

What do we know about ecological interactions of Colombian Magnolias?

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- ✓ Introduction: Classification and conservation priorities
- ✓ Ecology
 - Lowland Forests: *M. katorum* and *M. sambuensis*
- ✓ Ecological interactions
 - Cloud Forests: *M. yarumalensis* and *M. jardinensis*
- ✓ Conclusions



Introduction

Colombia: 37 species (1 new species in prep.)

From 0 to 3000 m altitude
13 species: lowland forests
24 species: Andean forests
Different disturbance levels



Classification of American *Magnolias*

Sections:
Auriculata
Magnolia
Macrophylla
Rytidospermum
Talauma



Sect. Talauma

Subsect. Cubensis

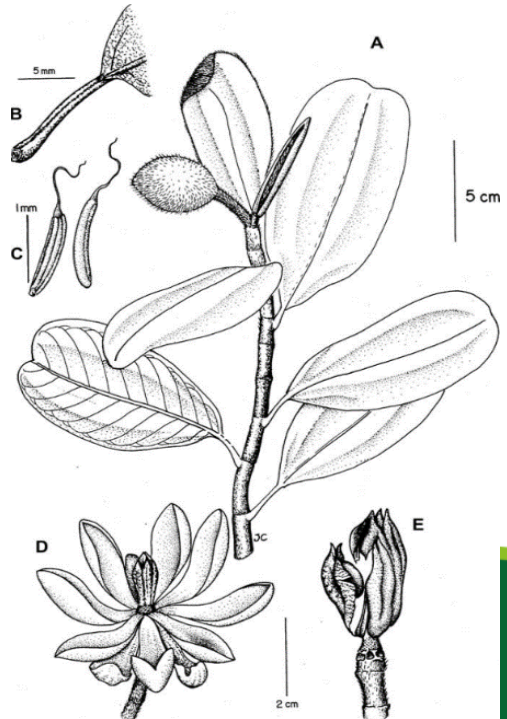
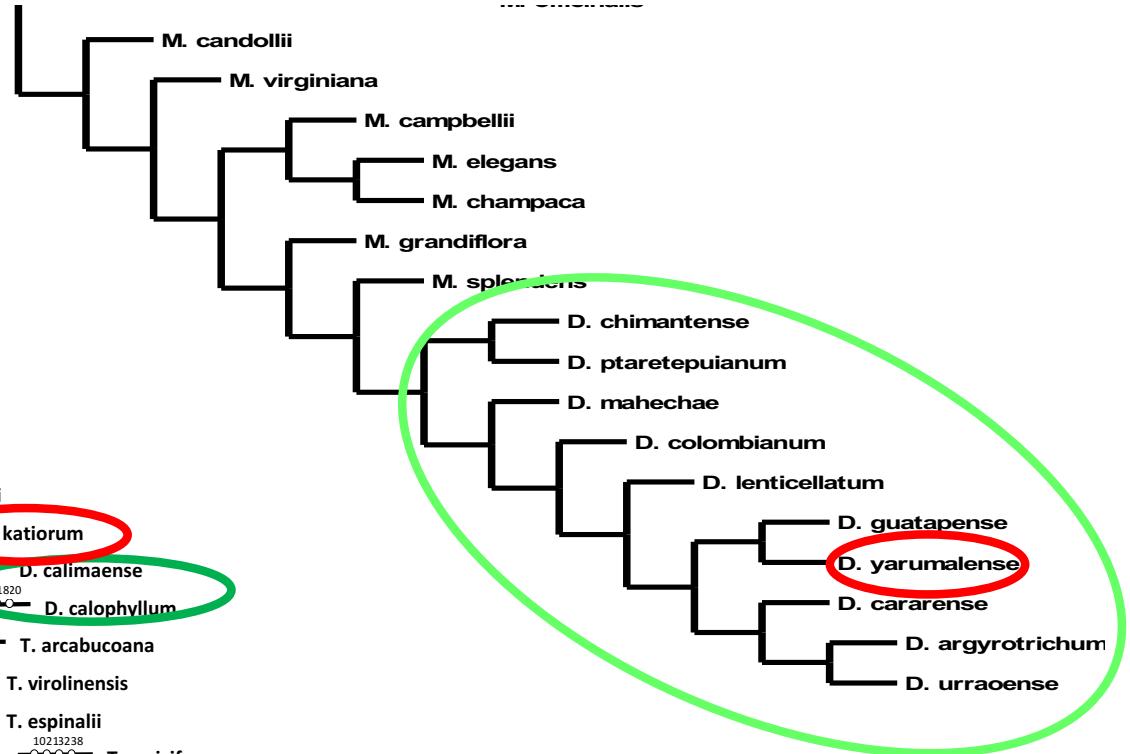
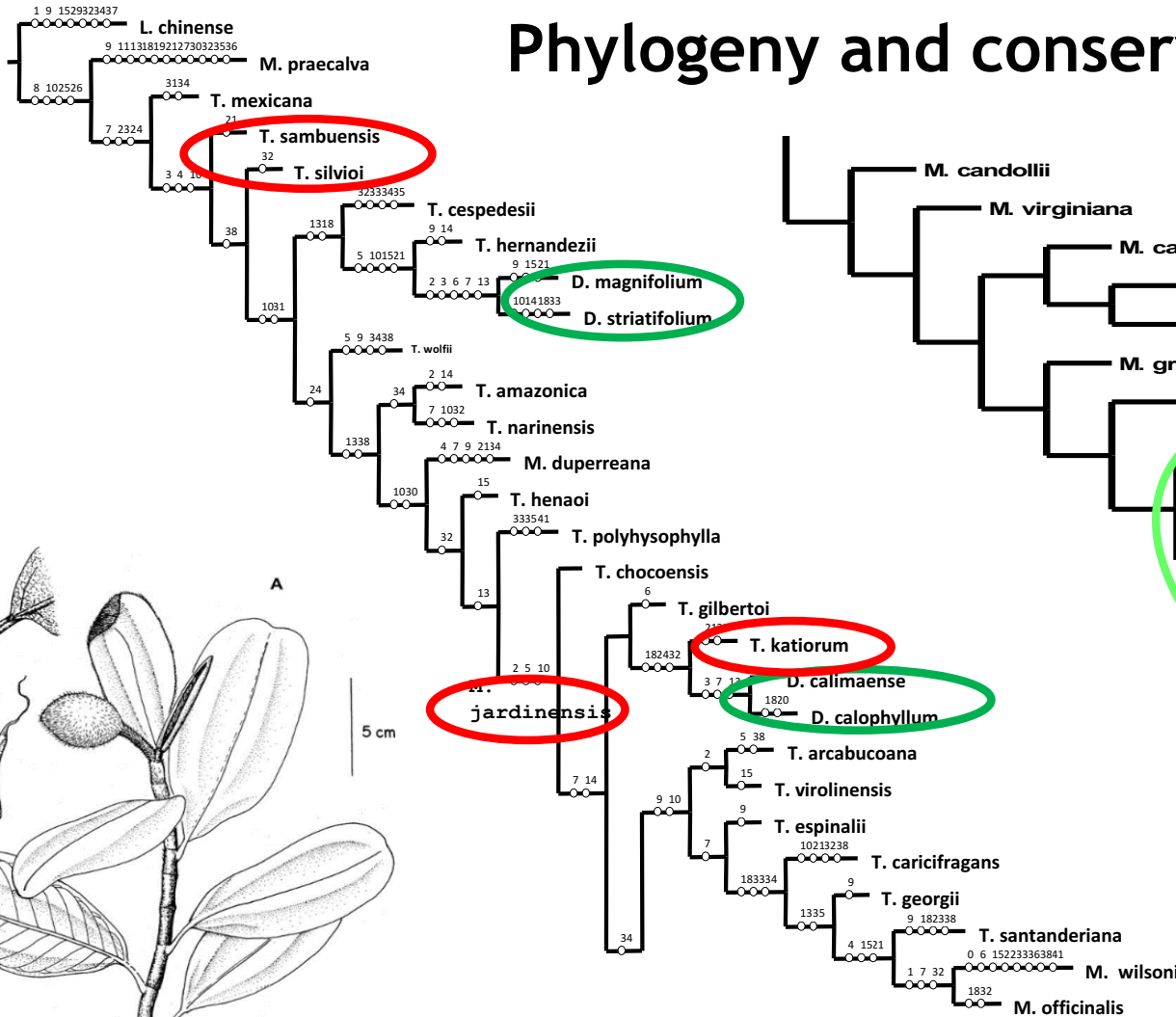


Subsect. Dugandiodendron

Subsect. Talauma



Phylogeny and conservation priorities: PDI



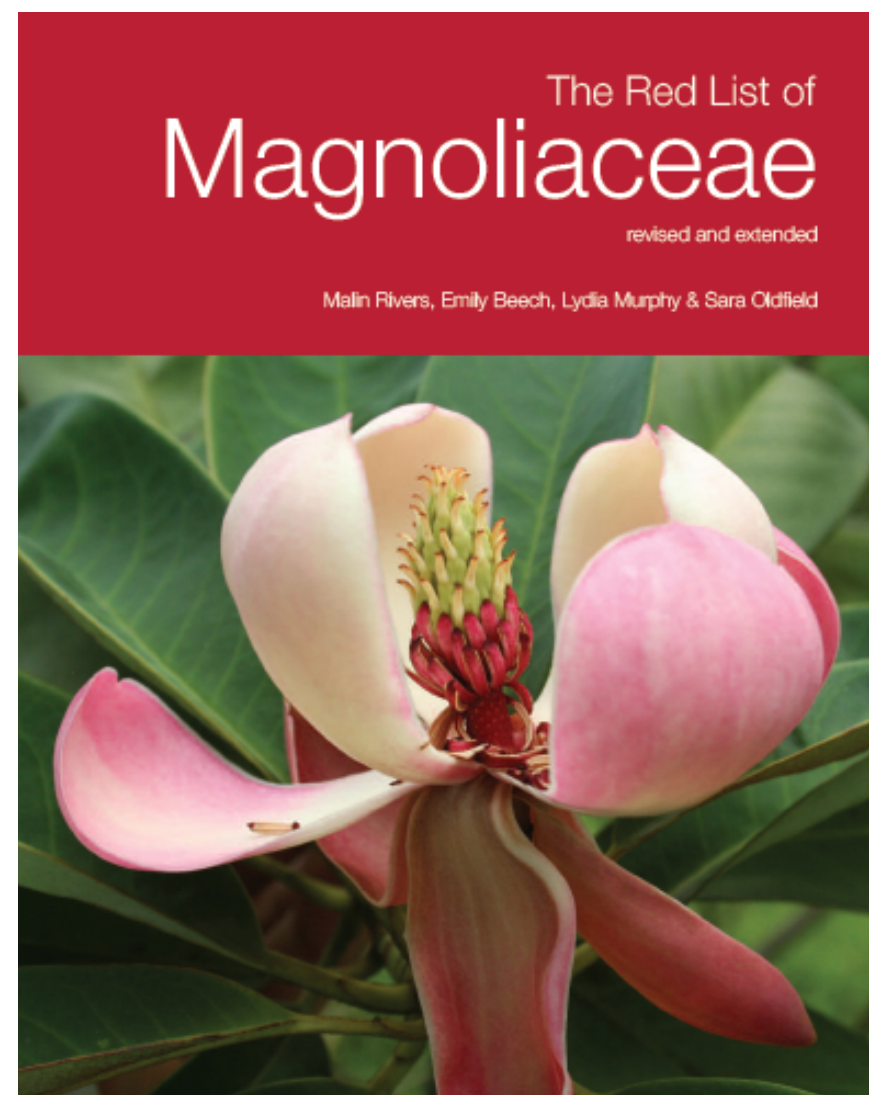
Dugandiodendron: 12 spp
Talauma: 25 spp

Serna, 2005



Conservation status

Category	No. Species
CR	12
EN	20
VU	1
LC	1
DD	2
NE	1
Total	37



Conservation status

- ✓ Rare species
- ✓ Low populations density
- ✓ Low populations size



Conservation status

✓ Overexploitation

✓ Habitat fragmentation

✓ What about specific requirements?



The case of two lowland species

Gradient from well preserved to highly disturbed forests, 0-600 m altitude and 4000 mm precipitation



The case of two lowland species

Are they living in the same type of community?

Magnolia sambuensis



Magnolia katorum



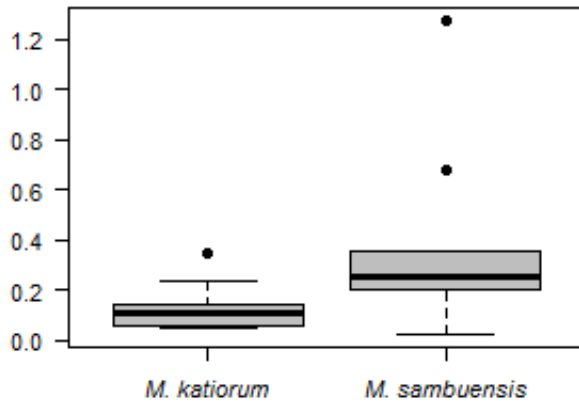
The case of two lowland species: *M. katiorum*, *M. sambuensis*

Forests highly disturbed. Some remnants with a high species richness

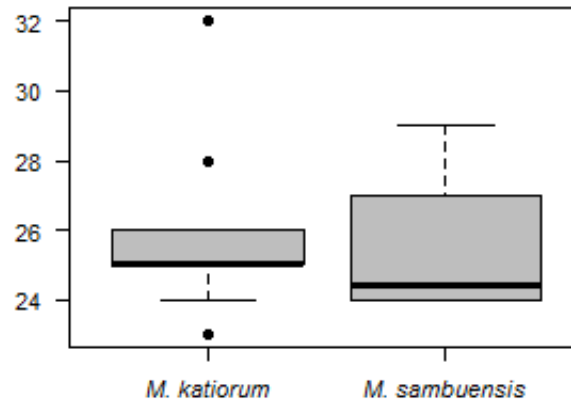


The case of two lowland species: *M. katorum*, *M. sambuensis*

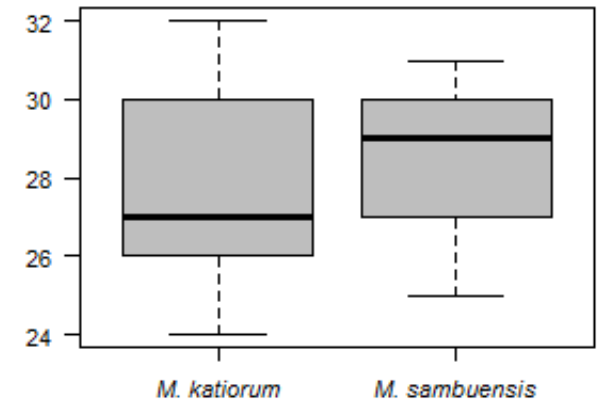
Basal Area (m²/ha)



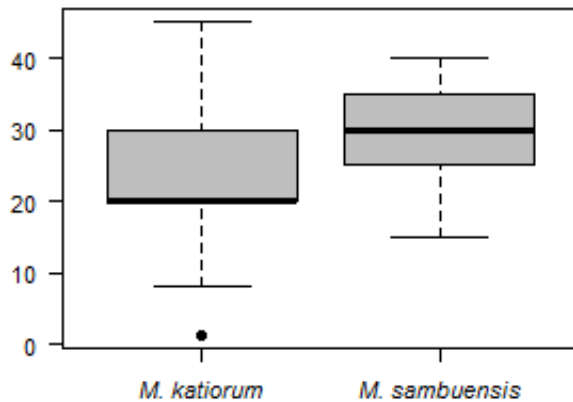
Soil Temperature (°C)



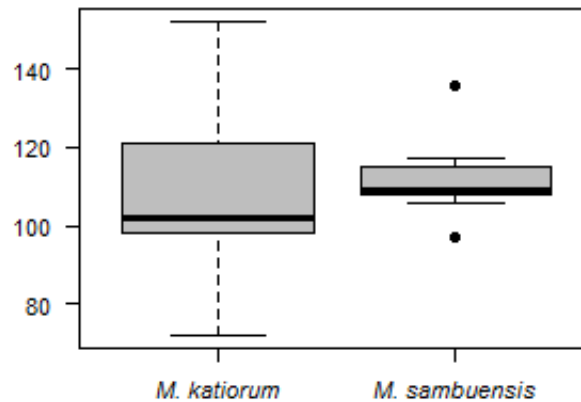
Air Temperature (°C)



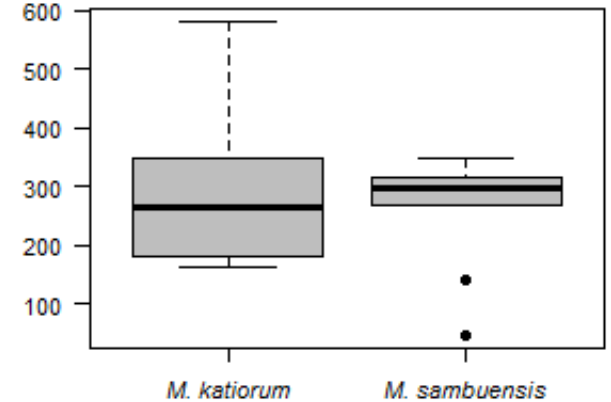
Tree Height (m)



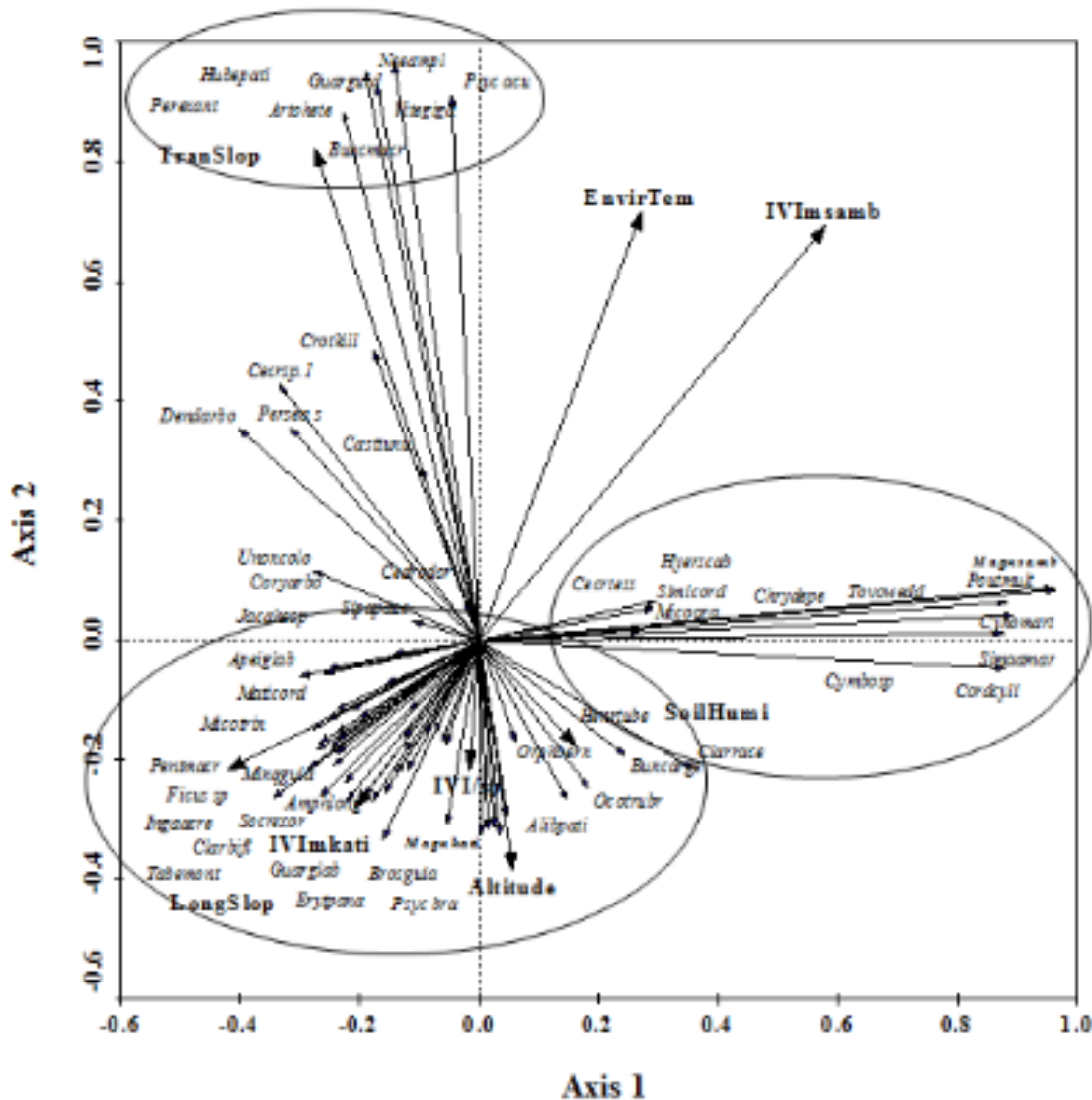
Soil Humidity (%)



Altitude (m.a.l.s.)



The case of two lowland species: *M. katorum*, *M. sambuensis*



M. katorum: related to the altitude and more preserved forests.

M. sambuensis: associated to the environmental temperature and more disturbed forests.

The case of two lowland species

M. sambuensis



M. katorum



What about ecological interactions?

The role of two ecological interactions in the vulnerability to the extinction of two *Magnolia* species

Ecology Letters, (2008) 11: 296–310

doi: 10.1111/j.1461-0248.2007.01139.x

REVIEW AND SYNTHESIS

The unseen majority: soil microbes as drivers of plant diversity and productivity in terrestrial ecosystems

Annals of Botany 104: 543–556, 2009

doi:10.1093/aob/mcp025, available online at www.aob.oxfordjournals.org

REVIEW

ANNALS OF
BOTANY
Founded 1887

Terrestrial orchid conservation in the age of extinction

Nigel D. Swarts^{1*} and Kingsley W. Dixon^{1,2}

Cloud forests: Ecological interactions (2400 m altitude)

M. yarumalensis

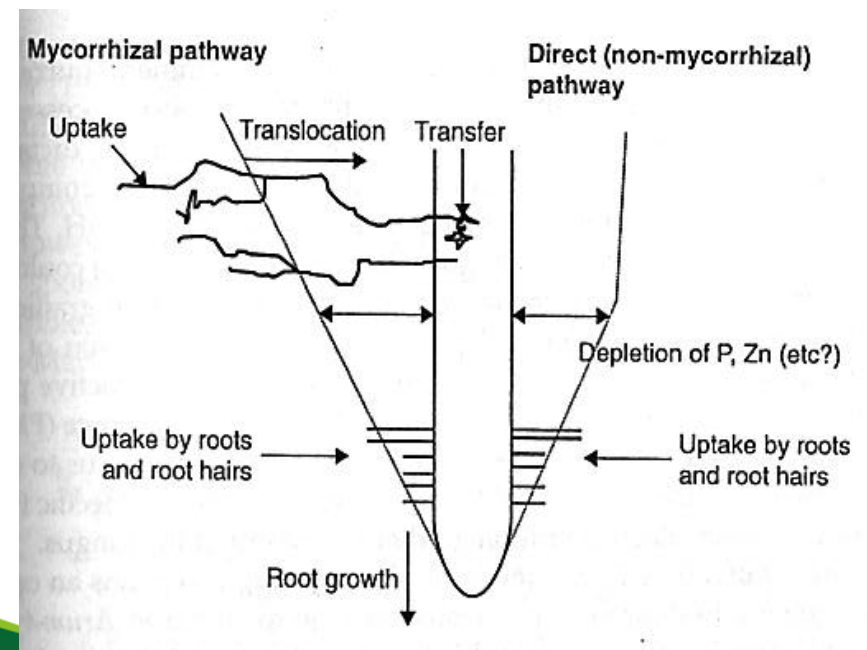


M. jardinensis



Ecological interactions: Mycorrhizal associations

pH	M.O	Al	Ca	Mg	K	CICE	P	Fe	Mn	Cu	Zn	B
	%	meq/100 gr suelo					ppm					
3,9	51,8	7	0,7	3,7	0,7	12,1	17	237	15	4	13	
4,1	31,6	10	0,8	4,1	0,4	12,7	7	735	11	2	11	4,9
4,4	24,4	6,1	3,4	3	0,4	12,9	6	6,3	37	6	50	4,9
5,1	15,1	0,8	9,8	8,8	0,3	19,7	4	69	95	2	9	1,5
4,7	19,7	3,4	7,8	1,6	0,5	13,3	9	341	81	7	6	1,6



Ecological interactions: Mycorrhizal associations

Obligated relationship with mycorrhiza:

L. tulipifera, *M. cylindrica*, *M. henryi*, *M. portoricensis*,
M. stellata.

Not obligated relationship: *M. ovata* (Brazil)

M. stellata: negative response to a commercial inoculum

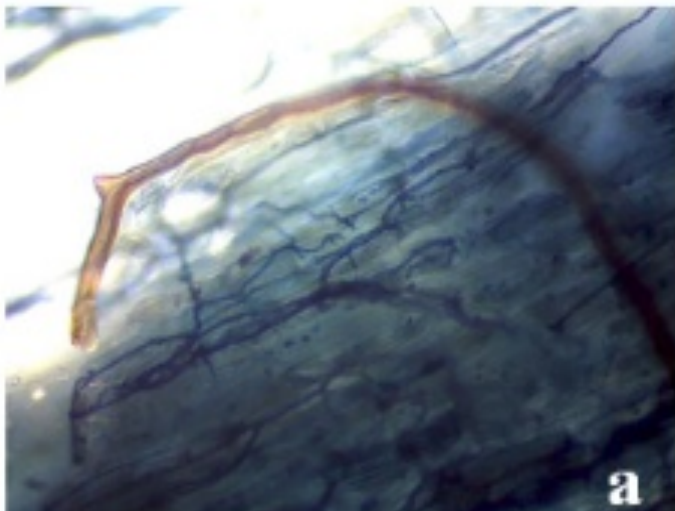


Ecological interactions: Mycorrhizal associations

Vesicicle Arbuscular Mycorrhizae (VAM)

Dark Septate Endophytes (DSE)

M. yarumalensis: a. Hyphae VAM, DSE 10X, b. Vesicicle 40X, c. Spore 40X



Ecological interactions: pollinators

M. Grandiflora (U.S.): 10 species of pollinators
M. taulipana, *M. schiedeana* (Mexico): 2 spp.

M. jardinensis



M. yarumalensis



Ecological Interactions: mutualism

Pollinator *M. yarumalensis*: Coleoptera



Ecological Interactions: mutualism

Pollinator *M. jardinensis*: *Cyclocephala*



Ecological interactions: pollinators?

M. Jardinensis 4:00 pm



Ecological interactions: depredation

Pyralidae, Lepidoptera
Larvae eating the stigmas



Conclusions and perspectives

- ✓ Taxonomy of colombian *Magnolias* is clear
- ✓ Priorities of conservation established (Phylogenetic Diversity Index: Urabá region)
- ✓ Ecological interactions could be a key aspect to conserve *Magnolia* species



Conclusions and perspectives

- ✓ Self compatibility experiments
- ✓ Floral scents
- ✓ Insects: behavior and identification
- ✓ Identification of mychorrizeae species



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(This list is too long!)

Thank you!

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