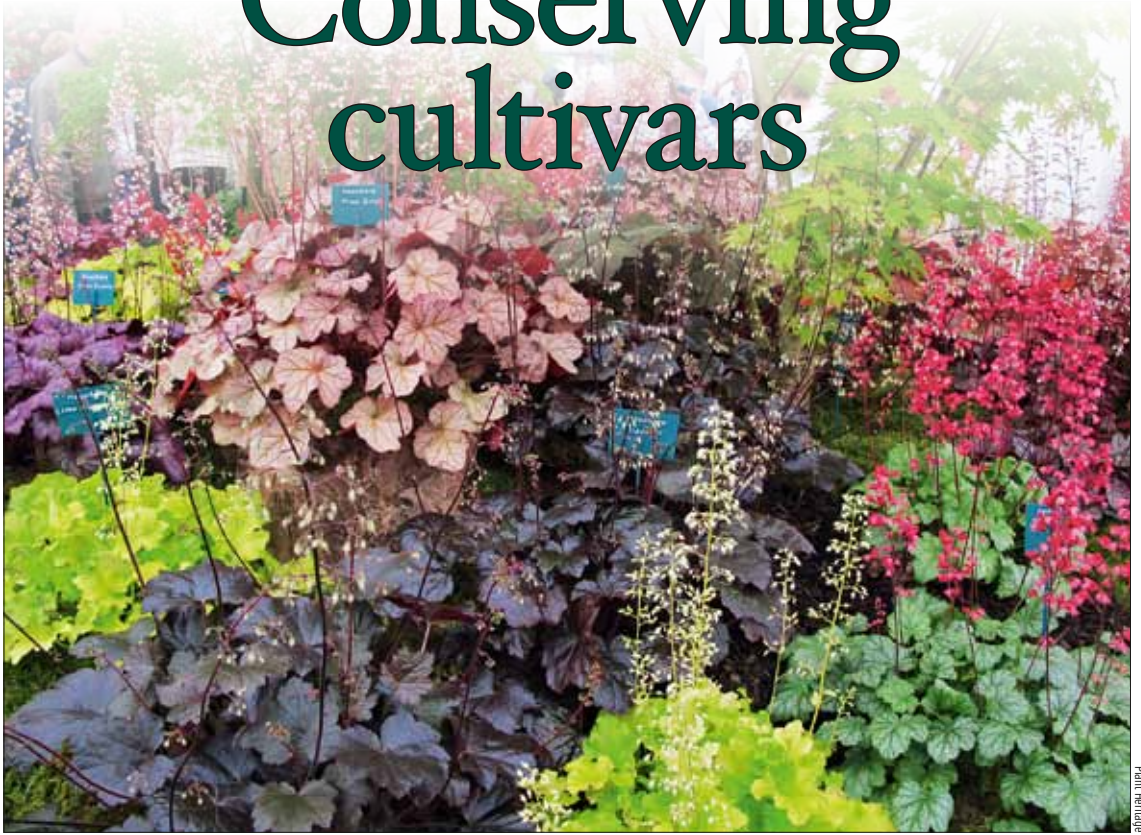


Conserving cultivars



Plant Heritage

How do you decide which cultivars are worth conserving? KALANI SEYMOUR outlines Plant Heritage's Threatened Plants Project

Genera cycle in and out of fashion. *Heuchera* (above, the National Plant Collection of Vicky & Richard Fox, Cheshire) are currently in fashion, but *Aucuba* (right, the National Plant Collection of Linda Eggins, Worcestershire) are less fashionable. Out of 41 known *Aucuba* cultivars, 22 are threatened: 15 of these are in the National Plant Collection, 5 in other gardens, and two, *A. japonica* 'Angelon' and 'Wykehurst', cannot be found



Plant Heritage

PLANT HERITAGE'S Threatened Plants Project is undertaking research in order to take action on cultivated plant conservation. For all cultivars grown in British and Irish gardens, Plant Heritage is asking whether they are rare commercially, which gardens hold them, and which have horticultural, heritage or economic value. The aim is to find out which cultivars we most need to conserve, and how best to do it. The Project (Anon. 2009) is now in its third year and the first 276 genera, containing tens of thousands of cultivars, are being assessed. This is being done with the help of more than 80 volunteers, as well as collection holders and experts.

Why conserve cultivated plants?

Plant Heritage has been conserving plants in cultivation since 1978, most notably in its National Plant Collections (Plant Heritage 2012). Threats to cultivated plants include difficulty of propagation or cultivation, loss of horticultural skills, loss of large gardens or change in their use, poor financial prospects for smaller growers, climate change, and crucially, changes in fashion.

Since 1987, nearly 85,000 cultivars in over 1,000 genera have been offered commercially, according to *RHS Plant Finder* (Cubey *et al.* 2012) data. Many are no longer available: 27,252 names were listed for the last time between 1996 and 2009, and 50,000 since 1987. No one knows which are most urgently in need of conservation, as little research has been done (RHS & NCCPG 2007).

Biodiversity and cultural importance

In the United Nations decade of biodiversity 2010–2020, the international importance of cultivated plant conservation is

being endorsed by the Convention on Biological Diversity (2011) in its new Global Strategy for Plant Conservation. Part of this is the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets. Target 13, for the first time, cites the importance of preserving the genetic diversity of culturally as well as socio-economically valuable species (see box, below).

How many have become extinct?

It is not known how many cultivars have become extinct. Identifying and verifying each must be done

Aichi Biodiversity Target 13

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity. (Convention on Biological Diversity 2011)

individually by someone with in-depth knowledge of that plant's history.

For example, National Plant Collection holders supplied information on extinct cultivars *Cistus* × *fernandesiae* 'Jane' and *C.* 'Laddie', *Dianthus* 'Lord Rosebery' and *D.* 'Duc de Montpensier', and *Iris* 'Benton Baggage', for a recent pilot project (Morris *et al.* 2010). Other documented extinctions, researched by the RHS, include *Narcissus* 'Weardale Perfection', *Nerine* 'Glitter' and *Lachenalia* 'Monte Carlo'.

Theory behind assessment

Inspired by the International Union for Conservation of Nature's assessment framework for conservation of wild species, we have developed a



Lachenalia 'Monte Carlo',
Extinct in cultivation

RHS Herbarium / Ebbie Katherine Sykes

similar scheme. It uses the same categories of threat, and is systematic and objective, but uses criteria appropriate to cultivated plants.

The criteria were developed from initial data received from an RHS survey of members of the horticultural industry in 2008 (David 2009, Price & Wildey 2009). The survey asked what they valued in terms of conservation importance. 91% rated rare or endangered species as high priority for conservation, and 83% rated rare or scarce plants raised in cultivation as high priority. Half of the raisers and breeders said that they used older cultivars, although most, only occasionally.

The choice and weighting of assessment criteria was informed by Plant Heritage's work, as well as that of other organisations. For instance, it took account of the National Trust's process for assigning Conservation Plant Values (Buffin 2009), English Heritage's listing scheme for historic buildings, the RHS's Award of Garden Merit criteria, and research done by the Hardy Plant Society's Pulmonaria Group for its Pulmonaria Conservation Project. ➤

Categories of rarity and threat

Data from the *RHS Plant Finder* (Cubey *et al.* 2012), the RHS Horticultural Database, National Plant Collections and other relevant sources are used to assess conservation concern and assign categories. Cultivated plants which have become rare are categorized as Threatened in cultivation (THR_{ic}). Those that are not threatened are categorized as of Least Conservation Concern (LC_{ic}) or Not Currently Threatened (NT_{ic}).

ARE THEY THREATENED?	
Category	Criteria
LC _{ic}	>21 occurrences in National Plant Collections + 5 years of <i>RHS Plant Finder</i> + Last Listed
NT _{ic}	7–21 occurrences
THR _{ic}	<7 occurrences

THR _{ic} : CAN THEY BE FOUND?	
Category	Criteria
VU _{ic}	growing at 3 or more sites
EN _{ic}	growing at 1 or 2 sites
CR _{ic}	not found growing

The category is calculated from the number of occurrences in total: in National Plant Collections; in the last five years of the *RHS Plant Finder* (number of nurseries offering for sale); and in the *RHS Plant Finder* Last Listed list (last listed between 1987 and 2010). Cultivars which were new in the past two years are removed from the threatened list, as their scarcity does not signify loss.

Plants assessed as Threatened in Cultivation are further categorized as Vulnerable (VU_{ic}), Endangered (EN_{ic}), or Critical in cultivation (CR_{ic}). This is based on whether they are found from plant collection records to be growing at: three or



more sites; only one or two; or nowhere at all, respectively.

Looking for rare plants

Plant records from 817 collections of

national importance (administered by 27 different organisations) are searched for rare cultivars. Curators and head gardeners are encouraged to send me plant records as well as to upload them to Botanic Gardens Conservation International's PlantSearch database. Our volunteers can then search publicly available, up-to-date records over the internet. They trawl through records from botanic gardens in England, Scotland and Ireland, RHS Gardens, the Sir Harold Hillier Gardens, and Cardiff parks. Confidential records, such as those of National Plant Collections, are checked at Plant Heritage. Checking is still required for 76 genera.

To see which plant collections are being searched for rare cultivars, go to the TPP website (see box, p158) and click on 'Finding rare and threatened cultivars'.

Expert assessment of Plant Heritage Value

Experts are requested to assess the Plant Heritage Value of threatened cultivars, according to the following scheme. Horticultural merit, heritage value, and usefulness to people are all taken into account, and the maximum score is 10 marks.

For horticultural merit five marks can be given: one each for garden value, resilience, breeding use, propagation ease, and winning of awards. A point for garden value could be for colour, scent, form, flower, flowering time, fruit, habit or role in garden such as hedging or herbal use. A mark for resilience may reflect coping well with cold, wet, drought, disease, wind or salt, or if it grows on a wide range of soils, or performs well under glass. One for breeding use might refer to a distinctive new break, being an important parent of a breeding line, or having unusual traits which could



Experts are needed to assess the conservation status of *Crocus* cultivars. *Crocus sieberi* 'Ronald Ginns' has already been found to be Critical in cultivation

Tim Smedley / RHS

be valuable in the future. Propagation ease could be just that, or coming true from seed. Award-winning encompasses the RHS AGM, other important awards, or a published recommendation by a respected garden plant authority.

Heritage value is worth up to three marks: for historical significance, age, and cultural importance. Historically significant

cultivars would have been collected, selected, bred at, or by or named after, a significant place, event or person in British or Irish horticulture, or been a significant parent of a breeding line here. Old is defined as existing pre-First World War. Cultural importance would be to a set of people, or distinctive locally, regionally or nationally, and possibly still in current use.

Usefulness to people can gain two marks, one each for direct and indirect uses. Direct, edible or medicinal use may refer to actual use or potential. Indirect use could include cosmetic, fuel, craft or wildlife value.

Experts are also encouraged to recommend if a cultivar should be conserved whatever the scores, or conversely warn if it is wrongly identified in cultivation, has a lookalike, or has been superseded by later cultivars.

RESULTS

Genera with no threatened cultivars

So far, 15 genera contain no cultivars rare enough to be classed as threatened in cultivation: *Billardiera*, *Blepharocalyx*, *Chamaelucium*, *Cortusa*, *Cosmos*, *Encephalartos*, *Ferula*, *Gasteria*, *Gerbera*, *Haloragis*, *Laburnocytisus*, *Olsynium*, *Orixa*, *Pachypodium* and *Sollya*. ➤

NUMBERS OF THREATENED CULTIVARS FOUND FROM AN INITIAL SURVEY OF 3,611 CULTIVARS

Garden	Threatened cultivars found out of first 3,611		Total cultivars grown
		Unique to that collection	
National Plant Collections*	1,462	at least 1,121	35,000 – 50,000
Royal Horticultural Society Gardens	778	622	28,000
National Trust	124	70	11,000
Sir Harold Hillier Gardens	75	43	13,000
Royal Botanic Garden, Kew, and Wakehurst Place	67	44	4,500
Sheffield Botanical Gardens	49	30	2,000
Royal Botanic Garden Edinburgh	38	17	2,800
Eden Project	32	20	3,500
Cambridge University Botanic Garden	32	12	1,800
St Andrews Botanic Garden	29	14	1,400
National Botanic Garden of Wales	27	20	3,000
Plant Heritage Plant Exchange	24	15	300
University of Oxford Botanic Garden	22	14	1,300
National Trust for Scotland	20	11	5,700
Pinetum Park & Pine Lodge Gardens	17	14	2,300
Hardy Plant Soc. Pulmonaria Conservation Project	14	14	45
Thorp Perrow Arboretum	11	6	300
Bristol Zoo Gardens	5	3	700
National Botanic Gardens of Ireland	4	2	3,700
Hardy Plant Society Conservation Scheme	3	1	100
High Beeches Garden	2	0	600

* Data from 53 National Plant Collections including 11 held by the National Trust, National Trust for Scotland, RHS Gardens, Sir Harold Hillier Gardens, Thorp Perrow Arboretum, and University of Oxford Botanic Garden (also listed separately)

Each has only a few common or new cultivars listed in the *RHS Plant Finder* or in National Plant Collections.

Threatened plants

The first 56 genera have now been assessed, comprising 5,832 known cultivars. Two-thirds of these cultivars (3,611: 62%) are Threatened in cultivation. Any additional cultivars found will most likely be rarer and therefore also Threatened.

Nearly half of these Threatened plants (1,652: 45%) are Critical in cultivation (CR_i) – not found growing anywhere, and scarce or not offered commercially. Over half of the Threatened cultivars (1,933: 54%) have been found, growing in established living collections. These plants, Endangered in cultivation (EN_i) are recorded at only one or two gardens, and are not readily available from nurseries. Fewer than 1% (26) of the threatened cultivars

are Vulnerable in cultivation (VU_i) – rare commercially, but growing in three or more major gardens.

Finding rare plants

The greatest contribution to the conservation of threatened cultivars is revealed to be within designated National Plant Collections, which are held by a great variety of organizations and individuals.

Plant Heritage (then known as the National Council for the Conservation of Plants and Gardens) was set up in 1978 specifically to safeguard rare cultivated plants through its National Plant Collections scheme (Morris 2011). Brickell & Sharman (1986) highlighted plants in 80 genera at risk of extinction. At that time 37 of these genera had been established as the first National Plant Collections, in the care of 57 different collection holders. 14 of them still hold the same Collections in 2012, and others have been carefully passed on through two or more different owners.

It is hoped that soon, results from the Threatened Plants Project will contribute to the establishment of additional heritage-themed plant collections to support targeted conservation. There are currently over 50 heritage-type National Plant Collections including Queen Mary II Exoticks (Hampton Court Palace), British award winners and historically significant Siberian iris cultivars (in Lockerbie), and traditional perry pears (Three Counties Agricultural Society).

Experts needed

The first 56 genera (working through in alphabetical order – updated lists

FURTHER INFORMATION

Threatened Plants Project pages on the Plant Heritage website: www.plantheritage.org.uk/TPP.aspx



Kalani Seymour / Plant Heritage

Steve McNamara and Kalani Seymour discussing threatened *Cassiope* at Branklyn Garden, Perth

can all be found on our website) now need experts to assess their Plant Heritage Value (Seymour 2012). Luckily we already have 53 collection holders from whom to request advice on 31 of these genera, but we need and welcome further input for these immediately, and, as the project continues, for everything else grown in British and Irish horticulture. If you can advise on any, or many, genera, please do let me know.

Active conservation

Our first plant found to be both threatened and worthy of conservation, *Pulmonaria* 'Red

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RHS and Hardy Plant Society *Plant Finder* data in electronic format were kindly provided by Janet Cubey and Rupert Wilson at the RHS. Mercy Morris (Plant Heritage), John David (RHS), Tim Upson (Cambridge University Botanic Garden) and Mike Buffin (National Trust) established and advise the project, and Peter Halliwell and Sarah Barton were previous Coordinators.

EXPERTISE REQUIRED

Experts are needed to assess these genera (no. of threatened cultivars)

- Acanthus* (6), *Acca* (1), *Actinidia* (13), *Amelanchier* (9), *Antirrhinum* (40), *Artemisia* (24), *Aucuba* (27), *Blechnum* (6), *Brachyglottis* (9), *Brugmansia* (100), *Callistemon* (37), *Calluna* (455), *Campsis* (2), *Canna* (320), *Cardamine* (5), *Cassiope* (10), *Chionodoxa* (4), *Cornus* (132), *Cotinus* (6), *Crocus* (141), *Dicbondra* (1), *Dierama* (28), *Digitalis* (59), *Diospyros* (4), *Echium* (4), *Epilobium* (12), *Epimedium* (46), *Eranthis* (3), *Erica* (322), *Erodium* (59), *Erysimum* (76), *Eucalyptus* (9), *Euphorbia* (68), *Fatsia* (2), *Festuca* (18), *Ficus* (118), *Forsythia* (36), *Fothergilla* (9), *Fragaria* (74), *Fremontodendron* (2), *Geum* (34), *Ginkgo* (19), *Griselinia* (5), *Gunnera* (1), *Hebe* (319), *Helianthemum* (120), *Heliotropium* (16), *Hepatica* (166), *Hyacinthus* (153), *Hyssopus* (2), *Iberis* (12), *Iresine* (4), *Juglans* (147), *Kalanchoe* (31), *Kalmia* (34), *Lavandula* (258)



Tom Hawker / The Hebe Society



Michael Evans / RHS

Hebe 'Headfortii' (left), is Critical in cultivation. Michael Evans lifting *Pulmonaria* 'Red Freckles' (right) for propagation, Endangered in cultivation, it was only found at RHS Gardens Wisley and Rosemoor

Freckles' (Anon. 2012), was last listed in the *RHS Plant Finder* in 1995. The RHS holds the only plant material found in the UK. Seven plants from RHS Garden Wisley were donated to the Hardy Plant Society's *Pulmonaria* Group for propagation. They also carried out the initial expert assessment of horticultural merit, and found every other cultivar which they had rated as worthy.

Out of 181 known named cultivars of *Pulmonaria* grown in Britain and Ireland, 4 were synonyms, 52 of least conservation concern (LC_{ic}), 26 not currently threatened (NT_{ic}), and 3 new, leaving 96 Threatened in cultivation (THR_{ic}), using *RHS Plant Finder* data (78 of these had been Last Listed). 35 more were added after Hardy Plant Society research,

giving a total of 131 Threatened cultivars. This total included 16 lookalikes identified by a previous Collection holder; there is no current National Plant Collection for *Pulmonaria*. Of the 131 none were found in more than two gardens (Vulnerable in cultivation, VU_{ic}), 22 were found in RHS gardens and 18 in other gardens (Endangered in cultivation, EN_{ic}), and 95 were not found (Critical in cultivation, CR_{ic}).

In May 2012 Plant Heritage's own Plant Exchange, for the first time, featured red labels identifying 30 Threatened cultivars across different genera (15 had not been found anywhere else). This attracted interest from donors and new guardians.

The National Trust holds many Threatened cultivars in its gardens

(Buffin 2010). Its Plant Conservation Programme, whose criteria partly overlap and were developed in parallel with this project, propagates 464 cultivars among 1,818 taxa, of which 12 have recently been identified as Threatened in cultivation, and six are uniquely held.

Cambridge University Botanic Garden is considering developing a collection of *Rosmarinus* and formalizing its holding of nine rare cultivars of *Lavandula* as new, heritage-themed collections.

In the light of these findings and ongoing work, Plant Heritage is currently reviewing its diverse conservation activities of registration, collections support, plant exchange and propagation. The aim is for better integration, and to provide more opportunities for new collection holders and others to contribute to cultivated plant conservation.

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