



Phylogenetic placement and new data on macro and micro morphology of *Nopalxochia phyllanthoides* (Cactaceae), an endangered species from Mexico

CÉSAR RAMIRO MARTÍNEZ-GONZÁLEZ¹, OTHÓN ALCÁNTARA-AYALA¹, ISOLDA LUNA-VEGA^{1,*} & RICARDO GARCÍA-SANDOVAL¹

¹Laboratorio de Biogeografía y Sistemática, Departamento de Biología, Facultad de Ciencias, Universidad Nacional Autónoma de México, Ciudad Universitaria, Delegación Coyoacán, 04510, México, D.F., México; luna.isolda@gmail.com, ilv@hp.fciencias.unam.mx
* Author for correspondence

Abstract

The phylogenetic placement of *Nopalxochia phyllanthoides* using DNA sequences of two plastid regions is investigated. New data on the micro- and macro-morphology are also presented. Detailed descriptions of habit, vegetative and reproductive structures, as well as micro-morphology of areoles, epidermic cells of the apical and medium part of the spines, stomata, pollen and seeds, are provided. The results obtained show the *N. phyllanthoides* is to be recognized as independent taxon, so correcting the previous treatment a taxon belonging to the genus *Disocactus*. A lectotype and epitype are designated for this species.

Key words: *Aporocactus*, Cactoideae, *Disocactus*, endemic species, Hylocereae, IUCN Red lists, restricted distribution

Introduction

Nopalxochia Britton & Rose (1923: 204) was originally described as a monotypic genus (Britton & Rose 1923), with *Nopalxochia phyllanthoides* (Candolle 1813: 84) Britton & Rose (1923: 207) as nomenclatural type (holotype). Recent taxonomic studies recognized at least three additional species (Meyrán 1962, Bauer 2003, Arias *et al.* 2005b) which were placed under the genus *Disocactus* Lindley (1845: t.9) (see Hunt 2006). Nowadays there is a large agreement on placing species of this genus in subfamily Cactoideae Eaton tribe Hylocereae Buxb. (Buxbaum 1958, Barthlott & Hunt 1993, Anderson 2001, Hunt 2006).

As many other endemic Mexican plants, none of its populations are included in any protected area (Natural Protected Areas (NPA)), but it is considered in the Priority Terrestrial Regions (TPRs) named “Bosques Mesófilos de la Sierra Madre Oriental” in Hidalgo, Puebla, Veracruz and “Cuetzalan” in Puebla and Veracruz (www.conabio.gob.mx).

The taxonomy of *Nopalxochia* has been subject of continuous debate, and many nomenclatural changes have been proposed (Bauer 2003). On the whole, there is a general acceptance on the close relationship between some species, and several authors agree to group them both as a subgenus into *Disocactus* (Barthlott 1991) or as a separate genus (Kimmach 1993).

Scheinvar (2004) recognized three genera under the tribe Hylocereae: *Disocactus*, *Hylocereus* (Berger 1905: 72) Britton & Rose (1909: 428), and *Selenicereus* (Berger 1905: 76–77) Britton & Rose (1909: 429), accepting *Nopalxochia* as a synonymous of *Disocactus*. Moreover, Scheinvar (l.c.) recognized five subgenera in *Disocactus* [*Ackermannia* Schumann (1890: 194), *Aporocactus* Lemaire (1860: 67), *Disocactus*, *Nopalxochia*, and *Wittia* Schumann (1903: 117)] on the basis of the classification proposed by Barthlott (1991); they have different structure of flowers and seeds, but all of them with distribution in Mexico, Central America and South America.

At some extent, the main difference between classifications resides in the ranking relevance assessed to different characters. Kimmach (1993) recognized the receptacle as a key character among some genera, with a thick, ribbed and spiny receptacle in *Nopalxochia*, *Aporocactus* and *Hylocereus*, and a thin, ribless and spineless one in *Disocactus*. On the other hand, Barthlott (1991) did not consider this characters as enough evidence for keep the genera separated, and he proposed to merge *Nopalxochia* and *Aporocactus* under *Disocactus*.