

MORPHOMETRIC ANALYSIS OF GENUS *PIPER* (PIPERACEAE), SRI LANKA

B. Gopallawa^{1*}, D.M.D. Yakandawala², A. Wickramasuriya³ and R. Samuel⁴

¹Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka.

²Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka.

³Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka.

⁴Department of Botany and Biodiversity Research, University of Vienna, Austria

*bgopallawa@gmail.com

The genus *Piper* is represented in Sri Lanka by five wild species, three of which are endemic. Five *Piper* species have been introduced for various medicinal and economic purposes. According to the National Red List 2020, three of these species are threatened: *P. hymenophyllum* Miq., *P. walkeri* Miq., and *P. trineuron* Miq. However, due to recent taxonomic revisions, some species have been delimited to specific taxa, causing confusion. As a result, a field-based taxonomic study was initiated to determine the species limits of the genus *Piper* in Sri Lanka. The fieldwork was conducted throughout the country during 2022-2023, encompassing wildlife reserves, forest reserves, and cultivations. The collected specimens were tentatively identified using available published literature and herbarium specimens. The plant specimens were extensively examined, and morphological characters, both vegetative and reproductive, were coded into a data set. A population was coded with at least three mature individuals. Using PAST software (version 2.15), a multivariate analysis was performed on the data set. Hierarchical cluster analysis was performed on data collected from 58 populations using 60 qualitative and quantitative characteristics. The cluster solution was chosen from the most suitable algorithm, which employed Gower Distance to calculate similarity measures with the 'paired group' (UPGMA) option and the Single Linkage Algorithm based on the highest Cophenetic Correlation Value. The hierarchical cluster analysis resulted in 11 phenotypic groups, of which 10 corresponded to already-described species. The most contributing characters for the grouping, based on the SIMPER analysis, were leaf width, leaf length, and inflorescence length. The study suggests that the species limits of the known species remain stable while some possible new species resulting from intraspecific groups are identified, especially in *P. betle*, *P. zeylanicum*, and *P. nigrum* that need confirmation through molecular studies.

Financial assistance from the Postgraduate Institute of Science (Grant No 2020/21) and FWF Austrian Science Fund are acknowledged.

Keywords: Biodiversity, Conservation, Multivariate analysis, Wild Pepper