

Taxonomy and Systematic Analysis of the Two Genera *Alpinia* and *Amomum* of the Family Zingiberaceae in Sri Lanka

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Abstract

Alpinia and *Amomum* are the largest two genera that list the highest number of endemics of family Zingiberaceae in Sri Lanka. The family is recognized as a least studied plant group in the country, justifying the need for a thorough study. Hence, it is timely that the family is taken into consideration of molecular and systematic studies given new techniques are available. As a pioneering step, in this study, we addressed several taxonomic issues, phylogenetic relationships and conservational status of *Alpinia* and *Amomum*. In order to collect more morphological data to address species boundaries with better insights, over 130 morphological characters were studied and analysed using multivariate statistical methods. Molecular phylogenetic analysis was done using two Chloroplast gene regions (trnL-trnF and trnS-trnfM). Results of the morphological analysis revealed the segregation of species rather depending on both vegetative and floral characters than only on floral characters. Study also identified a group of *Amomum* with a new character combination which needs to be recognized as a new species or subspecies along with a new addition to genus *Alpinia* (*A. zerumbet*) in Sri Lanka. Furthermore, in our efforts to make a field key for easy identification of species, results of this study also highlighted the difficulty in using only vegetative characters to differentiate species. Hence, the study has resulted in identifying a different and an easy set of morphological characters for species identification for Sri Lankan species. Evolutionary analysis of the two genera confirms that the Sri Lankan members of the two genera *Alpinia* and *Amomum* have a monophyletic origin. Although the genus *Alpinia* has a monophyletic lineage, two members (*A. abundiflora* and *A. fax*) show a polytomy within the genus. This was evident in both phylogenetic analysis and the morphological analysis. According to trnL-trnF and trnS-trnfM data analysis, all the studied members of the genus *Amomum* have an exclusive monophyletic origin. Illumination of an immediate need for conservation efforts of these species is another important finding of the current study.

Keywords: Zingiberaceae, *Alpinia*, *Amomum*, Taxonomy, Phylogeny