

# The UK Flora Seed Collecting Project 2015-2019

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# The Value of Seed Banking

## UK Flora Seed Collection Project Aims

### What is Involved?

# The Value of Seed Banks



- An **insurance policy** against threats to plants in the wild.
- Opportunities to develop **skills, knowledge and data** to support ecological restoration and sustainable utilisation
- **Options** for the future survival and use of plants

**Long-term, relatively low-cost conservation**



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# Making Collections Available

## MSB Seed List

Small samples available for research, education and conservation.

Register & MSA signed.  
Free of charge.

## UK Native Seed Hub

Larger quantities of seeds or plant plugs to support conservation and restoration programmes.

Charged on cost recovery basis



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# Use of Collections

## Research, Education, Conservation

Japanese Knotweed Bio-control Programme (CABI)

“Japanese Knotweed costs Great Britain an estimated £165m every year” ([Williams et al 2010](#))

- 43 samples provided to CABI from related UK taxa on their Test Plant List
- In 2015, 235 samples from UK flora collections supplied for research, education, conservation purposes



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Psyllid, *Aphalara itadori*



# Use of Collections

## Research, Education, Conservation

*Ranunculus ophioglossifolius*  
Adder's Tongue Spearwort

*Phyteuma spicatum*  
Spiked Rampion

Criteria: Projects collaborating  
with country agency and  
appropriate on-site  
management in place



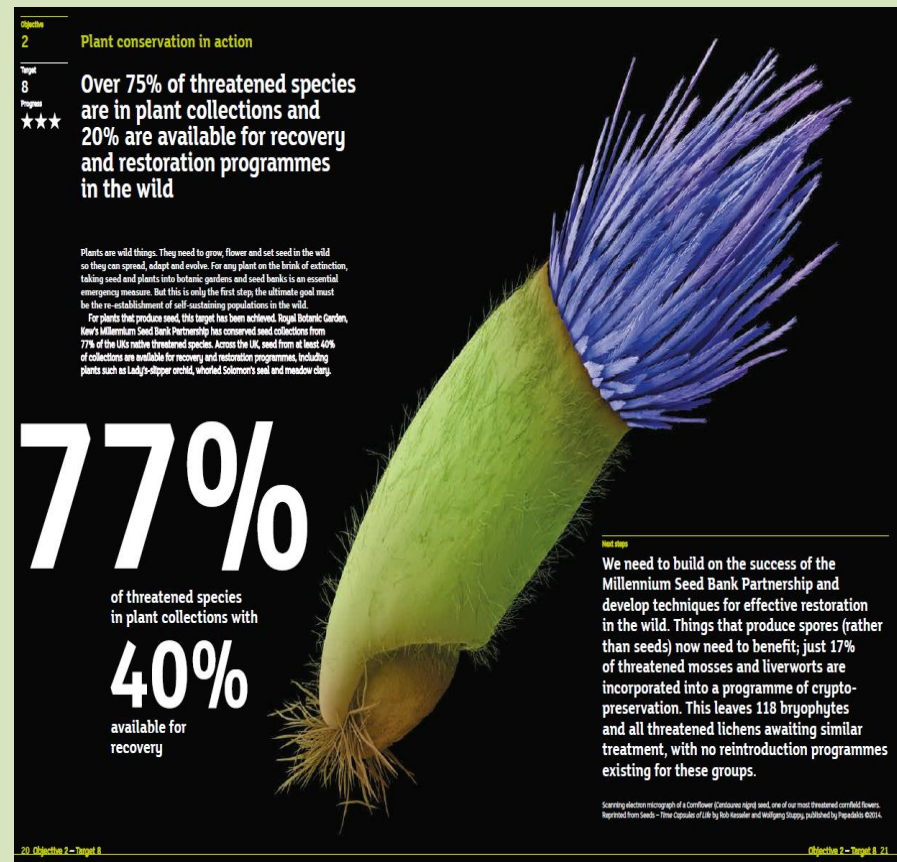
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# Global Strategy for Plant Conservation

**“Target 8:** At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes”





# UK Flora Seed Collection Project

- To date almost **95%** of the UK's storable native species conserved
- ~6000 collections conserved of varying quantity & quality
- Previously infraspecific taxa, archaeophytes and neophytes were low priority



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# Project Partners



Botanical Society of Britain and Ireland (2015-2019)

Royal Botanic Gardens Edinburgh (2016-2019)



*Myosotis stolonifera* (Pale Forget-me-Not)

140 collections received in 2015

54 collections from BSBI members

Including a new MSB species conserved of Pale-Forget (European endemic)

Mapping tool being developed by BSBI (Tom Humphrey) – collections overlaying distribution.

# UK Flora Seed Collecting Project Aims

## Priorities for the next three years:

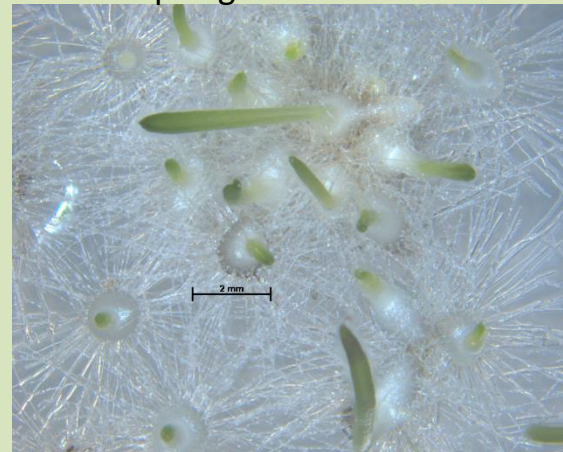
- To conserve as many of the ~70 remaining species on the target lists.
- To conserve infraspecific taxa
- To conserve multi-provenance samples of priority taxa
- To further study storage behaviour and germination protocols for 'difficult' groups, eg. aquatics, orchids, willows.

*Phyllodoce caerulea*



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Anacamptis germination



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# Seed Collecting Guidelines And Target Lists Available



UK FLORA SEED COLLECTING  
ON BEHALF OF THE  
MILLENNIUM SEED BANK PARTNERSHIP,  
ROYAL BOTANIC GARDENS, KEW

## PROTOCOL FOR SEED COLLECTION

This Protocol has been compiled to provide information and advice for botanists proposing to participate in the Millennium Seed Bank Partnership UK collecting, including collections made for the UK Native Seed Hub at RBG Kew.

### 1. AIM OF SEED COLLECTING

The aim is to conserve verified and well documented wild species seed collections, each of which comprises a significant representation of the genetic variation within a sampled population. The collections are a basis for off-site conservation and, where appropriate, for introduction or recovery programmes. Material will also be available for research into seed biology, germination behaviour and other aspects of biological study and more generally used to further RBG Kew's charitable and statutory purposes.

By working with partners and volunteer collectors across the UK, RBG Kew intends to collect and maintain viable seed samples from at least one population of each UK native plant species that regularly sets storable seed. RBG Kew also aims to store samples from across the natural UK range of our native species to support a wider range of future uses. These include restoration of native plant communities through the work of the UK Native Seed Hub (UKNSH), described in Annex 3.

### 2. AUTHORISATION AND TRANSFER OF MATERIAL TO KEW

- You must ensure that you have prior permission of the landowner or occupier to access and enter their land. It is important that landowners are aware of and agree with the potential to collect seed. Please ensure that they are supplied with a copy of the Landowner Consent & Information sheet that consent is given and that you or the landowner complete the relevant boxes and sign the sheet (Annex 1).

Species included in Schedule 8 of the Wildlife and Countryside Act, 1981<sup>2</sup> (listed at Annex 2) are of special concern from the relevant statutory conservation agencies. Please contact RBG Kew for

Sites of Special Scientific Interest (England, Scotland, Wales) or Areas of Special Scientific Interest (Northern Ireland) require approval from the statutory conservation agencies. RBG Kew will only collect seed from these sites with conditions for England (until October 2016), Wales (until January 2017) and Northern Ireland (until January 2017). Please note conditions attached in letters of assent. Landowner permission remains a requirement. Please contact RBG Kew for advice<sup>3</sup>

<sup>2</sup> Schedule 8 of the Wildlife (Northern Ireland) Order, 1985

<sup>3</sup> for RBG Kew contact details

#### MISSING SPECIES

#### PRIORITY 1A

December 2015

Neotinea maculata	Northern Ireland RRR	NI_Priority;
Neottia cordata	Scattered	Keep on 1A. Small quantity of viable seed 2015
Ornithogalum umbellatum subsp. campestre	Scattered E Eng Native?	
Orthilia secunda	R. Scattered	NI_Priority; W(NI)Q-Sch8_part1;
Phyllodoce caerulea	RRR. Few sites - Perthshire. Seed production low.	RedList_GB_post2001-VU; Status-NR; Scottish_Biodiversity_List; WACA-Sch8;
Poa alpina	RR. Usually proliferates. Seed bearing forms widespread. NW Eng.	Status-NS;
Poa bulbosa	RR. Usually proliferates. Possible to find seeding populations? S Eng	Status-NS;
Poa flexuosa	RRR in Scot. Seed set unknown	RedList_GB_post2001-VU; Status-NR; UKBAP-2007; Scottish_Biodiversity_List;
Potamogeton alpinus	Scattered	
Potamogeton epihydrus	RRR - South Uist	RedList_GB_post2001-VU; Status-NR; Scottish_Biodiversity_List;
Potamogeton rutilus	RRR - N Scot - Turions usually	Status-NR; UKBAP-2007; Scottish_Biodiversity_List;
Potamogeton trichoides	R. Scattered - usually turions	Scottish_Biodiversity_List;
Ranunculus fluitans	R. Scattered	NI_Priority; W(NI)Q-Sch8_part1;
Ranunculus paludosus	RRR - popn too small	
Ranunculus reptans	Scot	RedList_GB_post2001-VU; Status-NR; Scottish_Biodiversity_List;
Rosa obtusifolia	RR. Freq. C En.	
Salicornia emerici	RRR. Syn. S. nitens. Specialist - ID difficult	RedList_GB_post2001-DD; Status-NS;
Salicornia fragilis	RR. Specialist - ID difficult	Status-NS;
Salix arbuscula	RR. Local on mountains in C Scot (rocky ledges!) Wait for storage results.	Status-NS;
Salix aurita	Common. As capsules open. Dispatch to MSB immediately please	
Salix herbacea	Q common. As capsules open. Dispatch to MSB immediately please	

# Authorisation and Legislation

Landowner consent always required for access & collection (supply info sheet)

**SSSIs** – SNH assent required.  
MSB has general assent letter with conditions – available on request.  
SNH, liaison with site manager & landowner is still required

**Schedule 8** taxa can only be collected under licence.  
Agents may be nominated under SM licence on request.



# Maturity

- Pre-collection visit(s) recommended if practical
- Timing critical for high quality seed
- Collect seeds close to point of natural dispersal for maximum longevity in storage
- Seeds should detach easily from parent plant – seed coat hard & dry



# Assessing seed quality



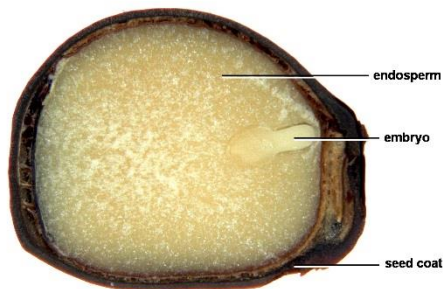
Estimate number of seeds available for collection

Assess proportion of

- Insect-damaged seed
- Empty seeds
- Aborted seeds

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2 mm

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# Setting a safe collecting limit



Harvesting 10 % of seed in 10% of years is generally SAFE

Harvesting 50 % of seed in 50% of years is generally NOT SAFE

(Menges, Guarrant & Hamze 2004. Effects of seed collection on the Extinction Risk of perennial plants)



Less intense, more frequent  
harvests are safer

Recommend 20% of available seed  
on day of collection or 10% for  
fragile populations

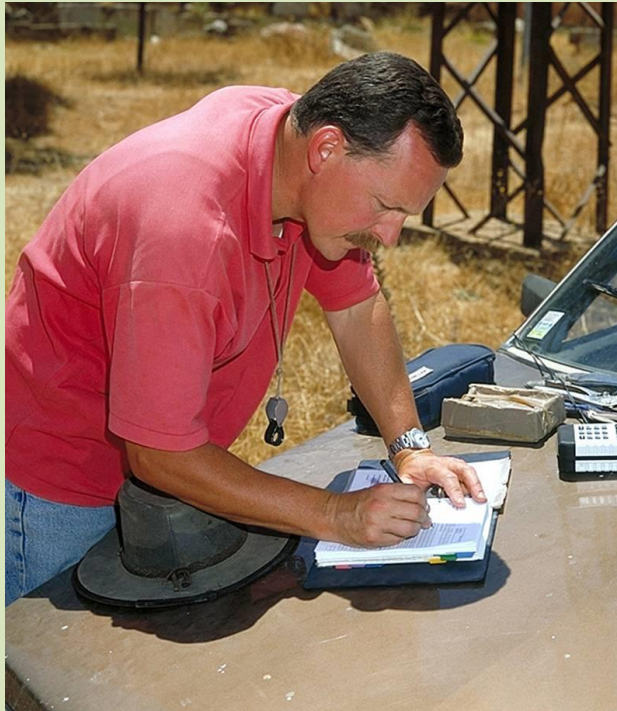


# Sampling Strategy

To maximise genetic diversity of the seed collection:

- Collect from at least 50 individuals (if available)
- Sample randomly and evenly across extent of population
- Collect fewer seeds from a large number of plants rather than all the seeds from a few plants

# Recording Data



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Record as much potentially useful info as possible

Assign each collection a unique collecting number  
eg. SM001, SM002, etc

## EXAMPLE

### MSB UK COLLECTION DATA FORM (Bold type = Obligatory Fields)

Office use only: UKNSH ☐

#### PLEASE USE BLOCK CAPITALS IF HANDWRITTEN

Date Collected	01/06/2011	Collection no.	AS001
Collector(s)	Andrew Smith - County Flora Group		
Incl. organisation			
SITE DATA			
County	West Sussex		
Local Situation	Wet Meadow, Bedelands Nature Reserve, Burgess Hill.		
Latitude	50° 58' 16.26" N	Grid ref:	
Longitude	0° 07' 26.43" W	Please circle GPS/Google Earth/map used? If map, see over.	
Altitude (m)	36	GPS Datum: WGS84/OSGB36	
Landowner	Mid Sussex District Council, Conservation Officer. Telephone no: 01444 477238		
Contact details:			

Has the landowner received the UKNSH information sheet? ☒ YES ☐ NO

#### HABITAT DATA

Habitat description & associated species	Seasonally wet meadow. Species-rich neutral grassland, associated with <i>Plantago lanceolata</i> , <i>Centaurea nigra</i> , <i>Serratula eboracae</i> .		
NVC community	M96a	Modifying Factors	Seasonally wet. Hay cut Aug/Sept.
Land form	Wetland Meadow	Slope*	0-5°
Land use	Recreation, hay production	Aspect	n/a
Geology	Wetland clay	Drainage	Impeded
Soil texture, colour, pH	Clay, brown soil		

#### IDENTIFICATION DATA

Family	Leguminosae	Identified by	Arthur Smith
Genus	Lotus	Institute	B5BI (reference/VC recorder)
Species	<i>pedunculatus</i>	Material identified	Wild living plant/herbarium specimen
Infra-specific		Date identified	03/6/2011
Schedule 8 species?	Y <input checked="" type="radio"/> N <input type="radio"/>	If yes, in whose name is the licence held	n/a

#### SAMPLING DATA

Herbarium specimen/Photo sent:	HSAP <input checked="" type="checkbox"/> v <input type="checkbox"/>	No. of Plants Sampled:	250	Area sampled (m <sup>2</sup> ):	600
Permission to use image:	v <input checked="" type="checkbox"/>	No. of Plants Examined:	>1000	% population producing seed:	80

Seed harvesting: (early/mid/late season)/Seeds Collected from (plant/ground, both)/State of seeds (moist/dry, both, other)

#### DESCRIPTION

Plant Habit:	Tree Shrub <input checked="" type="radio"/> Erect herb <input type="radio"/> Creeping herb <input type="radio"/> Climbing herb <input type="radio"/>	Plant Height (m)	To 0.5m
Other descriptors:			

+/- bi-py. Leaflets obov. Stems hollow. Flowers yellow. Calyx teeth spreading when in bud.

# Post-harvest Handling



Use porous bags (cloth or paper) Unless collecting fleshy fruits, in which case use plastic

Allow plenty of air to circulate within and around the bags – if wet, spread onto newspaper overnight.

Keep collections cool but not in the fridge

Send to MSB using FREEPOST label as soon as possible

Collections will be cleaned by staff at MSB.



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# Herbarium vouchers (Optional Extra)



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Useful: as well as verifying the seed collection, provides a biological record. Accessioned into Kew/RBGE herbarium.

\*Not from Schedule 8 or fragile populations.



# Tissue Samples (Optional Extra)



Useful: Tissue samples for storage – available for DNA extraction when required. Young leaves/buds from up to 5 individuals if sufficient material available

# Would you like to help?

Equipment supplied & travel expenses will be reimbursed.

Collection training day to be held in Edinburgh 22nd June.

Pledges welcome!



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