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A Preliminary Study on Sri Lankan *Impatiens*: Phylogenetics and Morphological Evidences

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Abstract

Genus *Impatians* (Family Balsaminaceae) having 23 native species in Sri Lanka, displays a high endemicity of nearly 70%. The objectives of the present study were to assess the phylogenetic placement of Sri Lankan *Impatiens* and to elucidate the morphological characters supporting their relationships. Based on the sequence availability, Internal Transcribed Spacer (ITS) region was used for a total of 57 species, including seven Sri Lankan *Impatiens* species. Maximum likelihood and neighbour joining analysis were performed to produce the phylogenetic trees using *Hydrocera triflora* as the outgroup. Selected morphological characters were obtained using published literature and herbarium records with special emphasis on floral characteristics to produce the cladogram. Analysis was conducted using R 4.2.2 version. Likelihood and neighbour joining analysis produced congruent phylogenetic trees. Results revealed that, Sri Lankan *Impatiens* taxa forms a monophyletic separate cluster revealing their phylogenetic distinctiveness. Sri Lankan group show a close relationship with *Impatiens* native to China and India providing insights to their biogeographic affinities. Furthermore, morphological data supported the relationships derived from molecular phylogenetic analysis. Two distinct species clusters were identified in both the phylogram and cladogram; *I. henslowiana* and *I. grandis* constituted one cluster, while *I. leptopoda* and *I. flaccida* comprised the other. These preliminary results provide baseline information to investigate character evolution, floral adaptations, more resolved phylogeny, and biogeography of old-world *Impatiens* species.

Keywords: Impatiens, Phylogeny, ITS, Morphology