

Morphological Characterization of *Citrus* Species in Sri Lanka

W.W.P Rodrigo*, W.A.N.R Wickramaarachchi, and S.R. Weerakoon

The Open University of Sri Lanka, Nawala, Nugegoda, Sri Lanka.

* wwrod@ou.ac.lk

Abstract

Citrus, a member of the Family Rutaceae, is recognized for its high nutritional and medicinal value, due to bioactive compounds like alkaloids, tannins, and phenols. In Sri Lanka, the diverse Citrus germplasm has not been fully characterized, and proper taxonomical classification remains incomplete. Therefore, this study aims to fill that gap through the morphological characterization of Citrus species found in the country. Herbarium samples were prepared and authenticated with existing specimens at the National Herbarium, Royal Botanical Gardens, Peradeniya. Morphological traits such as fruit, leaf, tree, and floral characteristics were documented. Quantitative data were scandalized using z-score normalization while qualitative data were encoded into numerical values. Gower distance in R software was used to calculate species similarities, and a dendrogram was constructed using Word’s method in IBM-SPSS software, revealing five distinct clusters. Cluster I included species such as calamansi (*Citrus microcarpa*), yak dehi, ambul naran, kumquat (*Citrus japonica*), tahiti lime (*Citrus latifolia*), key lime (*Citrus aurantiifolia*), nas naran (*Citrus japonica*), konda naran (*Citrus crenatifolia*), and kaffir lime (*Citrus hystrix*) while Cluster II includes lemon-round (*Citrus limon*), lemon-long (*Citrus limon*), peni kudalu orange, rough lemon (*Citrus jambhiri*), and trifoliate orange (*Citrus trifoliata*). The plants in Cluster III included heen naran (*Citrus crenatifolia*), sour orange (*Citrus aurantium*), sweet orange (*Citrus sinensis*), jama naran (*Citrus reticulata*), and philippine red lime (*Citrus limonia*). Citron (*Citrus medica*), Buddha’s hand (*Citrus medica*), and citron hybrid are part of a smaller cluster that joins with grapefruit (*Citrus paradisi*) and sidaran (*Citrus medica*) to form Cluster IV, while pumelo (*Citrus maxima*) belongs to the Cluster V which is exhibited distinct morphological traits. This classification provides a foundation for future research in Citrus breeding, conservation, and genetic studies.

Keywords: *Citrus*, *Dendrogram*, *Rutaceae*