

Phylogeny and evolution of *Echinopsis* s.l. (Cactaceae)

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The South American genus *Echinopsis* is the third largest, the morphologically most diverse and the least understood genus in the family and comprises several formerly independent genera such as *Lobivia* and *Trichocereus*. About 100 species accepted in recent literature with more than 500 synonyms, and taxon boundaries are unclear at all taxonomic levels. A phylogeny is presented based on three chloroplast markers and about 200 accessions, representing all major clades and life forms throughout the distribution area of the genus. Results suggest polyphyly for *Echinopsis* in its current delineation, with several other genera of the tribe Trichocereae embedded. Further, all major former genera, i.e. *Echinopsis* s.str., *Lobivia* and *Trichocereus*, are polyphyletic as well. Thus, many morphological characters such as growth form and floral traits are often the result of convergent evolution and are misleading as taxonomic characters. Chromosome numbers were evaluated for all major clades, usually yielding $2n = 22$, but tetraploids were found in both ingroup and outgroup taxa.