

# *Aspidistra obconica*, Asparagaceae [Ruscaceae], a new species from limestone areas in Guangxi, China

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**ABSTRACT.** *Aspidistra obconica* C. R. Lin & Yan Liu (Asparagaceae) is described and illustrated as a new species from the limestone areas in southwestern Guangxi, China. The new species is easily distinguished from all other members of *Aspidistra* by the obconic perianth and pistil. A somatic chromosome number of  $2n = 38$  and a karyotype formula  $2n = 24m^{2SC} + 2sm + 12st$  were determined for *A. obconica*. The new species is known only from Daxin County, which lies at the border between Guangxi and northern Vietnam. Color plates, line drawings and a distribution map are provided to aid in identification.

**Keywords:** Asparagaceae; *Aspidistra obconica*; China; Chromosome number; Guangxi; Karyotype; Limestone flora; New species; Ruscaceae.

## INTRODUCTION

*Aspidistra* Ker-Gawler (Asparagaceae: Nolinoideae in APG III, Angiosperm Phylogeny Group, 2009; Chase et al., 2009; former Ruscaceae sensu lato, see Rudall et al., 2000), distributed in eastern Asia, has been ignored by field botanists until quite recently when there has been a rapid rise in the number of species recognized. Currently, 95 species of *Aspidistra* are known, with more than 60 of them confined to China, mostly in Guangxi Zhuangzu Autonomous Region (Lang et al., 1999; Li, 2004; Tillich, 2005, 2008; Fang and Yu, 2002; Li and Tang, 2002; Li and Wei, 2003; Tang and Liu, 2003; Lin et al., 2009; Hou et al., 2009). Plants of *Aspidistra* are characterized by a perennial habit, conspicuous rhizomes, a variety of fruits and a highly diversified flower structure. During a field expedition in 2004, a new species was discovered in a limestone valley in southwestern Guangxi. It was transplanted to the Guilin Botanical Garden where it flowered and was carefully examined. It is markedly different from any hitherto known species in its unique flowers, which we name *Aspidistra obconica*.

## NEW SPECIES

*Aspidistra obconica* C. R. Lin & Yan Liu, sp. nov.—  
TYPE: CHINA. Guangxi Zhuangzu Autonomous Region, Daxin Xian (County), Encheng Zhen (Township), alt. 320 m, in a valley on limestone hill, 27 May 2004, Yan Liu L0960 (holotype: IBK; isotype: HAST).

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Figures 1, 2

*Species perianthio et pistillo obconico a congeneribus manifeste diversa.*

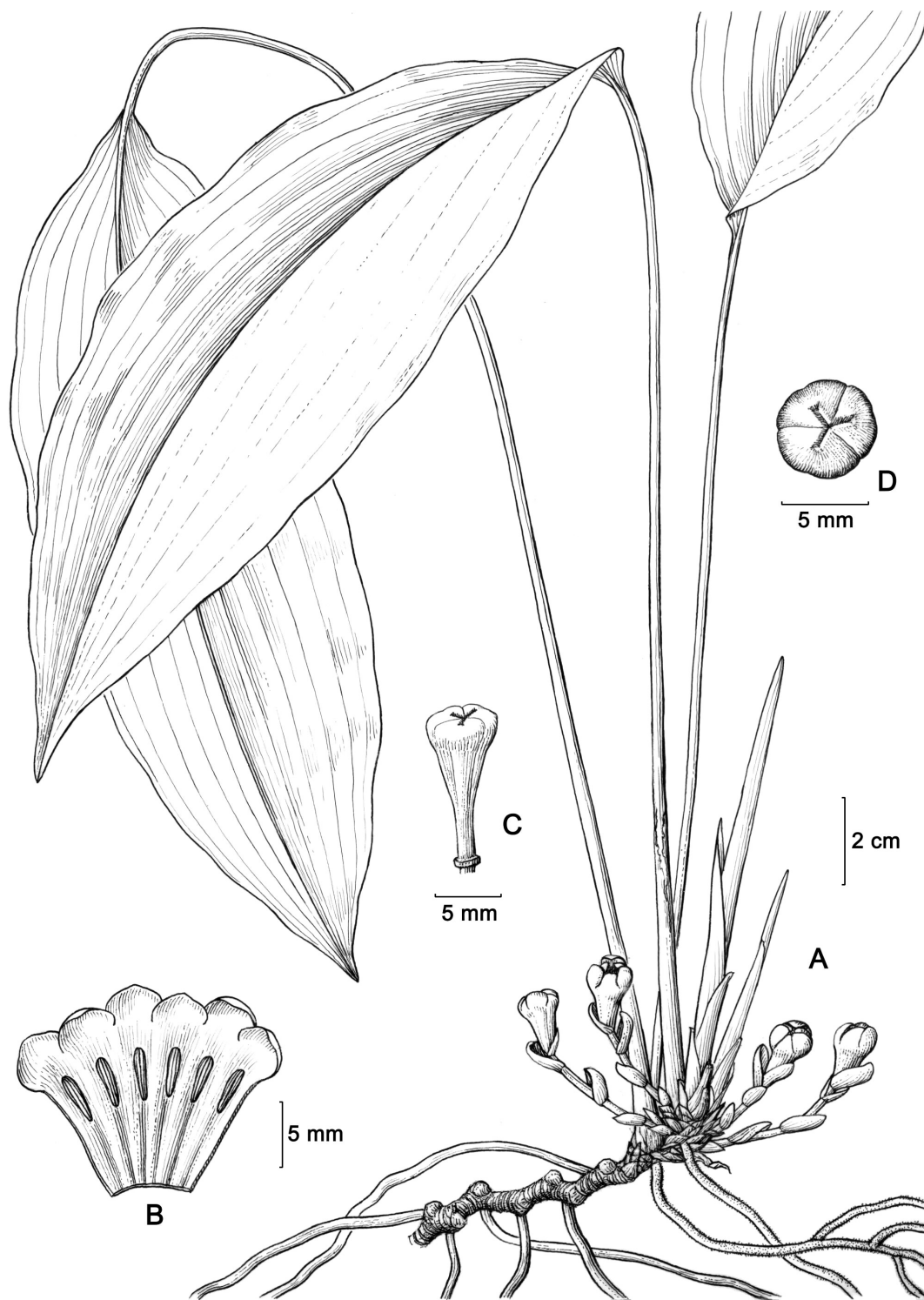
Herbs perennial, evergreen, rhizomatous. Rhizome creeping, subterete, 8-10 mm thick, covered with scales, nodes dense. Cataphylls 5 or 6, purplish red, 1-11 cm long, enveloping base of petiole, becoming blackish brown when dry. Cauline leaves ca. 5 mm apart; petiole stiffly upright, 9-15 cm long, 2-3 mm thick, adaxially sulcate; leaf blade usually narrowly elliptic to oblong-lanceolate, 15-23 cm long, 4.5-7.5 cm wide, dark green with small yellowish white spots on both surfaces, base cuneate, gradually narrowing into a petiole, inequilateral, margin entire, apex acuminate. Peduncle decumbent or declining, purplish red, 1.5-3.5 cm long, with 5 or 6 bracts, bracts gradually wider from base to apex of peduncle, basalmost bract broadly ovate-cucullate, purplish red, 7-10 mm long, 8-10 mm wide, apex subobtuse. Inflorescence a solitary flower; perianth obconic-campanulate, 1.4-1.6 cm long, fleshy, 6-lobed apically; lobes whitish, densely purplish mottled, usually incurved, ovate-triangular, apex rounded, distinctly 2-whorled, lobes of outer whorl 3-4 mm long, 4-5 mm wide, those of the inner whorl smaller; tube 1.1-1.3 cm long, distal opening 8-10 mm in diam., white or sometimes speckled with purple; stamens 6, inserted on upper mid part of perianth tube, anthers sessile, linear, pale yellow, ca. 4 mm long, distally reaching or just below level of stigma; pistil obconic, purple, 1-1.2 cm long, ovary inconspicuous, style distally gradually widened to stigma, stigma subrotund, 5-6 mm in diam., surface flat, with 3 fine radial grooves from center to margin, shallowly 3-lobed, with 3 radial, whitish, inconspicuous bifurcate lines in center.

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*Additional specimens examined.* CHINA. Guangxi Zhuangzu Autonomous Region, Guilin City, Yanshan (Township), introduced by Yan Liu from the type locality, cultivated, 20 May 2009, *Chun-Rui Lin 018* (IBK).

*Chromosome cytology.* Somatic chromosomes were examined using root tips from plants of the type collection.

Root tips were pretreated in 2 mM hydroxyquinoline at 15-18°C for about 8 h, then fixed overnight in a 3:1 ethanol-acetic acid solution at about 4°C. The chromosomes were stained in 2% acetic orcein with 1N hydrochloric acid (10:1) and observed. Classification of chromosome morphology is based on the position of the

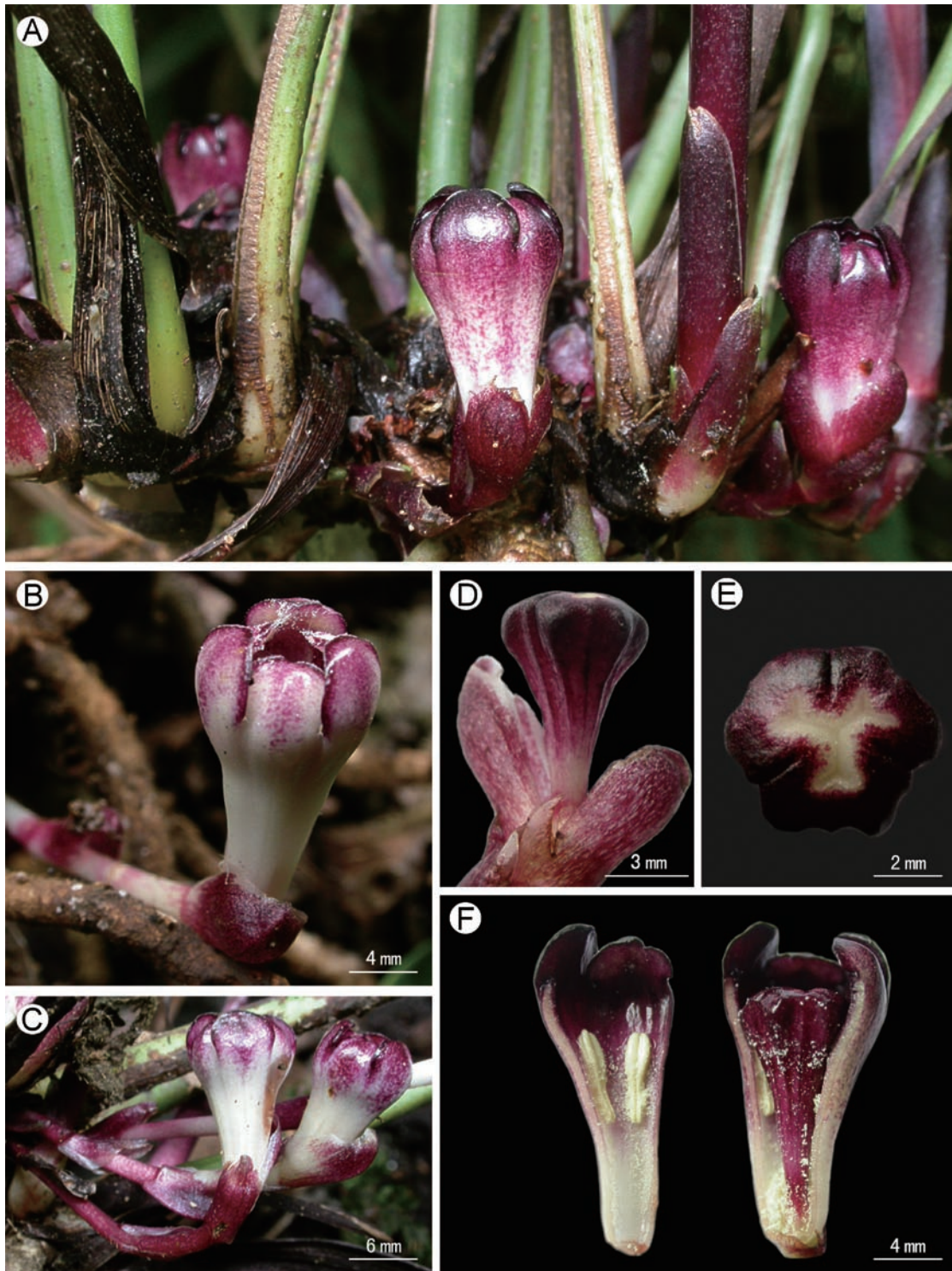


**Figure 1.** *Aspidistra obconica* C. R. Lin & Yan Liu. A, Habit; B, Perianth, dissected to show stamens; C, Pistil, side view; D, Stigma, top view. (Drawn by Shun-qing He from the holotype).

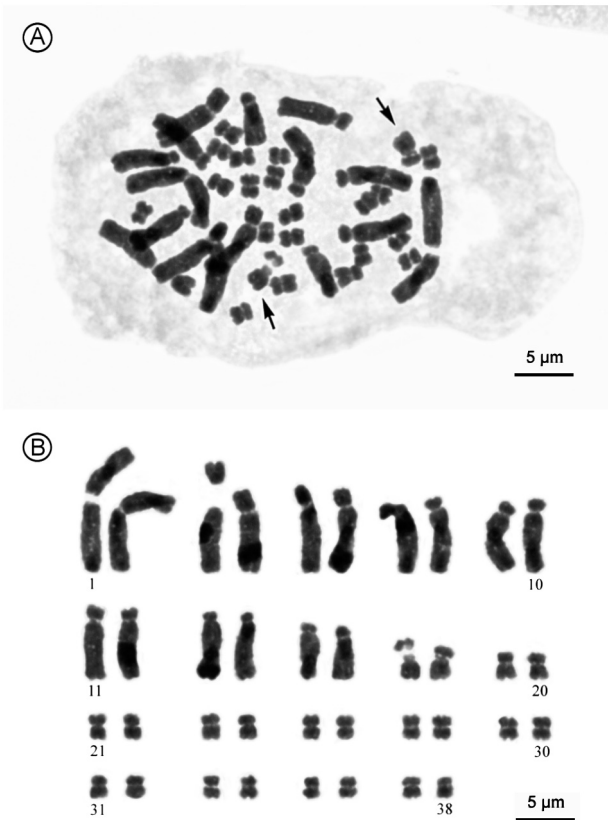
centromere, following Levan et al. (1964).

Our study of the somatic chromosomes of *Aspidistra obconica* revealed  $2n = 38$  (Figure 3). Chromosomes at mitotic metaphase showed trimodal variation in length. Of the 38 chromosomes, the first two were much longer (about 9.9–10.9  $\mu\text{m}$  long) than the rest; the next 14 gradually var-

ied from ca. 4.9 to 7.6  $\mu\text{m}$ ; the remaining 22 chromosomes varied similarly from ca. 1.9 to 3.4  $\mu\text{m}$  long. Regardless of chromosome length, twenty-four (Nos. 1, 2 and 17–38 in Figure 3B), two (Nos. 3 and 4 in Figure 3B), and twelve (Nos. 5–16 in Figure 3B) chromosomes had a centromere at the median (m), submedian (sm), and subterminal (st)



**Figure 2.** *Aspidistra obconica* C. R. Lin & Yan Liu. A, Habit; B, C, Flowers; D, Pistil, side view; E, Stigma, top view; F, Flower, longitudinally dissected.



**Figure 3.** Somatic chromosomes at mitotic metaphase of *Aspidistra obconica* [ $2n = 38$ , from *Chun-Rui Lin 018* (IBK)]. A, Microphotograph. Arrows indicate the median chromosomes with secondary constrictions; B, Somatic chromosomes serially arranged by chromosome length and centromere position.

positions, respectively. Secondary constrictions (SC) were observed in the proximal region of the short arms in two median chromosomes (Arrows in Figure 3A; Nos. 17 and 18 in Figure 3B). Hence, the karyotype formula of *Aspidistra obconica* is  $2n = 38 = 24m^{2SC} + 2sm + 12st$ .

Chromosome numbers and karyotypes of 40 species of *Aspidistra* from China and Vietnam were reported earlier (Bogner and Arnautov, 2004; Li, 2004; Yamashita and Tamura, 2004; Qiao et al., 2008; Hou et al., 2009). Several karyomorphological features were observed in the genus: basic chromosome numbers of  $x = 18$  or  $19$ ; the chromosomes show bimodal or trimodal variation in length; and the first two median or submedian chromosomes are much longer than the others. Moreover, secondary constrictions were observed on the short arms of the 9<sup>th</sup> or 10<sup>th</sup> pair of chromosomes (Li, 2004). The karyomorphological features of *A. obconica* reported here are in agreement with the above observations.

**Ecology and distribution.** *Aspidistra obconica* is known only from the type locality in Daxin County, Guangxi Zhuangzu Autonomous Region, China (Figure 4). It grows on shaded rocky limestone slopes in broadleaved forests. It co-occurs with *Aspidistra daxinensis* M. F. Hou & Yan

Liu (Hou et al., 2009) at the same location and is separated from it by only 10 meters. The two species flower at the same time, but natural hybrids were not found.

**Phenology.** Flowering from May to June.

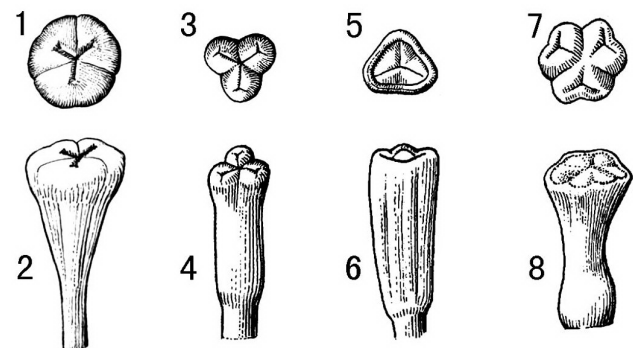
**Etymology.** The specific epithet is derived from its obconic perianth and pistil.

**Notes.** *Aspidistra obconica* (Figures 1, 2) is markedly distinct from its congeners by the obconic perianth and pistil. Its stigmatic surface is somewhat similar to that of *A. cerina*, *A. claviformis* and *A. saxicola*, all with 3 radial, inconspicuous bifurcate lines in the central part and shallowly 3-lobed margin. Morphological comparisons of the four species are shown in Figures 5, 6.

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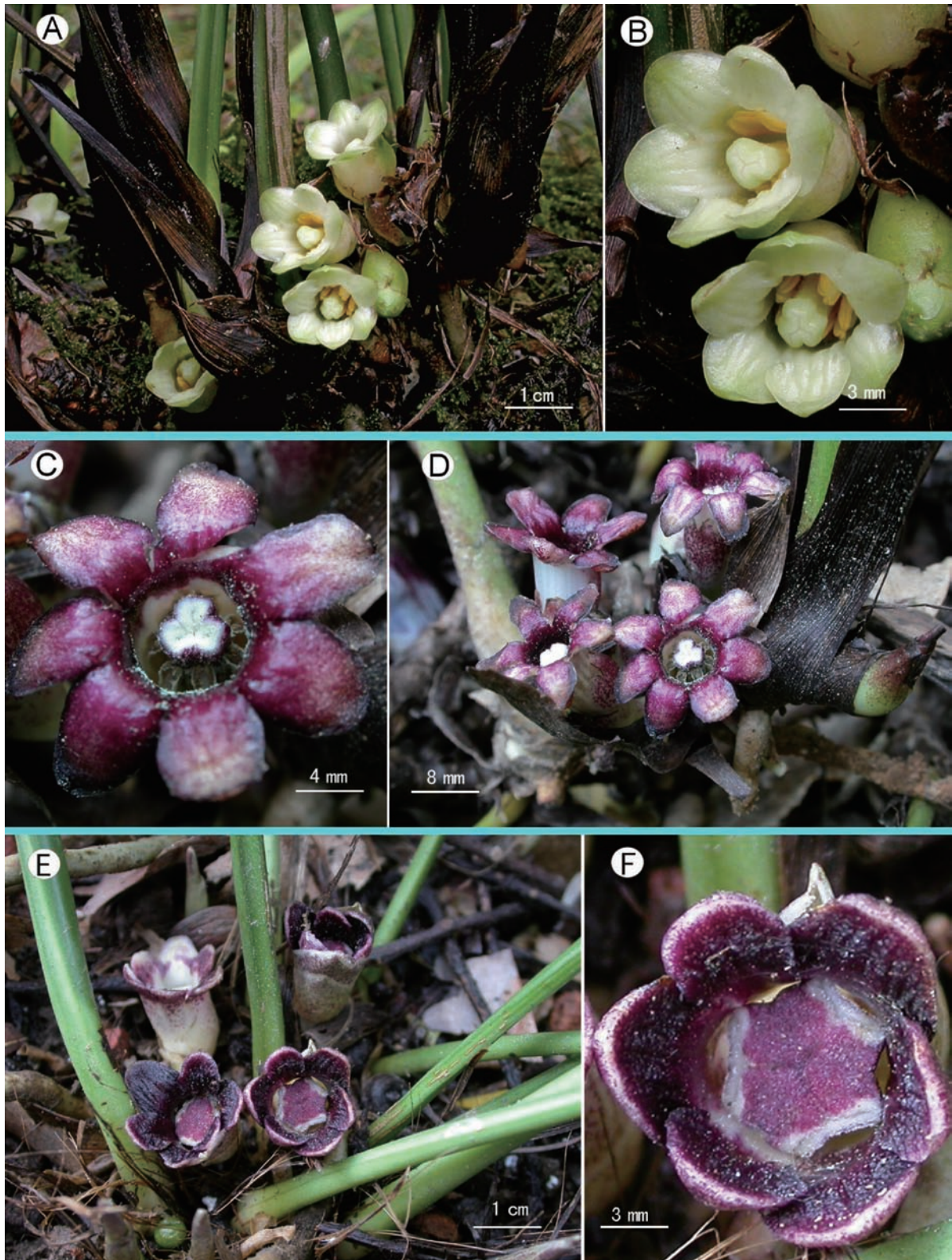
**Figure 4.** Distribution of *Aspidistra obconica* (★), *A. cerina* G. Z. Li & S. C. Tang (●), *A. claviformis* Y. Wan (□) and *A. saxicola* Y. Wan (▲) in Guangxi Zhuangzu Autonomous Region, China.



**Figure 5.** Comparison of pistil and top view of stigma in *Aspidistra*. 1, 2, *A. obconica*; 3, 4, *A. cerina*; 5, 6, *A. claviformis*; 7, 8, *A. saxicola*.

handsome drawing. This study was supported by Western Program for Fostering Personal Ability, CAS (2007) and Knowledge Innovation Project of the Chinese Academy of Sciences, Grant No. KSCX2-YW-Z-0912 to Yan Liu;

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**Figure 6.** *Aspidistra* flowers. A, B, *Aspidistra cerina*; C, D, *Aspidistra claviformis*; E, F, *Aspidistra saxicola*.

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## 中國廣西石灰岩地區天門冬科蜘蛛抱蛋屬一新種： 錐花蜘蛛抱蛋

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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蜘蛛抱蛋屬一新種，即錐花蜘蛛抱蛋 (*Aspidistra obconica*)。該新種的花被倒圓錐形鐘狀，雌蕊亦呈倒圓錐狀，明顯可與蜘蛛抱蛋屬其它種類區別。錐花蜘蛛抱蛋的染色體數目為  $2n = 38$ ，核型公式為  $2n = 24m^{2SC} + 2sm + 12st$ 。此新種目前僅知分佈於廣西西南與越南北部毗連的大新縣。本文提供了該新種的線繪圖、彩色圖版與植物地理分佈圖。

**關鍵詞：**天門冬科；錐花蜘蛛抱蛋；中國；染色體數；廣西；核型；石灰岩植物；新種；假葉樹科。