**Curcuma suraponii** sp. nov. (Zingiberaceae), a new species of *Curcuma* subgen. *Curcuma* from Thailand

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**Abstract.** Boonma T, 2023. *Curcuma suraponii* sp. nov. (Zingiberaceae), a new species of *Curcuma* subgen. *Curcuma* from Thailand. *Biodiversitas* 24: 4885-4895. A new species, *Curcuma suraponii* Boonma sp. nov. has been collected in Tak Province, Northern Thailand during an exploration of Zingiberaceae diversity. This species belongs to the family Zingiberaceae and the genus *Curcuma*. The plant materials were collected from their natural habitats and measurements were recorded from both living and preserved specimens. This species bears resemblance to *Curcuma rubrobracteata* Skornièková, Sabu & Prasanth, but differs in certain morphological characteristics and does not match any existing species. Therefore, the author described it as a new species to science under the name *Curcuma suraponii* Boonma. The description includes detailed information on its morphological characteristics, supported by illustrations, and provides the vernacular name, ecology, phenology, traditional utilization, conservation status, distribution map, and a comparative table to highlight its differences with allied species. Additionally, a revised key of 29 species within the *Curcuma* subgen. *Curcuma* in Thailand is also presented.

**Keywords:** *Curcuma*, new species, taxonomy, Thailand, Zingiberaceae

**Abbreviations:** AAU: Aarhus University Herbarium; BK: Bangkok Herbarium; BKF: The Forest Herbarium; BM: The Natural History Museum Herbarium; C: Natural History Museum of Denmark Herbarium; CALI: Calicut University Herbarium; CMU: Chiang Mai University Herbarium; E: Royal Botanic Garden Edinburgh Herbarium; K: Royal Botanic Gardens Kew Herbarium; L: National Herbarium Nederland, Leiden University Branch; P: Museum National d'Histoire Naturelle; PSU: Prince of Songkla University Herbarium; QBG: Queen Sirikit Botanical Garden Herbarium; and SING: Singapore Botanic Gardens Herbarium

**INTRODUCTION**

Plants serve as essential bioresources that intricately sustain our lives, whether through direct or indirect means and have long been harnessed for a diverse array of purposes. The wisdom of tapping into the potential of each plant has transcended generations. The family Zingiberaceae, also known as the ginger family, stands as a prime example of a family extensively utilized for a variety of purposes in Thailand. These encompass culinary applications, spice enhancement, traditional medicine, ornamental aesthetics, cut-flower arrangements, commercial cultivation, materials, rituals, and other socio-religious practices. With a species diversity of more than 400 species of Zingiberaceae distributed throughout Thailand (Saensouk et al. 2007, 2016, 2018, 2021a, b, c, d, e, 2022a, b, c, d, e, f; Khamtang et al. 2014; Saensouk and Saensouk 2014, 2019a, b, 2020a, b, 2021a, b, c, d; Nontasit et al. 2015; Maknoi et al. 2016, 2021; Tangjitman 2017; Pholhiamhan et al. 2018; Boonma and Saensouk 2019; Sangvirotjanapat et al. 2019a, b, 2020, 2021; Boonma et al. 2020a, b, 2021, 2022, 2023; Sangvirotjanapat and Newman 2021; Ragsasilp et al. 2022a, b; Inta et al. 2023; POWO 2023).

Most plants within the family Zingiberaceae, especially the genus *Curcuma* are referred to as *wan*, plants associated with Thai beliefs. They are planted as auspicious symbols, with the belief that these plants aid in enhancing trade, bestowing charm upon the grower, increasing invincibility, protecting against danger and magic, and serving as therapeutic remedies. This tradition of utilization has been documented in numerous collections of ancient Thai textbooks that focus on *wan*, such as Hawithee (1963); Gunhakanjana (1970); Phayakorn and Kosi (1979); Khanatham (2016); Saensouk et al. (2022b, c); and Boonma et al. (2023).

The study of plant taxonomy within the genus *Curcuma* in Thailand has garnered consistent attention from both foreign and Thai botanists. Over the years, various researchers have made noteworthy contributions, such as Sirirugsa (1966), Larsen (1996), Larsen et al. (1998), Sirirugsa and Newman (2000), Mood and Larsen (2001), Maknoi et al. (2005, 2011), Larsen and Larsen (2006). Notably, Sirirugsa et al. (2007) conducted a comprehensive study on Thai *Curcuma*, resulting in the proposition of five distinct groups based on characteristics such as anther shape, the presence of epigynous glands, and the characteristics of the coma bracts. These groups consist of *Curcuma alismatifolia* Gagnep., *Curcuma cochininchinensis* Gagnep., *Curcuma ecomata* Craib, *Curcuma longa* L., and *Curcuma petiolata* Roxb.. Subsequently, Záveská et al. (2012) introduced a classification that maintained *Curcuma* subgen. *Curcuma* L. and *Curcuma* subgen. *Hitcheniopsis*
(Baker) K.Schum., and introduced a new subgenus named *Curcuma* subgen. *Ecomatae* Škorníčk. & Šída f. The subgenus *Hitcheniopsis* is distinguished by the absence of epigynous glands. In contrast, the other two subgenera possess the epigynous glands, namely subgenus *Curcuma*, typically exhibit well-developed coma bracts and closed bell-shaped flowers, while subgenus *Ecomatae* generally lacks coma bracts and features open-form flowers, and bracts fused only at the base (Záveská et al. 2012; Leong-Škorníčková et al. 2015). This classification system has been applied to the current taxonomic study of *Curcuma* in Thailand (e.g., Leong-Škorníčková et al. 2017, 2020, 2021, 2022; Boonma and Saensouk 2019; Maknoi et al. 2019; Soonthornkalump et al. 2020, 2021, 2022; Rakarcha et al. 2022; Saensouk et al. 2021a, c, d, e, 2022a, b, c, f; and Ruchisansakun and Jenjittikul 2023).

As presented herein, the author has discovered a taxonomically undescribed plant belonging to the genus *Curcuma* subgen. *Curcuma* in the forests of Tak Province, Northern Thailand. Consequently, an imperative lie in conducting a taxonomic study of this species to provide comprehensive data that facilitates its accurate utilization and as fundamental information for another further research.

**MATERIALS AND METHODS**

The plant materials were collected in 2021 from Tak Province, Northern Thailand (Figure 1). Measurements were taken from both living and preserved specimens obtained from their respective natural habitats. To precisely document morphological traits, the author employed instruments like rulers and vernier calipers and conducted meticulous inspections using a stereo-microscope (Stemi 2000-C, ZEISS, Oberkochen, Germany).

Holotype specimens were appropriately deposited at the Khon Kaen University Herbarium (KKU), and isotype deposited at Queen Sirikit Botanical Garden Herbarium (QBG). The author meticulously conducted a comprehensive comparative analysis, scrutinizing the morphological characteristics of the specimens against the descriptions of all existing species in the genus *Curcuma*. Additionally, extensive use was made of available online digital images and data from herbarium collections, such as Aarhus University Herbarium (AAU), Bangkok Herbarium (BK), The Forest Herbarium (BKF), The Natural History Museum Herbarium (BM), Natural History Museum of Denmark Herbarium (C), Calicut University Herbarium (CALI), Chiang Mai University Herbarium (CMU), Royal Botanic Garden Edinburgh Herbarium (E), Royal Botanic Gardens Kew Herbarium (K), National Herbarium Nederland, Leiden University Branch (L), Muséum National d’Histoire Naturelle (P), Prince of Songkla University Herbarium (PSU), Queen Sirikit Botanical Garden Herbarium (QBG), and Singapore Botanic Gardens Herbarium (SING).

Moreover, the author extensively reviewed published literature on *Curcuma*, with a special focus on the morphological descriptions of all recognized species within the *Curcuma* subgen. *Curcuma*.

![Figure 1. Distribution map of Curcuma suraponii Boonma sp. nov.](image-url)
RESULTS AND DISCUSSION

The description of a new species, Curcuma suraponii Boonma (Zingiberaceae: Zingiberinae), belonging to the Curcuma subgen. Curcuma was presented. The species was collected in Tak Province, Northern Thailand. The description includes detailed information on its morphological characteristics, supported by illustrations, and provides the vernacular name, ecology, phenology, traditional utilization, conservation status, distribution map, and a comparative table to highlight its differences with allied species. Additionally, a revised key of 29 species within the Curcuma subgen. Curcuma in Thailand is also present.

Taxonomic treatment
Curcuma suraponii Boonma sp. nov. - Figures 2-4, Table 1

The new species resembles Curcuma rubrobracteata Škorničková, Sabu & Prasanth, but exhibits certain morphological character differences. Curcuma suraponii has ovoid primary rhizome with branched rhizome, yellow internally (vs. C. rubrobracteata has creeping rhizome, whitish yellow internally); leaf sheaths, petioles, peduncle, bracteoles, calyx, floral tube, and corolla lobes pubescent (vs. glabrous); inflorescence terminal, emerge through lateral slits of the pseudostem, 15-20 cm above ground (vs. 3-10 cm above ground); present of coma bract (vs. absent); fertile bracts pubescent on both surfaces and margin, ruby pink only at the distal part, and pale green towards the base (vs. glabrous on both surfaces, except margin hairy, bright red extends almost to the yellow base); anther 7.2 × 2 mm (vs. 6 × 2.5 mm); anther spurs 2.5 mm long (vs. 3 mm long); anther crest slightly longer than the anther lobes (vs. absent); ovary ellipsoid, 4 × 3 mm (vs. subglobose, 2 × 2.5 mm).

Type: Thailand, Tak Province, Umphang District, 600 m, Boonma 2201, 16 July 2021) Holotype KKU! isotype QBG!.

Figure 2. Curcuma suraponii Boonma sp. nov. A. Front view of flower. B. Top view of inflorescence. C. Side view of inflorescence. D. Underground part: old primary rhizome, young-branched rhizomes with tuberous and fibrous roots (Photographs and designed by Thawatphong Boonma)
Table 1. Morphological comparison of different characters of Curcuma suraponii and C. rubrobracteata

<table>
<thead>
<tr>
<th>Characters</th>
<th>C. suraponii Boonna sp. nov. (present study)</th>
<th>C. rubrobracteata Škorničková, Sabu &amp; Prasanth. (Škorničková et al. 2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhizome</td>
<td>Ovoid with branched rhizome, yellow internally, branches 9-12 cm long, 1.8-2.3 cm in diam.</td>
<td>Slender creeping, whitish yellow internally, creeping, 15-30 cm long, c. 1 cm in diam.</td>
</tr>
<tr>
<td>Tuberous roots</td>
<td>Narrowly elongate ovoid; lanceolate shape when cut in a longitudinal section, 3.0-4.5 × 1.0-2.0 cm, white with pale yellowish white core, distanced 6-10 cm away from rhizome</td>
<td>Ovoid: ovate shape when cut in a longitudinal section, 1.5-2.5 × 1.0-1.5 cm, white inside, distanced 1-5 cm away from rhizome</td>
</tr>
<tr>
<td>Leaf sheaths</td>
<td>Pubescent</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Ligule</td>
<td>5-6 mm long</td>
<td>1-2 mm long</td>
</tr>
<tr>
<td>Petiole</td>
<td>Pubescent</td>
<td>Elliptic-lanceolate or ovate, 35-60 × 10-16 cm</td>
</tr>
<tr>
<td>Lamina</td>
<td>Broadly elliptic, 40-66 × 16-20 cm</td>
<td>Terminal, emerge through lateral slits at the base of the pseudostem, 3-10 cm above ground</td>
</tr>
<tr>
<td>Inflorescence</td>
<td>Terminal, emerge through lateral slits of the pseudostem, 15-20 cm above ground</td>
<td>Terminal, emerge through lateral slits at the base of the pseudostem, 3-10 cm above ground</td>
</tr>
<tr>
<td>Peduncle</td>
<td>20-25 cm long, 1.4-1.6 cm in diam., greenish, pubescent</td>
<td>5-10 cm long, 0.7 cm in diam., whitish, glabrous</td>
</tr>
<tr>
<td>Spike</td>
<td>15-25 cm long, 9-10 cm in diam.</td>
<td>6-10 cm long, 7-9 cm in diam.</td>
</tr>
<tr>
<td>Coma bract</td>
<td>Present, 5-9, broadly obovate, 4.6-5.0 × 3.0-3.7 cm, apex acute slightly mucronate, ruby at distal half and greenish white to the base, pubescent on both surfaces</td>
<td>20-26 per spike, 3.5-4 × 3.5 cm, all bracts apex rounded to obtuse, glabrous on both surfaces, except margin hairy, fused almost only at the base, bright red extends almost to the base, with yellow base</td>
</tr>
<tr>
<td>Fertile bracts</td>
<td>28-35 per spike, 4.5-5 × 3.3-3.7 cm, upper apex acute, lowest bracts apex rounded to truncate, pubescent on both surfaces and margin, fused about half of the length, ruby pink only at the distal part, and pale green towards the base</td>
<td>6 mm long, apex obtuse</td>
</tr>
<tr>
<td>Bracteoles</td>
<td>Pubescent</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Flower</td>
<td>5.5-5.6 cm long</td>
<td>6 cm long</td>
</tr>
<tr>
<td>Calyx</td>
<td>Pubescent</td>
<td>Glabrous</td>
</tr>
<tr>
<td>Floral tube</td>
<td>4 cm long, pubescent</td>
<td>3.7 cm long, glabrous</td>
</tr>
<tr>
<td>Dorsal corolla lobe</td>
<td>16-17 × 10-11 mm, sparsely hairy</td>
<td>14 × 8 mm, glabrous</td>
</tr>
<tr>
<td>Lateral corolla lobes</td>
<td>16-17 × 10-11 mm, sparsely hairy</td>
<td>12 × 7 mm, glabrous</td>
</tr>
<tr>
<td>Lateral staminodes</td>
<td>Uniquely asymmetric obvate, 14.5-16 × 9-10 mm, apex rounded</td>
<td>Broadly obovate, 10 × 11 mm, Apex obtuse</td>
</tr>
<tr>
<td>Filament</td>
<td>4.5-5.0 mm long, c. 3.5 mm wide at the base</td>
<td>6 mm long, apex obtuse</td>
</tr>
<tr>
<td>Anther</td>
<td>7.2 mm long</td>
<td>measurement side view including spurs(, 2 mm wide, yellow</td>
</tr>
<tr>
<td>Anther thecae</td>
<td>4 mm long</td>
<td>5 mm long</td>
</tr>
<tr>
<td>Spur</td>
<td>2.5 mm long, yellow</td>
<td>3 mm long, orange</td>
</tr>
<tr>
<td>Crest</td>
<td>Slightly longer than the anther lobes, c. 1 mm long, apex rounded</td>
<td>Absent</td>
</tr>
<tr>
<td>Ovary</td>
<td>Ellipsoid, 4 × 3 mm</td>
<td>Subglobose, 2 × 2.5 mm</td>
</tr>
</tbody>
</table>

Perennial herb. **Rhizome** ovoid, brownish externally, yellow internally, 5-8 × 3-4 cm, light fragrance, bitter taste. **Branches** usually occur in opposite sideways or stabbed into the ground, curved, bent up at the end to form a new shoot, new shoot is usually far apart from the primary rhizome, 9-12 cm long, 1.8-2.3 cm in diam., covered by triangular sheaths scales, young-branched rhizome whitish with pale yellow core, mature-branched rhizome more yellowish internally with occasionally produce short subbranched. **Root** consists of fibrous roots and tubers. **Tubers** narrowly ovoid, 3.0-4.5 cm long, 1.0-2.0 cm in diam., and positioned about 6-8 cm from the rhizome. **Leafy shoot** 90-130( cm tall. **Sheathing bracts** 1-2, up to 30 cm long, green, or brownish green, apex mucronate, pubescent. **Leaf-sheaths** 4-(6-7, 40-55 cm long, distichous, green, or brownish green, pubescent; **ligule** bilobed, 5-6 mm long, green, apex rounded, ciliolate; **petiole** green, canaliculate, 12.5-30 cm long, pubescent. **Lamina** broadly elliptic, 40-66 × 16-20 cm the first leaf usually shortest, apex acuminate, base attenuate, margin entire with translucent white hyaline; adaxially green, short hairs along the embossed veins; midrib green; abaxially paler green, glabrous. **Inflorescence** spike, cylindrical, terminal, emerge through lateral slits of the pseudostem, 15-20 cm above ground; **spike** 15-25 cm long, 9-10 cm in diam.; **peduncle** 20-25 cm long, 1.4-1.6 cm in diam., greenish, paler at base, pubescent. **Coma** 5-9, broadly obovate, 4.6-5.0 × 3.0-3.7 cm, apex acute slightly mucronate, ruby at distal half and greenish white to the base, pubescent on both surfaces. **Fertile bracts** 28-35 per spike, broadly obovate, 4.5-5 × 3.3-3.7 cm, lower bracts apex rounded to truncate, upper bracts apex acute, ruby at distal part and pale green to the base, pubescent on both surfaces and margin hairy, bracts fused about half of the length. **Bracteoles** obovate, one per flower, keeled, 3.0-3.8 cm long, semi-translucent pale yellow, apex acute, hooded, with slightly mucronate tip 0.8 mm long, pubescent. **Flower** yellow, 5.5-5.6 cm, closed form. **Staminodes** were covered by dorsal corolla lobe, Cincinnati 3-5 flowers. **Calyx** tubular c. 10 mm long, apex trilobed, each lobe apex truncated with unilateral...
incision up to 3 mm long, white, translucent, pubescent. *Floral tube* tubular and enlarged to conical at distal part, 4 cm long, yellow, pubescent; *dorsal corolla lobe* 1, triangular-ovate, 16-17 x 10-11 mm, apex mucronate, ciliate, reddish gradually yellowish at the base, sparsely hairy; *lateral corolla lobes* 2, triangular-ovate, 16-17 x 10-11 mm, apex obtuse, ciliate, yellow with reddish tinge, sparsely hairy. *Lateral staminodes* 2, uniquely asymmetric obovate, 14-15 x 9-10 mm, apex rounded, yellow. *Labellum* orbicular, 15-16 x 16-17 mm, slightly tri-lobed, mid lobe with apex shortly emarginate with an incision 2 mm long, yellow. *Stamen* 1; filament flat 4.5-5.0 mm long and 3.5 mm wide at the base, sparsely hairy. *Anther* 7.2 mm long including spurs, 2 mm wide, yellow, pubescent; *spurs* conical, 2.5 mm long, yellow, pointing downwards; *crest* slightly longer than the anther lobes, 0.5 mm long, apex rounded, slightly darker yellow. *Stigma* conical, whitish, glabrous, ostiole ciliolate. *Epigynous glands* 2, 4 mm long, apex blunt, yellow. *Ovary* ellipsoid, 4 x 3 mm, yellowish-white, pubescent, hairs 0.8-1 mm long; *ovule* axile placentation. Fruit and seeds are not seen.

**Vernacular name:** Khamin Ajarn Sauce where Khamin refers to plants in the genus *Curcuma*, Ajarn means teacher or educator In Thai. It's also used as a respectful prefix before a person's name to acknowledge their expertise or knowledge in a field, and Sauce is named after the nickname of Prof. Dr. Surapon Saensouk.

This species also known as *Wan Krabi Thong*, is found in the oldest recorded instance available, dating back to 1963 in the book *The sacred and magical properties of Wan* written by Hawiithee (1963), where *wan* is a term used by Thai sacred plant collectors to refer to plants that are popularly cultivated for medicinal purposes as medicinal herbs and including rituals and other socio-religious practices. These plants are believed to have the power to make humans invincible and bring good fortune, fascination, or popularity to those who cultivate them. Each species has specific details regarding the date, time, and spells incorporated into the planting method, which vary according to the specific beliefs passed down from generation to generation or found in old textbooks about wan. Some practitioners believe that bringing flowers or any part of the plant with them enhances enchantment, often by soaking the flowers in sandalwood oil (Hawiithee 1963; Gunhakjanaja 1970). While krabi means sabur, thong means golden referring to its inflorescence resembling the sabur, and its yellow rhizome internal colour which Thais usually compare the yellow shade to gold. Furthermore, in addition to the short description and its usage, an alternate synonymous name, "Wan Nang Wanthong Haam Thap", was also documented (Hawiithee 1963). It was subsequently mentioned in a record by Gunhakjanaja (1970). The name "Nang Wanthong Haam Thap" lacks an explained origin for its meaning. However, "Nang Wanthong" holds significance as a prominent character in the Thai literary work "Khun Chang Khun Phaen." Additionally, the term 'Haam Thap' pertains to the act of ceasing hostilities between two opposing forces. While in horticulture, this species is known as "Ribbon Curcuma" (Wannakairoj 1996).

**Etymology:** The specific epithet name *suraponii* is named in honor of Prof. Dr. Surapon Saensouk, a botanist at Walai Rukhavej Botanical Research Institute, Mahasarakham University, who has been working on Thai Zingiberaceae for over 20 years, and Congratulations on his appointment as a "Professor" in botany in 2023! His guidance and support have been invaluable throughout the author's journey in botany, serving as a constant source of inspiration and shaping the author's growth and understanding in this field.

**Distribution:** It occurs within the natural forest habitat of Tak Province, Northern Thailand.

**Ecology:** It is found in mixed deciduous and dry evergreen forests with rich humus soil at elevations of 570-800 m above sea level, where *Kaempferia taksensis* Boonma & Saensouk is also found in nearby areas.

**Phenology:** Flowering in late June to August; flowers fully open in the early morning about 6.30-8.00 am., anthesis time in the morning about 7.30-10.00 am., and last a single day. Leafy shoot emerges in late April and dormancy begins in November. Fruit and seed not seen.

**Utilization:** Young inflorescences are commonly consumed either fresh or boiled, often served alongside chili paste for a flavorful meal. Fresh rhizome is used medicinally by chewing or taking it in the mouth to alleviate conditions, such as sore throat, chapped tongue, canker sores, mouth ulcers, throat, and nasal ulcers, and to aid in the healing of diphtheria. Pound fresh rhizomes thoroughly, mix with white wine or lime water, then filter and drink only water to help relieve stomach pain (Hawiithee 1963; Gunhakjanaja 1970). Rub fresh rhizome against a grinding stone and then mixed with lime water, the resulting mixture is applied to the abscess, whether in the mouth or nose, to help neutralize the inflammatory toxins and facilitate the collapse of the abscess.

The utilization of this plant in rituals and beliefs is used to help enhance invincibility for the owner, to solve or remove magic from enemies, and to prevent danger. Additionally, it was employed for soaking weapons before going into battle, believed to aid in annihilating the enemy's invulnerability (Phayakorn and Kosi 1979; Khanatham 2016).

**Conservation status:** The new species was recently discovered in 2021, and there is still a lack of sufficient information about its distribution range in nearby areas, including the neighboring country of Myanmar. Therefore, the author considering ranking this species in the Data Deficient (DD) category, following the IUCN (2022) criteria. In addition to describing a new species, I have examined various specimens of the most similar species, *Curcuma rubrobracteata* Škorničková, Sabu & Prasanth., which I gathered and organized alphabetically by the country name of the additional specimens that were examined as follows:

**Bangladesh:** Chittagong, Rangamati District, Rampahar, Baluchhara, 6 September 1999, Newman M.F. & Rahman M.A. 984 (E).

**India:** Mizoram, Lawngtlai District, on the way to Ngengpui Wildlife Sanctuary-Khomi, 10 September 2002,
Chinese Academy of Sciences.

The morphological comparison of different characters between Curcuma suraponii Boonma sp. nov. and C. rubrobracteata Skorníčková, Sabu & Prasanth is presented in Table 1.

The subgenus Curcuma, within the genus Curcuma, is distinguished by the presence of epigynous glands in its flowers, mostly produces cylindrical inflorescences, typically features well-developed coma, and mostly has a bell-shaped and closed form a flower. The global diversity within this subgenus comprises more than 70 known species (Leong-Škorníčková et al. 2015), while the species diversity of accepted species within Curcuma subgen. Curcuma in Thailand, when counted with a new species, C. suraponii, totals 29 species distributed throughout the country. A revised key for identifying Curcuma subgen. Curcuma in Thailand has been prepared to facilitate the identification of this new species, as follows:

Key to 29 species of Curcuma subgenus Curcuma in Thailand

1a. Rhizome without branches.................................................. 2
1b. Rhizome with well-developed branches.................................. 4
2a. Produces both terminal and lateral inflorescence
2b. Produces only terminal inflorescence.................................. 3
3a. Sheaths glabrous; leaf abaxially surface pubescent................. C. plicata
3b. Sheaths pubescent; leaf abaxially surface pubescent or glabrescent.................................................. C. attenuata
4a. Produces lateral inflorescence............................................. 5
4b. Produces terminal inflorescence......................................... 16
5a. Lamina pubescent on the abaxial surface.............................. 6
5b. Lamina glabrous on the abaxial surface................................ 10
6a. Midrib of leaf green.............................................................. 7
6b. Midrib of leaf red or reddish-purple.................................... 8
7a. Rhizome yellow; lamina broadly lanceolate......................... C. aromatica
7b. Rhizome pale yellow; lamina oblong................................. C. elata
8a. Bracts glabrous................................................................. C. zedoaroides
8b. Bracts pubescent............................................................... 9
9a. Spike almost globular less than 10 cm long; peduncle short, embedded in the ground................................. C. globifera
9b. Spike cylindrical more than 10 cm long; peduncle long, erect above the ground................................. C. latiffolia
10a. Petioles and leaf sheaths reddish brown ochraceous............. C. rubescens
10b. Petioles and leaf sheaths green.......................................... 11
11a. Midrib of leaf green........................................................... 12
11b. Midrib of leaf red or reddish-purple.................................. 14
12a. Fertile bracts pale pink; rhizome pale ochraceous.. C. comosa
12b. Fertile bracts green; rhizome white to pale yellow................ 13
13a. Bracts glabrous............................................................... C. leucorrhiza
13b. Bracts pubescent............................................................ 14
14a. Rhizome aequalinous green............................................... C. aequalinus
14b. Rhizome yellow or orange................................................. 15
15a. Corolla lobes nearly white or with a very pale pink tinge; rhizome pale straw internally......................... C. pica
In conclusion, a newly discovered species, Curcuma suraponii Boonma, is categorized within the Curcuma subgen. Curcuma due to the presence of epigynous glands, well-developed coma, closed bell-shaped flowers, and fertile bracts that are fused for about half of their length. Superficially, Curcuma suraponii might bear a resemblance to Curcuma rubrobracteata, as they both produce the inflorescence that emerges through the lateral slits of the pseudostem, and they both have flowers with calcareous anthers. However, their differences can be readily distinguished. Curcuma suraponii has non-creeping branched rhizomes, which are internally yellow. In contrast, Curcuma rubrobracteata possesses creeping rhizomes that are internally whitish yellow. Furthermore, Curcuma suraponii exhibits coma bracts, unlike Curcuma rubrobracteata, which lacks coma bracts. The fertile bracts of Curcuma suraponii are ruby pink at the distal part, with pale green reaching the base. This is different from Curcuma rubrobracteata, whose bracts are bright red and extend almost down to the yellow base.

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