

Research Article

Leaf Anatomical Characteristics of *Nepenthes* Species in Western Sarawak, Borneo

Mohd Hisham Nabilah Huda*, Kalu Meekiong and Hashimah Elias

Plant Resource Science and Technology Programme, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia

*Corresponding author: nabilahhuda1709@gmail.com

ABSTRACT

The dimorphism and phenotypic plasticity of genus *Nepenthes* is taxonomically challenging. They depicted a variety of pitcher morphological features that often lead to difficulty in the species delineation. However, there is an alternative that could aid to distinguish the *Nepenthes* species which is by observing the anatomical characteristics of their leaves. Despite few researches had reported the comparative study on leaf anatomy of certain *Nepenthes* species, yet, there are very scarce data showing other distinct anatomical characteristics that could be used to differentiate the *Nepenthes* species especially in the western of Sarawak. Hence, this research was performed to identify anatomical characteristics that could be useful taxonomic tools for *Nepenthes* species identification. There are nine species with one variety and three natural hybrids were included in the study namely, *Nepenthes albomarginata* Lobb, *N. ampullaria* Jack, *N. gracilis* Korth, *N. hirsuta* Hook. f., *N. hispida* Beck, *N. mirabilis* (Lour.) Druce, *N. mirabilis* var. *echinostoma* (Hook. f.) J. H. Adam & Wilcock, *N. nazreeana* sp. nov. ined., *N. rafflesiana* Jack, *N. reinwardtiana* Miq., *N. x trichocarpa* Miq., *N. x hookeriana* Lindl, and *N. x kuchingensis* Sh. Kurata. The anatomical data of leaves, i.e stomatal complex type, stomatal size and density, type of anticlinal walls, type of glandular structures and others were analysed, tabulated and discussed.

Key words: Anatomy, carnivorous plants, lowland species, Malaysia, Nepenthaceae, pitcher plants

Article History

Accepted: 1 December 2022

First version online: 26 December 2022

Cite This Article:

Nabilah Huda, M.H., Meekiong, K. & Elias H. 2022. Leaf anatomical characteristics of *Nepenthes* species in western Sarawak, Borneo. *Malaysian Applied Biology*, 51(5): 201-210. <https://doi.org/10.55230/mabjournal.v51i5.2339>

Copyright

© 2022 Malaysian Society of Applied Biology

INTRODUCTION

Borneo is a hotspot for tropical pitcher plant diversity. Commonly known as monkey cups (Malay: Periuk Kera), this bizarre group of pitcher plant were recognised as genus *Nepenthes* in a monotypic family, Nepenthaceae. Odoardo Beccari, Frederick Burbidge, Hugh Low and Johan Teysmann were among the first to discover *Nepenthes* in Borneo (Phillips *et al.*, 2008). Astonishingly, *Nepenthes x hookeriana*, and *N. veitchii* were reported by Phillips *et al.* (2008) as the earliest Borneo species to be introduced. Despite the exact number of *Nepenthes* species is unknown (Thorogood, 2010), Murphy *et al.* (2019) reported that there are approximately 160 – 180 species were distributed and described so far. In Borneo Malaysia, Sarawak has the most *Nepenthes* species with 33 different species distributed at lowland and highland areas (Steiner, 2002; Damit *et al.*, 2018; Tamizi *et al.*, 2020).

Generally, species delineation of genus *Nepenthes* is done primarily based on its morphological characteristics especially the pitcher morphology (Ridley, 1924; Corner, 1988; Clarke, 1997; Jebb & Cheek, 1997; Cheek & Jebb, 2001; Rizqiani *et al.*, 2018; Ghazalli *et al.*, 2021). The pitcher is actually a modified leaf that developed in various shape, size and colour from the tendril which protruded from the apex of the lamina. The pitcher morphology evolved to facilitate the habit of the plant and aid in adaptation and survival in low-nutrients soil, mainly nitrogen (Phillips *et al.*, 2008; Thorogood, 2010). Nonetheless, the genus *Nepenthes* is taxonomically challenging due to their