

## A new species of *Paraboea* (Gesneriaceae) from Thailand

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**ABSTRACT.** A new species, *Paraboea maculata* C.Puglisi, is described. It is compared to similar species and the habitat on granite rocks, unusual for the genus, is highlighted.

**Keywords.** Gesneriaceae, *Paraboea*, Thailand

### Introduction

A *Paraboea* (C.B.Clarke) Ridl. specimen, collected in fruit in Khao Khitchakut National Park in Chanthaburi, Thailand, in 2012, was recognised at the time as likely to be an undescribed species but was not published due to lack of flowering material. It has now flowered in the Royal Botanic Garden Edinburgh and is here described as a species new to science.

*Paraboea* was revised by Xu et al. (2008) but since then the genus has been considerably enlarged through the inclusion of *Trisepalum* C.B.Clarke and *Phylloboea* Benth. (Puglisi et al., 2011) and by the description of many more species (Chen et al., 2008; Kiew, 2010, 2012; Chen et al., 2012; Triboun & Middleton, 2012; Xu et al., 2012; Triboun, 2013; Wen et al., 2013). There are now over 130 species in the genus with many species being very locally endemic (Xu et al., 2008) which brings with it conservation concerns (Xu et al., 2008; Triboun & Middleton, 2012). The centre of diversity of the genus is in Thailand with over 75 species but it is likely that there are many undiscovered species in neighbouring countries.

*Paraboea* species are lithophytes, mostly on limestone substrates. A small number of species are recorded from other substrates, such as *Paraboea elegans* (Ridl.) B.L.Burt (southern Thailand, Peninsular Malaysia) and *P. graniticola* Z.R.Xu (southern central Vietnam) from granite, and *P. pubicorolla* Z.R.Xu & B.L.Burt and

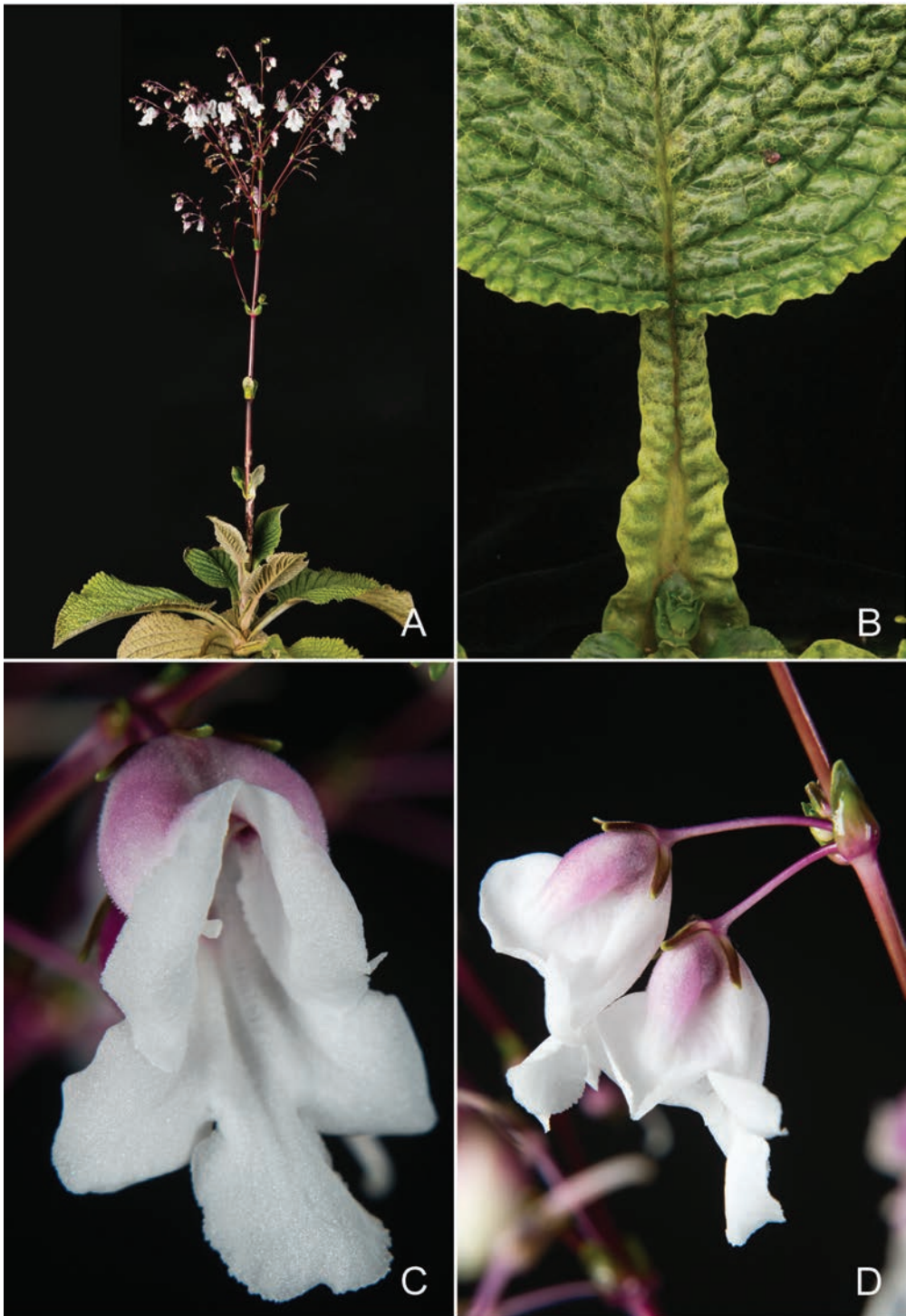
*Paraboea lavandulodora* Triboun from sandstone. In *Paraboea* these are a small number of exceptions to the otherwise overwhelming preference for limestone. In Thailand this results in a very uneven distribution of the large number of species, with very few in the relatively limestone-poor areas of southeastern and northeastern Thailand.

In Xu et al. (2008) only one collection of a *Paraboea* species was reported from the southeastern province of Chanthaburi. No further collections from Chanthaburi were reported by Triboun & Middleton (2012) and Triboun (2013). Therefore, when a *Paraboea* species was collected from granite rocks in Khao Khitchakut National Park in Chanthaburi in 2012, it was only the second known collection of any species of the genus from the province and only the third collection from the whole southeastern region (the third collection being from the island of Ko Chang). The Khao Khitchakut plant has a terminal inflorescence with leaf-like bracts towards the base of the peduncle, characters which place the species in the *Paraboea martinii* group (Xu et al., 2008). When only known from the fruiting collection, it could already be determined that the Khao Khitchakut plant was not one of the described species in that alliance nor one of the other species recorded from the southeastern region by Xu et al. (2008). With the flowering material now available this is confirmed and the species is here described.

***Paraboea maculata* C.Puglisi, sp. nov.**

Differs from other *Paraboea* species in the *Paraboea martinii* group, i.e. those with opposite leaves, campanulate corolla, twisted fruit and a terminal inflorescence, by the combination of a predominantly white and laterally compressed corolla, the purple spots at the base of the tube, the sticky glandular secretion on the bracts and calyx, and the winged petioles. – TYPE: Thailand, Chanthaburi, Khao Khitchakut, Khao Khitchakut National Park, Khao Phra Bhat, 12°50'14"N 102°10'3"E, 900 m, 27 August 2012, fr., Middleton, D.J., Karaket, P., Suddee, S. & Triboun, P. 5675 (holotype E; isotypes BK, BKF). (Fig. 1)

Lithophytic, caulescent herb to 60 cm high. **Stem** short and erect, with an indumentum of sessile and stalked glands, and sparse multicellular, eglandular hairs. **Leaves** opposite, congested; petioles winged, 2–9 cm long, those of a pair forming a distinct auricle across the node; lamina lanceolate to ovate, 8–19 × 4–10 cm, about twice as long as wide, surface rugose, apex acute, base rounded and then shortly attenuate onto the wing of the petiole, margin irregularly crenate, indumentum arachnoid and deciduous above, with white glands and a pale, thin, interwoven, semi-deciduous indumentum below, secondary veins 10–13 pairs, tertiary veins reticulate, venation prominent below. **Inflorescence** a terminal panicle, 25–30 cm long, occasionally flanked by subterminal cymes, with at least 4 orders of branching, axes deep red-purple to bright brown, appearing chestnut brown in herbarium specimens, with a diffuse arachnoid indumentum or glabrous, bearing a series of sessile, leaf-like, opposite and decussate pairs of bracts of a progressively decreasing size, with internodes 5–15 cm long; uppermost bracts 0.4–1 cm long, 0.3–0.6 cm wide at the base, sessile, joined at



**Fig. 1.** *Paraboea maculata* C.Puglisi. **A.** Inflorescence. **B.** Winged petiole. **C.** Corolla, front view. **D.** Corolla and calyx, side view. (Photos: A, C, D: Lynsey Wilson; B: Sadie Barber)

the base or nearly so, deltoid, concave at the base, proximally red or brown, turning green towards the tip, densely covered in sessile glands and sticky on both sides but particularly so on the outer, which is glossy due to an exudate; pedicels 1–1.6 cm long, glabrous. **Calyx** with lobes divided to the base, resembling terminal bracts in colour, indumentum and glossiness; lobes 3–5 mm long, c. 1 mm wide, linear to narrowly lanceolate, apex broadly acute. **Corolla** strongly zygomorphic, campanulate, white with dark purple-red markings inside towards the base of the tube and around the staminode insertions, visible from the outer side, laterally and above as a pink shade; tube laterally compressed with the exception of two lateral bulges running along its length, ventrally with 3 narrower bulges, separated by two depressions, running to the base of the central lower lobe; covered in minute glandular hairs outside making the corolla sticky but without the glossy appearance of the bracts and calyx; tube 9–13 mm long, slightly oblique, mouth compressed; upper lobes 4–5 × 9–11 mm, elliptic; lateral lobes of the lower lip elliptic, apex obtuse, 5–8 × 5–6 mm; central lobe 6–10 × 4–9 mm (4 mm at the base widening to 9 mm), slightly folded around the central of the three bulges running along the tube, apex obtuse, margin undulate. **Stamens** arising from the base of the corolla; filaments 0.8–1 cm long, purple both proximally and distally, with a white to bright yellow knee in the middle, glabrous in the purple areas, densely covered in glandular hairs on the knee; anthers coherent, 1–2 × 3–3.5 mm, white, with the connectives and tips of the thecae tinged with purple; thecae strongly divergent; staminodes 3, white, the lateral ones 1–1.5 mm long, arising 1.5–2 mm above the base of the tube, with scattered glandular hairs along the filament, the central staminodes c. 0.5 mm long, arising c. 2.5 mm above the base of the tube, glabrous. **Disc** annular, pale yellow, c. 0.5 mm long. **Gynoecium** 11–12 mm long, glabrous; ovary 5–7 mm long, indistinctly developing into a c. 5 mm long style; style enantiostylous, apically bent, stigma reduced. **Fruit** (immature) a strongly twisted capsule, glabrous, green, 2–4 cm long, 1–1.5 mm diameter. **Seeds** numerous, ellipsoid, slightly compressed, 0.5–0.7 × 0.15–0.2 mm.

*Distribution.* Only known from the type locality

*Ecology.* Evergreen forest, on granite bedrock in deep shade.

*Etymology.* The epithet refers to the purple markings inside the corolla tube.

*Provisional IUCN conservation assessment.* Data Deficient (DD). This species is currently only known from one locality within a National Park. Although there is some disturbance due to tourism at this one site, it is uncertain how extensive these possible threats are. There is less than 400 km<sup>2</sup> of suitable habitat (forest of over 800 m altitude) in the immediate vicinity of the collection locality, which would suggest an assessment of Endangered based on a restricted Extent of Occurrence if there were corresponding threats. Similar forest types occur in neighbouring parts of Cambodia, where the threat levels are even less well known. Even if these forests are included, the EOO remains less than 2000 km<sup>2</sup>, still within the boundaries of Endangered based

on EOO. However, a clearer assessment of the populations, the distribution and the threats would first have to be made before an accurate assessment could be proposed.

*Additional specimens examined.* THAILAND: **Chantanaburi:** Khao Khitchakut, Khao Khitchakut National Park, Khao Phra Bhat, *Middleton, D.J. et al.* 5675, cultivated as RBGE 20121417, vouchered 25 Jun 2014 as *Puglisi, C.* CP250614/1 (E); *ibidem*, vouchered 15 July 2014 as *Atkins, H.J.* 18 (SING).

*Notes.* This new species is unusual in being one of the very few species in the genus to occur on a substrate other than limestone. It quite clearly belongs in the *Paraboea martinii* group (Xu et al., 2008), which is characterised by opposite and decussate leaves, terminal inflorescence, reduced leaf-like bracts at the base of the peduncle, a large campanulate corolla, distinct limb, filaments with a bearded knee, and twisted capsules. Other species in this group include *Paraboea doitungensis* Triboun & D.J.Middleton, *P. glutinosa* (Hand.-Mazz.) K.Y.Pan, *P. paramartinii* Z.R.Xu & B.L.Burt and *P. thorelii* (Pellegr.) B.L.Burt. It differs from *Paraboea doitungensis* in the shorter calyx lobes, the flower colour, the laterally compressed corolla opening, the lateral swellings, and the longer fruit; it differs from *Paraboea glutinosa* in the broader leaves and the laterally compressed corolla opening; it differs from *Paraboea martinii* in the winged petiole, the lack of a matted or glandular indumentum on the floral axis and the compressed corolla; it differs from *Paraboea paramartinii* in the shorter petioles, the broader petiole wings and the more deeply crenate leaf margin; and it differs from *Paraboea thorelii* in the broader leaves, lack of glandular hairs on the inflorescence axes, laterally compressed corolla opening, calyx indumentum, and the pubescence on the upper leaf surface. We have also compared it to the material from Cambodia and Vietnam identified provisionally as *Paraboea cf. glutinosa* by Xu et al. (2008). It is not the same species as *Poilane 28717* from Cambodia, which has a different leaf indumentum, smaller upper bracts and calyx (but which is otherwise very similar to *Paraboea maculata* in shape and stickiness), very much larger lower bracts, and longer inflorescence internodes. It is also not the same species as *Poilane 16562* from Vietnam, which is an altogether hairier plant than *Paraboea maculata*, with bigger bracts and no visible glands.

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