

Roscoea glaucifolia (Zingiberaceae), a New Species from Yunnan, China

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A new species of *Roscoea* (Zingiberaceae), *R. glaucifolia* F. J. Mou, is described and illustrated from Yunnan, China. This new species is morphologically most similar to *R. cautleoides* Gagnep. in having partially sinuous leaf margin, exerted peduncle, crispate margin of labellum and with ciliate stigma, but differs from the latter in its glaucous leaves and bracts covered with white powder, labellum 2-lobed 1/2–2/3 to the base, six white lines at the claw of labellum in purple flowers and the pollen grain ornamentation with shorter spines with acute apex.

Key words: China, new species, *Roscoea cautleoides*, *Roscoea glaucifolia*, Yunnan, Zingiberaceae.

The genus *Roscoea* Sm. (Zingiberaceae) is represented by 18 species worldwide (Cowley 1982, 2007), and Wu and Larsen (2000) recognized 13 species in China, of which eight are endemic to China. Recently, a few new species, such as *R. bhutanica* Ngamr. formerly included in *R. tibetica* Batalin from Bhutan and southern Tibet (Ngamriabsakul and Newman 2000), *R. ngainoi* A. A. Mao & Bhaumik from Manipur, India (Mao and Bhaumik 2007) and *R. cangshanensis* M. H. Luo, X. F. Gao & H. H. Lin from Yunnan, China (Luo et al. 2007), were described. The genus is mainly distributed in temperate to alpine regions of the Himalayas and China (Ngamriabsakul and Newman 2000) and found in the Himalayan mountain range along the Himalaya ridges, from Pakistan in the west to Southwest China in the east. There are two distinct areas of distribution, namely

the Himalayas and the Hengduan Mountains in China (Ngamriabsakul et al. 2000). Only one widespread species, *R. tibetica*, links these two areas. Several species occur in the Hengduan Mountains ranges running from North to South between the Nu River, Lancang River and Jinsha River and are usually found 1200–4850 m above sea level. The exact distribution range of *Roscoea* is probably not yet known due to the inaccessibility of some regions. Further difficulties in the taxonomy of this genus arise mainly from the morphological change shown from seedling stage to mature plant and from the beginning of the growing season to the full-grown plant in fruit. Some species have compact forms with non-exerted peduncles and ones with taller exerted peduncles together in the same population. If they are found in different population, they may look like two

Table 1. Comparison between *Roscoea glaucifolia* and *R. cautleoides* in morphological characters

Character	<i>Roscoea glaucifolia</i> F. J. Mou	<i>R. cautleoides</i> Gagnep.
Plant height	30–50 cm	15–40(–60) cm
Leaf blade	6–20 cm long, 2.0–3.0 cm wide; glaucous, covered with white powder on both sides	5–15(–40) cm long, 1.5–3.0 cm wide; green, glabrous on both sides or covered with brownish black hairs
Inflorescence	2–6-flowered	1–4-flowered
Labellum	2-lobed to 1/2 to 2/3 of the length, with 6 white lines at the claw in the bluish violet flowers	2-lobed to the base, with 2 yellow maculae at the claw in the purple flowers
Flowering period	June to July	May to August
Altitude	2600–3000 m	2000–3500 m
Ornamentation of pollen grain	spinate, spines 2.5–3.0 μm long, acute at apex; nearly smooth between spines	spinate, spines 2.8–3.5 μm long, acuminate at apex; bumpy or smooth between spines

distinct species. Habitat can also bring about the changeable appearance within the same population; plants shaded with other vegetation appear different from those in open places.

In June 2010, during a field tour to Alpine Botanical Garden of the Yulong Mountain, Lijiang in Yunnan, an unusual species of *Roscoea* previously identified as *R. cautleoides* in the herbarium, was found. After a critical study comparing all traits with all described species of *Roscoea*, based on the observation of living plants in the wild and in cultivation for more than 3 years successively, as well as herbarium material at the Herbaria (KUN, PE and SWFC) and palynological data, we found that the plant represents a distinct species.

Methods

The material upon which this study is based, includes pollen grains from *Roscoea glaucifolia* (voucher specimen: F. J. Mou 354-2, SWFC) and *R. cautleoides* (voucher specimen: F. J. Mou 354-3 for yellow flowers and 354-4 for purple ones, SWFC). Pollen grains were extracted from dried flowers collected from the wild. All samples were rinsed 3 times with ultrasonic cleaning in 70% ethanol and stored in 70% ethanol. For SEM examination, pollen grains were air-dried onto specimen stubs covered with negative photographic film, sputter-coated with palladium gold and observed using a Hitachi-800 SEM. The terminology follows Erdtman (1969) and Liang (1988).

Results

This new species is distinct from other species in having glaucous leaves and bracts covered with white powder. This species is close to *Roscoea cautleoides* in the partially sinuous leaf margin, and in the floral characters such as the taller exerted peduncles, crispate margin of labellum and ciliate stigma. The ornamentation of pollen grains of *R. glaucifolia* and *R. cautleoides* are non-aperturate and spinate; the spines of the former are 2.5–3.0 μm long and acute at the apex while those of the latter are 2.8–3.5 μm long and acuminate at apex; the exine surface is smooth between spines (Fig. 3). This result is in accord with the previous studies (Liang 1988, Luo 2007). A table comparing *R. glaucifolia* with *R. cautleoides* in general and pollen morphology is given (Table 1 and Fig. 3).

Roscoea glaucifolia F. J. Mou, sp. nov.

[Figs. 1, 2]

Type: CHINA. Yunnan Province, Lijiang, Yulong Mountain, under pine forest, alt. ca. 2650 m, 9 July 2011, flower, F. J. Mou 354-2 (holotype–SWFC!).

Plants 30–50 cm tall when flowering and taller when fruiting. Roots tuberous, oblong-fusiform; tubers 4–8, 2–6 cm long and 0.5–1.0 cm in diameter. Leaves and bracts glaucous, covered with white powder. Bladeless sheaths 2–3, obtuse, apiculate; with pinkish brown veins; sheathing leaves 3–5, sheaths tubular, ligule membranous, truncate, 1.5–2 mm

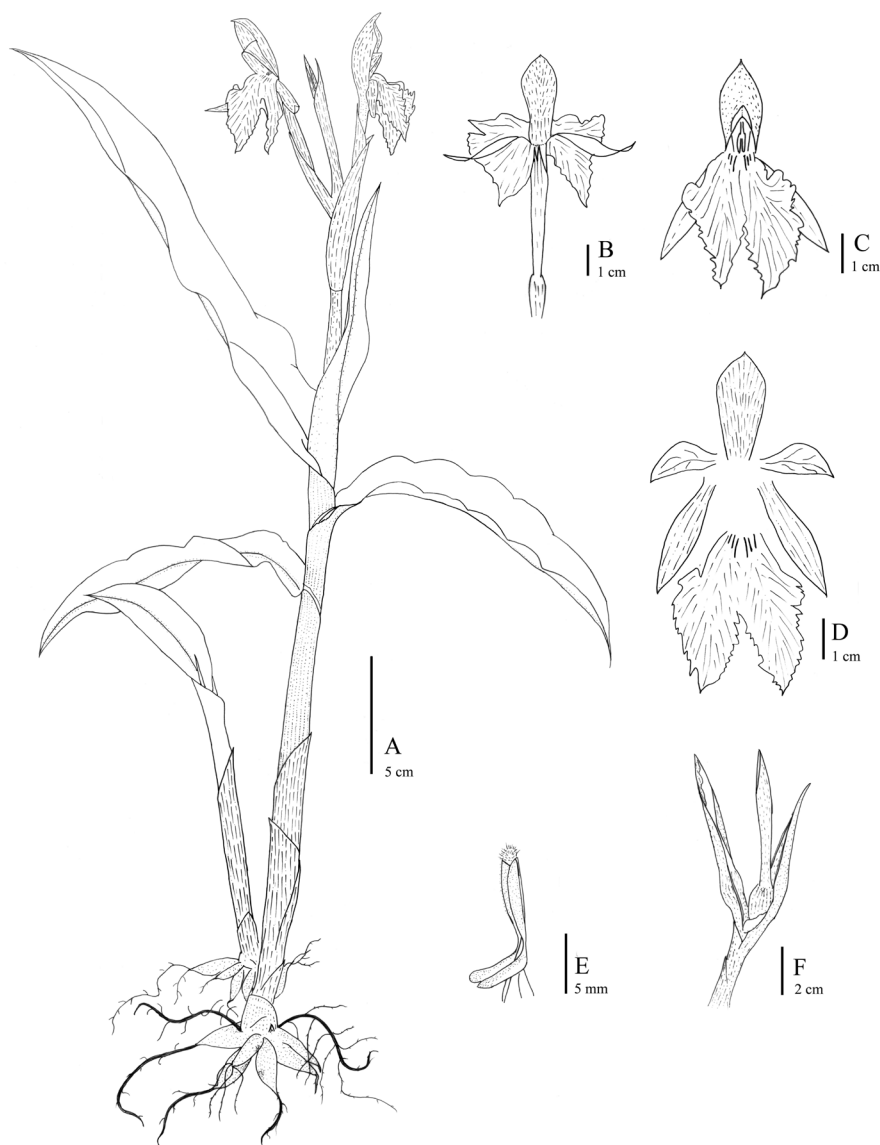


Fig. 1. *Roscoea glaucifolia* F. J. Mou. A. Plant. B–D. Flower. E. Stamen and pistil. F. Fruit. Drawn by Fengjuan Mou based on the plant in cultivation (origin: Yülong Mountain, Lijiang, Yunnan, China).

long; leaf blade lanceolate-ovate to oblong, 6–20 × 2–3 cm, base slightly auriculate, apex acuminate, margin partially sinuous, extended to hyaline membranous margin of the sheaths. Inflorescence exerted above leaves; opening one flower at a time, rarely 2. Bracts 5–6 × 2.5–3.5 cm, oblong to spatulate, acute. Calyx bluish violet or pale yellow, 3.5–5.5 cm long, apex

more or less equal to bract, bidentate, the teeth 1.5–2.0 cm long; corolla tube 4–5.5 cm long, dorsal petal narrowly oblanceolate, 3–3.5 × 1.7–2.2 cm, apiculate, lateral petals linear-oblong, 2.5–3.2 × 0.5–0.7 cm, acute, obtuse; labellum obovate, slightly deflexed, margins undulated, bluish violet with 6 white lines at claw or faint yellow, 3–4 × 2.5–3 cm, 2-lobed to 1/2–2/3

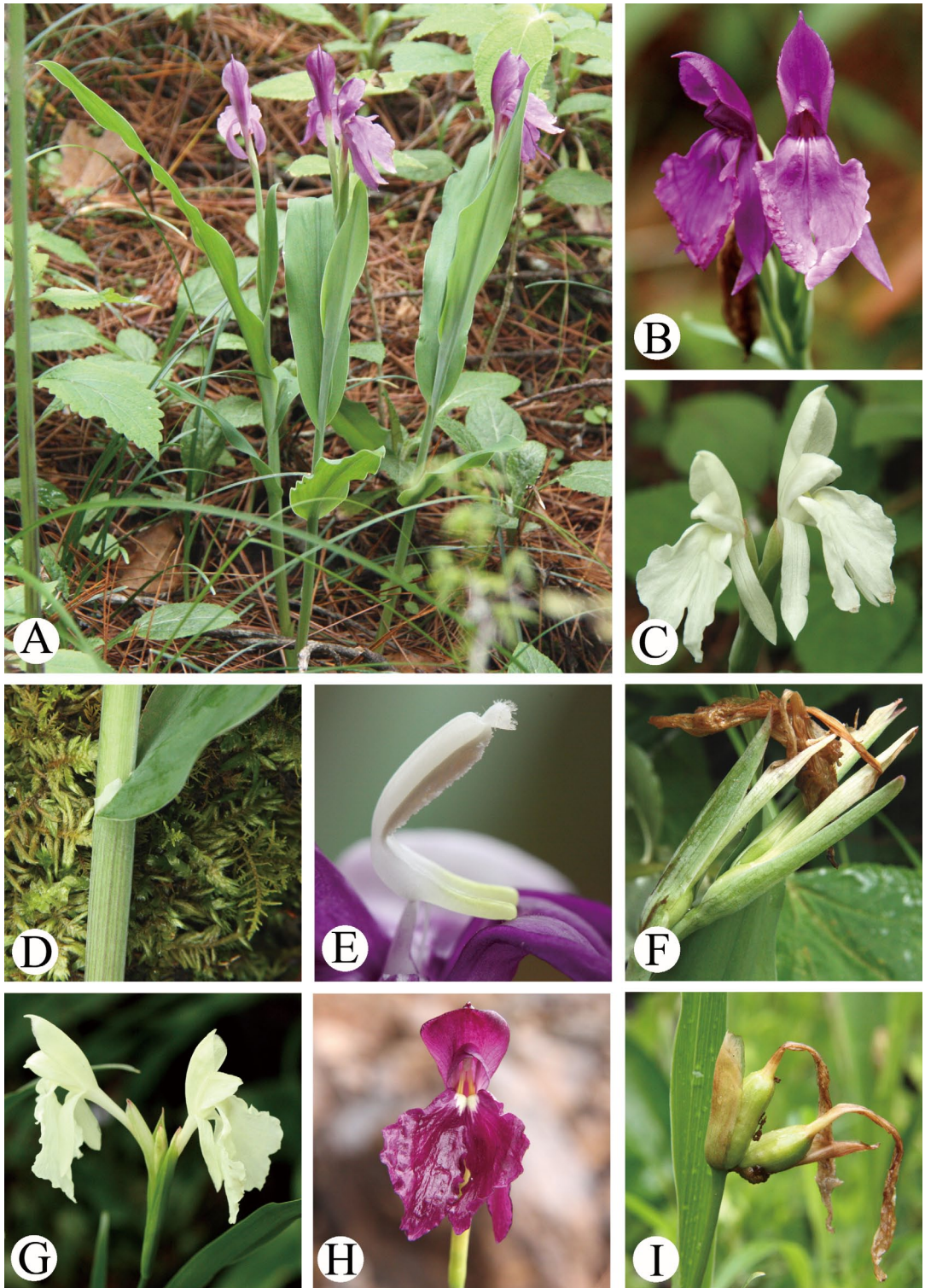


Fig. 2. *Roscoeia glaucifolia* (A–F) and *R. cautleoides* (G–I). A. Habitat. B. Bluish violet flower. C. Pale yellow flower. D. Membranous ligule. E. Stamen and pistil. F. Fruit. G. Yellow flower. H. Purple flower. I. Fruit.

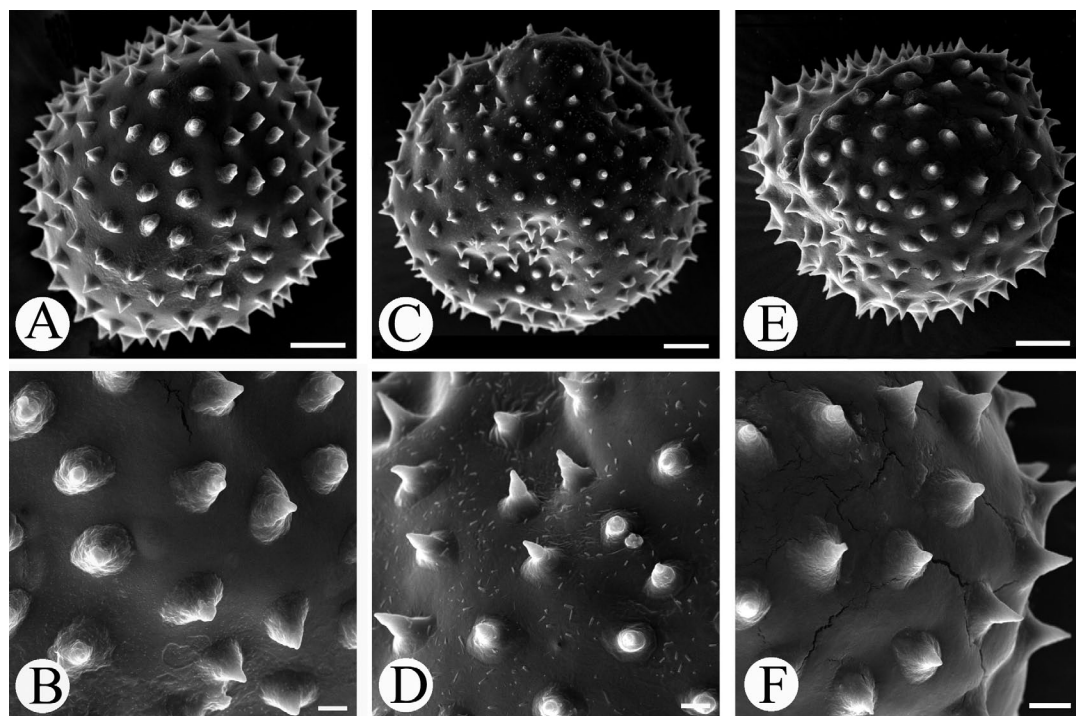


Fig. 3. Ornamentation of pollen grains of *Roscoea glaucifolia* (A, B) and *R. cauleoides* (C–F). A–B. *R. glaucifolia* (F. J. Mou 354-2, SWFC). C–D. *R. cauleoides* with faint yellow flower (F. J. Mou 354-3, SWFC). E–F. *R. cauleoides* with purple flower (F. J. Mou 354-4, SWFC). Scale bar: 10 μm (A, C, E); 2 μm (B, D); 3 μm (E).

of the length. Lateral staminodes obliquely spatulate, 1.5–2.0 \times 0.8–1.1 cm; functional stamen 1, anther white, thecae 6 mm long, connective spur 8.5–9.0 mm long and yellow at apex. Stigma white, with ciliate ostiole; ovary cylindrical. Capsule oblong, 1.0 \times 3.0 cm; seeds 1.5 \times 3.0 mm, ellipsoid to 3-angled, brown with white aril.

Additional specimens examined: **CHINA**. Yunnan province: Yulong County, Yulong Mountain, Heishui River, 3100 m, 10 July 1962, S. W. Yü & A. L. Zhang 100877 (KUN); Yunnan, Yulong County, Yulong Mountain, Baishui River, 1962, S. W. Yü & A. L. Zhang 100974 (KUN); Yunnan, Yulong County, Yulong Mountain, Heishui River, 2800 m, 11 July 1959, Anonymous 22378 (KUN); Yunnan, Yulong County, Xuesong Village, 14 July 1937, T. T. Yü 15304 (PE); Yunnan, Shangri-la County, Haba Mountain, August 1962, Lijiang Botanical Garden 100974 (KUN).

Flowering: June–July.

Fruiting: July–August.

Etymology: The specific epithet is derived from the most prominent character of this

species; the leaf and bract are glaucous and covered with white powder.

Distribution: Lijiang and Dali, Yunnan, China.

Habitat and ecology: The plants are growing on forest floor or in bush woods, at an elevation of 2600–3000 m in association with other species, such as *Roscoea schneideriana* and *R. cauleoides*.

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F.-J. Mou^a, M. Cao^b, X. Hu^c: 中国雲南省産の1新種,
Roscoea glaucifolia (ショウガ科)

中国雲南省玉龍雪山から、ショウガ科の1新種、*Roscoea glaucifolia* F. J. Mou を記載した。この新種は雲南省麗江と大理地区に知られ、形態的には、葉が部分的に波状縁となること、花梗が超出すること、柱頭が有毛で、唇弁に不規則な鋸歯がある点で *R. cautleoides* Gagnep. に似る。しかし、本新種は、葉と苞が粉白となり、唇弁が 1/2–2/3 まで二裂し、紫花では唇弁の基部

に6本の白い条があり、花粉粒の表面に先端が鋭形となる短いトゲ状突起がある点で、*R. cautleoides* と異なる。

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