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A new species of *Petrocodon* (Gesneriaceae) from Thailand

DAVID J. MIDDLETON¹, SUNISA SANGVIROTJANAPAT² & WARANUCH LA-ONGSRI²

ABSTRACT. The new species *Petrocodon flavus* D.J.Middleton & Sangvir. is described.

KEY WORDS: *Didymocarpus*, limestone, Phayao, taxonomy.

INTRODUCTION

Petrocodon Hance has been recently much expanded to include the genera *Tengia* Chun, *Calcareoboaea* C.Y.Wu ex H.W.Li, *Dolicholoma* D.Fang & W.T.Wang, *Lagarosolen* W.T.Wang and *Paralagarosolen* Y.G.Wei, and also a number of species formerly placed in *Didymocarpus* Wall., based on molecular data which showed that some of these genera were not monophyletic but that together they formed a strongly supported monophyletic group (Weber *et al.*, 2011). Since then Chen *et al.* (2014) published three more species and presented a key to the 23 species, distributed mainly in southern China but with distributions into northern Vietnam and with one poorly known species, *Petrocodon bonii* (Pellegr.) A.Weber & Mich.Möller, also found in Thailand and Laos. The expanded *Petrocodon* is now one of the most morphologically variable genera in Asian Gesneriaceae (Weber *et al.*, 2011), with a wide range of corolla morphologies reflecting different pollination syndromes. A consequence is that the genus is morphologically hard to define and the placement of new species within the genus is largely a function of recognizing their similarity to existing species or their possession of characters that place them into the more morphologically homogenous genera now placed in synonymy.

In August 2013 a team from Queen Sirikit Botanic Garden (QBG) collected a plant from Doi Pha Chor in Phayao Province and also brought plants into cultivation in the Botanic Garden. This plant (Accession number QSBG 20130468E) has proven to be a previously unknown species of *Petrocodon* which we describe here as *P. flavus*. It is most similar to *Petrocodon mollifolius* (W.T.Wang) A.Weber & Mich.Möller from SW Yunnan in China, and would key out to this species in Chen *et al.* (2014), but differs in the characters mentioned below. *Petrocodon flavus* and *P. mollifolius* belong to a group of species in the genus that were formerly included within *Didymocarpus* until the circumscription of *Petrocodon* was clarified by Weber *et al.* (2011). The species in this group, including *Petrocodon hancei* (Hemsl.) A.Weber & Mich.Möller and *P. niveolanosus* (D.Fang & W.T. Wang) A.Weber & Mich.Möller, are rosette plants, unlike most species of *Didymocarpus*.

***Petrocodon flavus* D.J.Middleton & Sangvir., sp. nov.**

Most similar to *Petrocodon mollifolius* (W.T. Wang) A.Weber & Mich.Möller in the rosette habit, villous hair covering on the leaves, and the yellow corolla, but differs in the generally narrower leaves with narrowly cuneate leaf base (vs broader leaves

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3.3–10.5 cm wide and broadly cuneate leaf base), 3–5-flowered cymes (vs. 7–12-flowered), shorter bracts (0.3–0.4 cm vs. 1.2–2 cm) and less densely hairy inflorescence axes, calyx, ovary and fruit. Type: Thailand, Phayao, Chiang Kham District, Rom Yen Subdistrict, Phu Sang National Park, Tham Pha Daeng, Doi Pha Chor, 876 m alt., 16 Aug. 2013, *La-onsri et al.* 3068 (holotype **QBG**; isotype **BKF**). Fig. 1.

Perennial acaulescent herb. *Leaves* in a densely crowded basal rosette; petioles 1.5–4 cm long, rather indistinct from base of lamina which is decurrent onto petiole, densely whitish villous; lamina narrowly elliptic, 5.5–11.5 × 2.3–3.5 cm, apex acute to short acuminate, base narrowly cuneate and somewhat decurrent onto petiole, margin crenulate, 3–4 pairs of secondary veins, strongly ascending, tertiary venation obscure, lamina

densely whitish villous above and beneath with hairs to ca 1 cm, interspersed with fewer and very much shorter glandular hairs. *Inflorescences* ca 8 per plant, axillary, cymose, 3–5-flowered, inflorescence axes with glandular and eglandular hairs to 1 mm long but mostly < 0.5 mm long, the glandular hairs generally slightly longer; peduncles 6.5–8.5 cm long; bracts linear, 2–3.5 mm long, densely villous; pedicels 8–12 mm long. *Calyx* 5-sect to base, lobes narrowly ovate, ca 2.5 × 0.5 mm, apex acute; indumentum as on inflorescence axes but glandular hairs fewer and eglandular hairs longer to 2 mm long. *Corolla* pale yellow, 1.9–2.2 cm long, campanulate, 2-lipped, lower lip much longer than upper lip, densely pubescent outside with a mixture of glandular and eglandular hairs, sparser on outside of lobes, glabrous inside except for two bands of papillae from top of tube to base of lower lip; tube downcurved,



Figure 1. *Petrocodon flavus* D.J.Middleton & Sangvir. A. Natural habitat; B. Whole plant; C. Inflorescence; D. Flower dissection. Photographs A. by Waranuch La-onsri, B–D. by Sunisa Sangvirojtjanapat

tubular at base and widening around middle, ca 1.2 mm long to sinus between upper and lower lips; upper lip 2-lobed, ca 3 mm long, lobes slightly diverging, ca 3×5 mm, apex rounded; lower lip 3-lobed, ca 10 mm long, lobes ovate, apices rounded, lateral lobes ca 4×4 mm, central lobe ca 5×3.2 mm. *Fertile stamens* 2, inserted in tube at ca 6 mm from corolla base; filaments ca 8 mm long, densely glandular pubescent, hairs with large black glandular tips; anthers ca 1.5×2.2 mm, glabrous, adnate face to face; staminodes 3 at 2.5–3 mm from corolla base, ca 0.2 mm long. *Disc* 0.9 mm long, glabrous. *Ovary* ca 11 mm long, densely covered in glandular and eglandular hairs; style ca 4 mm long, indumentum as on ovary but less dense; stigma disc-like. *Fruit* a cylindrical capsule, 1.7–2.1 cm long, with glandular and eglandular hairs, dehiscing into 4 valves when mature. *Seeds* not seen.

Thailand.— NORTHERN: Phayao [Chiang Kham, Rom Yen, Phu Sang National Park, Tham Pha Daeng, Doi Pha Chor, 876 m alt., 16 Aug. 2013, *La-onsri et al.* 3068 (QBG, BKF)].

Distribution.— Only known from the type locality.

Ecology.— Growing on a shaded limestone cliff in primary forest at 876 m altitude.

Etymology.— Named after the colour of the corolla.

Proposed IUCN conservation assesment.— Endangered (EN D). This species has been found only at the type locality in Phu Sang National Park where it is restricted to a small population of around 100–200 mature individuals.

Note.— Only the second species of *Petrocodon* recorded for Thailand, the other being *P. bonii* which was formerly placed in *Calcareoboea* C.Y.Wu ex H.W.Li by Burt (2001). *Petrocodon flavus* is most easily distinguished from *P. bonii* by its yellow corolla (vs purple corolla) and by being considerably more densely hairy with much longer hairs. *Petrocodon bonii* has only been collected twice in Thailand, on Khao Son Mountain in Kamphaeng Phet Province, *M. van de Bult* 685 (CMU), and on Pha Nok Khao in Khon Kaen Province, *Smitinand & Sleumer* 1140 (BKF). Both species are, therefore, poorly known in Thailand.

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REFERENCES

- Burt, B.L. (2001). Annotated checklist of Gesneriaceae. *Thai Forest Bulletin (Botany)* 29: 81–109.
- Chen, W.-H. Möller, M., Shui, Y.-M., Wang, H., Yang, J.-B. & Li, G.-Y. (2014). Three new species of *Petrocodon* (Gesneriaceae), endemic to the limestone areas of Southwest China, and preliminary insights into the diversification patterns of the genus. *Systematic Botany* 39: 316–330.
- Weber, A., Wei, Y.G., Puglisi, C., Wen, F., Mayer, V. & Möller, M. (2011). A new definition of the genus *Petrocodon* (Gesneriaceae). *Phytotaxa* 23: 49–67.

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