



Lijndenia phyllanthifolia (Melastomataceae—Olisbeoideae), new combination for a Critically Endangered shrub of Sri Lanka’s montane forest

ROBERT DOUGLAS STONE

School of Life Sciences, University of KwaZulu-Natal, Pietermaritzburg 3209, South Africa

 r.douglas.stone@gmail.com;  <https://orcid.org/0000-0003-2752-7788>

Abstract

Morphological analysis necessitates the transfer of the Sri Lankan endemic originally described as *Memecylon phyllanthifolium* to the genus *Lijndenia* (a group with 17 currently recognized species and a wide overall distribution in the paleotropics). A new combination *Lijndenia phyllanthifolia* is proposed for this rare and Critically Endangered taxon of montane forest in the Nuwara Eliya and Ratnapura districts.

Key words: *Lijndenia*, Melastomataceae, plant taxonomy, plant conservation, endangered species, Sri Lanka

Introduction

Lijndenia Zoll. & Moritzi (in Moritzi 1846: 10) is a small but widely distributed paleotropical genus with two previously recognized species in Sri Lanka, viz., *L. capitellata* (Walker-Arnott 1836: 17) Bremer (1982: 123) and *L. gardneri* (Thwaites 1859: 113) Bremer (1982: 124). The remaining congeners are in tropical Africa (4 spp.; Stone & Luke 2015) and Madagascar (9 spp.; Stone 2017, 2018), with the type species *L. laurina* Zoll. & Moritzi (in Moritzi 1846: 9) being found in Malesia, peninsular Thailand and the Philippines (Hughes & Wijedasa 2012).

Support for the monophyly of *Lijndenia* and its sister-group relationship with the African-Madagascan genus *Warneckea* Gilg (1904: 100) were seen in phylogenetic analyses of nuclear *GapC* gene sequences (Stone 2006, 2022). Subsequent analyses (Stone & Andreasen 2010, Stone 2014) with denser taxonomic sampling and faster-evolving DNA regions (the ITS and 5’ ETS regions of nuclear ribosomal DNA) offer added support for the hypothesis that *Lijndenia* and *Warneckea* are distinct from the paleotropical, species-rich genus *Memecylon* Linnaeus (1753: 349).

Morphologically, *Lijndenia* has been distinguished by having leaves strongly 3-nerved (e.g., Bremer 1988) versus leaves in *Memecylon* mostly appearing 1-nerved (with lateral nerves intramarginal and weak). However, leaf venation is not consistently different between these genera, as there are six Madagascan species of *Lijndenia* with apparently 1-nerved leaves (Stone 2017, 2018), and in some species of *Memecylon* the leaves are “subtrinnervate” (with lateral nerves ± conspicuous and forming a series of intramarginal arches between the transverse veins). Additional characters distinguishing *Lijndenia* from *Memecylon* include the minutely granular to papillose-muricate texture of the leaves on drying (owing to the presence of ramiform sclereid idioblasts in the mesophyll), inflorescence with a pair of persistent bracteoles fused to form a cupule subtending each flower, corolla in bud with style exserted (flowers protogynous, shared with *Warneckea*), petals unguiculate, ovary strictly unilocular, and embryo with a short hypocotyl and leafy cotyledons rolled lengthwise (Zollinger & Moritzi in Moritzi 1846, Jacques-Félix 1977, 1978, 1983, 1985a, 1985b, 1995, Jacques-Félix *et al.* 1978, Rao & Jacques-Félix 1978, Bremer 1981, 1982, Rao *et al.* 1983, Stone 2004, 2022).

The present article concerns the Sri Lankan endemic species originally described as *Memecylon phyllanthifolium* Thwaites ex Beddome (1872: 116). The treatment of this species by Triana (1872: 159) was published a few months earlier but is a *nomen nudum* (description lacking). The plant is a woody shrub with short internodes and small, narrow leaves that are very densely arranged (Fig. 1). In herbaria (see Acknowledgements), there are only a few collections of *M. phyllanthifolium*, the first being made by G.H.K. Thwaites in 1866 to 1868 and the most recent by A.H.M. Jayasuriya *et al.* on 15 August 1984. The species is evidently very rare and confined to montane forest at 1500–1650 m elevation in Sri Lanka’s south-central highlands (Nuwara Eliya and Ratnapura districts; Fig. 2). Using GeoCAT

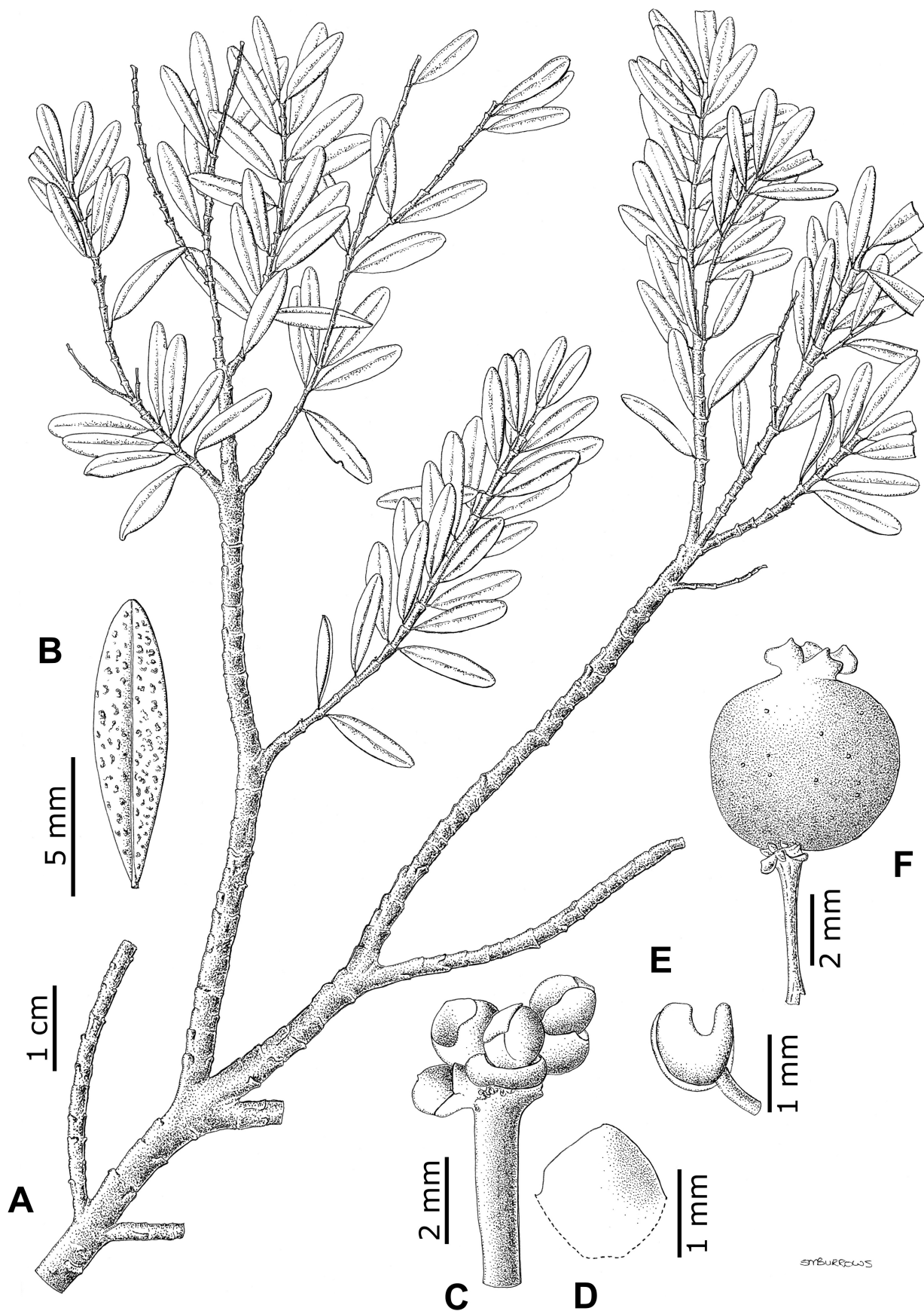


FIGURE 1. *Lijndenia phyllanthifolia*. A. Leafy branch. B. Leaf. C. Capitellate inflorescence showing persistent, fused bracteoles forming a cupule subtending each floral bud. D. Petal. E. Stamen showing anther-connective lacking a dorsal oil-gland. F. Fruit with persistent calycinal crown. (A–F from *Worthington 3243*. Illustration by Sandie Burrows).

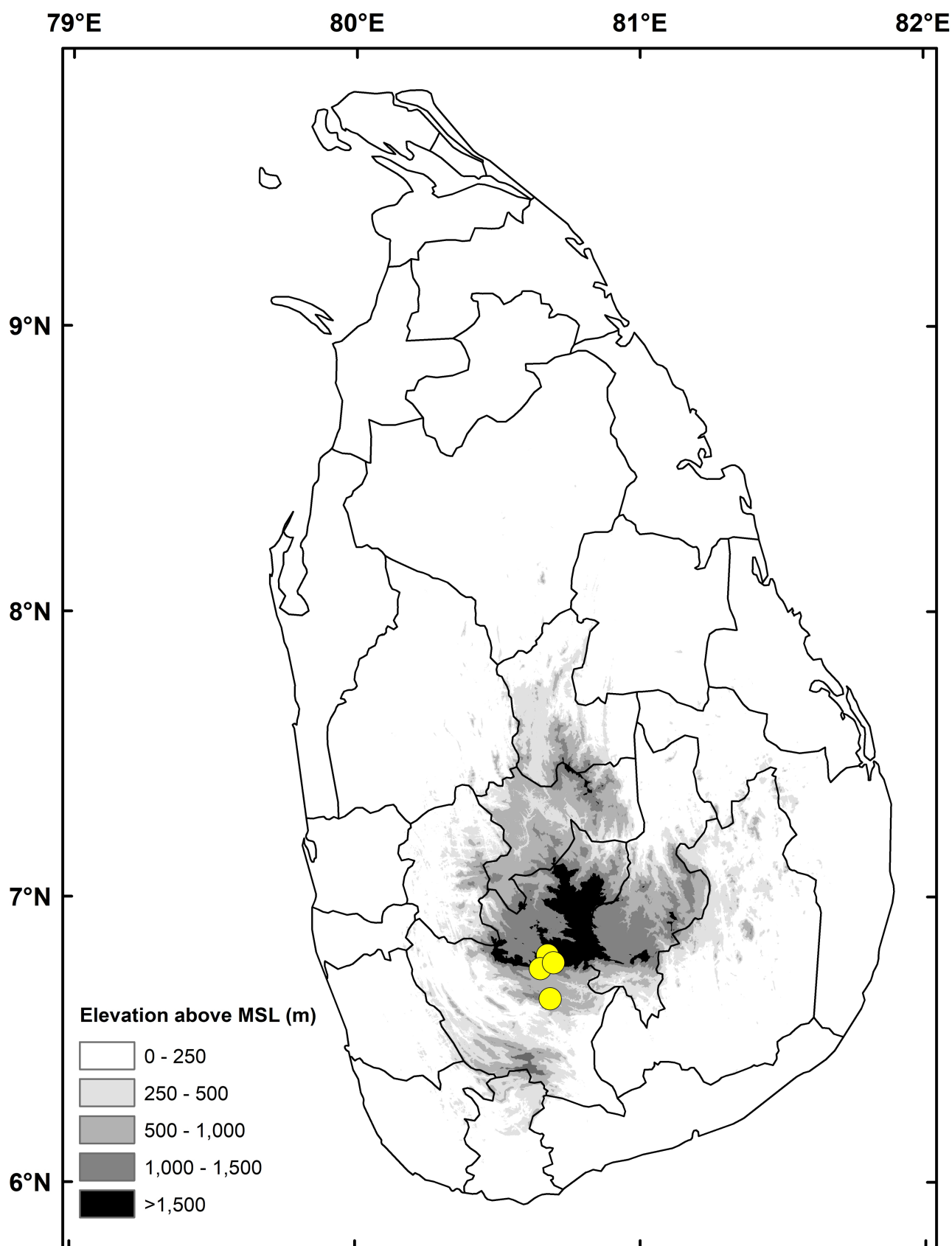


FIGURE 2. Map of Sri Lanka showing the geographic distribution of *Lijndenia phyllanthifolia*. (Known localities shown by yellow dots. Elevational data from Watte Vidanelage & Wanasingha 2024. District boundaries from <https://simplemaps.com/gis/country/lk#admin1>).

(Bachman *et al.* 2011), the extent of occurrence is estimated as 45 km² and the area of occupancy as 16 km² assuming a 4 km² grid-cell size. The habitat of *M. phyllanthifolium* has been largely converted to extensive tea plantations (R. D. Stone, pers. obs.), with much deforestation and land clearing taking place during the British colonial period (1815–1948, the first tea estate established in 1867). Change in land use and land cover did not end with the British but has continued in recent years with impacts sometimes extending into forest reserves or protected areas (Rathnayake *et al.* 2020). For these reasons, *M. phyllanthifolium* has been assessed as Critically Endangered in accordance with IUCN criteria (Sri Lanka Biodiversity Secretariat and National Herbarium 2020). Given that the plant was last seen more than 40 years ago, high priority should be placed on its rediscovery in the wild.

On vegetative characteristics alone, *M. phyllanthifolium* is remarkably unlike any other *Memecylon* species found on the island. Its foliar sclereids were described by Bremer (1988) as “roughly isodiametric or 2–4 times as long as wide, with short arms and knobs” (see also Rao 1957, Bremer 1979, Rao *et al.* 1980). The ramiform sclereids, similar to those found in *Lijndenia capitellata* and *L. gardneri*, together with some unspecified floral characters, led Bremer (1988) to suggest that *M. phyllanthifolium* might be better placed in *Lijndenia*, but he stopped short of formally effecting this transfer, citing the need for further studies of material with flowers and fruits containing well-developed embryos. The species was not included in Bremer’s (1981) study on seeds and embryos of Sri Lankan *Memecylon* sensu lato, evidently because of a lack of available material. *Memecylon phyllanthifolium* furthermore would not key to *Lijndenia* in Bremer’s (1988) treatment, because its leaves are apparently 1-nerved (lateral nerves invisible), not strongly 3-nerved as in *L. capitellata* and *L. gardneri*.

The present author has re-examined the herbarium material of *M. phyllanthifolium* in G-DC and K and found that it shares taxonomically important characteristics with members of genus *Lijndenia*—i.e., the papillose-muricate leaves and persistent, cupulate bracteoles subtending individual flowers. The collection *Worthington 3243* (in K) has numerous flowers as well as two globose fruits (the latter kept in a paper capsule mounted on the sheet). Because of the limited material, permission was not obtained to dissect the fruit and study the characteristics of the embryo. In August 2017, a team of Sri Lankan botanists made an unsuccessful attempt to relocate and collect DNA material of *M. phyllanthifolium* from its last known locality (the Peak Wilderness). Despite these limitations, the available evidence clearly warrants transfer of *M. phyllanthifolium* to the genus *Lijndenia*, necessitating a new combination.

Taxonomy

Lijndenia phyllanthifolia (Thwaites ex Beddome 1872: 116) R.D.Stone, *comb. nov.* Basionym: *Memecylon phyllanthifolium* Thwaites ex Beddome (1872: 116). Fig. 1.

Type:—SRI LANKA. Nuwara Eliya district, Bogawantalawa, March 1866, *C.P. 3901* (Lectotype PDA [designated by Bremer 1979: 30]!, islectotype K [barcode K000357768]!). Note: A different number, *C.P. 3900*, was cited by Beddome (1872), but this was presumably a typographical error. In K there are two sheets of *C.P. 3901* bearing the barcode numbers K000357768 and K000859176, respectively. Of these, K000357768 is presumably an islectotype, as it is labeled with the same locality and collecting date (“March 1866”) as the lectotype in PDA. The remaining sheets of *C.P. 3901* distributed to various herbaria are evidently not from the same gathering as the lectotype, as they are labeled with different collecting dates or localities (see Wheeler 1983 and discussion under “Thwaites” in Stafleu & Cowan 1986).

Additional specimens examined:—SRI LANKA. Ratnapura district, Bopatalawa, s.d., *C.P. 3901* (P); Ratnapura district, Balangoda Estate, jungles, 07 Feb 1940, *Worthington 759* (K, PDA); Nuwara Eliya district, Devonford Estate, upper Dikoya, elev. 5100 [ft.], NE of the SW escarpment, 19 Oct 1947, *Worthington 3243* (BM, K, PDA); boundary between Nuwara Eliya and Ratnapura districts, Peak Wilderness above Devonford and Maratenna Estate[s], 6°45'N, 80°39'E, elev. 1650 m, 15 Aug 1984, *Jayasuriya et al. 2811* (MO, PDA); sine loc., 25 May 1866, *C.P. 3901* (K); sine loc., anno 1868, *C.P. 3901* (G, G-DC, P, US); sine loc., s.d., *C.P. 3901* (BR); sine loc., s.d., *Thwaites* s.n. (NY).

Acknowledgements

The curators of the following herbaria are thanked for providing access to or loans of specimens or specimen-images: BR, G, G-DC, K, MO, NY, P, PDA, US. The author is also grateful to the staff of the Bews Herbarium (NU), to

Sandie Burrows for her fine work on the line drawing, to Kåre Bremer and another, anonymous reviewer for their time and helpful comments on the manuscript, and to the handling editor Lucas C. Majure for additional, constructive comments. Support for this research was provided by UKZN.

References

- Bachman, S., Moat, J., Hill, A.W., de la Torre, J. & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *ZooKeys* 150: 117–126.
<https://doi.org/10.3897/zookeys.150.2109>
- Beddome, R.H. (1872) *The forester's manual of botany for southern India*. Gantz Brothers, Madras. [This work was published in a series of parts with publication dates ranging from about April 1869 to March 1874, fide Turner (2012). The treatment of *Memecylon* sensu lato was published in part 18 with a publication date of June 1872. Turner (2012) follows TL-2 (Stafleu & Cowan 1976) in treating Beddome's manual as part of his 2-volume *Flora sylvatica for southern India*, which was published at the same time but is separately paginated. However, the BHL version of the *Flora sylvatica*, which was scanned from the copies held in the Smithsonian Institution, does not include the Manual which is found in the same library as a separate, third volume. Beddome's manual is also treated as a separate publication in IPNI]
- Bremer, K. (1979) Taxonomy of *Memecylon* (Melastomataceae) in Ceylon. *Opera Botanica* 50: 1–32.
- Bremer, K. (1981) Seeds and embryos in Sri Lanka (Ceylonese) species of *Memecylon*, with notes on *Spathandra* (Melastomataceae). *Nordic Journal of Botany* 1: 62–65.
<https://doi.org/10.1111/j.1756-1051.1981.tb01036.x>
- Bremer, K. (1982) *Lijndenia*, a re-established paleotropical genus of the Melastomataceae – Memecyleae. *Nordic Journal of Botany* 2: 121–124.
<https://doi.org/10.1111/j.1756-1051.1982.tb01171.x>
- Bremer, K. (1988) Melastomataceae. In: Dassanayake, M.D. (Ed.) *A revised handbook to the flora of Ceylon*, vol. 6. A.A. Balkema, Rotterdam, pp. 157–240.
- Gilg, E. (1904) Drei interessante Melastomataceae aus Deutsch-Ostafrika. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 34: 99–102.
- Hughes, M. & Wijedasa, L.S. (2012) *Memecylaceae of Thailand and Peninsular Malaysia*. Available from: <http://padme.rbge.org.uk/memecylaceae/> (accessed 24 February 2025)
- Jacques-Félix, H. (1977) La graine et l'embryon chez les *Memecylon* (Mélastomatacées) africains. *Adansonia*, sér. 2, 17: 193–200.
- Jacques-Félix, H. (1978) Les genres de Memecyleae (Melastomataceae) en Afrique, Madagascar et Mascareignes. *Adansonia*, sér. 2, 18: 221–235.
- Jacques-Félix, H. (1983) Mélastomatacées. Vol. 24. In: Satabié, B. & Leroy, J.-F. (Eds.) *Flore du Cameroun*. Délégation Générale à la Recherche Scientifique et Technique, Yaoundé.
- Jacques-Félix, H. (1985a) Les Memecyleae (Melastomataceae) de Madagascar (1re partie). *Bulletin du Muséum national d'Histoire naturelle* (Paris), 4e sér., sect. B (*Adansonia*), 6: 383–451 [dated 1984, published 1985] [<http://www.biodiversitylibrary.org/item/49419#page/400/mode/1up>]
- Jacques-Félix, H. (1985b) Les Memecyleae (Melastomataceae) de Madagascar (2e partie). *Bulletin du Muséum national d'Histoire naturelle* (Paris), 4e sér., sect. B (*Adansonia*), 7: 3–58 [<http://www.biodiversitylibrary.org/item/49405#page/5/mode/1up>]
- Jacques-Félix, H. (1995) Histoire des Melastomataceae d'Afrique. *Bulletin du Muséum national d'Histoire naturelle* (Paris), 4e sér., sect. B (*Adansonia*), 16: 235–311 [dated 1994, published 1995] [<http://www.biodiversitylibrary.org/item/49406#page/403/mode/1up>]
- Jacques-Félix, H., Mouton, J.A. & Chalopin, M. (1978) Nervation et types foliaires chez les *Memecylon* (Melast.) africains. *Adansonia*, sér. 2, 18: 67–81.
<https://doi.org/10.5962/p.297139>
- Linnaeus, C. (1753) *Species plantarum*. Laurentius Salvius, Stockholm.
<https://doi.org/10.5962/bhl.title.669>
- Moritz, A. (1846) *Systematisches Verzeichniss der von H. Zollinger in den Jahren 1842–1844 auf Java gesammelten Pflanzen*. Verfassers, Solothurn.
- Rao, T.A. (1957) Comparative morphology and ontogeny of foliar sclereids in seed plants. I. *Memecylon* L. *Phytomorphology* 7: 306–330.
- Rao, T.A., Bremer, K. & Chakraborti, S. (1980) Foliar sclereids in Sri Lanka (Ceylonese) species of *Memecylon* (Melastomataceae). *Botaniska Notiser* 133: 397–401.

- Rao, T.A. & Jacques-Félix, H. (1978) Les types de sclérites foliaires et la classification des *Memecylon* africains. *Adansonia*, sér. 2, 18: 59–66.
<https://doi.org/10.5962/p.297138>
- Rao, T.A., Bremer, K. & Naidu, T.R.B. (1983) Foliar sclereids in *Memecylon* and *Lijndenia* (Melastomataceae) from Borneo, Java, Malaya and Sumatra. *Nordic Journal of Botany* 3: 343–345.
<https://doi.org/10.1111/j.1756-1051.1983.tb01947.x>
- Raphael, S. (1970) The publication dates of the *Transactions of the Linnean Society of London*, series I, 1791–1875. *Biological Journal of the Linnean Society* 2: 61–76.
<https://doi.org/10.1111/j.1095-8312.1970.tb01688.x>
- Rathnayake, C.W.M., Jones, S. & Soto-Berelov, M. (2020) Mapping land cover change over a 25-year period (1993–2018) in Sri Lanka using Landsat time-series. *Land* 9: 27.
<https://doi.org/10.3390/land9010027>
- Sri Lanka Biodiversity Secretariat and National Herbarium (2020) *The National Red List 2020: conservation status of the flora of Sri Lanka*. Biodiversity Secretariat, Ministry of Environment in collaboration with the National Herbarium, Peradeniya. Available from: <https://lk.chm-cbd.net/sites/lk/files/2022-06/The%20National%20Red%20List%202020-The%20Conservation%20Status%20of%20the%20Flora%20of%20Sri%20Lanka.pdf> (accessed 24 February 2025)
- Stafleu, F.A. & Cowan, R.S. (1976) *Taxonomic literature* (2nd ed.), vol. 1 (A–G). Bohn, Scheltema & Holkema, Utrecht.
- Stafleu, F.A. & Cowan, R.S. (1986) *Taxonomic literature* (2nd ed.), vol. 6 (Sti–Vuy). Bohn, Scheltema & Holkema, Utrecht.
- Stone, R.D. (2004) *Phylogenetic systematics of Melastomataceae, subfamily Olisbeoideae*. Ph.D. dissertation, University of California, Berkeley.
- Stone, R.D. (2006) Phylogeny of major lineages in Melastomataceae, subfamily Olisbeoideae : utility of nuclear glyceraldehyde 3-phosphate dehydrogenase (*GapC*) gene sequences. *Systematic Botany* 31: 107–121.
<https://doi.org/10.1600/036364406775971741>
- Stone, R.D. (2014) The species-rich, paleotropical genus *Memecylon* (Melastomataceae): molecular phylogenetics and revised infrageneric classification of the African species. *Taxon* 63: 539–561.
<https://doi.org/10.12705/633.10>
- Stone, R.D. (2017) Revised treatment of the genus *Lijndenia* (Melastomataceae, Olisbeoideae) in Madagascar. *Candollea* 72: 67–86.
<https://doi.org/10.15553/c2017v721a7>
- Stone, R.D. (2018) *Lijndenia meeusei*, the correct name for the species previously known as *L. lutescens* (Melastomataceae, Olisbeoideae). *Candollea* 73: 257–259.
<https://doi.org/10.15553/c2018v732a10>
- Stone, R.D. (2022) Phylogeny and circumscription of the subfamily Olisbeoideae. In: Goldenberg, R., Michelangeli, F.A. & Almeda, F. (Eds.) *Systematics, Evolution, and Ecology of Melastomataceae*. Springer, Cham, pp. 167–192.
https://doi.org/10.1007/978-3-030-99742-7_6
- Stone, R.D. & Andreasen, K. (2010) The Afro-Madagascan genus *Warneckea* (Melastomataceae): molecular systematics and revised infrageneric classification. *Taxon* 59: 83–92.
<https://doi.org/10.1002/tax.591009>
- Stone, R.D. & Luke, Q. (2015) *Lijndenia udzungwarum* (Melastomataceae—Olisbeoideae): a new, endemic species from the Udzungwa Mountains of southern Tanzania. *Phytotaxa* 226: 169–176.
<https://doi.org/10.11646/phytotaxa.226.2.6>
- Thwaites, G.H.K. (1859) *Enumeratio plantarum zeylaniae*. Dulau & Co., London. [According to *TL-2* (Stafleu & Cowan date?), this work was published in five parts with publication dates ranging from November 1858 to December 1864. The treatment of *Memecylon* sensu lato was published in part 2 with a publication date of September–October 1859]
- Triana, J. (1871 publ. 1872) Les Mélastomacées. *Transactions of the Linnean Society of London* 28: 1–188. [This work was published in early January 1872, fide Raphael (1970), not 1871 as shown on the title page]
<https://doi.org/10.1111/j.1096-3642.1871.tb00222.x>
- Turner, I.M. (2012) The angiosperm taxa of R.H. Beddome with notes on the dates of publication of two serially published works. *Annales Botanici Fennici* 49: 289–304.
<https://doi.org/10.5735/085.049.0601>
- Walker-Arnott, G.A. (1836) *Pugillus plantarum indiae orientalis*. Reprinted (possibly preprinted) from *Nova Acta Academia Caesararum Leopoldino-Carolina Naturae Curiosorum* 18 (1): 319–356.
- Watte Vidanelage, N.S. & Wanasingha, W.A.K.I. (2024) *Validated high resolution (12.5m) DEM for Sri Lanka*. Mendeley Data. Available from: <https://doi.org/10.17632/hzf2fpndpt.1> (accessed 22 February 2025)
- Wheeler, L.C. (1983) Citation of the nineteenth century specimens in the herbarium at Peradeniya. *Ceylon Journal of Science, Biological Sciences* 16 (1 & 2): 58–64.