

CURCUMA IGNEA (ZINGIBERACEAE), A SPECTACULAR NEW SPECIES FROM THAILAND

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Curcuma ignea Ruchis. & Jenjitt., a new species in *Curcuma* subg. *Ecomatae* from Thailand, is described here. This species is distinct from others by the combination of open flowers and L-shaped anthers. It is most similar to *Curcuma glans* but differs by having anther spurs pointing outwards (vs divergent), remotely pilose corolla lobes (vs glabrous), and vivid red, green, to white bracts (vs pale green to green, with red veins). It is assessed as Endangered using IUCN categories and criteria.

Keywords. *Curcuma glans*, L-shaped anther, Southeast Asia, subgenus *Ecomatae*.

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Introduction

Curcuma L. (Zingiberaceae) is composed of about 150 species worldwide (POWO, 2022). Recently, many new species have been described from Thailand (Maknoi *et al.*, 2019; Leong-Škorničková *et al.*, 2020a, 2020b; Soonthornkalump *et al.*, 2020; Saensouk *et al.*, 2021; Soonthornkalump *et al.*, 2021; Rakarcha *et al.*, 2022; Saensouk *et al.*, 2022a, 2022b; Soonthornkalump *et al.*, 2022), and currently there are more than 50 native species recorded from the country (Saensouk *et al.*, 2021).

Curcuma subg. *Ecomatae* Škorničk. & Šída f. (= *Curcuma* subg. *Ecomata* [Záveská *et al.*, 2012]) contains species with well-developed ligules, mostly acute fertile bracts which are connate at the base, epigynous glands, and anther spurs, and without coma sterile bracts (Záveská *et al.*, 2012). It is distributed from eastern Myanmar and southern China to Cambodia. So far, it consists of 41 species, 28 of which are native to Thailand (Saensouk *et al.*, 2022b). During an expedition to Tak province in 2019, a species new to science was discovered and is described here.

Materials and methods

Fieldwork was conducted in September 2019. All plant parts were measured and described from fresh specimens. Morphological terminology used in the species description follows Beentje (2016). Herbarium specimens were prepared and deposited in BKF, QBG and SLR herbaria (acronyms according to Thiers, continuously updated). No material of this species was found in BK, BKF or QBG herbaria. Additional data were obtained from photographs and

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through interviews with the photographers. Conservation status was assessed following the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee, 2022). Extent of occurrence and area of occupancy were calculated using GeoCAT (Bachman *et al.*, 2011).

Taxonomic treatment

Curcuma ignea Ruchis. & Jenjitt., *sp. nov.*

Similar to *Curcuma glans* K.Larsen & Mood but differs by having anther spurs pointing outwards (vs anther spurs divergent), remotely pilose corolla lobes (vs glabrous corolla lobes), and vivid red, green to white bracts (vs pale green to green, with red-veined bracts). – Type: Thailand, Tak province, Tha Song Yang district, 16 ix 2019 (fl.),

Ruchisansakun & Thawara 1359 (holotype BKF; isotypes QBG, SLR). **Figures 1, 2, 3.**

Rhizomatous perennial herb to 50 cm tall. *Rhizome* c.2.2 × 2 × 1.5 cm, ovoid, up to 11 nodes, cream externally, with brown decayed scales on each node, white internally, aromatic. *Roots* to 9 cm long, 1.5 mm in diameter, with tubers c.3 cm long, 1.5 cm in diameter, ovoid to ellipsoid, cream externally, white internally. *Pseudostem* 16–30 cm long. *Bladeless sheaths* 1–3, 15 cm long, pale green, apex acute to obtuse, decayed at anthesis. *Leafy shoot* with 8–12 leaves; leaf sheaths 8–10 × 2.8 cm, light green, glabrous; ligule 2–6 × 11 mm, bilobed with an incision c.3 mm long, semitranslucent greenish, turning brown; petiole 7–15 cm long, 4–5 mm in diameter, canaliculate, light green, pilose; lamina 15–27 × 4–10 cm, ovate to elliptic, base cordate to round, apex acuminate, adaxially dark green, pilose, abaxially pale green, glabrous, midrib green. *Inflorescence* terminal; peduncle exceeding pseudostem by c.5 cm, light green to white, pilose; thyrse c.10 cm long, 5.2–5.5 cm in diameter in the middle, composed of 15–20 fertile bracts, no coma; bracts 3.5–4 × 2.5–3 cm, broadly ovate to lanceolate, connate for 1/3 to 1/2 from base, apex acute, vivid red, green, to white, puberulent on both sides; coma bract absent; cincinni with 1–3 flowers; bracteoles one per flower, to 15 × 9 mm (outer ones larger, inner ones gradually smaller), ovate to narrowly ovate, apex acute to hooded, base cuneate, semitranslucent white, adaxially glabrous, abaxially puberulent. *Flowers* 2.5 × 1.8 cm, 4.5 cm long, exerted from bracts; calyx 15–23 mm long, tridentate, with unilateral incision 2 mm, semitranslucent white, pilose; floral tube 28–31 mm long, 2.5–3 mm in diameter, bent 22 mm from base, narrowly cylindrical at base, funnel-shaped distally, white, sparsely pilose; dorsal corolla lobe 17–19 × 5–6 mm, elliptic to ovate, apex hooded, mucronate, white to red, glabrous to scattered pilose; lateral corolla lobes 15–17 × 4.5–5 mm, elliptic to oblong, apex obtuse, white to red, glabrous to scattered pilose; labellum 17 × 9 mm, obovate, bilobed, with 6 mm deep incision, white with yellow band at the centre, with two red lines, puberulous; lateral staminodes 14–15 × c.5 mm, narrowly ovate to narrowly obovate, apex obtuse, white to cream, with or without red patches or red V-shaped mark at base, sometimes with yellow tip, puberulous; stamen c.15 mm

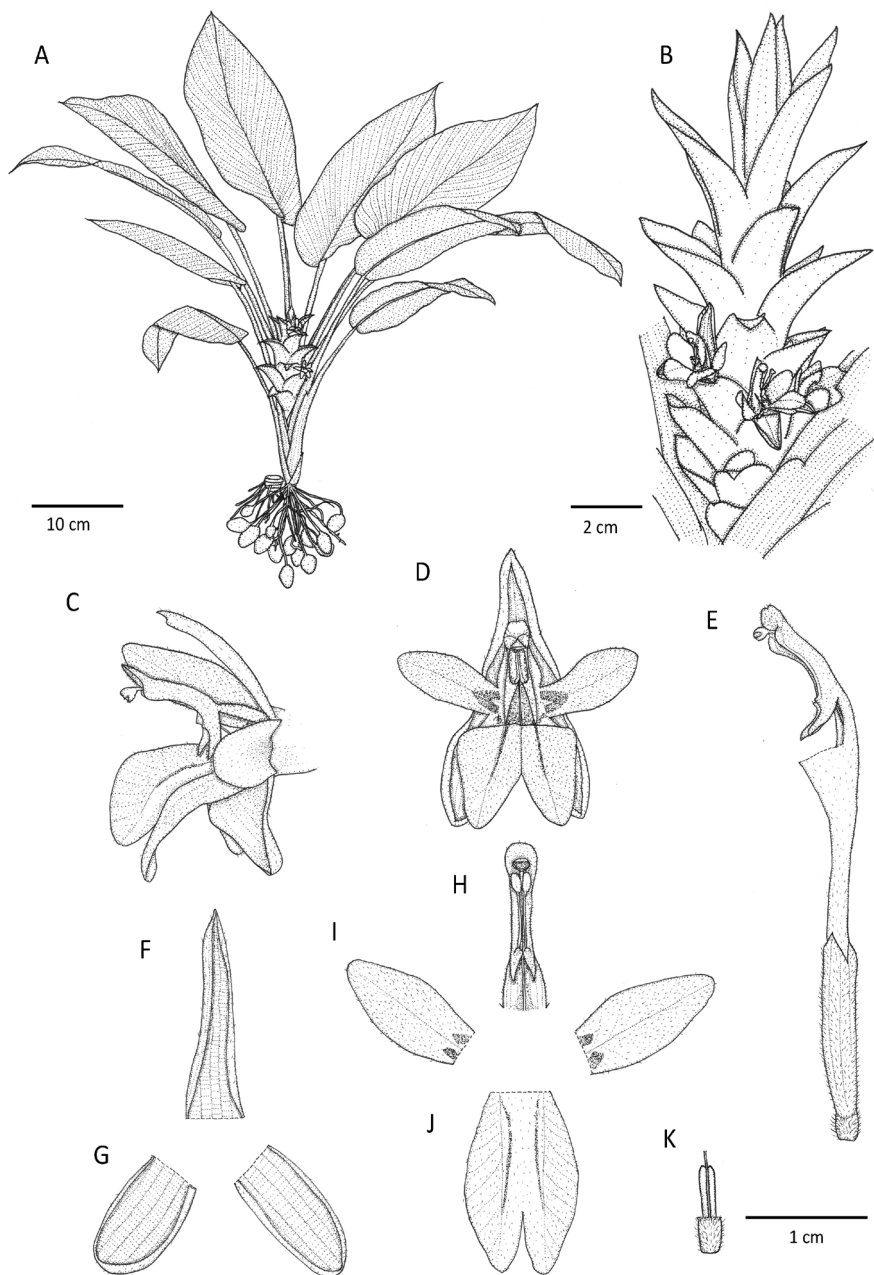


Figure 1. *Curcuma ignea* Ruchis. & Jenjitt., sp. nov. A, Habit; B, inflorescence; C, part of flower (lateral view); D, flower (front view); E, ovary, calyx, floral tube, stamen and stigma (lateral view); F, dorsal corolla lobe; G, lateral corolla lobes; H, stamen and stigma (front view); I, lateral staminodes; J, labellum; K, ovary and epigynous glands. Scale bars: A, 10 cm; B, 2 cm; C–K, 1 cm. Drawn from Ruchisansakun & Thawara 1359 (SLR) by Saroj Ruchisansakun.

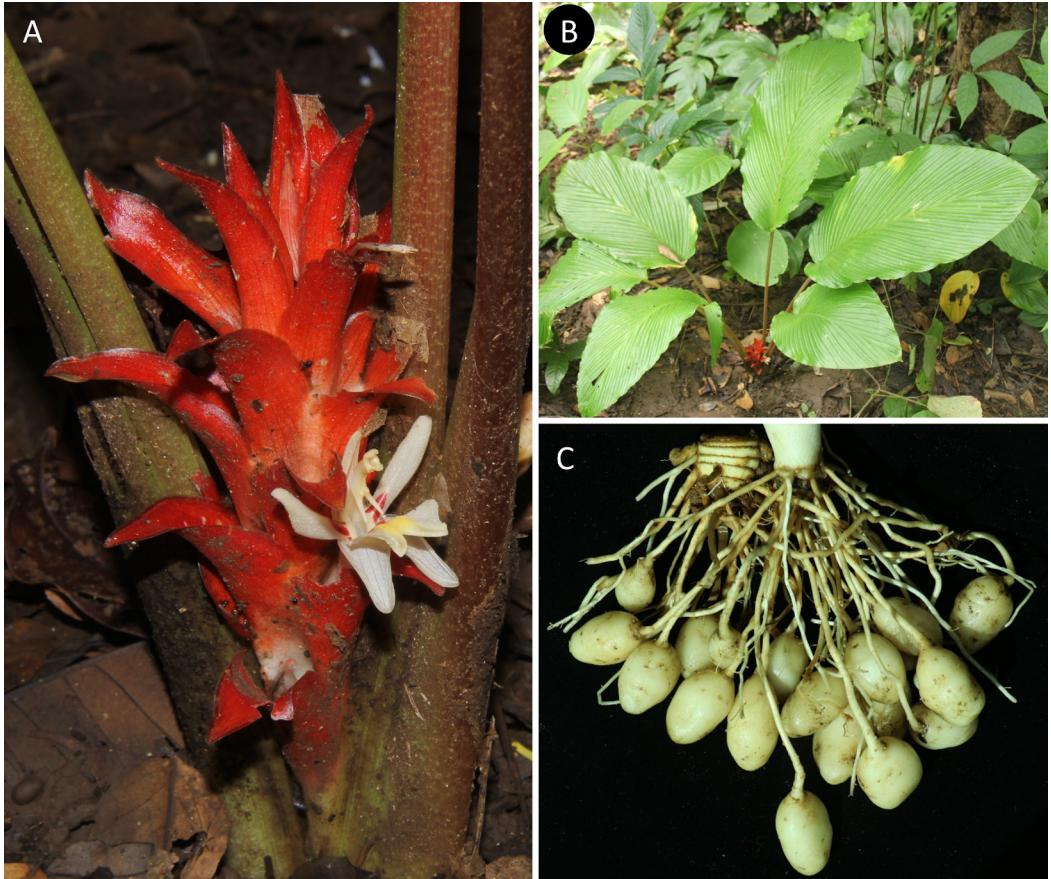


Figure 2. *Curcuma ignea* Ruchis. & Jenjitt., sp. nov. A, Inflorescence; B, habit in habitat; C, rhizome and tuberous roots. All photographs of Ruchisansakun & Thawara 1359 (SLR), taken by Saroj Ruchisansakun.

long; filament 5–5.5 mm long, 3–4 mm broad at base, c.2 mm broad at point of attachment, white, puberulous; anther 10–14 × 2–3 mm, ovoid, white to cream, dorsally puberulous; anther spurs 2.5–4 mm long, pointing outwards (making the anther appear as L-shaped), apex acute, pale yellow, puberulous; anther crest 1.5–2 mm, round, bi- to trilobed, apex round; epigynous glands 4–6 × 1 mm; style 45 mm, white; stigma capitate, c.1 mm long and wide, white to pale green; ovary 2–3 × 1.5–2 mm, ovoid, trilobular, pilose. *Fruit* not known.

Distribution. Thailand. Found in Tak province: Tha Song Yang district and Umphang district, and Nakhon Sawan province: Mae Wong district.

Habitat and ecology. Growing in shaded areas in mixed deciduous forest in limestone areas. Altitude 130–190 m. Flowering August to October, fruiting estimated around October to November.

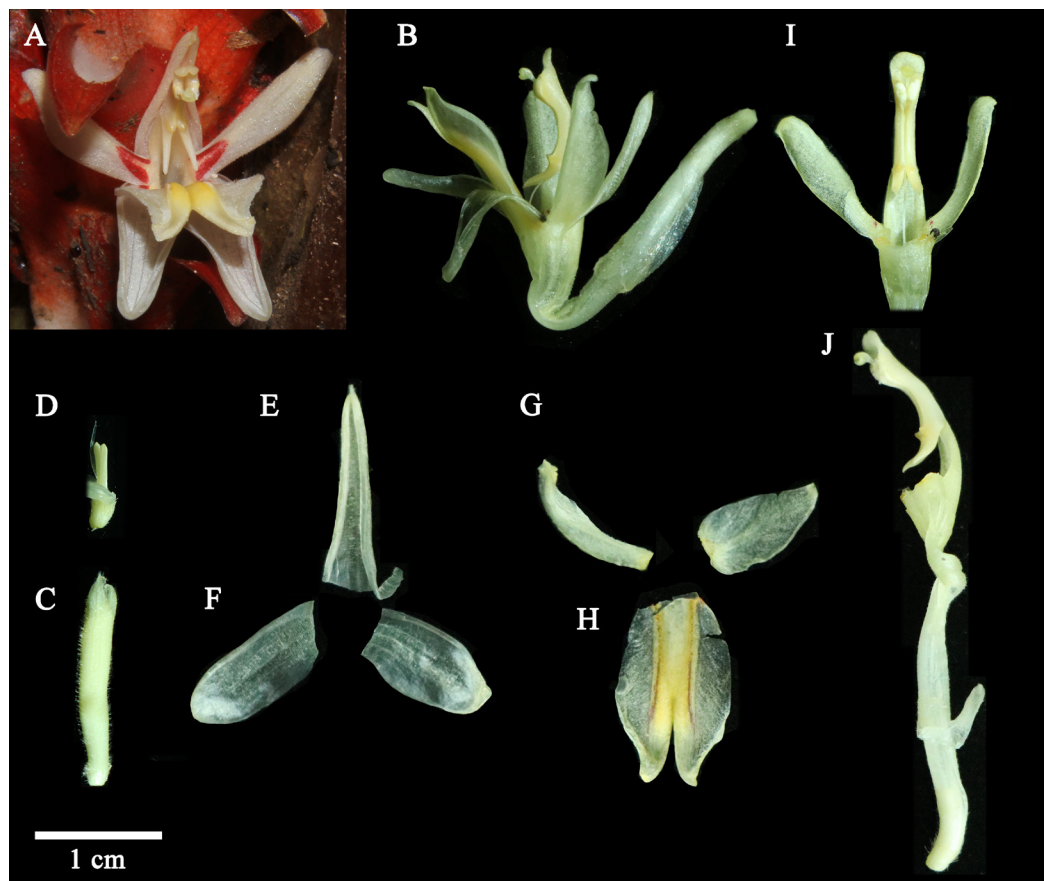


Figure 3. *Curcuma ignea* Ruchis. & Jenjitt., sp. nov. A, Flower (front view); B, flower (lateral view); C, calyx; D, ovary and epigynous glands; E, dorsal corolla lobe; F, lateral corolla lobes; G, lateral staminodes; H, labellum; I, stamen (front view) and lateral staminodes; J, stamen, stigma and floral tube (lateral view). Photographs: Saroj Ruchisansakun.

Etymology. The specific epithet, *ignea*, means 'fiery', referring to the vivid red-bracted inflorescence in the most common form of this species.

Vernacular name. *Krachiao fai* (กระเจียวไฟ) means 'fire siam tulip' and is proposed by the authors.

Proposed IUCN conservation category. Endangered (EN B1ab(iii,v)+B2ab(iii,v)). *Curcuma ignea* has an estimated extent of occurrence of 4716 km² and area of occupancy of 20 km² (GeoCAT, Bachman *et al.*, 2011). It is known from four localities in Thailand: two in Tak province, c.280 km apart, and two in Nakhon Sawan province, c.25 km apart. It is recorded very close to the Myanmar border and is possibly found there also. In Thailand the localities in Tak province both had < 100 individuals in each population. In Nakhon Sawan province,

the occurrence data were confirmed from photographs, and no estimate of population size was possible. None of the localities in which the species is recorded has any protection, and all localities were disturbed by maize agriculture. New species in this genus are collected, sometimes to extinction, by unscrupulous plant hunters to sell as ornamental plants. This represents an increasing threat to new species, and for that reason the authors have not given detailed locality information. The species is, therefore, assessed as Endangered based on IUCN criteria (IUCN Standards and Petitions Committee, 2022).

Notes. *Curcuma ignea* differs from other species in *Curcuma* subg. *Ecomatae* by the combination of open flowers and an L-shaped anther. It is similar to *Curcuma glans*, *C. ecomata* Craib and *C. flammea* Škorničk., with which we compare the new species in the Table. The most similar species is *Curcuma glans*, but *C. ignea* differs from that species by having anther spurs pointing outwards (vs anther spurs divergent), remotely pilose corolla lobes (vs glabrous corolla lobes), and vivid red, green, to white bracts (vs pale green to green, with red-veined bracts). In Thailand, *Curcuma ignea* has been confused with *C. rubrobracteata* Škorničk. and *C. cinnabarina* Škorničk. & Soonthorn because those species also have elongated inflorescence with red bracts.

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Table 1. Comparison of the morphological characters of *Curcuma ignea* Ruchis. & Jenjitt., sp. nov., and similar species

Character	<i>C. ignea</i>	<i>C. ecomata</i>	<i>C. flammea</i>
Leaf base	Cordate to round	Cuneate	Cordate
Bract	Vivid red, puberulent on both sides	Green to purple, glabrous	Red, sparsely puberulent outside, glabrous inside
Calyx	Pilose	Glabrous	Sparsely pilose
Corolla lobes	Remotely pilose outside, white to red	Glabrous, white	Glabrous, red outside
Lateral staminodes	Narrowly ovate to narrowly obovate, white to cream, puberulous on both sides	Broadly obovate, pale pink to dark purple, 10 × 7 mm, margin irregularly lobed, puberulous	Rhomboid, bright red in basal half, orange at apex, glabrous outside, with short glandular hairs present on the middle part facing the centre of the flower

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