

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

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**ABSTRACT.** *Begonia pulvinifera*, a new species of sect. *Diploclinium* from limestone areas in southwestern Guangxi Zhuangzu Autonomous Region, China, is described and illustrated. This new species is unique in having pulvinate petioles, a feature not known in any other species of *Begonia* in China. *Begonia pulvinifera* is similar to *B. wangii* T. T. Yü, differing in the lower surface of the leaf being pale green; petiole with a reddish brown swollen base; tepals obtuse; tepals of staminate flowers 4; tepals of carpellate flowers 3 and ovary with axile placentation throughout. *Begonia pulvinifera* also resembles *B. cavaleriei* Lév., but is distinguishable by the narrower leaf; pulvinate petiole; stipules triangular with apex acuminate or cuspidate; and ovate bracts with apex acute or acuminate. *Begonia pulvinifera* is rare, currently known only from one population near the border of China and Vietnam.

**Keywords:** *Begonia pulvinifera*; *Begonia wangii*; *Begonia cavaleriei*; Begoniaceae; China; Guangxi; Limestone flora; New species; Rare species; sect. *Diploclinium*; Taxonomy.

## INTRODUCTION

While preparing an account of Begoniaceae for the Flora of China, the senior author made a number of botanical inventories in the karst areas in Guangxi, China. Field surveys in these poorly explored areas proved to be rewarding: 12 new taxa of *Begonia*, all of sect. *Coelocentrum*, were reported in recent years (Fang et al., 2006; Ku et al., 2004, 2006; Liu et al., 2005; Peng et al., 2005a, b). In this paper, we report the discovery of a new species in *Begonia* sect. *Diploclinium* from the limestone areas in southwestern Guangxi, China, which is the distribution center of the Asiatic sect. *Coelocentrum* (Shui et al., 2002). In aspect this new taxon bears a superficial resemblance to *B. wangii* T. T. Yü and *B. cavaleriei* H. Lév., but a careful study of the plants grown in the experimental greenhouse reveals its distinct identity.

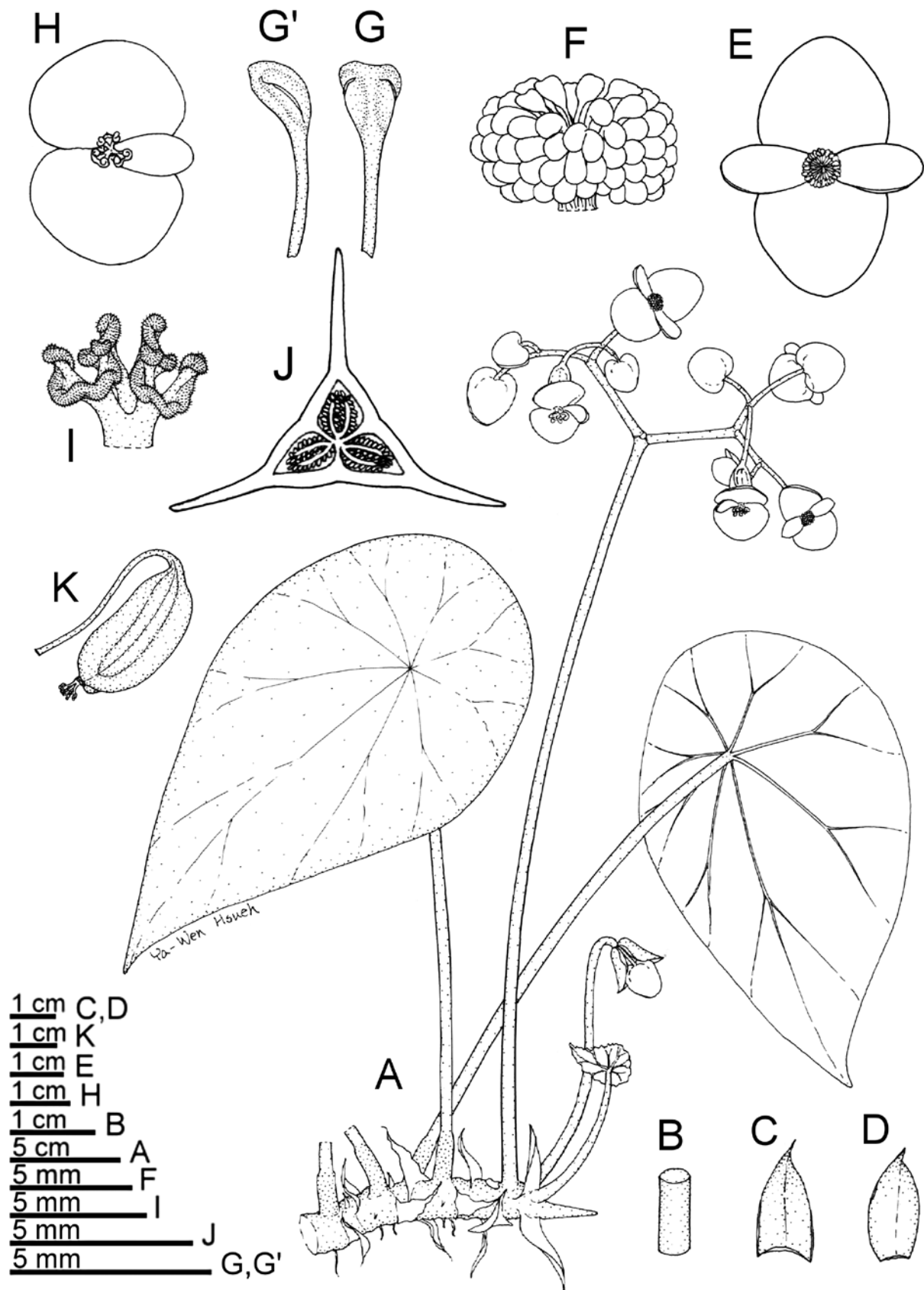
## DESCRIPTION

***Begonia pulvinifera*** C.-I Peng & Yan Liu, sp. nov. (sect. *Diploclinium*)—TYPE: CHINA, Guangxi Zhuangzu Autonomous Region, Baise Shi, Jingxi Xian, Huren Zhen, at base of a limestone hill in broadleaf forest, on rock face, 22°59'19"N, 106°40'53"E, elev. 320 m, 26 May 2004, specimens pressed from cultivated plants on 5 Feb 2005, *Ching-I Peng 19741-A* (holotype, HAST; isotype, IBK).  
 Figures 1, 2

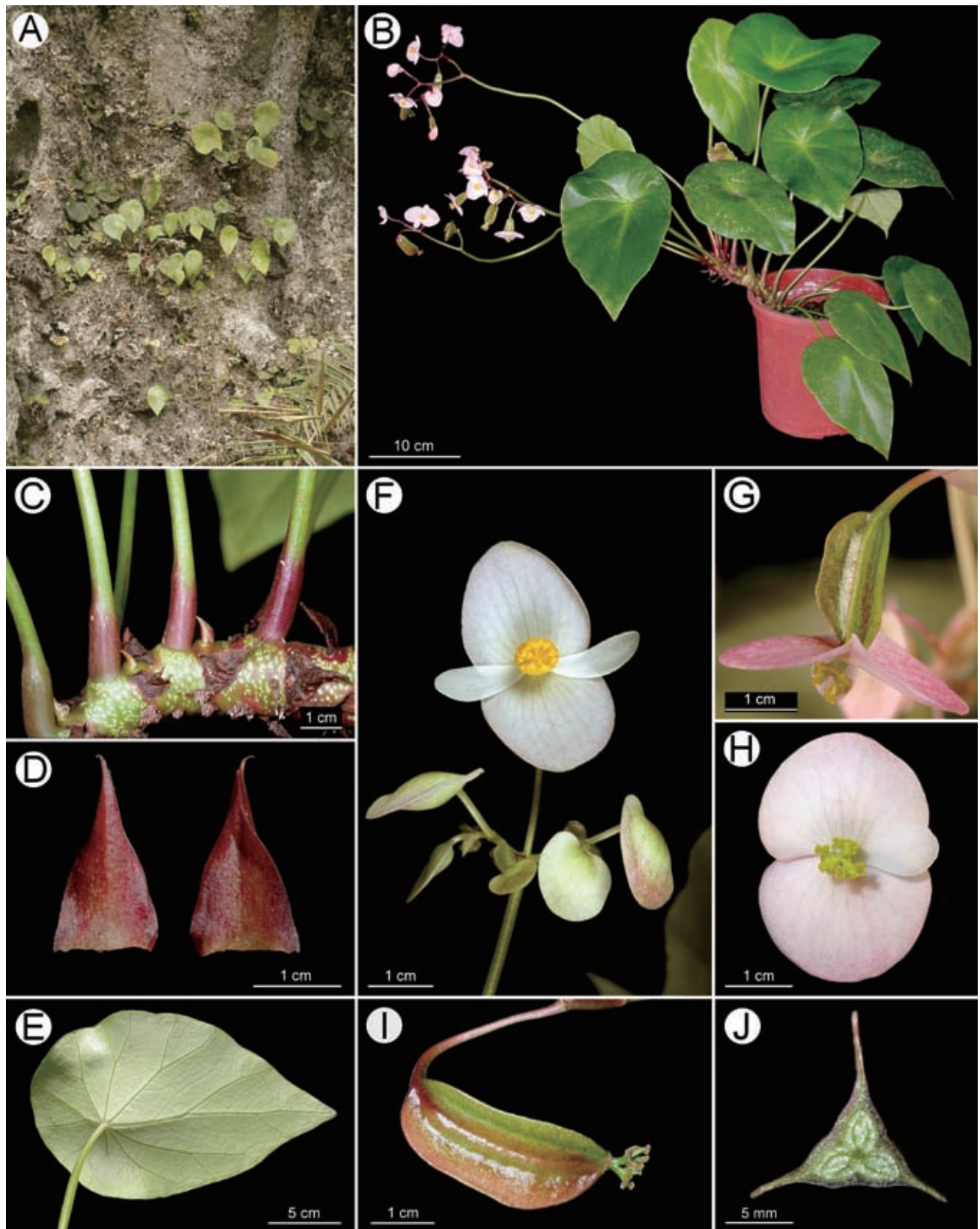
Haec species similis *Begoniae wangii* T. T. Yü, sed a qua differt foliis subtus pallido-viridibus, petiolis pulvinis, tepalis obtusis, floribus masculis tepalis 4 instructis, eis femineis tepalis 3 instructis, placentatione omnino axili; etiam similis *Begoniae cavaleriei* Lév., sed a qua differt foliis angustioribus, petiolis pulvinis, stipulis triangularibus, apice acuminatis vel cuspidatis.

Herbs, perennial, acaulescent, monoecious. Rhizomes elongate creeping, to 2 cm thick, glabrous, nodes dense; stipules triangular, 2.8-3 cm long, 1.7-1.9 cm wide,

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**Figure 1.** *Begonia pulvinifera* C.-I Peng & Yan Liu. A, Habit; B, Portion of petiole; C, Stipule; D, Bract; E, Staminate flower; F, Androecium; G, G', Stamen; H, Carpellate flower; I, Style branches; J, Ovary, cross section; K, Capsule. All from greenhouse grown plants of Peng 19741 (type collection, HAST).



**Figure 2.** *Begonia pulvinifera* C.-I Peng & Yan Liu. A, Habit and habitat on limestone rocky slope; B, Cultivated plant at anthesis; C, Portion of plant, showing rhizome and lower part of the pulvinate petiole; D, Stipules; E, Leaf abaxial surface; F, Inflorescence; G, Carpellate flower, side view; H, Carpellate flower, adaxial view; I, Capsule, side view; J, Ovary, middle-cross section, showing three locules each with a bifid placentation. All from Peng 19741 (HAST, type collection).

glabrous, margin entire, apex acuminate or cuspidate, persistent. *Leaves* alternate, arising from rhizome; petiole greenish, to 24 cm long, 4.5-5 mm in diam., glabrous, base reddish brown, swollen; leaf blade green, peltate, ovate, slightly asymmetric, 14-21 cm long, 8-14 cm wide, glabrous, base rotund, margin entire or nearly so, apex acuminate, shortly caudate; venation palmate, nerves 9. *Inflorescences* axillary, cymose, taller than leaves, 17-45 cm long; peduncle pale green, reddish brown toward base, 34-37 cm long, 3-4 mm across, glabrous; bracts reddish brown, narrowly ovate, 2-2.5 cm long, 0.9-1.2 cm wide, glabrous, margin entire, apex acute to acuminate; with 12-14 staminate flowers and 2-4 pistillate flowers. *Tepals* pinkish, glabrous. *Staminate flowers*: pedicel reddish or greenish, tinged pinkish near junction with tepals, glabrous, 2.2-3.5(-4.8) cm long; tepals 4, outer 2 tepals broadly ovate, 2.3-2.8 cm long, 2.2-2.5 cm wide, base cordate, apex obtuse, inner 2 tepals oblanceolate, 1.6-1.8 cm long, 0.5-0.8 cm wide, apex obtuse; androecium actinomorphic, very slightly compressed, 5-6 mm tall, 6-9 mm across; stamens more than 100, yellow, filaments nearly free, 3-5 mm long, anthers obovoid, ca. 1 mm long, apex truncate or sub-emarginate. *Carpellate flowers*: pedicel reddish or greenish, tinged pinkish toward junction with flower, glabrous, 13-15 mm long; tepals 3, unequal, outer 2 tepals depressed ovate, 1.8-2 cm long, 2.4-2.6 cm wide, base cordate, apex obtuse, inner 1 tepal oblanceolate, 1.2-1.4 cm long, 4-5 mm wide; ovary greenish, tinged reddish, trigonous, unequally 3-winged, glabrous, 3-locular; placentae axile, bilamellate, styles 3, 4-4.5 mm long, fused at base; stigmas 2-cleft, in a spiraled band. *Infructescences* 17 to 45 cm long; capsules nodding, ca. 3.1 cm long, unequally 3-winged, abaxial wing lunate, 5 mm tall, as wide as capsule, lateral wings smaller, 2-3.5 mm tall. Seed numerous, 0.47-0.57 mm long, 0.25-0.3 mm across, chalazal end rotund or nearly flat; operculum obtuse to subtruncate.

*Distribution.* Known only from one population in Huren Zhen (Township), Jingxi Xien, Baise City, Guangxi Zhuangzu Autonomous Region, China; at elevation 320 m (Figure 3).

*Etymology.* The specific epithet is derived from the petioles being pulvinate.

*Notes.* *Begonia pulvinifera* is unique in having pulvinate petioles, a feature not known in any other species of *Begonia* in China. It resembles *B. cavaleriei* (Figure 4), but is distinguishable by the stipules triangular with the apex acuminate or cuspidate (vs. broadly ovate to reniform, apex emarginated or acute and awned); relatively narrower leaf blade; petiole pulvinate; and bracts ovate with apex acute or acuminate (vs. reniform to fan-shaped with apex emarginate). *Begonia pulvinifera* is also similar to *B. wangii* T. T. Yü (Figure 5), differing in the lower surface of the leaf being pale green; petiole with a reddish brown swollen base; tepals obtuse; tepals of staminate flowers 4; tepals of carpellate flowers 3 and



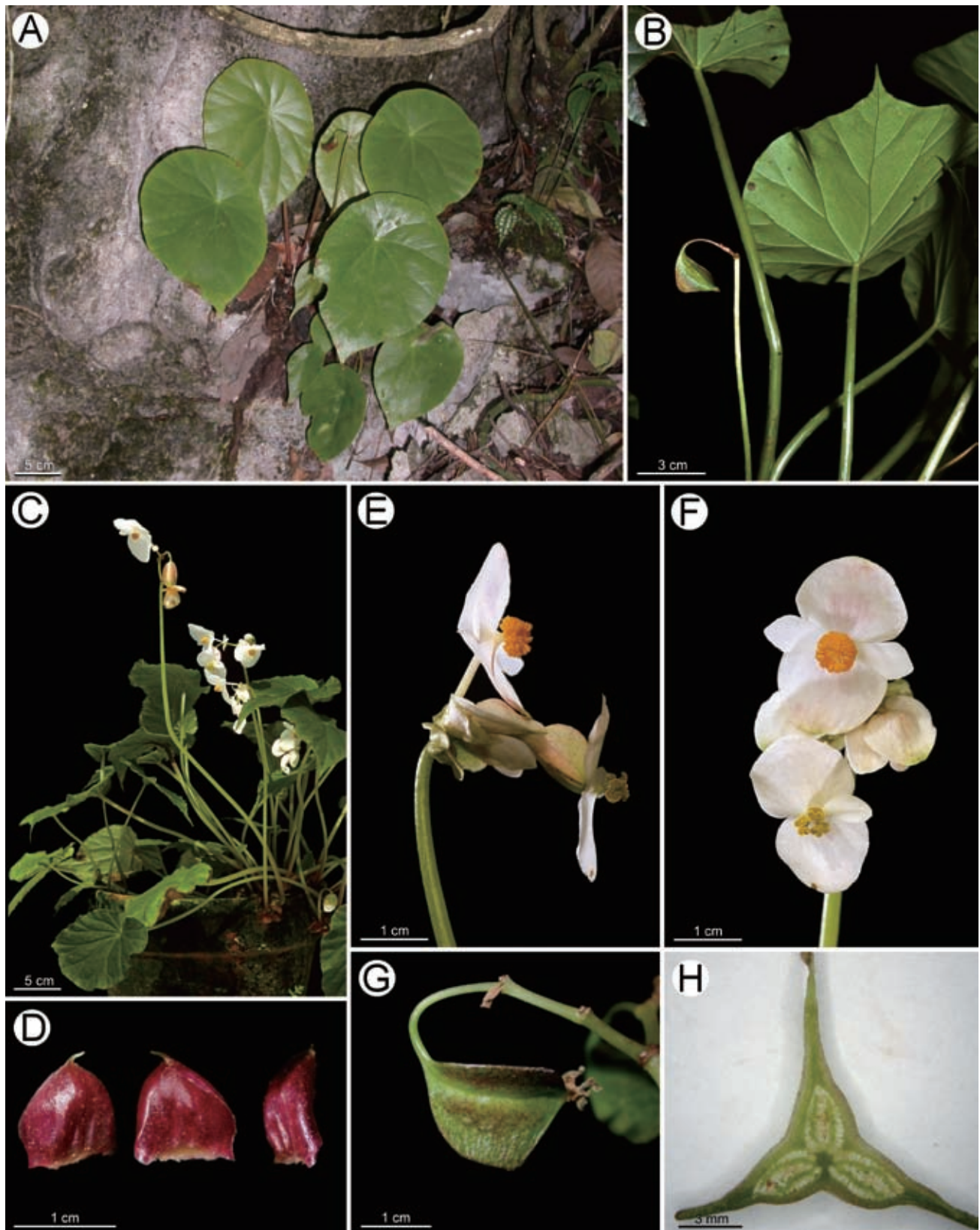
**Figure 3.** Distribution of *Begonia pulvinifera* (★) in Guangxi Zhuangzu Autonomous Region, China.

ovary with axile placentation throughout. By contrast, in *B. wangii*, the lower surface of the leaf is red throughout; petiole not swollen at base; both staminate and carpellate flowers with only 2 tepals and apex of tepals acute; and with parietal placentae near the summit of ovary (Figure 5-I; see also Shui et al., 2002). All three species occur on the face of limestone rocks, with *B. pulvinifera* being the rarest. It is currently known from only one population in southwestern Guangxi, near the border of China and Vietnam. The three species appear to form a closely knit, natural group in sect. *Diploclinium*, which is recognizable by the acaulescent habit, peltate leaf, trigonous-cylindrical ovary and the lunate abaxial wing on the capsule. A comparison of the salient features of the three species is shown in Table 1.

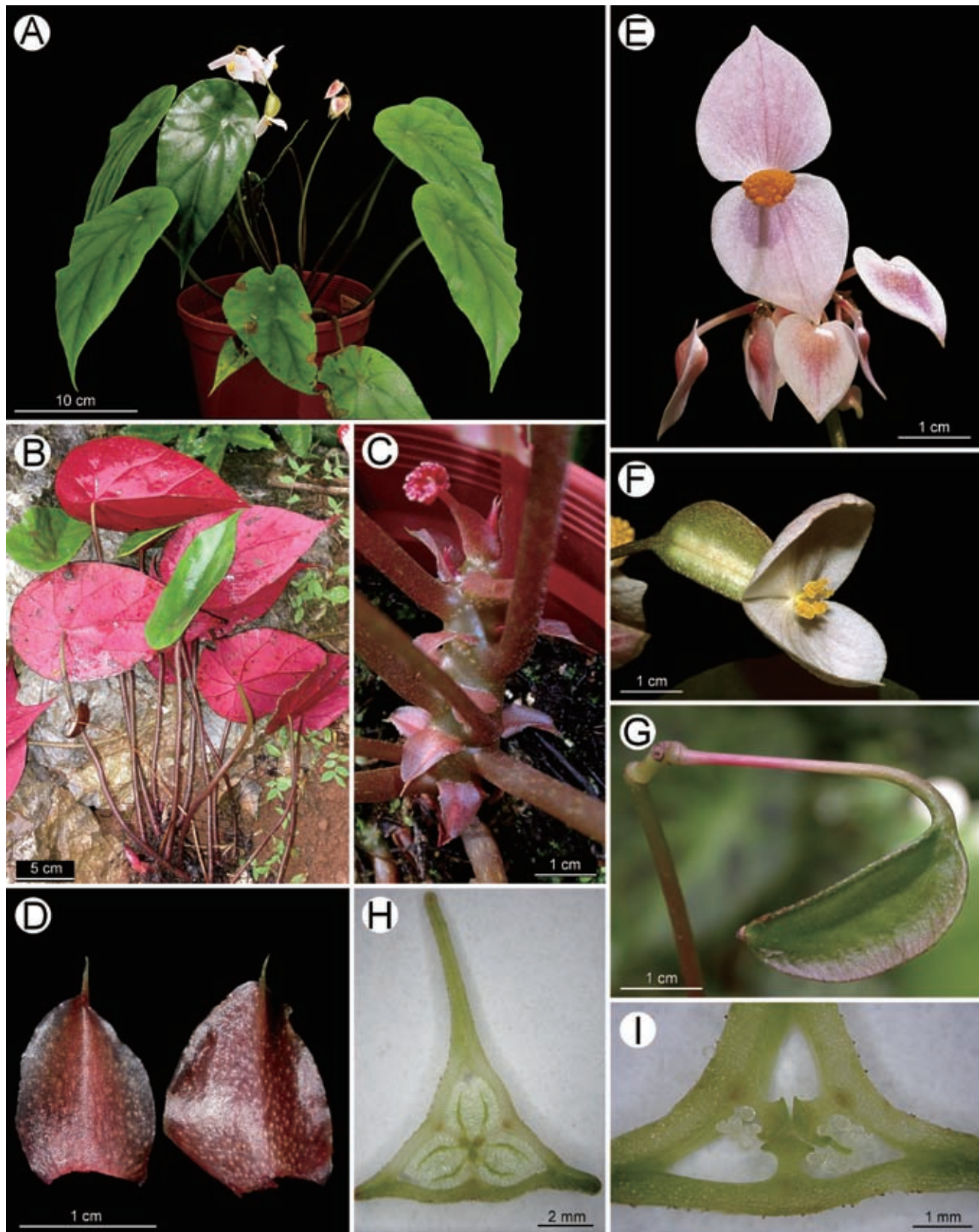
**Acknowledgements.** We thank David E. Boufford (A/GH) for improving the manuscript; Qiner Yang (PE) for assistance with the Latin diagnosis; Ya-Wen Hsueh (HAST) for the line drawings; Tung-Yu Hsieh (HAST) for preparing seed SEM microphotographs of *Begonia pulvinifera*; Chien-I Huang (HAST) for field assistance; Mao-Lun Weng and Huan-Yu Chen (HAST) for some of the colored photographs. This study was supported in part by a grant from the Guangxi Natural Science Foundation to Yan Liu (IBK) and grants from the Research Center for Biodiversity, Academia Sinica, Taipei to Ching-I Peng (HAST).

## LITERATURE CITED

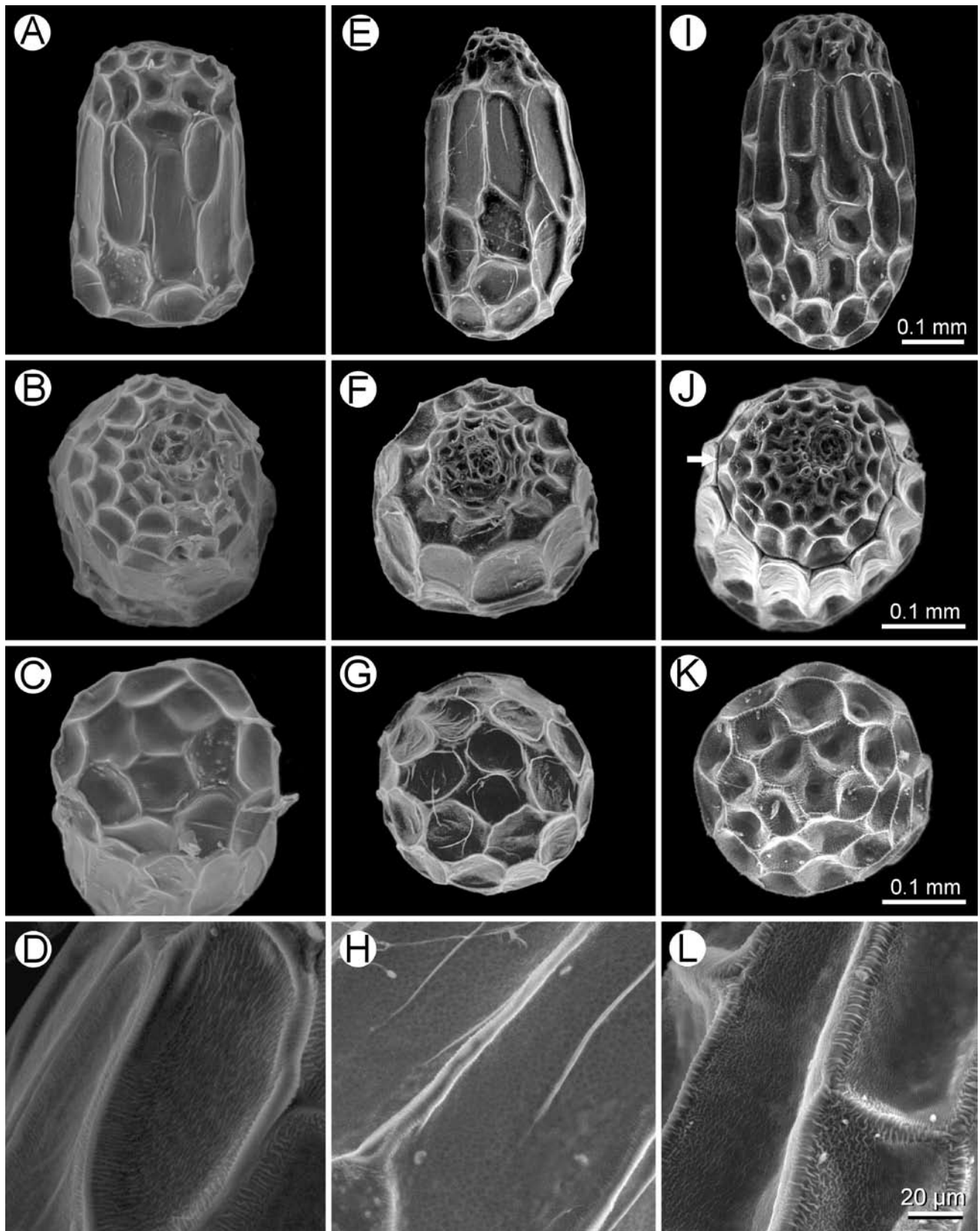
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**Figure 4.** *Begonia cavaleriei* H. Lév. A, Habit and habitat on limestone rocky slope; B, Portion of a plant, showing green abaxial leaf surface and a capsule; C, Cultivated plant at anthesis; D, Stipules; E, Inflorescence, side view; F, Inflorescence, adaxial view; G, Capsule, side view; H, Ovary, cross section (middle part), showing three locules each with a bifid placentation; I, Ovary, middle-cross section, showing three locules each with a bifid placentation. All but A from *Peng 18802* (HAST); A from *Peng 20555* (HAST).



**Figure 5.** *Begonia wangii* T. T. Yü. A, Cultivated plant at anthesis; B, Habit and habitat, showing leaf with green upper surface and red lower surface; C, Portion of plant, showing rhizome and lower part of the petiole; D, Stipules; E, Inflorescence with staminate flowers; F, Carpellate flower; G, Capsule, side view; H, Ovary, cross section (middle part), showing three locules each with a bifid placentation; I, Ovary, cross section (near summit), showing parietal placentation. All from *Leong 3346* (HAST).



**Figure 6.** *Begonia* seed SEM microphotographs. A-D, *Begonia pulvinifera*; E-H, *B. cavaleriei*; I-L, *B. wangii*. A, E, I, Side view; B, F, J, View of micropylar end, showing operculum; C, G, K, View of chalazal end; D, H, L, Collar cells, enlarged to show surface sculpture. Arrow indicates the manifestly channelled anticlinal walls between collar cells and operculum. (A-D from Peng et al. 19741. E-H from Peng et al. 18802. I-L from Leong et al. 3346. All at HAST).

**Table 1.** Comparison of *Begonia cavaleriei*, *B. pulvinifera* and *B. wangii*.

	<i>B. pulvinifera</i> (Figures 1, 2)	<i>B. cavaleriei</i> (Figure 4)	<i>B. wangii</i> (Figure 5)
Stipule	Triangular, apex acuminate or cuspidate	Broadly ovate to reniform, apex emarginate or obtuse, awned	Triangular, apex acuminate or cuspidate
Leaf blade			
Color	Abaxially pale green	Abaxially pale green	Abaxially red
Size	14-21 × 8-14 cm	8-22 × 5-19 cm	7-20 × 3-11 cm
Length/width ratio	1.49-1.75	1.16-1.89	1.82-2.44
Petiole	Swollen at base	Not swollen	Not swollen
Bract	Ovate, apex acute to acuminate	Reniform to fan-shaped, apex emarginate	Ovate, apex acuminate
Staminate flower			
Tepal number	4	4	2
Tepal apex	Obtuse	Obtuse	Acute
Outer tepal	2, broadly ovate	2, broadly ovate to ovate	2, broadly ovate to obovate-orbicular
Inner tepal	2, oblanceolate	2, oblong	lacking
Carpellate flower			
Tepal number	3	3	2
Tepal apex	Obtuse	Obtuse	Acute
Outer tepals	2, depressed ovate	2, broadly ovate or suborbicular	2, orbicular-ovate
Inner tepal	1, oblanceolate	1, oblong	lacking
Placentation			
Middle part of ovary	Axile	Axile	Axile (Figure 5-H)
Apical part of ovary	Axile	Axile	Parietal (Figure 5-I)
Seed (Figure 6)			
Length (mm)	0.47-0.57	0.4-0.48	0.48-0.6
Anticlinal walls between collar cells and operculum	Not channeled	Not channeled	Manifestly channeled (Figure 6-J)

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## 中國廣西石灰岩地區秋海棠科秋海棠組一新種： 腫柄秋海棠

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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秋海棠屬秋海棠組植物一新種：「腫柄秋海棠」。本新種葉柄基部具葉枕，此特徵非常獨特，未見於中國其它秋海棠屬植物。相似種類有少瓣秋海棠與昌感秋海棠；但本新種葉背面淺綠色，葉柄基部紅棕色、膨大，雄花花被片四枚，雌花花被片三枚，花被片先端圓鈍，且子房通體具中軸胎座，有別於少瓣秋海棠；此外，新種之托葉三角形，先端漸尖或驟尖，葉身較窄，葉柄基部具葉枕，卵狀苞片先端尖或漸尖，明顯不同於昌感秋海棠。腫柄秋海棠目前僅發現有一個族群，分布於中國與越南邊境附近，數量稀少。

**關鍵詞：**腫柄秋海棠；少瓣秋海棠；昌感秋海棠；秋海棠科；中國；廣西；石灰岩植物；新種；稀有植物；秋海棠組；分類學。