Molecular phylogeny versus morphology in the infrageneric classification of *Gymnocalycium* (Cactaceae)

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Phylogeny of the South American genus *Gymnocalycium*, based on DNA sequences from pDNA, was compared with the traditional infrageneric classification, based on seed shape. The molecular data were obtained from three non-coding chloroplast regions; Bayesian inference trees and maximum parsimony trees were constructed. The genus includes three major, well-supported clades. One of these contains the species typical of the Chaco ecosystem, mainly distributed in southern Bolivia and Paraguay, with one species widespread in Argentina; it corresponds to the morphologically defined subgenera *Muscosemineum* and *Pirisemineum*. Another well-supported clade encompasses a large part of the species currently belonging to the subgenus *Microsemineum*. The third clade includes the remaining species; within this clade, the subgenus *Trichomosemineum* represents a monophyletic group, thus appearing phylogenetically related to the subgenera *Gymnocalycium* and *Macrosemineum*. This last taxon is probably paraphyletic.