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Paris caobangensis Y. H. Ji, H. Li & Z. K. Zhou (Trilliaceae), a new species from northern Vietnam

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Abstract *Paris caobangensis* Y. H. Ji, H. Li & Z. K. Zhou (Trilliaceae), a new species from Cao Bang, northern Vietnam, is described and illustrated. The new species is related to *P. birmanica* (Takht.) H. Li & Noltie and *P. vietnamensis* (Takht.) H. Li, but differs in the plant being 30–35 cm tall, the leaf blade being ovate-lanceolate (ca. 9.5×4.5 cm) and triplinerved, and the stamens being twice as many as the petals.

Key words *Paris*, *Paris caobangensis*, Trilliaceae, new species, Cao Bang, Vietnam.

The Trilliaceae are traditionally divided into two genera, *Trillium* L. and *Paris* L., based on floral merosity: *Trillium* is trimerous, whereas *Paris* is 4- to 11-merous (Takhtajan, 1980; Thorne, 1992). *Paris* is a temperate genus with 24 perennial herbaceous species distributed from Europe to East Asia. Most species, except for a European one (*Paris quadrifolia* L.) and a Caucasian one (*P. incompleta* M. Bieb.), are restricted to East Asia, chiefly in China. Nineteen species occur in China, with the Yunnan-Guizhou Plateau as the center of species diversity (Li et al., 1988, 1998; Li, 1998). Northern Vietnam is the southernmost limit of the genus distribution; only two species, *P. vietnamensis* (Takht.) H. Li and *P. fargesii* Franch., having been documented from this area so far (Li, 1998).

Current classifications (Hara, 1969; Takhtajan, 1983; Li, 1984b, 1998; Mitchell, 1987, 1988) have not been consistent regarding the generic limit of Paris. Hara (1969) divided the genus into three sections: *Paris*, *Kinugasa* (Tategawi & Suto) Hara, and *Euthyra* (Salisb.) Franch. Takhtajan (1983) treated *Paris* as a collective genus that consists of three genera: *Paris sensu stricto*, *Kinugasa* Tategawi & Suto, and *Daiswa* Rafinesque-Schmaltz. Li (1984b, 1998) basically adopted Hara's (1969) treatment, recognizing *Paris* as a single genus, but divided it into two subgenera, *Paris* and *Daiswa* (Raf.) H. Li, with five (*Dunnianae* H. Li, *Euthyra* (Salisb.) Franch., *Marmoratae* H. Li, *Fargesianae* H. Li, and *Thibeticae* H. Li) and three (*Axiparis* H. Li, *Paris*, and *Kinugasa* (Tategawi & Suto) Hara) sections respectively. We have followed Li's (1984a, 1998) treatment in recognizing *Paris* as a single genus, because the phylogenetic analysis based on nuclear ITS and plastid *psb*A-*trn*H and *trn*L-*trn*F DNA sequence data resolved *Paris* as a monophyletic group with strong statistical support, from which the classification of *Paris* as a single genus rather than as three genera is justified (Ji et al., 2006).

In the spring of 2003, an unusual population of *Paris* was encountered during an expedition carried out in Cao Bang Province, northern Vietnam. After having carefully examined the relevant herbarium specimens of *Paris* and having reviewed the relevant literature (Hara, 1969; Takhtajan, 1983; Li, 1984ab, 1986, 1998; Li & Soukup, 1992; Li & Noltie, 1997; Liang & Soukup, 2000), we consider that this population represents an undescribed species.

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Paris caobangensis Y. H. Ji, H. Li & Z. K. Zhou, sp. nov. Fig. 1

高平重楼

Species *P. birmanicae* affinis, sed caule 30–35 cm alto, foliis ovato-lanceolatis, ca. 9.5×4.5 cm, tripinervibus, sepalis ovato-lanceolatis, circ. 3.5×2.5 cm, petalis fulvo-virentibus, staminibus 2×petalis in numero differt.

Vietnam. Cao Bang: Yan Lac, 105° 50′ 28.8″ E, 22° 44′ 16″ N, alt. 1100 m, limestone evergreen forest, 2003-04-19, *Y. H. Ji* (纪运恒) *0127* (holotype, KUN; isotype, PE). introduced and cultivated in the Kunming Botanical Garden, 2004-05-20, *Y. H. Ji* (纪运恒) *0159* (paratype, KUN).

Perennial herb. Rhizome cylindric, oblique or horizontal, 2–3 cm in diam., 5–7 cm long, bearing a bud at the top; fleshy roots about 10 cm long. Stem erect, cylindric, rubbish purple at lower portion and whitish green at upper portion, 30–35 cm×3–5 mm. Leaves 4–6 in a whorl at the top of stem (flowering plants); leaf blades ovate-lanceolate, green, papery, apex acuminated, base subrounded, 9.5×4.5 cm; middle vein obvious, triplinerved, net veins inconspicuous; petiole green, 2.5–3 cm. Flower solitary, developing from the top of stem, basic number 4–6, equaling to leaf number (or –1). Peduncle yellow-green, ca. 15 cm×2.5 mm. Sepals 4–6, ovate-lanceolate, yellow-green, ca. 3.5×2.5 cm. Petals 4–6, narrowly-linear at lower portion, gradually widening to 2–3 mm at upper portion, greenish yellow, 6–9 cm, longer than sepals. Stamens twice as many as the sepals, filaments yellow-green, 1.6–1.9 cm, anther sacs yellow, 6–9 mm; free portion of connective acute at apex, nearly absent. Ovary conic, green, with 4–6 longitudinal wings, carpels 4–6, unilocular with parietal placenta; style purple, ca. 4 mm, with an enlarged base (transverse rim at the top of the ovary: see Takhtajan, 1983); stigmas 4–5-lobed, purple, erect; transverse rim at the top of the ovary polyhedral, purple; ovules ovate, transparent, numerous, arranged along placentas. Flowering March to May.

According to Li's (1998) classification of *Paris*, *Euthyra* is the largest section, with eight species occurring from northern Vietnam to central and eastern China. Compared with other species in the section, *P. caobangensis* shows affinities with both *P. vietnamensis*, the southernmost species in the genus, and *P. birmanica* from northern Myanmar. They share the

Table 1 Comparison of *Paris caobangensis* and related species

	P. caobangensis Y. H. Ji, H. Li & Z. K. Zhou	*P. vietnamensis* (Takht.) H. Li	*P. birmanica* (Takht.) H. Li & Noltie
Stem	30–35 cm tall	more than 50 cm tall	more than 50 cm tall
Leaf	leaf blade ovate-lanceolate, ca. 9.5×4.5 cm, lateral veins 1 pair, basely developed	leaf blade obovate, oblong, or ovate, 15–26×10–17 cm, lateral veins 2–3 paris, basely developed	leaf blade oblong to elliptic, 10–26×4–10 cm, lateral veins 3–4 pairs, basely developed
Sepal	ovate-lanceolate, ca. 3.5×2.5 cm	lanceolate or oblong, 3.5–10 ×1.3–3.5 cm	lanceolate, 9–12×3–4 cm
Petal	filiform at lower portion, narrowly elliptic to lanceolate at upper portion, yellow-green, 7–7.5 cm	filiform-linear, gently expanding at the top, yellow-green, 3.5–10 cm	filiform at lower portion, narrowly elliptic to lanceolate at upper portion, purple, 7.5–11 cm
Stamen	2×petal number, filaments yellow-green, free portion of connective nearly absent	2–3×petal number, filaments purple, free portion of connective 1–5 mm	3×petal number, filaments yellow-green, free portion of connective about 2–3 mm
Pistil	style purple, transverse rim at the top of the ovary polyhedral, purple	style blue, transverse rim at the top of the ovary stelliform, blue	style purple, transverse rim at the top of the ovary polyhedral, purple

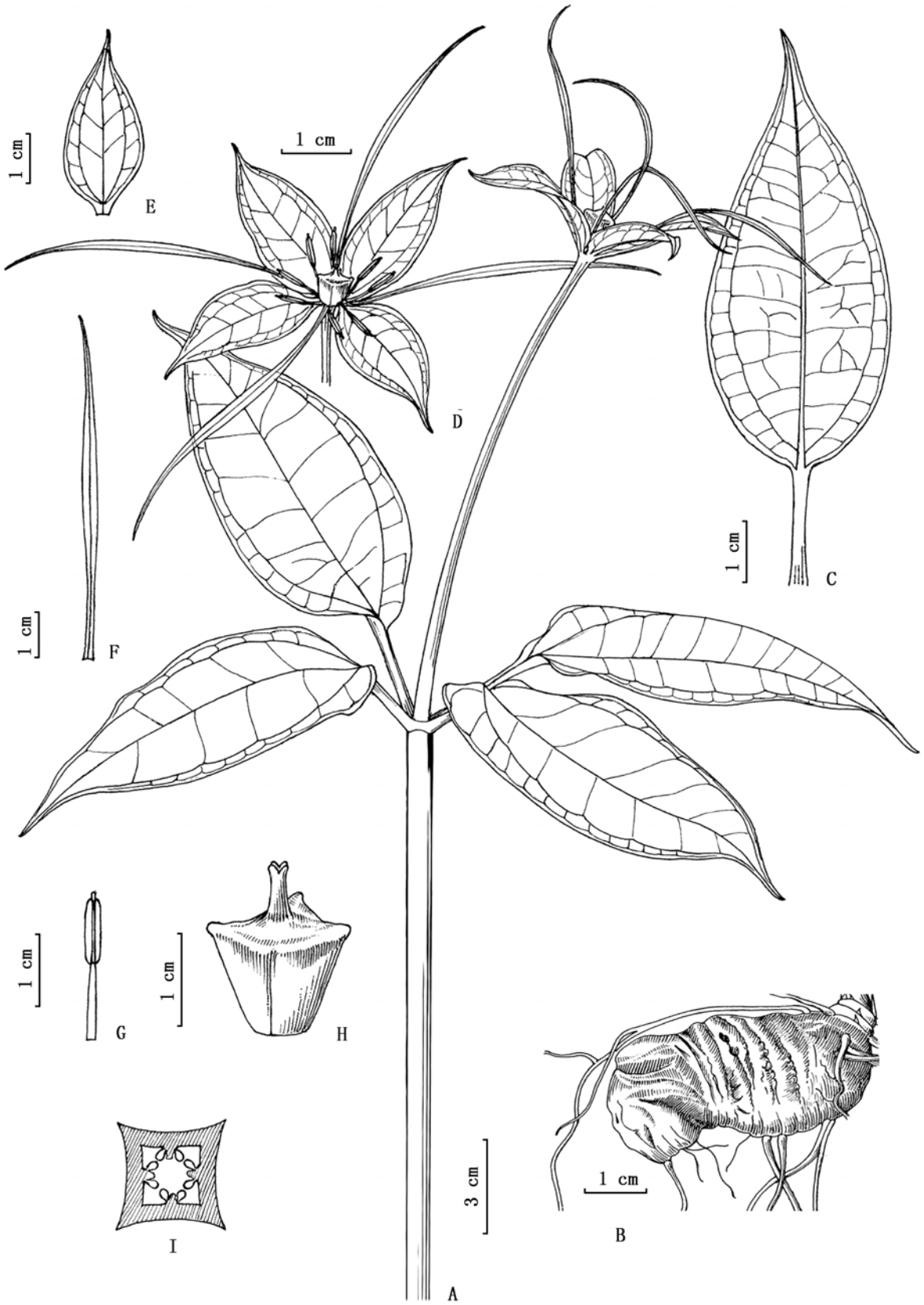

Fig. 1. *Paris caobangensis* Y. H. Ji, H. Li & Z. K. Zhou. A, flowering plant; B, rhizome; C, leaf; D, flower; E, sepal; F, petal; G, stamen; H, pistil; I, transverse section of ovary showing parietal placentation and ovules arranged along placentas. Drawn by X. L. Wu from the holotype, *Y. H. Ji 0127*.

than sepals, stamens ca. 25 mm long, the free portion of connective short or nearly absent, apex acute, and ovary conic with 4–6 longitudinal wings. However, the new species is clearly distinguished from these two species by having a shorter stem, an ovate-lanceolate and triplinerved leaf blade, (ca. 9.5×4.5 cm), and stamens being twice as many as the petals. Some other characters of the new species are intermediate between those of *P. vietnamensis* and *P. birmanica* as shown in Table 1. Hence, the new species can be placed between these two species. The new species was named after its type locality.

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高平重楼——越南北部重楼属(延龄草科)一新种

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摘要 描述了越南北部高平省延龄草科Trilliaceae重楼属*Paris*一新种——高平重楼*P. caobangensis* Y. H. Ji, H. Li & Z. K. Zhou。该新种形态与缅甸重楼*P. birmanica* (Takht.) H. Li & Noltie和南重楼*P. vietnamensis* (Takht.) H. Li相似，因地上茎高仅30–35 cm，叶片卵状披针形，约9.5×4.5 cm，基出侧脉一对，雄蕊数目为花瓣数目的2倍而区别于后二者。

关键词 重楼属; 高平重楼; 延龄草科; 新种; 高平; 越南