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Molecular phylogenetic analyses of Cucurbitaceae tribe Benincaseae urge for merging of *Pilogyne* with *Zehneria*

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Abstract

The tropical cucurbitaceous genus *Zehneria* as traditionally circumscribed displays much morphological diversity. Recent taxonomic revisions have resulted in its redefinition through both recognition and subsequent lumping of several additional genera. This study utilized plastid and nuclear DNA sequence data to reconstruct a molecular phylogeny of *Zehneria* and its close relatives in order to test whether these revisions reflected the molecular evolution in this group. The results suggest that *Neoachmandra* is monophyletic, and that *Zehneria* in a restricted sense and *Neoachmandra* accessions form a single monophyletic clade, whereas *Pilogyne* in its present understanding is polyphyletic. In the light of these results *Pilogyne* should be merged back into *Zehneria* from which it was split off earlier.

Key words: Cucurbitaceae, GAPDH, *trn*K, *trn*L–F, nrITS, *Neoachmandra*, *Pilogyne*, *Zehneria*

Introduction

The Cucurbitaceae family is well represented in the paleotropics, and includes several genera widely distributed across many environments. Species in the genus *Zehneria* Endl. as formerly taxonomically circumscribed are found across the paleotropics, with several species in Africa, and mainland and insular Asia (de Wilde and Duyfjes, 2006a; Schaefer and Renner, 2011a). *Zehneria* in that sense is species-rich in East Africa, but most diverse in South East Asia.

Zehneria was first described by Endlicher based on collections made by Bauer on Norfolk Island in 1804–5 (Endlicher, 1833). Cogniaux considered *Zehneria* to be part of the genus *Melothria* L., a large assemblage with many species in the Old and New Worlds (Cogniaux, 1916, 1881). The definition of *Melothria* was broadly constrained to cucurbitaceous plants sharing a common anther and floral type with a pantropical distribution. Jeffrey (1962) later on recognized differences between the Old and New World species and described the Old World taxa as the genus *Zehneria* (excluding *Mukia* Arn. and *Solena* Lour.). Jeffrey (1990, 1980) placed *Zehneria* and *Melothria* in subtribe Cucumerinae, along with ten other genera, including *Cucumis* L., *Cucumella* Chiov., and *Mukia*. This group was loosely defined as sharing small, compressed seeds and anther thecae fringed with trichomes. In Jeffrey's classification *Zehneria* remained a diverse genus of some 35 species, stretching from Africa to French Polynesia, of which many species were poorly collected or studied.

More recent studies of *Zehneria* for the Flora Malesiana project (de Wilde and Duyfjes, 2010) included an extensive review of museum and field collections of Asian and African species of *Zehneria*, and revealed significant differences and clear divisions among the species based on flower and fruit characters. As a result, de Wilde and Duyfjes recognized six genera, *Zehneria* (in a restricted sense), and five new ones: *Indomelothria* W.J.de Wilde & Duyfjes, *Neoachmandra* W.J.de Wilde & Duyfjes, *Papuasicyos* Duyfjes, *Scopellaria* W.J.de Wilde & Duyfjes, and *Urceodiscus* W.J.de Wilde & Duyfjes (de Wilde and Duyfjes, 2006a, 2006b; Duyfjes *et al.*, 2003). In 2009, de Wilde and Duyfjes further split *Zehneria* by reinstating the old name *Pilogyne* Schrad. for African and remaining Asian species except *Z. baueriana* Endl. (de Wilde and Duyfjes, 2009a, 2009b), leaving *Zehneria* monotypic. The above-mentioned six genera

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