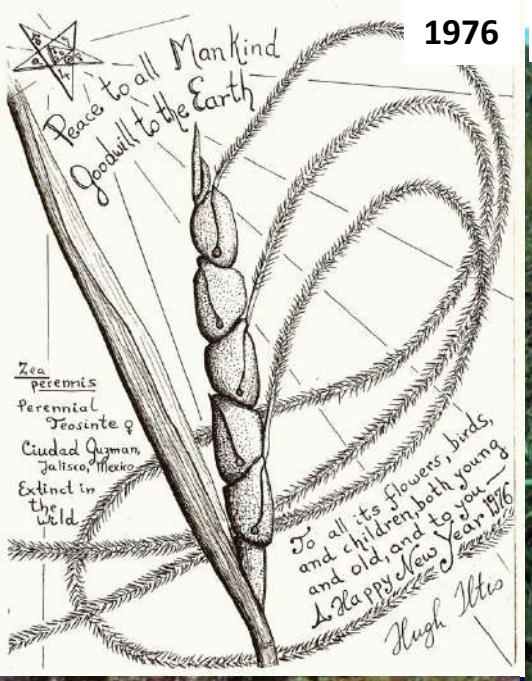
Lecciones de Conservación de las Magnolias

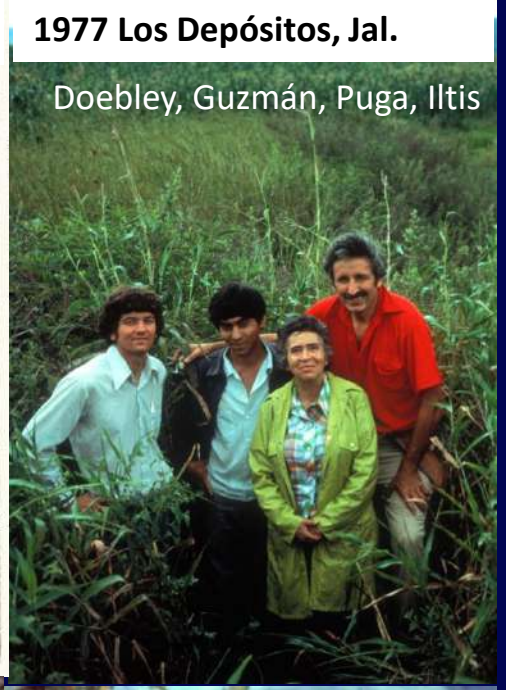
J. Antonio Vázquez-García

Instituto de Botánica
Universidad de Guadalajara

Lección 1.

Magnolias como especie sombrilla en la conservation In-situ de la Sierra de Manantlán; Jalisco, México





Iltis

In 1978, the discovery of *Zea diploperennis* was derived from the report of an alleged 2nd location for *Zea perennis* by Rafael Guzmán Mejía.

Wild relatives of corn are relevant resources for genetic Improvement of the 2nd world cereal

It became a World symbol of conservation value of wild plants

Jalisco is now a center of diversity of wild relatives and cultivated varieties of corn.

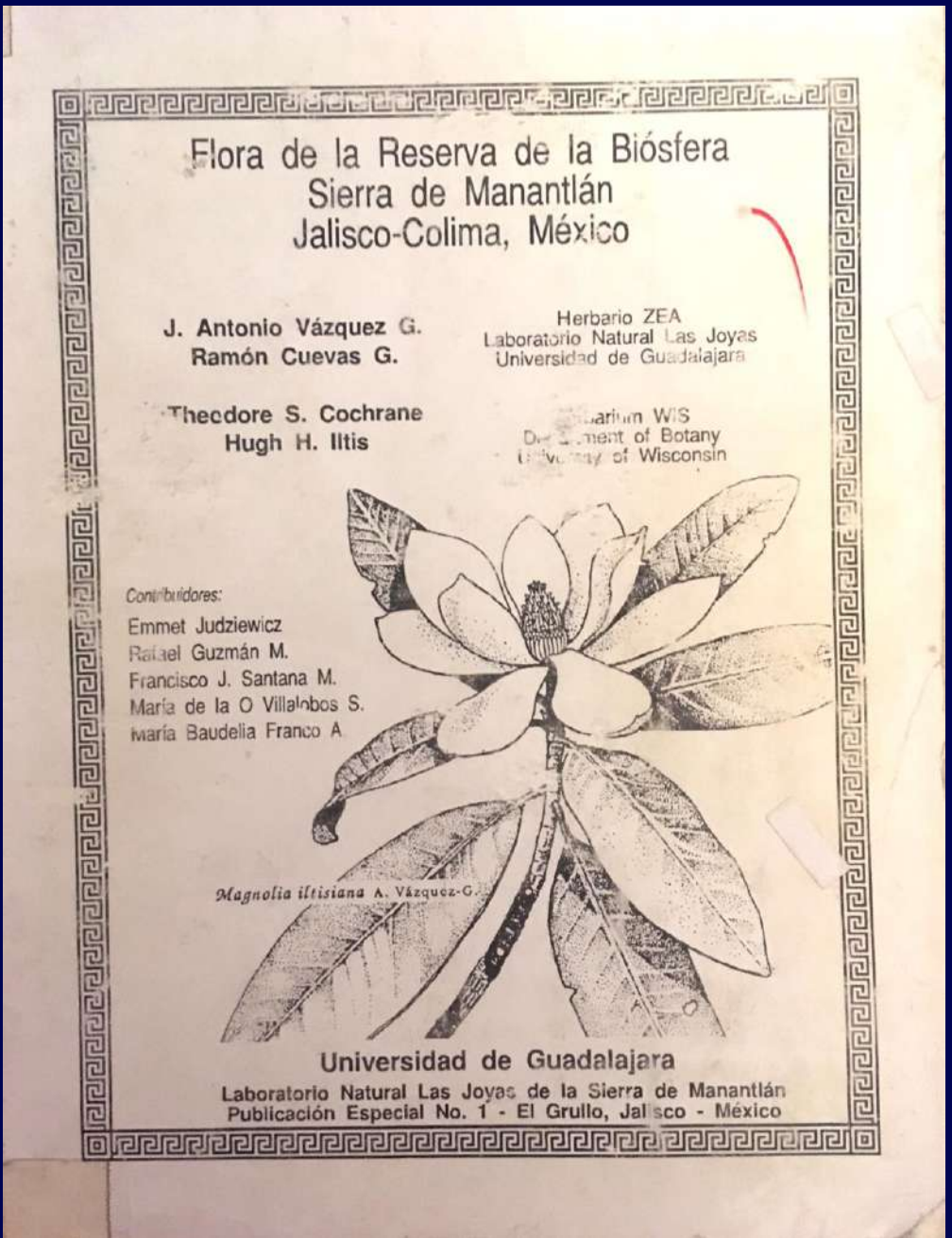
1980 Paralelamente arrancó el proyecto de estudiar toda la Flora vascular de la Sierra de Manantlán: de izquiera a derecha Servando Carvajal, Hugh Iltis, Maestra Luz Ma. Villarreal de Puga y Antonio Vázquez

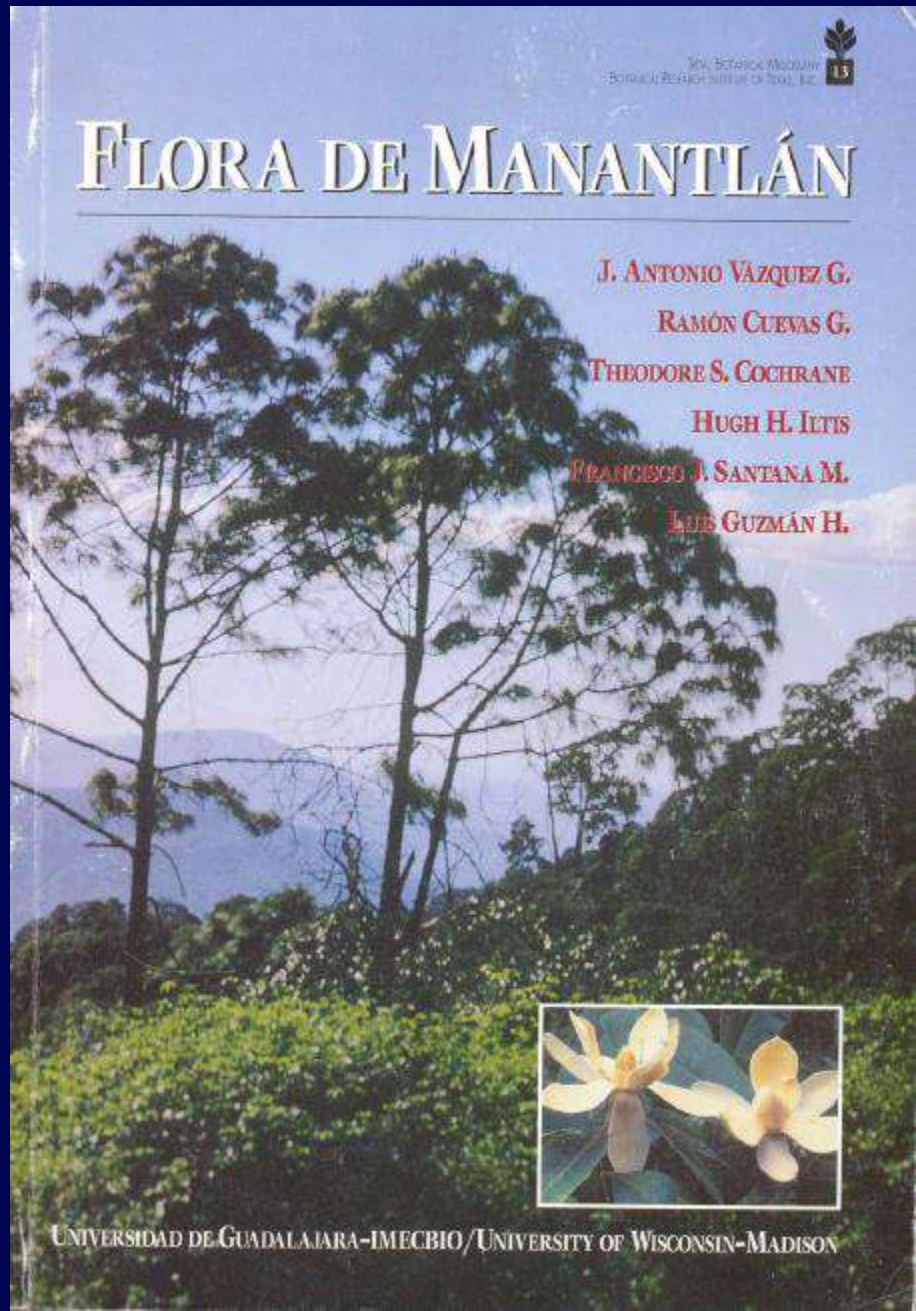
1984 Stopping of the cutting of old *Magnolia sp.* tree led to first conservation action, purchasing 1200 ha to build the Sicentific Station Las Joyas, in the Sierra de Manantlán, two years later 140,000 ha were established as a Biosphere Reserve.

In 1987, 140,000 ha were declared by Presidential Decree asa Biosphere Reserve (SMBR), subsecuently recognized by UNESCO

A goal of the RBSM is to conserve this genetic diversity

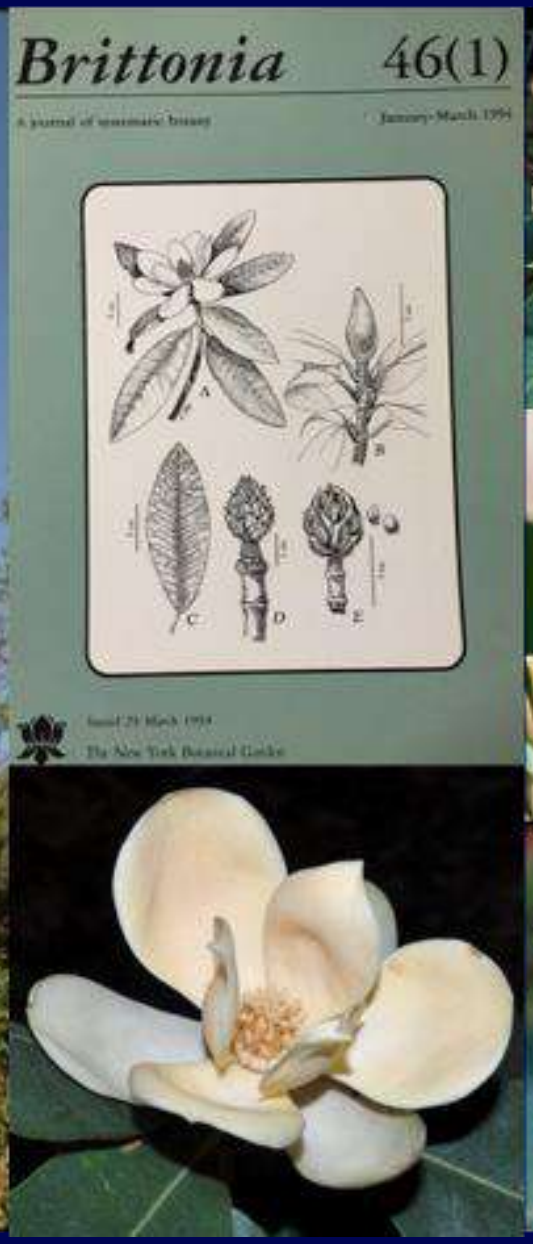
1990 & **1995** Se publican 1ra y 2da edición respectivamente, de la Flora de Manantlán, en colaboración entre la Universidad de Guadalajara y la Universidad de Wisconsin, con la participación de más de 130 especialistas nacionales e internacionaes.



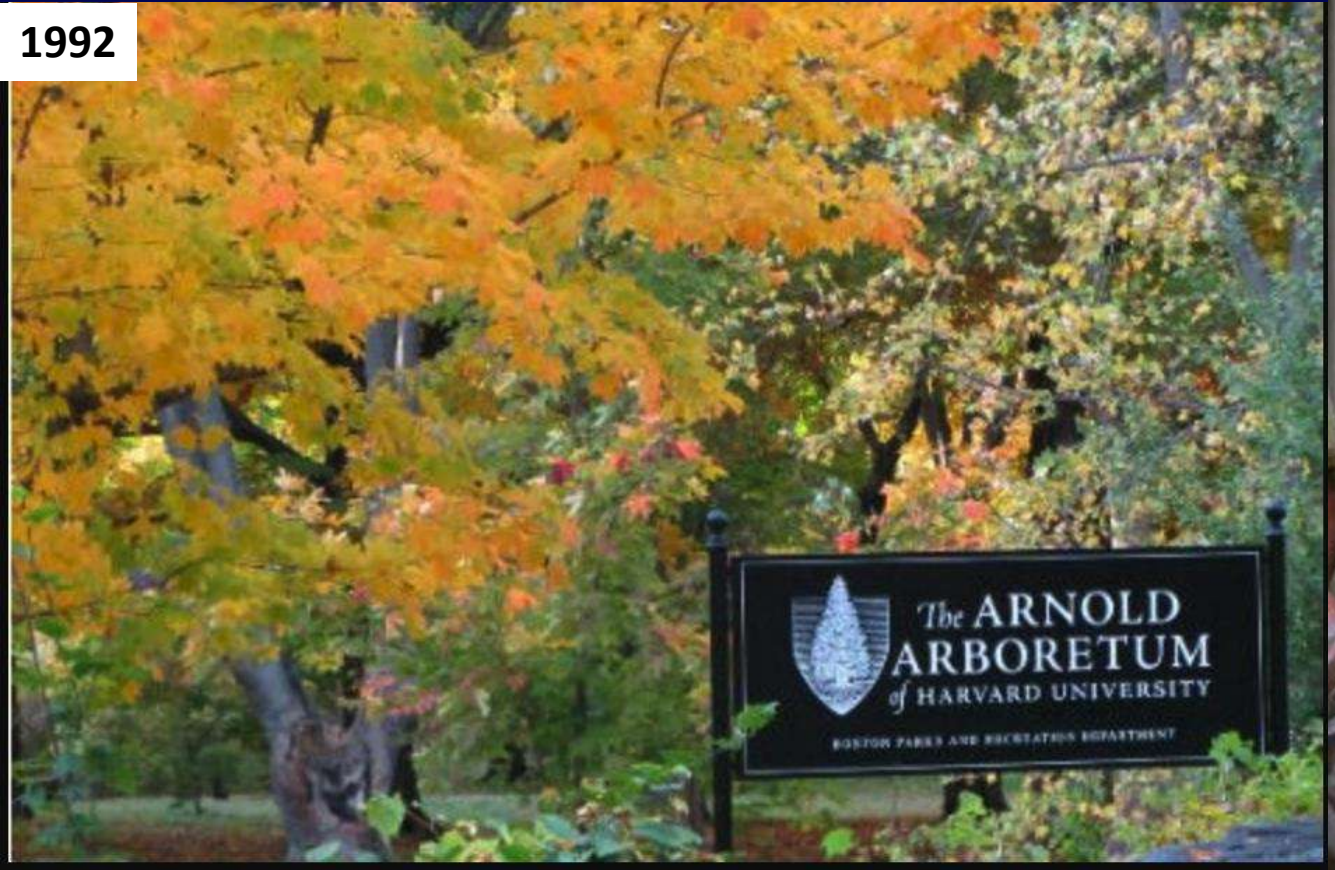


1994, 2002 Similarmente, se publica ***Magnolia pugana*** (Iltis & A. Vázquez) A. Vázquez & Carvajal *(Brittonia*-1994, *Novon-2002)* dedicada a la ahora Dra. Honoris Caus Luz Ma. Villarreal de Puga Puga. Abajo algunos de sus ex-estudiantes colaboradores en la Universidad de Guadalajara.

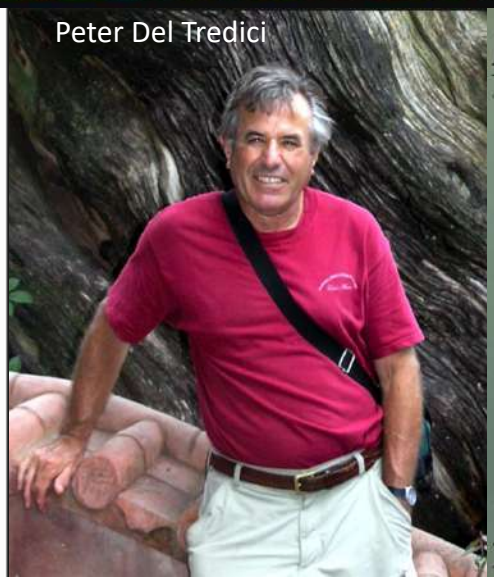
1994 Se publica ***Magnolia iltisiana*** *A. Vázquez (Brittonia1994)* dedicada al Dr. Hugh Iltis a una década de que Hugh H. Iltis y Rafael Guzmán denunciaron la magnolia marcada como señal de que talarían todo el arbolado viejo del predio Las Joyas.



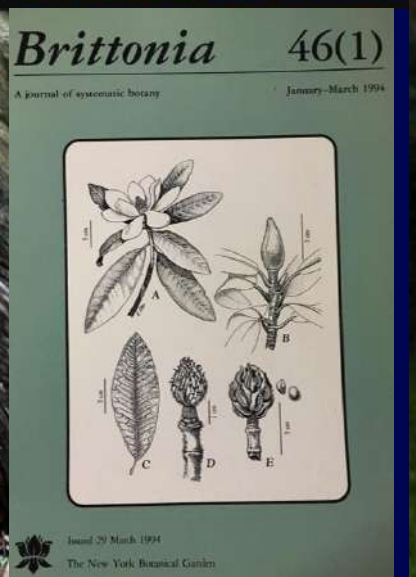
1992

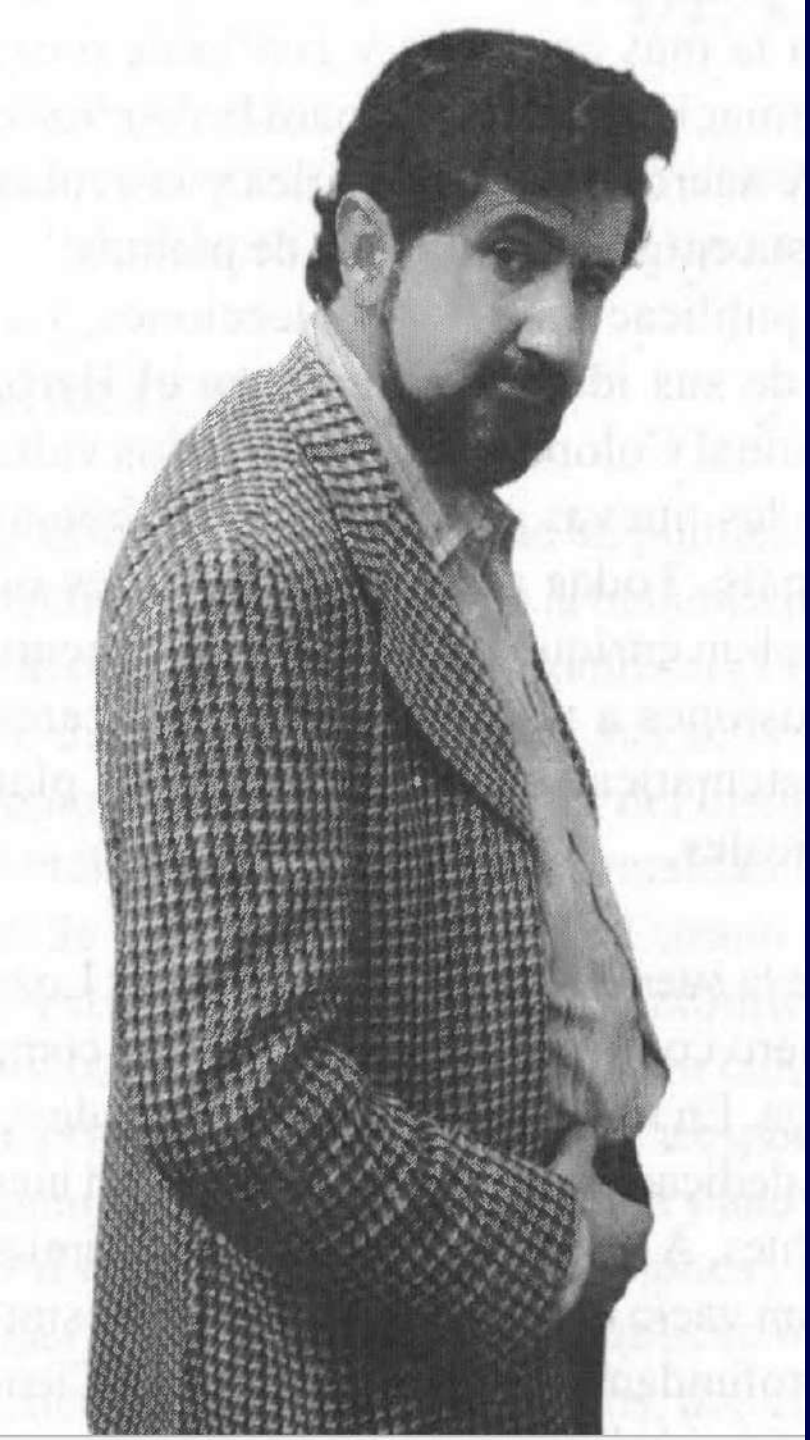


Richard Figlar

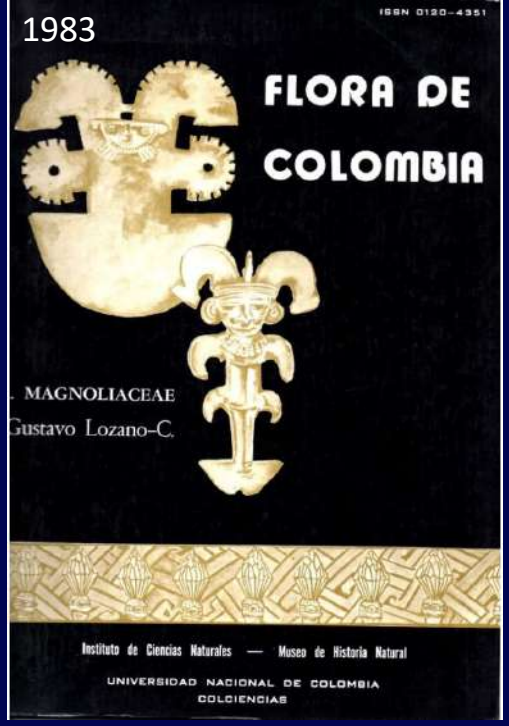


Peter Del Tredici

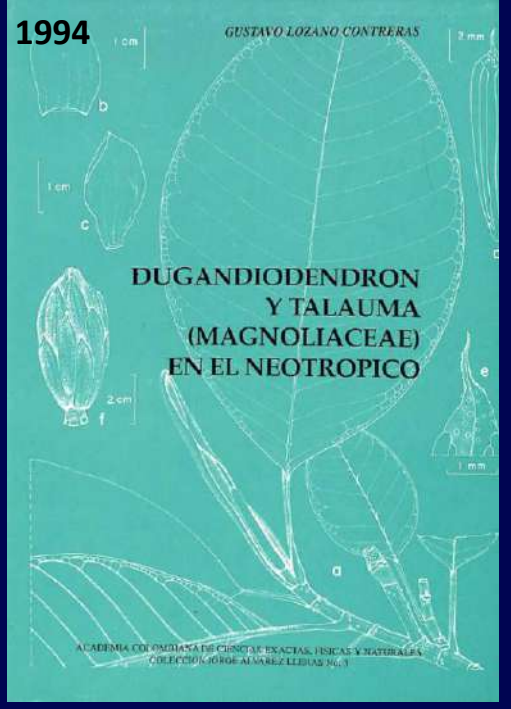




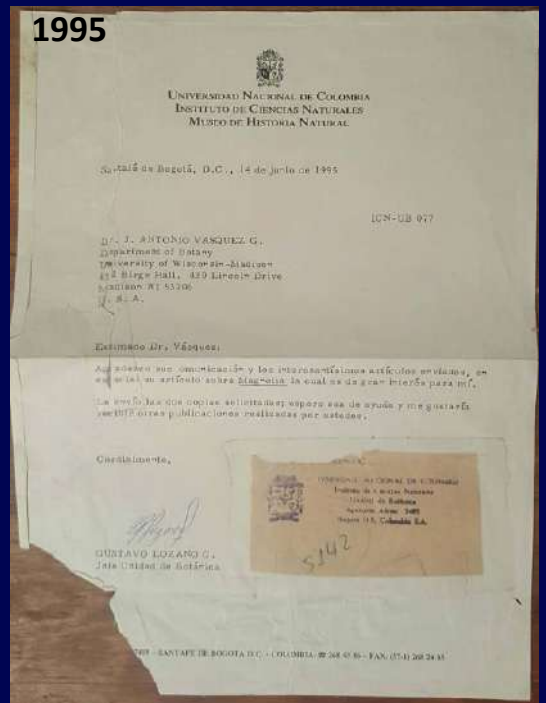
1983



1994



1995



UNIVERSIDAD NACIONAL DE COLOMBIA
INSTITUTO DE CIENCIAS NATURALES
MUSEO DE HISTORIA NATURAL

Santafé de Bogotá, D.C., 14 de junio de 1995

ICN-UB 977

Dr. J. ANTONIO VASQUEZ G.
Department of Botany
University of Wisconsin-Madison
430 Birge Hall, 120 Lincoln Drive
Madison WI 53706
U. S. A.

Estimado Dr. Vásquez:

Agradezco sus comunicación y los interesantísimos artículos enviados, en especial su artículo sobre Magnolia la cual es de gran interés para mí.

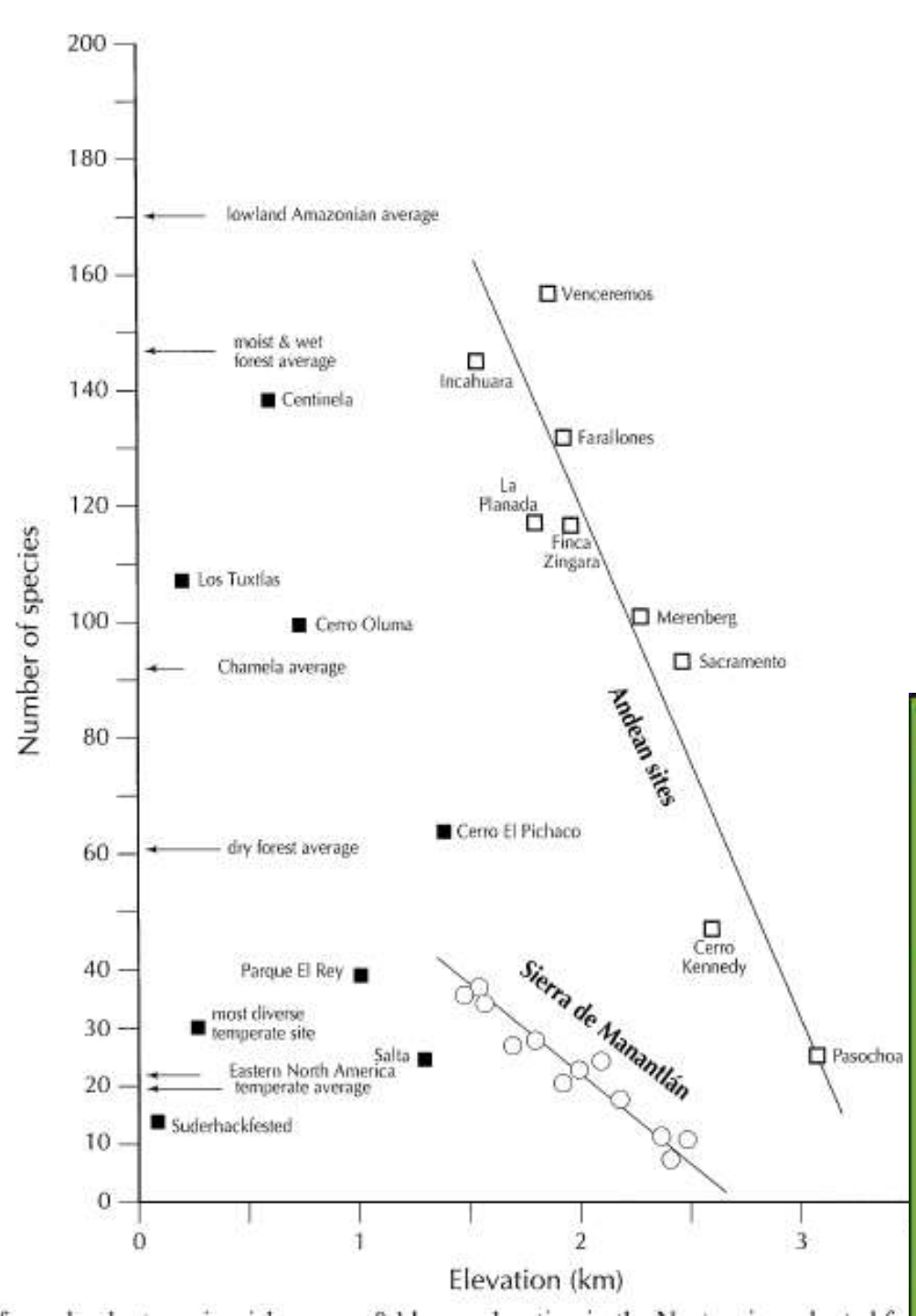
La envío las dos copias solicitadas; espero sea de ayuda y me gustaría recibir otras publicaciones realizadas por ustedes.

Cordialmente,

GUSTAVO LOZANO C.
Jefe Unidad de Botánica

5142

2012



1993

CLOUD FOREST ARCHIPELAGOS: PRESERVATION OF FRAGMENTED MONTANE ECOSYSTEMS IN TROPICAL AMERICA

José Antonio Vázquez-García

METHODS

The Concept Used for Cloud Forests

Types of Data

1995

Ecological Studies 110

Lawrence S. Hamilton
James O. Juvik
F. N. Scatena Editors

Tropical Montane Cloud Forests

Springer-Verlag

2012

Magnolia gentry, Perú

Caso 2:
Tres nuevos paradigmas para magnolias del Nuevo Mundo

Caso 2: Magnolias del Neotropico

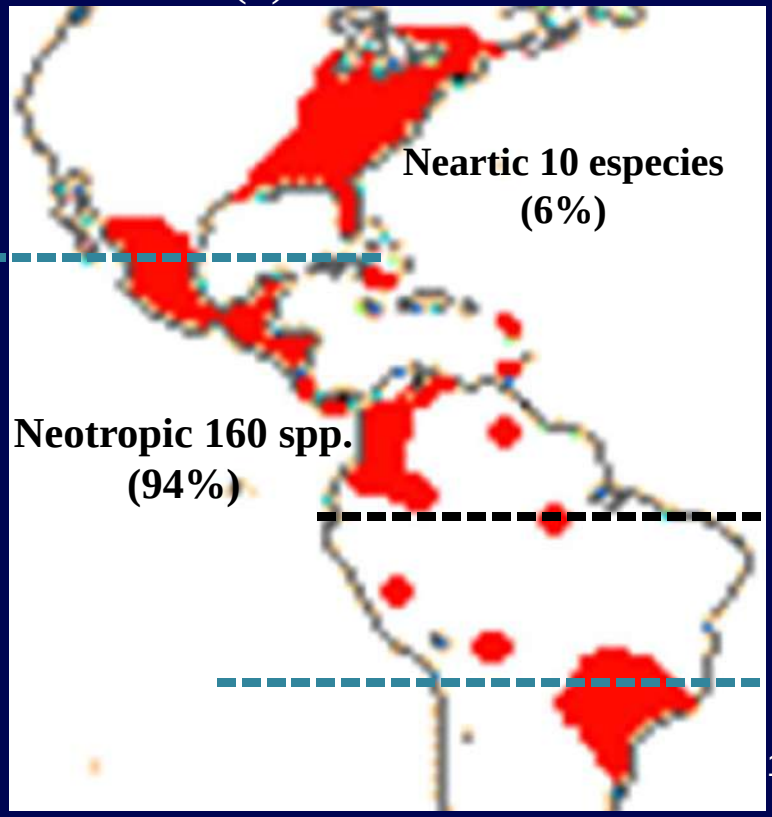
Taxonomical, ecological and phylogenetic analyses has resulted resulted in interesting findings.

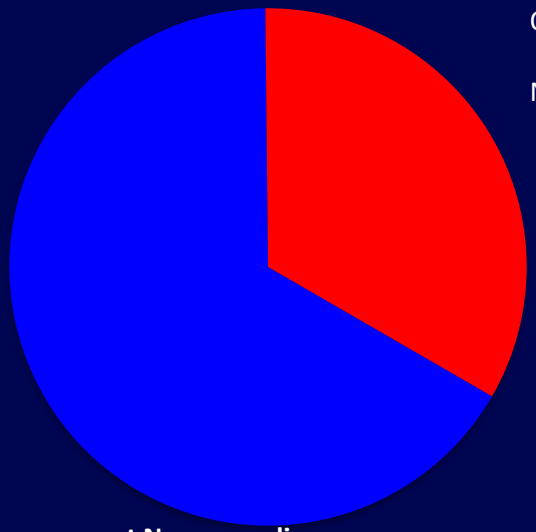
New World
170 spp. (49%) /
Eleven well supported lineages.
Distribution
70 grados de latitud
67 grados de longitud
Long evolutionary history >100 MY
Tricontinental fossil record.
Alopatric speciation
Barochory & short-distance bird dispersal

(Vázquez-García *et al.*, 2015)

Countries with high species richness of Magnoliaceae.

China (100 spp.)
Vietnam (60)
Colombia (38)
México (36)
Oaxaca (10)
Veracruz (12)
Chiapas (10)
Jalisco (6)



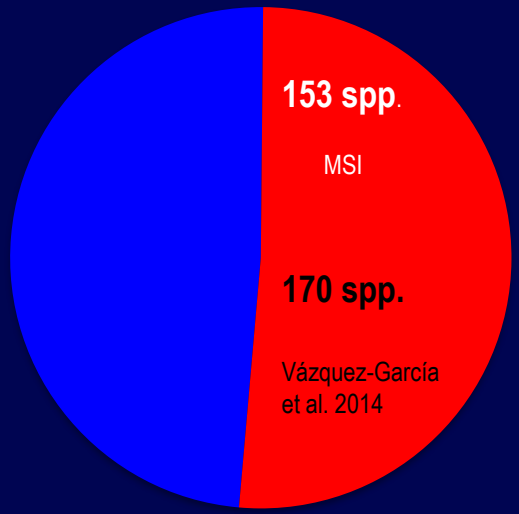


Old paradigm

Neotropical taxa

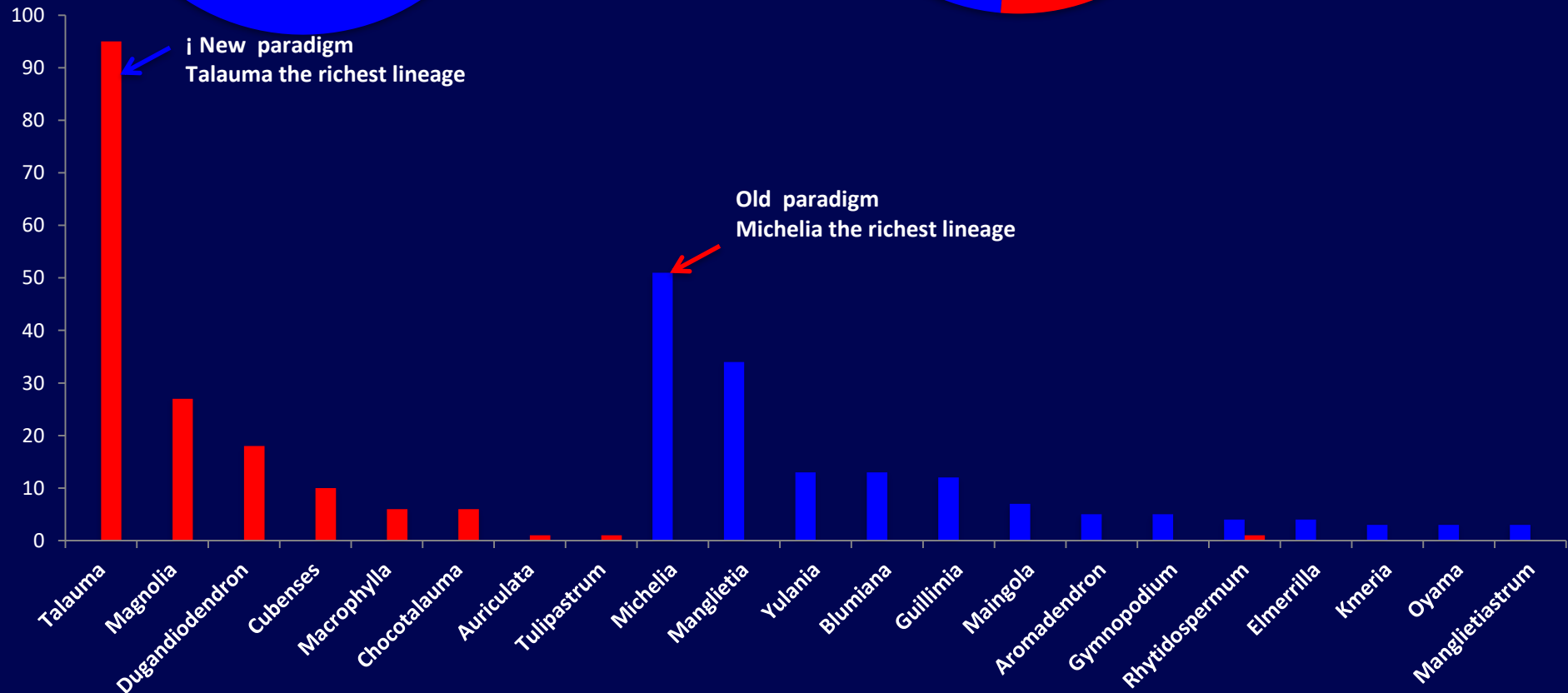
Old world

New World



¡ New paradigm !

Neotropical taxa represent 1/2



BGCI 2008

Most ex-situ conservation of threateneed or endangered Magnoliaceae are hosted in Non-Neotropical countries

Annex 3 Ranked botanic garden collections

The most significant botanic garden collections of *Magnoliaceae* as determined by assigning a score for each taxa within the collection, according to the Red List Category (CR – 10 points, EN – 7 points, VU – 5 points, NT – 3 points, DD – 2 points, LC – 1 points, NE – 0 points). The number of most threatened taxa (CR and EN) in each collection is also given in the table.

	Botanic garden	No. of CR & EN taxa	Collection Score
1	South China Botanical Garden, China	23	268
2	Kunming Botanical Garden, China	15	184
3	Shenzhen Fairy Lake Botanical Garden, China	14	178
4	San Francisco Botanical Garden Society, United States	9	144
5	Biological Resource Station of Emeishan in Sichuan Province, China	8	101
6	Stichting Arboretum Wespelaar, Belgium	6	94
7	Crown Estate Commissioners, United Kingdom	6	86
8	Royal Botanic Gardens, Kew, United Kingdom	6	85
9	Quarryhill Botanical Garden, United States	8	83
10	Royal Botanic Gardens, Melbourne, Australia	6	82
11	The Sir Harold Hillier Garden and Arboretum, United Kingdom	5	81
12	Shanghai Botanic Garden, China	6	79
13	The Arnold Arboretum, United States	4	64
14	Conservatoire Botanique National de Brest, France	4	63
15	The Royal Horticultural Society's Garden, Rosemoor, United Kingdom	4	62
16	Arboretum Bokrijk, Belgium	3	61
17 =	National Botanic Gardens, Ireland	4	59
17 =	The Royal Horticultural Society's Garden, Wisley, United Kingdom	3	59
19	Botanic Gardens of Adelaide, Australia	3	58
20	Arboretum Freiburg-Guenterstal im Staedtischen Forstamt, Germany	3	56
21	Hergest Croft Gardens, United Kingdom	3	55
22	Beijing (Northern) Botanical Garden, China	3	53
23 =	Fuzhou Botanical Garden, China	4	52
23 =	The Scott Arboretum of Swarthmore College, United States	4	52
23 =	Xishuangbanna Tropical Botanical Garden, China	3	52
26 =	Nanjing Botanic Garden Mem. Sun Yat-Sen, China	3	50
26 =	Wentworth Castle Gardens, United Kingdom	4	50
28	Westonbirt Arboretum, United Kingdom	4	49
29	Lushan Botanical Garden, China	2	48
30	Royal Botanic Garden Edinburgh, United Kingdom	3	44

Caso 3:
Jardínes Botánicos en la Conservación ex-situ de magnolias

Case 3: Puerto Vallarta, Jalisco, 2012 Magnolia vallartensis declared the official emblematic species of the Town.

3.- Lectura, discusión y en su caso aprobación del Acta de Sesión Ordinaria del Ayuntamiento Constitucional de Puerto Vallarta, Jalisco, celebrada en fecha 02 de Agosto de 2012. El C. Presidente Municipal, Lic. Salvador González Resendiz: "En primer término les pediría la dispensa de la lectura. Los que estén por la afirmativa favor de levantar la mano. Aprobado. En segundo término les pediría la aprobación, favor de levantar la mano. Aprobado". **Aprobado por Unanimidad** de votos, por la totalidad de los Munícipes del Ayuntamiento, por 17 (diecisiete) votos a favor.----------

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4.- Lectura de comunicados y turno de asuntos a comisiones----------

5.- Lectura, discusión y en su caso, aprobación de dictámenes y acuerdos agendados.----------

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6.- Asuntos Generales.----------

--- **6.18.- Punto de Acuerdo signado por el Regidor, Ing. Juan Pablo García Castillón, por el que se propone declarar la especie de Magnolia Vallartensis, como la flor representativa y patrimonio del municipio de Puerto Vallarta, Jalisco.** A continuación se da cuenta del presente Punto de Acuerdo planteado en los siguientes términos:----------

--- H. PLENO DEL AYUNTAMIENTO DE PUERTO VALLARTA. PRESENTE. El que suscribe Ing. Juan pablo García Castillón en mi carácter de regidor de este órgano colegiado, de conformidad a lo establecido en los artículos 41 Fracción II de la Ley del Gobierno y la Administración Publica Municipal del Estado de Jalisco, así mismo en lo dispuesto en los Artículos 20 Fracción I, 124 Fracción III y 125 del Reglamento Orgánico del Gobierno y la Administración Publica del Municipio de Puerto Vallarta, Jalisco; me permito presentar a este Honorable Cuerpo Edilicio la propuesta de Punto de Acuerdo que tiene como finalidad el declarar la especie de Magnolia Vallartensis como la flor representativa y patrimonio del Municipio de Puerto Vallarta, para un mayor

2012, First tree of Magnolia vallartensis planted at the Cuale River, Downtown Puerto Vallarta.

Yellow arrow, from left to right: De Castro- Arce, Muñiz-Castro, Vázquez-García & Díaz-Borioli

VIEW MAP

TAKE ACTION NOW

Magnolia vallartensis

http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T67513621A67513848.en

Scope: Global
Language: English
Download assessment

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

Summary | Classification Schemes | Images & External Links | Bibliography | Full Account

Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
Plantae	Tracheophyta	Magnoliopsida	Magnoliales	Magnoliaceae

Scientific Name:	*Magnolia vallartensis*
Species Authority:	A.Vázquez & Muñiz-Castro

Assessment Information [top]

Red List Category & Criteria:	Critically Endangered B1ab(iii) ver 3.1
Year Published:	2016
Date Assessed:	2015-05-01
Assessor(s):	Rivers, M.C., Samain, M.S. & Martínez Salas, E.
Reviewer(s):	Oldfield, S.
Justification:	

Local News | Event Calendar | About PV | Historic PV | Videos | Photos | Local Maps

Magnolia Vallartensis Named Official Flower of Puerto Vallarta

Rodrigo Lopez Becerril - Vallarta Opina
go to original
April 9, 2013

Share

For several years, research has been conducted by Dr. José Antonio Vázquez García, together with Maestro Ricardo Díaz Borioli and Rosa Murguía Araiza, where they have been investigating various botanical novelties in the region of the South Coast of the State of Jalisco.

In March, the University of Guadalajara published "Recursos Forestales en el Occidente de México" ("Forest Resources in the West of Mexico") in which the researchers were able to classify a new species of Magnolia.

12 species and over 100 Magnolia saplings represented at Vallarta Botanical Garden

Mexican Magnolia Report, May 2016
Vallarta Botanical Gardens

Magnolia rzedowskiana A. Vázquez, R. Domínguez & R. Pedraza									
Accesion number: 2016.0049									
Locality of collection: Zacualtipán de Ángeles, Hidalgo									
Donated by: Miguel Ángel Muñiz (CUCBA)									
Sowing date	# Seeds	Pregerminative Treatment	Germination date	Phenoligical stage	Type of container	# Container	# Living plants	Average size (cm)	# Photo
mar-16	16	take off the sead coat and wash with water	-	ungerminated	pot	16	0	-	M.010
Magnolia pugana (H.H.Iltis & Vazquez) A.Vazquez & Carvajal									
Accesion number: 2016.0047									
Locality of collection: IBUG Botanical Garden, Jalisco									
Donated by: Miguel Ángel Muñiz (CUCBA)									
Sowing date	# Seeds	Pregerminative Treatment	Germination date	Phenoligical stage	Type of container	# Container	# Living plants	Average size (cm)	# Photo
mar-16	186	take off the sead coat and wash with water	-	seedling	pot (3x container)	42	37	4	M.011, M.012, M.013
Accesion number: 2014.0032									
Locality of collection: Arroyo San Lorenzo, Zapopan, Jalisco									
Donated by: Miguel Ángel Muñiz (CUCBA)									
2013	-	-	-	sapling tree	ground	-	1		M.034
Magnolia tarahumara (A. Vázquez) A. Vázquez									
Accesion number: 2016.0052									
Locality of collection: Surutato, Sinaloa									
Donated by: Miguel Ángel Muñiz (CUCBA)									

Caso 4:
Trabajo comunitario en la conservación de Magnolia

Magnolia dealbata Zucc. Juquila, Oaxaca

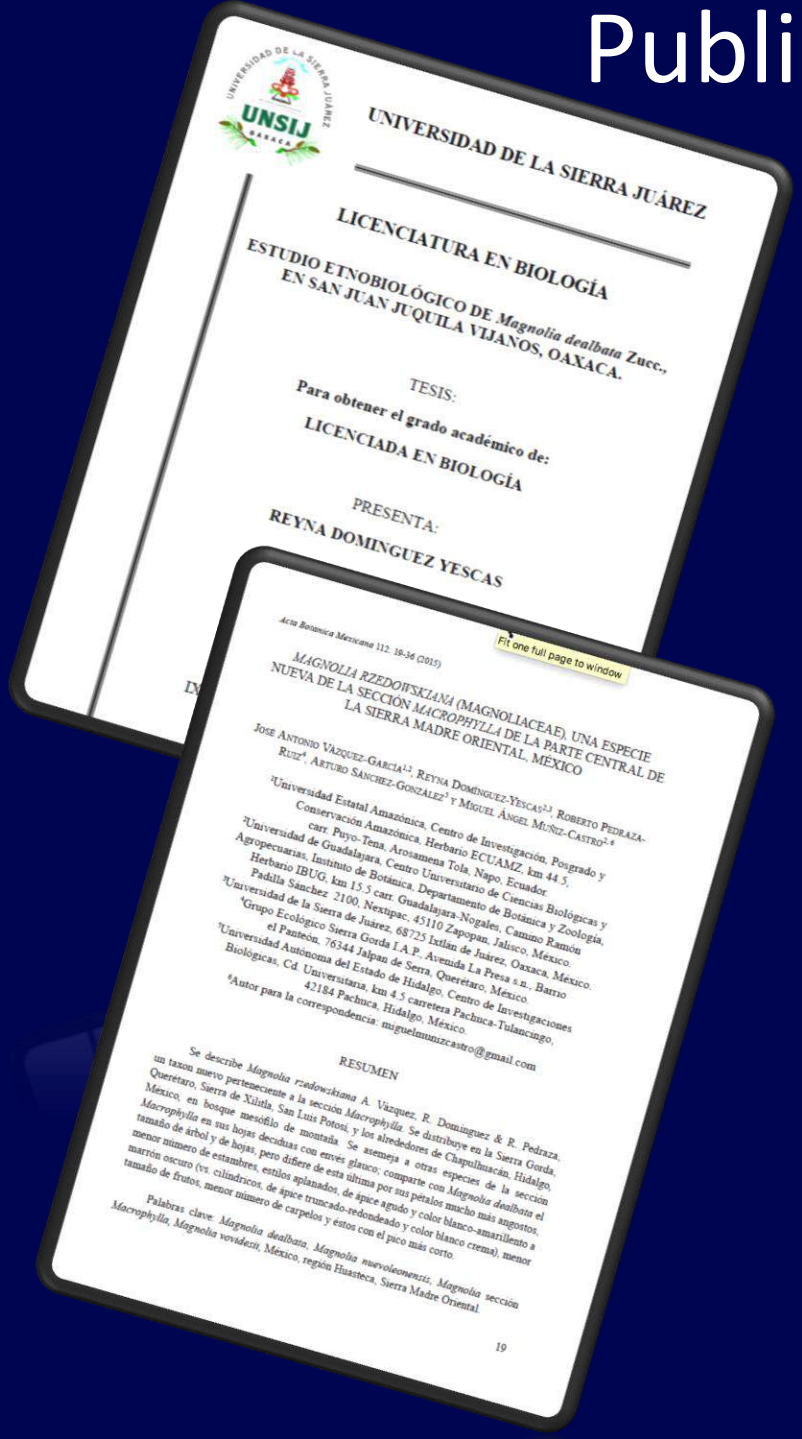
Detailed studies of Magnolia dealbata, the largest flower among angiosperm trees, by by Zapotecan Reyna Domínguez, , helped unveil five new species, of section Macrophylla, one of them about to be published.

Magnolia vovidesii A.Vázquez, Domínguez-Yescas & L. Carvajal.
Veracruz, Coyopola.

Magnolia rzedowskiana A. Vázquez, R. Domínguez & R. Pedraza.
Querétaro, Joya del Hielo.

M. nuevoleonensis A. Vázquez & Domínguez-Yescas
Nuevo León, Montemoreslos

Publicaciones


UNIVERSIDAD DE LA SIERRA JUÁREZ

LICENCIATURA EN BIOLOGÍA

ESTUDIO ETNOBIOLÓGICO DE *Magnolia dealbata* Zucc., EN SAN JUAN JUQUILA VIJANOS, OAXACA.

TESIS:

Para obtener el grado académico de:

LICENCIADA EN BIOLOGÍA

PRESENTA:

REYNA DOMINGUEZ YESCAS

Acta Botanica Mexicana 112: 19-36 (2015)

MAGNOLIA RZEDOWSKIANA (MAGNOLIACEAE), UNA ESPECIE NUEVA DE LA SECCIÓN *MACROPHYLLA* DE LA PARTE CENTRAL DE LA SIERRA MADRE ORIENTAL, MEXICO

RESUMEN

Se describe *Magnolia rzedowskiana* A. Vázquez, R. Dominguez & R. Pedraza, un taxon nuevo perteneciente a la sección *Macrophylla*. Se distribuye en la Sierra Gorda, Querétaro, Sierra de Xilitla, San Luis Potosí, y los alrededores de Chapulhuacán, Hidalgo, México, en bosque mesófilo de montaña. Se asemeja a otras especies de la sección *Macrophylla* en sus hojas deciduas con envés glauco; comparte con *Magnolia dealbata* el tamaño de árbol y de hojas, pero difiere de esta última por sus pétalos mucho más angostos, menor número de estambres, estilos aplanados, de ápice agudo y color blanco-amarillento a marrón oscuro (vs. cilíndricos, de ápice truncado-redondeado y color blanco crema), menor tamaño de frutos, menor número de carpelos y estos con el pico más corto.

Palabras clave: *Magnolia dealbata*, *Magnolia nuevoleonensis*, *Magnolia* sección *Macrophylla*, *Magnolia vovidesii*, México, región Huasteca, Sierra Madre Oriental.


Magnolia nuevoleonensis sp. nov. (Magnoliaceae) from northeastern Mexico and a key to species of section *Macrophylla*


10.2 Novelties in Neotropical *Magnolia* and an addendum proposal to the IUCN Red List of Magnoliaceae

M. dealbata has many traditional names and uses.

Reyna´s Zapotecan familly assist her in gathering seeds, reproduction, and for anual reintroduction and reforestation campains without any support from public or private institutions.

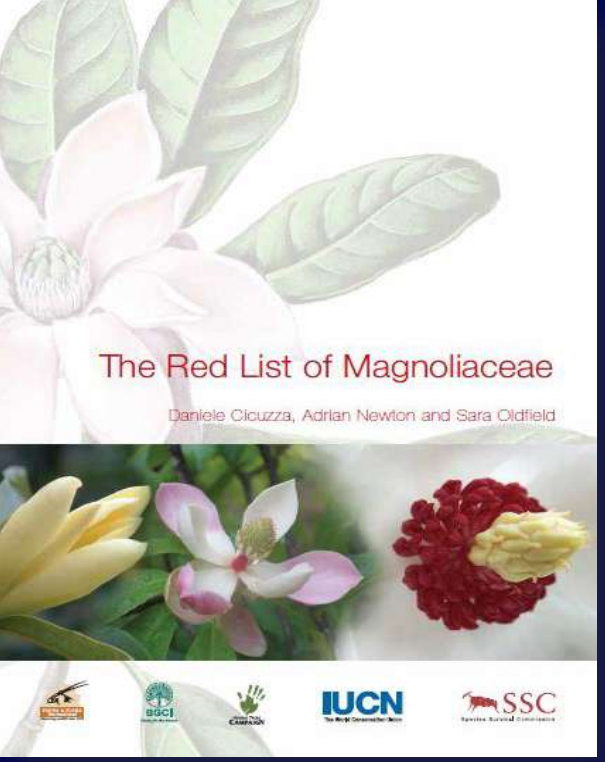






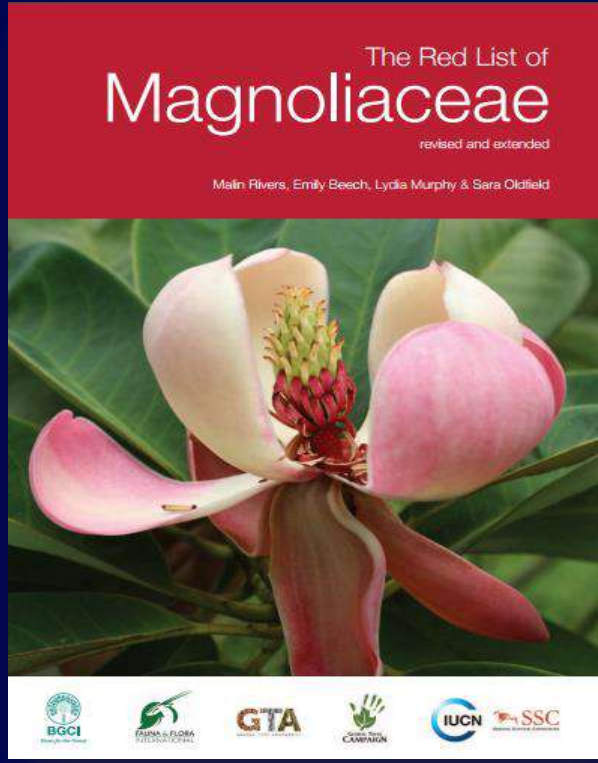


potecan children happyly assist annually in reforestation efforts with Magnolia dealbata, leaded by Reyna, working
rd over a wekend without any payment but an orange and a glass with jamaica (*Hibiscus sabdariffa*) water .



En peligro de extinción (EN).
(Cicuzza et al., 2007).

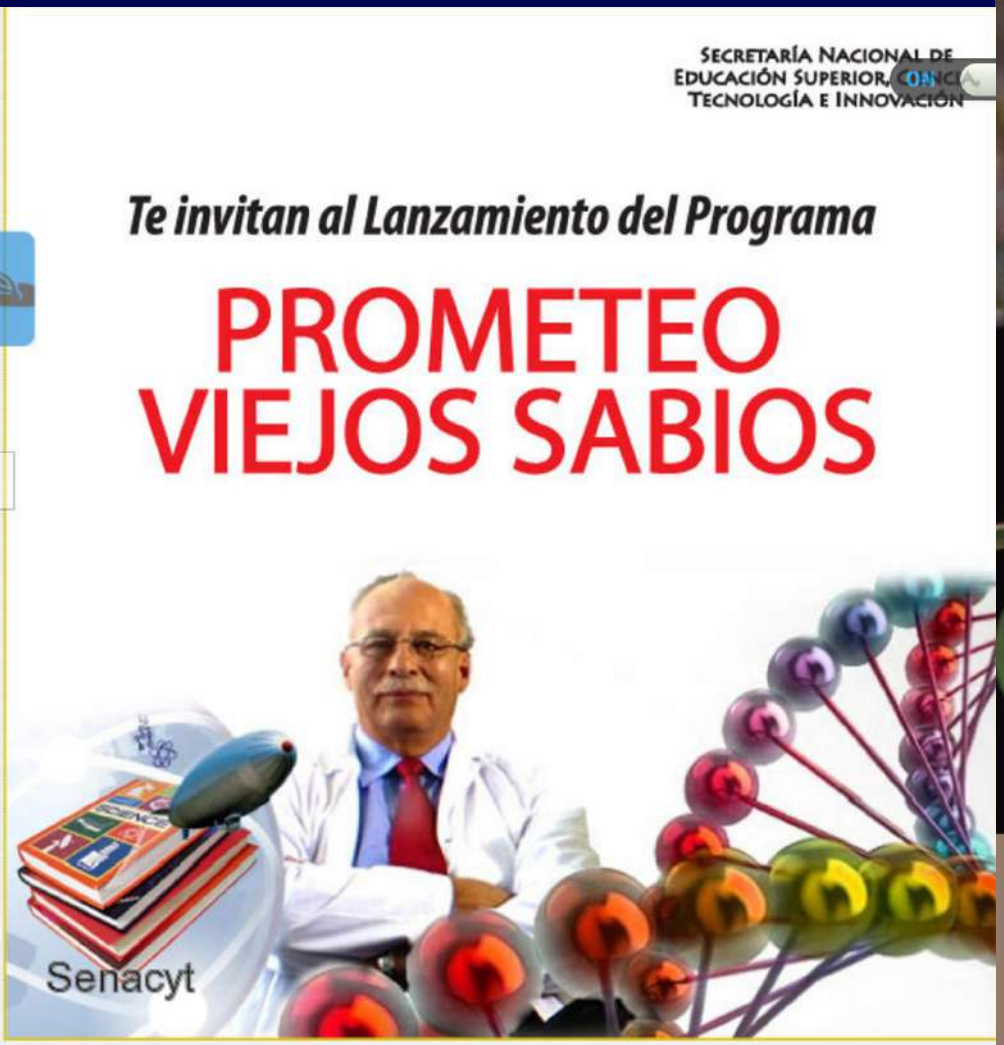
Thanks to the Zapotecan forest maagement practices on Pinus Chiapensis forest communities, Magnolia dealbata populations have increased considerably, thus, the species is no longer in endangere of extinction

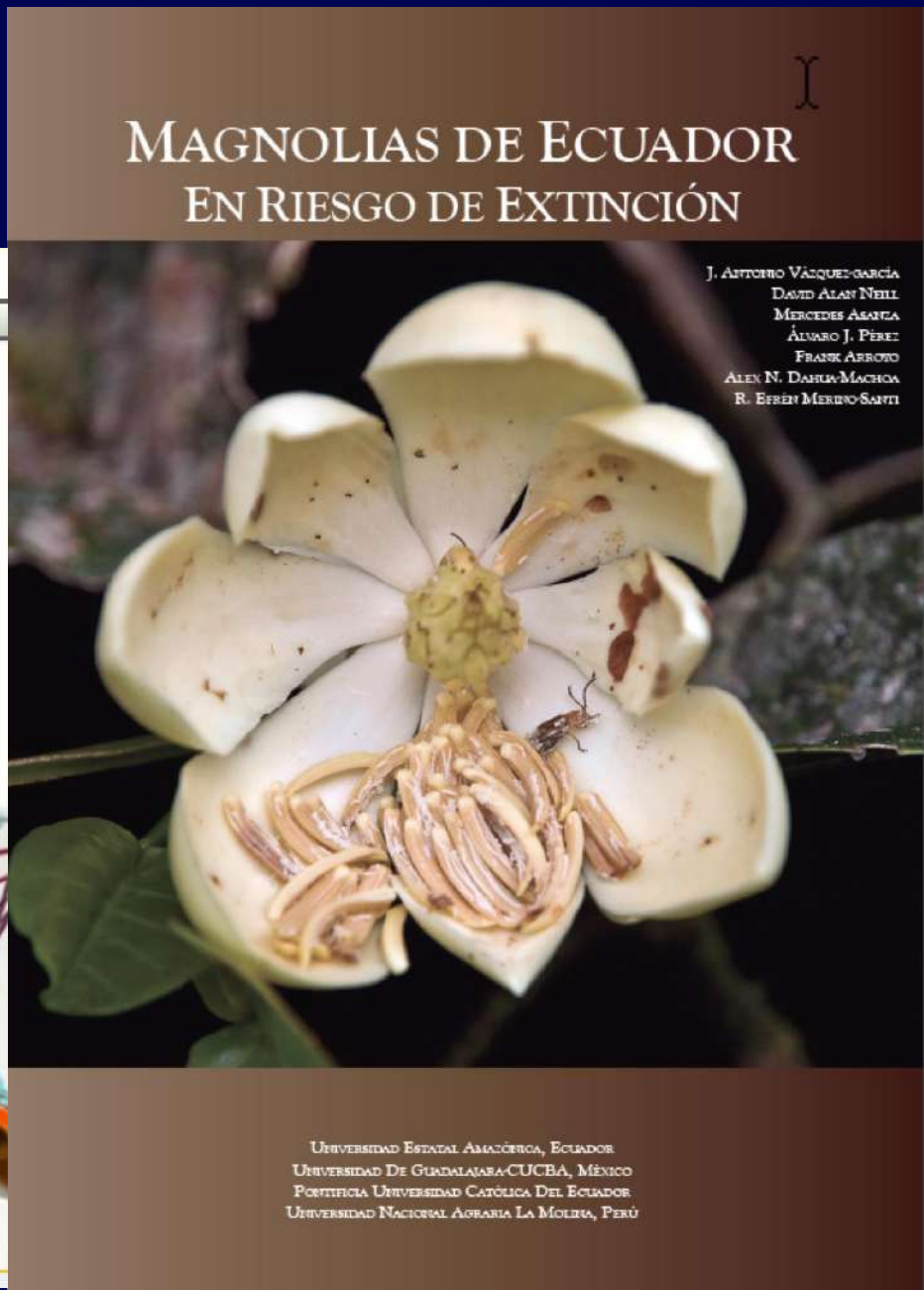


Casi Amenazada (NT).
(Rivers et al., 2016).

Case 5: Ecuador, 2014-2015

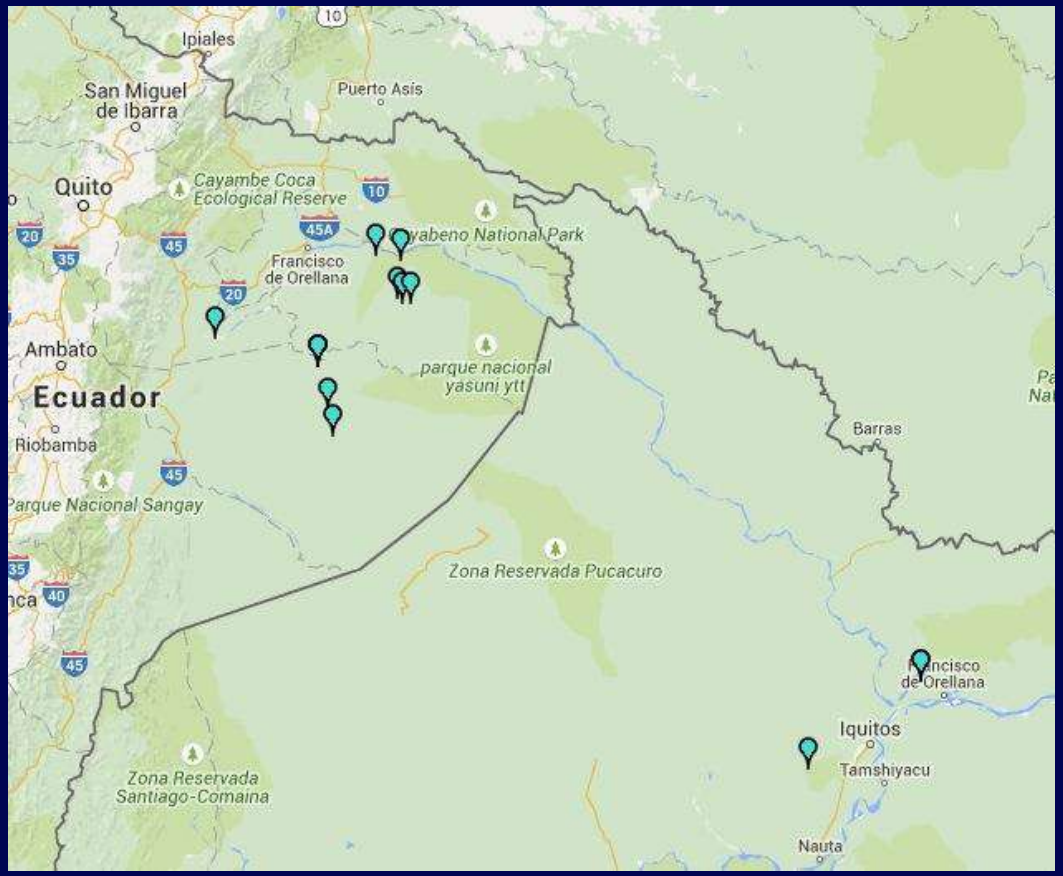
Ecuadorian Goverment hired from 2011-2017 leading scientist in most research fields and from any country

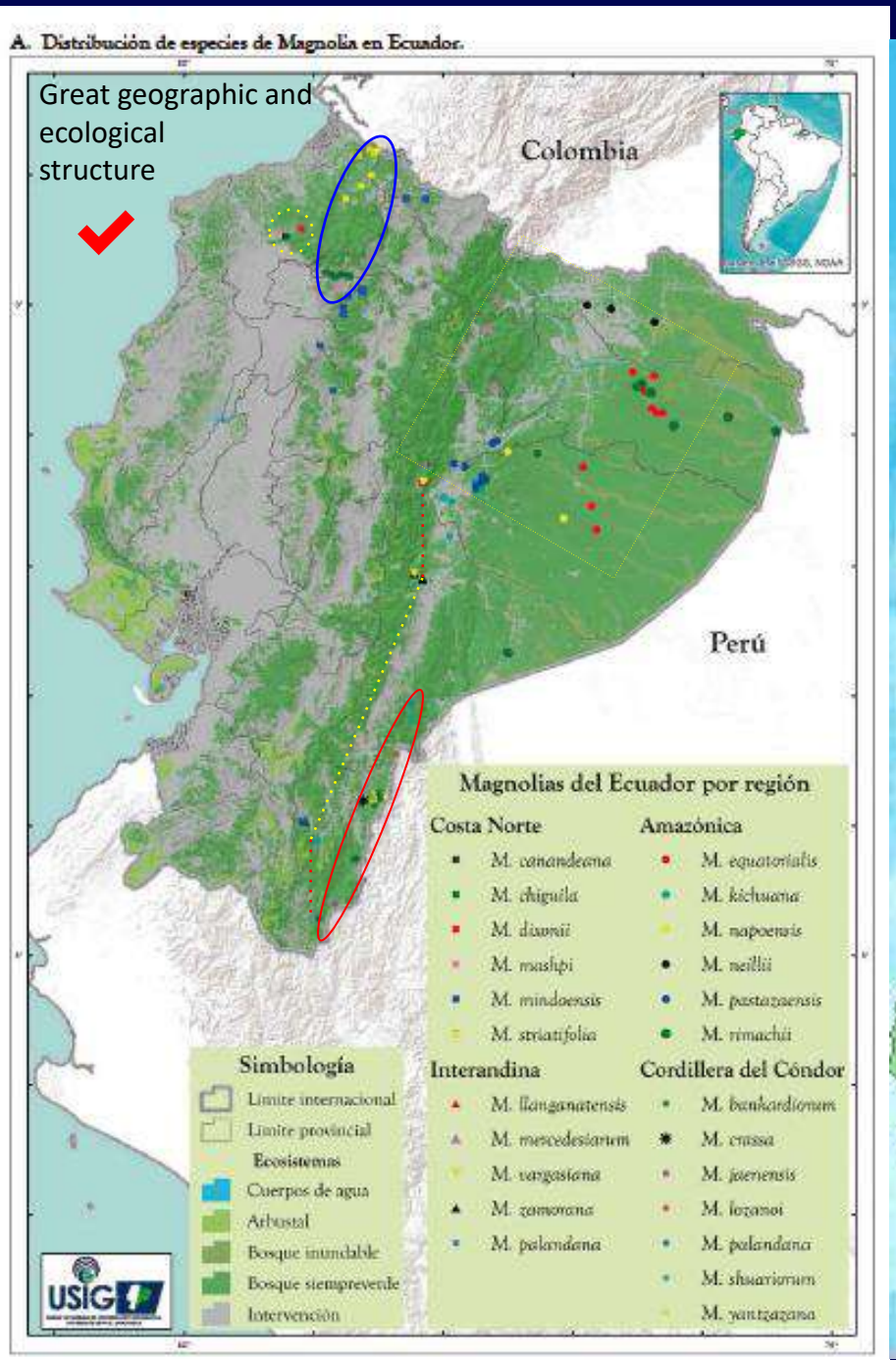
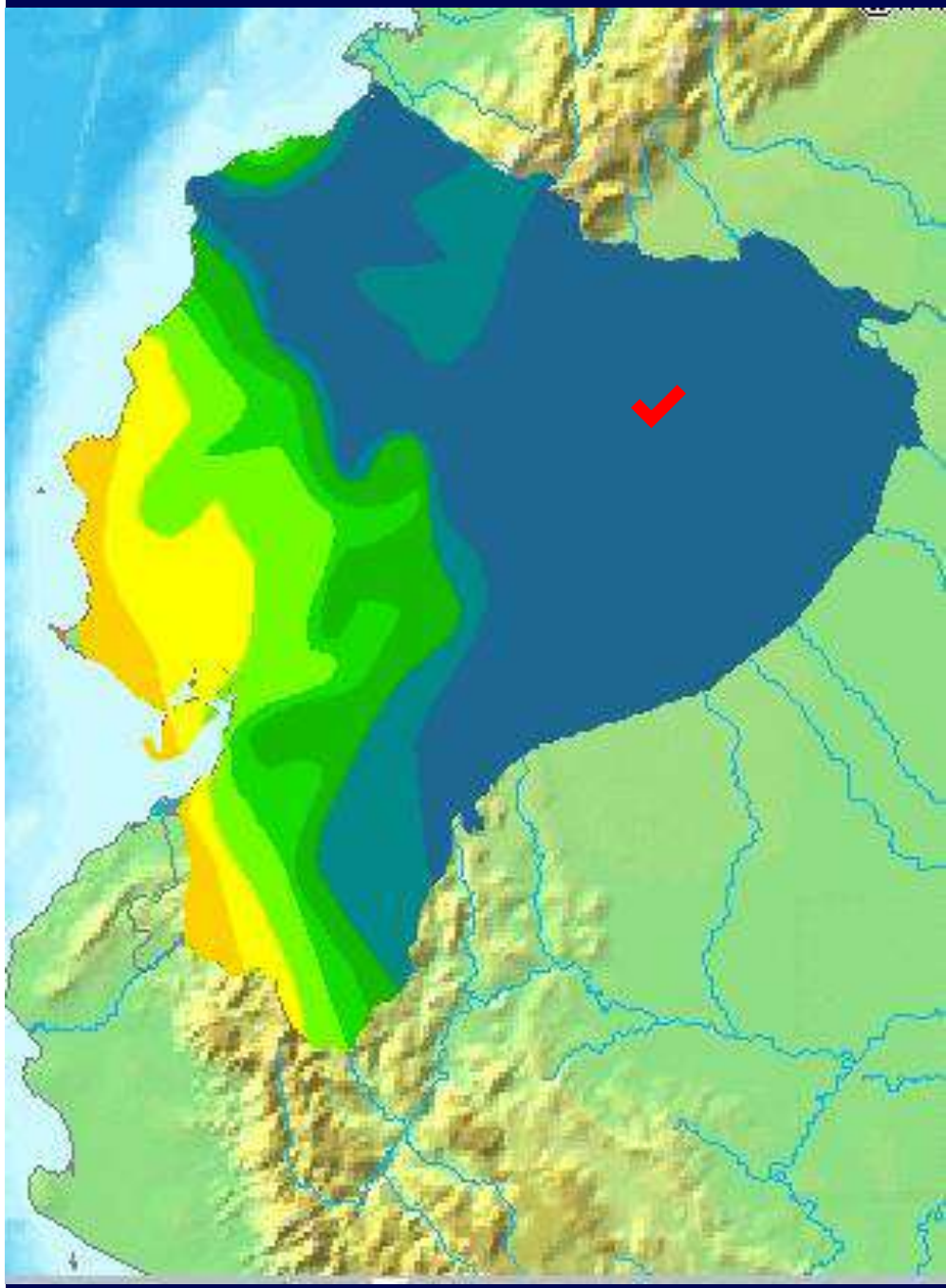




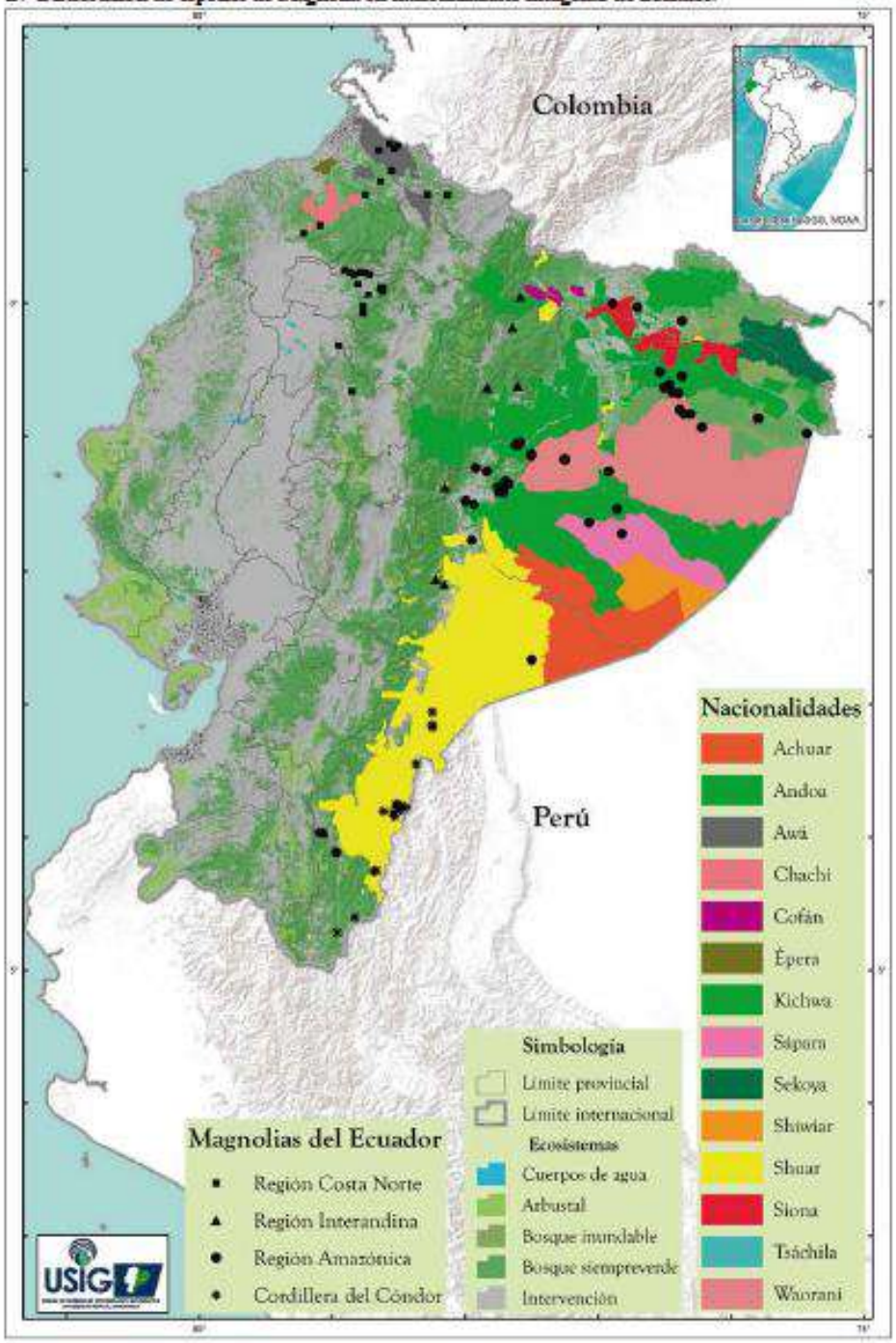
Magnolia equatorialis A. Vázquez

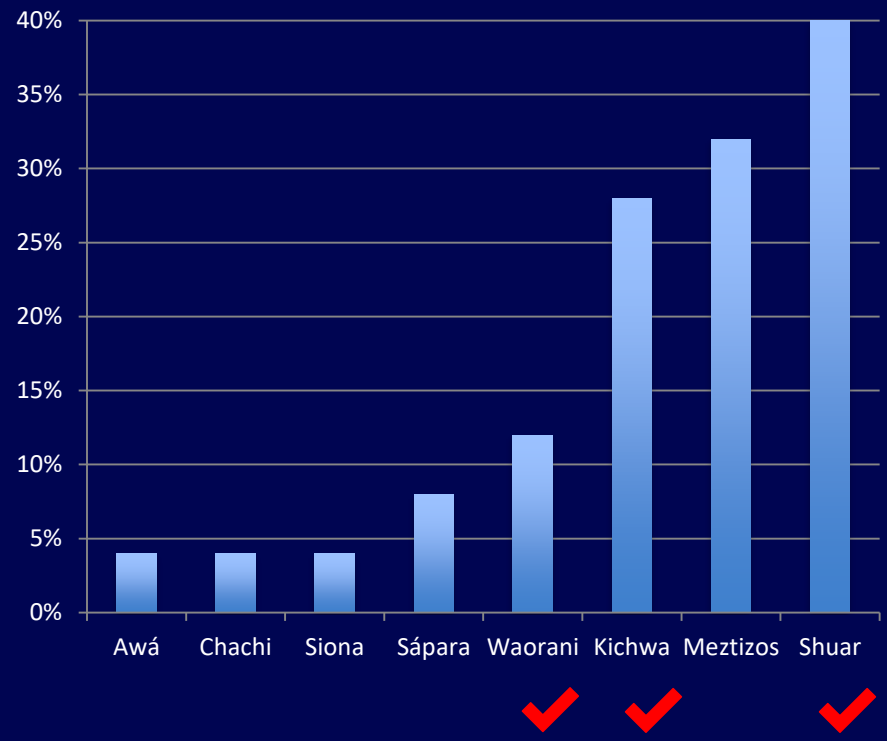
The majority of Magnolia species in Ecuadorian Andes and Wst coast lack regeneration and recruitment, except for few species like this one in the Yasuni National Park, Magnolia equetorialis, in lowland Amazonian rainforest.




A. Distribución de especies de Magnolia en Ecuador.
Great geographic and ecological structure
Colombia
Perú
Magnolias del Ecuador por región
Costa Norte
M. canandeana
M. chiguila
M. diaurii
M. mashpi
M. mindoensis
M. striatifolia
Amazónica
M. equatorialis
M. kichuana
M. napoensis
M. neillii
M. pastazaensis
M. rimachii
Interandina
M. llanganatensis
M. mercedesiarum
M. vargasiana
M. zamorana
M. palandana
Cordillera del Cóndor
M. bankardiorum
M. cruxa
M. jaenensis
M. lozanoi
M. palandana
M. shuariorum
M. yantzazana
Simbología
Límite internacional
Límite provincial
Ecosistemas
Cuerpos de agua
Arbustal
Bosque inundable
Bosque siempreverde
Intervención
USIG


B. Distribución de especies de Magnolia en nacionalidades indígenas de Ecuador.



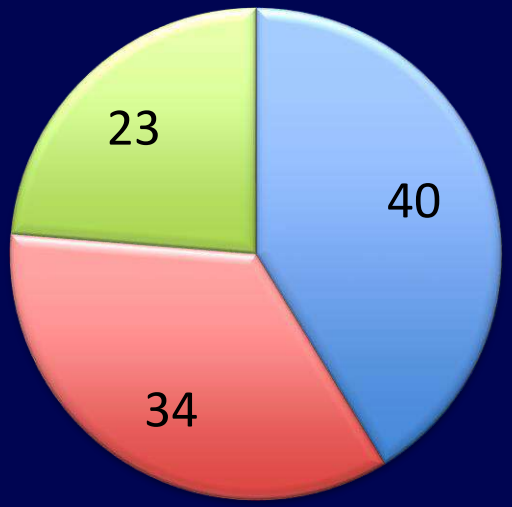


¿Conservation or an utopy?

we need to support training of
Kichwan, Shuar and Waorani,
starting with English language,
and in relevant fileds of science
for research thesis,
or conservation projects,
for saving Ecuadorian magnolias
and their megadiverse ecosystems

Knowledge of Magnoliaceae in Ecuador:

- 1999: 3 genera, 5 species, 2 endémic .
- 2012: 1 genus, 6 species, 3 endemic – (no *M. hernandezii*)
- 2015: 1 genus, 23 especies, 18 endemic.
- Increased by 6 times.



74% amnazadas

N°	Estado de Conservación de Especies en Ecuador	UICN 2012
1	*Magnolia dixonii* (Little) Govaerts	**En Peligro Crítico (CR): A1acd**
2	*Magnolia napoensis* A.Vázquez & D.A.Neill, *sp. nov.*	**En Peligro Crítico (CR): A1acd**
3	*Magnolia neillii* (Lozano) Govaerts	**En Peligro Crítico (CR): A1acd**
4	*Magnolia yantzazana* F. Arroyo	**En Peligro Crítico (CR): A1acd**
5	*Magnolia canandeana* F. Arroyo	**En Peligro Crítico (CR): B1ab(i,ii,iii)**
6	*Magnolia bankardiorium* M.O. Dillon & I. Sánchez-Vega	**En Peligro Crítico (CR): D**
7	*Magnolia crassa* F. Arroyo & A.J. Pérez	**En Peligro Crítico (CR): D**
8	*Magnolia striatifolia* Little	**En Peligro (EN): A1acd**
9	*Magnolia jaenensis* J. L. Marcelo-Peña	**En Peligro (EN): B1ab(i,ii,iii)**
10	*Magnolia shuariorum* F. Arroyo & A. Vázquez	**En Peligro (EN): B2a**
11	*Magnolia kichuana* A. Vázquez, F. Arroyo & A. J. Pérez	**En Peligro (EN): B2ab(i,ii,iii)**
12	*Magnolia chiguila* F. Arroyo, A.J. Pérez & A. Vázquez, *sp. nov.*	**Vulnerable (V): A1acd**
13	*Magnolia mercedesiarum* A.Vázquez & D.A.Neill, *sp. nov.*	**Vulnerable (VU): B1ab(i,ii,iii)**
14	*Magnolia palandana* F. Arroyo	**Vulnerable (VU): B1ab(i,ii,iii)**
15	*Magnolia zamorana* F. Arroyo	**Vulnerable (VU): B1ab(i,ii,iii)**
16	*Magnolia pastazaensis* F. Arroyo & A.J. Pérez	**Vulnerable (VU): B2ab(i,ii,iii,iv)**
17	*Magnolia vargasiana* A. Vázquez & D.A. Neill, *sp. nov.*	**Vulnerable (VU): D12**
18	*Magnolia llanganatensis* A.Vázquez & D.A.Neill, *sp. nov.*	**Casi Amenazado (NT)**
19	*Magnolia mindoensis* A.Vázquez & D.A.Neill, *sp. nov.*	**Casi Amenazado (NT)**
20	*Magnolia equatorialis* A. Vázquez	**Preocupación Menor (LC)**
21	*Magnolia mashpi* Á.J. Pérez, F. Arroyo & A. Vázquez, *sp. nov.*	**Preocupación Menor (LC)**
22	*Magnolia rimachii* (Lozano) Govaerts	**Preocupación Menor (LC)**
23	*Magnolia lozanoi* A.Vázquez & De Castro	**Datos Insuficientes (DD)**

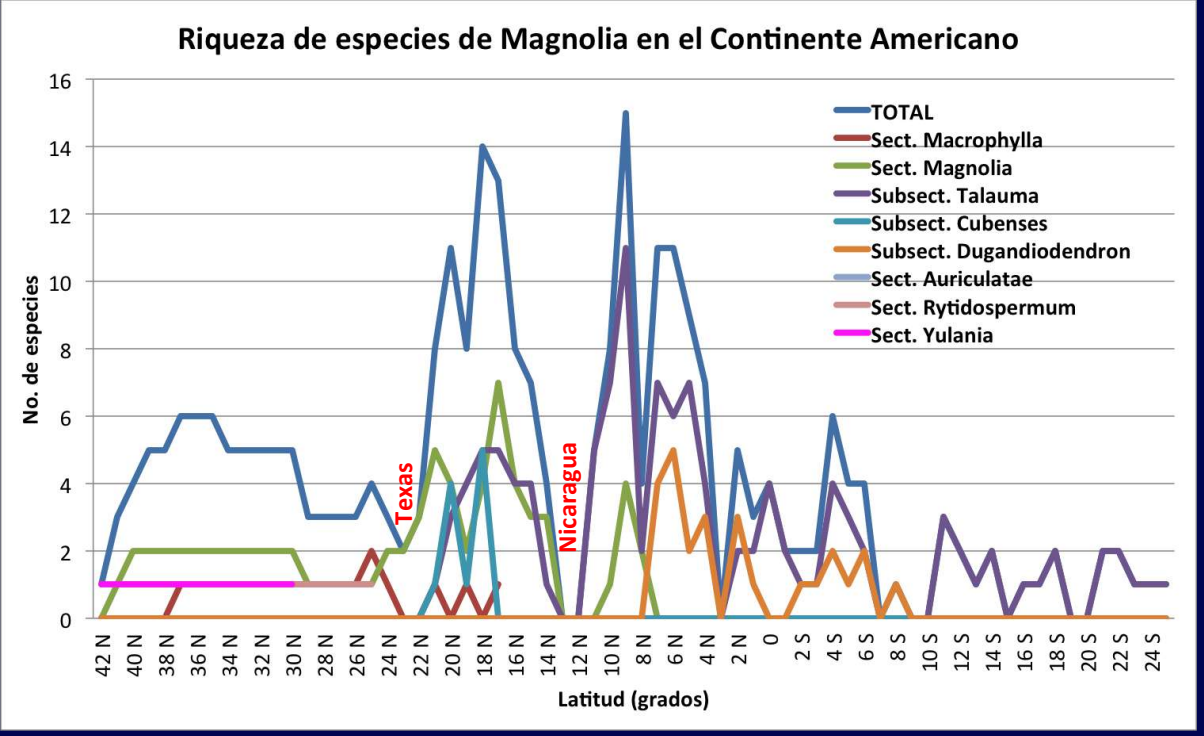
International Collaboration allowed the first meeting in Neotropical Magnoliaceae
Involving Universidad Estatal Amazónica-Universidad de Guadalajara
Wespelar Arboretum, Magnolia Society International, Naturalez and Conservation International
We thank all the supporters and attendants to th meeting

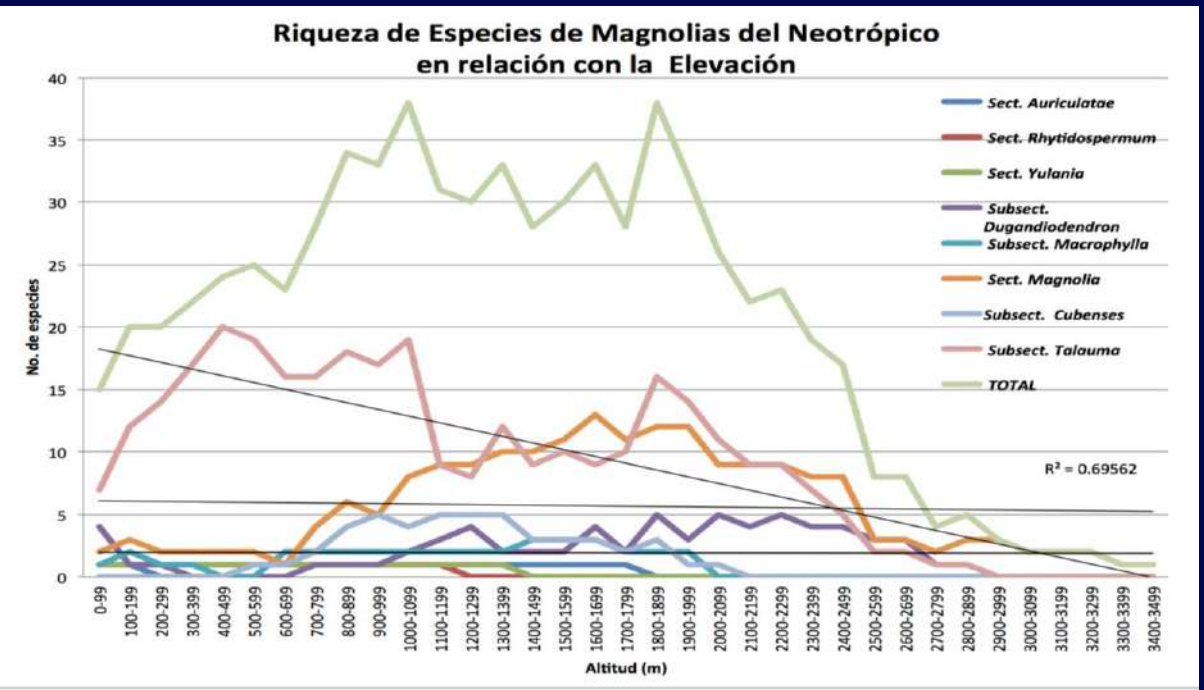
Caso 6: Magnolias y Cambio Climatico

¿Que podemos aprender del análisis directo de la riqueza de especies de distintos tipos de vegetación en gradientes ambientales en relación al cambio climático?

¿Son la altitud o la latitud substitutos apropiados del cambio climático?

Robert Whittaker


Riqueza de especies de Magnolia en el Continente Americano
No. de especies
Latitud (grados)
TOTAL
Sect. Macrophylla
Sect. Magnolia
Subsect. Talauma
Subsect. Cubenses
Subsect. Dugandiodendron
Sect. Auriculatae
Sect. Rytidospermum
Sect. Yulania
Texas
Nicaragua


Riqueza de Especies de Magnolias del Neotrópico
en relación con la Elevación
No. de especies
Altitud (m)
Sect. Auriculatae
Sect. Rhytidospermum
Sect. Yulania
Subsect. Dugandiodendron
Subsect. Macrophylla
Sect. Magnolia
Subsect. Cubenses
Subsect. Talauma
TOTAL
R² = 0.69562

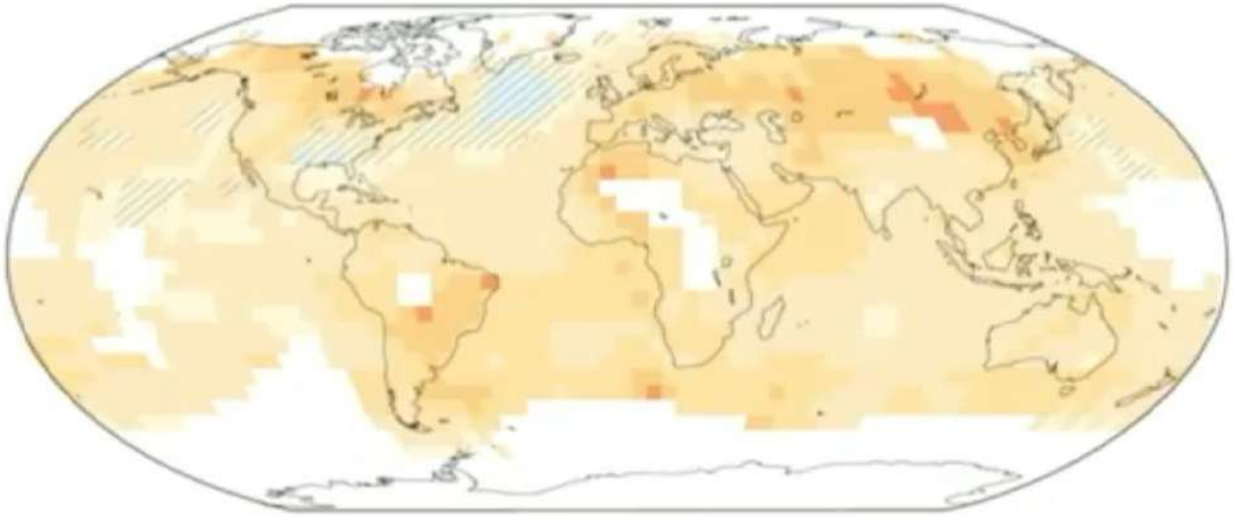
Observed Temperature Change

Based on trend over 1901-2012 (°C over period)

Solid Color — Significant trend

White — Insufficient data

Diagonal Lines — Trend not statistically significant



Projected Temperature Change

Difference from 1986-2005 mean (°C)

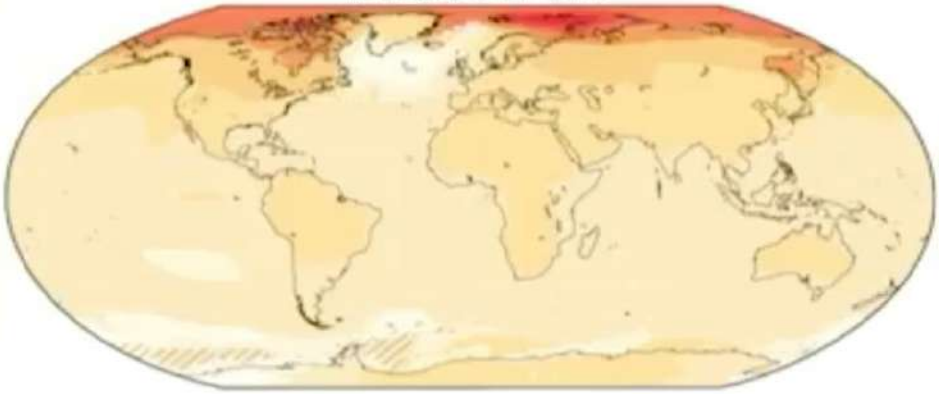
Solid Color — Very strong agreement

Gray — Divergent changes

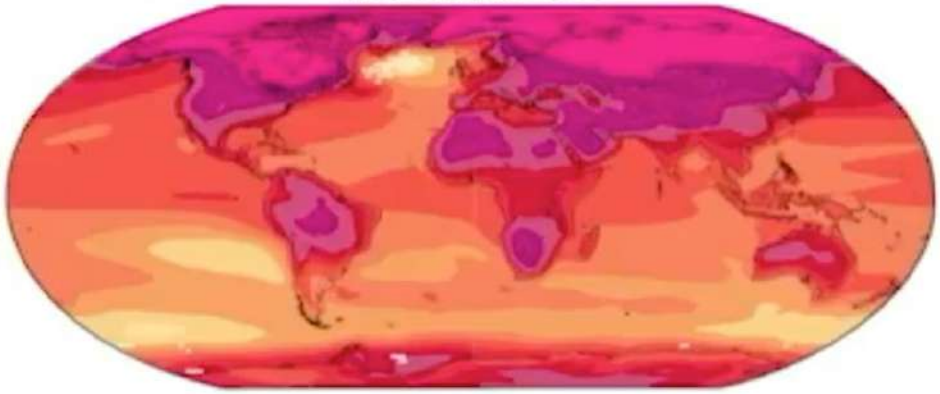
White Dots — Strong agreement

Diagonal Lines — Little or no change

RCP2.6 2081 - 2100

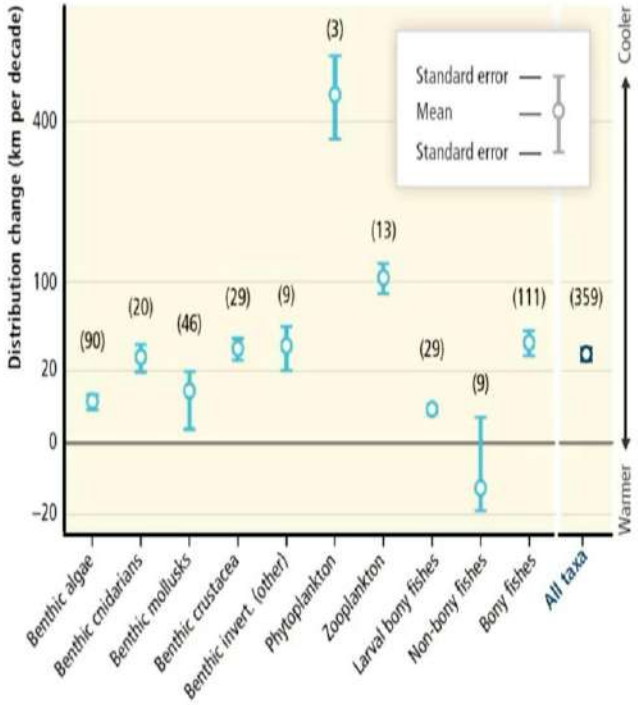


RCP8.5 2081 - 2100



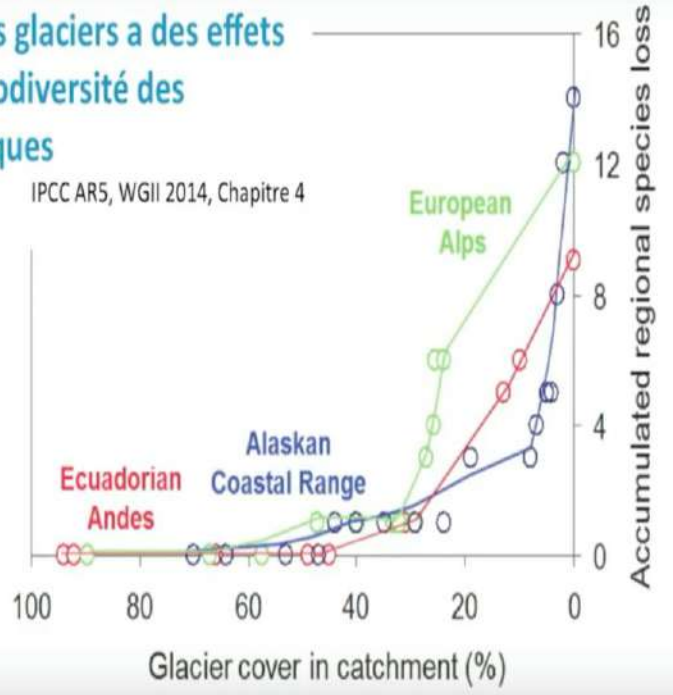
Les organismes marins ont déjà modifié leurs aires de répartition à cause du réchauffement climatique

(IPCC AR5, WGII 2014, Chapitres 6, 23 & 30)



La disparition des glaciers a des effets négatifs sur la biodiversité des systèmes aquatiques

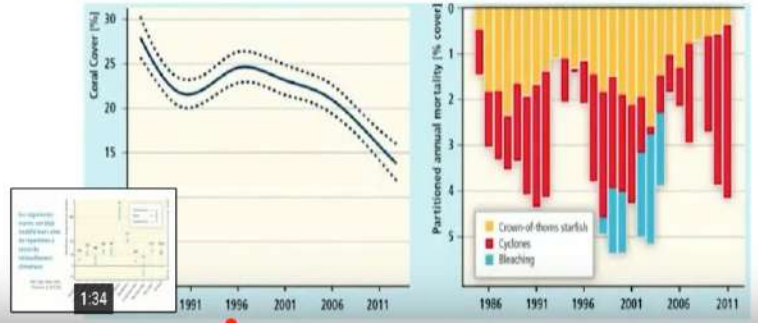
IPCC AR5, WGII 2014, Chapitre 4

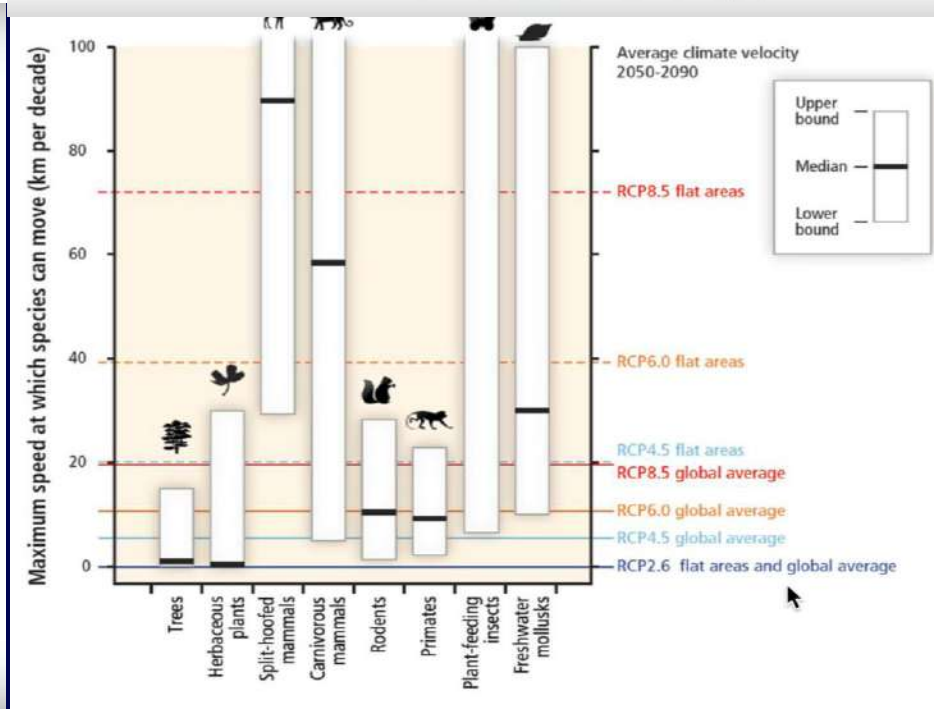


Les récifs coralliens sont parmi les écosystèmes les plus vulnérables au changement climatique

Exemple: Great Barrier Reef, Australia

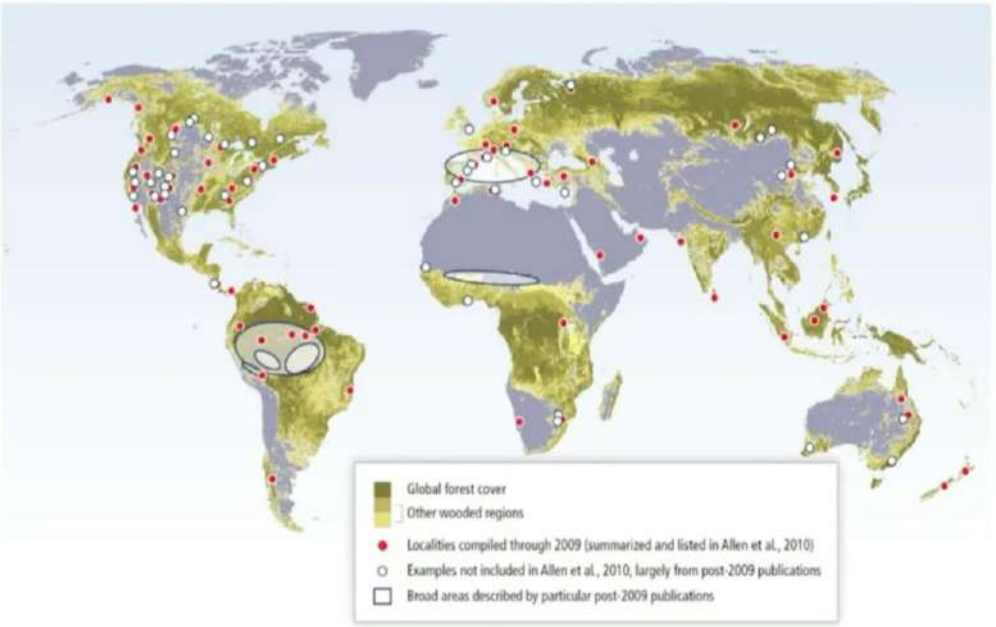
Sources: IPCC AR5, WGII 2014, Chapitres 6 & 30; Global Biodiversity Outlook 4, Objectif 10.



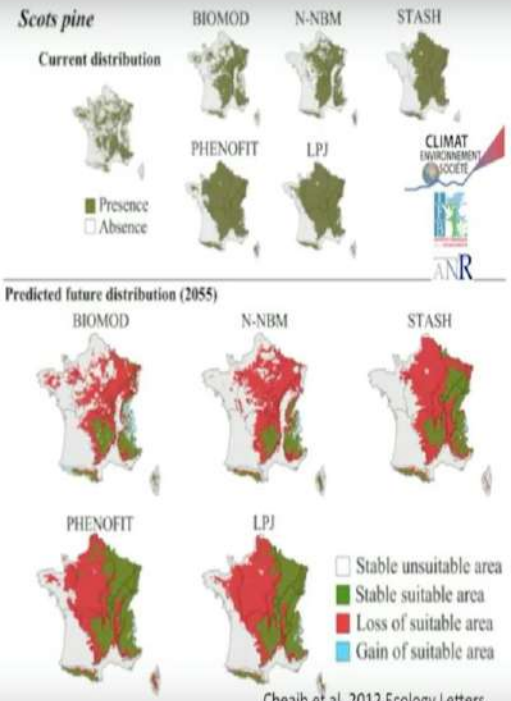


Il y a une augmentation de la mortalité des arbres liée au réchauffement climatique

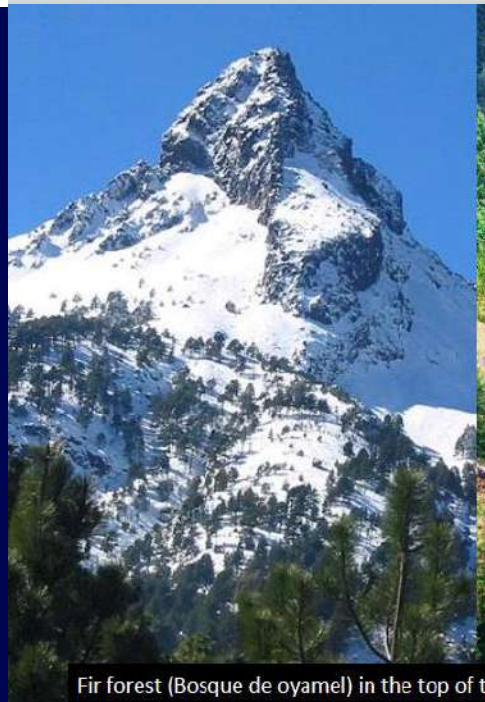
IPCC AR5, WGII 2014, Chapitre 4



Projections des impacts du changement climatique sur le pin sylvestre pour 2055



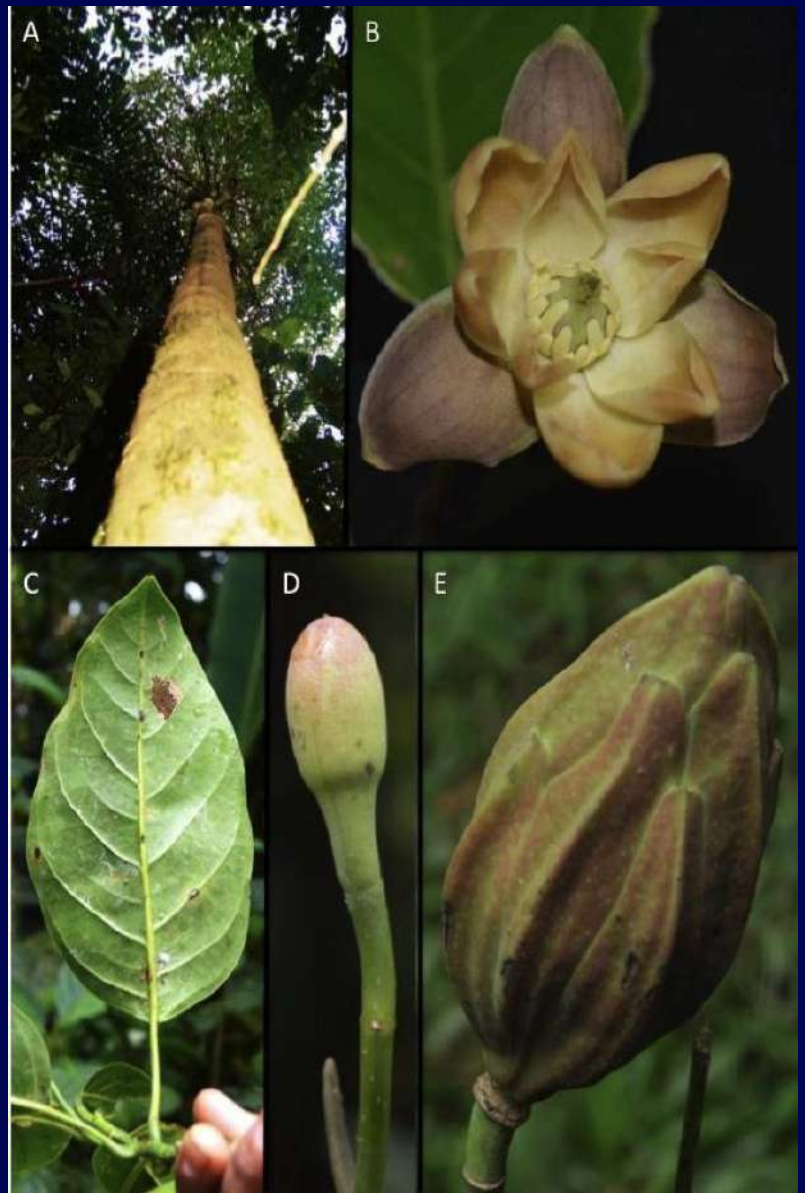
Cheaib et al. 2012 Ecology Letters

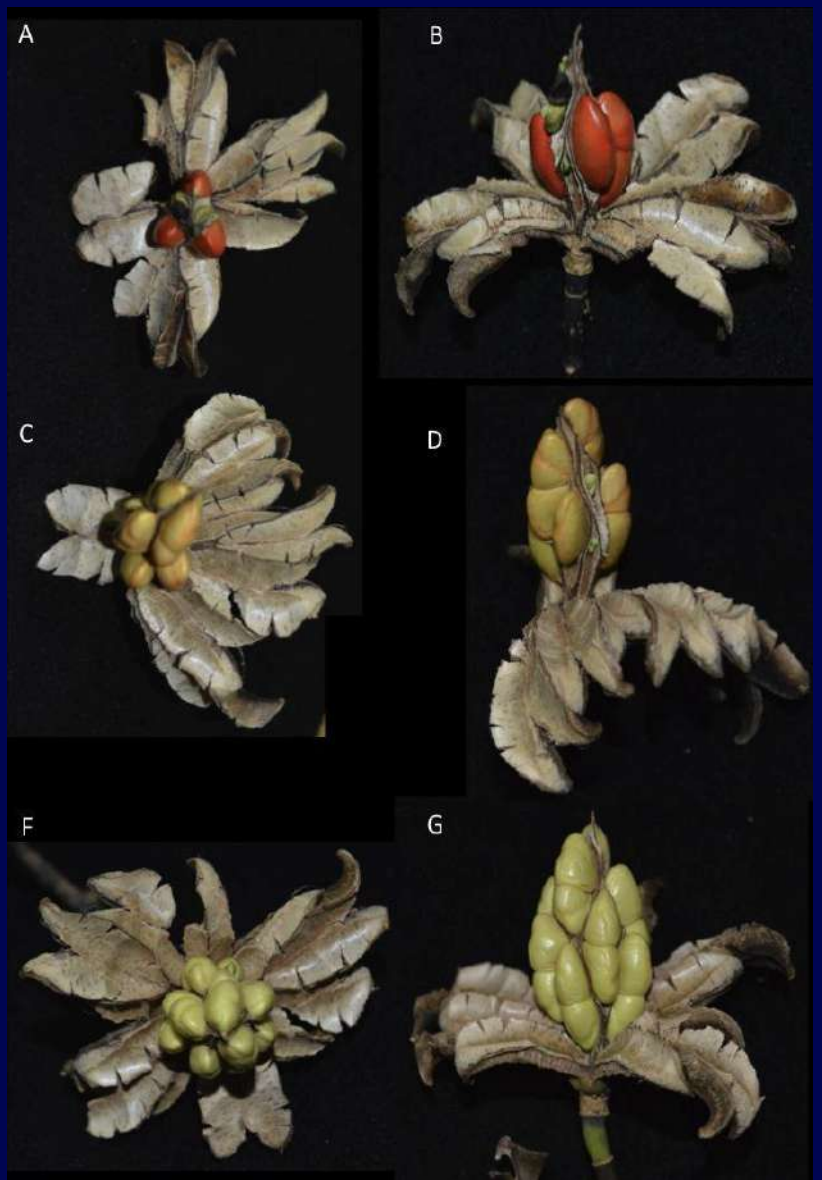


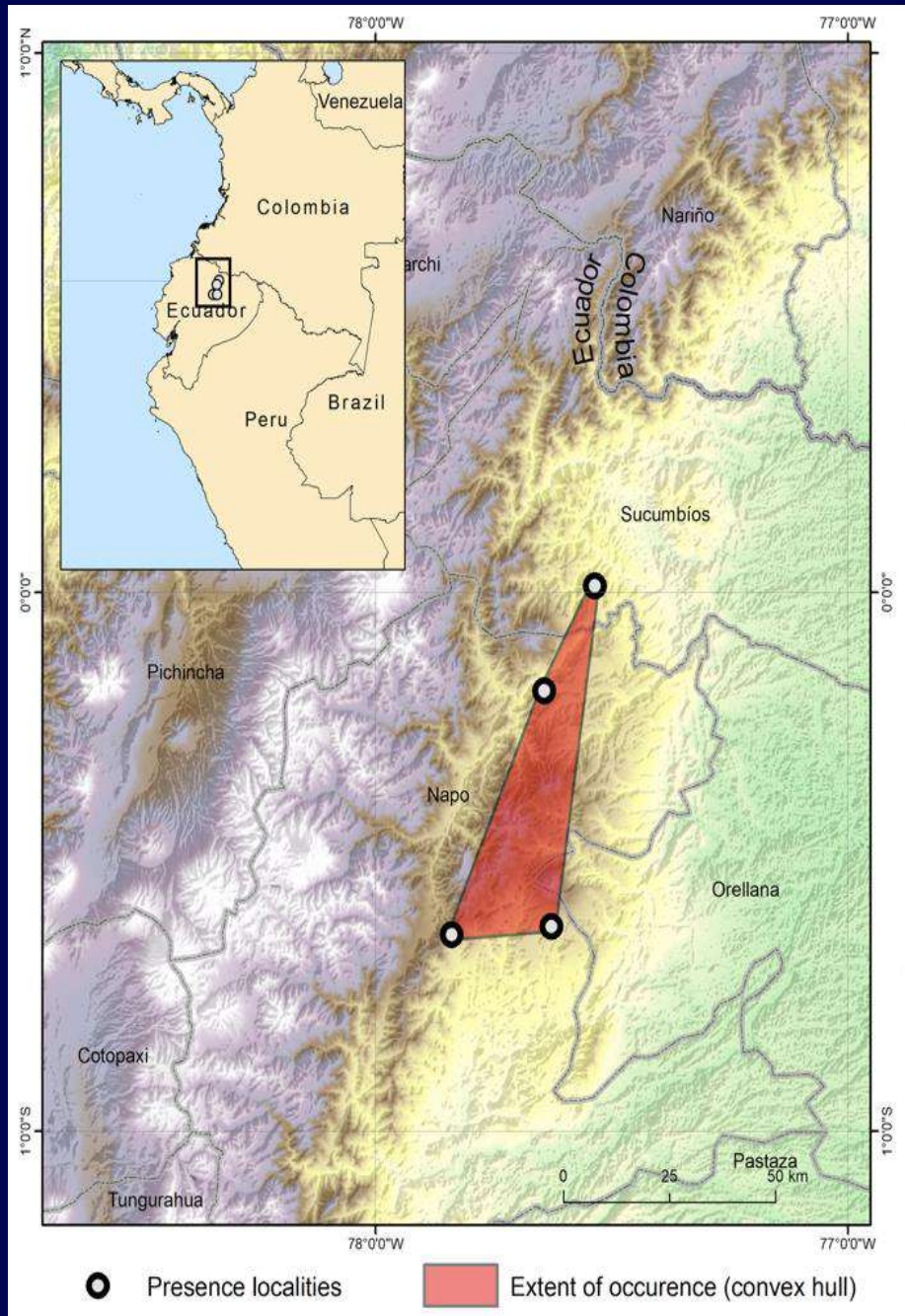
Fir forest (Bosque de oyamel) in the top of the mountains, here at Nevado de Colima

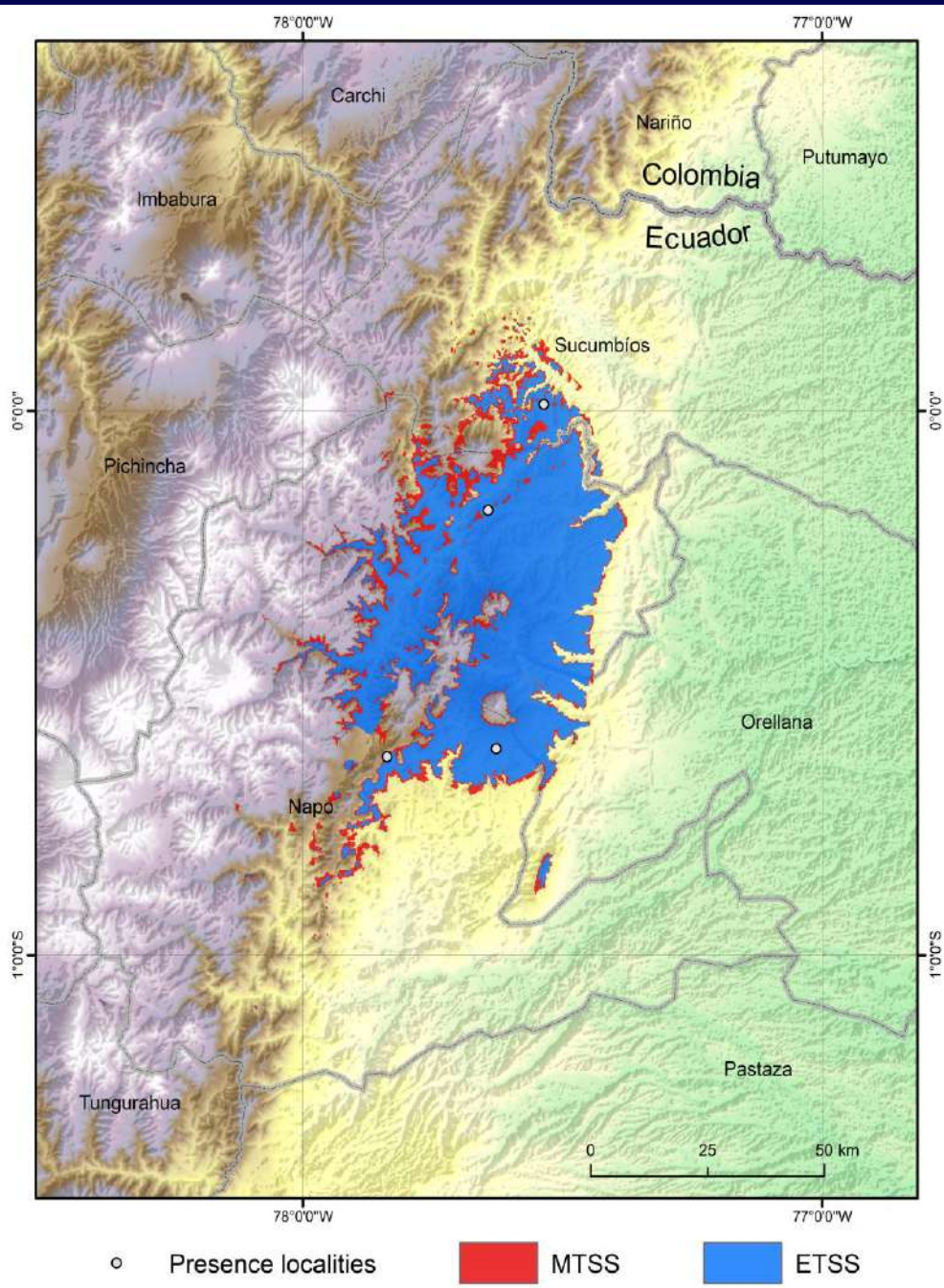
Magnolia mercedesiarum (subsect. *Talauma*, Magnoliaceae): a new Andean species from northern Ecuador, with insights into its potential distribution

J. Antonio Vázquez-García[1,2], David A. Neill[3], Viacheslav Shalisko[2], Frank Arroyo[4], R. Efrén Merino-Santi[3]






78°0'0"W
77°0'0"W
1°0'0"N
0°0'0"
1°0'0"S
Venezuela
Colombia
Ecuador
Peru
Brazil
Nariño
Ecuador
Colombia
Sucumbíos
Pichincha
Napo
Orellana
Cotopaxi
Pastaza
Tungurahua
0
25
50 km
Presence localities
Extent of occurence (convex hull)


78°0'0"W
77°0'0"W
0°0'0"
1°0'0"S
Carchi
Nariño
Putumayo
Colombia
Ecuador
Imbabura
Sucumbíos
Pichincha
Orellana
Napo
Pastaza
Tungurahua
0
25
50 km
Presence localities
MTSS
ETSS

Inminent habitat dissapearance in climate change scenario for a recently discovered Ecuadorian Endemic Magnolia species

Viacheslav Shalisko & J. Antonio Vázquez-García

Source data

- Estimated modern distribution of *Magnolia mercedesiarum* (Vazquez *et al.* 2017 in press) – product of MaxEnt SDM in 250 m resolution grids
- Current climate conditions: 1970-2000 WorldClim 2 data (Fick & Hijmans 2017)
- Future climate condition in 2 scenarios (RCP 4.5 & RCP 8.5) in 205 and 2070: CIMP5 Hadley Global Environment Model 2 - Earth System (Martin et al. 2011)

Met Office

HadGEM2

Met Office Hadley Centre ESM

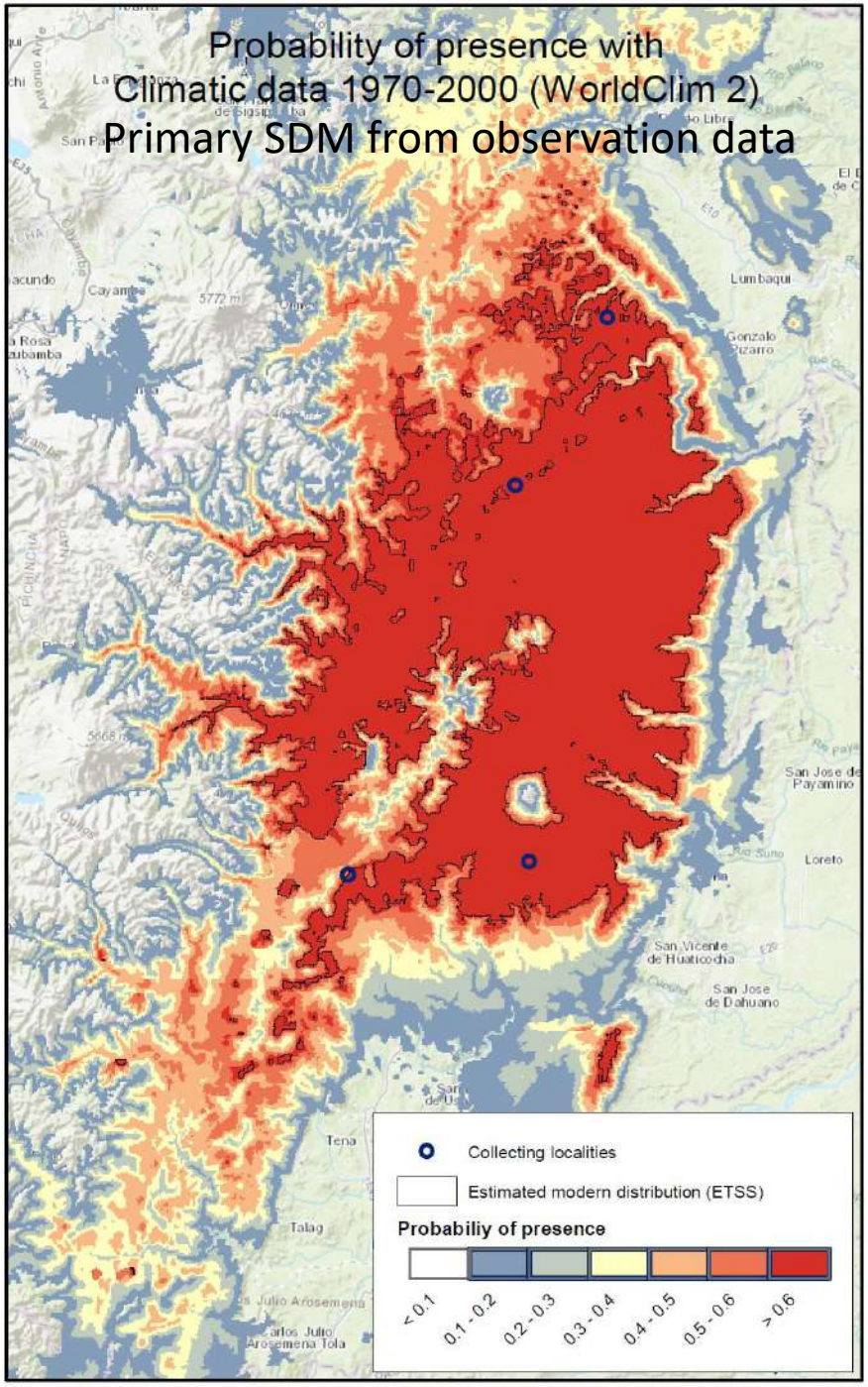
Premises

- No significant changes in specific adaptation to environmental conditions during the modelling period
- The current distribution responds to mean climate conditions of 1970-2000
- The variables derived from monthly precipitation, minimal and maximum temperature can be used to predict response of species distributions to climate change and niches geographical shifts

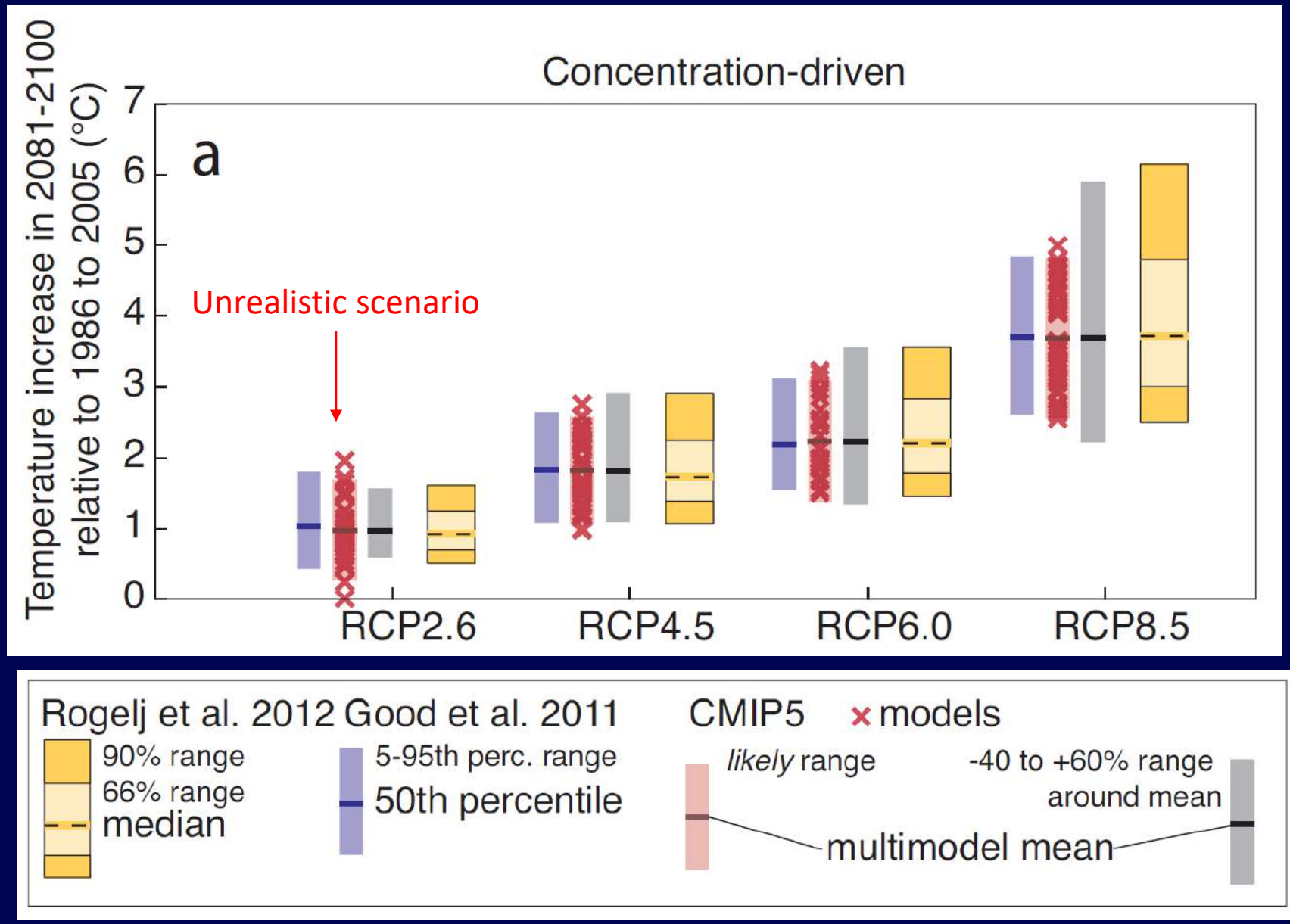
Method

- 10-fold cross-validated secondary MaxEnt SDM, configured with random sampling of modern probable distribution area and uniform background sampling, fitted to 1970-2000 climate conditions and applied to predict response to future conditions


Model of actual distribution of M. mercedesiarum
Medellin
Bogota
Cali
CORDILLERA OCCIDENTAL
CORDILLERA ORIENTAL
COLOM
Rio Magdalena
Rio Apaporis
Pasto
Rio Caqueta
Rio Putumayo
Quito
Rio Napo
Rio Caqueta
ECUADOR
Guayaquil
Rio Pastaza
Iquitos
Rio Chira
Rio Maranon
Reserva Nacional Pacaya-Samina
Rio Huallaga
Rio Javari
Piura
Chiclayo
PERÚ
Trujillo
Pobable presence area
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

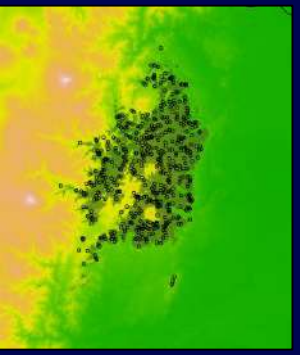

Probability of presence with
Climatic data 1970-2000 (WorldClim 2)
Primary SDM from observation data
Lumbaqui
Gonzalo Pizarro
San Jose de Payamino
Loreto
San Vicente de Huaticocha
San Jose de Dahuano
Tena
Talag
Collecting localities
Estimated modern distribution (ETSS)
Probabiliy of presence
< 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

Representative CO_2 concentration pathways (RPC) and Climate Change projections

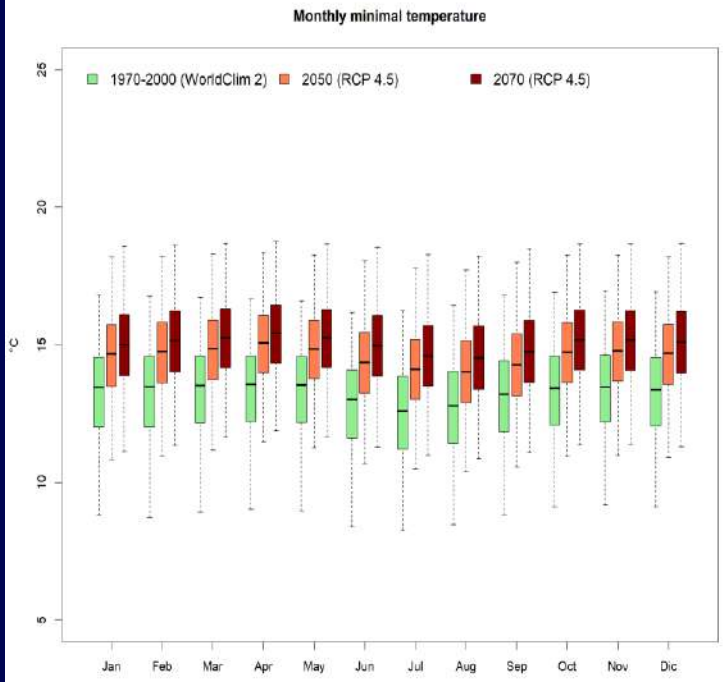


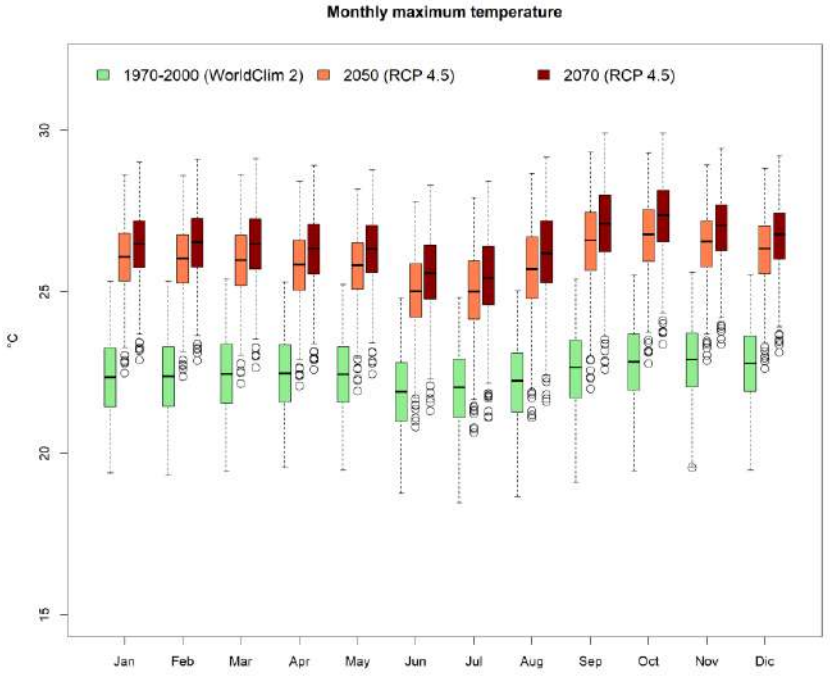
From Collins et al. 2013 IPCC report

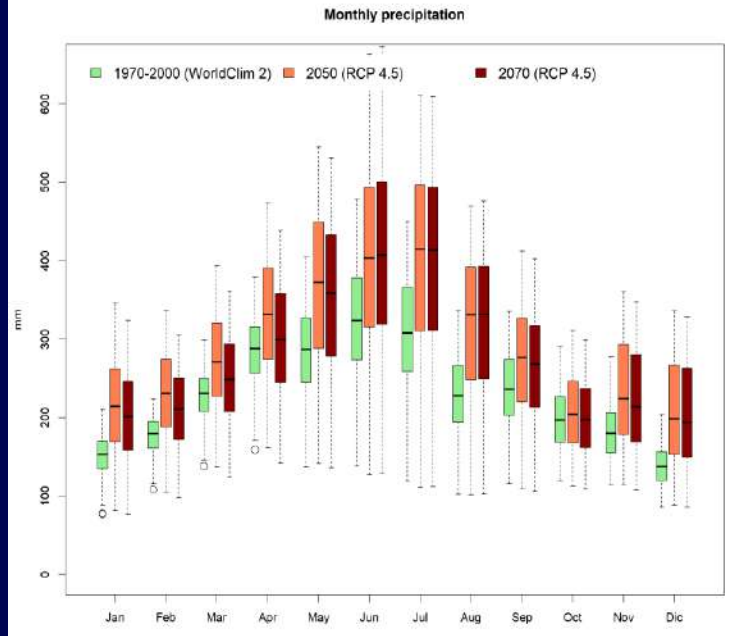
Magnolia mercedesiarum

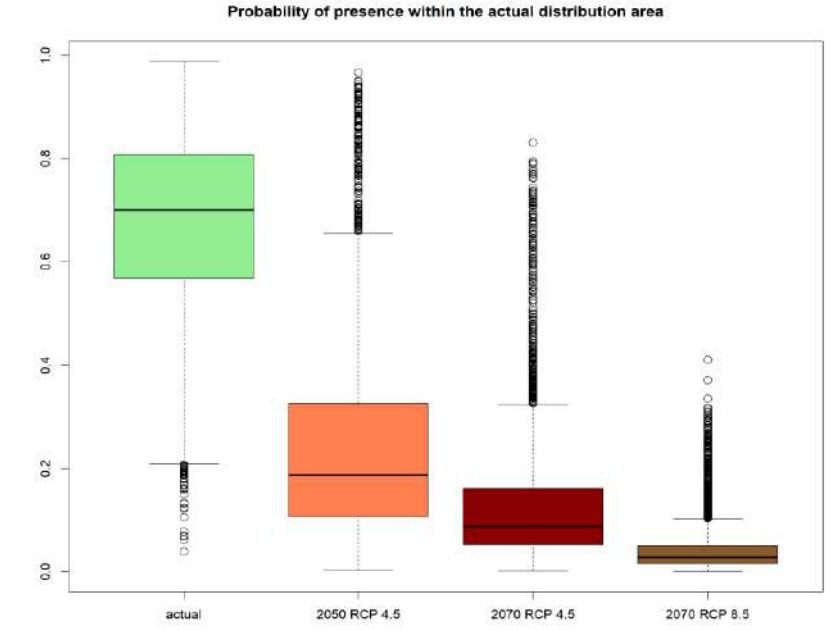


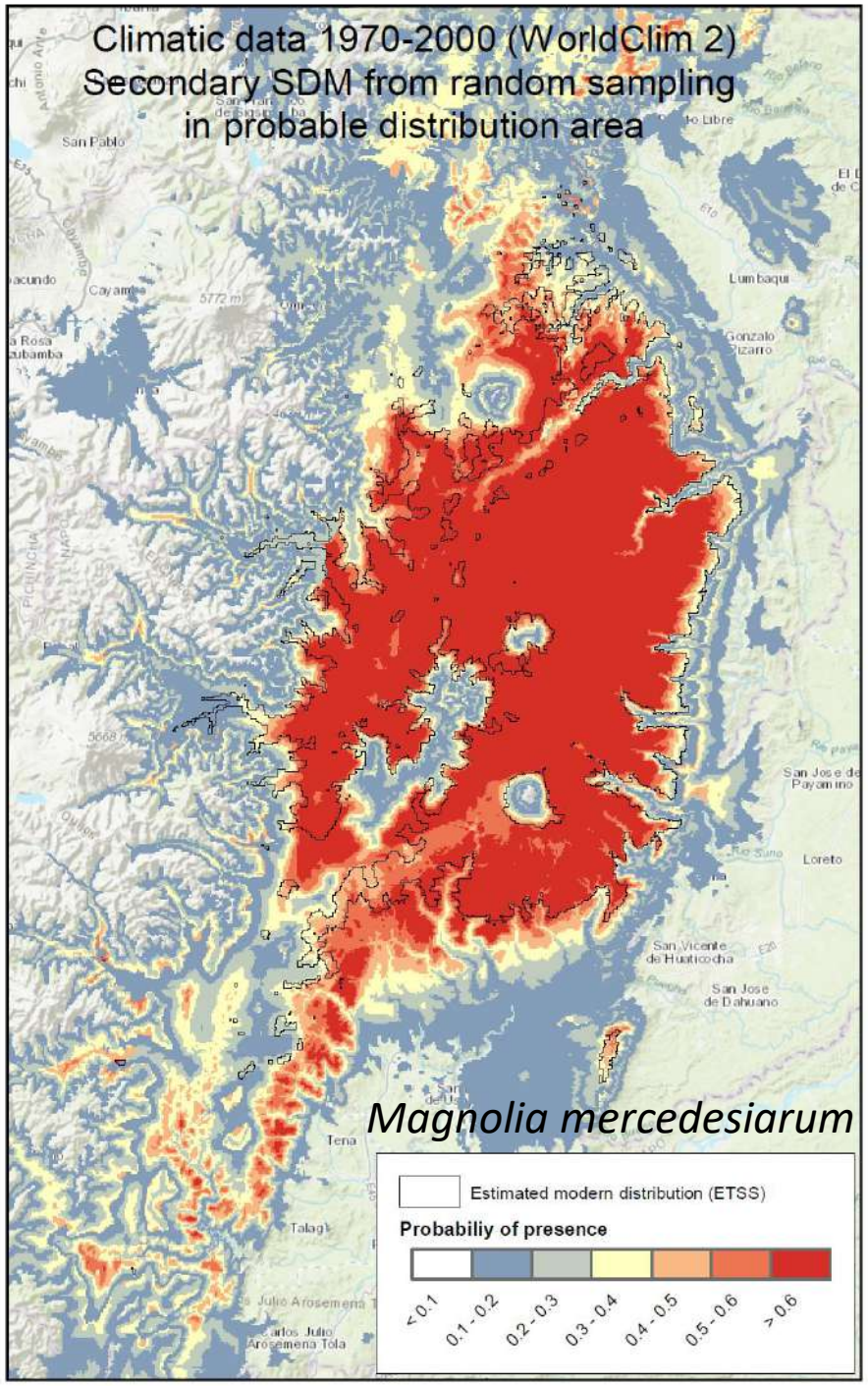
Random sampling in probable distribution area

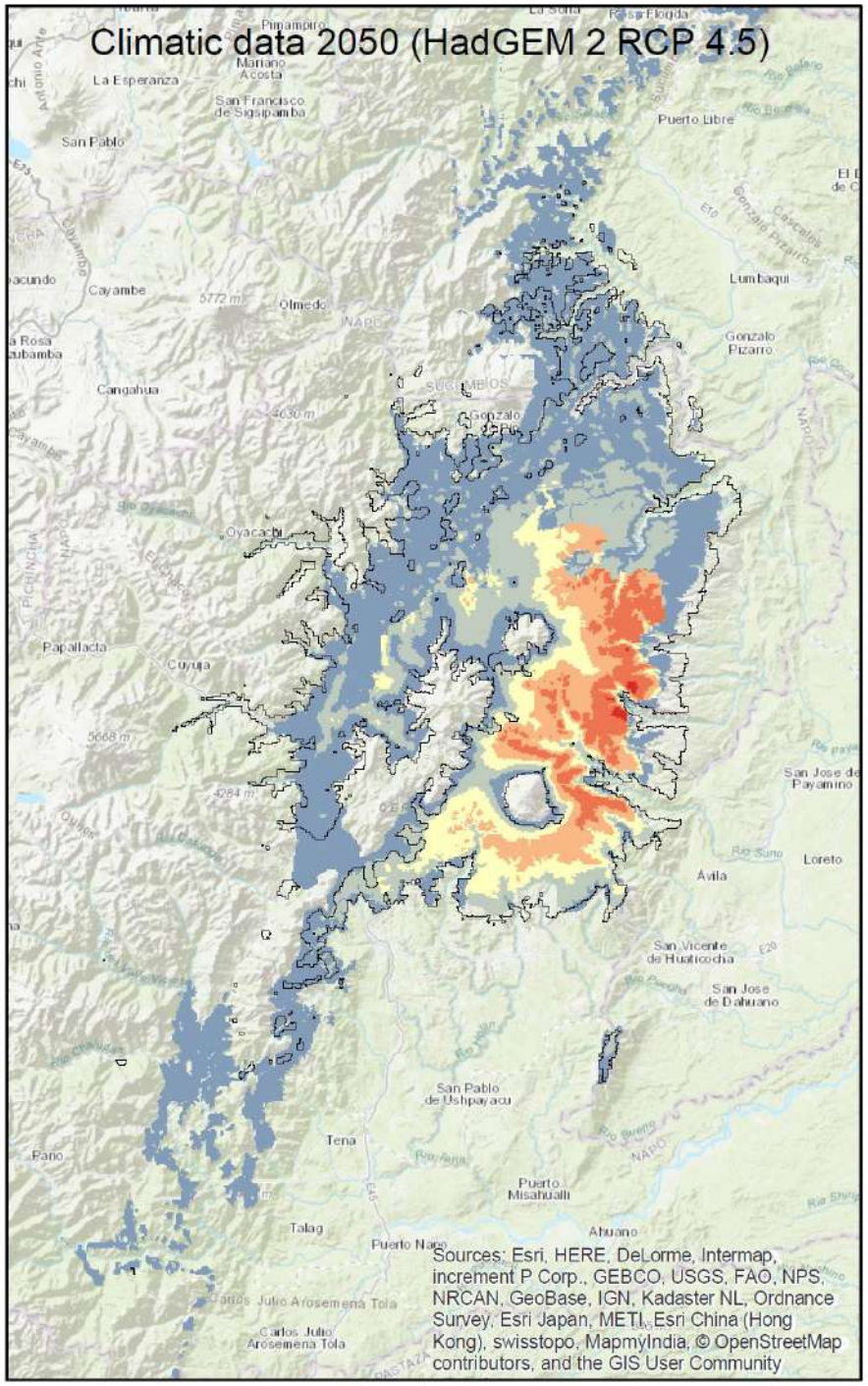


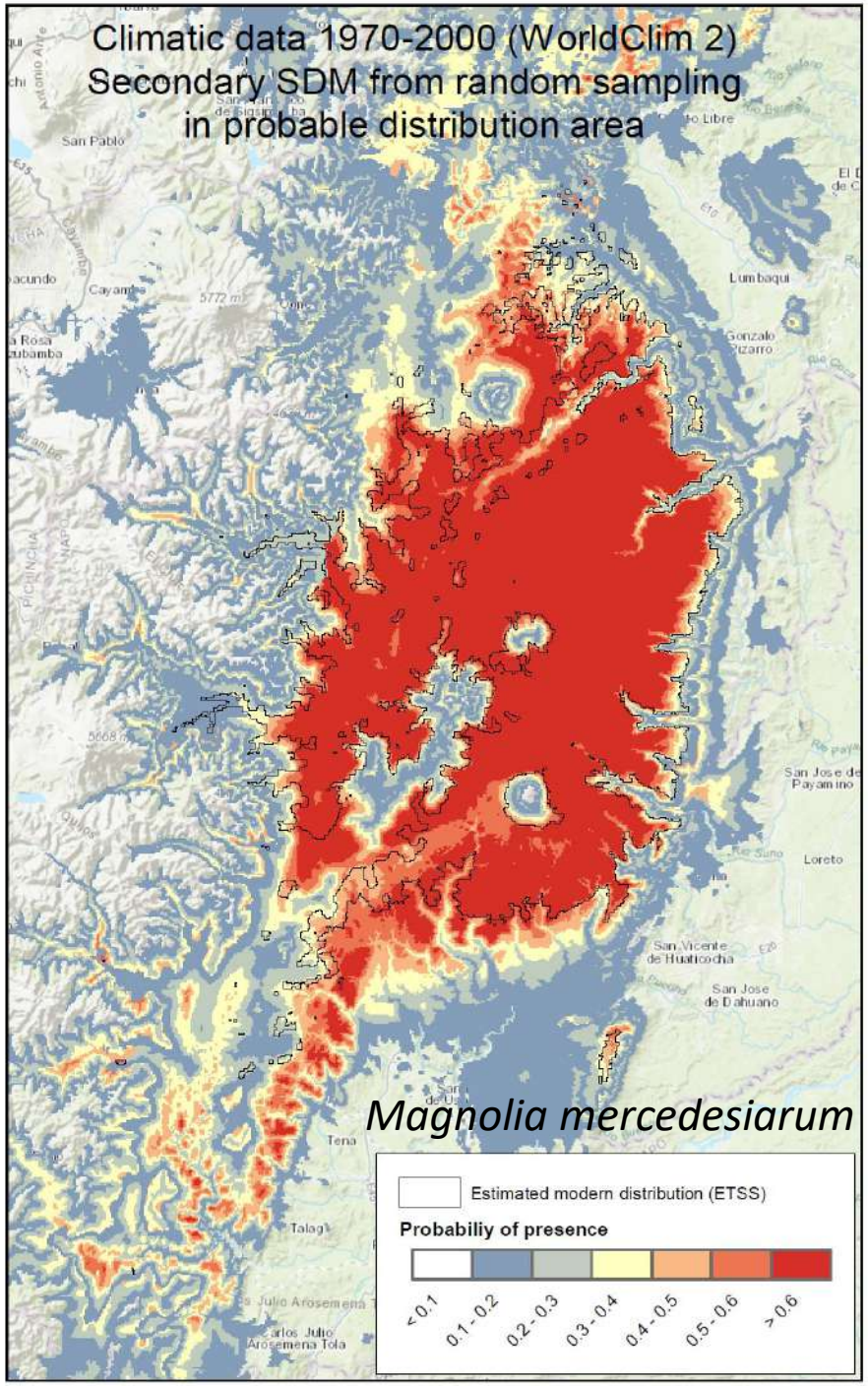


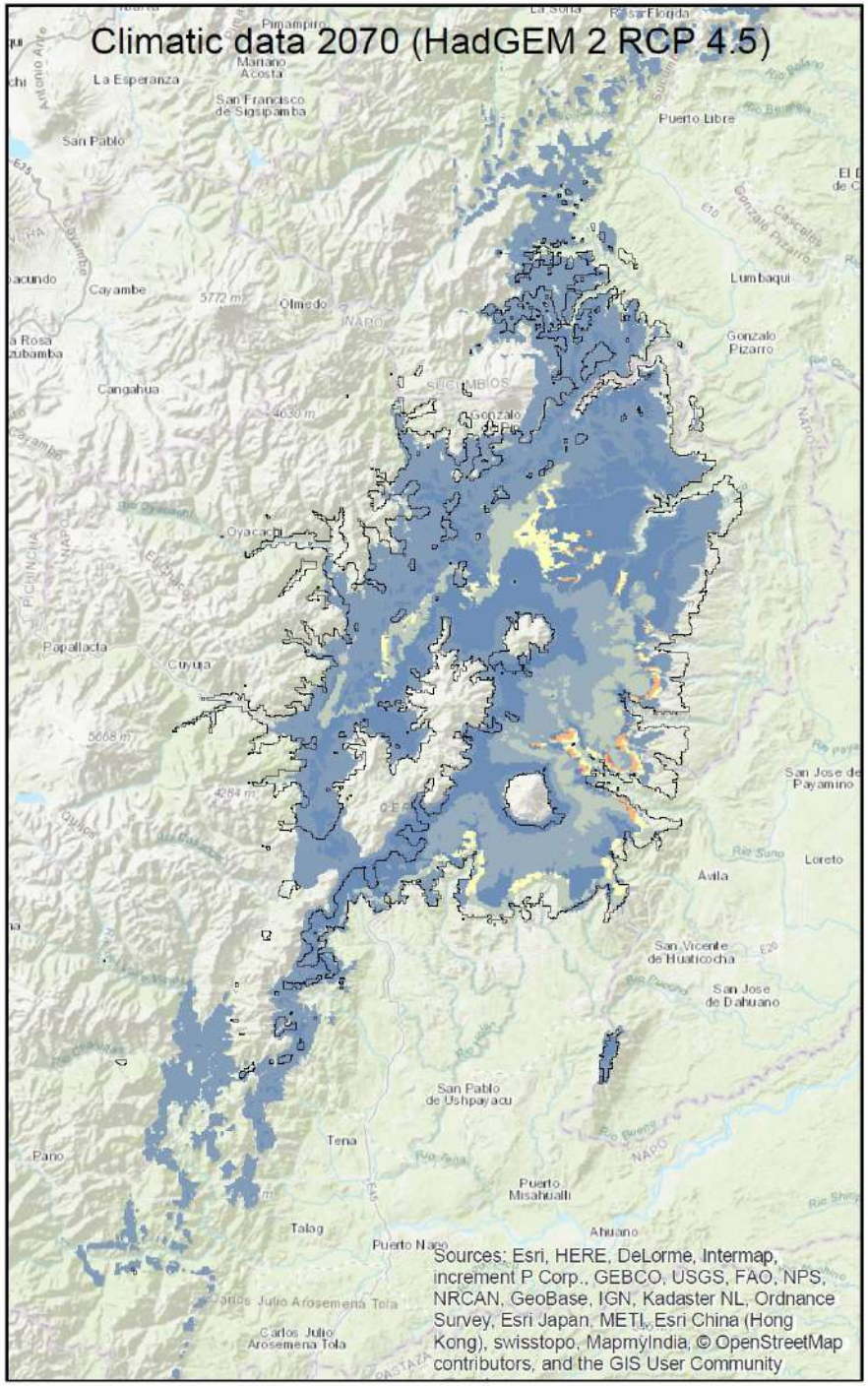


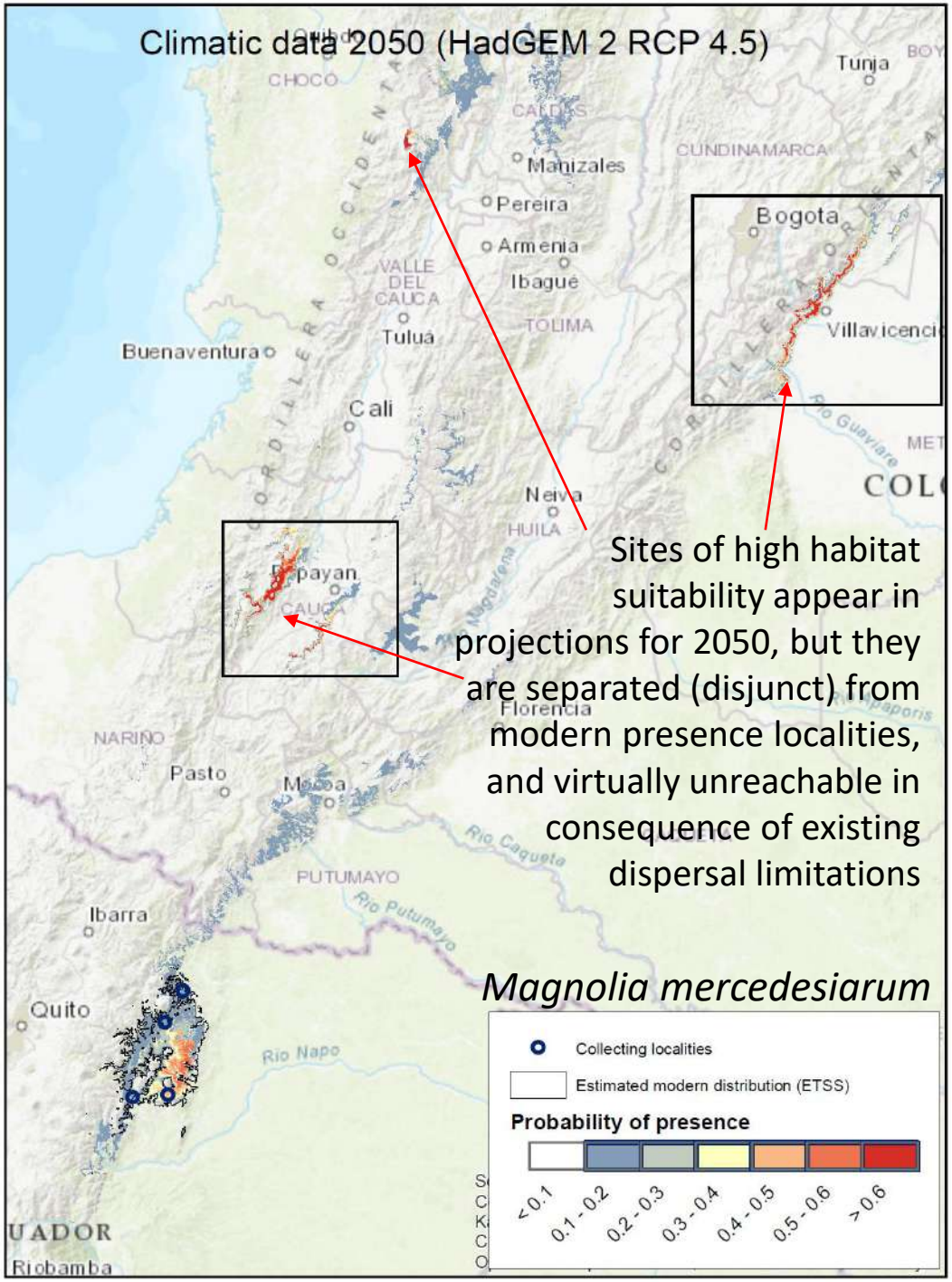


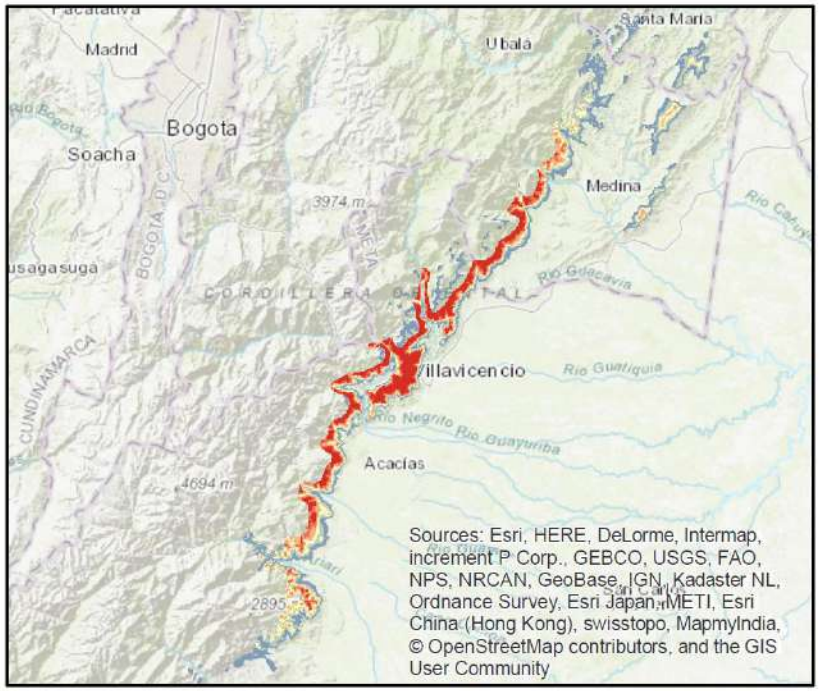

Climatic data 1970-2000 (WorldClim 2)
Secondary SDM from random sampling
in probable distribution area
Magnolia mercedesiarum
Estimated modern distribution (ETSS)
Probabiliy of presence
< 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

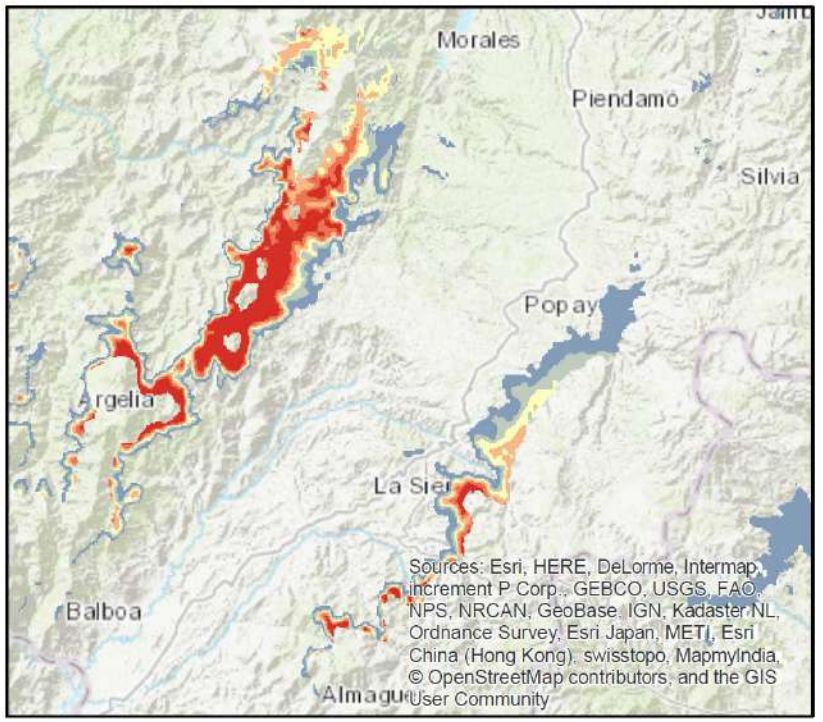

Climatic data 2050 (HadGEM 2 RCP 4.5)
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

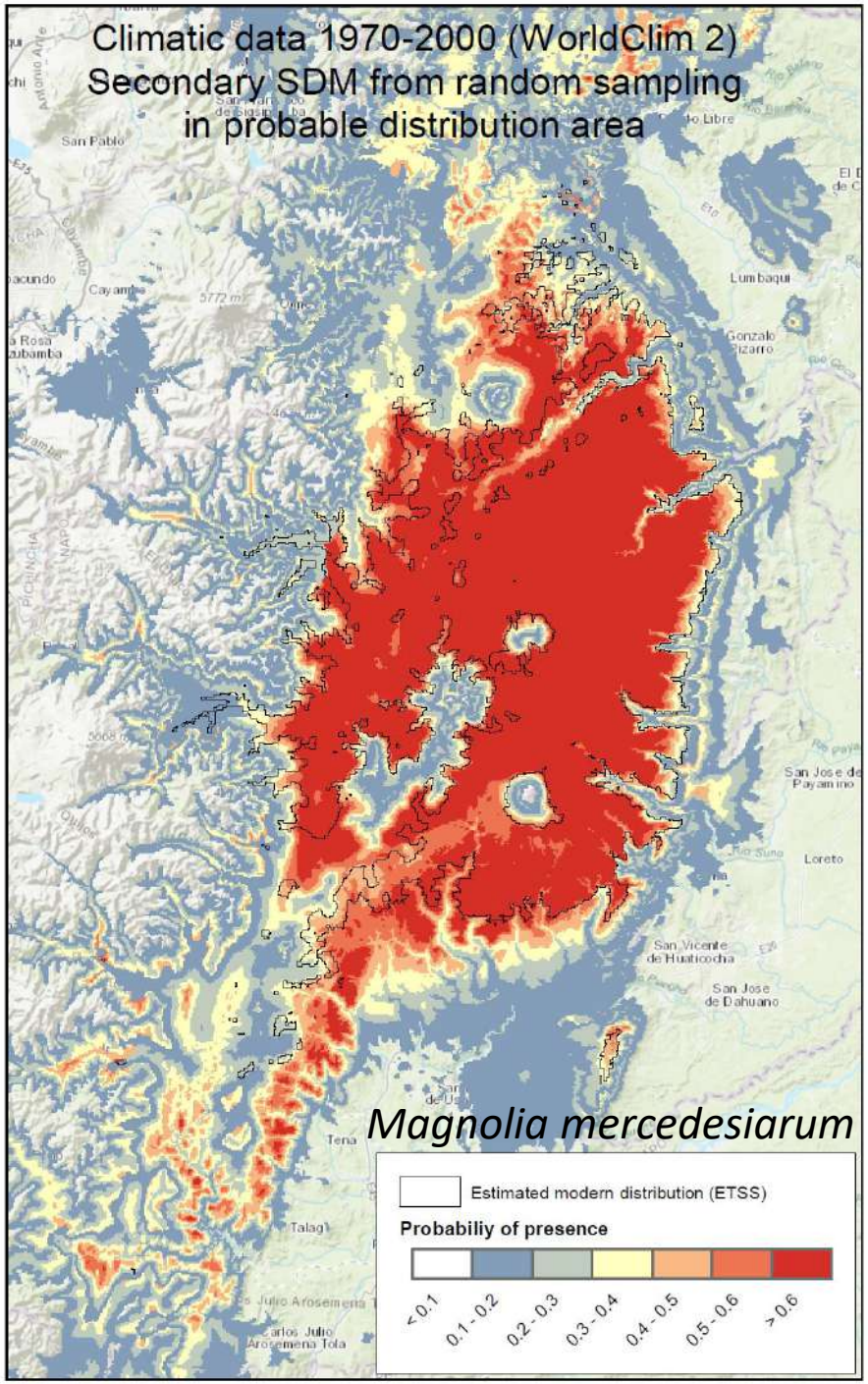

Climatic data 1970-2000 (WorldClim 2)
Secondary SDM from random sampling
in probable distribution area
Magnolia mercedesiarum
Estimated modern distribution (ETSS)
Probabiliy of presence
< 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

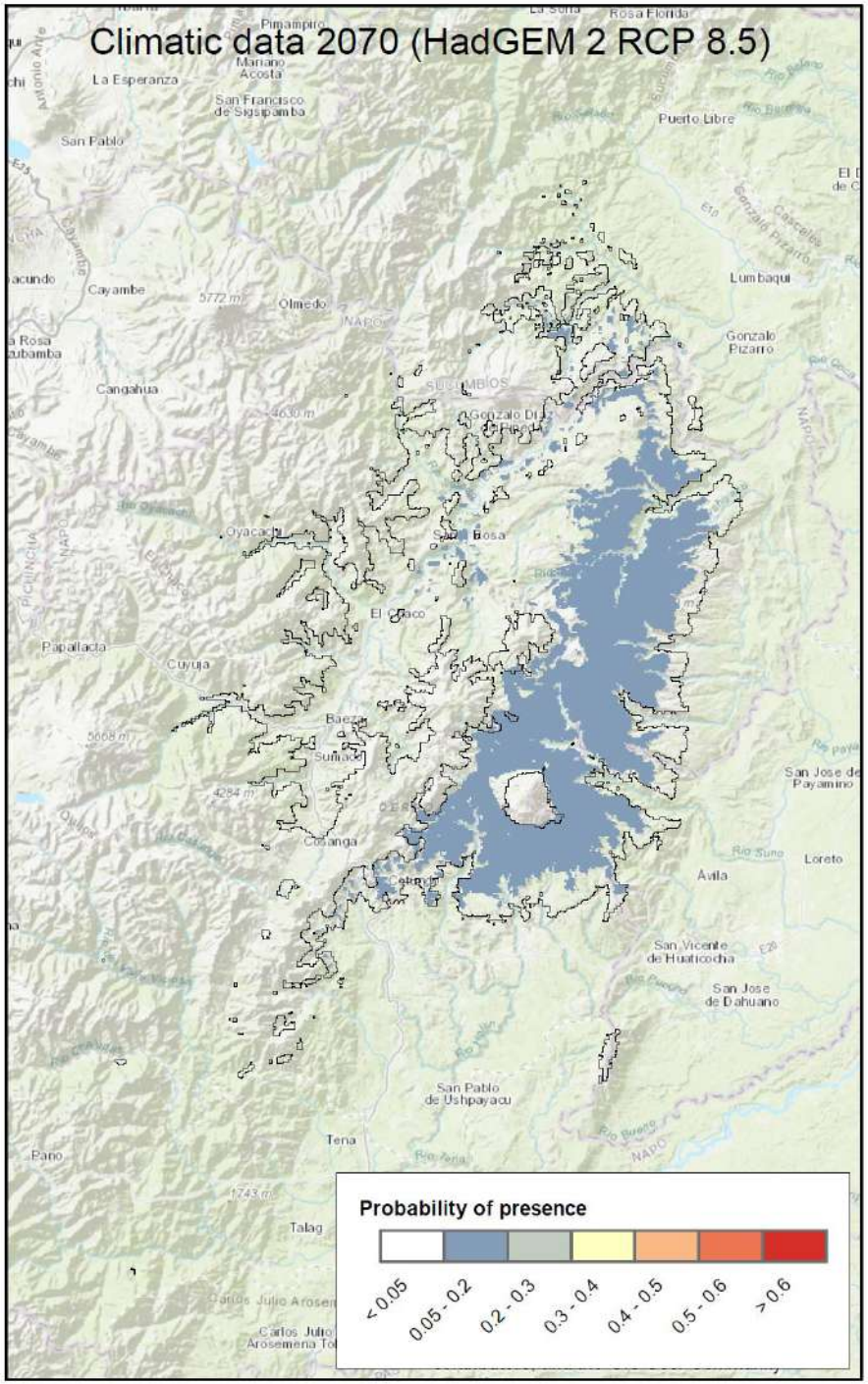

Climatic data 2070 (HadGEM 2 RCP 4.5)
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

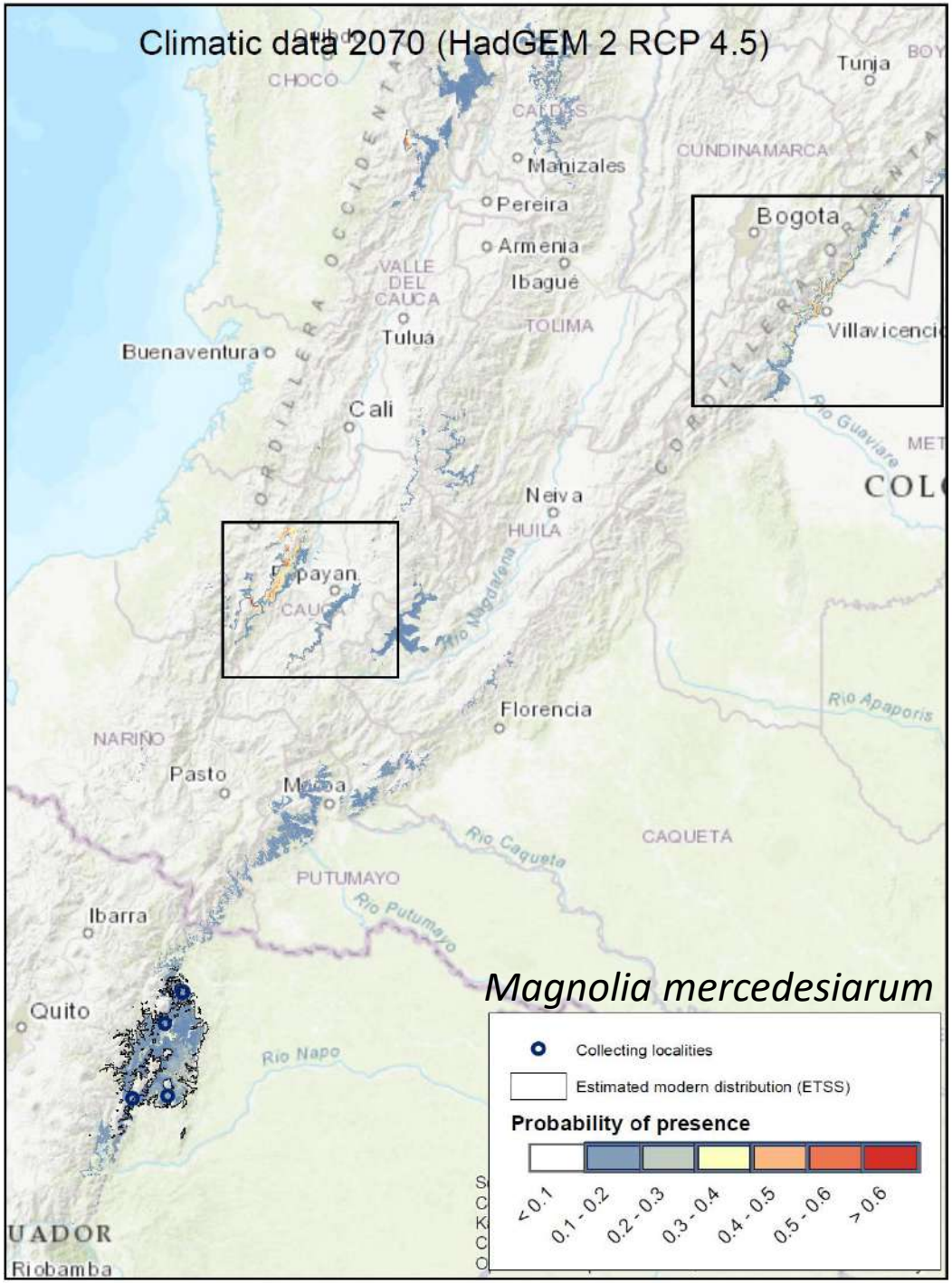

Climatic data 2050 (HadGEM 2 RCP 4.5)
Tunja
Manizales
Pereira
Armenia
Ibague
Tulua
Buenaventura
Cali
Bogota
Villavicencio
Neiva
Popayan
Pasto
Mocoa
Florencia
Ibarra
Quito
Riobamba
Sites of high habitat suitability appear in projections for 2050, but they are separated (disjunct) from modern presence localities, and virtually unreachable in consequence of existing dispersal limitations
Magnolia mercedesiarum
Collecting localities
Estimated modern distribution (ETSS)
Probability of presence
< 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

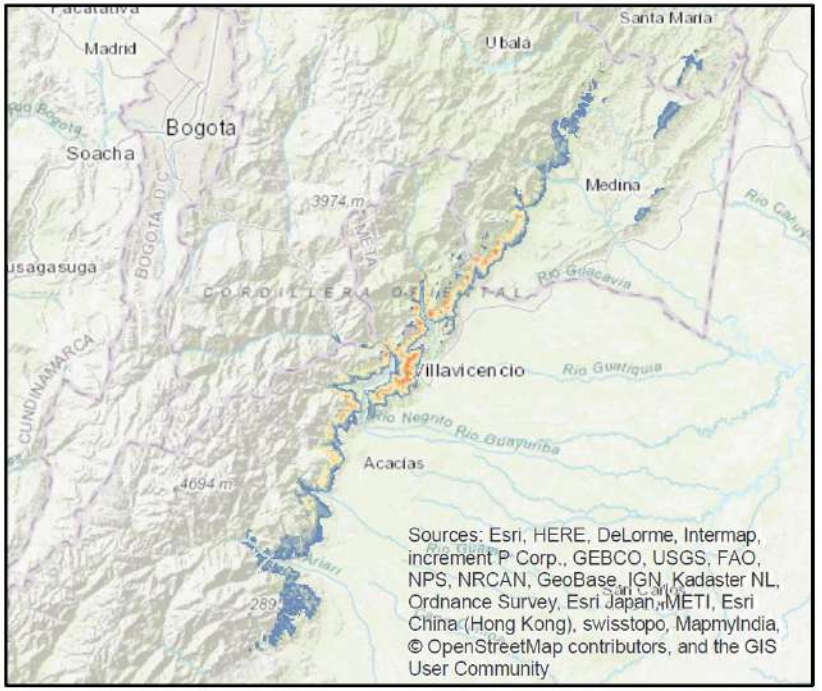

Madrid
Ubala
Bogota
Soacha
Medina
Villavicencio
Acacias
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

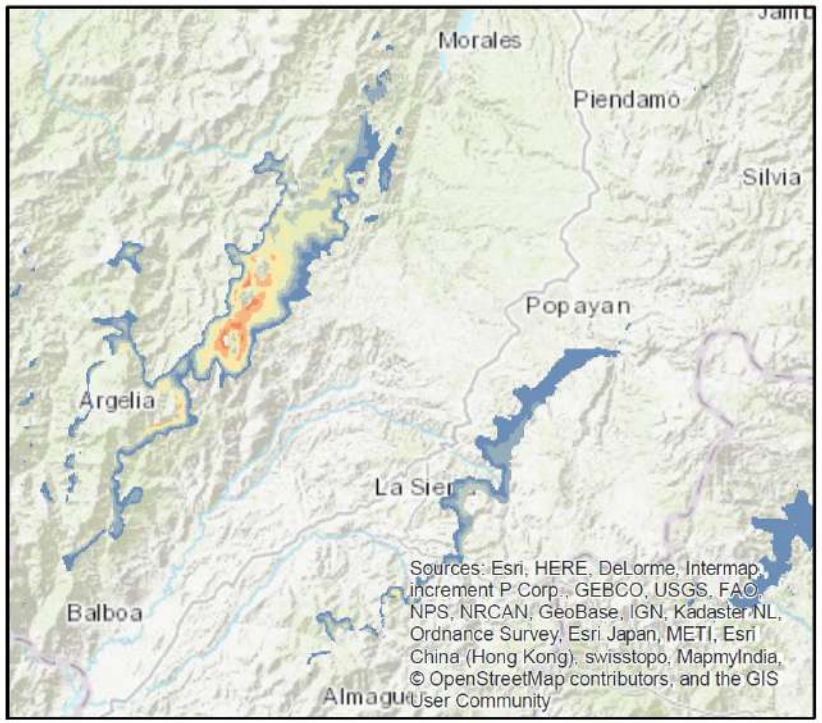

Morales
Piendamo
Silvia
Popayan
Argelia
Balboa
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

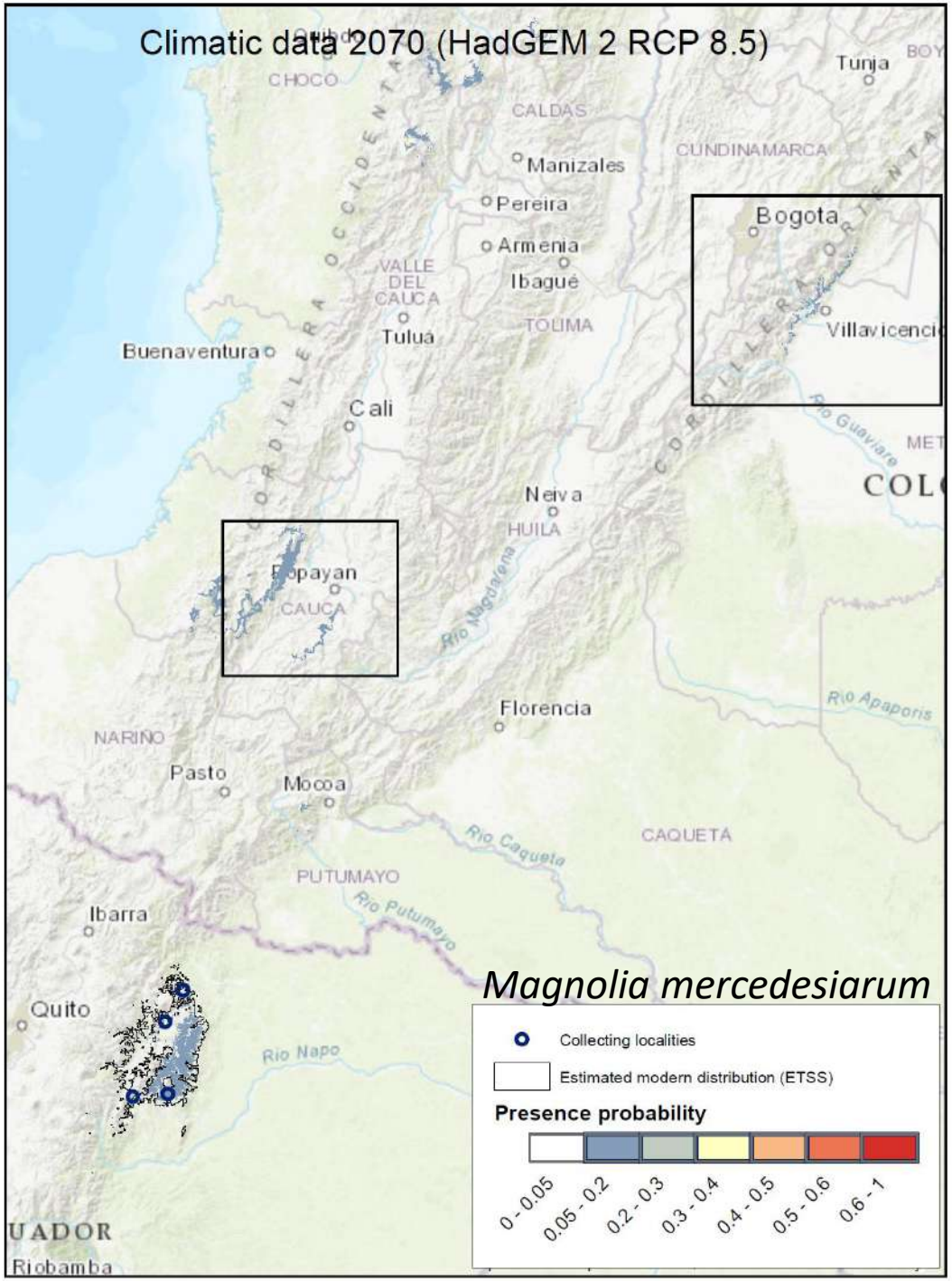

Climatic data 1970-2000 (WorldClim 2)
Secondary SDM from random sampling
in probable distribution area
Magnolia mercedesiarum
Estimated modern distribution (ETSS)
Probabiliy of presence
< 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

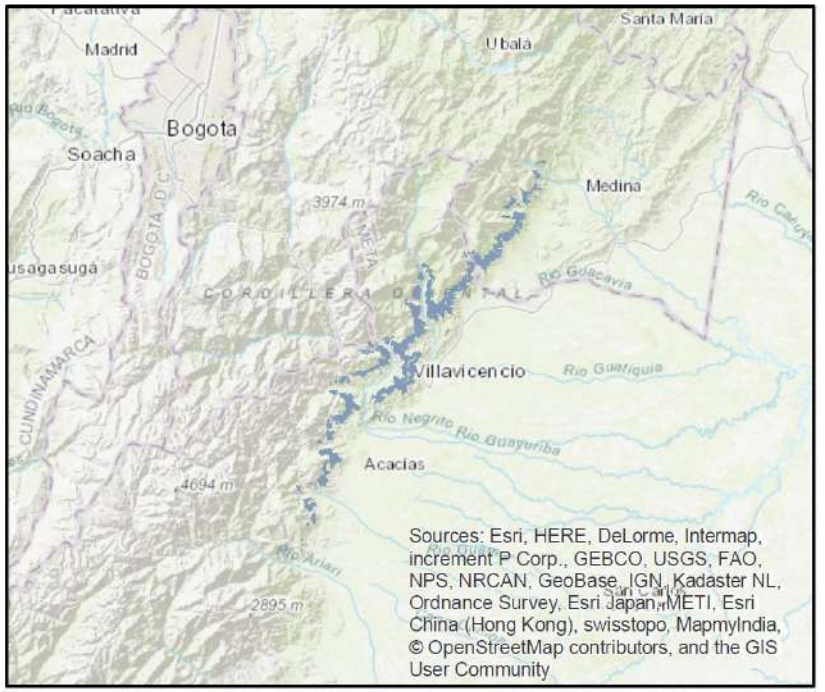

Climatic data 2070 (HadGEM 2 RCP 8.5)
Probability of presence
< 0.05
0.05 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
> 0.6

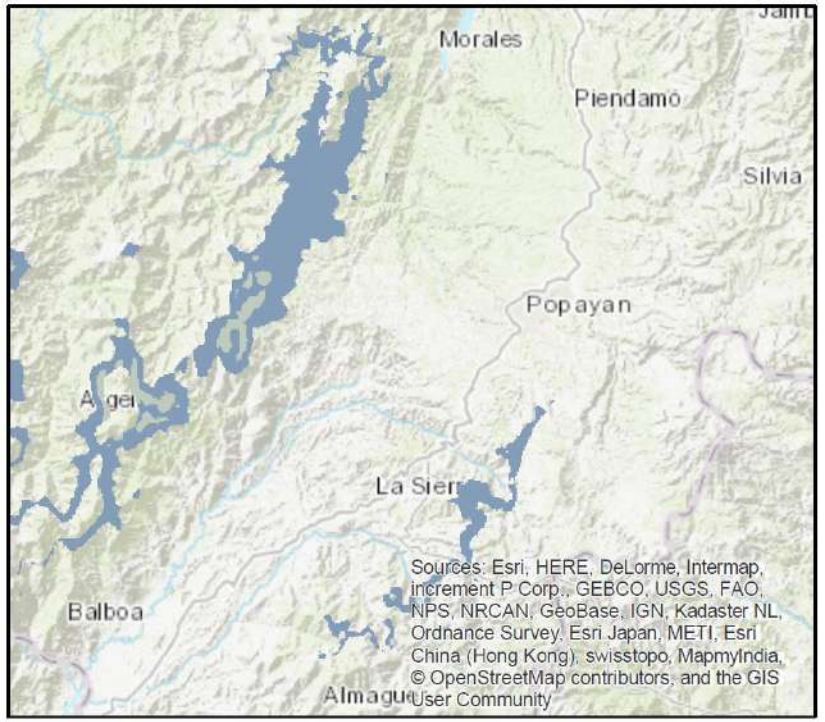

Climatic data 2070 (HadGEM 2 RCP 4.5)
CHOCO
CALDAS
CUNDINAMARCA
TOLIMA
HUILA
CAQUETA
NARIÑO
PUTUMAYO
VALLE DEL CAUCA
Tunja
Manizales
Pereira
Armenia
Ibagué
Tulua
Buenaventura
Cali
Bogota
Villavicencio
Neiva
Popayan
Florencia
Pasto
Mocoa
Ibarra
Quito
Riobamba
Rio Magdalena
Rio Guaviare
Rio Caqueta
Rio Putumayo
Rio Napo
Rio Apaporis
Magnolia mercedesiarum
Collecting localities
Estimated modern distribution (ETSS)
Probability of presence
<0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
>0.6


Madrid
Ubala
Santa Maria
Bogota
Soacha
Medina
3974 m
Villavicencio
Acacias
4694 m
Rio Guatiquia
Rio Negrito
Rio Guayuriba
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Morales
Piendamo
Silvia
Popayan
Argelia
La Sier
Balboa
Almaguer
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Climatic data 2070 (HadGEM 2 RCP 8.5)
CHOCO
CALDAS
CUNDINAMARCA
BOY
Tunja
Manizales
Pereira
Armenia
Ibagué
VALLE DEL CAUCA
TOLIMA
Tuluá
Buenaventura
Cali
Bogota
Villavicencio
Neiva
HUILA
Popayan
CAUCA
Florencia
NARIÑO
Pasto
Mocoa
CAQUETA
PUTUMAYO
Ibarra
Quito
Rio Napo
Riobamba
Rio Guaviare
Rio Magdalena
Rio Apaporis
Rio Caqueta
Rio Putumayo
Magnolia mercedesiarum
Collecting localities
Estimated modern distribution (ETSS)
Presence probability
0 - 0.05
0.05 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 1


Madrid
Ubalá
Santa María
Bogota
Soacha
Medina
3974 m
Villavicencio
Acacías
4694 m
2895 m
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

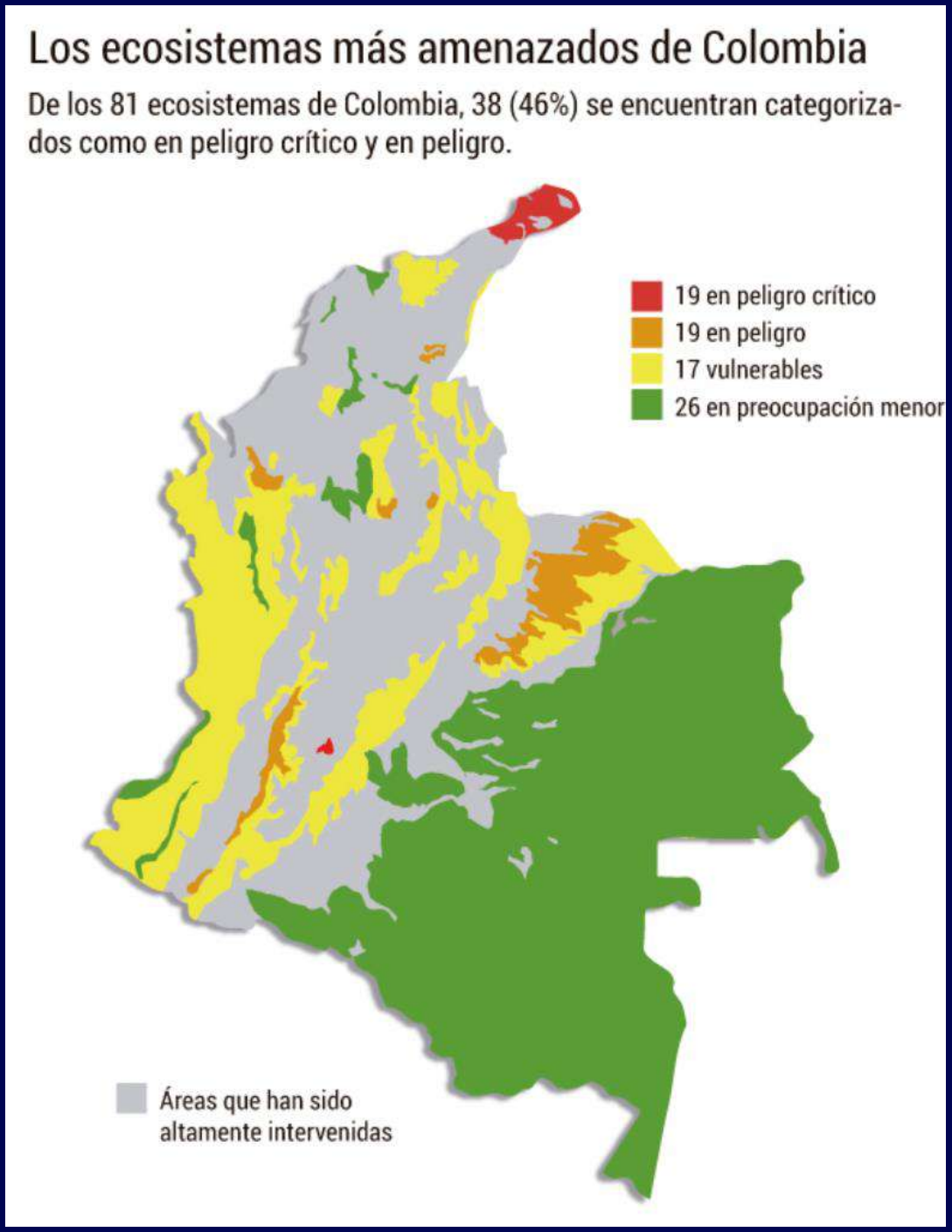

Morales
Piendamó
Silvia
Popayan
Balboa
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

CONCLUSIONS Part II

- The species distribution modelling allowed to determine probability of persistence of suitable environmental conditions in current distribution area by projecting actual ecological niche model to future conditions.

- The significant reduction of habitat suitability was discovered in case *of Magnolia mercedesiarum* in both scenarios, combined with lack of nearby areas with adequate environmental conditions.
-
- Several disjunct sites of high habitat suitability could be identified in 2050 projected data in Colombia, but they seem to be unreachable by this tree species in short time due to dispersal limitations.

- The reduction of habitat suitability and impossibility of distribution area shift could mean imminent species extinction, in case species has low adaptation potential to new environmental conditions.



What could we do to save our planet?

Goal

Reducing 2 degrees by reducing 2.5% GHG emisions per year until we reach the goal

Individuals

Planting a tree
Recycle
Saving Light bulbs
Closing the water tap while brushing
Giving up your car?
Give up to yur steak?

Governments

Use solar and eolic energy
Protect natural areas
Reduce deforestation
Reforestation
Habitat recovery
Stable cattle.

Consorcio para la Conservación de Magnolias del Neotrópico

¡ Una Nueva historia !

Thank you for your attention