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Distribution Patterns of *Impatiens* in Sri Lanka: Exploring Niche Breadth, Range Size, and Elevational Dynamics**Ruwanmalie, W.A.P.U.¹, Piumal, R.J.¹, Viduranga, W.A.A.D.M.²,
Kathriarachchi, H.S.^{1*}**¹*Department of Plant Sciences, University of Colombo, Colombo 03, Sri Lanka*²*Department of Ecology and Conservation Biology, Texas A and M University, USA***hashi@pts.cmb.ac.lk***Abstract**

In Sri Lanka, *Impatiens* (Family Balsaminaceae) is represented by 23 native species, of which 16 are endemic. Additionally, 3 exotic *Impatiens* are widely cultivated as ornamentals. According to the National Red List 2020, of the native species, 6 are vulnerable (VU), 9 are endangered (EN), 2 are critically endangered (CR) and *I. walkeri* is listed as critically endangered possibly extinct CR(PE). The present study aimed to analyse the current distribution of *Impatiens* species across floristic regions and along an elevational gradient in Sri Lanka. Species occurrence data were obtained from reputable repositories such as the National Herbarium, international herbaria, various national and international floristic databases. A georeferenced map was meticulously constructed to evaluate the spatial distribution of these species across distinct floristic zones and along an elevation gradient using ArcGIS Pro and R 4.2.2 version. Heat map analysis and Jaccard clustering based on the distribution of species in different floristic zones were used to detect niche specialty. The central mountains, encompassing the Ramboda-Nuwara Eliya and Adam's Peak floristic zones, exhibited the highest species richness of Sri Lankan *Impatiens*. Jaccard analysis delineated three primary clusters, none of which included the point endemic species, *I. janthina* and *I. jacobdevlasii*. Notably, regression analysis revealed a strong correlation ($R^2=+0.7751$) between niche breadth and range size, emphasizing the significance of colonizing adaptability in *Impatiens* species' occupancy patterns. *Impatiens acaulis* recorded the broadest niche breadth and the largest range size among the species. The optimal elevation range for the majority of *Impatiens* species was found to be between 1000 and 1200 meters above. *Impatiens acaulis* and *Impatiens cornigera* showed distribution patterns that were largely independent of elevation variations. In contrast, *I. macrophylla* and *I. leptopoda* exhibited a limited distribution preference especially for highland regions. The findings of the study are expected to be incorporated to conservation attempts of *Impatiens* species in Sri Lanka.

Keywords: *Impatiens*, Elevation, Niche, Range, Sri Lanka