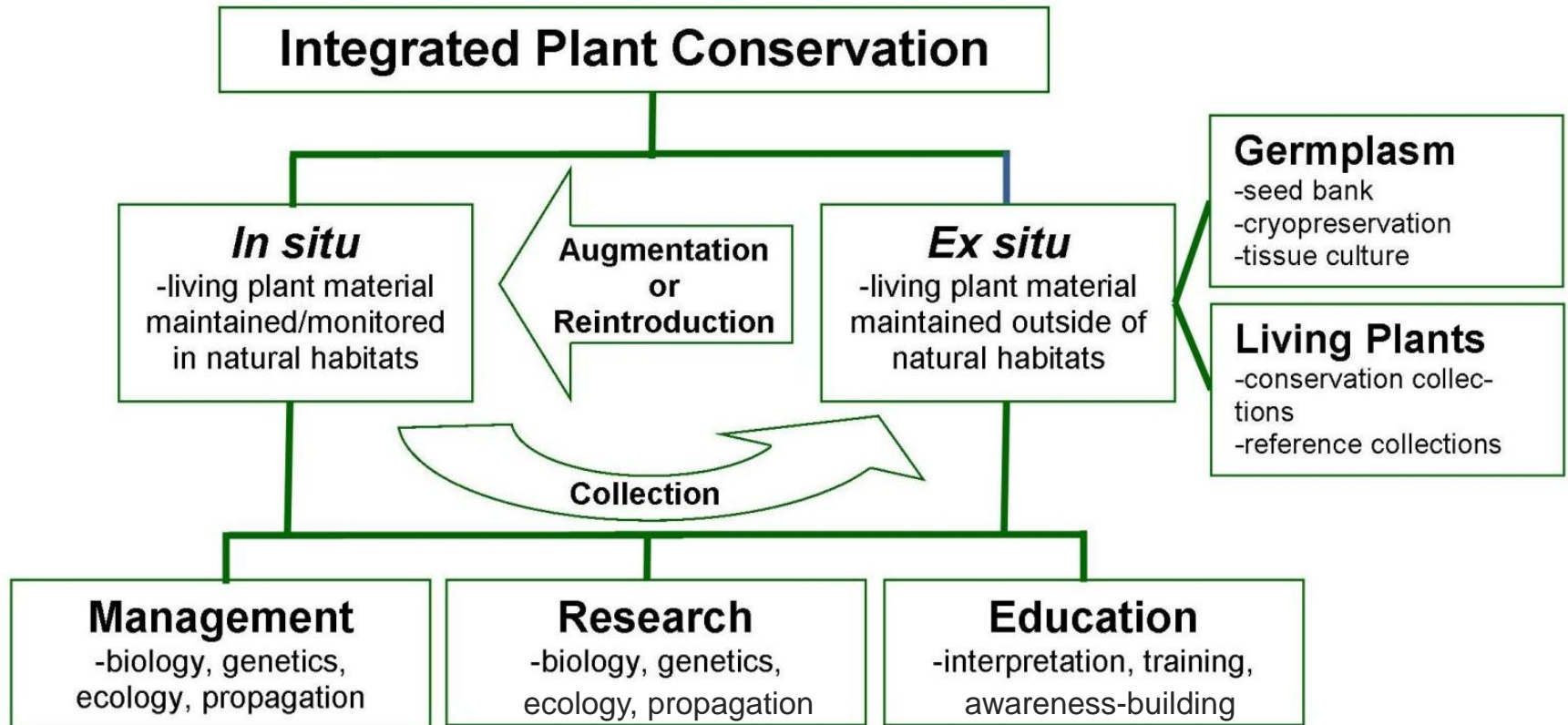


The Importance of Plant  
Collecting for  
Developing *ex-situ*  
Collections in Botanical  
Gardens and Arboreta

# Integrated Plant Conservation



# NAPCC Snapshot

48 participating institutions

43 single collections

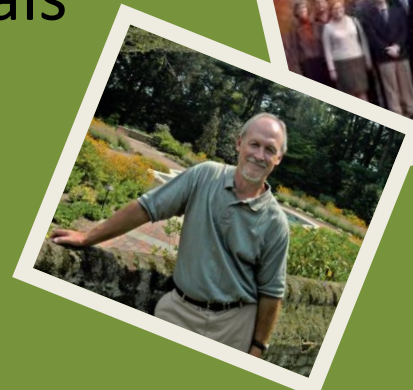
2 multisite collections

*Quercus* (Oak) – 15 + 2 sites

*Acer* (Maple) – 11 sites

15-yr collaboration with USDA

~100 volunteer professionals



# Associate Germplasm Collection

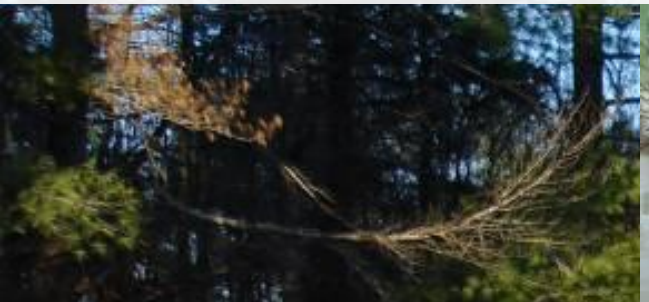
- Partners-United States Department of Agriculture-Agricultural Research Service
- National Germplasm Collections Program
- The USDA, ARS, NPGS is a network of cooperating institutions, agencies, and research units in the Federal, State, and Private sectors. Its primary goal is to preserve and make available to scientists plant genetic resources.
- The NPGS has instituted a policy to develop formal, non-funded collaborations with government and non-government institutions that are not components of the NPGS, yet maintain important collections of germplasm.

*“It’s not enough to just have it...*

*knowing & using the collection is the goal.”*



Atlanta Botanical Garden:  
Sarracenia (Pitcher-Plant)  
Collection



Mt. Cuba Center: Trillium  
Collection



# NAPCC Goals

**Assess genetic diversity**

**Conduct gap analyses**

**Document activities**

**Quantify combined resources**





# Conserve Wild Species

Improve genetic diversity

Coordinate on international level

Expand seedbanking

Inform the public

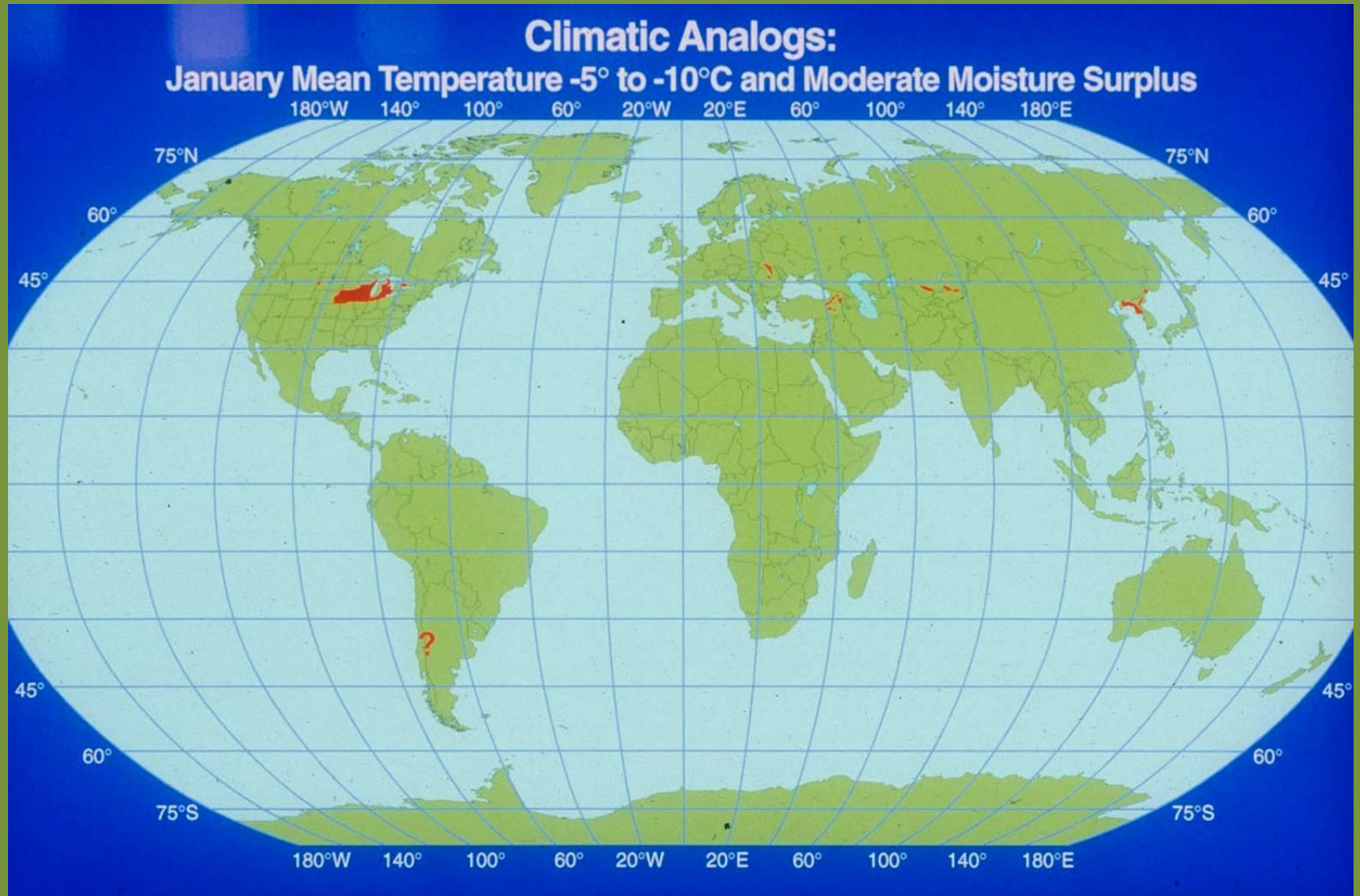


# NACPEC Plant Exploration Objectives

## North America-China Plant Exploration Consortium

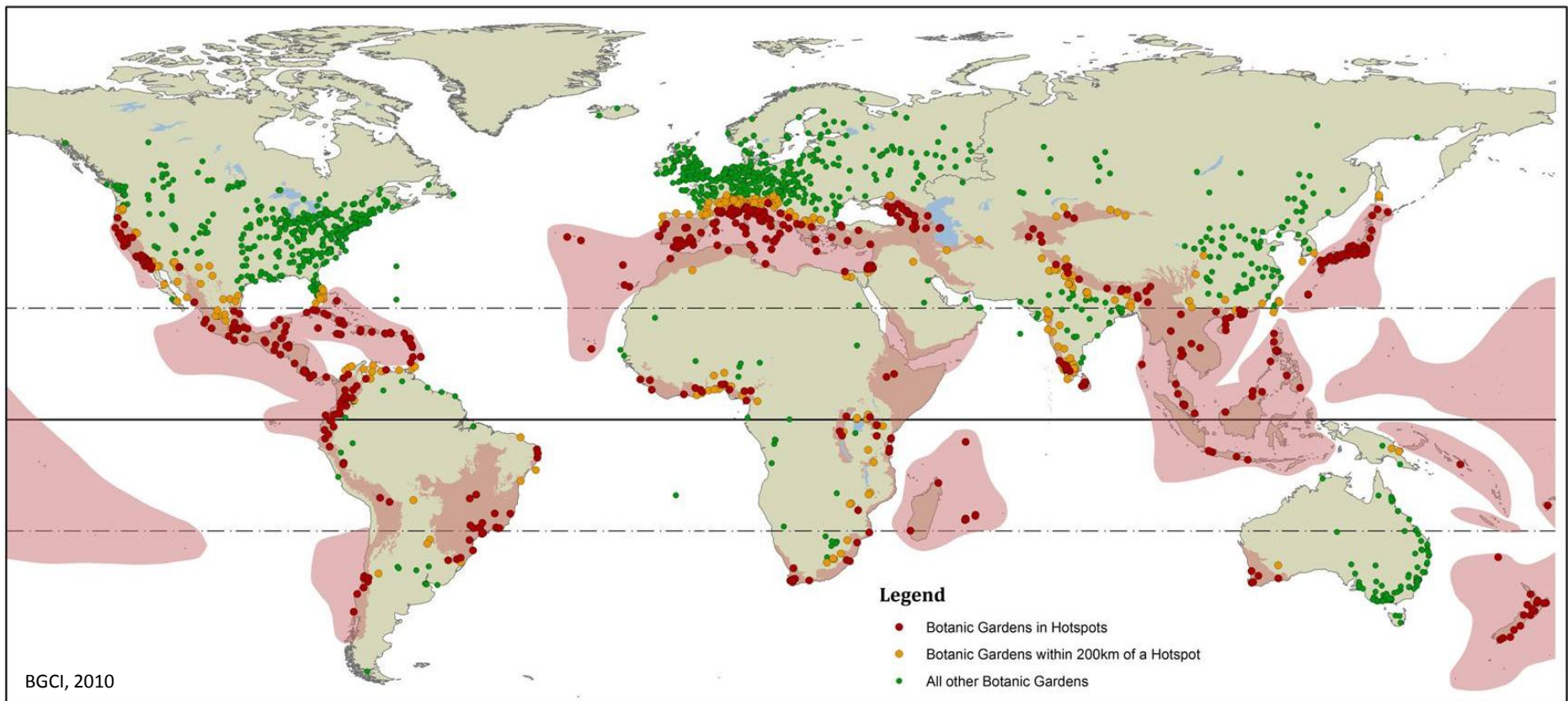
- Broaden the genetic pool of known species
  - Extend hardiness and increase vigor
  - Broaden adaptability to difficult microclimates
- Increase insect and disease resistance
- Conserve rare species (*ex-situ* conservation)
- Select improved horticultural forms
- Collaborate with key institutions in the national and international botanical community

# Where to Collect and Why



# The power of botanic gardens

- Botanic gardens and biodiversity hotspots



# Global and North American plant diversity

- Worldwide: 350,000+ plant species
- >1/5 (70,000) threatened
- CA/US: 20,000 native species
- MX: 22,000 native species



# Example of Integrated Plant Conservation

- *In situ* work supported by *ex situ* collections
- *Echeveria laui*, UNAM Botanic Garden, Mexico

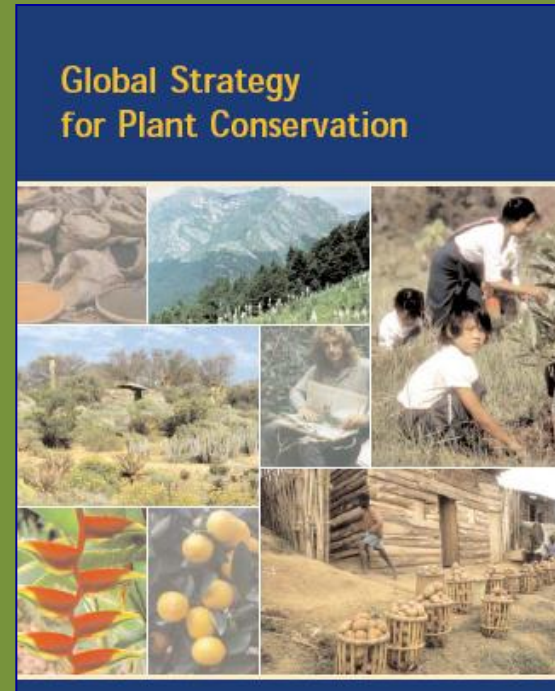


Type of <i>ex situ</i> collection	Genetic Diversity	Longevity	Relative costs per individual	Relative Conservation Value	Notes
<b>Seed bank</b>	High (if proper protocols followed)	High (with proper storage)	Low (if facilities exist)	Reintroduction – High Research – High Education – Low	Seed storage is not possible for some species
<b>Cryopreservation</b>	High (if proper protocols followed)	High (with proper storage)	Intermediate (if facilities exist)	Reintroduction – High Research – High Education – Low	Techniques for many species not yet available
<b>Tissue culture</b>	High (if proper protocols followed)	Intermediate (with proper storage)	Intermediate (if facilities exist)	Reintroduction – High Research – High Education – Low	Techniques for many species not yet available
<b>Conservation collection/Field gene bank</b>	Intermediate	Short (species' generation length)	High	Reintroduction – Intermediate Research – High Education – High	Cultivation is the only option for some species, adaptation to cultivation and hybridization is a concern
<b>Reference living collection</b>	Low*	Short (species' generation length)	High	Reintroduction – Low* Research – Intermediate* Education – High	Source may be unknown, often one or few individuals, likely adaptation to cultivation
<b>Display living collection</b>	Low*	Short (species' generation length)	High	Reintroduction – Low* Research – Low* Education – High	Source often unknown, often one or few individuals, likely adaptation to cultivation

\*May have higher genetic diversity or conservation and research value if material is wild-collected and maintained as multiple genetically diverse accessions, although adaptation to cultivation and hybridization is a concern.

# GSPC Target 8 (2020)

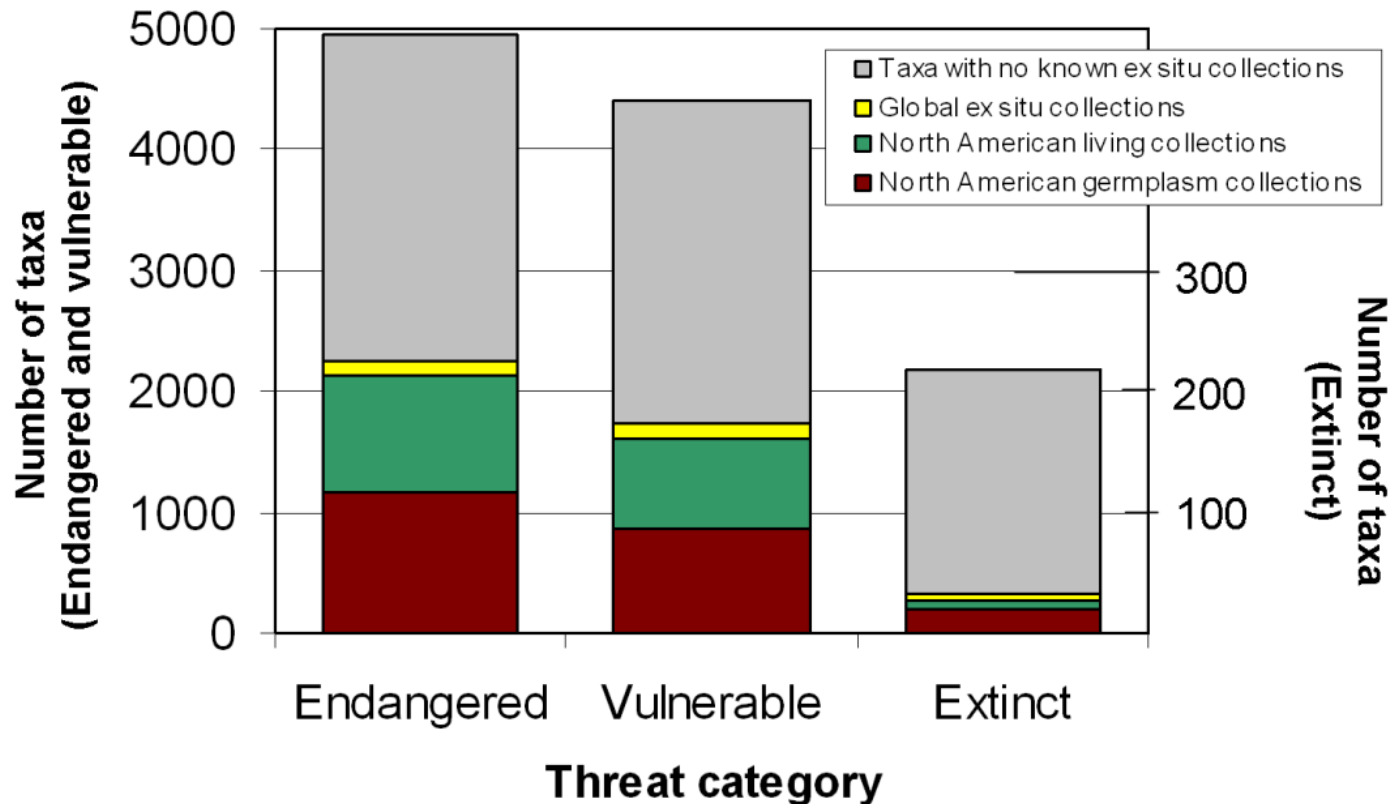
- *At least 75% of threatened plant species in ex situ collections, & at least 20% available for recovery/restoration programmes.*





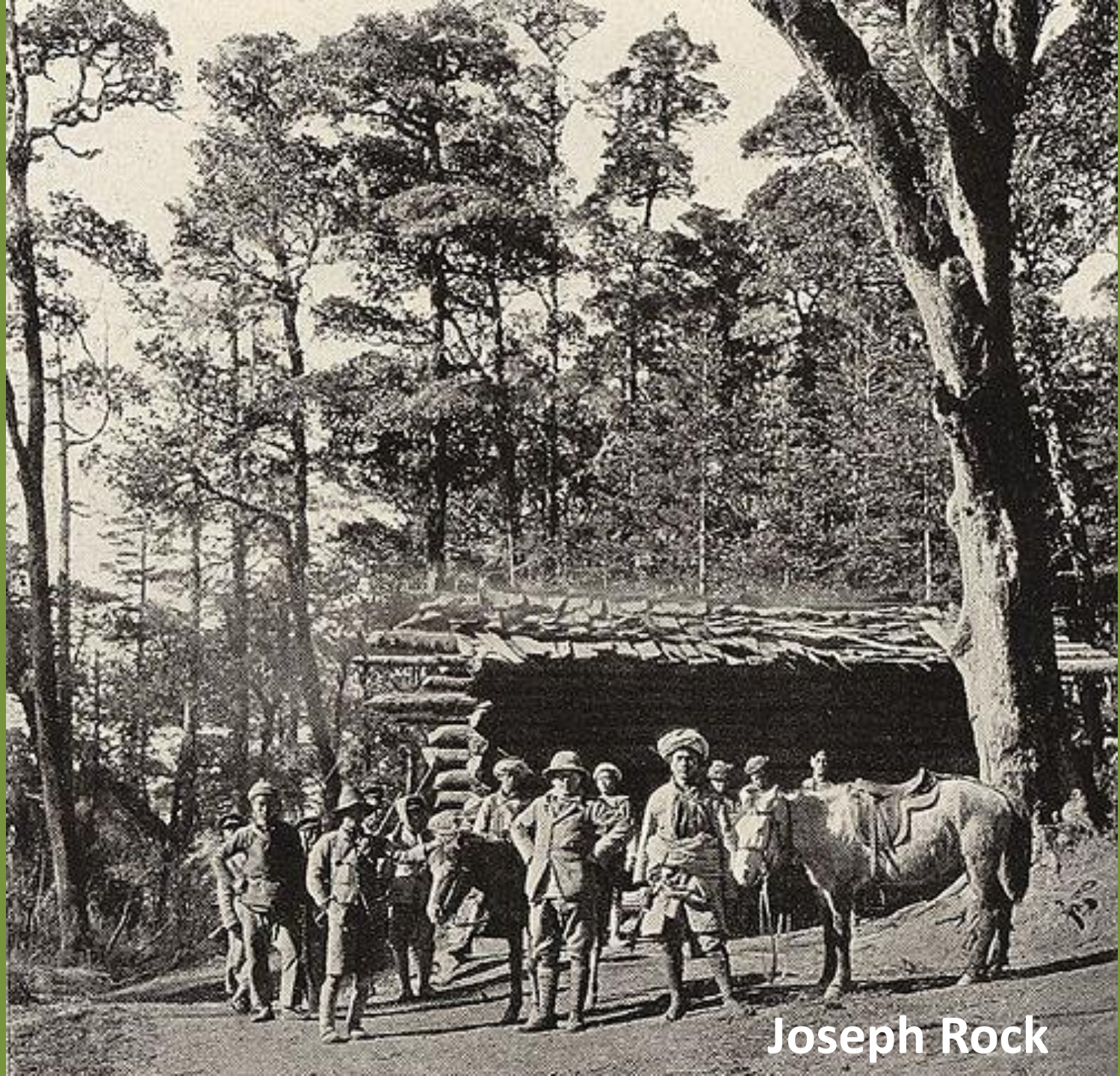
# 39% of N.A. Threatened Taxa in Collections

*Ex situ* collections for North American threatened plants



*Acer pentaphyllum* – Yalong River, Sichuan





Joseph Rock

留南園四野棠台

常隨名伯卓

風志輝陳晉福

一九二二年二月



Joseph Rock

洛克九百里——進入大香格里拉的钥匙



Entrance to Muli

洛克九百里——進入大香格里拉的鑰匙



Entrance to Muli

# 五小叶槭保护地 简介

名: *Acer pentaphyllum*

类: 槭树科 槭属

护级别: 中国物种红色名录等 级: 极危

五小叶槭植物仅产于四川西南部海拔2200-3000 m的河谷地带, 野外天然分布极其稀少。属国家珍稀保护植物, 但该物种野生种群实际已处于极危状态。该极危物种受到人为、牲畜及自然灾害的危害及威胁, 面临灭绝的边缘。使该极危物种得到延续和发展, 急需抢救性保护。把五小叶槭种群列为保护工作对象, 进行濒危机制方面的研究, 该区域被列为重点保护地。

面积

1000亩

株数

262株

雅江县林业局 制

2010.7.5



*Acer pentaphyllum* along Yalong River





*Acer pentaphyllum*



*Acer pentaphyllum*






*Acer pentaphyllum*



*Acer pentaphyllum*



*Acer pentaphyllum*

2005.144 F1

AP05002

06/14/2010

Wild-Direct

China

Quarryhill Botanical Garden



Quarryhill Botanical Garden



Quarryhill Botanical Garden





**Quarryhill Botanical Garden**



Quarryhill Botanical Garden



*Litsea populifolia*, Sichuan



*Litsea populifolia*, Windcliff



*Litsea populifolia*, Windcliff



*Sassafras tzumu*, Sichuan



*Sassafras tzumu*, Windcliff



*Sassafras tzumu*, Windcliff





*Tetracentron sinense*, Tao Yuan



***Tetracentron sinense*, Windcliff**



Vietnam 2013, Fan Xi Pan, Sapa, Five Finger Mountains



Vietnam 2013



**Dan Hinkley and Ozzie Johnson**



Ozzie Johnson collecting *Gesneriaceae*



Ozzie Johnson



**Seed processing**





Sapa



*Aesculus wangii*



*Aesculus wangii*

*Aesculus wangii*

Smithgall Woodland Garden

2011 10SM022 Scott McMahan



*Aesculus wangii* in ex-situ collection



*Amentotaxus* habitat



*Amentotaxus hatuyenensis*, Hagiang Province, northern Vietnam



*Amentotaxus hatuyenensis*





*Amentotaxus hatuyenensis*



*Amentotaxus hatuyenensis* in cultivation in Sapa



*Xanthocyparis vietnamensis*



*Xanthocyparis vietnamensis*



*Xanthocyparis vietnamensis*



*Xanthocyparis vietnamensis*



*Xanthocyparis vietnamensis*



*Magnolia* aff. *insignis*, Vietnam



*Magnolia foveolata*  
Smithgall Woodland Garden  
2010 SM025 (Vietnam)



*Magnolia foveolata*

*Anneslea lanceolata*  
Smithgall Woodland Garden  
2010 SM028 (N. Vietnam)



*Anneslea lanceolata*



*Magnolia sapaensis*, Dick Figlar's garden



*Holboellia brachyandra*, Fan Xi Pan



***Holboellia brachyandra*, Windcliff**



*Holboellia brachyandra*, Windcliff





*Magnolia caricifragrans*

*Magnolia caricifragrans*





*Magnolia caricifragrans*



*Magnolia caricifragrans*



*Magnolia caricifragrans*



*Magnolia caricifragrans* habitat



***Bogota Botanical Garden***



*Magnolia caricifragrans*, Bogota Botanical Garden





*Magnolia caricifragrans*

DÍA 9	MES 9	AÑO 12
VARIEDAD M. Wolfii		
C		

*Magnolia wolfii*



*Magnolia wolfii*



*Magnolia gilbertoi*



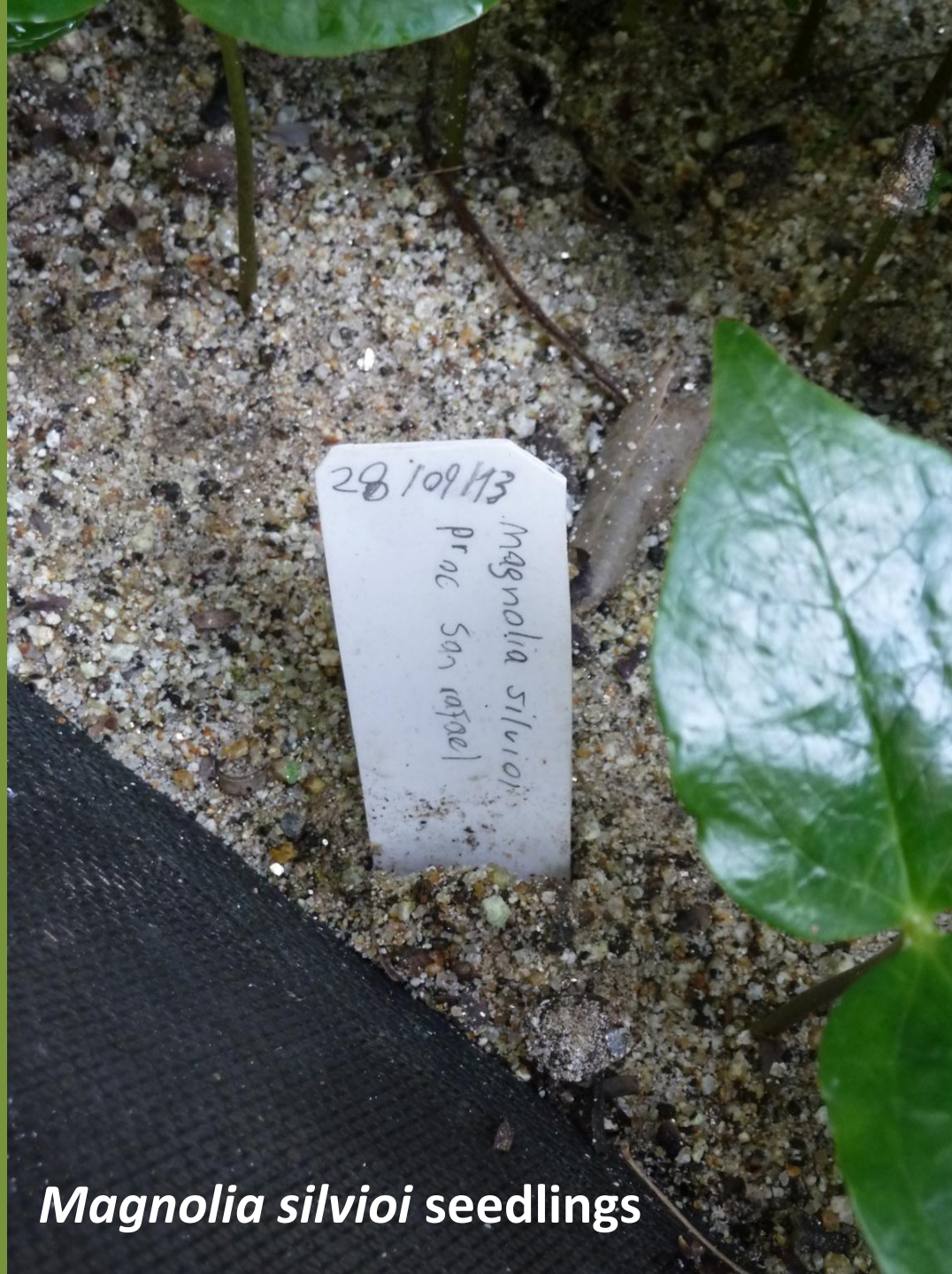
*Magnolia hernandezii*

JARDIN BOTANICO DE MEDELLIN





*Magnolia silvioi*



***Magnolia silvioi* seedlings**





*Magnolia silvioi* seedlings



*Magnolia sambiensis*



*Magnolia katorum*

# CONSERVACIÓN

de la Familia Magnoliaceae en Risaralda Colombia

(Árboles conocidos como: Copachí, Gallinazo, Almanegra y Molinillo)



NOMBRE COMÚN EN COLOMBIA:  
Gallinazo, Charambirá

2



1

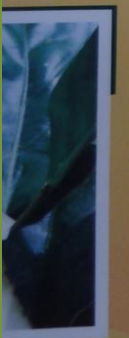
...Magnoliaceae en Risaralda Colombia  
...s como: Copachí, Gallinazo, Almanegra y Molinillo)



1 NOMBRE COMÚN EN COLOMBIA:  
Gallinazo, Charambirá  
ESPECIE: *Magnolia chochoensis*  
CATEGORÍA DE AMENAZA: EN: En peligro



2 NOMBRE COMÚN:  
Guanábano de monte, Guanabanillo, Hojarasco  
ESPECIE: *Magnolia espinalii*  
CATEGORÍA DE AMENAZA: CR: Crítico B1+2c



3 NOMBRE COMÚN:  
Copachí, Caña bravo, Alma negra  
ESPECIE: *Magnolia gilbertoi*  
CATEGORÍA DE AMENAZA: EN: En peligro B1+2c

4 NOMBRE COMÚN:  
Molinillo, Guanábano de monte, Gallinazo  
ESPECIE: *Magnolia hernandezii*  
CATEGORÍA DE AMENAZA: EN: En peligro B1+2c

5 NOMBRE COMÚN:  
Almanegra de urrao, Gallinazo morado, Hojiredondo  
ESPECIE: *Magnolia cf. urraoensis*  
CATEGORÍA DE AMENAZA: EN: En peligro B1ab (iii)

6 NOMBRE COMÚN:  
Copachí, Molinillo  
ESPECIE: *Magnolia wolfii*  
CATEGORÍA DE AMENAZA: CR: En peligro crítico B1+2c

## Colombian Magnolias

REPORTE

...ESTA FAMILIA



5

ESPECIE: *Magnolia cf. urraoensis*  
CATEGORÍA DE AMENAZA: EN: En peligro B1ab (iii)

6

NOMBRE COMÚN:  
Copachí, Molinillo  
ESPECIE: *Magnolia wolfii*  
CATEGORÍA DE AMENAZA: CR: En peligro crítico B1+2c

### REPORTE

INDIVIDUOS O POBLACIONES DE ESTA FAMILIA  
AL JARDÍN BOTÁNICO UNIVERSIDAD TECNOLÓGICA DE PEREIRA

ación de plantas  
*situ*

ies en campo  
neración  
ialización



Universidad Tecnológica de Pereira  
Acreditada Institucionalmente de Alta Calidad  
por el Ministerio de Educación Nacional



Sección de la Calidad ISO 9001:2008  
Sistema Público NTC 1070:2008

Diseño



Centro de Recursos Informativos y Educativos  
Innovación Educativa  
diseño@untp.edu.co

## Colombian Magnolias

a de Pereira - Vereda la Julita - Pereira Risaralda

3520 313 7500 313 7407



Cada  
son TAB  
al



Re



Tissue culture at Research Station Antioquia

CONSULTA INTERNA

Boletín Técnico *Biodiversidad* 6

AVANCES EN LA ESTRATEGIA PARA LA  
CONSERVACIÓN DE LAS ESPECIES  
DE LA FAMILIA MAGNOLIACEAE  
EN JURISDICCIÓN DE CORANTIOQUIA

ISSN 2011-4087



CORANTIOQUIA

CONSULTA INTERNA



Como se muestra en la tabla 1, siete de estas especies son endémicas del departamento de Antioquia, dos de las cuales son exclusivas de la jurisdicción de CORANTIOQUIA (Toro, 2009); estas son: *M. jardínensis* y *M. polyhypsophylla*.

Las especies de la familia Magnoliaceae han sido objeto de fuerte presión, en especial por el aprovechamiento de sus maderas, lo cual sumado a la destrucción de los hábitats, ha llevado a que 32 de las 33 especies nativas del país se encuentren bajo alguna categoría de amenaza (Calderón *et al.*, 2007), situación que es similar para la jurisdicción de CORANTIOQUIA, donde 9 de las 11 especies se encuentran bajo alguna categoría de amenaza, dos de ellas en peligro crítico de extinción (tabla 2).

**Tabla 2.** Especies de la familia Magnoliaceae nativas de la jurisdicción de CORANTIOQUIA amenazadas de extinción

Especie	Categoría	Fuentes
<i>Magnolia coronata</i> (Serna, Velásquez, Cogollo)	EN	Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia espinalii</i> (Lozano) Govaerts	CR	Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia guatapensis</i> (Lozano) Govaerts	EN	Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia hernandezii</i> (Lozano) Govaerts	EN	Cárdenas y Salinas (eds), 2007, Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia jardínensis</i> (Serna, Velásquez, Cogollo)	EN	Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia polyhypsophylla</i> (Lozano) Govaerts	CR	Cárdenas y Salinas (eds), 2007; Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia silvioi</i> (Lozano) Govaerts	EN	Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia urraoensis</i> (Lozano) Govaerts	EN	Cárdenas y Salinas (eds), 2007; Calderón S., E. <i>et al.</i> , 2007
<i>Magnolia yarumalensis</i> (Lozano) Govaerts	EN	Cárdenas y Salinas (eds), 2007; Calderón S., E. <i>et al.</i> , 2007

## Colombian Magnolia list

Como una medida de conservación CORANTIOQUIA vedó el aprovechamiento maderable de *M. hernandezii*, *M. jardínensis*, *M. polyhypsophylla*, *M. yarumalensis*



Por favor no regar el material vegetal de las bandejas.

Propagation facility



*Magnolia espinallii*



*Magnolia polypsophylla*



*Magnolia espinallii*



*Magnolia espinallii*



*Magnolia espinallii*



**Road to Jardin**





*Magnolia jardinensis*



*Magnolia yarumalensis*



*Magnolia yarumalensis*



*Magnolia yarumalensis*

# Taiwan Target Lists

- **Target List:** *Helwingia, Acer, Carpinus, Podophyllym, Trochodendron, Sinopanax, Fatsia, Schefflera, Gordonia, Schima, Magnolia, Hydrangea, Pittosporum, Sycopsis, Dystiliopsis, Arisaema, Asarum, Aspidistra, Begonia, Gesneriads, Illicium, Sarcococca, Lyonina, etc.*
- **Conservation Target List:** *Rhododendron nakaharai, Magnolia kachirachirai, Sassafras randaiensis*

# 台灣檫樹

學名: *Sassafras randaiense*  
(Hayata) Rehder

科名: 樟科 Lauraceae

它是台灣特有種落葉喬木，也是保育類野生動物寬尾鳳蝶的主要食草。分布於海拔900~2400公尺森林中。葉菱狀卵形，厚紙質，長10~15公分，寬約5公分，全緣或有2~3裂，幼嫩葉柄及葉脈常呈現鮮豔紅色。雜性花，雄蕊花被片6枚，花藥9枚，排成3輪，第3輪雄蕊有2枚帶柄的腺體，第4輪為箭形的退化雄蕊。核果球形，直徑約0.7公分，長在棍棒狀的果梗上。

These deciduous trees are Taiwanese endemic species and the main food supply for the protected Broad-tailed Swallowtail Butterfly.

They are distributed in forests at altitudes of 900~2400 meters. The leaves are 10~15 cm long, 5 cm wide, and the margin is entire or has 2~3 lobes. The young petiole and veins are often bright red. The polygamous has six perianths and nine anthers arranged in three whorls. The third whorl of stamens has two glands; the fourth whorl has the degradation stamens with arrow-shape. The drupes have a diameter of about 0.7 cm, and attaches on the long-thickened pedicel.





*Sassafras randaiense*



*Sassafras randaiense*





*Sassafras randaiense*

恆春熱帶植物園標本館

Herbarium, Heng-Chun Tropical Bot

PLANTAE FORMOS.

Collect No.: s.n.

350

Magnoliaceae 木蘭科

*Magnolia kachirachiral* (Kanchira & Yama  
石男

Collector: C.L.Pan 潘清連 & W.L.Chang 張萬

Detector: Yu-Pin Cheng 鄭育斌

Date: April 21, 1997

Locality: Pingtung County (屏東縣)

*Magnolia kachirachirai*

122111  
林業試驗所植物標本館(TAIF)  
Herbarium, Taiwan Forestry Research Institute

Collect No.: s.n.  
Magnoliaceae 木蘭科  
*Magnolia kachirachirai* (Kanehira & Yamamoto) Dandy 尚  
心石男

Collector:  
Detector: Her-long Chiang(江合隆)  
Date: December 2, 1978  
Locality: Pingtung County(屏東縣)  
Tahanshan(大漢山)  
(22° 25' 0" N, 120° 44' 0" E)

Altitude: 1130-1220m  
Habitat:  
Phenology: Flowering  
Note: 編號: -2432

Seed sorting



Seed sorting

072

Geultherie

ik...  
ik...



054

Kunji





*Fatsia polycarpa*

*Fatsia polycarpa*

Smithgall Woodland Garden

2012 SM 018



*Fatsia polycarpa*





*Fatsia polycarpa*, JCRA



*Trochodendron aralioides*



*Trochodendron aralioides*, JCRA



Huntington Botanical Garden



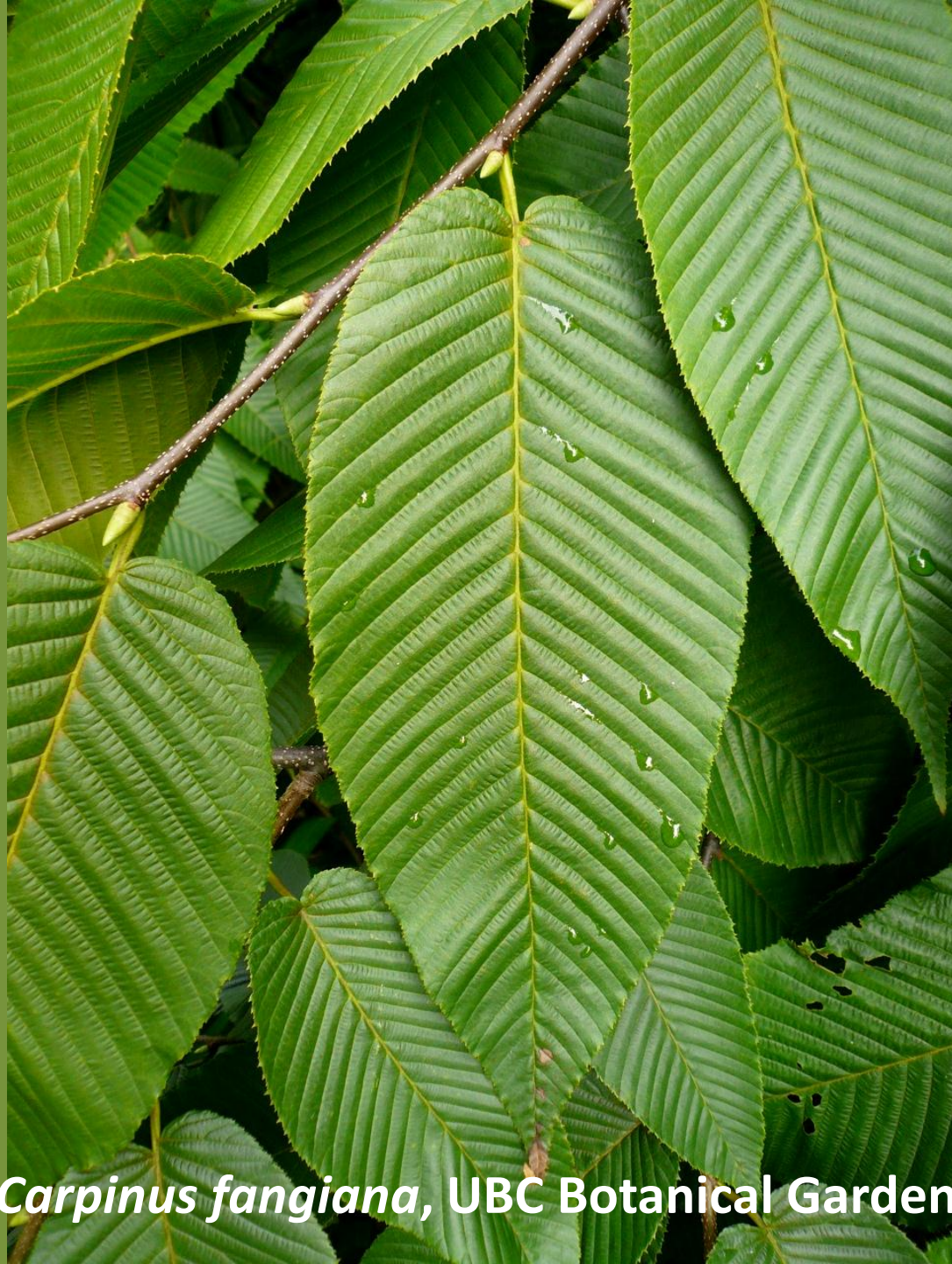
*Magnolia guatemalensis* subsp. *gautamalensis*



*Chorisia insignis*



*Delonix adansonioides*



*Carpinus fangiana*, UBC Botanical Garden





*Carpinus fangiana*, UBC Botanical Garden



*Carpinus fangiana*, UBC Botanical Garden



*Magnolia chevalieri*, HWJ 99533, UBC



*Magnolia chevalieri*, HWJ 99533, UBC



*Magnolia zenii*, UBC



*Rhododendron glanduliferum*, PW 0039, UBC



*Rhododendron ochraceum*, PW 035, UBC



*Thalictrum delavayi*, PW 185, UBC





Plant explorers