

Begonia fangii (sect. *Coelocentrum*, Begoniaceae), a new species from limestone areas in Guangxi, China

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(Received September 17, 2004; Accepted December 31, 2004)

Abstract. *Begonia fangii*, a new species of sect. *Coelocentrum* from limestone areas in southwestern Guangxi Zhuang Autonomous Region, China, is described and illustrated. Somatic chromosome number ($2n = 30$) is here reported. *Begonia fangii* is similar to *B. hemsleyana* (sect. *Platycentrum*) in having palmately compound leaves, but it is sharply distinct in having long creeping stem (vs. erect stem with a short rhizome); leaf with (3-)4-5(-7) [vs. (6-)7-10(-12)] leaflets; styles 3 (vs. 2); and ovary 1-locular with parietal placentation (vs. ovary 2-locular with axile placentation).

Keywords: *Begonia fangii*; *Begonia hemsleyana*; *Begonia hemsleyana* var. *kwangsiensis*; China; Chromosome number; Guangxi; Limestone flora; New species; Sect. *Coelocentrum*.

Introduction

Begonia sect. *Coelocentrum* comprises about 18 species in China (Guangxi, SE Yunnan and S Guizhou) and northern Vietnam (Shui et al., 2002). A number of new species were added to the list of sect. *Coelocentrum* thereafter (Fang et al., 2004; Ku et al., 2004). In the course of the taxonomic revision of *Begonia* sect. *Coelocentrum*, we came across several specimens that bear a superficial resemblance to *B. hemsleyana* Hook. f. [sect. *Platycentrum*] but differ markedly in having parietal placentation, a character that is diagnostic of sect. *Coelocentrum*. Such specimens were collected from limestone areas in SW Guangxi Zhuang Autonomous Region, which harbors many species of *Begonia* sect. *Coelocentrum*. We made several field expeditions there and were able to re-collect this remarkable species. A careful study of literature, herbarium specimens and plants grown in the experimental greenhouse reveals that it is a new species of *Begonia* sect. *Coelocentrum*.

Species Description

Begonia fangii Y. M. Shui & C.-I Peng, sp. nov.— TYPE: China. Guangxi Zhuang Autonomous Region, Chungzuo City, Longzhou Xian, Jinlong Xiang, Guiping Village, S of Yianbian Road, on the way to Banyian, 22°42'48" N,

106°47'07" E, elev. ca. 360 m. Broadleaf forest on mountain slope. On rock on steep limestone slope, shaded, abundant. Living collection made on 28 May 2004; type specimen (in flower) pressed from plant cultivated in experimental greenhouse, 14 Jan 2005. *Ching-I Peng* 19778A (holotype: HAST). 方氏秋海棠 Figures 1, 2

Species nova similis *Begoniae hemsleyanae* Hook. f. (sect. *Platycentrum*), sed a qua caulibus longis repentibus (vs. caule erecto cum rhizomate brevi), foliis (3-)4-5(-7)-foliolatis (vs. foliis (6-)7-10(-12) foliolatis), stylis 3 (vs. stylis 2), ovario 1-loculari, placentatione parietali (vs. ovario 2-loculari, placentatione axili) differt.

Plant monoecious; epipetric; perennial. Rhizome succulent, dark purple-red, long creeping (to 50 cm or more), rooting at nodes, 8-15 mm in diameter, internodes to 8-15 cm long (1.5-3 cm at the first anthesis, elongate thereafter), covered with sparse, appressed or ascending hairs. Stipules nearly persistent, red to reddish brown, subglabrous or sparsely sericeous, triangular to narrowly triangular, asymmetric, thickly herbaceous, 12-15 mm long, 9-12 mm wide, apex subcucullate and aristate, margin entire. *Leaves* alternate, palmately compound; leaflets 3-6, petiolulate, subcoriaceous, dark green above, red or reddish beneath, central leaflet nearly symmetric, lateral leaflets asymmetric, lanceolate or broadly so, 7-15 cm long, 2.5-4.5 cm wide, apex acuminate, base cuneate, rounded or slightly cordate, margins entire, undulate or remotely dentate, subglabrous on upper surface, covered with appressed or slightly ascending hairs along veins on abaxial surface, venation pinnate; petiole terete, 1-2.5 cm long, 2-2.5 mm across; petioles terete, (6-)11-15(-20) cm long, 4-5 mm across, sericeous, the hairs whitish initially, turning

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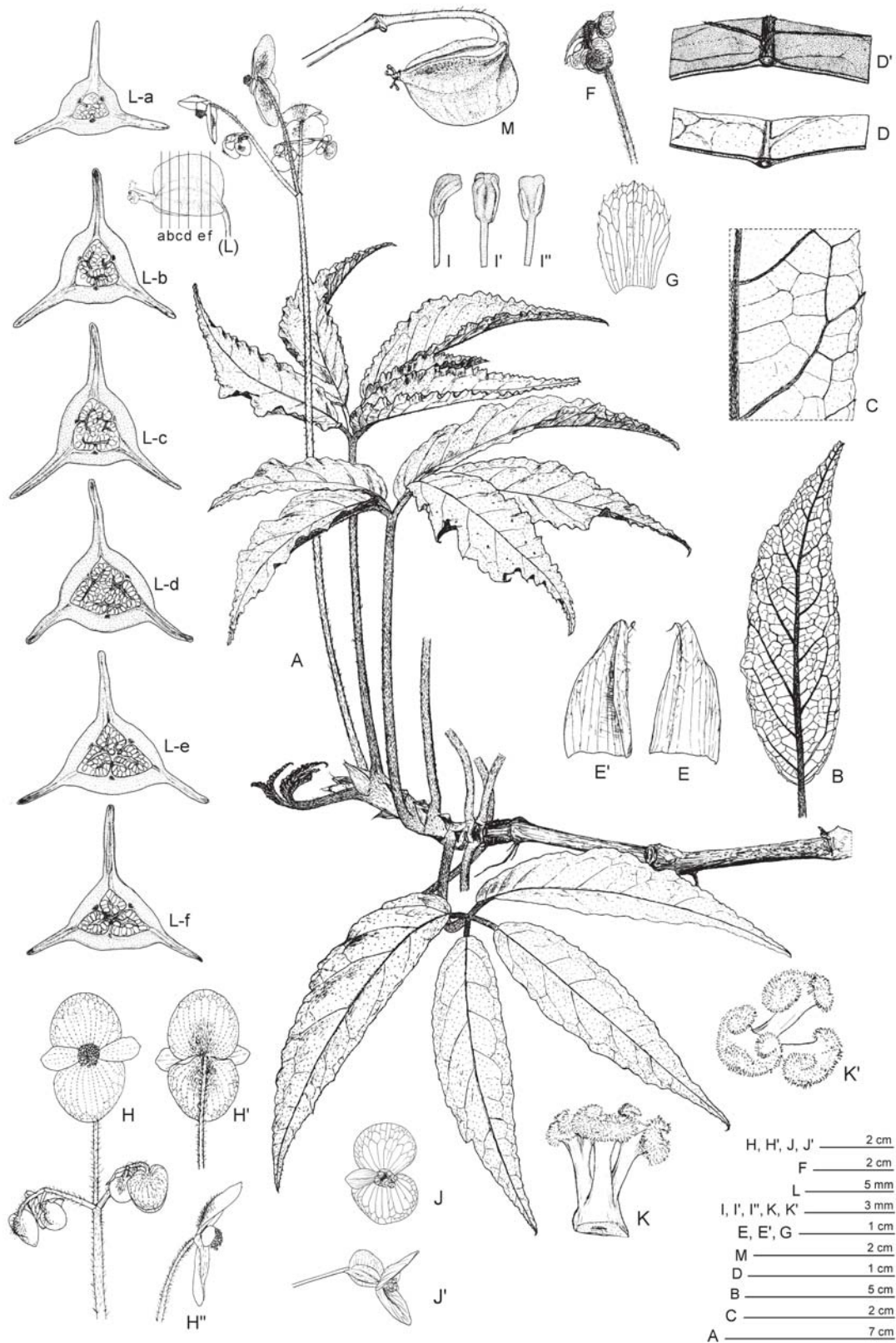


Figure 1. *Begonia fangii* Y. M. Shui & C.-I Peng. A, Habit; B, Leaflet, abaxial surface; C, Portion of a leaflet, showing venation; D, Portion of leaflet, adaxial surface, D', Abaxial surface; E, Stipule, abaxial surface, E', Adaxial surface; F, Flower bud; G, Bract; H, Staminate flower, face view, H', Back view, H'', Side view; I-I'', Anther, lateral view, ventral view and dorsal view; J, Carpellate flower, face view, J', Side view; K, Style, side view, K', Top view; L, a-f, A series of cross sections of ovary; M, Capsule. (All but M from a living plant (*Leong 3374*) cultivated in the experimental greenhouse; M from Peng 19769 (HAST). Line drawing by Shin-Ming Ku).

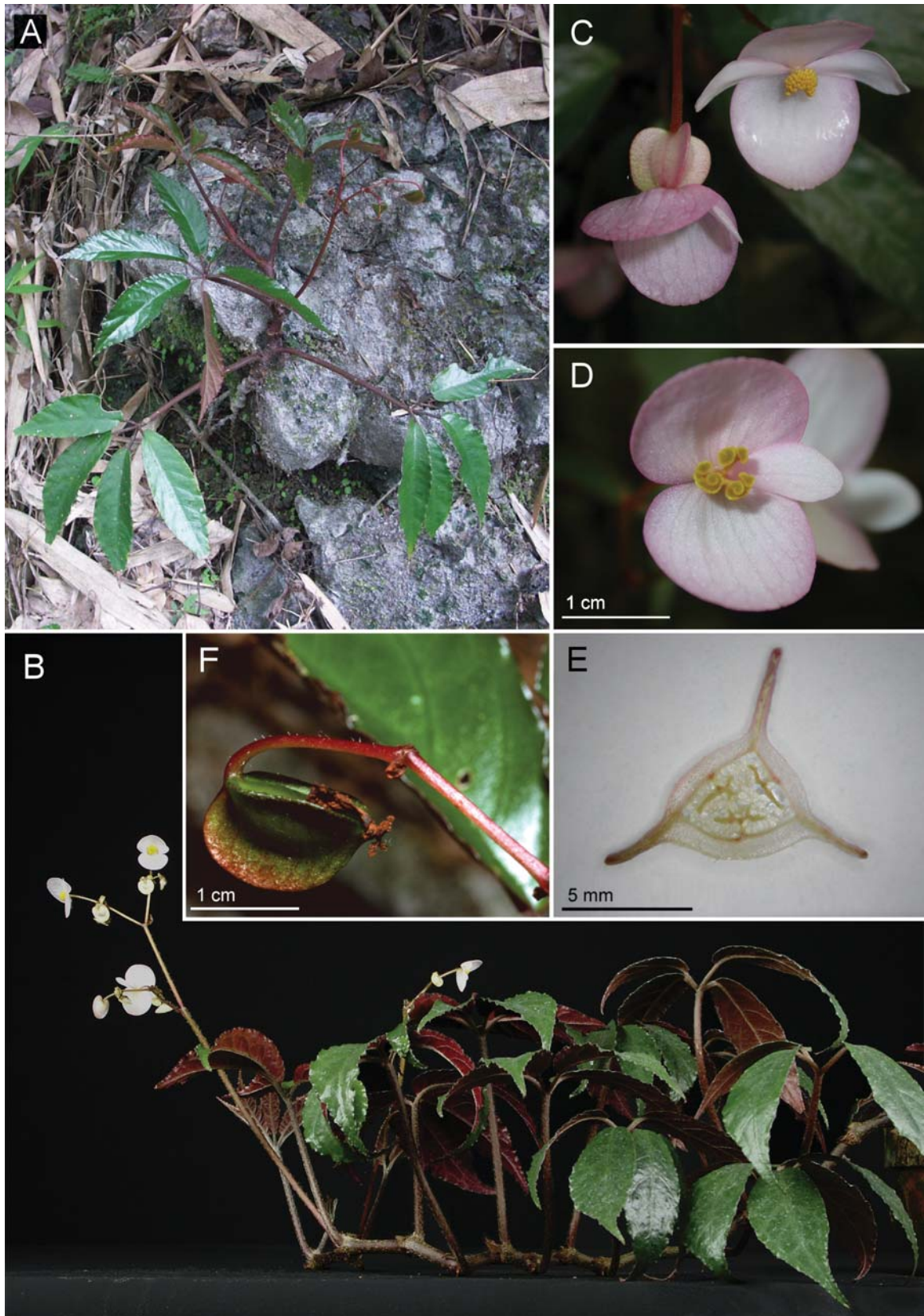


Figure 2. *Begonia fangii* Y. M. Shui & C.-I Peng. A, Habit and habitat; B, A cultivated plant at early anthesis, showing long creeping stem; C, Flowers, staminate (right) and carpellate (left); D, Carpellate flower; E, Cross section of ovary, showing parietal placentation; F, Fruit. (A, F from Peng 19769 (HAST)); B, C, D, E from a living plant (Leong 3374) cultivated in the experimental greenhouse. Photos A, F by Ching-I Peng; B by Mao-Lun Weng; C, D, E by Shin-Ming Ku).

brownish. *Inflorescence* an axillary dichasial cyme; peduncle well developed, reddish to red-brown, to 22 cm long, 2.5-3 mm in diameter, erect, sparsely to moderately pubescent, the hairs ascending, straight or curly; pedicels reddish to brownish, erect to ascending in staminate flowers, ascending to horizontal in carpellate flowers, sparsely pubescent. Bracts caducous, glabrous or rarely sparsely hairy on abaxial surface, oblong to ovate, herbaceous, greenish with reddish nerves, 8-13 mm long, 6-9 mm wide, apex acute to obtuse, margin loosely ciliate-serrate on upper part, entire below. Tepals pinkish. *Staminate flowers*: tepals 4, outer two broadly ovate to orbicular, apex rounded, base slightly cordate, 16-27 mm long, 20-24 mm wide, pilose on abaxial surface (denser toward base), the hairs whitish, more or less curved; inner two obovate, oblanceolate to obovate, 11-12 mm long, ca. 7 mm wide, glabrous; androecium zygomorphic, compressed; stamens 25-55, golf-club shaped, yellow; filaments free, subequal, 1.5-2 mm long; anthers oblong, yellow, to 1.5-1.7 mm long. *Carpellate flowers*: tepals 3, caducous, outer two broadly ovate to orbicular, apex rounded, base slightly cordate, 13-15 mm long, 14-16 mm wide, sparsely pilose on abaxial surface; inner one 8-10 mm long, ca. 5 mm wide, glabrous; ovary sparsely pilose or subglabrous, pinkish, 3-winged; wings unequal or subunequal; lateral wings ca. 3-4 mm high, 8-10 mm wide; abaxial wing semi-orbicular, 3.5-4 mm long, 8-10 mm wide; locule 1 with 3 parietal placentae, each biforked, T-shaped, rarely branched again; styles 3, yellowish, ca. 3.5 mm long, fused in the lower 1/5; stigma bands U-shaped, slightly spiraled. *Fruit* a dehiscent capsule, nodding, 12-15 mm long, 6-7 mm wide (not including wings), very sparsely pilose to glabrous; lateral wings 4-5 mm high, 12-15 mm wide; abaxial wing 4-6 mm high, 12-15 mm wide. *Seeds* many, brown, ellipsoid, 0.5-0.6 mm long, 0.3-0.35 mm in diam. Somatic chromosome number, $2n = 30$ (Figure 3).

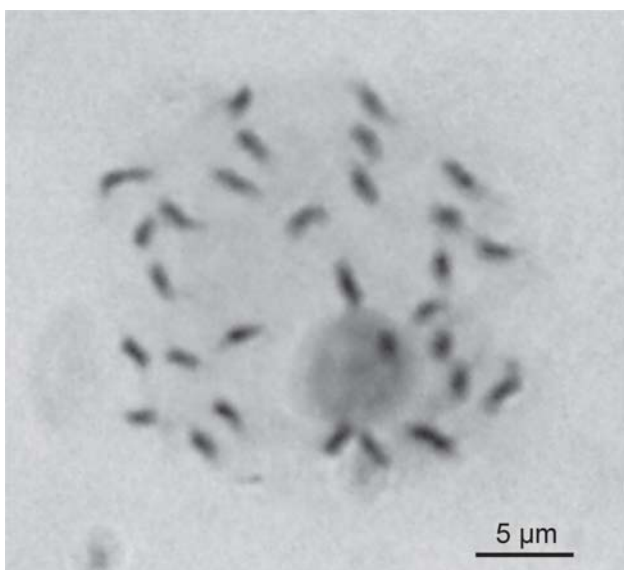


Figure 3. Mitotic chromosome spread of *Begonia fangii* ($2n = 30$, from *Leong 3374*, HAST).

Paratypes. **CHINA**. Guangxi Zhuang Autonomous Region: Nanning, specimen made from plants in cultivation at Guangxi Botanical Garden, 16 Mar 1981, *Ni & Lu 8988* (GXMG). Longzhou Xian, Jinlong Xiang, Banbi, Paotaihan, 21 Apr 1956, *Lee 95* (IBK, IBSC); same locality, elev. 600-700 m, 19 Apr 1990, *Fang & Yan 76371* (GXMI); same locality, elev. 450 m, 26 Apr 1991, *Qin 80226* (GXMI); Longzhou Xian, Jinlong People's Commune, Gaoshan Dadui, Banbi, Yahuai, 7 Feb 1977, *Fang & Tao 76184* (GXMI); Longzhou Xian, Jinlong Xiang, Gaoshan Village, 250 m alt., in remote forest on limestone hills, 15 Sep 2003, *Shui et al. B2003-46* (KUN); Chungzuo City, Longzhou Xian, Jinlong Xiang, Guiping Village, S of Yianbian Road, on the way to Banyian, $22^{\circ}42'48''$ N, $106^{\circ}47'07''$ E, elev. ca. 360 m. Broadleaf forest on mountain slope. On rock on steep limestone slope, shaded. Plant sterile when collected, leaves green above, red beneath. 28 May 2004, *Peng 19778* (HAST); Chungzuo City, Longzhou Xian, Jinlong Xiang, Banyian, $22^{\circ}42'48''$ N, $106^{\circ}47'07''$ E, ca. 400 m. Scrubby vegetation on mountain slope. Frequent on semi-shaded limestone rock face, 28 May 2004, *Peng 19790* (HAST); Nanning Diqu, Longzhou Xian, Jinlong Zhen, Gaoshan Cun, Banbi Tun, Guipi Shan, $22^{\circ}43'59''$ N, $106^{\circ}45'42''$ E, elev. ca. 550 m, 30 Aug 2002, *Leong 3374* (HAST), 3374A (HAST, flowering specimen pressed from plant in cultivation, 2 Feb 2004).

Ecology. Creeping up limestone rock face on semi-exposed or shady forested slope, at 250-700 m altitude.

Distribution. Guangxi, China (Figure 4); possibly also in northern Vietnam.

Phenology. Flowering December to March; fruiting March to June.

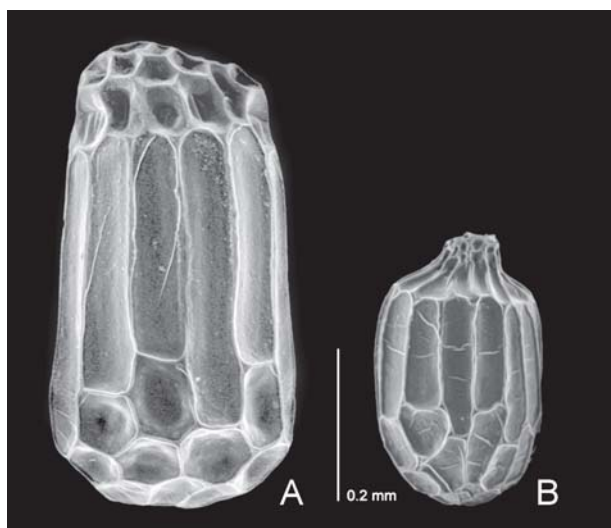
Etymology. The specific epithet commemorates Prof. Ding Fang, Guangxi Institute of Traditional Medical and



Figure 4. Distribution of *Begonia fangii* (star) in Guangxi Zhuang Autonomous Region, China.

Table 1. Comparison of *Begonia fangii* with *B. hemsleyana*.

	<i>Begonia fangii</i>	<i>Begonia hemsleyana</i>
Habitat	Epipetric, on limestone rock	Terrestrial
Stem	Long creeping	Erect, to ca. 70 cm tall, with short rhizome at base
Leaves	Subcoriaceous	Herbaceous
Number of leaflets	(3-) 4-5 (-7)	(6-) 7-10 (-12)
Petiolule	Terete	Grooved on adaxial surface
Carpellate flower		
Number of tepals	3	5 (-6)
Styles	3	2
Placentation	Parietal	Axile with 2 locules
Fruit		
Abaxial wing	Hemi-orbicular in outline, 4-6 mm tall	Narrowly oblong to triangular, 15-20 mm tall
Seed length	0.5-0.6 mm (Figure 5A)	0.3-0.35 mm (Figure 5B)
Chromosome Number	$2n = 30$ (Figure 3)	$2n = 22$ (Tien et al., 2002; Nakata et al., 2003)

**Figure 5.** SEM microphotographs of *Begonia* seeds. A, *Begonia fangii* (from Leong 3374, HAST); B, *Begonia hemsleyana* (from Peng 18680, HAST).

Pharmaceutical Sciences, Nanning, China, for his contribution to our knowledge of flora of Guangxi.

Notes. *Begonia fangii* is a very distinctive member of sect. *Coelocentrum*, which is characterized mainly by parietal placentation. This new species is epipetric, occurring in limestone areas in SW Guangxi Zhuang Autonomous Region at the China-Vietnam border. It bears a superficial resemblance to *Begonia hemsleyana* Hook. f., which is a relatively widespread terrestrial species in China (Yunnan, Guangxi, and Sichuan provinces) (Ku, 1999) and northern Vietnam [Ha Giang Prov., Peng 20155, 20157, 20158, 20204 (all at HAST)]. Previously, *Begonia hemsleyana* was known as the only species of *Begonia* with palmately compound leaves (Ye et al., 2004: Figure 3) in the Old World (Irmscher, 1939). *Begonia fangii* is the second species with such a character. However, *B. hemsleyana* belongs to sect. *Platycentrum*, which is characterized by axile placentation with 2-locular ovary. Table 1 summarizes salient distinctions between *B. fangii* and *B. hemsleyana*.

We have ruled out the possibility that our new species is *Begonia hemsleyana* var. *kwangsiensis* Irmsch., an imperfectly known taxon represented by only one collection made in 1928. A study of the original protologue (Irmscher, 1939) and isotypes of *B. hemsleyana* var. *kwangsiensis* [China, Guangxi (“Kwangsi”), Tsin Lung (“Hung”) Shan, N. Lin Yen in deep ravine, 4000 ft., 14 Aug 1928, R.C. Ching 6921 (IBSC; PE: Figure 6)] confirmed that *Begonia fangii* is distinct from that variety, which has membranous leaves, leaflets with cleft margin and attenuate or sessile bases, glabrous petioles, an erect stem with a short rhizome, and a protruded abaxial wing on the capsule.

Acknowledgments. We thank Dr. Qiner Yang (PE) for assistance with the Latin diagnosis; Mr. Wai-Chao Leong (HAST) and Ms. Wen-Hong Chen (KUN) for field assistance; Mr. Mao-Lun Weng (HAST) for taking handsome photographs of *Begonia fangii* in cultivation; Curators of GXMG, GXMI, IBK, IBSC, KUN and PE for facilitating our examination of herbarium collections. The authors are grateful to Dr. Thomas G. Lammers for useful comments on the manuscript. This study was supported in part by grants from National Science Council and Academia Sinica, Taiwan to Dr. Ching-I Peng (HAST) and from National Natural Science Foundation of China (grant no. 30270109) to Dr. Yu-Min Shui (KUN).

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Figure 6. Isotype of *Begonia hemsleyana* var. *kwangsiensis* (PE).

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中國廣西石灰岩地區秋海棠屬側膜組一新種：方氏秋海棠

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本文發表中國廣西壯族自治區西南部石灰岩地區的秋海棠屬側膜組 (*Begonia* sect. *Coelocentrum*) 的一個新種：方氏秋海棠 (*Begonia fangii*)，提供照片與繪圖，並報導其染色體數 ($2n = 30$)。方氏秋海棠外形略似掌葉秋海棠 (*B. hemsleyana*)，都具有掌狀複葉，主要差別在於方氏秋海棠具有匍匐延長的根狀莖、葉片具有 (3-) 4-5(-7) 枚小葉、花柱 3 枚、以及子房具有一室的側膜胎座；而掌葉秋海棠具有直立莖與短根莖、葉片具有 (6-) 7-10(-12) 枚小葉、花柱 2 枚、子房兩室、中軸胎座、染色體數為 $2n = 22$ 。

關鍵詞：方氏秋海棠；掌葉秋海棠；廣西掌葉秋海棠；側膜組；中國；染色體數；廣西；石灰岩植物；新種。