

Post-print: A Newly Recorded Genus of Gesneriaceae from China——Tetrachondra

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Abstract

This study reports a newly recorded genus of Gesneriaceae in China—Tetraphyllum Griff. ex C. B. Clarke. The genus Tetraphyllum comprises only three species, among which Tetraphyllum confertiflorum (Drake) B. L. Burt is recorded for the first time in China. This study provides a morphological description of the genus and diagnostic characters for species differentiation, along with a detailed morphological description and color photographs of this species. Voucher specimens are deposited in the Herbarium of Guangxi Institute of Botany (IBK) and Chenshan Herbarium, Shanghai (CSH).

Full Text

Tetraphyllum Griff. ex C. B. Clarke, a Newly Recorded Genus of Gesneriaceae from China

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Abstract

Tetraphyllum Griff. ex C. B. Clarke, a newly recorded genus of Gesneriaceae from China, is reported. The genus comprises only three species, among which *Tetraphyllum confertiflorum* (Drake) B. L. Burt is recorded for the first time in China. This study provides a morphological description of the genus and diagnostic features for species delimitation, along with a detailed morphological description and color photographs of *T. confertiflorum*. Voucher specimens are deposited in the Herbarium of Guangxi Institute of Botany (IBK) and Shanghai Chenshan Herbarium (CSH).

Keywords: *Tetraphyllum confertiflorum*; Gesneriaceae; new recorded genus; Guangxi; China

Introduction

The genus *Tetraphyllum* Griff. ex C. B. Clarke was established in 1883 as a monotypic genus containing only *T. bengalense* C. B. Clarke, distributed in Bangladesh, Bhutan, and northeastern India (Clarke, 1883). In 1896, Stapf described the second species, *T. roseum* Stapf, from Thailand (Ridley, 1896), and its distribution was later extended to Laos in 2021 (Lim et al., 2021). In 1962, Burt transferred *Didissandra confertiflora* Drake (Drake, 1890) to *Tetraphyllum* as *T. confertiflorum* (Drake) B. L. Burt, a species known from northern Vietnam (Burt, 1962). However, in the *Flora of Vietnam* (Vu, 2017), the author adopted Pellegrin's (1926) view, treating this taxon as a species of *Boeica* C. B. Clarke, namely *Boeica confertiflora* (Drake) Pellegr. Based on examination of herbarium specimens and literature review, we conclude that this species aligns with *Tetraphyllum* in having opposite leaves, axillary congested cymes, and a stigma that is not distinctly bilobed, differing from *Boeica* which has alternate leaves, paniculate or unbranched cymes, and a capitate stigma. Therefore, *T. confertiflorum* belongs to *Tetraphyllum*, bringing the total number of species in the genus to three.

Nomenclaturally, Doweld (2017) argued that the generic name “*Tetraphyllum*” had been previously published as a fossil angiosperm genus (*Tetraphyllum* Hosius & von der Marck) in 1880, rendering *Tetraphyllum* Griff. ex C. B. Clarke a later homonym that should be replaced with *Tetraphylloides* Doweld. However, Bertling (2019) carefully examined the fossil type specimen and concluded that it represented an animal trace fossil; since zoological and botanical generic names are not in competition, Doweld's revision was deemed illegitimate. Middleton et al. (2021) noted that under Article 54.1a of the *Shenzhen Code* of nomenclature for algae, fungi, and plants, although *Tetraphyllum* Griff. ex C. B. Clarke is an illegitimate later homonym, Article 36.1 raises questions about the valid publication of *Tetraphyllum* Hosius & von der Marck, which was provisionally assigned to plants by its authors. The legitimacy of the fossil genus determines whether the extant genus is a later homonym, and since the former

has not been cited in any literature since its publication, Middleton et al. (2021) proposed conservation of *Tetraphyllum* Griff. ex C. B. Clarke. We concur with their recommendation.

Taxonomic Treatment

During field investigations in July 2023, we encountered an unusual Gesneriaceae species in Baishang Township, Napo County, Guangxi. The plant had four leaves clustered at the stem apex and white flowers borne in axillary clusters. Detailed observations, photographs, and floral dissections were made, and after consulting relevant specimens and literature (Drake, 1890; Pellegrin, 1926; Burt, 1962; Vu, 2017; Wei, 2018; Wei et al., 2022), we confirmed this as *Tetraphyllum confertiflorum*, representing both a new generic and specific record for China.

Tetraphyllum Griff. ex C. B. Clarke in A. L. P. P. de Candolle & A. C. P. de Candolle, Monogr. Phan. 5: 137. 1883. Type: *T. bengalense* C. B. Clarke.

Perennial herbs. Stems erect, villous; leaves opposite, with internodes extremely shortened near the apex, appearing pseudo-whorled. Leaves short-petiolate or (sub)sessile, ovate, rhombic, or broadly lanceolate, sometimes asymmetric, base oblique. Cymes axillary, congested. Calyx with 5 free or basally connate sepals. Corolla white, blue, or pink, campanulate, bilabiate or nearly actinomorphic. Fertile stamens 4, didynamous, or 2. Ovary ovoid; style slender; stigma indistinctly bilobed. Capsule 4-valved.

The genus currently comprises three species distributed in western South Asia and the Indochinese Peninsula. *Tetraphyllum confertiflorum* is readily distinguished by its white, distinctly bilabiate corolla, whereas the other two species have non-white, nearly actinomorphic flowers. *Tetraphyllum roseum* has pink flowers in lax inflorescences, while *T. bengalense* has blue flowers in capitate inflorescences.

Tetraphyllum confertiflorum (Drake) B. L. Burt in Notes Roy. Bot. Gard. Edinburgh 24: 49. 1962; —*Didissandra confertiflora* Drake in Bull. Annuel Soc. Philom. Paris, sér. 8, 2: 127. 1890. Plate I.

Perennial herb. Stem erect, 15–30 cm tall, densely covered with brownish-yellow villous hairs. Leaves opposite, with internodes extremely shortened near the apex; mature leaves on the second and third nodes typically larger, pseudo-whorled, petiolate, occasionally with a pair of young leaves scattered at the very apex; nodes four and below bearing paired, narrowly triangular leaves (bracts) that are sessile. Leaf blades papery, ovate or rhombic-ovate, 5–12 × 3–6 cm, apex acute, base broadly cuneate and slightly asymmetric, margin denticulate, initially sericeous-pilose on both surfaces, later glabrous adaxially and appressed brownish-yellow villous along veins abaxially; lateral veins 6–11, subparallel; petiole 0.5–1.5 cm, brownish-yellow villous. Cymes axillary, clustered, with short, indistinct peduncles bearing 15 or more flowers; bracts narrowly tri-

angular, ca. 1.5×0.6 cm, with ca. 7 fine veins villous along the veins; pedicels 0.5–1.2 cm, villous. Calyx 5-parted to base; lobes broadly lanceolate to narrowly triangular, $7\text{--}9 \times 2\text{--}3$ mm, villous along the midrib externally, glabrous internally. Corolla broadly campanulate, white, ca. 5 mm long, bilabiate; upper lip ca. 4 mm, 2-lobed to middle, lobes ovate-triangular with rounded apices; lower lip ca. 6 mm, with 2 pale purplish-red markings, 3-lobed, lobes triangular, subequal, with rounded apices. Stamens 5, inserted at corolla base; 4 fertile stamens didynamous, upper pair ca. 3 mm, filaments linear, slightly curved at anthesis, later spirally twisted after pollen release; lower pair ca. 4 mm, slightly twisted; 1 reduced stamen inconspicuous, linear, ca. 2 mm. Disc inconspicuous, ca. 0.5 mm high. Pistil ca. 6 mm, puberulent and glandular-pilose; ovary oblong, $2\text{--}3 \times 1\text{--}1.2$ mm; style 3–4 mm; stigma shallowly bilobed, flabellate. Capsule ca. 1 cm long, ca. 1.5 mm in diameter. Flowering May–July.

Specimens examined. CHINA. Guangxi, Napo, Baishang, Nonglong Village, $23^{\circ}12' \text{ N}$, $105^{\circ}33' \text{ E}$, alt. 685 m, 3 July 2023, B. Chen, H. J. Wei & Z. W. Zhu CB04343 (CSH!); same locality, 8 July 2023, C. Xiong & Z. L. Li XC20230708-01 (IBK!).

Habitat and Conservation

The Sino-Vietnamese border region, known as the “Green Delta” of inland Indochina, harbors exceptionally rich biological resources with high plant species diversity and endemism. Recent investigations have yielded numerous new species, including *Cyrtomium calcis* Liang Zhang, N. T. Lu & Li Bing Zhang (Lu et al., 2023), *Polystichum napoense* C. Xiong & R. H. Jiang (Xiong et al., 2023), and *Begonia barosma* X. X. Feng, Y. N. Huang & Z. X. Liu (Feng et al., 2023), as well as new generic and specific records such as *Cordisepalum phalanthopetalum* Staples (Ding et al., 2023), *Tainia epiphytica* S. Sarkar et al. (Long et al., 2023), and *Sauropus racemosus* Beille (Hu et al., 2023).

Napo County lies in southwestern Guangxi, adjacent to Vietnam’s Hà Giang Province, with which it shares floristic similarities. Since *T. confertiflorum* has been documented from Hà Giang, its occurrence in Napo was anticipated. The species was found in a forested gully, where associated herbaceous species include *Selaginella delicatula* (Desv.) Alston, *Pellionia latifolia* (Blume) Boerl., and *Stauroanthera umbrosa* (Griff.) C. B. Clarke. Surveys of similar habitats in the vicinity revealed no additional populations. The only known population comprises merely ten individuals and is situated near a road, subject to significant human disturbance. More comprehensive surveys are urgently needed to assess its conservation status thoroughly.

Guangxi is rich in Gesneriaceae resources, with 33 genera, 285 species, and 16 varieties documented prior to this discovery (Wei et al., 2023). The addition of *Tetraphyllum* increases the provincial total to 34 genera, providing valuable baseline data for Gesneriaceae research in China and contributing to floristic studies and biodiversity conservation efforts in Guangxi.

Plate I. *Tetraphyllum confertiflorum* (Drake) B. L. Burt. A. Habitat; B–C. Plants; D. Leaf blades; E. Face view of flower; F. Side view of flower; G. Bracts; H. Calyx lobes; I. Opened corolla; J. Pistil; K. Capsule.

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