

Wild species of Mexican Cactus Pear

Léia Scheinvar

Jardín Botánico del Instituto de Biología, Universidad Nacional Autónoma de México
Ciudad Universitaria, Delegación Coyoacán, CP 04510, México, D.F.
leiascheinvar@gmail.com

This research aims to contribute to knowledge of the biodiversity of the wild cactus pear (genera *Opuntia* and *Nopalea*). The methodology consists in three parts: I. Office work, II. Field work and III. Cultivation *ex situ*.

I. Office work. It was done in eleven parts: 1. Bibliographic revision, herbarium revision and status of conservation. The main literature revised was: D. Griffiths; Britton & Rose, Bravo; Benson; Weniger; Parfitt and Pinkava; Paredes et al.; Gonzalez, Riojas and Arreola; Anderson; Pinkava; Guzmán, Arias and Dávila; Parfitt and Gibson and Hunt. It is interesting to mention that for Sinaloa and Sonora the last taxonomic study of cactus pear was made in 1929 by Jesus González Ortega. We reviewed 42 Mexican herbaria, the IUCN International Norm (only two species), CITES, the Mexican Norm: NOM-059-ECOL-2001(2002) (only three species), the Norm of Protected Natural Mexican Areas and the Map of Priority Terrestrial Regions to observe which species inhabit these areas. 2. Identification of the species; 3. Georeferencing of the collected or observed plants in the field and herbarium sheets which lack such data; 4. Herborization of the plants collected in the field, elaborating 4 sheets from two cladodes to deposit them in MEXU, CHAPA, ARIZ and MO; 5. Capture of the information in our Data Base: "Wild Species of Mexican Cactus Pear" that has 21 fields and we now have 5667 records from plants collected in the field, revision of 42 Mexican herbaria and types from 3 international collections: US, NY and MO that are on the Internet. 6. Maps of geographical distribution of each species, with ArcView 3.1 (ESRI 1999) and an overlay of Protected Natural Areas from CONAMP (2007) to evaluate the vegetation type where they live, which species are relatively protected in this protected areas and which species live near these protected areas (Lambert projection). We elaborated also potential models of distribution of the species (Garp and Maxent). We related 62 endemic species of *Opuntia* and 9 microendemic. About *Nopalea* we know 11 species, 6 endemic and 1 cultivated and we consider that Mexico is the centre of origin and centre of diversification of this genus. 7. With the scanning electron microscope we took photos of different structures (areoles, spines, glochids, pollen grains, epidermis and seed); 8. We made detailed descriptions of all the species (taxonomic cards) including distribution maps and bromatology [utilization for food]; 9. We revised the types of each species and designated some neo-types; 10. Bromatological studies of cladodes and fruits were done in our University; 11. We elaborated a diagram of a Web page to be implemented by UNIBIO; 12. Comparative studies of our taxonomic criteria were compared with the criteria of Bravo (1978), Guzman, Arias & Davila (2003) and Parfitt and Gibson (2003).

II. Field work. Many excursions were made by the team collaborating in this project (our academic technician, two graduate students and 12 undergraduate students of Biology writing theses or working as a group) to study in the field and to collect plants in the states of: BC, BC Sur, Chih., Son., Sinaloa, Nay., Col., Jal., NL, Tamps, Zac., SLP, Mich, Gto, Qro, Hgo, E. Méx, Tlax., Pue, Oax, Ver, Tab, Camp, Yuc, Q. Roo and Chis. In the field we took data of ecological, and morphological characteristics that can only be observed in the field, and took digital photos at 300 dpi. We collected the same species from different populations to evaluate the variation of characters. Some plants from the same population were observed and described but not collected. From each plant we collected 4 cladodes, 2 to elaborate 4 herbarium sheets to be sent to: MEXU,

CHAPA, ARIZ and MO; one was cultivated *ex situ* in our Botanical Garden and one sent to make bromatology studies.

III. Ex situ cultivation of the cactus pear. In the Botanical Garden of the Biological Institute of UNAM we cultivated one cladode of each collected plant, organized in 8 rows arranged according to the source state. This collection has more than 60% of all known wild species and in a Meeting of the "Mexican National Association of Botanical Gardens" it was named: "National Collection of Cactus Pear". Mexico shares species of cactus pear with other countries. Of the *Opuntia* species: 17 are common to the South of USA; 4 to Central America; 2 to South America; 2 to the Caribbean Islands and 1 to Canada. Of the *Nopalea* species 2 are common to Central America.

Some conclusions:

1. We consider that among cultivated cactus pear and wild ones there is no difference. For instance, we thought that *Opuntia undulata* Griffiths was a domesticated species but we found this species in the wild in three different states (Tamps., Col. and Nay.) in the "Bosque Tropical Caducifolio".
2. We consider that the cactus pear are poorly represented in most of the Mexican herbaria and it is necessary to improve field work.
3. In this year that is the Year of Biodiversity, we consider that our study is a contribution to the knowledge of Mexican Plant Biodiversity in Semi-arid Regions.
4. We acknowledge our student M. en C Ernestina Preciado, who lives in Los Moches, Sinaloa, and has collected the cactus pear in all Municipios of Sinaloa and Sonora, and especially our University, CONABIO and SAGARPA-SINAREFI-SNICS for their support for this project.