



A new species of *Paraboea* (Gesneriaceae) from a karst limestone hill in southwestern Guangdong, China

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Abstract

A new species of Gesneriaceae, *Paraboea tetrabracteata*, growing in rocky crevices on a limestone hill in Guangdong, China, is described and illustrated. It is morphologically similar to *P. rufescens* and *P. dictyoneura* in leaf and flower shape, but can be distinguished by undulate to faintly sinuate blade margins, 3–6 lateral veins on each side, petioles 0.4–1.3 cm, peduncles 4–9 cm, 4 narrowly oblong-ovate bracts, calyx narrowly oblong to lanceolate or linear, a purplish corolla tube, 2 staminodes and straight fruits.

Introduction

The genus *Paraboea* (C.B. Clarke) Ridley (1905: 63; Gesneriaceae) was first described as a section in *Didymocarpus* sect. *Paraboea* Clarke (1883: 105) and elevated to generic level by Ridley (1905). It was then revised by Burt (1984) who separated the genus based on differences in indumentum, but it has now been redefined to accommodate species from *Trisepalum* Clarke (1883: 138) and *Phylloboea* Benth (1876: 1020), following a molecular phylogenetic study (Puglisi *et al.* 2011). The genus currently includes 120 species (Puglisi *et al.* 2010) and is known from southern China, northeastern India, the eastern Himalayas, Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Philippines and Indonesia east to Sulawesi, occurring mostly in limestone karst habitats (Burt 1984, Xu & Burt 1991, Xu *et al.* 2008, Chen *et al.* 2008, Kiew 2010, David 2010, Puglisi *et al.* 2011, Xu *et al.* 2012). In China and Taiwan 21 species are currently known to occur, of which eleven taxa are endemic (Li *et al.* 2004, Wei *et al.* 2010, Xu *et al.* 2008, Chen *et al.* 2008, Chen *et al.* 2012). Until now four species have been recorded from Guangdong Province (Zheng *et al.* 2005, Li *et al.* 2004, Wei *et al.* 2010).

In June 2008 the authors collected some *Paraboea* specimens in the karst region of Guangdong Province, which was suspected to be a new species. During four years these populations were monitored in the field and an ecological survey was carried out. After thorough comparison with *Paraboea* specimens from China, Vietnam and Thailand, we concluded that it was indeed an undescribed species, which we name and describe below. We used the following references to identify our material and compare descriptions: Barnett (1961), Wang (1990), Xu (1994), Fang *et al.* (1995), Pham-Hoang (2000), Burt (2001), Li *et al.* (2004), Xu & Wei (2004), Xu *et al.* (2008), Wei *et al.* (2010) and Chen *et al.* (2012).

Taxonomy

Paraboea tetrabracteata F.Wen, Xin Hong & Y.G.Wei, *sp. nov.* (Fig. 1 & 2A–H)

This new species differs from *Paraboea rufescens* in its undulate to faintly sinuate leaf blade margins, 3–6 lateral veins, 4 narrowly oblong-ovate bracts, 1.3–1.5 cm long flowers and straight capsules. It differs from *P. dictyoneura* in its elliptic to ovate, or oblong leaf blade, the undulate to faintly sinuate margins, its 3–6 lateral veins, 4–9 cm long peduncles, 4 bracts, narrowly oblong to lanceolate or linear calices, 2 staminodes and straight capsules.

Type:—CHINA. Guangdong Province: Yangchun city, Kongtong Mountain, growing on rocks, 22°11'19"N, 111°44'28"E, elevation 38–80 m, 8 June 2008 (fl.), *Fang Wen 080608* (holotype IBK!, isotype ANU!).

Terrestrial, rosulate, perennial herbs, sometimes with rhizomes up to 8 cm long. Rhizomes stout and lignified, 3–8 cm, 0.4–0.5 mm in diameter. Roots slender, fibrous. Leaves 6–10 per plant, basal or clustered near the rhizome apex; petioles flattened, 0.4–1.3 cm, ca. 0.3 cm in diameter, densely covered with appressed grey velvety hairs; leaf blades thick papery, elliptic to ovate or oblong, 6–10 × 2–3 cm, bases cuneate-attenuate, margins undulate to faintly sinuate with a densely woolly strip, apices obtuse, adaxially densely brown cobwebbed when young, glabrescent when mature, abaxially densely brown woolly; principal vein depressed above, raised beneath, lateral veins 3–6 on each side of principal vein, concave and glabrescent adaxially, convex and densely woolly (matted) indumentum abaxially, more or less curved-ascending, tertiary venation indistinct or inconspicuous. Cymes 1–4(–6), axillary or subterminal, 2–3 branches, with few to many flowers; peduncle 4–9 cm, 1.2–1.5 cm in diameter, densely covered with long golden-brown hairs; bracts 4, narrowly oblong-ovate, 8–9 × 3–5 mm, woolly outside. Pedicels 12–15 mm, densely covered with brown woolly hairs when young and becoming gradually glabrescent. Calyx 5-sect from base; segments narrowly oblong to lanceolate or linear, 4–5 mm, 1.3–1.5 mm in diameter, acuminate at apex, densely yellowish-brown woolly outside. Corolla zygomorphic, purplish to white, 13–15 mm, ca. 10 mm across; glabrous outside, glandular puberulent from base to orifice outside; tube ca. 7 mm; limb two-lipped, adaxial lip 3.3–3.6 × 4.5–4.7 mm, biparted to the middle, semi-orbicular, apex obtuse; abaxial lip 5.8–6.2 × 5.5–5.8 mm, trilobed to the base. Stamens 2, adnate to abaxial side of corolla tube ca. 1.2 mm above the base; filaments baculiform, 5–6 mm, ca. 0.6 mm in diameter, glabrous, inflated and curved on the upper part; anthers fused by their entire adaxial surfaces, oblong, 3–4 × ca. 2 mm. Staminodes 2, linear, 3–4 mm, adnate to adaxial side of corolla tube ca. 1 mm above the base. Pistil ca. 9 mm, sparsely glandular puberulent to glabrous; ovary narrowly conical, ca. 6 mm, ca. 1 mm in diameter; style glabrous, ca. 3.5 mm, curved; stigma 1, terminal, capitate. Fruit a slender capsule, 2.0–2.5 cm, 0.1 cm in diameter, glabrous, slightly curved, not twisted, dehiscent loculicidally to base. Seeds elliptic, brown, ca. 0.6 × 0.4 mm.

Distribution:—China. Only known from a small population at the type locality on Kongtong Mountain (22°11'N, 111°44'E) ca. 16 km west of Yangchun City in southwestern Guangdong Province (Figure 4).

Habitat and flowering time:—*Paraboea tetrabracteata* grows in crevices of sun-facing cliffs of a limestone hill, at an elevation between 38 and 80 m. The forest where *P. tetrabracteata* occurs is subtropical evergreen broad-leaved forest. Flowering time is in June.

Etymology:—The epithet refers to its four bracts.

Vernacular name:—SiBao Zhumaotai (Chinese).

Notes:—*Paraboea tetrabracteata* is morphologically similar to *P. dictyoneura* (Hance 1883: 169) B.L.Burtt (in Burtt 1984) and *P. rufescens* (Franchet 1884: 449) B.L.Burtt (in Burtt 1984) in several characters (Figure 3), but can be easily distinguished by the characters provided in Table 1.

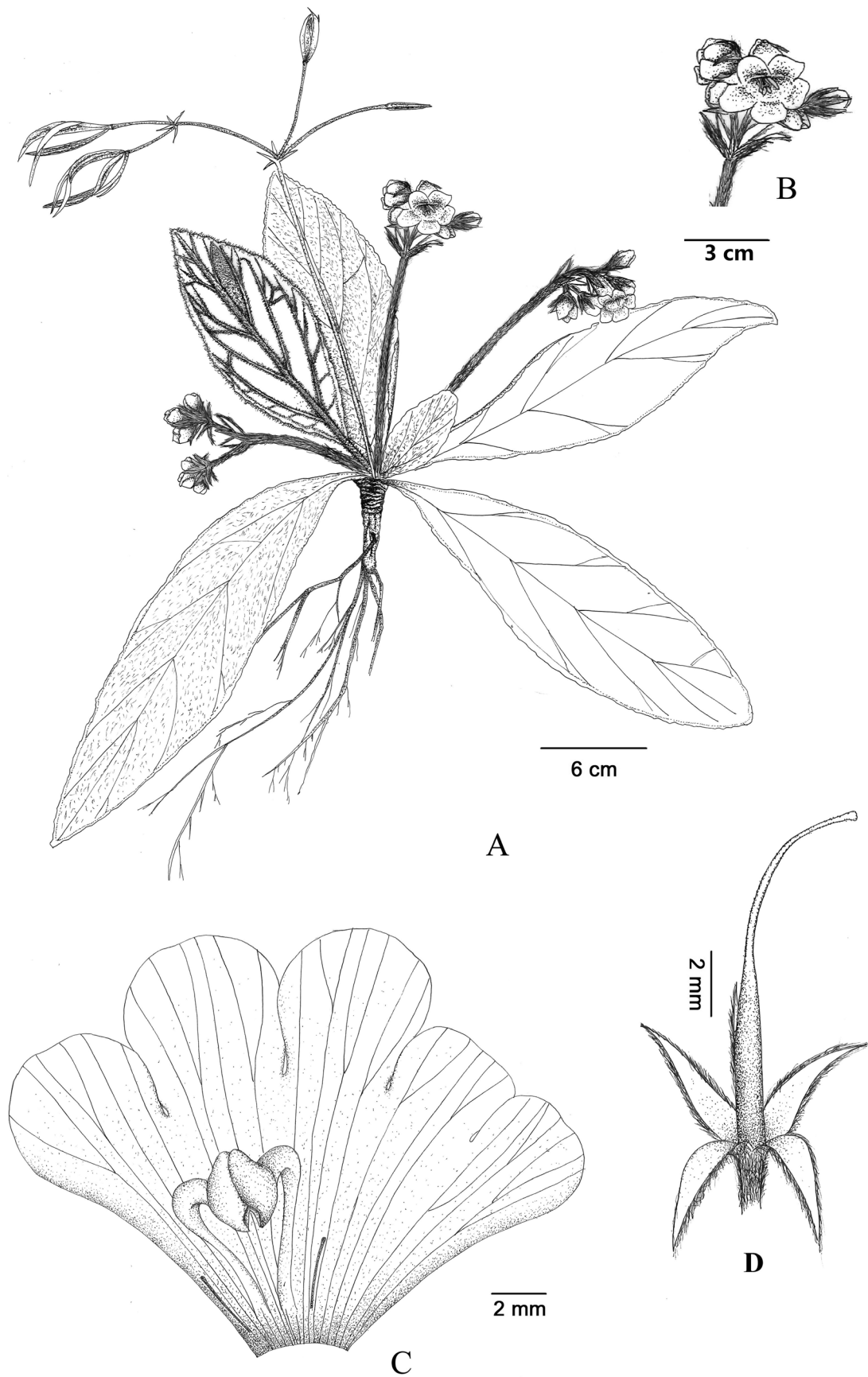


FIGURE 1. A–D: *Paraboea tetrabracteata* (A) Habit in flowering period. (B) Cyme with opening flowers, buds and four bracts. (C) Dissection of a flower showing stamens and staminodes. (D) Calyx and pistil (drawn from the holotype).

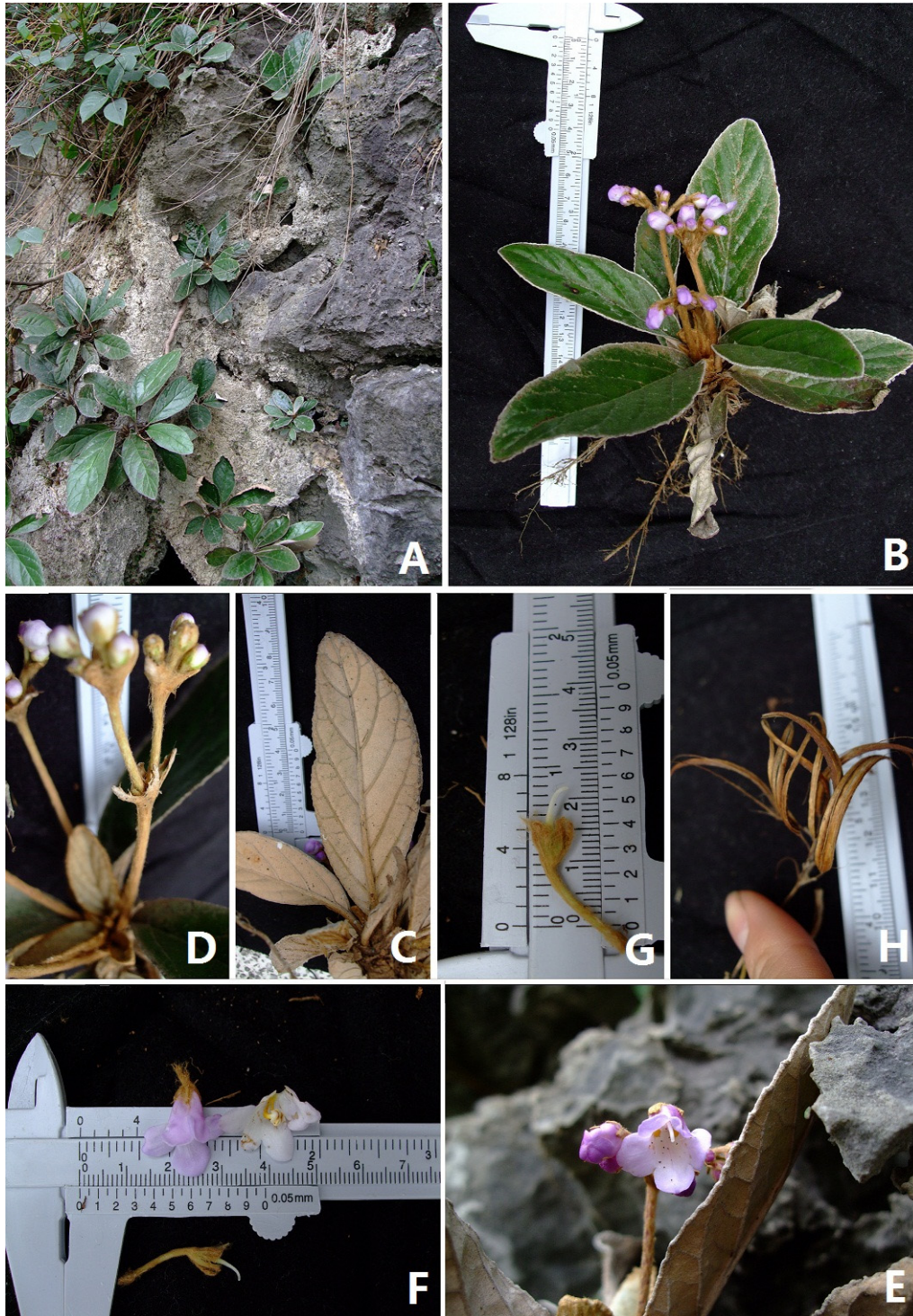


FIGURE 2. A–H: *Paraboea tetrabracteata* (A) Habitat. (B) Plants with flowers. (C) Abaxial leaf blade. (D) Cyme and bracts. (E) Cyme and opening flower. (F) Flowers for showing inner. (G) Peduncle and calyx lobes with densely brown pappose, and glabrous pistil. (H) Slightly curved capsule.

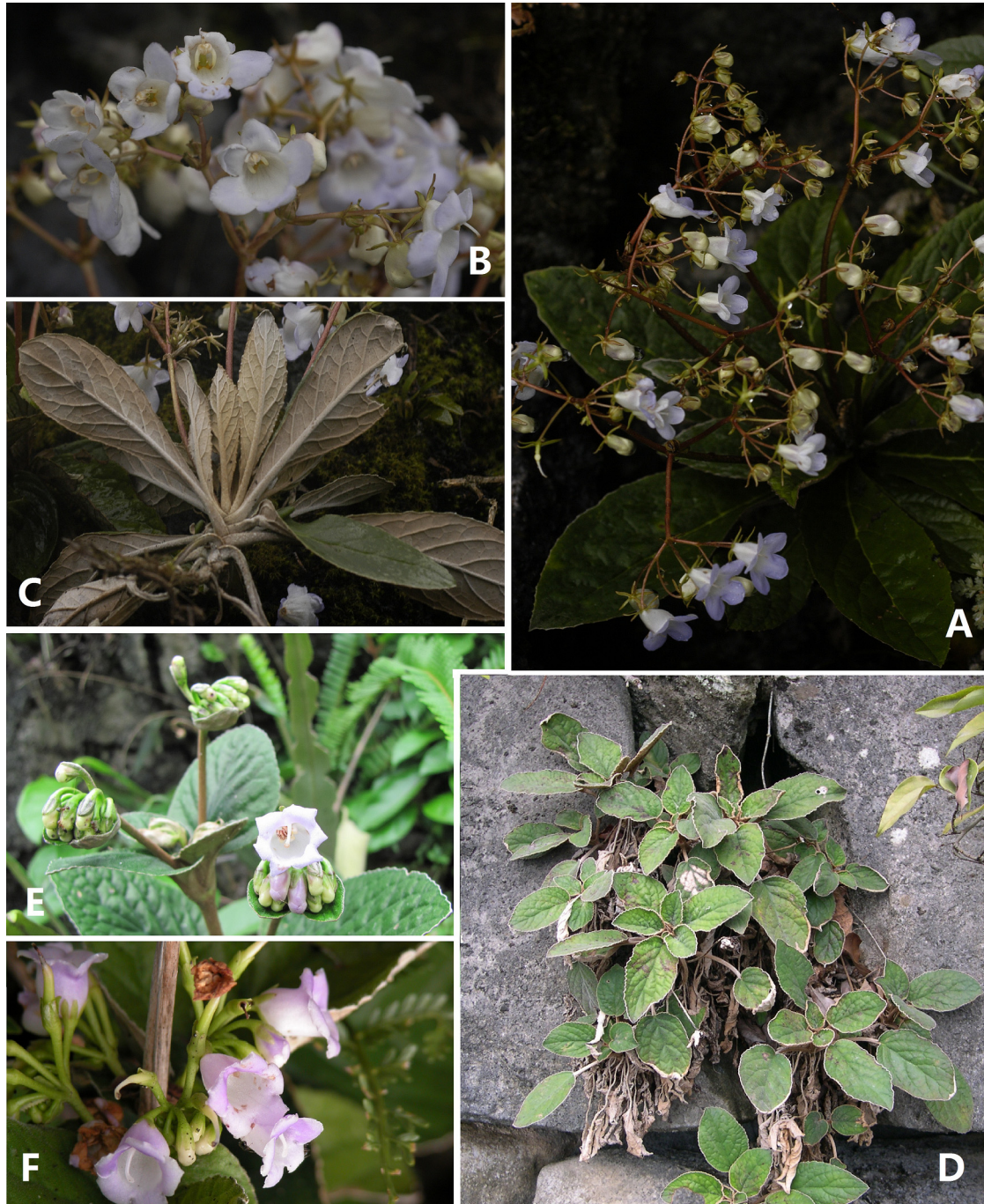


FIGURE 3. A–C: *Paraboea dictyoneura*. (A) Plant with cymes and flowers. (B) Cyme and opening flowers. (C) Abaxial leaf blade. D–F: *Paraboea rufescens*. (D) Plants. (E) Cymes. (F) Opening Flowers. (Figures A–C by Mr. An-Qiang Dong, E by Mr. Van-Truong Do)

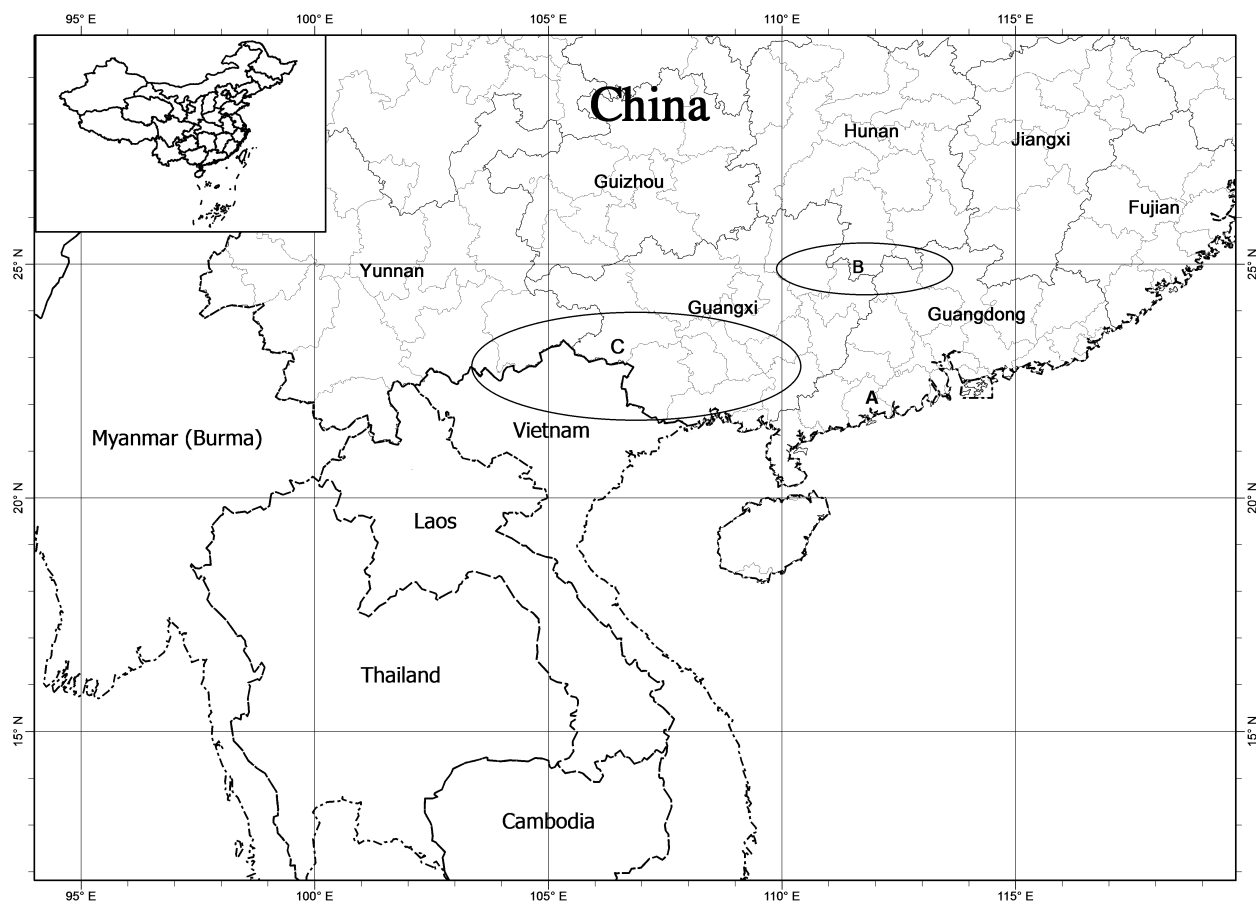


FIGURE 4. A–C: Distribution maps. (A) *Paraboea tetrabracteata*. (B) *Paraboea dictyoneura*. (C) *Paraboea rufescens*.

TABLE 1. Diagnostic characters of *Paraboea tetrabracteata* and the similar species *P. rufescens* and *P. dictyoneura*.

characters	<i>P. tetrabracteata</i>	<i>P. rufescens</i>	<i>P. dictyoneura</i>
habit	herbs	subshrubs or herbs	subshrubs or herbs
stem	rhizomes sometimes up to 8 cm long	with stems to 30 cm	rhizomes sometimes up to 10 cm long
leaf blade	elliptic to ovate, or oblong	elliptic to obovate, ovate, or oblong	oblanceolate, rarely obovate
blade margin	undulate to faintly sinuate	densely crenate-serrate	irregularly serrate to dentate or subentire
lateral veins	3–6	5–10	5–10
petiole length (cm)	0.4–1.3	(0.5–)1–10	(0–)1–4
peduncles length (cm)	4–9	4–12	8–21
bracts	4, narrowly oblong-ovate	2, ovate to suborbicular	2 (or 3), lanceolate to narrowly oblong
calyx	narrowly oblong to lanceolate or linear	narrowly oblong to lanceolate or linear	linear to narrowly triangular
flower size (cm)	1.3–1.5	1.0–1.3	1.2–1.5
corolla tube	purplish	white to purplish	purplish
staminodes	2	2	3
fruits	straight	spirally twisted	spirally twisted
flowering time	June	June–October	April–May

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