DALAT UNIVERSITY JOURNAL OF SCIENCE Volume 15, Issue 2, 2025 23–30

# *DYSOXYLUM MOLLISSIMUM* (SPRENG.) BLUME EX G. DON (MELIACEAE), A NEW RECORD FOR THE FLORA OF VIETNAM

**Luong Van Dung[a*], Le Ngoc Trieu[b], Nguyen Tan Dat[b], Nguyen Van Ket[c], Hoang Thanh Truong[d]**

*[a]Center for Biodiversity and Climate Change Research, Dalat University, Lam Dong, Vietnam*
*[b]Faculty of Biology, Dalat University, Lam Dong, Vietnam*
*[c]Faculty of Agriculture and Forestry, Dalat University, Lam Dong, Vietnam*
*[d]Forest Science Institute of Central Highlands and South of Central Vietnam (FSICHSCV), Lam Dong, Vietnam*
*[*]Corresponding author: Email: dunglv@dlu.edu.vn*

**Article history**
Received: June 6th, 2024
Received in revised form: October 16th, 2024 | Accepted: October 22nd, 2024
Available online: December 23rd, 2024

## Abstract

*Dysoxylum mollissimum (Spreng.) Blume ex G. Don is a new record for the flora of Vietnam. This species is distributed in primary and secondary forests in scattered populations at elevations of 800–1200 m above sea level in the provinces of Gia Lai and Lam Dong in the Central Highlands of Vietnam. It is most similar to Dysoxylum loureiri (Pierre) Pierre in the characters of general vegetative habit and the shape of the leaves, calyx, petals, and stamens. The investigated taxon is closely related to Didymocheton mollissimus (Spreng.) Mabb., a synonym of Dysoxylum mollissimum (Spreng.) Blume ex G. Don, in all three clustering methods used. This indicates that the investigated taxon belongs to Dysoxylum mollissimum (Spreng.) Blume ex G. Don and can be considered an ecological variety of this species.*

**Keywords:** *Dysoxylum mollissimum*; Flora; New record; Vietnam.

DOI: https://doi.org/10.37569/DalatUniversity.15.2.1350(2025)

Article type: (peer-reviewed) Full-length research article

## 1. INTRODUCTION

*Dysoxylum* Blume is a genus of Meliaceae with about 95 species, distributed across tropical Asia, tropical and subtropical Australia, and the Pacific islands (Holzmeyer et al., 2021; Peng & Mabberley, 2008). Vietnam has 15 species: *D. alliaceum* (Blume) Blume, *D. arborescens* (Blume) Miq., *D. binectariferum* (Roxb.) Hook. f. ex Bedd., *D. cauliflorum* Hiern., *D. cochinchinense* Pierre, *D. gobarum* (Buch.-Ham.) Merr., *D. hoaense* (Pierre) Pell., *D. juglans* (Hance) Pell., *D. loureiri* (Pierre) Pierre, *D. lukii* Merr., *D. perryanum* Pierre, *D. poilanei* Pell., *D. rubrocostatum* Pierre, *D. tonkinense* A. Chev. ex Pell., and *D. tpongense* Pierre (Ha et al., 2022; Loureiro, 1790; Pham-Hoang, 1999; Pierre, 1896; Tran, 2003).

*Dysoxylum mollissimum* Blume was first published in 1825 (Blume, 1825). The name was changed in 1827 to *Trichilia mollissima* Spreng in Sprengel's system (Sprengel, 1827), and it was combined in 1831 with G. Don as *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don (Don, 1831). The latter is a synonym of *Didymocheton mollissimus* (Spreng.) Mabb. (Holzmeyer et al., 2021). The species occurs in China, Bhutan, India, Bangladesh, Indonesia, Malaysia, Myanmar, and the Philippines (Holzmeyer et al., 2021; Peng & Mabberley, 2008). The suspicion that the genus *Dysoxylum* is polyphyletic has existed for a long time (Mabberley, 1979), and this was confirmed in the study of Holzmeyer et al. (2021).

A *Dysoxylum* specimen was collected during a floristic survey in the Central Highlands, Vietnam, in 2022 to 2024. After analyzing and comparing it with morphologically similar *Dysoxylum* species (Pellegrin, 1910; Peng & Mabberley, 2008; Pham-Hoang, 1999; Pierre, 1896), we concluded that this specimen is a new record in the flora of Vietnam. It is named *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don.

## 2. NEW RECORD

*Dysoxylum mollissimum* (Spreng.) Blume ex G. Don, 1831.

**Syn.:** *Dysoxylum filicifolium* H. L. Li; *Dysoxylum hainanense* Merrill; *Dysoxylum hainanense* var. glaberrimum F. C. How & T. C. Chen; *Dysoxylum mollissimum* var. glaberrimum (F. C. How & T. C. Chen) P. Y. Chen.

**Lectotype:**—JAVA: G. Salak, Blume s. n. ["602"; acc. 903295276] (L barcode L 0017238!).

**Description:** Trees 20 m tall, deciduous. Twigs and young leaves puberulent. Leaves alternate, pinnate; petiole 30–40(–80) cm, sparsely pubescent to glabrous; leaflets 9–11 pairs, subopposite to opposite; oblong to oblong-lanceolate, asymmetric, 10–13 cm long, 3.5–4.5 cm wide, membranous; base broadly obtuse to round, asymmetric, apex acuminate; below glabrous or sparsely villous, domatia foveoles with tufts of hair at the orifice; above glabrous; petiolules 4–5 mm, glabrous or sparsely pubescent; midrib and lateral veins sunken above, protruding below, secondary veins 10–15 on each side. Inflorescence axillary or subaxillary, 10–25 cm long, nearly glabrous; branches few, 5–6

cm at base of thyrse. Flowers 4-merous, 3–4.5 mm in diam., pedicel 1.5–2 mm, pubescent. Calyx 4, cup-shaped, ca. 2 mm in diam., outside sparsely short pubescent, lobes round. Petals 4, free, light yellow, linear to spatulate, 7–8 mm long, 2–2.5 mm wide, glabrous, apex obtuse. Androecium 8 stamens, tube cylindric, 6–7 mm high, both surfaces white villous, apical margin crenate. Disk cylindric, 2–2.5 mm high, longer than ovary, margin ciliate and crenate, inside white sparsely villous. Ovary conic, 4 locular, 1–1.5 mm high, 1–1.2 mm wide, densely villous; style 6–7 mm, base villous. Capsule globose, light yellow, 1.8–2.2 cm in diam.; glabrous, pericarp thin and flexible, dehiscent 4-valved. Seeds 1–2 per locule, narrowly ellipsoid, 1.4–1.7 cm long, 0.8–1.1 cm wide, bright red testa (Figure 1).

**Specimens examined:**—VIETNAM (new record). Gia Lai Province, K'Bang District, Son Lang Commune, 14°43′54,53″, 108°59′12,13″, elev. 860 m, Luong Van Dung DL220701 (DLU). Lam Dong Province, Dalat, Ta Nung Commune, 11°55′42″, 108°20′48″, elev. 1160 m, Luong Van Dung, Hoang Thanh Truong, Le Ngoc Trieu, Nguyen Tan Dat DL240301 (DLU).

**Habitat and Ecology:** *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don grows on slopes in primary and secondary forests scattered at elevations of 800–1200 m above sea level in association with *Castanopsis echidnocarpa* Hook. f. & Thomson ex Miq., *Ixonanthes reticulata* Jack, *Schima superba* Gardner & Champ., and *Syzygium zeylanicum* (L.) DC. Flowering 7–9, fruiting 3–4.

**Note:** Based on morphological characteristics, *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don is most similar to *Dysoxylum loureiri* (Pierre) Pierre in the characters of general vegetative habit and the shape of the leaves, calyx, petals, and stamens. A comparison of their characters is given in Table 1. Following sensu stricto (s. str.) *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don is a synonym of *Didymocheton mollissimus* (Spreng.) Mabb. (Mabberley, 2021). However, in sensu lato (s. l.), we still classify this species as belonging to the genus *Dysoxylum*.

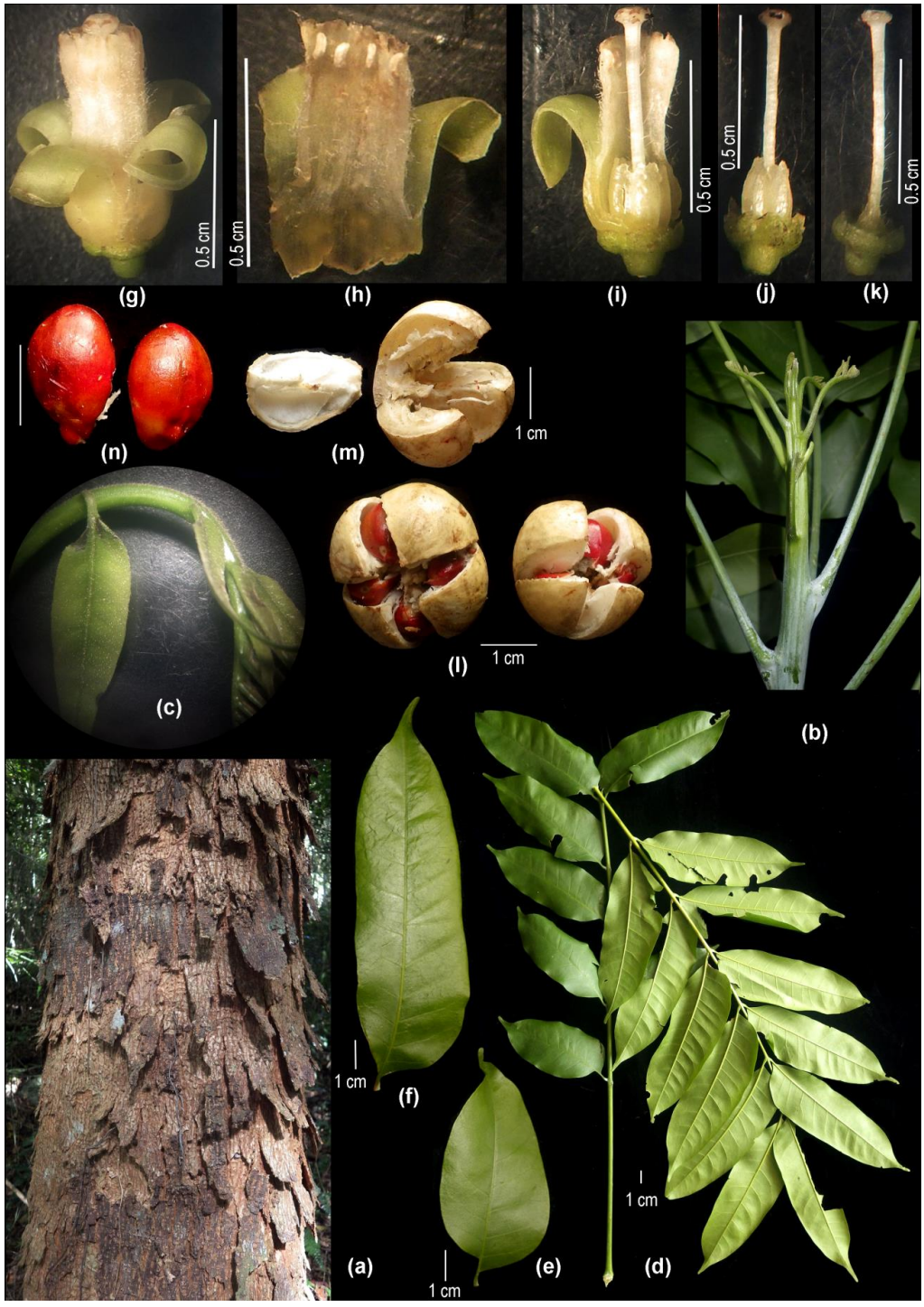


**Figure 1. Morphological characteristics of *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don**

Notes: (a) Bark; (b) Young branch; (c) Young leaf; (d) Compound leaves; (e) Leaflet (at base of leaf, abaxial surface); (f) Leaflet (adaxial surface); (g) Flower (side view); (h, i) Androecium (cross section); (j) Disk with style; (k) Ovary; (l) Capsule; (m) Pericarp; (n) Seeds.

Source: Photos by Luong Van Dung.

**Table 1. Morphological comparison of *Dysoxylum loureiri* and *Dysoxylum mollissimum***

| Character | *Dysoxylum loureiri* (Pierre, 1896; Pellegrin, 1910) | *Dysoxylum mollissimum* |
|---|---|---|
| Young branch | pubescent | puberulent |
| Leaves | alternate, pinnate, 5–9 pairs leaflets | alternate, pinnate, 9–11 pairs leaflets |
| Petiole | 30–40 cm, pubescent | 30–40(–80) cm, sparsely pubescent to glabrous |
| Leaflets | opposite or alternate, above glabrous, below glabrescent | subopposite to opposite, above glabrous, below glabrous or sparsely villous |
| Apex leaflets | long acuminate | acuminate |
| Base leaflets | obtuse to round, asymmetric | broadly obtuse to round, asymmetric |
| Inflorescence | subaxillary | axillary or subaxilliary |
| Calyx | 4, inside villous, outside glabrous | 4, cup-shaped, outside sparsely short pubescent |
| Petals | 4, inside villous, outside glabrous | 4, glabrous |
| Stamens | 8, tube, inner surfaces hirsute | 8, tube cylindric, both surfaces white villous |
| Disk | shallow cup-shaped, glabrous | cylindric, inside white sparsely villous |
| Ovary | globose, 3–4 locular, densely villous | conic, 4 locular, densely villous |
| Style | villous | base villous |
| Capsule | globose, pubescent, dehiscent 3–4 valved | globose, glabrous, dehiscent 4 valved |
| Seeds | - | bright red testa |

## 3. PHYLOGENETIC ANALYSIS

After sequencing, the three ITS sequences of the investigated taxon (Ta Nung 1 ITS) were identical; thus, only one of them, with GenBank accession number PQ510459, was used as the representative for further analysis.

Analyzing the ITS sequence of the investigated taxon using the BLAST tool indicated that all of the highly homologous sequences from GenBank of the investigated taxon belonged to Meliaceae. The highest identity belonged to *Didymocheton mollissimus* (Spreng.) Mabb. (97.65%). Next were *Dysoxylum forsteri* C. DC., *Didymocheton samoensis* (A. Gray) Holzmeyer & Hauenschild (96.39%), *Didymocheton mollis* (Miq.) Holzmeyer & Hauenschild (96.13%), *Dysoxylum rufescens* Vieill. ex Sebert & Pancher (95.48%), *Didymocheton canalensis* (Baill.) Holzmeyer & Mabb. (94.45%), *Dysoxylum bijugum* Seem. (93.98%), *Didymocheton pettigrewianus* (F. M. Bailey) Hauenschild & Holzmeyer (93.07%), and *Aglaia silvestris* (M. Roem.) Merr. (92.09%). The dendrograms for the phylogenetic relationship among the taxa including the investigated taxon and highly homologous taxa based on the ITS sequence are presented in Figures 2, 3, and 4.

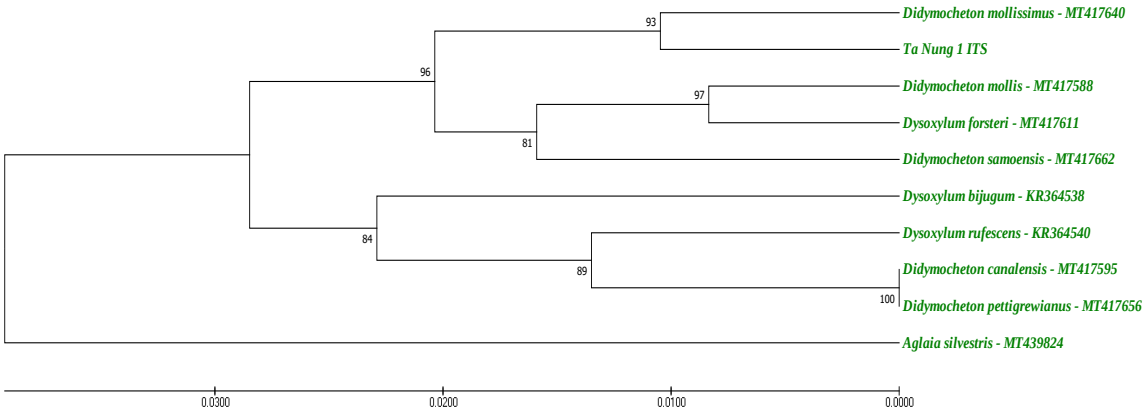


**Figure 2. Dendrogram of the phylogenetic relationship among surveyed taxon and other taxa with highly homologous sequences based on ITS sequences using the unweighted pair group with arithmetic mean method (bootstrap value = 2000)**

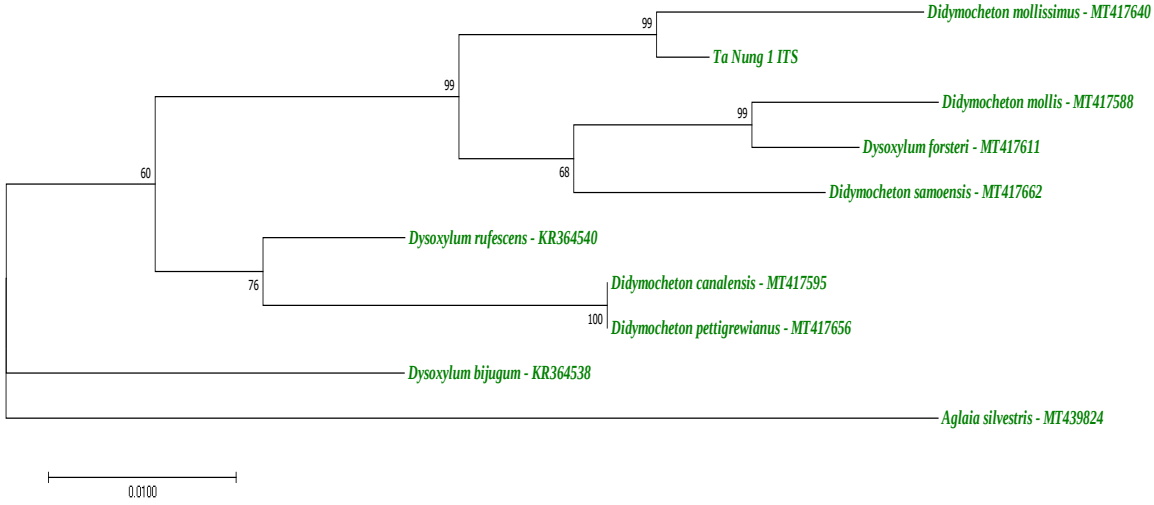


**Figure 3. Dendrogram of the phylogenetic relationship among surveyed taxon and other taxa with highly homologous sequences based on ITS sequences using the maximum likelihood method (bootstrap value = 2000)**

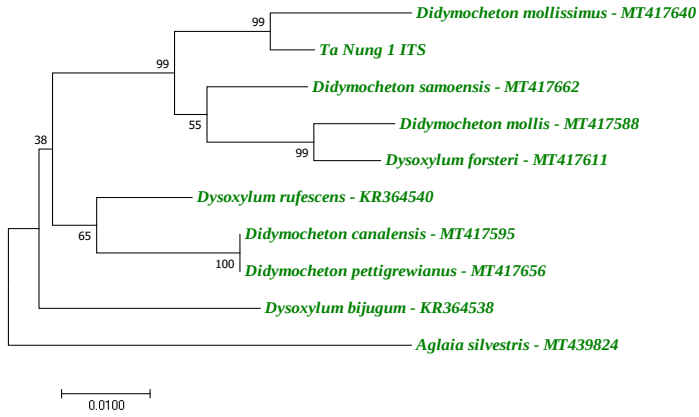


**Figure 4. Dendrogram of the phylogenetic relationship among surveyed taxon and other taxa with highly homologous sequences based on ITS sequences using the neighbor-joining method (bootstrap value = 2000)**

The clustering results from Figures 2, 3, and 4 all have the same characteristics: the survey taxon (Ta Nung 1 ITS) was closely grouped with *Didymocheton mollissimus* (Spreng.) Mabb. with a high bootstrap value (93). Other taxa belonging to the genera *Didymocheton* and *Dysoxylum* were not separate but alternately grouped together. This is also consistent with the study of Ha et al. (2002) in indicating that the genus *Dysoxylum* is a polyphyletic genus. It was worth noting that both *Didymocheton mollissimus* (Spreng.) Mabb. and *Didymocheton mollis* (Miq.) Holzmeyer & Hauenschild are the two other synonyms of *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don.

From the above results, it can be seen that the surveyed taxon (Ta Nung 1 ITS) belongs to the species of *Dysoxylum mollissimum* (Spreng.) Blume ex G. Don, but is not completely similar to other accessions of the same species recorded in GenBank. This can be explained by the fact that this surveyed taxon has a population distribution and, accordingly, climatic and soil conditions different from other populations of the same species. In other words, the surveyed taxon can be considered an ecological variety of the species.

## ACKNOWLEDGMENTS

The authors would like to thank Dalat University. This work was supported by the Genetic Conservation Project of Lam Dong Province, Vietnam.

## REFERENCES

Blume, C. L. (1825). *Bijdragen tot der Flora van Nederlandsch Indië* (4de Stuk). Ter Lands Drukkerij.

Don, G. (1831). *A general history of the dichlamydeous plants* (Vol. 1). Gilbert & Rivington.

Ha, M. T., Nguyen, N. H., & Mai, T. H. (2022). Taxonomical characteristics of *Dysoxylum* Blume in Vietnam. *HPU2 Journal of Science: Natural Sciences and Technology*, *1*(2), 63–67. https://doi.org/10.56764/hpu2.jos.2022.2.1.63-67

Holzmeyer, L., Hauenschild, F., Mabberley, D. J., & Muellner-Riehl, A. N. (2021). Confirmed polyphyly, generic recircumscription and typification of *Dysoxylum* (Meliaceae), with revised disposition of currently accepted species. *Taxon, 70*(6), 1248–1272. https://doi.org/10.1002/tax.12591

Loureiro, J. de (1790). *Flora Cochinchinensis* (Vol. 1, p. II). Ulyssipone. https://www.biodiversitylibrary.org/page/653185

Mabberley, D. J. (1979). The species of Chisocheton (Meliaceae). *Bulletin of the British Museum (Natural History) Botany, 6*(4), 301–386.

Pellegrin, F. (1910). "*Meliacées.*" In M. H. Lecomte (Ed.), *Flore Générale de l'Indo-Chine* (Tome 1, Fasc. 4) (pp. 337–464). Masson.

Peng, H., & Mabberley, D. J. (2008). *Dysoxylum*. In Z. Y. Wu, P. H. Raven, & D. Y. Hong (Eds.), *Flora of China* (Vol. 11) (pp. 125–129). Science Press & Missouri Botanical Garden Press.

Pham-Hoang, H. (1999). Theaceae. In P. H. Ho (Ed.), *An illustrated flora of Vietnam* (Vol. 1) (pp. 424–432). Youth Publishing House. [In Vietnamese with English summary].

Pierre, J. B. L. (1896). *Flore forestière de la Cochinchine*. Octave Doin.

Sprengel, K. (1827). *Caroli Linnaei: Systema vegetabilium* (16th ed., Vol. 4, Pars 1). Gottingae.

Tran, D. D. (2003). *Meliaceae in the list of Vietnam plants* (Vol. 2). Agricultural Publishing House.