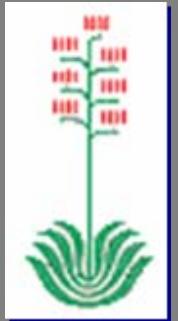


Taxonomy and Distribution of *Opuntia* and Related Genera

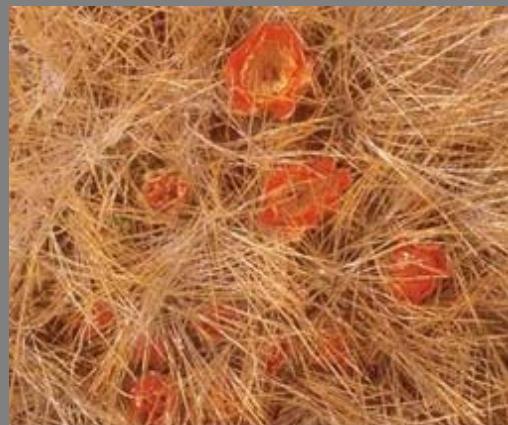
Raul Puente
Desert Botanical Garden

Donald Pinkava
Arizona State University



Subfamily Opuntioideae

- ◆ Ca. 350 spp.
- ◆ 13-18 genera
- ◆ Very wide distribution (Canada to Patagonia)

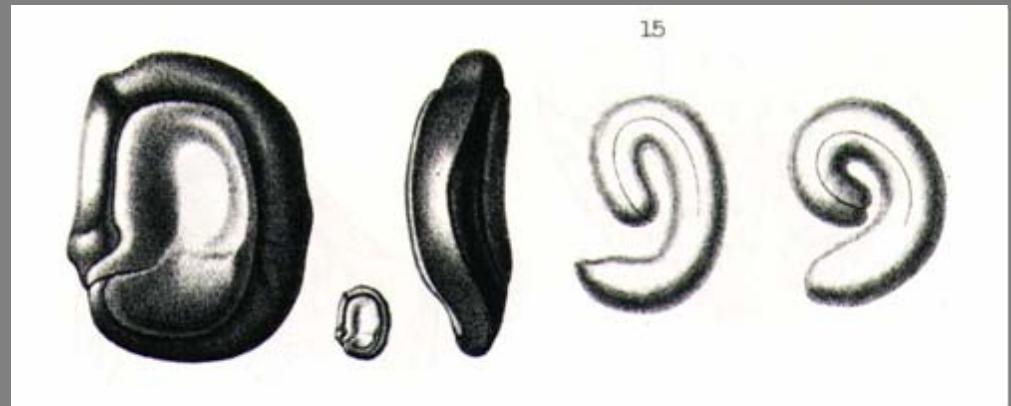


Morphological consistency

- ◆ Glochids



- ◆ Bony arils



Generic Boundaries

Britton and Rose, 1919

-- Seven genera

- ◆ *Grusonia*
- ◆ ***Maihuenia***
- ◆ *Nopalea*
- ◆ *Opuntia*
- ◆ *Pereskiopsis*
- ◆ *Pterocactus*
- ◆ *Tacinga*

Anderson, 2001

-- 15 genera

- ◆ *Austrocylindropuntia*
- ◆ *Brasiliopuntia*
- ◆ *Consolea*
- ◆ *Cumulopuntia*
- ◆ *Cylindropuntia*
- ◆ *Grusonia*
- ◆ *Maihueniopsis*
- ◆ *Miqueliopuntia*
- ◆ *Opuntia*
- ◆ *Nopalea*
- ◆ *Pereskiopsis*
- ◆ *Pterocactus*
- ◆ *Quiabentia*
- ◆ *Tacinga*
- ◆ *Tephrocactus*
- ◆ *Tunilla*

Hunt, 2006

--18 genera

- ◆ *Austrocylindropuntia*
- ◆ ***Brasiliopuntia***
- ◆ *Consolea*
- ◆ *Cumulopuntia*
- ◆ *Cylindropuntia*
- ◆ *Grusonia*
- ◆ ***Corynopuntia***
- ◆ ***Micropuntia***
- ◆ *Maihueniopsis*
- ◆ *Miqueliopuntia*
- ◆ *Opuntia*
- ◆ *Nopalea*
- ◆ *Pereskiopsis*
- ◆ *Pterocactus*
- ◆ *Quiabentia*
- ◆ *Tacinga*
- ◆ *Tephrocactus*
- ◆ *Tunilla*

Classification:

Family: Cactaceae

Subfamily: Maihuenioideae
Pereskioideae
Cactoideae
Opuntioideae

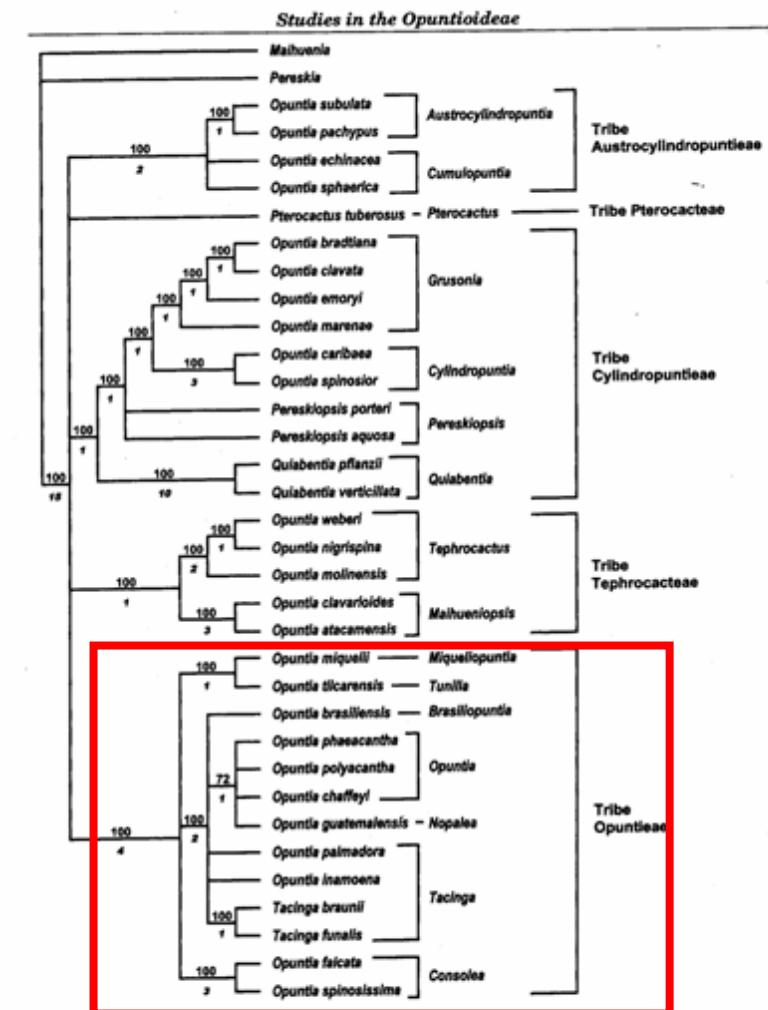
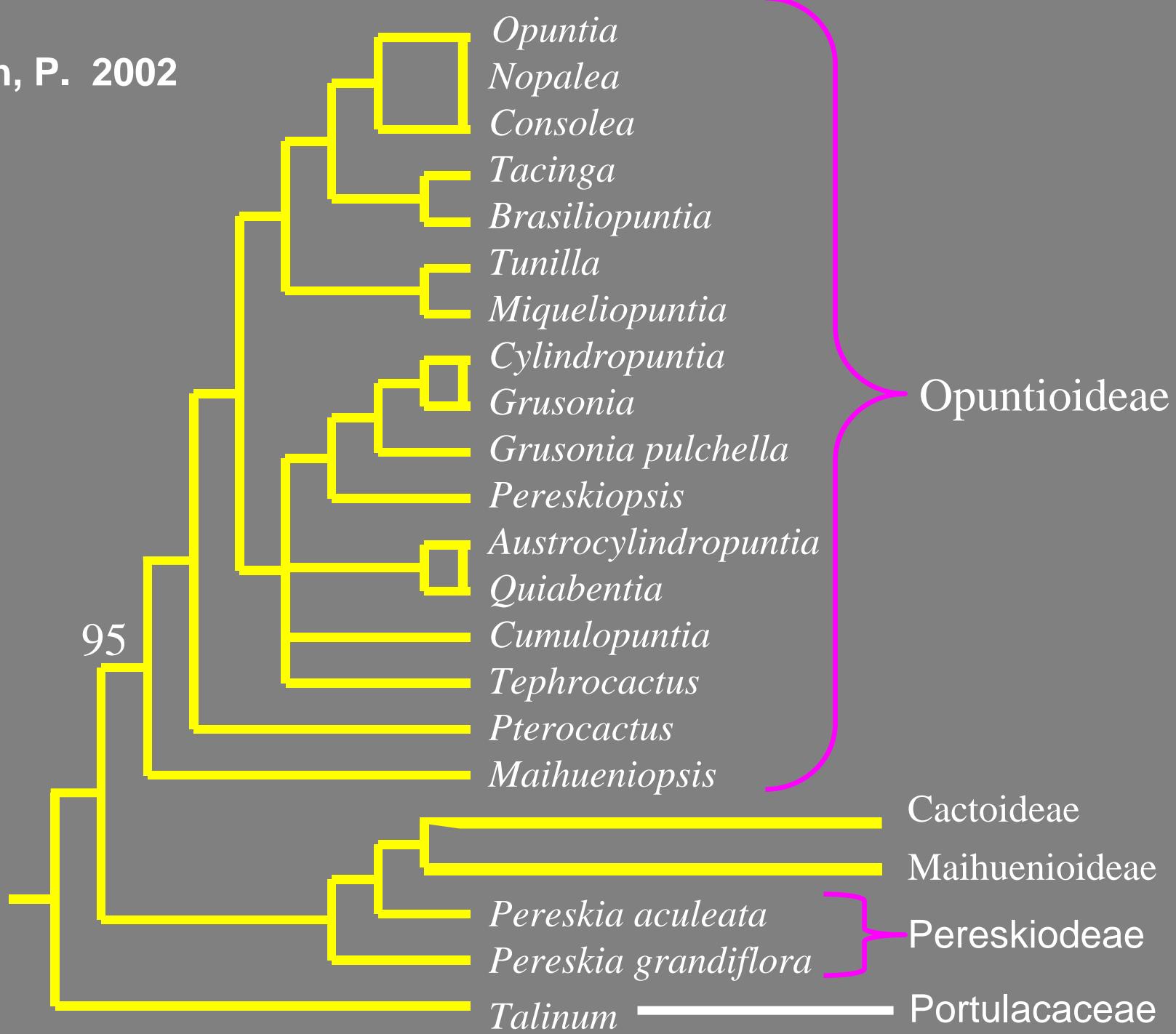


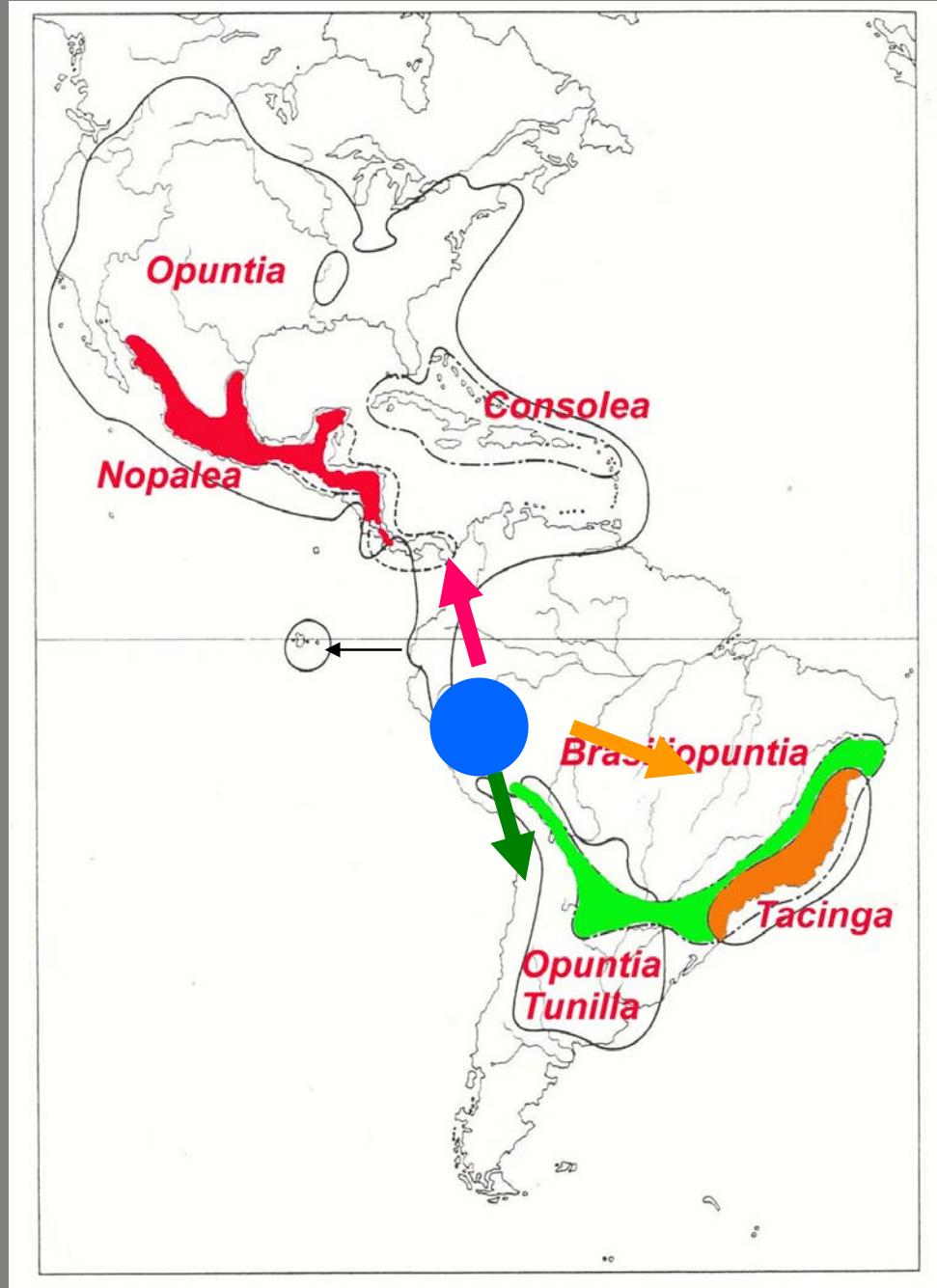
Figure 1. Majority rule consensus tree of 32,700 equally parsimonious trees for subfamily Opuntioideae based on comparative sequencing of *rpl16* intron sequences. CI = 0.802, RI = 0.799. Numbers above the branches are bootstrap replicate percentages; number below branch is the decay value. Consensus tree is rooted with *Pereskia* and *Maihuenia*. (Figure modified from Dickie 1997.)

Griffith, P. 2002
nrITS

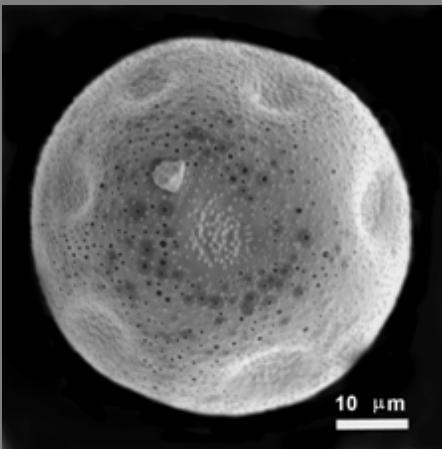


Origin and Dispersal

Andean Region
(Wallace and Dickie, 2002)



Cylindropuntia



Cylindropuntia tesajo

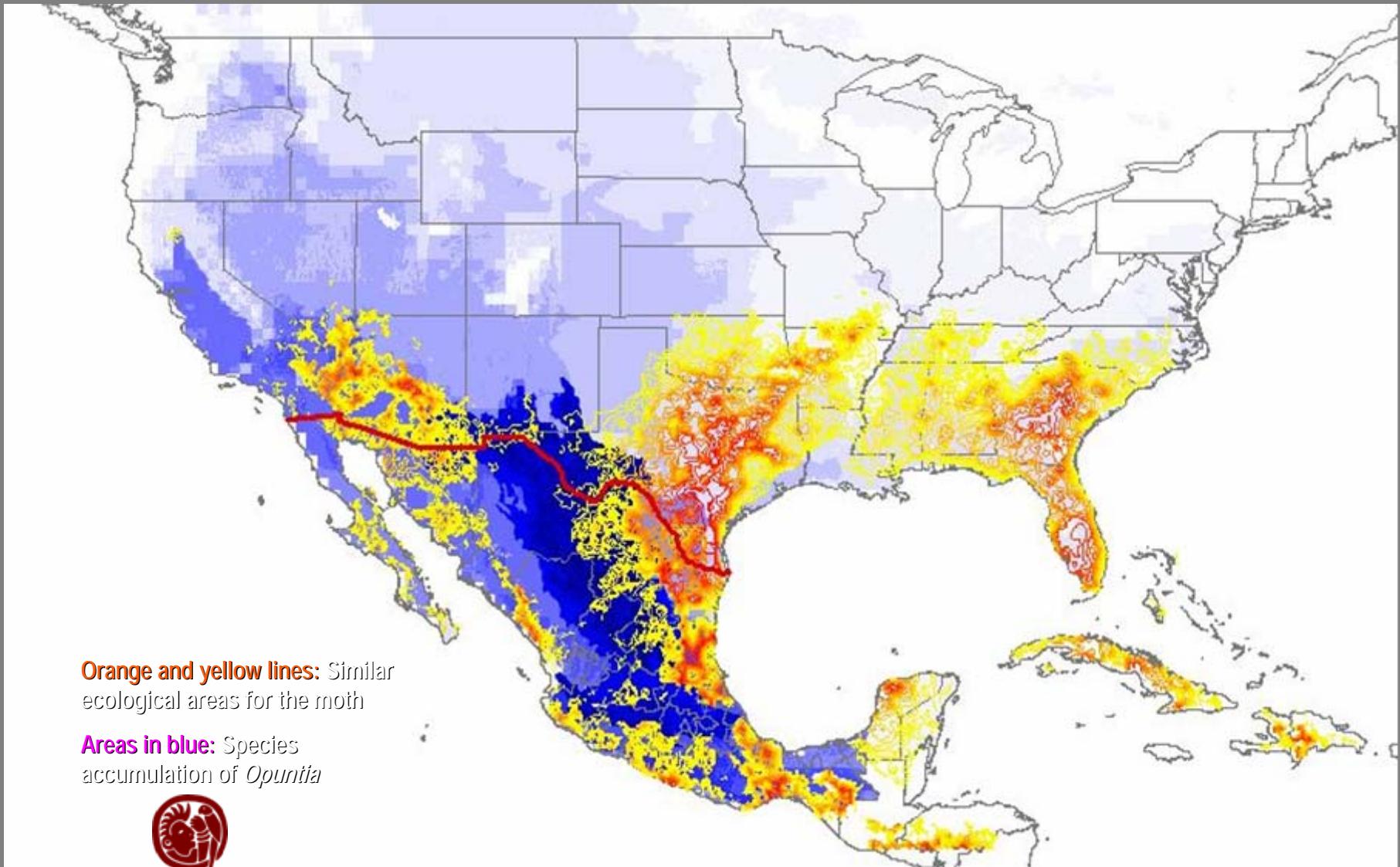


Cylindropuntia thurberi
(Engelmann) F. M. Knuth



Cylindropuntia cholla (Weber) F. M. Knuth

Potential overlapping areas between the *Opuntia* and the moth, *Cactoblastis cactorum*, in North America



Consolea Lemaire



Caribbean Region and Florida
9 species

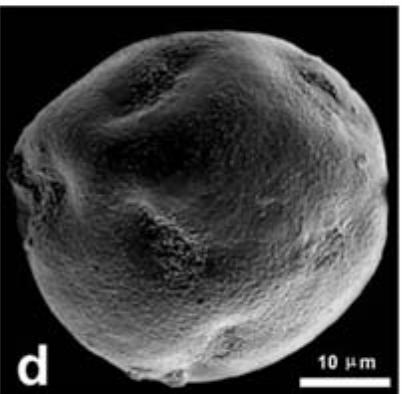


Consolea corallicola Small

Florida Keys

Endangered

Genus *Nopalea* Salm-Dyck

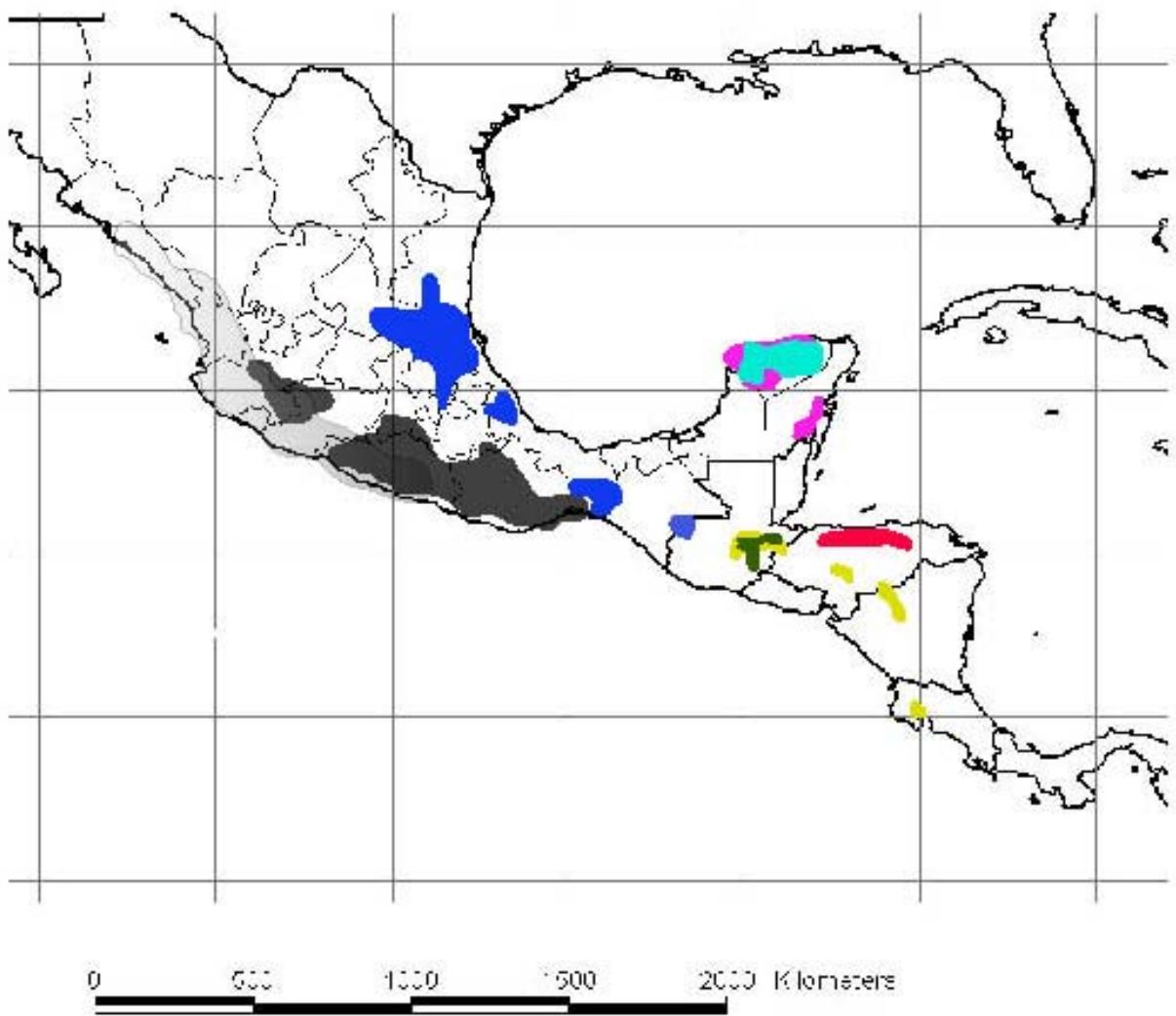


***Nopalea cochenillifera* (L.) Salm-Dyck**



Near Valles, San Luis Potosi, Mexico.

Distribution of *Nopalea* spp

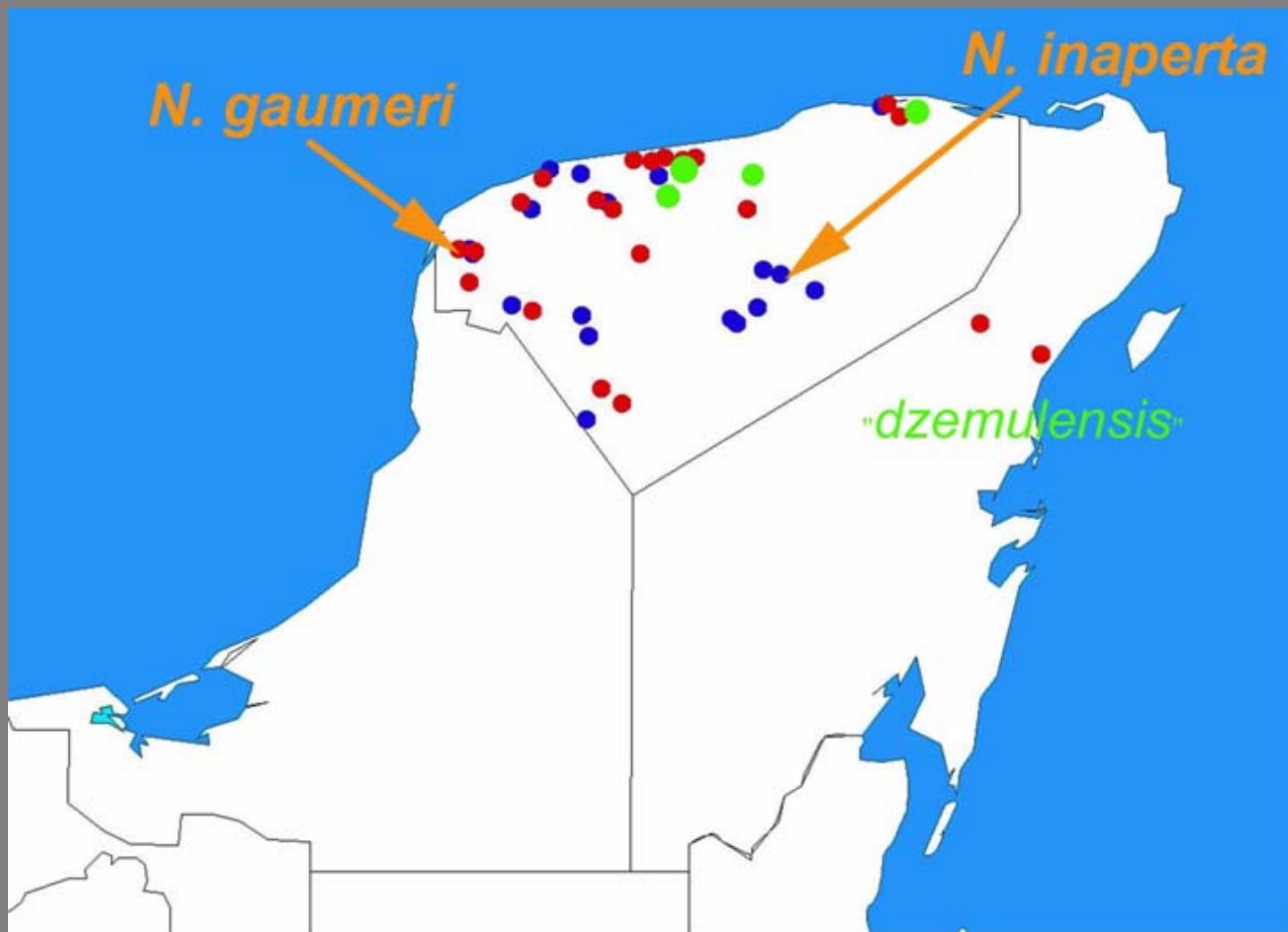


Nopalea gaumeri Rose

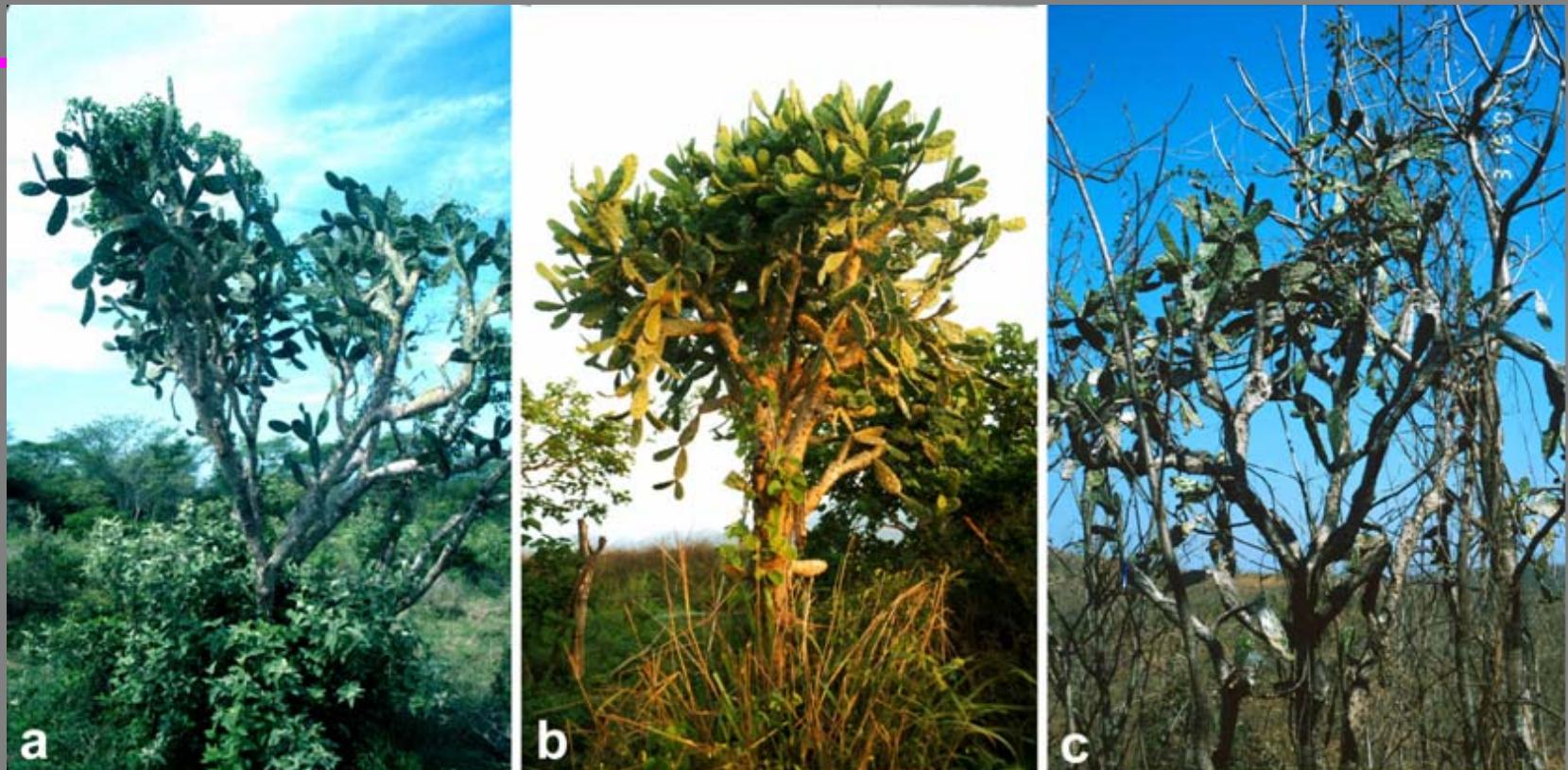


Yucatan Peninsula

Nopalea spp in the Yucatan Peninsula



Nopalea dejuncta Salm-Dyck



- a. Valles, San Luis Potosi, Mexico
- b. Sierra Soconusco, Chiapas
- c. Nenton, Guatemala

Nopalea lutea Rose



Guatemala to Costa Rica

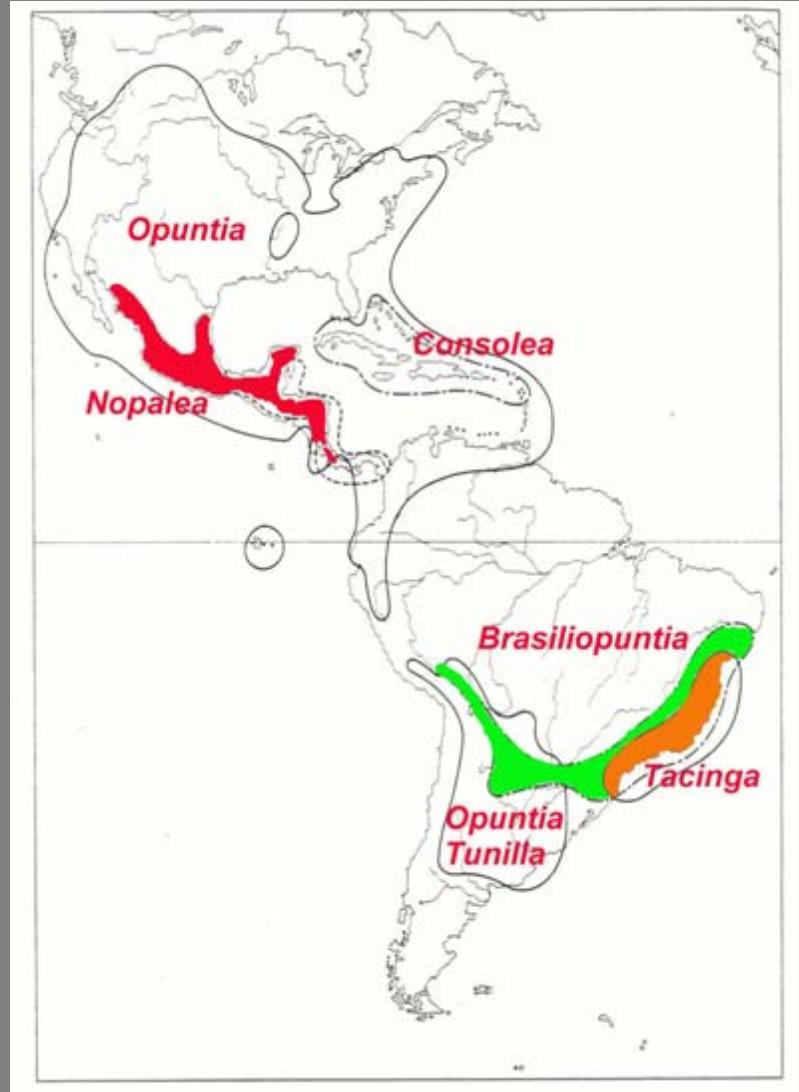
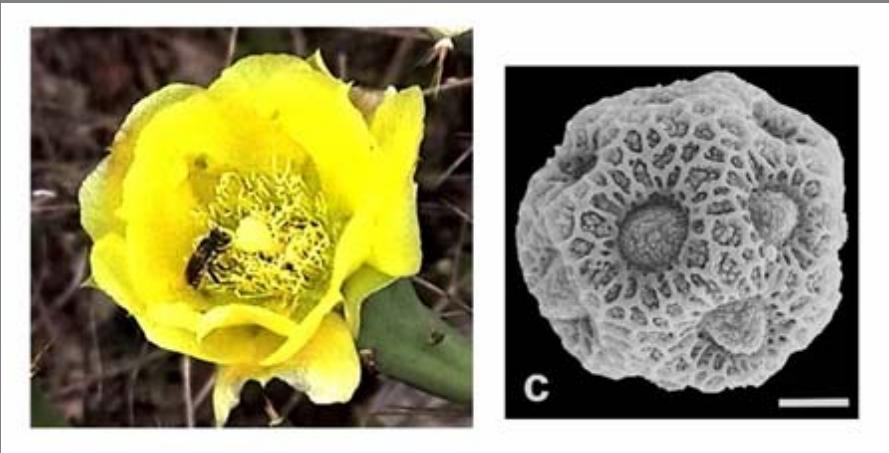
Nopalea hondurensis (P.C. Standley) R. Puente



Honduras

Opuntia (L.) Miller

About 80-120 species



Opuntia engelmannii Salm-Dyck



var. engelmannii



var. lindheimeri



var. linguiformis



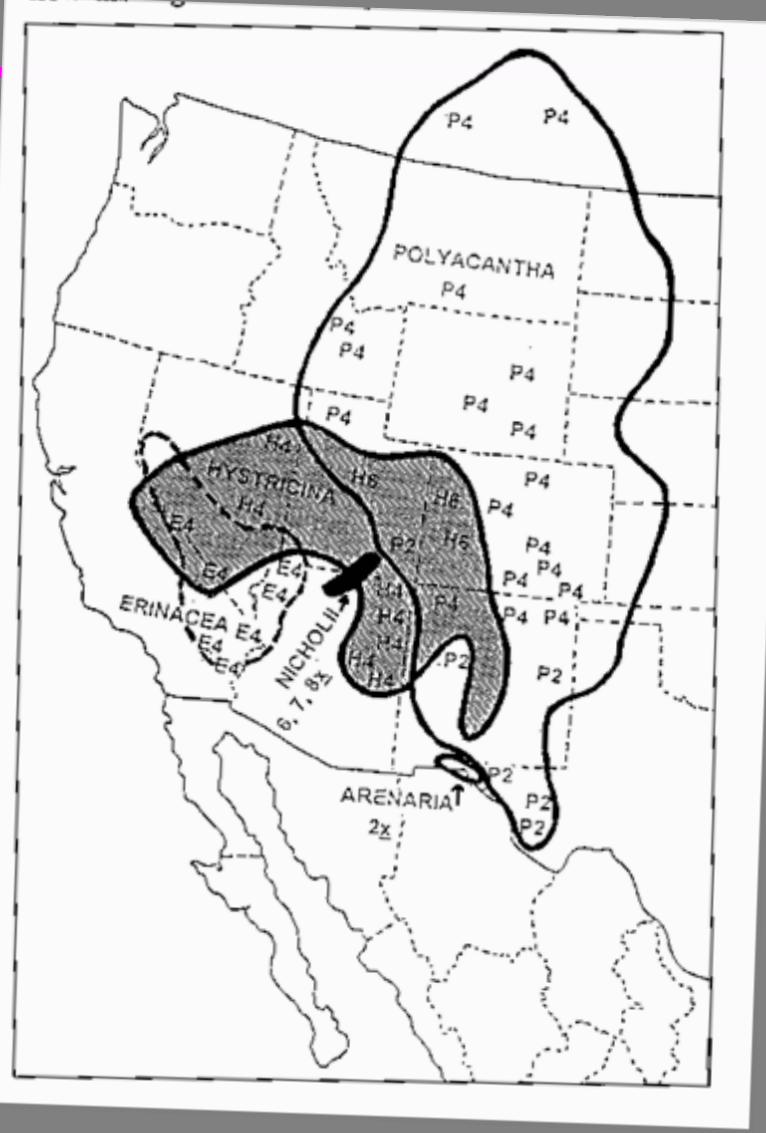
Opuntia rastrera Weber

Opuntia engelmannii

- a. var. *engelmannii* 66
- b. var. *lindheimeri* 66
- c. var. *linguiformis* 66
- d. var. *flavispina* 66
- e. var. *flexispina*?
var. *cuija* 22
var. *rastrera*?



Opuntia polyacantha



polyacantha
erinaceae
nichollii
histricina

Southwest US:



Opuntia basilaris
AZ and CA.



Opuntia gosseliniana
Arizona and Sonora, Mexico



Opuntia oricola
California



Opuntia santa-rita
Arizona

Opuntia streptacantha
“Nopal Cardon”

Central Mexico





Opuntia pilifera
Puebla and Oaxaca
Mexico





Tuna Reyna
O. ficus-indica
San Luis Potosí



Opuntia stricta
(*O. dillenii*)
(*O. inermis*)

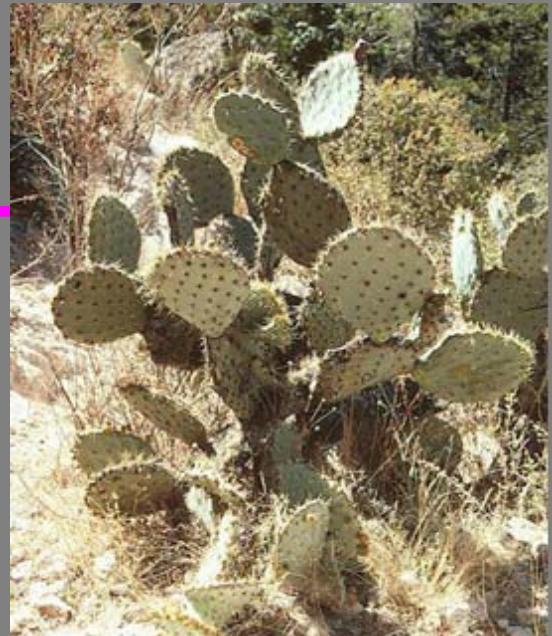


Sisal, Yucatan



Opuntia stricta
Santa Clara, Yucatan

Opuntia robusta Wendland



Sonora and Chihuahua
To Hidalgo

Opuntia puberula Pfeiffer



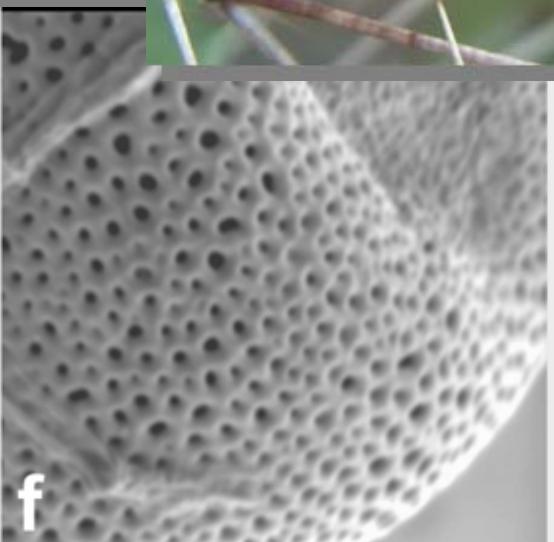
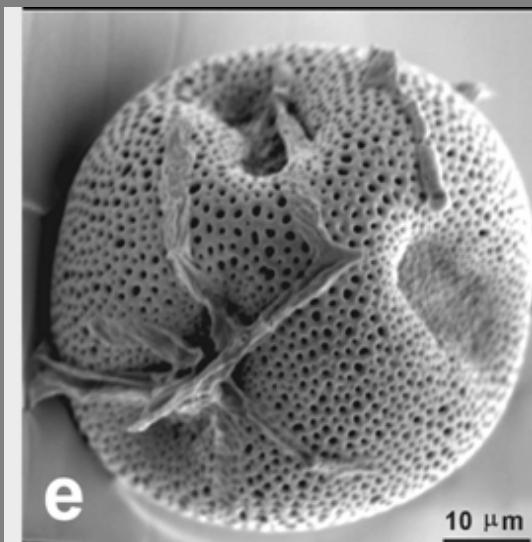
Sonora, Mexico to Costa Rica

Opuntia stenopetala Engelm.



Mexico: Coahuila to Hidalgo
and Queretaro

- Male or female flower (dioecious)
- Pollen 6-periporate



O. megarhiza Rose



San Luis Potosi

Endangered



Opuntia sulphurea G. Don

Northern Argentina



Tacinga Britton & Rose

6 species

Eastern Brazil



T. palmadora (Britton & Rose)
Stuppy & N. P. Taylor

T. funalis
Britton & Rose

Brasiliopuntia (K. Schumann) A. Berger

1 species



Brasiliopuntia brasiliensis (Willd.) Berger

Tunilla Hunt & Illif

9 species

Peru, Chile to Argentina



Tunilla corrugata (Salm-Dyck) Hunt & Illif



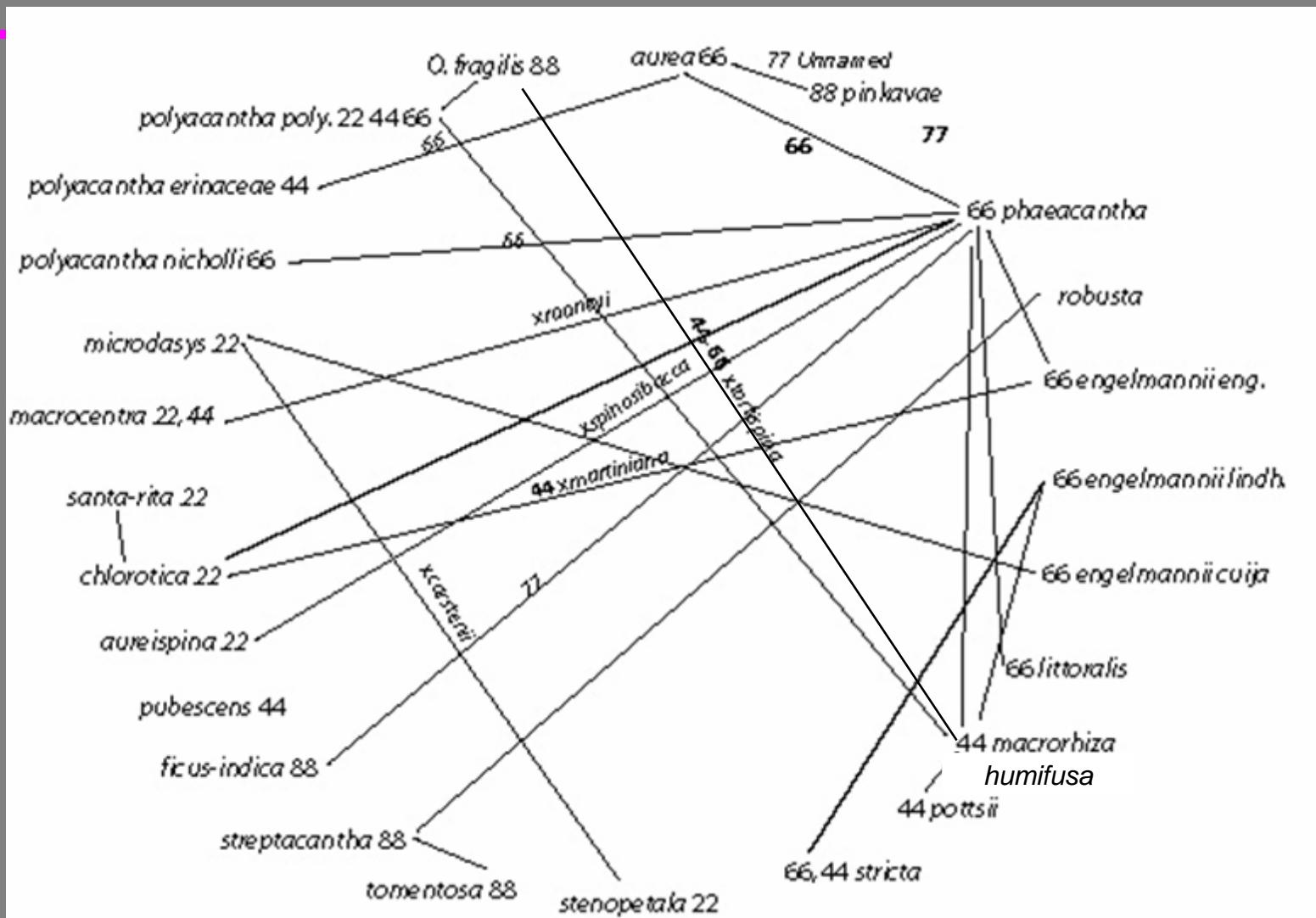
Tunilla soherensisii (Britton & Rose)
Hunt & Illif

Hybrids:

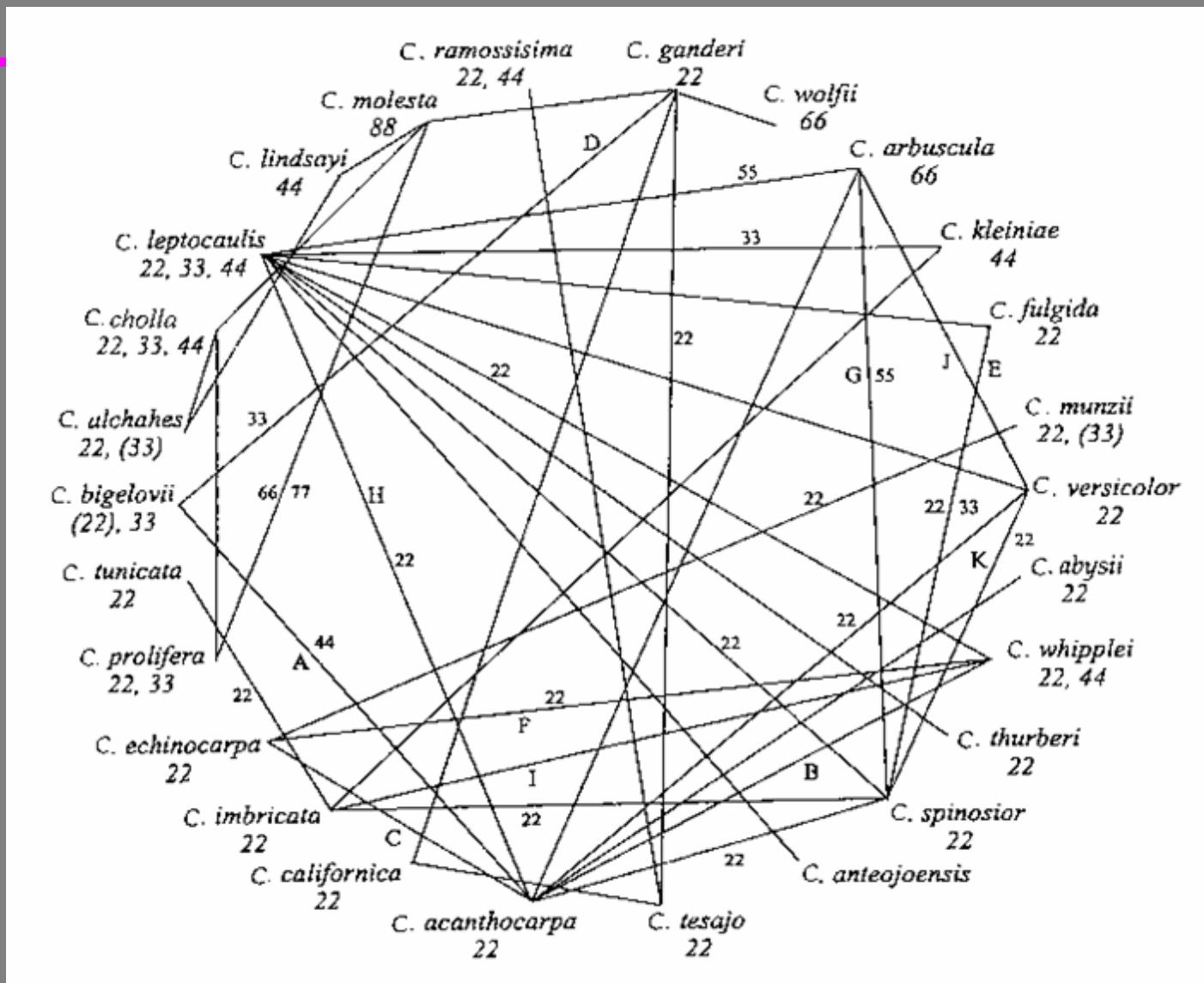


Opuntia xandersoni
(O. engelmanni var. cuija x
O. microdasys)

Putative Interspecific Hybridization in *Opuntia* spp



Putative Interspecific Hybridization in *Cylindropuntia* spp



Hybridization: Intergeneric Hybrids



Opuntia xacaulis
Haiti

(*Consolea nashii* x *Opuntia stricta*)

Opuntia stricta x *Nopalea dejuncta*

Summary:

- Numerous taxa are still poorly known as far as distribution, delimitation, ploidy level, etc.
- Several species complexes still require more study into their genetic relations.
- Taxa immune to *Cactoblastis* may provide a methodology to prevent damage to susceptible species
- Species found along tropical and semi-tropical regions may be more susceptible.
- *Nopalea*, *Consolea* and *Opuntia* appear to be the most susceptible genera.
-



