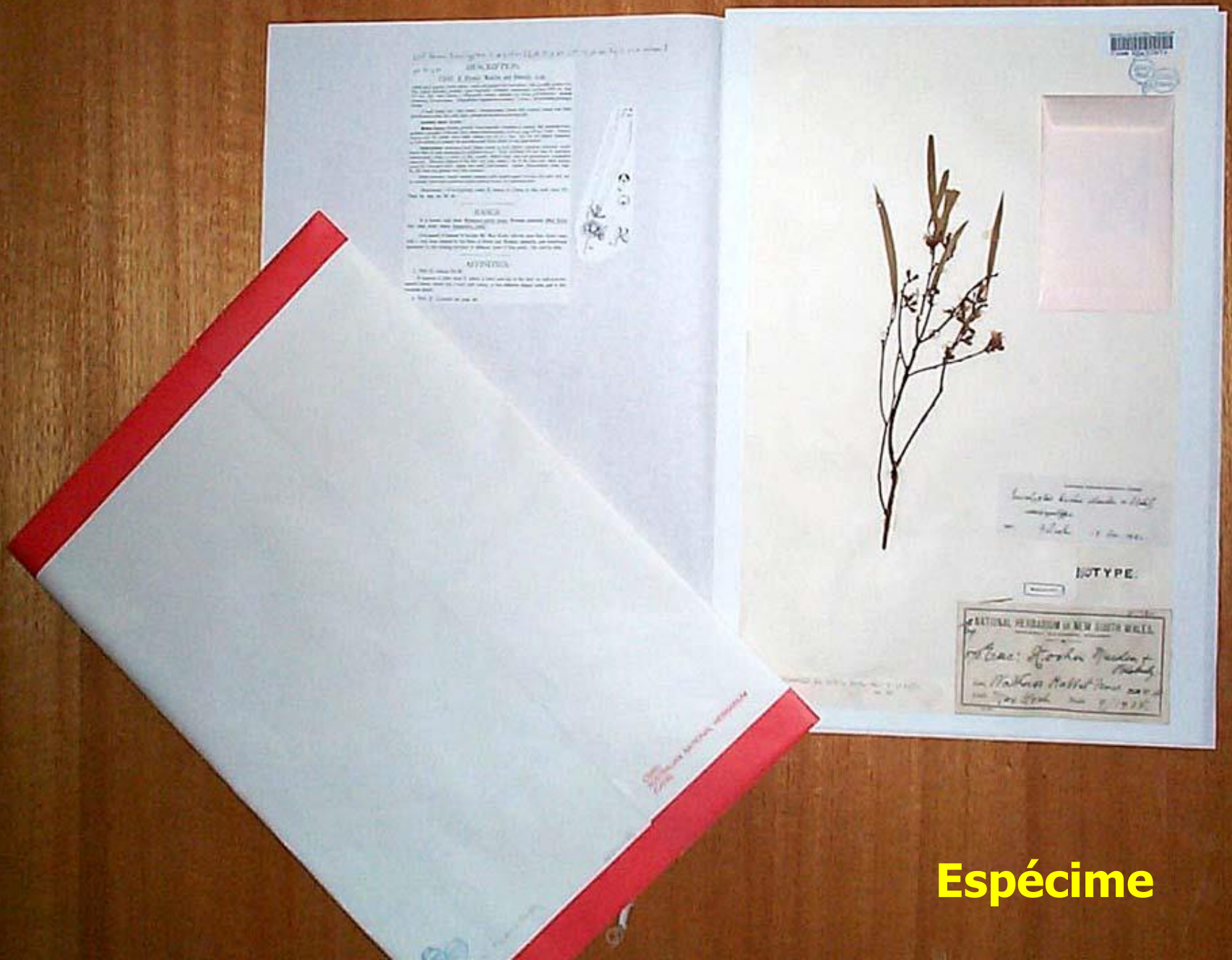
Metodos em estudos de biologia floral e reprodutiva

Estudos com biologia floral e reprodutiva: que posso fazer?

- Estudos de comunidades
- Grupo de plantas
- Estudo de caso
- Evolução da polinização
- Estudos biossistemáticos
- Co-evolução

Espécie de planta

Espécie de polinizador



Espécime

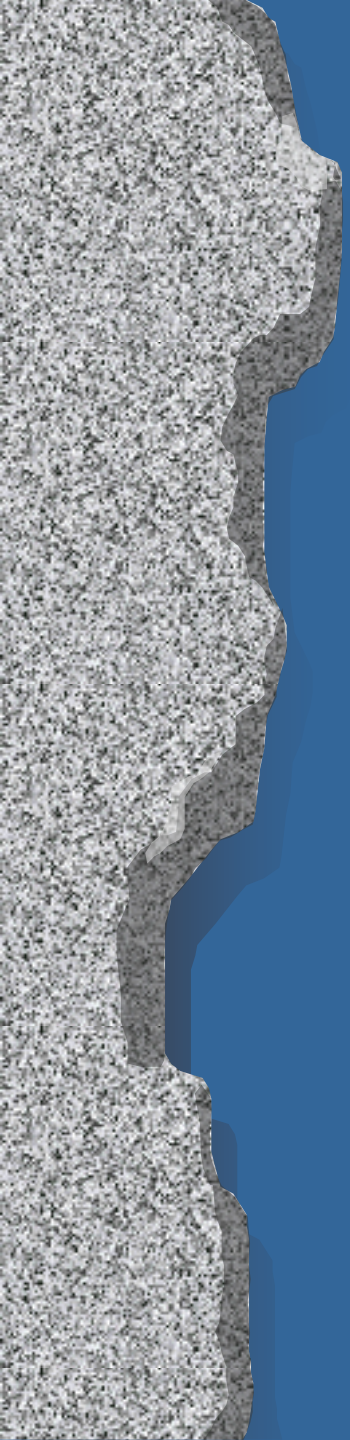
Observações de campo: como e quanto fazer?

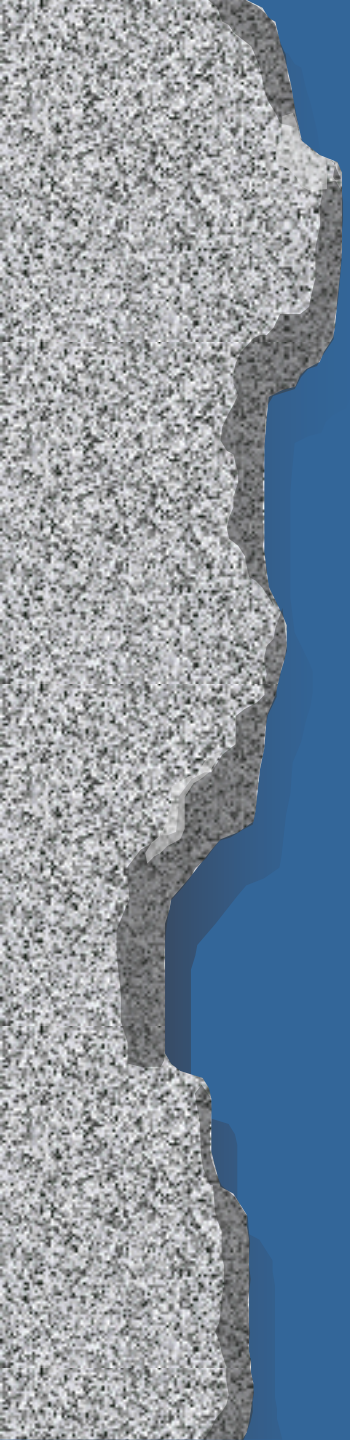
- Posição do observador
- Estudo de comunidades (+ - 30 hs)
- Estudos de caso (ate o completo entendimento)

Polinização por engano: um problema

Senso de percepção

- Mecanismo de polinização
- Comportamento do animal na flor
  - Filme, gravador
- Visitante ou polinizador?





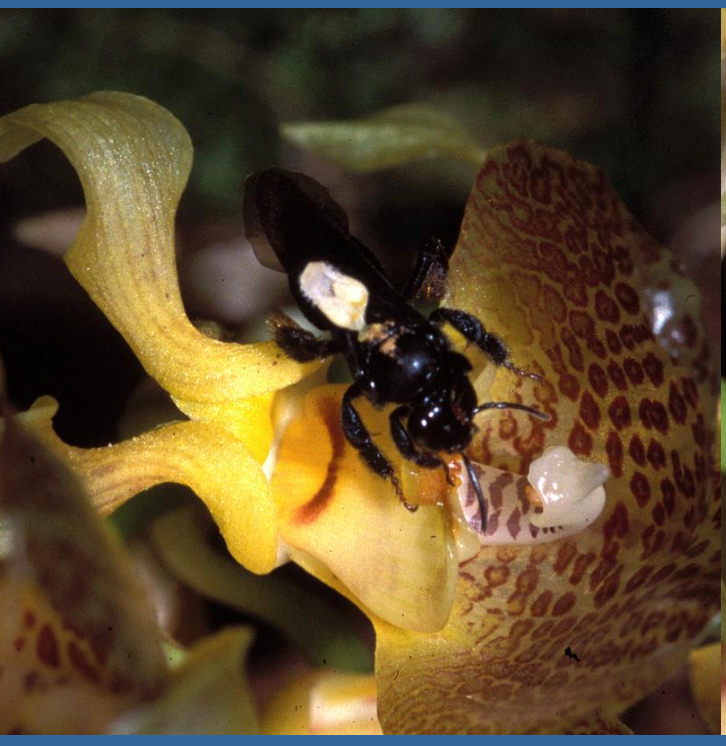

Grobya amherstiae


Grobya amherstiae

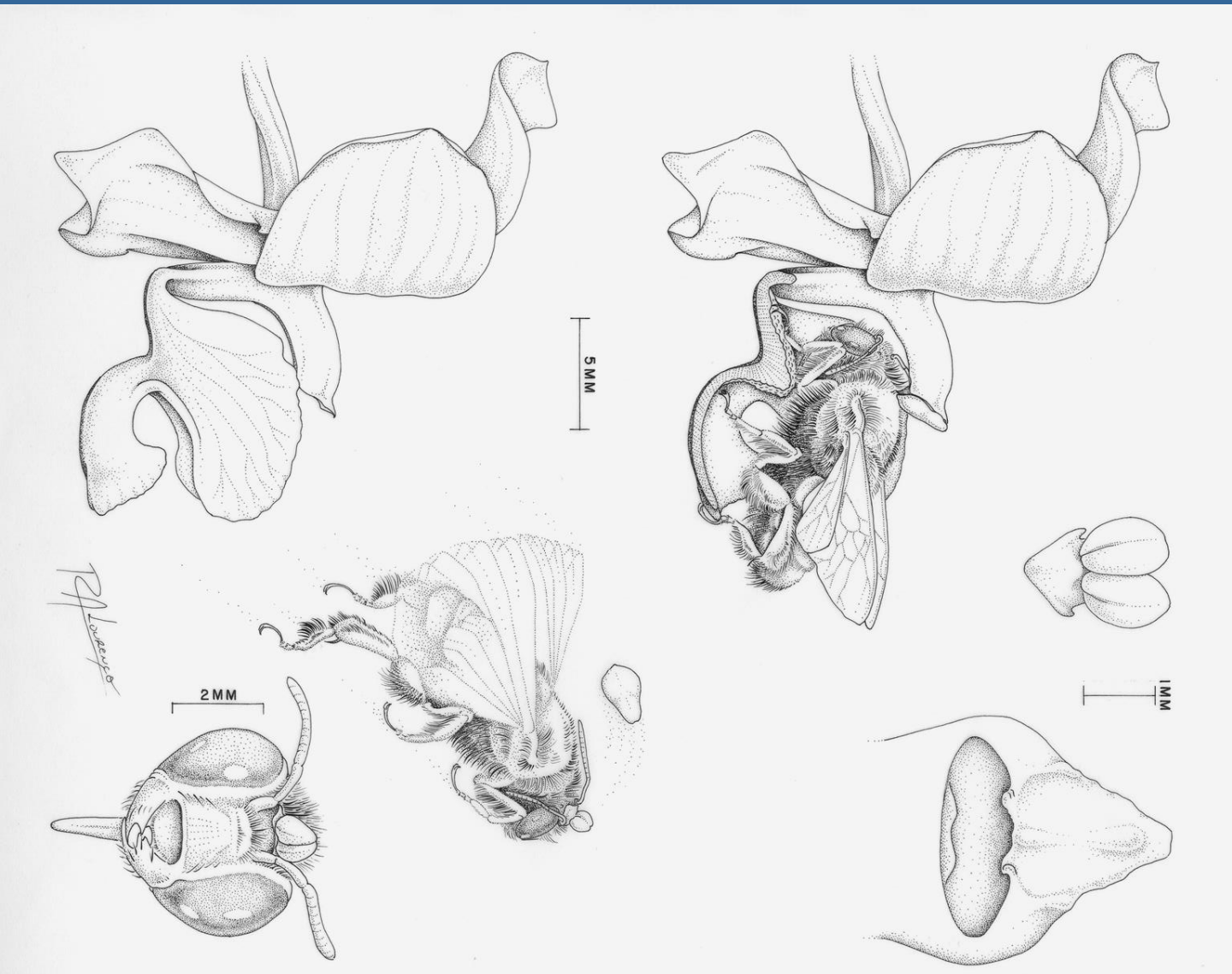
Descrição do processo de polinização

"Uma BOA imagem vale mais que mil palavras…"

Processo de polinização



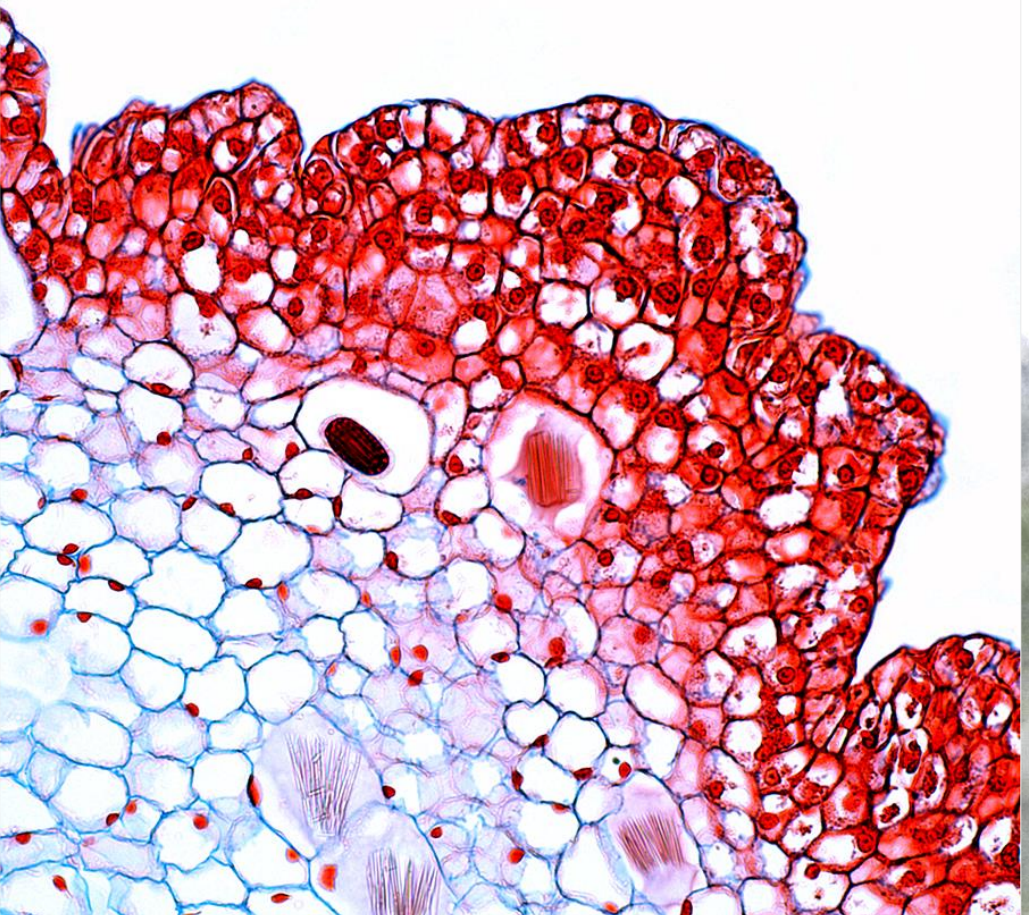
Processo de polinização

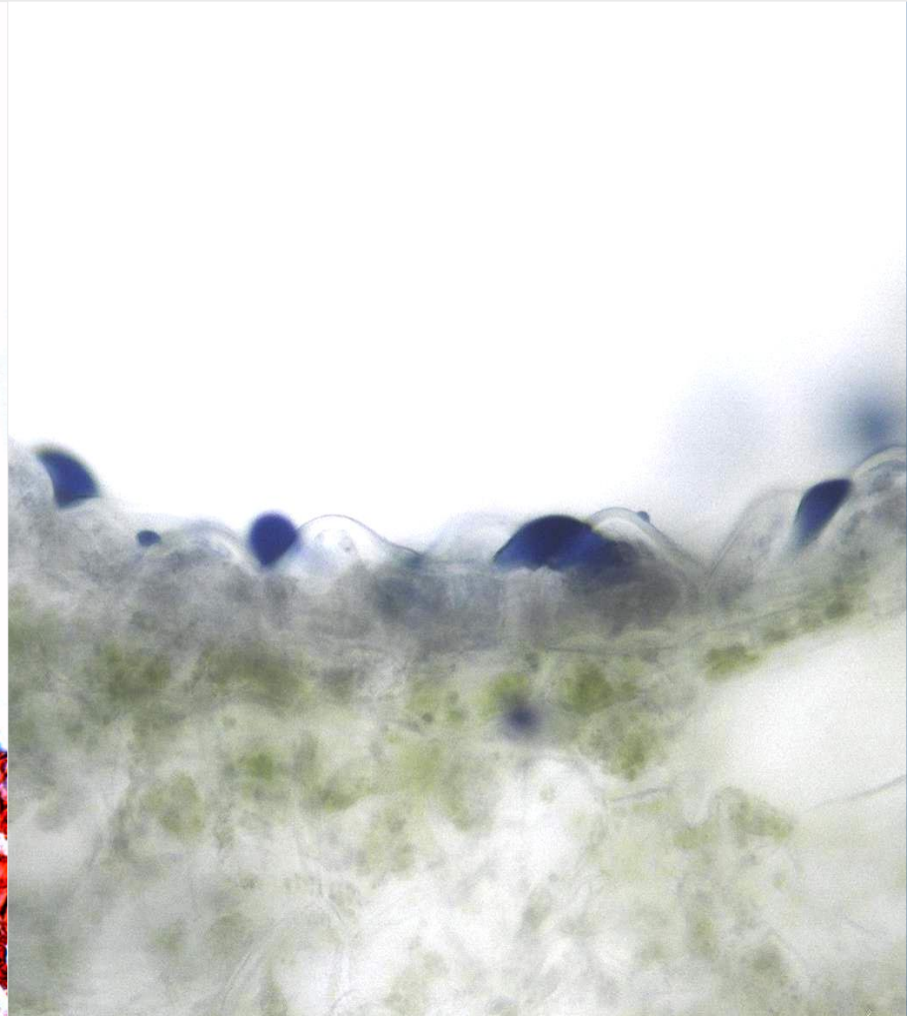


Teste para detecção de osmóforos

- Vermelho neutro
- Estudos anatômicos e histoquímicos

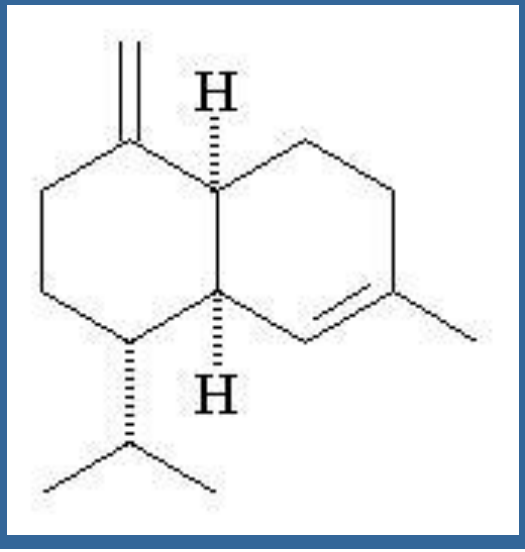
Teste para detecção de osmóforos

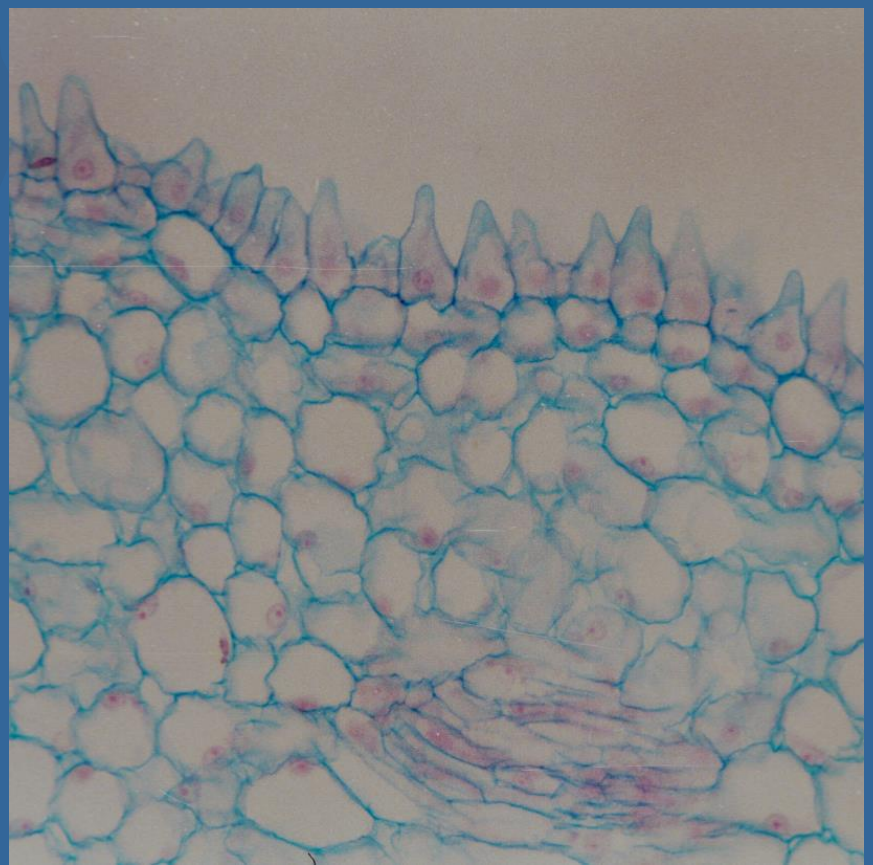


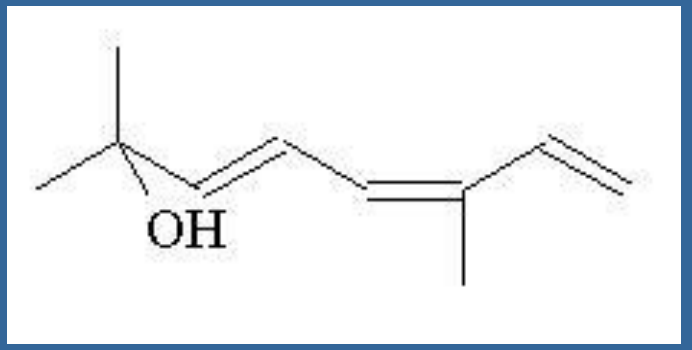


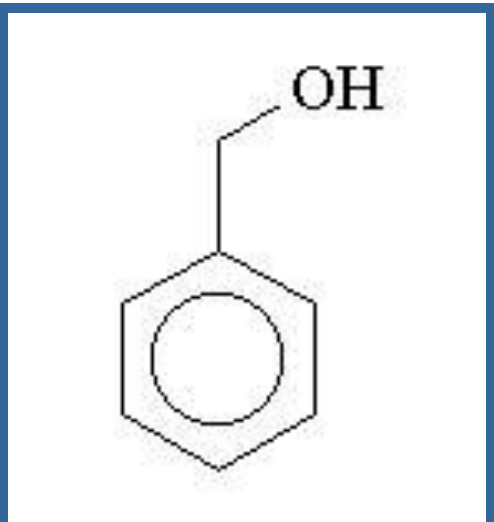
Analise de fragrâncias

- Monoterpenos
- Sesquiterpenos
- Substancias aromáticas

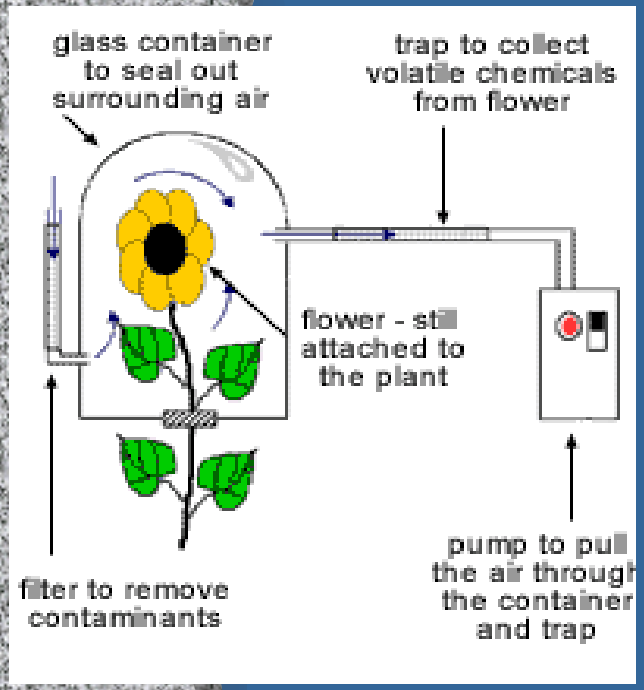




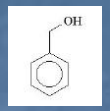
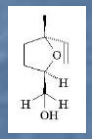
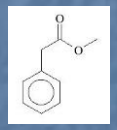
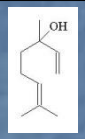
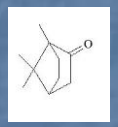
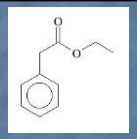
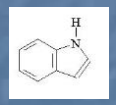
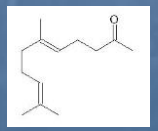
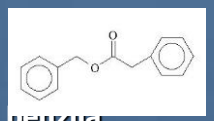




Analise de fragrâncias



Analises químicas

 Álcool benzílico	1032	1032	t	IR, EM, CP
 *trans*-óxido-linalol	1083	1088	t	IR, EM
 Benzoato de etila	1091	1091	t	IR, EM
 Linalol	1097	1098	4.0	IR, EM, CP
 Cânfora	-	1143	t	EM
 Benzoato de etila	1170	1170	t	IR, EM
 Indol	1295	1288	17.8	IR, EM, CP
 E-Geranilacetona	1449	1453	0.4	IR, EM
 Benzoato de benzila	1769	1762	49.4	IR, EM

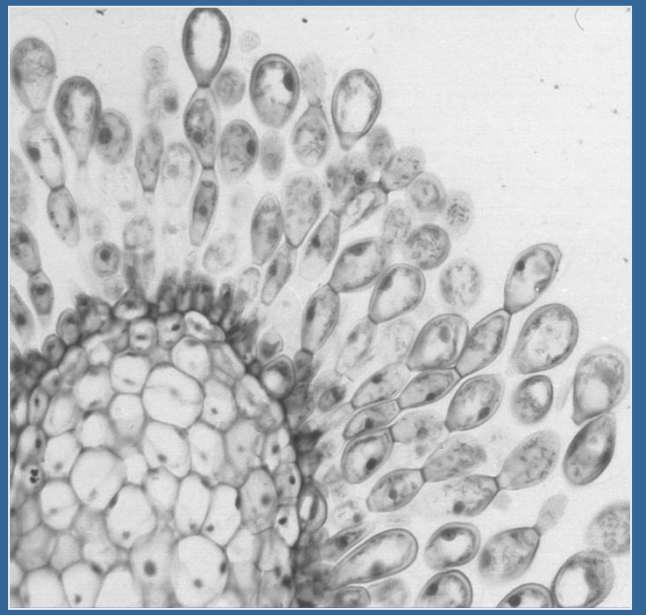
Odor - atração

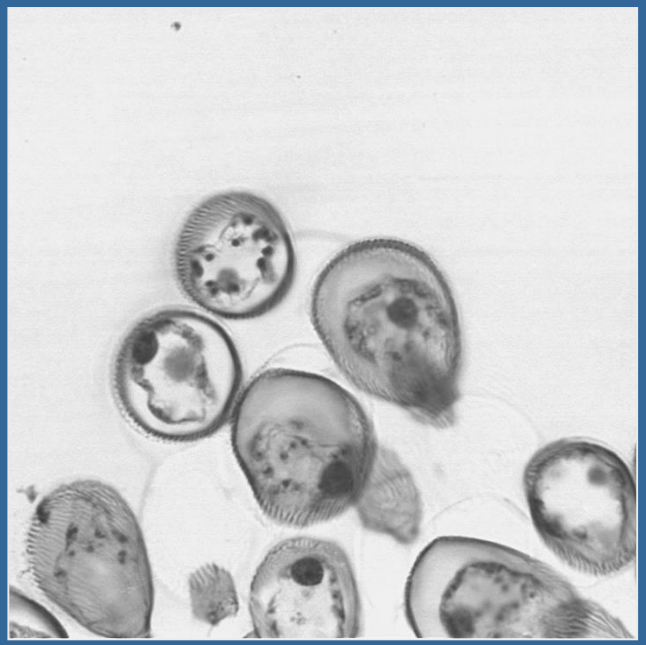
Odor - recurso

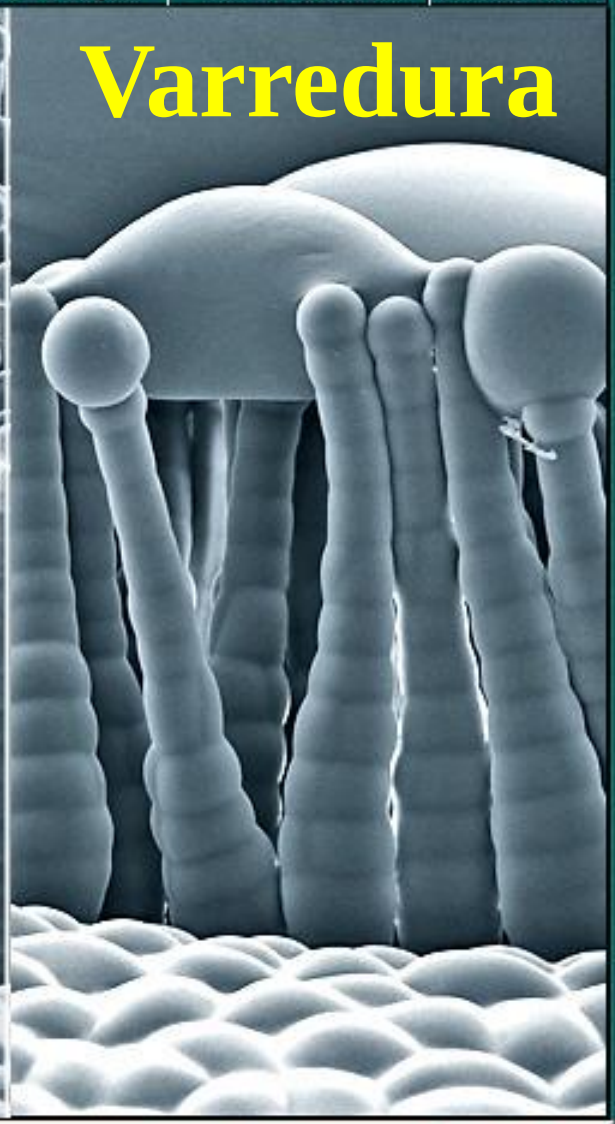
Iscas químicas

- Monoterpenos
- Sesquiterpenos
- Substancias aromáticas
- Substancias obtidas comercialmente
- Estudos com abelhas euglossine

Recursos florais







1

2.1.3 Cell types 3: absorption, secretion, vascular

Restart Topic

Instructions:-

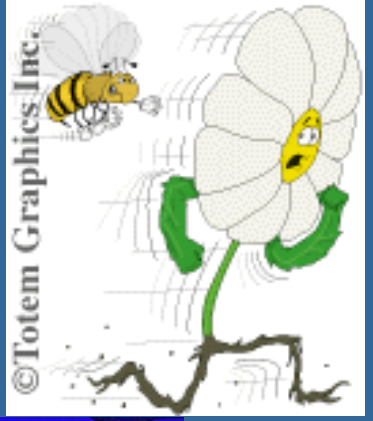
Select screens using the control panel buttons

Absorptive:- 1 2 3 4 5 6

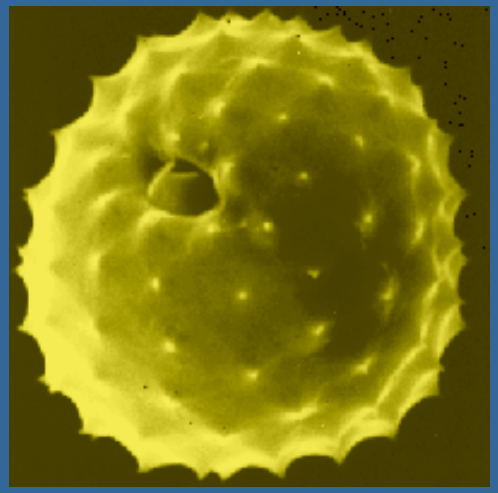
Secretory:- 1 2 3 4 5

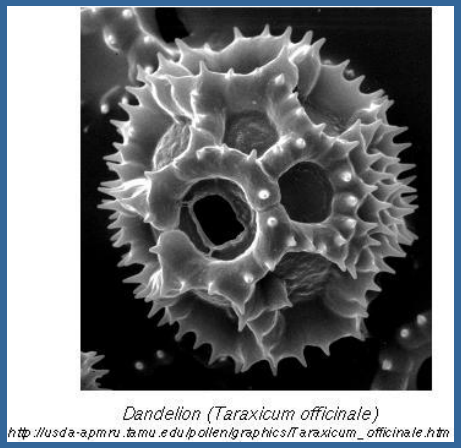
Vascular:- 1 2 3 4 5 6

Testes com luz ultravioleta

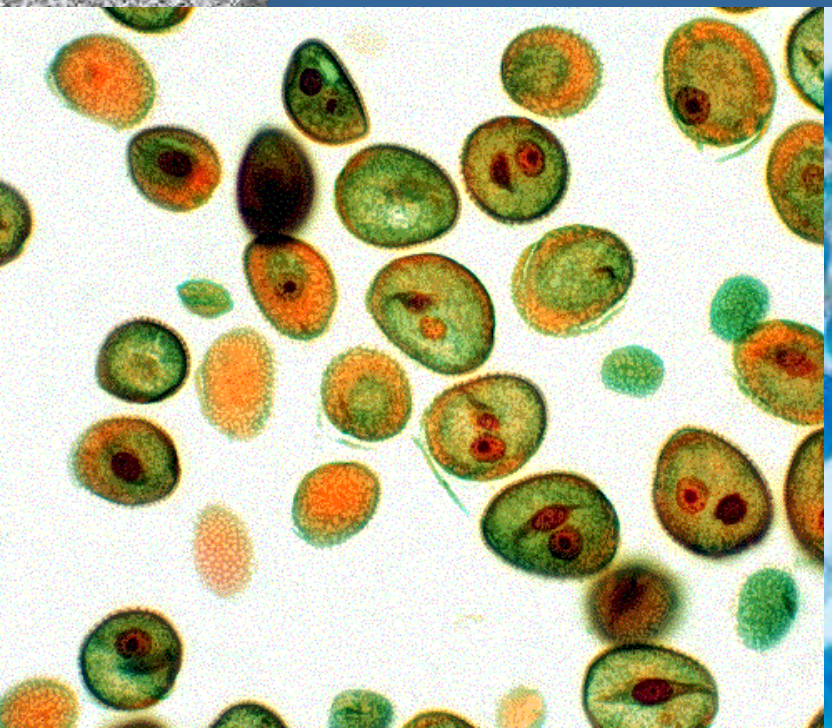


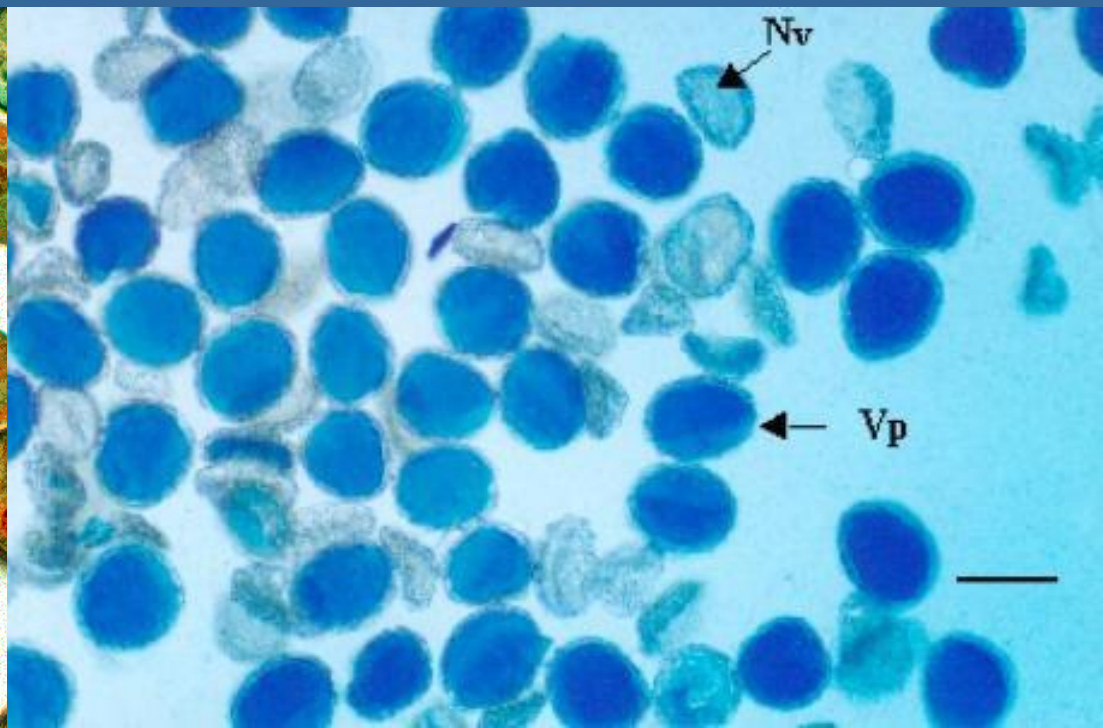
Viabilidade de Pólen





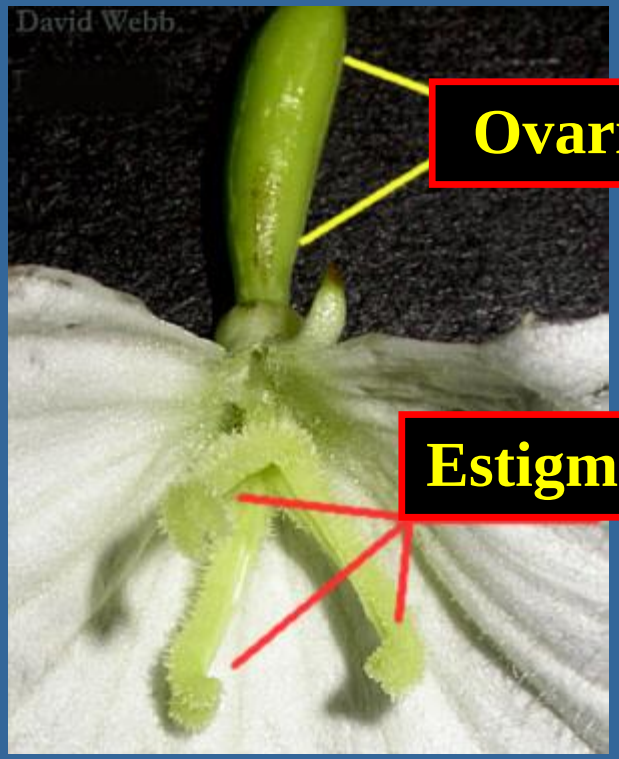
Dandelion (Taraxicum officinale)
http://usda-apmru.tamu.edu/pollen/graphics/Taraxicum_officinale.htm





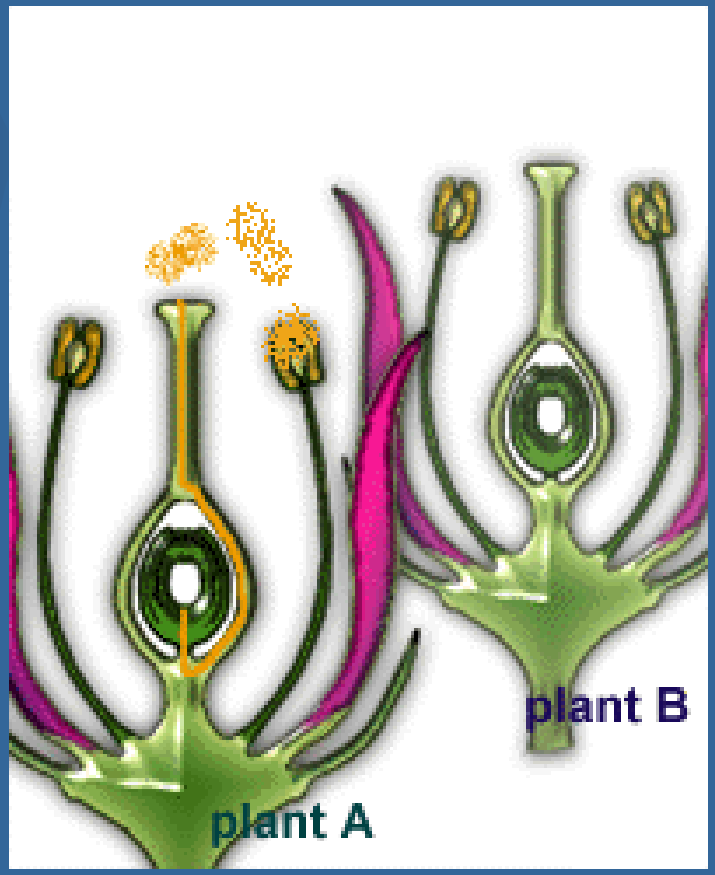
Volume e concentração de nectar

Receptividade do estigma

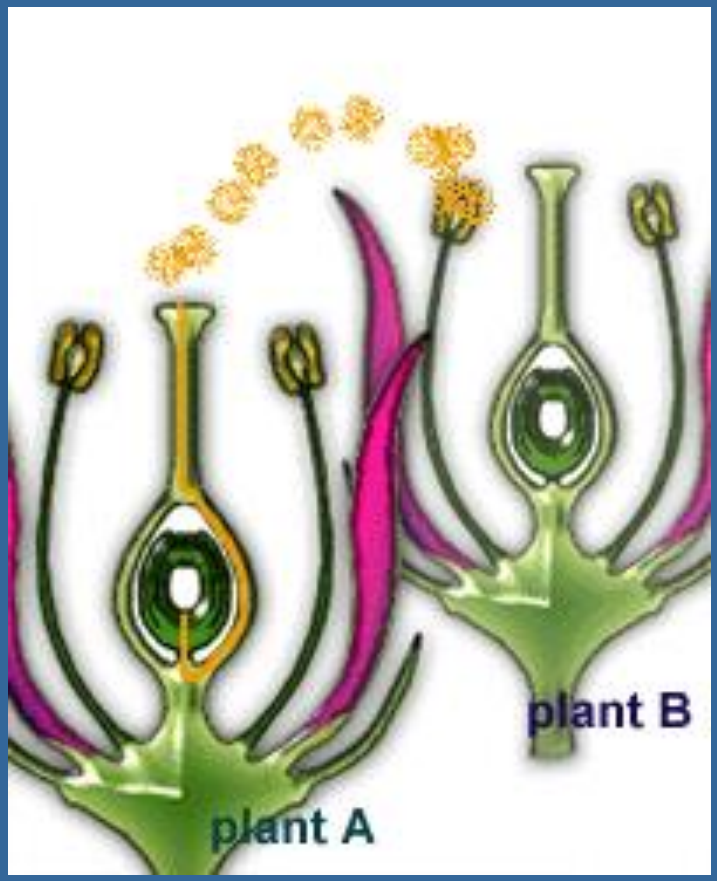


Cruzamentos artificiais

Autopolinização



Polinização cruzada



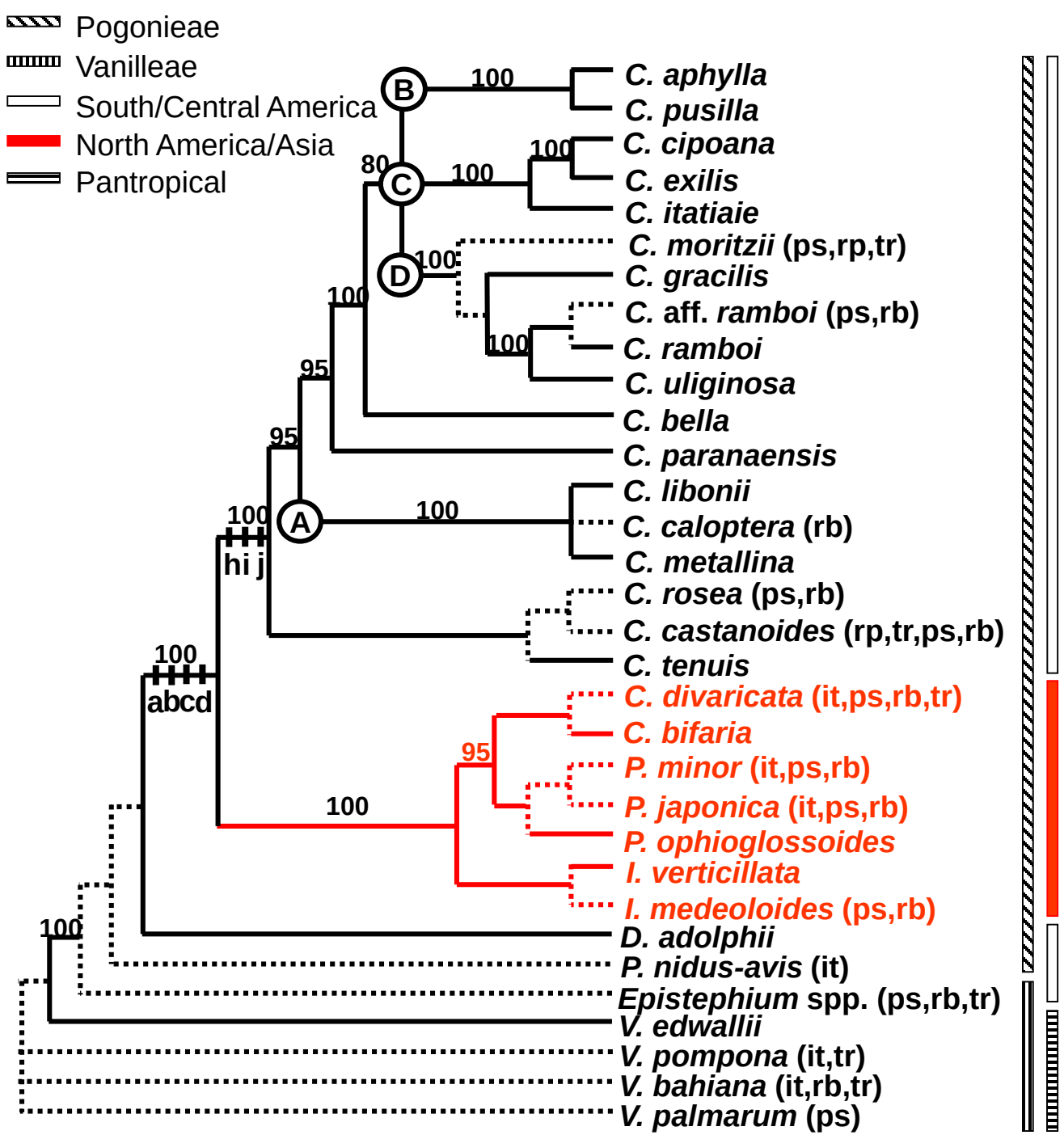
Cruzamentos artificiais

- Emasculação
- Flores intactas
- Controle – Taxa de frutificação
  - Sucesso reprodutivo

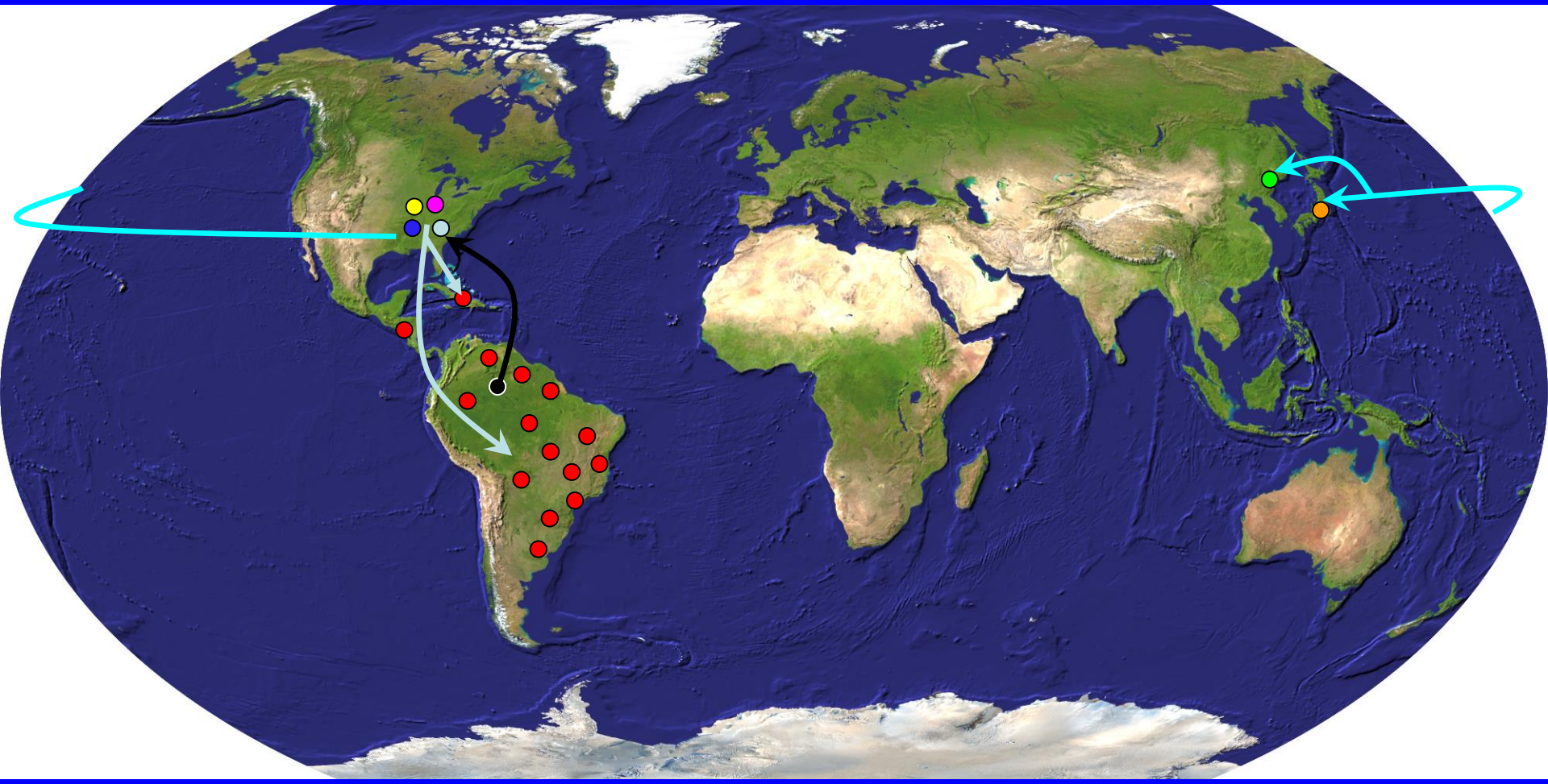
Contagem de sementes Potencialmente viáveis

Testes de germinação de sementes

Estudos Filogeneticos

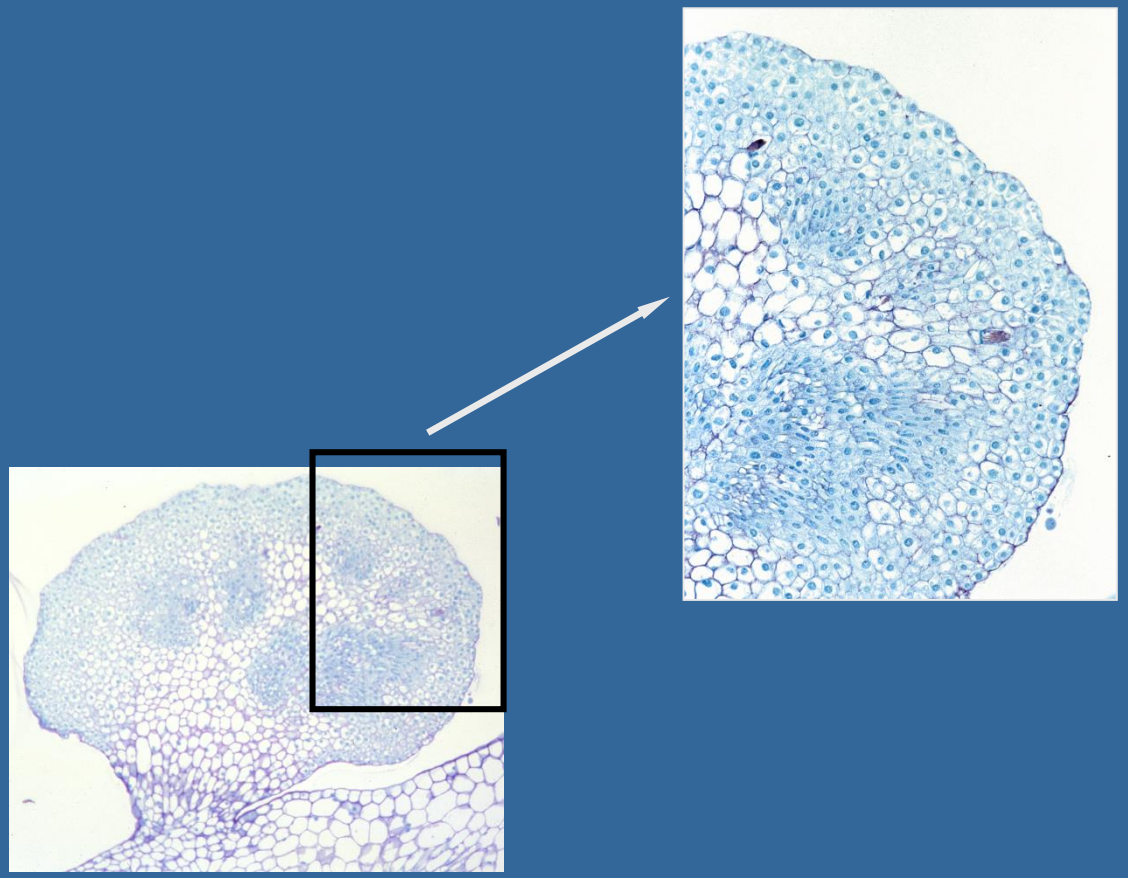

Pogonieae
Vanilleae
South/Central America
North America/Asia
Pantropical
B
C
D
A
hi j
abcd
100
80
95
C. aphylla
C. pusilla
C. cipoana
C. exilis
C. itatiaie
C. moritzii (ps,rp,tr)
C. gracilis
C. aff. ramboi (ps,rb)
C. ramboi
C. uliginosa
C. bella
C. paranaensis
C. libonii
C. caloptera (rb)
C. metallina
C. rosea (ps,rb)
C. castanoides (rp,tr,ps,rb)
C. tenuis
C. divaricata (it,ps,rb,tr)
C. bifaria
P. minor (it,ps,rb)
P. japonica (it,ps,rb)
P. ophioglossoides
I. verticillata
I. medeoloides (ps,rb)
D. adolphii
P. nidus-avis (it)
Epistephium spp. (ps,rb,tr)
V. edwallii
V. pompona (it,tr)
V. bahiana (it,rb,tr)
V. palmarum (ps)

Pogonieae

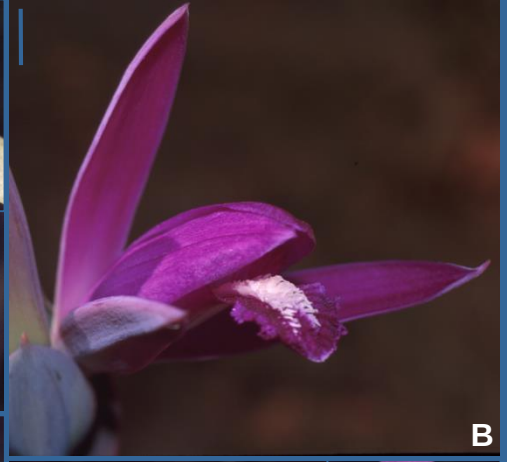


- Cleistes
- Cleistes divaricata
- Duckeella
- Isotria
- Pogonia ophioglossoides
- Pogonia japonica
- Cleistes bifaria
- Pogonia minor

Espécies centro- e sul-americanas




A


B

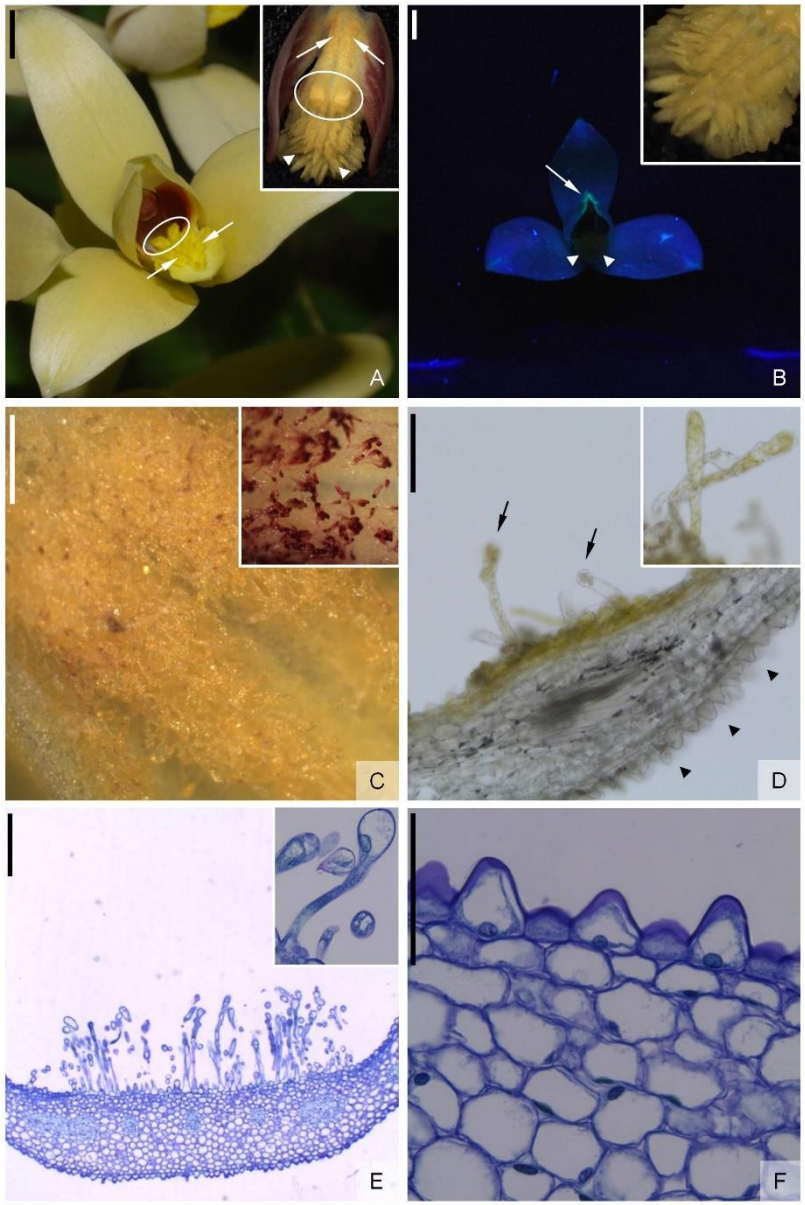

C


D

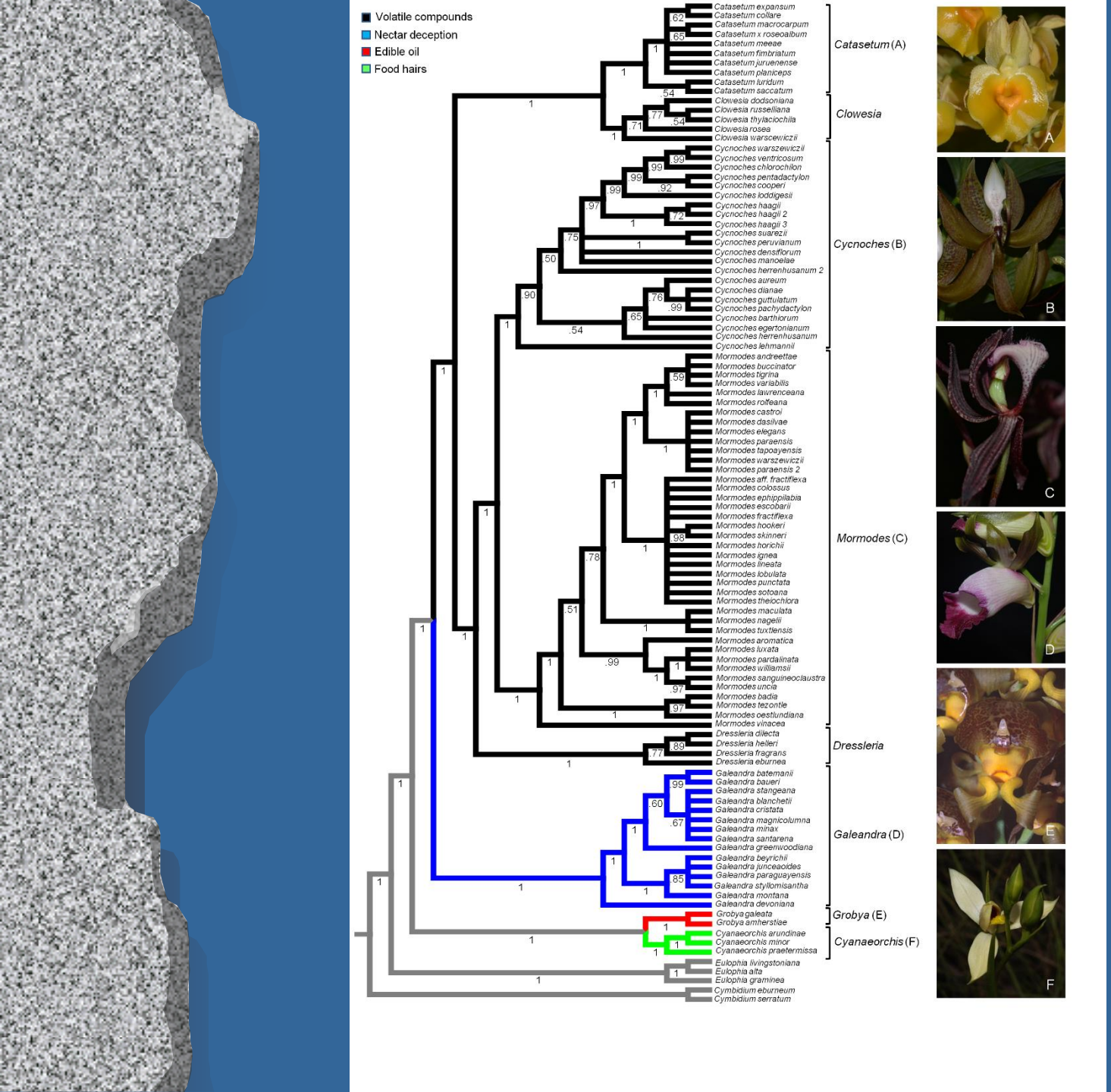

E


F


G


A
B
C
D
E
F


A
B
C
D


Volatile compounds
Nectar deception
Edible oil
Food hairs
Catasetum expansum
Catasetum collare
Catasetum macrocarpum
Catasetum x roseoalbum
Catasetum meeae
Catasetum fimbriatum
Catasetum juruenense
Catasetum planiceps
Catasetum luridum
Catasetum saccatum
Clowesia dodsoniana
Clowesia russelliana
Clowesia thylaciochila
Clowesia rosea
Clowesia warscewiczii
Cycnoches warszewiczii
Cycnoches ventricosum
Cycnoches chlorochilon
Cycnoches pentadactylon
Cycnoches cooperi
Cycnoches loddigesii
Cycnoches haagii
Cycnoches haagii 2
Cycnoches haagii 3
Cycnoches suarezii
Cycnoches peruvianum
Cycnoches densiflorum
Cycnoches manoelae
Cycnoches herrenhusanum 2
Cycnoches aureum
Cycnoches dianae
Cycnoches guttulatum
Cycnoches pachydactylon
Cycnoches barthiorum
Cycnoches egertonianum
Cycnoches herrenhusanum
Cycnoches lehmannii
Mormodes andreettae
Mormodes buccinator
Mormodes tigrina
Mormodes variabilis
Mormodes lawrenceana
Mormodes rolfeana
Mormodes castroi
Mormodes dasilvae
Mormodes elegans
Mormodes paraensis
Mormodes tapoayensis
Mormodes warszewiczii
Mormodes paraensis 2
Mormodes aff. fractiflexa
Mormodes colossus
Mormodes ephippilabia
Mormodes escobarii
Mormodes fractiflexa
Mormodes hookeri
Mormodes skinneri
Mormodes horichii
Mormodes ignea
Mormodes lineata
Mormodes lobulata
Mormodes punctata
Mormodes sotoana
Mormodes theiochlora
Mormodes maculata
Mormodes nagelii
Mormodes tuxtlensis
Mormodes aromatica
Mormodes luxata
Mormodes pardalinata
Mormodes williamsii
Mormodes sanguineoclaustra
Mormodes uncia
Mormodes badia
Mormodes tezontle
Mormodes oestlundiana
Mormodes vinacea
Dressleria dilecta
Dressleria helleri
Dressleria fragrans
Dressleria eburnea
Galeandra batemanii
Galeandra baueri
Galeandra stangeana
Galeandra blanchetii
Galeandra cristata
Galeandra magnicolumna
Galeandra minax
Galeandra santarena
Galeandra greenwoodiana
Galeandra beyrichii
Galeandra junceaoides
Galeandra paraguayensis
Galeandra stylomisantha
Galeandra montana
Galeandra devoniana
Grobya galeata
Grobya amherstiae
Cyanaeorchis arundinae
Cyanaeorchis minor
Cyanaeorchis praetermissa
Eulophia livingstoniana
Eulophia alta
Eulophia graminea
Cymbidium eburneum
Cymbidium serratum
Catasetum (A)
Clowesia
Cycnoches (B)
Mormodes (C)
Dressleria
Galeandra (D)
Grobya (E)
Cyanaeorchis (F)
A
B
C
D
E
F


A

B

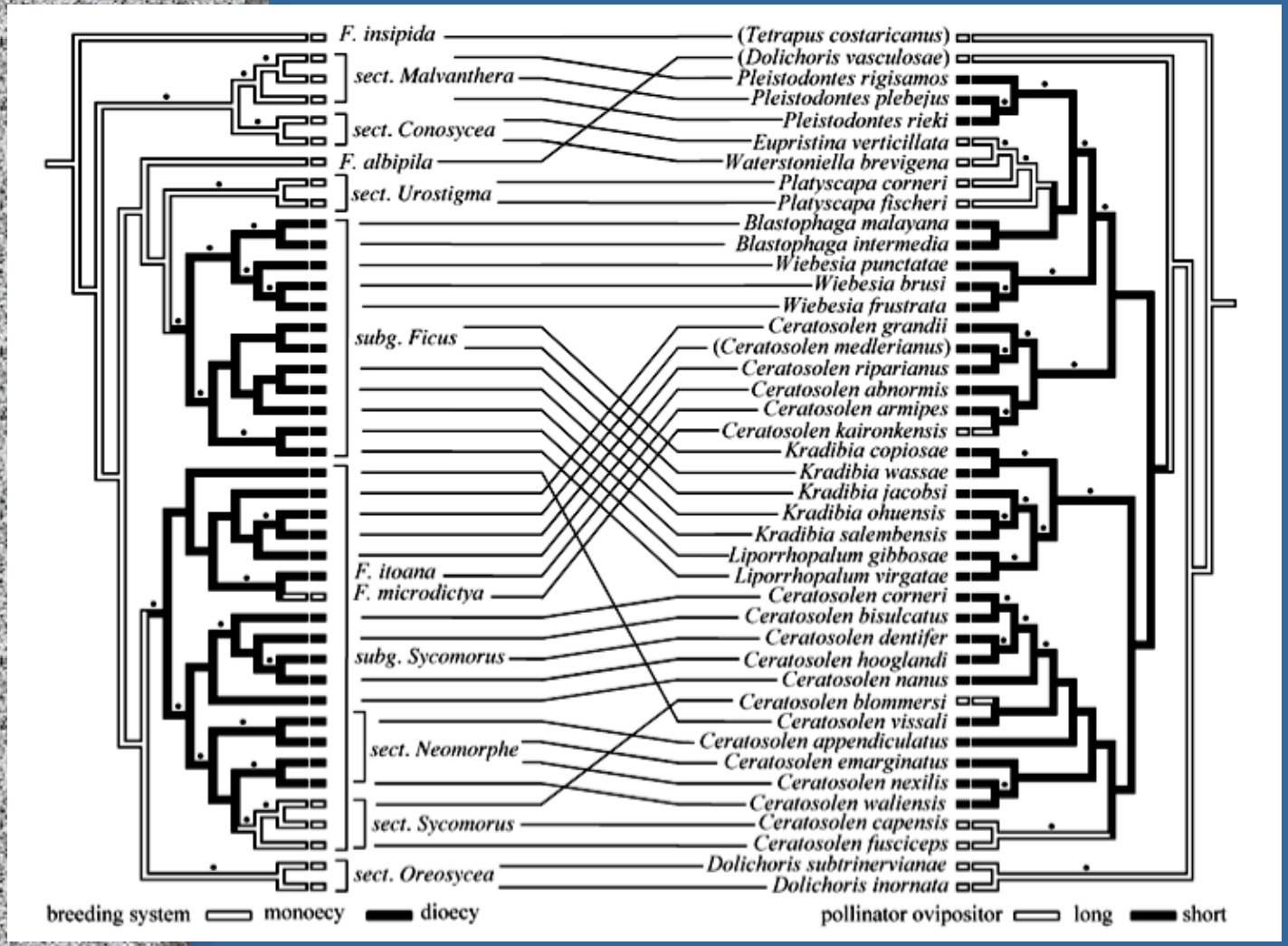

C


D

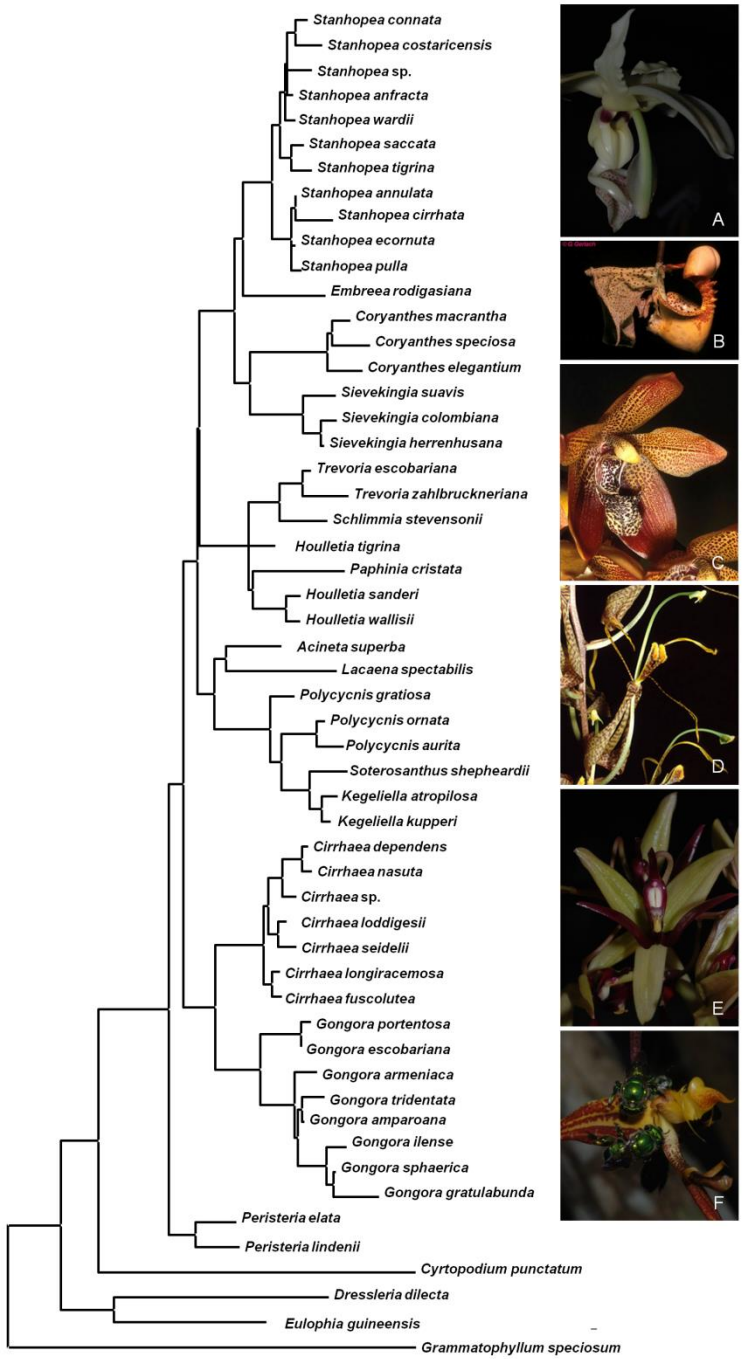

E

Catasetum fimbriatum
Galendra montana
Clowesia warcsewiczii
Dressleria eburnea
Mormodes paraensis
Cycnoches raagii
Cyannaeorchis arundinae
Grobya amherstiae
Brasiliorchis picta
Dichaea pendula
Zygopetalum crinitum
Baptistonia fimbriata
Lockhartia lunifera
Cirrhaea dependens
Scuticaria irwiniana
Rudolfiella aurantiaca
Bifrenaria tyrianthyna
Xylobium squalens
Oeceoclades maculata
Eulophia alta
Dendrobium
Campylocentrum aromaticum
Angraecum sesquipedale
Bulbophyllum
Acianthera aphtosa
Octomeria crassifolia
Bletia catenulata
Epidendrum denticulatum
Cattleya forbesii
Encyclia argentinensis
Polystachya estrellensis
Polystachya ottoniana
Phaius tancarville
Mediocalcar decoratum
Eria elata
Eria hyacinthoides
Coelogyne lawrenceana
Arundina bambusifolia
Liparis nervosa
Orchidoideae
Vanilloideae
Cypripedioideae
0.02
A
B
C
D
E

Co-evolução entre plantas e polinizadores



Fonte: George D Weiblen. Correlated Evolution in Fig Pollination. Systematic Biology 53(1): 128139, 2004.


Stanhopea connata
Stanhopea costaricensis
Stanhopea sp.
Stanhopea anfracta
Stanhopea wardii
Stanhopea saccata
Stanhopea tigrina
Stanhopea annulata
Stanhopea cirrhata
Stanhopea ecornuta
Stanhopea pulla
Embreea rodigasiana
Coryanthes macrantha
Coryanthes speciosa
Coryanthes elegantium
Sievekingia suavis
Sievekingia colombiana
Sievekingia herrenhusana
Trevoria escobariana
Trevoria zahlbruckneriana
Schlimmia stevensonii
Houlletia tigrina
Paphinia cristata
Houlletia sanderi
Houlletia wallisii
Acineta superba
Lacaena spectabilis
Polycycnis gratiosa
Polycycnis ornata
Polycycnis aurita
Soterosanthus shepheardii
Kegeliella atropilosa
Kegeliella kupperi
Cirrhaea dependens
Cirrhaea nasuta
Cirrhaea sp.
Cirrhaea loddigesii
Cirrhaea seidelii
Cirrhaea longiracemosa
Cirrhaea fuscolutea
Gongora portentosa
Gongora escobariana
Gongora armeniaca
Gongora tridentata
Gongora amparoana
Gongora ilense
Gongora sphaerica
Gongora gratulabunda
Peristeria elata
Peristeria lindenii
Cyrtopodium punctatum
Dressleria dilecta
Eulophia guineensis
Grammatophyllum speciosum
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A
B
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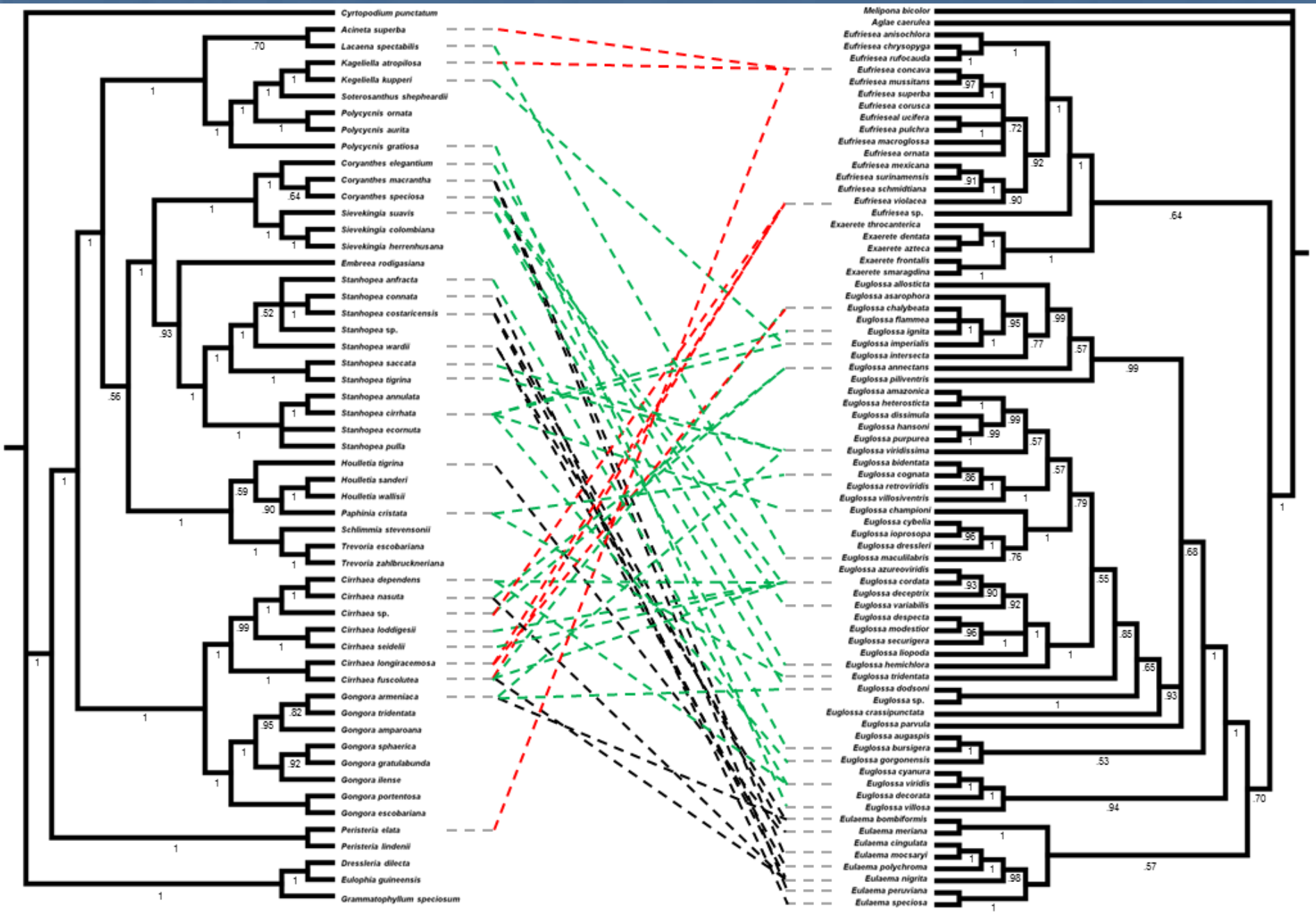
Cyrtopodium punctatum
Acineta superba
Lacaena spectabilis
Kageliella atropilosa
Kegeliella kupperi
Soterosanthus shepheardii
Polycycnis ornata
Polycycnis aurita
Polycycnis gratiosa
Coryanthes elegantium
Coryanthes macrantha
Coryanthes speciosa
Sievekingia suavis
Sievekingia colombiana
Sievekingia herrenhusana
Embreea rodigasiana
Stanhopea anfracta
Stanhopea connata
Stanhopea costaricensis
Stanhopea sp.
Stanhopea wardii
Stanhopea saccata
Stanhopea tigrina
Stanhopea annulata
Stanhopea cirrhata
Stanhopea ecornuta
Stanhopea pulla
Houlletia tigrina
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Cirrhaea seidelii
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Gongora armeniaca
Gongora tridentata
Gongora amparoana
Gongora sphaerica
Gongora gratulabunda
Gongora ilense
Gongora portentosa
Gongora escobariana
Peristeria elata
Peristeria lindenii
Dressleria dilecta
Eulophia guineensis
Grammatophyllum speciosum
Melipona bicolor
Aglae caerulea
Eufriesea anisochlora
Eufriesea chrysopyga
Eufriesea rufocauda
Eufriesea concava
Eufriesea mussitans
Eufriesea superba
Eufriesea corusca
Eufrieseal ucifera
Eufriesea pulchra
Eufriesea macroglossa
Eufriesea ornata
Eufriesea mexicana
Eufriesea surinamensis
Eufriesea schmidtiana
Eufriesea violacea
Eufriesea sp.
Exaerete throcanterica
Exaerete dentata
Exaerete azteca
Exaerete frontalis
Exaerete smaragdina
Euglossa allosticta
Euglossa asarophora
Euglossa chalybeata
Euglossa flammea
Euglossa ignita
Euglossa imperialis
Euglossa intersecta
Euglossa annectans
Euglossa piliventris
Euglossa amazonica
Euglossa heterosticta
Euglossa dissimula
Euglossa hansoni
Euglossa purpurea
Euglossa viridissima
Euglossa bidentata
Euglossa cognata
Euglossa retroviridis
Euglossa villosiventris
Euglossa championi
Euglossa cybelia
Euglossa ioprosopa
Euglossa dressleri
Euglossa maculilabris
Euglossa azureoviridis
Euglossa cordata
Euglossa deceptrix
Euglossa variabilis
Euglossa despecta
Euglossa modestior
Euglossa securigera
Euglossa liopoda
Euglossa hemichlora
Euglossa tridentata
Euglossa dodsoni
Euglossa sp.
Euglossa crassipunctata
Euglossa parvula
Euglossa augaspis
Euglossa bursigera
Euglossa gorgonensis
Euglossa cyanura
Euglossa viridis
Euglossa decorata
Euglossa villosa
Eulaema bombiformis
Eulaema meriana
Eulaema cingulata
Eulaema mocsaryi
Eulaema polychroma
Eulaema nigrita
Eulaema peruviana
Eulaema speciosa