Botanic Gardens Conservation International

The world's largest plant conservation network

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Plants for the Planet

Module 2: Prioritisation and Pre-collection Assessment




- Why plan
- Prioritisation
- Prospecting
- What, where, when, how
- Quantity
- Quality

Why plan?

Be in the right place at the right time and collect quickly and efficiently.

Especially important when collecting:

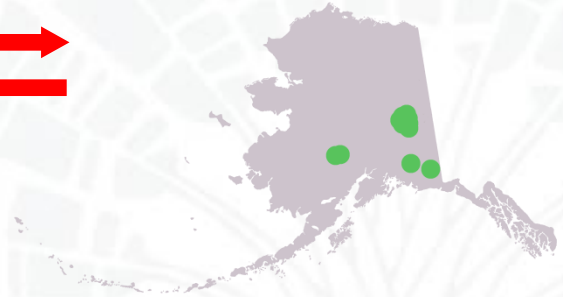
- in inaccessible, multispecific natural forests
- from different sources and widely spread species
- within different countries with differing regulations

Prioritisation

Decide on the species to collect and then look for a location.

OR

Decide on the sites and identify species to collect.



Prioritisation

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Species prioritised depends on national and institutional goals.

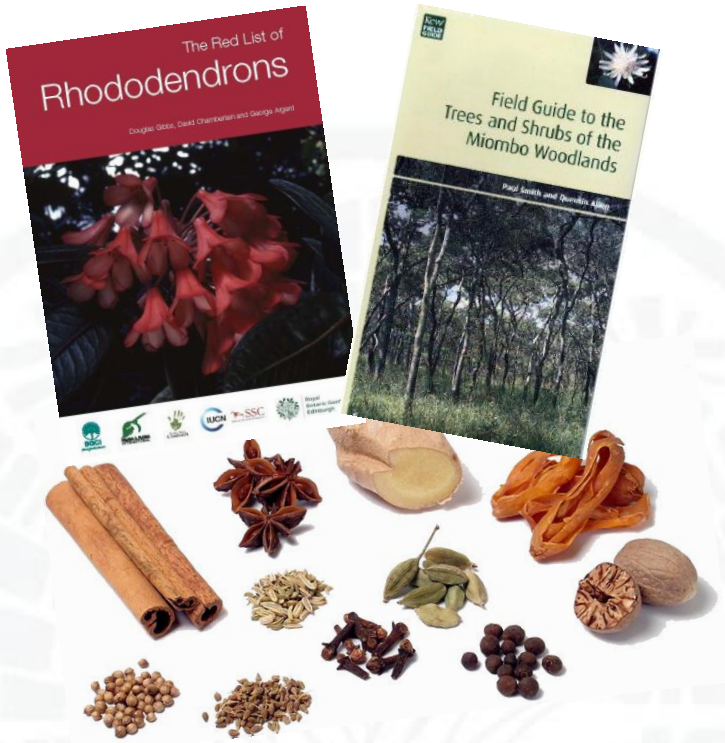
e.g.

Millennium Seed Bank Project

The three E's:

Endangered species: Critically Endangered, Endangered or Vulnerable species or habitats **Endemic species**: Species native to an area, and neither introduced nor a pan-tropical weed

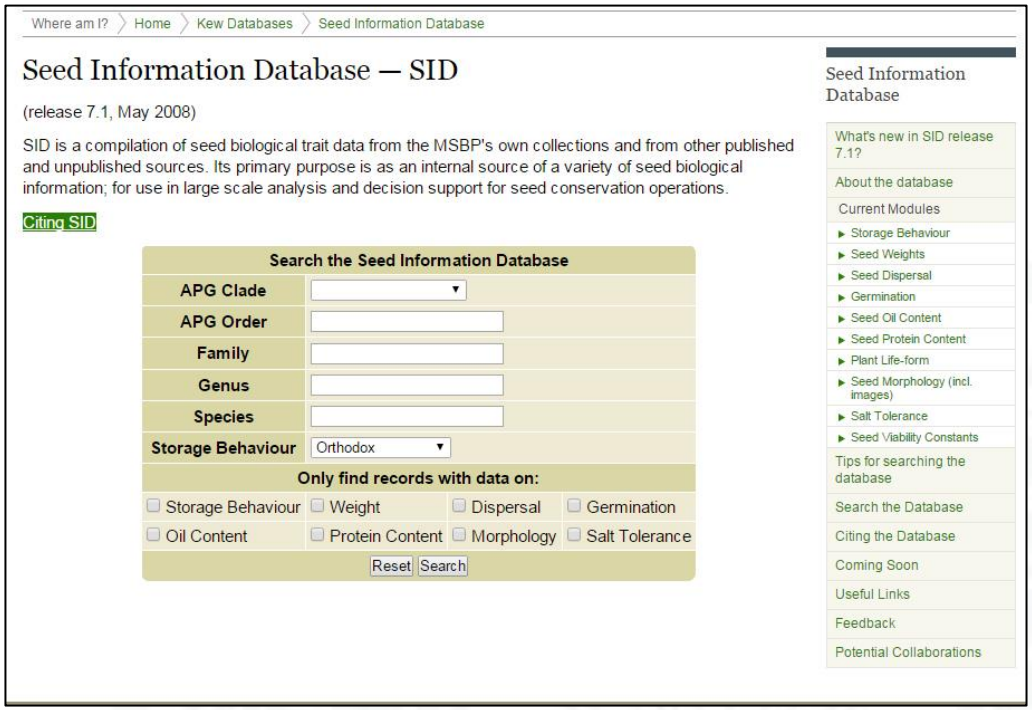
Economic species: Species valued/used by people



Prioritisation

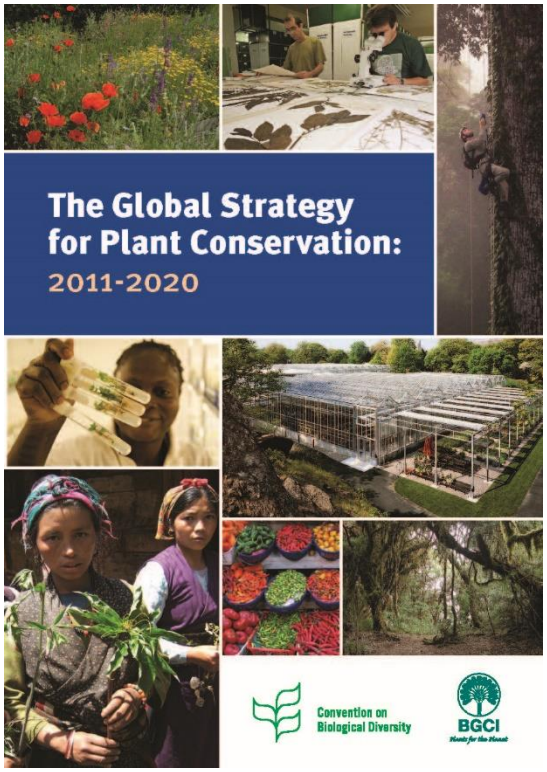
Other criteria for prioritising can include:

- Orthodox seeds: retain viability after drying and freezing
- Species required for research
- Rare seeds: not already banked or readily available



http://data.kew.org/sid/

Prioritisation



https://www.bgci.org/policy/gspc/

Target 8 of GSPC:

"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."

Prioritisation

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GLOBAL
SEED
CONSERVATION
CHALLENGE

Over 400 botanic gardens are involved in seed banking. The GSCC will increase the contribution of the botanic garden community towards Target 8 of the GPSC through training, prioritisation, prizes and sharing knowledge.

https://www.bgci.org/plant-conservation/seedconservation/

Prioritisation

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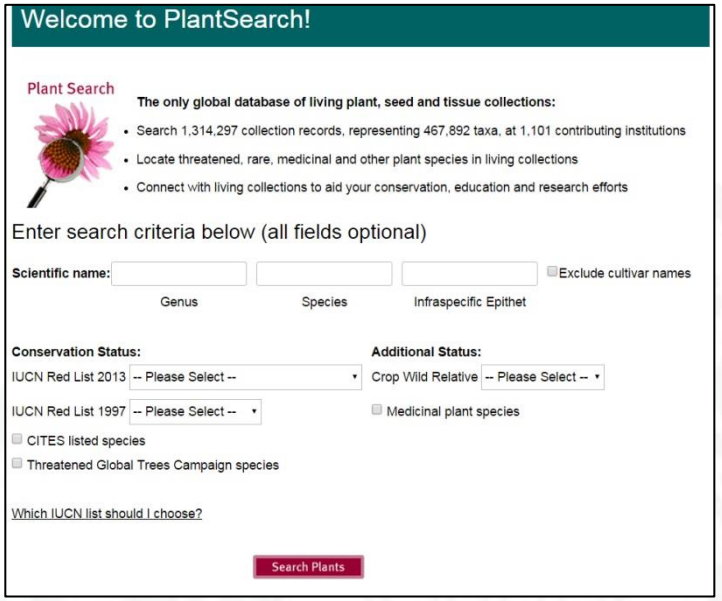
Sharing data helps to prioritise seed collection

e.g.

PlantSearch

- **Global database** of plant species in botanic gardens and similar organizations including taxon-level data on seed bank collections.
- Used to measure progress toward **Target 8 of the GSPC**



https://www.bgci.org/plant_search.php

Prospecting

The target species

- What is it?

Threatened	Useful	Endemic
		

- Where will you find it?

Desert	Roadside	Forest
		

- When will it fruit? Spring, Summer, Autumn

Spring	Summer	Autumn
		

Can you identify it?

Resources

- Nomenclature - Plant List, Tropicos, IPNI
- Location: IUCN, Red Lists, GBIF, checklists, Herbarium specimens
- Phenology: Herbarium specimens, Pep725
- Identification: Monographs, Floras, Biodiversity Heritage Library, Herbarium specimens
- Threat Status: IUCN Red List, National Red Lists

What is it?

The target species – *Echinopsis albispinosa* K.Schum.

The Plant List — A working list of all plant species

The Plant List → *Echinopsis albispinosa* K.Schum.

★★ *Echinopsis albispinosa* K.Schum. is a synonym of *Echinopsis tubiflora* (Pfeiff.) Zucc. ex A.Dietr.

This name is a synonym of *Echinopsis tubiflora* (Pfeiff.) Zucc. ex A.Dietr..

The record derives from WCSP (in review) (data supplied on 2012-03-23) which reports it as a synonym with original publication details: *Monatsschr. Kakteenk. 13: 154 1903.*

Synonym: Different name for same species

★★ *Echinopsis tubiflora* (Pfeiff.) Zucc. ex A.Dietr. is an accepted name

This name is the accepted name of a species in the genus *Echinopsis* (family *Cactaceae*).

Information under **accepted** name

Echinopsis albispinosa

NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

Threatened

PlanEAr — Plantas Endémicas de la Argentina

Echinopsis tubiflora (Pfeiff.) Zucc.

Categoría PlanEAr: 4	
Familia:	Cactaceae
Sinónimos:	--
UICN 2008:	--
Actualización:	2008
Observaciones:	Crece entre 500-1000 m s. m. (Kiesling, 1999).
Provincias:	Salta, Tucumán
Países:	Argentina
Expertos:	--
Bibliografía:	• Backeberg, C. 1959. Die Cactaceae 2: 639-1360. • Kiesling, R. 1999. Cactaceae, en F. O. Zuloaga & O. Morrone (eds.). Catálogo de las Plantas Vasculares de la República Argentina. II. Dicotyledoneae. Monogr. Syst. Bot. Missouri Bot. Gard. 74: St. Louis.

Endemic

Where will you find it?

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The target species – *Echinopsis albispinosa* K.Schum.

Echinopsis albispinosa

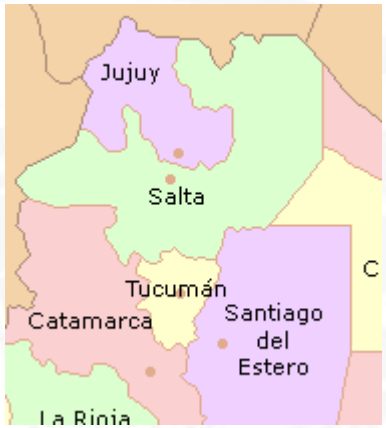
NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

Range Description:	This species is endemic to Argentina, where it occurs in Salta and Tucumán (Hunt *et al.* 2006). It grows at elevations of 750 to 1,600 m asl.
Countries:	**Native:** Argentina (Salta, Tucumán)
Range Map:	Click here to open the map viewer and explore range.
Conservation Actions:	The species may occur within Parque Provincial Quebrada de las Conchas.

Location

More information

Elevation



When will it fruit?

The target species – *Echinopsis albispinosa* K.Schum

Herbarium specimen, Floras

In flower

Date collected

Can you identify the species?

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BHL About Help Feedback
Biodiversity Heritage Library

Browse by: Title | Author | Date | Collection | Contributor

ADVANCED SEARCH

Echinopsis tubiflora

Bibliography for Echinopsis tubiflora by Page

View in | View Name Sources | Download CSV | Download BibTeX | Download EndNote

Title	Authors	Volume	Date	Page #
Abhandlungen der Königlichen Akademie de	Deutsche Akademie der Wissenschaften zu E	1899-1900	1899-190	Page 57
Anales del Museo Nacional de Buenos Aires.	Museo Nacional de Buenos Aires.	ser.3;t.4 (1905)	1905	Page 486
Anales del Museo Nacional de Montevideo.	Museo Nacional de Montevideo	v.5 = t.2 (Flora Uruguaya)	1901	Page 252
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The Book of gardening; a handbook of horti	Abbott, J. M. Drury, William D.,	(go to volume)	1900	(go to page)
Botanisches Zentralblatt; referierendes Org	Association internationale des botanistes. Botanischer Verein, Munich. Botaniska sällskapet, Stockholm. Deutsche Botanische Gesellschaft.	jahrg. 29, bd. 108 (1908)	1908	Page 135
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The Cactaceae : descriptions and illustration	Britton, Nathaniel Lord, Rose, J. N.	v.3	1922	Page v
The Cactaceae : descriptions and illustration	Britton, Nathaniel Lord, Rose, J. N.	v.3	1922	Page 61
The Cactaceae : descriptions and illustration	Britton, Nathaniel Lord, Rose, J. N.	v.3	1922	Page 65
The Cactaceae : descriptions and illustration	Britton, Nathaniel Lord, Rose, J. N.	v.3	1922	Page 67

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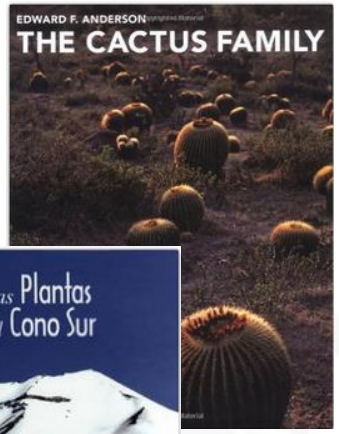
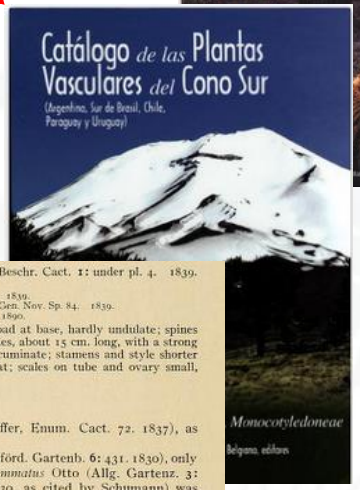
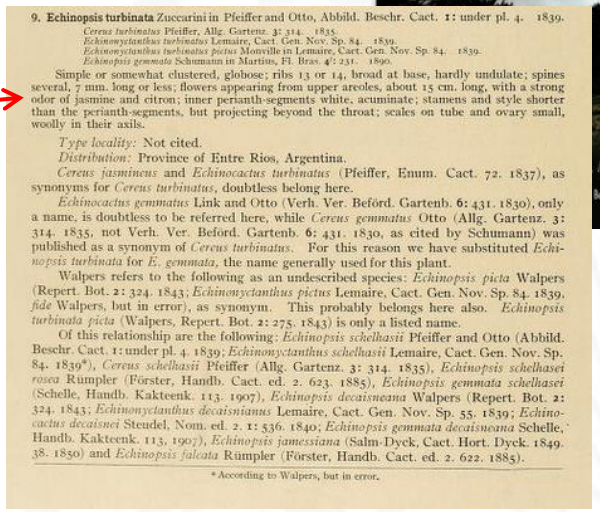
Species description







9. **Echinopsis turbinata** Zuccarini in Pfeiffer and Otto, Abbild. Beschr. Cact. **1**: under pl. 4. 1839.
Cereus turbinatus Pfeiffer, Allg. Gartenz. **3**: 314. 1835.
Echinonyctanthus turbinatus Lemaire, Cact. Gen. Nov. Sp. 84. 1839.
Echinonyctanthus turbinatus pictus Monville in Lemaire, Cact. Gen. Nov. Sp. 84. 1839.
Echinopsis gemmata Schumann in Martius, Fl. Bras. **4**: 231. 1890.

Simple or somewhat clustered, globose; ribs 13 or 14, broad at base, hardly undulate; spines several, 7 mm. long or less; flowers appearing from upper areoles, about 15 cm. long, with a strong odor of jasmine and citron; inner perianth-segments white, acuminate; stamens and style shorter than the perianth-segments, but projecting beyond the throat; scales on tube and ovary small, woolly in their axils.

Type locality: Not cited.

Distribution: Province of Entre Rios, Argentina.

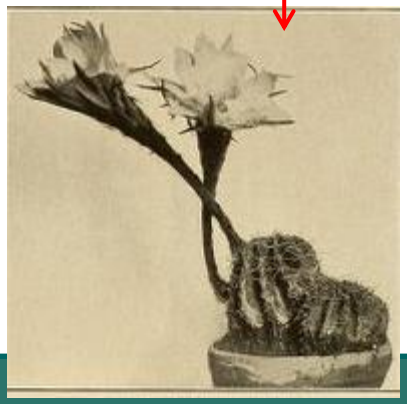
Cereus jasmineus and *Echinocactus turbinatus* (Pfeiffer, Enum. Cact. 72. 1837), as synonyms for *Cereus turbinatus*, doubtless belong here.

Echinocactus gemmatus Link and Otto (Verh. Ver. Beförd. Gartenb. **6**: 431. 1830), only a name, is doubtless to be referred here, while *Cereus gemmatus* Otto (Allg. Gartenz. **3**: 314. 1835, not Verh. Ver. Beförd. Gartenb. **6**: 431. 1830, as cited by Schumann) was published as a synonym of *Cereus turbinatus*. For this reason we have substituted *Echinopsis turbinata* for *E. gemmata*, the name generally used for this plant.

Walpers refers to the following as an undescribed species: *Echinopsis picta* Walpers (Repert. Bot. **2**: 324. 1843; *Echinonyctanthus pictus* Lemaire, Cact. Gen. Nov. Sp. 84. 1839, *fide* Walpers, but in error), as synonym. This probably belongs here also. *Echinopsis turbinata picta* (Walpers, Repert. Bot. **2**: 275. 1843) is only a listed name.

Of this relationship are the following: *Echinopsis schelhasii* Pfeiffer and Otto (Abbild. Beschr. Cact. **1**: under pl. 4. 1839; *Echinonyctanthus schelhasii* Lemaire, Cact. Gen. Nov. Sp. 84. 1839*), *Cereus schelhasii* Pfeiffer (Allg. Gartenz. **3**: 314. 1835), *Echinopsis schelhasei rosea* Rümpler (Förster, Handb. Cact. ed. 2. 623. 1885), *Echinopsis gemmata schelhasei* (Schelle, Handb. Kakteenk. 113. 1907), *Echinopsis decaisneana* Walpers (Repert. Bot. **2**: 324. 1843; *Echinonyctanthus decaisnianus* Lemaire, Cact. Gen. Nov. Sp. 55. 1839; *Echinocactus decaisnei* Steudel, Nom. ed. 2. **1**: 536. 1840; *Echinopsis gemmata decaisneana* Schelle, Handb. Kakteenk. 113. 1907), *Echinopsis jamesiana* (Salm-Dyck, Cact. Hort. Dyck. 1849. 38. 1850) and *Echinopsis falcata* Rümpler (Förster, Handb. Cact. ed. 2. 622. 1885).

* According to Walpers, but in error.



Can you identify the species?

- Crucial- don't mix up species in same genus.

Several spines

Echinopsis tubiflora

No spines

Echinopsis subdenudatus

Can you identify the population?

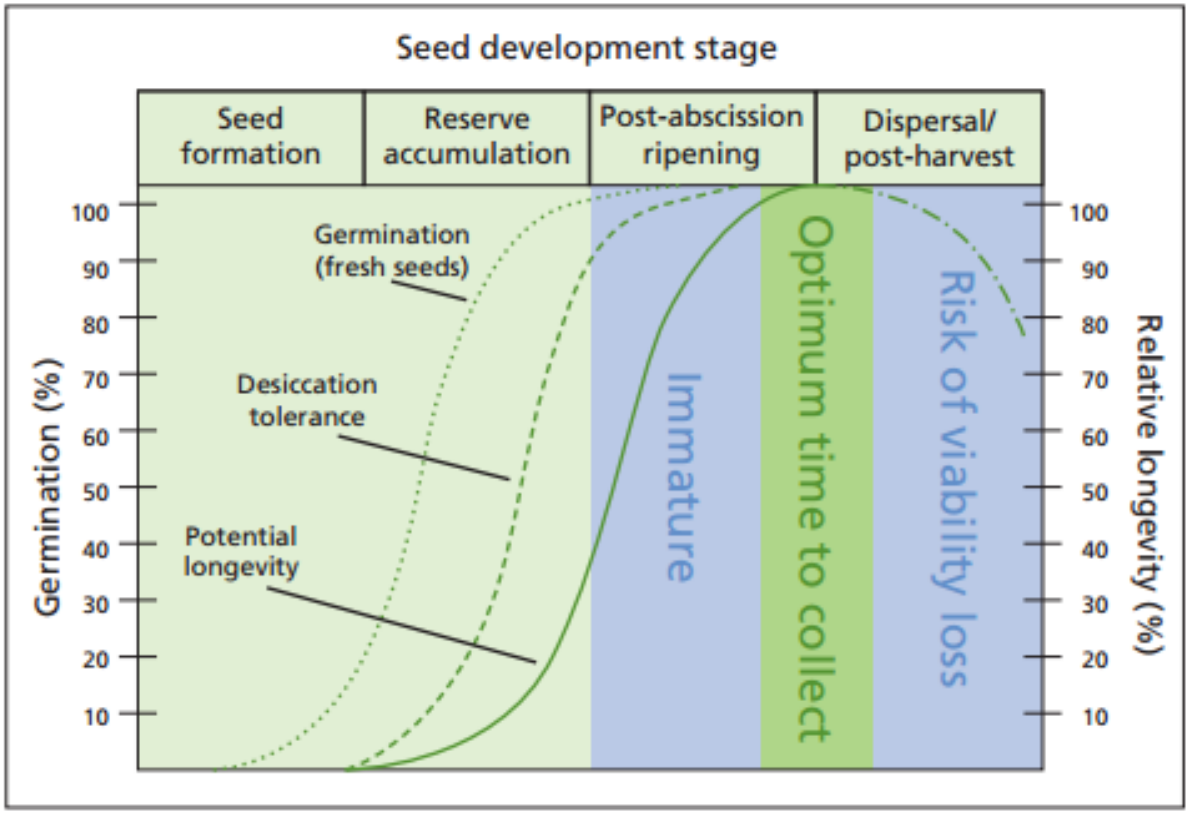
- What is a population?

- a group of individuals, capable of interbreeding, that occupy a defined geographic area.

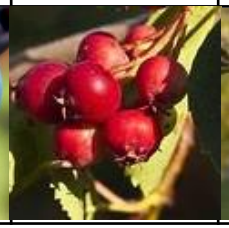
- populations will look different for different species.

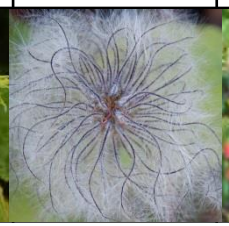
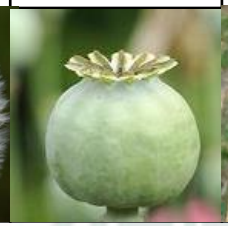
Quality

Aim: To collect healthy seed. Collect seed when it is ready



Quality

Berry	Drupe	Pome	Hesperidium	Pseudocarp	Follicle	Legume	Samara
							

Nut	Achene	Hip	Utricle	Cypsela	Capsule	Silique	Syconium	Lomentum
								

Different types of fruit display ripeness in different ways

Quality

Changes in fruit colour


Splitting of fruit

Some seeds are already dispersed

Fruit and seed hard and dry

Quality

Determining physical quality of the seeds

- Empty/insect damage/immature/deformed
- ‘Cut test’

Cut open ~ 10 seeds from several well spaced individuals in the population

If seeds are small use adhesive tape to hold them during sectioning.

Use a hand lens to view if seeds are small

Aim to collect healthy seed

Quantity

How much seed do you need?		
	ACTIVITY	**SEED REQUIRED**
Conservation	Base collection in case of… • loss of wild population or • need for regeneration of collection	500
Maintenance	Developing a germination protocol	100
	Viability monitoring over 200 years	650
Duplication	Seed stored and monitored at a second seed bank for safety reasons	1,150
Distribution	50-seed sample sent to users every second year for 200 years	5,000
Propagation & Restoration	Growing for display in botanic gardens & restoration	10,000
	Total	>20,000

Quantity

Collection plan

- From at least 50 individuals per population
- As many populations as possible
- Collect no more than 20% of mature seed available on the day of collection
- Ideally >10-20,000 viable seeds

Aim to collect a large sample

Pre-collection checklist

EXAMPLE OF A PRE-COLLECTION CHECKLIST (developed for a conservation and restoration project)						
IDENTIFICATION						
Family		Locality (GPS or map co-ordinates)				
Genus						
Species		Date of Assessment				
POPULATION ASSESSMENT						
Taxon identified and apparently similar taxa distinguished	*YES / NO*					
Approximate area of population			*x*			*(m², km²)*
Approx. number of accessible individual plants	*1-10*	*11-50*	*51-100*	*101-1000*	*>1000*	
Evidence of disturbance/damage by herbicides, fire etc.	*YES / NO*					

ASSESSING READINESS OF POPULATION FOR SEED COLLECTION		
Most frequently occurring phenological stage (please tick or give percentage)		
Vegetative		
Reproductive	Flowering	
	Immature seeds	
	Around natural dispersal	
	Post dispersal	
Estimated number of individual plants at natural dispersal		
PHYSICAL QUALITY		
Cut-test 10-20 seeds: of the sample examined, indicate the most frequently occurring (please tick or give percentage)		
Full seeds		
Empty seeds		
Infested seeds		
Immature seeds		
AVAILABILITY OF SEEDS		
Average number of seeds per fruit/dispersal unit		
Average number of fruits/dispersal units per individual plant		
Is it possible to collect *5,000 - 10,000* healthy seeds around natural dispersal without taking more than *20%* of the available seeds?	*YES / NO*	
MONITORING		
For populations NOT yet at natural dispersal, estimate suitable date to return and collect seeds		

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End of Module Two (Prioritisation and Pre-collection Assessment)

Why not try the quick quiz?

Then, go to Module Three (Seed Collection)

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Plants for the Planet

Connecting People • Sharing Knowledge • Saving Plants

Our Mission is to mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet

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