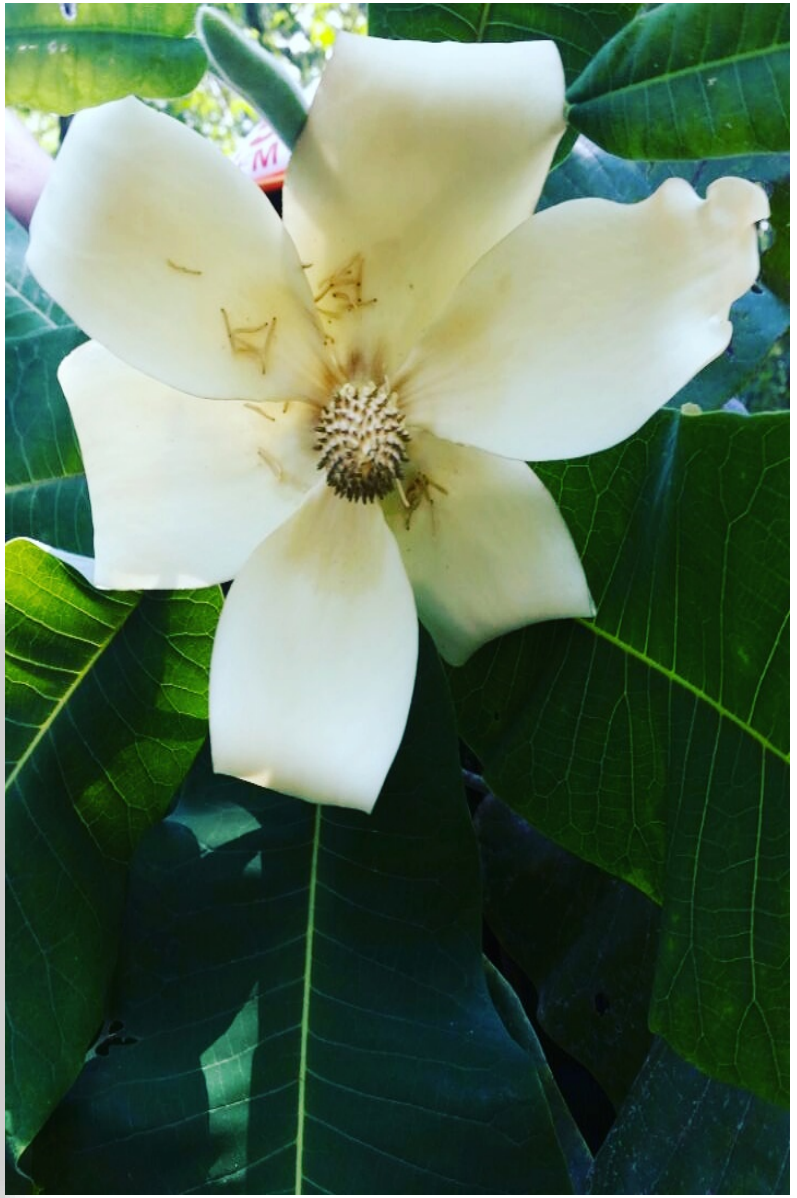
Impact of the extraction of flowers in viability population of *Magnolia dealbata* Zucc.

Reyna Domínguez-Yescas
J. Antonio Vázquez-García
Dánae Cabrera-Toledo
Eduardo Salcedo Pérez
Miguel Ángel Muñiz Castro
Gerardo Hernández-Vera

Importance of Magnolia dealbata (biological, economic, cultural, scientific, medicinal).

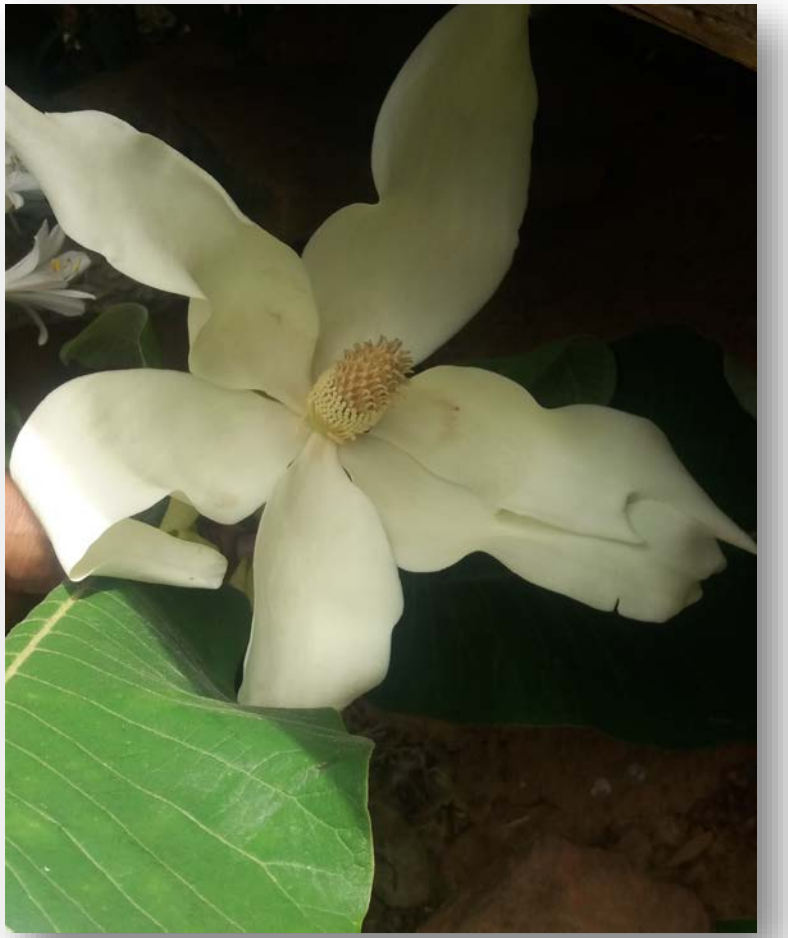


Threats to *Magnolia dealbata*

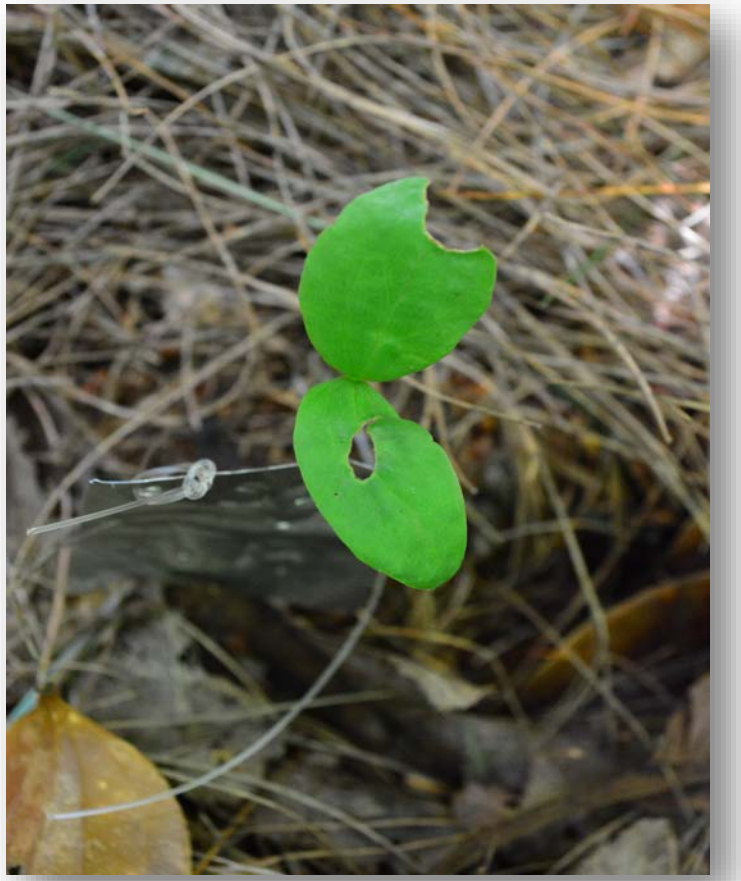
Road construction

Extraction of flowers

- Conservation and management strategies for threatened species are based to a large extent on knowledge of the dynamics of the populations and their viability.



- Matrix demographic models have proven to be a good tool, providing the necessary information to understand and analyze the population dynamics of an organism.



(Boyce 1992; Beissinger y Westphal 1998; Fiedler y Kareiva 1998; Caswell 2001, Pico 2002, López 2013; Vázquez 2015)

INVESTIGATION QUESTIONS

- Are the demographic attributes different in three populations of *Magnolia dealbata* under different history of flower extraction?

- What age categories are impacted or can be more compromised by the use?

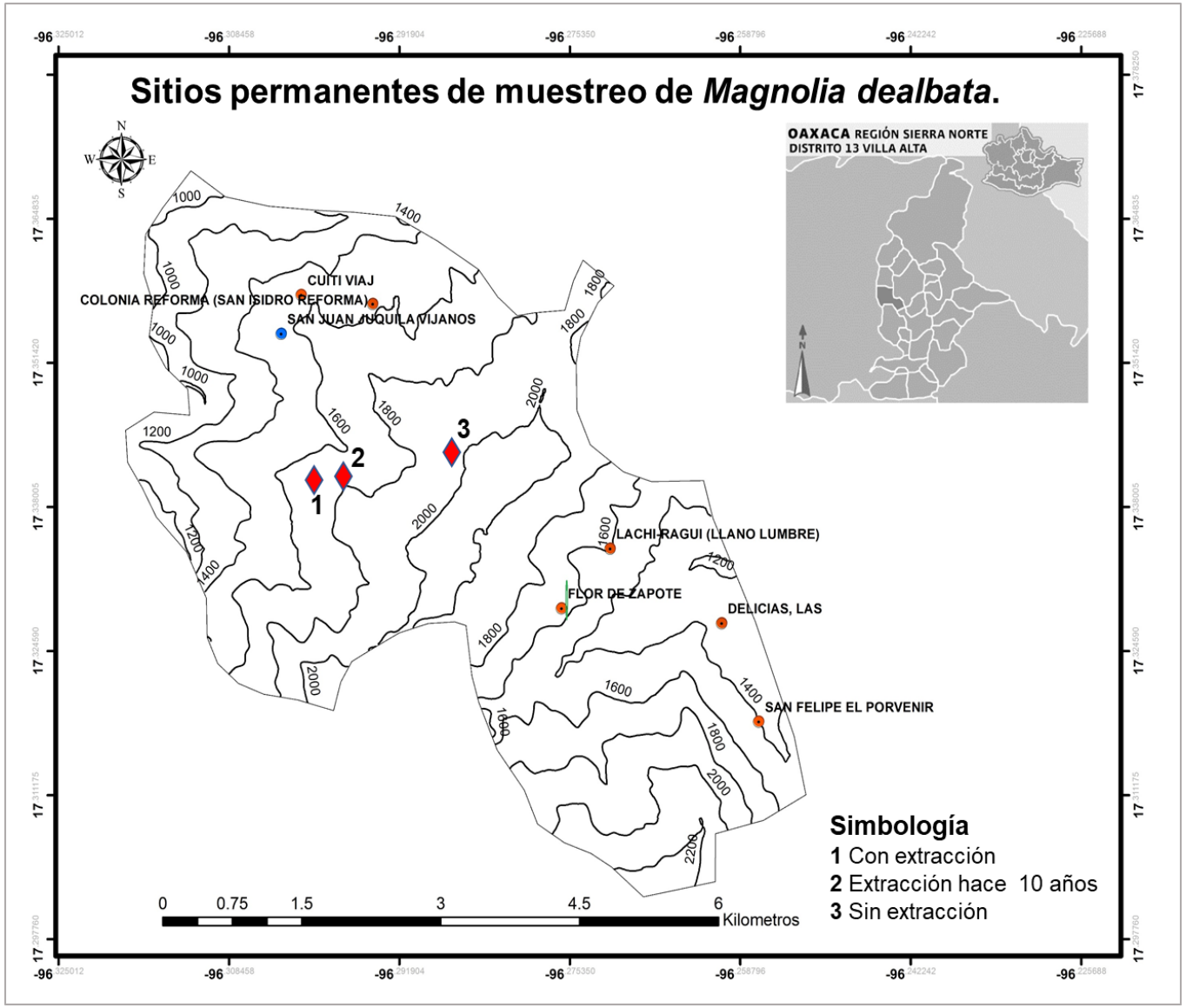
HYPOTHESIS

- The population growth rate is expected to be lower at the site with current flower extraction.

SPECIFIC GOAL

- Estimate and compare the demographic attributes of three populations of *Magnolia dealbata* under different history of flower extraction in San Juan Juquila Vijanos Villa Alta, Oaxaca, México.

Materials and methods
Study area



- Establishment of three permanent sites of 0.2 ha with different history of flower extraction.

SITE	COOR_X	COOR_Y	ALTITUDE
Current extraction (1)	787041	1919211	1669
Extraction 10 years ago (2)	787301	1919263	1672
Without Extraction (3)	788270	1919459	1962

FIELD WORK

- Location, measurement and labeling with aluminum labels of all individuals of *Magnolia dealbata*.
- Qualitative evaluation of the state of each individual (healthy, damaged, broken, or dead).
- Monitoring of 2 years (2017-2018, 2018-2019).
- Count of flowers and fruits in reproductive individuals.

CATEGORY	TYPE OF CATEGORY	CATEGORY SIZE (cm)
S1	Seedlings	<40 ht
S2	Large seedlings	>41 – 134 ht
S3	Juveniles	1 – 3.1 dbh
S4	Adults 1	3.2-10.1 dbh
S5	Adults 2	>10.2 dbh

ANALYSIS OF DATA

1) In Excel, a population transition matrix was built (2017-2018).

2) It was analyzed with the Popbio package of the R program

3) Popbio includes functions to estimate vital rates.

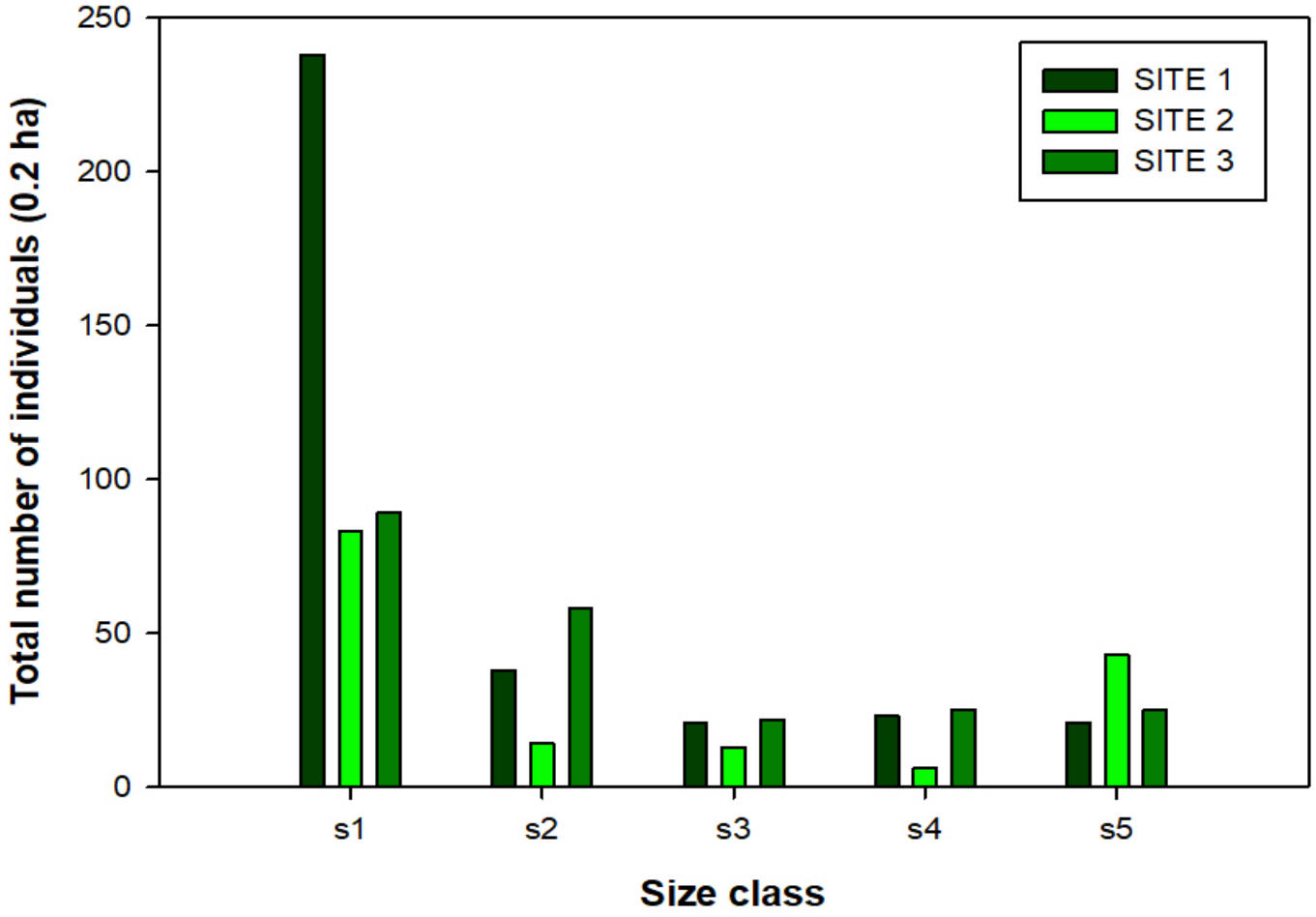
4) The estimated demographic attributes were: population growth rate (λ) and elasticity matrices.

sitio	Categoria	s1	s2	s3	s4	s5
1	s1	0.60504202	0	0	2.4	809
1	s2	0.0210084	0.9999	0	0	0
1	s3	0	0.0001	0.90476191	0	0
1	s4	0	0	0.04761905	0.91304348	0
1	s5	0	0	0	0.04347826	0.9999
2	s1	0.55421687	0	0	1.85	126244.85
2	s2	0.04819277	0.9999	0	0	0
2	s3	0	0.0001	0.92307692	0	0
2	s4	0	0	0.07692308	0.9999	0
2	s5	0	0	0	0.0001	0.97727273
3	s1	0.52808989	0	0	40.95	518.7
3	s2	0.0001	0.67241379	0	0	0
3	s3	0	0.0001	0.90909091	0	0
3	s4	0	0	0.04545455	0.96	0
3	s5	0	0	0	0.04	0.96

(Zuidema y Boot 2000; Caswell 2001; Stubben 2007; R Development Core Team 2009, López 2013).

PRELIMINARY RESULTS

Population structure of *Magnolia dealbata,* for site 1, 2 and 3. Period 2017-2018.



- Seedlings were the most abundant in site 1 with respect to the rest of the categories.
- Site one (current flower extraction) had the highest abundance of individuals (n = 341), followed by site 2 (n = 250) and site 3 (n = 219).
- For site 2, the number of individuals in category s5 was higher than in the other two sites.

Annual population projection matrix for Magnolia dealbata in site 1. A) Period 2017-2018.

Site 1 (current extraction)					
2017-2018 λ=1.024					
Size class	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**
S_1	0.6050	0.0	0.0	2.4	809
S_2	0.0210	0.9999	0.0	0.0	0.0
S_3	0.0	0.0001	0.9048	0.0	0.0
S_4	0.0	0.0	0.0476	0.9130	0.0001
S_5	0.0	0.0	0.0	0.0870	0.9999
qx	0.3739	0.0	0.0476	0.0	0
n	238	38	21	23	21

- 0.60% Chance that an individual will remain in the S1 category
- 0.02% Of an individual passing from category s1 to s2.
- The population growth rate was λ = 1.02, suggesting that the population of *Magnolia dealbata* is growing (annual increase of 2.4%).

Annual population projection matrix for *Magnolia dealbata* in site 2. A) Period 2017-2018.

Site 2 (extraction 10 years ago)					
2017-2018 λ=1.037					
Size category	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**
S_1	0.5542	0	0.0	1.85	1262
S_2	0.0482	0.9999	0.0	0.0	0.0
S_3	0.0	0.0001	0.9231	0.0	0.0
S_4	0.0	0.0	0.0769	0.9999	0.0
S_5	0.0	0.0	0.0	0.0001	0.9773
qx	0.3976	0.0	0.0	0.0	0.0233

- The population growth rate was λ = 1.03, suggesting that the population of Magnolia dealbata is growing (annual increase of 3%).

Annual population projection matrix for *Magnolia dealbata* in site 3. A) Period 2017-2018.

Site 3 (Without Extraction (3)					
2017-2018	**λ=0.961**				
Size category	**S_1**	**S_2**	**S_3**	**S_4**	**S_5**
S_1	0.528	0	0.0	40.95	518.7
S_2	0.001	0.672	0.0	0.0	0.0
S_3	0.0	0.001	0.909	0.0	0.0
S_4	0.0	0.0	0.045	0.960	0.0
S_5	0.0	0.0	0.0	0.040	0.960
qx	0.472	0.328	0.045	0.0	0.040

- The population growth rate for Magnolia dealbata was λ = 0.961, suggesting that the population of *Magnolia dealbata* is in decline (annual decrease of 4%).

Magnolia dealbata responds to the disturbance, it is a specie of secondary succession



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Thank you
Xklenlhi' deralhi'