Phytotaxa 203 (3): 287–291
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.203.3.8

Pueraria grandiflora (Fabaceae), a new species from Southwest China

BO PAN[1*], BING LIU[2], ZHI-XIANG YU[3] & YONG-QIONG YANG[3]

[1] *Centre for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Mengla, Yunnan 666303, China;*

[2] *State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, Chinese Academy of Sciences, No. 20 Nanxincun, Xiangshan, Beijing 100093, China*

[3] *Panzhihua Cycad Nature Reserve, No. 386 Renmin Road, Panzhihua, Sichuan 617000, China*

** Author for correspondence. Email: pb@xtbg.org.cn*

Abstract

A new species, *Pueraria grandiflora*, (Fabaceae, Phaseoleae), is described and illustrated. It resembles *Pueraria tuberosa*, but differs in lobed leaflets, larger flowers, single or once branched inflorescences, and flowering and fruiting season. This species is only known from dry-hot valleys in Sichuan and Yunnan, and is rare and narrowly distributed.

Key words: Dry-hot valley, Fabaceae, Phaseoleae, tuber

Introduction

Pueraria Candolle (1825; Fabaceae, Phaseoleae) comprises ca. 20 species, occurring in tropical and E. Asia (Wu & Thulin, 2010), with *P. tuberosa* DC. as the type species (Van der Maesen, 1985). Kudzu, *Pueraria montana*, is a well-known traditional medicine in China, and notorious invasive weed in North America (Van der Maesen, 1985). *Pueraria* has pinnately 3-foliolate and stipulate leaves, and axillary inflorescences, with 3 to several blue or purple flowers clustered at each node of the rachis. Bracts are very caducous. Some species produce edible tubers. Stipules are either basifixed or dorsifixed (Van der Maesen, 1985; Wu & Thulin, 2010). Four groups or three sections have been suggested (Lackey, 1977; Van der Maesen, 1985), while molecular studies have suggested that *Pueraria* is not a monophyletic group (Lee & Hymowitz, 2001). Ten species have been recorded in China, of which 3 species are endemic (Wu & Thulin, 2010).

During our field and herbarium work in 2012 and 2014, we discovered a new *Pueraria* species in Sichuan and Yunnan, which is very distinctive and has not been described before.

Taxonomy

Pueraria grandiflora Bo Pan & Bing Liu, *sp. nov.* (Fig. 1–2)

Type:—CHINA. Sichuan: Panzhihua Cycad Reserve, on montane slopes, 1500 m, 20 Aug. 2014, *Bo Pan 2014001* (Holotype: HITBC! Isotypes: KUN!). Panzhihua Cycad Reserve, 1300 m, 16 Jul. 2010, Panzhihua Cycad Expedition Team 360 (PE).

Liana 3–8 m long. *Roots* tuberous, ovoid in shape, elongate or compressed, 2.5–8 × 3–9 cm, 4 to many clustered underground. *Stems* usually woody at the base, with young parts grey pubescent, sometimes glabrescent. *Leaves* trifoliolate and alternate; stipules medifixed and split at the base, sagittate, 8–16 mm long, with striate lines; stipels linear-lanceolate, 5–8 mm; petioles 5–12 cm long with appressed, short hairs; petiolules 5–8 mm long; leaflets broad ovate or compressed ovate, entire or 2–3 lobed, veins 4–6 pairs, short pubescent on both surfaces; the terminal one 4–11 × 3–10.5 cm, base round or broad cuneate, apex acuminate; lateral leaflets oblique and sometimes very unequal (Fig. 2N), smaller, 3–10.5 × 3–9.5 cm, base broad cuneate to truncate. *Inflorescences* axillary or terminal pseudoracemes,

Accepted by Libing Zhang: 23 Feb. 2015; published: 25 Mar. 2015

unbranched or with 1 branch, 15–40 cm long, erect or slightly ascending; peduncle 4–14 cm, appressed hairy; pedicels ca. 7 mm in length. *Flowers* 3 per node, subtended with ovate bracts; bracts 4 per node, basifixed, long hairy the abaxial surface, 4–7 mm, caducous soon after flowering, the outer one is bigger than the other three each node (Fig. 2I). Bracteoles 2, ovate and striate, ca. 3 mm; petals 22–25 mm long; calyx 10 mm long, purplish grey, pubescent; calyx lobes 4, lanceolate, acuminate, with the upper two teeth completely fused, 5–6 mm long, slightly longer than the tube, the lower lobe slightly longer than the others. Corolla bicolored; standard obovate, white to light blue with a yellow patch in the middle, 22–25 mm, auriculate and with a pair of callosities at base, shortly clawed; wings purple-blue, darker than the standard, falcate, ca. 23 × 7 mm, base with linear auricles; keel like the wings in color, falcate-oblong, with very small and acute auricles, subequal with the wings; stamens 10, vexillary stamen connate with the other 9 in the middle, free at both ends; ovary linear, hairy. *Fruits* legumes, long-elliptic, ca. 5.5 cm × 10 mm, flattened, never twisted when ripe, 4–5 seeded, constricted between the seeds, densely brown hirsute. *Seeds* reniform, compressed, smooth and brown, ca. 4 × 2.5 mm; aril a short, circular rim around the hilium; funicle slender and terete, ca. 2 mm long.

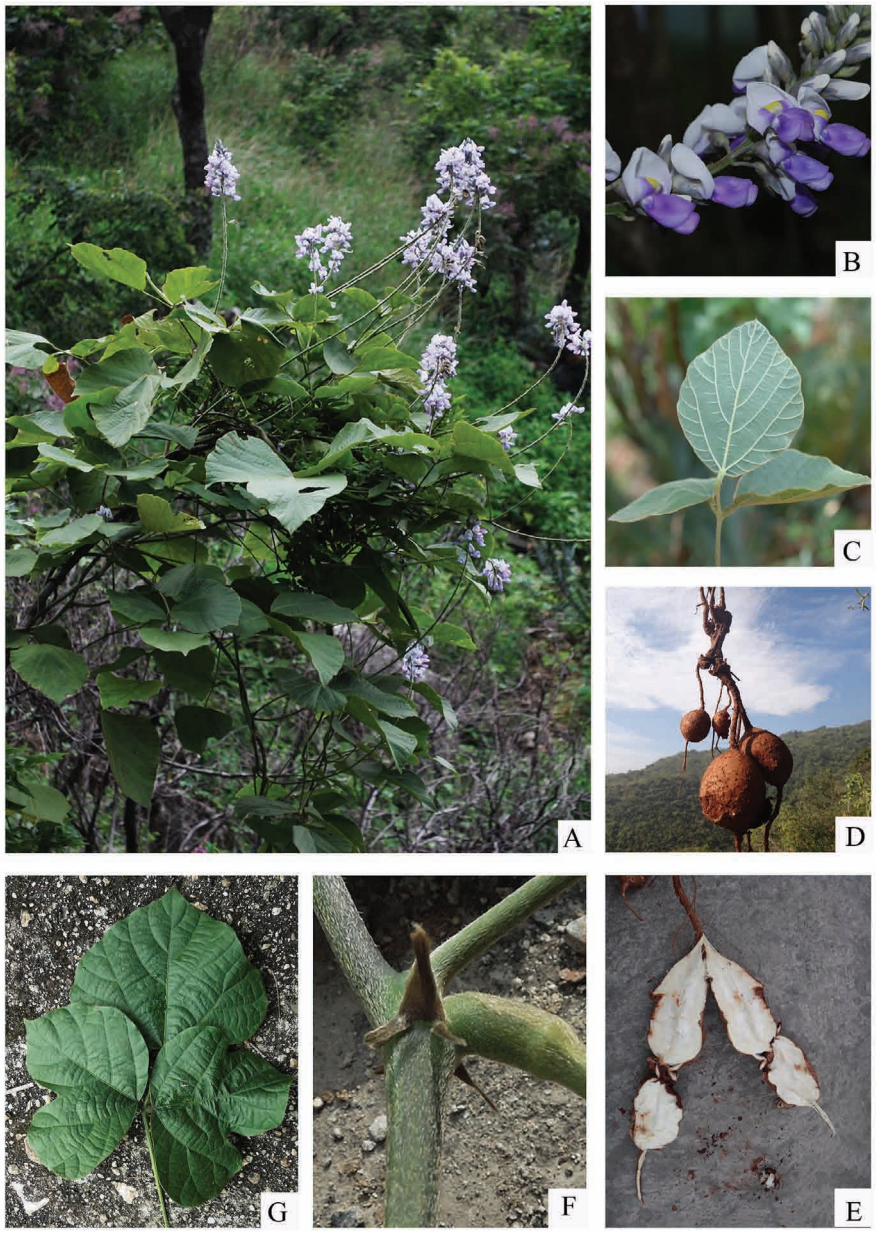

FIGURE 1. *Pueraria grandiflora* (from type locality). **A.** Habit. **B.** Flowers. **C.** Entire leaflets. **D.** Tubers. **E.** Tuber opened up. **F.** Sagittate stipule. **G.** Lobed leaflets. Photos by Bo Pan and Bing Liu.

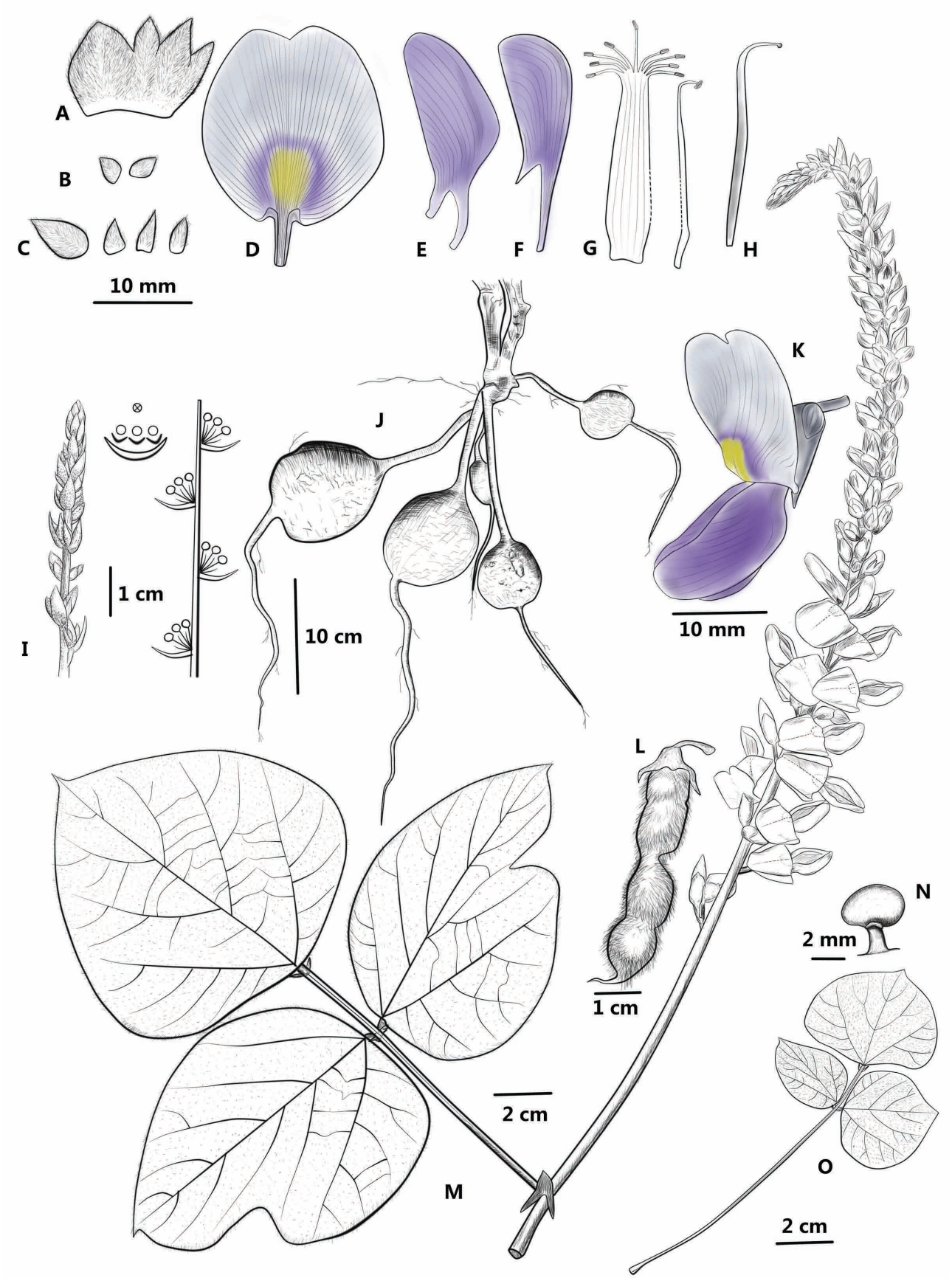

FIGURE 2. *Pueraria grandiflora*. **A.** Calyx. **B.** Bracteoles. **C.** Bracts. **D.** Standard. **E.** Wing. **F.** Keel. **G.** Stamens. **H.** Pistil. **I.** Inflorescence. **J.** Tuberous roots. **K.** Flower. **L.** Pod. **M.** Flowering branch. **N.** Seed. **O.** Leaf with entire leaflets. Illustrations by Bo Pan.

Distribution and habitat: *Pueraria grandiflora* is currently known from dry-hot valleys along the Jinsha River and Red River in Sichuan and Yunnan, SW China (Fig. 3), a very specialized habitat in East Himalaya and Hengduan Mountain. Dry-hot valley is characterized by arid or semi-arid climate, savanna vegetation, and strong foehn effect (He *et al.*, 2000). This liana creeps on mountain slopes, rocks, thickets, open places, or climbs into small trees. Its tubers store plenty of water, and help it survive the dry season. The elevation range is 700–1600 m.

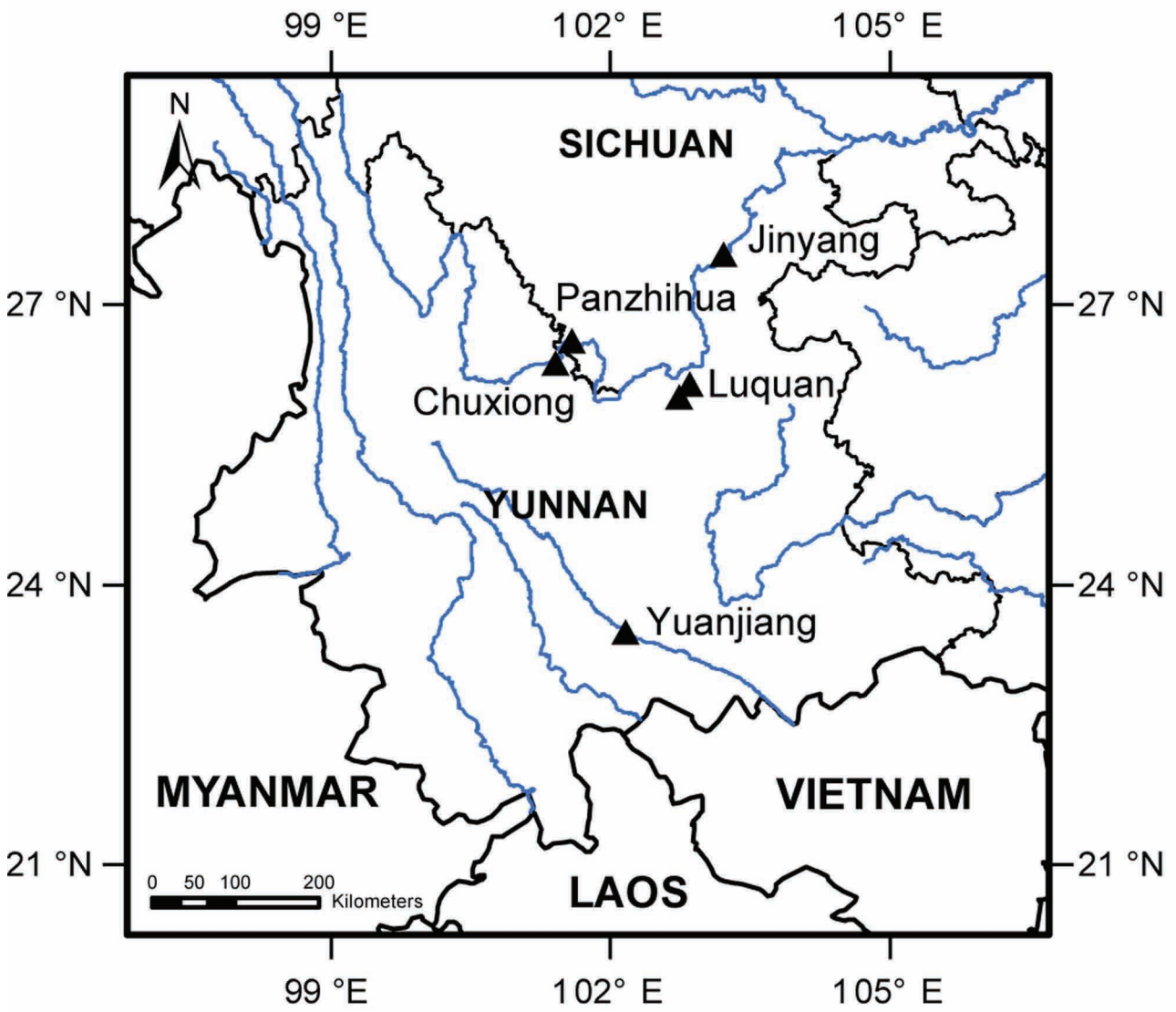

FIGURE 3. Distribution of *Pueraria grandiflora*. Map by Shu-Feng Li.

Etymology: The species epithet refers to the large flowers of this species, the largest within the genus to date.

Phenology: Flowering from June to September, fruiting August to October. Leaves fall in winter.

Conservation Status: All the specimens are only known from 6 locations (Fig. 3). According the IUCN (2001) redlist criteria, this species is considered data deficient (DD) due to the low number of collections. Further investigation into the range of this species would be required to more fully assess the conservation status.

Taxonomic notes: *Pueraria grandiflora* has the largest flower within this genus, 22–25 mm in length, while all other species have smaller flowers, 8–22 mm in length. *P. grandiflora* is most similar to *P. tuberosa* Candolle (1825), as both have bunches of tubers. However, *P. grandiflora* differs in lobed leaflets, larger flowers, single or once branched inflorescences, and flowering July to September. *P. grandiflora* also resembles *P. montana*, which has both entire and lobed leaflets. *P. montana* var. *thomsonii* (Benth.) M.R. Almeida also has a very large flower, 18–22 mm in length. Roots of both *P. tuberosa* and *P. montana* are important traditional medicines (Van der Maesen, 1985; Wu & Thulin, 2010). Potentially, the tubers of *P. grandiflora* could be a medicine.

Their differences are summarized below (Table 1):

Additional specimens examined: CHINA. Sichuan: Jinyang County, Dengchang, Lugao, among roadside grasses, 700 m, 10 Sept. 1978, *Sichuan Institution of Traditional Medicine 846* (SM). Yunnan: Luquan County, Wumeng,

Lezuoni, in valley, 26°1′ N, 102°44′ E, 1100 m, 7 Jun. 1982, *Heng Li et al., 20166* (KUN, HITBC). Luquan County, Pudu River Nature Reserve, Zhongping, dry and steep slope, 1170 m, 26°9′31.5″N, 102°50′45.5″ E, 7 Aug. 2008, *Hua Peng et al. 9910* (KUN). Chuxiong, Tuanshan, rocky slope, 1000 m, 17 Sept. 1939, *Ming-Kang Li 31* (KUN). Yuanjiang, Dudu, 1100 m, 15 Sept. 2011, *Jian-Wu Li 1007* (HITBC).

TABLE 1 Morphological differences between *Pueraria grandiflora*, *P. tuberosa*, and *P. montana*.

Character	***P. grandiflora***	***P. tuberosa***	***P. montana***
Leaflet	entire, or 2–3 lobed	entire	entire, or 2–3 lobed
Stipules	sagittate	sagittate	linear
Inflorescence	unbranched or with 1 branch	many branched	unbranched or with 1 branch
Flower	22–25 mm	ca. 15 mm	8–22 mm
Calyx lobe	lower lobe slightly longer than the others	lower lobe slightly longer than the others	lower lobe much longer than the others
Flowering	June–September, with leaves	March–April, without leaves	July–September, with leaves
Roots	ovoid	ovoid	slender to elongate
Hairs	appressed	appressed	appressed or hirsute
Pods	constricted between seeds	constricted between seeds	not constricted
Distribution	Sichuan, and Yunnan (SW China)	India, Pakistan, and Nepal	Tropical and E Asia

Acknowledgements

This research was financially supported by the One-thousand Scholar Program (Y2QR011B01). We thank Prof. Richard T. Corlett for improving the manuscript, and Dr. Shu-Feng Li for editing the distribution map.

References

Candolle, A.P. de (1825) *Pueraria*. *Annales des Sciences Naturelles* 4: 97. [Paris]

Lackey, J.A. (1977) *A synopsis of the Phaseoleae (Leguminosae, Papilionoideae).* Ph.D. dissertation, Iowa State University, Ames, Iowa, 293 pp.

Lee, J. & Hymowitz, T. (2001) A molecular phylogenetic study of the subtribe Glycininae (Leguminosae) derived from the chloroplast DNA *rps16* intron sequences. *American Journal of Botany* 88 (11): 2064–2073. http://dx.doi.org/10.2307/3558432

He, Y.B., Lu, Z.P. & Zhu, T. (2000) Causes of the formation of dry-hot valleys in Hengduan Mountain Plateau. *Resources Sciences* 22 (5): 69–72.

IUCN (2001) IUCN Red List Categories and Criteria, Version 3.1. Available from: http://www.iucn.org/ (accessed 10 March 2015)

Van der Maesen, L.J.G. (1985) *Revision of the genus Pueraria DC. with some notes on Teyleria Backer (Leguminosae)*. Agricultural University, Wageningen, pp. 5–13. [The Netherlands]

Wu, D.L. & Thulin, M. (2010) *Pueraria*. *Flora of China* 10: 244–248.