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[Chiarini, Franco](#) [1], [Deanna, Rocio](#) [2], [Bohs, Lynn](#) [3].

Phylogeny and character evolution of the genus *Sclerophylax* (Solanaceae).

Solanaceae is a cosmopolitan family with 2400-3000 species, several of which have remarkable economic importance world-wide. Even with a clear family circumscription and most of the intergeneric relationships resolved, ca. 50% of its species are not phylogenetically studied. Such is the case with the genus *Sclerophylax* within the Atropina clade. *Sclerophylax* has 14 species recognized to date, all but one of them endemic to Argentina. These species are morphologically similar, some of them were described relatively recently, and their patterns of character evolution are poorly known. Previous phylogenies only sampled three accessions of *Sclerophylax*. We used molecular sequence data from the *trnT-L* and the *trnL-F* intergenic spacer regions (chloroplast) and the nuclear *waxy* gene and ITS region to clarify the phylogenetic relationships within *Sclerophylax*, to infer evolutionary patterns in biological features (fruit, life form, floral size), and to examine biogeographical patterns in the Atropina clade in an evolutionary context. Trees were constructed using Maximum Likelihood (MCC) and Bayesian Inference analyses. Divergence times were estimated for the combined dataset using secondary calibration. A Bayesian binary MCMC (BBM) method was applied to reconstruct ancestral distribution areas. One continuous and six discrete traits were reconstructed on the combined MCC tree by means of Bayesian stochastic mapping. We present a well-sampled molecular phylogeny of the genus, encompassing almost all of the taxonomic, morphological and geographic variation. Results show that *Sclerophylax* is monophyletic, it belongs to the Atropina, and is sister to the *Lycium + Nolana* clade. *Sclerophylax* is divided into two sections, sect. *Caducifructus* (1 sp.) and sect. *Sclerophylax* (11 spp.). Relationships in sect. *Sclerophylax* are poorly supported and the boundaries of some species remain uncertain, which may be the result of a period of rapid diversification, but four well defined lineages are recognized by morphological synapomorphies. The ancestor of *Sclerophylax* was reconstructed as an annual, procumbent/decumbent plant with rhomboidal leaves and sessile persistent, 2-3-seeded fruits. The most variable traits within the genus are leaf shape and life form. Flower size was highly informative for diagnosing taxa within *Sclerophylax* and in the Atropina clade. The area of origin for the genus is hypothesized to be the Prepuna biogeographical province (probably in Catamarca, Argentina), from which it spread in relatively recent geological times. On the basis of these data, we redefined some species and synonymized two names, now recognizing 12 species in *Sclerophylax*.

- 1 - IMBIV, CONICET- National University of Córdoba, Velez sarsfield 299 CC495, Cordoba, Cordoba, 5000, Argentina
 2 - University of Colorado at Boulder, Department of Ecology and Evolutionary Biology, 1800 Colorado Ave., Boulder, CO, 80309-0334, USA
 3 - University Of Utah, Department Of Biology, 257 South 1400 East Room 201, Salt Lake City, UT, 84112.0, United States

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