

Plant Diversity Challenge

PLANT DIVERSITY CHALLENGE: UK'S RESPONSE TO THE GLOBAL STRATEGY FOR PLANT CONSERVATION



Scots pine, Scotland

Heathland, Wales

Bluebell wood, England

Wild thyme, Northern Ireland



The UK's response to the Global Strategy for Plant Conservation



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Foreword

One of the most important decisions of the Sixth Conference of the Parties of the Convention on Biological Diversity in 2001 was the adoption of the *Global Strategy for Plant Conservation*.

The Global Strategy rightly considered the vast importance of plant species in biodiversity - not only the vascular plants that are easy to see and recognise, but also the lower plants such as fungi and lichens, seaweeds and algae. They are essential to the operations of our ecosystems, the structure of our soils and for services to humankind in food, clothing and medicine.

In the UK we have risen to the challenge of the Global Strategy by producing this response within two years of COP 6. It takes each target in turn and gives an assessment of the existing state of understanding and the action currently underway. But then, most importantly, it assesses in detail what more needs to be done to meet the targets and whether the action is of high, medium or low priority.

I am pleased that so much important work to address these targets is already underway in the UK, for example through our Biodiversity Action Plans and Strategies. However, what we now have is a systematic approach to understanding the task ahead for, and indications of, the organisations who would be willing to help take the action forward.

The Government is greatly indebted to all the organisations concerned with plant biodiversity in the UK that have participated so willingly in the process of assessment, analysis and consultation to produce this strategy. We are most particularly grateful to Plantlife International, the Joint Nature Conservation Committee and the Royal Botanic Gardens, Kew, for having organised and seen through the process so comprehensively. It has been a model of partnership working.

Elliot Morley MP, Minister for Environment



Acknowledgements

This report is the result of a two-stage consultation process which has been overseen by a steering group comprising Hilary Neal and Glenys Parry (Department for Environment, Food and Rural Affairs), Chris Cheffings and Steve Gibson (Joint Nature Conservation Committee), Martin Harper (Plantlife International), Andy Jackson (Royal Botanic Gardens, Kew) and John Ramsay (Scottish Executive Environment and Rural Affairs Department). Joe Sutton (Plantlife International) managed the production of the report.

Over 120 representatives from 60 organisations met at the Royal Botanic Gardens, Kew on February 5th 2003 to begin the process of responding to the Global Strategy. The conference, organised by Plantlife International, RBG Kew and the JNCC and chaired by Jane Smart, Chief Executive of Plantlife International, included presentations and discussions on each of the targets. Gratitude is expressed to those individuals who helped develop the thinking for each of the targets: Target 1 - Peter Crane (RBG Kew), Target 2 - Paul Rose (JNCC), Target 3 - Tim Rich (National Museum and Galleries of Wales) and Michael Scott (Plantlife International), Targets 4 and 5 - Jenny Duckworth (Plantlife International), Target 6 - Mark Avery (Royal Society for the Protection of Birds) and Paul Rose (JNCC), Target 7 - Andrew Byfield (Plantlife International), Target 8 - Roger Smith and Steve Alton (both RBG Kew), Target 9 - Mike Ambrose (UK Plant Genetic Resources Group, John Innes Centre), Target 10 - Ian McLean (JNCC) and Martin Harper (Plantlife International), Target 11 - Noel McGough (RBG Kew), Target 12 - Deborah Long (Plantlife International), Target 13 - Hew Prendergast and Helen Sanderson (both RBG Kew), Target 14 - Peter Wyse-Jackson (Botanic Gardens Conservation International) and Jo Redman (The Eden Project), Target 15 - Richard Bateman (Natural History Museum), Target 16 - Elizabeth Radford (Plantlife International) and Judith Cheney (PlantNet).

A three-month written consultation was also carried out July - September 2003 and 19 responses were gratefully received.

This report has taken into account views expressed in both stages of the consultation and it is hoped that the resulting document adequately expresses the collective challenge that the UK plant conservation community faces to meet the Global Strategy targets by 2010.

Two walkers enjoy the Pembrokeshire coastal path. Floral displays from spring to late summer, such as western gorse *Ulex gallii* and thrift *Armeria maritima* are one of the key attractions to this popular destination.



DAVID WOODFALL/WOODFALL WILD IMAGES

Front cover - The St Cyrus National Nature Reserve, Fife. A summer display of clustered bellflower, harebell, common restharrow and common ragwort.

Inside front cover - A species-rich hay meadow below the slopes of Pen-y-Gent, Yorkshire.

Participating organisations

Department for Environment, Food and Rural Affairs

Defra is the Government Department which works for the essentials of life - water, food, air, land, people, animals and plants.

Defra
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Department of the Environment, Northern Ireland

The Department's aim is to improve the quality of life in Northern Ireland, now and for the future, by promoting a better and safer environment and supporting effective and efficient local government.

DoE, NI
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Joint Nature Conservation Committee

The Joint Nature Conservation Committee (JNCC) is the forum through which the three country conservation agencies – CCW, English Nature and SNH - deliver their statutory responsibilities for Great Britain as a whole, and internationally. These responsibilities contribute to sustaining and enriching biological diversity, enhancing geological features and sustaining natural systems. As well as a source of advice and knowledge for the public, JNCC is the Government's wildlife adviser, providing guidance on the development of policies for, or affecting, nature conservation in GB or internationally.

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National Assembly for Wales Department for Environment, Planning & Countryside

The Department for Environment, Planning & Countryside is working to improve the quality of our environment, protect and create a vibrant countryside, and develop and promote sustainable land-use planning, farming and rural regeneration policies.

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Cathays Park
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www.wales.gov.uk



Plantlife International

Plantlife International is a charity dedicated exclusively to conserving all forms of plant life in their natural habitats, in the UK, Europe and across the world. We act directly to stop common wild plants becoming rare in the wild, to rescue wild plants on the brink of extinction, and to protect sites of exceptional botanical importance. The charity carries out practical conservation work, influences relevant policy and legislation, and collaborates widely to promote the cause of wild plant conservation.

Plantlife International
14 Rollestone Street
Salisbury
Wiltshire SP1 1DX
www.plantlife.org.uk



PLANTLIFE

Royal Botanic Gardens, Kew

The Royal Botanic Gardens, Kew is a scientific and educational organisation devoted to increasing knowledge and public understanding of plant diversity - how it came to be, what its current status is, how it can be conserved for future generations, and how it can be used in sustainable ways for human benefit. We are also actively engaged in plant conservation both in the UK and overseas.

Royal Botanic Gardens, Kew
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Surrey TW9 3AB
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Scottish Executive Environment and Rural Affairs Department

SEERAD is responsible for advising Ministers on policy relating to agriculture, rural development, food, the environment and fisheries, and for ensuring the implementation of those policies in Scotland.

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SCOTTISH EXECUTIVE

Message of support



Plants are a vital part of the world's biological diversity and an essential resource for human well-being. Many thousands of plant species have great economic and cultural importance, providing food, medicine, fuel, clothing and shelter. Yet a large proportion of these - perhaps up to 100,000 species worldwide - are threatened by factors such as over-collecting, unsustainable agriculture and forestry practices, urbanisation, pollution, land use changes, the spread of invasive alien species, and climate change.

To respond to this crisis, governments meeting in The Hague, The Netherlands, in March 2002, at the Conference of the Parties to the Convention on Biological Diversity adopted a *Global Strategy for Plant Conservation*. For the first time under the Convention, a set of outcome-oriented targets for the Strategy were adopted, aimed at achieving a series of measurable goals by 2010. The targets were developed through a unique partnership of governments and international and national organisations and represent a consensus on what is necessary and feasible to achieve by 2010 as a step towards the ultimate aim of reducing the current rate of loss of plant diversity. They provide a framework for concerted action at global, national and local levels.

This report sets out clearly the actions that need to be carried out in the United Kingdom to rise to the challenges posed by the 16 targets of the Global Strategy, taking into account the particular characteristics of the UK flora. In addition to listing existing relevant initiatives, the report usefully identifies priorities for additional work.

The Government of the United Kingdom and its partners are to be congratulated on developing this report so soon after the adoption of the Strategy and on involving a wide range of governmental and non-governmental actors.

I hope that this report will now be used by all stakeholders to aid implementation of the Strategy in the United Kingdom, and that it will inspire similar action in other countries too.

Hamdallah Zedan

Executive Secretary of the Convention on Biological Diversity



MARTIN HARPER/PLANTLIFE



BOB GIBBONS/NATURAL IMAGE

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DAVID WOODFALL/WOODFALL WILD IMAGES



VAL CORBETT/WOODFALL WILD IMAGES



JOHN MACPHERSON/WOODFALL WILD IMAGES



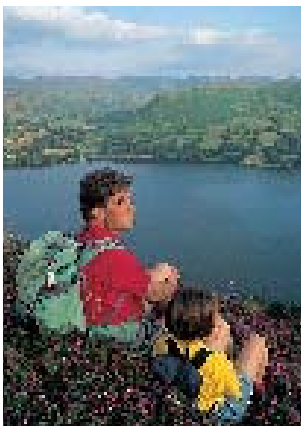
Executive summary

Plants and fungi are essential for our quality of life: they feed us, clothe us, cure and inspire us. They also provide food for many animals and are therefore considered to be the foundation upon which the rest of life depends. In the UK we have a responsibility to protect our wild-plant heritage. This report is the UK's response to the *Global Strategy for Plant Conservation*, which is a part of the Convention on Biological Diversity. The Strategy includes 16 outcome-oriented targets to be met by 2010. These range from protecting threatened species to ensuring plant products are taken from sources which are sustainably managed. Implementing the Strategy will contribute to meeting the 2010 target to reduce significantly the rate of biodiversity loss agreed at the World Summit in Johannesburg, and the more challenging target to halt the decline in biodiversity by 2010, agreed by EU countries and the Environment Ministers in the pan-European region.

The UK is committed to implementing the Strategy and much work is already ongoing to contribute to delivery of the targets, for example through the country biodiversity strategies and the UK Biodiversity Action Plan. Following an explanation of what each of the targets mean for the UK, this report details relevant ongoing actions and prioritises necessary additional actions which will enable the UK to meet the targets. The report has been prepared following an extensive two-stage consultation process involving many different people, and has been compiled on behalf of the devolved administrations by a partnership between the Joint Nature Conservation Committee, Plantlife International, and the Royal Botanic Gardens, Kew. The active involvement of participants from plant and fungus conservation groups, including universities, museum collections, botanic gardens, non-governmental organisations, expert societies, and government has been important in preparing this report, and will be vital in implementing the Strategy. We anticipate that existing work programmes will need to evolve in the light of the prioritised actions.

We plan to report on progress every two years to help review whether further action will be necessary to meet what we are calling our 'Plant Diversity Challenge' by 2010.

A man and his daughter rest in the heather whilst enjoying the views overlooking Ullswater in Cumbria.



Introduction

Why we need to save plants and fungi

There is a growing appreciation of the value of plants and fungi as part of our natural heritage. Plants make up vegetation which lies at the base of animal food chains while fungi decompose organic matter, recycle nutrients and help soil formation. Action to protect plant and fungal communities contributes to the survival of many animal communities. Fungi are an important food source for a wide range of vertebrates and invertebrates, while many butterflies rely on particular food plants for their larvae and if the host plants disappear, so do the insect species that rely on them.

Plants and fungi are intimately linked. An estimated 85% of the world's vascular plants are mycorrhizal: their roots have established an intimate and beneficial liaison with at least one fungus, often many more. Mycorrhizae supply vital nutrients such as phosphorus that the plant alone may be unable to exploit.

Vegetation is also a major contributor to many 'ecosystem services', the importance of which is being recognised. For example, beds of the common reed *Phragmites communis* are being used increasingly as natural, small-scale sewage treatment works. Bog mosses *Sphagnum* spp. play a key part in the ecology of peatlands in filtering and cleaning water courses, as do the shrubs and herbs that grow along riverbanks. This riverine vegetation also provides natural flood control, in a much more cost-effective way than 'hard' engineering schemes.

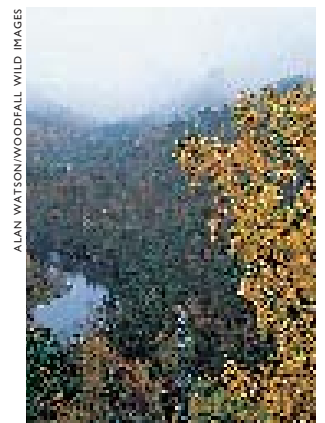
The growing understanding of the impact of climate change, for example through the MONARCH project (Modelling Natural Resource Responses to Climate Change), also drives a new perspective on plant and fungus conservation priorities. It has led to the realisation that, despite appearances, plants and fungi are not sedentary. Many plant and fungus populations will need to migrate, both altitudinally and longitudinally, to have any chance of surviving the new climatic regime.

Humans benefit directly from plants and fungi which provide the food that we eat, fuel, clothing, shelter and medicine. Many fungi for example, produce antibiotics, such as penicillin, which are valuable in medicine. Fungi also reduce the effects of toxic waste and are central to the global economy producing income through agriculture, forestry, food production, pharmacy and biotechnology. Finally certain lichens are well known to be good indicators of atmospheric pollution while various algae, including charophytes (stoneworts) and diatoms, are sensitive indicators of water quality. As many lower plants such as seaweeds, freshwater algae and bryophytes accumulate heavy metals, they can be used to monitor these pollutants.

Projects such as *Flora Britannica* and *Flora Celtica* have also increased our appreciation of the cultural importance of plants and emphasise the need for their sustainable use. They have been tokens of rites of passage and omens of good (and bad) luck. They evoke a powerful sense of place and identity too, not just of nations, but more locally as well, as Plantlife International's County Flowers project has demonstrated. Plants, especially flowering plants have a strong appeal and many people share the feeling that there has been a huge loss of colour and diversity from the countryside, and that our lives are poorer as a result. Our attempts to recreate that colour in our gardens prove the strength of that shared sentiment.

In short, plants and fungi are fundamental to human life.

A silver birch *Betula pendula* in a forest of Scots pine *Pinus sylvestris* stands besides the Glen Affric river in Scotland.



ALAN WATSON/WOODFALL WILD IMAGES

The importance of plants and fungi in the UK

The range and diversity of habitats across the United Kingdom are home to a wide variety of plant and fungus species (see Table). From the blanket bogs of the Flow Country to the Serpentine flora of the Lizard, from the famous fritillary meadows of the Thames and East Anglia to the Atlantic oak woods of western Britain; and from important fungus areas such as Epping Forest in Essex and Cloughy Dunes in County Down, the UK public are seldom far from our fascinating flora. It is a flora, however, that has been heavily influenced by humans.

The diversity of fungi and wild plants in the UK

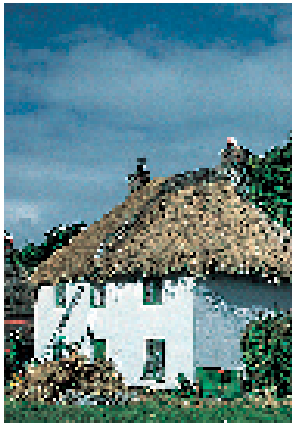
GROUP	NUMBER OF NATIVE SPECIES
Algae (including stoneworts)	c.15,000
Bryophytes (mosses and liverworts)	c.1,000
Fungi (including slime moulds)	c.12,000
Lichens	c.1,700
Vascular plants (seed plants and ferns)	c.2,300

When humans arrived in the UK 10,000 years ago, the tundra was still in the process of retreating and the habitats and flora present were very different to those we are used to now. Fairly soon, humans started small-scale grazing and cultivation of land for growing vegetables and crops. Some species flourished under this new regime, while others struggled to survive. However, in the last 150 years or so, the changing agricultural practices and other land uses have had a dramatic impact on our wild plants. Now nearly 70% of the UK's land area is actively managed for forestry and agriculture. The challenge is for plants and humans to co-exist in harmony. Our historic interest in gardening and trade in crops amongst other things have led to over 1,000 non-native vascular plant species being introduced and becoming established in the UK.

The UK has few endemic species but it is particularly important in an international context for bryophytes and lichens. About 65% of the known European bryophyte flora occurs in the UK which has a unique blend of northern Atlantic, Mediterranean and Lusitanian elements. We also hold internationally important plant assemblages such as oceanic western and Atlantic alpine communities, and have a responsibility for species for which we have a large proportion of the world's population. For example, between 25-49% of the world's bluebell *Hyacinthoides non-scripta* population is found in the UK. Furthermore, a number of our flowering plants are growing at the edge of their range, some recognised as endemic subspecies. Finally, the UK's position at the junction of cold and warm temperate latitudes means that our coastal waters are rich in algal species and two thirds of the UK's seaweeds are endemic to the Atlantic coastline.

The cultural and ecological interest in the UK flora therefore compensates for the relatively low species number when compared with other European countries.

Plants provide for all of our needs; from shelter, as seen here in Dorset, to food, medicine, and clothing.



PETER WILSON/NATURAL IMAGE

The global imperative

The Conference of the Parties to the Convention on Biological Diversity, at its sixth meeting in 2002, adopted decision VI/9 on the *Global Strategy for Plant Conservation*, including outcome-oriented targets for 2010. Implementing the Strategy will contribute to meeting the 2010 target to reduce significantly the rate of biodiversity loss agreed at the World Summit in Johannesburg and the more challenging target to halt the decline in biodiversity by 2010 agreed by EU countries and the Environment Ministers in the pan-European region. The 16 targets are arranged under five objectives:

- Objective 1: Understanding and Documenting Plant Diversity
- Objective 2: Conserving Plant Diversity
- Objective 3: Using Plant Diversity Sustainably
- Objective 4: Promoting Education and Awareness about Plant Diversity
- Objective 5: Building Capacity for the Conservation of Plant Diversity

The UK response

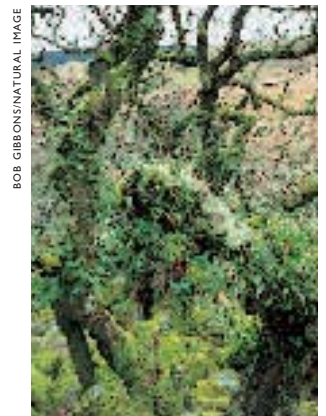
Many of the actions required under the Global Strategy are already in train in this country (see plant conservation framework in Appendix 2). The most recent platform for UK plant conservation was established by the UK Plant Conservation Strategy in 1994 as a response to the Convention on Biological Diversity. Current efforts in the conservation of areas important for plant diversity through Areas/Sites of Special Scientific Interest and recovery plans and programmes for threatened plants listed in the UK Biodiversity Action Plans have greatly improved the state of our wild plants. The UK BAP, the Biodiversity Strategies for England, Northern Ireland and Scotland and the Biodiversity Action Plan for Wales now represent the broad framework against which much of the action to help deliver the Global Strategy will take place.

We also have a strong institutional framework to help deliver action. We have botanic gardens of international reputation at Kew and in Edinburgh. We have expertise in the country nature conservation agencies and renowned research centres at the Natural History Museum and in universities. Moreover, we have a strong history of documenting our plants and fungi both by professional scientists and by amateur botanists and mycologists through the learned societies. The Government's Countryside Survey has equally helped to document change in our habitats over the past 30 years.

This report therefore details more specifically what the targets mean for the UK to clarify the scale and extent of the huge challenge for all of us in implementing this Strategy – our 'Plant Diversity Challenge'. Following consultation we have attempted to capture what we are already doing to help implement the targets and identify any additional action that will need to be done. As part of this process we have also attempted to make a judgement about priorities. We have therefore categorised action as:

- **Ongoing actions contributing to meeting the target** which are already being implemented as part of existing work programmes

Like a 'plant extra' from *The Lord of the Rings* this ancient oak woodland in Dartmoor is a classic example of the diversity of life this habitat supports.



BOB GIBBONS/NATURAL IMAGE

- **High priority additional work** which should be incorporated into work programmes of relevant contributing organisations and be completed or well advanced by 2010
- **Medium priority additional work** which should be initiated by 2010
- **Lower priority or long-term additional work** which should be initiated if resources are available by 2010

The commitment and enthusiasm that exists for plants in the UK put us in a strong position to address these priorities.

Definition and Scope

Although the definition of 'plant' in strict taxonomic terms is confined to the kingdom Plantae, we have used the word as a shorthand to include a wide diversity of other organisms popularly regarded as plants. This broad group therefore comprises not only bryophytes (mosses, liverworts and hornworts), but also lichens, fungi and all kinds of algae. The UK's response to the Global Strategy has therefore identified action to improve plant, fungal and algal conservation and unless specified otherwise, actions relate to vascular plants, bryophytes, lichens, fungi and algae.

Towards implementation

Implementing the Strategy will rely on a partnership approach, with many different organisations providing diverse aspects of the required actions. A list of some of the organisations that will be involved is provided in Appendix I, with an indication of the targets on which they will be working. The UK is already well-advanced in reaching the Strategy targets, and therefore further implementation should largely occur via an evolution of existing work programmes. *The key requirement for ensuring effective implementation is that all organisations working on plant conservation should review their work programmes and priorities in the light of the actions identified in this report.*

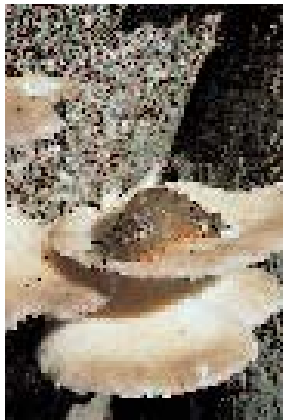
It is not the intention that implementing the Strategy should require the initiation of new steering groups and committees, unless a clear gap has been identified. There are already a considerable number of both organisations and co-ordinating networks working for plant conservation in the UK. Therefore, lead partners have not been indicated for the targets, although it is likely that for some of the targets, one organisation or network will effectively lead on the actions.

Monitoring and reporting on implementation

The UK is obliged to report on progress with implementation of the *Global Strategy for Plant Conservation* at the eighth and tenth meeting of the Conference of the Parties to the Convention on Biological Diversity in 2006 and 2010 respectively. The UK will produce reports on implementation in 2006, 2008 and 2010; these will be used to inform the international reporting rounds.

The JNCC, Kew and Plantlife International will be responsible for reporting on progress in collaboration with the devolved administrations. Organisations which are listed in Appendix I will be sent a simple questionnaire, requesting a brief summary of relevant actions. This will be used as supporting information for the report, which will focus on a number of indicators of success in meeting the targets, rather than the actions themselves.

Dining on oysters. A slug crawls across a spread of oyster mushroom *Pleurotus ostreatus*. An environment rich in vascular plants, fungi, mosses and lichens will support a variety of animal life.



It is expected that existing reporting plans will help to provide the necessary information to determine progress. The table below indicates existing reporting plans relevant to the 16 targets.

REPORT	REPORTING DATE	RELEVANT TARGETS
England Biodiversity Strategy Progress Report and Indicators *	Annual	5, 6, 7, 12 and 14
Trends in status of Species and Habitat Action Plans	2008	6 and 7
Condition monitoring on A/SSSIs and SACs	2005	5
Implementation of Habitats and Species Directive	2007	5
Implementation of Ramsar Convention	2005 and 2008	5
Countryside Survey	2006-8	6
CITES	Every two years	11
UK Sustainable Development Strategy	Annual	12

* *Scottish Biodiversity Strategy reporting arrangements still to be determined.*



Saltwater, brackish and freshwater environments are important plant habitats and are part of our natural flood defence system. This shows a fen in the Insh Marshes in Scotland.

Target 1: Developing a working list of species

Ongoing actions contributing to meeting the target

- Maintaining and updating the vascular plant, bryophyte, lichen, freshwater algae and charophyte checklists
- Producing a checklist of basidiomycete fungi
- Scoping study to create a 'Fungal Portal' to improve online dissemination of fungal information
- Developing NBN Species Dictionary

High priority additional work

- Producing preliminary checklists for remaining fungal groups
- Ensuring that update mechanisms are put in place for the NBN Species Dictionary, that will ensure that the ongoing work on checklists is widely accessible

Medium priority additional work

- Improving checklists of infraspecific taxa of vascular plants in order to help conserve genetic variation
- Improving classification of priority groups

Lower priority or long-term additional work

- Collecting and describing algae and fungi
- Developing checklists for micro-organisms

We need to know what species occur in the UK. The rare coral tooth fungus *Hericium coralloides* in the New Forest (below) and this hoary branch (right) demonstrate some of the variety amongst our fungi and lower plants.



A widely accessible working list of known plant species, as a step towards a complete world flora.

Scope

A widely accessible working UK checklist of plants and fungi will greatly enhance conservation programmes. When integrated with other, often scattered information concerning the taxonomy, systematics, nomenclature, distribution, frequency, habitat details and ecosystem function, such checklists become very powerful tools for setting priorities for both conservation action and ecological research.

Current situation

The known list of plants in the UK is relatively complete with accepted checklists for vascular plants, bryophytes, and freshwater algae (see table 1.1). Work is also underway for certain fungus groups. These are being developed as a component of the National Biodiversity Network (NBN) Species Dictionary Project.

A checklist of the downy mildews (Peronosporaceae) of the British Isles provides species names, hosts and basic distribution by county but no bibliographic or other data. However, other groups including Pythiales, Saprolegniales and Leptomitales require further work.

There are possibly a further 1000 species of Zygomycetes, Trichomycetes and other smaller groups. Many are of economic importance. No checklist exists. Collections and literature are at Kew, but there is no taxonomic expert. Specialist input from a range of partner organisations would be needed for these groups.

Looking to the future

It is clear that the UK has a considerable number of checklists already, and should develop more in order to meet this target. However, there is a continual need to maintain and update these checklists, as new species are described and understanding of classification is improved. The maintenance of these checklists relies on there being a sufficient number of trained taxonomists, and hence this target is fundamentally linked with target 15.

Table 1.1 Current checklists for plant and fungus groups

GROUP	CHECKLIST
Algae	
• Charophytes (stoneworts)	Complete
• Freshwater and Terrestrial	Complete
• Marine	Complete
Bryophytes (mosses and liverworts)	Complete
Fungi	
• Basidiomycetes	Due for completion in 2003
• Ascomycetes	In need of revision
• Myxomycetes (slime moulds)	Complete
Lichens	Complete
Vascular plants (seed plants and ferns)	Complete



Target 2: Assigning conservation status to species

Ongoing actions contributing to meeting the target

- Developing a Red Data List for fungi in Great Britain
- Revising the conservation assessment for charophytes in Great Britain
- Scoping study on importance of UK vascular plants in a European context

High priority additional work

- Revising the Irish vascular plant Red Data Book for plants in Northern Ireland
- Assessing all vascular plants in the UK using IUCN criteria
- Developing Red Data Lists for algae
- Reviewing the wider biogeographical status of species, and assessing the UK flora in a global context

Medium priority additional work

- Developing Red Data Lists for bryophytes and lichens in Northern Ireland
- Developing new and existing survey initiatives to improve plant status information, particularly information on trends in populations. This may involve the establishment of a 'Plant Information Centre' for the UK, to co-ordinate the surveys and collate the information.

Lower priority or long-term additional work

- Developing a Red Data List for fungi in Northern Ireland
- Undertaking conservation assessments of micro-organisms

A preliminary assessment of the conservation status of all known plant species at national, regional and international levels.

Scope

It is essential to have regular assessments of the conservation status of all plant species, in order to prioritise those in need of conservation action and to provide a measure of the success of actions being taken. For the purposes of this target, national is taken to mean the UK as a whole, regional is taken to mean relevant biogeographic zones, and the international level would consider the European and global contexts. A set of internationally agreed criteria for making conservation assessments have been devised by the IUCN which provides a consistent system, based on assessing the degree of threat to each species.

Current situation

Red Data Books and Lists provide conservation assessments for species using internationally agreed IUCN criteria. For biogeographic reasons, Red Data Books have covered either Great Britain or Ireland, with Northern Ireland being assessed in conjunction with the Republic of Ireland (see table 2.1).

There are no conservation assessments available for the Atlantic biogeographic zone, of which the UK is a part. Only the bryophytes have been assessed at the European level.

The JNCC has established a Species Status Assessment Project to support Red Listing and other conservation assessments in Great Britain. The aims of the project

Table 2.1 Red Data Books and Lists for plant, fungi and algae species

GROUP	RED DATA BOOK	
	GREAT BRITAIN	IRELAND
Algae		
• Charophytes (stoneworts)	Yes (Being revised)	Yes (In need of revision)
• Freshwater and Terrestrial	No	No
• Marine	No	No
Bryophytes (mosses and liverworts)	Yes	No
Fungi		
• Macrofungi and some microfungi	Due for completion in 2004	No
Lichens	Yes	No
Vascular plants	Yes (Not all species assessed)	Yes (In need of revision)



are to establish a single agreed process for assessing species status, using the expertise available in the country agencies, other professional bodies and the voluntary sector; to ensure the process is both efficient and transparent and that the resultant lists of species status are clearly disseminated to all potential users; and to ensure that all lists of species status are updated according to an agreed timetable. This will act as an umbrella project encompassing workshops on criteria, an ongoing review programme, and identification of plant surveillance requirements.

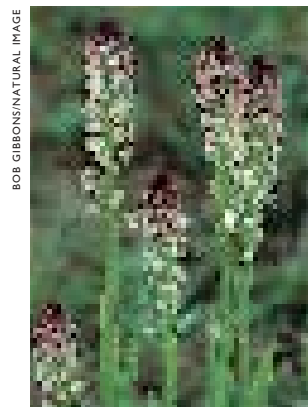
Many long-term plant monitoring and survey initiatives contribute to plant conservation status assessment. These initiatives include BSBI's Local Change project and their County Rare Plant Registers, the Threatened Vascular Plant and Threatened Bryophyte Projects, and various Plant Atlas initiatives. The series of national Countryside Surveys provides a framework for long-term surveillance of the status of widely occurring vascular plants.

Looking to the future

The production of conservation assessments for all plant species is a fundamental building block of plant conservation. The greatest challenge will be to improve our understanding of the UK flora in an international context, but this is vital if we intend to target conservation effort appropriately. It will also be necessary to initiate new surveillance projects in order to identify trends in species status. The use of such survey information will help inform us of the success of all aspects of *in situ* plant conservation, since the measure of success must be to halt or reverse the decline in biodiversity.

Canaries of the plant world. Stoneworts are highly susceptible to small levels of pollution and their conservation status is currently being assessed. Cors Erddreiniog in Anglesey is one of the sites where stoneworts are doing well.

Burnt orchid *Orchis ustulata* has undergone a spectacular decline and is now restricted to a few sites in England.



Target 3: Providing methods for plant conservation based on best practice

Ongoing actions contributing to meeting the target

There are already a very wide range of ongoing actions on this target, and an exhaustive list is not possible. Here, however, are some examples of relevant ongoing activity:

- Integrating *in situ* and *ex situ* conservation: action in this area should be developed in conjunction with target 8
- Maintaining threatened plants within ecosystems: much information already available, further action to be linked with work on target 7
- Balancing sustainable use with conservation: action in this area should be developed in conjunction with target 12
- Developing methods for monitoring conservation and sustainable use activities: all of targets 4-13 will need to be monitored to reveal conservation gain and methodologies require further development
- Developing a prototype information exchange mechanism for UK biodiversity research

Medium priority additional work

- Developing a central web-based information system which provides thematic lists of relevant information sources

Development of models with protocols for plant conservation and sustainable use, based on research and practical experience.

Scope

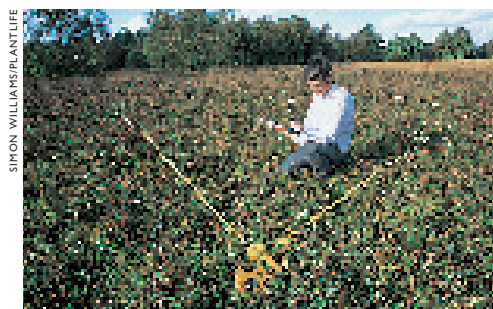
Research is essential to underpin both conservation and sustainable use of plant diversity. In recent years there has been a huge blossoming of such research, and there is now much experience in the UK and Europe which can be drawn upon to inform conservation programmes. This target acknowledges that 'best practice' examples, which draw on existing and new research and practical experience of management, are needed for plant conservation. Target 3 therefore seeks to provide the impetus for the development of such models, based on sound applied scientific approaches. This target is cross-cutting, underlying the implementation of many of the other targets.

Current situation

The technical review of this target undertaken for the CBD provided a series of key areas in which the development of models with protocols is required. These are: the integration of *in situ* and *ex situ* conservation, maintenance of threatened plants within ecosystems, applying the ecosystem approach, balancing sustainable use with conservation, methodologies for setting conservation priorities, and methods for monitoring conservation and sustainable use activities. The UK already possesses a considerable number of models in these areas, although the ecosystem approach and sustainable use are relatively new areas of research and need to be further developed. The UK Biodiversity Research Advisory Group provides a focal point for identifying research priorities, co-ordinating research programmes and disseminating the results of research.

Looking to the future

The key to achieving this target is ensuring wide dissemination of all the models that are developed. The development of a single information point listing all the relevant information sources would be of great importance.



SIMON WILLIAMS/PLANTLIFE

Updated and electronically available monitoring techniques will underpin our conservation efforts.



Target 4: Protecting the world's ecological regions

Ongoing actions contributing to meeting the target

- Implementing target 5 (see below)

Low priority or long-term additional work

- Collaborating with partners to determine the extent of European ecological regions effectively conserved

At least ten per cent of the world's ecological regions effectively conserved.

Scope

This target seeks to conserve plant diversity in 10% of each of the world's ecological regions. These are broad ecosystem types, for instance montane or coastal ecosystems. Given that this is a global assessment, the challenge will be to work with international partners to assess the UK's contribution to the protection of ecological regions. It is suggested that the results of target 5 (which will help identify important plant areas within all ecological regions) will help this assessment.

From rocky coastal habitats such as St David's Head in Pembrokeshire (below) to lowland blanket bog such as the Flow Country in northern Scotland (right) the UK contains a variety of habitats each hosting its own special plant assemblages.



BOB GIBBONS/NATURAL IMAGE



Target 5: Identifying and conserving Important Plant Areas

Ongoing actions contributing to meeting the target

- Compiling an inventory of the UK's Important Plant Areas
- Monitoring the condition of species and habitats in protected areas
- Completing and implementing the findings of the Review of Marine Nature Conservation
- Refining understanding of effective conservation and favourable condition as a part of work on the Habitats and Species Directive and the Country Agency Common Standards Monitoring project

High priority additional work

- Targetting the uptake of agri-environment schemes to support IPA protection and management
- In the light of the recommendations of the Irish Sea Pilot, determining whether additional means of protection are necessary to support the conservation of nationally important marine species and areas
- Using the UK IPA inventory to inform landscape-scale conservation projects
- Working with landowners to deliver positive management for IPAs

Lower priority or long-term additional work

- Ensuring the needs of IPAs are included in the work of relevant local and regional Biodiversity Action Plans

Protection of 50 per cent of the most important areas for plant diversity assured.

Scope

Many people will know and cherish a favourite plant place, perhaps because of the montane flora of Ben Lui, the limestone grassland flora of the Peak District, the fungi of Windsor Great Park or the richness of the bryophytes in the Anglesey dunes. Target 5 seeks to conserve those areas most important for plant diversity (or 'Important Plant Areas') by identifying, protecting and managing a network of such areas in each ecological region (as defined by target 4).

Current situation

A number of protected area mechanisms exist in the UK but the most relevant are those that have a specific conservation remit e.g. Areas or Sites of Special Scientific Interest (A/SSSIs) and internationally important sites designated as part of the EU's Natura 2000 network - Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). To date 601 sites (2,500,884ha) have been proposed as candidate SACs, 242 sites (1,470,364ha) have been classified as SPAs and 6,761 sites have been designated as A/SSSIs (2,377,714ha). The area covered by these designations represents very approximately 10% of the total UK area.

At sea, a number of different types of protected areas afford protection for marine plants but vary in their management options and their extent into the marine environment (e.g. Ramsar sites extend only to 6m below low tide). In some cases they only occur in limited numbers (e.g. only three Marine Nature Reserves exist). The current UK suite of candidate SACs conserves a wide range of algae as well as vascular plants within a range of coastal habitats. Further selection of SACs away from coastal regions may include vegetated areas although many of these sites will consist of habitat beyond the depth range of marine algae. The Review of Marine Nature Conservation (RMNC), established in 1999, is examining the effectiveness of the system for nature conservation in the marine environment. As part of the Review, the Irish Sea regional pilot is testing criteria for identifying nationally important areas, which includes consideration of vegetated marine habitats, and trialling a marine nature conservation framework which includes evaluation of the roles of existing and extended marine protected area networks. The Review supports the aims of the Government's strategy for the conservation and sustainable development of the marine environment set out in the first Marine Stewardship Report, *Safeguarding our Seas: A Strategy for the Conservation and Sustainable Development of our Marine Environment* published on 1 May 2002.

The Government is committed in England to achieving 95% of SSSIs in favourable condition by 2010 and 95% of ASSIs in Northern Ireland by 2013. Efforts to improve protection and management of these sites have been strengthened by the Countryside and Rights of Way Act 2000 (England and Wales) and the Environment (Northern Ireland) Order 2000. The emerging Nature Conservation (Scotland) Bill



will also strengthen SSSI provisions to protect places important for wild plants in Scotland.

The country agencies, together with the JNCC and the Environment Heritage Service in Northern Ireland, are producing guidance for monitoring of the condition of species and habitats on protected sites. The condition of the site features will be reported on a six-yearly cycle and will be used to help assess the conservation status at a UK level and also to influence management of sites.

Across the UK, financial incentives are offered to farmers to encourage them to manage their land sympathetically for, amongst other things, wild plants. These agri-environment schemes are crucial for delivering the right management for wild plants outside of protected areas (see target 6).

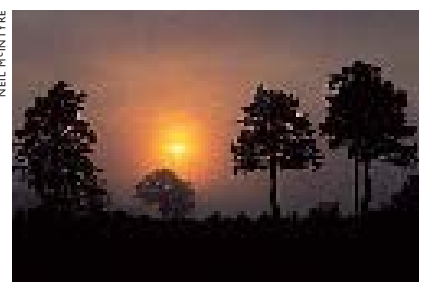
Looking to the future

A project to identify the Important Plant Areas (IPAs) of the UK has already started following internationally agreed criteria. It is not intended that IPAs become a new formal designation, rather the resulting inventory will support, inform and underpin existing efforts to protect our most important plant places through the most appropriate means whether it be legislation, incentives or advice.

Existing protected areas are probably sufficiently representative of areas important for vascular plants (including veteran trees) but it is likely that the UK IPA inventory will identify unprotected sites which are important for bryophytes, lichens, algae and fungi.

This IPA inventory will not only usefully help agri-environment targeting but also possibly support landscape-scale initiatives for plants.

The UK contains some of the world's most stunning plant habitats. Work to identify these areas as IPAs is underway and it is likely the inventory will include areas such as Scar Close National Nature Reserve in the Yorkshire Dales (above), and the last remaining ancient forests and woodlands such as the Caledonian pine forest at Rothiemurchus in the Scottish Highlands (below).



Target 6: Conserving plants within production lands

Ongoing actions contributing to meeting the target

- Delivering forestry management and agri-environment schemes
- Implementing plans for forestry and agriculture included in the UK, Scottish and English Biodiversity Strategies
- Delivering Habitat and Species Action Plans relating to production land habitats and species
- Producing management leaflets advising on techniques compatible with plant diversity
- Development of surveillance and methods for assessment of status of production lands, including review of requirements for the scope of Countryside Survey 2006.

High priority additional work

- Developing surveillance initiatives to monitor the impact of all of the various incentives and schemes on plant, fungal and algal diversity
- Monitoring the outcome of changes to farming systems and practices after the implementation of CAP reform
- Reviewing relevant HAPs to ensure that actions will help to achieve this target

Medium priority additional work

- Identifying land management techniques most likely to benefit plant, fungal and algal diversity
- Reviewing management incentives and schemes to ensure that relevant land management techniques are included
- Ensuring that management incentives and schemes help to conserve and enhance Important Plant Areas (see target 5)

Production lands when managed sympathetically with wildlife can be home to a large number of species such as this area of machair in South Uist, Outer Hebrides.

At least 30 per cent of production lands managed consistent with the conservation of plant diversity.

Scope

Approximately 70% of the terrestrial area of the UK is production land. Consequently, it is critical to the conservation of many species that this large part of the UK is managed consistent with plant diversity. In the UK, production lands are defined as areas where the primary purpose is agriculture (including horticulture) and forestry. Production land comprises mainly pastoral (including moorland and much semi-natural grassland), arable and commercial forest areas. Many of the UK's semi-natural habitats are a product of centuries of agricultural management and their conservation is highly dependent on their continued agricultural or silvicultural management. Production land can have an impact on integral and adjacent natural or semi-natural habitats through the intrusive direct or secondary effects of intensive management practices. By managing production land consistent with plant diversity the negative impacts on adjacent ecosystems should also be reduced.

Current situation

In the UK we have many plant species that are restricted to or highly dependent on production lands. For example, the UK is particularly important for grassland fungi. The UK BAP-listed pink waxcap *Hygrocybe calyptriformis* may be more common in the UK than anywhere else in the world and several of our 'waxcap grasslands' are thought to be of European significance. In addition, at least 12 of 220 plant species listed as priorities for action under the UK Biodiversity Action Plan (UK BAP) are defined as restricted to or highly dependent on arable land.

A large proportion of UK plant diversity can be found on production land but the Countryside Survey 2000 provided information to suggest that the intensification of production land management is reducing overall plant diversity in these areas. A number of threatened habitats (e.g. ancient and species-rich hedgerows, cereal field margins and lowland meadows) are found within production lands. Targets for the protection and recovery of habitats and species have been set in Habitat and Species Action Plans.





Policies for sustainable forest management attempt to ensure that all types of forest are managed to maintain and enhance biodiversity values so that even primarily production-oriented forests should include some provision for open ground habitats and native trees and shrubs. UK guidelines for conservation and other environmental values are incorporated into incentive schemes and policies for management of state forest land which together reach about 60% of UK forest land. In addition, all state forest land and some private land is included in the UK Woodland Assurance Standard.

Agri-environment schemes have made a major contribution to the conservation enhancement of biodiversity on farmed land. For example, 10% of England's, 17% of Northern Ireland's, 14% of Scotland's and 14% of Wales' agricultural land is currently managed under agri-environment schemes.

Looking to the future

One of the challenges of this target will be in establishing a definition for favourable condition for production lands, which is considered consistent with the conservation of plant diversity. A start has been made in the baseline assessment of indicators for the England Biodiversity Strategy. This includes a series of indicators of plant diversity in productive land. The review of HAPs to provide appropriate targets will be fundamental in achieving this. Agri-environment schemes have an important role to play. The UK administrations are committed to increased take up of these schemes. For example, in England a new Environmental Stewardship scheme is in development that will contain management objectives that are much more explicitly focussed on conserving UK BAP habitats and species than was the case previously. Reform of the European Common Agricultural Policy should also assist in a movement away from production subsidies towards environmental stewardship.

The 2002 *New Atlas of the British & Irish Flora* showed that arable flowers have declined more than any other group over the last 30 years. The sight of a field rich in cornflowers, poppies and corn marigolds is now rare.

Landlife have demonstrated that wild flowers can return to agriculturally improved land by restoring the right conditions and lowering fertility through techniques such as soil inversion.



LANDLIFE

Target 7: Conserving threatened species

Ongoing actions contributing to meeting the target

- Co-ordinating implementation of species action plans
- Carrying out species status assessment in accordance with target 2
- Protecting and managing protected areas where some threatened plants live

High priority additional work

- Reviewing action plans and targets
- Monitoring and reporting on trends every three years
- Ensuring efficient communication between field recorders and country agencies concerning the location of threatened plants on A/SSSIs
- Providing information on ecology, status and best conservation management practices for all threatened species
- Targeting agri-environment schemes towards species priorities

Medium priority additional work

- Identifying and undertaking applied research and monitoring necessary to support action in the field
- Developing tight linkages between Species Action Plans and Habitat Action Plans striving to achieve effective species conservation as a by-product of wider habitat management

Lower priority or long-term additional work

- Improving our understanding of the linkages between organisms e.g. the relationship between fungal diversity and vascular plant diversity

60 per cent of the world's threatened species conserved *in situ*.

Scope

Target 7 builds on the status assessment work of target 2 and seeks to ensure that the future of our most threatened plants (classified according to IUCN criteria), irrespective of the reasons why they became threatened, are secured. Crucially the target obliges action to ensure that threatened plants are protected *in situ* i.e. the places where they live in the wild.

Current situation

The UK Biodiversity Action Plan is the principal framework through which species conservation is administered. In England and Wales Section 74 of the Countryside and Rights of Way Act 2000 (CRoW Act) places a duty on the Secretary of State in England and on the National Assembly for Wales to publish lists of living organisms and habitats of principal importance for the conservation of biological diversity, and to implement or promote steps to conserve these interests. Action is further defined in country biodiversity strategies. For example, progress with the delivery of targets in the BAP species and habitat action plans is considered a key indicator of the success of the delivery of England's Biodiversity Strategy.

At the present time 220 plant and fungus species, comprising 14 algae (including 12 charophytes), 64 bryophytes, 28 fungi, 37 lichens and 77 vascular plants have specific action plans, and other threatened species can be conserved via appropriate HAPs. Lead Partners are co-ordinating the actions necessary to meet the targets within the plans. The 2002 BAP review of the trends in the status of priority species for which data exists indicated that 22% of plants and fungi are 'stable' or 'increasing', 57% are 'fluctuating' or the trend is 'unknown', 6% are showing signs of a 'slowing in their decline' and 15% are 'lost' or 'continuing to decline' (see Figure 1). The action plans and targets will be reviewed in 2005.

Many threatened species already occur on protected sites. It follows therefore that protected areas and habitat initiatives (as described in targets 5 and 6) will help many species, but some will require more specific management. Effective conservation of these sites should be delivered by the SSSI Public Service Agreement in England and the similar commitment in Northern Ireland. Moreover, some threatened species will benefit from appropriate management through agri-environment schemes.

Looking to the future

The UK BAP review in 2005 should allow a reassessment of whether any threatened species are not receiving conservation action either via SAPs or HAPs or related strategies. In addition, this will be the opportunity to move towards conservation action at the appropriate geographical scale (feature, site or landscape) to ensure populations of threatened species remain viable. Work is continuing to ensure that



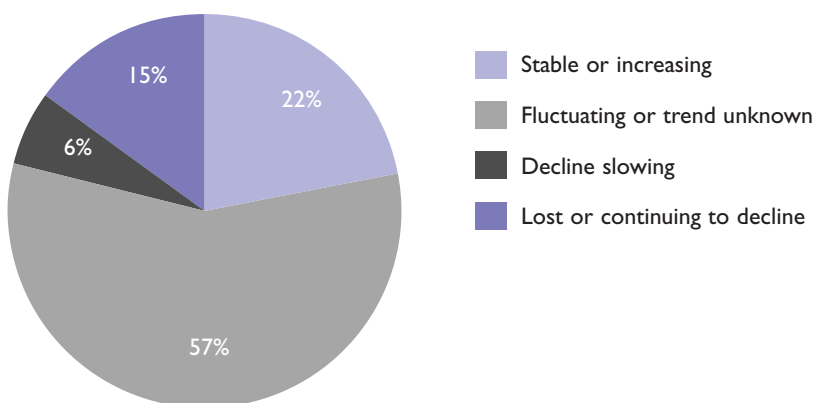
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measures to progress habitat conservation will additionally improve species prospects. However it is accepted that special management may be necessary for some species on some sites.

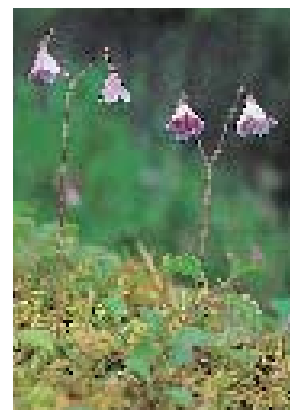
The priority will remain protecting the places where threatened plants live by the most appropriate means whether it is through statutory protection, management incentives, advice, direct intervention or policy change. It is however acknowledged (as described in target 8) that species reintroduction should be part of the recovery toolkit. However this should only be considered as a last resort (and in accordance with accepted guidelines).

The UK Biodiversity Action Plan has helped to protect many of the UK's most endangered species. Populations such as the twinflower *Linnaea borealis* (below) in Scotland and Deptford pink *Dianthus armeria* (above) have been stabilised and in some sites increased following collaboration between conservation organisations and landowners.

Figure 1: Trends in status of plant/fungus species listed in the UK Biodiversity Action Plan



STEVE AUSTIN/WOODFALL WILD IMAGES



Target 8: Linking *ex situ* and *in situ* conservation

Ongoing actions contributing to meeting the target

- Collecting and storing vascular plants, primarily in the Millennium Seed Bank, and reintroducing them as determined by the Biodiversity Action Plan process
- Developing methodologies for the *ex situ* conservation and reintroduction of bryophytes
- Developing the collections managed by the UK National Culture Collection network

High priority additional work

- Developing an integrated inventory of 'living' plant and fungal collections
- Researching the storage of pteridophyte spores
- Developing scientific and horticultural expertise for the *ex situ* conservation of vascular plants and reintroductions
- Researching the *ex situ* conservation of lichens and their reintroduction

Medium priority additional work

- Developing conservation collections of threatened species of fungi and other organisms held as part of the UK National Culture Collection. Evaluating the need for and constraints of reintroduction and restoration projects for these species
- Developing protocols and guidelines for conservation programmes to release the potential contribution from specialist plant societies, nurseries and gardeners

Lower priority or long-term additional work

- Following the development of protocols and baseline collections - developing collections to ensure that adequate genetic diversity of each species is maintained to support restoration programmes

60 per cent of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes.

Scope

This target seeks to underpin the conservation of threatened plant species through the maintenance of living collections, citing botanic gardens, seed banks and tissue culture collections as examples. Priority should be given to those threatened species in the IUCN Red Data Book category of 'critically endangered', with a target of 90% of such species in *ex situ* conservation. In the UK, focus should include species listed in the Habitats and Species Directive and the UK and European Red Data Books, in addition to those that are 'critically endangered' at a global level.

Current situation

Vascular plants are generally well represented in *ex situ* collections; for example, the Millennium Seed Bank at the Royal Botanic Gardens, Kew, holds seeds of around 94% of the UK's native seed-bearing plants. This project has been working with English Nature to improve coverage of the Red Data Book/Biodiversity Action Plan species, and out of the 131 species selected by English Nature, 110 are represented in the Bank and 40 have complete or adequate geographical coverage. The UK National Culture Collection network comprises organisations holding living cultures of a range of organisms, including freshwater and marine algae and protozoa, wood-rotting macrofungi, yeast cultures and pathogenic fungi. Although threatened species are included within these collections, the emphasis is on those species of commercial significance.

The Royal Botanic Garden Edinburgh has a spore bank for a number of threatened pteridophytes, but more research is needed into the long-term storage of spores. They also maintain living collections of fern species. Reintroductions have been carried out, for instance of oblong woodsia *Woodsia ilvensis*. *Ex situ* conservation of lichens suffers from a lack of professional lichenologists and an absence of basic research into conservation techniques. Fungal strains can be preserved cryogenically, but little work has been done on the *ex situ* propagation and cultivation of whole lichens or their reintroduction into the wild. There has been increasing interest in the conservation of fungi in recent years, but there is a fundamental lack of knowledge about some aspects of the mycota of the UK. Some groups have been relatively well studied, e.g. the Basidiomycetes, but others have been neglected or have received patchy coverage. There are conservation collections of pathogenic and wood-rotting species held as part of the UK National Culture Collection, but there is no emphasis on threatened species. The Mycology Section at Kew has done some work on threatened species in conjunction with English Nature, and holds both living



cultures and DNA samples of these. To date, however, there have been no reintroduction programmes.

The micropropagation unit at Kew has been working with English Nature, Scottish Natural Heritage and the Countryside Council for Wales on the propagation and *ex situ* storage of bryophytes. Cryopreservation techniques are under development but so far no re-introduction experiments have been carried out. There are also some small collections of living material in the UK. The PlantNet Directory of Botanical Plant Collections in Great Britain and Ireland provides an invaluable reference source of collections of both native and non-native plants in botanic gardens.

Looking to the future

The UK has made considerable progress towards this target and now must ensure that adequate genetic diversity is collected and maintained in order to support restoration programmes. The integration of *ex situ* conservation with reintroduction and restoration programmes has been driven by species recovery programmes and latterly through the Biodiversity Action Plan process. This is likely to continue in the future. Funding from the country agencies will assist delivery through a wide variety of partnerships with non-government organisations and industry. Some collections, particularly fungi, that were established with a focus on species of commercial importance will need to review their role in the conservation of threatened species. The *ex situ* conservation and reintroduction of the composite organisms, lichens (formed by the association of algal cells with a fungus) remains a scientific and practical challenge and will require fundamental research and funding. Further, fundamental research is also required for the *ex situ* conservation of pteridophytes and bryophytes.

The Royal Botanic Gardens, Kew, English Nature and Plantlife International have worked closely in propagating seed and then creating suitable sites for starfruit's *Damasonium alisma* reintroduction as shown here in Buckinghamshire.

The Royal Botanic Gardens, Kew Millennium Seed Bank at Wakehurst Place, Sussex has a seed collection of virtually all the UK's native flowering plants.



Target 9: Conserving crop diversity

Ongoing actions contributing to meeting the target

- Implementing the International Treaty on Plant Genetic Resources for Food and Agriculture
- Implementing the recommendations of the Defra policy review
- Continuing support to key gene banks, seed banks and national collections
- Participating in the European Co-operative Programme for Crop Genetic Resources
- Studying the relationship between ecogeographic distribution and genetic diversity in the UK's Plant Genetic Resources

High priority additional work

- Producing a checklist of species to be covered by this target, in particular this should include crop species grown in this country and crop wild relatives native to the UK
- Improving *ex situ* holdings of the genetic diversity of crop wild relatives native to the UK and of UK crop landrace material

Medium priority additional work

- Identifying suitable landraces of socio-economically important species for inclusion in on-farm conservation projects
- Promoting further integration of conservation efforts between *in situ* and *ex situ* genetic conservation workers and between genetic conservation and ecologically focussed conservation workers

Lower priority or long-term additional work

- Planning appropriate *ex situ* conservation of minor food crop socio-economically valuable plant species native to the UK
- Cross-referencing of *ex situ* holdings with local and historical knowledge

70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated local and indigenous knowledge maintained.

Scope

The conservation of useful plant diversity is a key component of the Global Plan of Action on the conservation and sustainable use of plant genetic resources for food and agriculture. Theory and practice demonstrate that, with an appropriate strategy, 70% of the genetic diversity of a crop can be contained in a relatively small sample (generally, less than 1,000 accessions). Genetic diversity is also conserved through on-farm management. By working with local communities, associated indigenous and local knowledge can also be maintained.

The target covers crop species, including major forage and tree species, as well as some other socio-economically valuable species. It is not intended that all socio-economically important plant species should be targeted, but that they should be selected on a case-by-case basis. For instance, medicinal plants may be considered important.

Current situation

The UK has signed the International Treaty on Plant Genetic Resources for Food and Agriculture and hopes to ratify soon. This provides an agreed international framework for conservation and sustainable use of plant genetic resources.

The Defra *Review of Policy on Genetic Resources for Food and Agriculture* looks at developing an overarching policy in England and Wales on the conservation and sustainable use of genetic resources relevant to food and agriculture, including animal and microbial resources as well as plants. As a step towards implementing Defra's strategic policy a Defra-funded project to develop a UK inventory of genetic resources for food and agriculture including landrace and crop wild relatives is underway and results will be available in 2004. This will help establish priorities for future conservation work. A recently funded scoping study to establish an information system for Genetic Resources for Food and Agriculture will include an assessment of crop wild relative species' *in situ* distribution and extant landraces and primitive forms grown across the UK. The devolved administrations in Scotland and Northern Ireland are responsible for policy in their territory. The Scottish Executive Social Research Programme funded a recent study to evaluate the effects on Scottish biodiversity of change in the use of traditional breeds and varieties, which included a review of ongoing genetic conservation projects.

Defra launched a web-based 'UK Focal Point' on access to genetic resources and benefit sharing in early 2002 (<http://www.defra.gov.uk/Science/GeneticResources>). The site lists summary details of germplasm holdings maintained at institutions across the UK.



The UK has been a committed participant of the European Co-operative Programme for Crop Genetic Resources from its formation. The UK currently has nine nominated attending members across the crop networks, four of whom are chairs of working groups (Avena, Allium, Umbellifer, Grain legumes), a further two are co-chairs (Barley and Prunus), and a UK expert also chairs the *In Situ* and On-Farm Network.

The UK Plant Genetic Resources Group was formed in 1985 in response to discussions on data management for plant breeding and plant genetics. In 1992 it adopted formal terms of reference and membership to act as a technical forum for *ex situ* PGR issues in the UK, to offer advice and technical support to Government departments on technical and policy matters which relate to the UK or the UK's international role in the area of plant genetic resources and *ex situ* collections. Its membership includes all the major UK *ex situ* collections including the National Fruit collections, Botanical Gardens Conservation International, the Forestry Commission, British Society of Plant Breeders and the non-governmental collections such as NCCPG and HDRA.

Looking to the future

Holdings of genetic diversity of major crop species already exceed the target level. Further work is needed to increase holdings of landrace varieties, minor crops, and genetic diversity of the crop wild relatives. Increasing holdings in these areas will also enable the UK to meet other international commitments.

Black Worcester pears at the National Fruit Collection at Brogdale, Kent. This vital collection of over 3,500 varieties of apple, pear, plum, and other fruits ensure the preservation of the great variety of cultivated fruit in the UK.

Target 10: Controlling non-native invasive species

Ongoing actions contributing to meeting the target

- Responding to the Defra *Review of Non-native Species Policy*
- Conducting a similar review for Northern Ireland as part of an *All-Ireland Review*

High priority additional work

- Identifying priority actions, in light of the Government reviews
- Preparing management plans for identified priorities

Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems.

Scope

The damage caused by invasive non-native species is recognised as a major threat to biological diversity. Invasive plants can hybridise with close relatives, cause competition for nutrients, light and space and can alter plant populations and communities in marine, terrestrial and freshwater situations. Target 10 acknowledges the threats to plant diversity from invasive species and seeks to identify the necessary action to minimise this damage. It suggests that priorities should be set at a national level but action should be co-ordinated internationally. The challenge is to identify those species that pose significant threats, to determine the nature of the response and then to co-ordinate action to alleviate the problems caused. Management plans should specify the mechanisms necessary to prevent, eradicate or control problem species so that our biotopes and native flora can be conserved successfully.

Current situation

Most non-native species pose no threat to native plants, and indeed many naturalised non-natives represent interesting additions to our flora. The 'tens rule' for British invaders states that for every 100 imported plants, only 10% become casuals, and of these casuals only 10% become established and of these only 10% actually go on and become pests i.e. 0.1% of non-native species might pose ecological problems.

Although this crude assessment does not take into account different life strategies and the varied vulnerability of habitats to invasion, it is a satisfactory rule of thumb that begins to give some perspective to the scale of the problem. It is therefore a minority of species that cause serious problems but predicting which species will become invasive is both difficult and the priority.

The challenges that this target presents will be considered as part of the Government response to the Defra *Review of Non-native Species Policy* and as part of a similar review in all-Ireland. The GB review was initiated following a commitment made in the Rural White Paper for England *Our Countryside: the Future - a Fair Deal for Rural England*. This review, led by Defra has considered the Convention on Biological Diversity's 15 guiding principles for taking action against damaging non-native species. The review group has submitted its report to Ministers and consultation on the Ministers' response is underway. Recommendations focus on the need to improve prevention, monitoring and risk assessment, and remedy and control.



Non-native invasive species pose a major threat to our wild plants. Efforts to control these species such as parrot's-feather *Myriophyllum aquaticum* shown here, include manual clearance and spraying with herbicide.

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PLANTLIFE



Target 11: Protecting species from international trade

Ongoing actions contributing to meeting the target

- Assessing status of plants and fungi (target 2)
- Continuing to contribute to the development of CITES and associated EU regulations to ensure they remain an effective international tool to control international trade in UK's wild flora

High priority additional work

- Determining whether there are any trade sensitive species of plants or fungi, and monitoring these species to identify what needs to be done to protect them

Medium priority additional work

- Reviewing the threat of genetic pollution of native populations from trade in non-native material

No species of wild flora endangered by international trade.

Scope

Internationally, many plants are legitimately traded in a sustainable way. This target is directed at those species endangered or potentially endangered by this international trade. However, the action is focussed on the impact of trade on the UK's flora, rather than the impact of UK consumers on plants abroad.

Current situation

There is currently no evidence of endangerment of any UK species of plant or fungus directly by international trade (see table 11.1). Some wild plants are protected against international trade under the Convention on International Trade in Endangered Species (CITES). The only UK species to which CITES applies are snowdrop *Galanthus nivalis*, if this is native, and all orchid species.

Table 11.1 Evidence of endangerment of any UK plant or fungus species by international trade

PLANT GROUP	INTERNATIONAL TRADE	ENDANGERMENT	ACTION
Vascular Plants	Little or no true international trade in UK wild plants. There has been exploitation of UK taxa for national use and some possible export to EU countries.	No evidence of endangerment by international trade.	UK use needs monitoring and targeting of possible illegal trade. National illegal trade can seek an international outlet.
Lichens	Some collection.	No evidence of endangerment by international trade.	UK use needs monitoring.
Bryophytes	Collection of bryophytes does occur e.g. collection of pleurocarpous weft forming mosses by raking from conifer plantations.	No evidence of endangerment by international trade.	UK use needs monitoring.
Algae	Some collection. Impact of maerl dredging unknown.	No evidence of endangerment by international trade.	UK use needs monitoring.
Fungi	Some collection. Increasing interest and demand.	No evidence of endangerment by international trade.	UK use needs monitoring.



The UK has played a leading role in promoting and supporting the use of CITES as the international tool for sustainable trade in wild plants and animals. The European Union (EU) implements CITES by regulations which go considerably further than the basic Convention. Council Regulation (EC) 338/97 is the core legal tool within the EU and is directly applicable in all member states, it is backed up by the implementation tool Commission Regulation (EC) 939/97 and its updates. These controls are the UK mechanism for dealing with international wildlife trade. They operate within the context of an EU with free movement within the borders of the Union. The EU represents one of the three largest markets for international wildlife trade along with the USA and Japan. This market will only grow with the expansion of the EU to 25 member states in 2004. In terms of wildlife trade the UK's international borders lie at the boundary of the European Union.

Orchids, such as early-purple orchid *Orchis mascula* above, and snowdrops are protected from international trade

On a separate issue, there is some concern about the vulnerability of native species from genetic pollution from the trade in species of non-native origin.

Looking to the future

In terms of wildlife trade the UK's international borders lie at the boundary of the European Union and the additional controls put in place by the EU are therefore fundamental to any action to protect UK species from over-exploitation or to control the United Kingdom's use of wild plant resources from other countries.

The threat of genetic pollution of native populations from trade in wild plants of non-native origin should be ascertained and minimised. The problem could be exacerbated by the UK's inclusion in EU boundaries for wildlife trade. This issue was acknowledged in the recent Defra-led review of non-native species as one which required further detailed consideration in due course. Flora locale has led the way in trying to provide guidance on the supply and use of native flora for projects in the town or countryside.

Target 12: Managing plants products sustainably

Ongoing actions contributing to meeting target

- Implementing the Biodiversity Strategies in England and Scotland and acting through the UK Biodiversity Partnership
- Implementing Sustainable Development Strategies in England, Scotland and Wales and UK level
- Developing and implementing sectoral plans, e.g. UK Forestry Standard, country forestry strategies, Organic Action Plans
- Demonstrating best practice for example, by LEAF (Linking Environment & Farming)
- Extending voluntary schemes such as the Good Bulb Guide and Soundwood Guide
- Continuing chain of custody and origin identification through voluntary schemes and FSC chain of custody policies
- Responding to CAP reform, which offers potential for cross-compliance to incorporate biodiversity priorities

High priority additional work

- Integrating existing UK biodiversity and sustainable development initiatives
- Raising consumer awareness and increasing demand for sustainably-sourced products
- Implementing the Strategic Environment Assessment Directive to integrate biodiversity and sustainable development at all levels of decision making

Lower priority or long-term additional work

- Improving chain of custody-tracing to identify where production is unsustainable and considering, where necessary, the introduction of new certification schemes for certain sectors

30 per cent of plant-based products derived from sources that are sustainably managed.

Scope

Plants and their derivatives provide a range of products including amongst other things fuel, food, shelter, clothing and medicines. By 2010, 30% of all plant-based products used and produced in the UK need to be sourced from sustainably managed systems, including not only plant products produced here but also imported products. Sustainable management of these systems relates to environmental as well as social issues, including fair trade, equitable sharing of benefits and participation of indigenous and local communities. Target 12 therefore should be considered alongside targets 3, 6, 11 and 13 in terms of production lands, trade, ecological services and sustainable livelihoods.

Current situation

Certification schemes are designed to ensure sustainable management practices and they currently exist for:

- organic farming (726,400 ha, approximately 4% of UK farmed land, see www.soilassociation.org);
- forestry (there are 273 companies registered by the Forest Stewardship Council (FSC) and 1,154,835 ha² or 38% of total forest cover of UK forest production land is FSC-certified for operations and management, see www.fsc-uk.org);
- non-timber forest products (two companies are FSC certified on non-timber forest products, see www.fsc-uk.org);
- Fairtrade products sold (£63 million retail value in 2002, see www.fairtrade.org.uk).

Commitments to other UK strategies also work towards achieving or exceeding target 12. For example, the UK Forest Partnership for Action has set a target of 80% of all UK forest products to be sourced from woodlands certified through the UK Woodland Assurance Scheme by 2010. In addition, the sectoral plans devised as part of the Country Biodiversity Strategies will ensure that social and economic development is environmentally sustainable.

Voluntary schemes are also in place, some of which require suppliers to specify plant stock origin for example Horticultural Trade Association national plant specification scheme, Forestry Commission Voluntary Scheme and Flora locale code of practice. Other initiatives, run by, for example Fauna & Flora International, offer guidance to consumers and suppliers on a selection of sustainably managed products.



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Looking to the future

There are a number of significant challenges for achieving target 12, not least the need to meet the requirements of the target whilst adhering to existing international trade agreements. The emerging biodiversity strategies and the evolving role of the UK Biodiversity Partnership do however have potential to integrate existing UK biodiversity and sustainable development initiatives. Current and future consultations on reform of the Common Agriculture Policy offer opportunities to ensure that environmentally sustainable management is included in cross-compliance conditions. Moreover raising consumer awareness and increasing demand is an immediate priority, targeted through public education programmes and publicising examples of good practice.

Coppicing is the art of cutting of trees and shrubs to ground level allowing vigorous regrowth and a sustainable supply of timber for future generations.

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Bogbean *Menyanthes trifoliata* is used as a herbal remedy to treat rheumatism and skin complaints.

Target 13: Providing sustainable livelihoods dependent on plant resources

Ongoing actions contributing to meeting the target

There are few UK commitments relating to this target. If the UK is successful in achieving target 14, then it is likely that there will be a much greater appreciation of plant resources.

Lower priority or long-term additional work

- Watching brief to ensure that no plant resources become threatened through non-sustainable exploitation

The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.

Scope

Target 13 focuses explicitly on the status of plants used by, and important to, local people. Plant resources may be either domesticated or wild, and their products include the material (e.g. for food, medicines, firewood, ecological services), and the immaterial (e.g. aesthetic, cultural or spiritual). The link between local, rural people and local plants is reinforced by the target's reference to sustainable livelihoods – implying a right of access – and to the knowledge that helps underpin them. The target recognises the intricate relationship between biodiversity conservation and local sustainable use.

Current situation

In rural areas of the UK, subsistence dependence on plant resources is, at most, extremely rare. There are however (mostly part-time or seasonal) livelihoods exploiting them and selling products into the cash economy. Most UK plant resources utilised covered here are 'wild' (with or without management) and are themselves not under threat.

In England coppiced, broad-leaved woodlands are the prime habitat location for sustainable livelihoods. Coastal and freshwater wetlands have locally valued resources such as algae, reed (for thatching) and willows (for basketry). A new, direct exploitation of plant resources is the collecting of seeds for habitat creation or restoration. The collecting of edible fungi has expanded away from personal use to commercial levels (involving non-local people), although the scale is still minute compared with elsewhere in Europe. As yet, neither with fungi nor with other exploited plant resources in the UK is there decline through these commercially-driven activities alone; although there is concern over moss collection, which needs to be more carefully monitored.

Looking to the future

Unless precautionary principles dictate a cautionary view of the UK's future, some key components of target 13 will not have any (at least short-term) impact. For example, no one in the UK has a vested interest in managing and conserving local plant resources for food security, and the direct role of UK plants in healthcare is minute. Despite the growth of interest in natural or alternative therapies, very few people collect medicinal plants for their own purposes, and even fewer for commercial ones. But the pleasure given by plants in the landscape, and the health benefits (however immeasurable) of such contact with nature, are undeniable. Country agency strategies now recognise the correlation.



Plants once formed an integral part of society but due to social changes throughout the nineteenth and twentieth centuries some local knowledge and lore has been lost. In some parts traditions are however experiencing a renaissance. Hedge laying, and thatching are some of the old traditions which are still commonplace.

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Marsh samphire *Salicornia* spp has always been a local delicacy in Norfolk and has become more popular in restaurants in recent years.

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Target 14: Communicating and educating

Ongoing actions contributing to meeting the target

- Implementation of country biodiversity plans for education and awareness

High priority additional work

- Public launch to help promote this report as the UK response to the Global Strategy.

The importance of plant diversity and the need for its conservation incorporated into communication, educational and public awareness programmes.

Scope

“People conserve what they love, they love what they understand and they understand what they are taught”. Target 14 seeks to implement this old Sri Lankan proverb and influence communication, awareness and education programmes to help deliver the Global Strategy.

Current situation

The importance of education and raising public awareness about biodiversity in general is firmly established in the emerging country biodiversity strategies. Indeed public attitudes to biodiversity have been recently assessed in England:

- The proportion of people in England concerned about the loss of wildlife in the UK has risen from 38% in 1986 to 50% in 2001.
- Awareness of the term biodiversity has increased from 22% in 1996 to 26% in 2001.

The country strategies include a comprehensive set of targets to address awareness and education needs. Central to these strategies is the need to encourage contact with nature. Botanical societies, the Natural History Museum and the Wildlife Trusts are among many organisations that encourage people to have contact with and raise awareness about wild plants. The BSBI and Plantlife International have, for example, a joint project funded by the Heritage Lottery Fund called ‘Making it Count for People and Plants’. This is designed to encourage more people to get involved in plant recording by tailoring surveys to people with differing skills. In turn their understanding of plants and plant conservation improves. Moreover, high profile visitor attractions such as the botanic gardens at Edinburgh and Kew and The Eden Project are important resources which foster enthusiasm for plant conservation.

Looking to the future

People need to be aware of the importance of the Global Strategy and the UK response and encouraged to participate in its implementation. The consultation process to date has helped secure support, but a broader section of the community will need to be involved. Opportunities must be found to help promote this strategy through the popular press.



Many habitats still provoke reactions of awe, and proximity to nature has shown to speed-up recovery times in hospital patients.



Every year 3 million people visit the Eden Project in Cornwall. This is one of many attractions which is dedicated to education and raising awareness about the importance of wild plants.

Target 15: Training in plant conservation

Ongoing actions contributing to meeting the target

There is much ongoing work in this area that will help to deliver the target. Delivery of the biodiversity strategy targets will be key in achieving this challenge.

High priority additional work

- Improving communication between ecological practitioners, training organisations, and the voluntary and academic sectors to share best practice and experience
- Promoting training in whole plant biology at all educational levels, in particular this must deliver more people trained in field identification

Medium priority additional work

- Promoting careers in plant conservation

The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this strategy.

Scope

Target 15 aims to strengthen and co-ordinate human and technical resources, improving communication and knowledge management to advance the conservation and sustainable use of plants and their habitats. These goals will be achieved by prioritising research and training needs and by enhancing technical and scientific co-operation. 'Trained' people are defined as individuals possessing more than basic identification or other conservation-related skills; 'facilities' are any element of the infrastructure that aids those activities (not only analytical laboratories but also libraries and web-based tools); and 'conservation' is defined in a broad sense.

Current situation

The decline of systematic biology was addressed recently by the House of Lords Select Science and Technology Committee Inquiry into Biodiversity and Systematics. The Government has now submitted its response to the Committee's report, this includes its response to the nine recommendations made by the House of Lords to improve the contribution that systematics can make in the conservation of biological diversity.

An indication of the number of field botanists in the UK can be made by considering the learned societies: the British Mycological Society has c. 600 members, British Lichen Society 621, British Phycological Society 517, British Bryological Society 589, British Pteridological Society 652 and the Botanical Society of the British Isles 2,950. A good indication of the contribution these botanists make to plant conservation is that it is estimated that more than a quarter of a million hours of volunteer time was invested in the field work and production of the *New Atlas of the British & Irish Flora* published in 2002.

A strategy for teaching science in schools in England has been produced by the Department for Education and Skills but concern has been expressed regarding the limited emphasis on organismal biology in schools. One key area especially (and widely) adversely affected has been field studies; for example, only c. 10% of schools now include a fieldwork element in GCSE biology and related subjects. This reinforces the need expressed in target 14 to encourage contact with nature.

Looking to the future

One of the main drivers for achieving this target will be providing the capacity required to meet the other targets in the Strategy. For instance, target 1 will require taxonomists trained in plant, algal and fungal taxonomy; targets 2, 5, 6 and 7 will require workers with field identification skills to provide surveillance; and target 8



We need to ensure that enough people are trained to do the many jobs required to support implementation of the *Global Strategy for Plant Conservation* in the UK.

will require conservationists based in botanic gardens. One of the key challenges will be promoting the subject at all educational levels in order to ensure that sufficient people are entering plant conservation careers. This is particularly urgent as the need for field identification skills increases in connection with the fields of environmental assessments and enforcement of biodiversity legislation.

The action outlined in the Country Biodiversity Strategies needs therefore to be supported by efforts to cultivate the fundamental aspects of plant conservation such as identification skills and practical conservation experience. The Field Studies Council, The Workers' Educational Association (WEA), and academic institutes such as the University of Birmingham are among many organisations which offer courses or qualifications in field identification.



Target 16: Networking

Ongoing actions contributing to meeting the target

- Continuing to support networks which already exist

High priority additional work

- Amending work programmes of existing networks to address high priority activities outlined in this report

Networks for plant conservation activities established or strengthened at international, regional, and national levels.

Scope

Implementation of the Global Strategy targets will rely on the enthusiasm, expertise and commitment of a range of different people. The challenge is for these people, who work (or volunteer) for different organisations across the UK, to come together to share experiences and expertise and agree collaborative action. Target 16 acknowledges that co-operative action is usually more effective than independent action. Emphasis is therefore placed on the development of networks to deliver plant conservation priorities.

Current situation

There is no shortage of UK and international networks working for plant conservation in the UK (table 16.1 gives a flavour of the networks that exist). These range from networks of volunteers such as the vice-county recorders of the Botanical Society of the British Isles to the UK Biodiversity Partnership, the umbrella for organisations working to implement the Government's Biodiversity Action Plan.

Table 16.1 Examples of the range of networks that exist

Global	The World Botanic Gardens Congress provides a forum for the botanic gardens of the world to consider matters of mutual importance and concern, particularly related to the development and implementation of common policies, programmes and shared priorities.
European	Planta Europa is the network of organisations working for plant conservation in Europe.
UK	The Plant Conservation Working Group is the forum of the country nature conservation agencies which agrees and takes action for plant conservation priorities Plantlife Link is the forum of botanical societies and conservation organisations, who work on a co-ordinated approach to plant conservation in the UK. The Fungus Conservation Forum promotes and co-ordinates the conservation of fungi in the UK PlantNet, the national network of botanic gardens, arboreta and other documented plant collections, promotes botanical collections in Britain and Ireland as a national resource for research, conservation and education, and facilitates networking and training among holders of plant collections through a programme of conferences and workshops and a regular newsletter.



Analysis of existing networks suggests that groups exist to help progress most of the Global Strategy targets.

Looking to the future

Given that so many networks already exist, the challenge is to influence the work programmes of existing networks, rather than invest in creating new networks for their own sake. Equally, where possible, work programmes should not detract from the fundamental (and often more enjoyable work) of identifying, documenting and managing plants in the countryside. The best plant conservation is usually conducted in the field rather than in committee rooms!

All botanic gardens have a role to play in plant conservation. The University of Cambridge Botanic Garden is a member of PlantNet, an organisation that provides a network for all plant collections.

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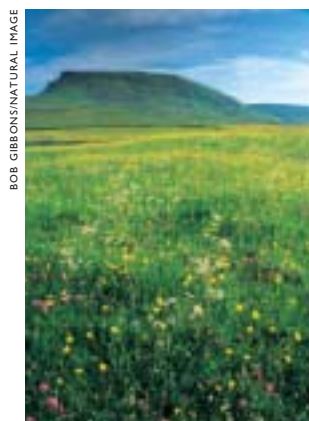


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Acronyms & Glossary

Acronyms

BAP	Biodiversity Action Plan
BGCI	Botanic Gardens Conservation International
BRAG	Biodiversity Research Advisory Group
BSBI	Botanical Society of the British Isles
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CCW	Countryside Council for Wales
CGIAR	Consultative Group of International Agricultural Research
CITES	Convention on International Trade in Endangered Species of Fauna and Flora
Defra	Department for Environment, Food and Rural Affairs
ECP/GR	European Cooperative Programme for Crop Genetic Resources Networks
EHS	Environment and Heritage Service, Northern Ireland
EN	English Nature
EUFORGEN	European Forest Genetic Resources Programme
FFI	Fauna & Flora International
HAP	Habitat Action Plan
IABG	International Association of Botanic Gardens
IPGRI	International Plant Genetic Resources Institute
IUCN	World Conservation Union
JNCC	Joint Nature Conservation Committee
NBN	National Biodiversity Network: the official Government-recognised node in the Global Biodiversity Information Facility
RBGE	Royal Botanic Garden Edinburgh
RBG, KEW	Royal Botanic Gardens, Kew
SAP	Species Action Plan
SNH	Scottish Natural Heritage
TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce
UNESCO	United Nations Educational, Scientific and Cultural Organization



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Glossary of terms used in the targets

Alien	the term is synonymous with non-native species (see below)
Casual	an alien which is present only as populations which fail to persist in the wild for periods of more than approximately five years, and such a species is therefore dependent on constant re-introduction
Establishment	occurs when an alien species in a new habitat successfully produces viable offspring with the likelihood of continued survival
Introduction	the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction
Invasive alien	an alien species whose introduction and/or spread threaten biological diversity. The term “invasive alien species” shall be deemed the same as “alien invasive species”
Local	this is used to describe activity at a sub-country level e.g. South West England
National	in the text of the Global Strategy targets, the term national refers to the UK as a whole; in text discussing baseline and existing commitments the term refers to the devolved administrations e.g. ‘National Biodiversity Strategies for Scotland, Northern Ireland and England’
Native species	a species, sub-species or lower taxon, occurring within, or extinct from, the range it occupies naturally or could occupy without direct or indirect introduction or care by humans
Non-native species	a species, subspecies or lower taxon, introduced outside its natural past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce
Production lands	lands where the primary purpose is agriculture (including horticulture), sport (e.g. grouse moors), or wood production
Regional	the term regional is taken to refer to biogeographical zones, for instance the Atlantic biogeographical zone, and is not taken to refer to political regions within the UK
Reintroductions	an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct
Socio-economically valuable plant species	non-crop species such as wild medicinal plants, inclusion of such species in actions will depend on national priorities
Sustainable use	the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations
Threatened species	include those which are classified as belonging to threatened categories by applying IUCN criteria at a national, regional or international level
World’s ecological regions	broad ecosystem types, for instance montane or coastal ecosystems

Appendix I

List of organisations contributing to target implementation

The organisations listed here indicated during the consultation that they had an interest in contributing to action in support of the Strategy. The list is not exhaustive; neither is it binding upon the organisations since action may be dependent upon resources being available (action to progress target 5 will help implement target 4; target 10 is currently subject to consultation).

TARGETS	1	2	3	5	6	7	8	9	11	12	13	14	15	16
Botanic Gardens Conservation International			Y				Y					Y	Y	Y
Botanical Society of the British Isles	Y	Y	Y	Y	Y	Y	Y		Y			Y	Y	Y
British Bryological Society	Y	Y		Y										Y
British Lichen Society	Y	Y		Y										Y
British Mycological Society	Y	Y		Y								Y	Y	Y
CABI	Y	Y	Y				Y						Y	
Countryside Council for Wales	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	Y	
English Nature	Y	Y	Y	Y	Y	Y	Y							
Environment Agency			Y	Y						Y				
Flora locale			Y		Y				Y	Y		Y		Y
Joint Nature Conservation Committee	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y			Y
Natural History Museum	Y	Y	Y	Y							Y	Y	Y	Y
National Biodiversity Trust and National Biodiversity Network	Y		Y								Y	Y	Y	Y
Plantlife International		Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y
PlantNet			Y				Y					Y	Y	Y
Plant Talk												Y	Y	Y
Royal Botanic Garden Edinburgh	Y	Y	Y	Y		Y	Y					Y	Y	Y
Royal Botanic Gardens, Kew	Y	Y	Y	Y		Y	Y	Y	Y			Y	Y	Y
Royal Horticultural Society			Y				Y	Y		Y		Y		Y
Scottish Natural Heritage	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y
University of Birmingham			Y					Y						
Woodland Trust and Ancient Tree Forum				Y	Y									

Appendix 2

The Policy and Legislative Framework for Plant Conservation in the UK

GLOBAL

- **The Convention on Biological Diversity (CBD)** was adopted in May 1992. UNCED 1992 Convention on Biological Diversity <http://www.biodiv.org/>. Biodiversity includes diversity within species, between species and of ecosystems. The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the equitable sharing of benefits arising from the use of genetic resources.
- **The Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture** was adopted by 150 countries at the International Technical Conference on Plant Genetic Resources (Leipzig, 1996). It contains 20 priority activities grouped in four theme areas: *In situ* conservation and development; *Ex situ* conservation; Use of Plant Genetic Resources; Institution and capacity building. <http://www.fao.org/ag/agp/>
- **The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)** 1973, seeks to prevent commercial trade in species which are in danger of extinction. Species covered by the convention are listed in three appendices, and each appendix has a different level of trade restriction. <http://www.cites.org/>
- **The World Heritage Convention** 1972 allows sites of outstanding cultural and/or natural value to be designated as **World Heritage Sites** and promotes international co-operation for safeguarding these areas. <http://www.unesco.org/>
- **The Convention on Wetlands of International Importance** 1971 (commonly known as **The Ramsar Convention**) is an intergovernmental treaty, which provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. Under the Convention, wetlands of international importance are designated as Ramsar sites and the sustainable use of wetlands is promoted. The Ramsar Convention provides a tool to help the protection of wetland plant species. <http://ramsar.org/>
- **UNESCO Man and the Biosphere programme (MAB)** 1970s. Biosphere reserves are designated as representative international examples of habitats and ecosystems where practical management and research can be undertaken, with a focus on information exchange between all stakeholders. <http://www.unesco.org/mab/>

EUROPEAN

- **The Convention on the Conservation of European Wildlife and Natural Habitats 1982 (commonly known as the Bern Convention)** requires member states of the Council of Europe to ensure the conservation of wild fauna and flora species and their habitats. Special attention is given to endangered and vulnerable species listed in appendices. Appendix 1 lists all the Strictly Protected Flora Species. The Standing Committee of the Bern Convention continues to adopt resolutions and associated recommendations that support and underpin the articles of the convention. <http://www.ecnc.nl/doc/europe/legislat/bernconv.html>
- **The Habitats and Species Directive (EC Directive 92/43/EEC on the conservation of natural habitats of wild fauna and flora)** is a legislative



Plantlife International's 2003 *Bluebells for Britain* survey involved thousands of people across the UK. Here, a staff member from Plantlife International helps a girl to identify the key features of the native bluebell.



Sympathetic management of land and the co-operation of land owners is vital to ensuring many of our most important plant habitats and species are protected.

instrument whose main focus to date has been the requirement of EC member states to set up a coherent ecological network of **Special Areas of Conservation (SACs)** that will, with Special Protection Areas (SPAs) designated under the Birds Directive, become the **Natura 2000 network**. SAC selection is based on the presence of species and habitats of European importance that are listed in the Directive's annexes. Annex I lists the habitat types and Annex IIb lists the plant species that qualify sites for SAC designation (in the UK 13 plant species are listed). Once designated, SACs are required to be adequately protected and managed to maintain and improve their nature conservation value. The Directive also makes provision for the protection of listed species outside of designated SACs. http://europa.eu.int/eur-lex/en/lif/dat/1992/en_392L0043.html

- **The Pan-European Biodiversity and Landscape Strategy (PEBLDS) 1995** provides a framework for strengthening and building on existing initiatives and programmes, drawn up as a Pan-European response to the CBD.

<http://www.nature.coe.int/english/cadres/biodiv.htm>

A significant project for plant conservation developed under PEBLDS is the establishment of a **Pan-European Ecological Network (PEEN)** consisting of core conservation areas, ecological corridors, buffer zones and restoration areas. http://www.strategyguide.org/at1/at1_inde.html

- **The European Community Biodiversity Strategy** was launched in 2001 and provides the framework for developing Community policies and instruments in order to comply with the CBD. The Strategy therefore aims to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at the source and is divided into eight policy areas with objectives on how this can be achieved. EC Biodiversity Action Plans have been developed for four sectoral policies; Conservation of Natural Resources, Agriculture, Fisheries, and Development and Economic Co-operation. <http://biodiversity-chm.eea.eu.int/>

UNITED KINGDOM

- All plants are given some protection under United Kingdom law. In Great Britain the legal foundation for conservation of wild plants is the **Wildlife and Countryside Act (1981)**, and in Northern Ireland the **Wildlife (Northern Ireland) Order (1985)**. These laws have been strengthened in England and Wales through the **Countryside and Rights of Way Act (2000)**, in Northern Ireland through the **Environment (Northern Ireland) Order (2000)**, and the Scottish Executive has consulted on new laws through the **draft Nature Conservation (Scotland) Bill**.
- **The UK Biodiversity Action Plan (1994)** was the UK's response to the CBD. This was the background to the production of action plans for 45 threatened habitats and 391 threatened species including 220 plant and fungus species (www.ukbap.org.uk). Plans for further action are outlined in country biodiversity strategies (DEFRA, 2002; Scottish Biodiversity Forum, 2003; Environment and Heritage Service, 2002). <http://www.ukbap.org.uk/>

Appendix 3

Lead Institutions for global implementation of the Global Strategy for Plant Conservation

A 'flexible coordination mechanism' has been established to facilitate and promote implementation and monitoring of the Global Strategy. This is co-ordinated by a liaison group comprising relevant international and national organizations which have agreed to take a lead in facilitating implementation of the targets (see table A3.1). It is proposed that the UNEP World Conservation Monitoring Centre be invited to support the Executive Secretary to the CBD in monitoring implementation of the Strategy, working in collaboration with the global partnership for plant conservation.

Table A3.1 The Lead Institutions nominated to co-ordinate implementation of the Global Targets

TARGET	LEAD INSTITUTION
1. A widely accessible working list of plant species, as a step towards a complete world flora	Royal Botanic Gardens, Kew
2. A preliminary assessment of the conservation status of all known plant species, at a national, regional and international level	IUCN – The World Conservation Union
3. Development of models with protocols for plant conservation and sustainable use, based on research and practical experience	Cross-cutting target: no lead
4. At least 10 per cent of each of the world's ecological regions effectively conserved	World Wide Fund for Nature
5. Protection of 50 per cent of the most important areas for plant diversity assured	Plantlife International and IUCN
6. At least 30 per cent of production lands managed consistent with the conservation of plant diversity	Food and Agriculture Organisation and International Plant Genetics Resources Institute
7. 60 per cent of the world's threatened species conserved <i>in situ</i>	UNEP – World Conservation Monitoring Centre
8. 60 per cent of threatened plant species in accessible <i>ex situ</i> collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes	Botanic Gardens Conservation International and IPGRI
9. 70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated local and indigenous knowledge maintained	FAO and IPGRI
10. Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems	Global Invasive Species Programme
11. No species of wild flora endangered by international trade	Convention on International Trade in Endangered Species
12. 30 per cent of plant-based products derived from sources that are sustainably managed	FAO and IPGRI
13. The decline of plant resources, and associated local and indigenous knowledge, innovations and practices, that support sustainable livelihoods, local food security and health care, halted	FAO, IPGRI and People and Plants International
14. The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programs	Botanic Gardens Conservation International
15. The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this strategy	Cross-cutting target: no lead
16. Networks for plant conservation activities established or strengthened at national, regional and international levels	Cross-cutting target: no lead