Alpinia rugosa (Zingiberaceae), a New Species from Hainan, China

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ABSTRACT. The new species *Alpinia rugosa* S. J. Chen & Z. Y. Chen (Zingiberaceae) is described and illustrated from Hainan, China. The new taxon is distinguished from its related species *A. kwangsiensis* T. L. Wu & S. J. Chen by having a shorter pseudostem, smaller and more pronounced rugose to the leaf blade, shorter inflorescence, absent bracteole, pink calyx, and an orange labellum with a red tinge.

Key words: *Alpinia*, China, Hainan, IUCN Red List, Zingiberaceae.

Established in 1810, *Alpinia* Roxb. is the largest genus in the Zingiberaceae and comprises ca. 230 species across tropical and subtropical Asia, Australia, and the Pacific Islands. There are 51 species, 35 of which are endemic in China (Wu & Larsen, 2000). *Alpinia* can be easily distinguished from other genera by its large herbs, terminal panicle, raceme, or spike, small or absent lateral staminodes, and often showy labellum (Larsen, 1998; Wu & Larsen, 2000).

While in the field in September 1990, Ze-Xian Li and Fu-Wu Xing (IBSC) collected an unidentified zingiberaceous plant from Mt. Diaoluoshan, Baoting County, Hainan Province, China. After studying its morphological characteristics in detail and further referring to the taxonomic literature and relevant herbarium specimens, we conclude that this plant represents a new species in *Alpinia*, which is described herein. It is known only from Hainan Island and is distinguished by its entirely wrinkled leaves, orange labellum, subulate lateral staminodes, and gamboge or deep yellow mature fruits.

Alpinia rugosa S. J. Chen & Z. Y. Chen, sp. nov. TYPE: China. Hainan: Baoting Co., Mt. Diaoluoshan [cultivated in Guangdong, at the Ginger Garden of the South China Botanical Garden], 26 Mar. 2010, *Zou Pu & Ye Yushi 01* (holotype, IBSC). Figure 1.

Species nova *Alpiniae kwangsiensi* T. L. Wu & S. J. Chen affinis, a qua praesertim foliis conspicue rugosis apice retrocurvis, bracteola nulla atque staminodiis lateralibus subulatis differt.

Pseudostems 0.5–1.2 m. Ligules coriaceous, bilobed, ca. 1 cm long, hirsute; petioles 1–5 cm, pubescent; leaf blades oblong, 23–57 × 5–8 cm, adaxially glabrous, abaxially densely pubescent, extremely rugose, base deeply cordate to overlapping, slightly oblique, margins entire and recurved, apex acuminate and recurved. Racemes erect, 7–10 × 9–26 cm, densely flowered, with 9 to 20 flowers, the entire inflorescence slightly elongate in fruit, dense yellow pubescence; bracts brown, 5–11 × 2 cm; bracteoles absent; pedicels 3–4 mm, densely pubescent. Calyx pink, tubular, 1.5–1.8 cm, split on one side, abaxially yellow hirsute, apex 2- or 3-cleft; corolla tubular, white, pubescent, ca. 1.4 cm; the 2 lateral corolla lobes 2.6–2.8 × 1.5–1.7 cm, margin ciliate, the central one ca. 3.3 × 2.1 cm; labellum orange, tinged with red, ovate, ca. 2.7–3.6 × 2.5–3.6 cm; staminodes subulate and short; fertile stamen ca. 2.3 cm, filament ca. 0.9 cm, anther ca. 1.4 cm; ovary oblong, ca. 5 mm, densely yellow hirsute, style ca. 3.7 cm, stigma cupulate. Capsule ellipsoid, 1.8–2.1 × 1.4–1.9 cm, pubescent, calyx persistent; mature fruit gamboge or intensely yellow in color. Chromosome count $2n = 48$.

Distribution and habitat. *Alpinia rugosa* is only known from Baoting County in Hainan Province, China. It has been observed in shaded wet habitats in valley forests at altitudes of ca. 600–800 m, and has been cultivated in Hawaii.

IUCN Red List category. There have been no comprehensive field surveys of populations of *Alpinia rugosa*, so this species should be classified as Data Deficient (DD), according to IUCN Red List criteria (IUCN, 2001). Further field research may provide a more precise conservation assessment in the future.

Phenology and usage. *Alpinia rugosa* has been observed in flower at the South China Botanical Garden under cultivation from March to April, with fruits from May to June. The taxon has been used for landscaping, such as ornamentals.

Discussion. *Alpinia rugosa* closely resembles *A. kwangsiensis* T. L. Wu & S. J. Chen in its oblong leaf blades, with a cordate base, bifid ligules, and erect racemes. However, the new species can be easily

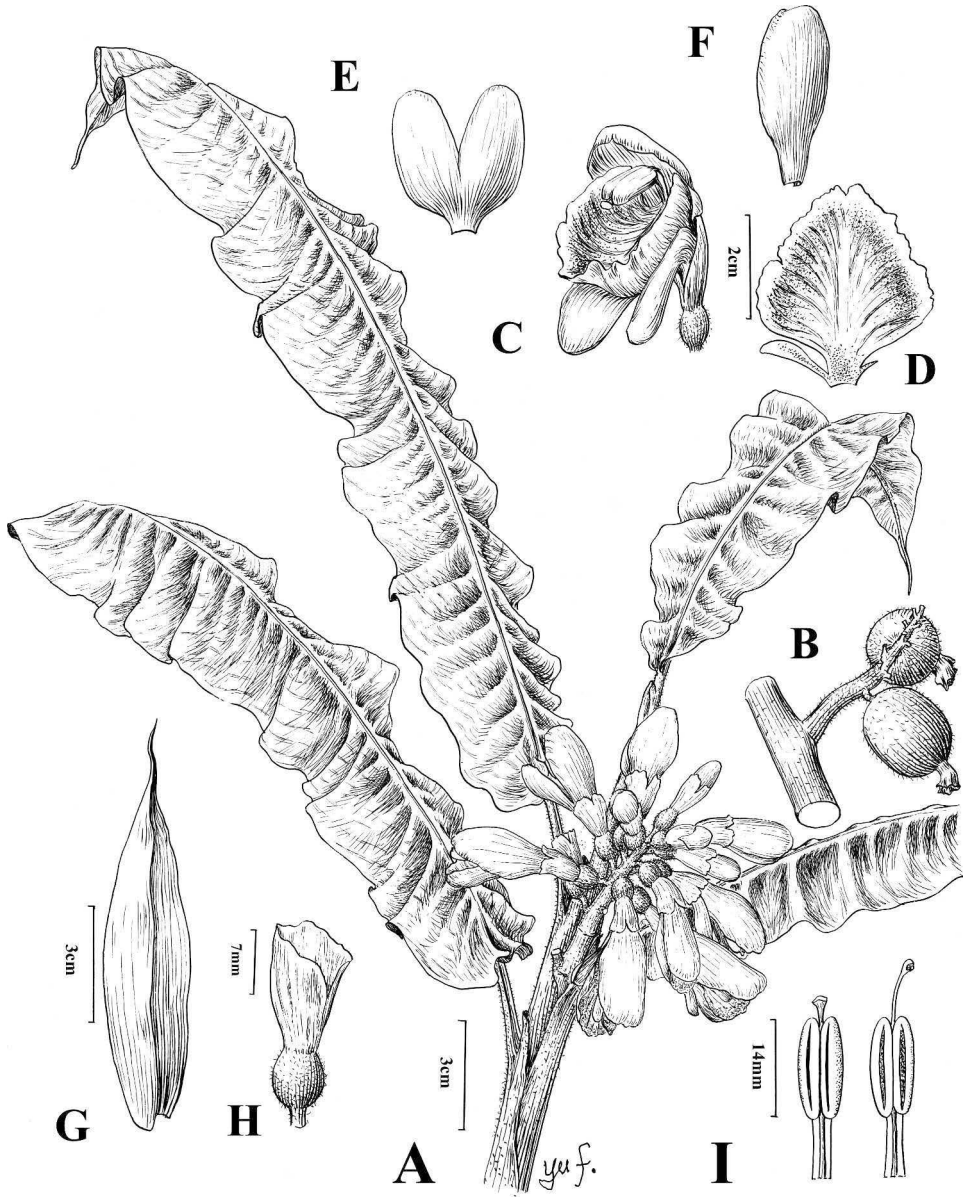

Figure 1. *Alpinia rugosa* S. J. Chen & Z. Y. Chen. —A. Flowering pseudostem. —B. Fruiting branch. —C. Flower. —D. Labellum. —E. Lateral lobes. —F. Middle lobe. —G. Bract. —H. Calyx tube and densely hirsute ovary. —I. Stamen and stigma (left: obverse view; right: inverse view). A–I drawn by Yu Feng from the paratype *Ye Yushi & Zou Pu 02* (IBSC).

distinguished from *A. kwangsiensis* by its shorter pseudostems, smaller and extremely rugose leaf blade, shorter inflorescences, absent bracteoles, and orange labellum tinged with red. Both species occur in similar wet, shaded habitats in valley forests, with *A. kwangsiensis* found from sea level to 700 m. Moreover, the new species has been collected only from Baoting County, Hainan Province, and in contrast *A. kwangsiensis* is more widely distributed in Guangdong, Guangxi, Guizhou, and Yunnan provinces. For more details, see Table 1 and Figure 1. Based on the absent bracteoles, *A. rugosa* belongs to subgenus *Probolocalyx* K. Schum. (Wu, 1981). Chromosome counts for *A. rugosa* were first reported by Chen and Huang (1996).

Paratypes. CHINA. **Guangdong:** cultivated in Ginger Garden of South China Botanical Garden, introduced from Mt. Diaoluoshan, Baoting County, Hainan Prov., 1 Apr.

Table 1. Comparison of morphological characters of *Alpinia rugosa* and *A. kwangsiensis* in China.

Characters	*A. rugosa*	*A. kwangsiensis*
Pseudostems (cm)	50–120	150–300
Leaf blades (cm)	23–57 × 5–8, oblong, extremely rugose	40–60 × 8–16, oblong-lanceolate, slightly wrinkled
Racemes (cm)	7–10	13–30
Bracteoles	absent	brown, oblong
Calyx	pink, tubular	pale purple, cylindric
Labellum	orange tinged with red	white tinged with red
Capsule	ellipsoid, pubescent, calyx persistent	globose, sparsely villous, bracteole persistent
Distribution	Baoting County, Hainan Province	Guangdong, Guangxi, Guizhou, and Yunnan provinces

2009, *Ye Yushi 4845* (IBSC), 30 Mar. 2010, *Ye Yushi & Zou Pu 02* (IBSC).

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