

Botanic Gardens Conservation International
The world's largest plant conservation network



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Plants for the Planet

Module 5: Germination and Dormancy

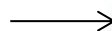




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- **GSPC Target 8** '20% of threatened species to be available for recovery and restoration programmes'
 - Linking *in situ* and *ex situ* conservation
 - Using collections for restoration activities



Conserving quality collections



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Restoration- Botanic Gardens



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Xishuangbanna Tropical Botanical Garden, South Yunnan, China

- Restoring remnants of tropical forest
- Cleared for rubber plantations
- Using historical records to determine what has been lost

ERA



ecological restoration
alliance of botanic gardens



Germination

- Germination requirements are species-specific

Consider

- Taxonomy
- Life cycle of the plant
- Dormancy

- Habitat
- Climate



Taxonomy



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Search the Seed Information Database	
APG Clade	<input type="text"/>
APG Order	<input type="text"/>
Family	<input type="text"/>
Genus	<input type="text" value="mimosa"/>
Species	<input type="text"/>
Storage Behaviour	<input type="text" value="(All)"/>
Only find records with data on:	
<input type="checkbox"/> Storage Behaviour	<input type="checkbox"/> Weight
<input type="checkbox"/> Oil Content	<input type="checkbox"/> Protein Content
<input type="checkbox"/> Dispersal	<input type="checkbox"/> Morphology
<input type="checkbox"/> Germination	<input type="checkbox"/> Salt Tolerance
<input type="button" value="Reset"/> <input type="button" value="Search"/>	

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

If information is not present for the species of interest find the most closely related species

Seed Information Database

Search Results

79 records found.

Taxonomy, **Storage Behaviour**, **Mean 1000 Seed Weight**, **Seed Dispersal**, **Germination**, **Oil Content**, **Protein Content**, **Morphology**, **Salt Tolerance**

Mimosa acantholoba var. *eurycarpa* **Orthodox** 363.2g **Germ**
Mimosa aculeaticarpa var. *biuncifera* **Orthodox**
Mimosa aculeaticarpa Ortega **Orthodox** 10.1g **Disp Germ** 6.1% 36.9% **Morph**
Mimosa acutistipula (M. Martens) Benth. **Orthodox** 13.2812g **Germ**
Mimosa adenocarpa Benth. **Orthodox** 2.6228g **Germ**
Mimosa albida Humb. & Bonpl. ex Willd. **Orthodox** 8.42g **Germ**
Mimosa albida Willd. var. *albida* **Orthodox** 7.5564g **Germ**
Mimosa arenosa (Willd.) Poir. 4.6608g
Mimosa bahamensis Benth. **Orthodox** 20.303g **Germ**
Mimosa bimucronata (DC.) Kuntze **Orthodox**
Mimosa biuncifera Benth.
Mimosa blanchetii Benth. **Orthodox** 7.1032g **Germ**
Mimosa brevispicata Britton & Rose **Orthodox** 7.6236g **Germ**
Mimosa busseana Harms. 13.5980769g
Mimosa camporum Benth. **Orthodox** 5.78g **Germ**
Mimosa chaetocarpa Brandegee **Disp**
Mimosa debilis Humb. & Bonpl. ex Willd. 3.76g
Mimosa delicatula Tind. & Kodala **Orthodox** 13.6984g **Germ**
Mimosa depauperata Benth. 11.577g
Mimosa distachya Cav. **Orthodox**
Mimosa distachya Cav. var. *distachya* **Orthodox** 7.4544g **Germ**
Mimosa dysocarpa Benth. **Orthodox** 12.612g **Germ**

1. **90 % germination**; pre-sowing treatments = seed scarified (chipped with scalpel); germination medium = 1% agar; germination conditions = 20°C, 8/16; (RBG Kew, Wakehurst Place.)
2. **85 % germination**; pre-sowing treatments = seed scarified (chipped with scalpel); germination medium = 1% agar; germination conditions = 25°C, 8/16; (RBG Kew, Wakehurst Place.)
3. **92 % germination**; pre-sowing treatments = seed scarified (chipped with scalpel); germination medium = 1% agar; germination conditions = 21°C, 12/12; (RBG Kew, Wakehurst Place.)

Top Interpreting the germination data

Habitat type



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Aquatic



Dune



Temperate Forest



Tropical forest



Grassland



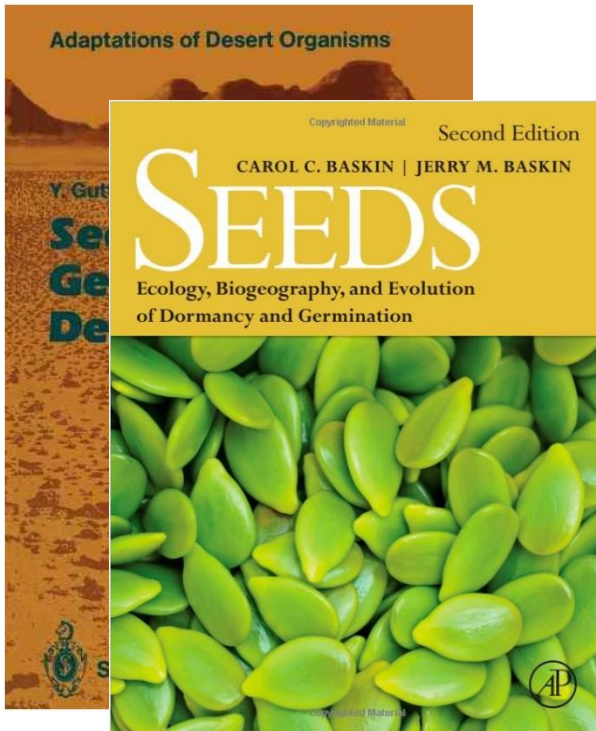
Life Cycle



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Books



Journal Papers

Seed Dormancy and Germination of the European *Chaerophyllum temulum* (Apiaceae), a

Seed dormancy and germination in three *Crocus* ser. *Verni* species (Iridaceae): implications for evolution of dormancy within the genus

A. Carta^{1,*}, R. Probert², M. Moretti¹, L. Peruzzi¹ and G. Bedini¹

Seed dormancy and germination of the three tropical medicinal species *Gomphandra luzoniensis* (Stemonuraceae), *Nothapodytes nimmoniana* (Icacinaceae) and *Goniothalamus amuyon* (Annonaceae)

Seed dormancy and germination traits of an endangered aquatic plant species, *Euryale ferox* Salisb. (Nymphaeaceae)

Growing Native Seeds for Restoration: Seed Dormancy and Germination of *Sidalcea malviflora* ssp. *virgata* (Malvaceae)

Efecto de diferentes métodos de escarificación sobre la germinación de las semillas de *Cenchrus ciliaris* cv. *Biloela*

B Bilbao, C Matías - Pastos y Forrajes, 2014 - payfo.ihatuey.cu
Resumen En un diseño de bloques al azar con 8 réplicas se estudió el efecto de diferentes tratamientos sobre la germinación de las semillas de *Cenchrus ciliaris* cv. *Biloela*. Los tratamientos fueron: SO 4 H 2 (24 N) durante 8, 12, 16, 20 y 30 minutos; NO 3 K (0, 2%) ...
Cited by 23 Related articles All 3 versions Cite Save More

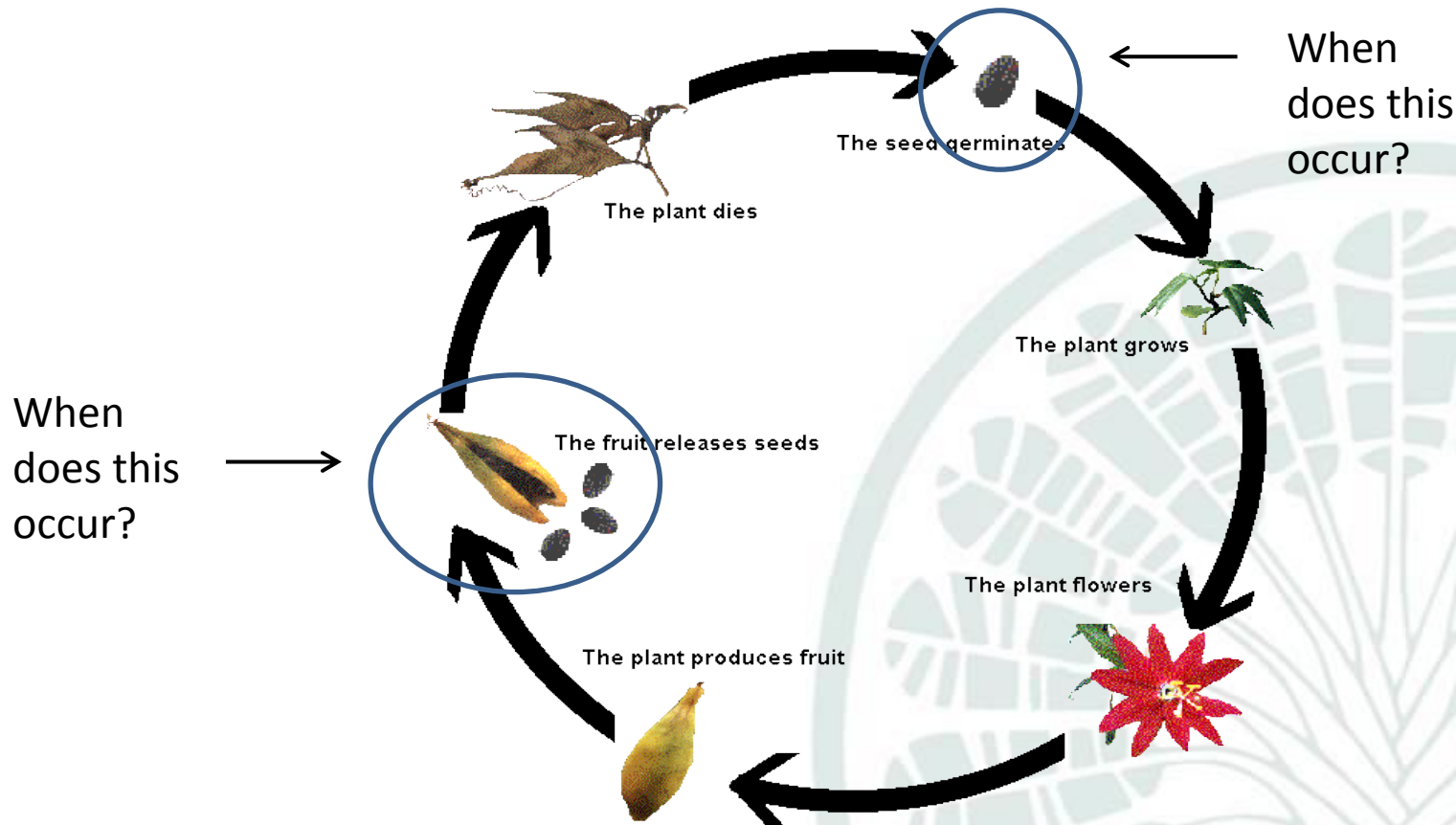
Life Cycle



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- What is the life cycle in the natural habitat?



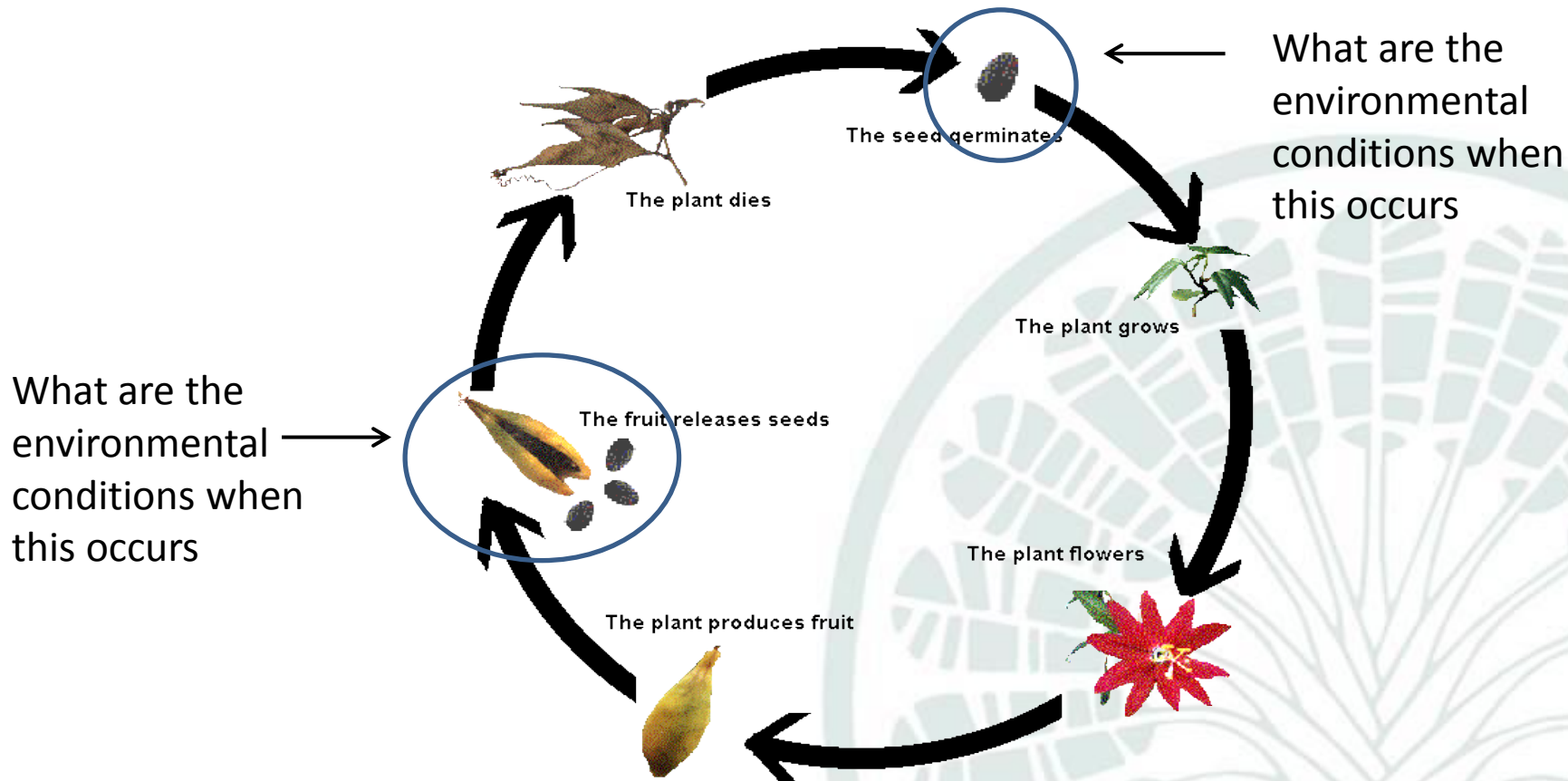
Life Cycle



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- What is the life cycle in the natural habitat?



Climate



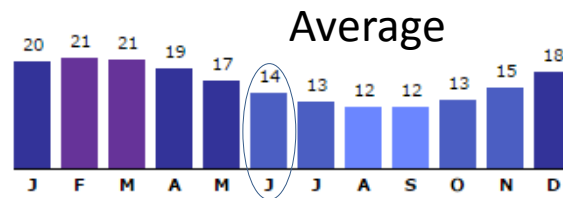
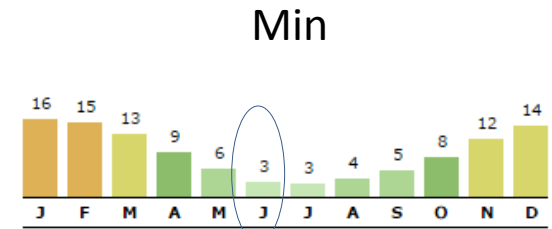
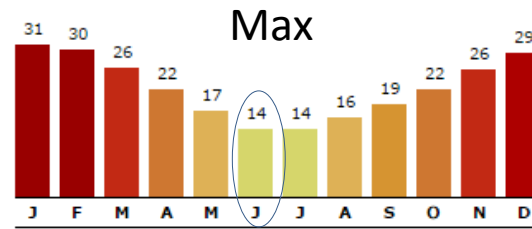
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Seed dispersal



Accession	Family	Species	Collector	Collector N	Collection date	Country	Latitude	Longitude
1	Aristolochiaceae	Aristolochia albertiana	Danmeri, F.	CBG-102	2002-04-12	Paraguay	25.234	57.667
2	Aristolochiaceae	Aristolochia burkartii	Milne, R.	JBCT-16	2007-05-02	Argentina	34.008	58.386
3	Aristolochiaceae	Aristolochia schulzii	Bennison, C.	RBGE-3042	2001-05-13	China	35.565	103.787
4	Aspleniaceae	Asplenium lilloanum	Morrissey, B.	KHD-134	2012-07-13	Germany	52.512	13.382



Climate



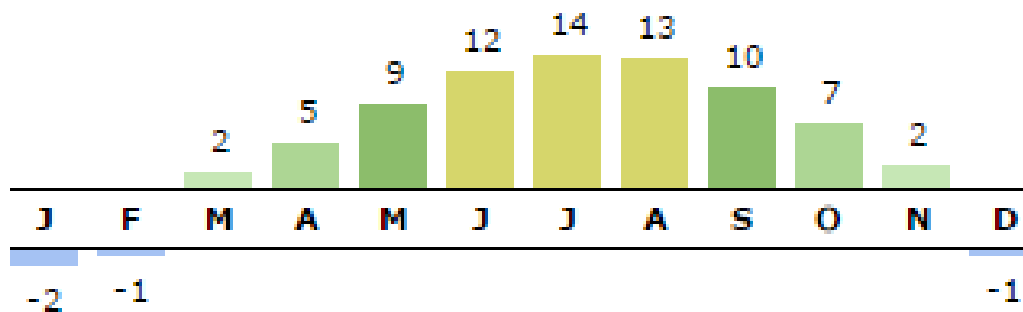
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eg. Temperate regions summer annuals

Seeds germinate

Seeds dispersed



Dormancy



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- Evolved to delay germination until favourable environmental conditions are present for survival.



Exogenous (external) dormancy



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Physical dormancy



Dormancy breaking in the wild

← Hard seed coat.
Fire stimulated high temperatures crack the seed coat

← Animal dispersed-digestive tract breaks physical dormancy

Dormancy breaking in the lab

Scarify seeds to allow imbibition of water



Sulphuric acid used to break dormancy

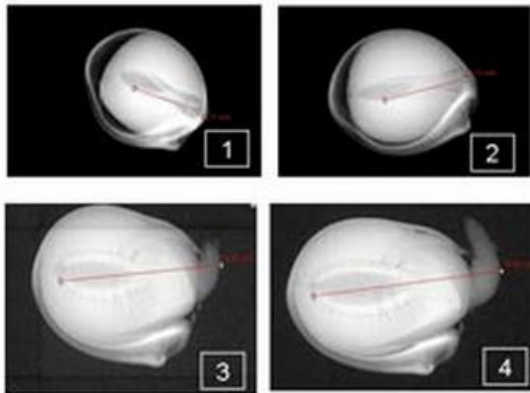
Endogenous (internal) dormancy



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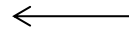
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Morphological dormancy



Dormancy breaking in the wild

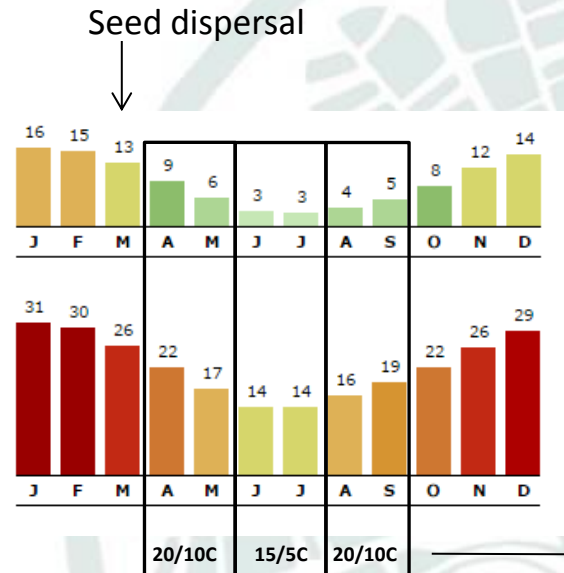
Embryo underdeveloped.
needs to grow before
germination occurs



Dormancy breaking in the lab

Cold or warm stratification

Cold or warm stratification- Move along experiment

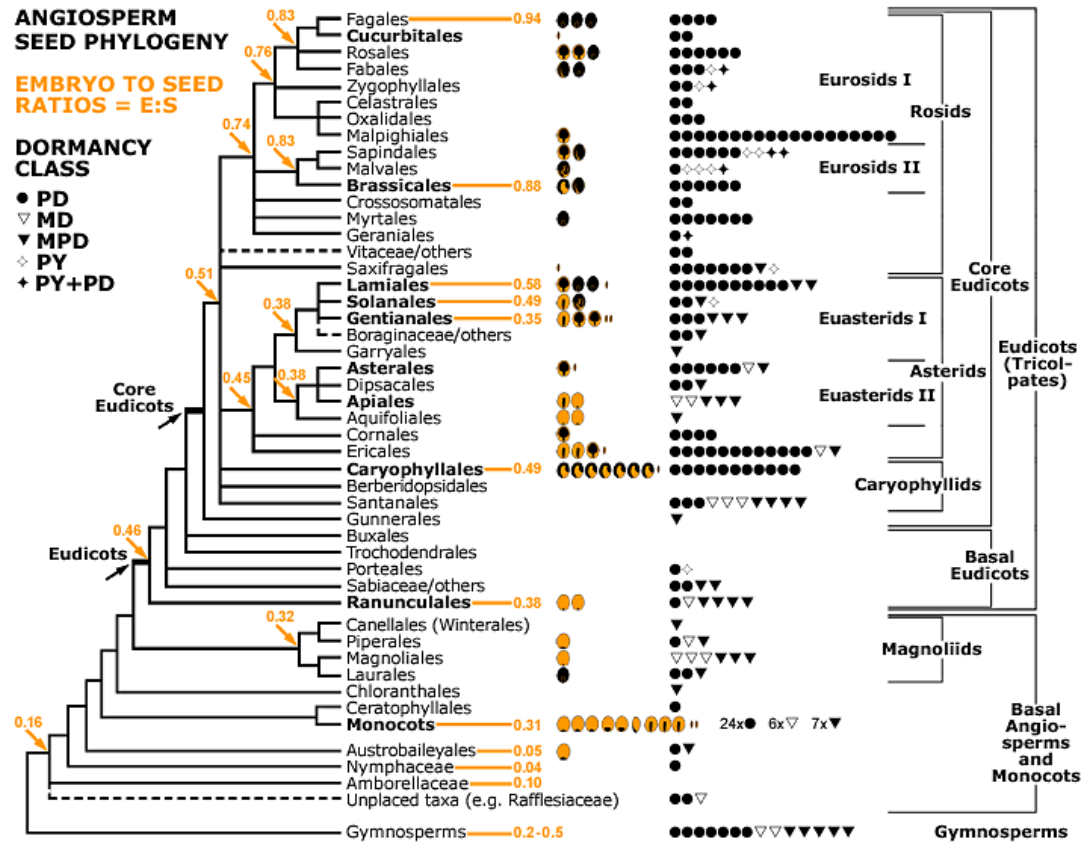


Dormancy – Plant orders



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Finch-Savage and Leubner-Metzger (2006) - Seed dormancy and the control of germination
 Tansley review, New Phytologist 171, © Blackwell Science, <http://www.newphytologist.org>

Germination in the wild and the lab



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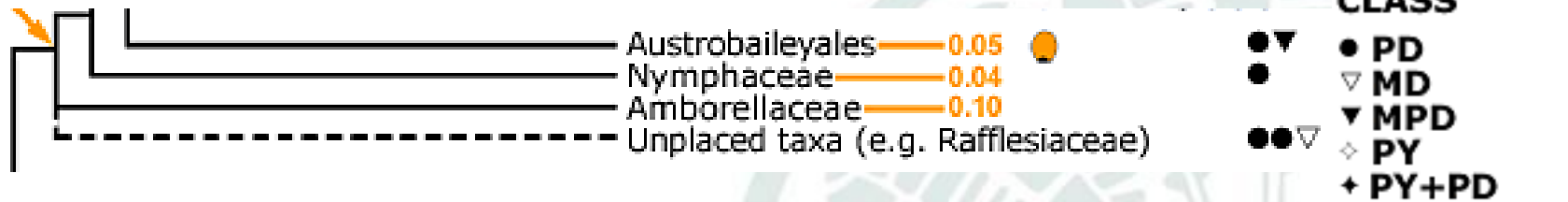
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Taxonomy - *Nymphaeae caerulea*.

Habitat - Aquatic. Germination occurs in water

Climate - Distribution. East Africa rivers, Nile. Warm water

Dormancy - Physical dormancy. To break seed coat needs scarification



Germination- Ex situ



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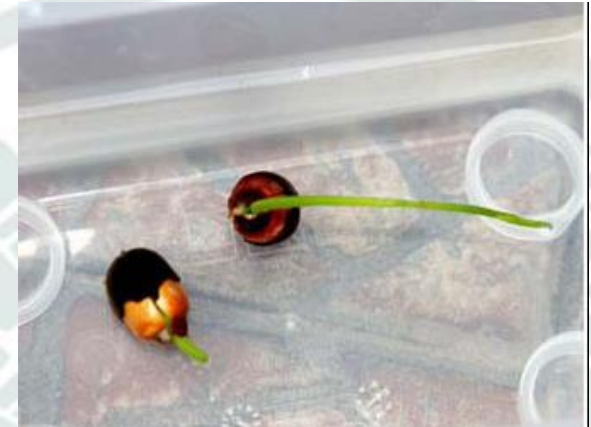
Physical dormancy –
Scarification of seed coat



Allows water in and
germination takes place



Germination takes place in
water





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End of Module Five (Germination and Dormancy)

Go to Module Six ([Data Management](#))



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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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