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Curcuma princeps (Zingiberaceae), A New Species from Southwestern Thailand

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ABSTRACT.– *Curcuma princeps*, a new species from the *Curcuma* subgen. *Curcuma* (Zingiberaceae: Zingiberoideae) from southwestern Thailand is described and illustrated. For the diagnostic purpose it is compared to the morphologically closest species *Curcuma petiolata*. Detailed description based on living flowering material, colour plates, notes on the distribution, habitat and phenology are provided. The provisional IUCN conservation status is proposed as Endangered for this species, based on the IUCN guidelines and criteria.

KEYWORDS: *Curcuma petiolata*, Kanchanaburi, Sangkhla Buri, subgenus *Curcuma*, Zingiberoideae

INTRODUCTION

Curcuma L. (Zingiberaceae: Zingiberoideae), with more than 150 currently accepted species, is one of the largest genera in the family (Soonthornkalump et al., 2022). It is widely distributed in monsoonal region of South and Southeast Asia and South China, with a few species extending to Northern Australia and the South Pacific archipelago (Záveská et al., 2012). According to the Flora of Thailand (Leong-Škorničková and Saensouk, 2023), 61 species representing all three subgenera (subgen. *Curcuma*, subgen. *Hitcheniopsis* (Baker) K.Schum. and subgen. *Ecomatae* Škorničk. & Šída f.) occur in Thailand, which is considered to be the centre of *Curcuma* diversity. Between 2020–2024, 17 additional species were described (e.g. Leong-Škorničková et al., 2020, 2021; Maknoi et al., 2019; Soonthornkalump et al., 2020, 2021), of which seven were published too late to be included in the Flora of Thailand (Leong-Škorničková et al., 2022, 2023; Rakarcha et al., 2024; Ruchisansakun & Jenjittikul, 2023; Soonthornkalump et al., 2022; Soonthornkalump, 2024). As a result, the total number of *Curcuma* species currently recorded in Thailand stands at 68, all of which are taxonomically good species. The introduction about the genus and its subgenera was given in our recent works (Leong-Škorničková et al., 2015, 2020, 2021) and is therefore not repeated here.

In continuation of our work on *Curcuma* in Thailand, we describe and illustrate here *Curcuma princeps,* a new species from Kanchanaburi province, southwestern Thailand. The presence of coma bracts, gullet type of the flower (as per Leong-Škorničková & Newman, 2015) and spurred anther place this species into subgenus *Curcuma*. Although *C. princeps* somewhat resembles *C. petiolata* Roxb., a species originally described from Pegu in Myanmar (Roxburgh, 1832: 37), it significantly differs in inflorescence size, and rhizome with long creeping branches, as elaborated in the diagnosis.

MATERIALS AND METHODS

The description is based on living flowering material of multiple plants from field survey at the type locality, including plants pressed into type specimens and flowers preserved in FAAII (Ruzin, 1999). The description style and level of the detail follows our recent works (e.g. Leong-Škorničková et al., 2021; Soonthornkalump et al., 2021; 2022). The general terminology follows Beentje (2016). All extant herbarium material of *Curcuma* were examined at AAU, BK, BKF, BM, CMU, E, K, L, P, PSU, QBG and SING. The preliminary conservation assessment is based on the most recent version of the guidelines of the IUCN Standards and Petition Subcommittee (IUCN, 2024). The Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated by Geocat (Bachman et al., 2011), but the exact GPS locations are not provided here as a conservation measure to prevent overharvesting from wild. *In vitro* culture of this species has been already established at Kasetsart University Chalermphrakiat Sakon Nakhon Province

Campus to saturate the potential horticultural demand and conservation for this species after it is published.

RESULTS

Taxonomic treatment

Family Zingiberaceae Martinov
Genus *Curcuma* L.
Subgenus *Curcuma* L.

***Curcuma princeps* Soonthornk. & Škorničk. sp. nov.**
urn:lsid:ipni.org:names:77364757-1
(Figs 1, 2)

Diagnosis.– Similar to *Curcuma petiolata* Roxb. in colour and shape of the flowers, but differs by the size of the main rhizome 2–3.5 × 2–3 cm and lateral branches long, slender and horizontally creeping, up to 0.5–1.1 cm in diam. (vs main rhizome 5–8 × 3–5 cm, lateral branches short, 1.5–2 cm in diam., arranged in palmate pattern and usually pointing upwards), lamina 17–31.5 × 10–16 cm, adaxially glabrous, abaxially densely puberulous (vs lamina 25–45 × 12–23 cm, glabrous on both sides or with a few hairs along secondary veins), thyrse not longer than 12 cm, composed of 12–15 fertile bracts and 4–5 coma bracts (vs thyrse 13–30 × 6–8 cm, composed of 20–50 fertile bracts and 5–10 coma bracts), cincinnus 1–4 flowers (vs cincinnus of 3–6 flowers) (Table 1).

Type.– **THAILAND:** Kanchanaburi Province, alt. approx. 150 m, Sangkhla Buri District, Nong Lu Subdistrict, Ban Huai Malai, *Sutt-219,* 13 July 2020 (holotype BKF!, including flowers preserved in spirit as part of a single specimen; isotypes SING!; QBG!, both types including flowers preserved in spirit as part of a single specimen).

Description.– Rhizomatous perennial herb up to 80 cm tall. Rhizome branched, 2–3.5 × 2–3 cm, globose, ovoid to pear-shaped, lateral branches creeping, 4.5–25 cm long, 0.5–1.1 cm in diam., light brown to brown externally, covered with rusty-coloured and decayed scales, cream to pale yellow internally, aromatic, very bitter with a weak pungent taste; root tubers 1.8–2.8 × 1.2–1.7 cm, ovate to fusiform, light brown externally, cream to pale yellow internally. Leafy shoot with 4–5 leaves when flowering; pseudostem 10.5–14 cm long, composed of leaf sheaths which soon disengage; bladeless sheaths 2 or 3, decayed at anthesis, leaf sheaths abaxially plain green with brownish red to pinkish red tinge, hyaline margin ca. 2 mm wide, puberulous; ligule to 3 mm long, obliquely bilobed, greenish white, semitranslucent, turning papery with age, sparsely ciliate at margin (cilia ca. 0.5 mm); petiole 12–35.5 cm long, canaliculate, plain green with more or less dense brownish red to pinkish red tinge extending from base of leaf sheath to the base of the lamina, adaxially glabrous, abaxially puberulent; lamina 17–31.5 × 10–16 cm, elliptic to broadly elliptic, prominently plicate, adaxially dark green, shiny, puberulous along the raised veins, abaxially somewhat paler, densely puberulous, midrib green often with abaxially narrow brownish red to pinkish red patch on the mid-rib basally which may or may not protrude to the upper side, running up to the middle of the entire length of the lamina, base round to obtuse, sometimes oblique, apex acuminate, margin hyaline, semitranslucent white ca. 0.05 mm wide, glabrous. Inflorescence central, many flowered; peduncle basally obscured within pseudostem, exceeding it by 7.5–15 cm, 4–5 mm in diam., plain light green to greenish cream, glabrous; thyrse 9–12 cm long, 4–5 cm in diam. in the middle; coma bracts 4–5 per inflorescence, 3.5–4 × 2–3.5 mm (basal larger, uppermost smallest), elliptic to ovate, apex obtuse, subobtuse to rounded, slightly hooded, bright pink to magenta, adaxially sparsely shortly puberulous (hairs 0.1–0.15 mm long) abaxially densely puberulous; fertile bracts 12–15 per inflorescence, 3–4 × 2.5–4 cm, obovate to elliptic-obovate, apex rounded to truncate, reflexed distally, light to pale green at base, turning cream distally with bright pink to magenta margin, uppermost bracts are usually larger, puberulous on both sides, connate in the lower 3/4 to 1/4; cincinni up to 4 flowers at the base of the inflorescence (2–3 of the lowermost bracts sterile), 1 or 2 flowers at the top, the flowers in the uppermost fertile bracts often underdeveloped or aborted and covered with developed bracteoles; bracteoles one per flower, 9–12 × 3.5–7 mm (outer ones larger, inner ones gradually smaller), elliptic to triangular, boat shaped with wide base, apex obtuse, sometimes emarginate, hyaline, semitranslucent white, almost glabrous, with very a few sparsely stipitate hair at apex. Flowers 4.5–5 cm long, slightly exserted from the bracts; calyx 6–7 mm long, 3-toothed, with unilateral incision 0.8–1 mm, semitranslucent white, glabrous excepted a few stipitate hair at margin ca 0.1 mm long; floral tube 2.7–3.2 cm long, narrowly cylindrical at base for 1.7–2 cm above the ovary, narrowly funnel-shaped distally, externally white, glabrous, internally white, glabrous at basal part, with ring of dense bright yellow hair positioned 1.4–1.7 cm from the base, funnel-shaped part puberulent, groove holding the style positioned dorsally from the base up to the constricted area; dorsal corolla lobe 15–16 × 10–14 mm (when flattened), broadly triangular ovate concave, hooded with promi-

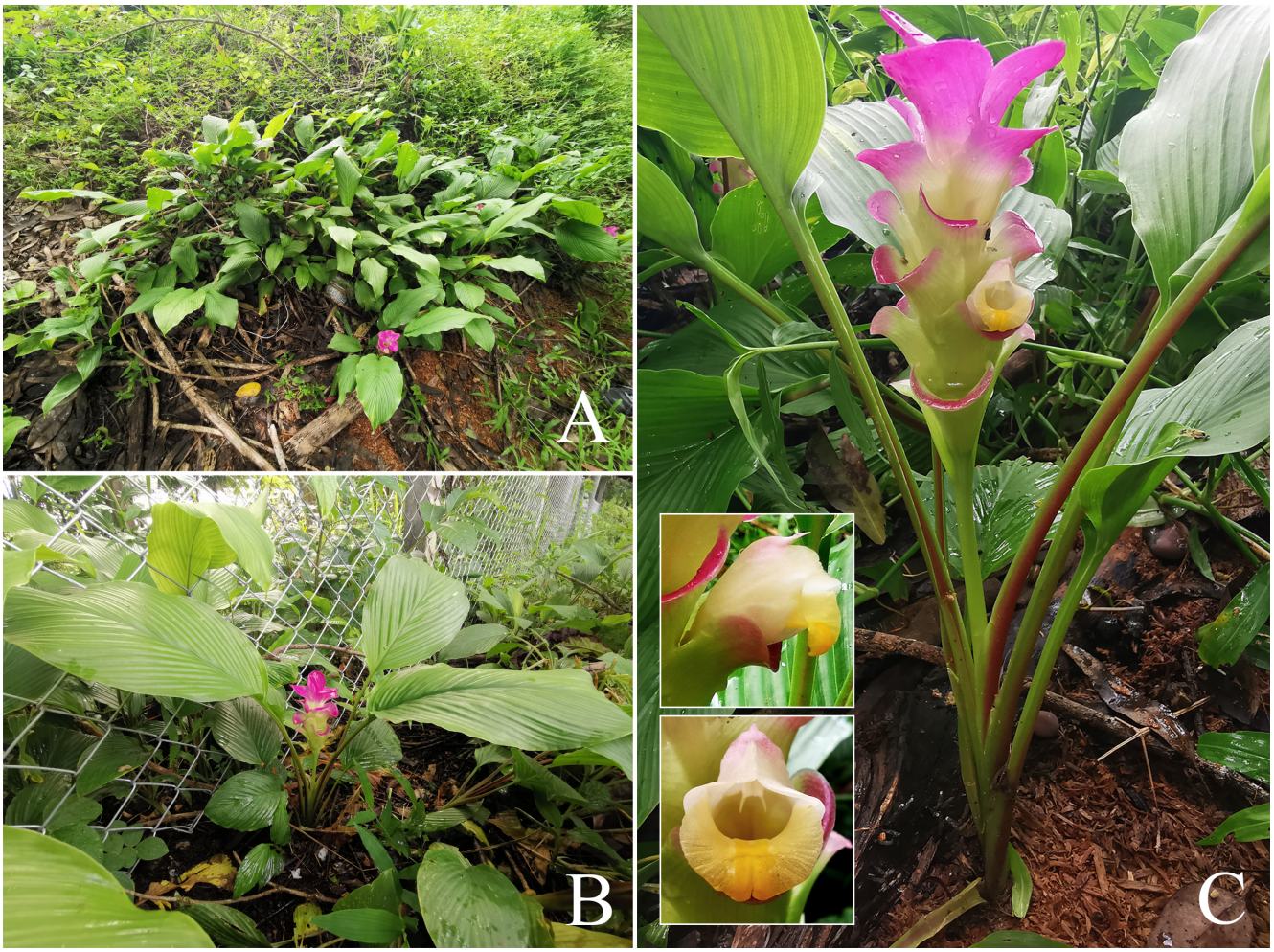


FIGURE 1. *Curcuma princeps* Soonthornk. & Škorničk. **A.** Natural population in habitat at type locality; **B.** Inflorescence with flower in natural habitat by roadside; **C.** Individual plant with inflorescence in habitat (inset: flower from side (upper) and front view (lower)). Photographed by Tidarat Puangpairote.

nently mucronate apex (mucro 3–4 mm long, glabrous with very a few sparse stipitate hair ca. 0.1 mm long), cream white at base, with rich reddish tinge distally, glabrous, margin hyaline; lateral corolla lobes 15–16 × 10–14 mm at base (when flattened), broadly triangular ovate with obtuse apex, strongly reflexing soon after anthesis, cream white sometimes with pale pinkish tinge distally, semitranslucent, glabrous, margin hyaline; androecial tube ca. 4 mm, labellum 14–15 mm long (18–19 mm long with portion of androecial tube attached, as in Fig. 2D), 16–19 mm wide, broadly obovate, obscurely trilobed, apex pointing downwards, with an incision 2–3 mm long, sides folding upwards, white to cream white with bright yellow median composed of swollen central lines extending from the apex of the labellum to about 1/2 towards the base, glabrous throughout except with sparse glandular hair at the median band through the hairy ring in floral tube; lateral staminodes 11–14 mm long (15–18 mm long with portion of androecial tube attached, as in Fig. 2D), 6–9 mm at widest point, obliquely obovate with apex rounded to bluntly truncate, white cream to yellowish cream, glabrous on both sides excepted sparse glandular hairs at midrib; stamen ca. 5–6 mm long (9–10 mm long with portion of androecial tube attached, as in Fig. 2C); filament flattened, widest at base, 2–3 mm long (6–7 mm long with portion of androecial tube attached, as in Fig. 2C) × 5–6 mm wide (but only ca. 1 mm wide at the point of attachment), white, glabrous; anther spurred, 6.5–7 mm long, connective tissue white, glabrous, anther spurs conical pointing straight downward slightly curved forward 1.5–2 mm long, cream white, glabrous in both sides except some glandular hair (ca. 0.1 mm long) adaxially, anther crest absent; anther thecae dehiscing along their entire length, ca. 4 mm long, pollen white; epigynous glands two, ca. 3 mm long, 0.7–0.85 mm in diam., cylindrical with blunted apex, yellowish cream; style white, glabrous; stigma ca. 1 × 1 mm wide, capitate, white; ostiole with irregularly serrulate margin, facing

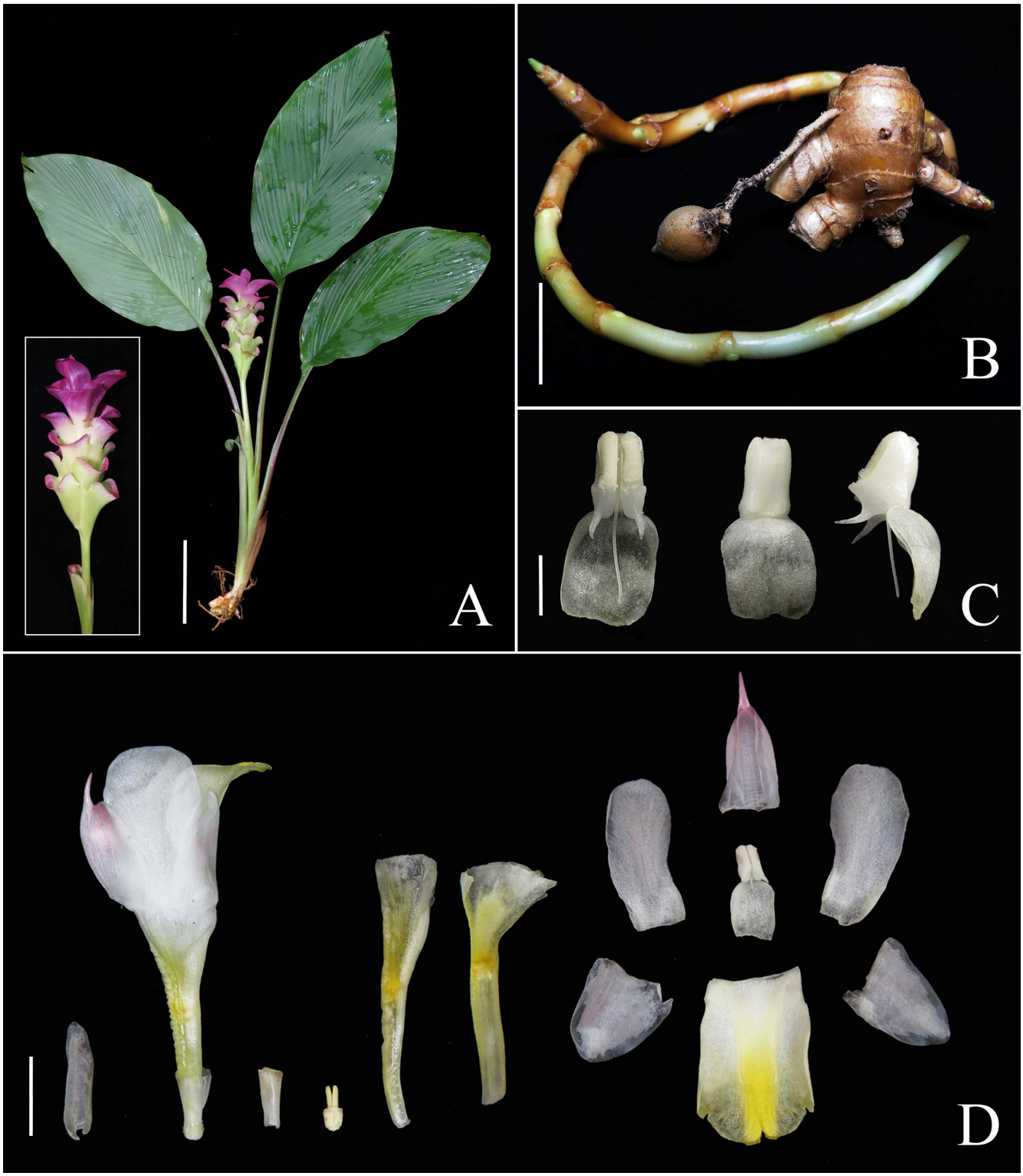


FIGURE 2. *Curcuma princeps* Soonthornk. & Škorničk. **A.** Plant habit (inset: close up of an inflorescence); **B.** Rhizome with slender lateral branch; **C.** Detail of stamen from front, back and side views; the base of filament includes 4 mm of androecial tube; **D.** Flower dissection, from left: bracteole, flower, calyx, ovary with epigynous glands attached, floral tube (longitudinally dissected), lateral staminodes with dorsal lobe in between (upper part), lateral lobes with labellum in between (lower part) and stamen in the centre. Basal part of labellum, staminodes and filament include ca. 4 mm of androecial tube. Scale bars: **A** = 10 cm, **B** = 2 cm, **C** = 3 mm, **D** = 1 cm. All from type. Photographed by Sutthinut Soonthornkalump.

TABLE 1. Distinguishing characters of *Curcuma princeps* Soonthornk. & Škorničk. and *Curcuma petiolata* Roxb.

Characters	*Curcuma princeps* Soonthornk. & Škorničk. sp. nov.	*Curcuma petiolata* Roxb.
Main rhizome	globose, ovoid to pear-shaped rhizome 2–3.5 × 2–3 cm, internally cream to pale yellow	ovoid 3–5 × 5–8 cm, internally light yelow to yellow
Rhizome branch	slender and horizontally long creeping, up to 0.5–1.1 cm in diam.	short, arranged in palmate pattern and usually pointing upwards, 1.5–2 cm in diam.
Leafy shoot	up to 80 cm tall, with 4–5 leaves	up to 120 cm tall, with 3–7 leaves
Lamina	17–31.5 × 10–16 cm, adaxially puberulous along the raised veins, abaxially somewhat paler, densely puberulous	25–45 × 12–23 cm, glabrous on both side, sometimes with a few hairs along secondary veins
Thyrse	9–12 × 4–5 cm, composed of 16–20 bracts	13–30 × 6–8 cm, composed of 25–60 bracts
cincinnus	1–4 flowers	3–6 flowers

forwards; ovary ca. 3 × 2.5 mm, ovoid, trilocular, cream white, pubescent. Fruits and seeds not seen.

Vernacular name.– Krachiao Chompu Sirhindhorn (กระเจียวชมพูสิรินธร) or princess curcuma. The name is bestowed in tribute to Her Royal Highness Princess Maha Chakri Sirindhorn.

Etymology.– From Latin *princeps* = princess.

Distribution.– Thailand. Kanchanaburi province, Sangkhla Buri district. Given the close proximity to the border with Myanmar, it is expected that the species also occur there.

Ecology.– This species grows in partially shaded areas, and along edge of evergreen forest, and scrub forest along the roadside at elevation 150–180 m.

Phenology.– Flowering starts in the rainy season and lasts from June–July, plants enter dormancy in December.

Utilization.– No uses were reported, except occasional sale as an ornamental in local markets. The species has a good potential for horticultural trade.

IUCN Conservation Status.– *Curcuma princeps* is endemic to Thailand and currently known only from Sangkhla Buri District, Nong Lu Subdistrict. During the field survey we have seen and photographed five sub populations from five locations, with number of mature individuals ranging from 30–100 plants, with total number not exceeding 400 plants. From the GPS data of the fragmented five subpopulations, the EOO was calculated as 1.263 km^2 and AOO 16 km^2. The main threats to this species include excessive collection from its natural habitat for horticultural purposes and trade. Additionally, all known locations are situated in unprotected areas, which are vulnerable to conversion into oil palm and rubber tree plantations. These habitats are also highly fragmented, which further compromises the integrity and long-term viability of the species' habitat. This conversion could occur at any time. Therefore, we propose classifying the species with a provisional status of Endangered (EN B1a,b (I,iii)), until adjacent areas are better surveyed with results, which would warrant relaxing this status. *Curcuma princeps* has been successfully established in a plant tissue culture system for conservation purposes and has demonstrated superior ease of cultivation for horticultural use at the Faculty of Natural Resources and Agro-Industry, Kasetsart University Chalermphrakiat Sakon Nakhon Province Campus.

DISCUSSION

Although this species is superficially somewhat similar to *Curcuma petiolata*, there are significant differences as outlined in the diagnosis. The long creeping lateral rhizome, smaller inflorescence, and in particular rather low number of inflorescence bracts, *Curcuma princeps* is not confusable with *C. petiolata* in living or dry herbarium material. No collection that could be identified as *C. princeps* was found during our revision of existing herbarium material of *Curcuma* collected from Thailand in AAU, BK, BKF, BM, CMU, E, K, L, P, PSU, QBG and SING.

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