

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

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**Abstract.** *Begonia picturata*, a new species of sect. *Coelocentrum* from the limestone areas in southwestern Guangxi Zhuangzu Autonomous Region, China, is described and illustrated. A somatic chromosome number of  $2n = 30$  was determined. *Begonia picturata* resembles *B. cirrosa* in having villous peduncles and the pedicels, outer tepals (abaxial surface), ovaries and capsules villous-setose or hispid-setose with red trichomes. *Begonia picturata*, however, is distinct in that the leaves are maculate (vs. maculation absent) and densely villous-setose or tomentose-setose (vs. sparsely to moderately pilose or pilose-setose) on the upper surface.

**Keywords:** *Begonia cirrosa*; *Begonia masoniana* var. *maculata*; *Begonia morsei*; *Begonia picturata*; *Begonia* sect. *Coelocentrum*; *Begonia variegata*; Begoniaceae; China; Chromosome number; Guangxi; Limestone flora; Medicinal plant; New species; Rare species.

## Introduction

In continuation of our taxonomic studies of Chinese *Begonia* (Shui et al., 2002; Ye et al., 2004; Ku et al., 2004; Peng et al., 2005a; Peng et al., 2005b; Peng et al., 2005c), we report another handsome new species of *Begonia* sect. *Coelocentrum*. The plant with remarkably attractive foliage was first observed by the first author at an annual medicinal herb market held at the 'Dragon Boat Festival' in Jingxi, Guangxi Zhuangzu Autonomous Region. According to the vender, it is effective in "alleviating fever, disintoxicating, invigorating blood vessels and dispersing stasis." The plant, which was brought into cultivation, is a distinct new species in *Begonia* sect. *Coelocentrum*. We were able to follow the medicinal herb vender's directions to the plant's native locality, where we observed the species in the wild and collected *Begonia picturata* in its native habitat. Worthy of note, our local field guide informed us that this rare, new species has been gathered as food for pigs by village farmers. Conservation of this stunning species is worthy of special attention.

## Species Description

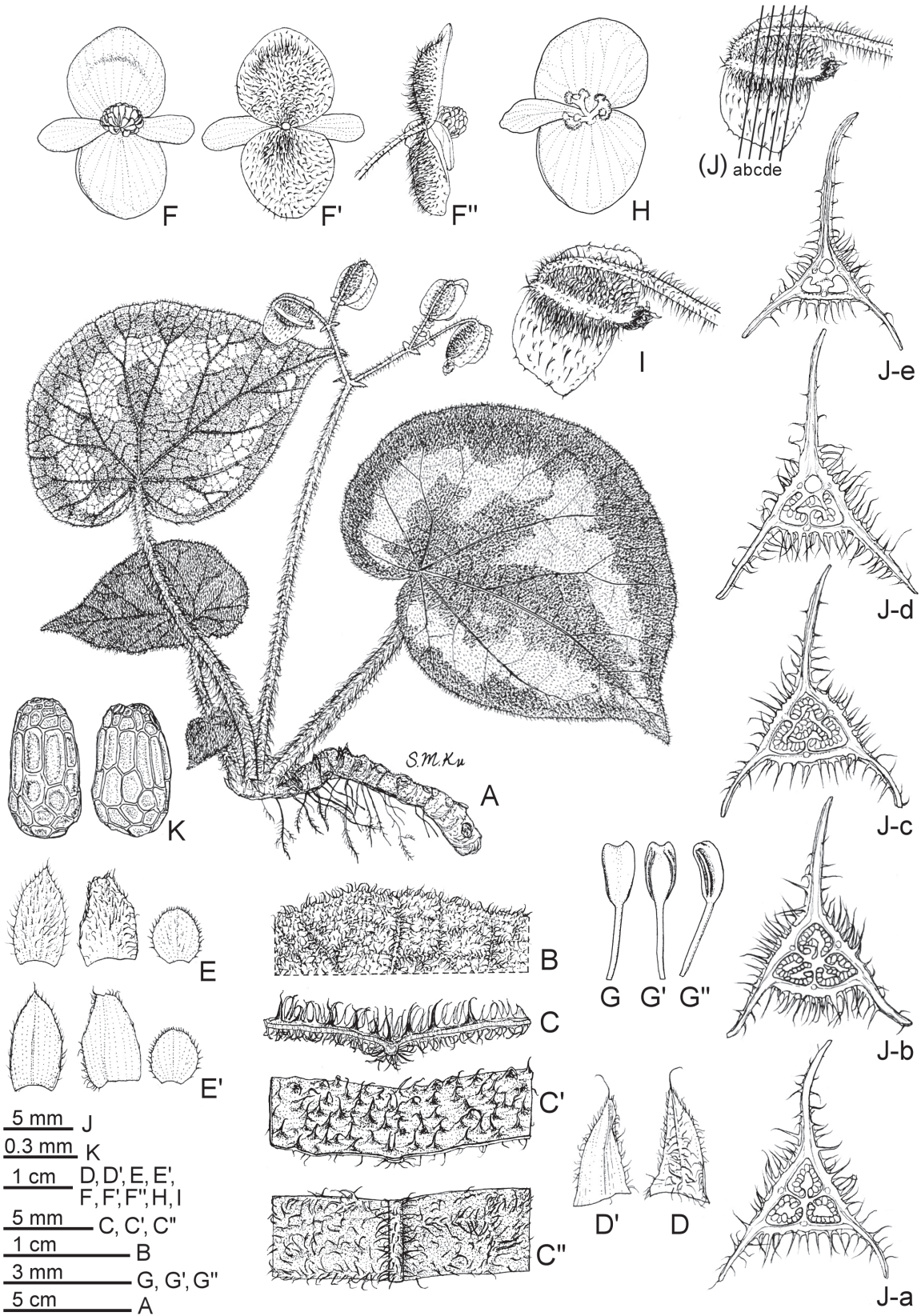
***Begonia picturata*** Yan Liu, S. M. Ku & C.-I Peng, sp. nov.— TYPE: China. Guangxi Zhuangzu Autonomous Region, Baise Shi, Jingxi Xian, Dizhou Xiang, Guwen Cun, 23°03'46''N, 106°17'45''E, elev. ca. 760 m, associ-

ated with *Acer*, *Myrsine kwangsiensis*, *Bauhinia*, *Garcinia*, *Paraboea*, *Pseudochirita guangxiensis* var. *glauca*, *Pilea*, *Hoya*, *Sinosideroxylon pedunculatum*, *Aster*, *Tirpitzia ovoidea*, *Nephrolepis*, *Lepisorus*, *Epipremnum pinnata*, *Asplenium*, *Sterculia*, *Smilax*. 3 May 2005, Yan Liu L1199, (holotype: IBK; isotype: HAST). 一口血秋海棠 Figures 1, 2

*Haec species nova* *B. cirrosae pedunculis villosis, pedicellis et tepalis exterioribus (abaxialiter) et ovariis et capsulis villosis-setosis vel tomentoso-setosis et in trichomatibus rubris similis, sed in foliis maculatis (in illa non maculatis), supra dense villosis-setosis vel tomentoso-setosis (in illa sparse moderateve pilosis vel setoso-pilosis) differt.*

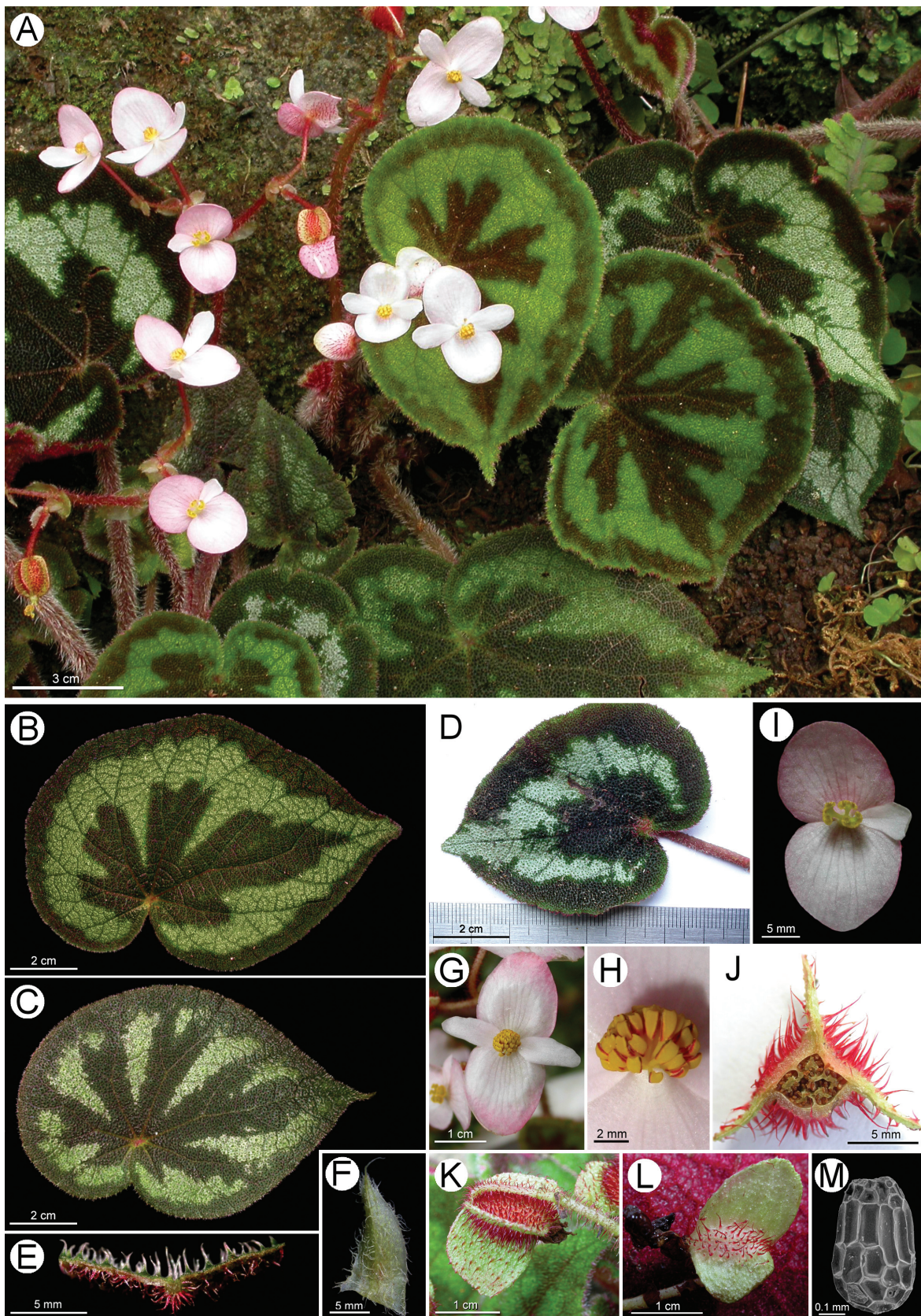
Plant monoecious, epipetric, perennial, rhizomatous. Rhizome stout, 5-15 cm long, 0.6-1.2 cm thick, internodes 0.8-2(-3) cm long, brown or reddish brown, villous. Stipules caducous, ovate-triangular to lanceolate-triangular, ca. 10-23 mm long, 6-10 mm wide, greenish or reddish hyaline, herbaceous, weakly to strongly keeled, abaxially villous (midrib more densely so), margin ciliate, apex aristate, arista 1-3 mm long, hair-like. *Leaves* 2-8, alternate, simple, asymmetric, unlobed, ovate to widely ovate, rarely suborbicular, base strongly oblique-cordate, margin inconspicuously denticulate and ciliate, apex shortly acuminate, (7-)10-15(-20) cm long (basal lobes included), (5.5-)7-11 (-14) cm wide, adaxially dark green or brown (abaxially red), adorned with a wide white, greenish-white, or pale green ring (abaxially pale green) in the middle (Figure 2: D) or with digitate dark brown bands along main veins and at leaf margin, pale green, yellowish green to whitish else-

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**Figure 1.** *Begonia picturata* Yan Liu, S. M. Ku, & C.-I Peng. A, Habit; B, Leaf margin, also showing some abaxial surface; C, Leaf, cross section, showing trichome types on both surfaces, C', Leaf adaxial surface, C'', Leaf abaxial surface; D, D', Stipules, adaxial and abaxial surface; E, Bracts, abaxial surface, E', Bracts, abaxial surface; F, Staminate flower, face view, F', back view, F'', side view; G, Stamen, dorsal view, G', ventral view, G'', side view; H, Carpellate flower; I, Fruit; J: a-e, Serial cross sections of an immature fruit; K, Seeds [A-G, K from Peng *et al.* 20387 (HAST); H from Liu L1199 (IBK); I, J from Liu L1019 (IBK)].





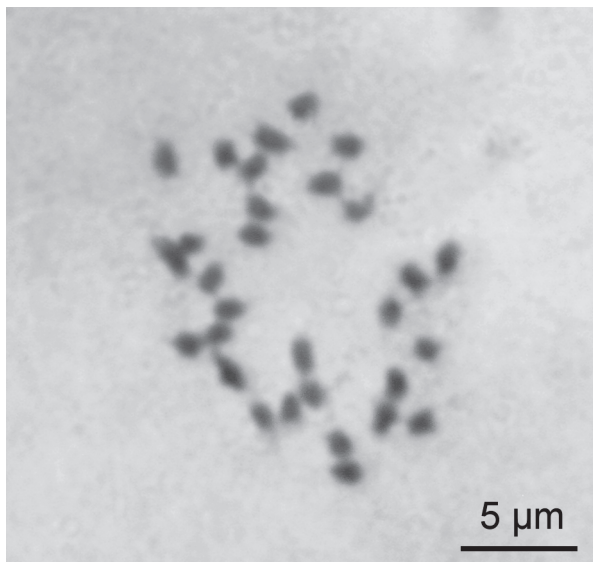
**Figure 2.** *Begonia picturata* Yan Liu, S. M. Ku & C.-I Peng. A, Habit; B, C, D, Leaves, showing variation in the maculation pattern; E, Leaf, cross section; F, Stipule; G, Staminate flowers; H, Androecium, showing yellow anthers with red margins; I, Carpellate flower; J, Middle cross section of an immature fruit, showing parietal placentation; K, L, Fruits; M, Seed, SEM microphotograph [A, D, G, I, L from Liu L1199 (IBK); J, K from Liu L1019 (IBK); B, C, E, H, M from Peng et al. 20387 (HAST)].



where (Figure 2: B), sometimes only maculate in intercostal areas (Figure 2: C), texture thickly chartaceous, surface somewhat rugose, adaxially villous-setose or tomentose-setose (trichomes 1-2 mm long, whitish-hyaline or reddish, with a swollen base), abaxially short villous, particularly so on veins; venation basally 6-7-palmate, midrib distinguishable, veins pinnate along midrib, with 1-3 major lateral veins on each side, other primary veins branching dichotomously or nearly so, tertiary veins weakly percurrent or reticulate, divergence angle 60-85°, minor veins reticulate, all veins on abaxial surface prominently raised; petioles terete, 7-17 cm long, 3-6 mm thick, brownish, villous. *Inflorescences* axillary, 1-3, arising directly from rhizome, dichasial cymes, branched 2-4 times, flowers 5-16 per cyme; staminate flowers 3-9, carpellate flowers 1-8; peduncle well developed, terete, erect, 10-16 cm long, 2-4 mm thick, reddish brown or greenish, villous (trichomes 3-4 mm long, white or pinkish); pedicels hispid-villous (trichomes 2-3 mm long, reddish), ascending in staminate flowers (1-3 cm long), horizontal to pendent in carpellate flowers (1-1.7 cm long). Bracts caducous, ovate, oblong or rounded, margin ciliate, apex acute, obtuse or rounded, 4.5-15 mm long, 4.5-8 mm wide, greenish or reddish, herbaceous. *Staminate flowers*: tepals 4 (rarely 6), margin entire or nearly so, outer 2 suborbicular to oblong, base rounded or slightly cordate, apex rounded, 14-18 (-22) mm long, 14-17 mm wide, abaxially pinkish or whitish, villous-setose, adaxially pinkish or white; inner 2 (rarely 4) tepals obovate, oblong or oblanceolate, base cuneate, apex obtuse or rounded, ca. 10-15(-19) mm long, 4-5.5 mm wide, white, glabrous; androecium zygomorphic, subspherical, stamens ca. 20-40, golf club shaped; filaments subequal, ca. 1-2 mm long, shortly fused at base; anthers 2-locular, slightly compressed, oblong-obovoid, apex slightly emarginate, ca. 1.3-1.6 mm long, 0.8-1 mm wide, yellow with red margin along anther sacs. *Carpellate flowers*:

tepals 3, margin entire, usually caducous (if persistent, not thickened in fruit); outer 2 tepals suborbicular to widely ovate, 13-16 mm long, 14-18 mm wide, abaxially pinkish or whitish, red villous-setose or hispid-setose; inner tepal obovate, base cuneate, apex obtuse or rounded, ca. 9-11 mm long, 4-6 mm wide, white, glabrous; ovary trigonous-ellipsoid, ca. 7-11 mm long, 5-7 mm across (wings excluded), greenish, red villous-setose or hispid-setose (trichomes conically thickened), 3-winged; wings unequal, sparsely red villous-setose; lateral wings narrower, ca. 2-4 mm tall; abaxial wing crescent shaped, suborbicular or subrectangular, ca. 5-7 mm tall, 7-12 mm wide; locule 1, placentation intruded parietal (axile near base); placentae 3, each 2-branched; styles 3, fused at base, yellow, ca. 3-3.5 mm long, apically split and C shaped; stigmas in a spiral band and papillose all around. *Fruit* capsules, dehiscent, nodding, greenish when fresh, 10-15 mm long, 6-8 mm across (wings excluded), apex with persistent styles; lateral wings 2-6 mm tall; abaxial wing crescent shaped, suborbicular or subrectangular, 6-9 mm tall. *Seeds* numerous, brown, usually widely ellipsoid or sometimes ellipsoid, 0.45-0.55 mm long, 0.3-0.35 mm thick, chalazal end rounded, micropylar end obtuse, outer periclinal walls of mature seeds concave; collar cells elongated, straight, nearly rectangular, 11-13 cells in a ring, 1/3-1/2 as long as seed; anticlinal walls between collar cells raised, straight or slightly undulate; testa cell nearly isodiametric-polygonal. Somatic chromosome number,  $2n = 30$  (Figure 3).

*Additional specimens examined*. **CHINA**. Guangxi Zhuangzu Autonomous Region, Baise Shi, Jingxi Xian, Dizhou Xiang, Dizhou Cun, 23°00'42"N, 106°21'40"E, elev. ca. 720 m, plant high on shaded, moist limestone rock face just inside a N-facing cave, rare, plant in fruit, 23 July 2004, *Yan Liu L1019* (IBK, HAST); same locality, plant at early anthesis, 16 March 2005, *Ching-I Peng, Yan Liu, Shin-Ming Ku & Huan-Yu Chen 20386* (HAST). Same locality

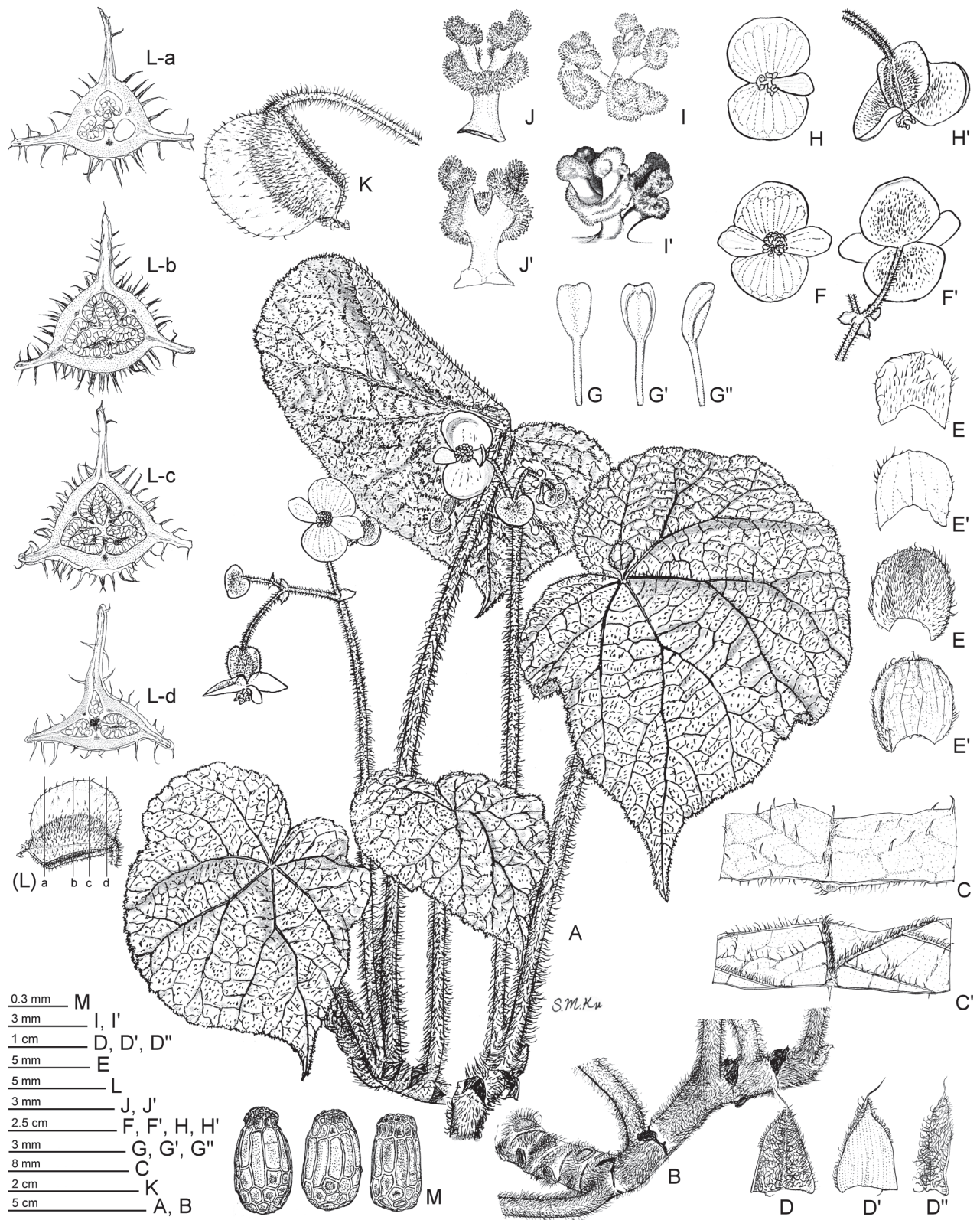


**Figure 3.** Mitotic chromosome spread of *Begonia picturata* ( $2n = 30$ , from Peng *et al.*, 20387, HAST).



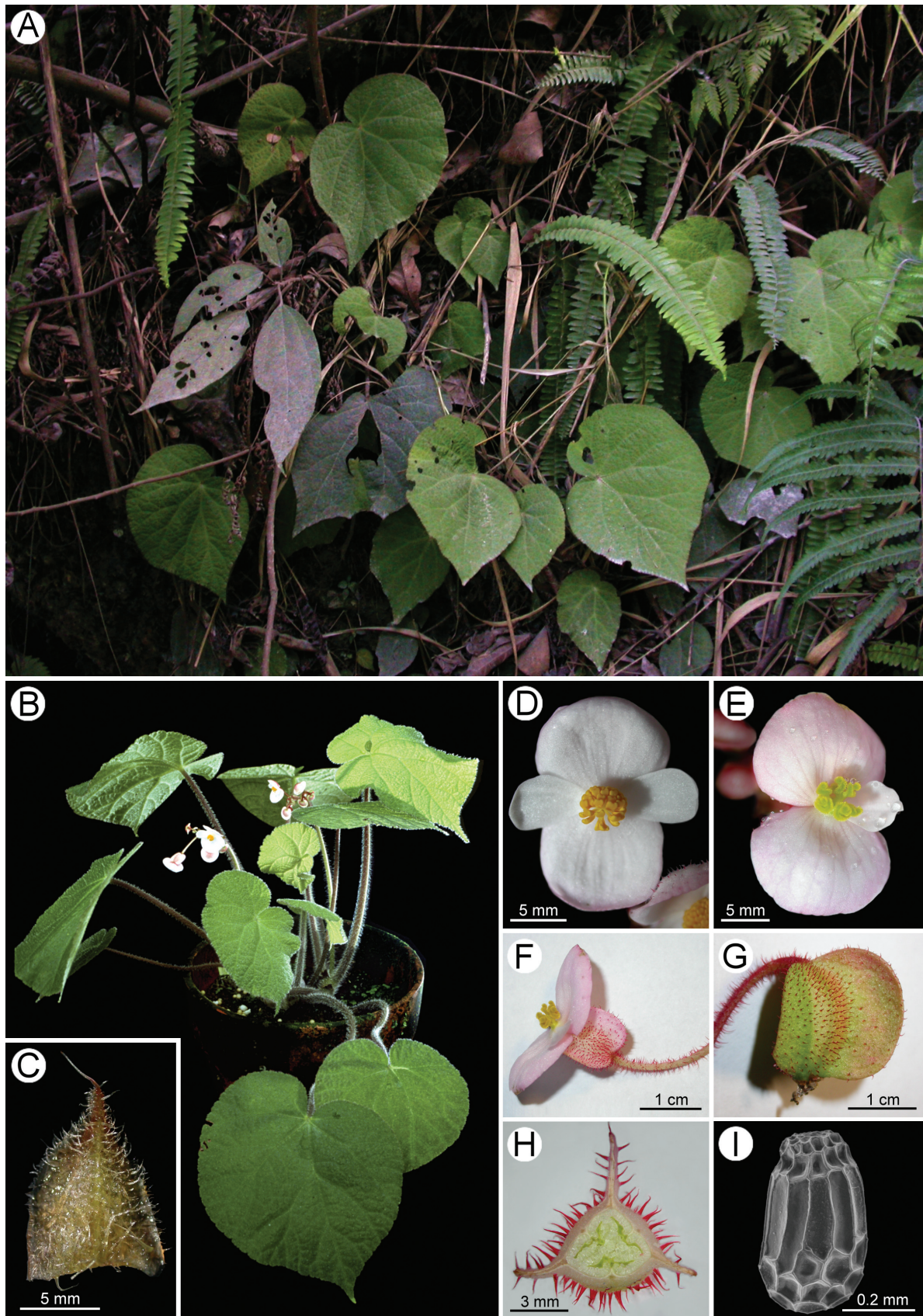
**Figure 4.** Distribution of *Begonia picturata* (star), *B. cirrosa* (circles) and *B. morsei* (square, known only from the type, Lungzhou, exact locality unknown) in China.





**Figure 5.** *Begonia cirrosa* L. B. Smith & D. C. Wasshausen. A, Habit; B, Rhizome; C, Portion of leaf, adaxial surface, C', abaxial surface; D, Stipule, abaxial surface, D', adaxial surface, D'', side view; E, Bract, abaxial surface, E', adaxial surface; F, Staminate flower, face view, F', back view; G, Stamen, dorsal view, G', ventral view, G'', side view; H, Carpellate flower, face view, H', side view; I, Style, top view, I', side view; J, Style and stigmatic band, dorsal view, J', ventral view; K, Fruit; L: a-d, Serial cross sections of fruit; M, Seeds [All from living plant (*Peng 18826*, HAST) cultivated in the experimental greenhouse].





**Figure 6.** *Begonia cirrosa* L. B. Smith & D. C. Wasshausen. A, Habit and habitat; B, Cultivated plant at anthesis; C, Stipule; D, Staminate flower; E, Carpellate flower; F, Carpellate flower, side view; G, Fruit; H, Middle cross section of ovary; I, Seed SEM microphotograph (A from Peng 20518, B-I from Peng 18826; both at HAST).



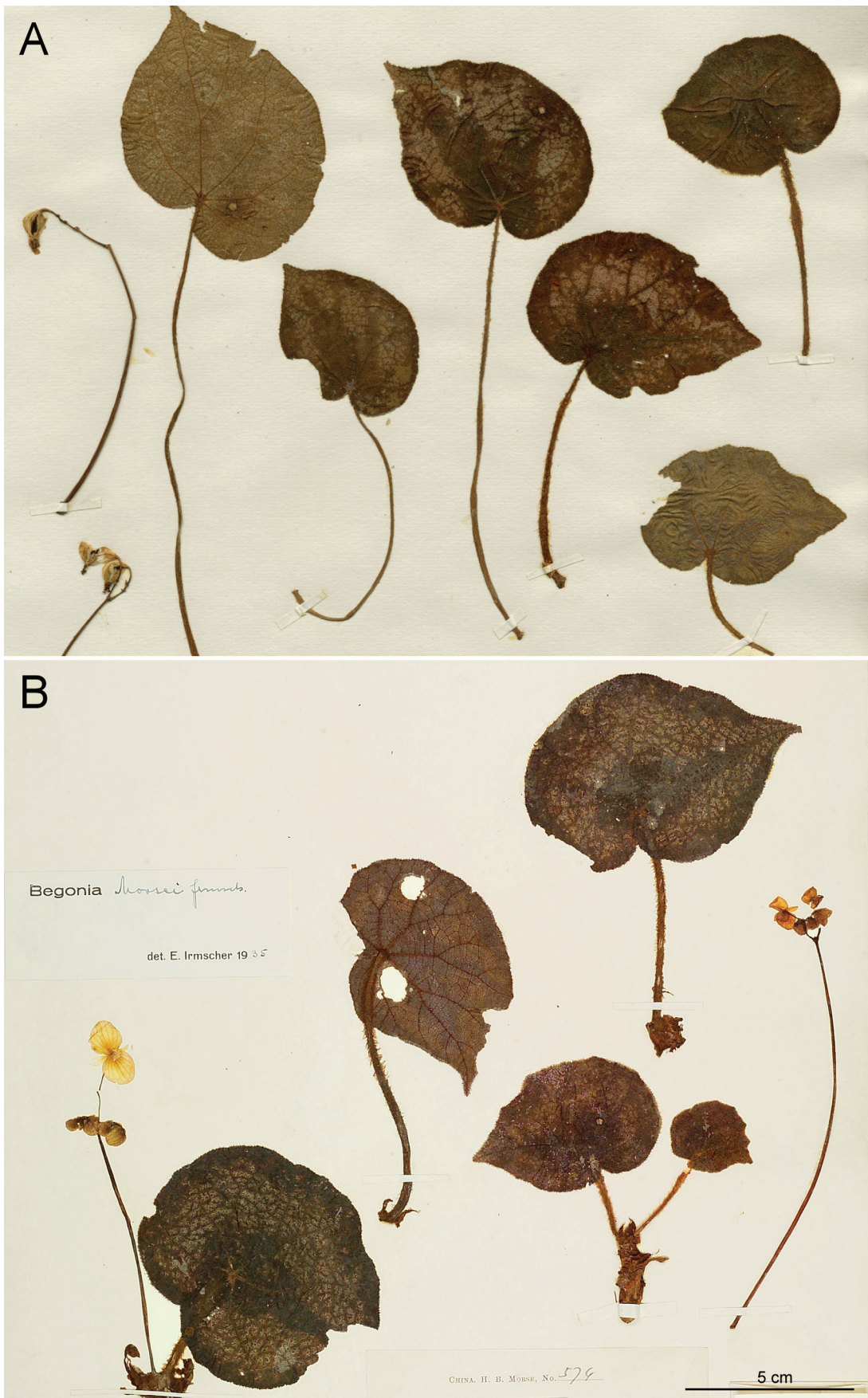
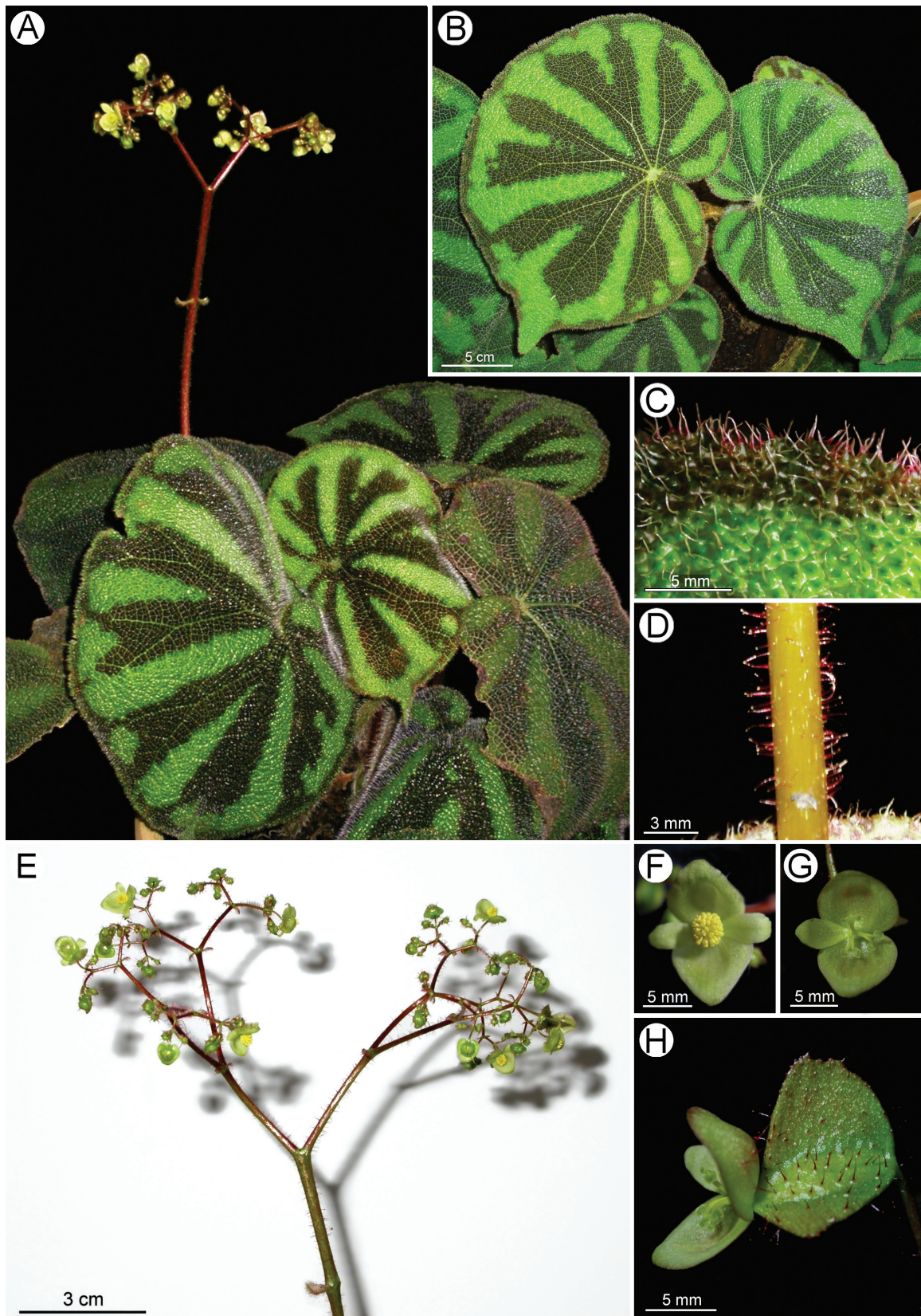


Figure 7. Syntypes of *Begonia morsei* Irmsch. A, Morse 197 (K); B, Morse 574 (K).





**Figure 8.** *Begonia variegata* Shui & W. H. Chen [= *B. masoniana* Irmsch. ex Ziesenh. var. *maculata* S. K. Chen, R. X. Zheng & D. Y. Xia]. A, Habit; B, Leaves; C, Leaf, portion; D, Peduncle, showing glandular hispid vestiture; E, Inflorescence; F, Staminate flower; G, Carpellate flower, face view; H, Carpellate flower, side view (All from a cultivated plant in Kunming Botanical Garden, Yunnan, China).



as the type, on N-facing limestone rock face or at base of the trunk; associated with *Acer*, *Myrsine kwangsiensis*, *Bauhinia*, *Garcinia*, *Paraboea*, *Pseudochirita guangxiensis* var. *glauca*, *Pilea*, *Hoya*, *Sinosideroxylon pedunculatum*, *Aster*, *Tirpitzia ovoidea*, *Nephrolepis*, *Lepisorus*, *Epipremnum pinnata*, *Asplenium*, *Sterculia*, *Smilax*. 16 March 2005, Ching-I Peng, Yan Liu, Shin-Ming Ku and Huan-Yu Chen 20387 (HAST).

**Ecology.** On shaded rocky limestone slopes in broadleaved forests and on barren limestone rock faces in caves near villages; ca. 700-800 m elevation.

**Etymology.** The specific epithet '*picturata*' refers to the leaves, which are marked with different colors as if they were painted.

**Distribution.** Southwestern Guangxi, China; rare (Figure 4).

**Phenology.** Flowering March to May; fruiting June to March.

**Notes.** The somatic chromosome number of *Begonia picturata* is  $2n = 30$  (Figure 3), which agrees with that of all other members of *Begonia* sect. *Coelocentrum* thus far reported [*B. masoniana*: Legro and Doorenbos (1969); *B.*

*curvicarpa*, *B. louchengensis*: Ku et al. (2004); *B. fangii*: Peng et al. (2005a); *B. liuyanii*: Peng et al. (2005b)].

*Begonia picturata* is similar to *B. cirrosa* (Figure 5, 6) in having villous peduncles and villous-setose or hispid-setose pedicels and outer tepals (abaxial surface), and the ovary and fruit covered with red trichomes (these conically thickened). *Begonia picturata* is distinguishable by its markedly maculated leaves (vs. maculation absent) and villous-setose or tomentose-setose (vs. sparsely to the moderately pilose or pilose-setose) upper surface of the leaves. *Begonia picturata* somewhat resembles *B. morsei* (Figure 7) in leaf maculation pattern, but is distinguishable by the villous (vs. glabrous) peduncle and villous-setose or hispid-setose (vs. glabrous) capsules. *Begonia picturata* also bears a striking superficial resemblance in leaf maculation pattern to *B. variegata* (Figure 8) [formerly as *B. masoniana* var. *maculata* (cf. Shui and Chen, 2005)]. However, *B. picturata* is sharply distinct by the villous (vs. glandular hispid) peduncle, large, white or pinkish (vs. small, greenish-yellowish) tepals, zygomorphic (vs. actinomorphic) androecium, and villous-setose or hispid-setose (vs. glandular hispid) capsules. *Begonia picturata* is unique in sect. *Coelocentrum* in having yellow anthers

**Table 1.** Comparison of *Begonia picturata*, *B. cirrosa*, *B. morsei* and *B. variegata*.

Characters	<i>B. picturata</i> (Figures 1, 2)	<i>B. cirrosa</i> (Figures 5, 6)	<i>B. morsei</i> (Figure 7)	<i>B. variegata</i> (= <i>B. masoniana</i> var. <i>maculata</i> ) (Figure 8)
Stipule apex	Hair-like	Hair-like	Hair-like	Horn-like
Leaf				
Shape	Ovate, broadly ovate to suborbicular	Broadly ovate to suborbicular	Broadly ovate to suborbicular	Suborbicular
Size (cm)	(7-)10-15(-20) × (5.5-)7-10(-14)	ca. 11-19 × 9-14	ca. 5-9 × 4-7	ca. 16-28 × 13-21
Upper surface	Rugose or rugulose	Flat or slightly rugose	Rugose or rugulose	Densely strongly conically bullate
Maculation	Adorned with a wide white, greenish-white, or pale green ring in the middle or with digitate dark brown bands along main veins and at leaf margin, pale green, yellowish green to whitish elsewhere	Lacking	Adorned with a wide white ring in the middle	Adorned with dark brown wide band along main veins and around leaf, yellowish green elsewhere
Indumentum on adaxial surface	Tomentose-setose or villous-setose, trichomes 1-2 mm long	Pilose or pilose-setose, trichomes ca. 1 mm long	Shortly villous-setose, trichomes ca. 0.5 mm long	Villous-setose or hirsute, trichomes 1-2 mm long
Peduncle	Villous	Villous	Glabrous	Glandular hispid
Tepals color	Pinkish or white	Pinkish or white	Unknown (probably pinkish or white)	Greenish or greenish-yellowish
Androecium	Zygomorphic	Zygomorphic	Unknown (probably zygomorphic)	Actinomorphic
Anthers	Yellow with red margins along anther sacs	Yellow	Unknown	Yellow
Capsule	Villous-setose or hispid-setose	Villous-setose or hispid-setose	Glabrous	Glandular hispid

with red margins along anther sacs (Figure 2:H). A comparison of the salient characters of the four species in sect. *Coelocentrum* is shown in Table 1.

**Acknowledgments.** We thank Hidetoshi Nagamasu (KYO) for assistance with the Latin diagnosis; Hong-Zhe Li and Hong Ma (KUN) for providing handsome images (Figure 8: B, D) and useful literature; Dave Boufford (A/GH) and Hidetoshi Nagamasu for improving the manuscript; and the curators of GXMI, K and KUN for facilitating our examination of herbarium collections. This study was supported in part by the Guangxi Natural Science Foundation (GKJ0448089) to Yan Liu (IBK) and grants from the Research Center for Biodiversity, Academia Sinica and the National Science Council, Taiwan, to Ching-I Peng (HAST).

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# 中國廣西石灰岩地區秋海棠屬側膜組一新種：一口血秋海棠

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本文報導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：一口血秋海棠 (*Begonia picturata*)，提供線繪圖與彩色照片以資辨識，並報導其染色體數 ( $2n = 30$ )。一口血秋海棠的花梗具長曲柔毛，小花梗、外花被片、子房與果實具有紅色圓錐狀的彎曲剛毛或直硬毛而與同為側膜組的捲毛秋海棠 (*B. cirrosa*) 略似；但一口血秋海棠葉片具有花紋、上表面密布長曲柔毛狀剛毛或絨毛狀剛毛，捲毛秋海棠葉片無斑紋、上表面被疏至中度的柔毛或剛毛狀柔毛。本文並提供同為側膜組較相似之龍州秋海棠 (*B. morsei*) 之模式標本與彩紋秋海棠 (*B. variegata*) 的彩色照片，以資辨識。

**關鍵詞：**捲毛秋海棠；彩紋秋海棠；龍州秋海棠；一口血秋海棠；側膜組；秋海棠科；中國；石灰岩植物；廣西；染色體數；藥用植物；新種；稀有植物。