

Evolutionary relationships in Thunbergioideae and other early branching lineages of Acanthaceae

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Abstract

Acanthaceae as circumscribed today consists of the three subfamilies Acanthoideae (Acanthaceae sensu stricto), Thunbergioideae and Nelsonioideae, plus the genus *Avicennia*. Due to the morphological dissimilarities of Thunbergioideae and Nelsonioideae, the delimitation of the family has been controversial. The mangrove genus *Avicennia* was only recently associated with Acanthaceae for the first time, based on molecular evidence, but without morphological support. In this thesis, phylogenetic analyses of nuclear and chloroplast DNA sequences were used to test the monophyly and exact positions of Thunbergioideae and Nelsonioideae, and to infer detailed phylogenetic relationships within these subfamilies and among major lineages of Acanthaceae. Floral structure and development were comparatively studied in *Avicennia* and other Acanthaceae using scanning electron microscopy and stereo microscopy. Phylogenetic analyses strongly support monophyly of Thunbergioideae and Nelsonioideae, and place the latter clade with strong support as sister to all other plants treated as Acanthaceae. Thunbergioideae and *Avicennia* are moderately supported as sister taxa, and together they are sister to Acanthoideae. The general morphology of *Avicennia* can be easily accommodated in the Acanthaceae, and three synapomorphies support the suggested sister group relationship of *Avicennia* and Thunbergioideae: (1) collateral ovule arrangement, (2) vertical orientation of ovule curvature, and (3) an exposed nucellus that is contiguous with the ovary wall. Within Thunbergioideae and Nelsonioideae, support values for major lineages are generally high. With some exceptions, the constituent genera are supported as monophyletic. Evolutionary relationships among and within genera are discussed in a morphological and biogeographical context.

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