARE – A JOURNEY TO A PEAT-FREE FUTURE (CONTINUED)

Gro Greener peat free compost (© Evergreen Garden Care Ltd)

"At Evergreen Garden Care, we recognise the importance of moving to a peat free future and over the last two years have seen a significant shift in consumer demand for peat-free products. We have long supported peat-free products and have a history of being the first to market with peat-free alternatives. There are more challenges to come in the supply of raw materials so it is essential that these volumes are substituted without compromising quality. However, I am delighted that the business is fully committed and investing in new equipment on all of its production sites."

Mark Portman (Managing Director)

CASE STUDY F
UNIVERSITY OF GREIFSWALD - *SPHAGNUM* BIOMASS PRODUCED IN PALUDICULTURE AS A SUSTAINABLE AND CLIMATE-FRIENDLY RAW MATERIAL FOR HORTICULTURAL GROWING MEDIA IN GERMANY

Introduction

Because *Sphagnum* (peat moss) biomass has similar properties, it provides a renewable alternative to fossil peat in horticulture. It has been used in orchid production for decades but has also been successfully tested in different mixtures with peat or other growing media constituents for other ornamental plants, vegetables, herbs, shrubs and trees. Generally, it can be concluded that a proportion of up to 50% by volume of *Sphagnum* biomass in potting substrates is trouble-free for most cultivars. The potential proportion of *Sphagnum* biomass in the substrate may be greater for many crops.

For orchid production, *Sphagnum* biomass has only been collected in the wild so far. *Sphagnum* paludiculture (a form of wet farming) aims to cultivate *Sphagnum* biomass for harvest as an agricultural crop. Since 2004, various field studies have demonstrated the feasibility of *Sphagnum* paludiculture on rewetted drained bogs that were formerly used as pasture (bog grassland) or for peat extraction.

Sustainable production in *Sphagnum* paludiculture – the trial in North West Germany

The case study site is situated in the peatland Hankhauser Moor near Rastede, NW Germany, a raised bog with a 2–2.5-metre-thick peat layer. The bog has been intensively drained for over six decades to allow agricultural use as grassland. In 2011, the first 5-hectare, commercial-size pilot trial was mechanically installed by removing the degraded topsoil, installing a water management system and applying *Sphagnum* mosses as founder material. For highest yields, a permanently high water table (around 5cm below peat moss surface) has to be ensured e.g. by active water management. After 1.5 years, a well-growing *Sphagnum* lawn had been established. In 2016, the first mechanical harvest provided *Sphagnum* shoots for extension of the *Sphagnum* paludiculture trial which now covers 17ha. The results demonstrate the feasibility of large-scale *Sphagnum* paludiculture. Considerably high mean biomass yields of around 5 t ha-1 yr-1 enable harvest cycles of 3 to 5 years (Wichmann *et al*. 2020).

“To achieve the goals of the Paris Climate Agreement of 2015, 1.) CO2 emissions from peat soils must be reduced to zero, which can only be achieved by rewetting, and 2.) the use of fossil peat must be stopped. At the same time, the availability of high-quality substrate raw materials for commercial horticulture must be ensured. Sphagnum paludiculture offers the unique opportunity to solve these three challenges in an integrative way.”

Prof. Hans Joosten (Greifswald Mire Centre)

CASE STUDY F
UNIVERSITY OF GREIFSWALD - *SPHAGNUM* BIOMASS PRODUCED IN PALUDICULTURE AS A SUSTAINABLE AND CLIMATE-FRIENDLY RAW MATERIAL FOR HORTICULTURAL GROWING MEDIA IN GERMANY (CONTINUED)

Double benefit for the climate and others

The cultivation of *Sphagnum* in paludiculture greatly reduces greenhouse gas (GHG) emissions and stops the subsidence of the formerly drained peat soil. GHG emissions are further reduced when using the produced renewable *Sphagnum* biomass for the substitution of fossil peat in growing media. Additionally, *Sphagnum* paludiculture provides climate cooling by evaporation, prevention of off-site eutrophication by nutrient filtration, sustainable employment in rural areas, habitats for rare bog species and preservation of the land's paleo-environmental archives.

Challenges and ambitions

In principle it is known how to cultivate peat moss in paludiculture. A net moss production area comprising 35,000ha could produce sufficient *Sphagnum* biomass to completely replace the white peat requirement of the German growing media industry. However, more research is needed for its large-scale implementation to reach technological maturity and to reduce costs.

Above all, political willingness for large-scale implementation is urgently needed. As long as drainage-based agriculture on peat soils (e.g., bog grassland) is supported by agricultural payments within the European Union Common Agricultural Policy (CAP), but paludiculture is not, the large-scale implementation of *Sphagnum* paludiculture will be difficult.

Sphagnum moss production photo, Manchester (© Jack Clough)

CASE STUDY G
UNIVERSITY OF EAST LONDON – GROWING *SPHAGNUM* MOSS AT SCALE

Sphagnum moss has a range of uses as a raw material, from use as a microbial inhibitor to a peat replacement in horticulture. However, simply wild harvesting *Sphagnum* from our wetlands at scale sufficient to meet the demand would be unsustainable and is likely to cause greater environmental degradation than it offsets.

***Sphagnum* farming**

Sphagnum farming offers the opportunity to cultivate *Sphagnum* mosses sustainably. The rationale is that *Sphagnum* grows best on peat soils. The methodology for cultivation typically involves the levelling of a degraded peat site (ideally a site unsuitable for restoration, such as an agriculturalised peat soil area or an ex-commercially extracted site), removing a thin layer of oxidised peat, applying *Sphagnum* 'founder' material then raising the water table to a high and stable position to maximise *Sphagnum* growth.

By raising the water table, a host of additional ecosystem benefits are generated, which include preservation of the peat soil, reduced Greenhouse Gas emissions and the opportunity for increased biodiversity.

UK trials

In the UK, cultivated *Sphagnum* is currently being demonstrated through several trial projects at site sizes of <5ha (for example BeadaMoss™ Agritech project, WaterWorks). The approach taken here differs from that used in Europe. Firstly, micropropagated *Sphagnum* material is used as founder material. This removes the need to harvest *Sphagnum* from a donor site, an advantage in areas of the UK where local donor sites are limited. It also ensures that the founder material is free of vascular plant species upon application. Additionally, surface irrigation techniques have been investigated. This approach could be used as an interim method in the UK while large scale raising of the water table is incorporated into future policy decisions and negotiated with landowners, or in areas where full re-wetting is technically difficult.

Sphagnum farming is likely to need around 2000ha just to meet the demand of UK growing media alone. Current markets that can utilise cultivated *Sphagnum* will include peatland restoration projects, reptile and amphibian bedding supplies, and commercial horticulture as well as many more awaiting innovations.

The future of farmed *Sphagnum*

The trials have shown that *Sphagnum* moss can be grown as a crop. There are technical challenges surround harvesting, however, the equipment for this exists and a small amount of innovation will be able to address this issue.

Economics will be the key driver for widespread uptake: peat costs very little to extract, so some form of incentive is likely to be needed for economic success. However, *Sphagnum* farming is currently economic as a greenhouse-grown product.

Education and training will also be required for farmers/landowners who are interested in getting involved. Early adopters may find themselves at an advantage in training others to farm *Sphagnum*.

"Farming Sphagnum moss at scale offers an array of fantastic opportunities, by cultivating it we can protect our peat soils, provide wider ecosystem service benefits and gain a useful crop, it truly is a win-win situation! We know we can grow Sphagnum, the challenge now is to spread the word, develop enabling policies and scale up fast."

Jack Clough (University of East London)

CASE STUDY G
UNIVERSITY OF EAST LONDON – GROWING *SPHAGNUM* MOSS AT SCALE (CONTINUED)

Squeezing *sphagnum* (© Lorne Gill, Scottish Natural Heritage)

CASE STUDY H
BEADAGRO™ – SUSTAINABLY PRODUCED *SPHAGNUM* AS A PROVEN PEAT ALTERNATIVE

Cultivated *Sphagnum* moss biomass has high potential to be used as an alternative to peat within horticultural growing media. *Sphagnum* is a logical replacement for poorly humified or 'white' peat currently used in horticultural growing media. This is because *Sphagnum* offers many of the desirable characteristics of peat, such as low pH, low bulk density and low nutrient levels as well as high potential for water and nutrient retention.

BeadaMoss™ has spent 15 years of R&D to develop BeadaGro™, a sustainable, UK produced product.

The project

The farming trial was carried out on two sites, a degraded peatland and an organo-mineral soil, as part of an Innovate UK project which included Melcourt Industries, Manchester Metropolitan University, the University of East London and Natural England.

The BeadaMoss™ 3,000m2 facility uses solar power, a ground source heat pump and heat recovery. It has produced 8 million micropropagated *Sphagnum* BeadaHumok™ using a unique method of micropropagation, planted on 7000ha of peatland restoration and employing 30 staff.

Crop covers and different irrigation methods have been tested, as well as other husbandry needs to grow the *Sphagnum*. The carbon dioxide and methane emissions were also monitored. An efficient *Sphagnum* farming system has been developed with patented technology.

Growing trials

BeadaGro™ has been trialled in growing media by Melcourt Industries with in-house tests which assessed standard germination tests and growth of vegetable plants, bedding plants and woody shrubs. In addition, they ran trials with five commercial nurseries to grow a range of plants, comparing the *Sphagnum*-based growing media with peat-based and other peat-free growing media.

Agapanthus in peat control and cultivated *Sphagnum*

CASE STUDY H
BEADAGRO™ – SUSTAINABLY PRODUCED *SPHAGNUM* AS A PROVEN PEAT ALTERNATIVE (CONTINUED)

The growth of woody shrubs, herbaceous perennials and annuals was recorded as well as the nutrient regime, water holding capacity and plant quality. The *Sphagnum* growing media mix performed well, giving very similar results to peat-based media.

Overall, the results concluded that the farmed *Sphagnum* growing media performed very well and was at least on par with the peat-based control mixes in terms of seed germination and growth. The additional fertilisers added to the *Sphagnum* based growing media reacted in the same way as in peat media, and produced good seedling germination even after 10 months of storage.

The blends tested were not necessarily the optimal growing media mixes, so there is scope to investigate additional mixes/blends further. However, farmed *Sphagnum* has a huge potential as a commercial growing media component. Ericaceous plants, such as rhododendrons and azaleas, are more challenging when formulating peat-free growing media because many peat alternatives are too high in pH and/or nutrient levels. *Sphagnum* could have particular benefits for this type of plant.

The future

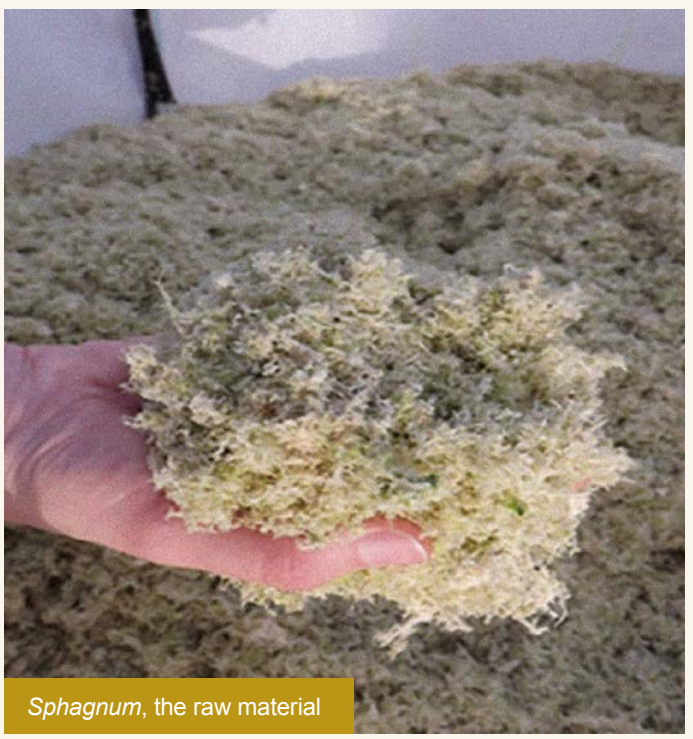
Mass-produced *Sphagnum* for horticultural peat replacement is in its infancy in the UK. There have been several trials within Europe which have demonstrated that *Sphagnum* can undoubtedly be grown. The next challenge is to scale up, develop markets and build grower confidence.

The horticultural industry is facing huge challenges with the planned ban on commercial use of peat in growing media; farming *Sphagnum* would enable continued supply of quality growing media.

Sphagnum farming on lowland degraded peat will help keep stored carbon in the soil, in the absence of peatland restoration. However, as set-up costs are high and it will be seen as high-risk it is imperative that government encouragement is given to assist farmers with these ‘pump-priming’ costs and provide incentives to venture into this climate-saving solution to peat harvesting. Additionally, this would give security to the UK growing media industry and create employment in the UK.

“I feel we are successfully completing the circle for peat free. Having run a horticultural propagation nursery using peat in its growing medium, I am really proud to have developed a sustainable, UK-sourced alternative.”

Dr Neal Wright (Director of BeadaMoss™)



Sphagnum, the raw material

CASE STUDY I
WEST COUNTRY SOIL IMPROVEMENT LTD – A PEAT-FREE SOIL CONDITIONER FROM AN AGRICULTURAL BY-PRODUCT

Introduction

West Country Soil Improvement started up in 2018 and was the first company to begin bagging digestate fibre to sell as a peat-free soil enricher via garden centres.

Digestate fibre is a by-product of the anaerobic digestion (AD) of crop residues used to generate biogas, a renewable energy source.

The parent company, J V Energen which is based on a farm in Dorset, was already supplying green gas from its anaerobic digester to local houses and using the liquid by-product from the process as an alternative to artificial fertilisers. They wanted to explore the potential of the solid by-product, which is a dry, fibrous material.

Background to the project

The family had already used the fibre as a mulch and soil improver in their own gardens and realised it had potential in this market. They commissioned independent trials to check how it performed when blended with standard growing media before launching 'Bloomin' Amazing', selling it in 50 litre bags via garden centres. It has proved very popular among gardeners and is ideal for use in 'no-dig' gardening systems, providing organic matter and slow-release nutrients which improve soil health. Gardeners have reported impressive increases in earthworm numbers after using the product, and no need to use other fertilisers on allotments where it was used as a mulch.

"We are proud of the fact that we recognised the potential of the digestate fibre and invested time and money to create our peat-free product before launching it to the gardening public."

Nick Finding (Director of JV Farming)

Manufacturing the product

Only digestates from crop fed anaerobic digestion are used, no animal manure wastes. The crops used to feed the digester include maize and ryegrass grown in the local area. Sustainability is a key driver in the business, with the average haulage distance for raw materials being only 7 miles. The digestate fibre is what is left after digestion to produce biogas, which takes about 30 days in the digester – which is full of microbes and works rather like a huge cow's stomach! The digestate comes out of the system as a sludge which is then squeezed to remove as much liquid as possible to produce a baggable product which is around 25-30% dry matter. Using the liquid fraction as a fertiliser on their crops has allowed reductions in manufactured fertiliser use on the farm.

The digester operates at a higher temperature and dry matter than many other AD units, which produces a more stable end-product.

Challenges

One challenge has been trying to find a more environmentally-friendly alternative to standard plastic packaging. The company are trialling a biodegradable plastic, in keeping with their sustainability goals.

Ambitions

The company now has the capacity to produce around 1.25 million bags of their product a year. It is being used as part of a new peat-free growing medium with the ambition to move into the potting medium market as well as the soil improver market. Growing media manufacturers are keen to find sources of locally produced peat-free raw materials with consistent quality and availability, and digestate fibre has potential in this sector.

CASE STUDY I
WEST COUNTRY SOIL IMPROVEMENT LTD – A PEAT-FREE SOIL CONDITIONER FROM AN AGRICULTURAL BY-PRODUCT (CONTINUED)

West Country Soil team (© WCSI Ltd)

West Country (© WCSI Ltd)

CASE STUDY J
FORTH RESOURCE MANAGEMENT – TOP QUALITY PEAT-FREE PRODUCTS FOR HOME GARDENERS AND COMMERCIAL USE

Introduction

Forth Resource Management (FRM) opened its first composting site for garden wastes at East Fenton near North Berwick in 2002, with five other sites in the Borders, Lothians and Edinburgh opening in the following years. The tonnage of green waste treated has grown dramatically since the beginning, from around 1,000t in 2002 to over 70,000t per annum at present. Most of the wastes are delivered to the site by Scottish Local Authorities including East Lothian, Midlothian, Edinburgh and the Scottish Borders, with the remainder coming from commercial landscapers and skip hire companies.

FRM is committed to having a positive environmental and social impact and has always been passionate about the quality of its products. It has achieved UK Compost Certification Scheme accreditation (to the BSI PAS100 standard) for all of its composting sites and has twice won Association for Organics Recycling awards for compost marketing and product innovation.

Background to the products

FRM recognises how important it is to stop using peat in horticulture and are committed to developing and supplying top quality, environmentally friendly peat-free products for use in home gardens and commercial landscaping. The company has spent a considerable amount of time developing a detailed understanding of the local marketplace and creating products which match the aspirations of an increasingly environmentally-aware clientele.

Most of FRM's horticultural product range is based on green compost, which is made from source-segregated garden waste delivered to one of their regional composting sites. The waste is shredded and composted outdoors in windrows, which are monitored and aerated to achieve the high temperatures needed to kill weed seeds and pathogens. After 14 weeks of careful management, the compost is ready to be prepared using screens of different mesh sizes, depending on the intended end use.

FRM Caledonian

CASE STUDY J
FORTH RESOURCE MANAGEMENT – TOP QUALITY PEAT-FREE PRODUCTS FOR HOME GARDENERS AND COMMERCIAL USE (CONTINUED)

The product range

FRM sell all their horticultural products using their own Caledonian Horticulture Brand. They manufacture two soil conditioners, based on top quality 0 – 10 mm PAS100 green compost. The first (Caledonian Green Goodness) is based entirely on compost while the second (Kelpie Compost) is based on the same compost but has added locally-sourced seaweeds, which contain a range of minerals, essential trace elements, vitamins and natural plant growth hormones. FRM also sell a decorative bark mulch (Caledonian Decorative Bark), a lawn top-dressing (Caledonian Top Dressing) and a topsoil (Caledonian Topsoil). Both the top-dressing and topsoil contain small amounts of green compost and the topsoil is tested and compliant with the UK standard for topsoil (BS 3882). All of these products come with advice on how to use them safely and to best effect and all can be delivered in easily handled plastic bags, bulk bags or as loose bulk deliveries.

Challenges

It is always challenging to ensure that the distribution of bulk products is environmentally friendly. In FRM's 'One Planet Pledge', they have committed to a fuel offsetting policy and a tree planting policy. They also engage in a range of community projects to benefit both future generations and the environment. FRM are always happy to deliver in bulk and bulk bags in order to reduce the amount of plastic used in their packaging.

Ambitions

The company is continuing to develop new products and aims to develop their own peat-free growing medium for gardeners using PAS100 green compost along with other high quality, locally sourced materials.

"We are proud of the fact that our customers love our products and give them such great reviews. It gives us the confidence to keep developing new peat-free products with the very best environmental footprint."

John Donaldson (General Manager, Forth Resource Management)

CASE STUDY K
UK GARDENING RETAILERS – MOVING TOWARDS PEAT-FREE

Many UK retailers have signed up to the British Retail Consortium (BRC) Climate Action Roadmap which aims for the retail industry to be net zero for carbon by 2040. Some horticultural retailers are acting more quickly, however, to ban the use of peat in products they sell before that date. There are two issues: the bagged products (growing media and soil improvers) sold to amateur gardeners and the growing medium used to grow the plants that are sold. Progress to move away from peat in bagged products has gained pace recently and as this accounts for around 70% of materials used, this is encouraging. As commercial growers move away from peat too, the plants sold in garden centres will increasingly be peat free also.

Homebase

Homebase has pledged to only sell peat-free growing media by spring 2024 and to have substantially reduced the peat content of its range of plants. To make it even easier for customers to make informed decisions, a new peat free logo will be rolled out across peat-free products and by spring 2022 a new biodiversity hub on the Homebase website will bring all the products and advice customers need together in one place.

Homebase is funding independent peat-free trials to find the best possible products for customers since the move to peat-free products should not make gardening less accessible or more difficult. The retailer currently sources its growing media from three suppliers – with all three supporting Homebase's peat free ambitions – and has been working closely with them to source peat free alternatives that do not compromise on quality.

With demand for peat-free compost quickly rising, the challenge will be to maintain a healthy supply of peat-free alternatives across the horticultural industry. Homebase welcomes industry support to overcome this and minimise disruption to customers.

Homebase has already been awarded a Which? Best Buy endorsement for its own brand peat-free growing medium and will be broadening its peat-free range with ericaceous, rose and shrub, houseplant and multipurpose products by January 2022. Homebase has also launched a 100% peat-free coir growing medium and will once again be only selling peat-free pot-grown real Christmas trees for the festive season.

'If we all take on small actions, such as using peat-free growing media, recycling garden waste, and making more sustainable product choices, we can all collectively have a big impact on biodiversity.

'We've been working closely with our suppliers to reduce the amount of peat in our garden range, and by spring 2024, we'll only sell peat-free products. It's really important that we aren't just offering our customers high-quality products for their gardens but that we're educating them on why and how they should use these more sustainable products too.

'As an industry, we need to work together to ensure that the supply of peat-free alternatives can meet the demand.'

Anthony Hawkins (Homebase Horticulture Quality Assurance Manager)

Waitrose

Waitrose has brought forward plans to stop selling bagged gardening compost made from peat, pledging to only sell peat-free alternatives by the start of 2022. They have also committed to being carbon net zero across their UK farming base by 2035.

'If rainforests are the lungs of the world, then peat bogs are its armour, helping to create a vital balance in our atmosphere by storing over a fifth of the world's soil carbon.'

'Peat bogs have been plundered for decades without fully understanding the consequences and this simply cannot continue. This is something that many of our customers feel strongly about and it's because of this that we're bringing forward our plans to remove all peat from our home compost offering.'

'This will only be the first step but it will set us on our journey to shifting the industry's reliance on peat and help accelerate the pace at which we find suitable alternatives.'

Marija Rompani (Director of Ethics and Sustainability, at the John Lewis Partnership)

CASE STUDY K
UK GARDENING RETAILERS – MOVING TOWARDS PEAT-FREE (CONTINUED)

Plant trials (© Homebase)

The Co-operative Group

The Co-op has been working with growing media manufacturer Westland Horticulture and has now banned peat in the bagged products they sell in their 1100 stores. They are also committed to the BRC Climate Action Roadmap.

Dobbies

Retailer group Dobbies aim to be peat-free for bagged products they sell by the end of 2021. Their own brand peat-free growing medium is one of their best sellers and they promote peat-free gardening in their stores, and to their 160,000 social media followers and 60,000 members. Dobbies has a pricing policy to make peat-free alternatives attractive to customers. They are supporters of Terra Carta, HRH The Prince of Wales's Sustainable Markets Initiative, which provides a road map to 2030 for businesses to move towards an ambitious and sustainable future.

B&Q

B&Q stopped selling 100% peat growing media in 2008 and introduced a range of peat-free bedding plants in 2014. They have made a commitment to be peat-free across their bagged growing media range in 2023 and are working with their suppliers to achieve this. They have developed a high-quality peat-free formulation under their 'GoodHome' brand, which launched in 2020.

Blue Diamond Group

The Blue Diamond garden centre group has committed to becoming peat-free by 2024. Throughout 2021 the group has been actively encouraging customers to move away from peat-based growing media via their monthly newsletters and instore activities and events.

(© Tina Claffey)

7. GARDEN ORGANISATIONS AND PEAT-FREE TRIALS

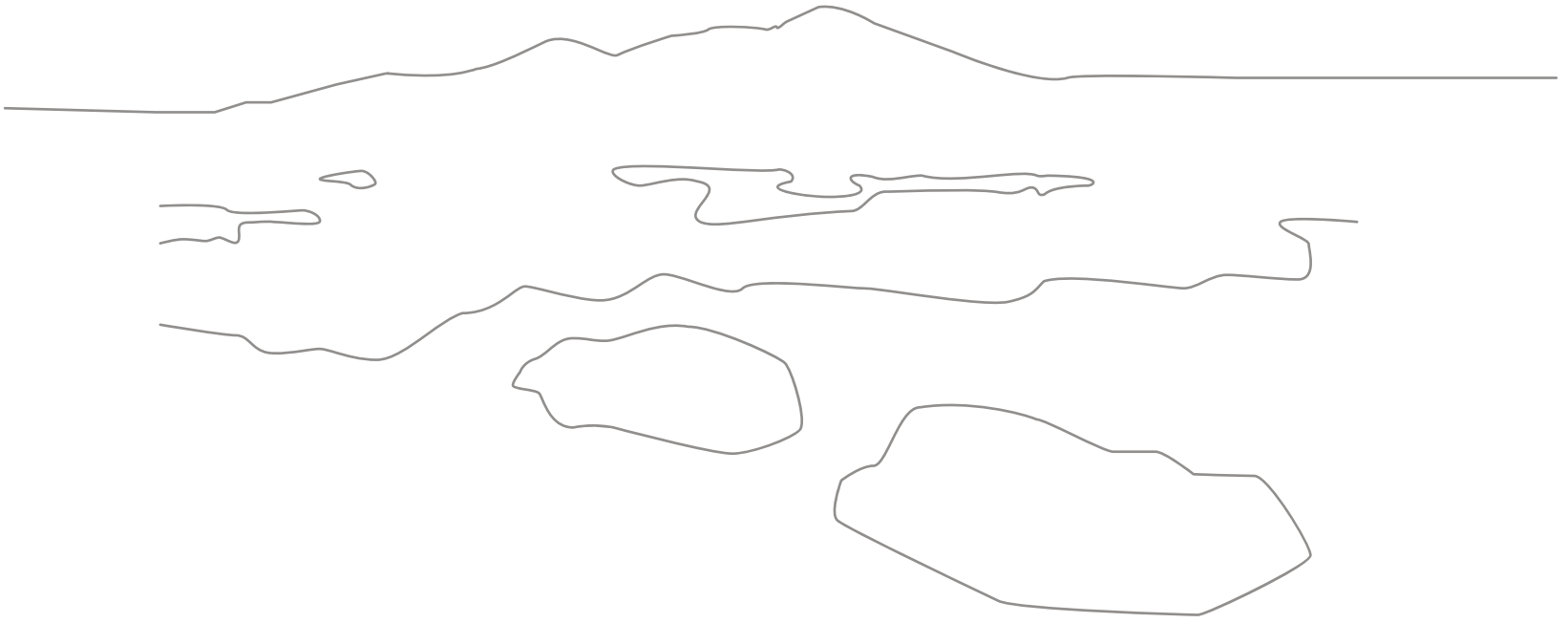
Case studies

L. The Royal Horticultural Society (RHS) – Going peat-free and helping gardeners do the same

M. National Trust & National Trust for Scotland – Phase out of peat

N. Beth Otway's trials – Detailed and comprehensive trials of peat-free growing media

O. Garden Organic's peat-free growing on-line course



CASE STUDY L
THE ROYAL HORTICULTURAL SOCIETY (RHS) – GOING PEAT-FREE AND HELPING GARDENERS DO THE SAME

As the world's largest gardening charity, the Royal Horticultural Society (RHS) shares public concern about the damage peat extraction does to the natural environment and its contribution to the current climate and biodiversity crises.

The RHS undertakes scientific research and shares knowledge and its horticultural expertise with gardeners and the general public. It has 575,000 members and RHS advisory total use in 2020/21 was 54.5 million, with 30 million people accessing their evidence-based information and gardening information free each year. The RHS has five gardens with 2.8 million visitors per year and 500,000 visitors to their flower shows, with millions of people also watching these on national television. The RHS has key schools and outreach programmes such as the Campaign for School Gardening and they work with Britain in Bloom right across the UK. In addition, through their operations they work closely with the whole horticulture and landscape industry supply chain upstream and gardeners downstream so that they can achieve their vision to enrich everyone's life through plants and make the UK a greener and more beautiful place. They are committed to inspiring everyone to grow sustainably. The RHS recognise that they must be role models in limiting the environmental impact of peat use and inspire others to practice sustainable gardening and horticulture.

In the instance of peat free, the RHS has been working on this for some time and, as a trusted charity, have always been fully transparent about their position and how they aim to be truly 100% peat free in all operations by 2025. The RHS continues to work with gardeners, industry, government and NGOs to overcome barriers and to help accelerate this transition.

The RHS also amplifies the voice of gardeners by chairing the Ornamental Horticulture Roundtable Group (OHRG), an industry and government body looking at key elements of how horticulture is undertaken in the UK. The RHS is also a partner on the EU Horizon 2020 Organic Plus project which is looking to develop alternative peat-free growing media.

The RHS peat free journey so far…

Scientific Research: The RHS in collaboration with the Agriculture and Horticulture Development Board (AHDB) and the industry funded and worked in 2012–2017 on the scientific research project *'Sustainable resource use in horticulture: a system approach to delivering high quality plants grown in sustainable substrates with efficient water use and novel nutrient sources'*. This 5-year study demonstrated that a wide range of peat-free media could be used commercially. The RHS has an Environmental Horticultural science team currently working with growing media manufacturers and growers on accelerating our transition to peat free and in 2022 are funding a second collaborative five-year post-doctoral student to work with growers and the supply chain to speed up the transition to peat free in all their operations.

Peat Free Endorsement: In 2013 the RHS endorsed Melcourt's peat-free growing media to raise awareness that peat free can grow high quality plants.

Banning the sale of peat-based growing media in RHS Retail: Over the last 15 years the RHS has increased its range of peat-free products and in 2019 they were one of the first major garden centres to stop selling peat-based growing media completely.

Peat-free RHS Gardens: In 1989 the RHS took the decision to make all five RHS Gardens peat-free. They are now 98% peat free, with a few plants of conservation concern remaining grown in peat. The RHS is currently trialling peat-free products on these specialist plants to stop peat use for ever in their gardens. All mulches and soil amendments used in RHS gardens are peat free and all 'green waste' from the gardens is composted and re-used – a circular green waste economy.

Peat-free RHS shows: In the 1990s exhibitors and designers were asked not to use peat in the mulching and dressing of beds and by 2025 all exhibitors should be peat free.

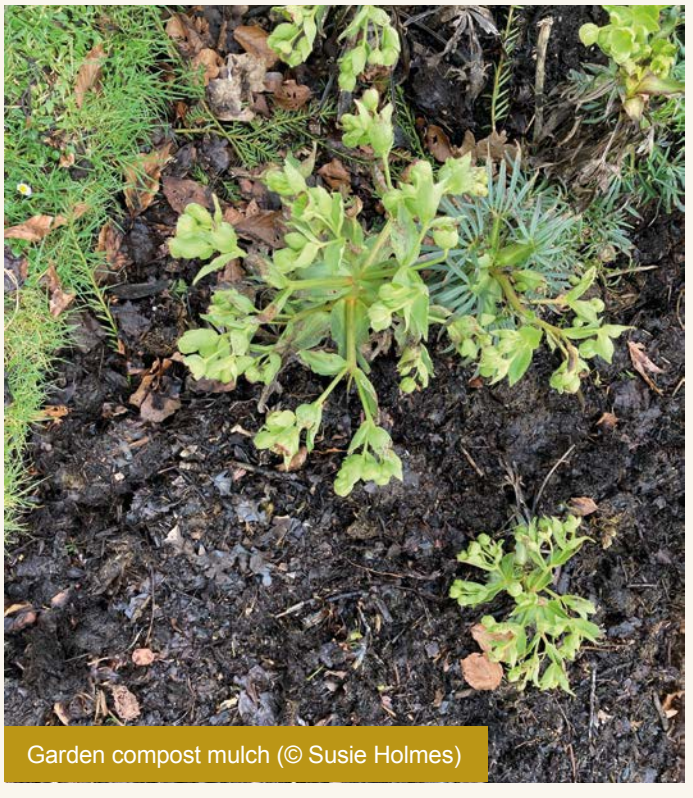
CASE STUDY L
THE ROYAL HORTICULTURAL SOCIETY (RHS) – GOING PEAT-FREE AND HELPING GARDENERS DO THE SAME (CONTINUED)

Providing Advice and Support: The RHS provides advice to gardeners on growing peat free to members and gardeners, both online and through its advisory pages. The RHS has provided and will continue to provide an increasing number of articles and communications on the use of peat-free in *The Garden* magazine and through national media channels

Training the next generation of Environmental Horticulturists: The RHS provides training for students about the impacts of using peat and in the new RHS Sustainability Strategy have committed to ensure that all training (informal and formal) increases the emphasis on the importance of going peat free.

RHS Retail: The RHS sells hundreds of thousands of plants each year and the supply chain remains one of the biggest issues to become 100% peat free. Over the last eight years RHS retail have been working with their plant suppliers and are now peat free in some of their plant ranges and aim to be 100% peat free in all their ranges by 2025.

Campaign and Public Awareness: The global pandemic has raised the importance of gardening in the UK, with 3 million more people taking up gardening during lockdown. Around 88% of people in the UK have a space where they can garden. The RHS believes that, collectively, the actions of each and every one of the nation's 30 million gardeners and the general public can create change and help mitigate the climate and biodiversity crises. That is why they are committed to an ambitious Sustainability Strategy, which includes a new nationwide RHS Planet-Friendly Gardening Campaign, including asking people to go peat free. Within the decade, the RHS aims to become net positive for nature and for people and to encourage and enable the gardening public to do the same.



Garden compost mulch (© Susie Holmes)

"We believe that eliminating peat from horticulture, ending burning practices on peatland, and restoring peatland will be crucial not only for our own journey to be Climate Positive by 2030 and Biodiversity Positive by 2023 but also so that gardeners and the general public can be truly peat free."

Alistair Griffiths (Director of Science and Collections)

CASE STUDY M
NATIONAL TRUST & NATIONAL TRUST FOR SCOTLAND – PHASE OUT OF PEAT

National Trust

As Europe's largest conservation charity, the National Trust cares for our natural and designed environment 'for ever, for everyone', including nine World Heritage sites, over 500 hundred properties, and the largest collection of Gardens and Parklands in the world. With 5.6 million members and 10 million visits per year, they recognise that they must be role models in limiting the environmental impact of peat use and inspiring others to practice sustainable horticulture. The National Trust stopped using peat for soil mulching and improvement in 1991, followed in 1999 by a member vote to recommend the complete cessation of peat use.

The National Trust's Plant Conservation Centre (PCC) in South-West England carries out the propagation and conservation of plants of heritage, horticultural and wild conservation value. Thirty-five years ago, the PCC developed its own peat-free growing medium based on loam, grit and coir. Since, the Trust has continued to work with industry partnerships and the UK's horticultural supply, through pioneering and extensive research and testing, to remove peat from long established processes. Their 370 gardens and parklands use a range of commercially available peat-free mixes, including a pine bark, loam and wood fibre blend known as T2 which was developed through the PCC research partnership with Petersfield Growing Mediums. This T2 mix is also used for the majority of the Centre's growing medium requirements including ericaceous subjects. Examples of species conservation achieved with peat-free growing mediums include:

The Wedgewood / Leith Hill Rhododendron – *Rhododendron falconeri*

Rhododendron falconeri is one of a number of Rhododendrons planted in the 1860s at Leith Hill Place by Caroline Wedgwood, the elder sister of Charles Darwin, a regular visitor to Leith Hill. *Rhododendron falconeri* from the Leith collection has been conserved by micropropagation from dormant flower. The young plants were transferred from the micropropagation solution to the Petersfield T2 compost and returned to the gardens at Leith Hill when 5 years old.

Isaac Newton's Apple – *Malus x domestica 'Flower of Kent'*

Woolsthorpe Manor in East England was once home to Isaac Newton and the National Trust garden staff continue to care for the old apple tree that is considered to be the one which dropped the famous apple. Although the cultivar is commercially available, there is frequent demand for both seeds and scion material. The Plant Conservation Centre graft many trees for peat-free cultivation and share, subject to Material Transfer Agreements, with organisations who wish to acquire

The National Monument Conifer of Chile – *Fitzroya cupressoides*

In 1973 this long-lived IUCN endangered conifer, which is native to the Andes mountains, was included under Appendix I of CITES, limiting trade and affording it the highest degree of protection in international law. Three years later, in 1976, Chile declared the species as a National Monument. The Plant Conservation Centre, in partnership with the International Conifer Conservation project at the Royal Botanic Garden Edinburgh, has propagated peat-free specimens from wild collected material to distribute to selected Trust gardens, to ensure the genetic survival of this endangered tree.

The global pandemic has focused a spotlight on the value of gardens and green spaces, which has only emphasised the importance of developing and promoting sustainable horticulture, including gardening without peat, and responsible soil and water management.

The National Trust sees climate change as the biggest threat to the places we love and has committed to being Net Zero in its greenhouse gas emissions by 2030. They are also deeply concerned about the rapid decline in nature, and have committed to restoring 25,000ha of land for nature to battle this crisis in biodiversity. They believe that eliminating peat from horticulture, ending burning practices on peatland, and restoring our precious uplands, both within their organisation and nationally, led by government, will be crucial not only for their own journey to Net Zero, but also for the national journey to a more climate-conscious and nature-abundant world.

CASE STUDY M
NATIONAL TRUST & NATIONAL TRUST FOR SCOTLAND – PHASE OUT OF PEAT (CONTINUED)

Teaching growing media management at NTS School of Heritage Gardening, Threave

National Trust for Scotland

The National Trust for Scotland has advocated against using peat in gardening for close to 25 years now. It makes complete sense to them, given their work to protect and restore peatlands across their estate from Shetland to the Borders and their advocacy in partnership with the IUCN UK Peatland Programme. Naturally, they faced a bit of resistance in the early days from some professional gardening staff who were trained and experienced in the use of products containing peat. They were fearful of moving away from the practical advantages of using a sterile, clean and light material, with its consistency of output. Change brings risk and uncertainty, and it is understandable that those charged with keeping our complex and beautiful gardens to a high standard required some encouragement and support to experiment with the emerging alternatives. National Trust for Scotland also had some peat banks in their gardens which were features of heritage significance, and had to find solutions for those too.

The National Trust for Scotland's gardens are all managed on a peat-free basis but they need the help of industry and perhaps regulatory change for the very last step. They need to be able to buy the plants needed for their own use at scale, for specialist use or for retail, that are peat-free from seed to sale.

"Through our training of new horticulturalists in our School of Heritage Gardening at Threave, one of our major public gardens, and our apprentice programme, we are delighted to be setting the next generation of professional gardeners out on the right path. We are equipping them with the knowledge and confidence to know they can manage without peat. Whether they stay working with us in heritage gardens or move on to botanic gardens, parks and other greenspace, they will carry those skills with them, embedded for their careers and ambassadors for peat-free gardening."

Ann Steele (Head of Heritage Gardening Policy)

CASE STUDY N
BETH OTWAY'S TRIALS - DETAILED AND COMPREHENSIVE TRIALS OF PEAT-FREE GROWING MEDIA

Introduction

Beth Otway is a horticulturist and garden writer, a peat-free advocate and trials specialist who runs independent, and very thorough, horticultural trials in her garden in Surrey.

Beth has always had a passionate desire to protect the environment. In 1998, she was disappointed not to be able to find any accessible growing media trial reports to direct gardeners towards good quality, peat-free growing media. Undeterred, Beth started up her own self-funded, independent trials, and she has been running peat-free growing media trials ever since. In 2015, Beth started a website (www.pumpkinbeth.com) which allowed her to share the results of her trials in full, helping gardeners find the best peat-free products on the market.

Beth's growing media trials

Over the years, Beth has run a variety of trials, underpinned by a core annual trial growing broad beans in large containers filled with a wide range of peat-free growing media which trials up to 15 different growing media at a time. The commercial products Beth trials vary each year and include media comprised of wool, bracken, coir, green waste, comfrey, manure, wood and soil, etc., using products that are available to both amateur and professional gardeners.

Beth tests both ornamental and edible plants in peat-free growing media to evaluate both traditional and modern peat-free gardening techniques, as well as assessing a variety of container types.

In addition to using her trials to highlight good quality and reliable commercial peat-free growing media, Beth also encourages gardeners to start up compost heaps and re-use their old, spent growing media. Beth demonstrates the possibilities of adding small quantities of rich, concentrated compost to reinvigorate and enrich old growing media.

Beth finds that growing the same plants in mixes made from different ingredients naturally leads to the plants requiring irrigating at different times. There are several other differences: some commercial peat-free growing media rely heavily on gardeners using liquid fertiliser regularly throughout the growing season to enable successful plant growth, while plants grown in other products will not require any additional fertiliser for a couple of years. Naturally, the cost of the media that Beth has trialled vary; she has trialled premium products, mid-price ones, and low-cost options.

Beth has found it challenging to find peat-free growing media for her trials. Many garden centres do not sell any peat-free products, and those that do stock peat-free tend to only hold one product. Therefore, the act of buying test mixes for every trial tends to require at least three weekends of driving from one garden centre to another in addition to ordering products online. All trialled products are bought within the same time frame, to ensure a fair comparison.

See all Beth Otway's trials in full on her website: https://www.pumpkinbeth.com/tag/compost-trial/

"Through my trials, I've found that peat-free growing media can be far better than peat-based ones. I'm particularly keen to encourage gardeners to start composting, make the most of their soils, and re-use their spent growing media by reinvigorating them with a concentrated peat-free product."

Beth Otway

CASE STUDY N
BETH OTWAY'S TRIALS - DETAILED AND COMPREHENSIVE TRIALS OF PEAT-FREE GROWING MEDIA (CONTINUED)

Tomatoes in peat-free (© B Otway)

Broad bean flower with bee (© B Otway)

CASE STUDY O
GARDEN ORGANIC'S PEAT-FREE GROWING ON-LINE COURSE

Garden Organic is the UK's leading horticultural organisation totally committed to organic and sustainable growing. Giving advice and expertise for over 60 years, they aim to support all growers on their organic journey. Going peat free is just one way they are helping gardeners in their quest to work alongside nature and make planet-positive decisions.

Designed for all gardeners and growers, this short, free online course has been designed to help gardeners cut peat out of their growing.

Garden Organic's online peat free growing course is full of tips and advice for all growers who want to go peat free. It includes the issues around peat, what goes in a 'potting compost' bag, and how to adapt growing and watering techniques to the new peat-free growing media. There is full advice on how gardeners can make their own potting media – for seed sowing and plant raising.

Course contents

Sections include:

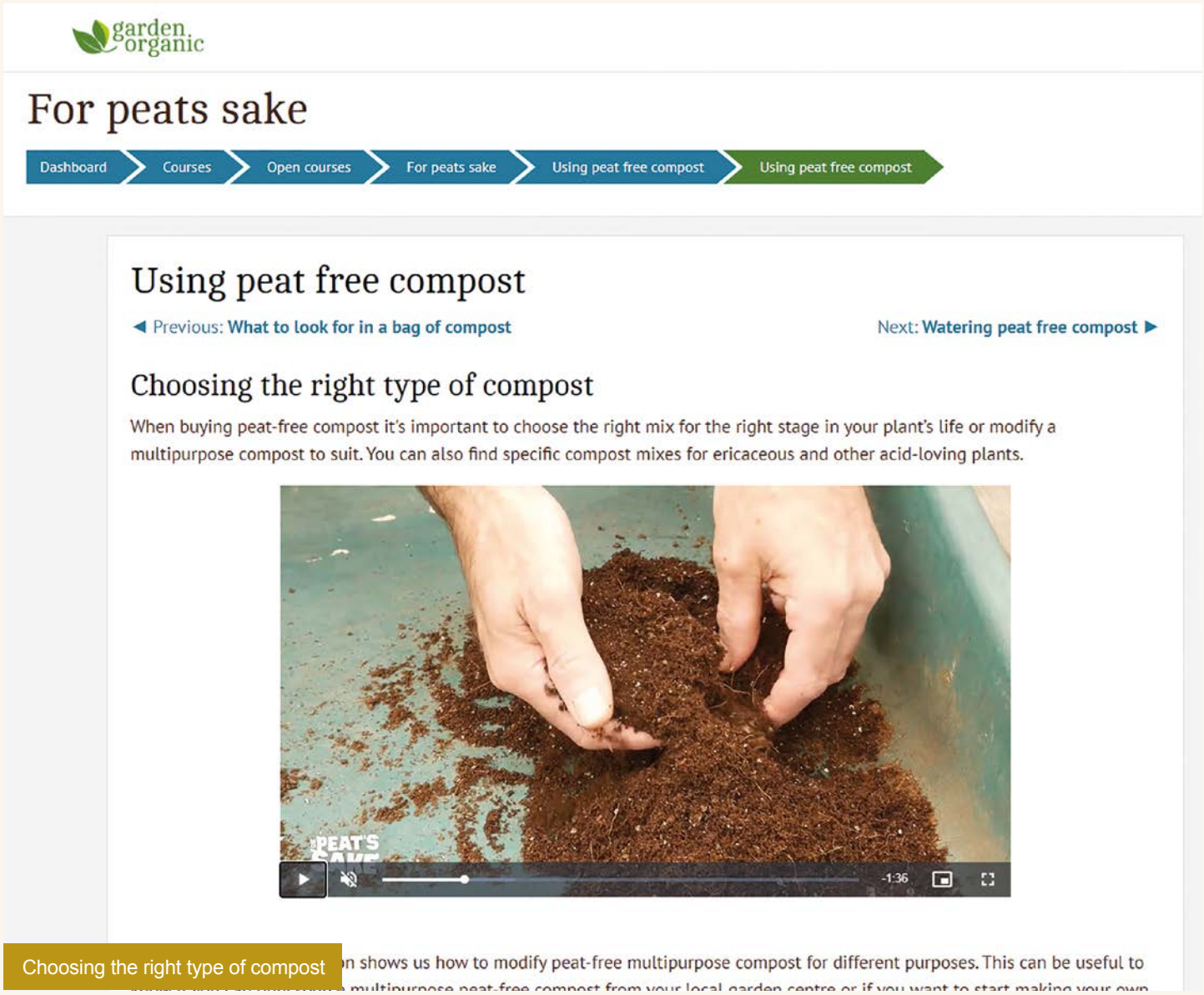
- *Why We Shouldn't Use Peat*
- *How to use Peat-Free mixes* – choosing the right type, watering and feeding.
- *Making Your Own Mixes* – the truly sustainable route to making potting media for all your growing needs.

This online course is the first of its kind on the important subject of cutting peat out of horticulture. It is designed to be free and accessible to all, as well as an enjoyable learning experience using videos, chats, podcasts, fun facts and quizzes. The aim is to take gardeners on a deep dive into the world of successful peat-free growing.

For more information please see:
www.forpeatsake.org.uk

Title page for on line advice tool

CASE STUDY O
GARDEN ORGANIC'S PEAT-FREE GROWING ON-LINE COURSE (CONTINUED)



"We know that many thousands of people took up gardening during last year's lockdown,' comments. So we are doing all we can to help these new growers follow organic and sustainable growing methods from the start. In the face of a climate emergency and huge biodiversity loss, digging out peat for use in horticulture simply isn't necessary. This exciting new online course will help people connect the dots between the environment and organic growing."

Hannah Rogers (Director of Communications at Garden Organic)

Beautiful demoiselle damselfly (*Calopteryx virgo*) (© Tina Claffey)

8. NURSERY GROWERS

Case studies

P. Peat Free Nurseries List - Providing a resource to help gardeners find peat-free nurseries across the UK

Q. Horticultural distributor, Fargro, working with commercial nurseries demonstrates success of peat-free growing media

R. The Farplants group, West Sussex – Rising to the challenge of peat-free

CASE STUDY P
PEAT FREE NURSERIES LIST - PROVIDING A RESOURCE TO HELP GARDENERS FIND PEAT-FREE NURSERIES ACROSS THE UK

Nic Wilson began compiling the Peat Free Nurseries List on her gardening blog in 2019 after struggling to source peat-free plants, partly due to a lack of centralised information about peat-free growers in the UK. She felt a list would make it easier for people to find peat-free nurseries and hoped it would encourage gardeners (including new gardeners and young people who had recently started gardening or growing houseplants) to buy peat-free plants.

Promoting peat-free

The list went live in September 2019 and has grown in reach and popularity since its inception. It received 1.5k hits in 2019, 4k hits in 2020 and has had nearly 8k hits so far in 2021. Every month, hundreds of people access a range of nursery websites through links in the list, with some nurseries getting 300-400 clicks since the list went online. Nic recently added a Google Map to help gardeners connect with their local growers and created a Twitter list to promote peat-free nurseries on social media.

By September 2021, the list included over 100 peat-free nurseries across the UK and had been accessed over 13,000 times.

Diverse range of nurseries

Beginning with only a handful of growers, the Peat Free Nurseries List has expanded to include over 100 nurseries, spanning the country from Edinburgh to Cornwall and from West Wales to Norfolk. The list covers a diverse range of businesses from small family-run nurseries and trade nurseries to charities like the National Trust and St Andrews Botanic Gardens. Many have online shops, making it easy for gardeners to source peat-free plants over the internet.

The nurseries on the list cover a wide range of plants including trees, native wild flowers, herbs, fruit and vegetables, bee-friendly plants, grasses and maritime plants. Many of the nurseries are also pesticide-free and are pioneering innovative ways to reduce the use of plastics such as the POSIpot, a cardboard transportation sleeve for plants developed by Edibleculture, a peat-free nursery in Kent.

Peat-free carniverous plants (© Sean Higgs, Floralive)

CASE STUDY P
PEAT FREE NURSERIES LIST - PROVIDING A RESOURCE TO HELP GARDENERS FIND PEAT-FREE NURSERIES ACROSS THE UK (CONTINUED)

Moving towards peat-free

Some growers, like Chris Seagon of The Edible Garden Nursery in Suffolk, made the transition to peat free years ago. Having established the nursery in 1985, he went peat free in 1995 and has not looked back since. Many other businesses are still working towards becoming 100% peat free, while nurseries like Harriet's Plants, established by houseplant grower Harriet Thompson in 2018, have been peat free from the outset.

Sourcing peat-free growing media

Some peat-free media have been selling out and there are concerns that sourcing in bulk may become more difficult and costly as more nurseries transition to peat free. Some nurseries also struggle to source peat-free plants for propagation and growing on. There is clearly a need to address problems with the supply of materials for peat-free growing media in the near future, especially if a widespread ban on peat goes ahead.

Peat-free plant stand (© Harriet Thompson, Harriet's Plants)

Peat-free success

Despite the challenges, many peat-free nurseries report that their plant sales are booming. As well as achieving commercial success, peat-free growers regularly exhibit at prestigious Royal Horticultural Society flower shows. Gold medal-winning nurseries like Hardy's Cottage Garden Plants and Pennard Plants have been chosen as RHS Master Growers (at RHS Chelsea and RHS Chatsworth respectively). Hardy's Cottage Garden Plants have won an impressive 24 gold medals at the RHS Chelsea Flower Show. These growers and other peat-free nurseries demonstrate to the public that plants thrive in peat-free compost. Nic has used her list to highlight these nurseries.

Other peat-free nurseries specialise in growing plants that are commonly believed to require peat. Sean Higgs, founder of Floralive Carnivorous Plant Nursery, has been growing peat free since 1990 and has developed THRIVE, the first peat-free compost specially formulated for carnivorous plants. He believes it is important to show that carnivorous plants can be successfully cultivated without peat. 'Dispelling the myth that these plants need peat to grow is a key message. If "peat native" subjects don't need it, nothing does.'

Updated Peat-Free Nurseries List – Nic Wilson (dogwooddays.net)

"The response to the Peat Free Nurseries List has been fantastic. I'm delighted that the list now includes over 100 nurseries with more being added on a regular basis. It is encouraging to see so many nurseries transitioning to peat free."

Nic Wilson (writer and curator of the list)

CASE STUDY Q
HORTICULTURAL DISTRIBUTOR, FARGRO, WORKING WITH COMMERCIAL NURSERIES DEMONSTRATES SUCCESS OF PEAT-FREE GROWING MEDIA

Introduction

Cramden Nursery in Northampton is a family business which started up in 1964, originally specialising in Pelargoniums but now growing a range of herbaceous plants. The nursery sells plants direct to the public and via its online shop, producing over 60,000 plants a year. The aim is to provide a wide choice and excellent quality plants. Customers also benefit from access to specialist advice and growing tips from the staff which is not always available at larger retailers. Unlike most garden centres, Cramden Nursery grows over 90% of all the plants they sell themselves. The nursery has traditionally grown their plants in a growing medium based on Irish peat but has been trialling peat-free mixes to improve sustainability.

Fargro, a leading requisite supplier to horticultural businesses in the south-east and east of England, has been established for over 75 years. They are able to provide growers with technical advice and support via their in-house Technical Team. Fargro supply a wide range of growing media to nurseries, most of which have traditionally been peat-based but they are now supplying most customers with either reduced peat or peat-free products. Their growing media and fertiliser specialist, Sean Whitworth, has been working with Cramden Nursery in a series of trials using three different peat-free growing media mixes.

Trials with non-peat mixes

Fargro have been running growing trials with the nursery to help them transition away from peat in the growing medium. They have started off focussing on Pelargoniums, as these are a major crop grown by the nursery. The plants are grown in 2 litre pots on benching in glasshouses with a base fertiliser in the growing medium, then regular liquid feeding is used to produce the best quality plants.

The peat-free mix produced plants with a more extensive root system compared with the nursery's peat mix. The standard liquid feed was sufficient for the peat-free plants as long as some slow-release organic fertiliser was added at potting to balance nitrogen levels. Without this fertiliser, the plants were slightly smaller than the peat-grown ones, probably due to the more free-draining nature of the peat-free mix and slightly lower nutrient retention.

"The trials have shown that, with some modification to nutrition, peat-free growing media can produce good quality plants for growers."

Sean Whitworth (Fargro growing media and fertiliser specialist)

CASE STUDY Q
HORTICULTURAL DISTRIBUTOR, FARGRO, WORKING WITH COMMERCIAL NURSERIES DEMONSTRATES SUCCESS OF PEAT-FREE GROWING MEDIA (CONTINUED)

Pelargoniums in non-peat and peat mixes

Plant roots in non peat and peat mixes

CASE STUDY R
THE FARPLANTS GROUP, WEST SUSSEX – RISING TO THE CHALLENGE OF PEAT-FREE

Introduction

The Farplants group is a cooperative of 4 West Sussex growers which together, make up one of the UK's largest producers of ornamental plants. They produce over 11 million plants annually on 70 hectares of covered and outdoor production units, for wholesale into garden centres and supermarkets nationwide.

Minimizing their impact on the environment is something they take extremely seriously. All aspects of production from energy consumption to water use are monitored and regularly audited to ensure they are as efficient and low impact as possible. They also manage their production areas in a way that supports biodiversity and maximises wildlife habitat.

Peat reduction at Farplants

High quality, consistent growing media are the cornerstone of container plant production. As a group they work with growing media manufacturers to ensure they maintain the highest quality of materials, sourced in an environmentally sensitive way. The Farplants group has been committed to reducing its reliance on peat for the last 20 years, collaborating with various government and industry peat reduction research projects. The group has trialled a wide range of peat-free media on a diverse range of crops. As a result, all their crops are grown in peat-reduced media and have been for many years. The key to success has been a close relationship with growing media manufacturers and maintaining an open dialogue as challenges arise.

Cistus in reduced peat media

CASE STUDY R
THE FARPLANTS GROUP, WEST SUSSEX – RISING TO THE CHALLENGE OF PEAT-FREE (CONTINUED)

They are now working towards further reducing peat content and including more wood fibres, composted bark and coir. These materials hold water, air and nutrients differently from peat, so they have had to adjust the way in which they manage their plants in terms of water and fertiliser application. To maintain high quality plant growth, these changes have been by necessity quite gradual, to minimise the impacts on customers.

As the UK Government's target of removing peat from the professional supply chain by 2030 approaches, Farplants has created a coordinated, intensive peat-reduction programme. The group is currently working with all major professional manufacturers and initial results from large-scale production trials are promising. Work is ongoing to further reduce the peat-content of our media to 40-50% across all areas of production while continuing to trial peat-free mixes across an ever-increasing range of our plants.

The future

Farplants has gained a wealth of experience in the last 20 years and are now at a point where many of the crops are grown with significantly less peat, with some short-term crops being produced peat-free. Of course, there are still challenges to overcome. They are working on how best to manage long-term perennial crops peat-free, investigating how nutrition and water provision might change throughout the year.

Work is also ongoing to understand how the change to peat-free will impact overall production costs. The biggest challenge, though, is one faced together as an industry: the supply and consistency of the raw materials that will be required to replace the 2.29 million cubic metres of peat currently used in UK Horticulture. At present, supply chains are not equipped to deal with the massive upsurge in demand for peat alternatives.

Primula in peat free and reduced peat

Golden plover (*Pluvialis apricaria*) (© Norman Russell)

9. REFERENCES

Barkham, J.P. (1993) 'For peat's sake: conservation or exploitation?', *Biodivers Conserv* 2, pp. 556–566. https://doi.org/10.1007/BF00056749

Bek, D, Lennartsson Turner, M, Lanari, N, Conroy, J & Evans, A (2020) 'Transitioning to peat free horticulture in the UK: an assessment of policy, progress, opportunities and barriers', Available at: https://hta.org.uk/uploads/assets/219d3ce6-e9a2-4659-b0a52d7a1bd6dd1e/FINALCOVNTRYUNIREPORT-HTAGMAFinalCoversauthors29Sept20-1.pdf (Accessed: September 2021)

Bragg, N (chairman of the Growing Media Association) (2021), pers. comm. October 2021

Cris,R., Buckmaster, S., Bain, C. & Bonn, A. (Eds.) (2011) 'UK Peatland Restoration—Demonstrating Success'. *IUCN UK Peatland Programme, Edinburgh*.

Campell, D. (2021) 'Multinational accused of 'inaccurate' claims over peat extraction', *The Ferret*, 05 January. Available at: https://theferret.scot/firm-accused-of-inaccurate-peat-extraction-claims/ (Accessed: September 2021)

Dawson, C (2021) 'Peat-free compost: a manufacturer's perspective', *The Horticulturist*, Summer 2021

Department for Communities and Local Government (2016) 'Mineral Extraction in Great Britain 2014', available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505631/Mineral_Extraction_in_Great_Britain_2014_final.pdf (Accessed: September 2021)

Horticultural Trade Association (HTA), Growing Media Association (GMA), Department for Environment, Food and Rural Affairs (Defra) & Agriculture and Horticulture Development Board (AHDB) (2021) 'Growing media monitor: Trends in the composition of UK growing media supplied 2011-2020', Available at: https://hta.org.uk/uploads/assets/baa50362-3876-4a46-9690c7fb711446a9/70af0da8-7f83-4a93-8cb4df18d781617a/Report-vf.pdf (Accessed: September 2021)

IUCN UK Peatland Programme (2017) 'Review of Extant Planning Permissions for Commercial Peat Extraction in Scotland (Summary)', Available at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-05/Summary%20of%20ROMP%20review%20findings_EG.pdf (Accessed: September 2021)

IUCN UK Peatland Programme (2017b), 'Horticulture and Peat in Scotland Round Table Event', Available at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-05/Horticulture%20and%20Peat%20Roundtable%20Notes%20final.pdf (Accessed: September 2021)

Lindsay, R.A. (1992) 'Peatland conservation: the Cinderella Syndrome', In: Bragg, O.M., Hulme, P.D., Ingram, H.A.P. and Robertson, R.A. (Eds.): *Proceedings of the International Symposium Peatland Ecosystems and Man: An Impact Assessment*. Department of Biological Sciences, University of Dundee, U.K. and International Peat Society, Jyväskylä, Finland, pp.331-334.

Dines,T (2018) 'Peat-free gardening tips and making peat-free compost', *The Wildflower Garden – Plantlife*, 09 February, Available at: https://plantlife.love-wildflowers.org.uk/wildflower_garden/all_about_peat/ (Accessed: September 2021)

Stop Climate Chaos Scotland (2018) 'SCCS proposed amendments to the Planning Bill: Using planning to create better, low carbon places' Available at: https://www.stopclimatechaos.scot/wp-content/uploads/2018/11/SCCS-Planning-Bill-Low-Carbon-Parliamentary-Briefing-October-2018.pdf (Accessed: September 2021)

UK Centre for Ecology and Hydrology (2020) 'Peatlands Factsheet', Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf (Accessed: September 2021)

Wichmann, S., Krebs, M., Kumar, S. & Gaudig, G. (2020) 'Paludiculture on former bog grassland:Profitability of *Sphagnum* farming in North West Germany', *Mires and Peat*, 26(8): pp.1–18. https://doi.org/10.19189/MaP.2019.SNPG.StA.1768

Wildlife Trusts (2020)'Environmental groups and Monty Don write to Government calling for end to use of peat compost', *The Wildlife Trusts News*, 25 November, Available at: https://www.wildlifetrusts.org/news/environmental-groups-and-monty-don-write-government-calling-end-use-peat-compost (Accessed: September 2021)

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