



**INSTITUTE OF BIOLOGY
SRI LANKA**

BIOLOGICAL INNOVATIONS FOR FOOD SECURITY AND SUSTAINABLE GREEN ECONOMY

Proceedings of the 45th Annual Sessions



25th September 2025



Morphological diversity and taxonomic resolution of Sri Lankan *Impatiens* (Family Balsaminaceae) with emphasis on evolution of floral characters

Kosala Abeykoon¹, H.D. Jayasinghe², H.S Kathriarachchi^{1*}

¹Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka

²National Institute of Fundamental Studies, Hantana Road, Kandy

*hashi@pts.cmb.ac.lk

The genus *Impatiens* (Family Balsaminaceae) exhibits high morphological and ecological diversity, with notable endemism in Sri Lanka's wet and montane forests. This study employed an integrative morphological framework to investigate interspecific variation and support the conservation of native *Impatiens* species, with particular emphasis on floral traits and their taxonomic significance. Field surveys across multiple ecological zones yielded specimens from 23 native and 2 introduced species. Vegetative and reproductive features were documented using standardized botanical protocols, and additional specimens were reviewed at the National Herbarium (PDA). A total of 46 morphological and morphometric characters were recorded from *Impatiens* species and the outgroup *Hydrocera triflora*. Factor Analysis of Mixed Data (FAMD) was used to reduce data dimensionality, identifying 19 key traits for further analysis. Principal Coordinate Analysis (PCoA) and Neighbor-Joining (NJ) tree construction, based on Gower distance matrices, revealed four well-supported clades three major and one minor distinguished by traits such as sepal spur length, leaf shape, and stem architecture. The first clade (Clade A) included species with long, filiform spurs and narrow leaves; the second (Clade B) grouped taxa with cuspidate leaves and bilobed lateral petals; the third (Clade C) consisted of robust perennials with semi-woody stems; and the minor clade (Clade a) showed unique morphological features. The alignment between PCoA and NJ trees affirms the evolutionary distinctiveness of these groupings. Ecological adaptations were evident: the first clade showed traits favoring low-light understory environments, while floral divergence in the second clade suggested pollinator specialization. Morphological convergence in the third major clade and evolutionary novelty in the minor clade highlight dynamic evolutionary processes. These results affirm the relevance of traditional morphological characters and underscore the value of morphometric integration for resolving species-level taxonomy. This framework strengthens the foundation for future phylogenetic and conservation efforts on *Impatiens* in tropical ecosystems.

Keywords: *Impatiens*, morphological diversity, taxonomy, conservation, clade differentiation