Frank Kingdon Ward on his Mt. Victoria expedition of 1956. Plants raised from this collection are still in cultivation at RBGE. A more recent introduction made by former Alpine and Propagation Garden Supervisor George Kirkpatrick from Sikkim is also in cultivation. It forms a charming little plant, coming into flower in midsummer. The white, nodding campanulate flowers last for a number of months.

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THE MANAGEMENT OF '*AD HOC*' *EX SITU* CONSERVATION STATUS SPECIES AT THE ROYAL BOTANIC GARDEN EDINBURGH: A REVIEW OF OPTIONS

Elizabeth Radford, Michael Dossman & David Rae

'*Ad hoc*' conservation status species refer to IUCN-listed plants that have been collected by botanic gardens for no immediate conservation objective. They differ from so-called conservation collections, which have usually been collected with very specific conservation objectives in mind. Information was collected for 53 *ad hoc* conservation status species in the Living Collection at the Royal Botanic Garden Edinburgh (RBGE). Each species was assessed for its potential value for conservation and suggested action points to improve their management for possible conservation projects in the future were given. Discussions were held with various members of staff about the current and future management of threatened plants in the collections.

In common with other botanic gardens the majority of the *ad hoc* collections of conservation status plants at RBGE have been acquired in very small numbers, usually as one accession, frequently of cultivated origin and therefore possess little genetic diversity. Current conservation programmes for such plants are few in number and scope, and the management potential of a large number are limited. More emphasis should be placed on the educational role of these plants and on a focused programme to safeguard the survival of the most threatened species at RBGE.

Introduction

Ex situ collections of conservation (i.e. with IUCN designations) plants in botanic gardens may be subdivided into two distinct groups – those collected and maintained for clear conservation objectives and those collected and maintained in a somewhat *ad hoc* fashion. Those in the former category are likely to have been collected fairly recently and will typically be represented in reasonable numbers, with a diverse genetic base and will be of known wild origin. The '*ad hoc*' collections will be far more random in their classification – they will have been collected over a long time period, probably in small numbers, possess little genetic diversity and are frequently of unknown origin. The former are sometimes described as 'conservation collections'

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and fall within clear management guidelines. The latter are sometimes described as collections of conservation-status or conservation-interest plants and their management requirements and opportunities are not always known, understood or optimised.

Collections of these conservation-status plants are more difficult to manage than the conservation collections, because little is known about them or where they came from and they are not part of a larger, more structured programme as typified by conservation collections. RBGE has about 1,200 taxa in both groups – possibly one of the largest numbers in any botanic garden. Of these threatened plants approximately 977 taxa (80%) are part of the *ad hoc* conservation-status group.

Most botanic gardens will have such plants, but what is their significance? Could they ever be used for re-introduction programmes, education, display or research? If not, how should they be managed, or should they be de-accessed? Two case studies were undertaken at RBGE to investigate the potential value of these rather *ad hoc* random collections of conservation-status plants.

Case Study 1

Procedure

Twenty threatened plants from RBGE's living collections were selected using BG-BASE generated lists of extinct, extinct/endangered and endangered plants (pre-1994 IUCN categories) growing in the Garden. Eighteen plants were selected, covering all continents/major world regions and a variety of plant habits (trees, shrubs, succulents, bulbs, palms, ferns etc.). Two additional species were chosen from less threatened categories for comparison. Species with large numbers of accessions were deliberately avoided as they were invariably part of a current focused conservation programme, such as the International Conifer Conservation Programme, and therefore outside the remit of this study. Two main phases of research were carried out on the selected species:

Phase 1: initial search for garden, herbarium and photographic information.

As a starting point the following information for each species was sought mainly using BG-BASE (the collections database), the herbarium, the photographic library and by 'ground truthing', in other words checking the plants where they are growing.

- number of accessions
- number of live plants
- herbarium specimens of RBGE accessions
- other herbarium specimens
- photographs
- shipments from RBGE
- provenance and origin of accessions
- source of accession
- year of acquisition

- location in the Garden
- evidence of propagation or stored germplasm
- current condition of plant

Phase 2: research for further information.

Using library resources, appropriate members of staff, the internet and personal contacts, more detailed information was sought for each of the selected species. Information included:

- other botanic gardens growing this taxon
- number of accessions in these other gardens
- condition of these accessions
- known conservation programmes
- threats in the wild
- number and distribution of wild populations
- any other miscellaneous information relevant to species conservation on both the RBGE accessions and the species in general

Finally, on the basis of all the information obtained, the value of each taxon to the Garden (in terms of its potential contribution to a conservation programme) was outlined and action points for conservation were suggested for each species.

Running parallel with the research, discussions were held with members of staff from various Garden Departments on the value of the case study and the possible development of work within the Garden on threatened plants:

Science and Conservation:	David Rae, Martin Gardner, Philip Lusby, Kerry Walter
Horticulture:	Dave Paterson, Pete Brownless, Fiona Inches
Education:	Ian Darwin Edwards

Results

Completed individual data-sheets of information for six of the selected taxa can be found in Appendix I. A further 14 completed data-sheets can be found on RBGE's website at www.rbge.org.uk/rbge/web/pub/sibbaldia.jsp 'Other garden information' and 'conservation information' from the data-sheets was transferred to BG-BASE on completion of the project. The twenty species selected for the case study, listing their country of origin, are shown below:

Species	Country of origin
Bromus interruptus (Hack.) Druce	UK
Carmichaelia prona T.Kirk	New Zealand
Chamaecyparis thyoides (L.) Britton, Sterns & Poggenb var. *henryae* (H.L.Li) Little	USA

Clianthus puniceus (G.Don) Lindl.	New Zealand
Cosmos atrosanguineus (Hook.) Voss	Mexico
Diascia patens (Thunb.) Grant ex Fourc.	South Africa
Dracaena goldieana Lindl.	Tropical Africa
Epidendrum ilense Dodson	Ecuador
Magnolia dealbata Zucc	Mexico
Nepenthes rajah Hook.f.	Malaysia
Opuntia linguiformis Griffiths	USA
Paphiopedilum delenatii Guillaumin	Vietnam
Platycerium grande (J.Sm ex Feé) C.Presl	Philippines, Australia
Pritchardia affinis Becc.	Hawaii
Pritchardia lowreyana Rock	Hawaii
Ruizia cordata Cav.	Reunion Islands, Mascarenes
Selaginella oregana D.C.Eaton	USA
Sorbus maderensis Dode	Madeira
Tecophilaea cyanocrocus Leyb.	Chile
Trochetiopsis erythroxylon Cronk	St Helena

The Garden holds only one accession of the majority of these plants and less than three individuals are kept of 85% of these accessions. Over half of these are not of known wild origin. Numbers, accessions and wild origin data are shown in Tables 1 and 2.

Computer-based records

The standards of record keeping for the plants selected varied tremendously, particularly propagation records, which were often ambiguous. For instance, it was not always obvious if a seed had germinated and given rise to a mature plant, as accession qualifiers were not always given and/or the information was not entered into

TABLE 1. Summary of 'garden information' for the selected species

	No.	%
Species investigated	20	100
Species with live plant accessions (not including seed)	18	90
Species with seed only accessions	1	5
Species with plant and seed accessions	1	5
Species with only 1 live accession	15	75
Accessions with only 1 live plant	12	46
Accessions with >3 live plants	4	15
Accessions originating in cultivation 'wild origin unknown'	15	57
Accessions with a propagation or seed record	7	30

TABLE 2. Summary of information on the wild origin accessions

	Nos	%
Wild origin accessions	13	54
Wild origin species covered by those accessions	9	45
Misidentified wild origin species	1	5
Species of uncertain taxonomic status	1	5
Wrongly listed, probably not threatened	2	10
Species (with wild origin accessions) of potential use for conservation	6	30

BG-BASE. Information regarding threatened plants that were currently being propagated was not always evident in the database either. Rather worryingly, some accessions or cuttings listed in BG-BASE could not be found at all in the Garden. Of particular concern were the two 'extinct in the wild' accessions that could not be found: *Opuntia linguiformis* and *Epidendrum ilense*. Garden staff were informed of all accessions that were not located. Some of the image records on BG BASE did not correspond with those in the slide library. Only two of the RBGE threatened plant accessions investigated are represented in the RBGE herbarium and only 6 other species have representative herbarium specimens collected elsewhere.

Information on the species in other gardens and conservation programmes

BGCI (Botanic Gardens Conservation International) provided information from their database on other botanic gardens holding accessions of 14 of the species under investigation. No information was held on the database for the species shown below. The institutes in brackets were listed by BGCI as either being involved in programmes or potentially having further information on these species.

Chamaecyparis thyoides var. *henryae*
Cosmos atrosanguineus (RBG Kew)
Diascia patens (SABONET – South Africa)
Opuntia linguiformis (Center for Plant Conservation, North America)
Tecophilaea cyanocrocus
Trochetiopsis erythroxylon

For some species little conservation information was available from any source other than a species description or taxonomic revision, their range in the wild and an affirmation of their endangered status. The few enquiries into current conservation programmes produced little feedback and it proved particularly difficult to obtain information on how a programme was progressing.

CASE STUDY 2

An additional, follow-up survey was deemed beneficial not only to track down specific, threatened taxa within the Garden, but also to contribute to the overall

assessment of the conservation work being conducted at RBGE. The second case study involved building up data-sheets on an additional 33 threatened taxa at RBGE. As in the previous survey each data-sheet contains information on the status of the species in the wild, in addition to the number and condition of accessions within the Garden. When it was known, information on other conservation programmes and gardens holding these taxa was included. The slide and illustration collections and the herbarium were also examined for holdings of any of the 33 taxa. When herbarium material was located, each sheet was extracted for bar-coding and data entry. Based upon all the information gathered, the potential utility of each species was assessed and plans of action were provided. Information gathered during the survey was also added to individual records on BG-BASE, if it was not in place already.

The 33 taxa were chosen using BG-BASE. A list of RBGE accessions within each IUCN conservation category was generated and individual species were selected with some controlled bias. Priority was given to those species with the most threatened status, using the pre-1994 categories (extinct, extinct/endangered, and endangered). In fact, with the addition of this survey, all taxa at RBGE with extinct and extinct/endangered conservation status have now been examined. Efforts were also made to represent a diversity of geographic regions and plant habits, with selections ranging from Chinese conifers (*Torreya jackii*) to Mediterranean geophytes (*Crocus cyprius*). Those examined were:

Species	Country of origin
Acacia enterocarpa R. V. Sm.	South-eastern Australia
Arctostaphylos klamathensis S. W. Edwards, K. Wolf, & Knight	Western North America
Corydalis cashmeriana Boyle	Northern India, Himalaya
Crocus cyprius Boiss. & Kotschy	Cyprus
Delphinium luteum A. A. Heller	Western North America
Dendrobium aurantiacum Reich	Assam, Bhutan
Disanthus cercidifolius Maxim. var *longipes* H. T. Chang	Japan
Erica turgida Salisb.	South Africa
Erica verticillata Berg.	South Africa
Franklinia alatamaha Bartram ex Marshall	North America
Genista dorycnifolia Font Quer	Mediterranean
Ilex perado Aiton ssp. *platyphylla* (Webb & Berth.) Tutin	Canary Isles, Azores
Kniphofia pauciflora Baker	South Africa
Machaeranthera tanacetifolia (Kunth) Nees	Western North America
Mandragora autumnalis Bertol.	Greece
Penstemon campanulatus (Cav.) Willd.	Mexico, Guatemala

Primula capillaris A. H. & N. H. Holmgren	South-west USA
Primula flexuosa Turkev.	Asia
Pritchardia remota Becc.	Pacific Islands
Quercus graciliformis C. H. Mull	South-east North America
Rhododendron santapaui Sastry *et al.*	India
Silene orphanidis Boiss.	Greece
Sinojackia xylocarpa Hu.	China
Sophora toromiro Skottsb.	Chile
Stuartia sinensis Rehd. & E. H. Wilson	China
Tecomanthe speciosa W. R. Oliver	Australia, New Zealand
Torreya jackii Chun.	China
Trillium govanianum Wall ex D. Don	Northern India, Pakistan
Trochetiopsis ebenus Cronk	St Helena
Tulipa sprengeri Baker	South-west Asia
Viola flettii Pipe	Western North America
Woodsia aff. *andersonii* (Bedd.) H. Christ.	China
Wulfenia baldaccii Degen.	Albania

Results

Of the 33 taxa listed above, 21 (64%) were represented by at least one accession that was of known wild origin. However, only 15 (45%) of the total were currently found to be alive, excluding two which were not located; five were also represented as germplasm (seeds or spores). Seven live plants were of known wild origin and thus have particular conservation value. Thirteen taxa on the list examined were not represented within the herbarium. When live plant material of these 13 was found to exist, a note was made that herbarium material should be obtained. Likewise, notes were made for the 20 plants where no slides exist. Data sheets for ten species can be found in Appendix II. Again, the remainder can be found on RBGE's website at www.rbge.org.uk/rbge/web/pub/sibbaldia.jsp

Discussion

That the majority of the '*ad hoc*' collections of conservation status plants investigated at RBGE have been acquired in very small numbers, usually as one accession, are frequently of cultivated origin and therefore possess little genetic diversity, confirms the expected outcome of this investigation. The sample used was small and taken mainly from the most threatened categories of plants at RBGE, but the results obtained are probably indicative not only for the remaining collection of threatened plants at RBGE but also for many other collections.

Conservation value of RBGE's ad hoc collections

It is largely undisputed that for *ex situ* conservation collections to be of use in conservation, the plants must be of known wild origin and possess a good base of genetic diversity (e.g. Given, 1987). 80% of the threatened plant taxa examined do not meet these criteria and alone are therefore of little conservation value. Even if some of these plants are propagated successfully the limited genetic diversity may render subsequent breeding unsuccessful due to weaknesses resulting from inbreeding depression, for example as occurred with *Trochetiospsis erythroxylon* (Rowe, 1995). 20% of those species selected may have some use to current conservation programmes. Below is a summary of conservation information for the six species with wild origin accessions thought to be of potential use for conservation:

- ***Bromus interruptus*** (1 accession) is under consideration for a recovery programme at Kew and the RBGE accession will be of use for this.
- ***Cosmos atrosanguineus*** (1 wild origin accession, propagated by cuttings at RBGE) is part of an up and running conservation programme at RBG Kew. This programme is currently limited to molecular screening. Leaf tissue from the wild origin specimen at RBGE has been sent to Kew.
- ***Magnolia dealbata*** (2 accessions, seed has been successfully germinated at Benmore Botanic Garden). There is a conservation programme running at Jardin Botanico Javier Clavijero Veracruz, Mexico – research and some reintroduction has taken place.
- ***Nepenthes rajah*** (1 accession, many plants). No known conservation or reintroduction programmes but the species is monitored and protected within the National Park in Sabah, where it grows.
- ***Pritchardia lowreyana*** (1 accession, no propagation at RBGE). Restricted to one island on Hawaii; no known conservation programmes. Possibly not threatened.
- ***Sorbus maderensis*** (1 plant, 2 seed accessions). Reintroduction and research programme at the botanic garden in Madeira.

The outlook for *ad hoc* conservation status plants at RBGE currently rests more upon what *could* be done, rather than what is being done. This contrasts sharply with the wide range of conservation projects that are being undertaken on structured, wild origin conservation collections such as species within the International Conifer Conservation Programme, Scottish Rare Plant Project, rhododendrons in general and some ferns. Assuming that a conservation role is very important at RBGE, the threatened plants that appear to be of little conservation value should not be ignored. Five of the species selected that fall into this category are, for instance, extinct in the wild. To increase just the numbers of plants in these accessions by propagation should be of utmost importance if only to guard against losing the species from our collections altogether. With the smaller herbaceous species this may not prove to be too difficult. It is essential that the most threatened plants are located in the Garden. The fact that *Opuntia linguiformis* and *Epidendrum ilense* (both extinct in the wild, herbaceous and therefore potentially a high priority for propagation) could not be found, as well as other less threatened accessions, is really not acceptable. It is hoped that further investigation will reveal these plants in the Garden.

No botanic garden can act effectively alone with single accessions of these threatened taxa. It is therefore essential to establish links with other gardens and institutions growing these taxa, for the exchange of pollen and/or seed as well as for propagation information. In addition to being used to increase the holding of any particular species at RBGE, these exchanges may result in an increase in the genetic diversity of the species at the Garden – a positive contribution to conservation. Special attention should be given to those species that are extinct in the wild, even if all known living material is of cultivated origin, as the exchange of germplasm with other institutions may ensure the species at least survives in cultivation (which has to be better than not surviving at all).

From Case Study 1 there are possibly four threatened plant species (20%) of the twenty selected, which could contribute in some way to established conservation programmes. This implies that from 170 taxa (the approximate number of *ad hoc* conservation status species at RBGE in the three most threatened IUCN categories) there *could* be 34 accessions that may be of use in a conservation programme – a small but potentially significant contribution to plant conservation. For some of the species where RBGE has a larger number of accessions and a history of successful propagation, it may be possible to start a 'home-grown' recovery programme in collaboration with institutions in the origin country, given sufficient resources. Again further research will be required to locate those countries wishing to undertake such work. *Magnolia dealbata* accessions for example, may be of use to the programme currently running in Mexico. Only three botanic gardens (including RBGE) possess wild origin accessions of this species.

Currently there is no focus on the most endangered plants in RBGE's collections and no clear conservation strategy for them. Propagation work directly for conservation does occur on certain groups of plants at RBGE such as *Rhododendron* and conifers but this is as part of long-established programmes, and does not cover the *ad hoc* group. Curators of individual sections are, or should be, aware of the threatened plants in their section and care is clearly taken to ensure their survival, but not necessarily to propagate them. Such propagation may occur as a result of individual interest but not as a result of direct conservation planning. RBGE possesses a seed store and nursery, has excellent horticultural staff and carries out much general propagation work. These are just the facilities and skills that could be put to direct use on the threatened plants in the collections, given adequate resources and a shift in priority. The resources needed include time, money, staff, initiative and ultimately space, but small projects can be (and sometimes are) 'grafted on' to other work and, given a change in emphasis, this work arguably should become part of routine curation.

The propagation work on threatened and/or difficult plants that is carried out is not always fully documented. This is readily admitted by those concerned and lack

of time is cited as the main reason for not doing this. A number of people with whom the project was discussed regard the recording of propagation and growing information as a very important requirement at RBGE. It would be of great value to be able to say that RBGE has protocols on how to successfully grow certain threatened species, and such a document could then help other gardens to perfect the growth of threatened plants in their collections, and could contribute significantly to conservation in botanic gardens. BG-BASE goes some way in providing the opportunity to document this type of information, but it is believed there may be value in producing this information in publishable format (see, for example, Cullen *et al,* 1988)

Setting up links with other botanic gardens and relevant institutes in countries of origin is the most essential and possibly the most difficult part of this work. Concentrating on those parts of the world that are already known to staff is likely to yield the best results. Alternatively seeds or cuttings of our most threatened plants may be useful for screening in other programmes. *Bromus interruptus* and *Tecophilaea cyanocrocus* have the potential to be used in this way, while *Cosmos atrosanguineus* and *Trochetiopsis erythroxylon* accessions already have been. RBGE undoubtedly has the potential to carry out much more threatened plant conservation than it currently does, rather than acting simply as a 'holding station'.

Other uses for the ad hoc conservation status collections

To initiate scientifically valid conservation work on our threatened plants would be expensive, time consuming and not instantly possible. Obtaining financial backing and establishing links for such projects takes time. The fact remains, however, that probably at least 80% of RBGE's threatened plants are of little immediate use to conservation programmes because they are represented by single accessions only. Can they be utilised in other ways and what value do these plants have in the Garden? Does RBGE need to justify their existence and are they being used in the Garden to their full potential?

It is very possible that many of RBGE's threatened plants could be used effectively for education and interpretation purposes. This should not be viewed as secondary to serious scientific conservation but as a requirement for helping the conservation of threatened species in botanic gardens. It is widely acknowledged that without an educated and concerned public, conservation initiatives will flounder through lack of support (e.g. Smith, 1997). Some of the threatened plants in the collection are currently used by education staff for guided walks, particularly for university and sixth form students. They are also used by the School of Horticulture for the HND in Horticulture with Plantsmanship course. A new course for teachers on biodiversity and conservation was launched in 1999 and includes such issues for discussion. At present this is the extent of using the *ad hoc* collections of threatened plants for educational purposes.

Many threatened plants have good stories associated with them and the research

carried out on the 20 species selected for Case Study 1 revealed seven such stories, of both conservation and general interest. *Dracaena goldieana*, for example, was first collected by an Edinburgh botanist and its history in cultivation is closely associated with this area of Scotland, while *Ruizia cordata* is believed to possess magical or mystical properties by local people on Réunion Island. This type of information is interesting, memorable, and has an educational value for introducing the public to threatened plants in RBGE's collection. Interpretation must be included from the planning stage in the Garden to be effective, and plants must be accessible and easy to view with interpretative materials appealing to all.

Suggestions for Potential Action Points for RBGE Threatened Plant Conservation Programme

The following suggestions for the increased utilisation of the '*ad hoc*' collections have been formulated as a result of this report and discussions with staff members at RBGE. They are listed in no particular order:

- establish a clear conservation strategy for the Garden including the '*ad hoc*' group of threatened plants
- as a priority, investigate all threatened plants at RBGE in the first three most endangered categories
- begin a propagation programme for the most threatened species i.e. those species held in the top two categories
- establish links with botanic gardens and other relevant institutions on the conservation of threatened species in RBGE's collections, promote sharing of information, germplasm and other resources between institutions
- maximise the information available on the threatened plants throughout the garden: make herbarium specimens of all rare accessions; sequence the rare accessions where appropriate; research as much information as possible on these species and enter the information into BG-BASE, including detailed propagation and 'plant care' records – see below
- establish rigorous propagation records for threatened and difficult plants. Make use of the vast amount of information already known within the Garden and develop this into detailed propagation notes for threatened plants
- make more use of the threatened plants in public education – effective use of simple interpretative panels would be a good start
- explore more species in the vulnerable and rare categories where there may be a greater genetic base with which to work and a realistic chance of success
- ensure all threatened plant accessions are easily identifiable by RBGE staff
- concentrate on the genera, families and world areas where there is current research and horticultural interest
- consider investing in research into the conservation status of groups that are, or have been, worked on within the Garden, whose current status is probably threatened but currently indeterminate

- amend the Garden's acquisitions policy to include more emphasis on threatened plants and make the collecting of both information on, and germplasm of, threatened plants more of a priority on expeditions (depending on national legislation and restrictions)
- expand the development of horticultural research to promote the growth/survival of threatened plants in cultivation, such as that being carried out on the promotion of early coning in conifers
- build up a photographic reference library for all threatened plants in the collection.

Conclusion

Considerably more could be done to improve the management of '*ad hoc*' conservation status taxa at RBGE. The use of many of these accessions to existing conservation programmes may, on further investigation, prove to be limited, but effort should be made to explore all possibilities. Concentrated propagation effort should be a priority for the most threatened (extinct in the wild) species, even if only to maintain them in cultivation. Much more use could be made of RBGE's threatened plants in public education, which ultimately may be the most important function of the rarest accessions. Record keeping at RBGE is on the whole very good but could be improved for the most threatened species, particularly propagation records and information regarding accessions in other gardens. Most of the staff consulted were keen to see conservation initiatives for the '*ad hoc*' group move forward given sufficient resources, and individuals' ideas on how this could be achieved are frequently similar.

Evaluation of Project

This project has been highly valuable in confirming and highlighting problems that are encountered during this type of work. More investigative research work on the threatened species at RBGE is essential if the Garden is serious about its conservation role. Such work will enable a clearer picture to be built up of the management potential of these '*ad hoc*' taxa, and further work can then be focused on the most suitable species.

There is a great deal of interest in furthering conservation work at RBGE; the information collected for this project is to be entered into BG-BASE and specific research on the extinct and extinct/endangered groups may be continued by one of the MSc/HND students.

Appendix 1

Bromus interruptus (Hackel) Druce

Family	Gramineae
IUCN category	EX
Range in wild	UK – S.E. England
Habit	Grass (annual)

RBGE accessions

No. of accessions	1
No. of live plants	Mass of plants
Herbarium specimens from RBGE accession	1
Herbarium specimens from other locations	Wild 15; Cultivated 3
Photograph/image	1 slide in the wild
Shipments from RBGE	1995 Phytera Ltd.

Other garden information

Other botanic gardens growing this species	Cambridge; Kew; Trinity, Dublin; Brest, France.
No. of accessions in these other gardens	
Condition of these accessions	

Conservation information

Known conservation programmes
RBG Kew Conservation Unit is looking in to developing a recovery plan (see Ben Lyte)
Threats in the wild
Extinction believed to be a result of better seed cleaning methods
No. and distribution of wild populations
None remaining, last seen in 1972 in Cambridgeshire where it also is believed to have arisen as a mutant.

Details of individual RBGE accessions

1.

Accession number	19892828
Provenance	Pampisford, Cambridgeshire
Original Collector	Unknown
Source of accession (person and type of material)	P.Smith, BG Cambridge, Whole plant
Year of acquisition	1989
Location in garden	D39 grid K010
Propagation/Germplasm	Seed stored in Q51
Last check for BG Base	1998
Condition of plant at last check	Good
Condition now (1999)	Alive

Further information

All known occurrences of this species probably originate from material collected by Dr. Philip Smith in Cambridgeshire (University of Edinburgh), whose paper on the species is near completion. Philip has given plants from this accession to many people, as far as France and Canada. Max Walters in Cambridge may be doing molecular work on the species.

Potential utilisation of RBGE accession(s)

The RBGE accession would be of use to a reintroduction programme should Kew establish one. The accession is of known wild origin and appears to be doing well in the Garden. The project leader at Kew (Ben Lyte) now knows about RBGE's accession. The accession is contributing to education at the Garden as part of the 'endangered plants bed' in the Demonstration Garden.

Action

It would be advisable to establish other plants elsewhere in the Garden in case this bed is damaged in some way.

Starting reference

Perring F. H. & Farrell, L. (1997) *British Red Data Book 1 Vascular Plants*. Biological Recording Committee, Institute of Terrestrial Ecology. Society for the Promotion of Nature Conservation.

Chamaecyparis thyoides (L.) Britton, Sterns & Poggenb. var. *henryae* (H.L.Li) Little

Family	Cupressaceae
IUCN category	R
Range in wild	USA
Habit	Tree

RBGE accessions

No. of accessions	3
No. of live plants	2
Herbarium specimens from RBGE accession	None
Herbarium from other locations	None
Photograph/image	Only of the species not the variety
Shipments from RBGE	Bedgeburg National Pinetum

Other garden information

Other botanic gardens growing this spp.	
No. of accessions in these other gardens	
Condition of these accessions	

Conservation information

Known conservation programmes: Protected by the forest service?
Threats in the wild:
No. and distribution of wild populations: Populations from Florida to Mississippi

Details of individual RBGE accessions

1.

Accession number	19780925
Provenance	WILD – Jackson Co. Mississippi
Original Collector	Unknown
Source of accession (person and type of material)	Henry Fdtn. BG seed
Year of acquisition	1978
Location in garden	YG8 485/470
Propagation/Germplasm	None
Last check for BG Base	1997
Condition of plant at last check	Alive
Condition now (1999)	

2.

Accession number	19860761
Provenance	WILD – Escambra Co. Florida
Original Collector	Page
Source of accession (person and type of material)	Page – whole plant
Year of acquisition	1986
Location in garden	P13
Propagation/Germplasm	None
Last check for BG Base	
Condition of plant at last check	Removed?
Condition now (1999)	

3.

Accession number	19851215
Provenance	WILD – Santa Rosa Co. Florida
Original Collector	Page
Source of accession (person and type of material)	Page

Year of acquisition	1986
Location in garden	
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	Dead
Condition now (1999)	

Further information

The taxonomic status of this variety is uncertain. The World Checklist of Conifers (1993) states *Chamaecyparis thyoides* var. *henryae* is a minor variant of the species and is not now distinguished from it – citing Rushforth. Rushforth (1987) states variants of the species (*Chamaecyparis thyoides)* from Florida to Mississippi are variously treated as var. *henryae* (Li) Little or sp. *henryae* Li the bark and foliage characters of the variety differ from C. *thyoides.*

Potential utilisation of RBGE accession(s)

If this variety is deemed true and rare then action may be needed to ensure its successful propagation – the Forest Service in the US may be reluctant to transfer material and may indeed have the plant sufficiently protected. *Chamaecyparis thyoides* is not threatened and therefore if variety status is not substantiated no conservation action need be taken.

Action

Establish whether there is interest in our accession in the US.

Clianthus puniceus (G. Don) Lindl

Family	Leguminosae
IUCN category	E
Range in wild	North Island New Zealand
Habit	Shrub

RBGE accessions

No. of accessions	4?
No. of live plants	Some plants grown on from seed at Logan
Herbarium specimens from RBGE accession	None
Herbarium specimens from other locations	4 wild origin
Photograph/image	1 slide
Shipments from RBGE	None

Other garden information

Other botanic gardens growing this species	Many gardens, only Sydney listed as having wild origin specimen, Auckland Regional Botanic Garden does too.
No. of accessions in these other gardens	
Condition of these accessions	

Conservation information

Known conservation programmes:
There has been an action plan for *C. puniceus* in the threatened species unit, Auckland Conservancy, New Zealand Department of Conservation since 1990. This is now in its second five-year phase. It is now prohibited to collect seed of this plant to sell commercially under the WAI 26, Treaty of Waitangi claim on the NZ Flora and Fauna.
Auckland Regional Botanic Gardens have a permanent collection of Moturemu origin plants and seed is harvested for replanting on this island. *Ex situ* populations from Moteuremu seed are also found on Tiritiri Matanai Island and Gulf Harbour Golf Course.
Threats in the wild:
Habitat destruction due to development of pastoral farming, grazing by domestic herbivores, feral goats and deer, introduced snails and slugs.
No. and distribution of wild populations:
Five known areas: Moturemu Island (Kaipara Harbour), 500 plants near Te Araroa, Hawkes Bay Scenic Reserve, Southern Te Urewara National Park and Tolaga Bay. Plants have been planted in Northand on Motura, Moturaohia and Limestone Islands from Moturemu stock.

Details of individual RBGE accessions

1.

Accession number	19599226
Provenance	CULTIVATED – unknown origin
Original Collector	Unknown
Source of accession (person and type of material)	Logan
Year of acquisition	1959
Location in garden	
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	DEAD
Condition now (1999)	

2.

Accession number	19882380
Provenance	CULTIVATED – origin unknown
Original Collector	Unknown
Source of accession (person and type of material)	New Plymouth Parks NZ

Year of acquisition	1988
Location in garden	(of the 2 unable to locate) TO5 grid 0360
Propagation/Germplasm	Cutting sent to GP3 April 1996
Last check for BG Base	
Condition of plant at last check	3 dead, 2 can't locate
Condition now (1999)	

3

Accession number	19981461
Provenance	CULTIVATED – unknown origin
Original Collector	ENZAT
Source of accession (person and type of material)	Dunedin BG NZ seed
Year of acquisition	1998
Location in garden	
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	
Condition now (1999)	?

4.

Accession number	19981500
Provenance	CULTIVATED – unknown origin
Original Collector	ENZAT expedition
Source of accession (person and type of material)	Auckland BG NZ seed
Year of acquisition	
Location in garden.	A few good healthy plants growing at Logan
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	
Condition now (1999)	Alive

Further information

Cultivated plants have been found to be genetically different from wild origin ones. There is also an *ex situ* site on Tiritiri Matangi Island for C. *puniceus.*

Potential utilisation of RBGE accession(s)

RBGE's plants are unlikely to be of use in New Zealand's recovery programme as an *ex situ* population, as all plants are of cultivated origin. There are accessions of *Clianthus puniceus* at Logan but they are mostly "from cuttings of the original plants that were here when the Garden was taken over in 1969" (according to Logan's Curator Barry Unwin), so it is presumed there is no further information on the origin of these accessions.

The Garden also has seed of *Clianthus puniceus* var. *maximus* at Logan from plants that have been grown from this seed but they are not very healthy. This variety occurs naturally in the wild, the last parent plant was destroyed by Cyclone Bola in 1987 but seed had been collected.

Action

Make use of it in an education/interpretation programme for threatened plants – these plants are highly appealing and known to many gardeners. Their endangered status is probably not so well known.

Starting references

GRAHAM HARRIS. (1998). A securer future for New Zealand's Kaka Beak. *Plant Talk* **14** 31–32 (this reference, though recent, is not up to date on the recovery programme)

SHAW, W. B. & BURNS. B. R. (1997). The ecology and conservation of the endangered endemic shrub, Kowhai Ngutukaka *Clianthus puniceus* in New Zealand. *Biology and Conservation* **81** 233–245.

STANLEY, R. (undated). *Action Plan for Kowhai Ngutukak in Auckland Conservancy.*

***DRACAENA GOLDIEANA* LINDL.**

Family	Dracaenaceae
IUCN category	E
Range in wild	SE Nigeria – extending into central Africa
Habit	Shrub

RBGE accessions

No. of accessions	1
No. of live plants	1
Herbarium specimens from RBGE accession	None
Herbarium specimens from other locations	None
Photo graph/image	2 BG-BASE
Shipments from RBGE	None

Other garden information

Other botanic gardens growing this species	Wageningen, an old cultivated specimen and several new (around 1984?) introductions from Gabon not yet flowered; Darwin, Australia
No. of accessions in these other gardens	
Condition of these accessions	

Conservation information

Known conservation programmes:
Threats in the wild:
No. and distribution of wild populations: Unknown

Details of individual RBGE cessions

Accession number	19471020
Provenance	CULTIVATED unknown origin
Original Collector	Unknown
Source of accession (person and type of material)	Glasgow BG whole plant
Year of acquisition	1947
Location in garden	G25 grid 0370
Propagation/Germplasm	None
Last check for BG Base	?
Condition of plant at last check	Alive
Condition now (1999)	Alive

Further information

This species is well known in cultivation and has a very interesting history in cultivation closely associated with Edinburgh:

- Discovered by Goldie in Calabar, Nigeria, and sent living material to Edinburgh 1870–1871
- Bullen of RBGE exhibited one of these plants in Glasgow Flower Show 1872
- Bull (eminent horticulturist) obtained the plant soon after, exhibited 1873+
- Slow growth, not offered for sale until 1877
- By 1880 material in many European collections probably clonal
- Now has declined (vanished according to Bos 1984) from living collections

Evidence of species from only four subsequent collections from SE Nigeria, all juvenile. There is very little to be found about the plant's current status etc. Cannot be sure of the identification of this species until it has flowered.

Potential utilisation of RBGE accession(s)

The Edinburgh accession could be important if the plant is truly rare in cultivation. Though obtained in 1947, it is possible that this accession is of the same lineage as the original introductions in the 1880s. Ultimately the use of this plant may be purely educational interest, telling its Edinburgh-linked story.

Action

Investigate the origin of the accessions in Darwin and possibly Waganignen. Propagate the RBGE accession, in case this one plant is damaged. Consider its inclusion in a threatened plants education programme.

Starting reference

Bos, J. J. (1985). *Dracaena* in West Africa. *Belmontia* **17** 1–126

Magnolia dealbata Zucc.

Family	Magnoliaceae
IUCN category	E (EN)
Range in wild	Mexico
Habit	tree

RBGE accessions

No. of accessions	2
No. of live plants	3
Herbarium specimens from RBGE accession	none
Herbarium specimens from other locations	none
Photograph/image	none
Shipments from RBGE	none

Other garden information

Other botanic gardens growing this species	Jardin Botanico Javier Clavijero, Veracruz;
No. of accessions in these other gardens	Kew
Condition of these accessions	

Conservation information

Known conservation programmes:
1000 seedlings produced *ex situ* at Jardin Botanico Francisco Javier Clavijero (1986); seed storage and propagation techniques researched.
Threats in the wild:
Habitat destruction, timber production, poor regeneration
No. and distribution of wild populations:
Four to five relict populations in areas of cloud forest largest has 80–100 individuals at Ixhuacan de los Reyes. Veracruz, small numbers in Oaxaca and Hidalgo.

Details of individual RBGE accessions

1.

Accession number	19851958
Provenance	WILD Veracruz, Mexico
Original Collector	G. Pattison
Source of accession (person and type of material)	Mexico Univ. BG seed
Year of acquisition	1985
Location in garden	Z33, YS2
Propagation/Germplasm	None
Last check for BG Base	?

Condition of plant at last check	Alive
Condition now (1999)	Alive but not thriving

2.

Accession number	19930171
Provenance	WILD Veracruz, Mexico – different population to above
Original Collector	
Source of accession (person and type of material)	Gardner and Knees, seed
Year of acquisition	1993
Location in garden	Benmore nursery
Propagation/Germplasm	Seed at E45
Last check for BG Base	1995
Condition of plant at last check	Alive
Condition now (1999)	Alive

Further information

Used locally for timber, medicine and ornament, flowers are traditional medicine for heart disease. This species is not well known in cultivation and could potentially be a good start for an RBGE conservation programme. Gutierrez and Vovides (1997) suggest that "propagation in botanic gardens and small *in situ* cottage industry nurseries run by peasant farmers, could protect the remaining natural populations". Seed germination and young plant production has been achieved.

Potential utilisation of RBGE accession(s)

Potentially worth maintaining and propagating as an *ex situ* collection in support of the above.

Action

Establish links with Jardin Botanico Francisco Javier Clavijero in Mexico to see if they would appreciate an *ex situ* collection here in Edinburgh. Investigate the origin of Kew's accession – encourage transfer/exchange of material where appropriate.

Starting references

GUTIERREZ, L. & VOVIDES, A. P. (1997). An *in situ* study of Magnolia dealbata Zucc.in Veracruz State: an endangered endemic tree of Mexico. *Biodiversiy and Conservation* **6** 89—97

VOVIDES, A. P. *et al.* (1995). The Jardin Botanico Francisico Javier Clavijero in Xalapa, Veracruz, Mexico. *Botanic Garden Conservation News* **2** *(5)* 32–39

PLATYCERIUM GRANDE (J.SM EX FEE)

Family	Polypodiaceae
IUCN category	EX/E
Range in wild	Philippines
Habit	Staghorn fern

RBGE accessions

No. of accessions	1 – probably a misidentification
No. of live plants	1
Herbarium specimens from RBGE accession	None
Herbarium specimens from other locations	2 wild; 1 cultivated
Photograph/image	?
Shipments from RBGE	None

Other garden information

Other botanic gardens growing this species	Kew; Bonn. Germany; Utrecht, Netherlands.
No. of accessions in these other gardens	
Condition of these accessions	

Conservation information

Known conservation programmes:
Threats in the wild:
Destruction of lowland dipterocarp forest in the Philippines
No. and distribution of wild populations:
In the Philippines all remaining specimens believed to be on Mindanao. The type location of San Cristobal is believed to be inaccurate, and has never subsequently been found there. Very possibly extinct in the wild.

Details of individual RBGE accessions

1.

Accession number	19734533
Provenance	WILD – Mt Glorious, Queensland, Australia
Original Collector	PAGE
Source of accession (person and type of material)	PAGE – unknown propagule type
Year of acquisition	1973
Location in garden	G35 grid 0985
Propagation/Germplasm	None
Last check for BG Base	1995
Condition of plant at last check	Alive
Condition now (1999)	

Further information

The RBGE accession is probably a misidentification of the Australian species *Platvcerium superbum* G.J. et E. Hennipman. This species was formerly (pre mid-1970s?) known incorrectly as *Playceriurn grande. P. grande* actually has two spore patches on each fertile frond and is endemic to the Philippines.

The RBGE accession has a known wild origin in Australia and therefore is not this very threatened species.

Action

None required for conservation purposes. Label in the garden should be changed and appropriate records amended!

Starting references

ANDREWS, S. B. (1990). Ferns of Queensland a handbook to the ferns and fern allies. Queensland Herbarium, Australia.

HENNIPMAN, E. & ROOS, M. C. (1982). *A monograph of the fern genus Platvcerium* (Polypodiaceae) North-Holland Publishing Co., Amsterdam, Oxford, New York.

HOSHIZAKI, B. J. & PRICE, M. G., Platycerium update. *American Fern Journal* **80** 53–70

APPENDIX 2

***CROCUS CYPRIUS BOISS.* & KOTSCHY**

Family	Iridaceae
IUCN category	Endangered
Range in wild	Cyprus
Habit	Herbaceous

RBGE accessions

No. of accessions	2
No. of live plants	2
Herbarium specimens from RBGE accession	1 from 19812055
Herbarium specimens from other locations	Yes
Photograph/image	3 slides of 1981 2055
Shipments from RBGE	1999, 3 plants of 19831853 sent to Saumer Bot. Gdn.

Conservation information

Known conservation programmes
Threats in the wild
No. and distribution of wild populations
Confined to the highest part of the Troodos Mts.

Details of individual RBGE accessions

1.

Accession number	1981 2055
Provenance	WILD; Troodos Mts., Cyprus
Original Collector	
Source of accession (person and type of material)	S. McPherson; Plant
Year of acquisition	1981
Location in garden	Q23
Propagation/Germplasm	
Last check for BG Base	1998
Condition of plant at last check	Good
Condition now (1999)	Good

2.

Accession number	1983 1853
Provenance	WILD; Troodos Mts., Cyprus
Original Collector	
Source of accession (person and type of material)	R. Johnstone; Plant

Year of acquisition	1983
Location in garden	Q23
Propagation/Germplasm	Seed available
Last check for BG Base	1998
Condition of plant at last check	Good
Condition now (1999)	Good

Potential utilisation of RBGE accession(s)

Wild-collected seed and plants could be available for distribution to other gardens and/or conservation programmes. Herbarium material could be made of second accession.

DELPHINIUM LUTEUM A. A. HELLER

Family	Ranunculaceae
IUCN category	Endangered
Range in wild	California
Habit	Herbaceous

RBGE accessions

No. of accessions	2
No. of live plants	1
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	Yes
Photograph/image	1 slide
Shipments from RBGE	1992 seed (1985 0045) to Mr. J. Sutherland 1995 seed (1985 0045) to Phytera Ltd.

Details of individual RBGE accessions

1.

Accession number	1985 0045
Provenance	Cultivated; may be WILD source from Sonoma Co., CA
Original Collector	
Source of accession (person and type of material)	R. Lutsko; Seed
Year of acquisition	
Location in garden	A: R08 B: R01
Propagation/Germplasm	
Last check for BG Base	A: 1998 B: 1991
Condition of plant at last check	A: Dead B: Alive
Condition now (1999)	B: Good

2.

Accession number	1987 5051
Provenance	Cultivated
Original Collector	
Source of accession (person and type of material)	RBGE; Seed
Year of acquisition	
Location in garden	R01
Propagation/Germplasm	
Last check for BG Base	1996
Condition of plant at last check	Dead
Condition now (1999)	

Potential utilisation of RBGE accession(s)

The single plant growing in the Garden should be monitored with care, and efforts to propagate it (vegetatively and sexually) should be attempted. Additional slides could be taken, and herbarium specimens made.

Starting reference

CLARK, R. (1987). Rare Plants at Point Reyes National Seashore. *Fremontia* 15(1) 13–16.

DENDROBIUM AURANTIACUM REICH (SYN. D. CHRYSEUM ROLFE)

Family	Orchidaceae
IUCN category	Extinct/Endangered
Range in wild	Himalaya; India, Bhutan, Bangladesh
Habit	Herbaceous

RBGE accessions

No. of accessions	1
No. of live plants	2
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	Yes
Photograph/image	Illustration in library
Shipments from RBGE	0

Details of individual RBGE accessions

1.

Accession number	1990 5007 (as *D. chryseum*)
Provenance	Cultivated
Original Collector	

Source of accession (person and type of material)	Unknown
Year of acquisition	
Location in garden	G48
Propagation/Germplasm	
Last check for BG Base	1999
Condition of plant at last check	Alive
Condition now (1999)	Alive; 2 plants

Potential utilisation of RBGE accession(s)

Although the plants growing at RBGE do not have wild origin details, they should still be maintained with a high-priority conservation status. Also, these two plants have striking ornamental appeal, and could be integrated into public display/interpretation with ease. Herbarium material of these two accessions could also be collected.

Ilex perado Aiton ssp. *platyphylla* (Webb & Berth.) Tutin

Family	Aquifoliaceae
IUCN category	Endangered
Range in wild	Canary Islands
Habit	Tree

RBGE accessions

No. of accessions	1
No. of live plants	0
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	Yes
Photograph/image	0
Shipments from RBGE	0

Conservation information

Known conservation programmes
Listed in government legislation (1991)
Threats in the wild
No. and distribution of wild populations
Small fragmented populations of fewer than 1000 individuals, confined to parts of Tenerife and Gomera (Garajonay National Park).

Details of individual RBGE accession

1.

Accession number	1991 2066
Provenance	WILD; La Gomera, Canary Islands (Spain)
Original Collector	Ensoll, Maquire, Nelson
Source of accession (person and type of material)	Ensoll, Nelson, and Wright; seed
Year of acquisition	1991
Location in garden	Logan
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	
Condition now (1999)	Dead

Quercus graciliformis C. H. Mull

Family	Fagaceae
IUCN category	Endangered
Range in wild	Chiso Mts., Texas
Habit	Tree

RBGE accessions

No. of accessions	1
No. of live plants	3
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	No
Photograph/image	0
Shipments from RBGE	0

Conservation information

Known conservation programmes
Threats in the wild
Occasional drought; human activity from local campground
No. and distribution of wild populations
One small and isolated population in riparian oak woodland in Chisos Mts., Texas

Details of individual RBGE accession

1.

Accession number	1996 2019
Provenance	WILD; Big Bend National Park, Blue Creek Canyon, Chisos Mts., Texas
Original Collector	Guy Sternberg
Source of accession (person and type of material)	Sir Harold Hillier Arboretum; Seed

Year of acquisition	1996
Location in garden	E17
Propagation/Germplasm	Germinated Sept. 1996
Last check for BG Base	
Condition of plant at last check	
Condition now (1999)	three plants, all in good condition (but need to be moved out of the nursery soon).

Potential utilisation of RBGE accession(s)

The three plants growing in the nursery are at an ideal age and size for transplanting. If it does not already exist, a plan for incorporating them into the collections should be drawn up in order to avoid the possible de-accessioning of these plants from the collection. Also, herbarium material should be collected, and although the plants are small, photographs could be taken.

RHODODENDRON SANTAPAUI SASTRY *ET AL*

Family	Ericaceae
IUCN category	Endangered
Range in wild	Arunachal Pradesh, NE India
Habit	Epiphytic shrub

RBGE accessions

No. of accessions	2
No. of live plants	6
Herbarium specimens from RBGE accession	Yes, of 1986 0996
Herbarium specimens from other locations	Yes
Photograph/image	Two slides
Shipments from RBGE	All of 1983 0996: Plant to L.M. Mason (1991), Cutting to Akagi Park (1993) Plant to National Botanic Garden, Glasnevin (1996) Two cuttings to Pukeiti Rhododendron Garden (1997)

Details of individual RBGE accessions

1.

Accession number	1983 0536
Provenance	Cultivated/WILD?, from SE Subansiri Division, India
Original Collector	P. Cox in 1965
Source of accession (person and type of material)	R. Withers and CSIRO, Canberra; plant

Year of acquisition	1983
Location in garden	p10
Propagation/Germplasm	
Last check for BG Base	
Condition of plant at last check	Five alive in 1997
Condition now (1999)	Two found

2.

Accession number	1983 0996
Provenance	Cultivated/WILD?, from SE Subansiri Division, India
Original Collector	P. Cox, in 1965
Source of accession (person and type of material)	M. Jorgensen
Year of acquisition	1983
Location in garden	A: P10 B: G58 530
Propagation/Germplasm	
Last check for BG Base	A: 1997 B: 1993
Condition of plant at last check	A: two alive B: one alive
Condition now (1999)	A: now three plants B: good

Potential utilisation of RBGE accession(s)

Herbarium material could be collected from accession 1983 0536; likewise additional slides.

Additional requests for shipments of genetic material and the integration of this species into other collections should be accommodated when possible, especially as these may represent wild source.

STUARTIA SINENSIS REHD. & E. H. WILSON

Family	Theaceae
IUCN category	Vulnerable
Range in wild	S. Henen; Sichuan, S & W Anhui, Jiangxi, NW & S Zhejiang, N Fujian, E & W Hubei, N & SW Hunan, NE & S Guangxi, SE Guizhou
Habit	Tree

RBGE accessions

No. of accessions	1
No. of live plants	1
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	Yes
Photograph/image	1 slide
Shipments from RBGE	0

Conservation information

Known conservation programmes
Few reserves on Mts. Huangshan, Lushan, and Xitianmu
Threats in the wild
Poor regeneration, constant destruction of vegetation
No. and distribution of wild populations

Details of individual RBGE accession

1.

Accession number	1973 4062
Provenance	Cultivated
Original Collector	
Source of accession (person and type of material)	Unknown
Year of acquisition	
Location in garden	V08
Propagation / Germplasm	
Last check for BG Base	1997
Condition of plant at last check	Good
Condition now (1999)	Alive

Potential utilisation of RBGE accession(s)

Because it is of cultivated source (and the IUCN status of the species is vulnerable), this accession may not have significant value in conservation efforts. However, the potential exists to procure and grow additional wild-source plants.

Starting references

China Plant Red Data Book: 668.

Tecomanthe speciosa W. R. Oliver

Family	Bignoniaceae
IUCN category	Endangered
Range in wild	Three Kings Island, New Zealand
Habit	Vine

RBGE accessions

No. of accessions	1
No. of live plants	1
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	No
Photograph/image	0
Shipments from RBGE	0

Conservation information

Known conservation programmes
Local interest in New Zealand by horticulturists and botanists has led to reintroduction programmes
Currently the region is a protected reserve.
Threats in the wild
No. and distribution of wild populations
A single wild plant

Details of individual RBGE accession

1.

Accession number	1955 1062
Provenance	Cultivated
Original Collector	
Source of accession (person and type of material)	RHS Wisley; Plant
Year of acquisition	1955
Location in garden	G45 0050
Propagation / Germplasm	
Last check for BG Base	
Condition of plant at last check	
Condition now (1999)	Good

Further information

This species is known in nature from a single specimen found in 1945.

Potential utilisation of RBGE accession(s)

It is likely that this accession is the same genotype as the lone individual grown in the wild (and most others in cultivation), and thus may not be that unique. Herbarium specimens of living material should be obtained, also photographs should be taken. Interpretative display work for this plant may also have merit.

Torreya jackii Chun.

Family	Taxaceae
IUCN category	Endangered
Range in wild	W & S Zhejiang and N & NW Fujian
Habit	Tree

RBGE accessions

No. of accessions	1
No. of live plants	1

Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	No
Photograph/image	0
Shipments from RBGE	0

Conservation information

Known conservation programmes
Proposed conservation areas at Jiangxi (Fujian) and Xiaosukeng and Jiafenkeng (Zhejiang)
Threats in the wild
Human activity, population growth; degradation of habitat
No. and distribution of wild populations

Details of individual RBGE accession

1.

Accession number	1997 0112
Provenance	Cultivated
Original Collector	
Source of accession (person and type of material)	Arnold Arboretum; Cutting
Year of acquisition	1997
Location in garden	P13
Propagation/Germplasm	
Last check for BG Base	1999
Condition of plant at last check	Alive
Condition now (1999)	Alive

Potential utilisation of RBGE accession(s)

The plant could be propagated and distributed, even though the genotype is of unknown provenance. Make herbarium specimen of living material once it is large enough; and photograph.

Starting references

CHINA PLANT RED DATA BOOK: 142

TRILLIUM GOVANIANUM WALL EX D. DON

Family	Trilliaceae (Liliaceae)
IUCN category	Endangered
Range in wild	The Himalayas: Xizang Zizhiqu, China; Jammu-Kashmir; Bhutan
Habit	Herbaceous

RBGE accessions

No. of accessions	3
No. of live plants	over 10
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	No
Photograph/image	2 slides of 1978 0628
Shipments from RBGE	1996 1 of 19780628 to Regensburg University 1998 1 of 19780628 to Bloom Nursery 1996 1 of 19861113 to C. Denton

Details of individual RBGE accessions

1.

Accession number	1978 0628
Provenance	WILD; Upper Swat Valley, Kalam, Pakistan
Original Collector	
Source of accession (person and type of material)	W. E. T. Ingwersen
Year of acquisition	1978
Location in garden	W04
Propagation / Germplasm	Seed in Q51
Last check for BG Base	1999
Condition of plant at last check	Dead
Condition now (1999)	

2.

Accession number	1986 1113
Provenance	WILD; Kulu, Manili, Himachal Pradesh India
Original Collector	
Source of accession (person and type of material)	Kirkpatrick and McBeath
Year of acquisition	1986
Location in garden	A: Q04/2 B: Q04.old
Propagation / Germplasm	
Last check for BG Base	A: 1999 B: 1995
Condition of plant at last check	A: alive B: dead
Condition now (1999)	A: good

3.

Accession number	1992 0133
Provenance	WILD; Barunkhola, Pematang Kharka, Napal
Original Collector	
Source of accession (person and type of material)	Edin. Makulu E
Year of acquisition	
Location in garden	E53 0060

Propagation / Germplasm	Seed in Q51 not found
Last check for BG Base	1997
Condition of plant at last check	4 plants alive
Condition now (1999)	At least 10 seedlings

Further information

Has also been classified as a member of the genus *Trillidium.*

Potential utilisation of RBGE accession(s)

Herbarium material should be gathered, and additional photographs could be taken. Much potential exists for distributing seed and/or plants of these wild-collected accessions.

Starting references

China Plant Red Data Book: 398

Trochetiopsis ebenus Cronk

Family	Sterculiaceae
IUCN category	Extinct/Endangered
Range in wild	St. Helena
Habit	Small Tree

RBGE accessions

No. of accessions	3 in BG-Base (2 with labels of *T. melanoxylon*)
No. of live plants	4 (3 with labels of *T. melanoxylon*)
Herbarium specimens from RBGE accession	No
Herbarium specimens from other locations	No?
Photograph/image	0
Shipments from RBGE	0

Conservation information

Known conservation programmes
Several on St. Helena
Threats in the wild
Grazing in 18th century caused major decline; current suppression by inbreeding has been a more recent contributing factor
No. and distribution of wild populations
Two individuals were discovered in 1980 on a cliff near the Asses Ears. Approximately 4000 vegetatively propagated plants have been reintroduced to the Island.

Details of individual RBGE accessions

1.

Accession number	1996 0356
Provenance	WILD; St. Helena
Original Collector	Q. Cronk
Source of accession (person and type of material)	Q. Cronk; Plant
Year of acquisition	1996
Location in garden	P14 (formerly P13)
Propagation/Germplasm	
Last check for BG Base	1997
Condition of plant at last check	Alive
Condition now (1999)	Alive

2.

Accession number	1986 0079 (labelled as *T. melanoxylon*)
Provenance	Cultivated
Original Collector	
Source of accession (person and type of material)	Liverpool Botanic Garden; Plant
Year of acquisition	1986
Location in garden	A: P14 (formerly in P13) B: P14 (formerly in P16)
Propagation / Germplasm	
Last check for BG Base	A: 1997 B: 1992
Condition of plant at last check	A: Alive B: Alive
Condition now (1999)	A: Good B: Good

3.

Accession number	1993 2239 (labelled as *T. melanoxylon*)
Provenance	WILD; Cultivated of known wild origin: St. Helena
Original Collector	
Source of accession (person and type of material)	Liverpool Botanic Garden; Seed
Year of acquisition	1993
Location in garden	P14
Propagation / Germplasm	
Last check for BG Base	1997
Condition of plant at last check	Alive
Condition now (1999)	Good

Further information

When first discovered, this species was given the epithet *melanoxylon*, which is that of a separate, extinct member of the genus. The name was therefore changed to the

current one. It is easily clonally propagated, and has been the subject of an extensive re-introduction programme on St. Helena. Another member of the genus, *T. erythroxylon*, is almost destined for extinction. Hybrids of this species with *T. ebenus* show extreme vigour and may be the only way of preserving the genetic make-up of *T. erythroxylon* (which suffers from severe inbreeding depression and is virtually impossible to clonally propagate).

Potential utilisation of RBGE accession(s)

The RBGE accessions are not unique genotypes, but should still be maintained and used as stock plants for continued propagation and distribution. Photograph and obtain herbarium material of living collections (if they do not already exist). This genus is a treasure chest of material with respect to conservation-specific interpretation.

Starting references

Q. C. B. Cronk has been a primary investigator and has many on file, as he has been studying this genus for some time.

Q. C. B. Cronk. 1995. A new species and hybrid in the St. Helena endemic genus *Trochetiopsis*. *Edinb. J. Bot.* 52(2): 205–213

Q. C. B. Cronk. 1986. The decline of the St Helena ebony *Trochetiopsis melanoxylon*. *Biological Conservation* 35: 159–172.

References

Cullen *et al.* (1988). *The Cultivation and Propagation of Threatened Plants: A proposal for the documentation of botanic garden methods*. IUCN, Botanic Gardens Conservation Secretariat.

Given, D. R. (1987). What the conservationist requires of ex situ collections . In: Bramwell *et al. Botanic gardens and the World Conservation Strategy*. Academic Press Inc (London) Ltd.

Rowe, R. E. (1995). *The Population biology of Trochetiopsis: a genus endemic to St Helena*. PhD thesis Oxford University unpublished [Quentin Cronk RBGE has a copy]

Smith, A. (1997). Environmental education in botanic gardens: is it helping to save biodiversity? In: *Conservation into the 21st Century – 4th International Botanic Gardens Conservation Congress* pp. 323–329