

Morpho-Histological Analysis of Leaves of *Paramignya lobata*

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Introduction

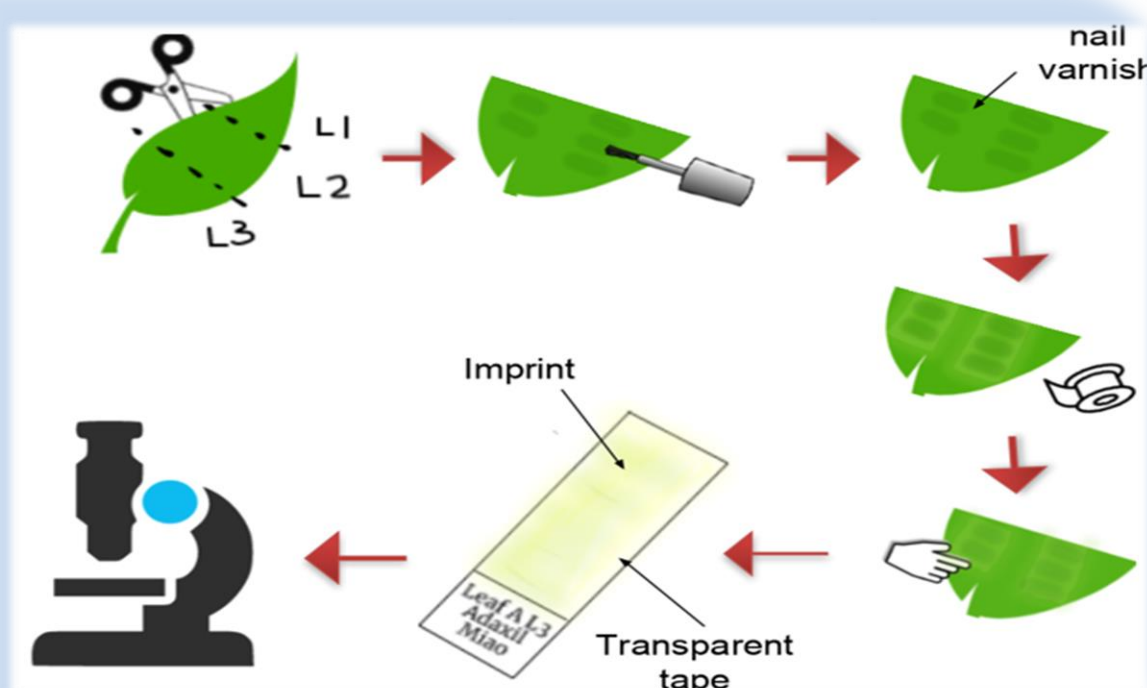
Paramignya lobata is an under-explored wild citrus plant. It has a climbing vine with acuminate leaves, weakly arching branches, and short spines along its stems. It is native to Peninsular Malaysia and widely distributed in lowland forests. Like other members in the Rutaceae family, it has secretory cavities in its stems and leaves to secrete valuable metabolites such as alkaloids, saponins, triterpenes and steroids (Bowen and Lewis, 1978). These constituents reveal the potential application of its stems and leaves in cancer-chemopreventive therapy (Ninh, 2018). Other medicinal benefits of *Paramignya lobata* include inducing cervical contraction during childbirth (Burkill, 1935) and supplementing post-natal conditions (Morad, 2012). However, anatomy of this medicinal plant is entirely unclear. The aim of this study is to establish an optimized histological protocol to elucidate the stomatal features as well as anatomical structures of its leaves and stems.



Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Sapindales
Family : Rutaceae
Genus : *Paramignya*
Species : *lobata* Burkill
Vernacular Name : Akar Lelimau (Malay)
Residential : Native

Methodology

Stomatal Analysis



Histological Analysis

Paramignya lobata leaves were processed through 3-day fixation in FAA, dehydration in TBA series (50%-100%), clearing and 2-day infiltration, then stained by Astra blue and Basic fuchsin for light microscopic examination.

Results

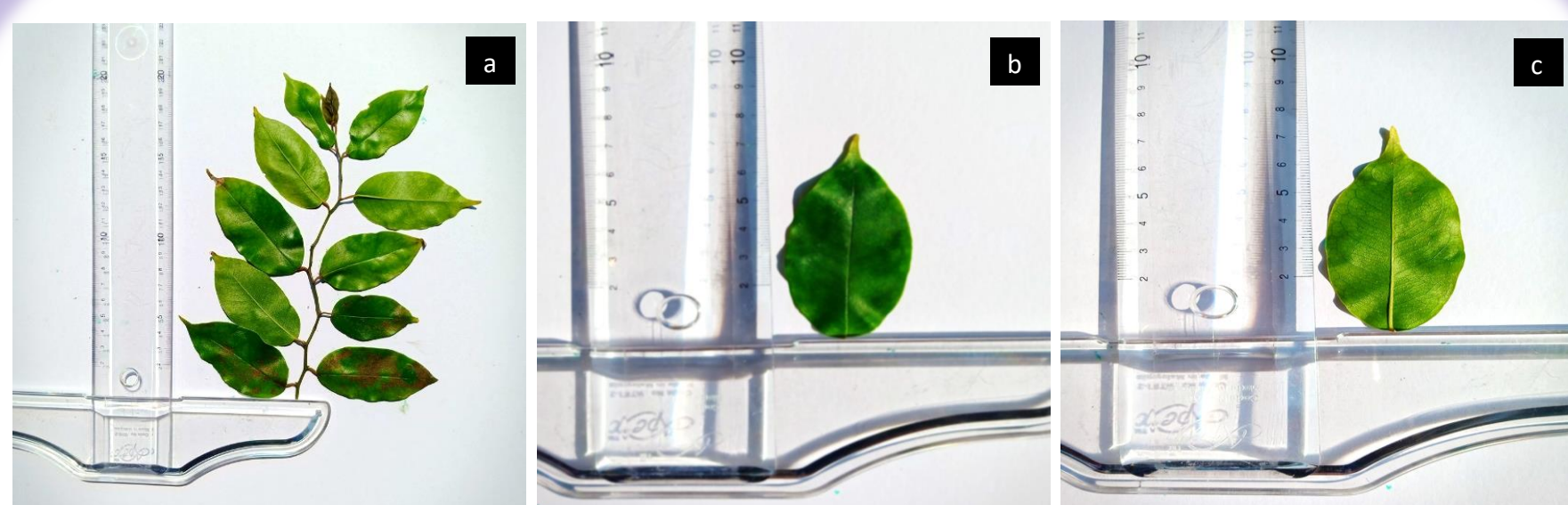


Fig. 1 Scientific photographs of *Paramignya lobata*. **a** twig (20.1 cm); **b** leaf adaxial and **c** abaxial surfaces (7.3 cm)

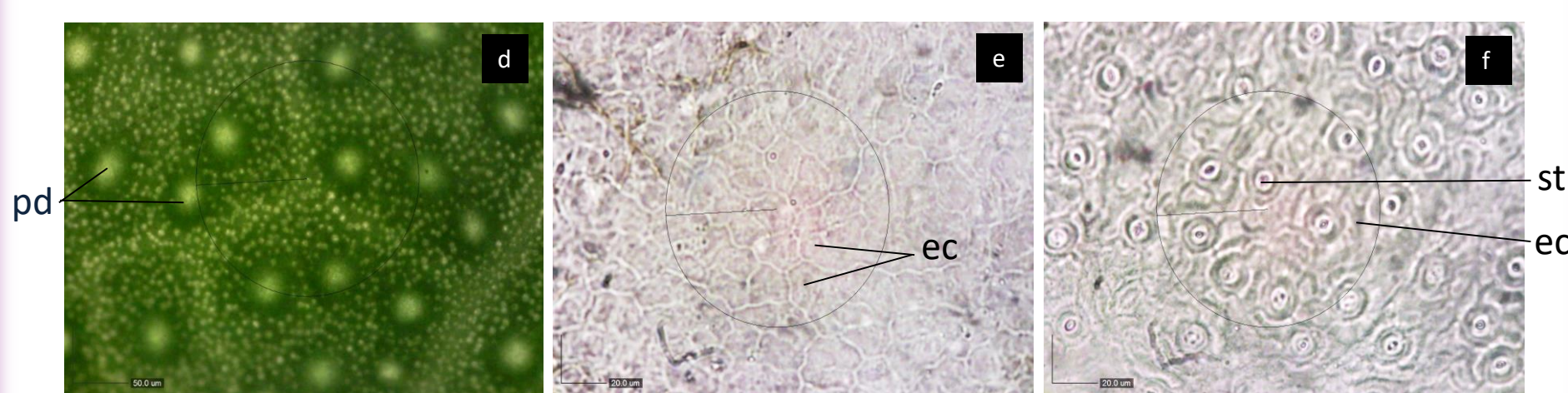


Fig. 2 Leaf surfaces of *Paramignya lobata* leaf. **d** pellucid dots; **e** adaxial surface and **f** abaxial surface. Stomata are present on abaxial surface but absent on adaxial surface of leaf of *Paramignya lobata*. The stomatal types present are paracytic and pericytic types. **Abbreviations:** pellucid dots (pd), epidermal cell (ec), stomata (st)

Results

Parameters		Values* ± SEM
Stomatal Density	Abaxial	0.671 ± 0.046
	Adaxial	-
Stomatal Index	Abaxial	14.080 ± 1.068
	Adaxial	-

*values expressed as mean of three readings; SEM = Standard Error Mean
Table 1 Values and SEM of Stomatal Density and Index of Leaf Surfaces. Independent T-test analysis conducted from these results proved that there is significant difference in the stomatal index and density between leaf surfaces of *Paramignya lobata*.

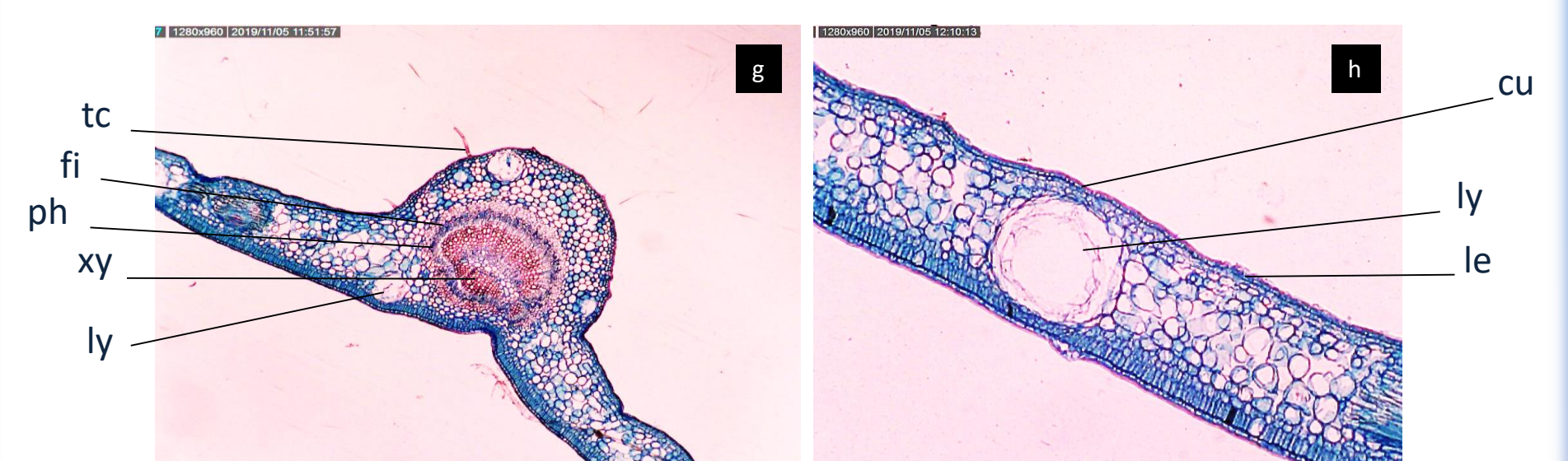


Fig. 3 Transverse section of leaf of *Paramignya lobata* passing through the midrib under 100x magnification. **g** Lignified tissues such as the xylem, midrib fibers and the cuticles are stained red by Basic fuchsin while others are stained blue by Astra blue. **Abbreviations:** trichome (tc), fibre (fi), phloem (ph), xylem (xy), lysigenous cavity (ly), cuticle (cu), abaxial epidermis (le)

Conclusion

First morpho-histological analysis reported on leaf of *Paramignya lobata* has identified the presence of lysigenous cavities which is responsible to secrete abundant of valuable metabolites such as saponins, alkaloids and triterpenes. This study is also useful for future taxonomic identification and pharmaceutical analysis. It can be further explored to reveal its therapeutic potential especially in the treatment of incurable diseases such as cancer.

Acknowledgment

This project was financially supported by High Impact Putra Grant (GPB/2017/9559900) of UPM. We are grateful to Rimba Ilmu, University Malaya for allowing sample collection throughout this study.

References

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