

Action plan for conservation of plants in cultivation



Guide to terms and abbreviations

ABS Access to Genetic Resources & Benefit Sharing.

AGM RHS Award of Garden Merit.

BG-BASE is a database application designed to manage information on biological (primarily botanical) collections. It is used by a wide variety of botanic gardens, arboreta, herbaria, zoos, universities etc. including the RHS.

BGCI Botanic Gardens Conservation International.

BGEN Botanic Gardens Education Network.

CBD Convention on Biological Diversity (1992: entered into force 29th December 1993).

CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973).

Clone A plant that is perpetuated solely by vegetative propagation so that all individuals are genetically identical.

COTES Control of Trade in Endangered Species.

Cryopreservation Storage of plant genetic material in liquid nitrogen means it can be kept for decades without regrowing the plant.

Cryptic hybrid A hybrid sharing many of the morphological features of one parent, so that it is not readily recognised visually and often only detected using biochemical or molecular methods.

Cultivar A plant with one or more stable and distinctive features or characteristics that has arisen in cultivation or has been selected from wild material and differs from the type.

DEFRA UK Department for Environment, Food and Rural Affairs.

Demeter software for recording plants in gardens developed by the NCCPG to help its National Plant Collection holders to document information about their National Plant Collections.

Ex situ [Of plant material] grown or held somewhere other than the natural habitat within the country of origin.

Genotype Part of the range of variation of a species or a natural population characterised by a distinct and unique genetic pattern.

Grex A group of hybrid cultivars, defined solely by parentage. Grex parents may be species or another grex. The term is only now used for orchids. The plural is greges, but more usually in horticulture, grexes.

GSPC Global Strategy for Plant Conservation.

Herbarium Place of deposition of permanently preserved plant material for reference in naming plants and for research.

HTA The Horticultural Trades Association.

Hyperdiverse A group of plants (or any organisms) that show an unusually high level of speciation or differentiation into taxa.

ICRA International Cultivar Registration Authority.

International Cultivar Register A list, as near complete as possible, of all the named cultivars of a particular group of plants with at least the date of introduction or registration and the registrant, where known. The Register is the responsibility of an ICRA (q.v.).

In situ [Of plant material] grown in the natural habitat within the country of origin.

IPEN International Plant Exchange Network.

IPR Intellectual Property Rights.

MTA Material Transfer Agreement.

NCCPG The National Council for the Conservation of Plants and Gardens.

Nomenclatural Standard A permanently preserved specimen or illustration, photograph or image, to which the name of a cultivar is attached and serves as an authoritative reference to interpret that name.

NT The National Trust.

PBR Plant Breeders' Rights.

PIC Prior Informed Consent.

Portal An internet site that acts as an entrance to related websites so that a search for information can be carried out without having to visit each of the websites separately.

RBGE Royal Botanic Gardens, Edinburgh.

RBGK Royal Botanic Gardens, Kew.

Red Data Book A list of wild plants for a particular region or taxonomic group whose continued existence is considered to be threatened, usually with an assessment of the degree of threat.

RHS The Royal Horticultural Society.

SSSI Site of Special Scientific Interest.

Taxon A unit of classification (genus, species, variety &c.); plural, taxa.

Cosmos *atrosanguineus*



RHS Herbarium

William Thompson, the founder of Thompson and Morgan Seed Merchants, first brought this tuberous rooted half-hardy perennial to Britain in 1835. Although it received an Award of Garden Merit from the RHS in 1938, and despite velvet maroon flowers with the distinctive chocolate perfume it disappeared from gardens. Living stock had been preserved at the Royal Botanic Gardens, Kew since the 1970s and during the 1990s material was micropropagated and cryogenically preserved. Until recently *Cosmos atrosanguineus* was thought to be extinct in the wild and Kew's material was repatriated to Mexico to attempt reintroduction. However, the present gene pool in cultivation only derives from one or two introductions and as cross-pollination is required to produce viable seeds it was not certain whether the reintroduction programme would be successful.

All is not lost, though, since from New Zealand has come the first instance of a self-fertile clone, registered for Plant Breeders Rights in New Zealand as 'Pinot Noir'. Plants have also more recently been rediscovered in the wild.

Cosmos is easily propagated by basal stem cuttings or dividing the tubers and is now a very popular garden plant, currently listed in the *RHS Plant Finder* by 59 nurseries.

Cosmos atrosanguineus, from a painting by Dorothy B Martin in 1938, part of the painting collection of the RHS Herbarium

Preface

In 1978 the Royal Horticultural Society (RHS) held a conference on the *Practical Role of Gardens in the Conservation of Rare and Threatened Plants*. Out of that conference was born the National Council for the Conservation of Plants and Gardens (NCCPG), an organisation that has gone from strength to strength in the succeeding years. The work of the NCCPG, so much of which depends on the willing contributions of volunteers, has shown how much can be achieved and, indeed, the model has been adopted by other countries. The NCCPG and the RHS felt that it was an opportune moment to review these achievements and to set the agenda for the medium term. In April 2006, the two organisations held the Growing Heritage Conference, and in the course of which this Action Plan was agreed.

However, in a world with ever increasing demands on people's time and money, it could be asked why we should put resources into conserving ornamental cultivated plants when there are so many other deserving causes. Moreover, is it so critical to maintain plants, some of which have been surpassed by more recent breeding and selection or lack the qualities that would make them first class plants for gardens today? The answer can be summed up in the word "Heritage": without such conservation efforts, accurate replanting of old gardens would not be possible; nor could we go back to older genotypes to recover attributes – such as scent, disease resistance or a particular colour – that have been lost in subsequent breeding programmes. And tastes in plants do change, as do fashions in gardening styles, often associated with an upsurge in interest in gardens and garden plants of the past. Heritage also means the wealth of cultural and historical connections that plants have with particular regions or communities that need to be recorded before they are lost. Finally, we must not overlook the need to maintain a diversity of garden plants adapted to our climate and conditions, or to new conditions in a period of climate change, in the face of increasing uniformity found in plant centre "chain stores". Each of these aspects contributes in a real way to improving the quality of life for the ordinary gardener.

The international and national context for plant conservation has changed dramatically since the coming into force of the Convention on Biological Diversity (CBD) in 1993 and the tightening of regulations on the trade in endangered species (CITES). A failure to recognise this and respond constructively will lead to stricter control of the movement of plant material as countries seek, quite understandably, to protect their resources and to gain benefits from them should those plants be found to have a wider value. But gardeners, nurserymen and plant enthusiasts cannot easily call on the machinery of state to provide the support they need to continue the valuable flow of new plants into our gardens. Any solutions to responsible and sustainable plant introduction must allow for this and provide the means for all involved to meet these goals. Further, gardeners and horticulturists have a vital role to play in the *ex situ* conservation of plants from around the world by growing and researching them. Not to put too fine a point on it: everyone from the large institutions to the individual gardener will benefit if the "good practices" that need to be encouraged and more widely adopted are achievable and supported by the horticultural community as a whole.

This Action Plan sets out the factors that affect cultivated ornamental plant conservation, which are in many respects the same as those that affect plant conservation as a whole. The future of cultivated plant conservation depends upon all of us, through partnerships and collaboration, and cannot be carried out by one organisation alone.

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OBJECTIVE 1 Knowledge

Make information about our plants more accessible ...



E Hagar-Alexander

The rapid growth and increased sophistication of technology over the past 20 years makes it possible to gather and connect information about garden plants that was inconceivable in the past. We have the means now to spread that knowledge and make it available to wider and different audiences. The UK has one of the most diverse garden floras in the world: it is vital that we do more to document and record it before further information is irretrievably lost. It is also an essential element of any conservation programme – either of wild species in cultivation or of plants raised and selected in horticulture.

Leucanthemum × superbum 'Fiona Coghill'

OBJECTIVE 2 Education

Make people more aware of the importance of cultivated plants ...



RHS Herbarium

There is no doubt that the general level of awareness about the need to protect and conserve the world's animals and plants has increased as the threat to the planet due to the loss of biodiversity is better appreciated. Cultivated plants can become extinct too: sometimes because better plants are developed but also because certain kinds of plants go through phases of being unfashionable. These plants may well have qualities that would be desirable for breeding further new plants one day – if they have gone, then these qualities are also lost.

Narcissus 'Varna', from a painting by Mrs Dykes in 1933, part of the painting collection of the RHS Herbarium

OBJECTIVE 3

Strategy

Raise the profile of horticulture where it matters...



Dr R.J.R. Vanderplank, National Plant Collection Holder, *Passiflora*

There are a great many positive aspects about gardening and horticulture in the UK, derived largely from an enormous public enthusiasm and interest. However, the decline in funding for horticultural science, the changing global environment and the introduction of legislation that affects plant collecting and trade are areas of great concern. Horticultural interests have not been well represented in discussions relating to the Convention on Biological Diversity (CBD) either at Government level or internationally. There is a need for all those concerned with horticulture and the introduction of new garden plants in particular, to work more closely together to raise the profile of cultivated plant conservation.

Passiflora cuneata 'Miguel Molinari'

OBJECTIVE 4

Enhancing diversity

Help to bring in new plants to cultivation...



Alistair Griffiths / Eden Project

The impressive diversity of plants in our gardens is, directly or indirectly, the product of introductions of wild plants from all over the world. The recognition that a country has ownership of and the right to benefit from its biodiversity, enshrined in the Convention on Biological Diversity (CBD) to which most countries in the world are signatories, has had important consequences for horticulture. Although the introduction of new plants has not entirely ceased, further plant collecting should be carried out responsibly, in accordance with the CBD. To achieve this, understanding of the CBD must improve and ways of returning benefits to source countries promoted. We need to assess the genetic diversity of plants already growing in the UK, known to have come from another country, so that we can assist source countries with their own conservation programmes.

Impatiens 'Ray of Hope'

OBJECTIVE 5

Best practice

And look after those we have already...



Janet Cubey / RHS Botany

Gardeners in the UK and elsewhere are constantly producing and selecting new forms of cultivated plants but, over time, some of these have been lost or are no longer available. For instance, just 6% of the cultivars listed in the *International Daffodil Register* are available in the UK as indicated in the *RHS Plant Finder 2007–2008*. A similar figure would be found for most plant groups where we have this information. The NCCPG has, since its inception, been working to conserve plants in cultivation that are threatened, particularly through its National Plant Collections®, but there are still gaps and there is a need to establish how threatened many cultivated plants are. There is also an urgent requirement to improve the conservation management of plants in cultivation to ensure the purity of stock, to increase the genetic diversity of species in cultivation, and to be more aware of the heritage value of certain elements of that diversity.

Araucaria araucana

OBJECTIVE 1

KNOWLEDGE

To decide how best to bring together, augment and disseminate more widely existing information and knowledge of cultivated plants – creating an essential resource for the future.

A succession policy for knowledge

Background

The growth of affordable personal computer systems since the 1980s and the development of the Internet in the 1990s have provided both individuals and organisations with the tools to record their cultivated plant knowledge and make it widely available; yet many excellent initiatives still remain largely undiscovered by the community. Recently, the phenomenal growth of social networking sites has encouraged people of all ages and abilities to search out their local plant heritage and share their personal gardening experiences. We need to be sure that further stories, distributed amongst gardeners, are also captured before they are lost, and made accessible to others – every plant has a story to tell.

Although the Internet can provide instant access to much of this information through the major search engines, increasingly the end user is faced with a barrage of unsorted and often contradictory information. What is needed are mechanisms to unify, and where necessary moderate, the information providing a consensus view to the user in a useful way. Only by having co-ordinated information on cultivated plants in the UK can conservation gaps be identified, threats fully assessed and duplication of efforts avoided.

Strategy

- Establish on the Internet a “knowledge gateway” as the “first stop for gardeners”, linking together all existing sources of cultivated plant information:
 - a start with one small pilot group of plants, using a focus group to confirm the viability and explore the potential

- b provide links to known authoritative sources of knowledge, such as: botanical gardens, the RHS, the National Trust, National Plant Collection Holders, BGCI, individual genus specialists
- c promote the acquisition of new data, by linking to further authoritative databases – particularly those currently less well known or established.
- Continue to develop a comprehensive list of names for cultivated plants based on the *RHS Plant Finder* and the International Cultivar Registers, taking active steps to include currently under-represented groups of plants such as: cacti & succulents, orchids, vegetables, annuals and other plants mainly distributed by seed.
- Promote best practice in recording of information about cultivated plants, including: their origin, breeder, cultivation requirements, folklore & cultural associations, derivation of name.
- Identify sources of written information (e.g. nursery catalogues) that may be held in archives in the horticultural community. Where possible take steps to digitise information or otherwise highlight the need to protect rare or valuable printed material.

- Consolidate existing knowledge of plant collectors and collecting expeditions into a website and encourage the horticultural community to fill the gaps in its coverage.

Key Actions

- RHS to identify key stakeholders for the portal project and form a small working party, initially to identify requirements for the pilot study.
- RHS to broaden the coverage of its authoritative cultivated plant names list.
- Develop standards for recording information about cultivated plants.
- RHS/RBGE to collate and make available their information on plant collectors and their abbreviations.
- Look to secure funding for data-basing nursery catalogue holdings.

Examples of valuable plant information include:

- acquisition
- cultivation and propagation histories
- breeding programmes and origins
- name derivation
- the significance of cultivated plants in:
 - history
 - culture
 - art
 - architecture
 - clothing
 - cosmetics
 - medicine

RIGHT: *Leucanthemum* × *superbum* 'Fiona Coghill'

TOP RIGHT: Nursery Catalogues: Carters 1934, Carters Blue Book Coronation Edition 1937, Karl Foerster 1964 and Hardy's Cottage Garden 2005

FAR RIGHT: *RHS Plant Finder* (1987–2007)

Leucanthemum × *superbum* 'Fiona Coghill'

Whilst undertaking research for her National Plant Collection of *Leucanthemum* × *superbum*, Lady Etain Hagart-Alexander of Mauchline, Ayrshire, became particularly interested in a cultivar by the name of 'Fiona Coghill'. The plant had originally been raised nearby in Kilmacollm, Ayrshire, by a Mr Jimmy Whittock, School Caretaker of the Kilmacollm Primary School and named after his granddaughter. The catalogue description of "large, fully double flowers" did not help much with identification, but further details describing "the whiteness of the petals accented by the small, greenish centre" did distinguish the flower as being unusual.

Further enquiries around Scotland to find this cultivar were unsuccessful, so Lady Etain continued her enquiries in Ireland, where Slieve Donard Nursery had first marketed the plant in the 1960s. Eventually, Reg Maxwell of Belfast Botanic Garden (and Area Co-ordinator for the NCCPG) made contact with Philip Woods, who had been in charge of the propagation of 'Fiona Coghill', whilst working for Slieve Donard. Attracted by the plant, Philip had grown it in his own garden and, as a result, nearly seven years after starting on her quest, an offset was obtained from Philip by Lady Etain to grow on in her National Plant Collection.

Now this cultivar is commercially available once more and listed by in the *RHS Plant Finder*.



E Hagart-Alexander



Janet Culbey / RHS Botany

Nursery catalogues

For many years nursery catalogues have been enthusiastically read by gardeners during the long winter nights. Yet increasingly, nurseries are only publishing their catalogues online. Nursery catalogues are an invaluable source of information, so it is important to archive them and to record information from them, regardless of whether they are paper or electronic.



Mike Grant / RHS Publications

20 years of the *Plant Finder*

As well as its traditional use as a directory for the avid plant collector the *Plant Finder* is routinely used by gardeners and plantsmen alike to check the spelling and validity of plant names, and garden writers look to it as a barometer of plant fashion.

OBJECTIVE 2

EDUCATION

To determine the resources and activities required for further increasing public awareness of the role of gardens and gardeners in the conservation of plants.

Our cultivated plant heritage matters

Background

Public perception of conservation issues tends to be focused on animals and wild plants. Most effort and emotion is directed to mammal conservation. The majority of plant conservation work is channelled towards *in situ* conservation of wild plants (e.g. bluebells, orchids, the tropical rainforest), both in the UK and worldwide. Although there is growing awareness of the need to preserve varieties of food crops, crop wild relatives and land races, this is slow in extending to ornamental plants.

There is insufficient awareness of the importance of cultivated plants, the role of gardeners in the conservation of plants and their accompanying skills and knowledge. There is little understanding that if a plant disappears from the *RHS Plant Finder* and does not reappear, it may be in danger of extinction. The NCCPG is not a campaigning body and the low level of awareness of National Plant Collections means that the importance of conserving cultivated plants is often overlooked.

People's main exposure to cultivated plant conservation will be through gardens. There is little information on conservation offered by the gardening-orientated media, although there is always interest in particular genera (e.g. hostas) especially rare ones.

Strategy

- Explore public perception of conservation, and how to communicate our message successfully to a variety of audiences.
- Identify and develop stories to convey key messages about conservation and use to widen understanding, engage imagination and promote plant conservation.
- Build on existing conservation initiatives to enhance awareness of cultivated plant conservation.
- Establish the heritage status of plants. Include those associated with collectors, in famous places, with cultural or historic value or with medicinal uses.
- Increase the profile of National Plant Collections, and people's appreciation of the value of a garden, the individual plants within it and those who care for them.

A display of diversity in a garden population of *Cyclamen coum* at RHS Garden, Wisley. Cyclamen are popular garden plants with a conservation message.



Mike Sleigh / RHS

Key Actions

- Target the listed groups with conservation messages appropriate and inclusive to each audience.
- The NCCPG to research and develop a series of key stories about heritage and cultivated plants for use by all to raise awareness with the public and other audiences.
- Explore the possibility of enhancing the coverage of conservation within the formal education structure, thus engaging younger people.
- Work with examining boards, colleges and universities to make cultivated plant conservation a theme within horticultural qualifications.
- Initiate a national campaign (such as “National Tree Week”, “Back from the Brink”) by developing a conservation activity to promote through major gardening events.

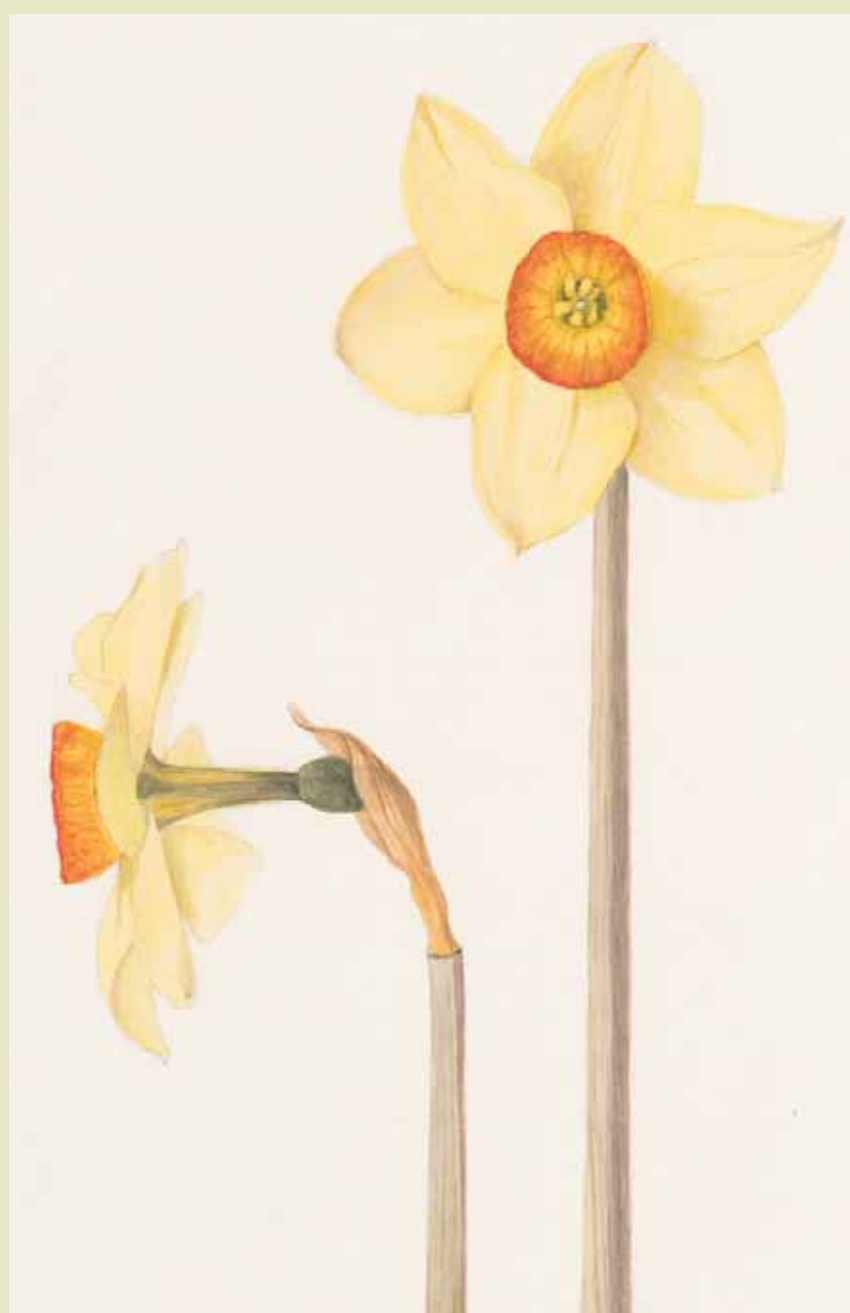
Audiences include:

- Gardeners
- Professional horticulturists
- Botanists and conservationists
- Horticultural trade
- Students (primary, secondary, further and higher education)
- Media, policy makers, investors and fundraisers

Narcissus ‘Varna’

Daffodils did not become popular garden plants until the end of the nineteenth century. Those grown today are very largely products of the 20th century. By 1880 the nurseryman Peter Barr grew about 500 varieties; by 1907 the RHS published a list of 1400 names, and the new edition of the Daffodil Register currently in preparation is expected to contain some 24,000!

This explosion of variety is largely the result of painstaking hybridisation carried out by a relatively small number of enthusiasts. One of the greatest of these was Major Ian Brodie of Brodie, the 24th laird. Between 1899 and 1942 – the year before he died – Brodie raised tens of thousands of seedlings in the walled garden at Brodie Castle. His daffodil breeding programme was conducted with military precision; his collection was planted in regular, well



RHS Herbarium

Narcissus ‘Varna’, from a painting by Mrs Dykes in 1933, part of the painting collection of the RHS Herbarium.

OBJECTIVE 2 EDUCATION

labelled lines; each cross made was recorded meticulously in a notebook, often with notes on the weather that day, and the resulting seed-set and number of seedlings raised were later added. He set exacting standards; he used hundreds of cultivars as parents down the years and his records show that many of the progeny swiftly fell by the wayside if they did not come up to scratch. Over a half century, he deemed only some 370 of the seedlings he raised as being worthy of naming, though a further 70 were named by nurserymen or fellow enthusiasts to whom he had passed on numbered stocks. Only a handful of “Brodies” have remained in commerce; ‘Coverack Perfection’, ‘Hexameter’, ‘Samaria’, ‘Swansdown’, ‘Tain’ and ‘White Butterfly’, and possibly ‘Kilmorack’. Indeed it is likely that some of the Brodie cultivars were never distributed commercially, and so are now extinct.

By the time the National Trust for Scotland acquired Brodie Castle in 1978 sadly only a small number of the daffodils could be recognised with any certainty within the grounds. However, searches over the past 20 years have uncovered about 100 stocks, and they are still coming to light – some from as far as Australia and the United States. It is thought that some may still survive in the UK, having been planted for sentimental reasons because of their names: ‘Cameronian’, ‘Gallipoli’, ‘Lovat Scout’ or ‘Sulva’ for example in an old soldier’s garden; ‘Aida’, ‘Mozart’ or ‘Musician’ in a musicologists; and ‘Helston’, ‘Penzance’, ‘Perth’ or ‘Windsor’ may still exist in these places.

Daffodils have the advantage, compared to many garden plants, that they can persist despite neglect. Therefore it may be enough simply to have an old planting list of cultivars to be able to relocate

missing ones. For example, ‘Silver Salver’, was found by simply searching through a large collection where, in about 1956, it had once been recorded as growing.

The Brodie Daffodils have been sent to other National Trust gardens and some stocks, that can be confidently named, have bulked up enough to allow them to be sold to visitors to Brodie Castle. Each sale includes a certificate, part of which is a return slip by which the purchaser can register that they have a particular stock. This way a dispersed collection is being registered which should help to ensure that the Brodie cultivars should never again face being lost.

(From text written by Duncan Donald, while he was Head of Gardens at the National Trust for Scotland, holder of the National Plant Collection of *Narcissus* – Brodie cultivars).



Paul Upward / RHS

Pupils from Amherst School in the Teaching Garden, RHS Wisley.

OBJECTIVE 3

STRATEGY

To agree strategies to engage with decision-makers to enhance support for cultivated plant conservation.

Greater support for cultivated plant conservation

Background

The UK has a long history of horticultural skill and enthusiasm. We benefit from an environment in which a wide range of plants are grown by amateurs and professionals. Many of the most important horticultural groups are based on volunteer support and funded by private donations or grant support. There are also committed and well-established organisations such as the botanic gardens, the National Trust, the RHS and the NCCPG. Several of the most important resources such as *The Plant Finder* have originated in voluntary organisations and made the transition to more professional status. The quality of horticultural media and publishing is high, and it is a popular subject area.

However, core-funding for horticultural organisations is hard to find, leading to a increasing loss of expertise particularly in specialist areas such as propagation, botany and taxonomy. While the NCCPG has successfully established over 650 National Plant Collections, these are not secure and there is no formal recognition of their status. These collections have a clear role in plant conservation, both of cultivars and *ex situ* conservation of wild species. However, there is no objective evidence of their conservation value as few data are available about the levels of genetic diversity within the collections.

A joint approach between horticultural organisations to policy is essential. There is currently little communication between the horticultural trade and the more academic areas, such as botanic gardens. There also is a lack of understanding by ordinary gardeners of how they can, and do, contribute to cultivated plant conservation.

Gardeners can sometimes also be viewed from a negative standpoint as being complicit in introducing invasive plants and wasting water.

Strategy

- Use the Global Strategy for Plant Conservation, and other policy initiatives, to focus and drive joined up action from those organisations with a direct or indirect interest in cultivated plant conservation. Involve, and communicate with the appropriate Government Departments.
- Explore the possibilities of a government-sanctioned, national system of designation (akin to SSSIs or listed buildings) for National Plant Collections with taxonomic, cultural, heritage or social significance.
- Build long-term partnerships within the public and private sector to promote plant conservation and secure the long-term future of the National Plant Collections.
- Address the current issues affecting cultivated plant conservation (invasive alien plant species, water restrictions, withdrawal of pesticides, lack of resources, lack of understanding) and work towards publicising current successes and possible future solutions. Utilise the collections in explaining how these challenges affect our communities and the wider world.
- Recognise and work to alleviate the future pressures on plant conservation (climate change, CBD, ABS, urbanisation, change in farming practice, and pressure on land use) and promote the importance of cultivated plants in terms of the environment and quality of life.

Key Actions

- Create succession plans to identify and safeguard the skills specific to the curation of cultivated plant resources.
- Establish measurable targets indicative of the direction of policy and help engage and inform other bodies; setting targets that are consistent with the wider objectives of the organisations involved.
- Set up pilot projects to establish what is held in gardens, specifically in terms of genetic diversity.
- In partnership with the relevant institutions, ensure that horticultural issues are considered in future policy development – at local, national and international levels.
- Seek support and collaboration to deliver the Key Actions of this Plan; linking in with organisational planning and budgetary processes.

Passiflora cuneata 'Miguel Molinari'

While this species is a native of Venezuela and Columbia, a local geographical variant of it, from the state of Merida in Venezuela, is named as 'Miguel Molinari'. Dr Miguel Molinari, who has studied *Passiflora* in Venezuela, found this form and collected the seed to conserve it. As a result of fire and developers, this variant became extinct in the wild shortly afterwards. However,

due to Dr Molinari's foresight it was possible to distribute seed and it is now maintained in the National Plant Collection of *Passiflora* by John Vanderplank. It has also been distributed to other collections and so the possibility exists that material can be reintroduced to the wild in the future. Its maintenance in cultivation depends upon well curated living collections to ensure the genetic purity of the stock and the continuation of support for such collections.



Dr R J R Vanderplank, National Plant Collection Holder, *Passiflora*



Carl Denton

TOP: *Passiflora cuneata* 'Miguel Molinari'.

MIDDLE: *Trillium chloropetalum* 'Val Mulvihill'. A new colour break of *Trillium chloropetalum* discovered in a garden in New Zealand and unknown in the wild.

BOTTOM: Growing Heritage conference. One of the break-out sessions at the Conference, debating Objective 2 – Education, led by Gail Bromley, RBG Kew, April 2006.



NCCPG

OBJECTIVE 4

ENHANCING DIVERSITY

To define concerns and establish how private collectors and commercial growers might be assisted to enhance the pool of plants available for cultivation within the changing regulatory climate.

New plants coming into the UK – working within regulations

Background

The native flora of northern Europe is naturally low in diversity because of glaciation and isolation. The garden flora of this region has been supplemented by introducing plants that are then developed and diversified by hybridisation and selection. For the countries from which these plants originate there are numerous, sometimes unacknowledged, benefits. These include not only the obvious value of *ex situ* conservation of genetic diversity but also, for instance, the thriving industry in plant and garden-inspired tourism.

The implementation of the Convention on Biological Diversity has changed perceptions and, to some extent, governs the introduction of new plants and therefore approaches to plant-collecting are changing. The CBD is a complex policy framework and the principles are still evolving, along with different interpretations and different rates of national implementation. As such it has yet to find force in law in many countries. Some countries do not yet have national bodies set up to receive or process requests to collect plant material, and UK horticulturists often do not understand the application process. Therefore there are practical difficulties in organising access to genetic resources and benefit sharing. Some *ad hoc* arrangements to share benefits are being put in place and therefore some models for the future are emerging but there is concern from the horticultural trade that these do not yet address the core of the problem. As the commercial yield on new introductions is usually very small, other benefits need to be identified.

The evolving regime has, to date, had unfortunate consequences in forming a gulf between the scientific institutions and the horticulture trade in the UK. There has been a reduction in the exchange of plant material due to the implications of Prior Informed Consent (PIC), the need for Material Transfer Agreements (MTAs) and where botanical gardens are uncertain about the origin of nursery plants, they will not risk accepting them.

It is acknowledged that there is some material in cultivation in the UK and across Europe, collected after 1993, for which no explicit permission to collect is recorded. As a result collectors, growers and nurseries are increasingly concerned about the implications of supplying full collection information for their plants and, as a consequence, vital conservation data are being lost.

Trends in the protection of Intellectual Property Rights (IPR) will have implications for cultivated plant conservation that have yet to be appraised (e.g. Plant Breeders' Rights). CITES is another important regulatory instrument which has worked well in support of plant conservation. Further refinement of characterisation of wild populations is important in the application of CITES (e.g. recent studies in *Cyclamen*).

British gardens have made, and should continue to make, a significant contribution to the conservation of plant diversity worldwide. The contribution of the disparate community of stakeholders in cultivated plant conservation must not be overlooked.

Strategy

- Communication and awareness of CBD within the horticultural community should be improved.
- A network of key organisations should be established to examine the impact of the CBD on horticulture, monitor developments in the Convention and provide input to relevant bodies when changes of legislation are proposed.
- Effective approaches to access and benefit sharing, examining the potential of general schemes and 'fair trade' in particular, should be developed.
- Projects for benefit-sharing that have already been delivered (e.g. Royal Botanic Gardens, Edinburgh in Chile; University of Reading in Morocco and the Eden Project in the Seychelles) should be highlighted and more broadly relevant initiatives developed.
- Knowledge and experience should be shared more widely with others facing similar issues elsewhere in the world, particularly in Europe and the USA.
- Engagement with source countries should be increased, responding to their concerns and seeking to improve a mutual understanding of the role of horticulture in plant conservation. The possibilities of source countries propagating and supplying material to UK horticulture should be investigated.

Key Actions:

- Encourage greater and more effective horticultural representation in the informal CBD stakeholder meetings facilitated by DEFRA.
- Create and publicise a web page linking existing sources of CBD information relevant to horticulturists.
- RHS and HTA to develop proposals for a symposium on access to genetic resources and benefit sharing in horticulture.
- Review the level of horticultural expertise available in biodiversity-rich countries, identifying where support is needed.

Relevant publications

- *The CBD for Botanists: An introduction to the Convention on Biological Diversity for people working with botanical collections; Version 2.* China Williams, Kate Davis & Phyllida Cheyne. RBG Kew, 2006.
www.rbgkew.org.uk/data/cbdbotanists.html
- *BGCI webpages on Access to Genetic Resources and Benefit Sharing including case studies on commercialisation projects*
www.bgci.org/abs
- *Results of the Pilot Project for Botanic Gardens: Principles on Access to Genetic Resources and Benefit-sharing to Assist with their Implementation and Explanatory Text.* Latorre Garcia et al. RBG Kew, 2000.
www.rbgkew.org.uk/consevation/principles.html
- *The CBD website including guidelines on invasives*
www.biodiv.org
- *UK Government guidance on invasives, including the Horticultural Code of Practice*
www.defra.gov.uk/wildlife-countryside/non-native/
- *IPEN Code of Conduct*
www.bgci.org/abs/Description_of_IPEN/

Impatiens 'Ray of Hope'

Impatiens gordonii is a rare and threatened native of the Seychelles, and there are said to be no more than 120 plants left in the wild. *Impatiens* 'Ray of Hope', a hybrid between *I. gordonii* and *I. walleriana*, was raised and is being sold by the Eden Project. £1 from each plant sold goes back to the Seychelles to help protect their rare and endangered plants, including *I. gordonii*, in their natural habitat.



Alistair Griffiths / Eden Project

Impatiens namchabarwensis

In 2003 an unrecognised *Impatiens* was found by Yuan Yong-Ming and Ge Xue-Jun growing 200m from the Tsangpo river, at an altitude of 930m, in the Namcha Barwa Canyon. The Namcha Barwa Canyon is the deepest canyon in the world and is accessible only on foot, so remains relatively unexplored botanically. It was found only in a limited area, growing in open shrubland near the margins of a broad-leaved forest. Seed was collected and sent to the National Plant Collection of *Impatiens* for cultivation and in 2005 the holder of the Collection, together with the two discoverers of the plant published the new species name *Impatiens namchabarwensis*. It grows 40-50cm high and has thick fleshy roots, but it is mostly for its floriferous nature and its ultramarine blue flowers that it has considerable horticultural potential.



Ray Morgan, National Plant Collection Holder, *Impatiens*

Lapageria rosea

Chile has given the UK some wonderful garden plants and *Lapageria rosea* is no exception to this. Also known as the Chilean bellflower, or copihue to give it its local name, it is the national flower of Chile. It was named in honour of Empress Josephine (née Marie Joséphe-Rose Tascher de la Pagerie), the wife of Napoleon Bonaparte and a keen botanist. The first specimen in the UK came to the Royal Botanic Gardens, Kew in 1847, swiftly followed in 1848 by material being sent to Veitch & Sons Nursery by their collector William Lobb. The dramatic, waxy bell-shaped flowers are pollinated by birds with long beaks while seeking nectar. Flowers are sold in Chilean markets, the fruits are edible and the roots sometimes used as an alternative to sarsaparilla. Numerous colour variations are recorded in Chilean literature, though few are documented in UK horticulture. Perhaps by working with the Chileans more of these colour forms could be brought to the UK; diversifying the genetic base, as well as expanding its potential as a garden plant.



Roy Cheek

OBJECTIVE 5

Best practice

To identify priorities and best practices for the conservation of plants in cultivation involving all branches of horticulture.

Maintaining our plant heritage

Background

The UK has a rich garden flora and these plants have all originated from, or been derived from, wild-collected material. Within this garden flora there are significant holdings of known or documented origin which gives them extra conservation and scientific value. However sometimes these plants may only be represented by a single clone or a limited clonal-line. This makes them more prone to loss of viability and vulnerable to disease as well as having less value for species conservation.

Despite this, because of losses in countries of origin, the UK – together with other countries rich in cultivated plants – represent a potential source of genotypes that have been lost or are threatened in the wild (e.g. *Berberidopsis corallina*, *Cedrus libani*). However, so far there has been limited research on the genetic diversity of UK material, although we now have the DNA techniques available to do this.

Regrettably some introduced material, over time, has proven to spread into the natural environment and to be difficult to eradicate. While the

instances of invasive (rather than naturalised) plants are relatively few in the UK, the impact in some other countries has been significant. It also gives a “bad news” angle to plant introductions.

Cultivars can arise through selection of natural variation, hybridisation, or from natural mutants or sports. Clonal cultivars require vegetative propagation to ensure they remain “true”. Where cultivars are of hybrid origin their development history can be either secret or by chance, so their actual parentage is not known for sure and therefore they cannot easily be recreated if the cultivar is lost. Preservation of cultivars in cultivation is not secure and whenever a cultivar is lost, part of our heritage is also lost. But at the same time, in hyperdiverse groups such as orchids, cultivars and grexes routinely become extinct as it is impossible to conserve everything.

What is the best way to look after, as well as enhance, the existing genetic diversity within the UK?

Jim Marshall's exhibit of Malmaison carnations from the National Plant Collection at the Hampton Court Palace Flower Show 2007.



NCCPG

Strategy

- Having first acknowledged that it is not possible to conserve every cultivar, ways need to be found to evaluate, prioritise and decide what should be conserved.
- a A *Red Data Book* equivalent for cultivated plants should be developed to enable resources and efforts to be effectively channelled.
- b A list of criteria for establishing conservation significance, particularly for cultivars within large genera, should be established.
- The desired level of genetic diversity in a collection of cultivars should be established; acknowledging that this will vary with different groups of plants and the way they are propagated.
- Alternative ways of conserving specific groups of plants, other than through the National Plant Collections, should be investigated. Seedbanking and cryopreservation for cultivated plant material should be explored. The concept of the 'Virtual Plant Collection'¹ as a way of duplicating individual plants and separating taxa likely to hybridize, as well as involving and engaging with a wider audience, could be developed.
- When it is not possible to propagate plants that are already within cultivation, then to promote the responsible sourcing of wild-collected material (e.g. using in-country programmes for propagating native plants, such as Turkish-origin *Galanthus* and *Cyclamen*.)

- Wild-sourced material should be distributed responsibly as soon as possible after introduction to maximise survival. Giving due regard to CBD agreements and also to the potential future invasiveness of the material and how future climate change may effect it.
- Further research into the genetic diversity of plants in cultivation should be undertaken, using DNA techniques, initially focusing on priority groups known to be threatened in the wild. Exchange of genetic material with origin countries can then be explored.
- Genotypes should be kept pure, by vegetatively propagating clonal cultivars. Routine circulation of open-pollinated seed under a species name or a collector's number should be discouraged.
- Documentation and traceability of holdings, of both cultivars and wild-origin material, should be improved and linked to herbarium voucher specimens.
- Ensure, wherever possible, that a succession policy is available for National Plant Collections and aim to develop further international links with other bodies involved with the curation of cultivated plant stocks.

¹ A Virtual Plant Collection would be one where the plants that form that collection are distributed in two or more geographically separate locations but where the records are jointly kept and coordinated electronically.

Key Actions

- NCCPG to lead on producing a Red Data Book for cultivated plants.
- Develop project proposals for genetic diversity research.
- Identify original genotypes and ensure their priority for conservation.
- NCCPG to agree prioritisation criteria for cultivated plants.
- Enhance stability of preservation of genotypes.
- NCCPG to develop a succession policy for National Plant Collections and explore the feasibility of Virtual Plant Collections.
- Promote the value of UK holdings in plant conservation.

Criteria for establishing Conservation Significance could include:

- historical
- local distinctiveness
- wild selections
- social
- medical
- disease resistance
- authenticated collectors' number
- has or has held a plant award such as an AGM
- key breeding breakthroughs
- cultivars with unusual characters

Araucaria araucana

Plant collector Archibald Menzies was dining out in Chile one night when, unable to identify some nuts on the table, he popped a few in his pocket. Some of them sprouted on the voyage home and this is how *Araucaria araucana*, or the monkey puzzle tree, found its way into the plant collections of 18th century Europe. Its common name comes from a comment by an English man in the 1800s, who said that it would certainly be a puzzle for a monkey to climb. Now widely grown in gardens in Europe, in Chile it is threatened in the wild and listed in Appendix A of CITES.

Perhaps the most famous tree of its native land, this ancient conifer is estimated to be 200 million years old, based upon fossil records, and is a relative of the recently discovered Australian “living fossil” *Wollemia nobilis*. Its seed forms a staple food of the Pehuenche Indians, a mountain tribe of the Mapuche culture and is also sold in local Chilean markets. It has potential to become a commercial crop as it produces a high yield and the large tasty seeds are easily harvested. The disadvantage is its slow rate of growth before the first crop is produced (up to 40 years from seed). The plant is dioecious, so at least one male plant needs to be grown for every 5-6 females. Unfortunately there is no way of telling the sex of the tree until it is mature. Female cones take 2-3 years to ripen and contain up to 200 large seeds.

The native habitat of *Araucaria araucana* is now threatened and has been reducing in size. In recent years the International Conifer Conservation Programme has introduced more diversity into the collections within the UK and Europe, to act as a larger gene pool resource for the future.



Janet Clibbey / RHS Botany

Chrysanthemum cryopreservation

Initial studies by the School of Biological Sciences, University of Reading, using *Chrysanthemum* 'Euro' have shown that it is possible to preserve apical meristems in liquid nitrogen (-196°C) and successfully recover and regrow the plants. They are now collaborating with the National Chrysanthemum Society to establish the first comprehensive collection of cryopreserved cultivars. Because of the small size of the stored tissue cultures, a vat occupying 1m^2 can house 1000 cultivars replicated many times over. The techniques developed allow for almost indefinite retention of the propagules.

Cryoprotected chrysanthemum shoot tips



Andy Wetten

Magnolia sieboldii subsp. *sinensis*



Mike Slegh / RHS



Andy Wetten

Magnolia sieboldii subsp. *sinensis* is only known in the wild from three counties of Sichuan in south western China and has been classified as being "vulnerable" in *The Red List of Magnoliaceae* (2007). The population is noted as being severely fragmented, occurring on the edges of forest and in scrub. This habitat has been cleared in places already and some trees have been affected by regular bark stripping for medicinal use.

It is relatively widely cultivated in the British Isles as an attractive garden plant. How wide is the gene pool these cultivated plants represent? And is the diversity that is present in cultivation, diversity that has been lost from the wild?

What if?

Following the Growing Heritage conference, an exhibit was put on in the Plant Heritage marquee at the Hampton Court Palace Flower Show in July 2006. The stand showed two gardens, one from before 1750 (above) and one of today (below). The former only contained plants known to be in cultivation at that time and the viewer was invited to compare the range and diversity of plants available to the gardener and realise the impact of the introduction of new plants from other countries on UK horticulture. The overall message being that the continued development of new garden plants depends upon recognising the rights of source countries to the benefits of their genetic diversity.



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The Royal Horticultural Society

The RHS is the UK's leading gardening charity dedicated to advancing horticulture and promoting gardening. It is committed to bringing the personal and social benefits of gardens and gardening to a diverse audience of all ages. Its goal is to help people share a passion for plants, to encourage excellence in horticulture in private and public spaces, to help create healthy, sustainable communities and support long-term environmental improvements.

The Royal Horticultural Society

80 Vincent Square

London SW1P 2PE

www.rhs.org.uk

RHS Registered Charity No.: 222879/SCO38262



National Council for the Conservation of Plants and Gardens

The NCCPG seeks to conserve, document, promote and make available Britain and Ireland's rich biodiversity of garden plants for the benefit of everyone through horticulture, education and science.

This is achieved through the National Plant Collection® scheme of 650 'living libraries' comprising over 80,000 different plants.

NCCPG

12 Home Farm

Loseley Park

Guildford GU3 1HS

Tel: 01483 447540

www.nccpg.com

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