Monitoring of peat and alternative products for growing media and soil improvers in the UK 2005

First biennial report by ADAS UK Ltd and Enviros Consulting Ltd

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Abbreviations

BAP	Biodiversity Action Plan
BSI	British Standards Institution
CA	Composting Association
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
HGMF	Horticultural Growing Medium Forum
HTA	Horticultural Trades Association
GMA	Growing Media Association
LA	Local authority
MGA	Mushroom Growers Association
MIANI	Mushroom Industries Association of Northern Ireland
ODPM	Office of the Deputy Prime Minister (now Department of Communities and Local Government (DCLG))
PAS	Publicly Available Specification
PWG	Peat Working Group
SEPA	Scottish Environment Protection Agency
SMC	Spent Mushroom Compost
WRA	Wood Recyclers Association
WRAP	Waste and Resources Action Programme

Executive Summary

Introduction

The UK government is committed to reducing peat use under the Biodiversity Action Programme and has targets for 40% of total market requirements for soil improvers and growing media to be supplied by non-peat materials by 2005, and 90% by 2010.

To assist Government and the horticultural industry in developing strategies to achieve these targets, data on the use of peat and peat alternatives has been gathered. Surveys commenced in 1993 and continued in the period 1996 to 1999, monitoring the use of materials in amateur gardening, local authorities and landscaping. In 1999, professional growing media were included. The study was repeated in 2001 including all four markets.

Project Scope and methodology

The monitoring aims to measure the extent to which the use of peat and alternatives changes, and identify the sectors that use most peat and therefore indicate where effort to change use should be targeted.

As in previous years, the 2005 survey set out to obtain data from the producers of soil improver and growing media products including those that manufacture growing media and retail soil improver products made from peat and various alternative materials, producers of spent mushroom compost (last surveyed in 1998) and green compost manufacturers. 38 growing media manufacturers, 38 mushroom growers and 115 compost manufacturers were contacted with response rates of 100%, 80% and 77% respectively. It is estimated that 95%, 90% and over 75% of the materials from each of these sectors were accounted for, respectively, providing robust data. The co-operation of manufacturers is gratefully acknowledged as without their significant input in supplying data for the project it would not be possible to have such confidence in the aggregated data.

Supply of peat and alternatives in 2005

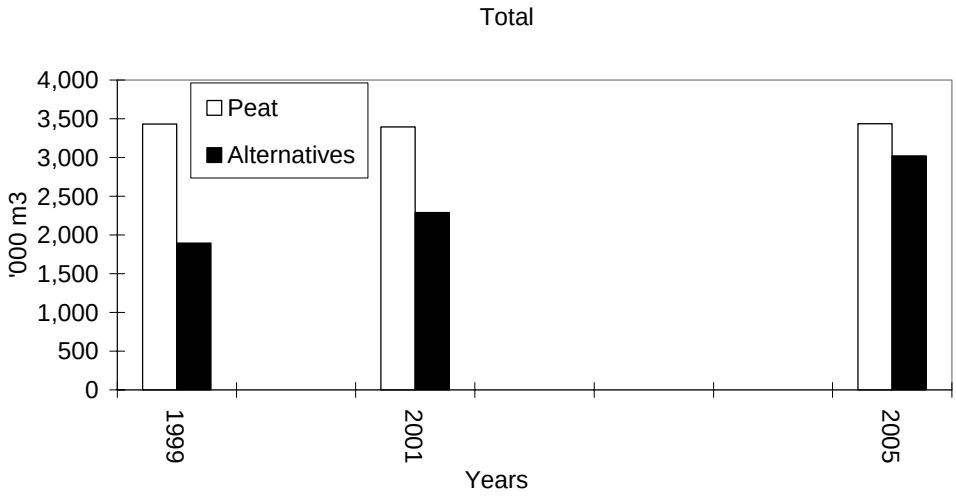
In 2005, the total volume of peat and alternatives used in growing products (soil improvers and growing media) rose to 6.46 million m^3 from 5.68 million m^3 in 2001. The overall proportion of peat in the products fell from 60% to 53%, and the proportion of alternatives rose to 47%, well ahead of the BAP target of 40% for 2005. The greatest consumption of peat was by amateur gardeners (66% of the total peat used by all sectors).

The total market was split between soil improvers at 38% and growing media at 62%, with the former market growing more (19%) than the latter (10%) since 2001. Of the total peat used, 96% was in growing media and 4% was used in soil improvers. Peat accounted for only 6% of the total material used in soil improvers. Amateur gardeners utilised the greatest amount of all of the materials (59%) followed by professional growers at 22% and landscape contractors at 17%.

Trends in the supply of peat and alternatives 1999 to 2005

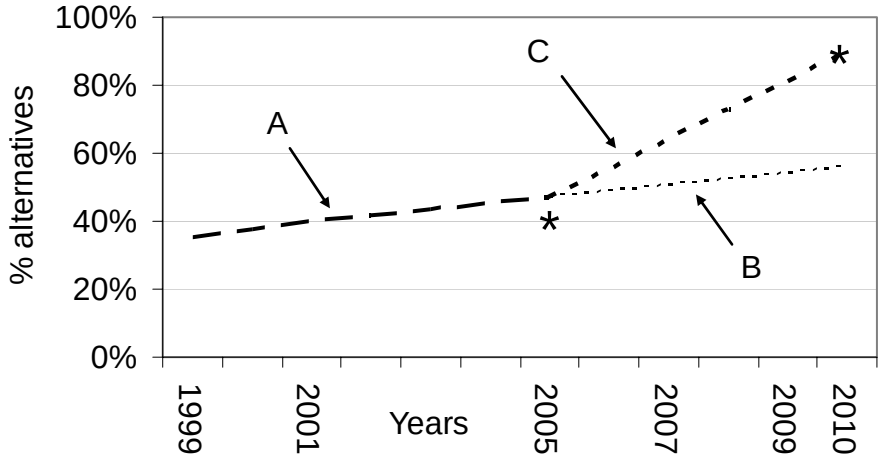
Figure 1 shows that the amounts of alternative materials used have risen. The increase in total market requirements has been met by alternatives because the volume of peat used has not significantly changed since 1999.

Figure 1 Combined use of peat and alternatives in all four sectors 1999-2005 ('000 m^3)



Although the volume of peat used has remained unchanged at around 3.4 million m^3, the proportion of peat used in all sectors has fallen since 1999 as the percentage of alternatives has risen from 36% in 1999 to 47% in 2005 exceeding the 2005 BAP target of 40% non-peat as shown in Figure 2.

Figure 2 The proportion of alternatives and the BAP targets to 2010



* BAP targets (40% in 2005, 90% in 2010)

A. Trend in proportion of alternatives to 2005.

B. Indication of trend in the future, based on extrapolation assuming the constant rate of change in increasing the proportion of alternatives shown in A.

C. Required trend in the future, based on a constant, but **greater** rate of change from 2005 onwards that is required to meet the BAP target in 2010.

The lines in Figure 2 beyond 2005 are for illustrative purposes only. It shows the trend in adoption of alternatives as reflected by the observed proportion of alternatives each year for the period up to 2005. It also illustrates two future trends. One of these indicates an extrapolation to 2010 that predicts a peat replacement approaching 60 %, based on a constant of the observed rate of change up to 2005. This clearly fails to meet the target of 90% by 2010. The second indicates a steeper line, or **greater** rate of change beyond 2005 that would be required to meet the BAP target in 2010.

Among the two groups of materials, soil improvers and growing media, changes in the proportion of peat in growing media among different sectors are now starting to come through in the industry. Professional growers use only growing media, and the volume of peat used by this sector has been fairly consistent at around 1.1 million m^3, but with increasing volumes of peat alternatives, so that the proportion of peat has reduced from 95% to 92% to 80% in 1999, 2001, and 2005 respectively.

Similar changes in the amateur gardening market are also occurring with a fairly consistent volume of peat (2.1 million m^3) being used annually in growing media products and increasing volumes of alternatives. This means that the proportion of peat in amateur gardening growing media products has reduced from 94% to 92% to 84% in 1999, 2001 and 2005 respectively. In addition, the amateur soil improver products have used a fairly consistent quantity of peat, (0.1 million m^3), but with increasing proportions of other materials making up the bulk of these products.

As the amateur gardening growing media sector consumes the greatest amount of peat (2.15 million m^3, 66% of the total peat used across all sectors), concentrating on this sector may have the quickest impact on meeting the BAP targets. Educating the gardening public will be a key requirement to achieve this.

The results have shown that the reduction in the proportion of peat used has been achieved by an increase in the volume of alternative materials used in growing media. This has largely been achieved by investment in the development of reduced peat media by the growing media industry. There is clearly an increasing demand for the products, which has risen from 5.33, to 5.68 to 6.46 million m^3 in 1999, 2001, and 2005 respectively representing a rate of increase of almost 0.2 million m^3 per year. While the increasing proportion of alternative materials has buffered any potential increase in demand for peat to meet this increasing demand for the products, the volume of peat used in these products has not changed greatly; it must be assumed that there is continued extraction from peatlands. At the fairly consistent rate of peat use of 3.4 million m^3 per year, this could amount to a total of 17 million m^3 between 2005 and 2010. The amount of peat actually used could also increase along with increasing amounts of alternatives in the products.

The sources of peat include other countries, and while 38% of our demand has been met from within the UK, 56% has been met by the Republic of Ireland and 6% from Northern Europe. This suggests that a review of the BAP target may also be required to provide appropriate protection towards sustainable development for peatlands, and that some international collaboration may be required to reduce the impact of this UK target on other countries.

1. Introduction

1.1 Background

The purpose of this project is to obtain accurate information on the use of peat and bulky non-peat materials in the horticultural markets in the UK between 2005 and 2010. These data are needed in order to monitor trends and to assist government in developing strategies to achieve targets on peat use reduction. The UK government is committed to reducing peat use under the Biodiversity Action Plan (BAP) and has targets for 40% of total market requirements for soil improvers and growing media to be supplied by non-peat materials by 2005, and 90% by 2010 (see Section 3.3 for definitions). Soil improver/mulch products are predominantly not now peat-based. Growing media products make up the major proportion of the total peat used (approximately 3.4 million m^3 of the total, 5.4 million m^3 in 2001) and therefore growing media will need to contain 85% non-peat materials to meet the UK BAP target for 2010.

Previous reports have been produced for various government departments by the same authors on peat and alternatives use for 1993, 1996-1999 and for 2001. The current project is funded by the Department for Environment, Food and Rural Affairs (Defra), with peer review from a Steering Group from Defra's Horticultural Growing Media Forum (HGMF). The HGMF was set up in 2005 to replace the Peat Working Group (PWG) and comprises stakeholders from the horticultural industry, conservation bodies, growing media manufacturers, retailers and organisations representing both professional and amateur growers.

The Waste & Resources Action Programme (WRAP) was established in 2001 in response to the UK Government's Waste Strategy 2000 to promote sustainable waste management. WRAP's initial programmes of work included creating stable and efficient markets for recycled materials and products for the 100 million tonnes of waste accounted for by commercial, industrial and municipal waste. A significant proportion of this tonnage is biodegradable waste and WRAP aim to increase recycling and composting, by setting up an advisory service to help councils make their recycling schemes more effective and providing support for the composting industry to expand to absorb the extra material collected. These activities are expected to increase the availability of suitable composted materials over the next few years to the markets surveyed, particularly the soil improver market, in this study.

The data from the monitoring exercise gives information on the volumes of peat and non-peat materials used by the four main horticultural sectors – amateur gardeners, professional growers, landscapers and local authorities. It is mainly collected from the manufacturers supplying these markets, but supplemented with separate studies of the wider supply of green compost and spent mushroom compost.

The study obtains reliable information on the types of materials used by the four sectors in all growing media and soil improver products (soil improvers including surface mulches) which have traditionally included peat in the past. More detailed descriptions of the characteristics of soil improvers and growing media are given in Section 3.3. Soil improver products are mainly based on non-peat materials nowadays. However growing media used in the UK have been largely based on peat since the 1970s. The adoption of reduced peat growing media, which contain other materials as well as peat, is reducing the overall percentage of peat in UK growing media and it is this area of peat use in particular that will be of interest in the current project.

1.2 Peat and alternative materials

Peat-based products have proven performance, consistency, good availability, are competitively priced and growers are familiar with their management. Peat is an excellent growing medium and became the dominant material for growing media formulation in the 1970s. Peat-based mixes were found to give more consistent results and were less heavy than traditional John Innes mixes; an important consideration with the increase in national distribution of container-grown plants. The UK was also fortunate to have supplies of good quality horticultural peat available locally.

In the 1980s and 90s increasing volumes of peat were imported from further afield, for example Finland and the Baltic states, particularly for professional growing media. These peats are younger, less humified and have been found useful when formulating mixes for specific purposes, such as long-term shrub media. Imported peat has also been used more in years when wet summers reduced the amount of peat that could be harvested in the UK and the Republic of Ireland.

Amateur growing media have, until recently, been based on almost 100% peat. The good storage characteristics of peat-based growing media are particularly important as they are often manufactured many months prior to the peak sales period in spring. Economics have also been an important factor as peat has been relatively cheap, requiring little processing, in contrast to alternative materials. The amateur gardening market is very competitive because most products are sold via large retailers who compete on price for products.

Professional growers have more stringent quality requirements because they have to produce large numbers of uniform grade plants to schedules. More recently there has been a move to 'reduced peat' growing media, particularly for professional growers supplying the multiple retailers, many of whom have environmental policies involving reducing dependence on peat. Bagged retail growing media are also mostly 'reduced peat' now, with typically up to 30% peat dilution with other materials. There is a market for peat-free plants for certain customers, such as the National Trust and some local authorities.

The main materials being used in place of peat are organic by-products from forestry, agriculture and horticulture (such as bark, wood waste, spent mushroom compost, cocoa shell and coconut coir) as well as commercially produced green compost. Inorganic minerals (such as Perlite and Vermiculite) are used to a small extent and sterilised loam is also still used.

By far the most widely used soil improver product in the UK is bark, which is used as a surface mulch in the landscaping and amateur gardening sectors. The creation or 'artificial' topsoils for landscaping use has increased in recent years and data on the amount of green compost (but not the associated soil) used for this purpose has been collected for the first time and amalgamated into soil improver data for this project. A more detailed description of the properties and characteristics of alternative materials in current use is given in Appendix 2.

1.3 Horticultural markets

The market for soil improvers and growing media in the UK encompasses four main user groups, of which the principal market sectors are as follows.

Amateur gardeners: Gardening is one of the most popular leisure activities in the UK, embracing all social groupings and age classes. The main products bought by amateur gardeners are 'multi-purpose compost', used for raising plants, filling tubs and baskets and "grow-bags" used for growing tomatoes and other vegetables. The increase in patio gardening and the cheapness of products such as grow-bags have both contributed to the increase in this market since the 1980s. Amateur gardeners also buy bagged soil improver products and mulching materials via multiple retailers. Additionally, many gardeners continue the traditional practice of home composting, where the end product is mainly used for soil improvement.

Professional growers: There are 3,000 glasshouse ornamental nurseries and 5,500 nursery stock growers in the UK (Defra 2004 census) who use substantial quantities of growing media. Professional growers often obtain materials from the same producers who supply the amateur market, but the market is more specialised with growers using particular formulations according to the crops grown and their growing systems. Many growers in the UK used to mix their own growing media from raw materials but most now buy in ready to use media.

Private sector landscapers: There are approximately 8,000 landscape contractors operating in the UK, using large quantities of soil improvers for the rehabilitation of ground following development and construction work. Landscape architects may be involved in specifying the type of materials used in various schemes. Materials are usually purchased in bulk direct from producers or wholesalers. The sector mostly uses soil improver products such as planting composts and mulches, generally purchased in bulk loads.

Local authority grounds maintenance: There are almost 400 local authorities in the UK which have statutory responsibilities for grounds maintenance, focusing on the up-keep of open space amenities such as parks, gardens and playing fields. The local authority market used to be more significant when most councils had their own nurseries to raise plants for use in parks, etc but this has declined as much of this activity is now contracted out. Most consumption nowadays of relevant materials is for soil improvement. Materials may be purchased either direct from producers or horticultural wholesalers.

1.4 Producers of soil improvers and growing media

The supply of soil improver and growing media products sold to amateur gardeners is dominated by a few large manufacturers who can service the national distribution requirements of the multiple retailers. Professional growing media supply is also mainly from a relatively small number of manufacturers who can source the right quality of raw materials and invest in the sophisticated mixing equipment used. In total however, up to 40 established producers are based in the UK and Republic of Ireland, many of which have considerable capital assets in the form of peat reserves. Many producers have also invested in recent years to increase significantly their production of peat alternatives in response to consumer interest. They have invested much time and money in trials of non-peat and reduced peat growing media for both the amateur and professional grower markets.

There is some local supply of soil improver products such as spent mushroom compost and green compost but bark is traded nationally through a supply chain of producers and distributors.

Significant volumes of growing media for use by professional growers are imported into the UK. Some raw materials used by professional growing media manufacturers are also imported, for example coconut coir, pine bark and wood fibre. Imported peat from the Republic of Ireland and the Baltic States is particularly significant in the professional growing media sector.

These changes reflect the commitment and efforts of the growing media producers to support the BAP and to satisfy consumer interest in the environment by developing and providing reduced peat growing media products to both professional and amateur growers.

2. Project objectives and scope

The aim of the whole project is to monitor the use of peat and alternatives between 2005 and 2010 for growing media and soil improvers, particularly in those sectors where peat use is greatest, including amateur gardening, professional horticulture, private sector landscaping and local authority grounds maintenance. Monitoring episodes will be carried out for the years 2005, 2007, 2009 and 2010 with biennial reports for each of these years and a final monitoring report.

The monitoring aims to measure the extent to which the use of peat and alternatives changes, and identify the sectors that use most peat and therefore indicate where effort to change use should be targeted.

Data have been collected since 1993 and it is essential that the surveys are directly comparable in methodology of data acquisition and presentation, taking into account changes that have occurred in the past with the addition of spent mushroom compost in 1998, professional growing media in 1999 and loam incorporated in growing media (not turf topdressings or root zone mixes) in 2001.

The objectives are to:

- identify the total supply of peat and alternatives, including green compost and spent mushroom compost, in each of the years;
- present the data broken down according to:

  use as growing media or soil improver;

  the sector of use;

  by year of collection and from 1999 onwards for all sectors and

  from 1993 for the three sectors excluding professional growing media;
- Identify the sources of peat and bark.

3. Methodology

3.1 Data collection

It should be possible to obtain data on the use of soil improver and growing media products from both the supply side of the market (production data from producers) and also from sales information held by retailers. In the early years of the study (1993, 1996 and 1997) attempts were made to collect data using both approaches as a crosscheck on the findings. The results firmly indicated that the most reliable quantitative data was that available from the producers who are able to provide very comprehensive and complete data for each of the market sectors of interest. Thus only the producers were contacted again as the preferred source of information for the present study.

Participants were asked to supply data for 2005 on the volumes of materials supplied separately to each of the four markets, amateur gardeners, local authorities, landscapers and professional growers with the data further sub-divided as soil improvers and growing media.

Survey forms and letters were agreed with Defra in 2005 prior to being sent out. Changes from 2001 included asking for data on green compost use in topsoil manufacture, a growing market, and a note to clarify that tree planting compost should be regarded as a soil improver as some materials may have been incorrectly classed as growing media in the 2001 survey.

Producers were asked to identify their sources by region for peat and bark. Peat sources have been grouped into UK, the Republic of Ireland and Northern Europe, and bark sources into UK, Southern Europe (including the small mount from the Republic of Ireland) and Northern Europe. These groupings have been used to maintain the confidentiality of commercial information obtained as it might otherwise have been possible to identify individual importers.

3.1.1 Peat and the main alternatives

Initial meetings were held with the Chairman and the Deputy Chairman of the Growing Media Association and also the Horticultural Trades Association to agree an initial list of those to be contacted.

For 2001, when data were last collected, 29 suppliers were contacted. Since then one supplier of peat and a bark supplier have ceased sending materials to the end markets of interest. However, discussion with the industry identified a further eight minor producers to include two supplying peat, four bark and two a range of materials. Additionally, the emerging recycled woodchip industry, which mainly supplies recycled wood fragments for the construction of paths, equestrian centres and play areas, has begun to send small quantities for use as surface mulch. A meeting was held with the Secretary of the Wood Recyclers Association and the three main suppliers were included. Thus a total of 38 producers were contacted to obtain 2005 supply data.

All producers were contacted by letter and telephone at the end of 2005 seeking their agreement to participate. In early January the new producers, plus those who had changed personnel since the previous study, were contacted again to explain the objectives of the study and to confirm that the details of what was being sought were fully understood. Arrangements were made for face to face visits with some, mostly those supplying a range of materials to all four end markets, to ensure complete data were accurately supplied. Most companies, particularly those with more straightforward data were able to supply the information remotely by completion of the data collection table, or electronically.

Information was sought on the supply of peat and the main alternatives to peat including bark, green compost, wood-based materials, cocoa shell, coir, loam and a wide range of minor physical amendments. Additionally, the country of origin of both peat and bark was identified.

All 38 producers, listed in Appendix 3, willingly supplied data on their materials sent to each of the markets which they supplied during 2005. Confidence in the reliability of the data is very high since no significant producer is omitted from the list and the view of the industry is that well in excess of 95% of the market has been accounted for.

3.1.2 Green compost

A meeting was held with the Composting Association and a list of producer members was obtained. The Environment Agency and sources in Scotland (through the Scottish Environment Protection Agency (SEPA)), Wales and Northern Ireland were contacted to identify licensed compost manufacturers who sold materials off site. A comprehensive list of green compost producers was compiled and a separate survey was carried out. A letter was sent with the survey form to each of the producers in December 2005 and January 2006. Those who had not responded by the end of January were contacted by telephone and visits were arranged to a small number to explain the survey in more detail and assist with the collection of data.

The survey was sent to 115 compost producers and 88 responses were received, giving a response rate of 77% overall. Of these 115 producers, 7 were of unknown capacity, 26 were classed as small, producing less than 5,000 m^3 of compost in 2005, 57 were medium sized, producing 5,000 - 20,000 m^3 in 2005 and 25 were classed as large, producing over 20,000 m^3 of compost in 2005. The response rates for these four groups were 0%, 77%, 81%, and 88%, respectively. Of the large composters, only three did not return any data. Based on the numbers and capacities of non returns, it is estimated that over 75% of the compost used in the markets has been accounted for.

3.1.3 Spent mushroom compost (SMC)

Spent mushroom compost has a long track record of use by landscapers and when information was last collected in 1998 it was second only to bark as a peat alternative. Industry knowledge indicates that at least 500,000 m^3 of SMC was available for disposal in the UK in 2005.

A new separate study was made of 2005 SMC use by the three original end markets, amateur gardeners, local authorities and landscapers only, since use by professional growers is negligible. An initial meeting was held with the Chairman of the Mushroom Growers Association (MGA), which covers Great Britain and contact was also made with the Chairman of the Mushroom Industries Association of Northern Ireland (MIANI).

A total of 38 mushroom growers were contacted to encompass all the large-scale growers, most of the medium sized growers and a significant number of small scale growers since their disposal routes might be different from others. Additionally a wide geographical spread was achieved. All were contacted by letter and telephone at the beginning of January to obtain supply data to the three end markets of interest. In practice, four growers had ceased trading within the previous 18 months. Additionally two mushroom marketing co-operatives and a mushroom packaging manufacturer were able to provide helpful information on the spent mushroom compost market.

Whereas most growers were personally able to provide accurate information, a number of growers, notably the large-scale producers, had their SMC removed by third parties and had no knowledge of its end use. Subsequently, ten third parties, mainly haulage companies and horticultural suppliers, were contacted on the advice of mushroom growers. These companies play a major role in removing spent compost from growers' premises and selling it on, mainly to landscape contractors but also for use in agriculture.

Defra statistics on production of fresh mushrooms in Great Britain, supplemented by information from the two mushroom growers' trade associations, indicated that 2005 fresh mushroom production in the UK was around 67,000 tonnes; 50,000 tonnes in mainland Britain and 17,000 tonnes in Northern Ireland. Each grower was firstly asked for fresh mushroom production information so that an estimate of the proportion of the total UK industry contacted during the study could be made. The 34 trading growers contacted accounted for just over 80% of the fresh mushroom industry in Great Britain.

Each was asked about their disposal of spent mushroom compost and all provided data on SMC supply. Thus around 80% of SMC production and supply in Great Britain was readily accounted for.

Much of the remaining approximately 18% of fresh mushroom production in Great Britain is from small growers, many of whom the industry maintains sell small amounts of SMC locally at the roadside or, occasionally through garden centres. The remainder mainly goes to agriculture.

In Northern Ireland, where mushroom growing units are generally small and around 95% of spent mushroom compost goes to agriculture, the hauliers gave the best estimate of supply to all three markets. A further quantity of SMC is imported into the UK from the Republic of Ireland.

Finally, checks with the suppliers of peat and the main alternatives who also supply SMC enabled further adjustments to avoid double counting.

Although mushroom compost is initially cropped using peat and chalk as a surface casing layer, growers have advised that the approximately 10% of peat included is lost among the decomposed straw after cropping. Therefore, within the 1998 data and again in the 2005 data the reported quantity of SMC used has not been adjusted downwards since any double counting of peat volume is considered minor.

A more difficult issue to compensate for is the fact that the volume of SMC is reduced markedly after a few weeks of stockpiling. Whereas most is used within days of removal from buildings a significant amount is stored before use by landscapers during which time it loses volume and turns darker in colour as it matures. Thus, although data have been accurately collected or estimated with good guidance from almost all of the industry, the reported volumes of SMC use may well be subject to an error of 10% or more.

All contacts, including hauliers, who provided data and information about the SMC supply chain are included in Appendix 3.

3.1.4 General comments on data collection

Many producers, particularly those dealing in peat, bark and green compost not only supply to end users but also sell or exchange raw materials to other producers for product formulation and onward sale. In early discussion much emphasis was put on the need to avoid double counting and producers took great care when assembling their data. It was often possible to carry out an audit trail by tracking batches of materials among companies to confirm that this source of error had been minimised. Many producers of peat and the main alternatives were contacted subsequently, particularly those supplying green compost or spent mushroom compost, to confirm the primary supplier of these materials thereby enabling the necessary adjustment of data collected in the two separate studies.

Contributors provided a full breakdown of production and supply as either soil improvers or growing media into the four markets. It has been assumed that the entire supply to professional growers is used as growing media since the quantity of peat which is incorporated into glasshouse soils is negligible nowadays.

In practice, most producers continued to have some difficulty, as in the earlier surveys, in separating out data for local authority and landscaper markets since these customers are often grouped within their records along with professional growers, particularly for sales of growing media. Thus despite the best of co-operation there remains some uncertainty over the split of materials supply between local authorities and professional landscapers.

The quantitative information gathered for growing media is based on materials which are mainly supplied as branded products by established suppliers operating at national level. However, there are materials supplied into the soil improver market on a local basis for which no reliable data are available. These are compost produced at home, farmyard manure and stable waste, all of which are not strictly comparable with peat and alternatives since they are primarily used as organic fertilisers rather than physical soil improvers.

A full list of all producers who participated, including suppliers of information on green compost and spent mushroom compost, is given in Appendix 3.

The issue of the importation of growing media with plants is discussed in section 5.2.1.

3.2 Data management

The data collected are commercially sensitive and so steps were taken to ensure confidentiality through the use of coded forms and aggregation of data. Data gathered by Enviros and ADAS were independently amalgamated for the compost producers, and the peat and spent mushroom producers, respectively. Steps to minimise the risk of double counting of materials were taken through close liaison between Enviros and ADAS. Where green compost data was supplied in tonnes, this was converted to cubic metres by using a factor of 0.6 kg/m^3 as in previous years. The data were entered into a database and the tables and graphs produced.

Pie charts have been used to show the relative proportions of materials, and graphs have been produced with bars representing volumes in thousands of cubic metres (m^3).

3.3 Definitions

3.3.1 Soil improvers

For the purposes of this project the term “soil improver” incorporates true soil improvers, tree planting composts, surface mulches and specialist products such as turf dressings. True soil improvers are materials that are added to improve a soil’s organic matter level and physical condition, either by improving structure and/or increasing water-holding capacity. They should therefore have a high organic matter content. pH and nutrient content are less important. They should be largely free of weeds and physical hazards such as glass and metal. There should normally be a wide range of particle sizes up to about 25 mm.

Tree planting composts are a specialist form of soil improver. Again the main component is organic matter but a significant nutrient content is also desirable and particle size should be slightly smaller.

Turf dressings are similar in properties to tree planting composts, but a lower organic matter content can be tolerated. The most stringent requirements are fine particle size and absence of sharps such a stones, glass, metal and sharp plastic.

Surface mulches have two main functions: firstly to suppress weed growth and secondly to conserve soil moisture. For both purposes the product must be of coarse particle size, typically over 20 mm, to allow water to infiltrate and the surface to dry quickly, hence preventing weed establishment. The colour should ideally be dark brown or black since this is more aesthetically pleasing. A low nutrient content is desirable to discourage weed establishment.

3.3.2 Growing media

A growing medium consists of a bulky physical medium with an appropriate and safe nutrient content to sustain plant growth for a period in a container. Since plants are grown in isolated containers it must be free of phytotoxic chemicals or excessive nutrient levels.

It must be sufficiently well drained to allow good air porosity but at the same time hold enough moisture to avoid the need for frequent watering. The pH should ideally be between 5.0 and 7.0, depending on species grown and the buffering capacity of the medium, in order to maximise the availability of nutrients to plants.

A growing medium should be physically and biologically stable and with little variability, physically and nutritionally, between batches. This is particularly important for professional growers who are required to produce batches of uniform plants to schedules. The shelf-life of growing media sold via retail outlets to amateur gardeners is important as such products may be manufactured at least 6 months before they will be used.

3.4 Baseline years

The original Peat Working Group (PWG) was established in 1992 to assess the balance between nature conservation and mineral extraction which might affect peatlands. Surveys were started in 1993, and were continued through 1996 to 1999, on peat and the use of alternatives in three sectors: amateur gardeners, local authorities and landscapers. In 1998, spent mushroom compost use was included in the survey but the data excluded from data tables to enable the trends to be compared. In 1999 professional growing media were included in the survey, with loam in growing media added in 2001.

Comparable data can therefore be presented since 1993 for the three main sectors (presented in the Appendices) and from 1999 onwards for all four sectors by incorporating the 1998 spent mushroom compost data into the survey data for 1999 and 2001.

4. Supply of peat and alternative products 1999 - 2005

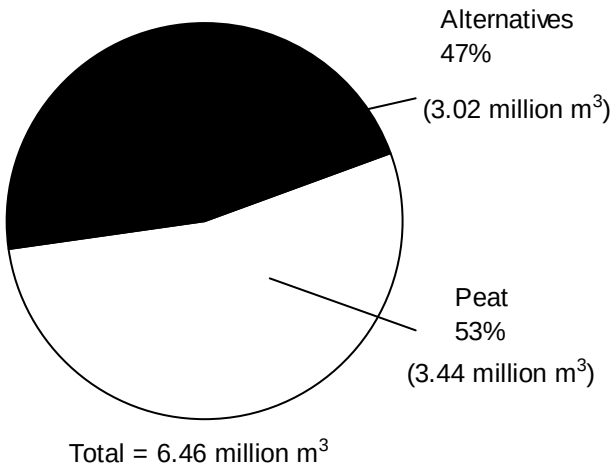
The data for 2005 and trends from 1999 to 2005, including data for the professional grower market and bulk spent mushroom compost (SMC), are provided in this section of the report.

In the 2001, and previous, reports the bulk spent mushroom compost data were excluded from the tables and graphs of trends to maintain continuity with data since 1993. The historic data for the three sectors excluding professional grower market and excluding SMC are shown in Appendix 1.

4.1 Total supply of materials to all market sectors in 2005

In 2005, the total consumption of peat and alternative materials used in all four sectors was 6.46 million m^3 of which 3.44 million m^3 was peat (53%) and 3.02 million m^3 (47%) was alternatives (Figure 3 and Table 1). The 2005 BAP targets were therefore met.

Figure 3 The quantities of peat and alternative materials used in soil improvers and growing media in 2005 for all market sectors



The quantity of the materials used in soil improvers was 2.46 million m^3 but over 60% of the materials, 4.00 million m^3, was used in growing media (Figure 4).

Figure 4 The quantities of all materials used as soil improvers and growing media in 2005

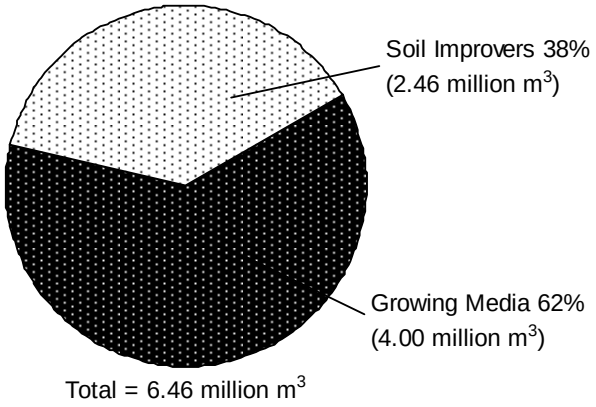
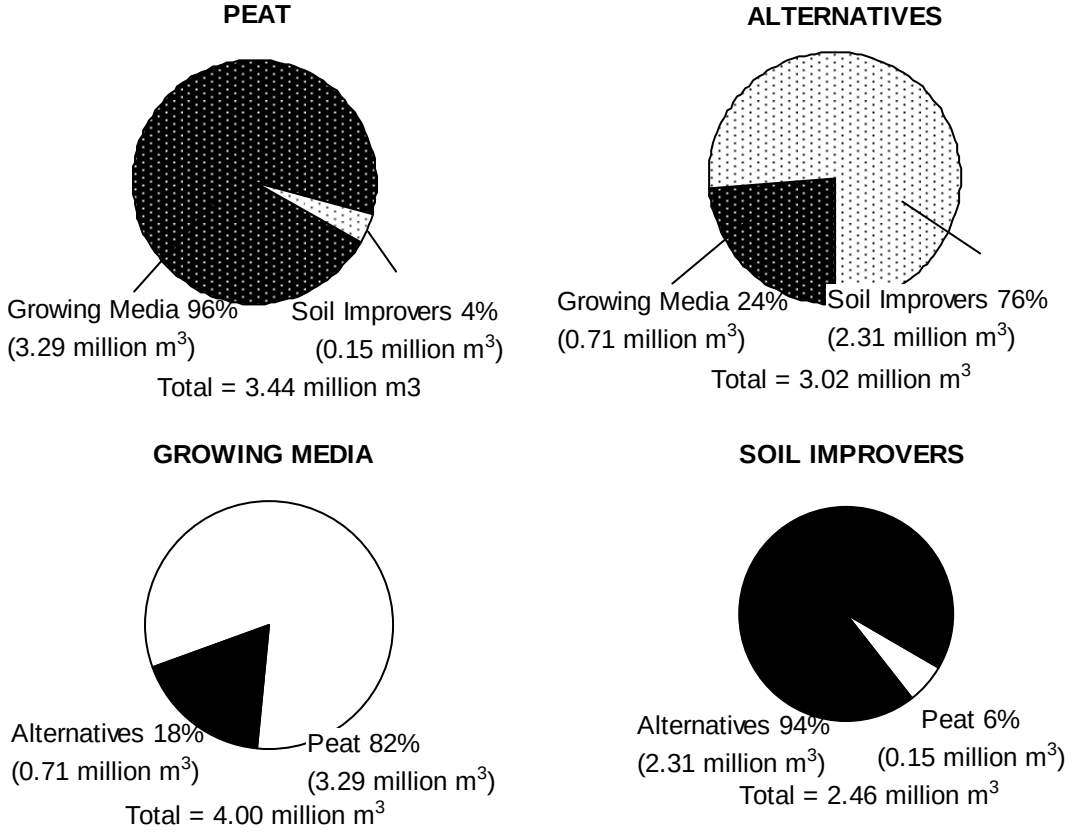


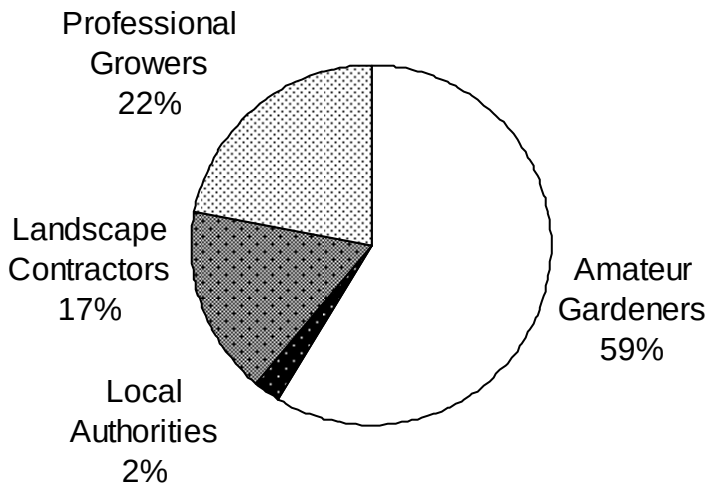
Figure 5 The relative use of peat and alternatives for soil improvers and growing media in 2005



The majority (96%) of the total peat used in 2005 was in growing media (Figure 5) whilst the bulk of alternatives used (76%) was in soil improvers. 18% of the composition of all growing media in 2005 was alternative materials with peat usage in soil improvers being 6%.

Amateur gardeners consumed the greatest proportion of materials in 2005 (59% of the total materials used), followed by professional growers and landscape contractors. Local authorities used very little in comparison (Figure 6).

Figure 6 Consumption of all materials by the main user groups in 2005



The sector that used the most peat was amateur gardening. Table 1 shows that most of this was in the form of growing media products (amounting to 2.15 million m^3 of peat) and the peat used in soil improvers was only 0.13 million m^3, while Table 2 shows that amateur gardeners account for 66% of all the peat used across the sectors. Professional growers used approximately half as much peat as amateur gardeners (Table 1 and Table 2). From this, targeting amateur gardeners could contribute most to reductions in peat usage.

Table 1 Summary of material supplied to all sectors of the UK horticultural market in 2005 ('000 m^3)

Market sector	Soil improvers	Growing media	Total
Amateur gardening			
Peat	134.3	2,148.8	2,283.1
Alternatives	1,107.1	402.1	1,509.2
Sub-Total	1,241.4	2,550.9	3,792.3
% Peat	11%	84%	60%
Local authority			
Peat	6.5	3.7	10.2
Alternatives	145.5	6.0	151.5
Sub-Total	151.9	9.7	161.6
% Peat	4%	38%	6%
Landscaping			
Peat	6.3	3.5	9.8
Alternatives	1,055.9	25.4	1,081.3
Sub-Total	1,062.2	28.9	1,091.1
% Peat	0.59%	12%	1%
Professional growers			
Peat	0.0	1133.0	1133.0
Alternatives	0.0	277.8	277.8
Sub-Total	0.0	1410.7	1410.7
% Peat		80%	80%
Total market			
Peat	147.1	3,289.0	3,436.0
Alternatives	2,308.4	711.3	3,019.8
Total	2,455.5	4,000.3	6,455.8
% Peat	6%	82%	53%

Table 2 Consumption of peat and alternatives by each market sector in 2005 (percent of total consumption)

Market sector	Peat	Alternatives
Amateur gardeners	66.4%	50.0%
Local authorities	0.3%	5.0%
Landscape contractors	0.3%	35.8%
Professional growers	33.0%	9.2%

4.2 Informal supply

The data presented above cover the mainstream commercial supply of soil improvers and growing media to the UK horticultural market. However, there is an informal supply of other materials at a local level, which are primarily used for soil improvement. The principal materials of interest are home composts and manures.

Home compost made from garden and kitchen wastes: more and more householders produce their own compost each year to be used in the garden as a soil improver either as a surface mulch or dug in to supply nutrients and organic matter.

Livestock manures: much farmyard manure and stable waste is readily available to amateur gardeners. Manures are valued for their nutrient and organic matter contents and their ability to stimulate soil biological activity.

It would be difficult and costly to obtain reliable data on supply of either of these two materials, which have also not been included in previous studies. Therefore no data from these informal supply sources is included.

4.3 Discussion of trends 1999 – 2005

In 1999, the use of materials in professional horticulture was included for the first time in the peat monitoring reports. In 1998, the bulk spent mushroom compost (SMC) supply was assessed for the first time in a separate survey. The amounts of bulk SMC recorded in the 1998 and 2005 separate surveys are shown in Table 3. The 1998 data have been added to the data for alternatives for 1999 and 2001 to make the data comparable to 2005 and beyond. ***The 2001 report did not include this bulk SMC data.*** It should be noted that the volumes shown are the **additional** supply from mushroom growers, often through hauliers, which supplements the quantity of SMC used directly by the producers of growing media and retail products. All of the bulk SMC was used as a soil improver.

Table 3 Bulk spent mushroom supply ('000 m^3)

	1998	**2005**
Amateur gardeners	77.5	37.0
Local authority	14.0	24.0
Landscaping	190.5	164.0

The data for all four sectors, including bulk SMC is shown in Tables 4 to 6 and graphically in Figures 7 to 11.

Table 4 Trend of material use by market sector 1999 - 2005 ('000 m^3)

	1999	2001	2005
Amateur gardeners			
Peat	2,269.9	2,241.2	2,283.1
Alternatives	695.3	1,003.6	1,509.2
Sub-Total	2,965.2	3,244.8	3,792.3
% Peat	77%	69%	60%
Local authority			
Peat	14.0	25.3	10.2
Alternatives	189.5	142.1	151.5
Sub-Total	203.5	167.4	161.6
% Peat	7%	15%	6%
Landscaping			
Peat	9.4	12.5	9.8
Alternatives	949.6	1,043.3	1,081.3
Sub-Total	959.0	1,055.8	1,091.1
% Peat	1%	1%	1%
Professional growers			
Peat	1,140.0	1,116.1	1,133.0
Alternatives	61.8	100.7	277.8
Sub-Total	1,201.8	1,216.8	1,410.7
% Peat	95%	92%	80%
Total market – all four sectors			
Peat	3,433.3	3,395.1	3,436.0
Alternatives	1,896.2	2,289.7	3,019.8
Total	5,329.5	5,684.8	6,455.8
% Peat	64%	60%	53%

Table 5 Trend of material use for soil improvers by market sector 1999 - 2005 ('000 m^3)

	1999	2001	2005
Amateur gardeners			
Peat	138.4	111.0	134.3
Alternatives	557.2	814.1	1,107.1
Sub-Total	695.6	925.1	1,241.4
% Peat	20%	13%	11%
Local authority			
Peat	0.2	0.1	6.5
Alternatives	185.7	125.4	145.5
Sub-Total	185.9	125.5	151.9
% Peat	0%	0%	4%
Landscaping			
Peat	6.4	1.0	6.3
Alternatives	944.0	1,003.5	1,055.9
Sub-Total	950.4	1,004.5	1,062.2
% Peat	1%	0%	1%
Professional growers			
Peat	0.0	0.0	0.0
Alternatives	0.0	0.0	0.0
Sub-Total	0.0	0.0	0.0
% Peat			
Total market – all four sectors			
Peat	145.0	112.1	147.1
Alternatives	1,686.9	1,943.0	2,308.4
Total	1,831.9	2,055.1	2,455.5
% Peat	8%	6%	6%

Table 6 Trend of material use for growing media by market sector 1999 - 2005 ('000 m^3)

	1999	2001	2005
Amateur gardeners			
Peat	2,131.5	2,130.2	2,148.8
Alternatives	138.1	189.5	402.1
Sub-Total	2,269.6	2,319.7	2,550.9
% Peat	94%	92%	84%
Local authority			
Peat	13.8	25.2	3.7
Alternatives	3.8	16.7	6.0
Sub-Total	17.6	41.9	9.7
% Peat	78%	60%	38%
Landscaping			
Peat	3.0	11.5	3.5
Alternatives	5.6	39.8	25.4
Sub-Total	8.6	51.3	28.9
% Peat	35%	22%	12%
Professional growers			
Peat	1,140.0	1,116.1	1,133.0
Alternatives	61.8	100.7	277.8
Sub-Total	1,201.8	1,216.8	1,410.7
% Peat	95%	92%	80%
Total market – all four sectors			
Peat	3,288.3	3,283.0	3,289.0
Alternatives	209.3	346.7	711.3
Total	3,497.6	3,629.7	4,000.3
% Peat	94%	90%	82%

4.3.1 Main trends

The total volume of all materials supplied to the four main horticultural markets increased from 5.68 million m^3 in 2001 to 6.46 million m^3 in 2005. The largest increase was in the soil improver materials. Peat accounted for 53% of the total materials use in 2005 (Table 4), as compared to 60% in 2001. However, peat consumption was broadly similar in 2005 to that in 2001, at around 3.44 million m^3 because the total market size increased. Indeed, since 1999, the total market has increased at almost 0.2 million m^3 per year.

The total quantity of materials used in soil improvers was 2.46 million m^3 (38% of total consumption) and a total of 4.00 million m^3 of materials were used in growing media (62% of total consumption – see Table 5, Table 6 and Figure 4) in 2005. The soil improver market (mainly landscaping) increased proportionately more (19%) than the growing media market (10%) between 2001 and 2005. This would be expected from trends in the retail horticultural market over the last few years (HTA Garden monitor scheme), with poorer sales of plants and gardening sundries in some years due to economic factors and less favourable weather during key sales periods.

The growing media market is the most important in relation to trends in peat consumption because 96% of peat is used in growing media products, mainly for plant growing by amateur gardeners and professional growers (see Figure 5). Soil improvers are mostly based on non-peat materials (94% alternatives).

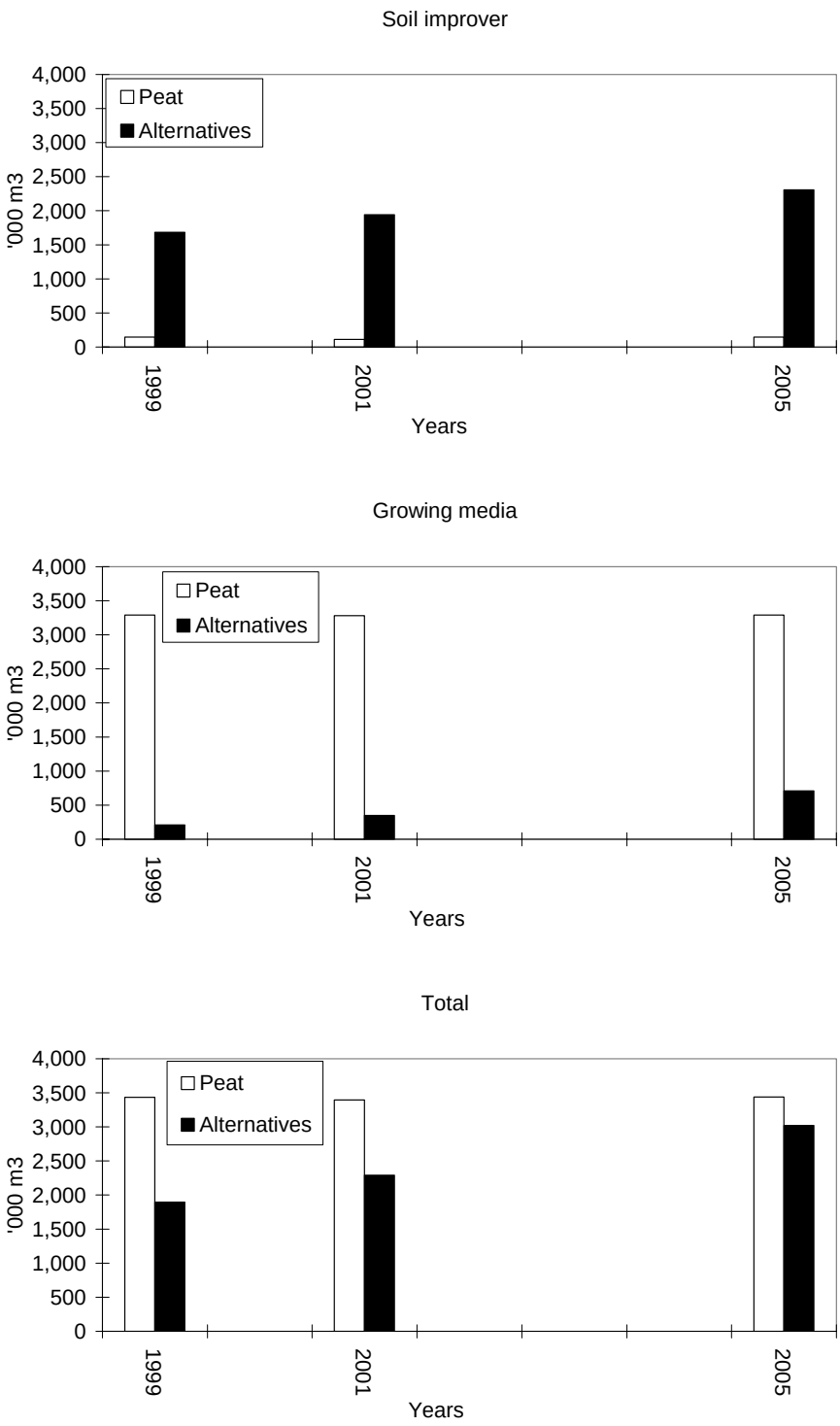
The split of consumption of peat and alternative materials by the four horticultural sectors was much the same in 2005 as in 2001. Amateur gardeners used the largest volume of materials, accounting for 59% of all consumption. Professional growers (22%) and landscapers (17%) are smaller but significant users, however the majority of landscaper materials use is non-peat product in soil improvers and mulches. Local authorities represent a very small proportion of total use (2%), as would be expected with most plant raising and landscaping operations now contracted out.

Despite fairly consistent peat usage, all of the horticultural sectors have reduced the proportion of peat in total materials use since 1999 (Table 4). This has been the result of increased usage of alternative materials. For amateur gardeners, peat now represents 60% of total use of materials in growing media and soil improvers (from 77% in 1999) and for professional growers peat is now 80% of the total use of all materials (from 95% in 1999). The move in the professional grower sector is particularly relevant as this sector is using virtually only growing media products, not soil improvers and it is the growing media market that has been dominated by peat in the past. Amateur gardeners are, however, the most significant sector in terms of volumes of peat and other materials used, therefore changes in this sector, particularly reduction in the percentage of peat in growing media products, will have the greatest influence on overall trends to meet BAP targets.

The overall soil improver market has increased in size since 1999 (Table 5) but this has not affected peat use much as it is only a minor material in this market. Soil improver use has increased by 78% since 1999 in the amateur gardening market and by 12% in the landscaping market. The increase in the gardening market for soil improvers reflects greater sales of bagged soil improver and mulch products via retail outlets.

The total growing media market has shown a more modest increase since 1999, with amateur gardening growing media increasing by 12% and professional growing media by 17% (Table 6). The overall growing media market increased from around 3.50 million m^3 in 1999 to 4.00 million m^3 in 2005.

Figure 7 Combined use of peat and alternatives by the amateur gardening, local authority, private sector landscaping markets and professional growers 1999-2005 ('000 m^3)



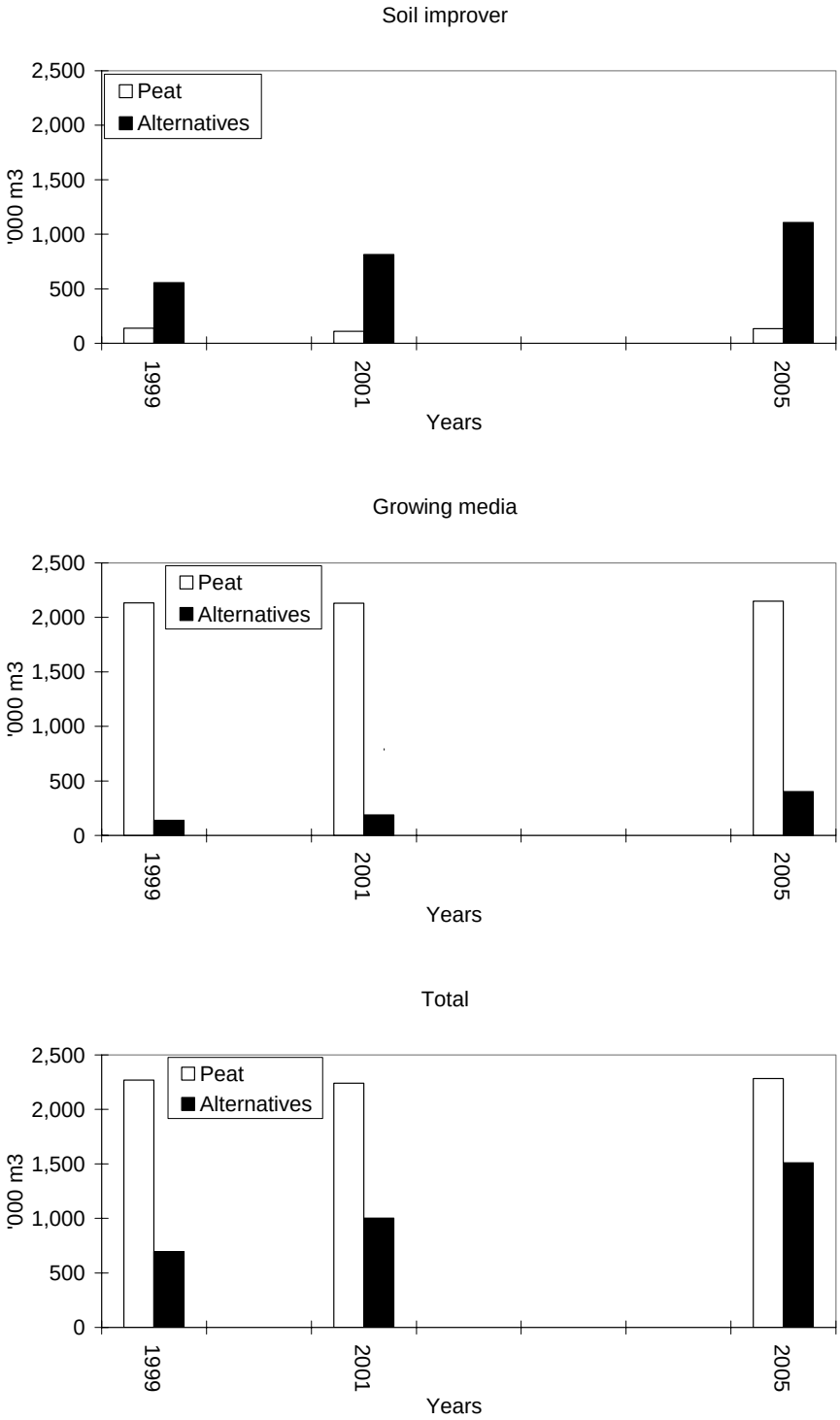
4.3.2 Trends in amateur gardening usage

Amateur gardening represents the largest user group and trends in peat and alternatives use by this sector will have the most impact on overall trends in the UK. This sector continued to use 66% of the total peat consumed (Table 2). The proportion of peat in products used by this sector was 60% in 2005, steadily declining from 77% in 2001 (Table 4). Most of this peat is consumed in growing media products such as 'Multi-purpose Compost' and 'Growing Bags'.

The introduction of 'reduced peat' formulations by many growing media manufacturers has increased the proportion of other materials in these products and this is seen in Figure 8 . The use of alternative materials is still relatively small but has increased from only 6% of the total growing media volume in 1999 to 16% in 2005, hence the percentage peat has reduced from 94% to 84% (Table 6).

One of the reasons for the continued dominance of peat in the amateur gardening market has been the very cost-competitive nature of this market giving manufacturers less opportunity to use more expensive materials. There have also been concerns in the past about technical issues and sufficient long-term supply of reliable alternative materials for this large market. Many UK manufacturers are still based in traditional peat-harvesting areas, which may not be the optimum location if other materials replace an increasing part of the peat used. With increasing fuel costs, the cost of transporting raw materials to the factory and transport of the end products in national supply chains will become increasingly influential in this market. Materials with a high bulk density, such as loam and green compost, are a particular problem in this respect.

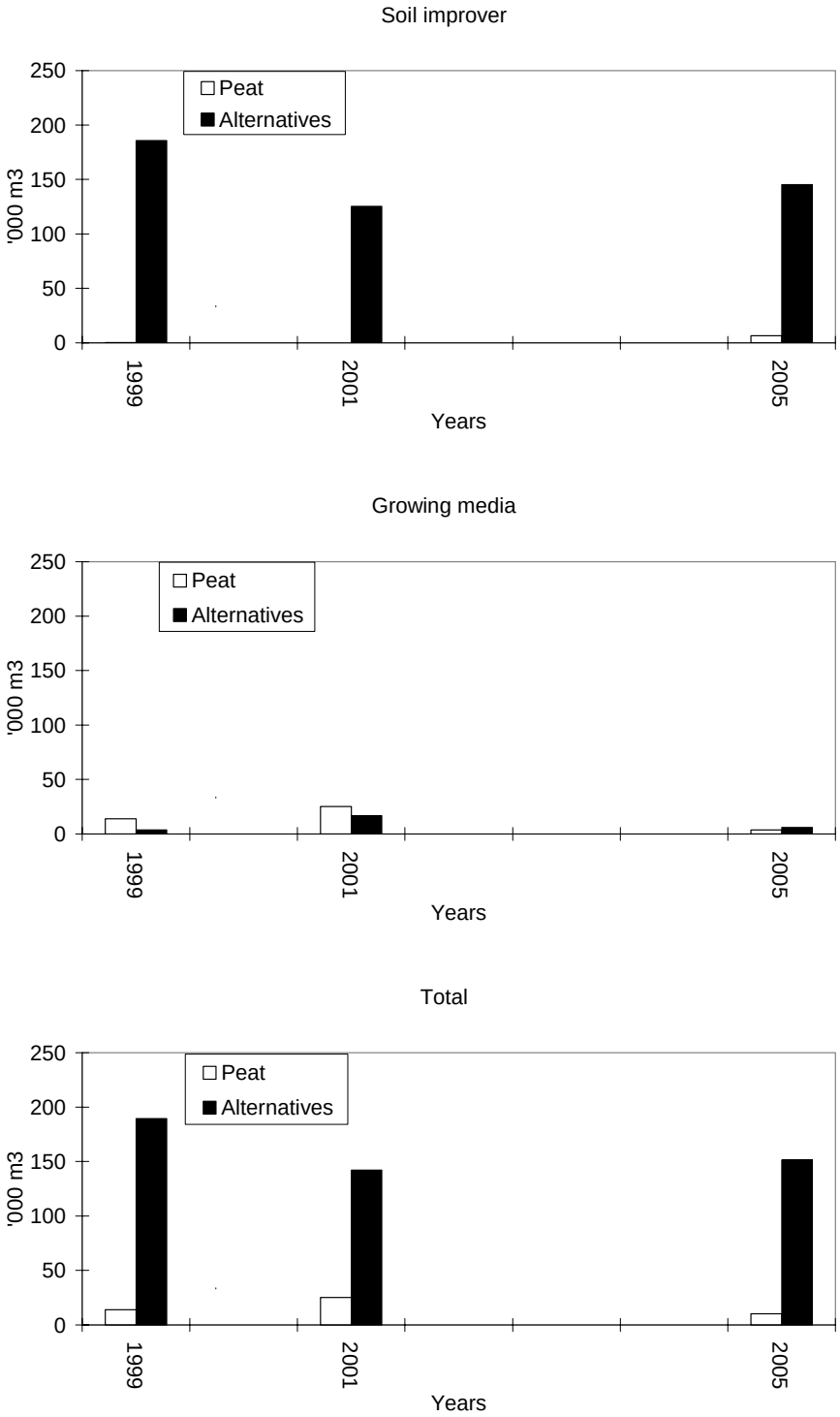
Figure 8 Use of peat and alternatives by the amateur gardening market 1999-2005 ('000 m^3)



4.3.3 Trends in local authority usage

The local authority market decreased between 1999 and 2001 and again, marginally, in 2005, only representing about 2% of total consumption of peat and other materials (Figure 9 . The few local authorities still producing plants in growing media have reduced peat use to only 38% of the total growing media used. There is a strong emphasis on reducing peat use in many local authorities, some of which specify that bought-in plants for amenity planting must be peat-free.

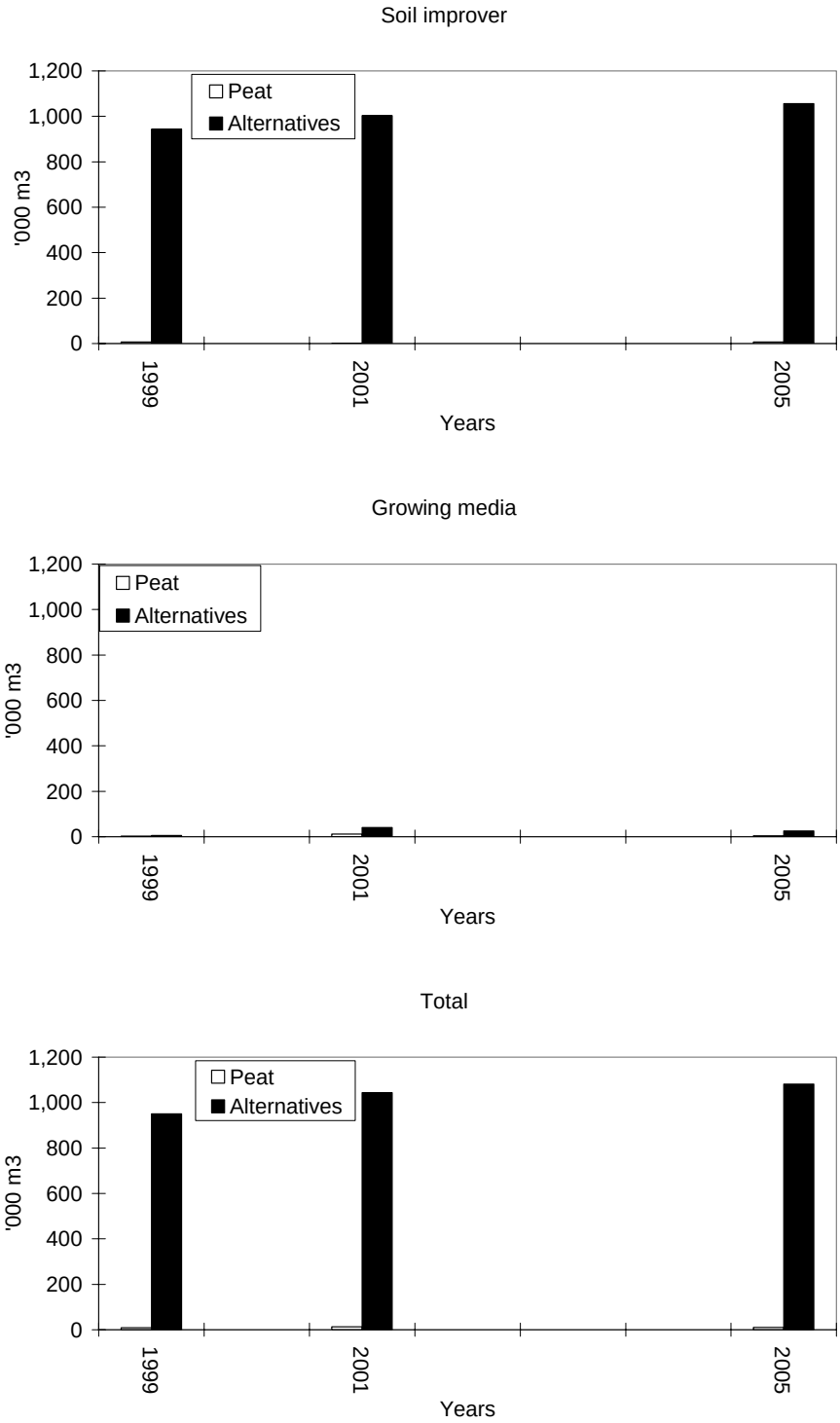
Figure 9 Use of peat and alternatives by the local authority market 1999-2005 ('000 m^3)



4.3.4 Trends in landscape contractor usage

The landscape market uses a significant percentage of all soil improver materials (43%), predominantly as surface mulches (Table 1). This sector uses very little peat, even in growing media (Figure 10); peat was only 12% of the average growing media composition (Table 6).

Figure 10 Use of peat and alternatives by the landscape contractor market 1999-2005 ('000 m^3)



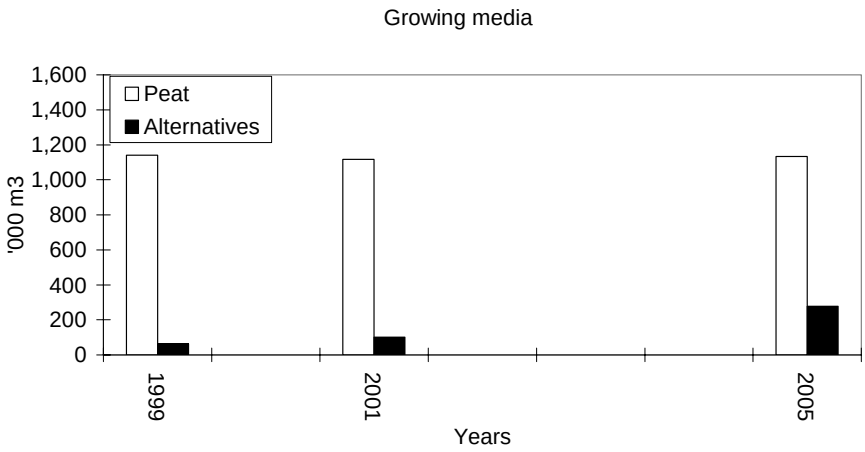
4.3.5 Trends in professional grower usage

Professional growers have stringent quality requirements for their growing media as they normally have to produce large batches of uniformly high quality plants to fixed schedules. Peat has been the major ingredient in professional growing media since the 1970s and accounted for almost 95% of material use in 1999 (Table 4). Demands from multiple retailers to reduce peat use have caused significant numbers of growers to move away from pure peat mixes to blends with 10 to 30% of alternative materials over the last few years. A number of growers now produce peat-free plants for specialist markets, such as the National Trust and some local authorities. Peat still represented an average of 92% of growing media used by this sector in 2001 but this reduced to 80% in 2005, a greater reduction than that recorded in the amateur gardening market (Table 6). It should be noted that this reduction has been achieved by increased use of alternatives, while the volume of peat used remained fairly consistent between 1999 and 2005.

Economic issues and lack of confidence in reduced peat or peat-free growing media has hindered their uptake by some growers but many of those adopting them have seen improved performance over 100% peat media. There are large differences in the ease of peat substitution between different sectors within the professional grower category. Some groups of plants, such as the ericaceous shrubs (*e.g. Rhododendron, Azalea)* are more difficult to grow in peat-free media than other crops. The most significant influence on the adoption of reduced peat growing media by professional growers has been that of their multiple retailer customers. Most of these now have policies on peat reduction as part of their Corporate Social Responsibility programmes and some, such as Marks & Spencer plc, have been actively encouraging suppliers to move to reduced peat growing media where possible.

The UK retailers also buy plants from growers outside of the UK and there has therefore been some influence on growing media use in those countries. In The Netherlands a research project on ‘New Growing Media’ (personal communication) was set up as a direct response to UK retailer demands. This Defra monitoring project does not include volumes of peat and other materials imported into the UK in pots with plants but it would be interesting to track trends in peat consumption in this area also (see Section 5.2.1).

Figure 11 Use of peat and alternatives by the professional growers market 1999-2005 ('000 m^3)



4.4 Sources of peat

As in previous years, around half the peat used in the UK in 2005 was from the Republic of Ireland. Northern Europe supplied only 6% of the peat, mostly from the Baltic States and mostly used in professional growing media. The volume of peat used that is from the UK has fallen since 2001, which reflects reduced extraction on some UK sites and increased extraction from sites in other countries, especially the Republic of Ireland. The extraction of peat in any one year varies according to the weather during the summer harvesting period, therefore fluctuations in supply from different sources are common.

Figure 12 Sources of peat supplied to all horticultural markets in the UK (2005)

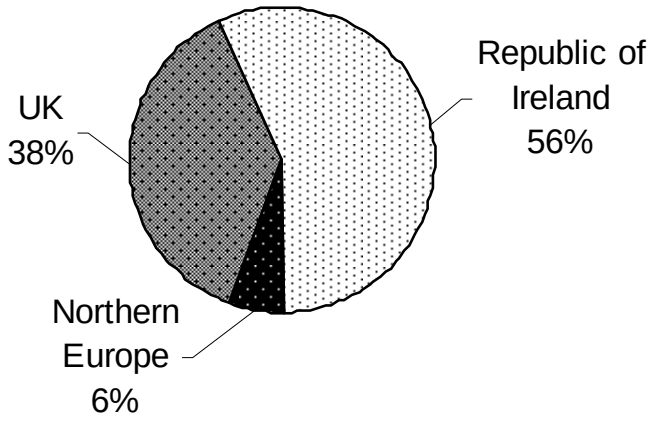


Figure 13 Domestic and imported peat into the UK 1999 – 2005

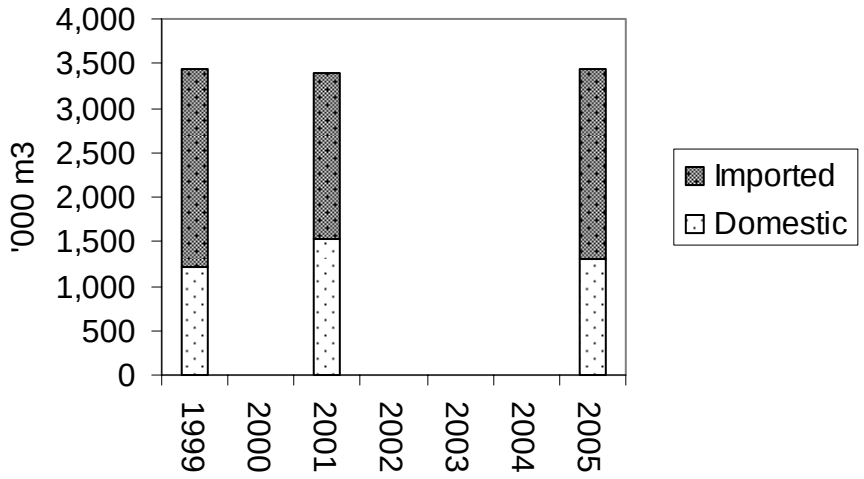


Table 7 Sources of peat supplied to all horticultural markets in 1999 - 2005 ('000 m³)

Source:	Year	Soil improvers	Growing media	Total
UK	1999	50.6	1154.3	1,204.9
	2001	36.0	1,486.0	1,522.0
	2005	40.7	1,254.9	1,295.5
Republic of Ireland	1999	91.8	1,691.0	1,782.8
	2001	59.0	1,422.0	1,481.0
	2005	103.2	1,835.5	1,938.7
Northern Europe	1999	2.7	442.9	445.6
	2001	17.1	375.0	392.1
	2005	3.2	198.6	201.8
Total	1999	145.1	3,288.2	3,433.3
	2001	112.1	3,283.0	3,395.1
	2005	147.1	3,289.0	3,436.0

4.5 Sources of bark

Since information was collected by country of origin for the first time in 2005, data for 1999 and 2001 are shown as totals only.

The total volume of bark supplied increased by 25% from 2001 to 2005. The majority was used in soil improver products, predominantly surface mulches, but the proportion used to make growing media doubled in 2005 compared with earlier years.

There are various types of bark used in the horticultural industry in the UK but for most purposes coniferous barks are the most suitable. However, UK production of coniferous bark is not sufficient to meet domestic requirements and bark has traditionally been imported from France, Spain and Portugal for many years. More recently some has also been imported from Northern Europe, particularly the Baltic States, such as Estonia and Latvia (Table 8).

Of the total bark volume used by the four horticultural markets (over 1.67 million m^3 in 2005) around one half was from the UK, about one third was from Southern European countries (including the small amount from the Republic of Ireland). Several Northern European countries supplied the rest in small amounts.

Just over half of the total bark used was sold to the amateur market, mostly as bark mulch, with the landscape industry also being a significant user of bark in mulch products (Table 10). Around 55% of the bark used in growing media in 2005 was supplied to professional growers

Table 8 Sources of bark supplied to all horticultural markets in 1999 - 2005 ('000 m^3)

Source:	Year	Soil improvers	%	Growing media	%	Sub-total	% of year
UK bark	2005	625.7		208.4		834.1	50
Southern European bark	2005	490.8		74.7		565.5	34
Northern European bark	2005	200.0		78.8		278.8	17
Total	1999	1,087.9	90	126.9	10	1,214.8	
Total	2001	1,197.3	89	145.0	11	1,342.3	
Total	2005	1,316.5	78	361.9	22	1,678.5	

4.6 Supply of alternative materials

Alternative materials to peat accounted for about 47% of the total of all materials supplied to the UK market in 2005. Most of the alternative materials, (76% in 2005), were used for soil improvement, which is fairly tolerant of a wide range of material properties, in contrast to the more specific requirements of growing media products. There has, however, been a significant increase in the use of alternative materials in growing media products since 2001, mainly due to the increased use of reduced peat products in both the amateur gardening and professional grower sectors. A detailed summary of the sourcing of alternative materials, including the technical characteristics of different materials such as bulk density, uniformity, storage, availability and sustainability, is given in Appendix 2.

There has been a 32% growth in the use of alternative materials since 2001 in the four market sectors, in particular the use of green compost in soil improver materials. Green compost use in the horticultural markets has increased by 108% and woodfibre/brash use by 744% since 2001 (see Table 9 and references in Section 7, ODPM 2001 report).

Use by type of alternative material

Bark: The most commonly used non-peat material; it accounted for 56% of the total alternative materials used in 2005 (Table 9). The major use of bark is in landscaping as a mulch to suppress weed growth and conserve soil moisture, but it also represents 51% of alternative materials use in growing media (mainly pine bark). Graded bark is used by professional growers in blends with peat, to increase the aeration and drainage of the mix for longer-term plants. In Northern Ireland pine bark is less available so composted spruce bark is more commonly used. Finer grade composted barks are used in some peat-free media as a major bulk ingredient, often blended with wood-fibre and a small percentage of loam or green compost. Bark is a renewable material (if sourced from sustainable forestry operations) that can be used as an alternative to peat in growing media, but must be properly composted before use. Significant quantities of pine bark are now being imported from countries such as Estonia, France, Portugal and Spain. The balance between imports and home-produced bark is affected by the economics of the UK timber industry and the exchange rate.

Green compost: The volumes of green compost available to horticulture have continued to increase, 323,000 m^3 were used in 2001 and this increased to 673,000 m^3 in 2005. Green compost now accounts for 22% of the total alternatives used in the four markets surveyed and has overtaken spent mushroom compost as the second most important non-peat material. The majority of this composted material (81%) is used for soil improvement, but an increasing proportion is now used in growing media (around 130,000m^3 in 2005 compared to 92,000 m^3 in 2001, a 41% increase). Green compost is a better soil improver than peat because it improves the nutrient status of the soil as well as the organic matter level. Research and development into the use of green compost as a component of growing media by WRAP, including uniformity and storage issues, and growing media manufacturers has encouraged greater use of this material. Green compost has to be blended with materials with lower bulk density and nutrient levels for use in a growing medium, however, to avoid problems with the structure/drainage, excess nutrient levels and high bulk density of the end product (which influences handling and transport costs).

Timber Industry By-products (wood waste and wood fibre): By-products from forestry operations, sawmills and chipboard manufacture are increasing in importance as raw materials for composting. The end products have been used with good results in growing media as well as soil improvers. The use of manufactured wood fibre has increased significantly since 2001 (when it was not included as a separate category but recorded under 'woodfibre/brash') and this is predicted to continue, particularly if UK production of such material increases. Woodfibre currently accounts for about 5% of alternative materials used in growing media.

Coir: Coir-fibre dust has successfully been used as a peat alternative material for use in growing media formulations because of its good air and water-holding properties. It is used quite extensively in The Netherlands and Belgium, for example for non-soil strawberry production systems and for pot plants. The relatively high price of the material continues to restrict its wider use in the UK and in 2005 coir still only accounted for around 1% of the alternative materials used in growing media. Use of coir did however increase significantly between 2001 and 2005 (65% increase).

Spent mushroom compost (SMC): Spent-mushroom compost continues to be a significant non-peat material used for soil improvement by landscapers and amateur gardeners. It is a well-known and sought-after product, therefore supply to the horticultural markets is still significant, despite the decline in the UK mushroom industry and hence output of mushroom compost. SMC accounted for 12% of peat alternatives for soil improvers in 2005, which is significantly less than in 2001 (28%), due to reduced availability of SMC in some areas, as UK mushroom growers have gone out of business, and due to increased uptake of green compost as an alternative soil improver.

Loam (soil): Sterilised loam is used in some peat-free growing media to improve water and nutrient holding characteristics. It is also used in specialist John Innes-type growing media sold to amateur gardeners. Loam accounted for 10% of the volume of alternative materials used in growing media in 2005, a reduction of 15% from 2001.

Cocoa shell: Cocoa shell is used as a decorative mulch and mostly sold to amateur gardeners. It is relatively expensive and only accounts for a very small proportion of the consumption of alternatives (< 1% in 2005).

Other materials: Inorganic materials such as grits, perlite and vermiculite are recorded in Table 9 under ‘Others’. They are incorporated into growing media at around 5-10% by volume so only account for a small percentage of the non-peat material used. They have to be mined from finite resources and materials such as perlite require energy use in their manufacture, hence may be viewed as less sustainable than organic peat alternatives. Materials such as clay granules and brewery by-products are also included under ‘other materials’.

Table 9 Supply of alternative materials to all sectors of the UK horticulture market in 2005 ('000 m³)

	Quantity of material			Growth since 2001
	Soil improvers	Growing media	Total	
Bark	1,316.5	361.9	1,678.5	**25 %**
Green compost	543.0	129.7	672.7	**108 %**
Loam	29.2	68.4	97.6	-15 %
SMC	351.2	0.0	351.2	-6 %
Wood waste	22.2	39.7	61.9	-13 %
Cocoa shell	12.5	1.0	13.5	-28 %
Coir	0.3	22.2	22.5	65 %
Brash	8.1	2.4	10.6	**744 %**
Wood fibre	24.0	33.9	57.9	
Others	1.5	52.1	53.6	139 %
Total	**2,308.4 (76%)**	**711.3 (24%)**	**3,019.8**	**32 %**

Table 10 shows the supply of the main alternative materials to each end-user market in 2005. The type of alternative materials used by the different sectors is related to products being used, i.e. soil improvers/mulches or growing media. The vast majority of the bark consumed is as a mulching material used by amateur gardeners and landscapers. Green compost is mainly used as a soil improver by landscapers but consumption of this material by gardeners has increased, probably due its competitive price compared to bark and greater availability through garden centres in the last few years. Spent mushroom compost is used in a very similar way to green compost and increase in consumption of one may well reduce that of the other. Landscapers used most of the spent mushroom compost (61%). Loam use is mostly that incorporated in soil improvers and growing media sold to amateur gardeners, hence their consumption of 73% of the total amount used. Coir is mostly used by professional growers (71%`of use). The other alternative materials are used in much smaller volumes.

Table 10 Supply of alternative materials by sector in 2005

	Amateur gardener		**Local authority**		**Landscaping**		**Professional growers**	
	'000 m^3	**%**	**'000 m^3**	**%**	**'000 m^3**	**%**	**'000 m^3**	**%**
Bark	907.9	54%	91.5	5%	475.8	28%	203.3	12%
Green compost	284.6	42%	32.9	5%	341.1	51%	14.1	2%
Loam	71.4	73%	0.9	1%	20.9	21%	4.4	4%
SMC	113.1	32%	24.0	7%	214.0	61%	0.0	0%
Wood waste	37.4	60%	0.4	1%	20.6	33%	3.5	6%
Cocoa shell	11.3	84%	0.2	1%	1.0	7%	1.0	7%
Coir	6.0	27%	0.3	1%	0.3	1%	15.9	71%
Brash	0.4	4%	1.0	9%	6.7	63%	2.4	23%
Wood fibre	38.3	66%	0.2	0%	0.0	0%	19.4	34%
Other	38.7	72%	0.2	0%	0.9	2%	13.8	26%
Total	**1509.2**	**50%**	**151.5**	**5%**	**1081.3**	**36%**	**277.8**	**9%**

Table 11 shows the trends in the volumes of non-peat materials use since 1999. The amateur gardeners and landscaper sectors are the biggest consumers and both have increased consumption of peat alternatives significantly between 1999 and 2005. The largest increase in volume in growing media is that of non-peat materials used in amateur gardening products (almost a 200% increase since 1999). Professional growers make up a smaller percentage of overall peat alternatives use but their use has increased greatly since 1999 (a 350% increase, from 62,000 m^3 to nearly 280,000 m^3 in 2005).

Table 11 Supply of alternative materials by sector 1999 - 2005 ('000 m^3)

		Amateur gardeners	Local authority	Landscaping	Professional growers
Soil improvers	1999	557.2	185.7	944.0	0.0
	2001	814.1	125.4	1,003.5	0.0
	2005	1,107.1	145.5	1,055.9	0.0
Growing media	1999	138.1	3.8	5.6	61.8
	2001	189.5	16.7	39.8	100.7
	2005	402.1	6.0	25.4	277.8
Total supply	1999	695.3	189.5	949.6	61.8
	2001	1,003.6	142.1	1,043.3	100.7
	2005	1,509.2	151.5	1,081.3	277.8

5. Discussion

5.1 Trends

The total amount of materials used in 2005 rose to 6.46 million m^3 from 5.68 million m^3 in 2001, an increase of 13%, following a 7% rise between 1999 and 2001, representing a general increase in the total market of almost 0.2 million m^3 per year. Peat usage has remained static over the period 1999 to 2005, at around 3.40 million m^3 and the increase in materials has been supplied from alternative materials.

The increase in material usage has come from an expansion of the use of alternatives, up 32% since 2001. Bark accounts for over half of the volume of alternatives and rose by 25% to 1.68 million m^3 in 2005. Almost 60% of the bark is sourced from within the UK. The usage of brash and woodfibre materials has risen greatly but is still a small proportion of the total volume of alternatives. The usage of composted green wastes has doubled since 2001 to 0.67 million m^3 due to the increased availability and improved composting standards (BSI PAS 100). Some of the other materials have increased such as coir whilst loam, spent mushroom compost, wood wastes and cocoa shell have declined in usage.

The sector that accounted for the greatest amount of the increase in total usage of alternatives has been the amateur soil improver market, up 0.29 million m^3. This has been due to the public buying an increased amount of bagged mulch and soil improver products derived from bark and green wastes.

Changes in production of growing media are beginning to be seen in the data resulting from the growing media producers' commitment to work towards the BAP targets by supplying more reduced peat media to both amateur and professional growers. With the fairly constant volumes of peat usage, increased usage of alternatives has enabled the rising demand for growing products to be met, and professional growers to use products that were only 80% peat on average in 2005 compared with 92% in 2001, and 95% in 1999. Similar changes in the amateur gardening market are also occurring so that now peat represents 84% of growing media products.

As the amateur gardening growing media sector consumes the greatest amount of peat (2.15 million m^3, 66% of the total peat usage across all sectors), this is the area that should be targeted for further change if the BAP targets are to be met.

5.2 Future work

5.2.1 Import of peat with plants

The import of growing plants in containers, chiefly pot plants and nursery stock, into the UK increases steadily each year. It is possible that the associated amount of growing medium imported has reached a point where it is significant when analysing UK trends in peat and alternatives use. At the first meeting of the Horticultural Growing Media Forum in October 2005 it was recommended that this issue be investigated.

The main country from which plants are imported is The Netherlands. There are also significant numbers of imported plants from Belgium (house plants in particular), Denmark (particularly pot roses) and Italy (e.g. nursery stock specimen trees). Plants sold through the multiple retailers are often imported via an agent based in the country of export. Dutch plants are also sold direct to nurseries and retailers in the UK; these may be young plants for growing on or finished product. Imports from other countries in eastern Europe are likely to increase because they benefit from cheaper labour so can compete with UK nurseries even with the extra transport costs.

This is an area of study which could be investigated in the future but is not within the remit of the current study. The starting point would be to obtain data on imported plant numbers. However, the main uncertainty will be the physical composition of the growing media used in terms of the proportion of peat and alternatives included. To achieve this information it would be necessary to enquire either of the suppliers or agents in the exporting country or to contact the recipients within the UK. Multiple retailer policies on peat reduction will automatically have an impact on growers in other countries supplying UK markets. Such information has been collected in the past by UK multiple retailers in order for them to track peat use by their suppliers. Success relies on co-operation from the agents involved who source the plants.

6. Conclusions

The Survey

The questionnaire based survey obtained data from the producers of soil improver and growing media products made from peat and various alternative materials, and from producers of spent mushroom compost (last surveyed in 1998) and green compost manufacturers. A high degree of co-operation from producers was achieved, as in previous studies.

Confidence

Any shortfall in the collection of data is most likely to be of alternative products rather than peat. The magnitude of any shortfall is estimated to be less that 200,000 m^3 or less than 3% of the total market. The comparison of the percentage of alternatives in these markets with the BAP 2005 target is therefore only likely to be an under rather than an over estimation.

Trends

Although the volume of peat used has remained relatively unchanged at around 3.40 million m^3, the proportion of peat used in all sectors has fallen since 1999 as the percentage of alternatives has risen from 36% in 1999 to 47% in 2005 exceeding the 2005 BAP target of 40% non-peat.

The reduction in the proportion of peat used has been achieved by an increase in the amount of alternative materials used, but there is clearly an increasing demand for the products, which has risen from 5.33, to 5.68 to 6.46 million m^3 in 1999, 2001, and 2005 respectively representing a rate of increase of around 0.2 million m^3 per year

The total market is split between soil improvers at 38% and growing media at 62%, with the former market growing more (19%) than the latter (10%) since 2001. 96% of the peat used was in growing media; but soil improvers account for only 4% of the usage as they are dominated by alternatives to peat.

Professional growers use only growing media, and the volume of peat used by this sector has been fairly consistent at around 1.1 million m^3, but with increasing volumes of peat alternatives so that the proportion of peat was reduced from 95% to 92% to 80% in 1999, 2001, and 2005 respectively. The replacement of peat in a growing medium becomes progressively more challenging technically as the proportion of peat reduces, for example the step from 100% peat to 70% peat is much easier to achieve than the step from 70% to 40% while retaining acceptable product performance.

The amateur gardening market uses both product groups, and there is fairly consistent peat volume usage of around 2.1 million m^3 in growing media and increasing volumes of alternatives so that the proportion of peat was reduced from 94% to 92% to 84% in 1999, 2001, and 2005 respectively. In addition, the amateur use of soil improver products has shown fairy consistent use of peat, around 0.1 million m^3, but with increasing proportions of alternative materials making up 80%, 87% and 89% of the product in 1999, 2001, and 2005 respectively.

As the amateur gardening growing media sector consumes the greatest amount of peat (2.15 million m^3, 66% of the total peat used across all sectors), this is the area that should be targeted for further change if the BAP targets are to be met.

Possible influences on the trends

The increasing volumes of peat alternatives used reflects the commitment and efforts of the growing media producers to support the BAP and to satisfy consumer interest in the environment by developing and providing reduced peat growing media products to both professional and amateur growers.

The introduction of 'reduced peat' formulations by many growing media manufacturers for professional growers has increased the proportion of alternative materials in these products.

The continued dominance of peat in the amateur gardening market is likely to be due to the cost-competitive nature of this market giving manufacturers less opportunity to use more expensive materials. Most of the major brands of amateur gardener 'multi-purpose' growing media are now reduced peat rather than the 100% peat they contained when data were last collected (2001).

Demands from multiple retailers to reduce peat use have caused significant numbers of growers to move away from pure peat mixes to blends with 10 to 30% of alternative materials over the last few years.

Economic issues and lack of confidence in reduced peat or peat-free growing media has hindered their uptake. Increase in experience and management of new growing media incorporating alternatives have led to their gradual uptake by growers.

The most significant influence on the adoption of reduced peat growing media by professional growers has been their multiple retailer customers, who have policies on peat reduction as part of their Corporate Social Responsibility programmes.

The usage of composted green wastes has doubled since 2001 to 0.67 million m^3 due to increased availability and improved composting standards (BSI PAS 100).

BAP Targets

The percentage of alternatives that made up the supply of soil improvers and growing media to the four main market users (amateur gardening, local authorities, landscapers and professional growers) increased from 36% in 1999 to 40% in 2001 and stood at 47% in 2005. The BAP target of 40% in 2005 was therefore exceeded.

The rate of change, however, needs to be accelerated if the 2010 target of 90% alternatives is to be met. Over the last six years, the amount of peat that has been used has not declined, rather the total volume of alternatives used has risen. If the 2010 target is to be met, amateur gardening practices, in particular, need to be changed. Initially, this is likely to happen through the retail sector, but promotion and education of amateur growers about environmental benefits, and advances in peat free compost as a growing media is likely to be an important mechanism to change behaviour and demand. This sector is larger than the professional growers, is less technically demanding and, in 2005, used slightly more peat as a proportion of its growing media mixes.

The possible influences of the trends shown in this report should be reviewed to focus effort on addressing storage and performance issues for non peat products, education of amateur gardeners and increasing confidence of growers in non peat products.

While the increasing proportion of alternative materials has buffered any potential increase in demand for peat to meet this increasing demand for the products, the volume of peat used in these products has not changed greatly; it must be assumed that there is continued extraction from peatlands. At the fairly consistent rate of peat use of 3.4 million m^3 per year, this could amount to a total of 17 million m^3 between 2005 and 2010. The amount of peat actually used could also increase along with increasing amounts of alternatives in the products.

The sources of peat include other countries, and while 38% of our demand has been met from within the UK, 56% has been met by the Republic of Ireland and 6% from Northern Europe. This suggests that a review of the BAP target may also be required to provide appropriate protection towards sustainable development for peatlands, and that some international collaboration may be required to reduce the impact of this UK target on other countries.

7. References and further information

ODPM 'Monitoring of peat and alternatives as growing media and soil improvers in the UK, 2001'
http://www.odpm.gov.uk/index.asp?id=1145858

The Composting Association www.compost.org.uk

The Growing Media Association www.growingmedia.co.uk

The Waste and Resources Action Programme (WRAP)
www.wrap.org.uk/organics

The UK Peatlands Consortium
http://www.peatlandsni.gov.uk/education/campaign.htm

8. Glossary

Bark

Lignified outer protective tissue from the trunks of one or more types of tree species that is removed at sawmills and may thereafter be aged or composted and screened to provide material that may serve as a growing media constituent, soil improver or mulch.

Brash

A fine composted wood fibre that can be used as a growing media constituent.

Bulk Density (BD)

Composts and growing media are often sold with a measurement of bulk density being on the basis of ‘fresh’ or ‘as received’ weight per litre or cubic metre of material.

Cocoa shell

The material which becomes separated from the cocoa bean during the roasting process. Cocoa shell is commonly used as a mulch or soil improver in landscaping.

Coir

A generic name for material derived from the outer husk of a coconut. The fibre portion is used for the production of mats and ropes etc. and the residual pith is a by-product that can be used as a horticultural substrate.

Compost

A solid particulate material that is the result of composting organic material. Compost has been sanitised and stabilised through the composting process and confers beneficial effects when added to soil and / or used in conjunction with growing media. It specifically excludes materials such as John Innes or Levington ‘Compost’, which were historically labelled as ‘composts’, but which are not based on composted materials; these are more accurately described as growing media.

Composting

Process of controlled microbiological decomposition of biodegradable materials under managed conditions that are predominantly aerobic and that allow the generation of heat, in order to achieve compost that is sanitised and stable.

Cubic metre (m^3)

Volumetric measure equivalent to 1000 litres and the unit in which growing media or their bulky components are traded and the market size expressed.

Green compost (GC)

Composted material derived from the composting of green waste.

Green waste (GW)

Material derived from plants such as trees, shrubs, grass, vegetables, fruit and other plant types. Green waste specifically excludes kitchen, human and animal by-products or catering wastes and wastes that contain non-biodegradable fractions. Green waste arises from a range of sources such as domestic gardens, green spaces that are publicly, privately or communally owned, highways, nurseries, field-based plant production, and processors of vegetables or salad crops.

Growing medium/media

Material (other than soil in situ) in which plants are grown. Note: In this report the term 'growing medium / media' refers to materials that are ready-mixed and sold for growing plants in pots, containers, growing bags and media blocks that specifically exclude soil conditioners and mulches.

Loam

A good quality soil composed of a relatively even mixture of three mineral particle size groups: sand, silt, and clay. Loam has a relatively high organic matter and nutrient content.

Mulch

A material applied to the surface of a soil or other growing medium to minimise cultivation and enhance plant growth by retaining moisture, suppressing weeds and enhancing biological activity.

Peat

Partially decomposed plant residues derived from bogs, mires or fens consisting principally of mosses such as Sphagnum species, sedges or reeds etc. Peat has traditionally been the standard substrate for growing media production in the UK and North-West Europe.

Peat alternative

A material with appropriate physical, chemical and biological properties that may be used to partially or completely replace peat as a growing media substrate, soil improver or mulch.

Soil amendment

The process of adding materials to a soil to manipulate or improve its current condition.

Soil improver

Material added to soil in situ primarily to maintain or improve its physical properties, and which may improve its chemical and/or biological properties or activity. Also known as a soil conditioner.

Spent Mushroom Compost (SMC)

Material which remains following the commercial production of edible mushrooms. It is a high nutrient and typically high pH product which is used widely as a soil improver but is unsuitable for use as a growing medium component.

Substrate

A combination of several materials that give a plant support, water, air and nutrients.

Topsoil

Material with a mineral base which will perform the functions of natural topsoil. BS 3882:1994 defines natural topsoil as "upper layer of an in situ soil profile, usually darker in colour and more fertile than that below (subsoil) and which is a product of natural biological and environmental processes".

Wood fibre

A manufactured product made by subjecting coniferous wood chips to steam under pressure, which expands and separates the fibres.

Wood waste

Material originating from untreated or biodegradable preservative treated woods from joinery, furniture making and packing materials including woods that have been reused in chipboards and MDF.

Appendices

1. **Material use by type and original three market sectors 1993 – 2005**

2. **Key characteristics of peat and alternative materials used in growing media and soil improvers**

3. **Producers who supplied data**

4. **Survey forms**

1. Material use by type and original three market sectors 1993 – 2005

The historical data since 1993 is presented in this Appendix. All of the data excludes the professional grower market and bulk spent mushroom compost (SMC), which were only collected for the first time in 1999 and 1998, respectively.

Data for the total of the three markets and by each of the three market sectors are shown, broken down into soil improvers, growing media and the total, in Figures 14 to 17. Tables 12 to 14 show the proportions of peat and alternatives by each sector and totals over the years surveyed from 1993 to 2005.

Figure 18 shows the proportion of domestic to imported peat over the years 1993 to 2005.

Table 15 shows the usage of peat, according to source, in soil improvers and growing media since 1993.

Figure 14 Combined use of peat and alternatives by the amateur gardening, local authority and private sector landscaping markets 1993-2005

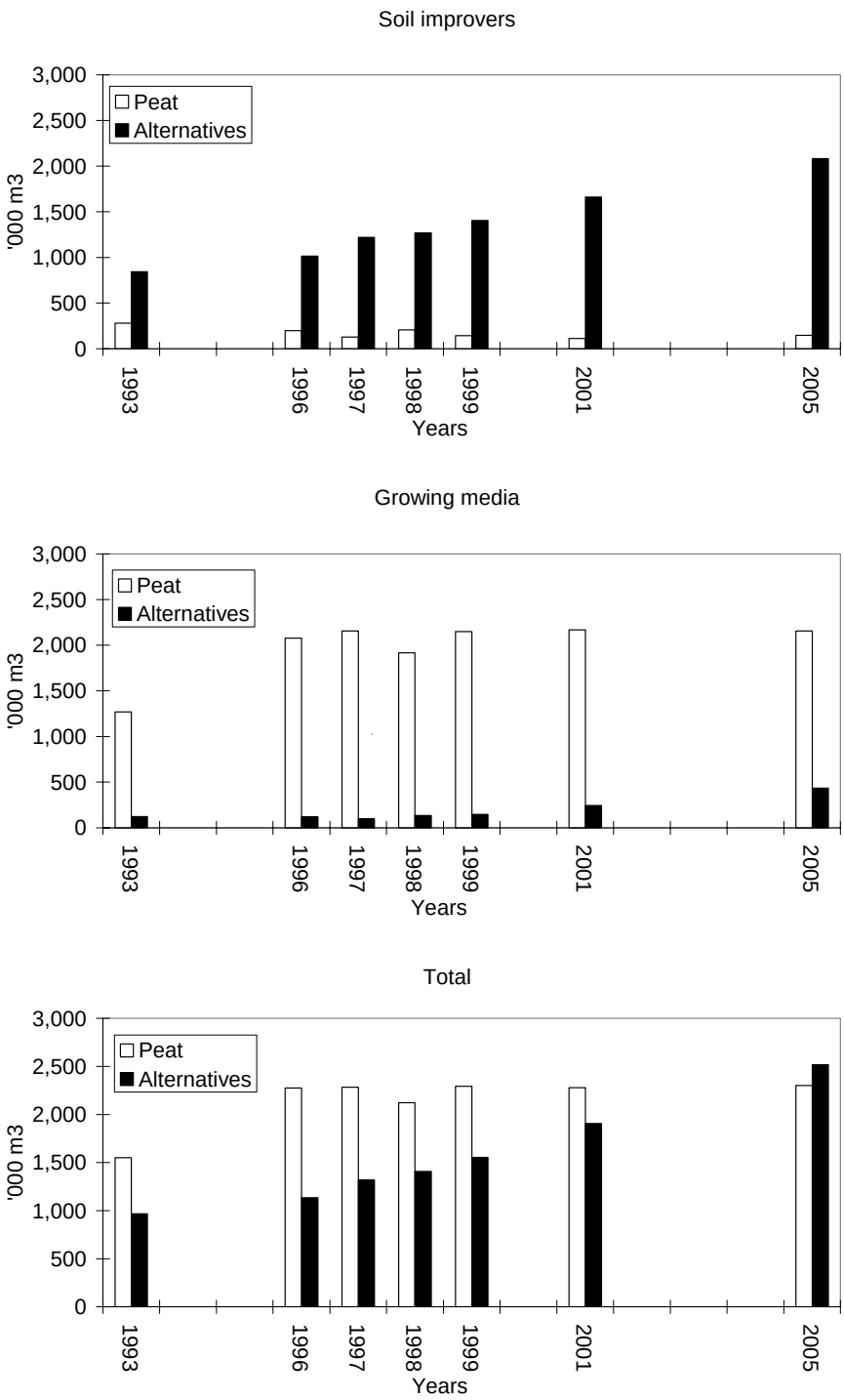


Figure 15 Use of peat and alternatives by the amateur gardening market 1993-2005

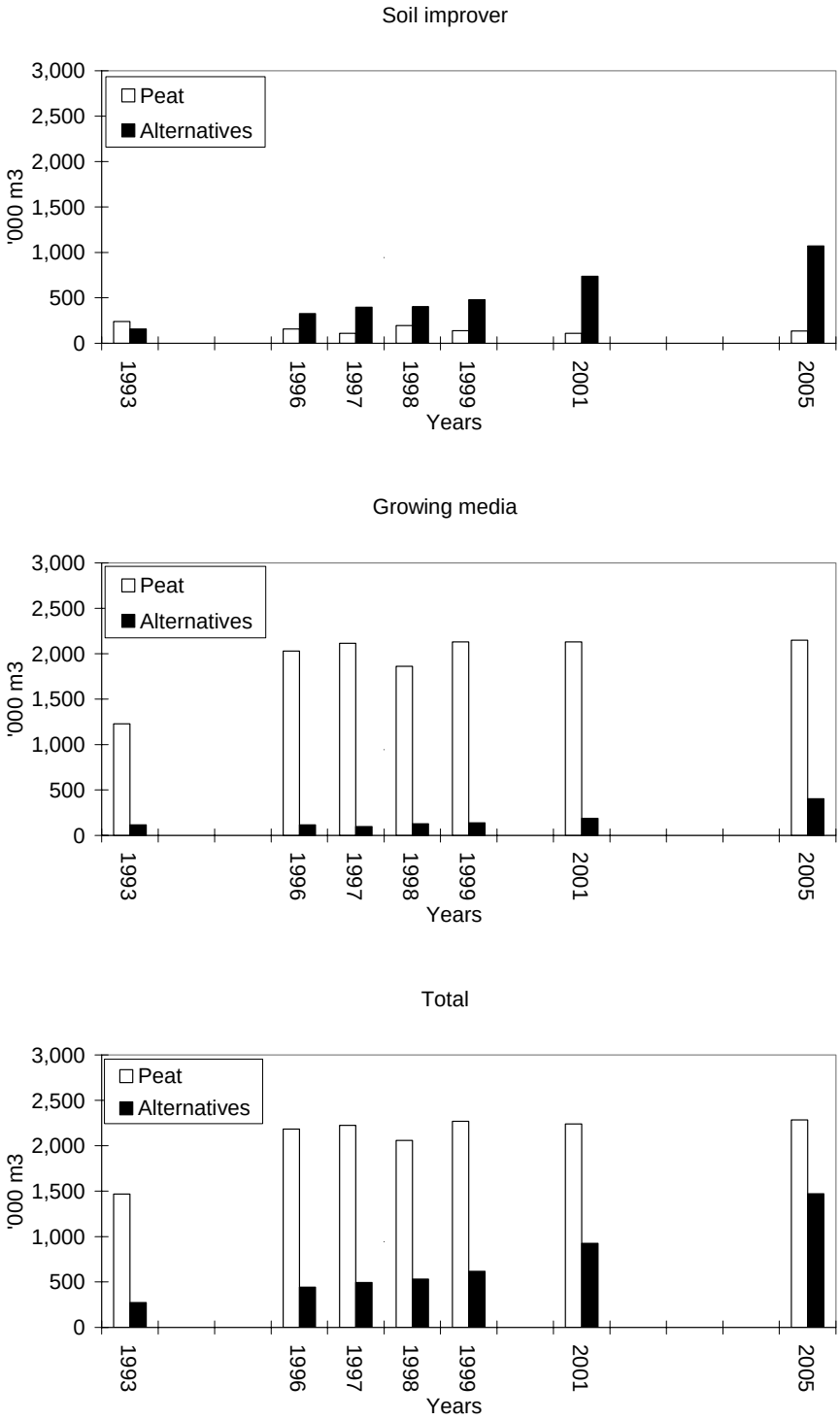


Figure 16 Use of peat and alternatives by the local authority market 1993-2005

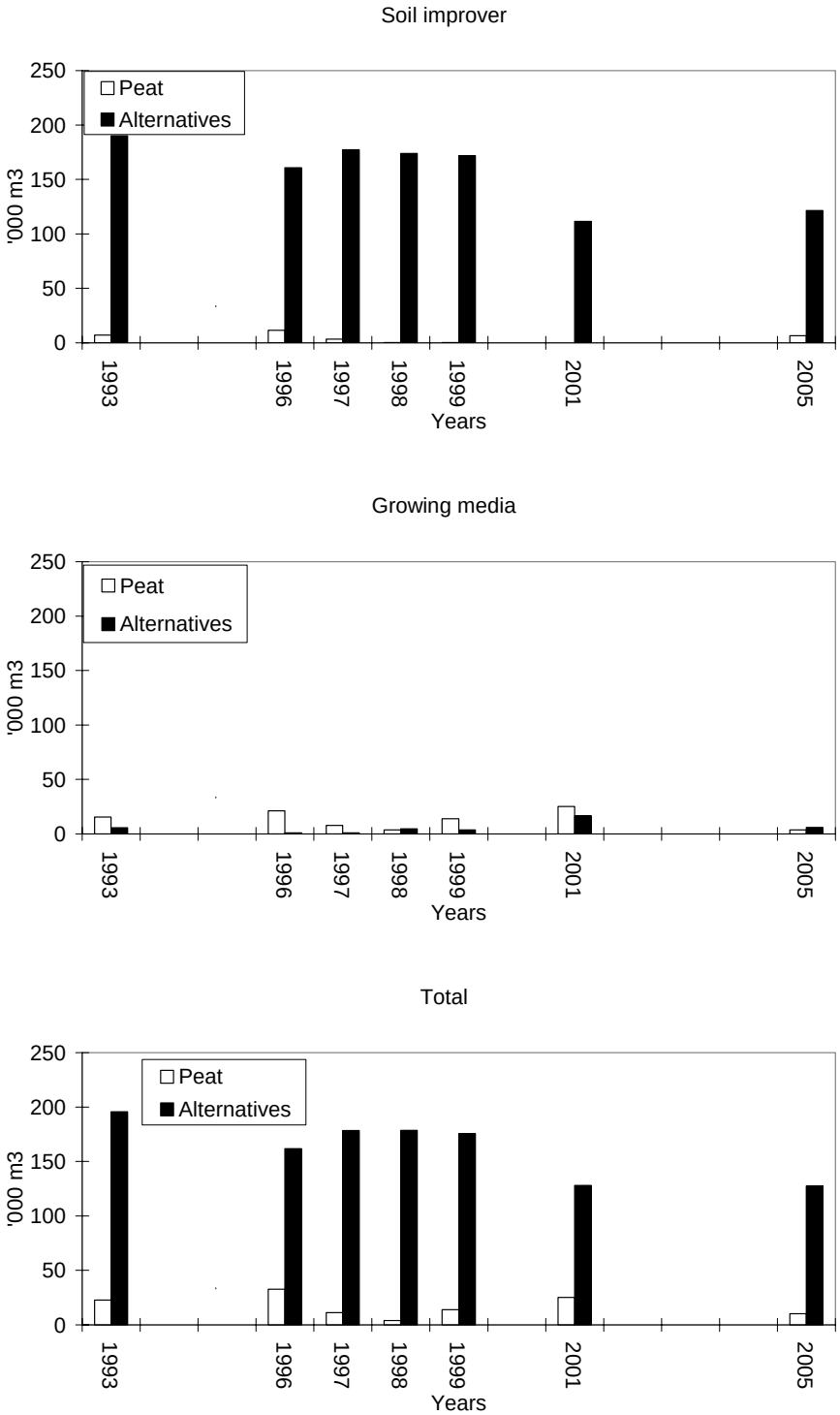


Figure 17 Use of peat and alternatives by the landscape contractor market 1993-2005

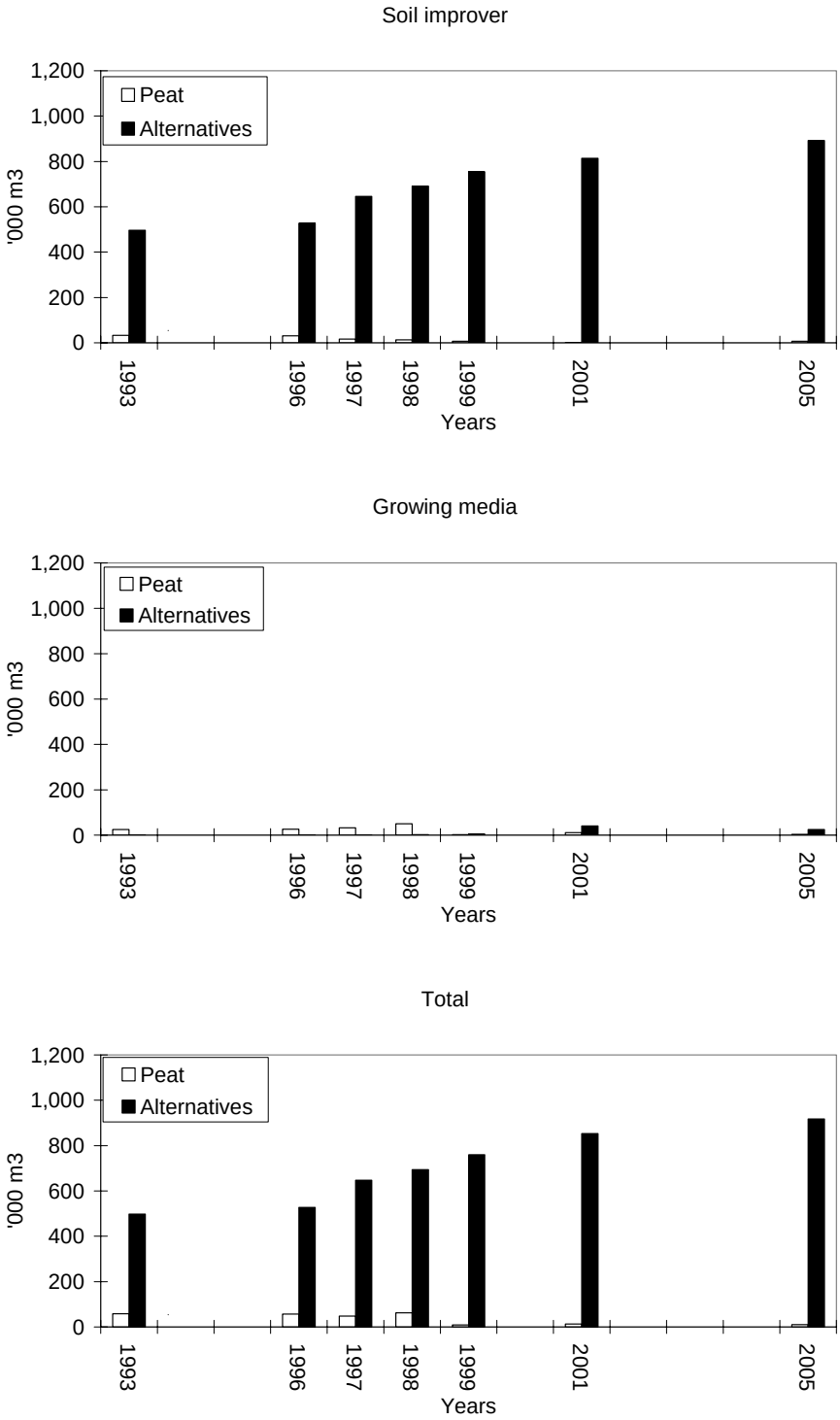


Table 12 Soil improvers for three market sectors 1993 - 2005 ('000 m^3)

	1993	1996	1997	1998	1999	2001	2005
Amateur gardeners							
Peat	239.4	156.0	111.0	194.5	138.4	111.0	134.3
Alternatives	156.4	328.5	398.2	404.0	479.7	736.6	1,070.1
Sub-Total	395.8	484.5	509.2	598.5	618.1	847.6	1,204.4
% Peat	60%	32%	22%	32%	22%	13%	11%
Local authority							
Peat	7.2	11.5	3.5	0.2	0.2	0.1	6.5
Alternatives	190.1	160.8	177.3	174.0	171.7	111.4	121.5
Sub-Total	197.3	172.3	180.8	174.2	171.9	111.5	127.9
% Peat	4%	7%	2%	0%	0%	0%	5%
Landscaping							
Peat	33.4	30.9	16.0	12.3	6.4	1.0	6.3
Alternatives	496.5	526.2	644.9	691.4	753.5	813.0	891.9
Sub-Total	529.9	557.1	660.9	703.7	759.9	814.0	898.2
% Peat	6%	6%	2%	2%	1%	0%	1%
Total - amateur gardeners, local authority and landscaping only							
Peat	280.0	198.4	130.5	207.0	145.0	112.1	147.1
Alternatives	843.0	1,015.5	1,220.4	1,269.4	1,404.9	1,661.0	2,083.4
Total	1,123.0	1,213.9	1,350.9	1,476.4	1,549.9	1,773.1	2,230.5
% Peat	25%	16%	10%	14%	9%	6%	7%

Table 13 Growing media for three market sectors 1993 - 2005 ('000 m^3)

	1993	1996	1997	1998	1999	2001	2005
Amateur gardeners							
Peat	1,229.7	2,028.7	2,114.9	1,862.4	2,131.5	2,130.2	2,148.8
Alternatives	116.2	116.7	96.4	129.8	138.1	189.5	402.1
Sub-Total	1,345.9	2,145.4	2,211.3	1,992.2	2,269.6	2,319.7	2,550.9
% Peat	91%	95%	96%	93%	94%	92%	84%
Local authority							
Peat	15.6	21.2	7.9	3.7	13.8	25.2	3.7
Alternatives	5.7	1.0	1.1	4.6	3.8	16.7	6.0
Sub-Total	21.3	22.2	9.0	8.3	17.6	41.9	9.7
% Peat	73%	95%	88%	45%	78%	60%	38%
Landscaping							
Peat	24.7	26.3	32.6	49.9	3.0	11.5	3.5
Alternatives	1.1	0.9	1.4	2.6	5.6	39.8	25.4
Sub-Total	25.8	27.2	34.0	52.5	8.6	51.3	28.9
% Peat	96%	97%	96%	95%	35%	22%	12%
Total - amateur gardeners, local authority and landscaping only							
Peat	1,270.0	2,076.2	2,155.4	1,916.0	2,148.3	2,166.9	2,156.0
Alternatives	123.0	118.6	98.9	137.0	147.5	246.0	433.6
Total	1,393.0	2,194.8	2,254.3	2,053.0	2,295.8	2,412.9	2,589.6
% Peat	91%	95%	96%	93%	94%	90%	83%

Table 14 Total usage for three market sectors 1993 - 2005 ('000 m^3)

	1993	1996	1997	1998	1999	2001	2005
Amateur gardeners							
Peat	1,469.1	2,184.7	2,225.9	2,056.9	2,269.9	2,241.2	2,283.1
Alternatives	272.6	445.2	494.6	533.8	617.8	926.1	1,472.2
Sub-Total	1,741.7	2,629.9	2,720.5	2,590.7	2,887.7	3,167.3	3,755.3
% Peat	84%	83%	82%	79%	79%	71%	61%
Local authority							
Peat	22.8	32.7	11.4	3.9	14.0	25.3	10.2
Alternatives	195.8	161.8	178.4	178.6	175.5	128.1	127.5
Sub-Total	218.6	194.5	189.8	182.5	189.5	153.4	137.6
% Peat	10%	17%	6%	2%	7%	16%	7%
Landscaping							
Peat	58.1	57.2	48.6	62.2	9.4	12.5	9.8
Alternatives	497.6	527.1	646.3	694.0	759.1	852.8	917.3
Sub-Total	555.7	584.3	694.9	756.2	768.5	865.3	927.1
% Peat	10%	10%	7%	8%	1%	1%	1%
Total - amateur gardeners, local authority and landscaping only							
Peat	1,550.0	2,274.6	2,285.9	2,123.0	2,293.3	2,279.0	2,303.1
Alternatives	966.0	1,134.1	1,319.3	1,406.4	1,552.4	1,907.0	2,517.0
Total	2,516.0	3,408.7	3,605.2	3,529.4	3,845.7	4,186.0	4,820.0
% Peat	62%	67%	63%	60%	60%	54%	48%

Figure 18 Domestic and imported peat supply into the UK excluding professional growers 1993 – 2005

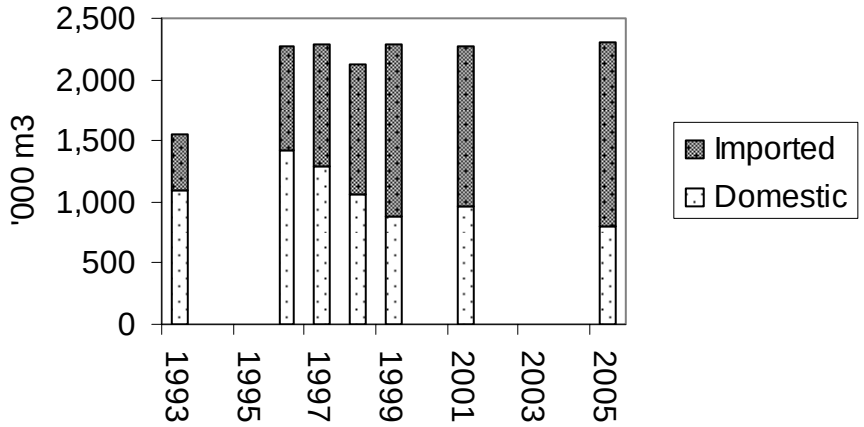


Table 15 Sources of peat supplied to the three market sectors 1993 - 2005 ('000 m^3)

Source	Year	Soil improvers	Growing media	Sub-total	% of total
UK	1993	153.8	938.0	1,091.8	70%
	1996	53.8	1371.2	1,425.0	63%
	1997	50.6	1241.0	1,291.6	56%
	1998	111.2	945.3	1,056.5	50%
	1999	50.6	836.4	887.0	39%
	2001	36.0	934.8	970.8	43%
	2005	40.7	765.4	806.1	35%
Irish Republic	1993	126.0	321.1	447.1	29%
	1996	143.0	691.0	834.0	37%
	1997	79.7	877.4	957.1	42%
	1998	90.8	851.7	942.5	44%
	1999	91.8	1182.9	1,274.7	56%
	2001	59.0	1070.8	1,129.8	50%
	2005	103.2	1372.4	1,475.7	64%
N. Europe	1993	0.2	10.9	11.1	1%
	1996	1.7	14.0	15.7	1%
	1997	0.3	37.2	37.5	2%
	1998	5.0	118.9	123.9	6%
	1999	2.7	128.9	131.6	6%
	2001	17.1	161.3	178.4	8%
	2005	3.2	18.1	21.3	1%
Total	1993	280.0	1270.0	1,550.0	
	1996	198.5	2076.2	2,274.7	
	1997	130.6	2155.6	2,286.2	
	1998	207.0	1915.9	2,122.9	
	1999	145.1	2148.2	2,293.3	
	2001	112.1	2166.9	2,279.0	
	2005	147.1	2156.0	2,303.1	

2. Key characteristics of peat and alternative materials used in growing media and soil improvers

Peat: Peat forms where plant material does not decompose normally because of anaerobic conditions where water accumulates. There are many different types of peat and only some are suitable for use in horticultural growing media. The type of peat occurring in any one area is dependent on the age of the peat bog, the underlying geology, the topography and the climatic conditions at the time of the peat formation. Sedge peats formed from reed beds, such as those in the Norfolk Broads and Somerset Levels areas. Sphagnum peats, more commonly used in horticulture, developed in wetter lowland areas of Europe where sphagnum mosses were predominant in wetland areas. There are many different species of sphagnum and in the wettest areas, such as the western UK and Ireland the moss has gradually accumulated in 'raised bogs'. Blanket bogs are the main type of peatland found in upland areas, such as Scotland, which have developed as a shallower layer of peat in cool, wet conditions. Sedge peats are used in blocking substrates however the main horticultural peats are raised bog sphagnum peats.

The age of peat and its degree of humification (decomposition) has a strong influence on its properties. Older, darker peats such as sedge peat hold more water and less air than younger, lighter peats, such as those from Finland and the Baltic area.

Peat has been used as a major component of many growing media in the UK since the 1970s. Its physical characteristics of having good water and air capacity and a low bulk density, combined with its naturally low pH and nutrient status have allowed growers and gardeners to use it to grow a wide range of plants successfully, either on its own or in blends with other materials. It is generally free of disease, weed or pest problems and is safe to handle. For long-term crops, such as over-wintered shrubs, container trees and strawberry production the coarse grades of peat are needed to give satisfactory drainage; finer grades being more suited to seedling and protected crop production.

Peat has been used as a soil conditioner in the past but it is not well-suited to this use as it rapidly decomposes in the soil and has little nutrient value.

Bark: Bark is the most commonly used non-peat material. The quality and suitability of barks for specific uses depends on the tree species, grading and maturity. Considerable quantities of cheaper varieties of bark (for example spruce bark) are sold to landscape contractors and amateur gardeners as mulch products. Higher quality (more expensive) pine barks, are used in professional growing media but are not used much for price sensitive amateur growing media products. Bark is traditionally used by professional growers at 20-30% of the mix to improve the drainage of the growing medium, particularly for high-value shrubs and for propagation. Supplementary nitrogen fertiliser must be added to counteract nitrogen immobilisation as the bark continues to be broken down microbially when in use. Bark also has useful root disease suppressive qualities.

The volumes of bark available for horticultural markets have increased over the last few years in line with increased timber production but this industry is very susceptible to exchange rate variations affecting the export of timber. Significant volumes of bark are imported from France, Spain, Portugal and the Baltic states however there are strict controls on the import of bark from some countries outside the UK because of the risk from non-indigenous bark beetles.

Woodfibre: Woodfibre is a manufactured product made by subjecting wood chips to steam under pressure, which blows the fibres apart. It is manufactured in Germany, France and by a UK growing media manufacturer in Northern Ireland. The wood chips used are waste wood from the timber industry from coniferous plantations. In Germany some of the energy used for production is wind energy. The capital cost of installing a wood fibre production plant is very high. Woodfibre is a very useful raw material for reduced peat and peat-free growing media and has been used successfully in such mixes for a number of years. It has only recently been taken up by UK growing media manufacturers, mostly using imported German woodfibre. It has a low bulk density (similar to that of a young peat), which is beneficial for technical reasons and economically as lighter materials are cheaper to transport as growing media product or as part of the end product (plants sold). Woodfibre also has low nutrient levels and a relatively low pH. In common with bark it must be treated to counteract nitrogen immobilisation.

Forestry Brash: Forestry brash is sometimes called 'woodfibre' in the UK but must be distinguished from manufactured woodfibre. Brash is produced from lop and top tree waste and is a by-product from the timber industry. The main area of production is in the Thetford Forest area of Norfolk. Forestry brash is a well-established peat alternative product in the UK. It has similar characteristics to fine bark and must be composted or matured before use to stabilise it and minimise nitrogen immobilisation.

Woodwaste/Recycled wood: Woodwaste is a generic term for by-products from the timber/wood manufacturing industry. Wastes are generated by a number of industries using wood as a raw material, e.g. chipboard or furniture manufacture. Wastes have potential for use in horticultural soil improvers or growing media if they have not been treated with phytotoxic paint, preservative or varnish. Chipboard waste is used by some growing media companies as part of reduced peat or peat-free media. Supply of such materials is influenced however by changes in the industries producing the waste, e.g. improved processes may produce less waste, imports may displace UK producers or alternative industries might compete for waste wood (e.g. as biofuel). Recycled wood is being marketed as an alternative to bark as a mulch for play areas, paths, landscaping and equestrian arenas. The Waste and Resources Action Programme has assisted companies supplying such products, which has increased their use over the last few years and allowed them to compete with bark suppliers.

Loam: 'Loam' was a key ingredient of traditional 'John Innes' growing media used widely in the 1950s and 60s. The sterilised loam that is used now in many peat-free or reduced peat growing media to increase nutrient and water holding capacity is generally topsoil (often a 'waste' from road/house building projects). Traditional 'loam' had a high organic matter content and was made by stacking cut turves and allowing them to mature before use. Loam is used at 5-20% by volume of the mix; it has a high density compared to peat, which may be a problem if it increases transport costs for the plants produced. It is the clay mineral and humus content of loam/soil that gives the chemical buffering effect. Clay minerals are sometimes used in professional growing media as a refined product to give this effect without increasing the bulk density of the product.

Coir: Coir (coconut fibre dust) is a by-product of the coir industry in India and Sri Lanka producing products such as doormats and ropes from coir fibre, which is obtained from coconut shells. Coir has been used in peat-free growing media for many years and has excellent air/water holding properties, making it particularly suitable for use in propagation of plants from cuttings. It is used in Belgium and the Netherlands for pot plant, strawberry and rose production and is more suitable for protected crops than outdoor ones. It has a low bulk density and excellent flow characteristics and hence is well suited to automated potting and tray-filling systems. It is usually more expensive than peat due to the costs of importing the raw material.

Spent Mushroom Compost: Spent Mushroom Compost (SMC) is a by-product of mushroom production and supply is therefore affected by the volume and location of mushroom production in the UK. There has been a significant reduction in mushroom production in the UK in the last 5 years due to competition from imports grown in countries with lower labour costs, such as Poland. SMC is a well-known and popular soil improver used by landscapers. It contains chopped straw, horse, pig or poultry manure, gypsum and added nutrients. The compost is topped with a casing of peat, mixed with chalk or sugar-beet waste lime. Once the mushrooms have been harvested the compost is discarded. The spent compost contains 10-15% peat by volume (so the product is not actually peat-free) and has high nutrient levels and, usually, a high pH because of the lime in the casing. It is used by many landscape contractors as a soil improver but is unsuitable for use as a growing medium component because of the high pH and nutrient status.

Composted materials: The volumes of composted waste materials available to horticultural markets have continued to increase with the incentives to reduce land-filling of organic wastes. 'Green compost' is second only to bark in terms of volume use as a soil improver. The main feedstock is green waste from landscapers and gardeners and the number of composting operations in the UK continues to increase. The product has the advantage of being relatively cheap although transport costs are high so it is generally only economic to use it within 50 miles of so from the point of production. Its main use is as a soil improver, with coarser grade compost being used as a mulch. Its high bulk density and nutrient content limit the proportion that can used in a growing medium (typically 10-30%). Green compost is often diluted with low nutrient material such as bark/timber by-products or coir to lower the nutrient content and bulk density of the final mix. High quality green compost has been successfully used in growing media and with continuing research this could increase, particularly if its disease suppressive characteristics could be harnessed by professional growers looking to reduce pesticide use. There is a British Standard Publicly Available Specification for compost, PAS100, and the Waste and Resources Action Programme (WRAP) have also produced guidelines for the quality characteristics of compost to be used in growing media.

Cocoa shell: This material is used as a decorative mulch, similarly to bark, but the large majority is sold to amateur gardeners rather than landscapers. It is produced from cocoa beans imported into Humberside and Dublin, hence cost depends on transport distances. Most cocoa shell is ground and used in animal feed, only about 25% being used in horticulture. It is more expensive than bark and sales have suffered with the reduction in bark prices. The nutrient content of cocoa shell is higher than that of bark so it has soil improving benefits as it is broken down. It is considered too expensive to have much potential in the growing media market as it would require composting and dilution with other ingredients.

Inorganic materials: Vermiculite and perlite are used in small volumes as constituents of amateur gardener growing media. Expanded urea-formaldehyde foams are also used to a small extent, in professional growing media. Vermiculite is an aluminium-iron-magnesium silicate which has a high cation exchange capacity. It is expensive as high temperatures are used in its manufacture and it is therefore usually only suitable for use as a small proportion of a growing medium. Perlite is another silicate of volcanic origin which is also relatively expensive as it requires crushing and heating to expand it to form the lightweight aggregates used in growing media. Perlite has no nutritional content but is useful to improve the aeration of a medium in a similar way to bark. 'Leca' (Lightweight Expanded Clay Aggregate) is an inert material made by heating clay to form porous beads that are most often used in hydroponic type growing systems.

Organic manures: Small amounts of composted livestock manures or sewage sludge are used in some peat-free growing media and soil improvers. Composting is carried out under strictly controlled conditions to remove all human health risks. As well as being a bulky physical medium these materials add nutrients to the product.

3. Producers who supplied data

A D Waste Ltd
A W Jenkinson Forest Products
ADAS Composting
Agrivert Limited
Aidan Coleman
Aidan Finn
Allensway Recycling Ltd
Amenity & Horticultural Services
Ancillary Components
Anglian Water Services
ASB Greenworld
Banks Amenity Products
Baron Jackson
Barr Environmental Ltd
Beeva Plant Hire
Bernard Gordon Appleton
Biffa Waste Services Ltd
Bilting
Binn Skips
Bioganix Ltd
Bord na Mona
Bourne Amenity
Bracken Down Ltd
Brier Hills Recycling Ltd
Bryn Quarry Ltd
Bulrush Horticulture Ltd
Cambridge Recycling Services Ltd
Capel
Carmarthenshire Environmental Resources Trust
Central Scotland
Chislet
Cleanaway Ltd
Cleansing Services Group Ltd
Clover Peat
Cory Environmental (Glos) Ltd
Country Compost Ltd
Countrystyle Recycling Ltd
County Mulch Ltd
CRJ Services Ltd
Crook Mushroom
Crown Estate
David Stewart
Donarbon Limited
Drinkwaters
E J Godwin (Peat Ind) Ltd
E Q Waste Management
Eco Composting Ltd
Eco-Sci Ltd
Elite Mushrooms
EPSD Jersey
Erin Horticulture
Fertile Fibre
Fiddleford
Flixton
Forth Resource Management Limited
Fountain Bark Products
G Heron Haulage
G P Plantscape
Giffords
Gordon Orr
Greener Composting
Greenmyre
Hadfield Wood Recyclers
Hallstone Contractors
Harte Peat
Haymes Farm
Heveco
Higgins Recycling Centre
Hills Waste
Hinton Organics Ltd
HLC Waste Management Services Ltd
Humax Horticulture

J B Shropshire & Sons Limited
J McKenna
J Rothwell
Jack Moody Ltd
James Piffney
James Pinkerton
JF & CM Strathern
John Playfair Contractors
Joseph Metcalf
K Hughes
Kentdown
Kevin McCann
Klasmann Deilmann

KPS Composting Services
Land Network Boxon Ltd
Langmead Farms Ltd
Leckford
London Composting Company
M & B Bark Supplies
M E C Recycling
Magee's
Marigold
Material Change Limited
Melcourt Industries Ltd
Mersey Waste Holdings Ltd
Monaghan, East Lothian
Monaghan, Goole
Monaghan, Somerset
Murtagh Recycling
Natural World Products Ltd
Neales Waste Management
New Earth Solutions
Newcastle City Council
Noel Hackett Haulage
Norfolk Environmental Waste Services
Oakfield Farm

Olus Environmental Ltd
Onyx Environmental Group
Orchard
Organic Recycling Limited
Organic Services (Scotland) Ltd
Organic Waste Recycling
Overdale
Paul Hammond
Petalshell
Peter Woad
Petersfield Growing Mediums
Pond Chase Nurseries
Premier Waste Management Limited
R Draper & Sons
Reviva Composting Ltd
RJT Ainsworth
Roffey
RW Dalglish
Scotbark
Scottish Water
Scotts UK
Severn Waste Services
Shackleford
SITA UK Ltd
Snowcap
Snowie Limited
Somerset Peat Producers
South West Water Ltd
Southdown
Sunshine Garden products
T Askins Haulage
T J Composting Group Ltd
Tas Valley
TEG Environmental PLC
Terra Ecosystems

The Earth Cycle / Woodhorn Group

The Green Waste Company
TMA Bark Supplies
Tracey Timber
Tree Fella plc
Tref
Tregonning
Tyseley Waste Disposal Ltd
Vapogro
Viridor Waste Management
Waste Recycling Group plc
Waveney
Welshlands / J C Platt
Wessex Horticultural Products
Westland Horticulture
White Moss Horticulture
Whitegates
Widness Skips
William Sinclair Horticulture
William Tracey Ltd
Winterpick
Woodland Horticultural Products
Woodlands
Woodview
Worm Tech Ltd
Worton Park Composting
Wyvern Waste Services Ltd
Yorwaste Limited

4. Survey forms

VOLUME (m^3) OF PEAT AND ALTERNATIVES 2005

Producer code_____

MARKET							
MATERIAL	**Amateur Gardeners**		**Local Authorities**		**Landscapers**		**Professional Growers**
	Soil Improvers inc. mulches & planting composts	Growing Media	Soil Improvers inc. mulches & planting composts	Growing Media	Soil Improvers inc. mulches & planting composts	Growing Media	Growing Media
UK peat							
Irish peat							
Other peat (specify country of origin)							
Bark (specify country of origin)							
Coir fibre							
Loam							
Cocoa shell							
Green compost							
Woodfibre (eg 'Toresa')							
Forestry brash (eg 'Sylvafibre')							
Wood waste (eg chipboard)							
Paper waste							
Perlite							
Vermiculite							
Other (please specify)							

Producer code_____

Volume (m^3) Supply of Spent Mushroom Compost 2005

Product	Market		
	Amateur Gardeners	Local Authorities	Professional Landscapers
Soil Improver including surface mulches and tree planting compost			

Volume (not weight) supplied to each sector during the year in cubic metres please. *However, if you can supply the data only by weight,* ***please do so and indicate this in the table.***

Our fresh mushroom production is lb./week, lb./year, kg./year (please indicate which).

VOLUME (m^3) OF COMPOSTED MATERIALS 2005 Producer code_____

1. Total Tonnage Composted:_____ tonnes

2. Total Volume Produced:_____ m^3 Note: If all data is in tonnes, please state here _____

3. Total Volume Supplied **Direct to End-Users** (m^3)

MARKET							
Amateur Gardeners/ Retail Outlets		**Local Authorities**		**Landscapers**		**Topsoil manufacture**	**Professional Growers**
Soil Improvers inc. mulches & tree planting composts	Growing Media used in containers	Soil Improvers inc. mulches & tree planting composts	Growing Media used in containers	Soil Improvers inc. mulches & tree planting composts	Growing Media used in containers	Ex-situ [1]	Growing Media

4. **Additional** Volume Supplied to Bulk Distributors or Peat Blenders (m^3)

	Name of company	**Distributor or Blender?**	**Soil Improvers inc. mulches & planting composts**	**Growing Media**
1				
2				
3				
4				

5. Total Volume Supplied to Other Sources: landfill engineering _____m^3, agriculture _____ m^3; other_____ m^3

[1] Ex situ is the volume of compost which either you have mixed with excavated soil or you have supplied for this purpose (excluding compost for retail bagging - please identify this as volume supplied to bulk distributors to avoid double counting).