Botanical Journal of the Linnean Society, 2008, **157**, 83–90. With 7 figures

A new species of *Begonia* (Begoniaceae) from Guangxi, China

HONG-ZHE LI, HONG MA, ZHE-KUN ZHOU and KAI-YUN GUAN*

Kunming Institute of Botany, Chinese Academy of Sciences, Heilongtan, Kunming 650204, Yunnan, China

Received 9 November 2005; accepted for publication 6 November 2007

Begonia gigabracteata H.Z. Li & H. Ma **sp. nov.** (*Begonia* section *Diploclinium*, Begoniaceae) is described and illustrated from North Guangxi Zhuang Autonomous Region, south-west China. Its chromosome number ($2n = 30$) and pollen and seed micromorphology are reported. This species grows in ravines on damp or slightly moist limestone. It is morphologically similar to *B. summoglabra* T.T. Yü (section *Reichenheimia*) and *B. labordei* H. Lél. (section *Diploclinium*). However, it differs by its sparse glandular hairs, number of perianth segments, colour of venation on the abaxial blade, and unique heteromorphous bracts. A line drawing and plate of ***B. gigabracteata*** and a photograph of the type of *B. summoglabra* are presented as an aid to identification. *Botanical Journal of the Linnean Society*, 2008, **157**, 83–90.

ADDITIONAL KEYWORDS: chromosome number – pollen morphology – section *Diploclinium* – seed micromorphology.

INTRODUCTION

Begonia L. (Begoniaceae) is a large genus distributed throughout the tropics and subtropics, which is both morphologically diverse and important to the ornamental plant trade. China is endowed with about 150 species of *Begonia*, which are divided into nine sections (Ku, 1999; Shui, Peng & Wu, 2002). In recent years, many new taxa have been described from China (Guan & Tian, 2000; Qian, 2001; Shui, 2002a, b; Tebbitt & Guan, 2002; Fang, Wei & Qin, 2004; Ku, Peng & Liu, 2004; Shui & Chen, 2004, 2005; Ye *et al*., 2004; Li *et al*., 2005; Liu, Ku & Peng, 2005; Peng *et al*., 2005; Peng, Chen & Leong, 2005; Peng, Ku & Leong, 2005; Xing *et al*., 2005; Fang *et al*., 2006; Ku, Liu & Peng, 2006; Peng, Leong & Shui, 2006).

Section *Diploclinium* (Lindl.) A. DC. is a large polymorphous group of *Begonia*, which has traditionally been difficult to delimit (Doorenbos, Sosef & de Wilde, 1998). About 120 species are included in this section, and more than 40 of these species are distributed in China (Doorenbos *et al*., 1998; Shui *et al*., 2002).

With the aim of providing a taxonomic revision of Chinese section *Reichenheimia* (Klotzsch) A. DC., two field expeditions were carried out in North Guangxi Zhuang Autonomous Region in late August 2003 and late September 2005. With the help of local people, a begonia was collected at Pojie Xiang, Tian'e Xian (Fig. 1), and introduced into Kunming Botanical Garden. A detailed study of herbarium specimens and living plants demonstrated that it was a new species, sharply distinct from *B. summoglabra* T.T. Yü and *B. labordei* H. Lél.

DESCRIPTION

BEGONIA GIGABRACTEATA H.Z. LI & H. MA, SP. NOV. (FIGS 2, 3) (SECTION *DICLOCLINIUM* (LINDL.) A. DC.)

Type: China. Guangxi Zhuang Autonomous Region: Tian'e Xian, Pojie Xiang, 780 m, in the ravine, on moist rocks, 28.viii.2003, *H.Z. Li 127* (holotype: KUN; isotype: KUN).

*Corresponding author. E-mail: guanky@mail.kib.ac.cn

Figure 1. Distribution of ***Begonia gigabracteata*** H.Z. Li & H. Ma.

Examined specimens: The same locality. 13.x.1977, *G.W. Wei 4-6-713* (Herbarium of Guangxi Institute of Chinese Medicine & Pharmaceutical Science).

Diagnosis: A *B. summoglabra* et *B. labordei* planta rarissime glandulos (nec glabra ut in *B. summoglabra*; nec hispida ut in *B. labordei*), florum masculorum tepalis 4 (nec 2 ut in *B. summoglabra*; nec 4 ut in *B. labordei*), florum femineorum tepalis 5 (nec 2 ut in *B. summoglabra*; nec 4 ut in *B. labordei*) facile distincta.

Description: PLANT monoecious; epipetreous; deciduous. RHIZOME tuberous, irregular globose, less than 2 cm in diameter, rooting from the base. STIPULES caducous. LEAVES 1–3, basal; petiole 4–9.2 cm long, cylindrical in cross-section, ruby-coloured or green, slightly covered with short glandular hairs; blade slightly oblique, obovate, 7.6–10.7 × 4.5–8.2 cm, glabrous, adaxial surface peak green, abaxial surface white and slightly spongy, base cordate, basal lobes overlapping or not, apex acute or cuspidate, margin entire or slightly wavy or irregularly shallow-serrate; venation reaching the margin, palmate-pinnate, with three to four major lateral veins on each side, usually red and raised on abaxial surface. INFLORESCENCE arising from the tuber, thyrsoid, peduncle somewhat zigzagged, 10–16 cm tall, sometimes with a leaflet, base covered by two bracts, bracts greenish with a little pink, oblique triangular, 9 × 3 mm, margin ciliate; peduncle gradually elongating during anthesis, ruby-coloured or greenish, with sparse glandular hairs; the first branch *c.* 5 cm long, secondary degree branches *c.* 2 cm long, third degree branches 0.5–1 cm long. BRACTS caducous, paired at each pedicel node, white to greenish, margin ciliate, oblique triangular, *c.* 1.9 × 0.5 cm, gradually becoming smaller in size up the inflorescence; cymose lateral branches wrapped by pairs of gigantic bracts, oblong, 2.2–2.4 × 1.1–1.9 cm, apex bilateral curly backward, margin entire. MALE FLOWERS: tepals 4, pink, glabrous, outer 2, ovate to broad ovate, 12–15 × 9–11 mm, inner 2, narrowly obovate, slightly pendulous, 9–11 × 1–2 mm; pedicel white, pink to greenish, *c.* 2.2 cm long, scabrous; filament about 10–25, fused at base, *c.* 1 mm long; stamen hemispherical, yellow, about 1 mm long, dehiscing through slits along the sides of the anther. FEMALE FLOWERS: tepals 5, pink, glabrous, outer 2, ovate, 12–13 × 8–9 mm, inner 3, one narrowly obovate, *c.* 9 × 2 mm, the other two oblique ovate, 10–11 × 3.5–4 mm; pedicel white, pink to greenish, *c.* 1.7 cm long, scabrous; styles 3, fused at base, with U-shaped branches; stigmatic papillae in a spiral arrangement; ovary pink with greenish, glabrous, broad triangular, *c.* 7 × 10 mm (wings included), unequal three-winged, lateral wings nearly equal, crescent-shaped, *c.* 1 mm broad, abaxial wing 7 × 10 mm. FRUIT white to brownish. SEEDS many, brown, ellipsoid. SOMATIC CHROMOSOME NUMBER $2n = 30$ (H. Ma, H.-Z. Li & K.-Y. Guan, unpubl. data).

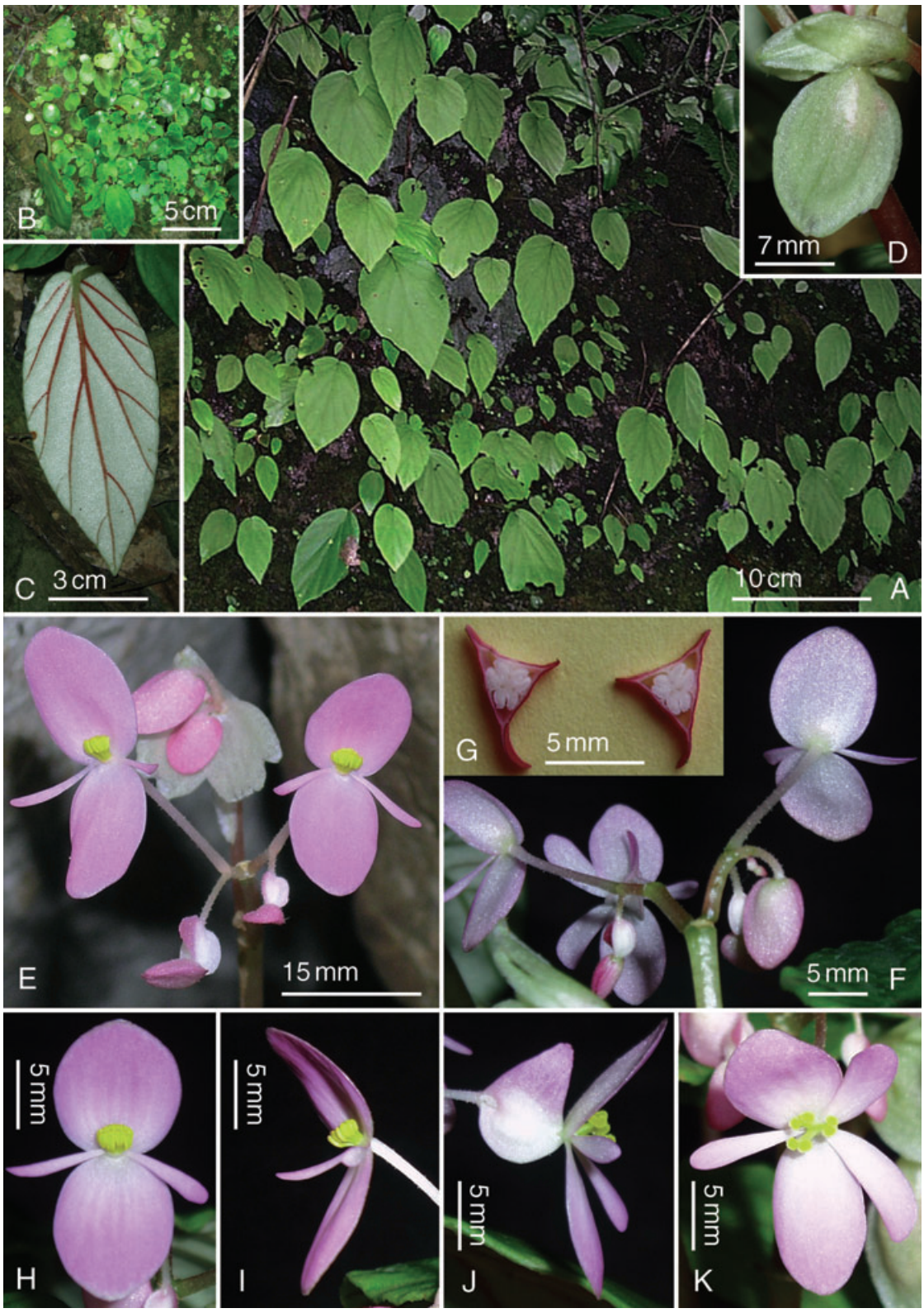

Figure 2. ***Begonia gigabracteata*** H.Z. Li & H. Ma. A, Habit and habitat. B, Assembled seedlings. C, Abaxial surface of leaf. D, Cymose lateral branch wrapped by a pair of large bracts. E, F, Inflorescence, face and dorsal views. G, Cross-section of ovary, showing axile placentation, two-forked in each locule. H, I, Staminate flower, face and lateral views. J, K, Carpellate flower, lateral and face views.

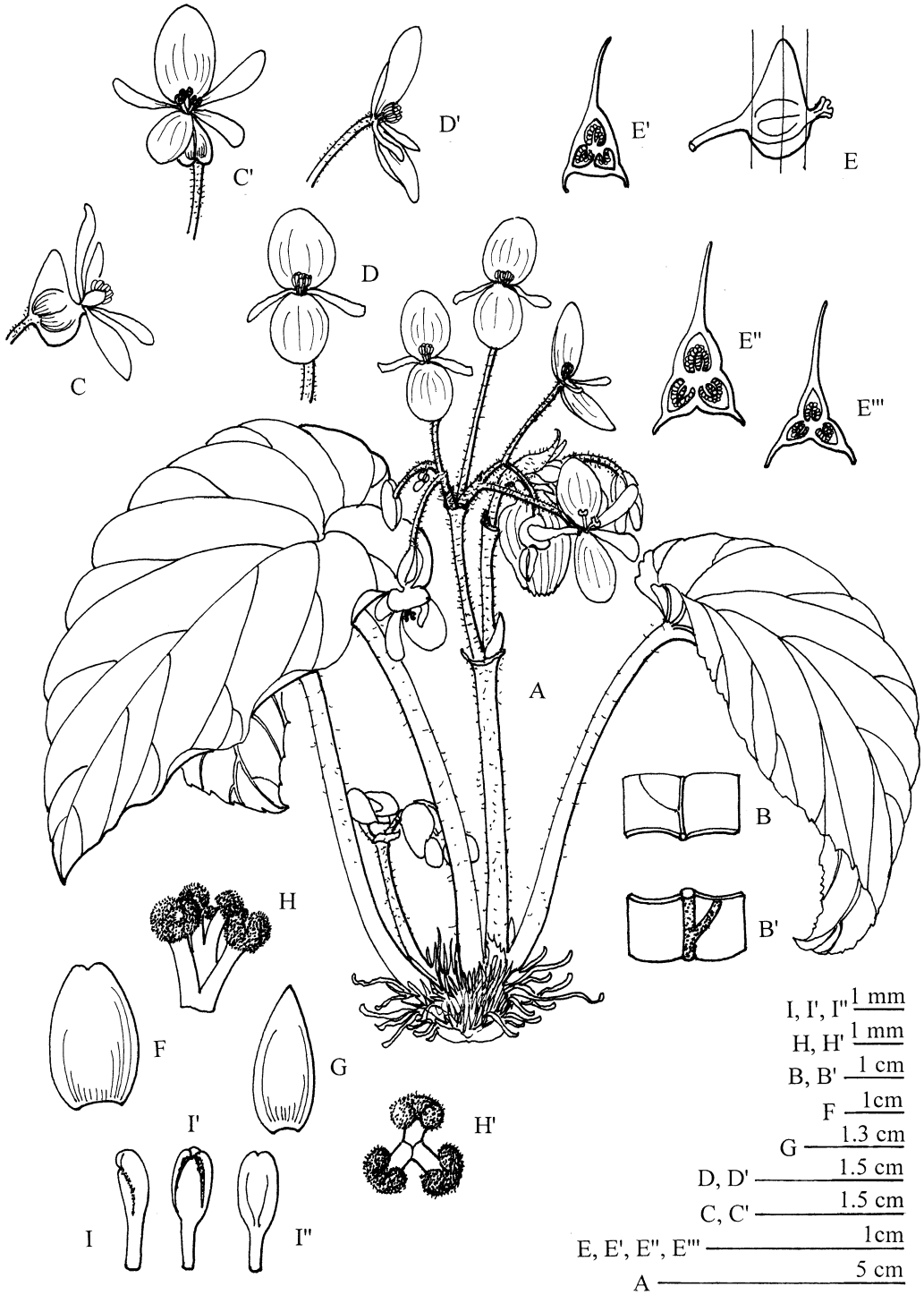

Figure 3. ***Begonia gigabracteata*** H.Z. Li & H. Ma. A, Habit. B, B′, Segment of leaf, adaxial and abaxial surfaces. C, C′, Carpellate flower, lateral and face views. D, D′, Staminate flower, face and lateral views. E, Cross-sections of ovary: E′, upper; E″, middle; E‴, basal. F, Large bract. G, Common bract. H, H′, Style, face and apical views. I, I′, I″, Stamen, lateral, ventral, and dorsal views.

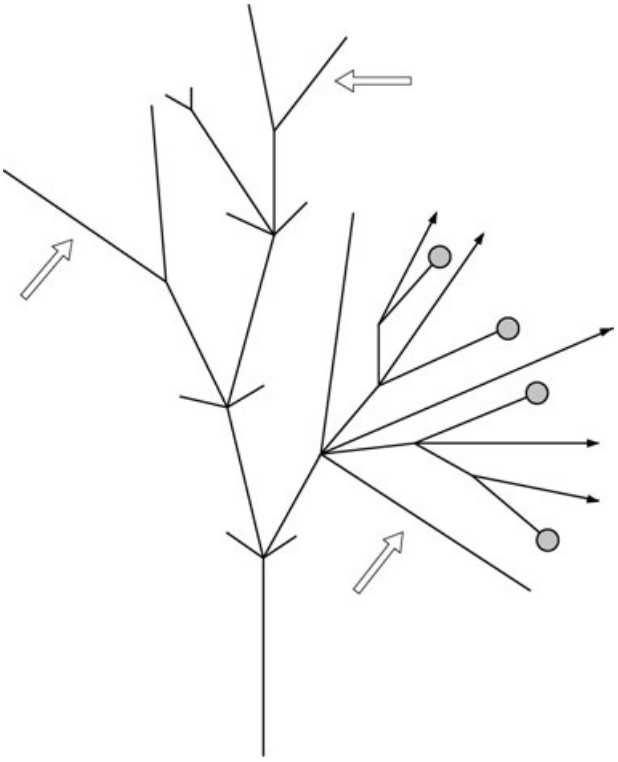

Figure 4. Inflorescence sketch of ***Begonia gigabracteata*** H.Z. Li & H. Ma, showing the large bracts of cymose lateral branch (thin arrows, staminate flowers; circles, carpellate flowers; thick arrows, pairs of large bracts).

Distribution: North Guangxi, China, known only from the type locality.

Phenology: Flowering September to November; fruiting December to January. Plants cultivated in Kunming Botanical Garden flowered from August to October, fruited from November to January.

Ecology: Begonia gigabracteata is endemic to North Guangxi, and grows in shady ravines on moist limestone at *c*. 500–800 m elevation.

Etymology: The bracts of this begonia are heteromorphous and significantly different from those of other tuberous begonias, with the cymose lateral branches wrapped by a pair of gigantic bracts (2.2–2.4 × 1.1–1.9 cm). Figure 4 shows a sketch of the inflorescence of *B. gigabracteata*. The specific epithet is derived from 'giganteus' and 'bract'.

Pollen morphology: The pollen of *B. gigabracteata* is elongate-ellipsoid, *c*. 25.4 × 10.2 μm, tricolporate. Exine with approximately parallel stripes and dotted with foveolae in the polar areas. Stripes along colpi distinct and rugosely reticulate (Fig. 5).

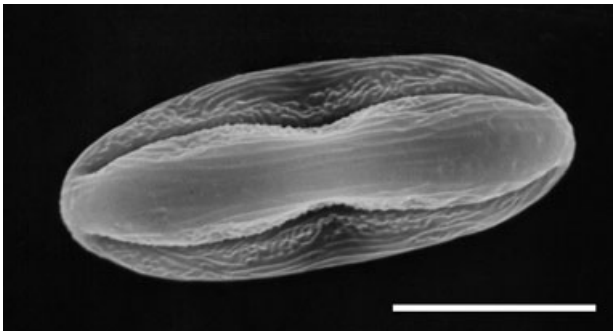

Figure 5. Scanning electron microphotograph of ***Begonia gigabracteata*** pollen (from *H.Z. Li 127*, KUN; bar, 10 μm).

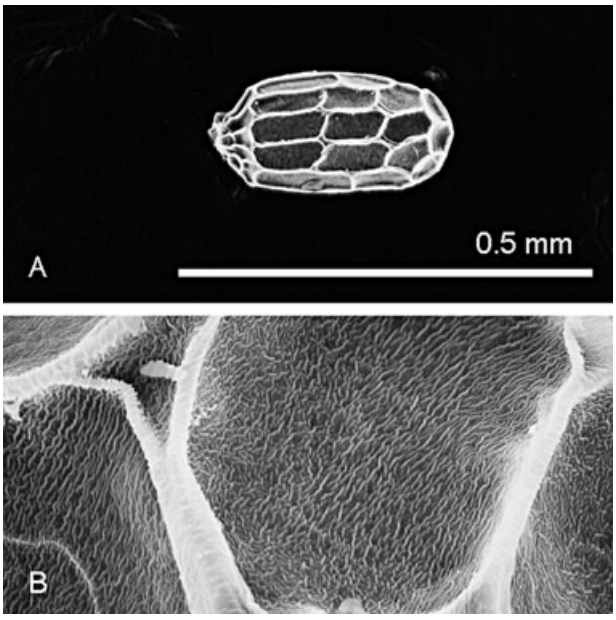

Figure 6. Scanning electron microphotographs of ***Begonia gigabracteata*** seed. A, Seed morphology. B, Seed sculpture. ×1500 (from *H.Z. Li 127*, KUN).

Seed morphology: The seed of *B. gigabracteata* is oblong, 280–290 × 140–150 μm, chalazal end rounded, micropylar end somewhat constricted, outer periclinal walls collapsed in mature seeds; collar cells elongated, longitudinal walls straight, 10–14 cells in a ring, anticlinal walls straight, rarely slightly undulated; other testa cells often elongated, with undulated anticlinal walls, cells of chalazal part more pentagonal and hexagonal (Fig. 6).

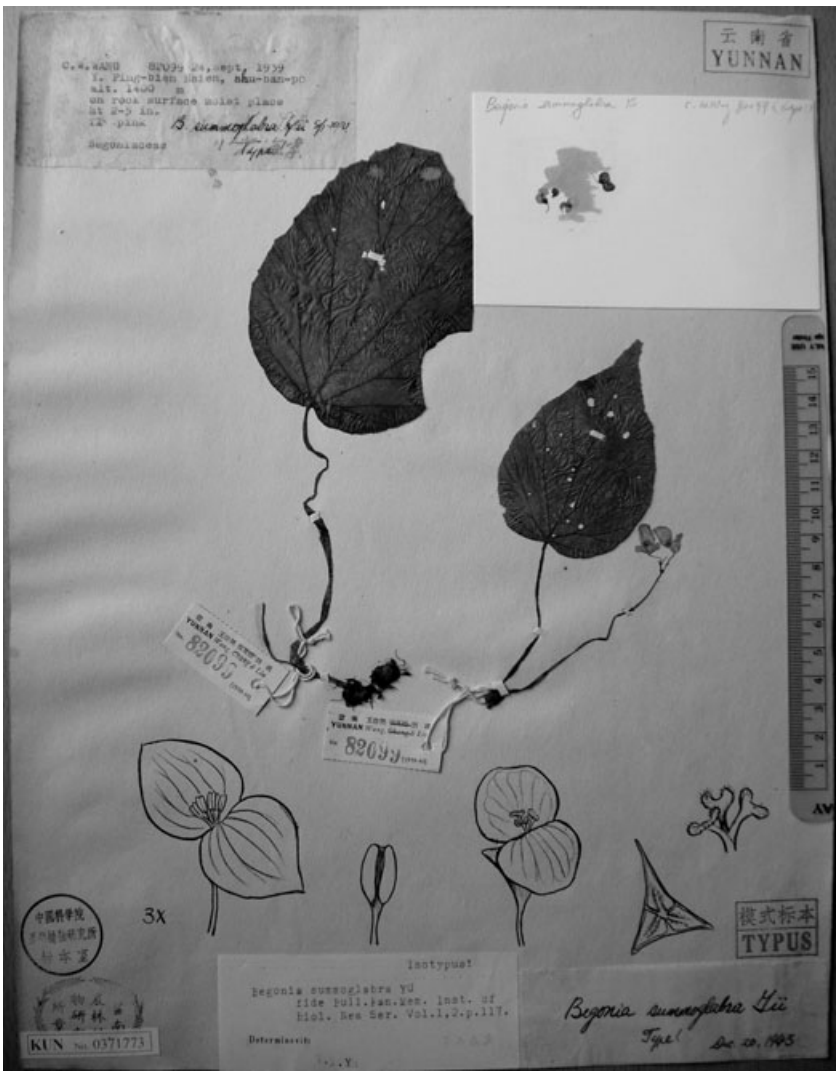

Figure 7. Type specimen of *Begonia summoglabra* T.T. Yü.

Notes: In our field expeditions in 2003 and 2005, we found that plants were much paler in colour and smaller in size on drier rocks than on wetter ones, with numerous seedlings assembled in the drier rocks.

Tubers of this species are used in traditional Chinese medicine to cure traumatic injury and dissipate blood stasis to resolve swelling. Local herbalists collect only the large tubers and leave the smaller ones, so that the size of the population of *B. gigabracteata* is maintained. The species is very attractive and of considerable horticultural merit.

Begonia gigabracteata is similar to *B. summoglabra* (Fig. 7) and *B. labordei* in aspect. It differs from these two species in the sparsely glandular hairs, number of perianth segments, colour of venation on the abaxial blade, and distinct heteromorphous bracts (Table 1).

ACKNOWLEDGEMENTS

We thank Dr Masashi Nakata and Dr Makoto Hashiya (BGT) for taking pollen and seed scanning electron microphotographs, Ling Wang (KUN) for the superb line drawing, Dr Tohru Ohmiya (BGT) and Dr Xian-Wen Yang (KUN) for technical assistance with the photo plate, and all the teachers of Longcha Primary School for assistance in the field expeditions. This work was supported by the Natural Foundation of Yunnan Province (grants 2001C0010Z and 2003BA901A14) to Professor Guan Kai-Yun.

Table 1. Comparison of ***Begonia gigabracteata*** with *B. summoglabra* and *B. labordei*

	B. gigabracteata	*B. summoglabra*	*B. labordei*
Plant	Slightly glandular hairy	Subglabrous	Usually hairy
Leaf			
Texture	Quite fleshy	Fleshy	Papery to fleshy
Indumentum	Glabrous	Subglabrous	Hispid
Petiole	Slightly glandular hairy	Subglabrous	Hispid, usually adorned with red maculation
Venation	Usually reddish on abaxial surface	Green	Greenish, sometimes adorned with red maculation and hispid on abaxial surface
Margin	Slightly wavy to shallow-serrate	Irregularly shallow-serrate	Double serrate
Flower	Several	Few	Many
Colour	Pink	Pink	White to pink
Indumentum	Slightly glandular hairy	Subglabrous	Usually hairy
Bract	Heteromorphous	Homomorphous	Homomorphous
♂ tepals	4	2	4
♀ tepals	5	2	4
Filament	Free	Free	Connate
Pollen morphology			
Average size (μm)	25.4×10.2	–	19.1×8.2
Ratio of length to width	2.5	–	2.3
Seed size (μm)	$280–290 \times 140–150$	–	$250–400 \times 200–230$
Chromosome number	$2n = 30$	–	$2n = 24$

REFERENCES

Doorenbos J, Sosef MSM, de Wilde JJFE. 1998. *The sections of Begonia, including descriptions, keys and species lists (studies in Begoniaceae).* Wageningen: Wageningen Agricultural University.

Fang D, Ku SM, Wei YG, Qin DH, Peng CI. 2006. Three new taxa of *Begonia* (sect. *Coelocentrum*, Begoniaceae) from limestone areas in Guangxi, China. *Botanical Studies* **47:** 97–110.

Fang D, Wei YG, Qin DH. 2004. Four new species of *Begonia* L. (Begoniaceae) from Guangxi, China. *Acta Phytotaxonomica Sinica* **42:** 170–179.

Guan KY, Tian DK. 2000. Three new species of *Begonia* (Begoniaceae) form Yunnan, China. *Acta Botanica Yunnania* **22:** 129–134.

Ku SM, Liu Y, Peng CI. 2006. Four new species of *Begonia* sect. *Coelocentrum* (Begoniaceae) from limestone areas in Guangxi, China. *Botanical Studies* **47:** 207–222.

Ku SM, Peng CI, Liu Y. 2004. Notes on *Begonia* (sect. *Coelocentrum*, Begoniaceae) from Guangxi, China, with the report of two new species. *Botanical Bulletin of Academia Sinica* **45:** 353–367.

Ku TC. 1999. Begoniaceae. In: Ku TC, ed. *Flora reipublicae popularis sinica*, Vol. 52. Beijing: Science Press, 126–269.

Li HZ, Ma H, Guan KY, Peng CI. 2005. *Begonia rubinea* (sect. Platycentrum, Begoniaceae), a new species from Guizhou, China. *Botanical Bulletin of Academia Sinica* **46:** 377–383.

Liu Y, Ku SM, Peng CI. 2005. *Begonia picturata* (sect. *Coelocentrum*, Begoniaceae), a new species from limestone areas in Guangxi, China. *Botanical Bulletin of Academia Sinica* **46:** 367–376.

Peng CI, Chen YK, Leong WC. 2005. Five new species of *Begonia* (Begoniaceae) from Taiwan. *Botanical Bulletin of Academia Sinica* **46:** 255–272.

Peng CI, Ku SM, Leong WC. 2005. *Begonia liuyanii* (sect. *Coelocentrum*, Begoniaceae), a new species from limestone areas in Guangxi, China. *Botanical Bulletin of Academia Sinica* **46:** 245–254.

Peng CI, Leong WC, Shui YM. 2006. Novelties in *Begonia* sect. *Platycentrum* for China: *B. crocea*, sp. nov. and *B. xanthina* Hook., a new distributional record. *Botanical Studies* **47:** 89–96.

Peng CI, Shui YM, Liu Y, Ku SM. 2005. *Begonia fangii* (sect. *Coelocentrum*, Begoniaceae), a new species from limestone areas in Guangxi, China. *Botanical Bulletin of Academia Sinica* **46:** 83–89.

Qian YY. 2001. A new species of *Begonia* (Begoniaceae) from Yunnan, China. *Acta Phytotaxonomica Sinica* **39:** 461–463.

Shui YM. 2002a. A new species of *Begonia* (Begoniaceae) from Mt. Huanglianshan of SE Yunnan, China. *Acta Botanica Yunnania* **24:** 307–308.

Shui YM. 2002b. A new species of *Begonia* (Begoniaceae) from SE Yunnan, China. *Acta Phytotaxonomica Sinica* **40:** 374–376.

Shui YM, Chen WH. 2004. Revision to Sect. *Petermannia* of *Begonia* (Begoniaceae) in China. *Acta Botanica Yunnania* **26:** 482–486.

Shui YM, Chen WH. 2005. New data of sect. *Coelocentrum* (*Begonia*) in Begoniaceae. *Acta Botanica Yunnania* **27:** 355–374.

Shui YM, Peng CI, Wu CY. 2002. Synopsis of the Chinese species of *Begonia* (Begoniaceae), with a reappraisal of sectional delimitation. *Botanical Bulletin of Academia Sinica* **43:** 313–327.

Tebbitt MC, Guan KY. 2002. Emended circumscription of *Begonia silletensis* (Begoniaceae) and description of a new subspecies from Yunnan, China. *Novon* **12:** 133–136.

Xing FW, Wang FG, Chen HF, Chau LKC. 2005. *Begonia hongkongensis* (Begoniaceae), a new species from Hong Kong. *Acta Botanica Fennica* **42:** 151–154.

Ye HG, Wang FG, Ye YS, Peng CI. 2004. *Begonia coptidifolia* (Begoniaceae), a new species from China. *Botanical Bulletin of Academia Sinica* **45:** 259–266.